

CARE

User Guide



CARE

V 10.08.01

USER GUIDE

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BASICS

CENTRALINE DEVICE LIST

INTRODUCTION

CARE CONCEPTS

GETTING STARTED

CARE ENVIRONMENT

QUICK TOURS

CENTRALINE DEVICE LIST

This user guide originally refers to different target audiences, CentralLine and Honeywell. In most of the functional descriptions and screenshots, the Honeywell product names are shown and used, whereas in the CARE software, the Honeywell product names are replaced with the selectable CentralLine product names. If a product name is not explicitly mentioned as CentralLine product name, please refer to the following cross-reference table when using CentralLine products and applying CARE functions that are described in this user guide using Honeywell product names.

Device	Name in Honeywell CARE (or in Demo Mode for this CARE)	Name in CentralLine System Integrator CARE or in Demo Mode for this CARE)	Name in CentralLine Partner CARE or in Demo Mode for this CARE)
XL800 CPU	XL800	LION	LION
XL50 CPU	XL50	XL50/PANTHER	PANTHER
XL80 CPU	XL80	XL80	Not visible
XL100 CPU	XL100	XL100	Not visible
XL500 CPU	XL500	XL500/TIGER	TIGER
XL600 CPU	XL600	XL600	Not visible
XL500 Smart CPU	XL Smart	XL Smart	Not visible
Excel Web	Excel Web	Falcon	Not visible
Eagle	Excel Web2	EAGLE	EAGLE
Analog Input (LON)	XFL821A	CLIOL821A	CLIOL821A
Analog Output (LON)	XFL822A	CLIOL822A	CLIOL822A
Analog Output (LON, with manual override)	XFLR822A	CLIOLR822A	CLIOLR822A
Binary Input (LON)	XFL823A	CLIOL823A	CLIOL823A
Relay output (LON)	XFL824A	CLIOL824A	CLIOL824A
Relay output (LON, with manual overrides)	XFLR824A	CLIOLR824A	CLIOLR824A
Analog Input (Panel Bus)	XF821A	CLIOP821A	CLIOP821A
Analog Output (Panel Bus)	XF822A	CLIOP822A	CLIOP822A
Analog Output (Panel Bus, with manual override)	XFR822A	CLIOPR822A	CLIOPR822A
Binary Input (Panel Bus)	XF823A	CLIOP823A	CLIOP823A
Relay Output (Panel Bus)	XF824A	CLIOP824A	CLIOP824A
Relay Output (Panel Bus, with manual override)	XFR824A	CLIOPR824A	CLIOPR824A
Floating Actuator (Panel Bus, with manual override)	XFR825A	CLIOPR825A	CLIOPR825A
Analog inputs, analog outputs, binary inputs, and relay outputs (Panel Bus)	XF830A	CLIOPR830A	CLIOPR830A
ELink, XLink, OLink, OPS	ELink, XLink, OLink, OPS	ELink, XLink, OLink, OPS	Not visible

When the "TIGER" controller is selected, special provisions like manual point assignment have to be taken for the engineering of his controller. Please, refer to the TIGER user guide.

INTRODUCTION

Applicable Literature

Form No.	Title
EN1Z-0964GE51	CARE Installation Guide
74-3556 (US) EN2B-0183GE51 (Europe)	Excel Live CARE User Guide Instructions for using Live CARE software to access controller files on-line and simulate operation
EN2Z-0940GE51	Excel CARE Control Icons User Guide Descriptions and application examples of control icons used in the CARE control strategy
EN2B-162GE51	RACL Editor User Guide Graphical Editor for creation of strategy logic programs for Excel 800/500 controllers.
74-3594 (US) EN2B-185GE51 (Europe)	ASPECD Editor User Guide Provides functions to modify the user interface for Excel Operator Terminals
EN2Z-0962GE51	Falcon User Guide Comprehensive description of the BACnet functions and operation of the Falcon controller via Web interface
EN2Z-0970GE51	Eagle Web Interface User Guide Comprehensive description of the BACnet functions and operation of the EAGLE controller via Web interface
EN2Z-0971GE51	Eagle User Guide Comprehensive description of the Onboard HMI Eagle controller operation
EN2Z-0929GE51	CL-Touch User Guide Detailed instructions for using the CL-Touch panel unit
EN2B-0092GE51	Excel 50/100/500/600/800 Software Description Fundamentals of the Excel 5000 system
EN2B-1031GE02	Excel OpenLink Point Server User & Installation Guide
EN3B-1007	Excel OpenLink Point Server Flyer Server Flyer

CARE Features

CARE (Excel Computer Aided Regulation Engineering) software provides graphic tools to create downloadable control programs for EXCEL 5000[®] Controllers. The CARE process includes the development of:

- C-bus, LON-bus, and BACnet networks
- Schematics (does not apply to Excel Web controller and ELink controller)
- Control strategies
- Switching logics
- Point attributes
- Point mapping files (optional)
- Time programs
- Job documentation

Supported Controllers and Devices

- Excel 10 / 50 / 80 / 100 / 500 / 600 / 800
- Excel Smart Controller
- Falcon/Eagle Controller
- Excel Link (XLink) Controller
- Excel OLink/OPS Controller
- Excel IRC
- Excel ELink
- Standard I/O Modules
- Distributed I/O Modules
- Smart I/O Modules
- Panel I/O Modules (pluggable)
- Mixed I/O Modules (with panel bus communication)
- M7410G Linear Valve Actuator with LON capabilities and other Honeywell LON devices
- 3rd party LON devices
- 3rd party BACnet devices

Excel 10 Controllers

Excel 10 applications use an Excel 10 Zone Manager Controller (ELink Controller) as the interface between the EXCEL 5000 C-bus and an E-bus with Excel 10 Controllers. In addition to providing point mapping between the C-bus and the E-bus, the Excel 10 Zone Manager Controller has the functionality of an Excel 100, except that it has no physical points.

Excel 10 applications cover the Q7750A1xxx (1000-series) devices used with VAV 1 (Standard VAV) applications and the 2000-series including the Q7752A2xxx Zone Manager and its corresponding controllers such as VAV 2 and FCU.

CARE 10.08.01 can only be applied to the engineering of 2000-series applications. For these the process is partly done in CARE and completed within the E-Vision software tool.

The complete process is described in the Excel E-Vision User Guide 74-2588. The CARE steps are described in the Excel 10 Applications section in this User Guide.

Excel Link (XLink) Controller

Excel Link applications enable the connection of C-NAP bus controllers to an EXCEL 5000 C-bus. C-NAP bus controllers include Excel MicroCel, Excel MacroCel, Excel W7620, and Excel W7600.

The CARE process for Excel Link applications is similar to that for the Excel 800/500 controller. There are special considerations as well as additional software requirements for Excel Link applications.

Excel OLink/OPS Controller

The Excel OLink controller and its successor the Excel OPS (Open Point Server) controller can be engineered in CARE in the same way as a standard Excel 800/500 controller. External bus system information such as from M-bus will be integrated by simple point mapping between subsystem points and CARE datapoints.

CARE CONCEPTS

An HVAC control system is typically composed of controller(s) and plant(s). A controller can be any EXCEL 5000 controller. Plants are specified by their type such as Air conditioning, Chilled water and Hot water.

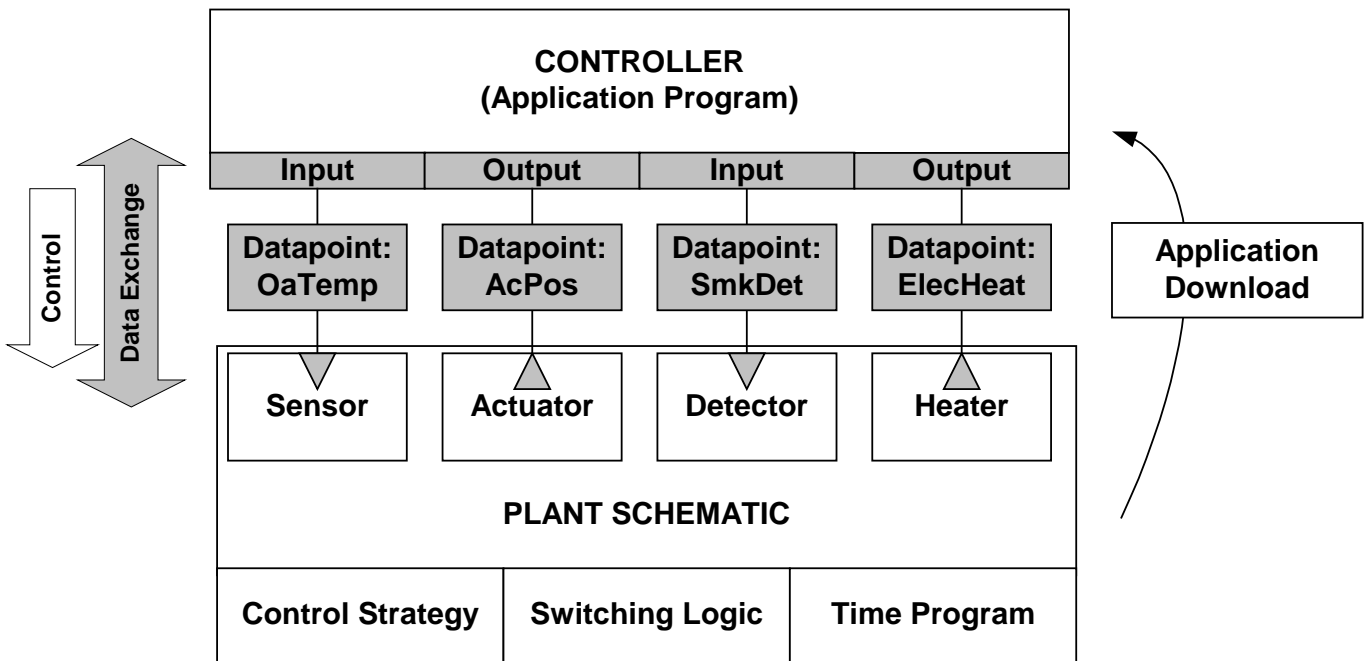
Physical Control System

A plant is a controlled mechanical system. For example, a plant can be an air handler, boiler, chiller, or MicroCel Variable Air Volume (VAV) system which is composed for example, of boilers, heaters, pumps, sensors, and other devices. Depending on the technical function, each device has its inputs, respectively its outputs.

The controller and the device are connected via their inputs/outputs. Depending on the used bus system, the devices are connected physically (C-Bus) or logically (LON-Bus, or BACnet-bus) to the controller. The plant is controlled by the application program (control strategy, switching logic, time program) running in the controller. For example, if the sensor gives a changed temperature value, the actuator drives the valve to the appropriate position to compensate the temperature deviation.

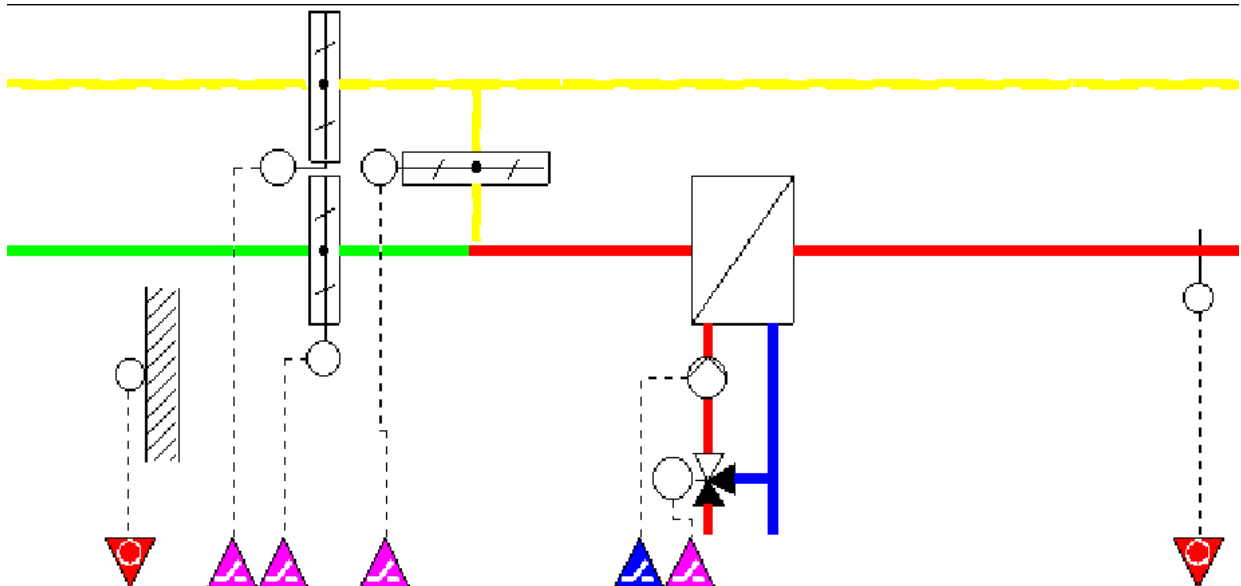
CARE Control System Model

The physical HVAC control system is realized in CARE by a "Controller - Datapoint - Plant schematic" model.



Controller The controller is provided by CARE with its controller specific features such as controller memory and datapoint capacity.

Plant Schematic The physical plant is represented by a schematic (not applicable to Excel Web controller and ELink controller), that shows the equipment in the plant and how it is arranged.



Datapoints

At the bottom of the schematic (CARE XL-5000 only), arrowheads represent the inputs/outputs of the equipment as datapoints. They are color-coded, directional (down is input; up is output), and marked with special symbols for additional information:

Color	Direction within triangle	Datapoint Type
Green	downward	Digital input or totalizer
Red	downward	Analog input
Blue	upward	Digital output
Violet	upward	Analog output
Light blue	upward	Flex point

Alternatively a plant schematic can be drawn without the component symbols and just displaying the datapoints as arrows.

CARE distinguishes between physical or hardware points which are related to physical inputs or outputs and software or pseudopoints. Software points can be created for processing calculation results of software programs.

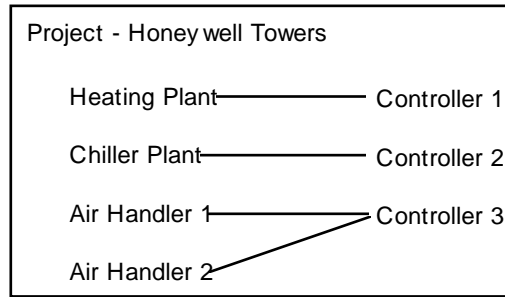
Datapoints are specified by certain properties, such as point type (analog input, digital output etc.), user address (OaTemp=outside air temperature) etc. Datapoints can be identified within the EXCEL 5000 system by their unique user address.

To control the equipment, a control strategy, a switching logic and/or a time program is added to the plant (see also CARE Main Applications section). For the control process through the application program in the controller, the datapoints represent links to provide data exchange between the controller and the plant. Data exchange through datapoints will be performed according to the attached logic functions.

Project

All relevant information of controllers and their attached plants are saved in a project.

Example of a project with four plants and three controllers:



In addition, general information such as reference number, client name, and order number are part of the project.

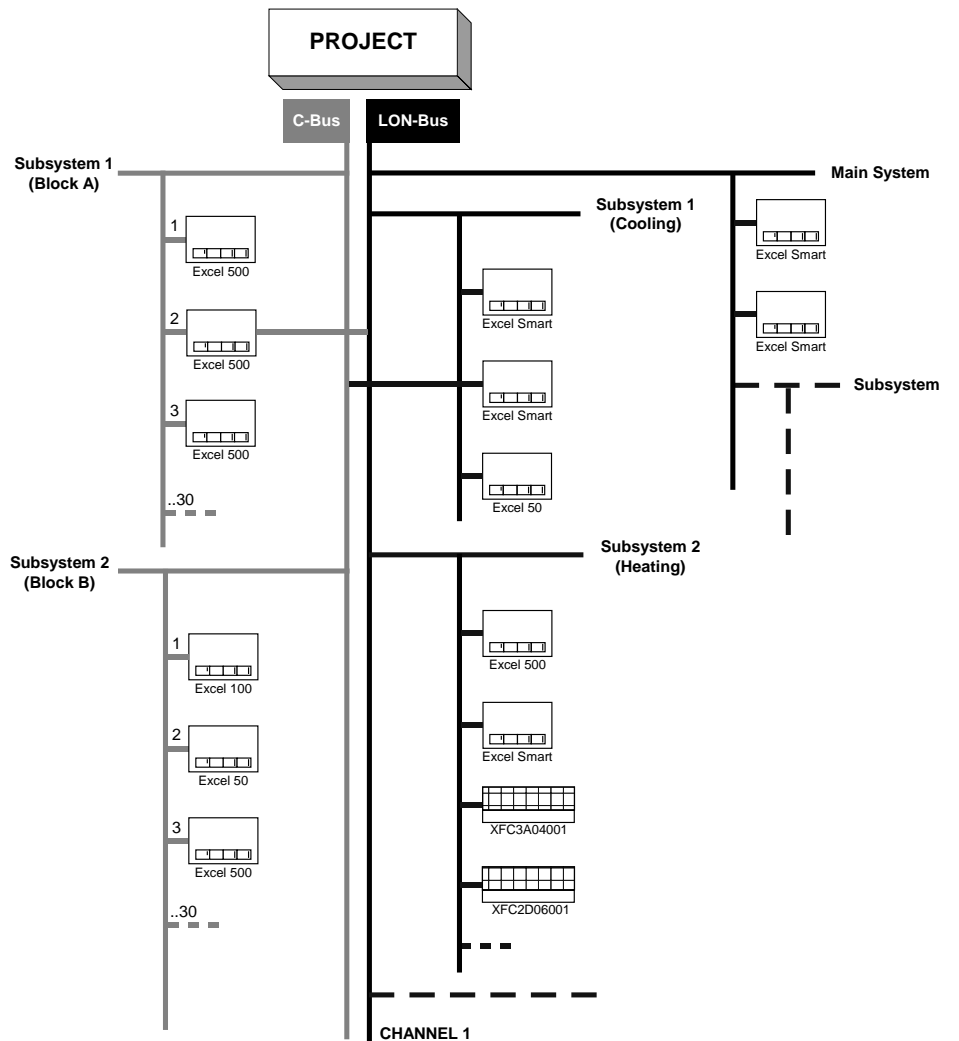
Bus Types

The controller and plant devices are attached to certain communications media (bus) and communicate with one another using a common communication protocol. CARE supports the proprietary Honeywell C-bus (local LON-bus), the open LON-bus (LonWorks), BACnet-bus and 3rd party bus systems such as Meter bus.

Network Architecture

In addition to the specified bus type, the physical arrangement of the devices attached to the bus can be represented as network architecture in CARE.

A project can cover multiple of different buses building up a network, for example, a network can include the C-Bus and the LON-Bus.



CARE Main Applications

CARE provides four main applications to create downloadable control programs:

- Plant Schematics (CARE XL-5000 only)
- Control Strategy
- Switching Logic
- Time Programs

Plant Schematic

The physical plant is represented by a schematic, that show the equipment in the plant and how it is arranged (CARE XL-5000 only).

Control Strategy

After the plant schematic has been created, a control strategy may be created that provides the controller with the intelligence to handle the system. Control strategy defines loops for decisions based on conditions, mathematical calculations, and/or time-of-day schedules. Control can depend on analog values, digital values, or both. CARE provides standard control algorithms such as Proportional-Integral-Derivative (PID), minimum value, maximum value, averaging, and sequencing.

Switching Logic

In addition to adding a control strategy, a switching logic can be added to a schematic for digital control such as switch status.

Switching logic is based on logic tables that set up logical ORs, logical ANDs, and exclusive ORs. For example, switching logic can be defined to have the return fan start after a programmed delay from the time that the supply fan was started.

Time Programs

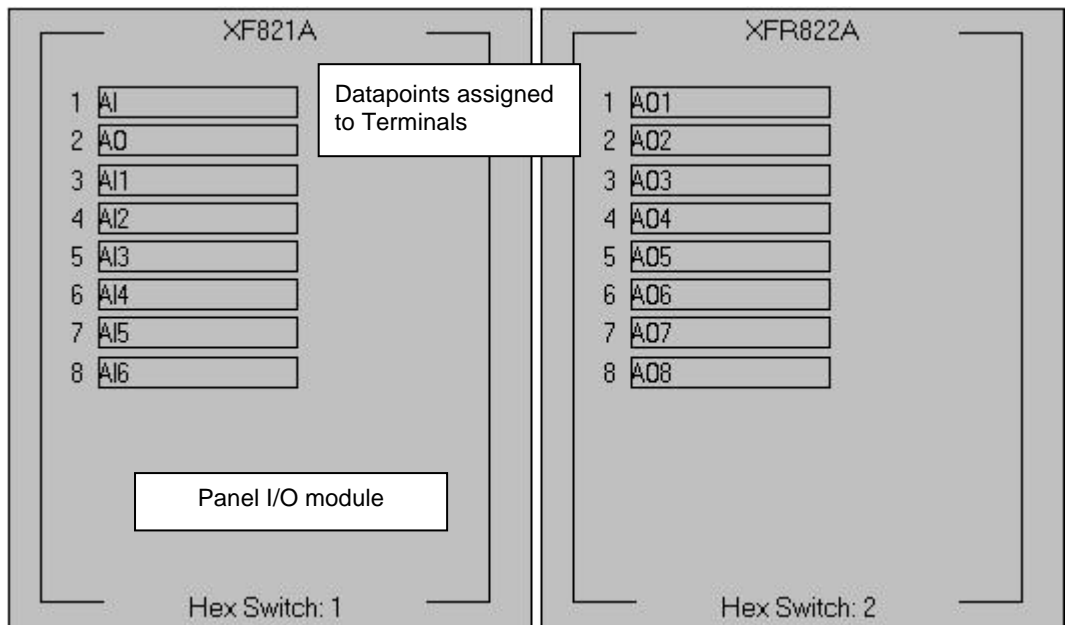
Time programs can be set up that control equipment on/off times to coincide with occupancy. Daily schedules (for example, weekdays, weekends, holidays) will be defined and assigned to weekly schedules.

Connecting Inputs/Outputs

Depending on the used hardware and bus type, CARE provides 2 methods to connect inputs/outputs between plant and controller.

Terminal Assignment (Panel Bus)

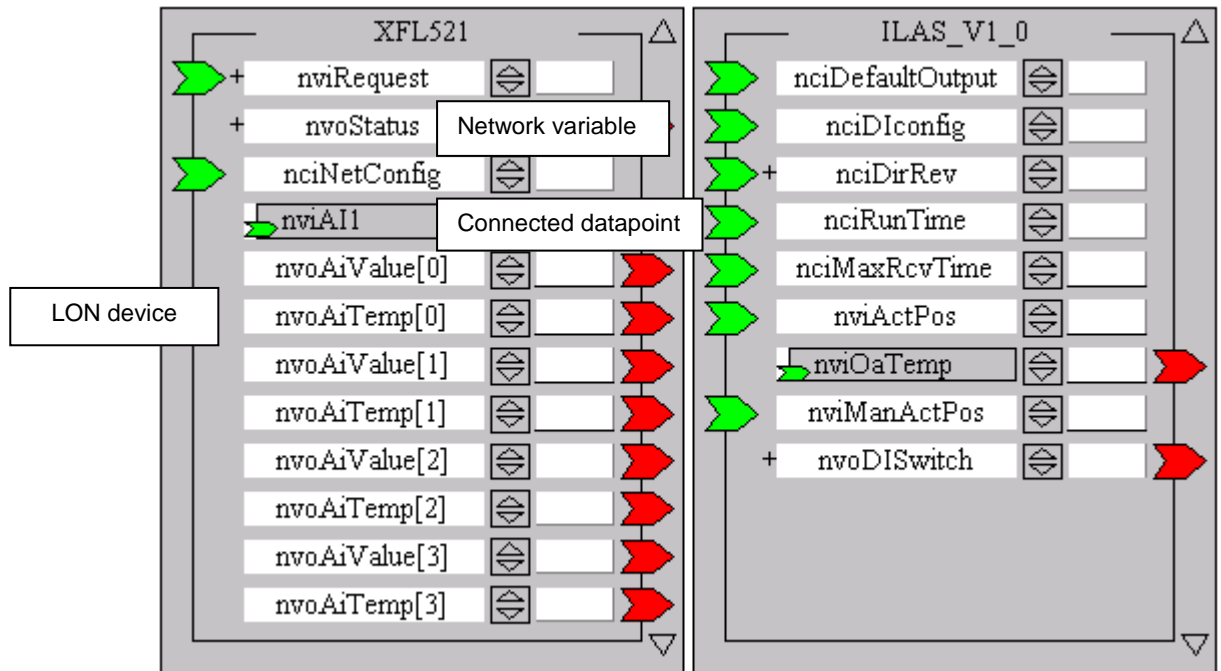
In case of physical connections between controller, for example the Excel 800 and devices on the panel bus, the controller has panel I/O modules and/or distributed I/O modules. Then, the device inputs/outputs, respectively the corresponding datapoints will be automatically assigned to the controller terminals. The connections can graphically be viewed and re-arranged on the terminal assignment pane.



Binding (Open LON-bus)

In case of a logical connection between a LON controller and other (3rd party) LON devices on an Open LON-bus, the controller uses neither IP nor distributed I/O modules. Instead, the device inputs/outputs, respectively the corresponding datapoints are boardless. Then, connections will be made by dragging&dropping

boardless controller points to LON device datapoints which are called network variables (NVs). The process of connecting LON devices to each other is called Binding.

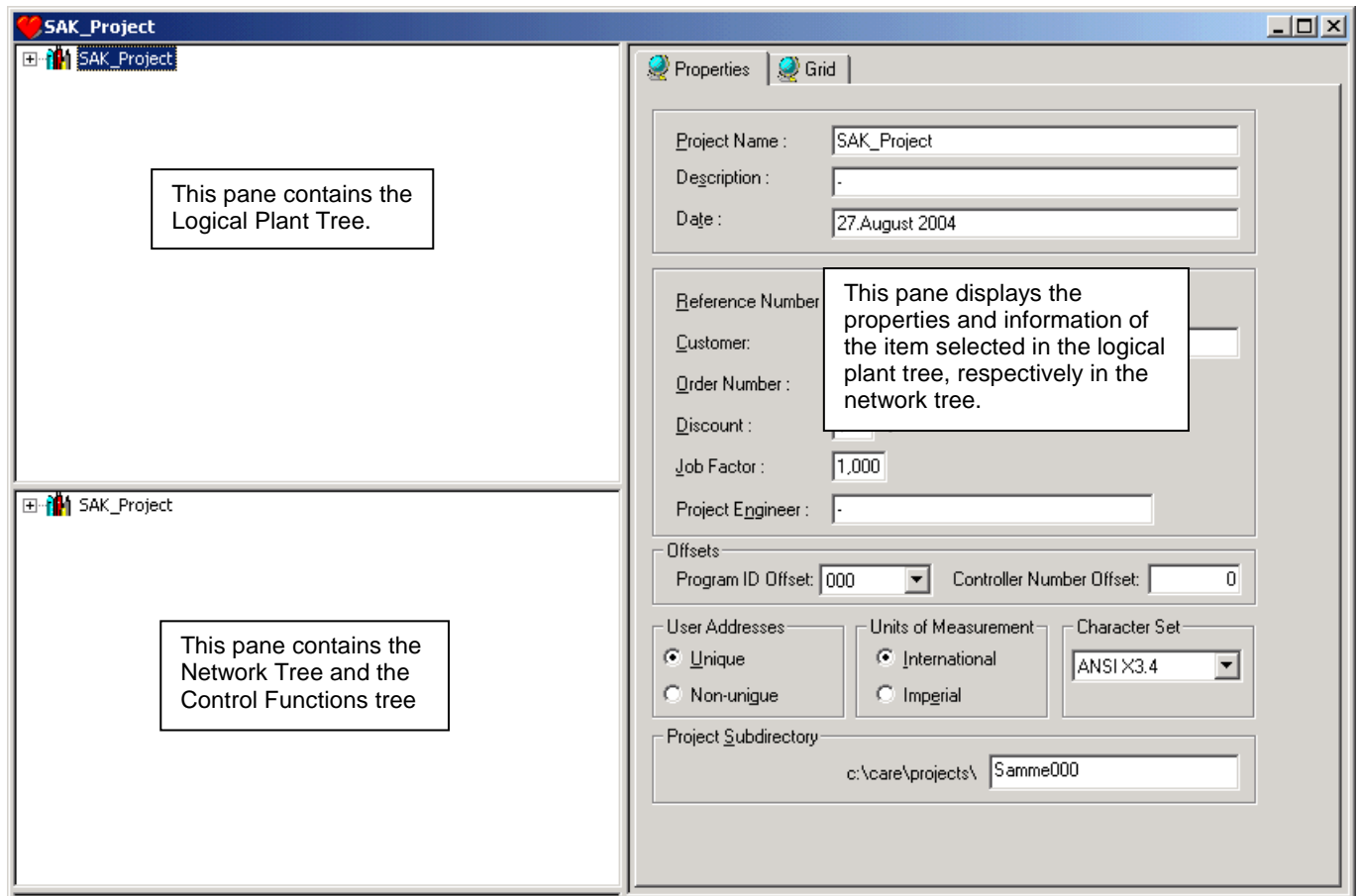


Application Download into Controller

After a plant has been completed by editing the main applications such as control strategy, switching logic, etc., the application files will be translated into a suitable controller format. Then the file will be downloaded and the controller test operation can be started.

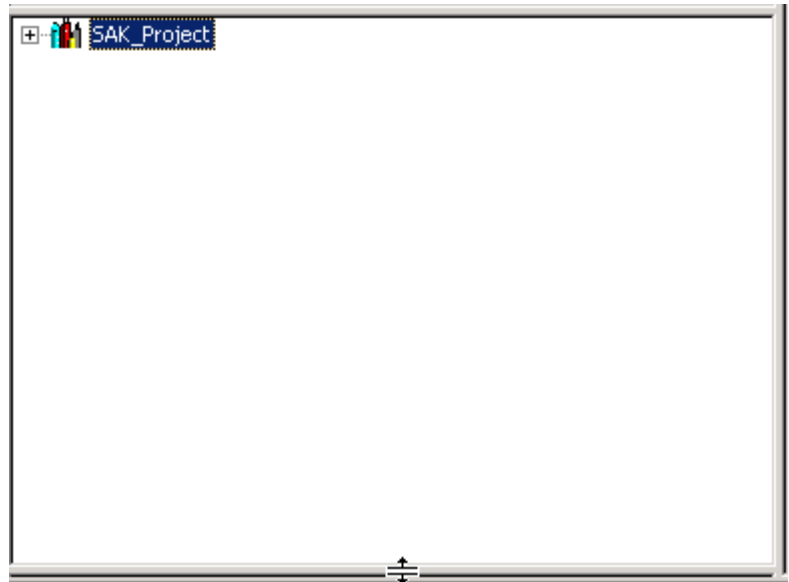
CARE ENVIRONMENT

When you start CARE, you can see three distinct panes of the CARE environment.

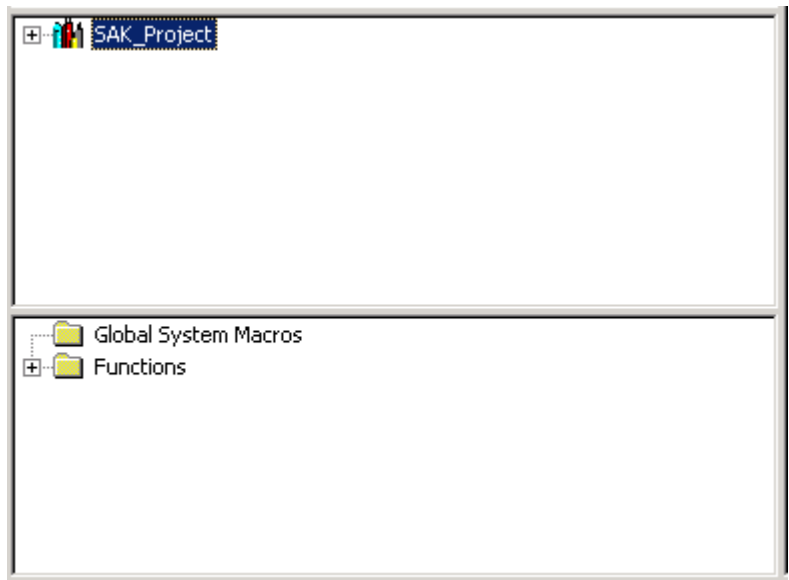


In the CARE-BACnet environment, the left bottom pane further can be split. So a fourth pane will be displayed.

The left bottom pane includes two trees, the network tree and the control functions tree. When starting CARE-BACnet, the control functions tree is not visible. To view the control functions tree, point the cursor on the bottom border till the pointer's image changes to a split pointer.

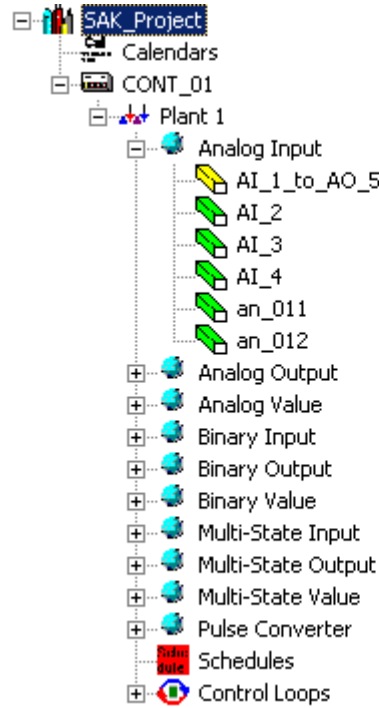


Move the split bar upwards. The control functions tree will be visible in the fourth pane.



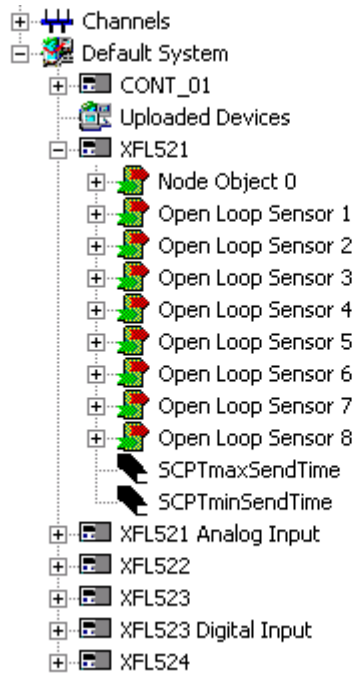
Logical Plant Tree

The logical plant tree allows to maintain an overall view regarding the logic structure of the project. This helps you to manage and organize the logical components (controllers, plants, datapoints, schedules and control loops) of your project.



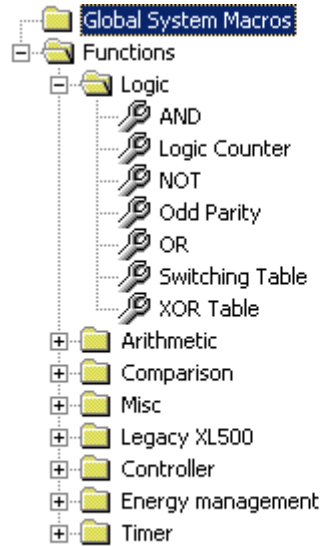
Network Tree

The network tree allows to maintain an overall view regarding the bus systems and the network architecture of the project. This helps you to manage and arrange the network components (Controllers, BACnet devices, LON devices, LON-objects, etc.) of your project(s).



Control Functions Tree (CARE-BACnet only)

The control functions tree provides control functions and control macros which will be used in the control editor for creating control loops.



Sizing the Tree Displays

The size of the tree display can be varied by moving the split pointer/split bar up or downwards.

Information and Editing Pane

The right pane can look very different depending on the item selected in the logical plant tree, respectively in the network tree. It shows the properties for the selected item. For example, it can show the properties of the project such as name, client, units of measurement etc. or it can show the terminal assignment of a selected controller.

The screenshot shows a 'Properties' dialog box with the following fields and values:

- Project Name : DebisStuttgart
- Description : -
- Date : 15.January.2002
- Reference Number : 0
- Client : -
- Order Number : 0
- Discount : 1 %
- Job Factor : 1,000000
- Project Engineer : -
- Offset : 000
- User Addresses: Unique, Non-unique
- Units of Measurement: International, English
- Project Subdirectory: D:\care\projects\ Debis000

A callout box in the top right corner states: "All information available for the selected item is grouped on tabs."

Example 1: Project Properties

Module No. 1		Module No. 2	
1	Blr1StrnFlo	1	Blr1TempRst
2	Blr1StrnTemp	2	
3	Blr1WtrTemp	3	
4		4	
5		5	
6		6	
7		7	
8		8	

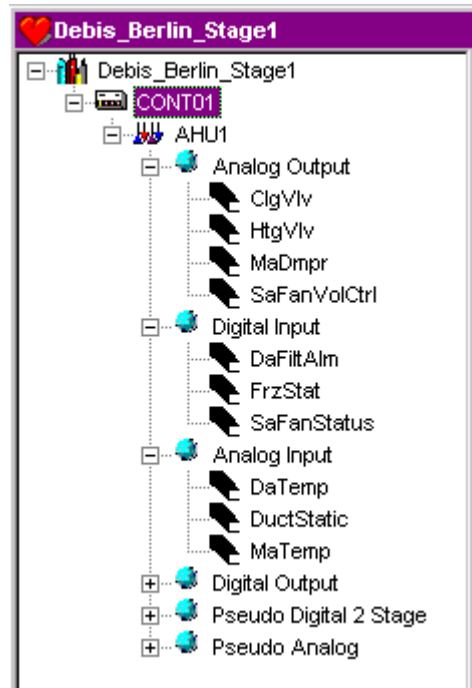
Labels at the bottom of the table: XP502, XF521, XF522, XC5010

Housing 1

Example 2: Terminal Assignment

Logical Plant Tree

The logical structure of the project is shown in a hierarchical tree, the logical plant tree. It shows the controllers with their plants (attached or unattached) and the datapoints grouped in types such as Analog Input, Analog Output etc.



The icons in the logical plant tree have the following meaning:



= Project (max. one)



= Controller



= Plant



= Point Type



= Single Point (color depends on point status such as mapped or bound)

The following information can be displayed and edited on the right pane by clicking on the corresponding tree item:

- Properties of the project, controller, plant and datapoint
- Terminal assignment
- Plant schematic

Display and Edit Properties

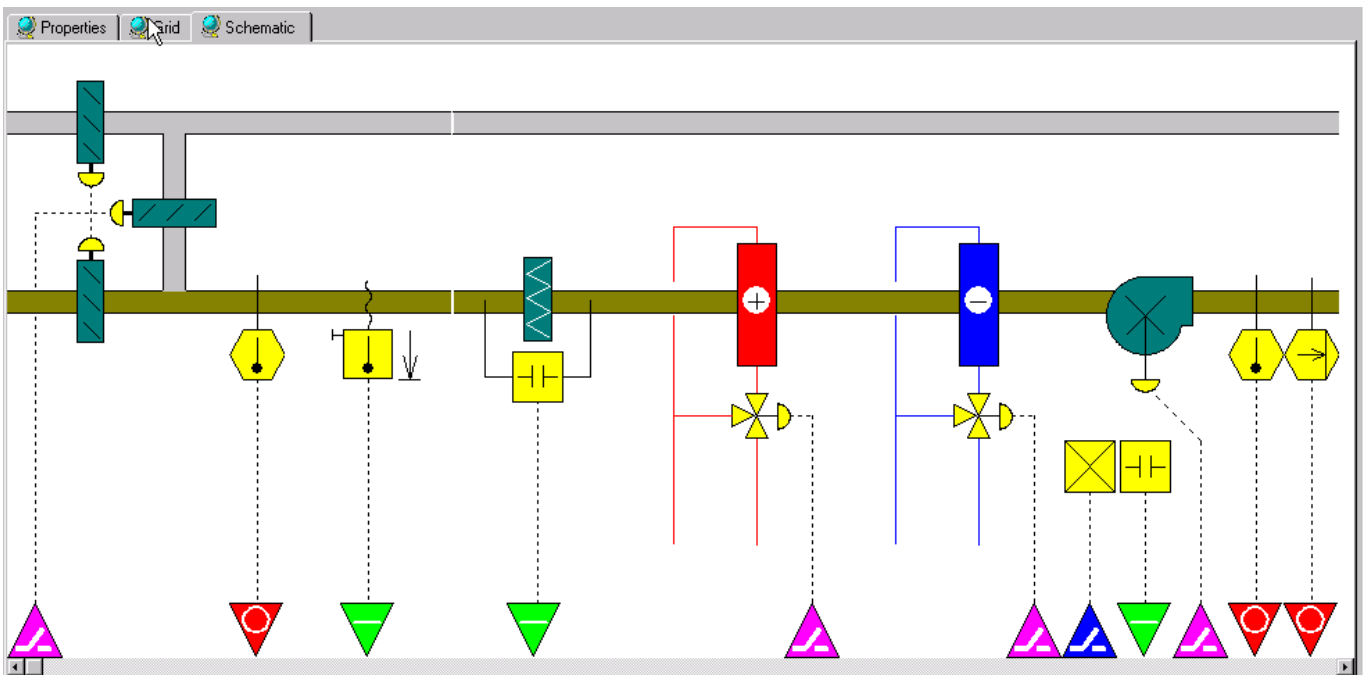
Clicking on the desired item (project, controller, plant, datapoint) in the logical plant tree displays the corresponding properties on the right pane for editing:

The screenshot displays the CARE software interface. On the left, a tree view shows the project structure: 'Debis_Berlin_Stage1' contains 'CONT01', which includes 'AHU1'. Under 'AHU1', there are three main categories: 'Analog Output' (with sub-items ClgVlv, HtgVlv, MaDmpr, SaFanVolCtrl), 'Digital Input' (with sub-items DaFiltAlm, FrzStat, SaFanStatus), and 'Analog Input' (with sub-items DaTemp, DuctStatic, MaTemp). Below these are 'Digital Output', 'Pseudo Digital 2 Stage', and 'Pseudo Analog'. The right pane is the 'Properties' window, which is currently active. It contains several input fields and radio buttons. The 'Project Name' is 'Debis_Berlin_Stage1', 'Date' is '08.February.2002', 'Reference Number' is '0', 'Client' is 'Debis', 'Order Number' is '0', 'Discount' is '1 %', 'Job Factor' is '1,000000', and 'Offset' is '000'. There are also radio buttons for 'User Addresses' (Unique/Non-unique) and 'Units of Measurement' (International/English). The 'Project Subdirectory' is 'D:\care\projects\Debis'.

Example 3: Project Properties

Display Plant Schematic (CARE XL-5000 only)

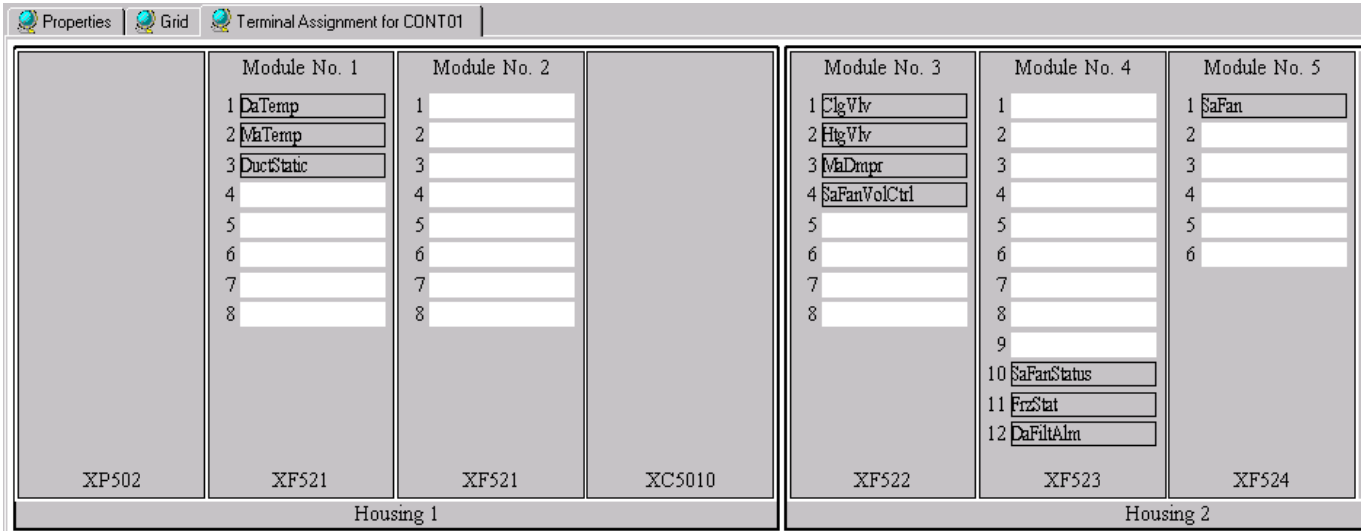
Clicking on the plant in the logical plant tree and then selecting the *Schematic* tab on the right pane displays the plant schematic (display only). To create and edit a plant schematic, please refer to the "Create Plant Schematic" section.



Display Terminal Assignments

Clicking on the controller in the logical plant tree and then selecting the *Terminal Assignment* tab on the right pane, displays the terminal assignments of the controller. If LON devices have been added, they will also be displayed.

To assign datapoints to terminals, please refer to the “Manually assign Datapoints to Controller” section.



Display Datapoints in Grid

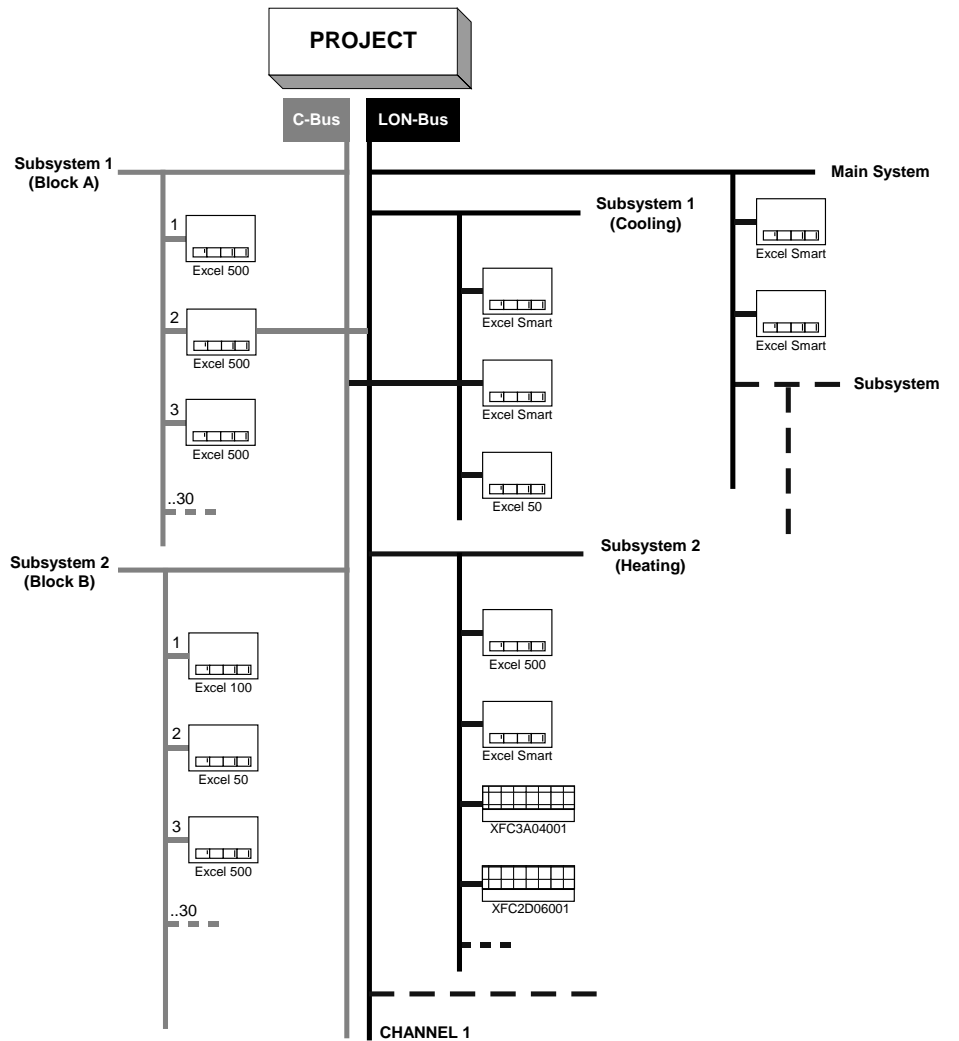
Clicking either on the project, controller or plant in the logical plant tree and then selecting the Grid tab on the right pane, displays all datapoints with their attributes in a grid. To edit datapoints, please refer to the “Modify Datapoints” section.

Point	User Address	Techn. Address	Sensor Offset	Bus	Characteristic	Engineering Unit	Descriptor	Alarm Text	Active State	Oper. Access Level	Suppr. Alarm	Critical Alarm (Type)	Alarm Point
Filter									*	*			
AO	ClgVlv	01/03/01		IP	LINEAR_GRAPH	Pct				3	<input checked="" type="checkbox"/>		
DI	DaFiltAlm	01/04/12		IP		Normal			0	3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AI	DaTemp	01/01/01	0,000000	IP	PT 1000 Type FA	Deg				3	<input type="checkbox"/>	<input type="checkbox"/>	
AI	DuctStatic	01/01/03	0,000000	IP	Pressure 0-3"	Inw				3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
DI	FrzStat	01/04/11		IP		Normal			0	3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AO	HtgVlv	01/03/02		IP	LINEAR_GRAPH	Pct				3	<input checked="" type="checkbox"/>		
AO	MaDmpr	01/03/03		IP	LINEAR_GRAPH	Pct				3	<input checked="" type="checkbox"/>		
AI	MaTemp	01/01/02	0,000000	IP	PT 1000 Type FA	Deg				3	<input type="checkbox"/>	<input type="checkbox"/>	
DO	SaFan	01/05/01		IP		On			1	3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
DI	SaFanStatus	01/04/10		IP		Off			0	3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AO	SaFanVolCtrl	01/03/04		IP	LINEAR_GRAPH	Pct				3	<input checked="" type="checkbox"/>		
PD2	EXECUTING_STOPPED					Normal			0	3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD2	SHUTDOWN					Normal			0	3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD2	STARTUP					Normal			0	3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PA	static_setpoint									3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Network Tree

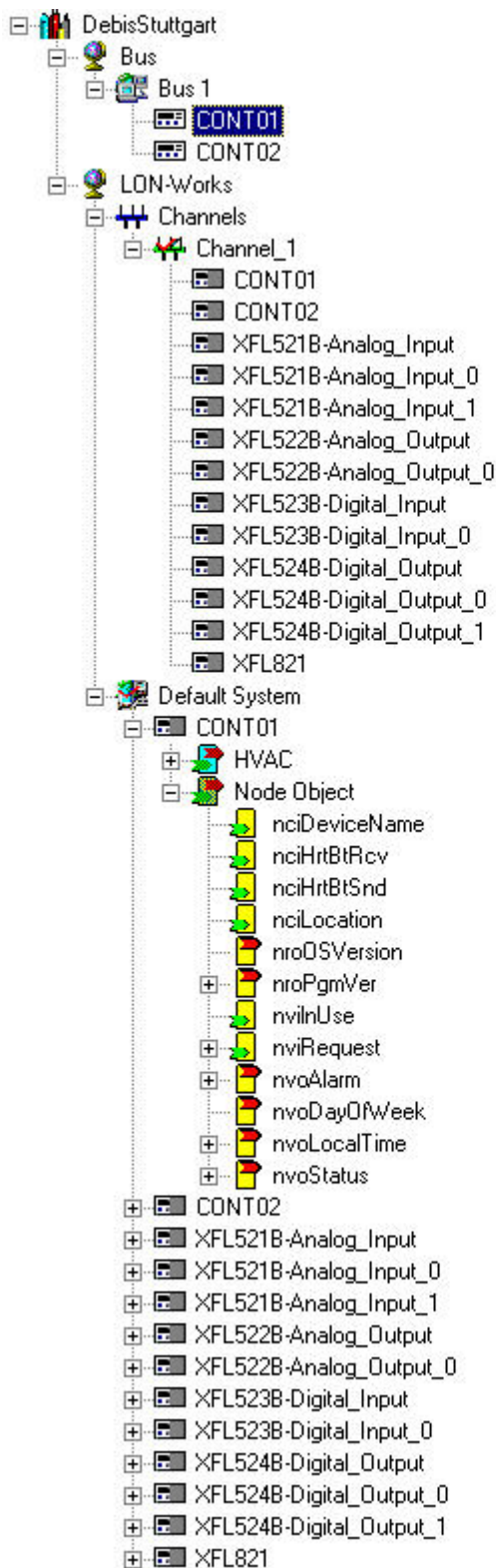
The Bus types and Network Architecture

A project can cover multiple of different buses (C-Bus, LON-Bus, BACnet-Bus or other) building up the network. The skeletal structure of the network represents the physical and logical conditions in the building.





Example 4: Project with multiple different buses, in this case (C-Bus and LON-Bus)


The network is displayed below the logical plant tree in a hierarchical network tree.





The icons in the network tree have the following meaning:


 = Project


 = Bus type


 = LON-channel


 = User defined Default System or Subsystem, or Uploaded Devices


 = LON device (dependent on status different colors)


 = LON object (dependent on status different colors)


 = Input NV (dependent on status different colors)


 = Output NV (dependent on status different colors)

 = Structured Input NV

 = Structured Output NV

 = Standard configuration property type (SCPT) / User-defined configuration property type (UCPT)

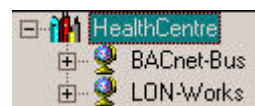
 = Connection between datapoint/NV and NV

 = Router

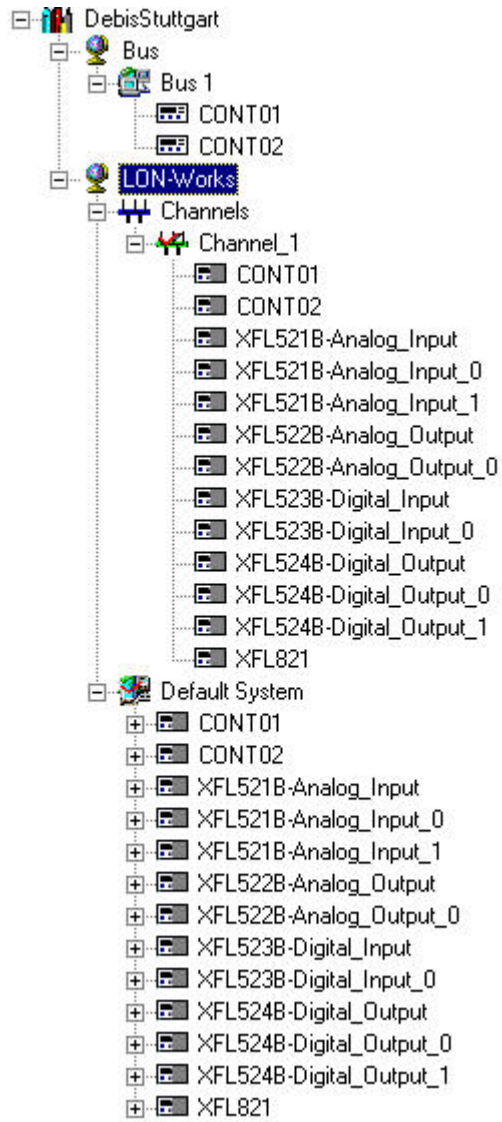
The network tree shows two basic bus types. In CARE XL-5000, it contains the C-Bus, simply named Bus and LON-Works.



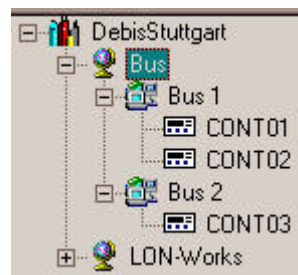
In CARE-BACnet, it contains the BACnet-Bus and LON-Works.



Each bus is sub-divided by default to allow an arrangement of the network components according to the physical conditions in the building.



The C-Bus (Bus) folder contains the Bus 1 subfolder by default. Further created subfolders will be numbered continuously. The Bus subfolders represent the physical C-Bus network structure of the project and contain the C-bus controllers which control that segment of the building.

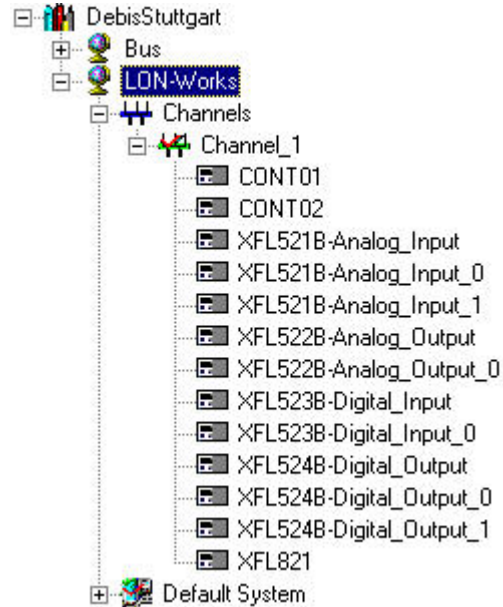


NOTE: The subfolder names are examples and freely editable. For example, the default Bus 1 subfolder can be named into Area1 or Block A.

The LON-Works folder represents the network interface of the LON-Bus and is subdivided by default into a physical part, called Channels and a logical part, called Default System.



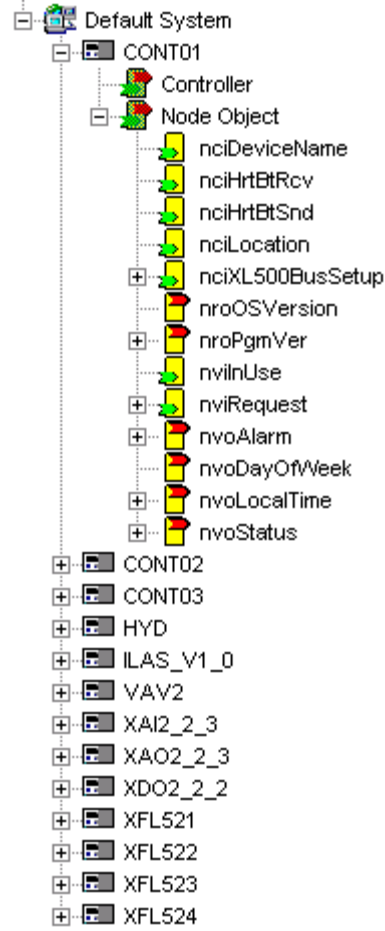
The Channels folder contains the Channel_1 subfolder by default. Additional channels can be created and their names are freely editable.



A channel arranged in the Channels folder, represents the physical medium, for example, twisted-pair cable, and lists all LON devices attached to this cable. Controllers can be shifted between channels to model the physical conditions in the building.

The Default System represents the logical LON-Bus part and provides all software functions necessary to work on LON devices, LON objects, NVs etc. It might contain the following components:

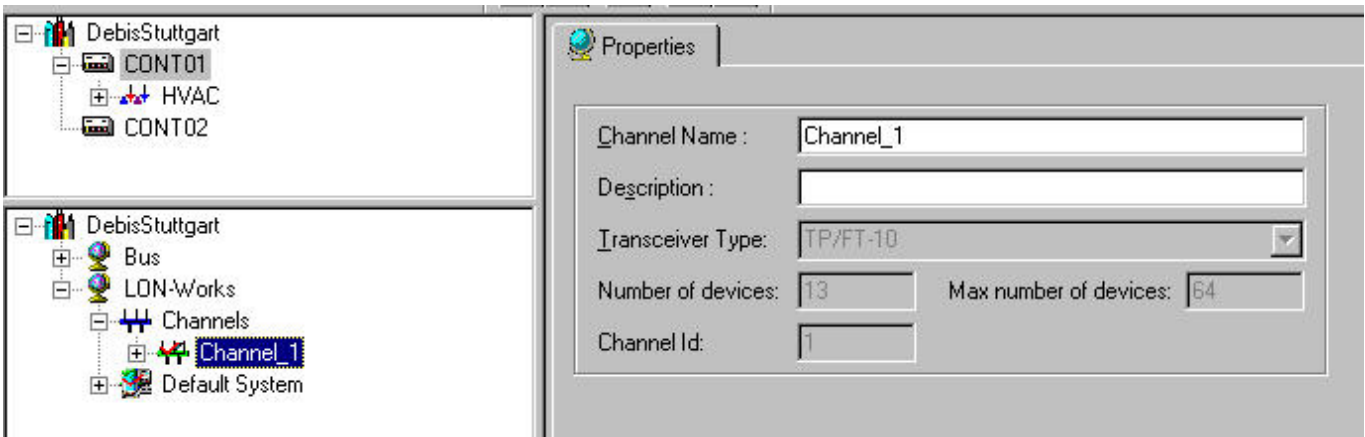
- Subsystems (to be created below the Default System)
- LON devices
- LON objects
- NVs (network variables)
- SCPTs (standard configuration property types)



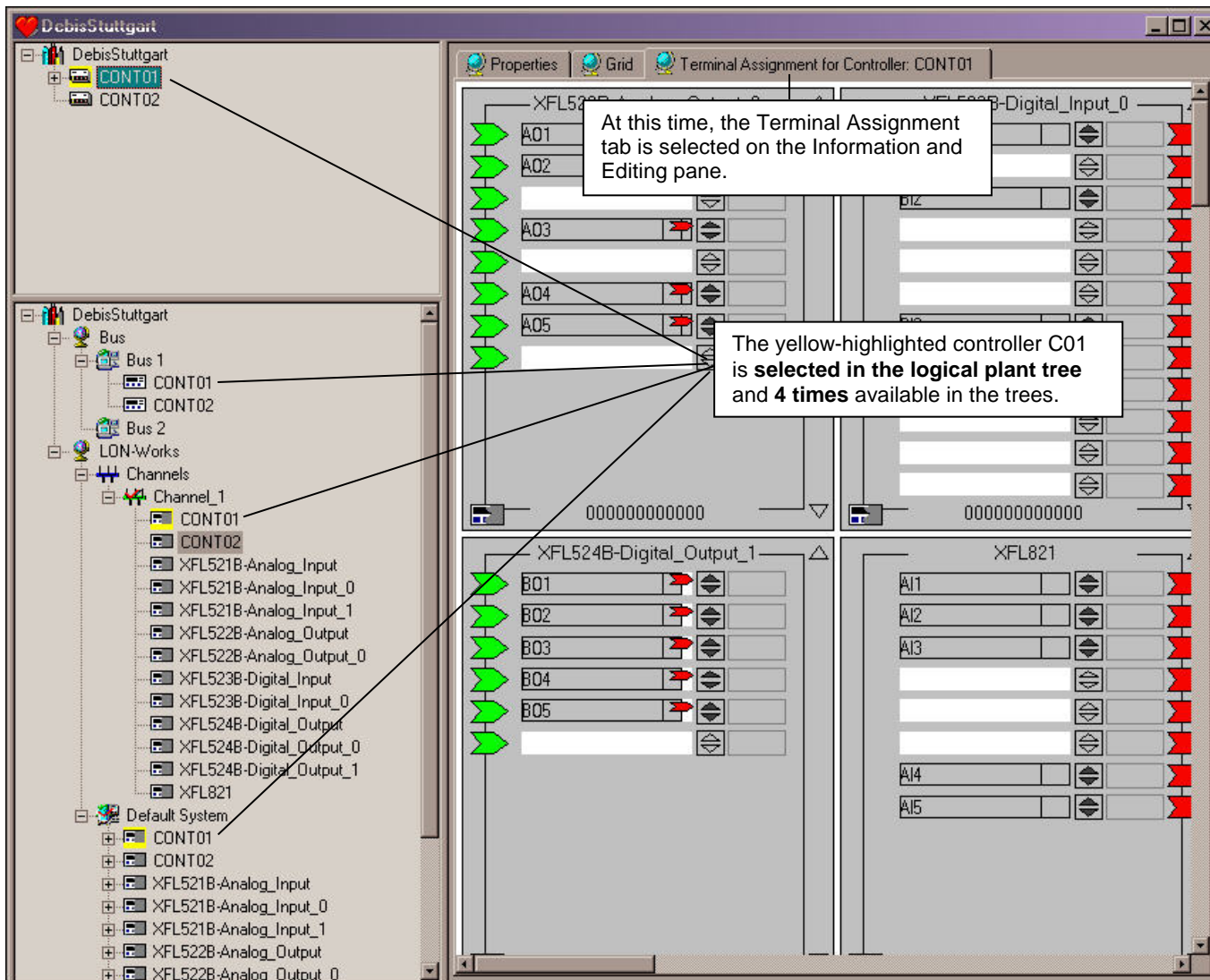
NOTE: The Default System and subsystems can have further subsystems. Names as "Default System" and "Subsystem" are examples and freely editable.

Display and Edit Properties

Clicking on the desired item (project, subsystem, LON device, LON object, NV) in the network tree, displays the corresponding properties on the right pane for editing:



Example 5: Channel Properties



CUSTOMIZE WINDOWS DEFAULT REGIONAL AND LANGUAGE SETTINGS

In order to setup an Excel 5000 system that uses any language other than the respective Windows default language, you must customize the Regional and Language Options Settings in Windows as a prerequisite before working with CARE / COACH and Excel Online / COACH Online. In addition, for a successful application engineering, the controller must be equipped with the appropriate firmware and XI582 with the appropriate EPROM.

For all settings to be done, please refer to the country and language settings table that lists the settings for:

- Windows
- CARE / COACH
- Excel Online / COACH Online
- XI852 EPROM
- Controller firmware

For information on coding special characters in Western, Eastern and Turkish languages, please refer to the character settings tables following the country and language settings table.

To customize Windows, refer to the procedure following the character settings tables.

Table 1. HBS Country and Language Settings

Country	Windows Version / Regional and Language Options Settings	CARE Country Code / Location Selection	Controllers with Internal Text MMI		Controllers with Internal Graphic MMI	Controllers with External XI581/2	XL Online
			XL 40	XL 50	XL 50	XL100/500/800	
			XL40A2MMI XI40AI (required firmware)	XL50- MMI-xxxx XL50D XL50A-MMI-xxxx XL50A-UMMI-xxxx (required firmware)	XL50CH XL50CY XL50TW XL50ACH XL50ACY XL50ATW (required firmware)	XI581/2 XI581B/2B (required hardware)	
Several	Arabic	Arabic (not supported)	not supported	not supported	not supported	not supported	not supported
Australia	English (Australia)	Australia	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Albania	Albanian	not supported	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Austria	German (Austria)	Austria	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Belgium	Dutch (Belgium), French (Belgium)	Belgium	XL50I207.02C or or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Bulgaria	Bulgarian	Russia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Brazil	Portuguese (Brazil)	Brazil	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Canada	English (Canada)	Canada	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
China	Chinese (Simplified)	PR China	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU XI581B/2B-CH	CHINESE_ BIG5
Croatia	Croatian	Slovakia	XL50I207.02C	EU50L207.02C or	EU50L207.02C	XI581B/2B-EU	Central

Country	Windows Version / Regional and Language Options Settings	CARE Country Code / Location Selection	Controllers with Internal Text MMI		Controllers with Internal Graphic MMI	Controllers with External XI581/2	XL Online
			XL 40	XL 50	XL 50	XL100/500/800	
			XL40A2MMI XI40AI (required firmware)	XL50- MMI-xxxx XL50D XL50A-MMI-xxxx XL50A-UMMI-xxxx (required firmware)	XL50CH XL50CY XL50TW XL50ACH XL50ACY XL50ATW (required firmware)	XI581/2 XI581B/2B (required hardware)	
			or higher	higher	or higher		European
Czech Republic	Czech	Slovakia	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Central European
Denmark	Danish	Denmark	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Finland	Finnish	Finland	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
France	French	France	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Germany	German	Germany	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Several	Hebrew	Hebrew	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Hungary	Hungarian	Slovakia	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Central European
Iceland	Icelandic	Iceland	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Ireland	English (Ireland)	Ireland	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Italy	Italian	Italy	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Japan	Japanese	Japan	not supported	not supported	not supported	XI581B/2B-JP	Japanese
Korea	Korean	Korea	not supported	not supported	not supported	not supported	Western
Several	Several	Latin America	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Lithuania	Lithuanian	not supported	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Macedonia	Macedonian	Russia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Mexico	Spanish (Mexico)	Mexico	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Morocco	French	France	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Netherlands	Dutch	Netherlands	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
New Zealand	English (New Zealand)	New Zealand	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Norway	Norwegian	Norway	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Poland	Polish	Slovakia	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Central European
Portugal	Portuguese	Portugal	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Romania	Romanian	Slovakia	XL50I207.02C	EU50L207.02C or	EU50L207.02C	XI581B/2B-EU	Central

Country	Windows Version / Regional and Language Options Settings	CARE Country Code / Location Selection	Controllers with Internal Text MMI		Controllers with Internal Graphic MMI	Controllers with External XI581/2	XL Online
			XL 40	XL 50	XL 50	XL100/500/800	
			XL40A2MMI XI40AI (required firmware)	XL50- MMI-xxxx XL50D XL50A-MMI-xxxx XL50A-UMMI-xxxx (required firmware)	XL50CH XL50CY XL50TW XL50ACH XL50ACY XL50ATW (required firmware)	XI581/2 XI581B/2B (required hardware)	
			or higher	higher	or higher		European
Russia	Russian	Russia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Serbia	Serbian (Latin, Bosnia and Herzegovina)	not supported	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Slovakia	Slovak	Slovakia	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Central European
Slovenia	Slovenian	Slovakia	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Central European
Spain	Spanish	Spain	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Sweden	Swedish	Sweden	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Switzerland	German (Switzerland), French (Switzerland), Italian (Switzerland)	Switzerland	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Taiwan	Chinese (Taiwan)	Taiwan	not supported	not supported	TW50L207.02C or higher	XI581B/2B-TW	Thai
Tunisia	French	France	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Turkey	Turkish	Turkey	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Turkish
U.A.E.	Arabic (U.A.E.)	Arabic (not supported)	not supported	not supported	not supported	not supported	not supported
Ukraine	Ukrainian	Russia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
United Kingdom	English (United Kingdom)	United Kingdom	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
United States	English	United States	XL50I207.02C or higher	EU50L207.02C or higher TW50L207.02C or higher XL50L207.02C or higher	EU50L207.02C or higher TW50L207.02C or higher XL50L207.02C or higher	XI581B/2B-EU XI581B/2B-TW XI581B/2B-CH XI581B/2B-JP XI581B/2B-CY	Western

Table 2. CentraLine Country and Language Settings

Country	Windows Version / Regional and Language Options Settings	COACH Country Selection	Controllers with Internal Text MMI		Controllers with Internal Graphic MMI	Controllers with External CLMMI00N2x	COACH Online
			Tiger	Panther	Panther	Lion	
			Tiger	Panther	Panther	Lion	

			CLTG38L11 CLTG00MMI (required firmware)	CLPA13LC1x CLPA13LM1x CLPA21CM1x CLPA21LC1x CLPA21LM1x (required firmware)	CLPA13LC2x CLPA13LM2x CLPA21LC2x CLPA21LM2x (required firmware)	CLMMI00N2x (required hardware)	
Several	Arabic	not supported	not supported	not supported	not supported	not supported	not supported
Australia	English (Australia)	Australia	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Albania	Albanian	Albanian	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Austria	German (Austria)	Austria	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Belgium	Dutch (Belgium), French (Belgium)	Belgium	XL50I207.02C or or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Bulgaria	Bulgarian	Bulgaria	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Brazil	Portuguese (Brazil)	not supported	not supported	not supported	not supported	not supported	not supported
Canada	English (Canada)	not supported	not supported	not supported	not supported	not supported	not supported
China	Chinese (Simplified)	not supported	not supported	not supported	not supported	not supported	not supported
Croatia	Croatian	Croatia	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Central European
Czech Republic	Czech	Czech Republic	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Central European
Denmark	Danish	Denmark	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Finland	Finnish	Finland	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
France	French	France	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Germany	German	Germany	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Several	Hebrew	as desired	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Hungary	Hungarian	Hungary	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Central European
Iceland	Icelandic	Iceland	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Ireland	English (Ireland)	United Kingdom	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Italy	Italian	Italy	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Japan	Japanese	not supported	not supported	not supported	not supported	not supported	not supported
Korea	Korean	not supported	not supported	not supported	not supported	not supported	not supported
Lithuania	Lithuanian	Lithuania	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Macedonia	Macedonian	Macedonia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Mexico	Spanish (Mexico)	not supported	not supported	not supported	not supported	not supported	not supported
Morocco	French	Morocco	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Nether- lands	Dutch	Netherlands	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western

Country	Windows Version / Regional and Language Options Settings	COACH Country Selection	Controllers with Internal Text MMI		Controllers with Internal Graphic MMI	Controllers with External CLMMI00N2x	COACH Online
			Tiger	Panther	Panther	Lion	
			CLTG38L11 CLTG00MMI (required firmware)	CLPA13LC1x CLPA13LM1x CLPA21CM1x CLPA21LC1x CLPA21LM1x (required firmware)	CLPA13LC2x CLPA13LM2x CLPA21LC2x CLPA21LM2x (required firmware)	CLMMI00N2x (required hardware)	
New Zealand	English (New Zealand)	not supported	not supported	not supported	not supported	not supported	not supported
Norway	Norwegian	Norway	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Poland	Polish	Poland	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Central European
Portugal	Portuguese	Portugal	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Romania	Romanian	Romania	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Central European
Russia	Russian	Russia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Serbia	Serbian (Latin, Bosnia and Herzegovina)	Serbia	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
Slovakia	Slovak	Slovakia	EU50L207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Central European
Slovenia	Slovenian	Slovenia	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Central European
Spain	Spanish	Spain	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Sweden	Swedish	Sweden	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Switzerland	German (Switzerland), French (Switzerland), Italian (Switzerland)	Switzerland France not supported	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Taiwan	Chinese (Taiwan)	not supported	not supported	not supported	not supported	not supported	not supported
Tunisia	French	Tunisia	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
Turkey	Turkish	Turkey	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Turkish
U.A.E.	Arabic (U.A.E.)	U.A.E. (not supported)	not supported	not supported	not supported	not supported	not supported
Ukraine	Ukrainian	Ukraine	not supported	not supported	EU50L207.02C or higher	XI581B/2B-EU	Cyrillic
United Kingdom	English (United Kingdom)	United Kingdom	XL50I207.02C or higher	EU50L207.02C or higher	EU50L207.02C or higher	XI581B/2B-EU	Western
United States	English	not supported	not supported	not supported	not supported	not supported	not supported

Table 3. Character Settings (Western Europe)

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
20	32		32	SPACE

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
23	35	#	35	NUMBER SIGN
24	36	\$	36	DOLLAR SIGN
25	37	%	37	PERCENT SIGN
26	38	&	38	AMPERSAND
27	39	'	39	APOSTROPHE
28	40	(	40	LEFT PARENTHESIS
29	41	)	41	RIGHT PARENTHESIS
2E	46	.	46	FULL STOP
30	48	0	48	DIGIT ZERO
31	49	1	49	DIGIT ONE
32	50	2	50	DIGIT TWO
33	51	3	51	DIGIT THREE
34	52	4	52	DIGIT FOUR
35	53	5	53	DIGIT FIVE
36	54	6	54	DIGIT SIX
37	55	7	55	DIGIT SEVEN
38	56	8	56	DIGIT EIGHT
39	57	9	57	DIGIT NINE
3A	58	:	58	COLON
40	64	@	64	COMMERCIAL AT
41	65	A	65	LATIN CAPITAL LETTER A
42	66	B	66	LATIN CAPITAL LETTER B
43	67	C	67	LATIN CAPITAL LETTER C
44	68	D	68	LATIN CAPITAL LETTER D
45	69	E	69	LATIN CAPITAL LETTER E
46	70	F	70	LATIN CAPITAL LETTER F
47	71	G	71	LATIN CAPITAL LETTER G
48	72	H	72	LATIN CAPITAL LETTER H
49	73	I	73	LATIN CAPITAL LETTER I
4A	74	J	74	LATIN CAPITAL LETTER J
4B	75	K	75	LATIN CAPITAL LETTER K
4C	76	L	76	LATIN CAPITAL LETTER L
4D	77	M	77	LATIN CAPITAL LETTER M
4E	78	N	78	LATIN CAPITAL LETTER N
4F	79	O	79	LATIN CAPITAL LETTER O
50	80	P	80	LATIN CAPITAL LETTER P

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
51	81	Q	81	LATIN CAPITAL LETTER Q
52	82	R	82	LATIN CAPITAL LETTER R
53	83	S	83	LATIN CAPITAL LETTER S
54	84	T	84	LATIN CAPITAL LETTER T
55	85	U	85	LATIN CAPITAL LETTER U
56	86	V	86	LATIN CAPITAL LETTER V
57	87	W	87	LATIN CAPITAL LETTER W
58	88	X	88	LATIN CAPITAL LETTER X
59	89	Y	89	LATIN CAPITAL LETTER Y
5A	90	Z	90	LATIN CAPITAL LETTER Z
5F	95	_	95	LOW LINE
61	97	a	97	LATIN SMALL LETTER A
62	98	b	98	LATIN SMALL LETTER B
63	99	c	99	LATIN SMALL LETTER C
64	100	d	100	LATIN SMALL LETTER D
65	101	e	101	LATIN SMALL LETTER E
66	102	f	102	LATIN SMALL LETTER F
67	103	g	103	LATIN SMALL LETTER G
68	104	h	104	LATIN SMALL LETTER H
69	105	i	105	LATIN SMALL LETTER I
6A	106	j	106	LATIN SMALL LETTER J
6B	107	k	107	LATIN SMALL LETTER K
6C	108	l	108	LATIN SMALL LETTER L
6D	109	m	109	LATIN SMALL LETTER M
6E	110	n	110	LATIN SMALL LETTER N
6F	111	o	111	LATIN SMALL LETTER O
70	112	p	112	LATIN SMALL LETTER P
71	113	q	113	LATIN SMALL LETTER Q
72	114	r	114	LATIN SMALL LETTER R
73	115	s	115	LATIN SMALL LETTER S
74	116	t	116	LATIN SMALL LETTER T
75	117	u	117	LATIN SMALL LETTER U
76	118	v	118	LATIN SMALL LETTER V
77	119	w	119	LATIN SMALL LETTER W
78	120	x	120	LATIN SMALL LETTER X
79	121	y	121	LATIN SMALL LETTER Y

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
7A	122	z	122	LATIN SMALL LETTER Z
7E	126	~	126	TILDE
80	128	Ç	199	LATIN CAPITAL LETTER C WITH CEDILLA
81	129	ü	252	LATIN SMALL LETTER U WITH DIAERESIS
82	130	é	233	LATIN SMALL LETTER E WITH ACUTE
83	131	â	226	LATIN SMALL LETTER A WITH CIRCUMFLEX
84	132	ä	228	LATIN SMALL LETTER A WITH DIAERESIS
85	133	à	224	LATIN SMALL LETTER A WITH GRAVE
86	134	å	229	LATIN SMALL LETTER A WITH RING ABOVE
87	135	ç	231	LATIN SMALL LETTER C WITH CEDILLA
88	136	ê	234	LATIN SMALL LETTER E WITH CIRCUMFLEX
89	137	ë	235	LATIN SMALL LETTER E WITH DIAERESIS
8A	138	è	232	LATIN SMALL LETTER E WITH GRAVE
8B	139	ï	239	LATIN SMALL LETTER I WITH DIAERESIS
8C	140	î	238	LATIN SMALL LETTER I WITH CIRCUMFLEX
8D	141	ì	236	LATIN SMALL LETTER I WITH GRAVE
8E	142	Ä	196	LATIN CAPITAL LETTER A WITH DIAERESIS
8F	143	Å	197	LATIN CAPITAL LETTER A WITH RING ABOVE
90	144	É	201	LATIN CAPITAL LETTER E WITH ACUTE
91	145	æ	230	LATIN SMALL LETTER AE
92	146	Æ	198	LATIN CAPITAL LETTER AE
93	147	ô	244	LATIN SMALL LETTER O WITH CIRCUMFLEX
94	148	ö	246	LATIN SMALL LETTER O WITH DIAERESIS
95	149	ò	242	LATIN SMALL LETTER O WITH GRAVE
96	150	û	251	LATIN SMALL LETTER U WITH CIRCUMFLEX
97	151	ù	249	LATIN SMALL LETTER U WITH GRAVE
98	152	ÿ	255	LATIN SMALL LETTER Y WITH DIAERESIS
99	153	Ö	214	LATIN CAPITAL LETTER O WITH DIAERESIS
9A	154	Ü	220	LATIN CAPITAL LETTER U WITH DIAERESIS
9B	155	ø	248	LATIN SMALL LETTER O WITH STROKE
9D	157	Ø	216	LATIN CAPITAL LETTER O WITH STROKE
9F	159	ƒ	402	LATIN SMALL LETTER F WITH HOOK
A0	160	á	225	LATIN SMALL LETTER A WITH ACUTE
A1	161	í	237	LATIN SMALL LETTER I WITH ACUTE
A2	162	ó	243	LATIN SMALL LETTER O WITH ACUTE
A3	163	ú	250	LATIN SMALL LETTER U WITH ACUTE

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
A4	164	ñ	241	LATIN SMALL LETTER N WITH TILDE
A5	165	Ñ	209	LATIN CAPITAL LETTER N WITH TILDE
A8	168	¿	191	INVERTED QUESTION MARK
B5	181	Á	193	LATIN CAPITAL LETTER A WITH ACUTE
B6	182	Â	194	LATIN CAPITAL LETTER A WITH CIRCUMFLEX
B7	183	À	192	LATIN CAPITAL LETTER A WITH GRAVE
C6	198	ã	227	LATIN SMALL LETTER A WITH TILDE
C7	199	Ã	195	LATIN CAPITAL LETTER A WITH TILDE
D0	208	ð	240	LATIN SMALL LETTER ETH
D1	209	Ð	208	LATIN CAPITAL LETTER ETH
D2	210	Ê	202	LATIN CAPITAL LETTER E WITH CIRCUMFLEX
D3	211	Ë	203	LATIN CAPITAL LETTER E WITH DIAERESIS
D4	212	È	200	LATIN CAPITAL LETTER E WITH GRAVE
D5	213	ı	305	LATIN SMALL LETTER DOTLESS I
D6	214	Í	205	LATIN CAPITAL LETTER I WITH ACUTE
D7	215	Î	206	LATIN CAPITAL LETTER I WITH CIRCUMFLEX
D8	216	Ï	207	LATIN CAPITAL LETTER I WITH DIAERESIS
DE	222	Ì	204	LATIN CAPITAL LETTER I WITH GRAVE
E0	224	Ó	211	LATIN CAPITAL LETTER O WITH ACUTE
E1	225	ß	223	LATIN SMALL LETTER SHARP S
E2	226	Ô	212	LATIN CAPITAL LETTER O WITH CIRCUMFLEX
E3	227	Ò	210	LATIN CAPITAL LETTER O WITH GRAVE
E4	228	õ	245	LATIN SMALL LETTER O WITH TILDE
E5	229	Õ	213	LATIN CAPITAL LETTER O WITH TILDE
E6	230	μ	181	MICRO SIGN
E7	231	þ	254	LATIN SMALL LETTER THORN
E8	232	Þ	222	LATIN CAPITAL LETTER THORN
E9	233	Ú	218	LATIN CAPITAL LETTER U WITH ACUTE
EA	234	Û	219	LATIN CAPITAL LETTER U WITH CIRCUMFLEX
EB	235	Ù	217	LATIN CAPITAL LETTER U WITH GRAVE
EC	236	ý	253	LATIN SMALL LETTER Y WITH ACUTE
ED	237	Ý	221	LATIN CAPITAL LETTER Y WITH ACUTE
EF	239	´	180	ACUTE ACCENT
F8	248	°	176	DEGREE SIGN

Table 4. Character Settings (Eastern Europe)

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
20	32		32	SPACE
23	35	#	35	NUMBER SIGN
24	36	\$	36	DOLLAR SIGN
25	37	%	37	PERCENT SIGN
26	38	&	38	AMPERSAND
27	39	'	39	APOSTROPHE
28	40	(	40	LEFT PARENTHESIS
29	41	)	41	RIGHT PARENTHESIS
2E	46	.	46	FULL STOP
30	48	0	48	DIGIT ZERO
31	49	1	49	DIGIT ONE
32	50	2	50	DIGIT TWO
33	51	3	51	DIGIT THREE
34	52	4	52	DIGIT FOUR
35	53	5	53	DIGIT FIVE
36	54	6	54	DIGIT SIX
37	55	7	55	DIGIT SEVEN
38	56	8	56	DIGIT EIGHT
39	57	9	57	DIGIT NINE
3A	58	:	58	COLON
40	64	@	64	COMMERCIAL AT
41	65	A	65	LATIN CAPITAL LETTER A
42	66	B	66	LATIN CAPITAL LETTER B
43	67	C	67	LATIN CAPITAL LETTER C
44	68	D	68	LATIN CAPITAL LETTER D
45	69	E	69	LATIN CAPITAL LETTER E
46	70	F	70	LATIN CAPITAL LETTER F
47	71	G	71	LATIN CAPITAL LETTER G
48	72	H	72	LATIN CAPITAL LETTER H
49	73	I	73	LATIN CAPITAL LETTER I
4A	74	J	74	LATIN CAPITAL LETTER J
4B	75	K	75	LATIN CAPITAL LETTER K
4C	76	L	76	LATIN CAPITAL LETTER L
4D	77	M	77	LATIN CAPITAL LETTER M
4E	78	N	78	LATIN CAPITAL LETTER N

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
4F	79	O	79	LATIN CAPITAL LETTER O
50	80	P	80	LATIN CAPITAL LETTER P
51	81	Q	81	LATIN CAPITAL LETTER Q
52	82	R	82	LATIN CAPITAL LETTER R
53	83	S	83	LATIN CAPITAL LETTER S
54	84	T	84	LATIN CAPITAL LETTER T
55	85	U	85	LATIN CAPITAL LETTER U
56	86	V	86	LATIN CAPITAL LETTER V
57	87	W	87	LATIN CAPITAL LETTER W
58	88	X	88	LATIN CAPITAL LETTER X
59	89	Y	89	LATIN CAPITAL LETTER Y
5A	90	Z	90	LATIN CAPITAL LETTER Z
5F	95	_	95	LOW LINE
61	97	a	97	LATIN SMALL LETTER A
62	98	b	98	LATIN SMALL LETTER B
63	99	c	99	LATIN SMALL LETTER C
64	100	d	100	LATIN SMALL LETTER D
65	101	e	101	LATIN SMALL LETTER E
66	102	f	102	LATIN SMALL LETTER F
67	103	g	103	LATIN SMALL LETTER G
68	104	h	104	LATIN SMALL LETTER H
69	105	i	105	LATIN SMALL LETTER I
6A	106	j	106	LATIN SMALL LETTER J
6B	107	k	107	LATIN SMALL LETTER K
6C	108	l	108	LATIN SMALL LETTER L
6D	109	m	109	LATIN SMALL LETTER M
6E	110	n	110	LATIN SMALL LETTER N
6F	111	o	111	LATIN SMALL LETTER O
70	112	p	112	LATIN SMALL LETTER P
71	113	q	113	LATIN SMALL LETTER Q
72	114	r	114	LATIN SMALL LETTER R
73	115	s	115	LATIN SMALL LETTER S
74	116	t	116	LATIN SMALL LETTER T
75	117	u	117	LATIN SMALL LETTER U
76	118	v	118	LATIN SMALL LETTER V
77	119	w	119	LATIN SMALL LETTER W

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
78	120	x	120	LATIN SMALL LETTER X
79	121	y	121	LATIN SMALL LETTER Y
7A	122	z	122	LATIN SMALL LETTER Z
7E	126	~	126	TILDE
80	128	Ç	199	LATIN CAPITAL LETTER C WITH CEDILLA
81	129	ü	252	LATIN SMALL LETTER U WITH DIAERESIS
82	130	é	233	LATIN SMALL LETTER E WITH ACUTE
83	131	â	226	LATIN SMALL LETTER A WITH CIRCUMFLEX
84	132	ä	228	LATIN SMALL LETTER A WITH DIAERESIS
85	133	û	367	LATIN SMALL LETTER U WITH RING ABOVE
86	134	ć	263	LATIN SMALL LETTER C WITH ACUTE
87	135	ç	231	LATIN SMALL LETTER C WITH CEDILLA
88	136	ł	322	LATIN SMALL LETTER L WITH STROKE
89	137	ë	235	LATIN SMALL LETTER E WITH DIAERESIS
8A	138	Ő	336	LATIN CAPITAL LETTER O WITH DOUBLE ACUTE
8B	139	ő	337	LATIN SMALL LETTER O WITH DOUBLE ACUTE
8C	140	î	238	LATIN SMALL LETTER I WITH CIRCUMFLEX
8D	141	Ž	377	LATIN CAPITAL LETTER Z WITH ACUTE
8E	142	Ä	196	LATIN CAPITAL LETTER A WITH DIAERESIS
8F	143	Ć	262	LATIN CAPITAL LETTER C WITH ACUTE
90	144	É	201	LATIN CAPITAL LETTER E WITH ACUTE
91	145	Ł	313	LATIN CAPITAL LETTER L WITH ACUTE
92	146	Í	314	LATIN SMALL LETTER I WITH ACUTE
93	147	ô	244	LATIN SMALL LETTER O WITH CIRCUMFLEX
94	148	ö	246	LATIN SMALL LETTER O WITH DIAERESIS
95	149	Ĺ	317	LATIN CAPITAL LETTER L WITH CARON
96	150	ĺ	318	LATIN SMALL LETTER L WITH CARON
97	151	Ś	346	LATIN CAPITAL LETTER S WITH ACUTE
98	152	ś	347	LATIN SMALL LETTER S WITH ACUTE
99	153	Ö	214	LATIN CAPITAL LETTER O WITH DIAERESIS
9A	154	Ü	220	LATIN CAPITAL LETTER U WITH DIAERESIS
9B	155	Š	356	LATIN CAPITAL LETTER S WITH CARON
9C	156	š	357	LATIN SMALL LETTER S WITH CARON
9D	157	Ł	321	LATIN CAPITAL LETTER L WITH STROKE
9F	159	č	269	LATIN SMALL LETTER C WITH CARON

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
A0	160	á	225	LATIN SMALL LETTER A WITH ACUTE
A1	161	í	237	LATIN SMALL LETTER I WITH ACUTE
A2	162	ó	243	LATIN SMALL LETTER O WITH ACUTE
A3	163	ú	250	LATIN SMALL LETTER U WITH ACUTE
A4	164	Ą	260	LATIN CAPITAL LETTER A WITH OGONEK
A5	165	ą	261	LATIN SMALL LETTER A WITH OGONEK
A6	166	Ž	381	LATIN CAPITAL LETTER Z WITH CARON
A7	167	ž	382	LATIN SMALL LETTER Z WITH CARON
A8	168	Ę	280	LATIN CAPITAL LETTER E WITH OGONEK
A9	169	ę	281	LATIN SMALL LETTER E WITH OGONEK
AB	171	ź	378	LATIN SMALL LETTER Z WITH ACUTE
AC	172	Č	268	LATIN CAPITAL LETTER C WITH CARON
AD	173	š	351	LATIN SMALL LETTER S WITH CEDILLA
B5	181	Á	193	LATIN CAPITAL LETTER A WITH ACUTE
B6	182	Â	194	LATIN CAPITAL LETTER A WITH CIRCUMFLEX
B7	183	Ě	282	LATIN CAPITAL LETTER E WITH CARON
B8	184	Ş	350	LATIN CAPITAL LETTER S WITH CEDILLA
BD	189	Ž	379	LATIN CAPITAL LETTER Z WITH DOT ABOVE
BE	190	ž	380	LATIN SMALL LETTER Z WITH DOT ABOVE
C6	198	Ă	258	LATIN CAPITAL LETTER A WITH BREVE
C7	199	ă	259	LATIN SMALL LETTER A WITH BREVE
D0	208	đ	273	LATIN SMALL LETTER D WITH STROKE
D1	209	Đ	272	LATIN CAPITAL LETTER D WITH STROKE
D2	210	Ď	270	LATIN CAPITAL LETTER D WITH CARON
D3	211	Ë	203	LATIN CAPITAL LETTER E WITH DIAERESIS
D4	212	ď	271	LATIN SMALL LETTER D WITH CARON
D5	213	Ň	327	LATIN CAPITAL LETTER N WITH CARON
D6	214	Í	205	LATIN CAPITAL LETTER I WITH ACUTE
D7	215	Î	206	LATIN CAPITAL LETTER I WITH CIRCUMFLEX
D8	216	ě	283	LATIN SMALL LETTER E WITH CARON
DD	221	Ť	354	LATIN CAPITAL LETTER T WITH CEDILLA
DE	222	Û	366	LATIN CAPITAL LETTER U WITH RING ABOVE
E0	224	Ó	211	LATIN CAPITAL LETTER O WITH ACUTE
E1	225	ß	223	LATIN SMALL LETTER SHARP S
E2	226	Ô	212	LATIN CAPITAL LETTER O WITH CIRCUMFLEX
E3	227	Ń	323	LATIN CAPITAL LETTER N WITH ACUTE

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
E4	228	ń	324	LATIN SMALL LETTER N WITH ACUTE
E5	229	ň	328	LATIN SMALL LETTER N WITH CARON
E6	230	Š	352	LATIN CAPITAL LETTER S WITH CARON
E7	231	š	353	LATIN SMALL LETTER S WITH CARON
E8	232	Ř	340	LATIN CAPITAL LETTER R WITH ACUTE
E9	233	Ú	218	LATIN CAPITAL LETTER U WITH ACUTE
EA	234	ř	341	LATIN SMALL LETTER R WITH ACUTE
EB	235	Ů	368	LATIN CAPITAL LETTER U WITH DOUBLE ACUTE
EC	236	ý	253	LATIN SMALL LETTER Y WITH ACUTE
ED	237	Ý	221	LATIN CAPITAL LETTER Y WITH ACUTE
EE	238	ť	355	LATIN SMALL LETTER T WITH CEDILLA
F8	248	°	176	DEGREE SIGN
FB	251	ú	369	LATIN SMALL LETTER U WITH DOUBLE ACUTE
FC	252	Ř	344	LATIN CAPITAL LETTER R WITH CARON
FD	253	ř	345	LATIN SMALL LETTER R WITH CARON

Table 5. Character Settings (Turkey)

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
20	32		32	SPACE
23	35	#	35	NUMBER SIGN
24	36	\$	36	DOLLAR SIGN
25	37	%	37	PERCENT SIGN
26	38	&	38	AMPERSAND
27	39	'	39	APOSTROPHE
28	40	(	40	LEFT PARENTHESIS
29	41	)	41	RIGHT PARENTHESIS
2E	46	.	46	FULL STOP
30	48	0	48	DIGIT ZERO
31	49	1	49	DIGIT ONE
32	50	2	50	DIGIT TWO
33	51	3	51	DIGIT THREE
34	52	4	52	DIGIT FOUR
35	53	5	53	DIGIT FIVE
36	54	6	54	DIGIT SIX
37	55	7	55	DIGIT SEVEN

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
38	56	8	56	DIGIT EIGHT
39	57	9	57	DIGIT NINE
3A	58	:	58	COLON
40	64	@	64	COMMERCIAL AT
41	65	A	65	LATIN CAPITAL LETTER A
42	66	B	66	LATIN CAPITAL LETTER B
43	67	C	67	LATIN CAPITAL LETTER C
44	68	D	68	LATIN CAPITAL LETTER D
45	69	E	69	LATIN CAPITAL LETTER E
46	70	F	70	LATIN CAPITAL LETTER F
47	71	G	71	LATIN CAPITAL LETTER G
48	72	H	72	LATIN CAPITAL LETTER H
49	73	I	73	LATIN CAPITAL LETTER I
4A	74	J	74	LATIN CAPITAL LETTER J
4B	75	K	75	LATIN CAPITAL LETTER K
4C	76	L	76	LATIN CAPITAL LETTER L
4D	77	M	77	LATIN CAPITAL LETTER M
4E	78	N	78	LATIN CAPITAL LETTER N
4F	79	O	79	LATIN CAPITAL LETTER O
50	80	P	80	LATIN CAPITAL LETTER P
51	81	Q	81	LATIN CAPITAL LETTER Q
52	82	R	82	LATIN CAPITAL LETTER R
53	83	S	83	LATIN CAPITAL LETTER S
54	84	T	84	LATIN CAPITAL LETTER T
55	85	U	85	LATIN CAPITAL LETTER U
56	86	V	86	LATIN CAPITAL LETTER V
57	87	W	87	LATIN CAPITAL LETTER W
58	88	X	88	LATIN CAPITAL LETTER X
59	89	Y	89	LATIN CAPITAL LETTER Y
5A	90	Z	90	LATIN CAPITAL LETTER Z
5F	95	_	95	LOW LINE
61	97	a	97	LATIN SMALL LETTER A
62	98	b	98	LATIN SMALL LETTER B
63	99	c	99	LATIN SMALL LETTER C
64	100	d	100	LATIN SMALL LETTER D
65	101	e	101	LATIN SMALL LETTER E

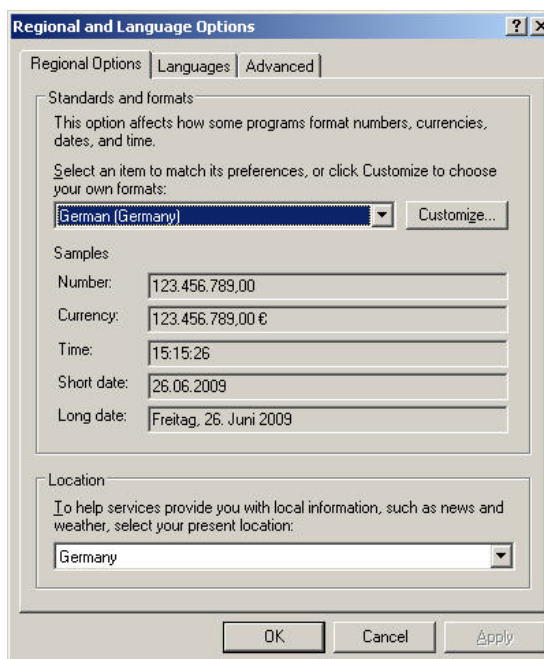
Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
66	102	f	102	LATIN SMALL LETTER F
67	103	g	103	LATIN SMALL LETTER G
68	104	h	104	LATIN SMALL LETTER H
69	105	i	105	LATIN SMALL LETTER I
6A	106	j	106	LATIN SMALL LETTER J
6B	107	k	107	LATIN SMALL LETTER K
6C	108	l	108	LATIN SMALL LETTER L
6D	109	m	109	LATIN SMALL LETTER M
6E	110	n	110	LATIN SMALL LETTER N
6F	111	o	111	LATIN SMALL LETTER O
70	112	p	112	LATIN SMALL LETTER P
71	113	q	113	LATIN SMALL LETTER Q
72	114	r	114	LATIN SMALL LETTER R
73	115	s	115	LATIN SMALL LETTER S
74	116	t	116	LATIN SMALL LETTER T
75	117	u	117	LATIN SMALL LETTER U
76	118	v	118	LATIN SMALL LETTER V
77	119	w	119	LATIN SMALL LETTER W
78	120	x	120	LATIN SMALL LETTER X
79	121	y	121	LATIN SMALL LETTER Y
7A	122	z	122	LATIN SMALL LETTER Z
7E	126	~	126	TILDE
80	128	Ç	199	LATIN CAPITAL LETTER C WITH CEDILLA
81	129	ü	252	LATIN SMALL LETTER U WITH DIAERESIS
82	130	é	233	LATIN SMALL LETTER E WITH ACUTE
83	131	âyyy	226	LATIN SMALL LETTER A WITH CIRCUMFLEX
84	132	ä	228	LATIN SMALL LETTER A WITH DIAERESIS
85	133	à	224	LATIN SMALL LETTER A WITH GRAVE
86	134	â	229	LATIN SMALL LETTER A WITH RING ABOVE
87	135	ç	231	LATIN SMALL LETTER C WITH CEDILLA
88	136	ê	234	LATIN SMALL LETTER E WITH CIRCUMFLEX
89	137	ë	235	LATIN SMALL LETTER E WITH DIAERESIS
8A	138	è	232	LATIN SMALL LETTER E WITH GRAVE
8B	139	ï	239	LATIN SMALL LETTER I WITH DIAERESIS
8C	140	î	238	LATIN SMALL LETTER I WITH CIRCUMFLEX
8D	141	ı	305	LATIN SMALL LETTER DOTLESS I

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
8E	142	Ä	196	LATIN CAPITAL LETTER A WITH DIAERESIS
8F	143	Å	197	LATIN CAPITAL LETTER A WITH RING ABOVE
90	144	É	201	LATIN CAPITAL LETTER E WITH ACUTE
91	145	æ	230	LATIN SMALL LETTER AE
92	146	Æ	198	LATIN CAPITAL LETTER AE
93	147	ô	244	LATIN SMALL LETTER O WITH CIRCUMFLEX
94	148	ö	246	LATIN SMALL LETTER O WITH DIAERESIS
95	149	ò	242	LATIN SMALL LETTER O WITH GRAVE
96	150	û	251	LATIN SMALL LETTER U WITH CIRCUMFLEX
97	151	ù	249	LATIN SMALL LETTER U WITH GRAVE
98	152	İ	304	LATIN CAPITAL LETTER I WITH DOT ABOVE
99	153	Ö	214	LATIN CAPITAL LETTER O WITH DIAERESIS
9A	154	Ü	220	LATIN CAPITAL LETTER U WITH DIAERESIS
9B	155	ø	248	LATIN SMALL LETTER O WITH STROKE
9D	157	Ø	216	LATIN CAPITAL LETTER O WITH STROKE
9E	158	Ş	350	LATIN CAPITAL LETTER S WITH CEDILLA
9F	159	ş	351	LATIN SMALL LETTER S WITH CEDILLA
A0	160	á	225	LATIN SMALL LETTER A WITH ACUTE
A1	161	í	237	LATIN SMALL LETTER I WITH ACUTE
A2	162	ó	243	LATIN SMALL LETTER O WITH ACUTE
A3	163	ú	250	LATIN SMALL LETTER U WITH ACUTE
A4	164	ñ	241	LATIN SMALL LETTER N WITH TILDE
A5	165	Ñ	209	LATIN CAPITAL LETTER N WITH TILDE
A6	166	Ĝ	286	LATIN CAPITAL LETTER G WITH BREVE
A7	167	ĝ	287	LATIN SMALL LETTER G WITH BREVE
A8	168	¿	191	INVERTED QUESTION MARK
B5	181	Á	193	LATIN CAPITAL LETTER A WITH ACUTE
B6	182	Â	194	LATIN CAPITAL LETTER A WITH CIRCUMFLEX
B7	183	À	192	LATIN CAPITAL LETTER A WITH GRAVE
C6	198	ã	227	LATIN SMALL LETTER A WITH TILDE
C7	199	Ã	195	LATIN CAPITAL LETTER A WITH TILDE
D2	210	Ê	202	LATIN CAPITAL LETTER E WITH CIRCUMFLEX
D3	211	Ë	203	LATIN CAPITAL LETTER E WITH DIAERESIS
D4	212	È	200	LATIN CAPITAL LETTER E WITH GRAVE
D6	214	Í	205	LATIN CAPITAL LETTER I WITH ACUTE
D7	215	Î	206	LATIN CAPITAL LETTER I WITH CIRCUMFLEX

Hex	Dec	Char	Unicode	ISO/IEC 10646-1:2000 Character Name
D8	216	ï	207	LATIN CAPITAL LETTER I WITH DIAERESIS
DE	222	ì	204	LATIN CAPITAL LETTER I WITH GRAVE
E0	224	Ó	211	LATIN CAPITAL LETTER O WITH ACUTE
E1	225	ß	223	LATIN SMALL LETTER SHARP S
E2	226	Ô	212	LATIN CAPITAL LETTER O WITH CIRCUMFLEX
E3	227	Ò	210	LATIN CAPITAL LETTER O WITH GRAVE
E4	228	õ	245	LATIN SMALL LETTER O WITH TILDE
E5	229	Õ	213	LATIN CAPITAL LETTER O WITH TILDE
E6	230	μ	181	MICRO SIGN
E9	233	Ú	218	LATIN CAPITAL LETTER U WITH ACUTE
EA	234	Û	219	LATIN CAPITAL LETTER U WITH CIRCUMFLEX
EB	235	Û	217	LATIN CAPITAL LETTER U WITH GRAVE
EC	236	ì	236	LATIN SMALL LETTER I WITH GRAVE
ED	237	ÿ	255	LATIN SMALL LETTER Y WITH DIAERESIS
F8	248	°	176	DEGREE SIGN

Procedure

1. In Windows, click Start>Settings>Control panel.
2. Double-click **Regional and Language Options**. The *Regional and Language Options* dialog box displays.

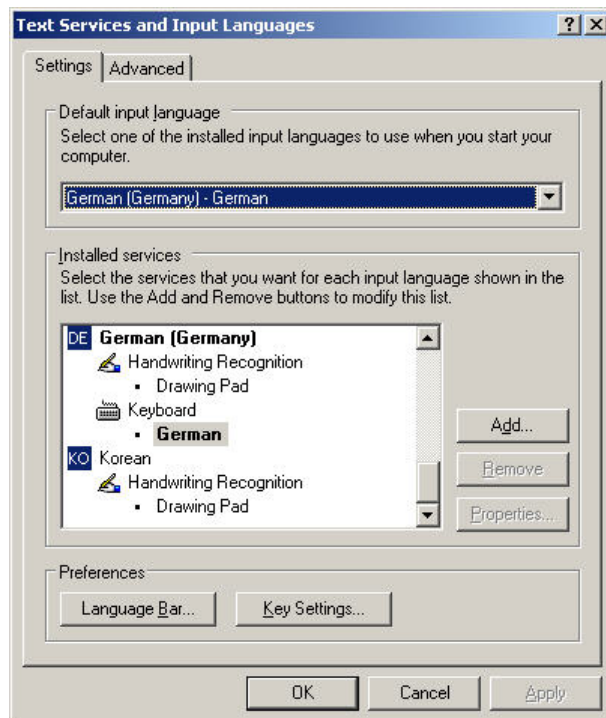


3. On the *Regional Options* tab under **Standards and formats**, select the language for displaying standards and formats such as format numbers, currencies, dates, and time.
4. Under **Location**, select the matching country for supporting you with local services such as news and weather.

5. Select the *Languages* tab.
6. If you want to support Arabic, Armenian, Georgian, Thai, Hebrew, Indic, Thai and Vietnamese languages, check **Install files for complex script and right-to-left languages (including Thai)**.
7. If you want to support Japanese, Chinese and Korean languages, check **Install files for East Asian languages** under **Supplemental language support**.
8. Make sure that you have the necessary harddisk space indicated in the message boxes displayed. Close the message boxes by clicking **OK**.

After confirming by clicking **OK** or **Apply**, the additional files will be installed on the PC.

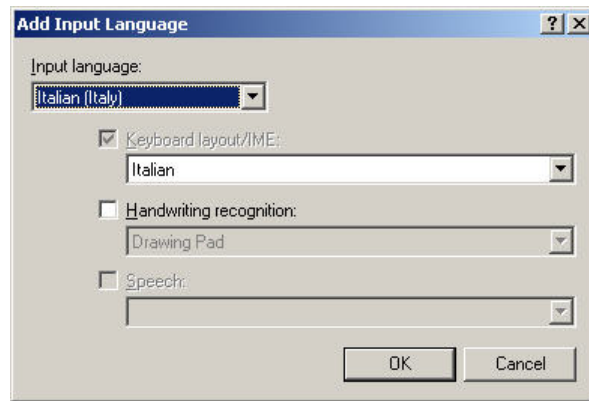
9. After successful installation, repeat steps 1 through 5, and then proceed with step 10.
10. Click **Details** button. The *Text Services and Input Languages* dialog box displays. The actual input language is selected in **Default input language** and the corresponding installed services are highlighted in bold under **Installed services**.



11. To add a new input language, click the **Add** button. The *Add Input Language* dialog box displays.



- In **Input Language**, select the language, in this case Italian. Check/select optional settings for Keyboard layout/IME, Handwriting recognition and Speech if available and if desired.



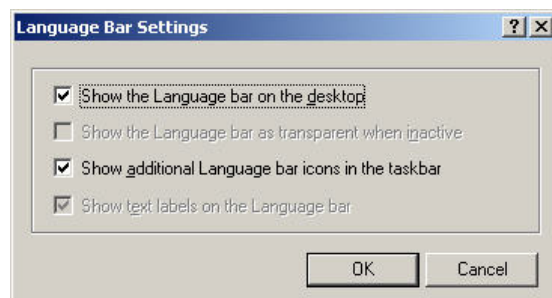
- Click **OK**. The new language and its services are added to the *Installed Services* list and can be selected as default input language.



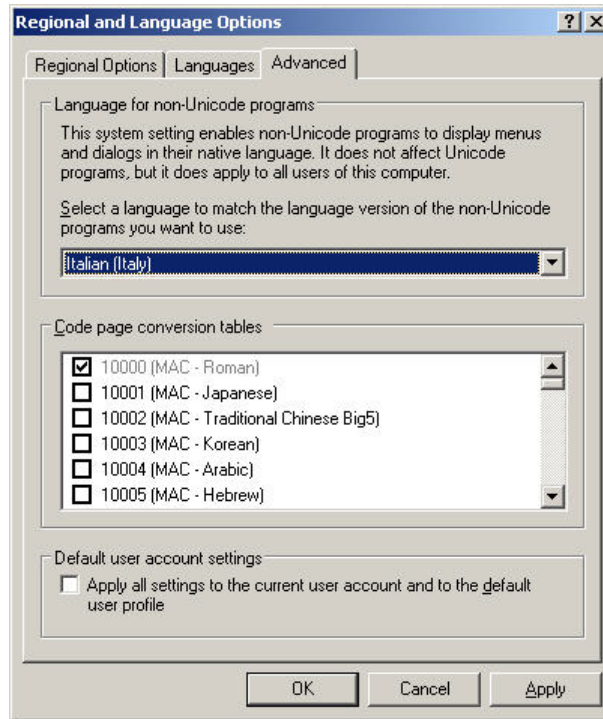
- In **Default input language**, select the language, in this case Italian.



15. In the *Text Services and Input Languages* dialog box, click the **Language bar** button. The *Language Bar Settings* dialog box displays. Check **Show the Language bar on the desktop** and **Show additional Language bar icons in the task bar**. These enabled options allow toggling between several language(s) on the desktop and in the taskbar after the customization is finished.

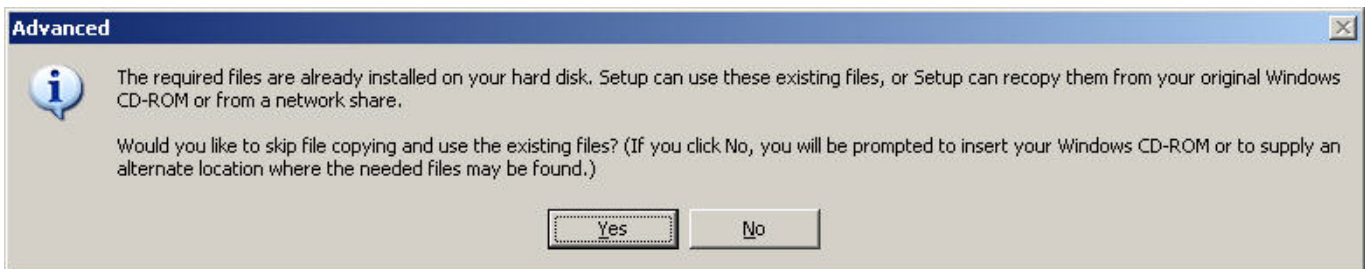


16. Click **OK**.
17. In the *Text Services and Input Languages* dialog box, click **OK**, and then select the *Advanced* tab in the *Regional and Language Options* dialog box.

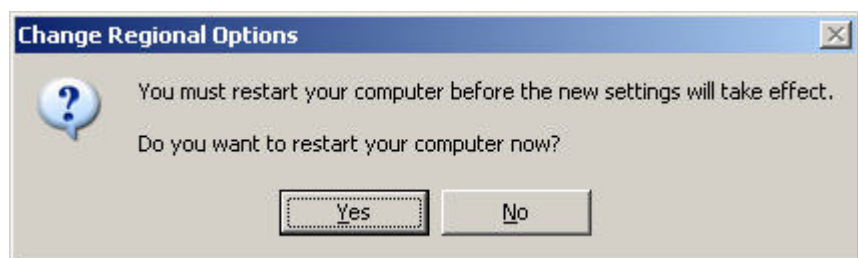


18. In **Language for non-Unicode programs**, select the language, in this case Italian.

19. Click **OK** to save all settings. The *Advanced* message box may display.



20. Follow the instructions described in the message box, and close the message box. The *Change Regional Options* message box displays.



21. Restart the PC by clicking **Yes**. After restart, the new language, in this case Italian is added to the *Language* bar.



22. Check the language in the *Language* bar.
23. For selecting the language in CARE, COACH, XL-Online respectively in COACH Online, please refer to the corresponding Online Help and/or PDF documentation.

QUICK TOURS

The following engineering steps are typical for Excel 800 / 600 / 500 / Smart / 100 / 80 / 50 controllers in CARE XL-5000 and are described in more detail in the subsequent sections:

- Create Project
- Set Global CARE Options
- Create Controller
- Create Plant
- Create Plant Schematic
- Modify Datapoints
- Assign Datapoints to Controller
- Develop Control Strategy
- Develop Switching Logic
- Create Time Program
- Design and Configure C-Bus Network
- Startup Controller
- Generate Documentation

For special information on basic engineering of LON controllers and BACnet controllers refer to the LonWorks Engineering and Excel Web Controller chapters.

Create Project

Purpose Define project name, password, and general information such as reference number, client name, and order number. This information appears in the final documentation for the project, is used in pricing estimates, and controls access to the projects.

Procedure 1. Click menu item Project, then drop-down item New.

RESULT: The New Project dialog box displays.

New Project

Project Name:

Description:

Reference Number:

Customer:

Order Number :

Discount: %

Job Factor:

Project Engineer:

Date:

User Addresses:

Units of Measurement

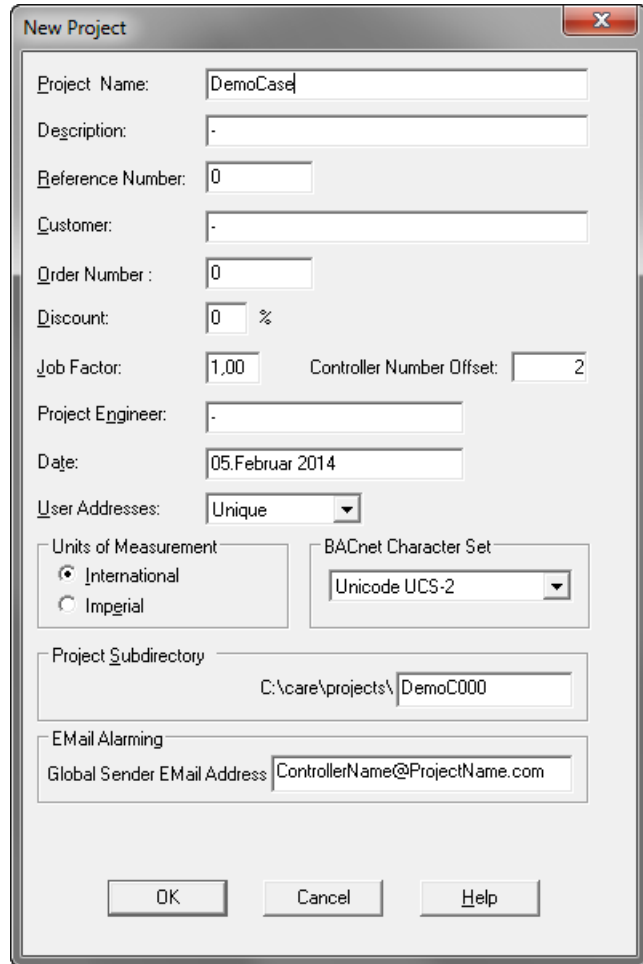
International

Imperial

Project Subdirectory

OK Cancel Help

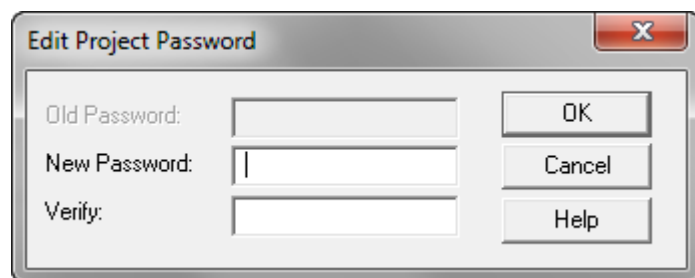
CARE-XL-5000: New Project dialog box



CARE-BACnet: New Project dialog box

2. Enter information in all fields. In some fields defaults are displayed. Do not leave any fields blank. For detailed information on the fields and listbox values, please refer to the PROJECTS DEFINITION AND MANAGEMENT section.
3. Click **OK** (or press **Enter** key) to close dialog box and create project. All fields must have entries or the **OK** button is inactive.

RESULT: In CARE-XL 5000, the Edit Project Password dialog box displays.



NOTE: In CARE XL 5000, the input of a password is not necessary. If applied, a password must have at least 5 characters and can have maximum 15 characters. For the password, any combination of numbers, letters, and special characters like commas are possible.

RESULT: In CARE-BACnet, the Edit Project Passwords dialog box displays.

NOTE: In CARE-BACnet you must enter the following three passwords:

SystemAdmin

Allows general access to the project for the CARE user and unlimited web-browser access with SystemAdmin rights. The System Admin password must have at least 5 characters, but should have more characters, including upper & lower case, letters, numbers and special characters. It can have maximum 33 characters

XwAdmin

Allows restricted access to the Linux operating system of the controller including access to the tool and application directories. This allows setting up the controller including translation and connection, application upload and download, download of settings, download of graphics (UI Suite), firmware upgrade and reset of the configuration

Root

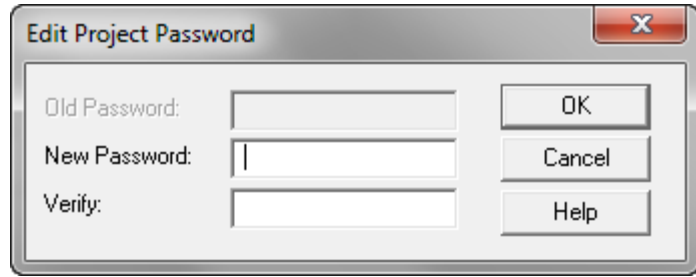
Allows unrestricted access to the Linux operating system of the controller via serial interface using a console

FTP user

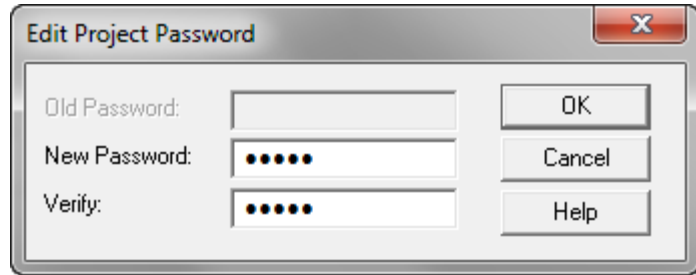
Allows uploading/downloading diagnostic files via FTP

For the root, XwAdmin, and FTP passwords, CARE proposes visible passwords. You can change these passwords as described in step 5. The XwAdmin, Root, and FTP passwords have 16 characters and can have maximum 33 characters.

For all passwords, any combination of numbers, letters, and special characters like commas are possible and should be used.



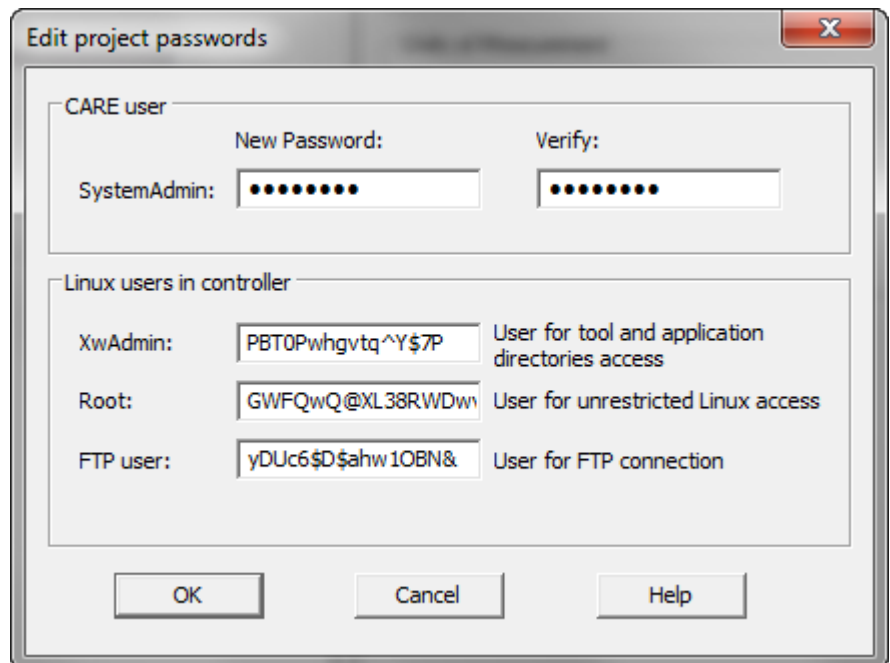
- For a CARE XL 5000 project, type in the password in **New Password** and **Verify** if desired, and then click the **OK** button. For a CARE-BACnet project continue with step 5.



CAUTION

If a password was entered, make a note of the password. No one can work on the project without knowing this password.

- For a CARE-BACnet project, enter the project password twice in **New Password** and **Verify**. This password is for the CARE user with **SystemAdmin** rights. When entering the passwords they are hidden.
- In **XwAdmin**, **Root**, and **FTP user** visible passwords are shown. If desired, change the passwords.

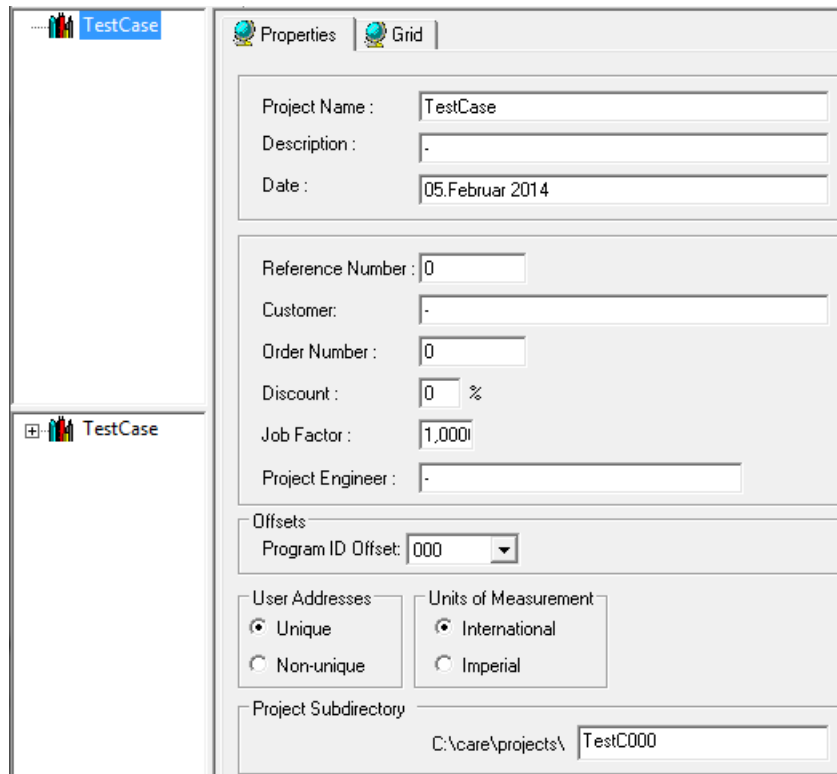


7. Then, click the **OK** button.

CAUTION

Make a note of all the passwords. No one can work on the project without knowing the SystemAdmin password. No one can setup the controller in CARE without knowing the XwAdmin password. No one can access the controller via a console without knowing the Root password.

RESULT: The Project is created and displayed twice, in the logical plant tree and in the network tree. On the right pane, the project properties are displayed.



The screenshot displays the 'Project Properties' dialog box in the CARE software. The dialog is titled 'TestCase' and has two tabs: 'Properties' and 'Grid'. The 'Properties' tab is selected, showing the following fields:

- Project Name:** TestCase
- Description:** -
- Date:** 05.Februar 2014
- Reference Number:** 0
- Customer:** -
- Order Number:** 0
- Discount:** 0 %
- Job Factor:** 1,000
- Project Engineer:** -
- Offsets:** Program ID Offset: 000
- User Addresses:** Unique, Non-unique
- Units of Measurement:** International, Imperial
- Project Subdirectory:** C:\care\projects\ TestC000

CARE-XL-5000: Project Properties

CARE-BACnet: Project Properties

- Continue by setting default settings as described under the “Set Global CARE Options” section.

Set Global CARE Options

Purpose To set global settings for the project and the different buses (C-Bus, LonWorks, and BACnet).

These settings are project-related and will be applied globally within the project. Global settings include the following:

- Default project settings such as project description and simultaneous NV renaming in case of datapoint renaming etc.
- Default LON properties settings such as default connection settings and channel limit
- XL 500/800 Controller settings for translation, LiveCARE, etc.
- BACnet Controller settings such as timeouts, etc.
- LNS Synchronization options
- Backup/Restore
- Email Alarming

Procedure 1. Click on menu item Options, then submenu item Global Options.

RESULT: The *Global Options* dialog box displays.

The screenshot shows the 'Global Options' dialog box with the 'General' tab selected. The 'Project Default Settings' section contains the following fields:

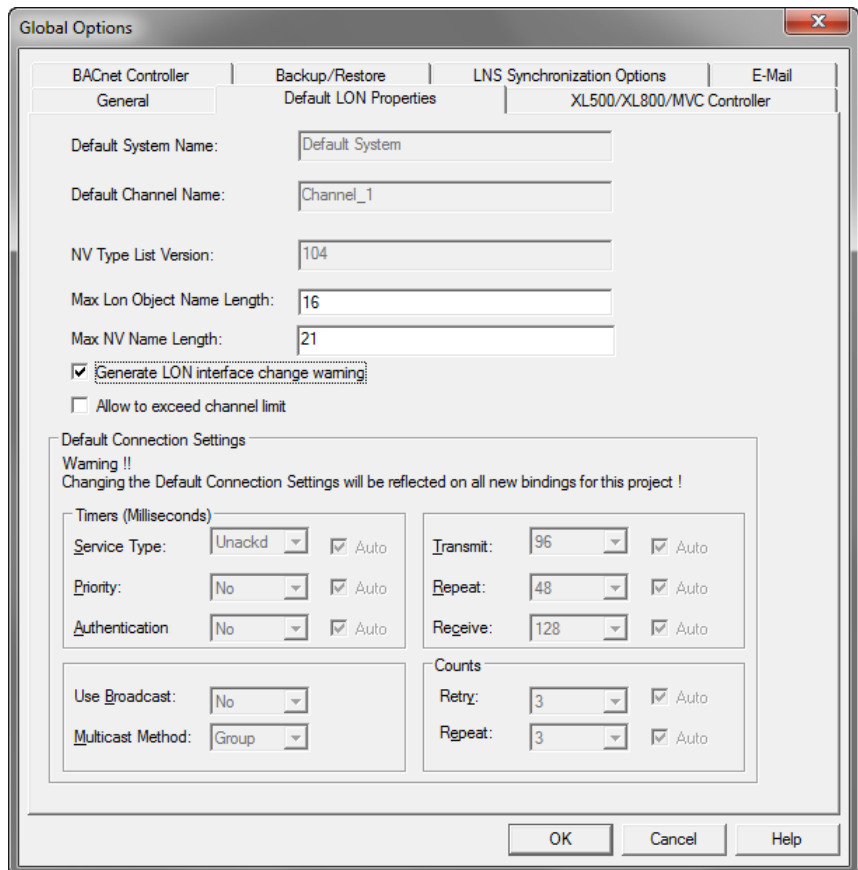
- Description: -
- Reference Number: 0
- Customer: -
- Order Number: 0
- Discount: 0 %
- Job Factor: 1
- Project Engineer: -

Below these fields are four checkboxes, all of which are currently unchecked:

- Rename mapped NV on Datapoint name change
- Rename Lon Object name on Plant name change
- Rename Event Enrollments on Controller/Plant/Datapoint name change
- Prevent automatic rename of Datapoint and NV names

At the bottom of the dialog are 'OK', 'Cancel', and 'Help' buttons.

2. On the *General* tab, enter **Project Default Settings**. For detailed description of the settings, please refer to the Create New Project section.
3. Check the **Rename mapped NV on Datapoint name change** option if you want a NV name to be changed accordingly when changing the referring datapoint name.
4. Check the **Rename Lon Object name on Plant name change** option if you want a Lon Object name to be changed accordingly when changing the referring plant name.
5. Check **Rename Event Enrollments on Controller/Plant/Datapoint name change** option if you want the names of event enrollments to be changed accordingly when changing the referring controller, plant, or datapoint name.
6. Check the **Prevent automatic rename of Datapoint and NV names** option if you want a NV name not to be changed accordingly when changing the referring datapoint name.
7. Continue by clicking the *Default LON Properties* tab.



RESULT: The default LON properties are shown. The Default System Name and Default Channel Name are displayed in disabled fields. These defaults have been set in the network tree and can be changed there at any time. The NV Type list Version displays the version number, which is useful for the Honeywell Technical Support Center (TAC) in case of updates.

8. Enter/change the following:

Max. Lon Object Name Length

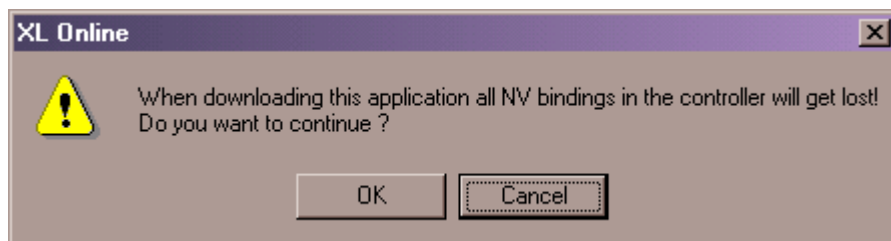
The max. Lon Object Name Length has to be considered when replicating plants. The length of NV object names is restricted to 16 characters. Names longer than 16 characters will abort the translation of the application and must be reworked. Defaults to 16.

Max. NV Name Length

The max. NV Name Length has to be considered when replicating plants. The length for NV names is restricted to 21 characters. Names longer than 21 will abort the translation of the application and must be reworked. Defaults to 21.

NOTE: The Max. NV Name Length should only be changed if longer names are desired for exclusive use of CARE, not in LNS (EBI).

9. Check the **Generate LON interface change warning** option if you want to display the following warning in case the LON interface has been changed.



That is, this warning will be displayed whenever you change the LON interface in the network tree by adding or deleting NVs and/or LON objects.

10. Check the **Allow to exceed channel limit** option if you want to allow exceeding the max. number of devices to be added to channels.

IMPORTANT

The physical layer of the LonTalk protocol is designed for max. 64 devices per channel in order to assure a properly working network. Exceeding that number of devices may cause electrical problems. When adding more than 64 devices to the channel, increased traffic on the LonWorks network may also cause problems. It is recommended to avoid exceeding the limits. Whenever it may become necessary to exceed the limit of 64 devices, it is recommended to use a repeater.

11. Under **Default Connection Settings**, check the settings that should be used for connections when creating bindings. Note that these settings will become valid only for bindings created from now on. If you are not an advanced user of LON technology, it is recommended to keep the settings as provided by CARE.

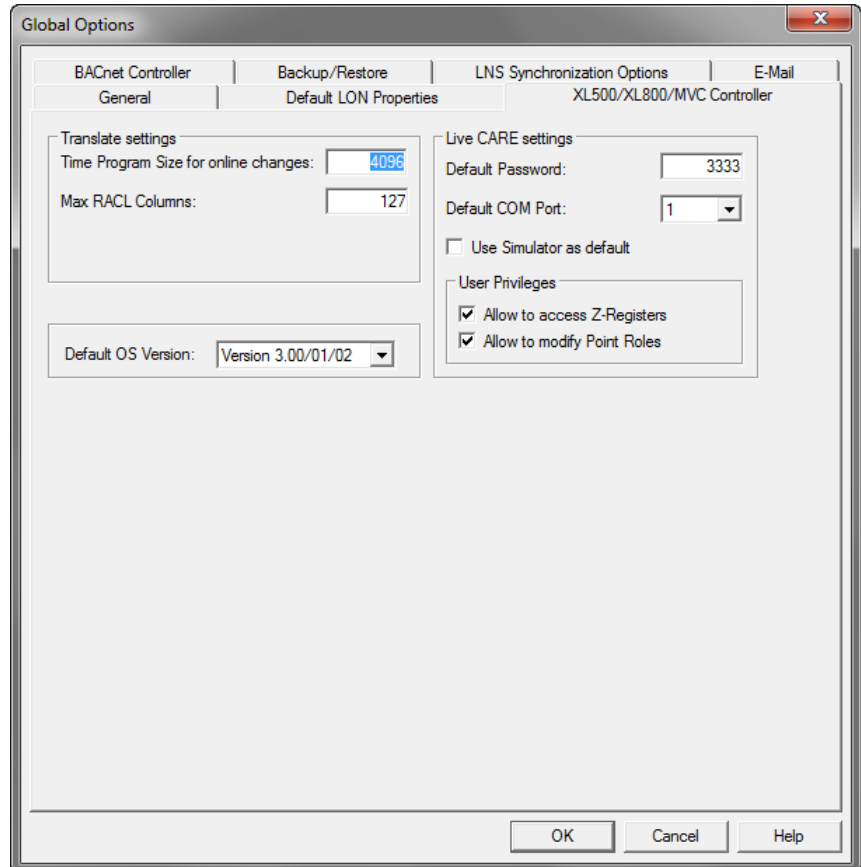
IMPORTANT

Multiple Bindings (Group Binding) and Address Table Entries Allocation

*When creating group binding (multiple bindings) by connecting one datapoint to multiple terminals of LON devices, CARE has an option to specify the broadcast type (**Use Broadcast** field). In order to save address table entries it is possible to use the binding type 'Yes, if group'. That will ensure that no address table entry is needed independent on how many bindings will be created.*

But, on LNS synchronization this may cause a problem because LNS issues one address table entry for each group binding. For controllers where all address tables are used up, a workaround could be to change the connection type to broadcast before performing the bindings (either in the Global Options dialog before performing the bindings or for each connection individually afterwards).

12. Continue by clicking the *XL500/800/MVC Controller* tab.



13. Enter/change the following:

Time Program Size for Online Changes

This value defines the enhanced buffer size in KBytes for online changes of the time program. Defaults to 4096.

Max. RACL Columns

This value defines the max. number of RACL columns. For XL 50 fixed applications it is recommended to set the value to 255.

Live CARE Settings

Here you select the default settings which will be set in the Live CARE *Communication* dialog box after starting Live CARE.

Default Password

The default password to automatically connect to the controller without the need of entering the password in the *Communication* dialog box, is 3333. If you change the password here, you must enter the same password in the *Communication* dialog box.

Default COM Port

Selects the Default COM Port that Live CARE uses for connection to the controller.

Use Simulator as default

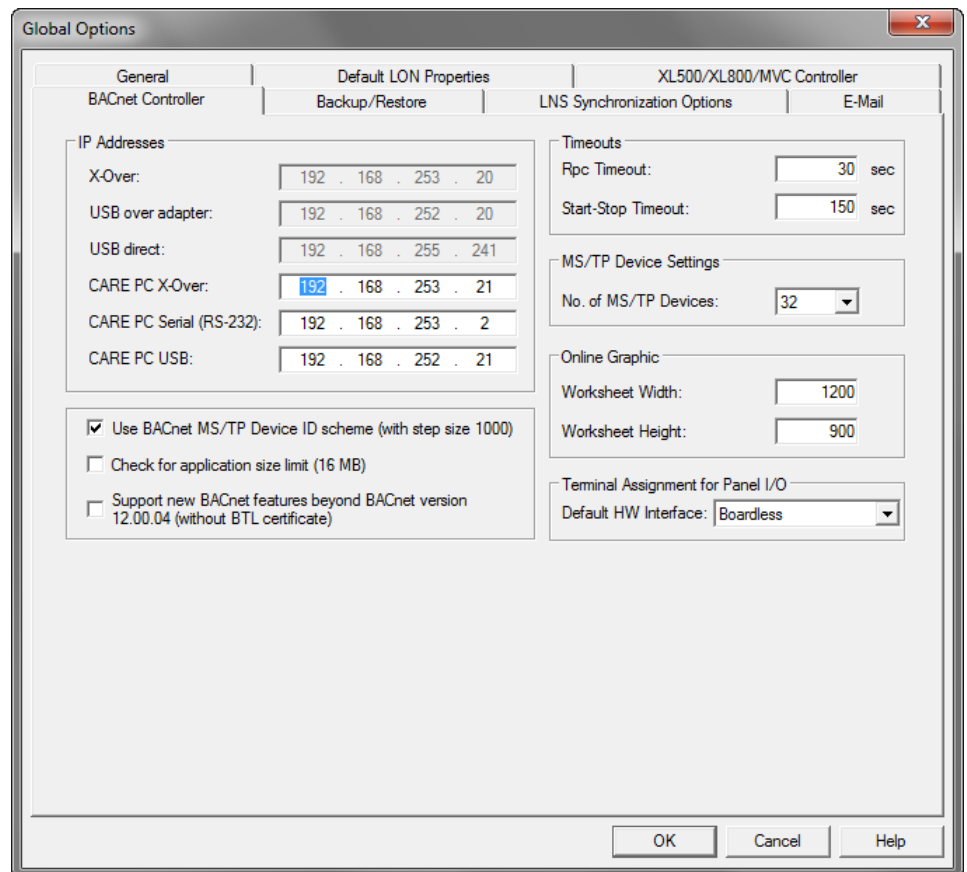
If checked, the Use Simulator option is preselected in the *Communication* dialog box. Then Live CARE simulates controller function via simulation software, but communicates not directly with a controller (online).

User Privileges

If checked, it allows to modify Z-Registers

If checked, it allows to modify point roles

14. Continue by clicking the *BACnet Controller* tab.



15. Enter/change desired values:

IP Addresses

X-Over
 USB over adapter
 USB direct

The IP Addresses above are defined defaults in the controller and cannot be changed.

The following local IP addresses are pre-defined default addresses the local PC can use when connecting to the Excel Web controller. Each address should match the original IP address issued when creating the corresponding connection (X-Over= crossover cable, Serial direct or USB). For detailed instructions on connection types, please refer to the Setup BACnet Controller chapter and its subsections. If an IP address displayed/entered here is not the same as in the corresponding network connection, an error message will be displayed when connecting to the controller via this connection.

CARE PC X-Over
 Crossover cable

Allows initial setup of the controller by local access like with USB cable, but with higher speed and temporary disconnection to the network.

CARE PC Serial (RS-232)

Using a null modem cable, the Excel Web controller can be connected to the PC via the RS232 interface.

CARE PC USB

For initial access to the controller, you must connect via USB cable.

Make sure that the local IP addresses of the above connection types match the original IP addresses of the connections. If an IP address of the connection has been changed, change the address here likewise.

For more information on PC - Excel Web network connections, please refer to the Excel Web User Guide, EN2B-0289GE51.

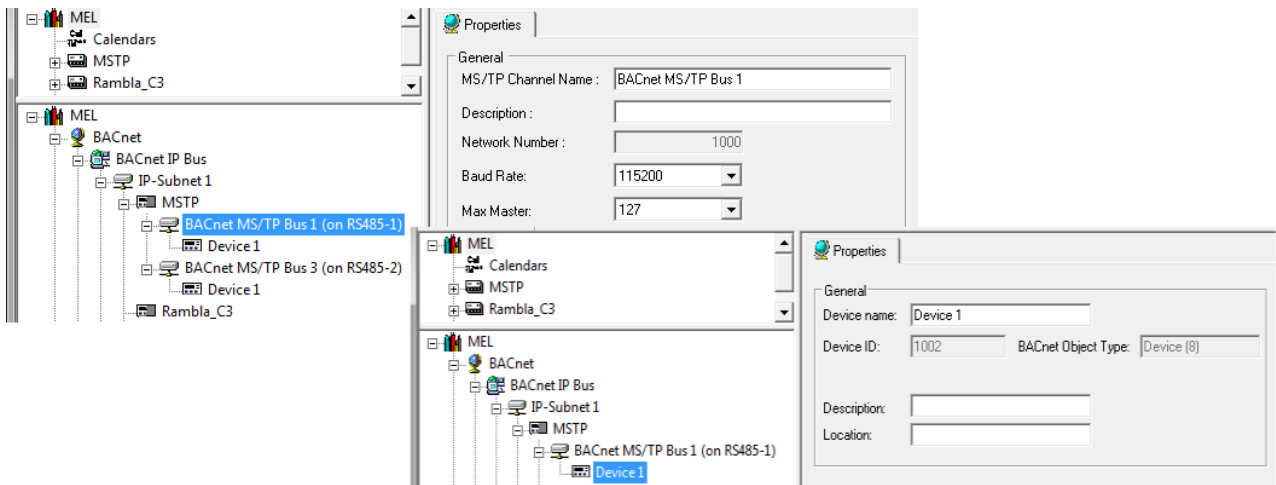
Use BACnet MS/TP Device ID scheme (with step size 1000)

If checked, for every controller created from now you can select a controller number in the range of 1000 through 65000 with steps of 1000. Already allocated numbers will be considered.

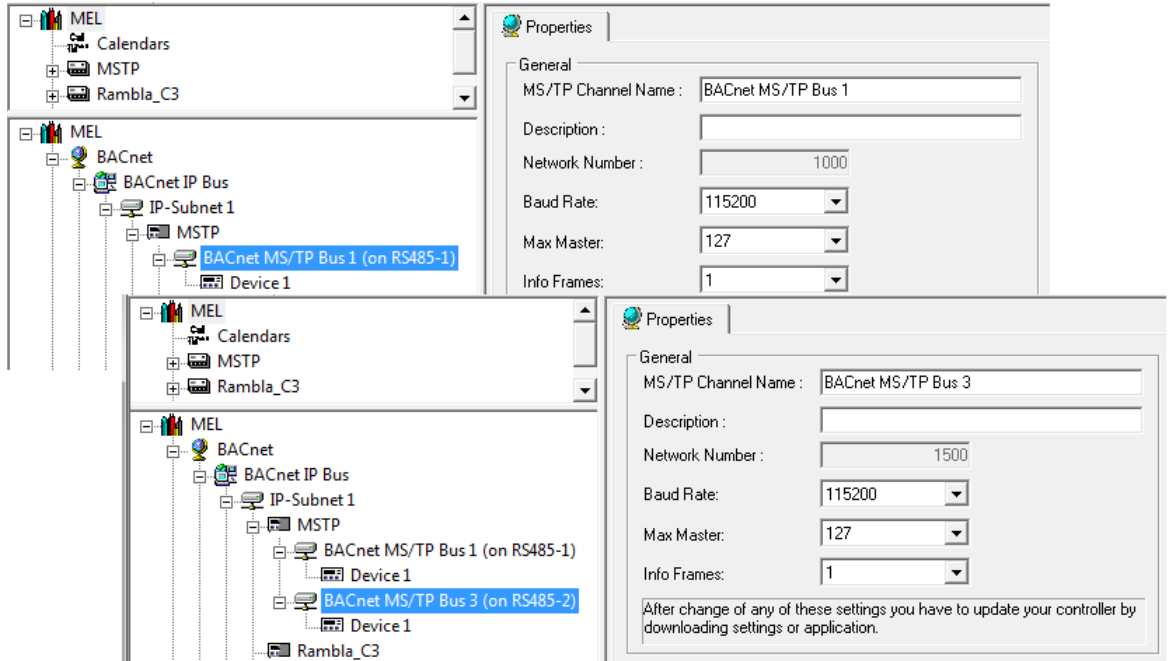
If unchecked, for every device (controller) created from now you can select a controller number in the range of 1 through 512 with steps of 1.

For both schemas, already allocated numbers will be considered. You can toggle the schema at any time.

When applying the schema option, it also affects the network number and device ID.

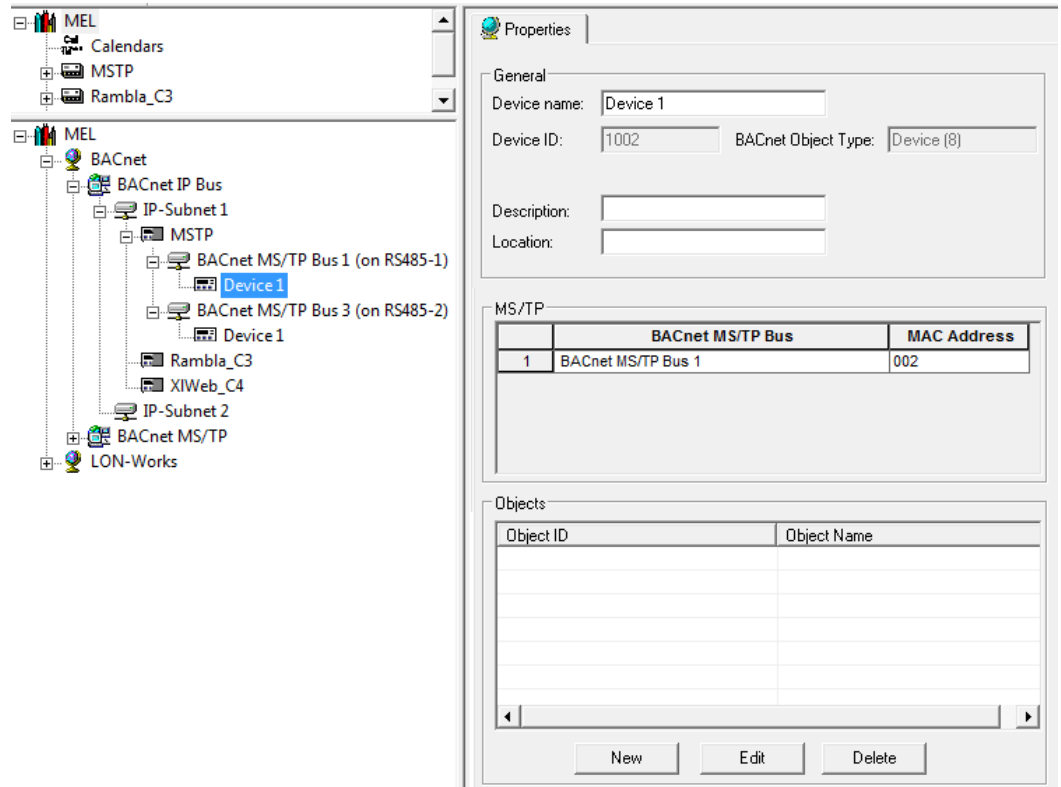


If a controller is created as first controller in the project and it has one BACnet MS/TP bus, this single BACnet MS/TP-1 bus will receive the same network number as the controller, starting with 1000. If a controller is created as first controller in the project and it has two BACnet MS/TP busses, the second BACnet MS/TP-2 bus will receive the network number 1500.



A device ID is assigned to any device belonging to the BACnet MS/TP bus (BACnet MS/TP 1 or BACnet MS/TP 2) according to the following formula:

$$\text{device ID} = \text{network number} + \text{MAC address}$$



Check for application size limit (16 MB)

If checked, CARE will check the application size during controller translation. When the size of 16 MB is extended, a warning will be displayed. If unchecked, no warning will be displayed if the application size is greater than 16 MB.

Support new BACnet features beyond BACnet version 12.00.04 (with BTL certificate)

If checked, CARE allows the creation of loop objects.

Timeouts

RPC Timeouts

This time sets the timeout for the communication between CARE and the BACnet controller.

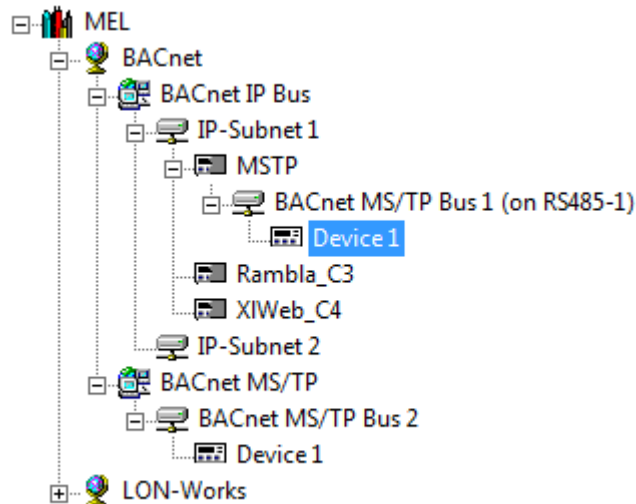
Start-Stop Timeout

This time sets the timeout for the Start and Stop commands initiated by CARE for the BACnet controller. If this time is decreased, the corresponding status message displays earlier. It is recommended to keep the default time for normal application sizes, for big application sizes it is recommended to increase the time to the desired value.

MS/TP Device Settings

No. of MS/TP Devices

This number defines the max. number of devices that can be created for a MS/TP bus. The MS/TP bus can have a pure MS/TP topology for integrating EAGLE controllers and BACnet 3rd party devices based on an already existing wired building channel, or it can be part of a BACnet IP network including panel bus and MS/TP bus.



Online Graphic

Worksheet Width

Shows the default width for online graphics.

Worksheet Height

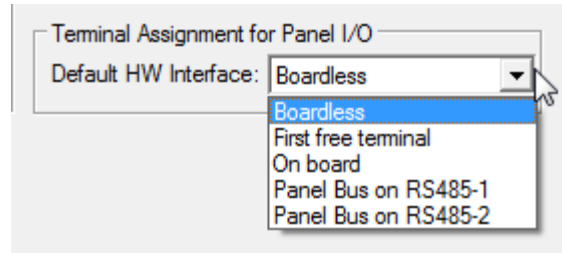
Shows the default height for online graphics.

Change the width and/or height values if desired.

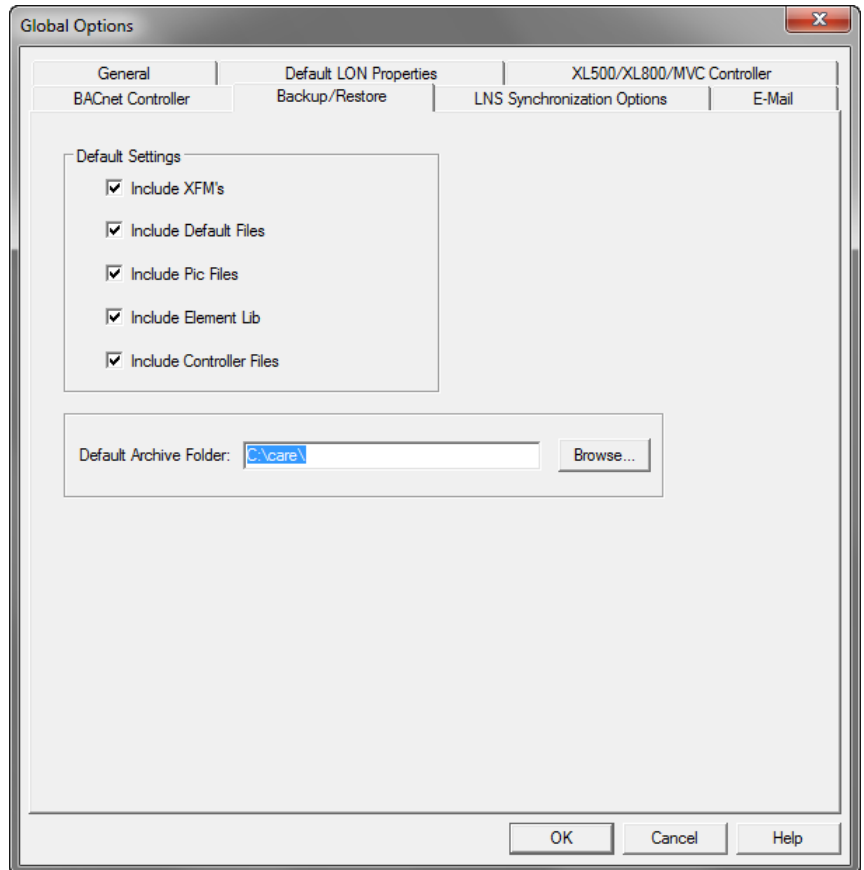
Terminal Assignment for Panel I/O

Default HW Interface

Defines the default hardware interface when using panel I/O modules. By default, datapoints will be assigned to the hardware interface selected.



16. Continue by clicking the *Backup / Restore* tab.



17. Select desired options:

Default Settings

For backups and restores in CARE, the listed items can be purposefully included/excluded from the backup and restore process.

NOTE: It is recommended to include all items. Items which are not included in a backup cannot be restored.

Check the items, you want to be included in a backup / restore.

Include XFMs (applies to CARE-XL 5000 only)

XFMs (Extended Function Modules) are applications (or subprograms) that can combine with other control icons, subprograms, or points to provide additional control strategy functionality. For details on XFMs, please refer to the "CONTROL STRATEGY" section and the Control Icons User Guide, EN2B-0184GE51.

Include Default Files (applies to CARE-XL 5000 only)

Default files can be customized for use in a specific area or region. Default files have a file extension of ID and correspond to different versions of controllers. For example, the default file for Excel 500 Controllers, OS Version 2.06, is

called xl_2_6.id. For OS Version 1.5, the file is called xl_1_5.id. For details on default files, please refer to the "DEFAULT TEXT EDITOR" section.

Include Pic Files

These are the segment graphics in the plant schematics

Include Element Lib (applies to CARE-XL 5000 only)

The Element library includes "Elements" (source records) for the segments that are available for each type of plant. For example, an air conditioning plant can have fan, sensor, and damper segments. The fan segment can include return and supply air fans in single and multiple configurations. For details on Element Library, refer to the "IMPORT THE ELEMENT LIBRARY" and the "EXPORT THE ELEMENT LIBRARY" sections.

Include Controller Files

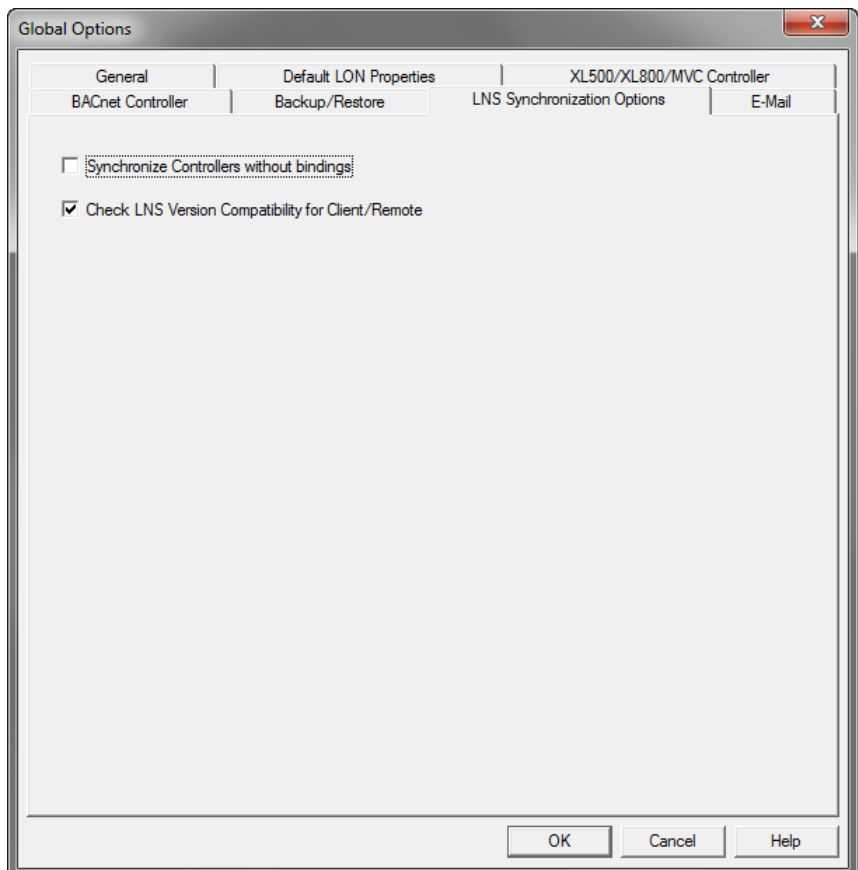
Controller files are multiple files (.IPL, .ADL, .KDX, .PRA, .RAZ, .RAP, and others) generated during controller translation for latter download into the controller.

NOTES: It is recommended to include all items. When backing up / restoring a project or the database you can include/exclude the same items in the corresponding dialog.

Default Archive Folder

Here you select the folder to/from which the selected items will be by default backed up/restored. Click **Browse** button, select the default folder, and then click OK. The selected folder will be displayed as default folder.

18. Continue by clicking the *LNS Synchronization Options* tab.



19. Select desired options:

Synynchronize Controllers without bindings

If checked, controllers without bindings will be available in LNS after Synchronization. If unchecked, such controllers will not be available after Synchronization.

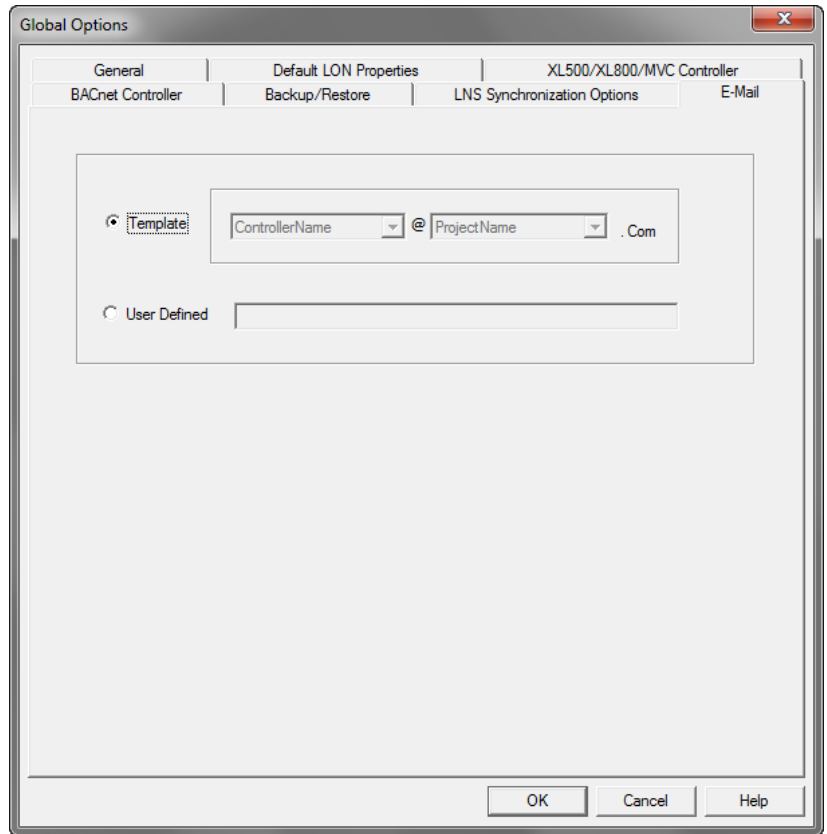
Check LNS Version Compatibility for Client/Remote

If checked, CARE displays a message if the local and remote LNS versions are not compatible. In case of incompatibility, synchronization will be aborted. To get a proper synchronization, please make sure you have compatible LNS versions. If unchecked, CARE does not check for compatibility and displays no message even if the LNS versions are incompatible. In this case, inconsistencies and failure results may occur in the remote LNS database.

NOTES: We recommend using the checked default options and using compatible LNS versions. We assure compatibility when using LNS 3.08 and LNS Turbo SP2 3.22 versions.

- 20. Continue by clicking the *E-Mail* tab (applies to CARE-XL Web only).

Here you enter the global email address for Email Alarming that CARE by default uses for each controller of the project. This email address can be changed later for each controller individually. See “Email Alarming” and “Create Excel Web” sections.



Template

Select this radio button, if the global sender email address of the controller should by default be as: <ControllerName><ProjectName>@.Com

User Defined

Select this radio button, if you want to use another address than the template address as global sender email address, and then enter the email address.

- 21. Confirm your settings by clicking OK.
- 22. Continue by creating a controller as described under the “Create Controller” section.

Create Controller

Purpose Create a new controller

- Procedure**
1. If not already highlighted in the logical plant tree, select the project.
 2. Click menu item Controller, then drop-down item New.

Or, click right mouse key and with left mouse key, click on Create Controller in the context menu.

RESULT: The New Controller dialog box displays.

3. Type a controller name (must be unique within the project). In this example, CONT01.
4. Tab to Bus Name (CARE XL-5000) or Subsystem/Subnet Name (CARE-BACnet). This field allows to select the subfolders, where the controller should be arranged. By default, software creates a folder named "Bus 1" (CARE XL-5000) and "IP-Subnet 1" (CARE-BACnet).

Click down arrow and select a subfolder.

5. Tab to Controller Number. Click down arrow and select a number from 1 through 30 (must be unique within the project). In this example 5.

NOTE: In CARE-BACnet, please note if a controller offset has been issued during project creation. In this case, only a controller number higher than the entered offset can be set here.

6. Tab to Controller Type. Tab to the next field to keep current type or click down arrow to display and select a different type.
7. Tab to Controller OS Version (the version of OS that will be running in the controller). Tab to the next field to keep the current version or click down arrow to display and select a different version.
8. Tab to Country Code (CARE XL-5000) or Location (CARE-BACnet). The operator interface is required to provide the correct language for the selected country. The default depends on the Windows™ version installed. Tab to the next field to keep it or click down arrow to display and select a different country.
9. Tab to Default File Set. Select the appropriate default file for the selected Controller OS Version. A short description for the selected default file set is given below the drop down list box.
10. Tab to Units of Measurement. Select whether the controller should use International (metric) or Imperial units in Control Strategy EMS icons. This selection controls whether inputs are accepted in Celsius or Fahrenheit.
11. Tab to Hardware Type (CARE-BACnet only). Select the hardware type.
12. Tab to Power Supply. Select desired module type. Power supply applies only to Excel 800, 500 and 600 controllers.
13. Tab to Installation Type. Normal installation is the default selection. If the controller has high-density digital inputs, select Cabinet Door Installation. Installation Type applies only to Excel 800, 500 and 600 controllers.
14. Tab to Wiring type and select desired type (screw terminals or flat strip cabling). Wiring type applies only to Excel 50 controllers.
15. Tab to LON (applies only to Excel 500 controllers OS version 2.04). Select desired configuration:

Shared / Open LON I/O

Allows multiple controllers with its distributed I/O modules residing on one physical LON-bus and/or integration of additional Open LON devices.

NOTE: For this configuration, the controller must contain the 3120E5 LON chip. In Shared configuration only the following distributed I/O modules can be used: XFL521B, XFL522B, XFL523B, XFL524B.

Local

Allows just one controller with its distributed I/O modules residing on one physical LON-bus.

NOTE: For this configuration, controllers containing the 3120E5 LON chip and earlier controller models containing the 3120B1 LON chip can be used. In Local configuration the following distributed I/O modules can be used: XFL521, XFL522A, XFL523, XFL524A. If B-types of distributed I/Os shall be used, the backwards compatibility must be enabled by pressing service while turning hex switch.

For detailed information on the configuration, please refer to the Define LonWorks Network Architecture section.

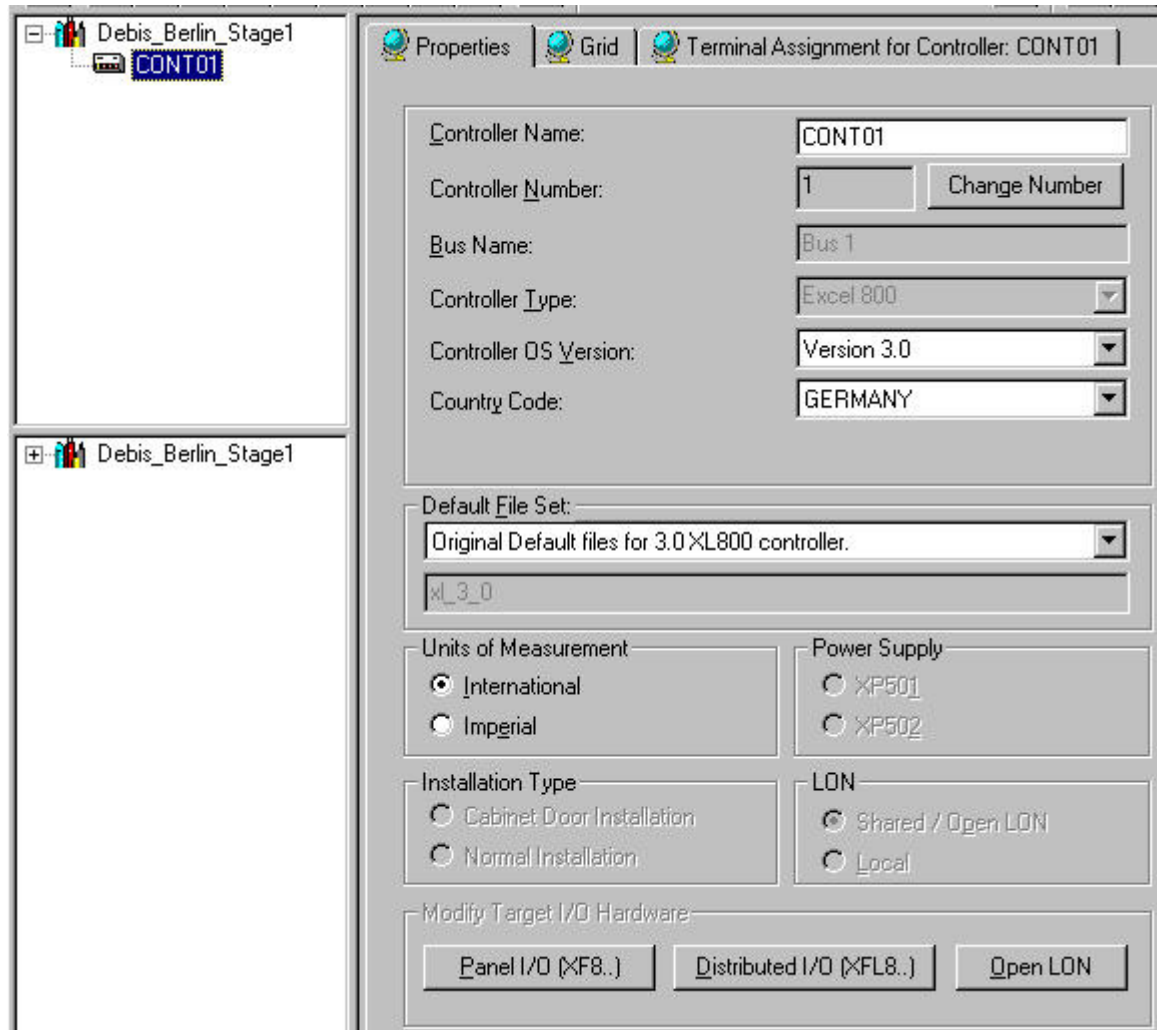
Refer to the Controllers with changeable Hardware Configuration section for a detailed introduction into system configuration. Refer to the Terminal Assignment Tool section for assigning the neuron IDs to the modules.

16. Click **OK**.

RESULT: The new controller is created and displayed four times in all:

- Once in the logical plant tree
- Once in the C-Bus folder
- Once in the Channels folder
- Once in the Default System folder

On the right pane, the controller properties are displayed.



17. Continue by creating plants as described under the Create Plant section.

Create Plant

Purpose	Define a plant name, select a plant type and preferred target I/O hardware, and preassign a controller (if desired).
Attached/Unattached Plants	A plant is automatically attached to the selected controller. To create unattached plants in the beginning, the project instead of the controller must be selected. Plants can be detached or re-attached by simply dragging&dropping them to the desired destination (controller, project).
Procedure	<ol style="list-style-type: none"> 1. If not already highlighted in the logical plant tree, select the controller, you want attach the plant to. 2. Click menu item Plant, then drop-down item New. <p>Or, click right mouse key and with left mouse key, click on Create Plant in the context menu.</p> <p>RESULT: The New Plant dialog box displays.</p>

3. Type a plant name in the Name field (the new name cannot match an existing plant name in the project). Maximum 30 alphanumeric characters; no spaces; first character cannot be a number.
4. Type a additional description in the Description field (CARE-BACnet only).
5. From the Plant Type drop down listbox (CARE-XL5000 only), select desired type:

Air Conditioning	Air handler or fan system building blocks.
Chilled Water	Cooling tower, condenser water pumps, and chiller building blocks.
Elink	Elements that represent system points for Excel 10 Controllers.
Hot Water	Boilers, converters, and hot water system building blocks.
MacroCel	Air handling unit of moderate control complexity building blocks
MicroCel	VAV box, small central air handler, converter and exhaust fan building blocks
W7620	Individual HVAC zone equipment
W7620WSHP	Water source heat pump building blocks
XLink	Master plant that contains the system points for MicroCel, MacroCel, W7620 and W7620WSHP subsystem plants.

6. From the Plant OS Version drop down listbox select desired version (CARE-XL5000 only). This number is the OS version of the controller where the plant will be downloaded. See Appendix for rules on upgrading/downgrading controller versions.
7. From the Plant Default File Set drop down listbox (CARE-XL5000 only), select desired plant default file. Plant default files are customized project defaults for use in specific areas or regions generated in the Default Text editor (see

Default Text Editor section). A short description for the selected default file set is given below the drop-down list box.

- 8. Under Units of Measurement (CARE-XL5000 only), select the desired type for the plant, International (metric) or Imperial. This selection tells the Control Strategy EMS icons which type of inputs to accept, Celsius or Fahrenheit. Units of Measurement applies not to ELink applications.

- 9. Under Preferred Target I/O Hardware (CARE XL-5000 only), select desired target I/O hardware:

Standard I/O (XF5..)
 (applicable to Excel 500 and 50 with OS 2.0 - 2.06).
 Hardware points of this plant will be assigned to XF5.. modules (IP bus).

Panel I/O (XF8..)
 (applicable to Excel 800, OS 3.00 only)
 Hardware points of this plant will be assigned to XF8.. modules (panel bus).

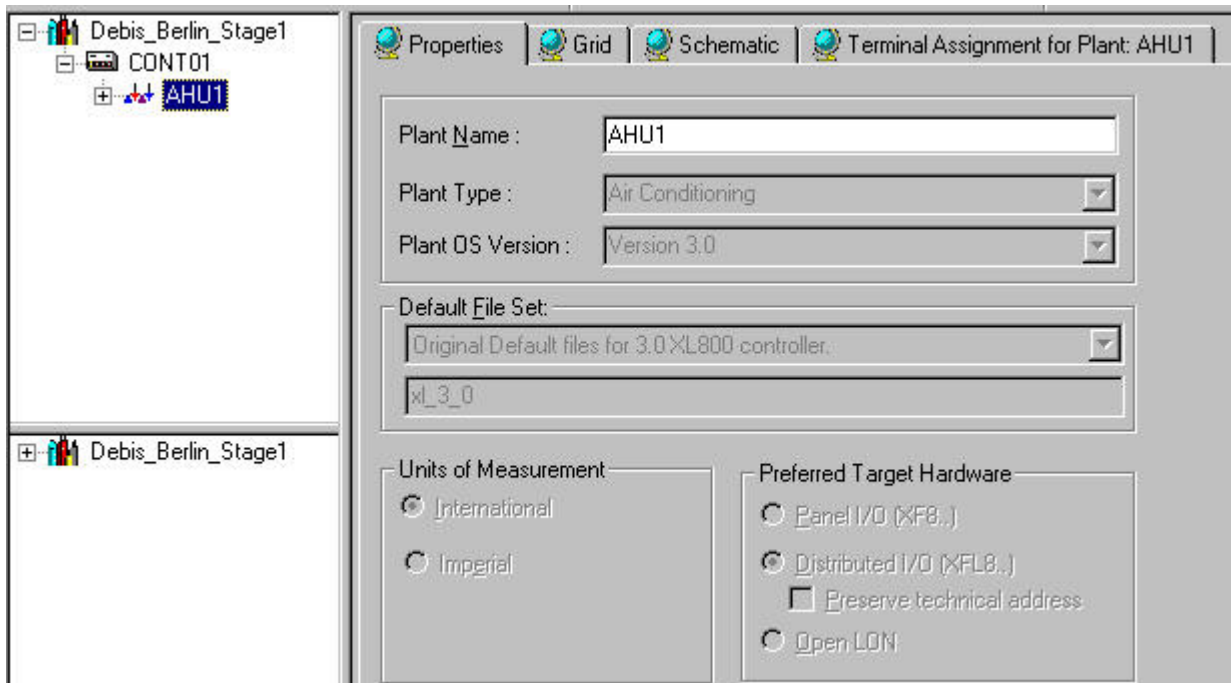
Distributed I/O (XFL5..)
 (applicable to Excel 500 and Smart with OS 2.0 - 2.04).
 Hardware points of this plant will be assigned to XFL5.. modules. (LonWorks-bus).

Distributed I/O (XFL8..)
 (applicable to Excel 800, OS 3.00 only).
 Hardware points of this plant will be assigned to XFL8.. modules (LonWorks-bus).

Open LON
 Hardware points of this plant will be boardless, that is, unassigned (applicable to Excel 800, 500, Smart, 50 with OS 2.06 and higher, and Excel 10)

- 10. Click **OK**.

RESULT: The new plant is created and automatically attached to the controller. It is displayed in the logical plant tree. On the right pane, the plant properties are displayed.



- 11. Continue by creating the plant schematic as described under the Create Plant Schematic section.

Create Plant Schematic

Purpose To provide control over the system operation.

To get a good control of the plant a minimum number of datapoints are required. These datapoints are automatically created by drawing a graphical plant schematic or by quickly creating datapoints without graphics. Both procedures can be combined.

NOTE: For the EXCEL WEB and EXCEL WEB II controllers (CARE-BACnet) schematic creation is not possible.

NOTE: For the ELink controller, schematic and quick datapoint creation is not possible.

Draw Plant Schematic When drawing a plant schematic you define the equipment of the plant and how it works together. A plant schematic is a combination of graphical segments such as boilers, heaters, and pumps. Segments consist of equipment such as sensors, status points, valves, and pumps. Each segment has an associated minimum number of datapoints required for good control.

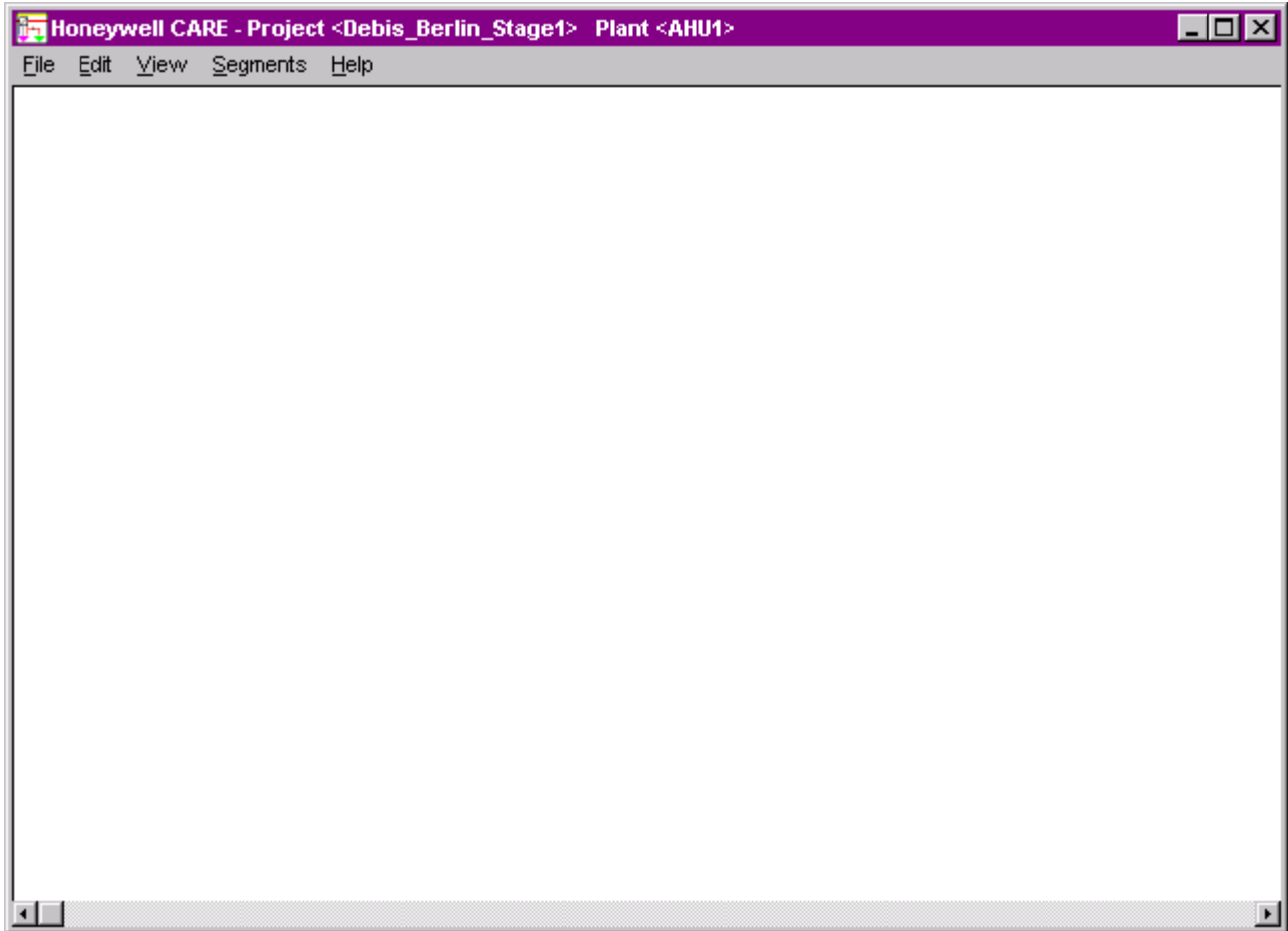
Creation of HW/SW Points without Graphic In comparison to drawing a plant schematic, datapoints without graphics can quickly be generated. These quick creation can include hardware as well as software points.

For detailed information on point types, please refer to the PLANT SCHEMATICS section.

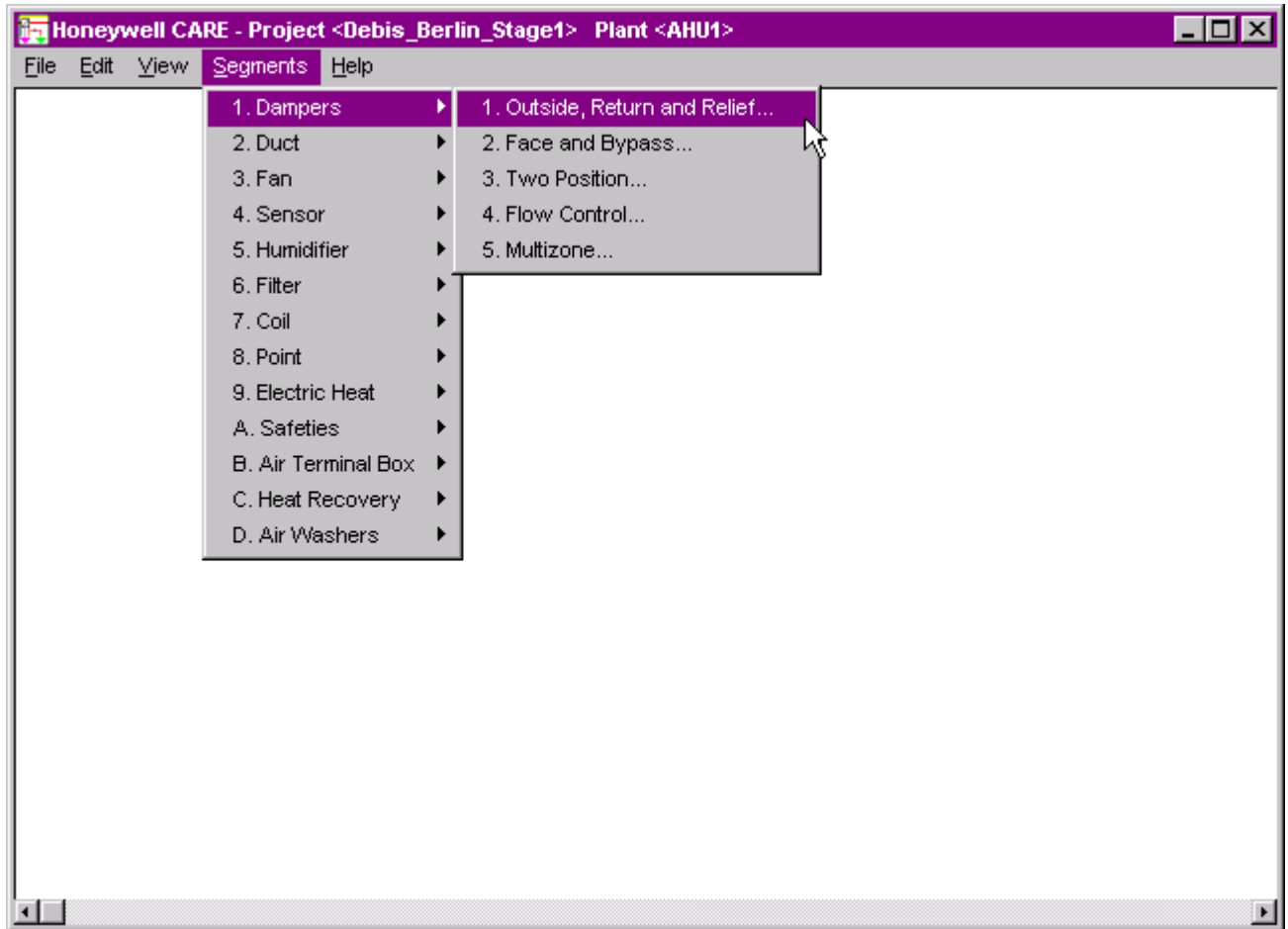
Procedures **A) Draw Plant Schematic**

1. If not already highlighted in the logical plant tree, select the plant.
2. Click menu item Plant, then drop-down item Schematic.

RESULT: The Schematic Main Window displays.

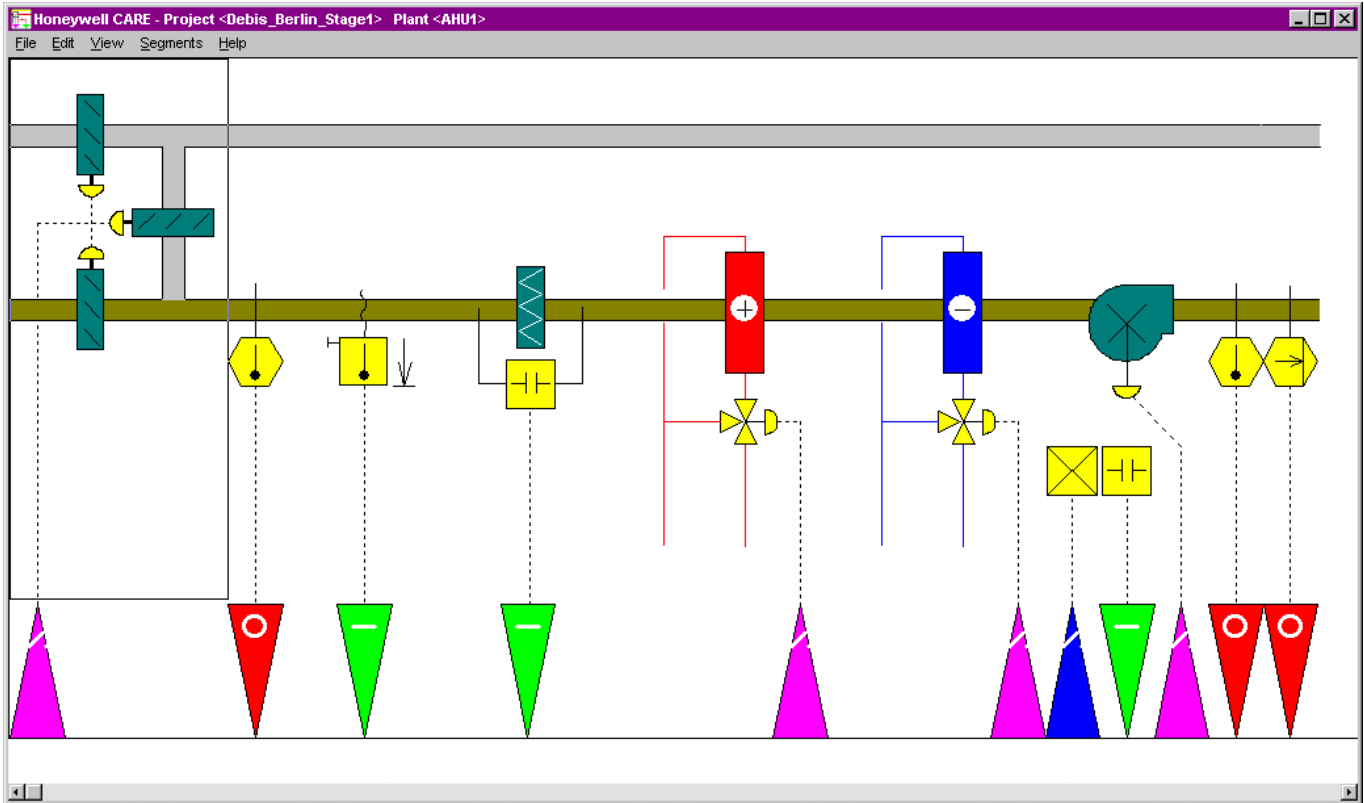


3. Click menu item Segments, then select the desired component to insert it into the plant.



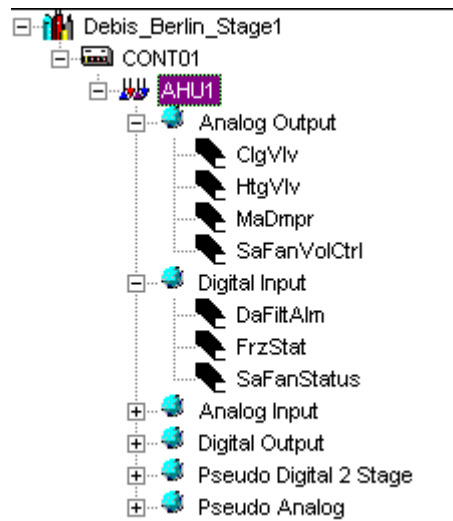
4. Add the following components by selecting the corresponding menu sequences:

- Dampers/Outside, Return and Relief/Mixing Damper/No Minimum Damper
- Sensor/Temperature/Mixed Air
- Safeties/Freeze Status
- Filter/Outside, Mixed or Supply Air Duct/Differential Pressure Status
- Coil/Hot Water Heating Coil/Supply Duct/3-Way Valve/No Pump
- Chilled Water Cooling Coils/Supply Duct/3-Way Valve/No Pump
- Fan/Single Supply Fan/Single Speed with Vane Control/Fan and Vane Control with Status
- Sensor/Temperature/Discharge Air Temp
- Sensor/Pressure/Supply Duct Static



5. When finished the drawing, click menu item File, then submenu item End.

RESULT: In the logical plant tree, the datapoints assigned to the plant components are displayed.



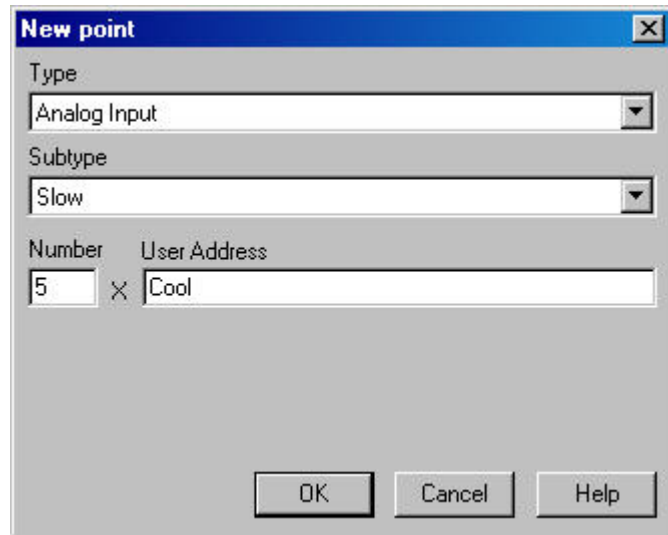
6. If desired, continue with adding HW/SW points without graphic to the schematic as described in the Quick Creation of HW/SW Points without Graphic procedure.

B) Quick Creation of HW/SW Points without Graphic

1. If not already highlighted in the logical plant tree, select the plant.
2. Click menu item Plant, then drop-down item Create HW/SW Points.

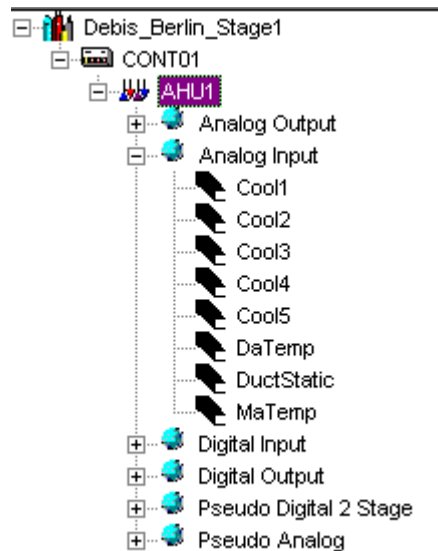
Or, click right mouse key and with left mouse key, click on Create HW/SW Point(s) in the context menu.

RESULT: The New Point dialog box displays.

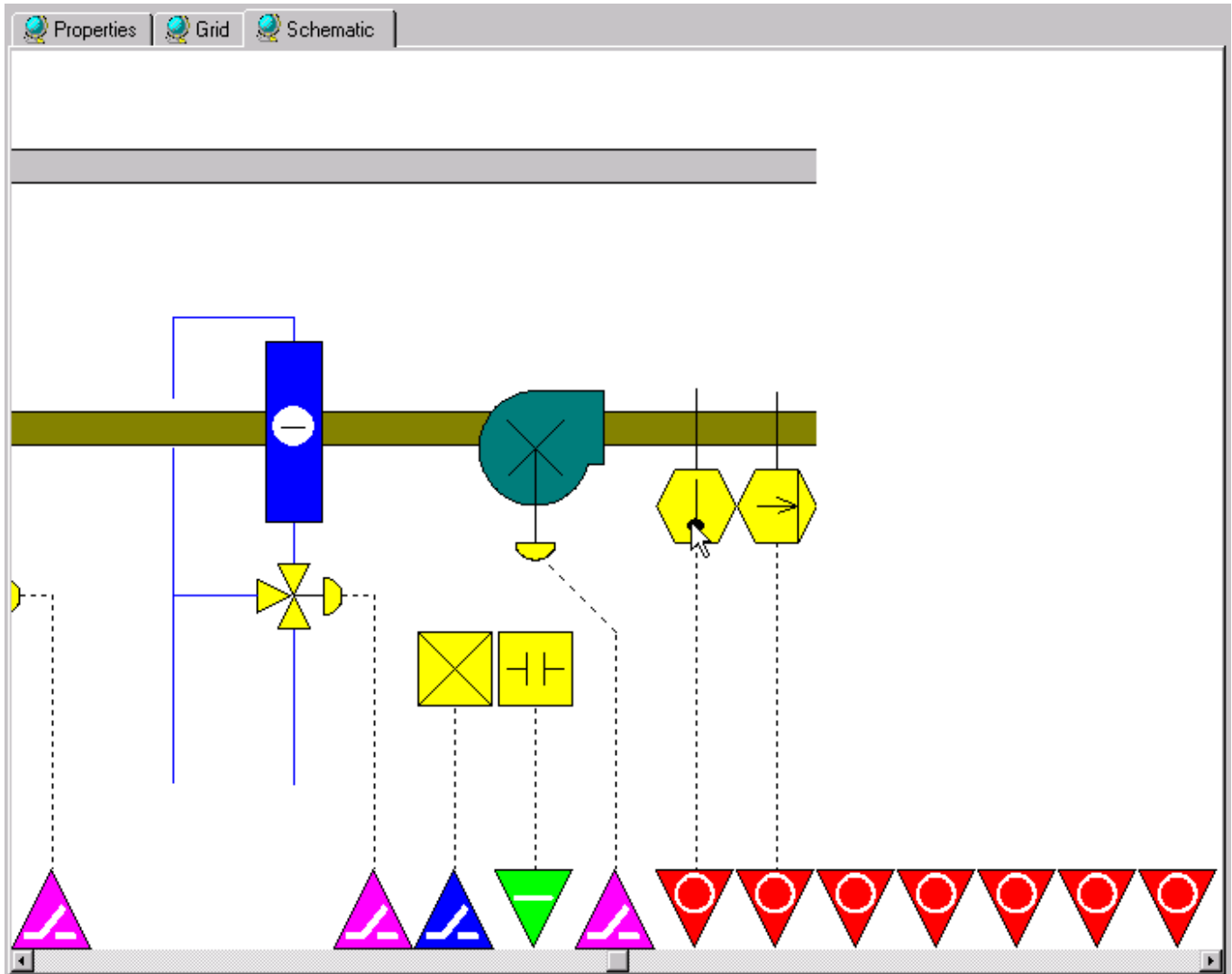


3. From the Type drop-down listbox, select the datapoint type and, if available, from the Subtype drop-down listbox, select the datapoint subtype.
4. In the Number field, select the number of points to be created and in the User Address fields enter the name of the datapoint(s) to be created. If you are adding more than one point, software automatically numbers the corresponding user addresses sequentially to guarantee unique user addresses. For example, if you enter pt and request two points, software creates two points named pt1 and pt 2. Only use alphabetic characters. Do not use blanks.
5. Click **OK**.

RESULT: In the following example, the datapoints are added to the Analog Input type folder in the logical plant tree.



6. To view the plant schematic, click on the plant in the logical plant tree and select the Schematic tab on the right pane.



7. Continue by modifying datapoints as described under the Modify Datapoints section.

Modify Datapoints

Purpose To customize point attributes according to desired system operation.

Points can be modified in two different views, in the itemized display and in the grid display (for display options, see Basic Working Techniques section). The itemized display is suited for editing only a few datapoints, the grid display is suited for editing many datapoints in an overall view.

Procedures **A) Modify Datapoints in Itemized Display**

1. In the logical plant tree, select the point you want to modify.

RESULT: On the right pane, the point attributes are displayed on the Properties tab.

Properties

Type

User Address: ClgVlv IP
 Controller: CONT01
 Technical Address: 01/03/01 Plant Info: AHU1
 Point ID:
 Point Role:
 Point Subtype: AO Continuous with Switches
 Lon Point: none
 NV Type: (Input) none
 (Output) none

Misc. Editor Functions

Engineering Unit: Pct
 Descriptor:
 Characteristic: LINEAR_GRAPH

Special Values

Operator Access Level: 3

Write Protect Priority: 0

Time to Open: 120,00 sec
 Time to Close: 120,00 sec

Suppress Alarm
 Trend Hysteresis: 1,0 Pct
 Hide Point

2. Modify desired values in the fields and/or select/deselect desired options.
3. Continue with assigning datapoints to the controller as described under the Manually Assign Datapoints to Controller section.

B) Modify Datapoints in Grid Display

1. In the logical plant tree, select the plant of which datapoints you want to edit and select the Grid tab on the right pane.

RESULT: All datapoints assigned to that plant are displayed in a grid.

Point	User Address	Techn. Address	Sensor Offset	Bus	Characteristic	Engineering Unit	Descriptor	Alarm Text	Active State	Oper. Access Level	Suppr. Alarm	Critical Alarm (Type)	Alarm Point
Filter													
AO	ClgVlv	01/03/01		IP	LINEAR_GRAPH	Pct				3	<input checked="" type="checkbox"/>		
AI	Cool1	01/01/04	0,000000	IP	Linear Input	V				3	<input type="checkbox"/>	<input type="checkbox"/>	
AI	Cool2	01/01/05	0,000000	IP	Linear Input	V				3	<input type="checkbox"/>	<input type="checkbox"/>	
AI	Cool3	01/01/06	0,000000	IP	Linear Input	V				3	<input type="checkbox"/>	<input type="checkbox"/>	
AI	Cool4	01/01/07	0,000000	IP	Linear Input	V				3	<input type="checkbox"/>	<input type="checkbox"/>	
AI	Cool5	01/01/08	0,000000	IP	Linear Input	V				3	<input type="checkbox"/>	<input type="checkbox"/>	
DI	DaFiltAlm	01/04/12		IP		Normal			0	3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AI	DaTemp	01/01/01	0,000000	IP	PT 1000 Type F/I	Deg				3	<input type="checkbox"/>	<input type="checkbox"/>	
AI	DuctStatic	01/01/03	0,000000	IP	Pressure 0-3"	Inw				3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
DI	FrzStat	01/04/11		IP		Normal			0	3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AO	HtgVlv	01/03/02		IP	LINEAR_GRAPH	Pct				3	<input checked="" type="checkbox"/>		
AO	MaDmpr	01/03/03		IP	LINEAR_GRAPH	Pct				3	<input checked="" type="checkbox"/>		
AI	MaTemp	01/01/02	0,000000	IP	PT 1000 Type F/I	Deg				3	<input type="checkbox"/>	<input type="checkbox"/>	
DO	SaFan	01/05/01		IP		On			1	3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
DI	SaFanStatus	01/04/10		IP		Off			0	3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AO	SaFanVolCtrl	01/03/04		IP	LINEAR_GRAPH	Pct				3	<input checked="" type="checkbox"/>		
PD2	EXECUTING_STOPPED					Normal			0	3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD2	SHUTDOWN					Normal			0	3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD2	STARTUP					Normal			0	3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PA	static_setpoint									3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

2. Modify desired values in the fields and/or select/deselect desired options.
3. Continue by assigning the datapoints to the controller as described under the Assign Datapoints to Controller section.

Manually Assign Datapoints to Controller

Purpose To accommodate the terminal assignments in CARE to the physical cabling.

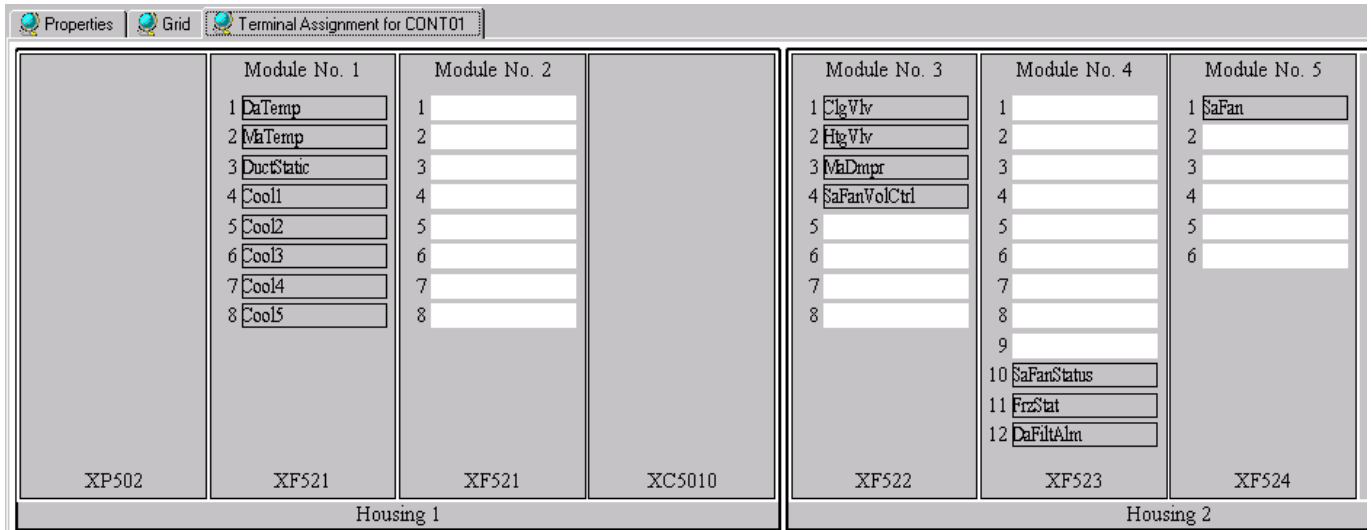
When creating a plant schematic for a XL 50, 80, 100, 500, 600, Smart, or 800 controller, CARE automatically assigns the datapoints of the plant to the appropriate hardware modules, for example, analog inputs are assigned to the XF521A module, digital outputs are assigned to the XF524A module of an XL5800 controller. But, the order of the datapoints on their module do not necessarily correspond to the physical cabling. Therefore in some cases, datapoints need to be moved on their module in CARE. On the other hand it is also possible to accommodate the physical cabling according to the CARE terminal layout.

NOTE: For the XL 500/Smart and XL 800 controllers, the target hardware can be chosen among the following different module types:

- Standard I/O (XF5..)
- Panel IO (XF8..)
- Distributed I/O (XFL5..)
- Distributed I/O (XFL8..)
- Open LON

- Procedure**
1. In the logical plant tree, select the controller.
 2. On the right pane, select the Terminal Assignment tab.

RESULT: The terminal assignments of the controller are displayed.



3. If datapoints need to be relocated, click on the datapoint and with pressed mouse key, move it to the target terminal.

RESULT: The datapoint gets green as you move it over terminals which it matches to.

NOTE: You can move datapoints only to terminals which match to the datapoint type. Over terminals which do not match to the datapoint type, the datapoint gets black and is indicated via a forbidden symbol.



4. On the target terminal, release mouse key.
5. Continue by developing control strategy for the plant as described under the Develop Control Strategy section.

Develop Control Strategy

Purpose The control strategy for a plant consists of control loops that monitor the environment and adjust equipment operation to maintain comfort levels. For example, a control loop for an air handling system can turn on a return air fan

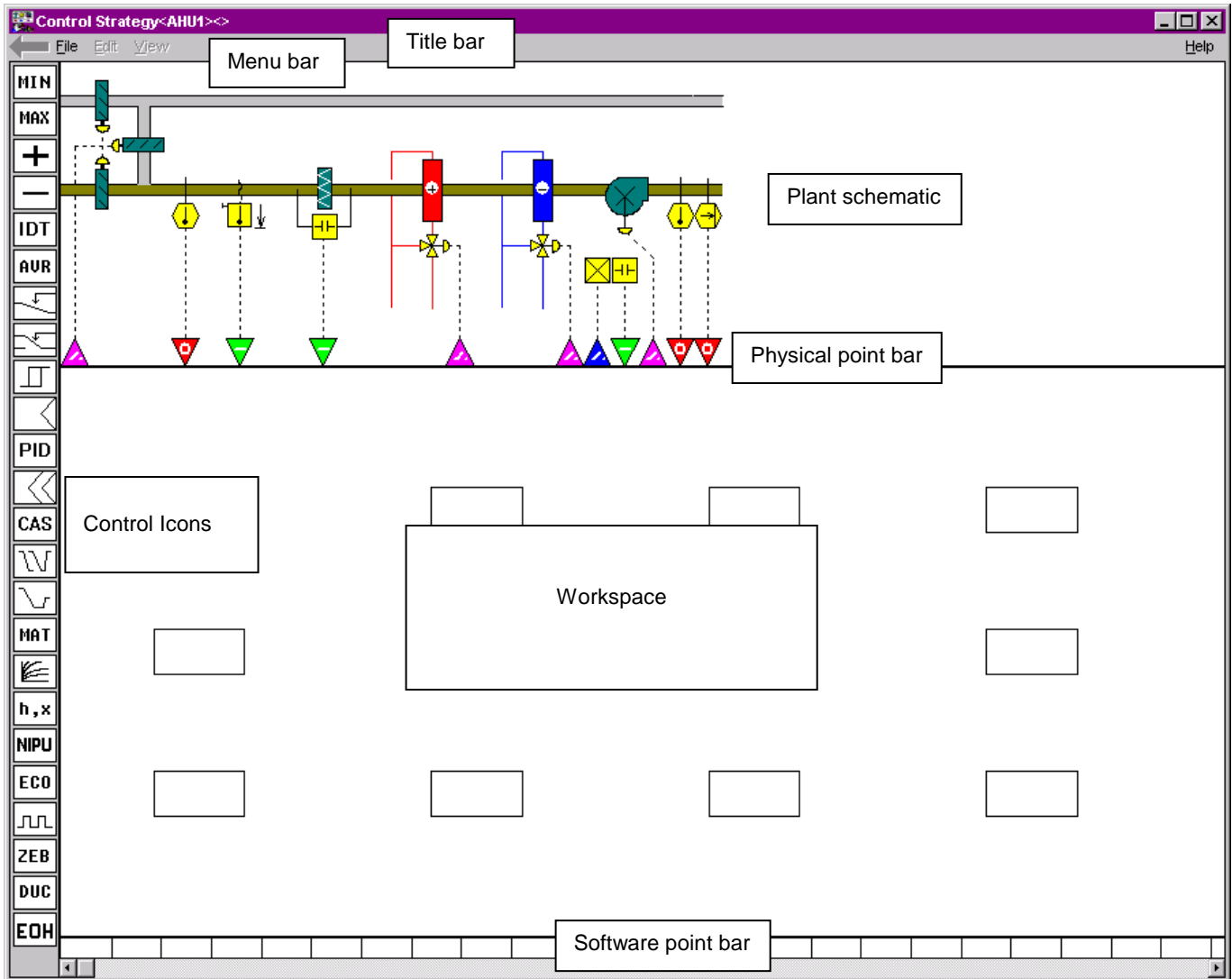
when discharge air temperature in the return air duct is greater than or equal to 68 F (20 °C). Control loops consist of a series of “control icons” that dictate a sequence of events. Control icons provide preprogrammed functions and algorithms to implement sequences of control in a plant schematic. For detailed information on control strategy development, please refer to the Control Strategy section.

Example (CARE XL-5000):

In the following you will add a PID control element to the plant.

- Procedure**
1. In the logical plant tree, select the plant.
 2. Click menu item Plant, then drop-down item Control Strategy.

RESULT: The Control Strategy Main Window displays.



RESULT: The Control Strategy Main Window is divided in the following areas:

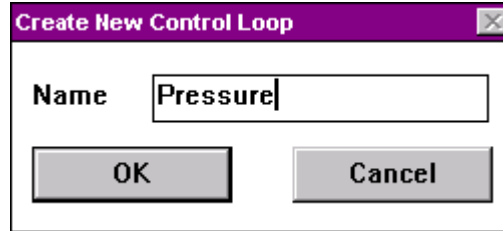
- Title
- Menu bar
- Plant schematic
- Physical point bar
- Software point bar
- Work space

- Control icons

The functions will be described by creating a new control loop in the following steps.

3. The sequence of operation requires control of the duct static pressure.
4. To create a new control strategy, click menu file, then drop-down menu New.

RESULT: The Create New Control Loop dialog box displays.



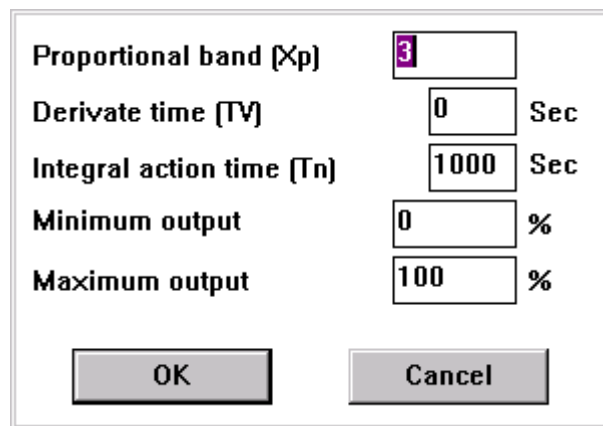
5. Enter a name, e.g. Pressure for the control loop and click **OK**.

RESULT: You can now select the control icons to place them into the workspace.

6. Click the PID control icon.
7. Click a free rectangle in the control strategy work space to place the control icon.

RESULT: Software places the symbol in the rectangle.

Software may then display a dialog box that asks for “internal parameter” information relevant to the control icon. In this case, the PID icon asks for proportional band, derivative time, integral action, minimum output, and maximum output. For this system the default values are fine.

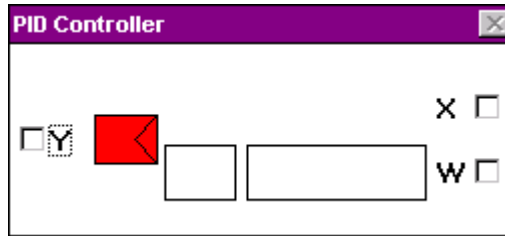


8. Click **OK**.

RESULT: Notice the control icon. The red color indicates that not all inputs and outputs are connected to the schematic.

9. To connect the icon to required inputs and outputs, double-click the icon to display an input/output dialog box that requests required variables.

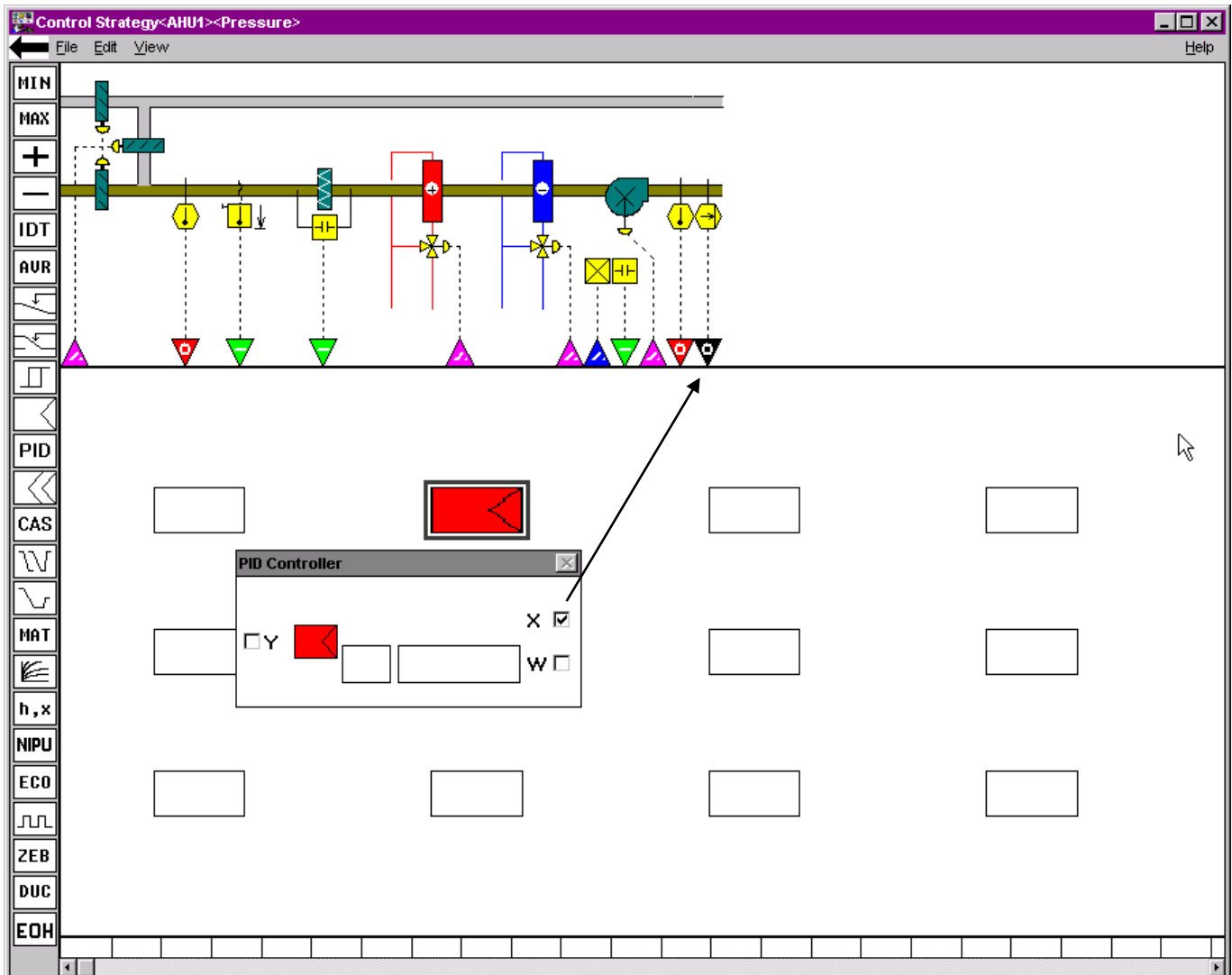
For example, the PID icon displays the following dialog box:



The Y, X, and W variables need connection to either physical points, pseudopoints, and/or other control icons. Variables on the left (Y in this case) are outputs. Variables on the right (X and W in this case) are inputs.

The two blank rectangles in the dialog box are editing fields where you can enter values to replace the physical connections. For example, in the PID dialog box, you can type an engineering unit table reference and value for the W variable, instead of connecting W to a point or control icon. For engineering unit, enter the corresponding index number.

- 10. To connect the icon, click a W, X, or Y check box, click a physical point at the schematic, then click the control icon in the dialog box.
- 11. To connect the sensor input, click on the X check box.



- 12. Select the static pressure sensor physical point by clicking the red arrow head on the far right.

RESULT: The arrow head turns black indicating that it has been selected.

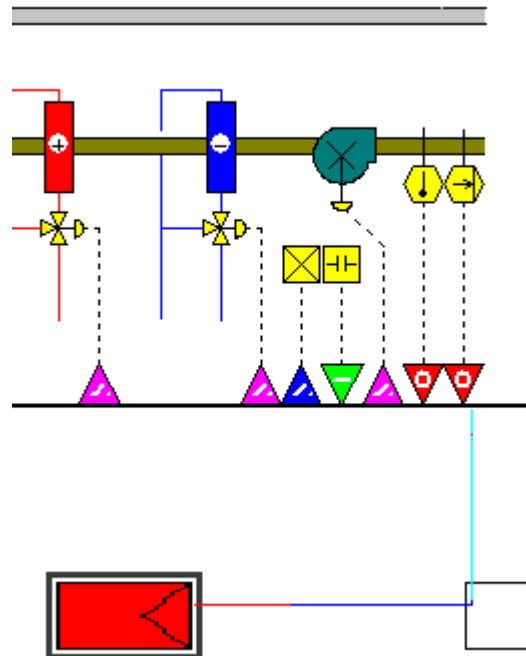
13. Click the control icon symbol in the dialog box.

RESULT:

- The dialog box closes.
- The active control icon changes color to dark blue.
- Software adds a short connecting line leaving the icon from the X location
- Two lines appear in the work space. One line is vertical; one is horizontal. Where they intersect each other is the focus point for mouse clicks. You can move these lines by moving the mouse:
 - When you move the mouse left or right, the vertical line moves left or right.
 - When you move the mouse up or down, the horizontal line moves up or down.

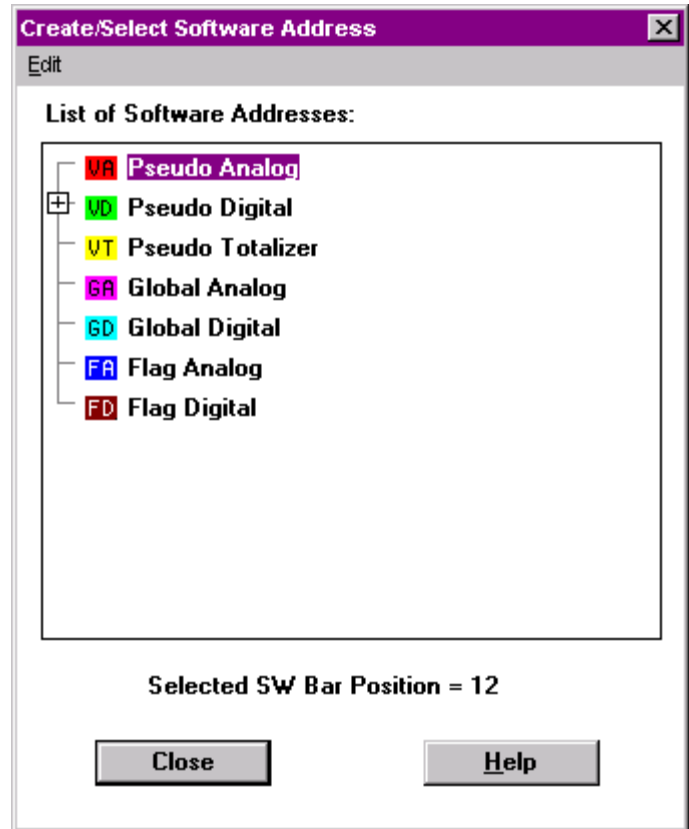
14. Move and click the intersection point to create connecting lines. Move the intersection point over the point arrow head until a cross, +, appears. Click the left mouse key to complete the connection.

RESULT: Software connects the point and icon.



15. Now connect the W input of the PID control icon to the reference variable - a user definable setpoint. An alternative would be to use the editing fields in the control icon dialog box which would fix the setpoint to the value entered.
16. To create a software point, click on a free position in the software point bar. Locate it near the relevant control icon.

RESULT: The Create/Select Software Address dialog box displays.



The selected software bar position is displayed at the bottom line of the dialog box. The list displays all existing pseudopoints/flags including unassigned, assigned and connected, assigned and unconnected pseudopoints/flags. Unassigned and assigned points/flags can be distinguished by the following symbols:



Assigned points: Pseudopoints/flags that reside on the software bar.



Unassigned pseudopoints/flags or points in switching tables in folder color with point abbreviation.



Unassigned software points mapped to internal datapoints of XFM.



Unassigned software points mapped to XFM parameters.

Each pseudopoint/flag type has its own colored folder which can be empty or contain already created pseudopoints/flags.

Each pseudopoint/flag type has its own colored folder which can be empty or contain already created pseudopoints/flags.

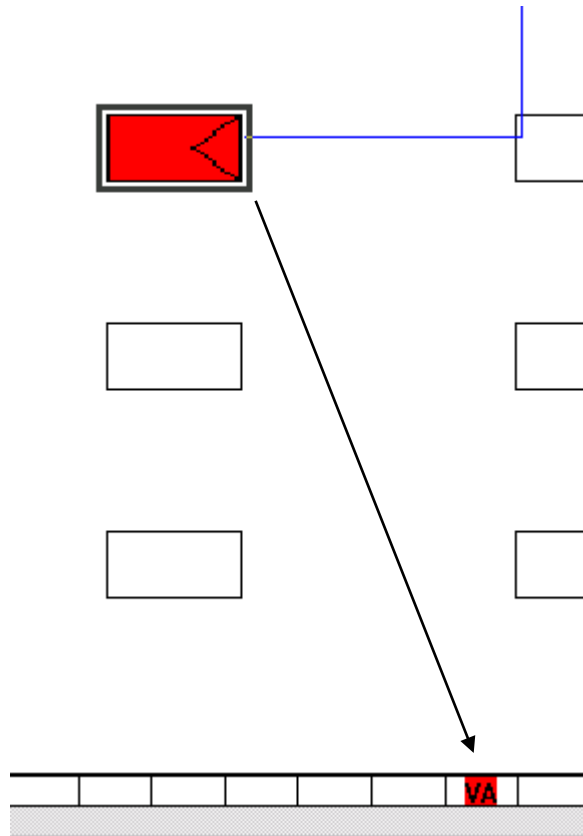
17. Click the Pseudo Analog folder.
18. Click right mouse button, and with left mouse button click **New** in the context menu,
or

click menu item **Edit**, then drop-down item **New**.

RESULT: The New Software Datapoint dialog box displays.

19. Enter "static_setpoint" in the User Address field.

RESULT: In the software point bar, the created software point is indicated by VA (virtual analog).



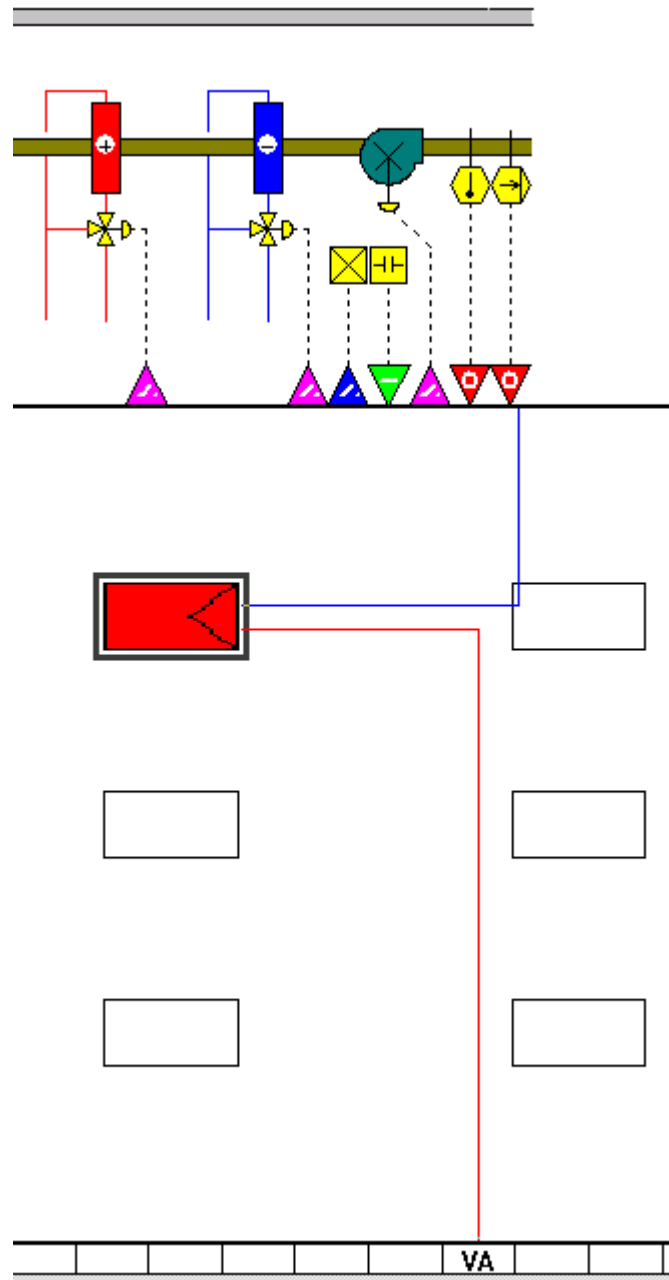
20. To connect the PID control icon to the software point, double-click the control icon once to open it.

21. Click the W checkbox, then click on the VA software point you have been created.

22. Click the control icon symbol **in** the control icon dialog box.

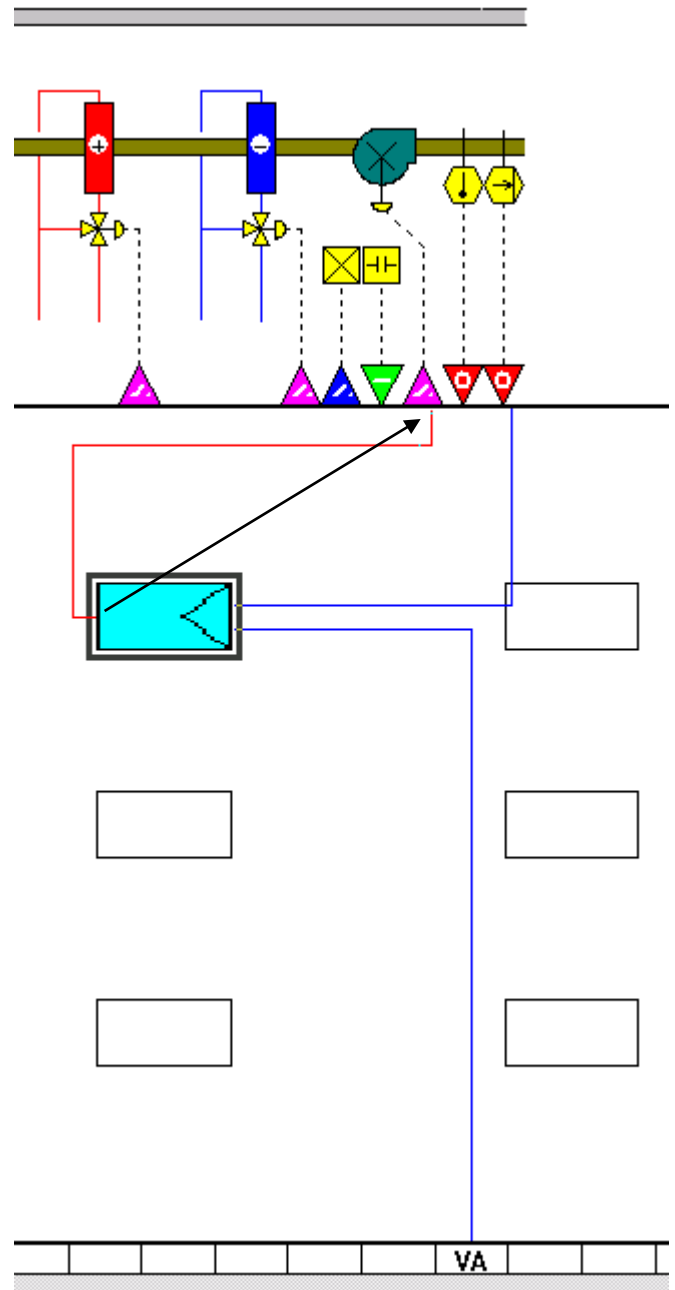
RESULT: Notice that there is a red line leaving the control icon from the W location.

23. Complete the connection, by clicking on the software point in the software point bar.



24. To finally connect the PID control icon's output to the dampers on the fan, double-click the control icon once to open it.
25. Click the Y checkbox, then click the violet arrow head beneath the fan.
RESULT: The physical point is now black indicating that it has been selected.
26. Click the control icon symbol in the control icon dialog box.
RESULT: Notice that there is a red line leaving the control icon from the Y location.
27. Complete the connection, by clicking on the physical point previously selected.
RESULT: The PID icon changes color to light blue to let you know that the PID is correctly connected to your system.

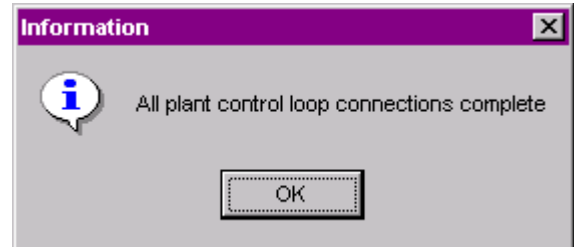
This completes the sequence of operation for the static pressure. When the fan is on, control strategy modulates the damper to maintain static pressure at the setpoint. When the fan is off, the switching logic will place the damper in the minimum position.



28. Click menu item File, then submenu item Exit.
29. To check the control loop connections, click **OK** in the End Control Strategy dialog box.



30. CARE verifies that all control connections are complete by the following Information dialog box.



31. Confirm the Information dialog box by clicking OK.
32. Continue by developing the switching logic for the plant as described in the Develop Switching Logic section.

Develop Switching Logic

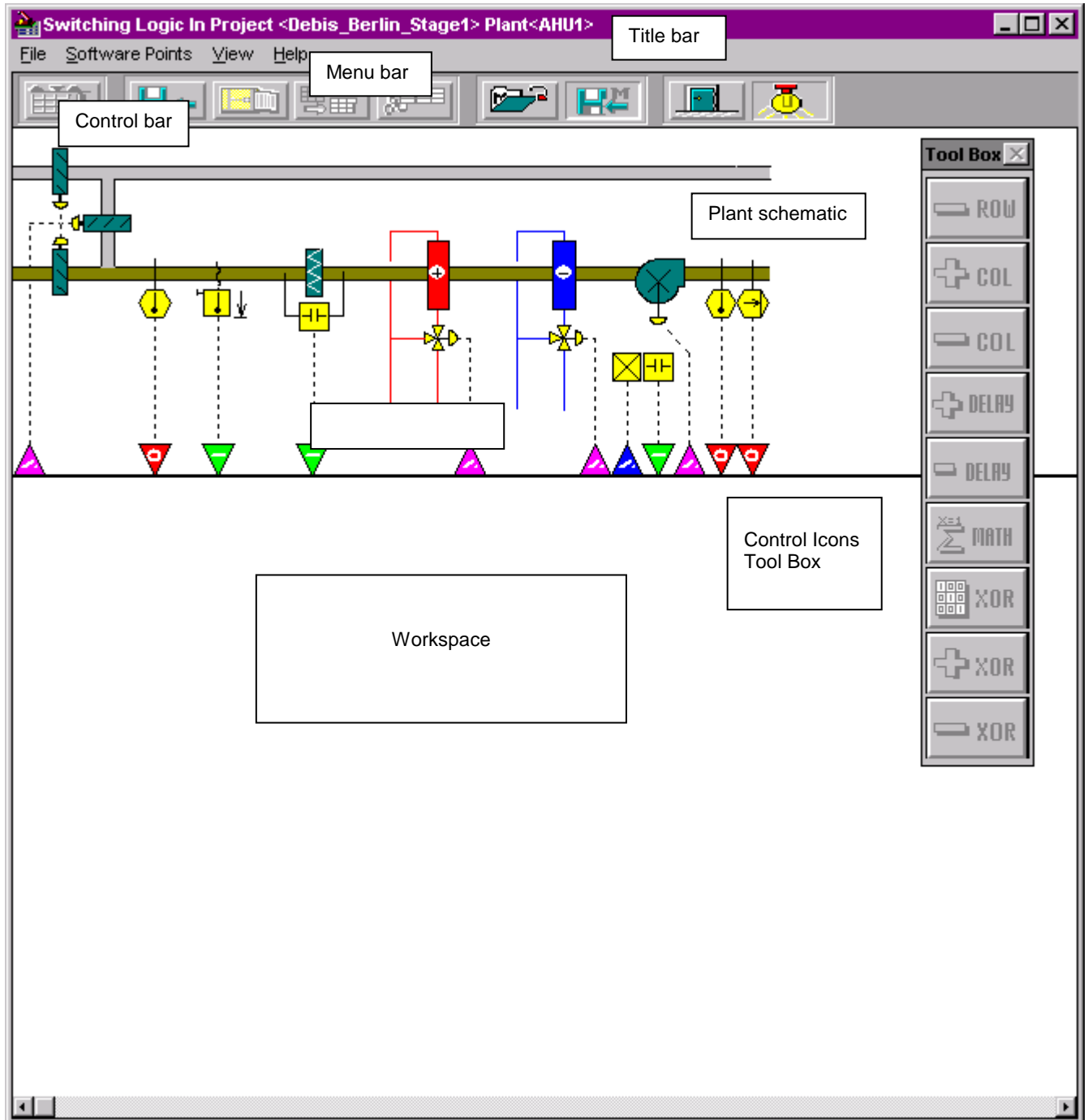
Purpose Switching logic provides a convenient means to implement digital (Boolean) logic control of a point. An analog or digital point is commanded to a specific value or state if a certain set of conditions are met. Time delays can also be added. For example, switching logic can start a return air fan 30 seconds after a supply air fan starts. For detailed information on switching logic development, please refer to the Switching Logic section.

Example (CARE XL-5000):

According to the sequence of operation, the dampers of the fan will be placed in minimum position in case of fan failure.

- Procedure**
1. In the logical plant tree, select the plant.
 2. Click menu item Plant, then drop-down item Switching Logic.

RESULT: The Switching Logic Main Window displays.

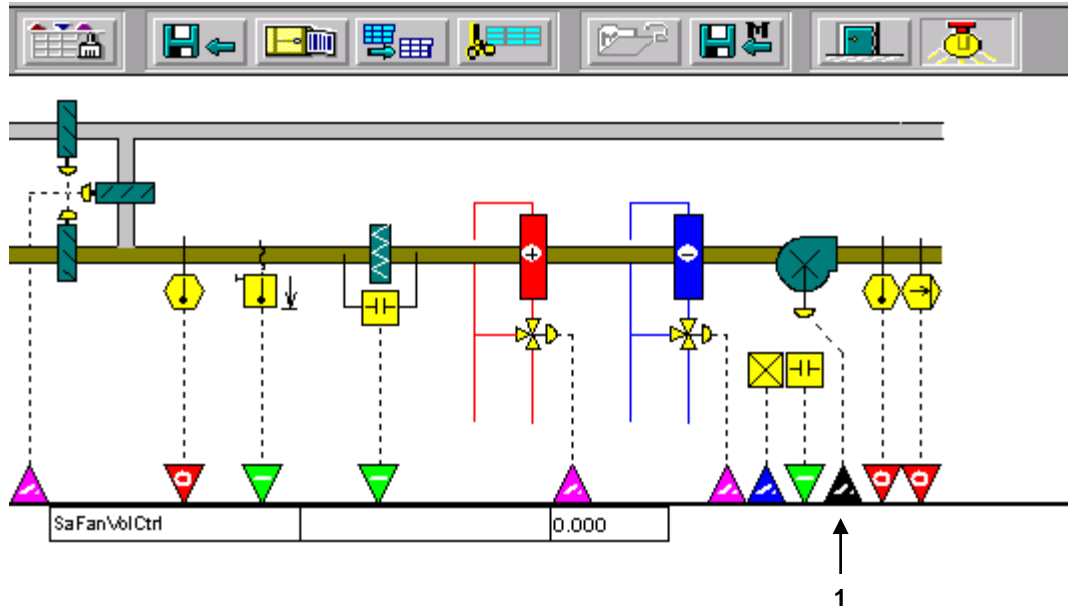


The Switching Logic Main Window is divided into the following areas:

- Title bar
- Menu bar
- Control bar
- Plant schematic
- Switching table (Work space)
- Switching logic icons toolbox

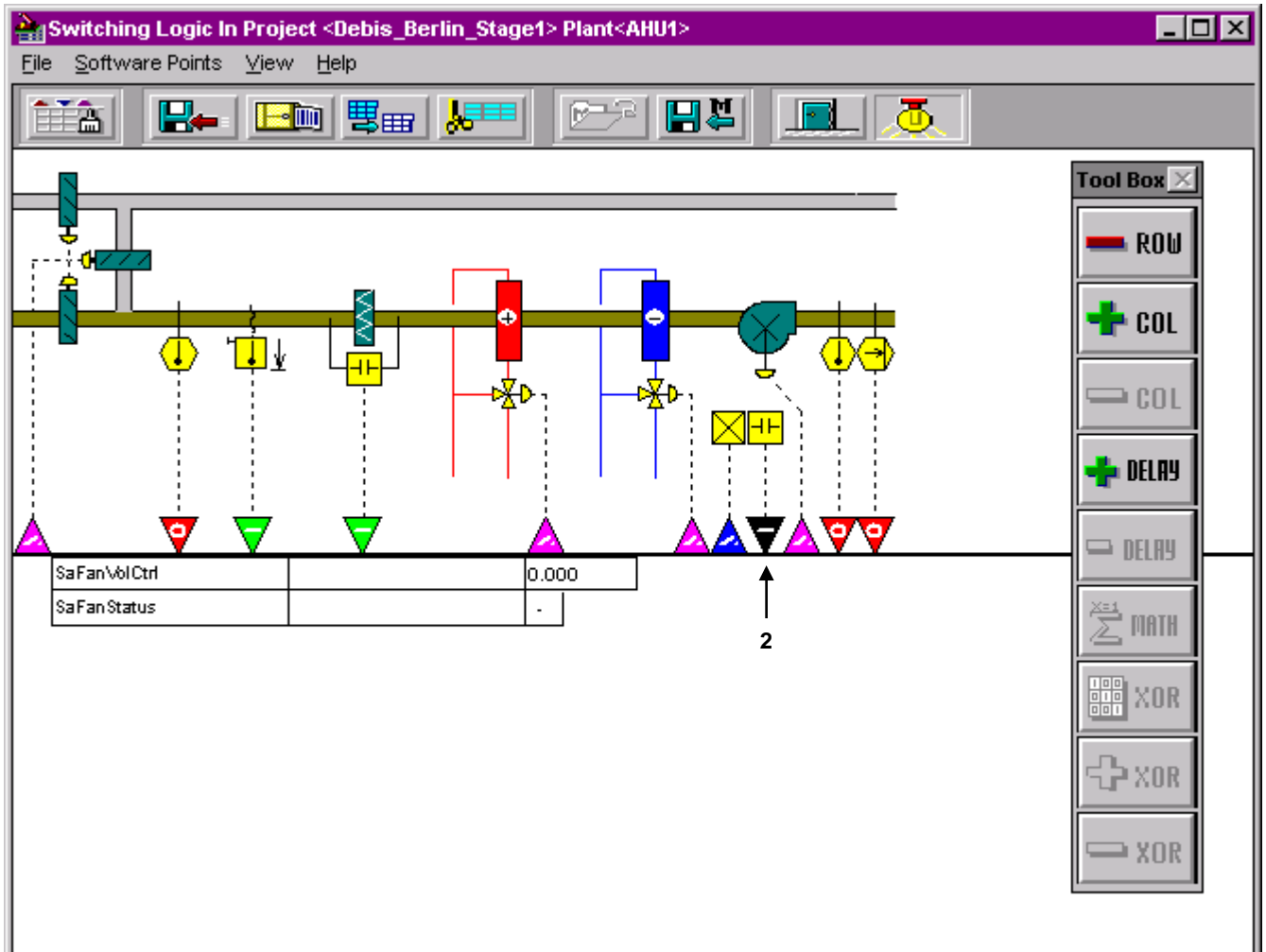
The functions will be described by adding switching logic tables in the following steps.

3. To begin a switching logic for the dampers, click on the fan address point (violet arrow head, 1) that controls the dampers.



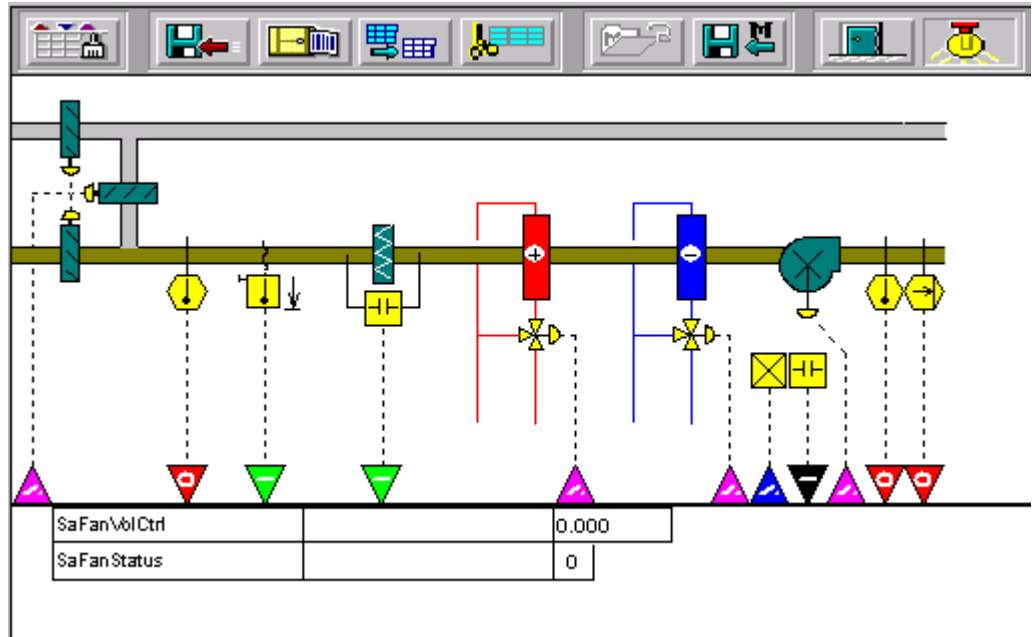
RESULT: The title " SaFanVolCtrl" is the user address for the damper input point on the fan. The default of "0.000" matches the condition required by the sequence of operation. No change is required. We will use the status of the fan to determine when the damper will return to minimum position.

4. Click the green arrow head representing the fan status physical point (2) to add it to the current switching table.



RESULT: According to the sequence of operation, the dampers of the fan will be placed in minimum position in case of fan failure. The field containing the "-" should indicate the status of the fan when you want the damper to be closed.

5. Click the "-" field twice to change it to a "0" (a false or off condition).



RESULT: The switching table is now complete. If the fan status is "0" false or off), the damper will be placed in a minimum position. The system also needs a table to open the heater valve under freeze conditions. The new button from the button bar is used to start a new switching table.

6. Click the  button in the control bar.

RESULT: The following dialog box displays.

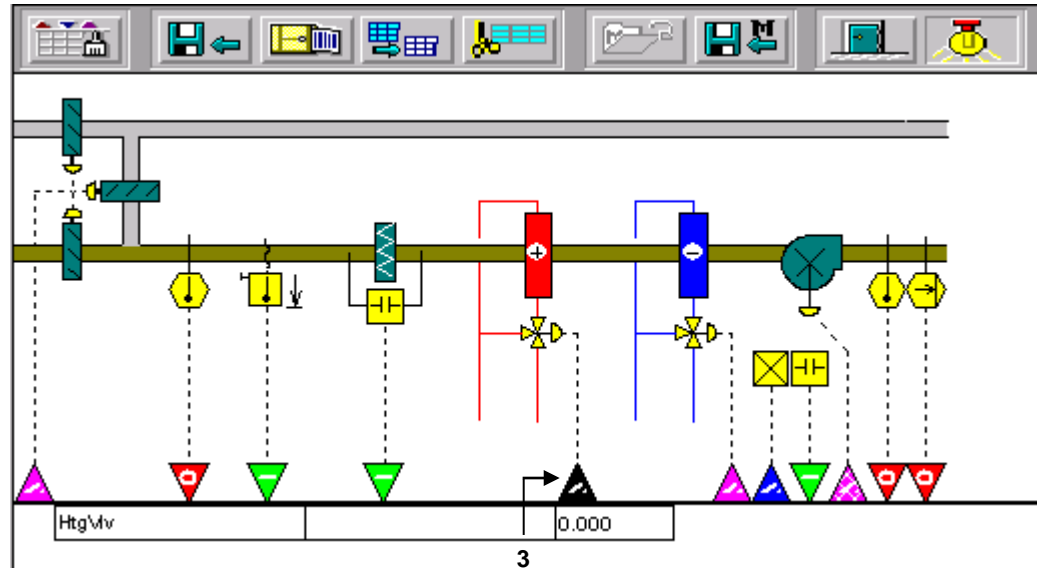


7. Save the switching table by clicking OK.

RESULT: The violet arrow head for the fan dampers is now cross hatched. This indicates that a switching table is assigned to the point.

8. To start a switching table for the heating coil, click on the heating coil control point (second violet arrow head from left, 3).

RESULT: The title "HtgVlv" is the user address for the hot water valve. The default of "0.000" represents a fully closed valve. We need to change the condition to fully open.



9. Click the third column once to change 0.000 to 100.

10. Type 100 and press ENTER key to fully open the heater valve if the switching conditions are met.

RESULT: The heater valve is now set to 100 % open when the switching table conditions are met. Now we will specify those conditions.

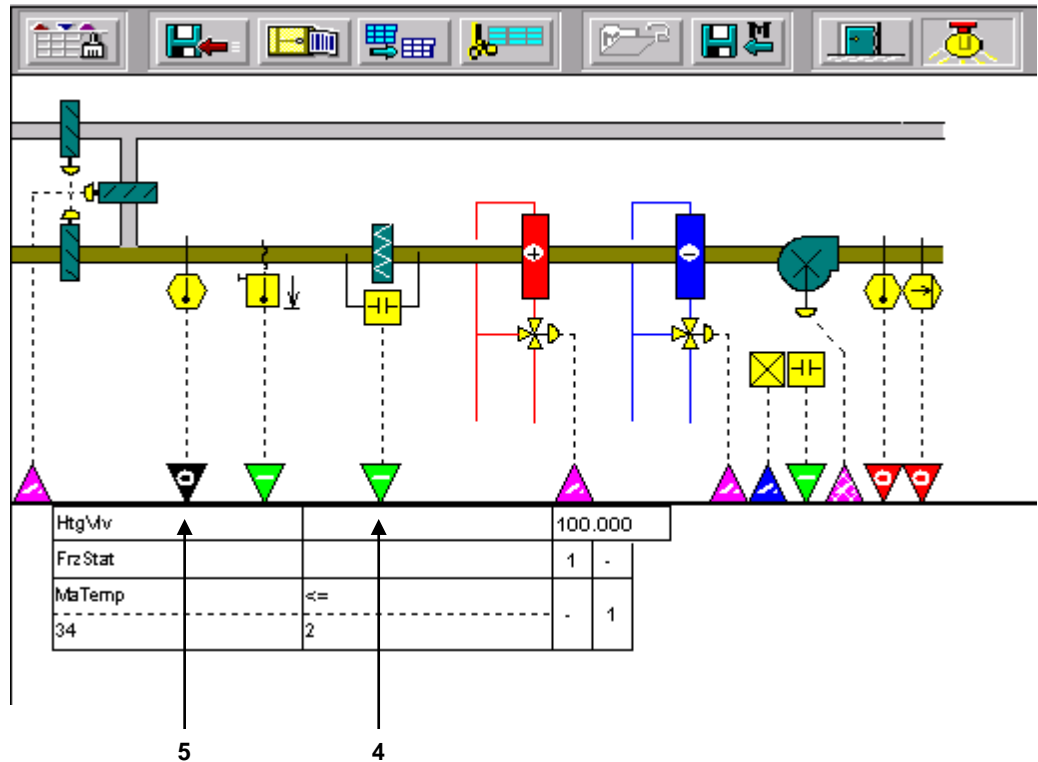
The temperature of the freeze status is one input that should determine the position of the heater valve.

11. Click the green arrow head (left from the heating coil control point, 4) representing the freeze status physical point.

RESULT: The title "Frz Stat" is the user address and the "-" is a true/false or on/off condition. The arrow head representing the physical point turns black to indicate which point is active. Clicking the "-" toggles between "-", "1" and "0".

12. Click the "-" field once to turn it to a "1".

13. For this plant, we want to add an "OR" function with the next step. This is accomplished by adding an additional column.



14. Click the + COL icon on the switching logic icons tool box once.

RESULT: The column is inserted.

15. The heater valve will open to 100 % if the freeze status is active. We also need to open the heater valve if the mixed air temperature is less than 34 degrees Fahrenheit.

16. Click the red arrow head representing the mixed air temperature sensor physical point (second from left, 5).

RESULT: The title "MaTemp" is the user address for the mixed air temperature sensor. The "0" below on the left represents the temperature that activates the condition. The "0" on the right indicates the deadband before the condition is deactivated. The first change needed on this table is to toggle the "=>" to a "<=" sign.

17. Click the "=>" to change it to a "<=" sign.

18. The "0" in the left column represents the temperature that activates the condition. Entering a 34 in the left column indicates you wish to activate the heater valve when the temperature is less that or equal to 34 degrees Fahrenheit.

19. To change the temperature to 34, first click the "0" in the left column.

20. Then type "34" and press ENTER key.

21. The "0" in the second column represents how much the temperature will rise above 34 degrees Fahrenheit before the condition is no longer active. A deadband of 2 degrees is appropriate for this system.

22. Click the "0" field once to enter the deadband.

23. Type 2 and press ENTER key.

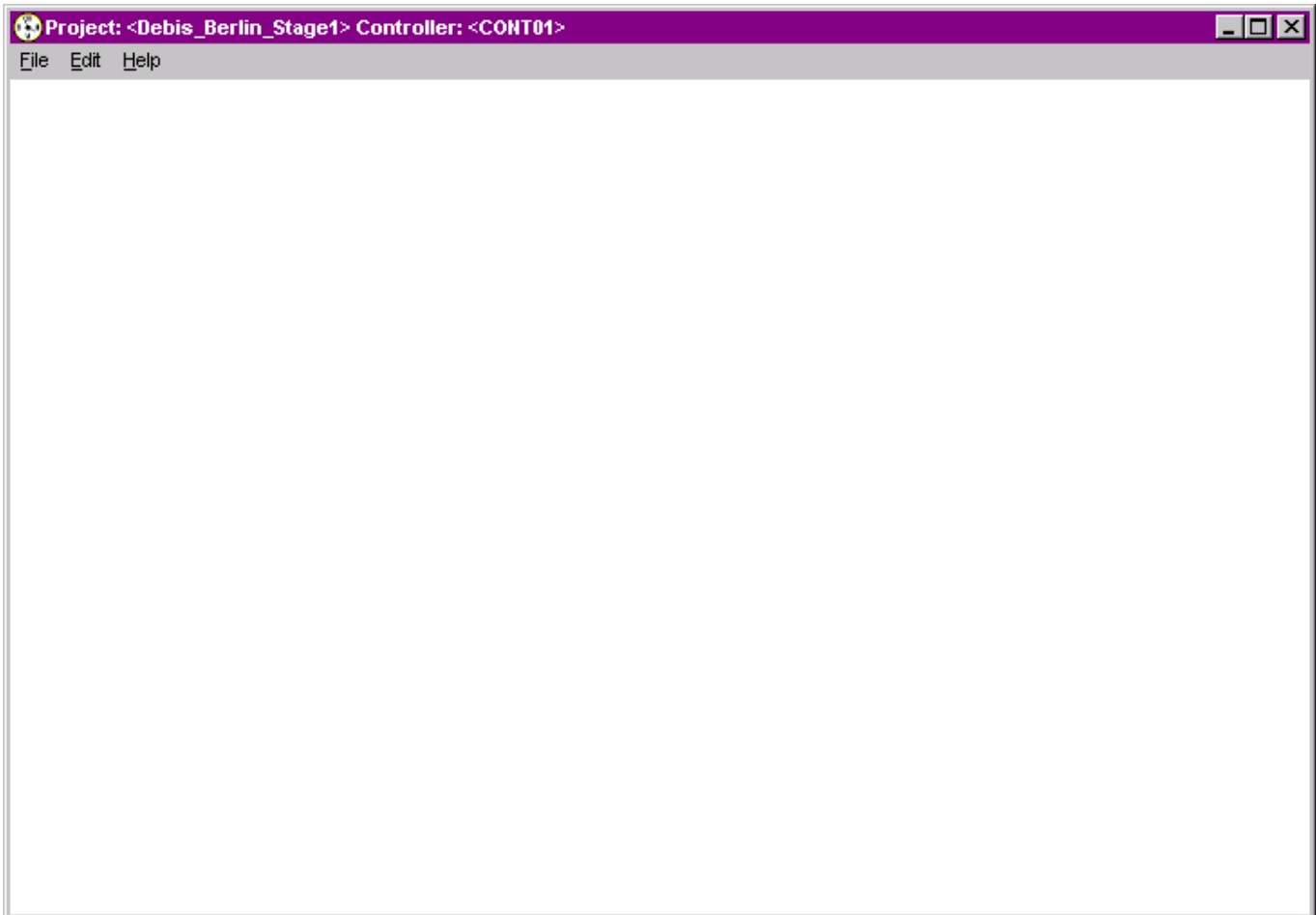
24. The field on the far right is where the "or" condition is entered. Clicking the "-" field" cycles through three conditions: "-" which is neutral, "1" which is true, and "0" which is false.
25. Click the "-" field" once to turn it to a "1" (true).

RESULT: The table is now complete. When the freeze status is active or the mixed air temperature is equal to or below 34 degrees Fahrenheit, the hot water valve will be opened to 100 %.
26. Click menu File, then drop-down menu Exit.
27. Save the switching table by confirming with OK in the dialog box.
28. Continue by creating a time program as described under the Create Time Program section.

Create Time Program

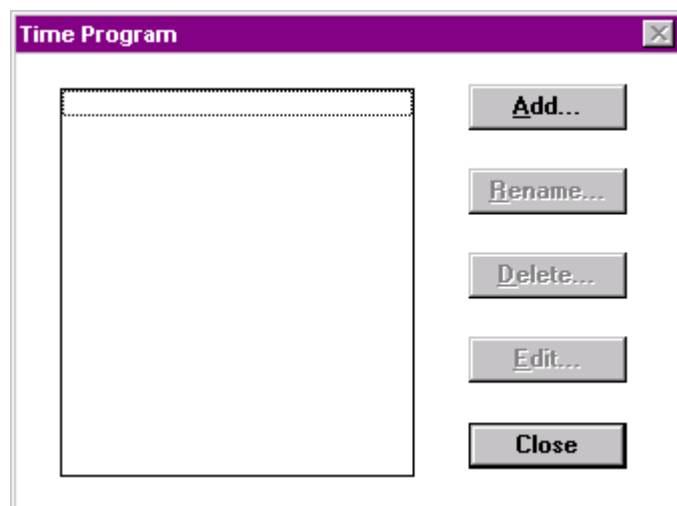
- Purpose** Create time sequences for controller operation of devices. For example, set HVAC start and stop times. Time Programs implement these command schedules.
- A controller can have a maximum of 20 time programs. Every time program created will be performed by the controller.
- Each Time Program specifies a list of datapoints to command. A Weekly Program defines the normal daily activity of the system by specifying which Daily Programs a controller should use for each day of the week (Sunday through Saturday). The Weekly Program applies for each week of the year. There is only one Weekly Program per Time Program.
- Daily Programs list points and point actions and times for the controller to implement.
- Holiday programs define special daily programs for holidays such as Christmas and Easter.
- Yearly Programs define time periods with special daily programs. Yearly programs are suited to consider specific local conditions, for example, regional vacation and public /religious festivals. Yearly programs can be defined for more than one year.
- The following procedure describes the time program handling in CARE XL-5000. For the handling in CARE-BACnet, please refer to the Schedules and Calendars section.
- Procedure (CARE XL-5000)**
1. In the logical plant tree, select the controller.
 2. Click menu item Controller, then drop-down item Edit and Time Program Editor.

RESULT: The Time Program Editor displays.



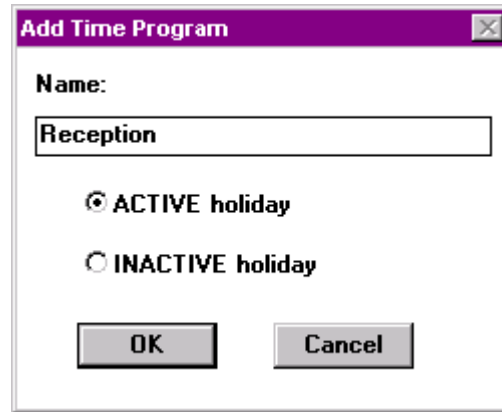
3. Click menu item Edit,

RESULT: The Time Program dialog box displays.



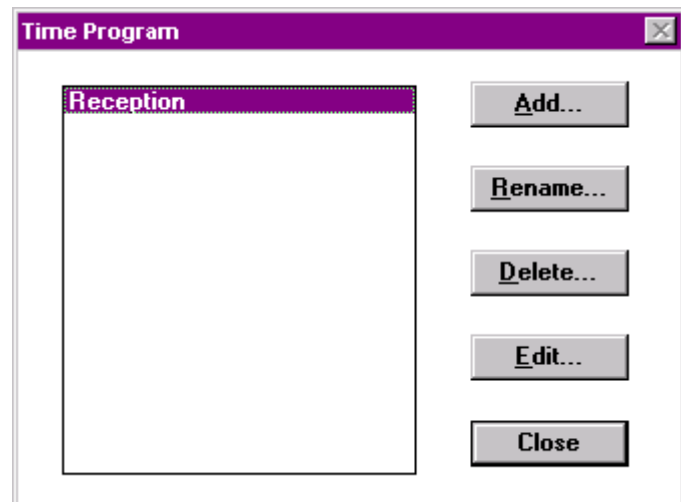
4. Click Add.

RESULT: The Add Time Program dialog box displays.



5. Enter name for the time program and click **OK**,
6. The **ACTIVE** holiday radio button enables the Holiday Program. To disable the Holiday Program, click the **INACTIVE** holiday radio button. If holiday is inactive, this Time Program uses the Daily Programs, as set up by the Weekly Program, on holidays.

RESULT: The Time Program dialog box redisplay. It shows the name of the overall time program to which then you can add daily, weekly, holiday and yearly programs.



7. Click **Edit**.

RESULT: The Time Program: <name of time program> dialog box displays.



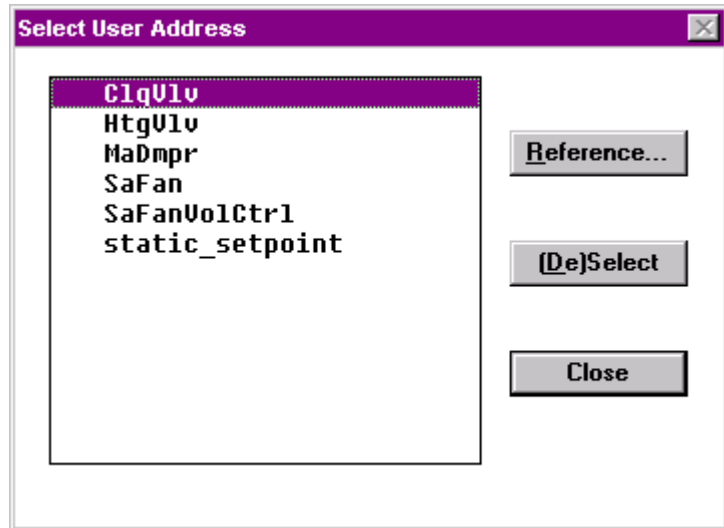
Create Daily Program

- Purpose** Define Daily Programs and assign point commands and command times to each Daily Program. Each Daily Program covers a 24-hour period
- Daily Programs specify switching times, setpoints, and switching status for selected points.
- Each time program must have a list of assigned datapoints before you can set up Daily Programs....

Assign/Unassign User Addresses

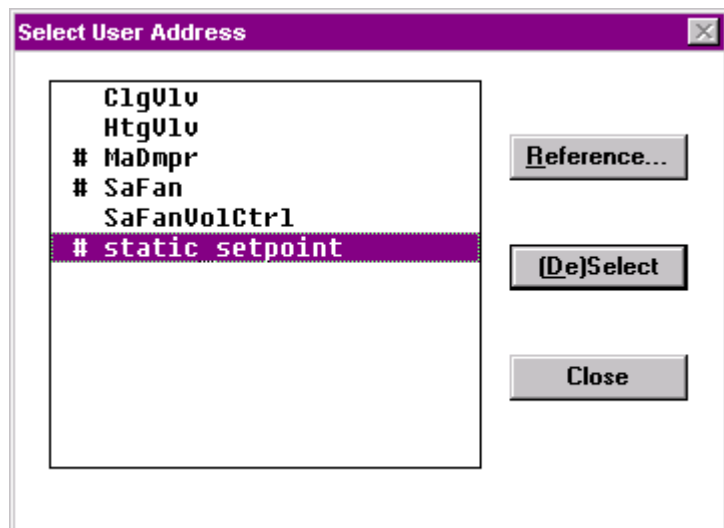
1. In the Time Program: <name of time program> dialog box, click menu item User address.

RESULT: The Select User Address dialog box displays. To set up any daily program, you first must define user addresses which should be controlled by the daily time program. You can assign each user address to only one time program.



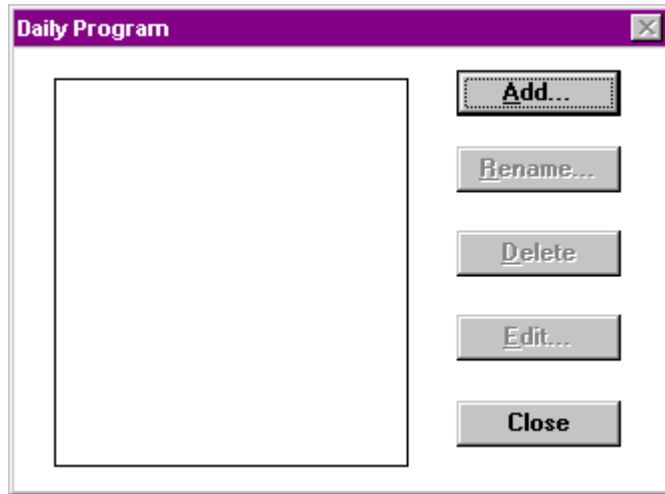
2. Click **Reference** to list already assigned datapoints.
3. Click on datapoint in the list you want to assign and click **(De)Select**.

RESULT: The assigned datapoint will be marked by a #.



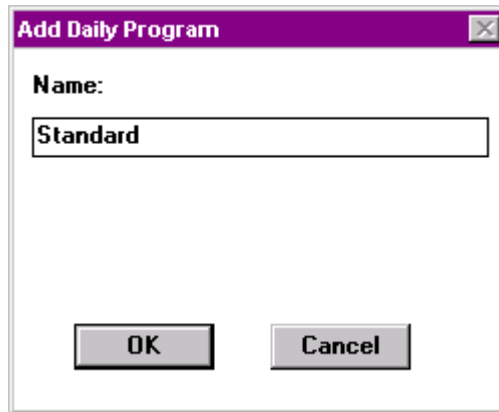
4. Click **Close**.
5. In the Time Program: <name of time program> dialog box , click menu item Daily program.

RESULT: The Daily Program dialog box displays.



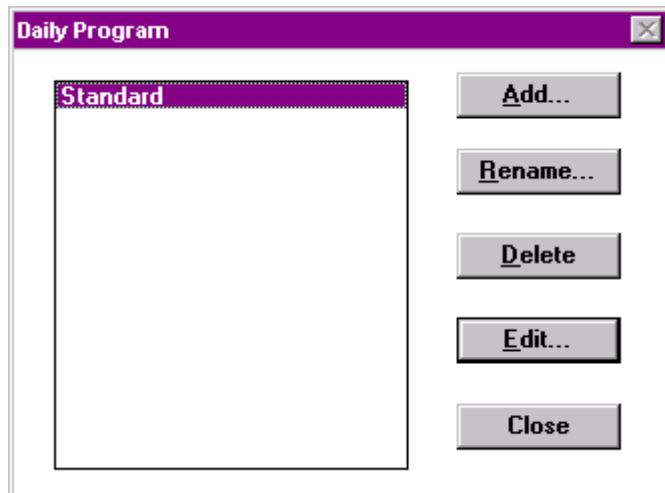
6. Click **Add**.

RESULT: The Add Daily Program dialog box displays.



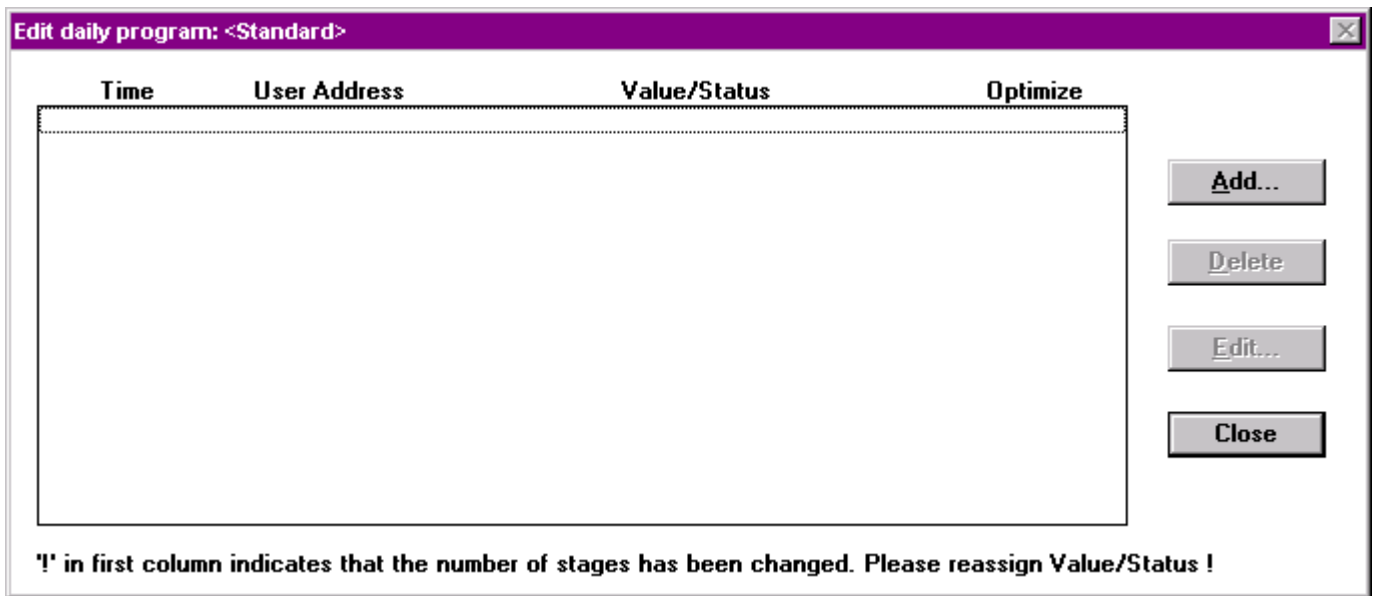
7. Enter the name for the daily program and click **OK**.

RESULT: The Daily Program dialog box redisplayes with the new name highlighted.



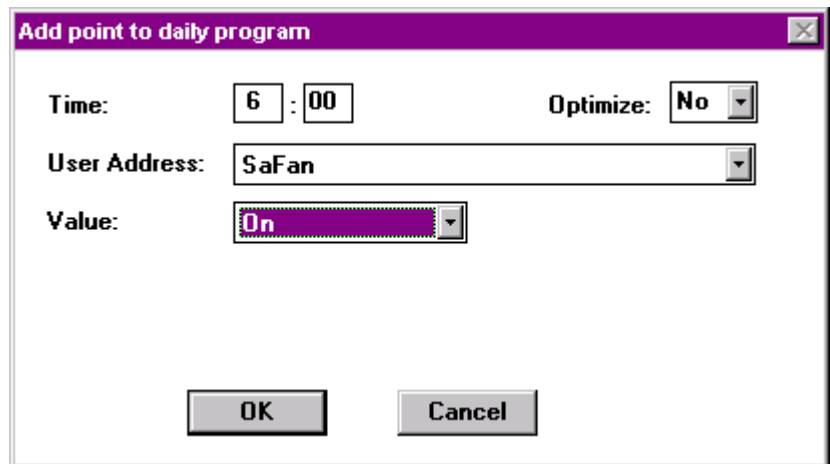
8. Click **Edit**.

RESULT: The Edit Daily Program <name of daily program> dialog box displays in which you assign the datapoints to command the daily program.



9. Click **Add**.

RESULT: The Add Point to Daily Program dialog box displays.

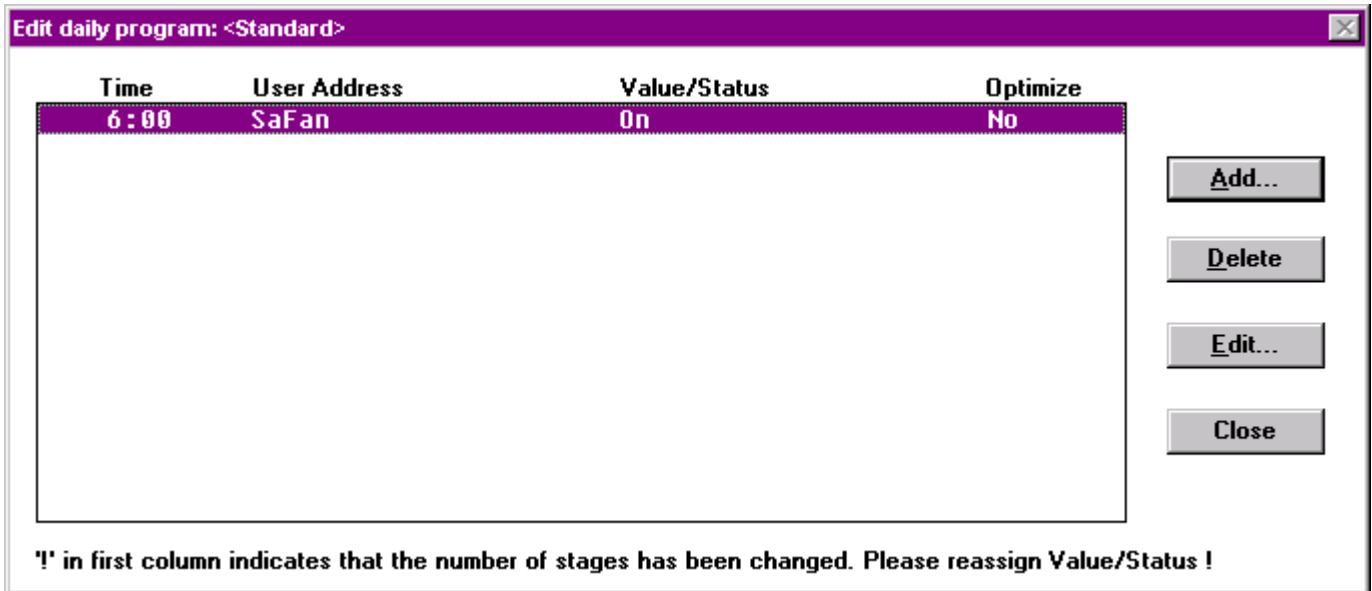


10. From the User Address drop-down listbox, select the user address.

NOTE: The following values and options to be set depend on the type of datapoint selected.

11. In the time fields, enter the time.
12. From the Value drop-down listbox, respectively in the value field, select option, respectively enter the value.
13. For switching points select optimization or not by clicking the corresponding option in the Optimize dropdown list box.
14. Click **OK**.

RESULT: The Edit Daily Program <name of daily program> dialog box redisplayes for adding further datapoints. Each line in the list represents one command. Each command specifies time, user address, and value or status command.



15. Click **Add** to add further datapoints, etc.

16. Click **Close**.

17. Continue by creating weekly programs as described under the Create Weekly Program section.

For detailed information on creating time programs, please refer to the Time Program Editor section. In the following you will open an existing switching logic.

Create Weekly Program

Purpose Assign Daily Programs to days of the week.

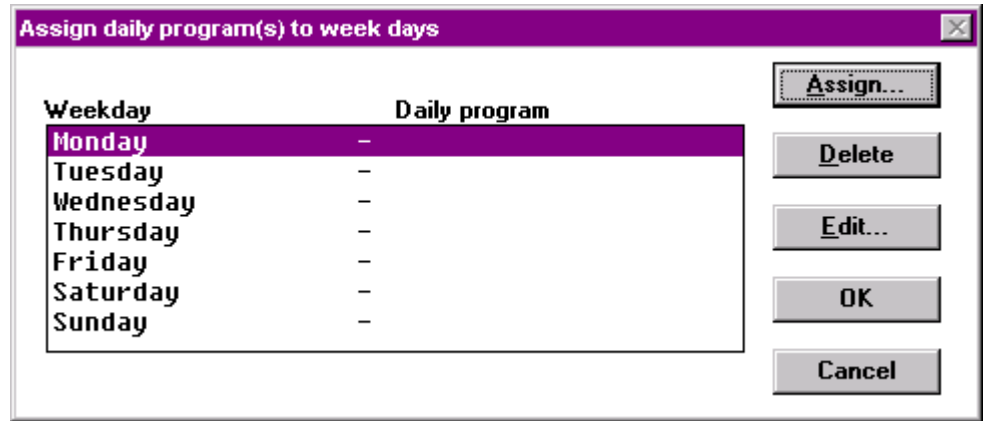
Every Time Program has one Weekly Program that specifies a Daily Program for each day of the week.

Software uses the Weekly Program to generate the annual program. The Annual Program is a repeat of the Weekly Programs for each week of the year.

Default Daily Program If you do not assign a Daily Program to a weekday, the Time Program uses the Daily Program for the previous weekday. The default assignments display after you exit the Weekly program function and then reselect it.

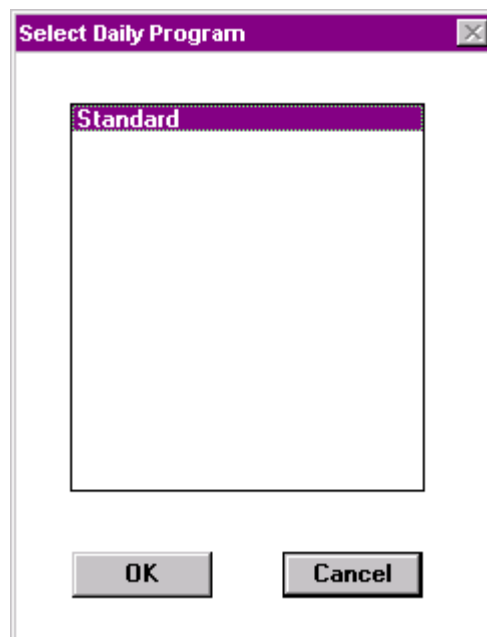
Procedure 1. In the Time Program: <name of time program> dialog box, click menu item Weekly programs.

RESULT: The Assign daily program(s) to week days dialog box displays.



- To assign a Daily Program to a weekday, click Daily Program name, then click **Assign**.

RESULT: The Select Daily Program dialog box displays. The existing daily programs for the Time Program display in the list box.

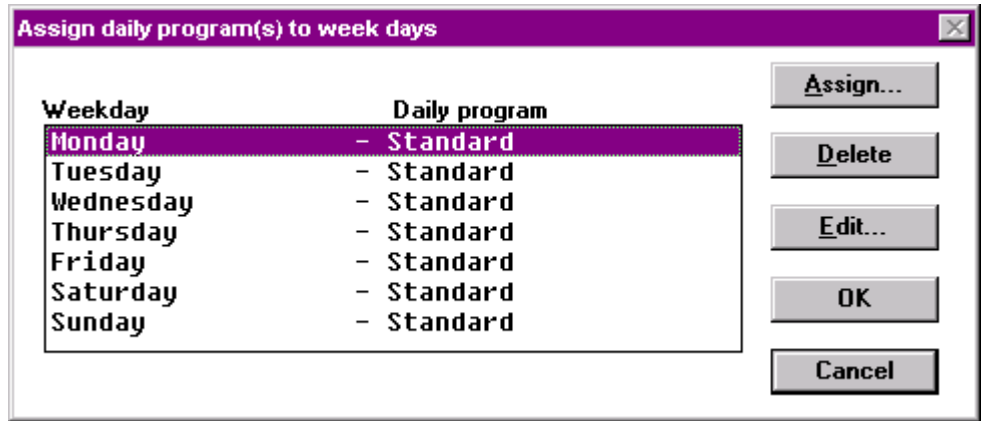


Click desired program name, then click **OK**.

RESULT: The dialog box closes and the Assign daily program(s) to week days dialog box redisplay. The new Daily Program assignment is in the list box.

- When through assigning Daily Programs, click **OK**.

RESULT: The dialog box closes and software assigns the last-assigned Daily Program to the weekdays that were not specified, in this case the daily program "Standard".



Example:

Monday Weekday
 Tuesday Holiday
 Wednesday
 Thursday
 Friday
 Saturday
 Sunday

Software assigns "Holiday" to Wednesday through Sunday because Holiday was the last Daily Program assigned. The Time Program window redisplay.

Holiday Program and Yearly Programs To create Holiday and Yearly Programs, please refer to the Holiday Program Function and Yearly Program Function sections.

Design and Configure C-Bus Network

NOTE: For information on the BACnet-Bus network structure in CARE-BACnet, please refer to the "BACnet Network Structure" section.

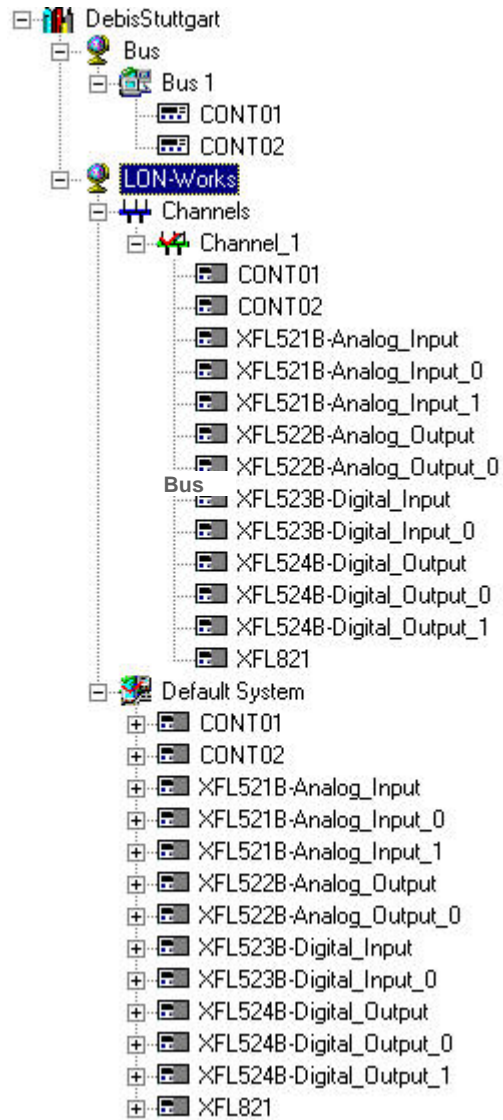
NOTE: For detailed instructions on LON network engineering, please refer to the LonWorks Network Engineering chapter.

Purpose To structure the C-bus according to conditions in the building.

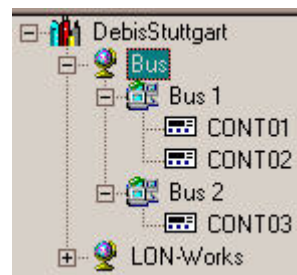
Default Network Structure By default, the network tree shows the two basic bus types, Bus (=C-Bus) and LON-Works.



Each bus is sub-divided by default to allow an arrangement of the network components according to the physical conditions in the building.



The C-Bus (Bus) folder contains the Bus 1 subfolder by default. Further created subfolders will be numbered continuously. The Bus subfolders represent the physical C-Bus network structure of the project and contain the C-bus controllers which control that segment of the building.

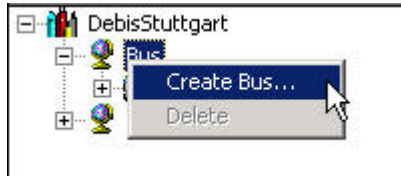


NOTE: The subfolder names are examples and freely editable. For example, the default Bus 1 subfolder can be named into Area1 or Block A.

Create C-Bus Subsystems

- Procedure** 1. With left mouse key, select the physical Bus folder in the network tree.

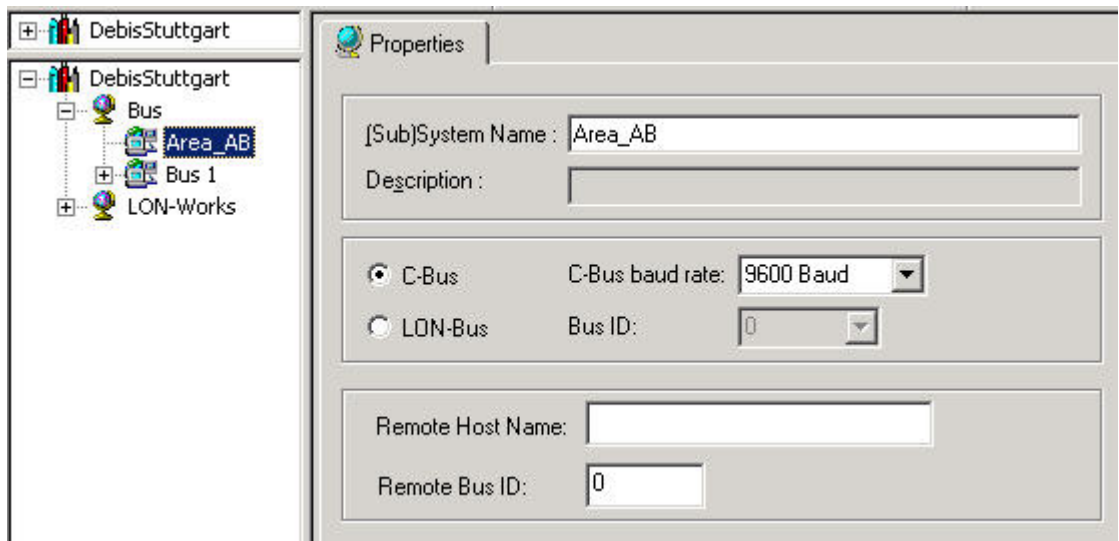
- Click right mouse key and with left mouse key, click Create Bus in the context menu.



RESULT: The new subsystem folder will be added below the Bus folder.

- On the Properties tab on the right pane, edit the name in the (Sub)System Name field, if desired, and click on the created subsystem folder below the Bus folder.

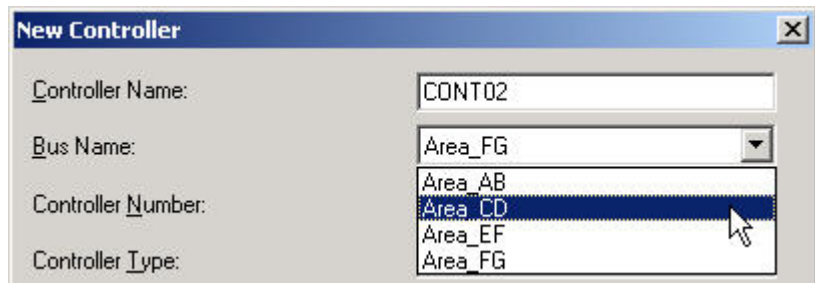
RESULT: The new named subsystem folder displays.



- For further information on the Subsystem Properties, please refer to the Create C-Bus Subsystems section under LONWORKS NETWORK ENGINEERING.
- To position controllers in Bus subsystems, please refer to the Create and Place Controller in the Network tree section.

Create and Place Controller in the Network tree

When creating a controller via the New Controller dialog, the Bus subsystem where the controller should be placed in, can be selected in the Bus Name drop-down listbox.



Controllers can also be moved between different subsystems by Drag&Drop as described in the Move Controllers in the Network Tree by Drag&Drop section.

Move Controllers in the Network Tree by Drag&Drop

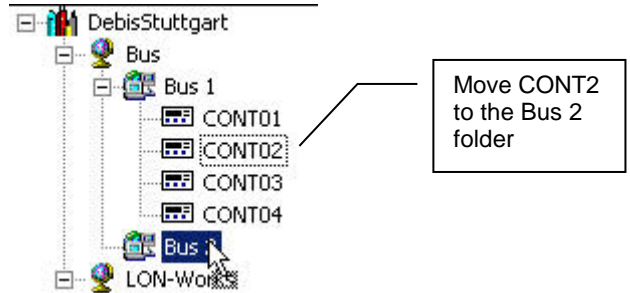
In the C-C-Bus part of the network tree, controllers can be moved between different subsystem folders.

IMPORTANT

Do not move controllers which are already bound to other devices. First, move the controller and then do the binding.

Procedure

1. In the source folder, select controller (controller device), drag it to the desired target folder and drop it.



Example 7: Move C-Bus Controller between Bus Subsystems

For detailed instructions on LON network engineering, please refer to the LonWorks Network Engineering chapter.

Startup Controller

NOTE: This section applies to CARE XL-5000 only. Some steps are more or less the same in CARE-BACnet. For specific details on starting up an Excel Web Controller, please refer to the Setup Excel Web Controller section.

Starting up a controller includes the following steps:

1. Physical connection
2. Translation
3. Download
4. Commissioning (LON controllers only)

Physically Connect to Controller

- Purpose** Physically connect controller to Excel CARE PC so that CARE can upload or download to the controller database.
- Requirements** The PC must be within 49 ft. (15m) of the controller. At greater distances (up to 3281 ft. [1000m]), you must add a line driver.

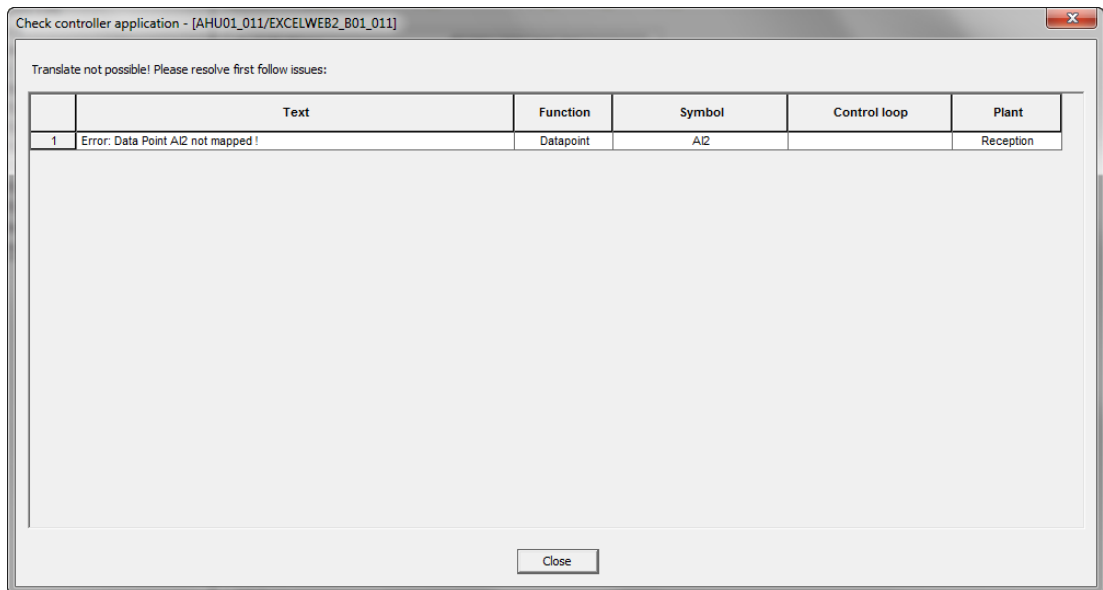
Use a XW585 Connection Cable.
- Procedure**
 1. Insert plug on the XW585 connection cable into the socket on the front of the controller computer module.
 2. Insert the other plug on the XW585 connection cable to the serial interface socket on the back of the PC (COM 1 or COM 2).
 3. Power on the PC.
 4. Start XL Online as described in the Start XL Online section.

Translate Controller

Purpose Convert the files for an attached plant to a form suitable for download into the controller.

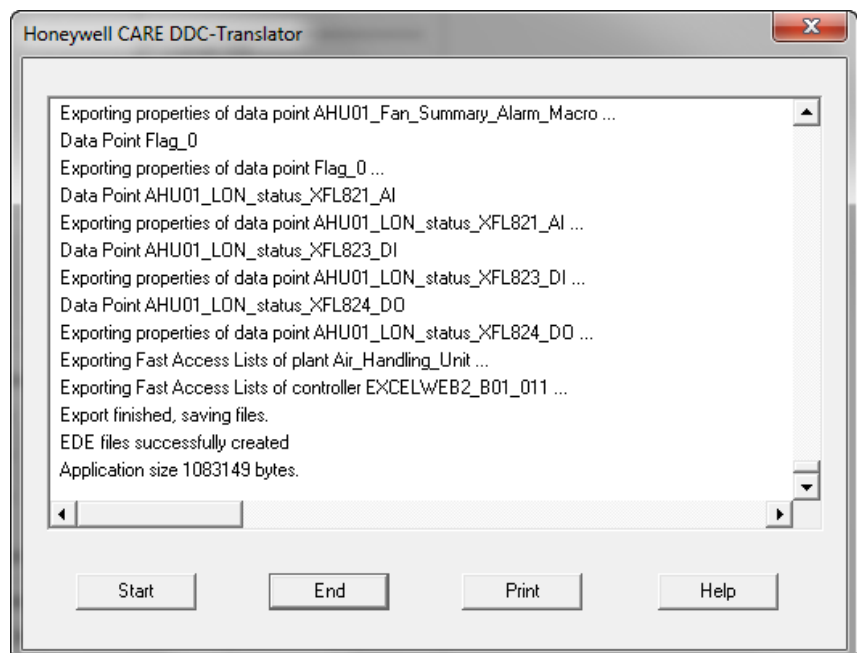
- Procedure**
1. In the logical plant tree, select the controller, you want to translate.
 2. Click menu item Controller, then drop-down item Translate or, click the Translate button in the button bar.

RESULT: If there are errors in the application, the Check controller application window displays. To solve a problem, read the cause of the issue in the Text column. For datapoint issues you can jump to the datapoint by double-clicking on the corresponding line.



3. After you have solved the problems and closed the Check controller application window, repeat step 2.

RESULT: CARE finishes the translation. The execution messages are shown in the Honeywell CARE DDC-Translator window.



4. Click End button to exit the translate function.
5. Click Print button to print the translation result.

Download Controller

Purpose Copy translated files to the CARE XL-5000 controller.

NOTE: For copying files into a BACnet controller, please refer to the "Download Application into Excel Web Controller" section.


Prerequisites The controller must be connected to the CARE PC and translated.

Procedure 1. Click menu item Controller, then submenu item Tools and XL Online.

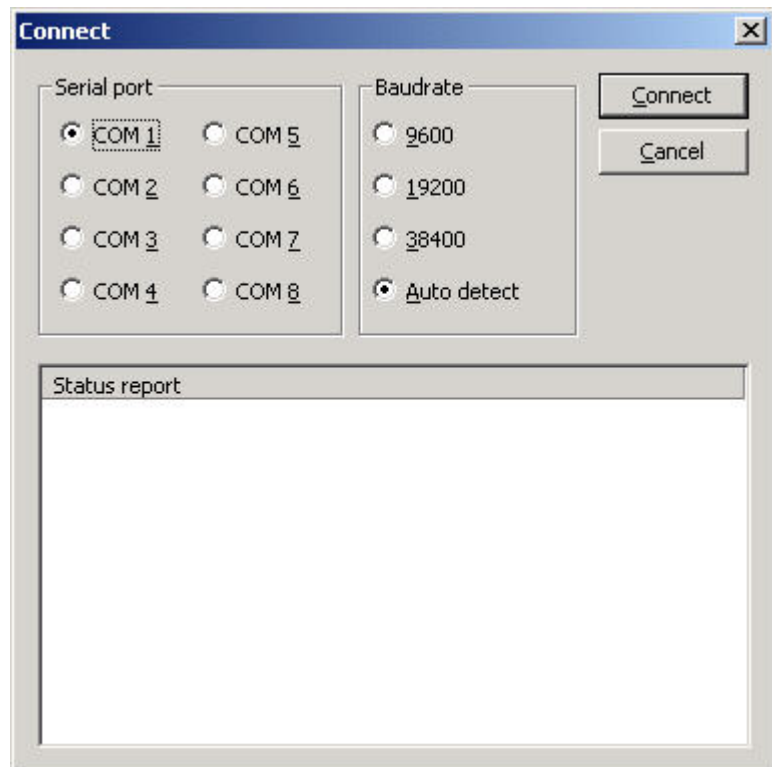
RESULT: The XL Online main window displays. Software tries to connect to the port according to the settings defined in the XL Online dialog box (see Define Port Settings section).

If no controller is connected to the port or software cannot connect to the controller due to wrong port settings, the XI 581/2 MMI is gray and the status message No connection is displayed.

If the connection is completed and no application is running, the MMI is blue and blank. If an application is running, the MMI is blue and the initial text is shown.

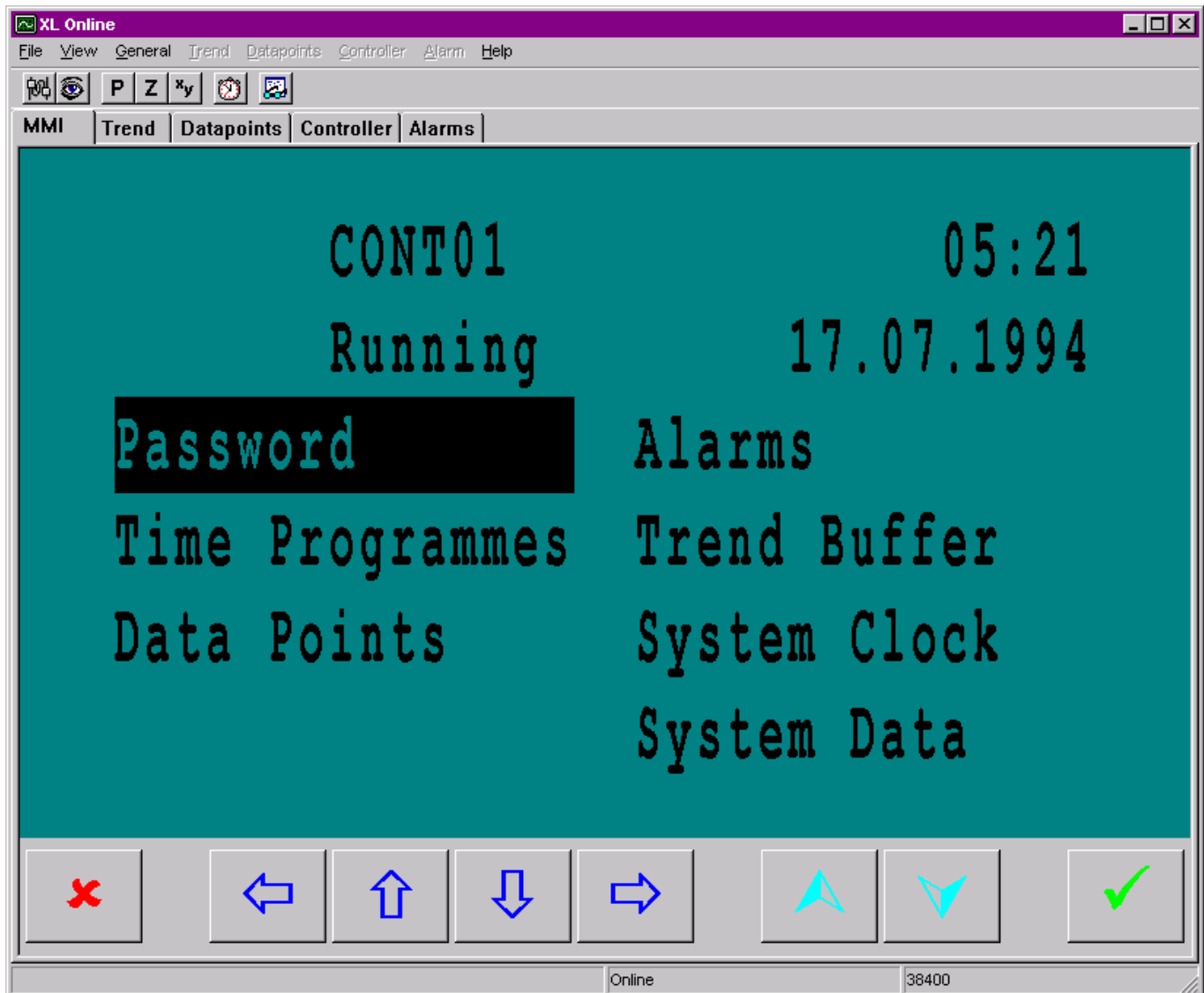
2. If the MMI is gray, connect the controller to the port as follows:
3. Click menu item File, then submenu item Connection.
Or, click on the Change serial port settings icon  on the button bar.

RESULT: The Connect dialog box displays.



4. Select the serial port and the baudrate by clicking the corresponding radio buttons. Select Auto detect, if you do not know the baudrate (default setting).
5. Click the Connect button.

RESULT: If the connection could not be completed, a status report is displayed with the message that CARE is unable to establish the connection. If the connection could be completed, the MMI is invoked in blue and the initial text is shown, if an application is running. If no application is running the MMI is blank.




6. If no application is running, reset the controller by pressing the Reset button at the controller.
7. Make sure that the controller number in CARE and in the MMI is the same. If they are different, set them equal either in CARE or in the MMI. For operating instructions of the MMI refer to the XI581/2 Operator Terminal Manual.
8. Click the Controller tab.

RESULT: Controller status information is listed.

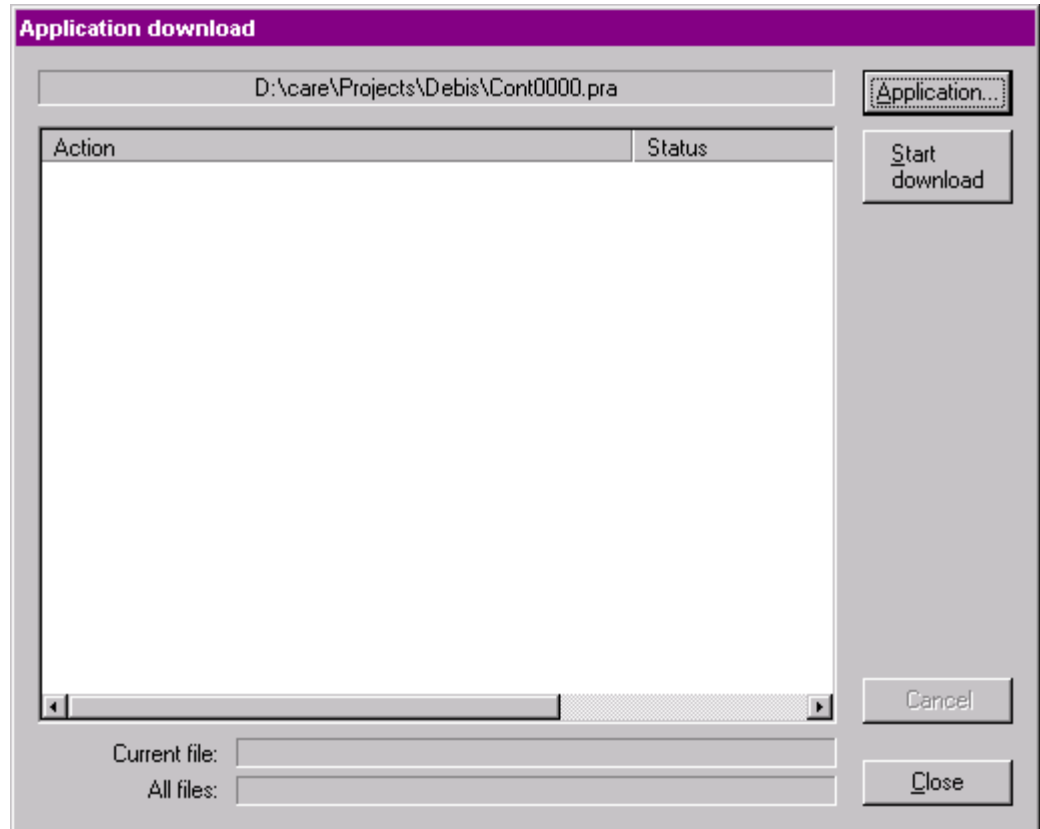
Description	Value
Controller name	CONT01
Program name	CONT01
Controller no.	22
Device type	XL500 - Version 2.04.94
Download time	16. July 94 - 13:54:01
Country code	Germany
--- Application status ---	
Application status	Running
AppPart: Common value	Running
AppPart: Field ID	Running
AppPart: Timeprogram	Running
AppPart: RACL	Running
AppPart: ASPECCD	Running
Logon status	Inactive
--- Application parts ---	
RACL application (ral)	3.1 - 192 Bytes
RACL Parameter (rap)	3.1 - 496 Bytes
RACL Z-Register (raz)	3.1 - 16 Bytes
RACL T-Register (rat)	3.1 - 16 Bytes
ASPECCD (adl)	3.1 - 20320 Bytes
Time program (zpg)	3.2 - 4416 Bytes
Datapoint description (ipl)	3.1 - 3632 Bytes
Descriptors (klx)	3.1 - 592 Bytes
Alarm text (alk)	3.1 - 2240 Bytes
State text (zsx)	3.1 - 464 Bytes
Engineering units (phx)	3.1 - 1024 Bytes
Characteristics (kdx)	3.1 - 512 Bytes
Configuration (kfx)	3.1 - 144 Bytes
Project (pra)	3.1 - 112 Bytes
NV Mapping table (ymp)	3.1 - 176 Bytes
NV Conversion (ycv)	3.1 - 48 Bytes
NV Configuration (ynv)	3.1 - 1504 Bytes

Online 38400

9. Check the information.

10. Click menu item controller, then submenu item Download or,
click on Download to Controller icon  on the toolbar.

RESULT: The Application download dialog box displays.

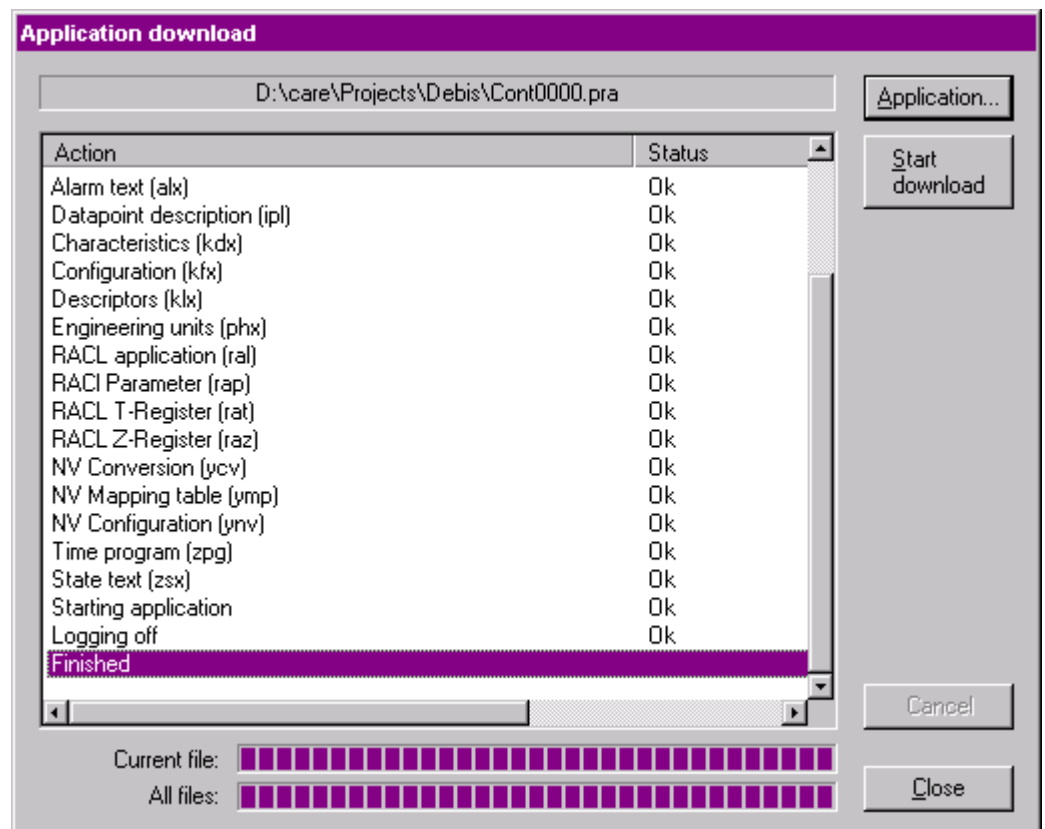
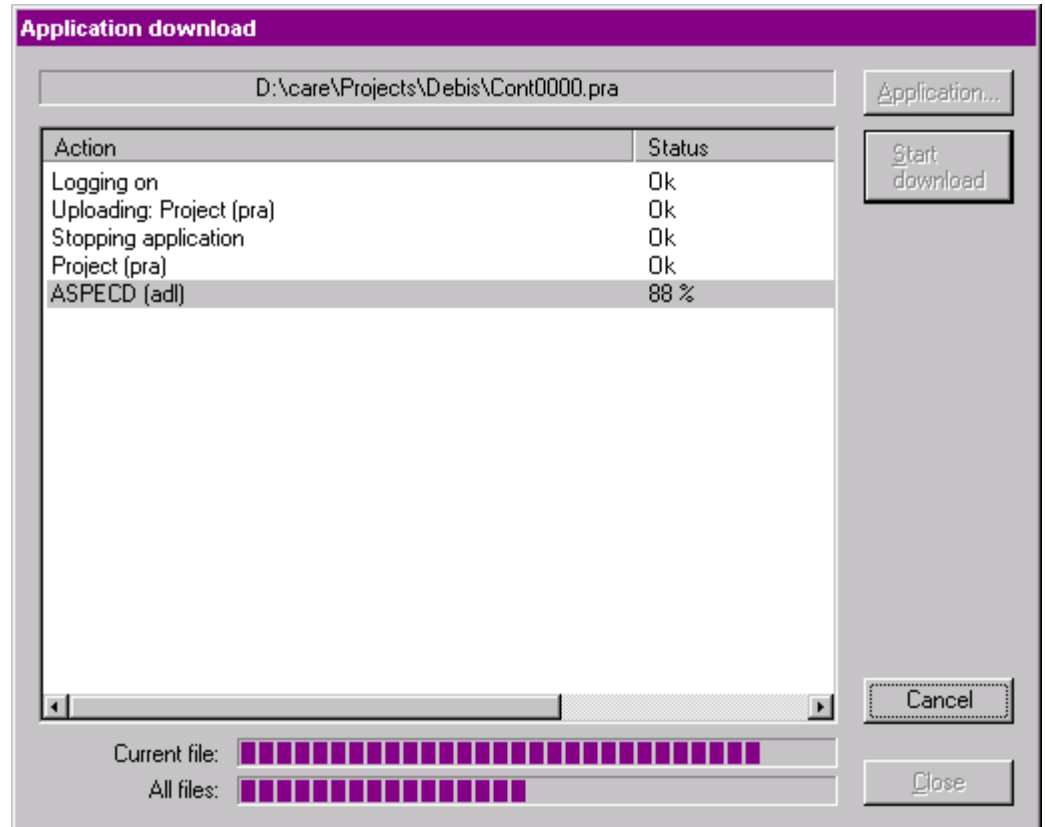


RESULT: On the top, the path of the previously downloaded application is displayed.

11. If you want to download a new application, click Application button and select the desired application (.pra file).
12. Click Start download button if you want to download the previously downloaded application or the new application.

RESULT: Depending on the kind of application you want to download, different messages can appear (see *What kind of Application to Download* section).

The download starts. Action and status messages will be listed while the download proceeds.



13. Click the Close button when the download is finished.

RESULT: Eventually alarms are generated as indicated by the flashing alarm icon on the Alarms tab.

14. Click the Alarms tab, check the messages and perform appropriate troubleshooting procedures if necessary.

Commission LON Controller / LON Device / LonWorks Network

NOTE: Commissioning applies to LON controllers and LON devices only. Commissioning is the final necessary step in order to complete the startup a LON controller. For more information on LON engineering, please refer to the LonWorks Network Engineering section.

Purpose The commissioning process is the software supported startup of a LON node and executes the following steps:

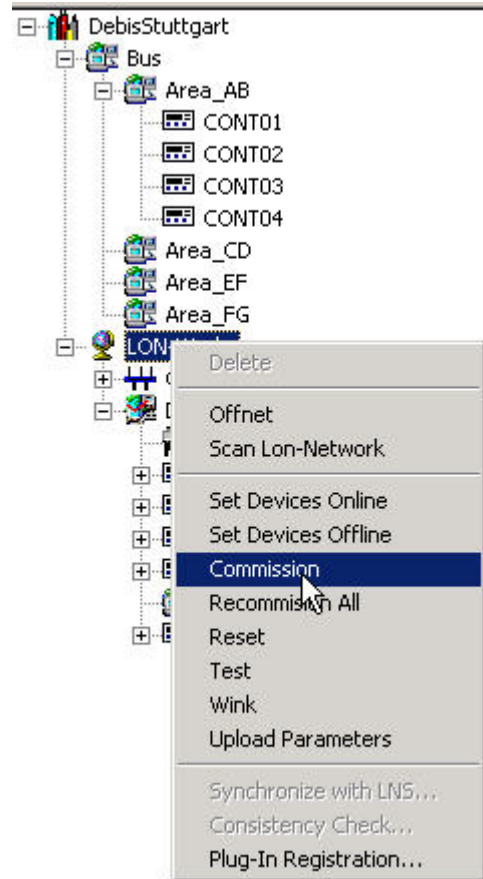
- Addressing (network address)
- Binding (binding information of NVs)
- Configuration (parameters)

In CARE, it is possible to commission single devices, all devices of a system (top-level system such as the Default System) or subsystem), or the complete LonWorks network.

When commissioning all devices of a system or the network, only those devices will be commissioned which network interface had been changed in CARE since the latest commissioning, that is, the current state of the device is different to the current state in CARE.

Prerequisites The controller must be connected to the CARE PC, translated and downloaded.

- Procedure**
1. In the network tree, click on the desired item (LonWorks folder = complete network, system folder = all devices of the system, or the device) you want to commission.
 2. Click right mouse key and with left mouse key, click Commission.



RESULT: For any device which is not addressed yet, the Get Service Pin dialog box displays asking you to press the service pin. Press the service pin and Click OK. After all devices have been addressed, they will be commissioned. Commissioned devices are indicated by the fully colored green display of the devices in the network tree as well as on the device status icon on the devices.

Generate Documentation

Purpose Print reports showing system operation and parameters. Also, you can output a variety of file types to supplement job documentation. For example, you can create graphic metafiles (.WMF extension) that are a plant's schematics, control loops, and switching tables. You can also create spreadsheet files that contain information useful for pricing (Data Export function).

CARE provides printing of:

- Complete projects
- Controller(s) with attached plants
- Unattached plants

IMPORTANT

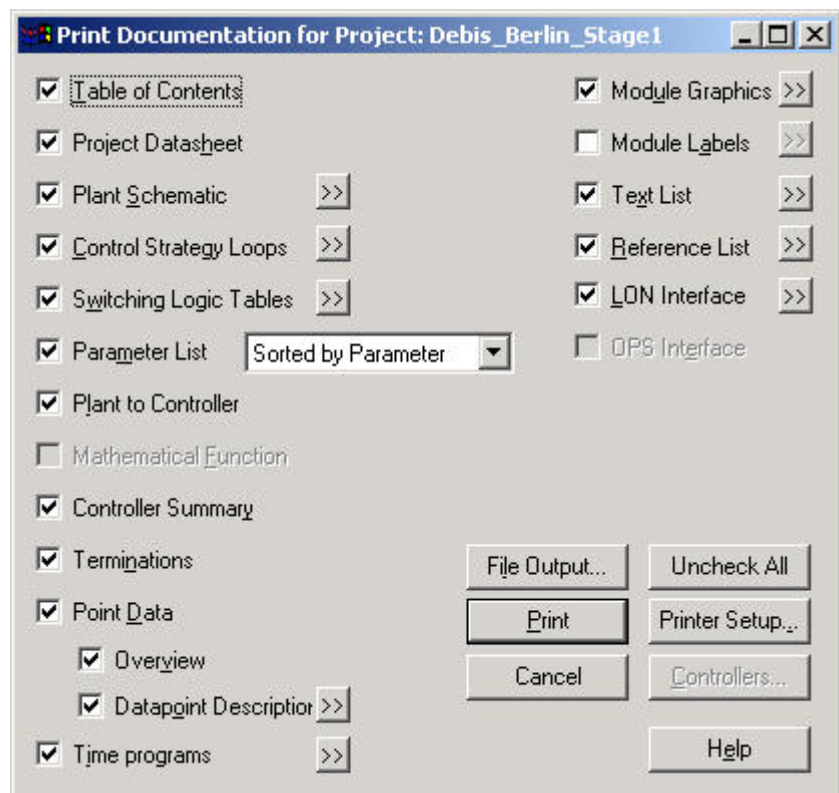
Printing complete projects is not recommended because this results in Word documents that exceed 1000 pages and file in excess of 40 Megabytes. These large documents cause Word for Windows™ to become very slow.

Procedure

1. Click menu item **Database**, then submenu item Print.
Or, in the logical plant tree, right-click on the controller, plant or project and with left mouse key, click on Print in the context menu. Use Database/Select to select the controller, plant or project you wish to print.

2. Select **Database/Print...**

RESULT: The printout main dialog box is displayed showing the options for printout. Depending on the application (controller, plant, project) selected, not all options are available and grayed therefore. For example, for plants you can only print table of contents, project data sheet, plant schematic, control strategy loops, switching logic tables and parameter list sorted by usage.



3. Check the options that you wish to print.

4. Press the **Print** button in order to print directly or alternatively press the **File Output...** button to store the printout in a file that can be edited by Word.

NOTES: You may want to have different page breaks or change the layout of tables, etc. To optimize the page breaks and document layout, Microsoft Word for Windows™ can be used to edit the document.

RTF (Rich Text Format) is a text format that can be accessed by Word. This format has been selected for the printout, because it is much more reliable than the DOC format. After loading a file into Word, it might be saved also as DOC or any other Word supported file format (refer to the Word user's manual).

BEYOND THE BASICS

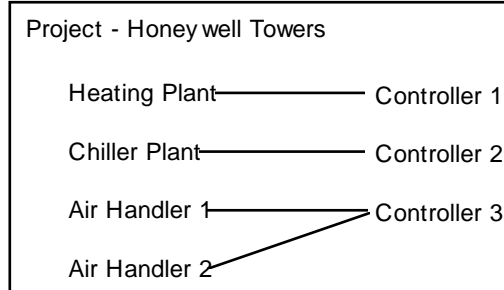
PROJECTS DEFINITION AND MANAGEMENT
CONTROLLERS DEFINITION, ATTACHMENT AND MANAGEMENT
PLANTS DEFINITION AND MANAGEMENT
PLANT SCHEMATICS
CONTROL STRATEGY
SWITCHING LOGIC
EDITORS
TIME PROGRAMS
TERMINAL ASSIGNMENT FUNCTION
FILE MANAGEMENT
DOCUMENTATION

PROJECTS DEFINITION AND MANAGEMENT

Purpose This chapter describes how to define and select a project as well as other project management functions in CARE, for example, how to change existing project information.

Project Definition A project is a set of controllers with attached plants communicating via bus. A project can cover multiple of different buses (C-Bus, LON-Bus etc.) building up a network.

Example of a project with four plants and three controllers:



You can assign more than one plant to a controller. You cannot assign the same plant to more than one controller.

In addition, general information such as reference number, client name, and order number are part of the project.

CARE organizes plants by project. The first step when you start CARE is to select a project. If none exists, or if you need a new one, you can define a new project.

Chapter Contents

- Create New Projects
- Open Existing Projects
- Change Project Password
- Display and/or Modify Project Information
- Rename Projects
- Rename User Addresses
- Delete Projects
- Rename Datapoints
- Delete Unused Datapoints

See Also ⇒ File Management chapter for procedures to delete, back up, and restore projects

Create New Project

Purpose Define project name, password, and general information such as reference number, client name, and order number. This information appears in the final documentation for the project, is used in pricing estimates, and controls access to the projects.

Procedure

1. Click menu item Project, then drop-down item New.

RESULT: The New Project dialog box displays.

The 'New Project' dialog box contains the following fields and options:

- Project Name:
- Description:
- Reference Number:
- Customer:
- Order Number:
- Discount: %
- Job Factor:
- Project Engineer:
- Date:
- User Addresses:
- Units of Measurement:
 - International
 - Imperial
- Project Subdirectory:

Buttons: OK, Cancel, Help

CARE-XL-5000: New Project dialog box

CARE-BACnet: New Project dialog box

2. Enter information in all fields of the box. Do not leave any fields blank. In some fields defaults are displayed, which are defined in the ProjectsDefaults section of the CARE.INI file:

Project Name

Name of project, for example, site location. First character must be a letter. There cannot be any spaces; use an underscore, `_`, to separate words, if desired. Maximum 32 alphanumeric characters.

NOTE: For LON projects where a synchronization is highly probable to be done, the number of alphanumeric characters of 16 must not be exceeded.

Description

Default Text about the project that may help to identify it. Approximate maximum 30 alphanumeric characters. Default display is defined in the CARE.INI file.

Reference number

A number that further describes the project. For example, enter branch number. Numeric characters only (0-9). Approximate maximum 9 numeric characters. Default display is defined in the CARE.INI file.

Customer

Customer name. Approximate maximum 30 alphanumeric characters; Default display is defined in the CARE.INI file .

Order number

Number assigned to project order. Approximate maximum 10 numeric characters (0-9). Default display is defined in the CARE.INI file.

Discount

Percent of discount from list price. Maximum two numbers (0-99). This value is available to the data export file that can be used in an Excel spreadsheet. Default display (1) is defined in the CARE.INI file.

Job Factor

Difficulty factor (0 through 99.99). If you enter a number with more than two decimal places, software truncates the entry to two decimal places after you click **OK**. For example, if you enter 15.045, software saves 15.04. If you enter a number with more than two integer digits, software displays an error message and lets you enter another value. Default display (1) is defined in the CARE.INI file.

When calculating project costs, software multiplies additional services in the estimate with this factor. Job factor can result in an increase or decrease in total costs. This value is available to the data export file that can be used in an Excel spreadsheet.

Controller Number Offset (BACnet Project only)

The number of the first controller in the project will be equal to the controller number offset plus 1.

Project Engineer

Name of responsible project engineer. Approximate maximum 20 alphanumeric characters. Default display is defined in the CARE.INI file.

Date

Date of most recent project modification. Approximate maximum 20 alphanumeric characters.

User Addresses

Whether you want non-unique or unique user addresses in this project. Unique is the default. You cannot change this assignment after you create a project. The following text explains the implications of the two choices.

It is recommended that you select "unique" addresses. Enabling this feature tells software to check for duplicate nonglobal, uncommon points within the controller and project (a project is a bus) as you create points in the other CARE functions (schematics, control strategy, etc). If software detects duplicate points, software issues a warning message. You cannot attach a controller that has duplicate nonglobal or uncommon points. If a controller is to be used with a central (for example, Excel Building Supervisor [XBS] or Excel Building Supervisor-Integrated [XBS-I]), the addresses must be unique.

Global points are points that send their information to receiver pseudopoints in other controllers. The points have the same user addresses. Global points are meant to be duplicated and used by multiple controllers.

Common points are used multiple times in the same controller but in different plants. For example, the ahu1 and ahu2 plants in controller 1 can use the same outdoor air temperature sensor in their schematics. The sensor is considered a common point to two plants.

Selecting "unique" also allows you to modify user addresses in the Schematic function when you select an element that is already in a previous plant. When software encounters a repeat element, it displays the following message:

User address already exists, create nevertheless?

There are two buttons in the message box, **OK** and **Cancel**.

If you click **OK**, software creates the element with the same user address as before. This action is desirable in the case of common points.

If you click **Cancel** and the element is a segment (not a Point Without a Graphic), software creates the element and appends a number to a user address. For example, a user address of OaTemp becomes OaTemp1. If the element is selected again in another plant and you click **Cancel** again, software appends a 2 (that is, OaTemp2). You can also change user addresses later when you use the Editors.

If you click **Cancel** and the element is a Point Without a Graphic, software does not create a point.

Units of Measurement

Set default for project: International or English. This selection affects the operation of the icons in Control Strategy that perform EMS operations. The values for the inputs and outputs are different depending on the selection of International or English units. See Excel CARE Control Icons User Guide 74-5577 (US) / EN2B-0184 (Europe) for more information.

Character Set (BACnet Project only)

The appropriate character set is necessary for unobstructed communication between devices on the BACnet bus. For proper communication between Excel Web controllers and the EBI central, the ANSI character set must be selected.

IMPORTANT

CARE does not check for entering any illegal characters. If ANSI X3.4 has been chosen, you can enter characters like é, è, ã, ö, or ü without any warning. If ISO-Latin-1 has been chosen, you can enter the Euro sign, which is no Latin-1 character, without any warning.

ProjectSubdirectory

According to the description entered in the Project field, a subdirectory where the project and the controller files are saved is concurrently set under the CARE\projects directory. The entry can have max. 8 digits. By default the first 5 digits are taken from the Project Name, which can have a maximum of 18 digits. The last 3 digits are numbers starting with 000 and counting forward when defining new projects, which start their project names with the same first 5 digits than the first project created.

The entry can be changed during creation of a new project to any desired name or on the Project's Properties tab.

With this function you can structure related projects by their names and save them under different subdirectories.

Example:

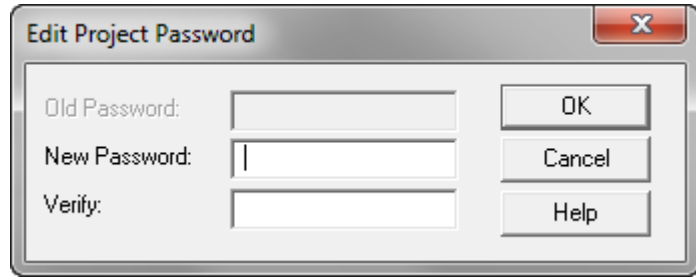
Project Name	Project Subdirectory
AirportTerminalA	Airpo000
AirportTerminalB	Airpo001
AirportTerminalC	Airpo002

Email Alarming (BACnet Project only)

Shows the default email address used for the Email Alarming of the controller in the **Global Sender EMail Address** field. The default is defined in the *Global Options* dialog as described in the Set Global CARE Options section. You can change the email address here if the email address displayed does not match the email address you want to use for email alarming or if you use different email addresses for email alarming in multiple projects.

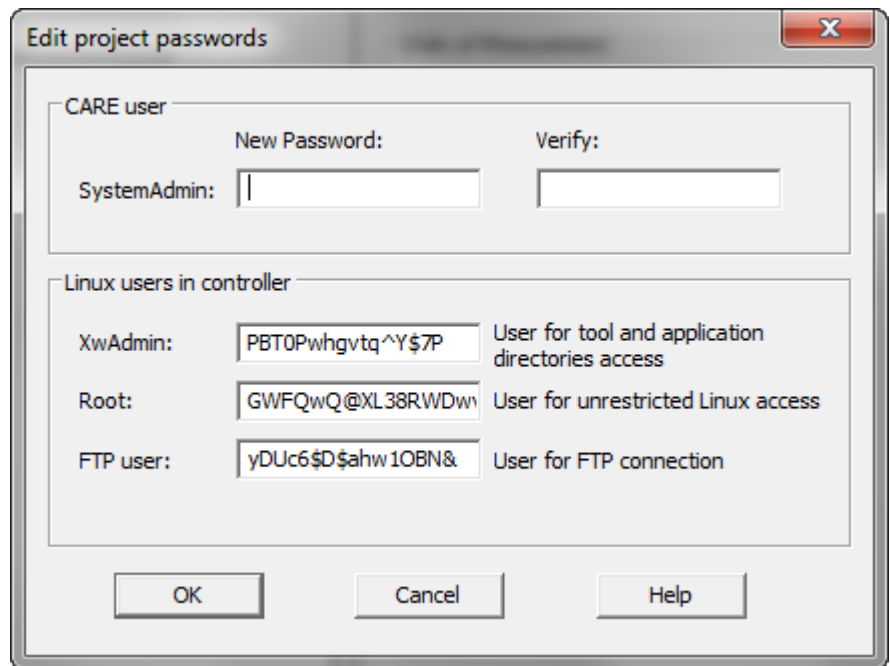
3. Click **OK** (or press **Enter** key) to close dialog box and create project. All fields must have entries or the **OK** button is inactive.

RESULT: In CARE-XL 5000, the Edit Project Password dialog box displays.



NOTE: In CARE XL 5000, the input of a password is not necessary. If applied, a password must have at least 5 characters and can have maximum 15 characters. For the password, any combination of numbers, letters, and special characters like commas are possible.

RESULT: In CARE-BACnet, the Edit project passwords dialog box displays.



NOTE: In CARE-BACnet you must enter the following three passwords:

SystemAdmin

Allows general access to the project for the CARE user and unlimited web-browser access with SystemAdmin rights. The System Admin password must have at least 5 characters, but should have more characters, including upper & lower case, letters, numbers and special characters. It can have maximum 33 characters

XwAdmin

Allows restricted access to the Linux operating system of the controller including access to the tool and application directories. This allows setting up the controller including translation and connection, application upload and download, download of settings, download of graphics (UI Suite), firmware upgrade and reset of the configuration

Root

Allows unrestricted access to the Linux operating system of the controller via serial interface using a console

FTP user

Allows uploading/downloading diagnostic files via FTP

For the root, XwAdmin, and FTP access, CARE proposes visible passwords. You can change these passwords as described in step 5. The XwAdmin, Root, and FTP passwords have 16 characters and can have maximum 33 characters.

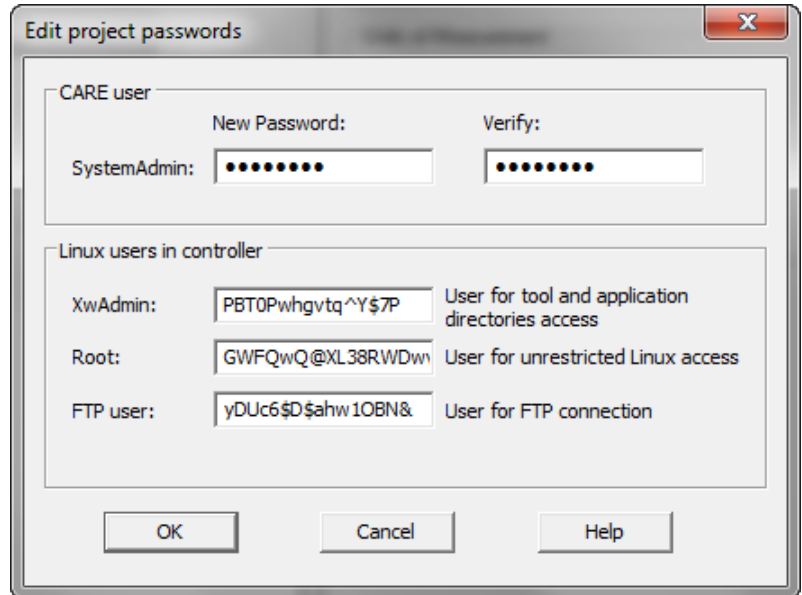
For all passwords, any combination of numbers, letters, and special characters like commas are possible and should be used.

- For a CARE XL 5000 project, type in the password in **New Password** and **Verify** if desired, and then click the **OK** button. For a CARE-BACnet project continue with step 5.

CAUTION

If a password was entered, make a note of the password. No one can work on the project without knowing this password.

- For a CARE-BACnet project, enter the project password twice in **New Password** and **Verify**. This password is for the CARE user with **SystemAdmin** rights. When entering the passwords they are hidden.
In **XwAdmin**, **Root**, and **FTP user** change the visible passwords if desired.

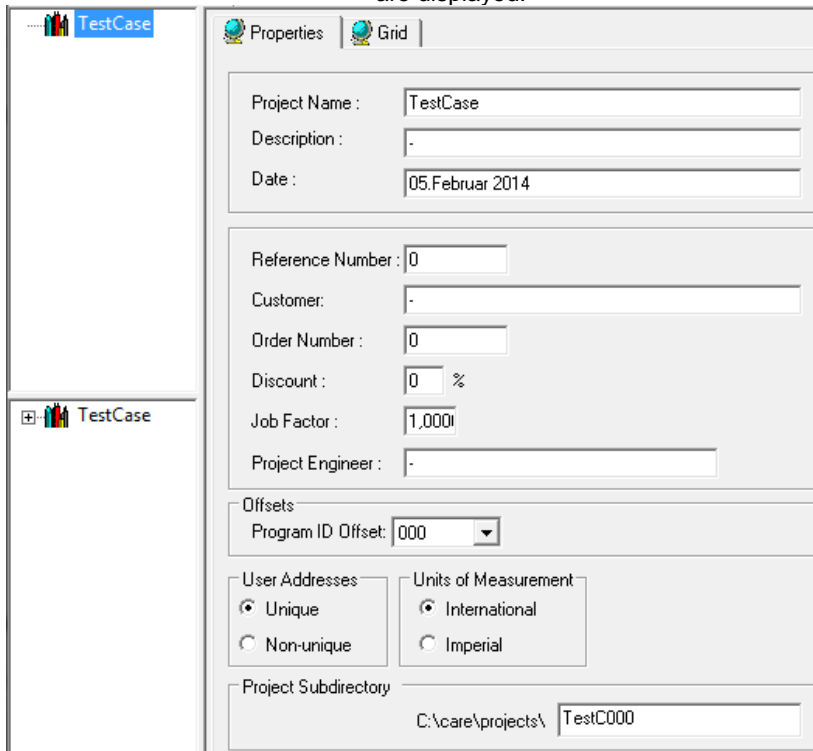


6. Then, click the **OK** button.

! CAUTION

Make a note of all the passwords. No one can work on the project without knowing the SystemAdmin password. No one can setup the controller in CARE without knowing the XwAdmin password. No one can access the controller via a console without knowing the Root password. No one can upload/download diagnostic files without knowing the FTP user password.

RESULT: The Project is created and displayed twice, in the logical plant tree and in the network tree. On the right pane, the project properties are displayed.



CARE-XL-5000: Project Properties

CARE-BACnet: Project Properties

9. The following properties are available only after a BACnet project has been created:

Program ID Offset

The project offset is used for calculating unique program IDs for the network interfaces if more than one CARE project is used for the same construction project (see also Enter Project Offset section)

Enable Web Server

If checked, this option provides access to a BACnet controller via Web Interface.

Enable Comfortable Login

If checked, this option provides the login to the web interface without the necessity to enter user name and password each time you are logging in.

CAUTION

If checked, make sure that the controller is operated in a closed network or VPN to avoid misuse through cyber attacks or easy login by other persons not knowing your password and user name.

Enable QVGA Pages

If checked, the web pages will be displayed in QVGA (quarter VGA = 320 pixels by 240 pixels) resolution. This is necessary for the proper display of the web pages in the CL Touch panel.

NOTE: The settings (checked or unchecked) of the **Enable Web Server**, **Enable Comfortable Login** and **Enable QVGA Pages** properties will be applied to any

controller created afterwards in the project. When changing the settings again, the settings of the controllers created before the change will not be reverted. The settings of each controller can/must then be changed individually.

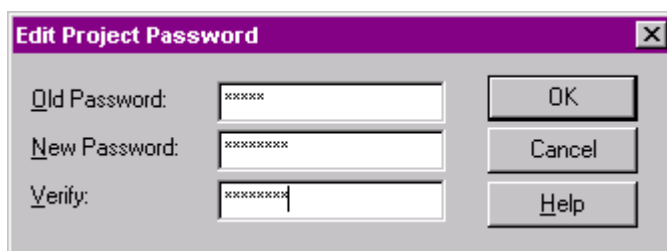
10. Continue by setting default settings as described under the "Set Global CARE Options" section.

Change Project Password

Purpose Replace the current password for a project.

- Procedure**
1. Open the project and click on any item in the logical plant tree.
 2. Click menu item Project, then drop-down item Change Password.

RESULT: The Edit Project Password dialog box displays.



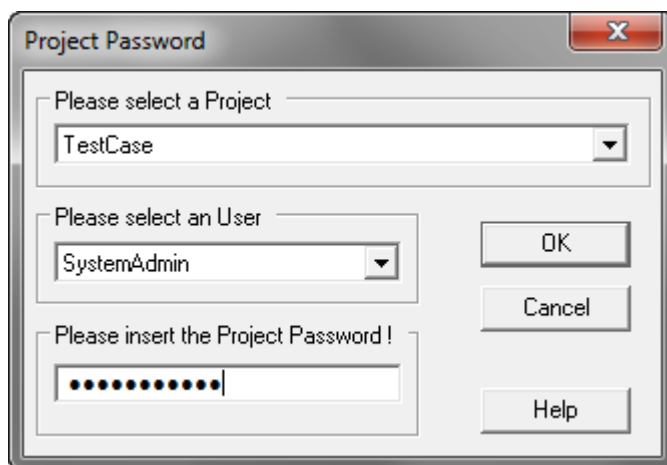
3. In the Old Password field, type old password. Tab to the New Password field and type a new password (maximum 20 characters). Tab to the Verify field and retype the new password.
4. Click OK to confirm.

Open Existing Project

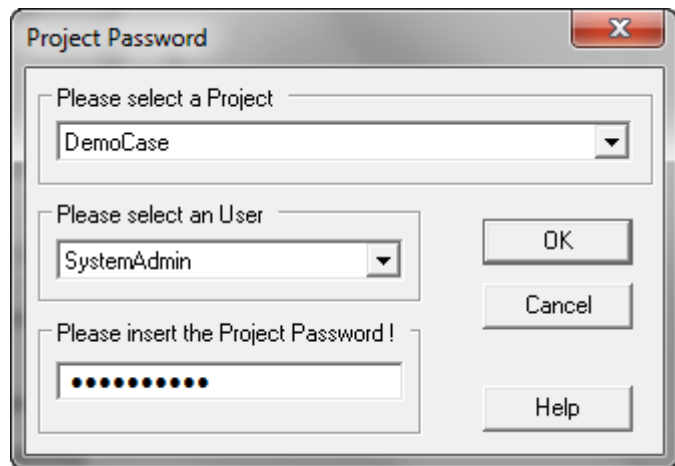
Purpose Specify a project, plant, and/or controller to work on.

- Procedure**
1. Click menu item Project, then drop-down item Open.

RESULT: The Project Password dialog box displays.



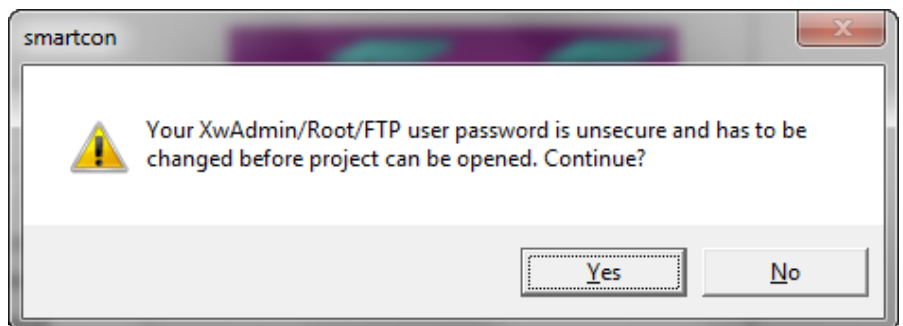
CARE - XL 5000: Project Password dialog



CARE - BACnet: Project Password dialog

2. In Please select a Project, select the project.
3. In Please select an User, select the user (CARE-BACnet only).
4. In Please insert the Project Password !, do any of the following:
 - a. In CARE-XL 5000, the input of a password is optional when creating a project. If a password had been issued when the project was created, enter it. If not, continue with step 5.
 - b. In CARE-BACnet, enter the System Admin password which had been issued when the project was created.

RESULT: If the project contains old unsecure passwords for XwAdmin, ftpuser, and/or Root, the following message box displays:



- c. It is recommended to change the passwords. Hence, confirm by clicking Yes.

RESULT: The Edit project passwords dialog box displays.

Edit project passwords

CARE user

New Password: Verify:

SystemAdmin:

Linux users in controller

XwAdmin: %1cRQ#5n!cGwzLdP User for tool and application directories access

Root: 5T6GCrVRNeGtDjIn User for unrestricted Linux access

FTP user: 1fpS!24kGAdRHdjp User for FTP connection

OK Cancel Help

- d. In the XwAdmin, Root, and FTP user fields, change the passwords.

! CAUTION

Make a note of all the passwords. No one can work on the project without knowing the SystemAdmin password. No one can setup the controller in CARE without knowing the XwAdmin password. No one can access the controller via a console without knowing the Root password. No one can upload/download diagnostic files without knowing the FTPuser password.

5. Click OK.

RESULT: The project is displayed in the logical plant tree and the network tree. Plants and controllers can be listed by clicking the plus symbols. On the Properties tab on the right, project data can be entered/edited.

The screenshot shows the 'Properties' window for a project named 'TestCase'. The interface includes a sidebar with a tree view containing 'TestCase'. The main panel has two tabs: 'Properties' (selected) and 'Grid'. The 'Properties' tab contains several input fields and sections:

- Project Name:** TestCase
- Description:** -
- Date:** 05.Februar 2014
- Reference Number:** 0
- Customer:** -
- Order Number:** 0
- Discount:** 0 %
- Job Factor:** 1,000
- Project Engineer:** -
- Offsets:** Program ID Offset: 000
- User Addresses:** Unique (selected), Non-unique
- Units of Measurement:** International (selected), Imperial
- Project Subdirectory:** C:\care\projects\ TestCase000

CARE-XL-5000: Project Properties

The screenshot shows the 'Properties' window for a project named 'DemoCase'. The interface includes a sidebar with a tree view containing 'DemoCase'. The main panel has two tabs: 'Properties' (selected) and 'Grid'. The 'Properties' tab contains several input fields and sections:

- Project Name:** DemoCase
- Description:** -
- Date:** 27.Oktober 2014
- Reference Number:** 0
- Customer:** -
- Order Number:** 0
- Discount:** 0 %
- Job Factor:** 1,000
- Project Engineer:** -
- Offsets:** Program ID Offset: 000, Controller Number Offset: 2
- User Addresses:** Unique (selected), Non-unique
- Units of Measurement:** International (selected), Imperial
- BACnet Character Set:** Unicode UCS-2
- Project Subdirectory:** C:\care\projects\ DemoC000
- E-Mail Alarming:** Global Sender EMail Address: ControllerName@ProjectName.com
- Enable Web Server:**
- Enable Comfortable Login:**

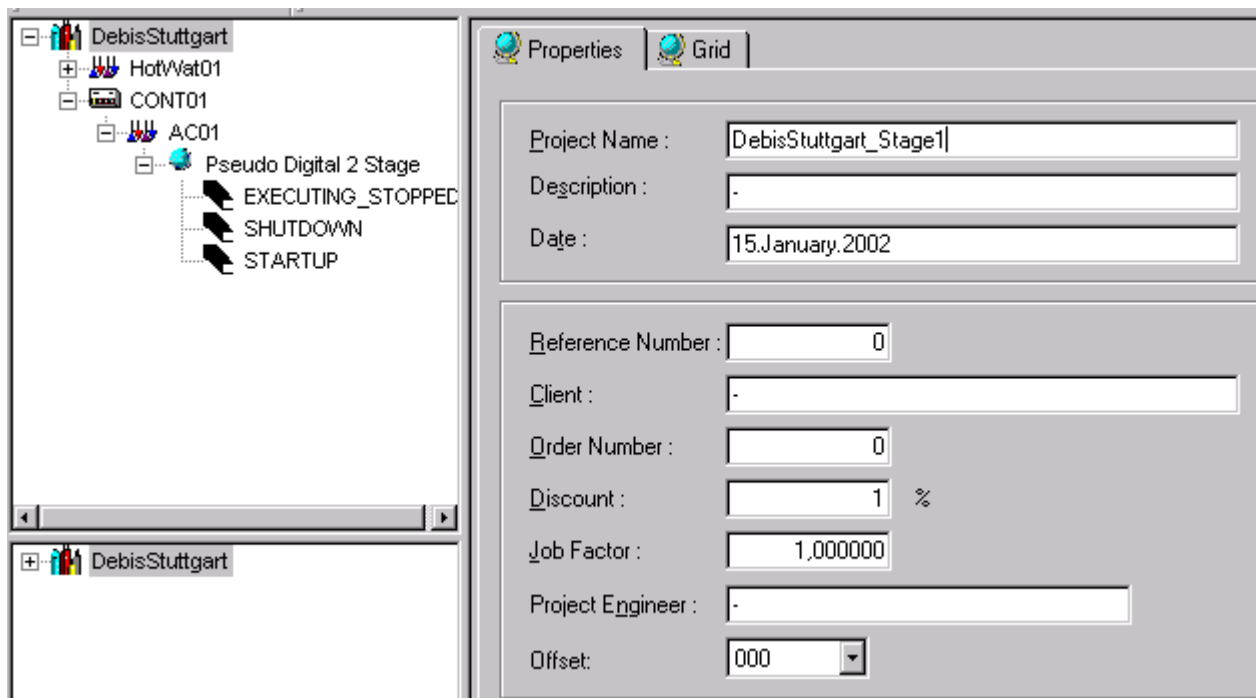
CARE-BACnet: Project Properties

- On the Properties tab, change project information, if desired. For detailed description of the fields, please refer to the Create New Project section and the Enter Project Offset section.

Rename Project

Purpose Rename a project.

- Procedure**
- In the logical plant tree, click on the project.
 - On the Properties tab on the right, rename the project in the Project Name field.



- In the logical plant tree on the left, click on the project.

Delete Project

Purpose Delete a project.

- Procedure**
- With right mouse key, click on the project in the logical plant tree.
 - With left mouse key, click on Delete in the context menu.
RESULT: A message box displays.
 - Click Yes to delete the project.

Display/Change Project Information

Purpose Display and/or change project information such as reference number, client name, and order number.

- Procedure**
- In the logical plant tree, click on the project.
 - On the Properties tab on the right, change desired project data.

The screenshot shows the 'Properties' window for a project named 'DemoCase'. The window is divided into several sections:

- Project Information:** Project Name: DemoCase, Description: -, Date: 27. Oktober 2014.
- Reference and Customer Information:** Reference Number: 0, Customer: -, Order Number: 0, Discount: 0 %, Job Factor: 1,000, Project Engineer: -.
- Offsets:** Program ID Offset: 000, Controller Number Offset: 2.
- User Addresses:** Unique (selected), Non-unique.
- Units of Measurement:** International (selected), Imperial.
- BACnet Character Set:** Unicode UCS-2.
- Project Subdirectory:** C:\care\projects\ DemoC000.
- Email Alarming:** Global Sender EMail Address: ControllerName@ProjectName.com.
- Checkboxes:** Enable Web Server, Enable Comfortable Login.

For detailed description of the fields, please refer to the Create New Project section and the Enter Project Offset section.

Enter Project Offset

Purpose The project offset is used for calculating unique program IDs for the network interfaces if more than one CARE project is used for the same construction project. The offset is only effective for controllers being newly created.

Procedure 1. In the logical plant tree, double-click on project name.

CARE XL-5000 Project Properties

CARE- BACnet Project Properties

2. From the Offset (CARE XL-5000) respectively Program ID Offset (CARE-BACnet) drop-down listbox, select an offset value.

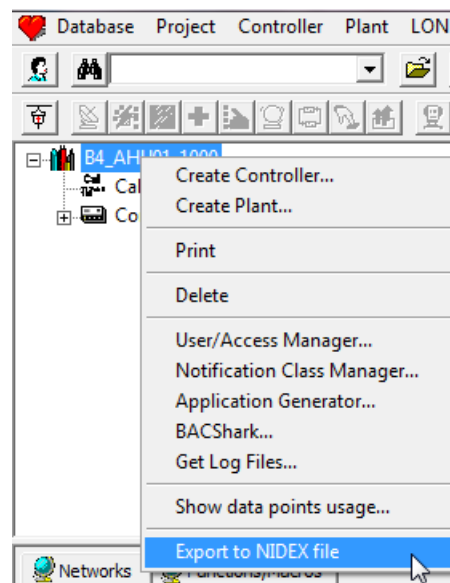
Export Project Data to Niagara

Purpose For CARE-BACnet and CARE-XL5000 projects, the following project data can be exported to Niagara in XML format via NIDEX file:

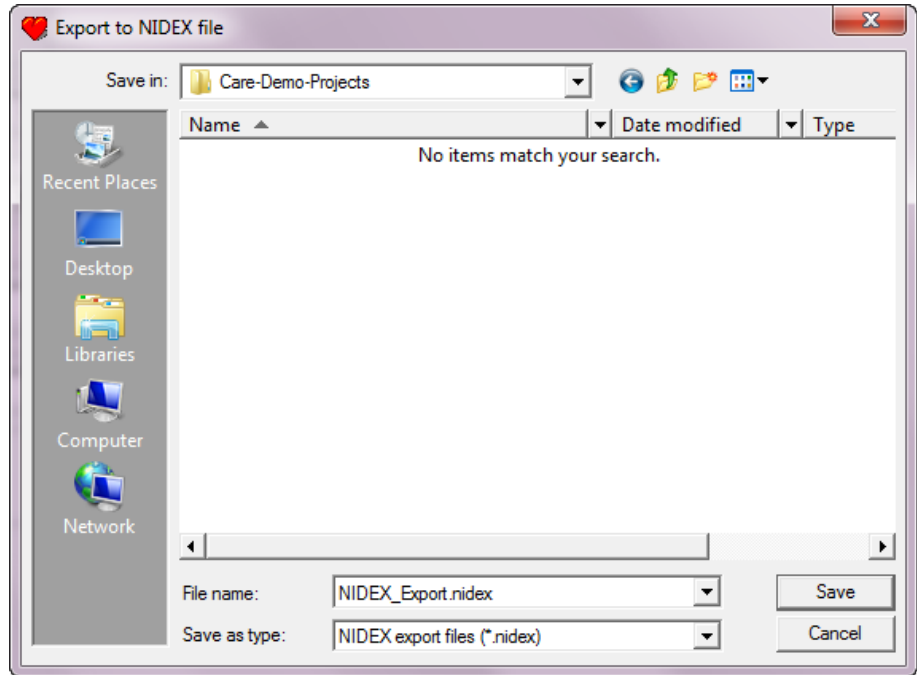
Project name and ID
BACnet-Bus, C-Bus, and LON-Bus properties and their network structure (folders, subsystems, channels)
BACnet, C-Bus, and LON controllers and devices
BACnet notification classes
Datapoints and their properties
C-Bus parameter files
BACnet schedules and C-Bus timeprograms

NOTE: The control logic and switching logic cannot be exported.

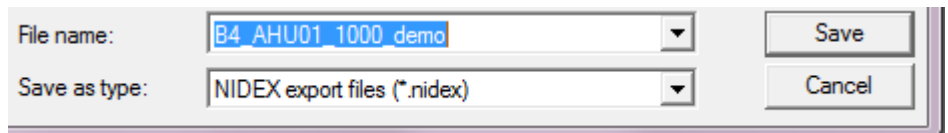
Procedure 1. In the logical plant tree, right-click on the project name.



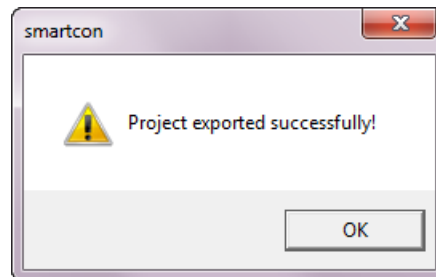
RESULT: The Export to NIDEX file dialog box displays.



2. In the File name field, enter a file name.



3. Click the **Save** button.



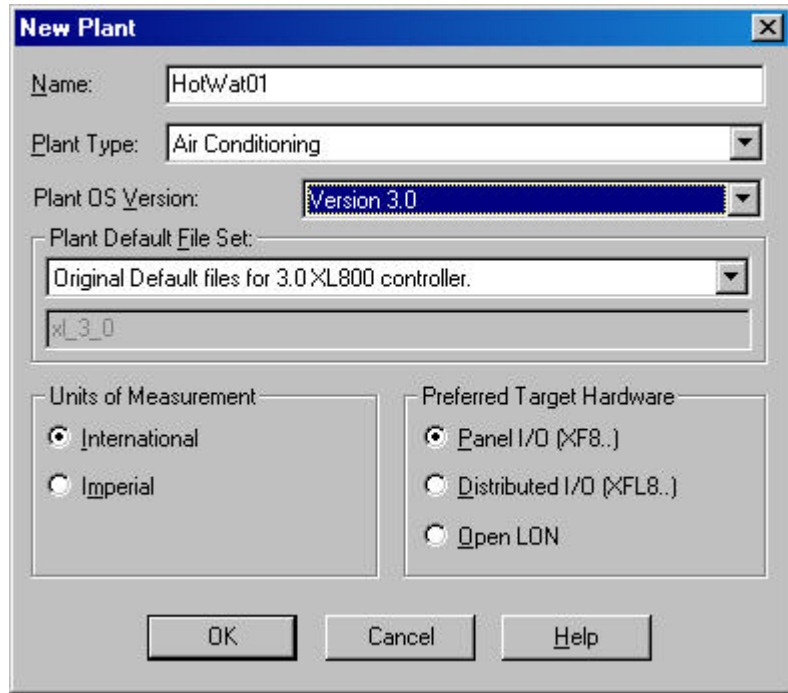
4. In the smartcon message box, click the **OK** button.

PLANTS DEFINITION AND MANAGEMENT

Purpose	<p>This chapter describes how to define and select plants as well as other plant management functions that CARE provides, for example, plant replication and deletion.</p> <p>CARE functions such as Schematics, Control Strategy, and Switching Logic pertain to specific plants. The first step when you start CARE is to select a project and then a plant. If no plant exists, or if you need a new one, you can create a new plant.</p>
Shortcuts	<p>You can copy existing plants and then modify the copies to create new plants more quickly. You can also copy plants to other projects to reuse them.</p> <p>CARE also provides a library of standard plants that you can use in any project. See Excel 5000™ Control Application Manual 74-3958 for descriptions of the applications. The Copy Applications from the Control Application Library section describes how to load a standard application.</p>
Maximum Plants	You can define a maximum of 128 plants per controller.
Chapter Contents	<p>Create New Plant Display/Change Plant Information View Plant Schematic Replicate a Plant Rename a Plant Copy a Plant Delete a Plant</p>
See Also ⇒	<p>File Management chapter for procedures to back up and restore plants</p> <p>Appendix Plant and Controller Upgrades and Downgrades for details on changing the OS version for a plant</p>

Create New Plant

Purpose	<p>Define a plant name, select a plant type and preferred target I/O hardware, and assign a controller (if desired).</p> <p>You can define a maximum of 128 plants per controller.</p> <p>When creating a plant, you can instantly attach the plant to a controller or create it unattached for later attachment.</p>
Procedure	<ol style="list-style-type: none"> 1. In the logical plant tree, click on the controller, to which you want attach the plant. Or, if you want to create an unattached plant for later attachment, click on the project. 2. Click menu item Plant, then drop-down item New. <p>RESULT: The New Plant dialog box displays.</p>



3. Type a plant name in the Name field (the new name cannot match an existing plant name in the project). Maximum 30 alphanumeric characters; no spaces; first character cannot be a number.

4. Type a additional description in the Description field (CARE- BACnet only).

5. From the Plant Type drop down listbox (CARE-XL5000 only), select desired type:

Air Conditioning	Air handler or fan system building blocks.
Chilled Water	Cooling tower, condenser water pumps, and chiller building blocks.
Elink	Elements that represent system points for Excel 10 Controllers.
Hot Water	Boilers, converters, and hot water system building blocks.
MacroCel	Air handling unit of moderate control complexity building blocks
MicroCel	VAV box, small central air handler, converter and exhaust fan building blocks
W7620	Individual HVAC zone equipment
W7620WSHP	Water source heat pump building blocks
XLink	Master plant that contains the system points for MicroCel, MacroCel, W7620 and W7620WSHP subsystem plants.

6. From the Plant OS Version drop down listbox select desired version (CARE-XL5000 only). This number is the OS version of the controller where the plant will be downloaded. See Appendix for rules on upgrading/downgrading controller versions.

7. From the Plant Default File Set drop down listbox (CARE-XL5000 only), select desired plant default file. Plant default files are customized project defaults for use in specific areas or regions generated in the Default Text editor (see Default Text Editor section). A short description for the selected default file set is given below the drop-down list box.

8. Under Units of Measurement (CARE-XL5000 only), select the desired type for the plant, International (metric) or Imperial. This selection tells the Control Strategy EMS icons which type of inputs to accept, Celsius or Fahrenheit. Units of Measurement applies not to ELink applications.

9. Under Preferred Target Hardware (CARE XL-5000 only), select desired target I/O hardware:

Standard I/O (XF5..)

(applicable to Excel 500 and 50 with OS 2.0 - 2.06).

Hardware Points of this plant will be assigned to XF5.. modules (IP bus).

Panel I/O (XF8..)

(applicable to Excel 800, OS 3.00 only)

Hardware points of this plant will be assigned to XF8.. modules (panel bus).

Distributed I/O (XFL5..)

(applicable to Excel 500 and Smart with OS 2.0 - 2.04).

Hardware Points of this plant will be assigned to XFL5.. modules. (LonWorks-bus).

Distributed I/O (XFL8..)

(applicable to Excel 800, OS 3.00 only).

Hardware Points of this plant will be assigned to XFL8.. modules (LonWorks-bus).

Open LON

Hardware points of this plant will be boardless, that is, unassigned (applicable to Excel 800 OS 3.0, Excel 500, Smart, 50 with OS 2.06 and higher, and Excel 10)

10. Click **OK**.

RESULT: If the new name is acceptable, software closes the dialog box. In the logical plant and network tree, the plant is added below the controller (plant attached) or below the project (plant unattached).

CARE software performs validation checks for an attached plant while you are creating schematics, control loops, and switching tables for the plant. For example, if you attach the plant to an Excel 80 controller, CARE issues warning messages if you add too many points to the plant schematic.

Restrictions

Certain point types are not supported by Open LON. When using OS 2.04, non-supported types will be put on IP (Excel 500, 50) or distributed I/O modules (Excel 500, Smart), even if Open LON was selected. When using OS 2.06 or 3.0, non-supported types will be indicated in red in the logical plant tree and must be put manually on IP boards or Panel I/O boards.

Point types not supported by Open LON:

DO	Pulsed Digital Output
FF	Flex DO_Feedback_DI
FM	Flex Multistage
FP	Flex Pulse2
GA	Global Analog
GD2	Global Digital 2state
GDn	Global Digital Nstate
PT	Pseudo Totalizer
TO	Totalizer

When Distributed I/O was selected for an Excel 500/800 controller and the application contains a point type, which is not supported by distributed I/O modules, these points will be put on standard I/O / Panel I/O modules.

Create Plant Schematic

Please refer to the PLANT SCHEMATICS chapter.

Add Control Strategy to Plant

Please refer to the CONTROL STRATEGY chapter.

Add Switching Logic to Plant

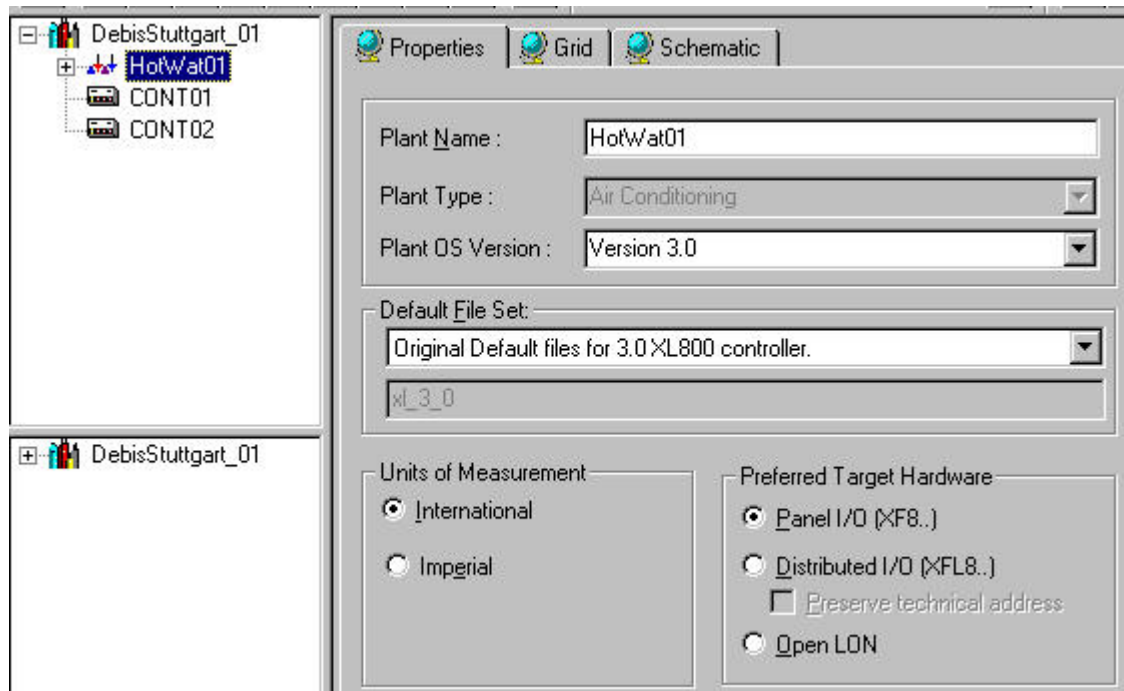
Please refer to the SWITCHING TABLES chapter.

Display/Change Plant Information

Purpose Display/Change the Plant Information such as plant name, plant type, OS version with corresponding default file set, engineering unit, and target I/O hardware selection.

Attached or unattached plant You cannot change any item of attached plants except the target I/O hardware, if the plant OS version is 2.0 or higher. For unattached plants you can change any item except plant name and plant type.

Procedure 1. In the logical plant tree, click on plant you want to display/change plant information for.



2. On the Properties tab on the right, change desired plant data as described in the following.
3. Plant OS Version is the OS version of the controller where the plant will be downloaded. Select desired version from the list. Note that depending on the version number and state of the plant, error messages may occur if you change Plant OS Version. See Appendix Plant and Controller Upgrades and Downgrades for details on changing the OS version for a plant.
4. Plant default files are customized project defaults for use in specific areas or regions generated in the Default Text Editor. Plant Default Files Set includes all plant default files to the corresponding OS version selected under Plant OS Version. To select a different file, click the drop down arrow, and then click the desired file from the list. A short description for the selected default file set is given below the drop-down list box.

5. Units of Measurement selection affects the operation of the icons in Control Strategy that perform EMS operations. The values for the inputs and outputs are different depending on the selection of International (metric) or Imperial units. To change Units of Measurement, click desired type, International or Imperial.
6. Preferred Target Hardware displays the module type that the hardware points of the plant are assigned to (only applies to OS Versions 2.0 and higher):

Standard I/O (XF5..)

(applicable to Excel 500 and 50 with OS 2.0 - 2.06).

Hardware points of this plant will be assigned to XF5.. modules (IP bus).

Panel I/O (XF8..)

(applicable to Excel 800, OS 3.00 only)

Hardware points of this plant will be assigned to XF8.. modules (panel bus).

Distributed I/O (XFL5..)

(applicable to Excel 500 and Smart with OS 2.0 - 2.04).

Hardware points of this plant will be assigned to XFL5.. modules. (LonWorks-bus).

Distributed I/O (XFL8..)

(applicable to Excel 800, OS 3.00 only).

Hardware points of this plant will be assigned to XFL8.. modules (LonWorks-bus).

If desired, change the target I/O hardware by clicking the corresponding radio button.

Preserve technical address refers to modification of the target hardware via the Standard I/O and Distributed I/O radio buttons, if point changes in the TAF have already been made before (only applies to Excel 500 controller OS Versions 2.0 and higher).

Enabling this checkbox when changing the target hardware results in the following:

Points that are already assigned to that target hardware type, which will be changed to, preserve their technical address on the corresponding module.

Disabling this checkbox when changing the target hardware results in the following:

Points that are already assigned to that target hardware type, which will be changed to, may lead to a change of the technical address on the corresponding module. The Attach process optimizes for best use of modules.

Open LON

Hardware points of this plant will be boardless, that is, unassigned (applicable to Excel 800, 500, Smart, 50 with OS 2.06 and higher, and Excel 10)

7. Click **OK** to confirm.

RESULT: An attached plant will be automatically detached, all empty hardware modules will be removed and the plant automatically attached to the selected target hardware.

Restrictions

Certain point types are not supported by Open LON. When using OS 2.04, non-supported types will be put on IP (Excel 500, 50) or distributed I/O modules (Excel 500, Smart), even if Open LON was selected. When using OS 2.06 or 3.0, non-supported types will be indicated in red in the logical plant tree and must be put manually on IP boards or Panel I/O boards.

Point types not supported by Open LON:

DO Pulsed Digital Output

FF	Flex DO_Feedback_DI
FM	Flex Multistage
FP	Flex Pulse2
GA	Global Analog
GD2	Global Digital 2state
GDn	Global Digital Nstate
PT	Pseudo Totalizer
TO	Totalizer

When Distributed I/O was selected for an Excel 500/800 controller and the application contains a point type, which is not supported by distributed I/O modules, these points will be put on standard I/O / panel I/O modules.

IMPORTANT

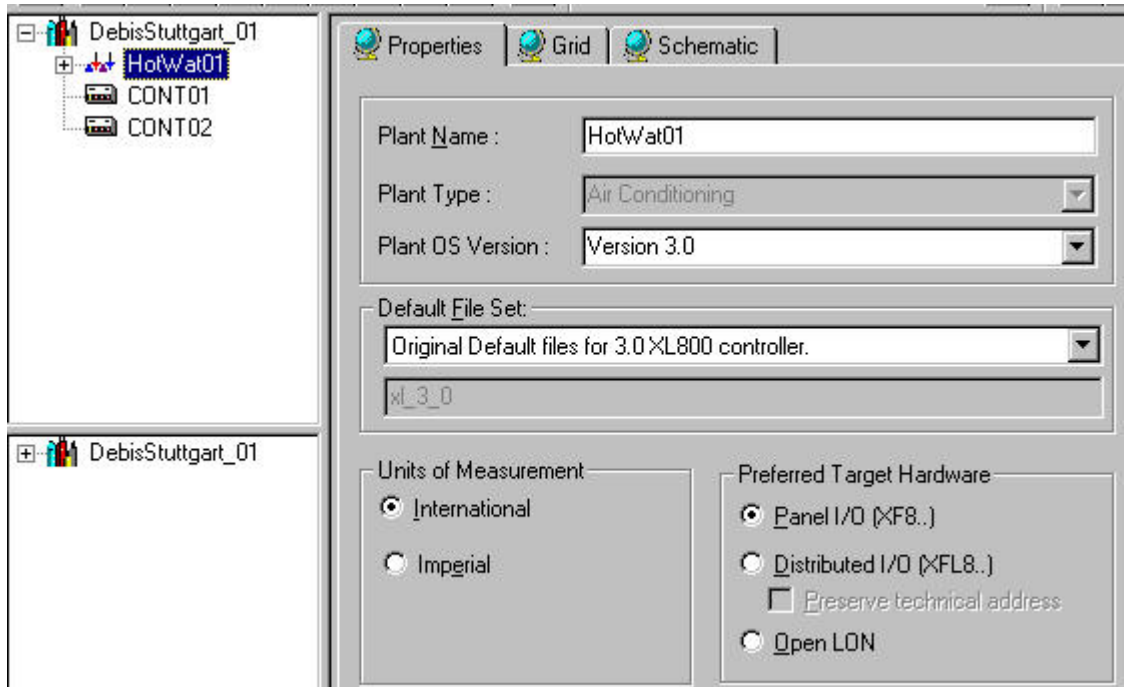
*When an Excel 50/800 controller is full, that is, the maximum number of modules has been reached, a change in the **plant** target I/O hardware will not be able to create any different module type. Therefore the actual hardware will not change, even if the setting for the plant is changed. In this case you have to do manual changes via the Terminal Assignment or set the Controller to the other target I/O hardware which will affect **all** plants.*

Change Target I/O Hardware for a Plant

NOTE: This function is only applicable to the Excel 800 with OS 3.0 and Excel 500, Smart and 50 controllers with its relevant OS Versions, 2.0 and higher.

Purpose Modify target I/O hardware from standard I/O (IP bus modules) to distributed I/O (LON-bus modules) to Open LON with boardless points and vice versa. All changes are possible. This allows to create a mixed hardware configuration on the same controller. To create a unique hardware configuration refer to the ModifyTarget I/O Hardware for a Complete Controller section.

Procedure 1. In the logical plant tree, click on plant you want to change target hardware for, in this case an unattached plant.



2. On the Properties tab on the right, select desired hardware by clicking corresponding radio button under Preferred Target Hardware: Standard I/O (XF5..)

(applicable to Excel 500 and 50 with OS 2.0 - 2.06).

Hardware points of this plant will be assigned to XF5.. modules (IP bus).

Panel I/O (XF8..)

(applicable to Excel 800, OS 3.00 only)

Hardware points of this plant will be assigned to XF8.. modules (panel bus).

Distributed I/O (XFL5..)

(applicable to Excel 500 and Smart with OS 2.0 - 2.04).

Hardware points of this plant will be assigned to XFL5.. modules. (LonWorks-bus).

Distributed I/O (XFL8..)

(applicable to Excel 800, OS 3.00 only).

Hardware points of this plant will be assigned to XFL8.. modules (LonWorks-bus).

If desired, change the target I/O hardware by clicking the corresponding radio button.

Preserve technical address refers to modification of the target hardware via the Standard I/O and Distributed I/O radio buttons, if point changes in the TAF have already been made before (only applies to Excel 500 controller OS Versions 2.0 and higher).

Enabling this checkbox when changing the target hardware results in the following:

Points that are already assigned to that target hardware type, which will be changed to, preserve their technical address on the corresponding module.

Disabling this checkbox when changing the target hardware results in the following:

Points that are already assigned to that target hardware type, which will be changed to, may lead to a change of the technical address on the corresponding module. The Attach process optimizes for best use of modules.

Open LON

Hardware points of this plant will be boardless, that is, unassigned (applicable to Excel 800 OS 3.0 and Excel 500, Smart, 50 with OS 2.06 and higher, and Excel 10)

3. Click on the plant icon in the logical plant tree.

RESULT: An attached plant will be automatically detached, all empty hardware modules will be removed and the plant automatically attached to the selected target hardware.

Restrictions

Certain point types are not supported by Open LON. When using OS 2.04, non-supported types will be put on IP (Excel 500, 50) or distributed I/O modules (Excel 500, Smart), even if Open LON was selected. When using OS 2.06 or 3.0, non-supported types will be indicated in red in the logical plant tree and must be put manually on IP boards or Panel I/O boards.

Point types not supported by Open LON:

DO	Pulsed Digital Output
FF	Flex DO_Feedback_DI
FM	Flex Multistage
FP	Flex Pulse2
GA	Global Analog
GD2	Global Digital 2state
GDn	Global Digital Nstate
PT	Pseudo Totalizer
TO	Totalizer

When Distributed I/O was selected for an Excel 500/800 controller and the application contains a point type which is not supported by distributed I/O modules, these points will be put on standard I/O modules / panel I/O modules.

IMPORTANT

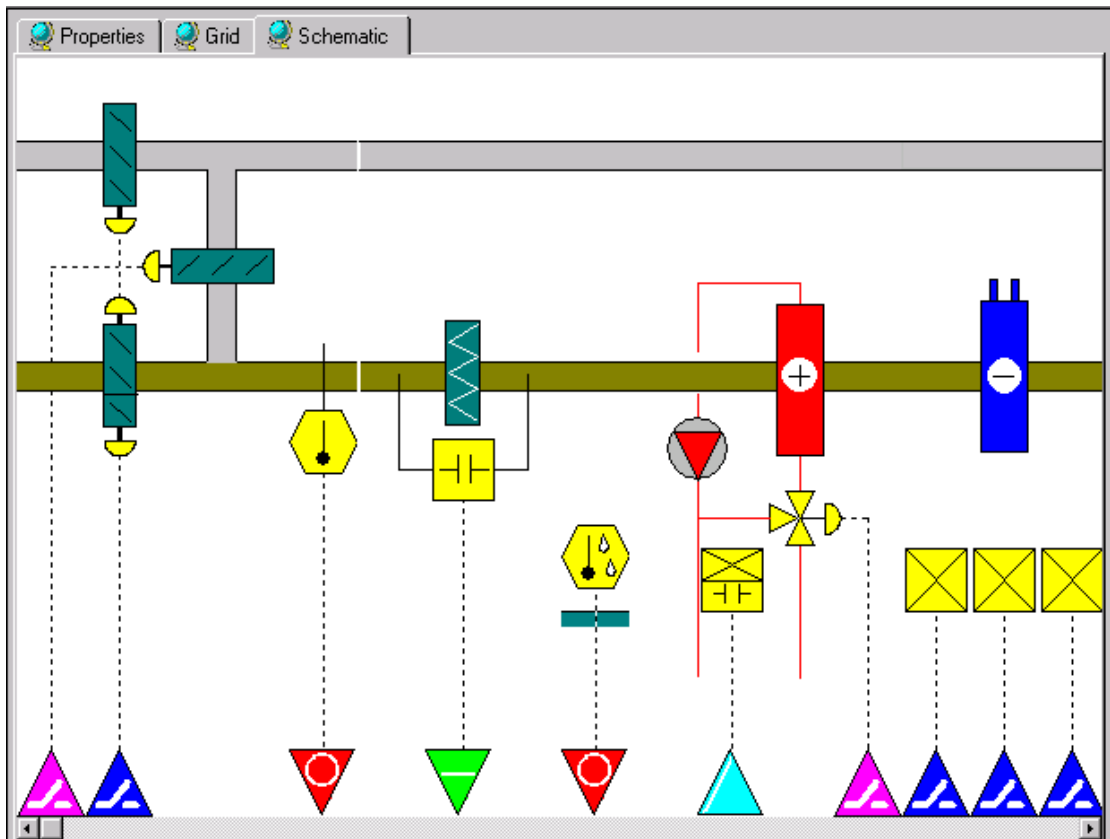
When an Excel 500/800 controller is full, that is, the maximum number of modules has been reached, a change in the **plant** target I/O hardware will not be able to create any different module type. Therefore the actual hardware will not change, even if the setting for the plant is changed. In this case you have to do manual changes via the Terminal Assignment or set the Controller to the other target I/O hardware which will affect **all** plants.

Display Plant Schematic

Purpose Quick view of the plant schematic without editing.

- Procedure**
1. In the logical plant tree on the left, click on the plant.
 2. On the right pane, click on the Schematic tab.

RESULT: The schematic is displayed without the possibility for editing. For detailed information about editing/creating plant schematics etc., please refer to the PLANT SCHEMATICS chapter.



3. Use the horizontal scroll bar to view the complete schematic.

Copy / Replicate Plant

Purpose Create one or more copies of an attached or unattached plant and its information. A plant can be replicated on controller level and on project level. The replicate process on controller level is called Copy Plant. The replicate process on project level is called Replicate Plant. In both processes the plants can be replicated multiple times.

The replicate function is useful in reducing the amount of time necessary to set up similar plants in a controller or project. When replicating a plant, the following information will be copied and changed during the replication process:

- Plant name
- Datapoint names
- LON object names and NV names (only if LON controller is applied)
- Panel bus modules
- MS/TP devices with referenced datapoints
- OPS subsystem names and OPS point names (only if OPS controller is applied)
- Mapping information between LON points, respectively OPS points and CARE datapoints
- Modbus and M-Bus structure and mappings (on controller level only)

NOTE: When replicating plants on project level, Modbus and M-bus mappings will be lost and must be re-done manually in the replicated plants of the target project. When replicating plants on controller level, the Modbus and M-bus mappings will be kept in the replicated plants of the target controller.

To get the replication well done, you need to set how the particular information items should be changed. For the new plant(s), each item to be generated, will be composed of several, partly freely definable, items.

Example: Creation of plant name

The new plant name can be composed of the following items:

- Project name where the plant belongs to
- Controller name where the plant is attached to
- Plant name (current plant name)
- Custom text (freely definable)
- Counter (numerical and/or alphabetical with incremental step)
- Replicate counter (counts the number of replications)

Rules for Composition The new name, in this case the plant name **must** be composed of at least **one name** (project, or controller, or plant) **or custom text** and **one counter**:

IMPORTANT

A counter must be used in any case the times to replicate is higher than 1.

Each name or custom text can be used as variable item which means that the full text of the source item is taken for composing the new name or as fixed item which means that the source item is taken with a defined length. The length of the item is defined by Start and Length, e.g.:

Source item **Exhibition** with Start = 1 and length = 4 results in Exhi,
Source item **AirportMunich** with Start = 4 and length = 7 results in portMun

Example: Creating new plant name based on source items with variable length

	Project name	Controller name	Current plant name	Number of Replications	New plant names
	AirportMunich	TerminalA	TerminalA	3	
Items selected for composition					
Plant name			x		TerminalA01
Counter (numerical, incremental step = 1, length format = 2)					TerminalA02 TerminalA03
Project name	x				AirportMunich01
Counter (numerical, incremental step = 1, length format = 2)					AirportMunich02 AirportMunich03
Project name	x				AirportMunichTerminalA01
Plant			x		AirportMunichTerminalA02
Counter (numerical, incremental step = 1, length format = 2)					AirportMunichTerminalA03

Example: Creating new plant name based on source items with fixed length

	Project name	Controller name	Current plant name	Number of Replications	New plant names
	AirportMunich	TerminalA	TerminalA	3	
Items selected for composition					
Plant name (Start=1, length=4)			x		Term01
Counter (numerical, incremental step = 1, length format = 2)					Term02 Term03
Project name (Start=1, length=4)	x				AirpA
Counter (alphabetical, incremental step = 1, length format = 1)					AirpB AirpC
Project name (Start=1, length=10)	x				AirportMunichTerm0A
Plant name (Start=1, length=4)			x		AirportMunichTerm0B AirportMunichTerm0C
Counter=alphabetical, incremental step = 1, length format = 2					

The same procedures must be applied in a corresponding fashion for the datapoint names, the LON items and the OPS items.

Restrictions and Inconsistencies

Note, that the max. length for datapoint names is 18 characters in CARE-XL 5000 and 64 characters in CARE-BACnet. For plant names, the max. length is 30 characters. If the new datapoint names are longer than 18 characters in CARE-XL 5000, CARE truncates the letters beyond 18. If the plant name used for datapoint names creation is more than 18 characters, all new datapoint names are truncated to the same 18-character name.

The length for NV names is restricted to 21 characters, the length of NV object names is restricted to 16 characters. Names longer than 21, respectively 16 characters will abort the translation of the application and must be reworked.

The length for OPS subsystem names and OPS point names is restricted to 32 characters.

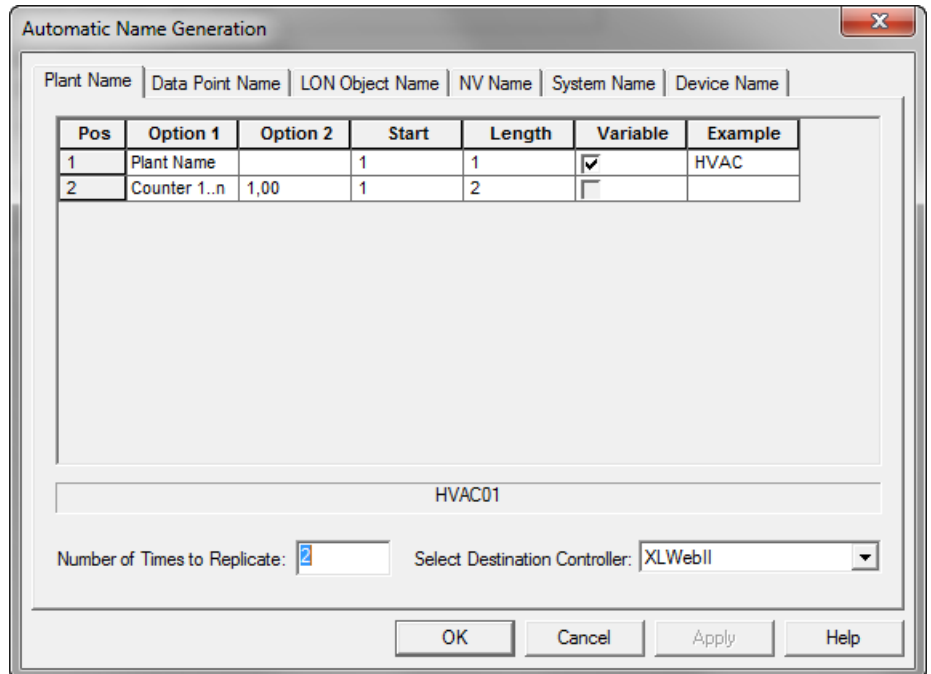
Besides long names, CARE will also detect double, non-unique names and the use of invalid characters. They will be displayed in bold in a tree structured dialog for changing. For the OPS controller multiple identical names are allowed.

General Procedure For Any Controllers

NOTE: The following procedure describes the main steps for the replication of a plant for any kind of controller. The additional steps for LON and OPS controllers will be described in the subsequent sections.

1. In the logical plant tree, click on the plant, you want to replicate or copy.
2. To copy a plant on controller level, right-click the plant in the logical plant tree, then click Copy plant in the context menu.
3. Or, to replicate a plant on project level, click menu item Plant, then drop-down item Replicate.

RESULT: The Automatic Name Generation dialog box displays.



The new name of the plant will be composed of several items which are defined in rows. The new name starts with the first row at position one (Pos 1). Every further row will add a new item to the previous one building up the new plant name. By default, 2 rows (Pos1 and Pos 2) are provided by CARE. The Option 1 column in the Pos 1 row shows the item, which the new plant starts with (default = plant name).

The following items are available by clicking the drop-down list box:

- Project name
- Controller name
- Plant name
- Replicate
- Counter
- Counter 1..n
- Counter A..Z
- Custom text

Defining New Plant Names

- In the Option 1 column of Pos 1 row, select Project name, for example. The project name, in this case `HVAC` is displayed in the Example column.

Pos	Option 1	Option 2	Start	Length	Variable	Example
1	Plant Name		1	1	<input checked="" type="checkbox"/>	HVAC
2	Project Name		1	1	<input checked="" type="checkbox"/>	Beta_Sec1

- If you want to use the whole project name for the new plant name, check checkbox in the Variable column. If you want to use a part of the project name, uncheck the Variable checkbox and define the part by selecting its start in the Start column and its length in the Length column.

Example: Project name = Beta_Sec1, Start = 1, Length 4
Result = Beta

The result, in this case `HVACBeta` is displayed at the bottom of the dialog box.

Pos	Option 1	Option 2	Start	Length	Variable	Example
1	Plant Name		1	1	<input checked="" type="checkbox"/>	HVAC
2	Project Name		1	4	<input type="checkbox"/>	Beta_Sec1

HVACBeta

- If required, add new row(s) for further item(s) to be included into the new plant name by clicking right mouse button and selecting Add Row.
- Select third component for the new plant name in the Option 1 column of the Pos 3 row. For example, select Custom text. As described for the second row, where project name was selected, define whether the custom text should be used as variable full text or as name with fixed length. Enter the custom text, for example an underscore `_`.
- Select fourth component for the new plant name in the Option 1 column of the Pos 4 row. For example, select Counter A..Z as alphabetical counter. In the Option 2 column, set the increment for the counter. Define the Start of the counting in the Start column.

Plant Name	Data Point Name	LON Object Name	NV Name	System Name	Device Name	
Pos	Option 1	Option 2	Start	Length	Variable	Example
1	Plant Name		1	1	<input checked="" type="checkbox"/>	HVAC
2	Project Name		1	4	<input type="checkbox"/>	Beta_Sec1
3	Custom Text	_	1	1	<input checked="" type="checkbox"/>	_
4	Counter A..Z	1,00	A	1	<input type="checkbox"/>	

Example: Option 1 = Counter A..Z, Option 2 = 1.00 (increment), Start = A

RESULT: A counter in single-digit format starting with A and incremental step of 1.

IMPORTANT

A counter must be used in any case the times to replicate is higher than 1.

9. Into the Number of Times to Replicate field, enter the number of times for replication.
10. If the plant is replicated on controller level (see step 2), select the controller, to which the replicated plants should be assigned from the Select Destination Controller drop-down listbox.

11. If the plant is replicated on project level (see step 3), select the controller, to which the replicated plants should be assigned from the Select Destination Project drop-down listbox.

12. Continue with step 13 and define datapoint names for the replicated plants.

Defining New Datapoint Names

13. Click on Datapoint Name tab.

RESULT: CARE provides 3 rows by default.

Pos	Option 1	Option 2	Start	Length	Variable	Example
1	Custom Text	R	1	1	<input checked="" type="checkbox"/>	R
2	Replicate Counter	1,00	1	2	<input type="checkbox"/>	
3	Data Point Name		1	1	<input checked="" type="checkbox"/>	AO_OB3

14. Compose the new datapoint names in a corresponding fashion by following the rules for composition you applied when composing the new plant names.

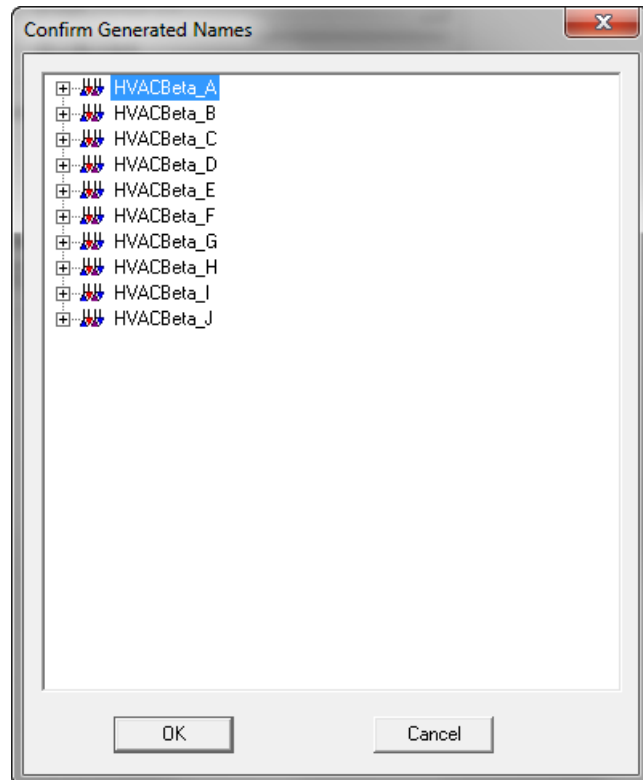
NOTE: When using 'Generated Plant Name', a replicate counter does not have to be used.

15. Click OK.

RESULT: In the following cases, messages will be displayed to inform you about inconsistencies in the replicated plants:

- plant and/or datapoint names are too long
- plant and/or datapoint names are not unique
- plant and/or datapoint names include invalid characters, e.g. quotation marks

Nevertheless, the Confirm Generated Names dialog box is displayed showing all generated plants in a tree.



16. If messages about inconsistencies were displayed before, open the tree to check the result. Inconsistent names are displayed in bold.

17. To edit inconsistent names which are too long or non-unique or which include invalid characters, highlight name and click on it.

18. If desired, edit correct names, which you want to edit explicitly.

19. Confirm by clicking OK.

RESULT: The replicated plants are now available in the controller, respectively in the project.

NOTE: When using the Replicate command again, the last generated rules are preset by default.

Background Process of BACnet Controllers

Plants of BACnet controllers can have its datapoints assigned on panel I/O modules and MS/TP devices.

For each type of target hardware, the general plant copy procedure which defines the plant names and datapoint names is the first step to be done (see "General Procedure For Any Controllers" section") first.

In the second step, CARE completes the copy process for the panel I/O modules and the MS/TP devices in the background.

Panel I/O Modules Process

The datapoints in the plant of the source controller will be copied and assigned to panel I/O modules of the same type in the destination controller. If panel I/O modules of the same type do not exist in the destination controller, they will be created.

MS/TP Devices Process

Essential prerequisites for copying MS/TP devices are:

- In the source controller: external reference points (BACnet objects) of the MS/TP device are assigned to reference input or output points of the plant
- In the destination controller: MS/TP bus is available

The MS/TP device with its external reference points in the source controller will be copied and added to the MS/TP bus in the destination controller. The associated reference input and output points in the plant of the source controller will be copied to the destination controller according to the settings for plant and datapoint names defined in the general procedure.

NOTE: The background process for BACnet controllers does not apply to the replicate plant function.

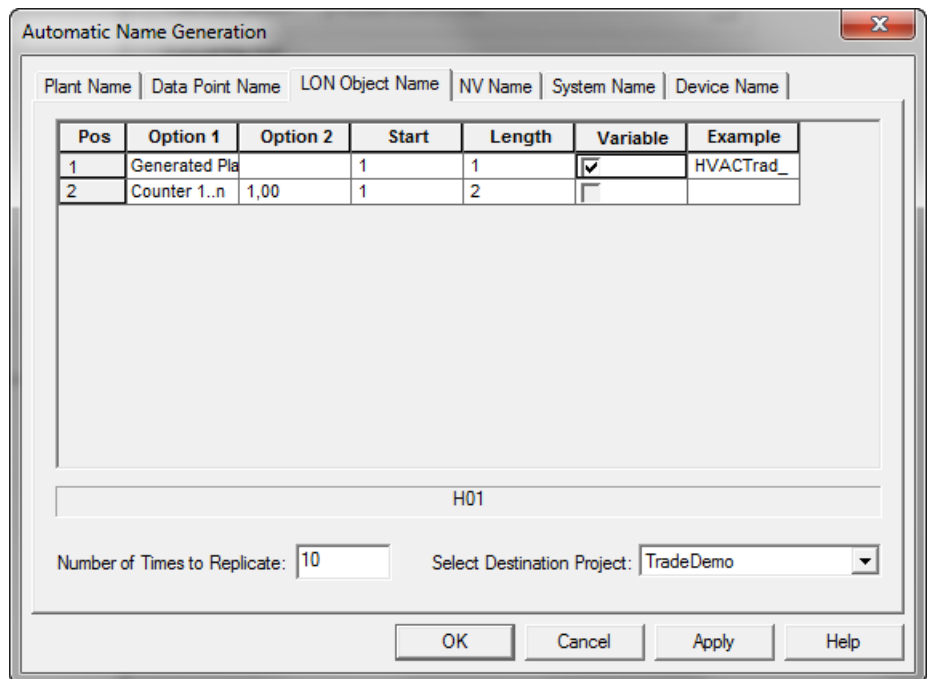
Additional Procedure For LON Controllers

IMPORTANT

Note that the restriction of the name length is 21 characters for NV names and 16 characters for NV object names. Names longer than 21, respectively 16 characters will abort the translation of the application and must be reworked.

Defining New LON Object Names

1. Follow the General Procedure steps 1-19 and in addition...
2. ...Click on LON Object Name tab.



3. Compose the new LON object names in a corresponding fashion by following the composition rules you have applied when composing the new plant names as described in the general procedure for any controllers.
4. Continue with step 5 and define new NV names for the replicated plants.

Defining New NV Names

5. Click on NV Name tab.

Pos	Option 1	Option 2	Start	Length	Variable	Example
1	NV name		1	3	<input type="checkbox"/>	
2	Custom Text	R	1	1	<input checked="" type="checkbox"/>	R
3	Replicate Cou	1,00	1	2	<input type="checkbox"/>	
4	NV name		4	1	<input checked="" type="checkbox"/>	

6. Compose the new NV names in a corresponding fashion by following the composition rules you have applied when composing the new plant names as described in the general procedure for any controllers.
7. Continue by defining new system names as described in the following:

Defining New System Names

Note, that LON devices are arranged in the logical LON bus part of the network tree, for example, LON devices controlling a floor may reside in the "Floor" folder. In case you want to replicate, for example, the "Floor" folder with all its devices, the following has to be considered:

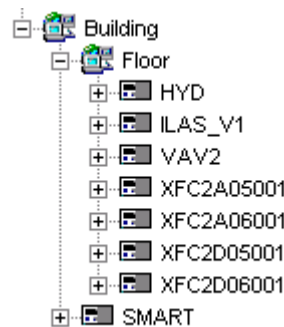
CARE replicates the folder and all devices, bound or unbound, residing in the folder.

IMPORTANT

CARE checks all system folders (default and subsystems) for bound devices and takes that folder which hierarchically includes all interconnected devices. Note, that unbound devices residing in the included folders will be replicated too.

Example:

The "Floor" system should be replicated. Some devices residing in the "Floor" folder are bound to the "SMART" controller. Since the SMART Controller resides in the "Building" system lying one level above, the Building folder will be used as top level folder and replicated too.



IMPORTANT

To avoid undesirable, confusing replication results, move the controller device temporarily to the system folder you want to be replicated, in this case to the Floor folder. After the replication has been finished, move it to the original folder.

8. Click on System Name tab.

Plant Name	Data Point Name	LON Object Name	NV Name	System Name	Device Name	
Pos	Option 1	Option 2	Start	Length	Variable	Example
1	Custom Text	R	1	1	<input checked="" type="checkbox"/>	R
2	Replicate Cou	1,00	1	2	<input type="checkbox"/>	
3	System Name		1	1	<input checked="" type="checkbox"/>	System

9. Compose the new System names in a corresponding fashion by following the composition rules you have applied when composing the new plant names as described in the general procedure for any controllers.

10. Click on Device Name tab.

Plant Name	Data Point Name	LON Object Name	NV Name	System Name	Device Name	
Pos	Option 1	Option 2	Start	Length	Variable	Example
1	Generated Pla		1	1	<input checked="" type="checkbox"/>	HVACTrad_
2	Counter 1..n	1,00	1	2	<input type="checkbox"/>	

11. Compose the new device names in a corresponding fashion by following the composition rules you have applied when composing the new plant names as described in the general procedure for any controllers.

12. Click OK.

RESULT: The Confirm Generated Names dialog box is displayed showing all generated names in a tree structure.

13. If any inconsistent bold names were generated, edit them.

14. Confirm by clicking OK.

NOTE: When using the Replicate command again, the last generated rules are preset by default.

15. Attach the replicated plants to the controller.

RESULT: The replicated plants are now available in the controller, respectively in the project.

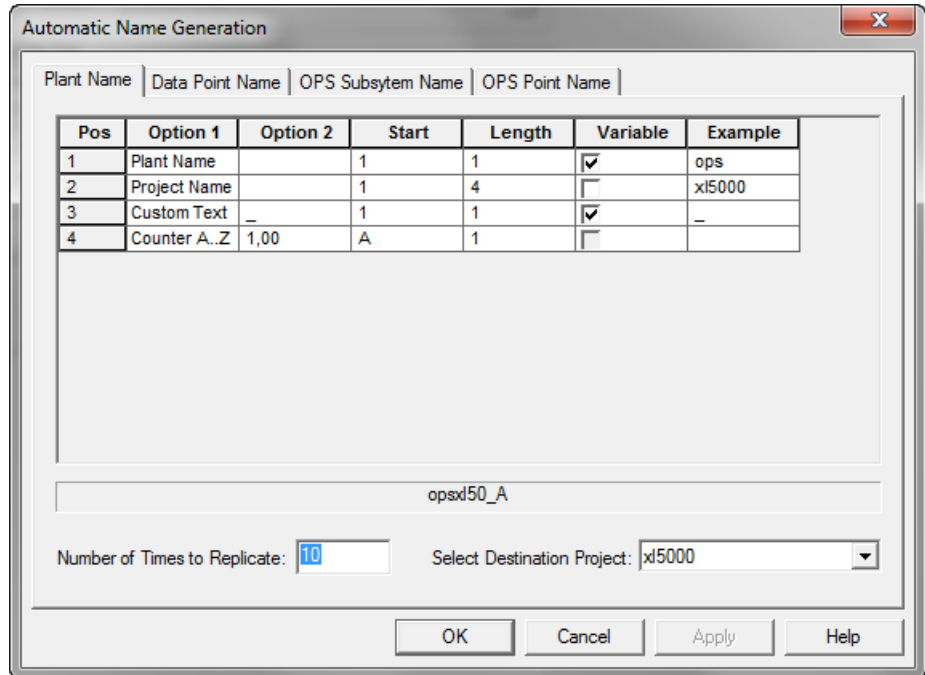
NOTE: When using the Replicate command again, the last generated rules are preset by default.

Additional Procedure For OPS Controllers

NOTE: The following OPS controller related tabs are only displayed if the current controller is an OPS controller.

IMPORTANT

Note that the length for OPS subsystem names and OPS point names is restricted to 32 characters, but multiple identical names are allowed.



Defining new OPS Subsystem Names

1. Follow the General Procedure steps 1-19 and in addition...
2. ...Click on OPS Subsystem Name tab.
3. Compose the new OPS subsystem names in a corresponding fashion by following the composition rules you have applied when composing the new plant names as described in the general procedure for any controllers.
4. Continue with step 5 and define new OPS point names.

Defining new OPS Point Names

5. Click on OPS Point Name tab.
6. Compose the new OPS point names in a corresponding fashion by following the composition rules you have applied when composing the new plant names as described in the general procedure for any controllers.
7. Click OK.

RESULT: The Confirm Generated Names dialog box is displayed showing all generated names in a tree structure.

8. If any inconsistent bold names were generated, edit them.
9. Confirm by clicking OK.

RESULT: The replicated plants are now available in the controller, respectively in the project.

NOTE: When using the Replicate command again, the last generated rules are preset by default.

Delete a Plant

Purpose Remove a plant from a project if it is no longer required.

- Procedure**
1. In the logical plant tree, click on the plant, you want to delete.
 2. Click menu item Plant, then drop-down item Delete.
Or, click right mouse key and with left mouse key click on Delete in the context menu.

CONTROLLERS DEFINITION, ATTACHMENT, AND MANAGEMENT

Purpose This chapter describes CARE functions that relate to controllers, for example, defining new controllers and uploading and downloading them.

Chapter Contents

- Create New Controller
- Attach/Detach Plant
- Copy a Controller
- Rename Controller
- Delete Controller
- Display and/or Modify Controller Information
- Translate Controller
- Download Controller

See Also Appendix Plant and Controller Upgrades and Downgrades for details on changing the OS version for a controller.

Create New Controller

Purpose Create a new controller

- Procedure**
1. In the logical plant tree, click on the project.
 2. Click menu item Controller, then drop-down item New.
Or, click right mouse key and with left mouse key, click on Create Controller in the context menu.

RESULT: The New Controller dialog box displays.

New Controller

Controller Name: CONT02

Bus Name: Bus 1

Controller Number: 12

Controller Type: Excel 500

Controller OS Version: Version 2.06

Country Code: GERMANY

Default File Set: Original Default files for 2.06 XL500 controller & XL50 external MMI.
xl_2_06

Units of Measurement: International Imperial

Power Supply: XP501 XP502

Installation Type: Cabinet Door Installation Normal Installation

LON: Shared / Open LON Local

OK Cancel Help

3. Type a controller name (must be unique within the project). In this example, CONT02.

Maximum 15 characters. Note that software uses only the first four characters of the controller name followed by a 4-digit number to name the database files for the controller. For example, the name controller_1 has associated data files named cont0000. The name controller_2 has associated data files named cont0001.

4. Tab to Bus Name (CARE XL-5000) or Subsystem/Subnet Name (CARE-BACnet). This field allows to select the subfolders, where the controller should be arranged. By default, software creates a folder named "Bus 1" (CARE XL-5000) and "IP-Subnet 1" (CARE-BACnet).
5. Tab to Controller Number. Click down arrow and select a number from 1 through 30. It must be unique within the C-Bus segment, defined under C-Bus name. In this example, 2.

NOTE: CARE-BACnet, please note if a controller offset has been issued during project creation. If this is the case, only a controller number higher than the entered offset can be set here.

For changing the controller number later, please refer to the Display/Modify Controller Information section.

6. Tab to Controller Type. Tab to the next field to keep current type or click down arrow to display and select a different type.
7. Tab to Controller OS Version (the version of OS that will be running in the controller). Note that any plant attached to this controller must abide by the rules of this version or you cannot attach the plant. Tab to the next field to keep the current version or click down arrow to display and select a different version. See Appendix for rules on upgrading/downgrading controller versions.
8. Tab to Country Code (CARE XL-5000) or Location (CARE-BACnet). The operator interface is required to provide the correct language for the selected country. The default depends on the Windows™ version installed. Tab to the next field to keep it or click down arrow to display and select a different country.

NOTE: For Excel 500 Ver. 1.2 Controllers, the only valid country codes are Germany and United States. Other countries appear in the list box, but United States is always the selection if you select anything other than Germany.

9. Tab to Default File Set. Select the appropriate default file for the selected Controller OS Version. Alternate default files are created via the Default Text Editor. See Appendix for details. A short description for the selected default file set is given below the drop-down list box.
10. Tab to Units of Measurement. Select whether the controller should use International (metric) or Imperial units in Control Strategy EMS icons. This selection controls whether inputs are accepted in Celsius or Fahrenheit. Units of measurement does not apply to Excel 600 and Excel ELink controllers.
11. Tab to Hardware Type (CARE-BACnet only). Select the hardware type.
12. Tab to Power Supply. Select desired module type. Power supply applies only to Excel 800, 500 and 600 controllers.
13. Tab to Installation Type. Normal installation is the default selection. If the controller has high-density digital inputs, select Cabinet Door Installation. Installation Type applies only to Excel 800, 500 and 600 controllers.
14. Tab to Wiring type and select desired type (screw terminals or flat strip cabling). Wiring type applies only to Excel 50 controllers.
15. Tab to LON (applies only to Excel 500 controllers OS version 2.04). Select desired configuration:

Shared / Open LON

Allows multiple controllers with its distributed I/O modules residing on one physical LON-bus and/or integration of additional Open LON devices.

NOTE: For this configuration, the controller must contain the 3120E5 LON chip. In Shared configuration only the following distributed I/O modules can be used: XFL521B, XFL522B, XFL523B, XFL524B.

Local

Allows just one controller with its distributed I/O modules residing on one physical LON-bus.

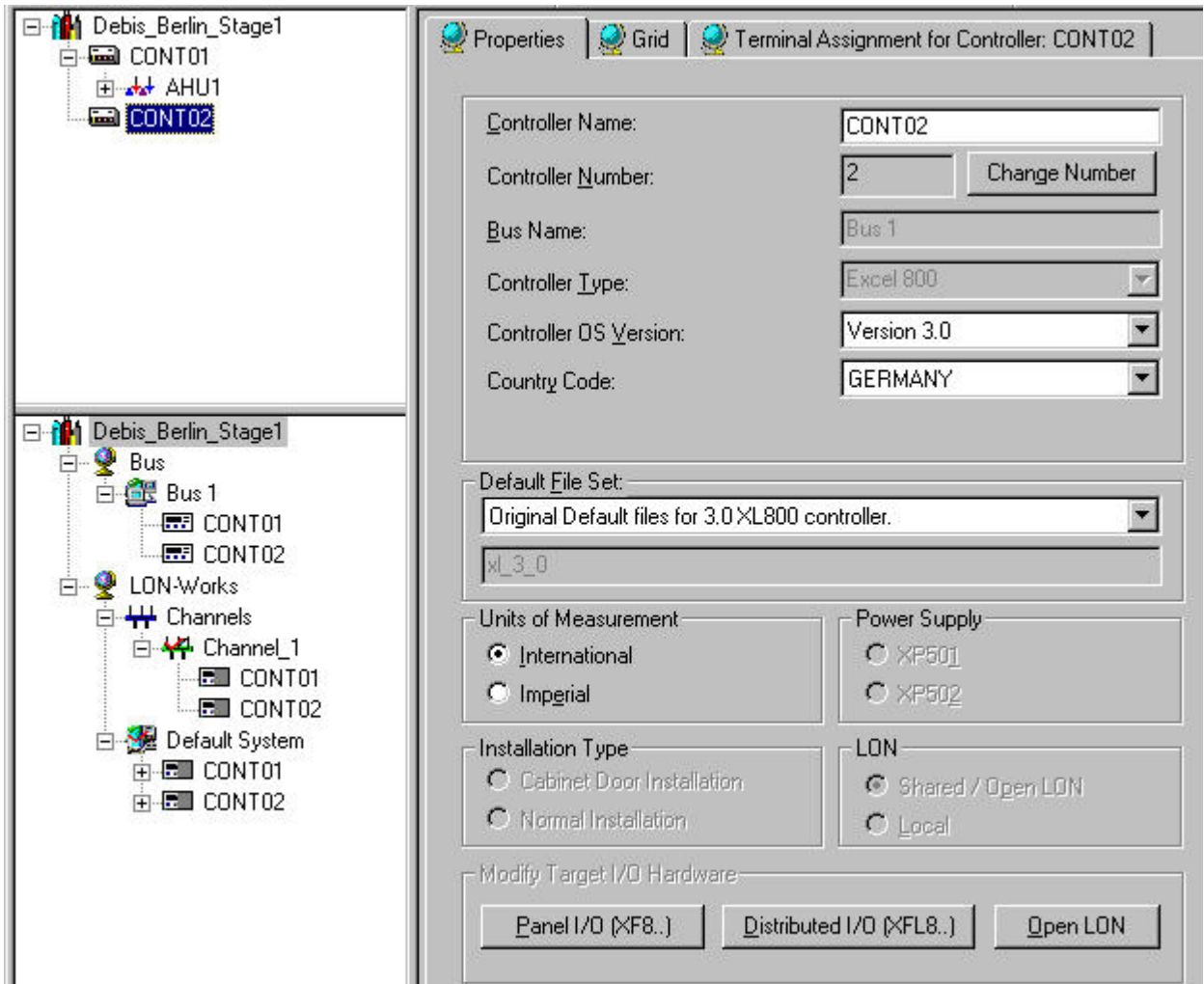
NOTE: For this configuration, controllers containing the 3120E5 LON chip and earlier controller models containing the 3120B1 LON chip can be used. In Local configuration the following distributed I/O modules can be used: XFL521, XFL522A, XFL523, XFL524A. If B-types of distributed I/Os shall be used, the backwards compatibility must be enabled by pressing the service pin while turning hex switch.

For detailed information on the configuration, please refer to the Select LonWorks Network Architecture section.

Refer to the Terminal Assignment chapter for assigning the neuron IDs to the modules.

- Click **OK**. (All fields must have an entry.)

RESULT: The dialog box closes and the controller is added once to the logical plant tree and three times to the network tree.



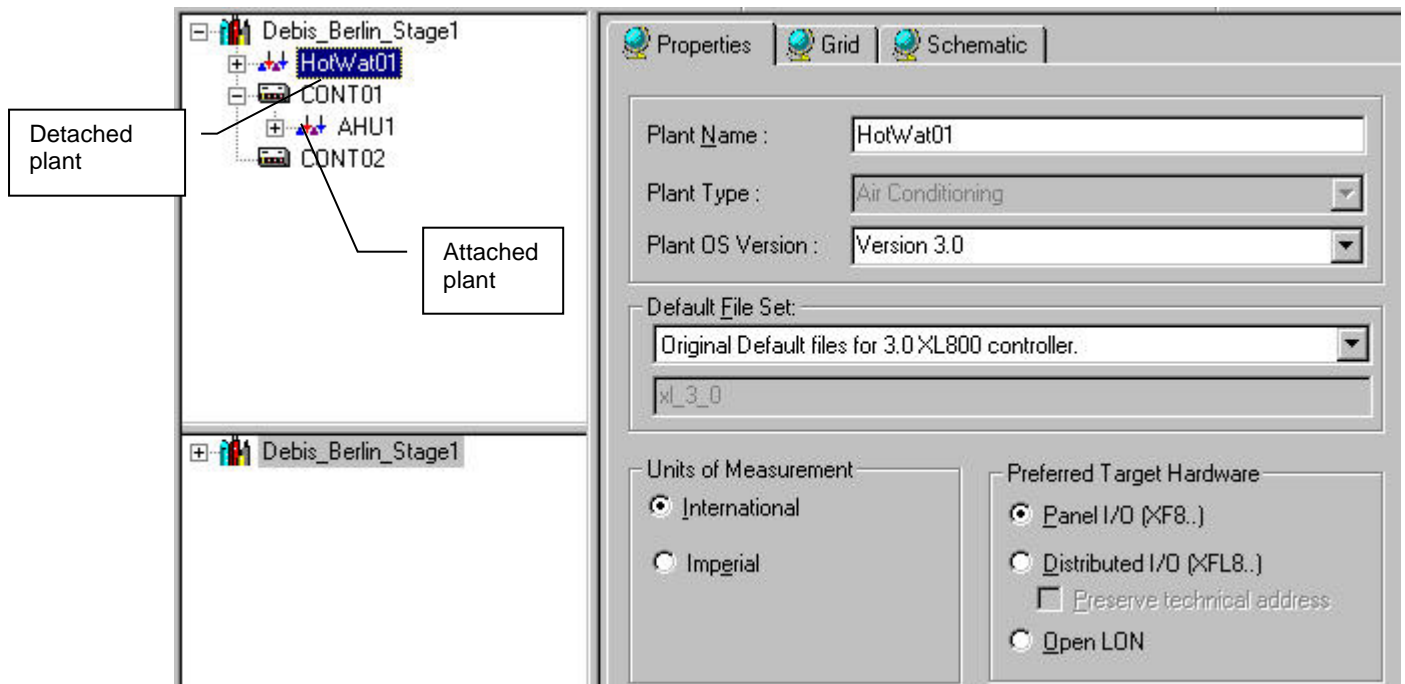
- Continue with creating new plants or attaching already existing plants. For creating new Plants, see PLANTS DEFINITION AND MANAGEMENT section. For attaching plants see Attach/Detach Plant section.

Attach/Detach Plant

When creating a plant, you can instantly attach the plant to a controller or create it unattached for later attachment. Attached plants can be detached from one controller and instantly attached to another controller or can be left detached at the project.

An attached plant is displayed below the controller level in the logical plant tree. An unattached plant is displayed just below the project, respectively the first controller in the logical plant tree.

A plant can easily be attached/detached by drag&drop.



Attach Plant to Controller

Purpose Assign a plant to a controller and determine I/O terminations required in the controller.

Requirements The controller and the plant being attached must have the same units of measure (that is, Imperial or International units).

Also, the plant's OS version must be less than or equal to the controller's OS version. For example, if the controller is Ver. 2.06, the plant's OS must be either 2.06 or 2.04.

If either one or both of these rules is violated, the plant can **not** be attached.

Check Summary Before you attach a plant to a controller, you may want to view a summary of controller points to determine whether or not the controller can handle the plant (menu item Controller, drop-down item Summary).

Plants with unique target hardware Hardware points will be assigned first to existing modules of the selected target

(Excel 800, 500, Smart, and Excel 50) hardware (IP, Panel I/O or Distributed I/O). New modules will be created until the maximum number of I/O modules have been reached. If not all points can be attached, the max. number of hardware modules and points respectively have been exceeded.

Plants with different target hardware (Excel 800, 500, Smart, and Excel 50) Hardware points will be assigned first to existing modules of the selected target hardware (IP, Panel I/O, Distributed I/O, or Open LON = boardless points). New modules will be created until the maximum number of I/O modules have been reached. In case this limit is reached, remaining points will be attached to eventually existing free terminals on modules of the other hardware type. If still not all points can be attached, the max. numbers of hardware points have been exceeded.

NOTE: If the application for an Excel 500/800 controller contains a point type, which is not supported by distributed I/O modules such as fast AI points, a standard I/O / Panel I/O module will be created, even if Distributed I/O was selected.

IMPORTANT

*When an Excel 500/800 controller is full, that is, the maximum number of modules has been reached, a change in the **plant** target I/O hardware will not be able to create any different module type. Therefore the actual hardware will not change, even if the setting for the plant is changed on the Plant Properties tab. In this case you have to do manual changes via the terminal assignment or set the controller to the other target I/O hardware that will affect **all** plants.*

Restrictions Certain point types are not supported by Open LON. When using OS 2.04, non-supported types will be put on IP (Excel 500, 50) or distributed I/O modules (Excel 500, Smart), even if Open LON was selected. When using OS 2.06 or 3.0, non-supported types will be indicated in red in the logical plant tree and must be put manually on IP boards / Panel I/O boards.

Point types not supported by Open LON:

DO	Pulsed Digital Output
FF	Flex DO_Feedback_DI
FM	Flex Multistage
FP	Flex Pulse2
GA	Global Analog
GD2	Global Digital 2state
GDn	Global Digital Nstate
PT	Pseudo Totalizer
TO	Totalizer

Plant Replication You can replicate an attached or unattached plant (menu item Plant, drop-down item Replicate). Replication of attached plants copies the modifications made in the Datapoint Editor, for example, alarm limits, etc., as well as control strategies and switching tables. Note that when you detach a plant, you lose any changes you made with the Editors (see Editors chapter). Therefore, after you replicate an unattached plant, you must use the Editors again to make the desired changes to the original plant as well as each of the new plants.

IMPORTANT

LON data of the plant will not be copied when replicating it.

Assumption The schematic, control strategy, and switching logic for the plant are done. You must exit these functions before attaching the plant.

NOTE: If the plant has control strategy loop(s) that are incomplete, the attach will fail. Return to control strategy to complete them.

Procedure

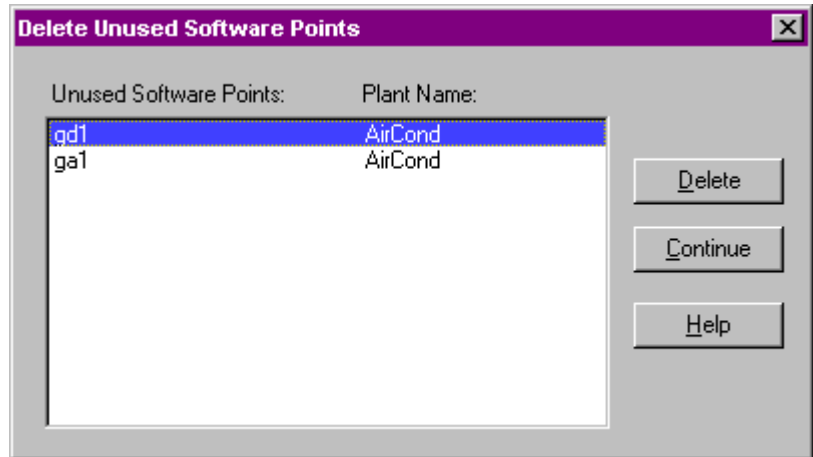
1. In the logical plant tree, click on the unattached plant.
2. Drag the unattached plant to the controller, which you want attach the plant to, and drop it.

RESULT: The Plant will be added one level below the controller in the logical plant tree.



Unused Software Points

If there are unused software points in the plant schematic, the unused software points dialog box displays with a list of those points and an option to delete them, if desired. For example:

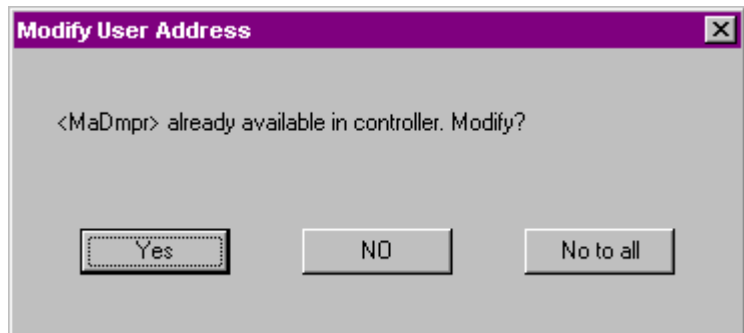


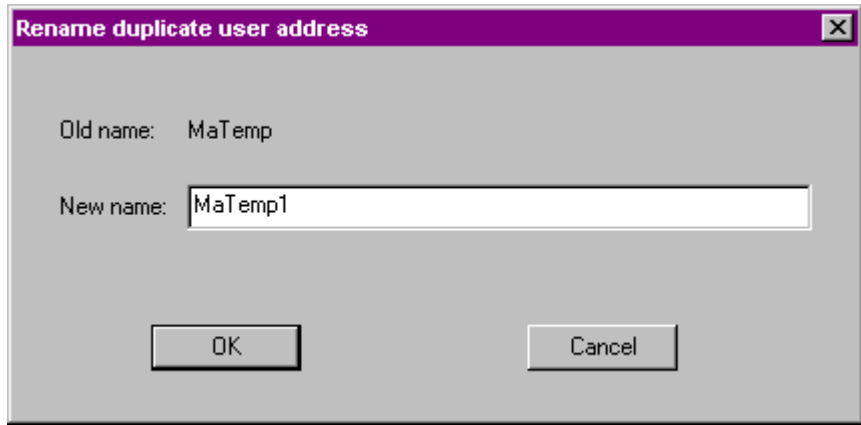
Click the points you want to delete (hold down the **Shift** key while you click to select multiple points). Then click **Delete** for software to delete these unused points. (The **Delete** key is not active until you select at least one point.)

Click **Continue** to close the dialog box. Points that you did not delete remain in the plant.

Duplicate User Addresses

If there is a duplicate user address, software displays a message box with the user address in the title and allows you to enter a new address for it. Example:

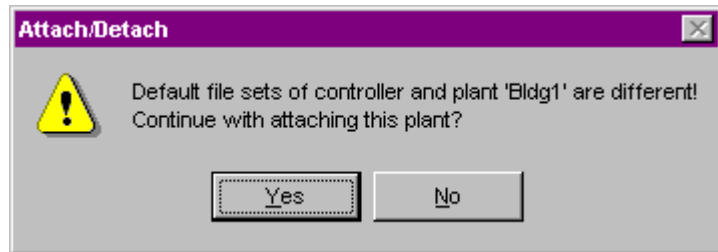




Type a unique address and click **OK** to change user address and close the dialog box. Or, click **Cancel** to keep the user address as is.

Different Default File Sets

If the point is common to all plants in the controller, you should leave the user address as is.
 If the default file sets of the controller and the plant(s) to be attached are different, the following message displays:



Note, that the default file may be set different (multiple default file sets), although the OS version of the controller and the plant(s) are the same.

Example:

OS Version 2.0 provides the default file set
 xl_2_0

Detach Plant from Controller

Purpose Unassign a plant from a controller and erase its I/O terminations file so that you can assign the plant to a different controller.

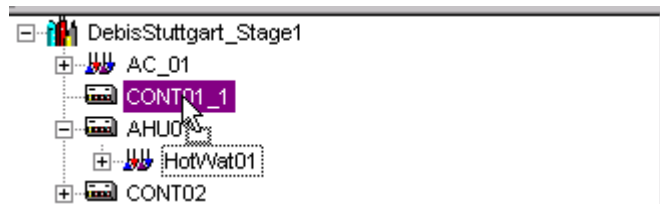
- Procedure**
1. In the logical plant tree, click on the attached plant, which you want detach.
 2. Drag the plant to the project and drop it.

RESULT: The Plant is added on level below the project in the logical plant tree.

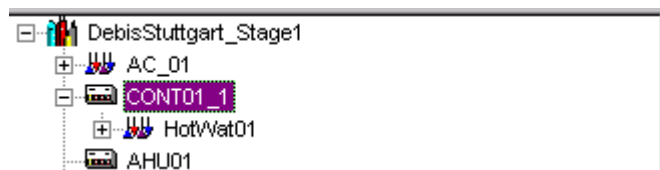


Detach Plant from one Controller and Attach it to another Controller

- Purpose** Unassign a plant from a controller and assign it concurrently to another controller.
- Procedure**
1. In the logical plant tree, click on the attached plant, which you want detach.
 2. Drag the plant to the target controller and drop it.



RESULT: The Plant will be added one level below the target controller in the logical plant tree.



Copy Controller

- Purpose** Create a new controller by copying the files of an existing controller.
- Procedure**
1. In the logical plant tree, click on controller, you want to copy.
 2. Click menu item Controller, then drop-down item Copy.
- Or, click right mouse button and with left mouse button, click on **Copy Controller** in the context menu.
- RESULT:** The Copy Controller dialog box displays with the name of the currently selected project, controller name, and controller number. This information displays in the Source field.

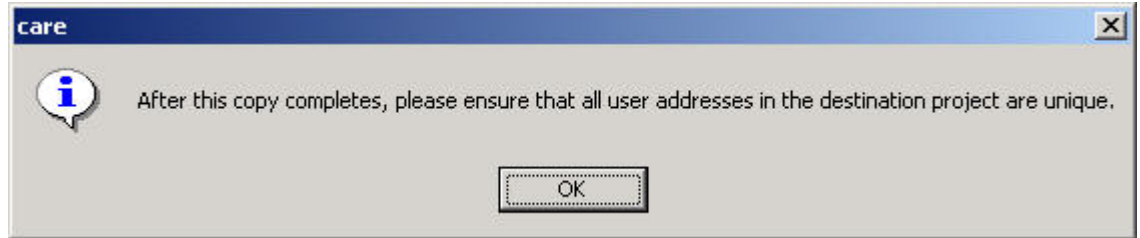
3. Select a project to receive the copy of the selected controller. The Target Project field defaults to the currently selected project. Click the drop-down listbox to display and select a different project.
4. In the New Controller Name field, enter a new name for the controller to be created.
5. From the Bus Name drop-down listbox (CARE XL-5000 only), select the bus system, in which the controller should be created in the network tree.
6. In the New Controller Number field, enter a number for the controller to be created.

In the Modify Plant Names box, select whether or not you want software to modify the plant names in the new controller. If the controller should be copied in the same project, the plant names must be changed. If so, specify how software should modify them:

Do not modify	Software copies the plant names from the source controller to the new controller as is. This selection results in duplicate plant names in the CARE database.
Prefix Text	Software modifies the plant names from the source controller by prefixing them with the text that you enter in the Text box. The modified names are used in the new controller.
Append Text	Software modifies the plant names from the source controller by appending the text that you enter in the Text field. The modified names are used in the new controller.

Click **OK** to begin the copy.

RESULT: Software displays a message box to remind you to ensure that all user addresses are unique after the copy.



! CAUTION

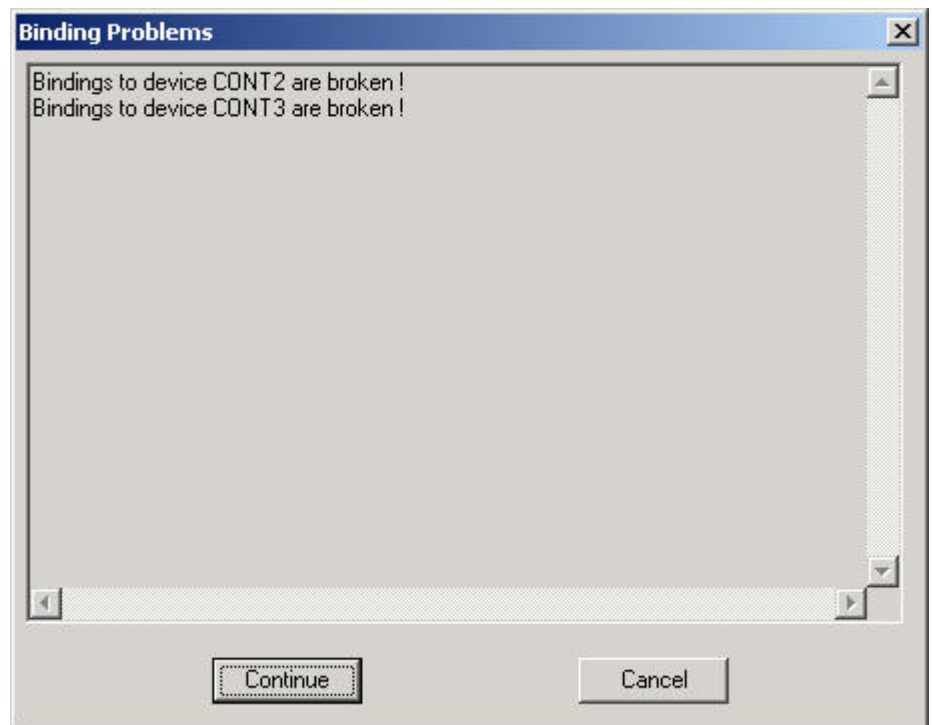
In case the controller has bindings and is copied within the same project, all bindings will be removed and the mappings will be kept



7. Click the **OK** button to acknowledge the messages.

! CAUTION

In case bound LON devices of the controller have bindings to other Excel 5000 controllers these bindings will be broken. The Bindings Problems dialog box informs you about that fact.



8. Click the **Continue** button in the Bindings Problems dialogbox if you want to accept that the bindings will be broken, if not click the **Cancel** button.

RESULT: Software copies the source controller files to the selected target project and names and numbers the controller as specified.

For LON controllers, the neuron IDs for the distributed I/O modules of the copied controller are set to 0 by default.

The channel and system/subsystem structures of the network tree will also be copied.

IMPORTANT

Software copies the user addresses without changes. If unique addresses are required, you must manually change the user addresses. See Replicate Plant section.

9. On the Terminal Assignment tab, set the neuron IDs for the copied controller modules.

Rename Controller

Purpose For changing the name of a controller, please refer to the Display/Change Controller information section.

Delete Controller

Purpose Erase a controller.

- Procedure**
1. In the logical plant tree, click on the controller, you want to delete.
 2. Click menu item Controller, then drop-down item Delete.
Or, click right mouse key and with left mouse key click on Delete in the context menu.

RESULT: The controller will be deleted.

Display/Modify Controller Information

NOTE: This section applies to CARE XL-5000 only. For the corresponding description for the FALCON and EAGLE controllers in CARE- BACnet, please refer to the Display/Modify BACnet Controller Properties section.

Purpose View and/or change controller information such as OS Version, power supply, installation type, and target I/O hardware.

- Procedure**
1. In the logical plant tree, click on the controller.
 2. On the right pane, click on the Properties tab.

Properties | Grid | Terminal Assignment for Controller: CONT02

Controller Name: CONT02

Controller Number: 2

Bus Name: Bus 1

Controller Type: Excel 500

Controller OS Version: Version 2.06

Country Code: GERMANY

Default File Set:
Original Default files for 2.06 XL500 controller & XL50 external MMI.
xl_2_06

Units of Measurement
 International
 Imperial

Power Supply
 XP501
 XP502

Installation Type
 Cabinet Door Installation
 Normal Installation

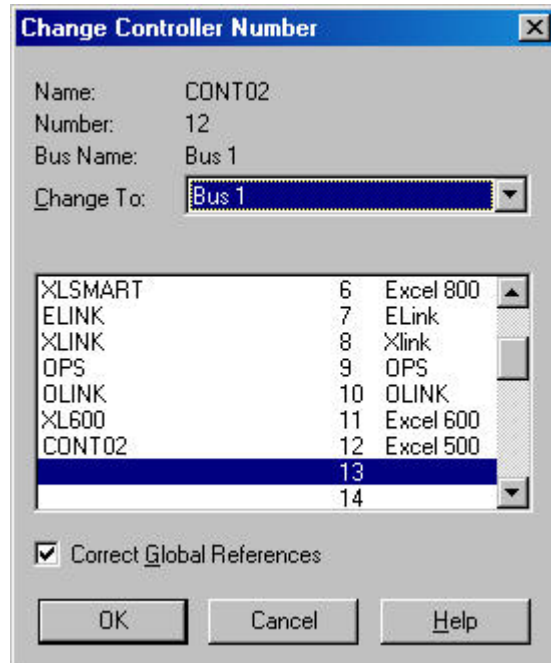
LON
 Shared / Open LON
 Local

Modify Target I/O Hardware

3. Change Controller Name, if desired.

4. To change the controller number, click on the **Change Number** button.

RESULT: The Change Controller Number dialog box displays showing the Name, Number, and Bus Name (C-Bus location) of the selected controller and all controllers of the project.



- e. From the Change To drop-down listbox, select a different C-Bus location where the controller should be moved to (CARE XL-5000 only, optional).
- f. Decide whether or not you want CARE to correct global references by checking/unchecking the Correct Global References checkbox . The default is to correct the references. If you let CARE correct the references, it changes the controller number in the files for any other controllers that link to this controller via global receptor and originator points.
- g. In the list, select a free number (13 in this example) you want to assign to the currently selected controller (12 in this example).
- h. To swap the number of the currently selected controller (12 in this example) with another controller's number, click the other controller's number in the list. For example if number 6 is assigned to the XLSMART controller and you selected it, software assigns number 12 to the XLSMART controller and number 6 to the CONT02 controller after clicking OK.
- i. Click OK.

RESULT: A message box displays reminding you that renumbering the controller causes the controller application files to be deleted and requests confirmation that you want to continue.



- f) Click Yes to continue with the renumbering.

5. Change Controller Type, if desired (Excel 800, 500 or 600 only).

6. Change Controller OS Version (the version of OS that will be running in the controller), if desired. Note that any plant attached to this controller must abide by the rules of this version or you cannot attach the plant. Select desired version.

NOTE: For results on changing OS versions refer to Appendix Plant and Controller Upgrades and Downgrades for details on changing the OS version for a controller.

7. Change Country Code, if desired. The operator interface is required to provide the correct language for the selected country. The default depends on the Windows™ version installed. Tab to the next field to keep it or click down arrow to display and select a different country.

NOTE: For Excel 500 Ver. 1.2 Controllers, the only valid country codes are Germany and United States. Other countries appear in the list box, but United States is always the selection if you select anything other than Germany.

8. Change Default File Set, if desired. Select the appropriate default file for the selected Controller OS Version. Alternate default files are created via the Default Text Editor. See Appendix for details. A short description for the selected default file set is given below the drop-down list box.
9. Change Engineering Units, if desired. Select whether the controller should use International (metric) or Imperial units in Control Strategy EMS icons. This selection controls whether inputs are accepted in Celsius or Fahrenheit.
10. Click new power supply and/or installation type, as desired.

Normal installation is the default selection. If the controller has high-density digital inputs, select Cabinet Door Installation. Installation refers only to Excel 500 and 600 Controllers.

11. Click new wiring type for Excel 50 controller, as desired.
12. Change system configuration, if desired, from Shared /Open LON to Local and vice versa by clicking respective radio button.

IMPORTANT

When changing the system configuration from Shared/Open LON to Local after a network interface had already been created, the network interface will not be downloaded.

13. Change Target I/O Hardware, if desired (only applies to Excel 800 OS 3.0 and Excel 500, Smart, and 50 controller with its relevant OS Versions, 2.0 and higher):

NOTE: If not already done, you must set the controller OS version to 2.0 or higher and confirm this by clicking OK, then select the Controller Properties tab again and set the target hardware by clicking the desired button:

Standard I/O (XF5..)
(applicable to Excel 500 and 50 with OS 2.0 - 2.06).
Hardware points of this plant will be assigned to XF5.. modules (IP bus).

Panel I/O (XF8..)
(applicable to Excel 800, OS 3.00 only)
Hardware points of this plant will be assigned to XF8.. modules (panel bus).

Distributed I/O (XFL5..)
(applicable to Excel 500 and Smart with OS 2.0 - 2.04).
Hardware points of this plant will be assigned to XFL5.. modules. (LonWorks-bus).

Distributed I/O (XFL8..)
(applicable to Excel 800, OS3.00 only).

Hardware points of this plant will be assigned to XFL8.. modules (LonWorks-bus).

Open LON

Hardware points of this plant will be boardless, that is, unassigned (applicable to Excel 800, 500, Smart, 50 with OS 2.06 and higher, and Excel 10)

RESULT: At once **all** plants will be automatically detached, all empty hardware modules will be removed and the plant automatically reattached to the selected target hardware. All datapoint attributes remain unchanged except the technical address.

14. Click on the controller in the logical plant tree.

RESULT: Software saves the changes and closes the dialog box.

Restrictions

Certain point types are not supported by Open LON. When using OS 2.04, non-supported types will be put on IP (Excel 500, 50) or distributed I/O modules (Excel 500, Smart), even if Open LON was selected. When using OS 2.06 or 3.0, non-supported types will be indicated in red in the logical plant tree and must be put manually on IP boards / Panel I/O boards.

Point types not supported by Open LON:

DO	Pulsed Digital Output
FF	Flex DO_Feedback_DI
FM	Flex Multistage
FP	Flex Pulse2
GA	Global Analog
GD2	Global Digital 2state
GDn	Global Digital Nstate
PT	Pseudo Totalizer
TO	Totalizer

When Distributed I/O was selected for an Excel 500/800 controller and the application contains a point type, which is not supported by distributed I/O modules, these points will be put on standard I/O modules / panel I/O modules.

Controller Translation

Purpose Convert the files for an attached plant to a form suitable for download into a controller.

Assumptions The schematic, control strategy, and switching logic for the plant are done. You have exited those functions and the main CARE window is on display.

Plant attachment is done.

IMPORTANT

Integrated modem communication for CARE versions 1.5 and higher is only possible for total application sizes of max. 100 kBytes.

- Procedure**
1. In the logical plant tree, click on the controller.
 2. Click menu item Controller, then drop-down item Translate. Or, click the Translate button.

RESULT: Software begins translation. As it translates, messages and warnings display in the dialog box.

When the translation is complete, software displays the following message at the bottom of the dialog box:

RACL generation completed successfully.

3. Check messages to verify proper translation.

4. If desired, click Start button to re-start the translation.
5. If desired, click Print button to print the translation result. The CARE Translator stores its messages in a printable file. Software names the file using the last four letters of the controller name and appending four numbers. For example, if the name of the controller is AHUCPU1, the name of the print file will be CPU10001.LST.
6. Click End button to exit the translate function.

Translation Message Examples

The following messages are examples for the type of information the translator displays for a plant.

1. Loadable files
2. Point numbers and names (physical points, global points, pseudopoints, flex points). There can be a maximum of 383 points in a controller (128 physical and 253 pseudo + EXECUTING_STOPPED, SHUTDOWN, STARTUP). Pseudopoints and Flags in the Control Strategy chapter describes the permissible number of pseudopoints.
3. Flags and formula names (from the mathematical editor). Formula names and flags are not included in the 381 + 3 internal point maximum per controller.
4. Control loops
5. Switching tables
6. Calculated execution times, including modules, control loops, switching tables, and total execution time.

NOTE: CARE sets execution time depending on controller type and analog input card type. If the controller is an Excel 600 and all analog input cards are "fast", CARE calculates the optimum cycle time. However, all analog input points must be defined as "fast". If any points are defined as "slow", CARE calculates cycle time as if the controller is an Excel 500 or Excel 800. This cycle time could be six to eight times slower.

7. Excel code size (in bytes)
8. File sizes (parameter, Z-register, and T-register)
9. Excel program size
10. Total application size
11. Data point description size

Switching Tables Warning

The warning "Several switching tables for user address" may appear during a plant translation. It means that more than one switching table commands the same point. This situation is very common with analog points and sometimes with digital points. It could be a problem if you have inadvertently created two switching tables commanding the same point to do opposite actions. You may want to check your tables.

Integrated Modem Communication Warning

When the total application size is bigger than 100 Kbytes, integrated modem communication is not possible, which is shown by a message of the same name:

This concerns the CARE version 1.5 and higher ones.

NV Warning and Translation Abortion


Due to restrictions in LNS, CARE can only handle NVs of which names do not exceed 21 characters. Any NV of which name exceeds 21 characters will abort the translation. All such NVs are listed and must be reworked in the NV Editor to allow the translation of the LON application.

Controller Download

See the Upload/Download procedures in the ONLINE SERVICE AND COMMISSIONING chapter of this manual for details.

Rename Datapoints

- Purpose** To rename double non-unique datapoint names within a project resulting, for example, from controller copying.
- Procedure**
- In the logical plant tree, right-click the controller of which datapoints you want to rename, then click **Rename Datapoint(s)** in the context menu.

RESULT: The Rename Data Points dialog box displays. All datapoints of the controller are listed. In the Select column, double datapoint names are checked. Unique datapoint names are unchecked. In the Old datapoint name column, the current datapoint names are displayed. In the New datapoint name column, new datapoint names are suggested on the basis of the old names and can be edited.
 - Uncheck datapoint names you do not want to rename. Re-check datapoint names you want to rename. You can check all datapoint names by clicking the icon on the top and you can uncheck all datapoint names by clicking the icon on the top.
 - To display all datapoint names, click **All** icon on the top. To hide unique datapoint names, click the  icon on the top.
 - In the New datapoint name column, rename suggested names if desired.
 - Click **Rename** button.

RESULT: The datapoints are renamed and the new names are shown in the logical plant tree.
-

Delete Unused Datapoints

- Purpose** To delete unused datapoints of the controller or plant.
- Procedure**
- In the logical plant tree, right-click the controller or plant of which datapoints you want to delete, and then click **Delete Unused Datapoints** in the context menu.

RESULT: The Delete Unused Datapoints dialog box displays. All unused datapoints of the controller respectively of the plant are listed. By default, all datapoints are checked In the Select column for deletion.
 - Uncheck datapoint names you do not want to delete, or re-check datapoint names you want to delete. You can check all datapoint names by clicking the icon on the top and you can uncheck all datapoint names by clicking the icon on the top.
 - Click **OK** button.

RESULT: All checked datapoints are deleted from the controller or plant.

PLANT SCHEMATICS

Purpose	This chapter describes how to develop and change plant schematics for a project. A plant schematic defines the equipment in the plant and how it connects together.
	<p>IMPORTANT</p> <p><i>For the FALCON and EAGLE controllers (CARE XL-Web) schematic creation is not possible. The Schematics function works differently for Excel 10 (2000series) applications. See Excel 10 Applications chapter.</i></p>
Assumption	This step assumes that you already selected or created a plant.
Chapter Contents	<p>Schematic Window Description</p> <p>Segment Additions/Insertions</p> <p>Segment Deletion</p> <p>Macros (includes saving, loading, and deleting)</p> <p>Physical Point Types (includes analog outputs, digital inputs, digital outputs, totalizers, feedback points, extra user addresses)</p> <p>Flex Points (includes DO_Feedback_DI points, Pulse_2 points, and multistage points)</p> <p>User Address Changes</p> <p>Points Without a Graphic</p> <p>Plant Information Summary (point count, user addresses, segment information, extra text, I/Os)</p> <p>Schematic Redraws</p> <p>Schematic Function Exit</p>
See Also ⇒	<p>Getting Started chapter for procedures to start and exit CARE</p> <p>Plants Definition and Management chapter for procedures to define and select a plant</p> <p>File Management chapter for procedures to back up and restore plant files.</p>

Schematic Window Description

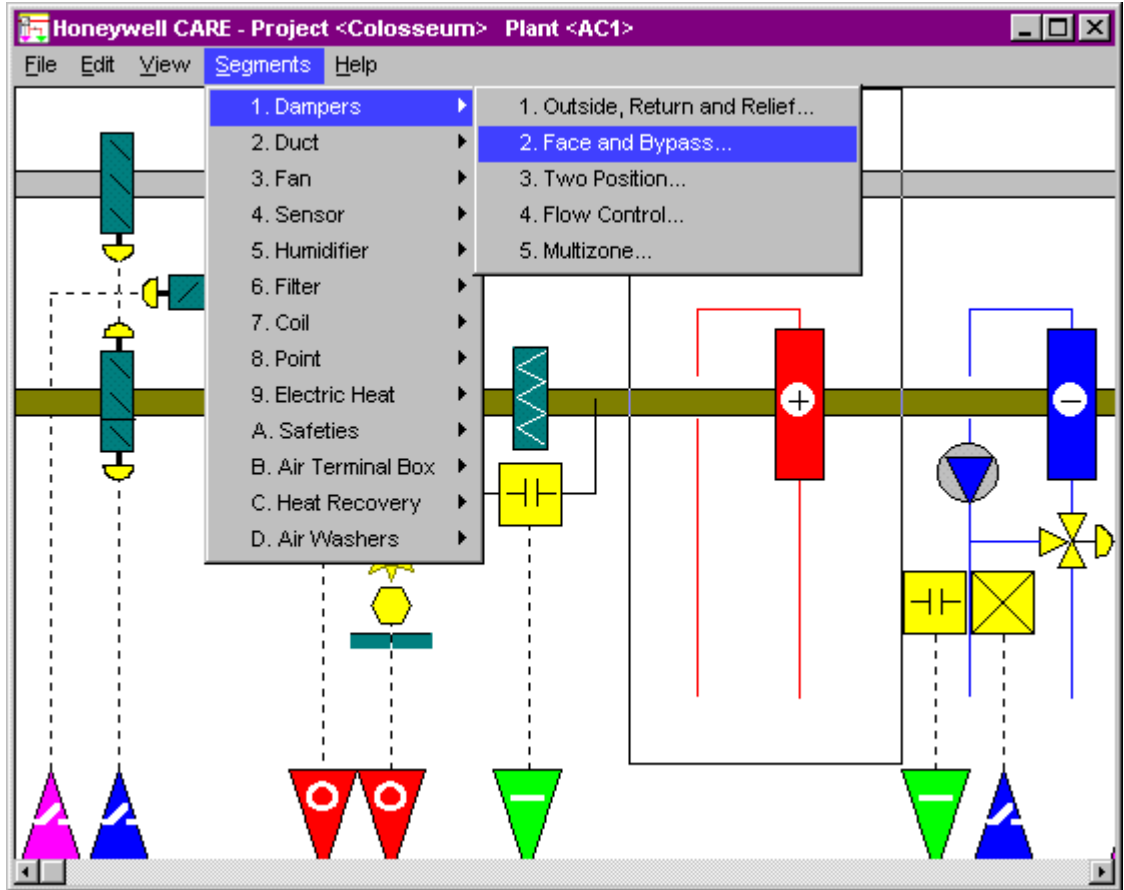
Purpose	Define plant equipment and how it connects together.
Schematic Definition	<p>A plant schematic is a combination of segments such as boilers, headers, and pumps. Segments consist of equipment such as sensors, status points, valves, and pumps. Each segment has an associated minimum number of points required for good control.</p> <p>In the schematic workspace you can add or insert ysegments, delete segments, and modify some point defaults such as type and user addresses. The CARE library contains predefined segments called macros. You can use macros to more quickly add segments to the schematic. You can also save segments that you create as macros and put them in the library for future use.</p>
Procedure	<ol style="list-style-type: none"> 1. In the logical plant tree, click on the plant. <p>A window displays with the plant name in the title.</p>

- Click menu item Plant, then drop-down item Schematic. Or click the Schematic button in the button bar below the menu bar.

RESULT: The schematic window displays.

Schematic Window

The following diagram is an example of a workspace with the Segments menu item selected.



Menu Items

This section describes how to use these menu items as well as how to create and modify a schematic.

File

End Close Schematic window.

About Display copyright information.

Edit

Insert mode on/off Select whether to add a new segment to the end of the schematic (off) or to insert the segment just before the currently selected segment (on).

Delete Erase selected segment.

Load macro Select and insert/add a previously saved segment.

Save macro Save selected segment as a macro for use in other plants and projects.

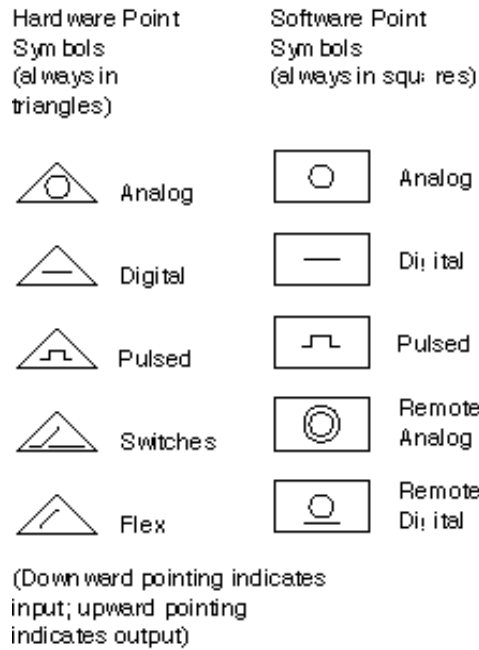
Delete macro	Erase a macro that is no longer useful.
Modify hardware point	Change default attributes for analog outputs, digital inputs, and digital outputs.
Feedback point	Create extra user addresses (digital inputs or outputs).
Modify user address	Change user address for a selected point.
Point without graphic	Add a point to the schematic without selecting a segment.
Redraw schematic	Refresh schematic display.
View	
Point count	Display the Plant summary window with the number of available inputs and outputs as well as the types of inputs and outputs.
User address	Display user addresses below their respective triangles on the schematic.
Segment list	Display segment information related to the selected segment. For example, for a supply fan, display its options such as single speed, no volume control, auxiliary contact.
Extra text	Display extra text that relates to the selected segment. Extra text is usually default values for a sensor or actuator.
Segments	Equipment types that you can select for the selected plant. Different plant types have different segment types.
Help	Display a topics list for the on-line user guide. Click a topic to display related information.

Schematic Area The area below the menu bar is where the plant schematic appears as you select segments. Schematic elements represent equipment such as fans, sensors, and dampers. Dotted lines lead from equipment to the bottom of the schematic and end with an arrowhead.

Arrow Heads The arrowheads at the bottom of the schematic represent points. They are color-coded, directional (down is input; up is output), and marked with a symbol for additional information:

Color	Direction within triangle	Symbol	Point Type
Green	downward	—	Digital input or totalizer
Red	downward	0	Analog input
Blue	upward	—	Digital output
Violet	upward	0	Analog output
Light blue	upward	/	Flex*

If a digital or analog point has switches, its — or 0 symbol changes to represent a switch, _/_ or pulsed. The following diagrams show other symbols that may appear:



*Flex points represent one or more physical points. They can command and/or display associated physical points and their values via an operator terminal. Flex point types include Pulse_2, Multistage, and DO_Feedback_DI. The Flex Points subsection later in this section describes how to create and modify these points.

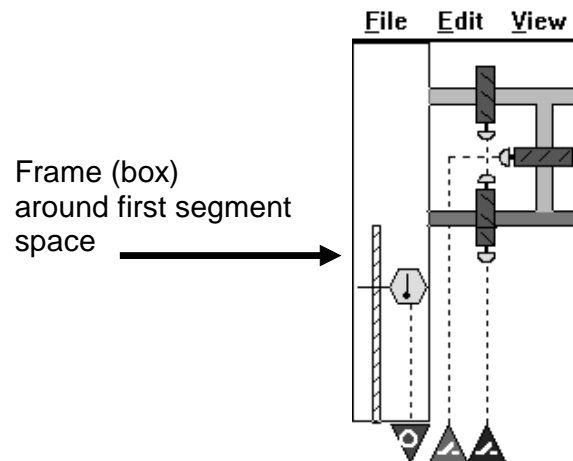
User Address Display

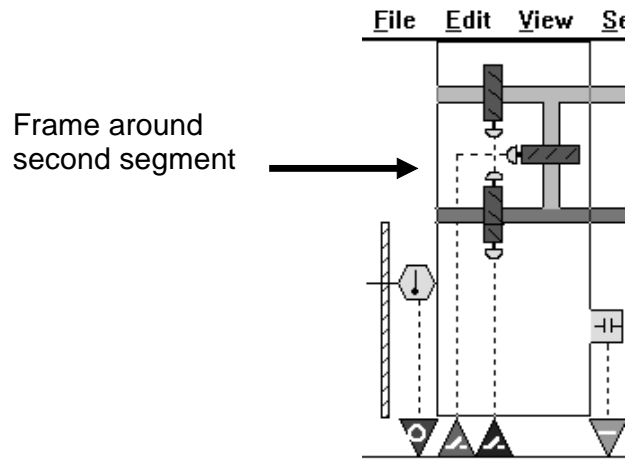
If you move the cursor over a triangle and press and hold the left-hand mouse button down, the user address for the point displays. When you release the mouse button, the display disappears. If the point is used in a control strategy and is connected, the display includes a red block preceding the user address; otherwise, the block is white.

Frame

The schematic always includes a rectangle that “frames” the currently selected segment. You can move the frame by clicking a different segment. Typically, you must select a segment before you can perform an operation on it. When you first open a schematic, the frame appears around the first segment.

Frame Examples





Segment Additions and Insertions

Purpose Create or modify a plant schematic by adding and inserting segments
As a general rule, pick segments in sequence to flow from left to right. For example, when building a VAV box controller, first pick the inlet arrangement (single duct or dual duct), then the damper actuator, then the fan, then the heating coil, then the space sensor.

Adding vs. Inserting When you “add” a segment to a schematic, software places it at the end of the schematic.

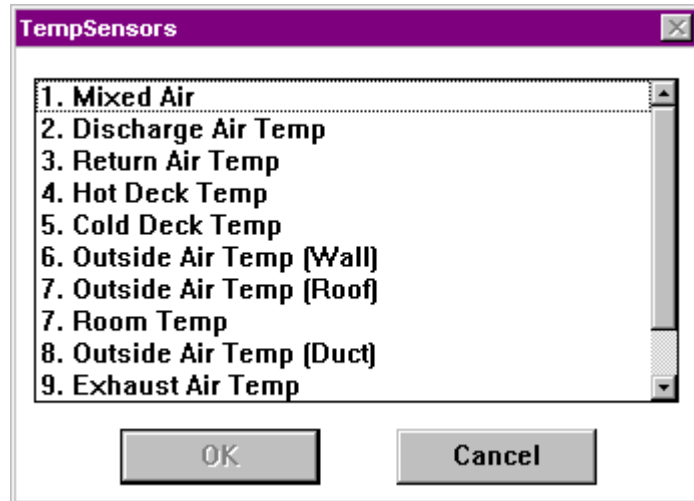
When you “insert” a segment in a schematic, software places it just to the left of the currently framed segment.

You control the add and insert functions via the Insert mode on/off option under the Edit menu item:

- If Insert mode on/off is on, there is a check mark next to it. When you select a segment, software *inserts* it. Insert mode remains on until you turn it off.
- If Insert mode on/off is off, there is no check mark next to it. When you select a segment, software *adds* it. Insert mode remains off until you turn it on.

To turn Insert mode on and off, simply click it. If it is on, it turns off. If it is off, it turns on.

- Procedure**
1. Select mode, insert or add, as described in the previous paragraphs.
 2. If you are in insert mode, position segment frame as desired so that the new segment appears where you want it. Software inserts new segments to the left of the framed segment. For example, if you want to insert a new segment between segments 2 and 3, click segment 3 to frame it.
 3. Click menu item Segments.
RESULT: A list of segments displays.
 4. Select desired segment by either clicking segment name or typing segment number.
RESULT: A list of options displays.
 5. Select desired option by either clicking option name or typing option number.
RESULT: Another list may display or a dialog box. For example:



NOTE: To cancel the inclusion of the segment, click **Cancel**.

6. Click item (or type number), then click **OK** to select it. (Or, double-click item as a shortcut).

Depending on the selected segment, additional windows may appear. Select items as required.

RESULT: After you make the last selection, the segment list window closes and the schematic work space reappears with a drawing of the new segment to the left of the previously framed segment. The new segment is framed.

7. You can continue selecting segment menu items and then specific components.

When you are through with a plant schematic, you can end the Schematic function (menu item File, drop-down item End) and create a control strategy for it. See the Control Strategy chapter for details.

Example This section shows how to add a Supply Fan segment to an air conditioning plant.

1. Click menu item Segments, then drop-down item Fan.

RESULT: A drop-down list displays with a choice of four types, Single Supply Fan, Single Return Fan, Multiple Supply Fans, and Multiple Return Fans.

2. Click Single Supply Fan.

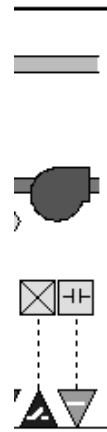
RESULT: The SaFanType segment list window displays with four options, Single Speed, Single Speed with Vane Control, Two Speed, and Variable Speed.

3. Double-click Single Speed.

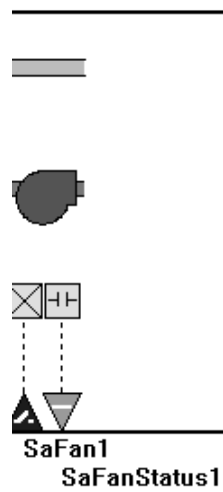
RESULT: The SaFanDev window displays with four choices, Control with Status, Control Only, Status Only, and No Control or Status.

4. Double-click Control with Status.

RESULT: A diagram of the fan displays in the schematic work space. Examples:



The triangles represent points. To see point names, click View, then drop-down item User address. Software displays default names below the triangles:



Default Point Attributes

Each point associated with a segment has an associated default file that assigns various types of information to the point. For example, an analog point can have the following defaults:

User Address	sup_fan
CARE type	S
Descriptor number	0
Access attribute	1
Engineering Unit	3
Characteristic number	0
Alarm Text number	0
Low Warning Limit	0
High Warning Limit	100
Low Alarm Limit	0
High Alarm Limit	100
Alarm Delay	360 sec
Suppress Alarm	J
Critical/non-critical alarm	U
Hide Point	No

These default values are accessible via the Data Point Description Editor. This editor provides point dialog boxes that list these default values as well as other values that relate to point operation. The Editors chapter in this manual describes the dialog boxes and how to change the point values.

Segment Deletion

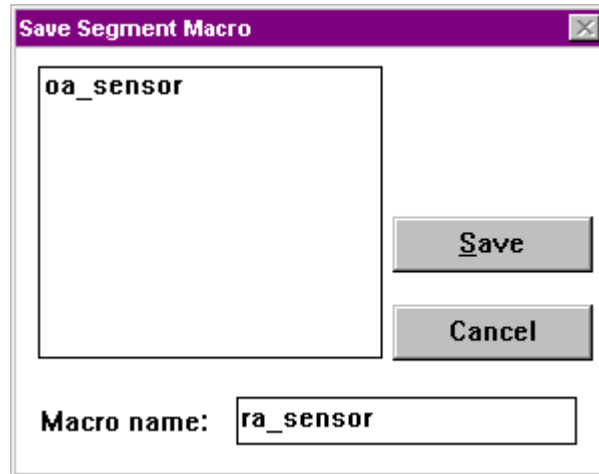
- Purpose** Modify a plant diagram by deleting equipment segments.
- Procedure**
1. Click segment diagram that you want to delete.
 RESULT: Software frames the segment.
 2. Check whether or not the segment contains points connected to a control loop or switching logic. If there are connected points, first remove the points from the control loop or switching logic. Otherwise, software issues an error message when you try to delete the segment. See Control Strategy or Switching Logic chapter in this manual for procedures.
 3. Click Edit, then drop-down item Delete. Or, press the **Delete** key.
 RESULT: Software displays a message asking for confirmation.
 4. Click **Yes** to continue (or **No** to cancel).
 RESULT: If you clicked **Yes**, software removes the segment from the schematic.
-

Macros

- Purpose** If a segment and its components are used frequently in plant designs, you can save the segment as a macro.
- A macro describes a segment with all specified components, such as sensors, status points, etc. When you use a macro, you do not need to make all the choices that you do when you select a segment from the menu bar. For example, if you add a single-speed supply fan with no volume control and auxiliary contact status to a schematic and then save it as a macro, you can use that macro to quickly add that type of fan to any schematic.
- Each macro is stored under a unique, personalized name. You can recall it repeatedly in multiple plants and projects.
- Stored macros are available independent of selected plant type. For example, you can use segments from a heating plant in air conditioning plants.
-

Save a Segment as a Macro

- Procedure**
1. Select the segment to be saved as a macro from the plant schematic.
 RESULT: Software frames the segment.
 2. Click Edit, then drop-down item Save macro. Or, press **F3**.
 RESULT: The Save segment macro dialog box displays.



3. Type a new macro name in the Macro name editing field. The macro name cannot already exist.
4. Click **Save** to save macro and close the dialog box. Or, Click **Cancel** to close the dialog box without saving the macro.

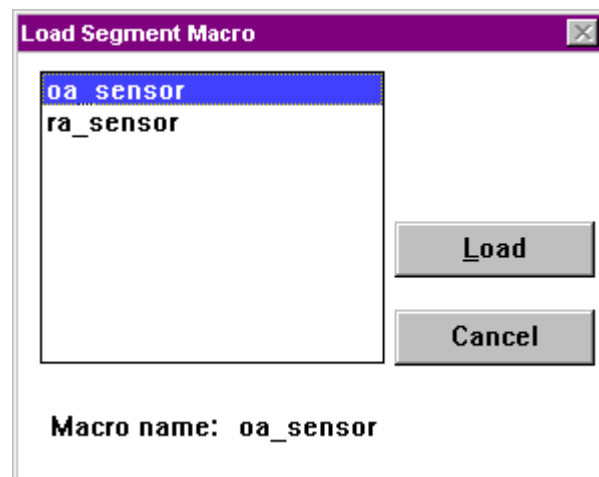
Load a Macro

You can add or insert a segment, previously stored as a macro, anywhere in a plant schematic.

Procedure

1. To add the macro segment to the end of the schematic, make sure Insert mode is off (no check mark under Edit menu). To insert the macro segment within the schematic, make sure the Insert mode is on (check mark under Edit menu) and select the segment where you want the macro to appear.
2. Click Edit, then drop-down item Load macro. Or, press **F2**.

RESULT: The Load segment macro dialog box displays.



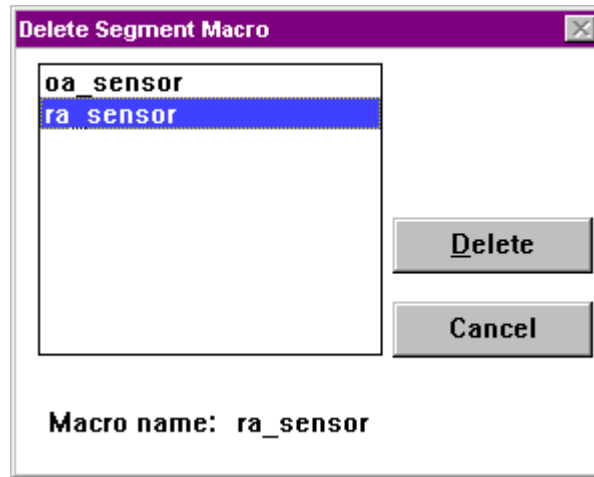
3. Select the desired macro from the existing macros in the list box.
4. Click **Load** to add or insert the segment in the plant schematic and close the dialog box. Or, to close the dialog box without loading the macro, click **Cancel**.

Delete a Macro From the Library

Procedure

1. Click Edit, then drop-down item Delete macro. Or, press **F4**.

RESULT: The Delete segment macro dialog box displays.



2. Select the macro to be deleted from the existing macros in the list box.
3. Click **Delete**. Or, click **Cancel** to just close the dialog box without continuing.

RESULT: Software asks whether or not you really want to delete it.

4. Click **OK** to delete the macro and close the dialog box. Or, click **Cancel** to close the dialog box without deleting the macro.

Physical Point Types

Definition Physical points are the plant inputs and outputs from and to controllers.

CARE recognizes various types of physical points. If the type of point preassigned by CARE does not agree with that which exists in the plant, you must modify point type.

In the plant schematic, colored triangles represent the various physical points:

Green	Digital input or totalizer
Red	Analog input
Blue	Digital output (normally open contact)
Violet	Analog output (modulating)

(Light blue triangles represent flex points such as DO_Feedback_DI, Pulse_2, and Multistage. See the Flex Points section for information on creating and modifying these points.)

When you click a triangle to select a point it changes color to black.

If you double-click a triangle, the Datapoint information dialog box displays with point type and user address.

You can modify analog inputs, analog outputs (continuous or three-position output signal), digital inputs, totalizers, and feedback points. The following sections describe the procedure for each type of point.

Maximums The maximum number of physical points varies per controller. For example, an Excel 500 can have 128. An Excel 100 can have 36. An Excel 80 can have 24.

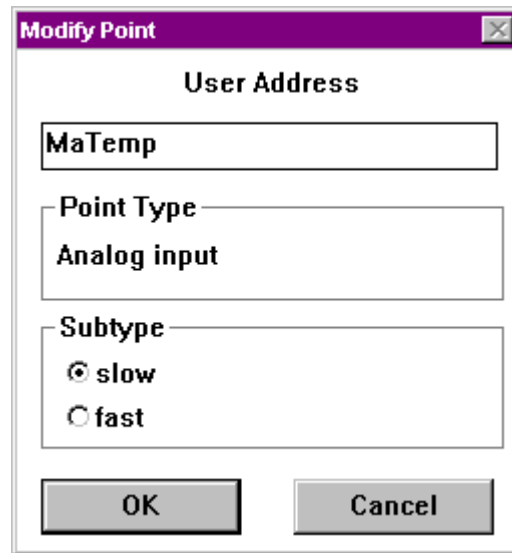
Analog Inputs

If an analog input must have either Balco 500 or PT3000 sensors, select the fast subtype and, optionally, change the user address.

Procedure

1. Click Edit, then drop-down item Modify hardware point. Or, press **F5**.
2. Select the analog input in the plant schematic by clicking on the red arrow pointing down.

RESULT: The arrow head turns black. The Modify point dialog box displays with analog input choices.



3. If desired, you can change user address by typing over the address.

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

For a point that requires Balco 500 or PT3000 sensors, select Subtype fast.

For other sensor types, select Subtype slow.

See the Analog Input Characteristics note for differences between the slow and fast subtypes.

4. Click **OK** to save changes. Or, to close the dialog box without changing the point, click **Cancel**.

RESULT: The arrow head remains black until you select another arrow head.

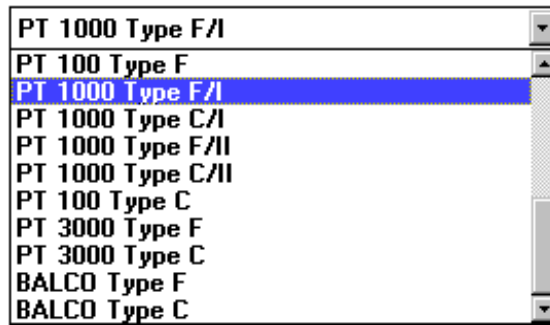
Board Types

CARE assigns slow analog inputs to XF521A and XFL521 boards respectively and fast analog inputs to XF526 Boards. Excel 80 and Excel 100 controllers can use only slow analog inputs.

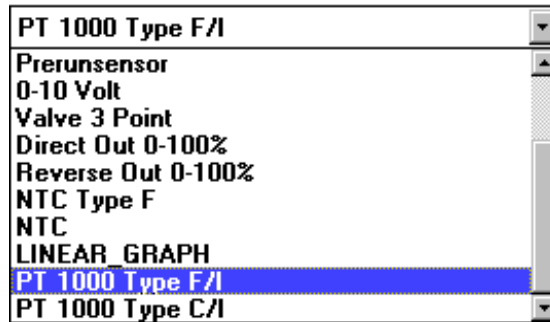
Analog Input Characteristics

Each analog input point has an associated set of characteristics. These characteristics describe the action of the associated sensor. When you select a Subtype, software changes the types of characteristics available to the point. You select the characteristics when you use the Data Point Description Editor to modify point attributes (see the Editors chapter).

The fast subtype can have the following types of characteristics:



The slow subtype can have the following types of characteristics:



Descriptions of these characteristics follow.

CARE Subtype Index		XL-Online Index	Characteristic	
Slow	Fast		Name	Specification
15	23	253	NTC Type F	-58.0 to 302.0 F Negative temperature coefficient degrees F
11	11	255	NTC	-50.0 to 150.0 C Negative temperature coefficient degrees C
12	12	254	LINEAR_GRAPH	0 to 10 V
13	19	249	PT1000 Type F/I	-58.0 to 302.0 F
14	20	250	PT1000 Type C/I	-50.0 to 150.0 C
	17	247	PT1000 Type F/II	32 to 752.0 F
	18	248	PT1000 Type C/II	0.0 to 400.0 C
	21	251	PT100 Type F	-58.0 to 302.0 F
	22	252	PT100 Type C	-50.0 to 150.0 C
	15	245	PT3000 Type F	-58.0 to 302.0 F
	16	246	PT3000 Type C	-50.0 to 150.0 C
	13	243	BALCO Type F	-58.0 to 302.0 F
	14	244	BALCO Type C	-50.0 to 150.0 C
	24	241	0-10 V	0-10 V
	25	242	2-10V = 0-100 %	2-10V = 0-100 %
	26	237	NI 1000 TK5000 F	-22.0 to 266.0 F Positive temperature coefficient degrees F
	27	238	NI 1000 TK5000	-30.0 to 130.0 C Positive temperature coefficient

				degrees C
	28	239	NTC-10 F	-22.0 to 212.0 F Negative temperature coefficient degrees F
	29	240	NTC-10	-30.0 to 130.0 C Negative temperature coefficient degrees C

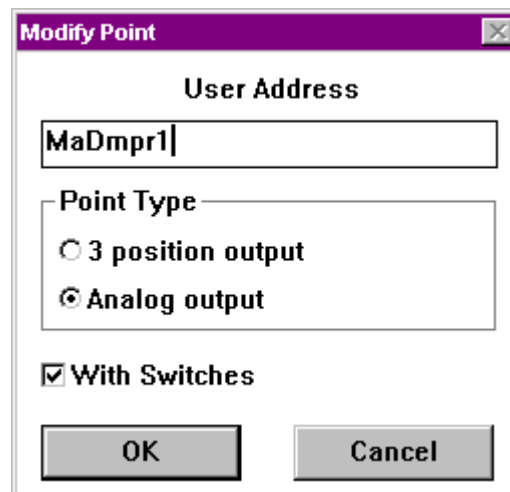
Analog Outputs

If an analog output is to control an actuator in the plant, determine whether the analog output should be a continuous or three position signal.

Procedure

1. Click Edit, then drop-down item Modify hardware point. Or, press **F5**.
2. Select the analog output in the plant schematic by clicking on the violet arrow pointing up.

RESULT: The arrow head turns black. The Modify point dialog box displays with analog output choices.



3. If desired, you can change user address by typing over the address.

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

For a continuous output signal, click Analog output.

For a three-position output signal, click 3 position output.

The With Switches check box indicates whether or not the analog output is on a board with switches:

- If the analog output is on an XF522 with switches, the check box should have a checkmark.
- If the analog output is on an XF527 board without switches, the check box should be empty.

The XF522 board is a multipurpose board that has eight outputs (five with switches and three without). When you select "With Switches", software specifies an XF522 board. When you disable "With Switches", software specifies an XF527 board. The XF527 board has eight outputs, all without switches.

An exception to this action is when a combination of with and without switches is required. CARE then uses the XF522 board and places the “with switch” outputs on the first five and the “without switch” outputs on the last three.

When the target hardware for the plant is DIO, CARE assigns any kind of analog output to an XFL522 board with switches.

Excel 80 and Excel 100 Controllers do not support “With Switches”.

Click the check box to change it from checked to blank and vice versa.

4. Click **OK** to save changes.

RESULT: The arrow head remains black until you select another arrow head.

Excel 20 External 3-Pos Outputs

During creation of the application it must be assured that the created board addresses of CARE match the Excel 20 hardware. XL20 requires:

Point Type	Board Type	Board Technical Address
AI	XF521A	1
AO *)	XF522A	2
DI	XF523A	3
DO	XF524A	4
external 3-position *)	XF522A	2

*) If an external 3-position output has to be used, it must reside on the AO board.

CARE creates the following configuration automatically during attach:

Point Type	Board Type	Board Technical Address
AI	XF521A	1
AO	XF522A	2
DI	XF523A	3
DO	XF524A	4
external 3-position	XF525A	5

In case a three-position output is included in your application and therefore the terminations created by the CARE attach do not match the XL20 hardware, use the terminal assignment function.

Procedure

1. Drag the 3 position user addresses from the XF525 board to any free locations on the XF522 board. It is mandatory that all 3-position points are swapped to the analog board, to empty the XF525 board.
2. Click on the XF525 board, which is empty now with the right mouse button. Select "Delete" from the context menu in order to delete the module.
3. Translate the controller.

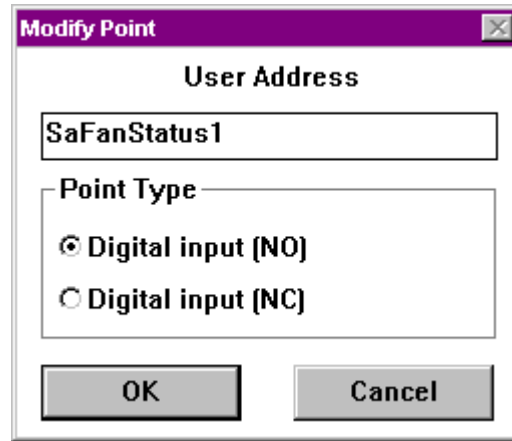
Digital Inputs

Digital inputs can be normally open or normally closed. The default is normally open. Use the following procedure to change it.

Procedure

1. Click Edit, then drop-down item Modify hardware point. Or, press **F5**.
2. Select the digital input in the plant schematic by clicking on the green arrow pointing down.

RESULT: The Modify point dialog box displays with digital input choices.



3. If desired, you can change user address by typing over the address.

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

If the switch is normally open, click Digital input (NO).

If the switch is normally closed, click Digital input (NC).

4. Click **OK** to save changes. Or, to close the dialog box without changing the point, click **Cancel**.

RESULT: The arrowhead remains black until you select another arrowhead.

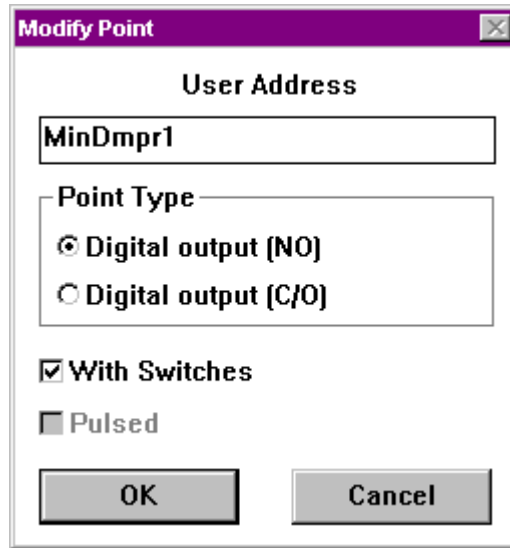
Board Types CARE assigns digital inputs to XF523 and XFL523 boards respectively.

Digital Outputs

Digital outputs can be normally open or changeover. The default is normally open. Use the following procedure to change it.

- Procedure**
1. Click Edit, then drop-down item Modify hardware point. Or, press **F5**.
 2. Select the digital output in the plant schematic by clicking on the blue arrow pointing up.

RESULT: The Modify point dialog box displays with digital output choices.



3. If desired, you can change user address by typing over the address.

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

If the switch is normally open, click Digital output (NO).

If the switch is changeover, click Digital output (C/O).

The With Switches check box indicates whether or not the digital output is on a board with switches:

- If the digital output is on an XF524 A, the check box is checked.
- If the digital output is on an XF529 board without switches, the check box should be unchecked.

The XF524 board is a multipurpose board that has six outputs (five with switches and one without). When you select "With Switches", software specifies an XF524 board. When you disable "With Switches", software specifies an XF529 board. The XF529 board has six outputs, all without switches.

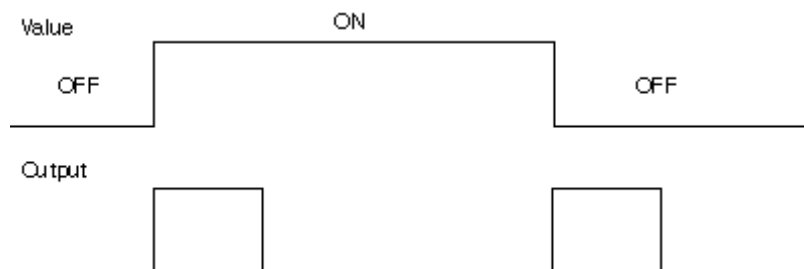
An exception to this action is when a combination of with and without switches is required. CARE then uses the XF524 board and places the "with switch" outputs on the first five and the "without switch" outputs on the last one.

When the target hardware for the plant is DIO, CARE assigns any kind of digital output to an XFL54 board with switches

Excel 80 and Excel 100 Controllers do not support "With Switches".

Click the check box to change it from checked to blank and vice versa.

The Pulsed check box indicates whether or not the output is a momentary output. The duration of the output can be from 1 to 255 seconds. The following diagram illustrates pulse action:



Click the check box to change it from checked to blank and vice versa.

NOTE: Do not select Pulsed if you select With Switches.

You can set the duration of the output later using the Data Point Description Editor described in the Editors chapter.

4. Click **OK** to save changes.

Plant Attachment

During plant attachment, CARE software assigns controller I/O terminations according to preset rules. The digital IP output module XF524 has six outputs (five normally closed, one normally open). The five normally closed (C/O) points have five associated override switches. The digital DIO output module XFL524 has six switches on its manual override module XFR524 to independently switch each of the digital outputs OFF (0) or ON (1) or Automatic, which causes the channel to operate normally.

To have a manual override switch on a particular digital output, use this Modify Digital Outputs function to modify the output point from normally open to normally closed.

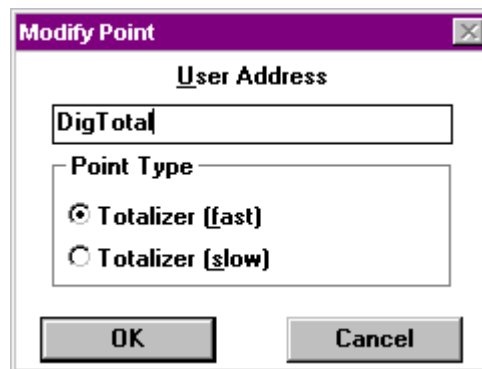
Totalizers

Totalizer points can be fast or slow. The default is fast. Use the following procedure to change it.

Procedure

1. Click Edit, then drop-down item Modify hardware point. Or, press **F5**.
2. Select the totalizer in the plant schematic by clicking on the green arrow pointing down.

RESULT: The Modify point dialog box displays with totalizer choices.



3. If desired, you can change user address by typing over the address.

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

If the totalizer is slow, click Totalizer (slow).

If the totalizer is fast, click Totalizer (fast) (or leave as is).

4. Click **OK** to save changes. Or, to close the dialog box without changing the point, click **Cancel**.

RESULT: The arrowhead remains black until you select another arrowhead.

Feedback Points

Digital outputs can have feedback points as follows:

- Three extra user addresses via digital inputs
- Two extra user addresses via digital outputs

You can use the digital inputs to define feedback signals such as “Burner 1 switched on”.

You can use the digital outputs to connect alarm devices such as a horn or bell.

IMPORTANT

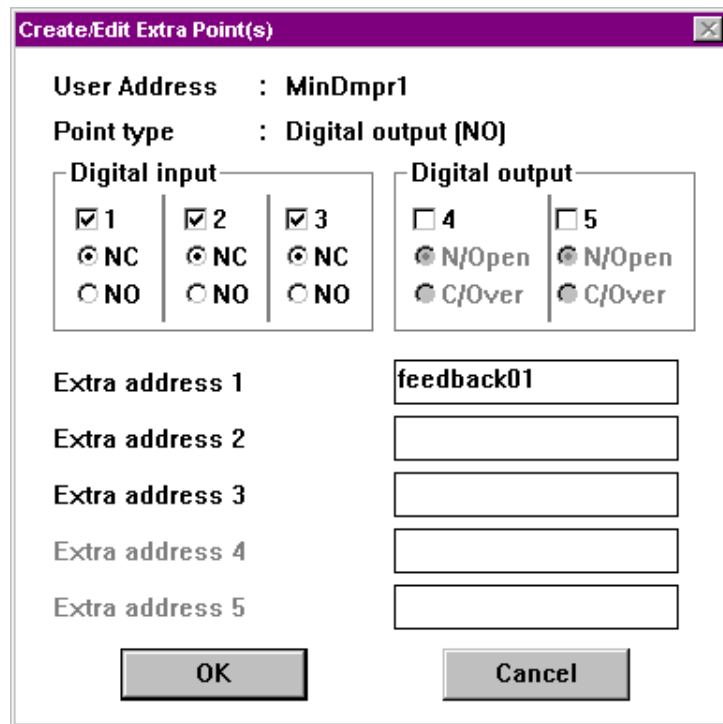
There are no physical or software connections to the digital output point, that is, no correlation.

You need to establish an extra user address for each additional feedback point.

Procedure

1. Click Edit, then drop-down item Feedback point. Or, press **F9**.
2. Select the digital output to be modified from the plant schematic by clicking on the blue arrow pointing up. The point selected must have a graphic.

RESULT: The Create/Edit extra point(s) dialog box displays.



3. Click a digital input or output check box to add it as a feedback point.

The Digital Input field allows you to select one, two, or three inputs and indicate the type of contacts through which the feedback point connects, either C/O (normally closed contacts) or NO (normally open contacts).

The Digital Output field allows you to select one or two outputs and indicate the type of contacts through which the feedback point connects, N/Open (normally open contacts) or C/Over (changeover contacts).

RESULT: A checkmark appears in the check box for the selected point.

To reset a check box selected in error, click the check box again (to remove the checkmark).

4. Click the appropriate switching status for the selected point (C/O, NO, N/Open, or C/Over).
5. Click the corresponding Extra address field to select it and type in a user address for the point. Extra address fields are not selectable until you select a digital input or output.

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

6. Repeat Steps 3 through 5 until you are through selecting all desired inputs and outputs.
7. Click **OK** to save changes and close the dialog box.

Extra User Addresses Display

The extra user addresses do not display on the plant schematic. To view them, double-click the digital output point triangle. The Datapoint information dialog box displays with point type and user address for each point.

Flex Points

Purpose Flex points represent one or more physical points. They can command and/or display associated physical points and their values via an operator terminal. Flex point types include Pulse_2, Multistage, and DO_Feedback_DI.

To add flex points to a schematic, use the Point without graphic function under the Edit menu. The Create/View point(s) without graphic dialog box includes the three flex point types. Select desired type(s) and create as many as needed.

In some plant types, there is also a POINTS segment that allows you to create flex point types in the same way as you create schematic segments.

After you add flex points to the schematic, you may want to change the defaults for the points. The following sections describe each type of flex point, lists its defaults, and describes how to change them.

DO_Feedback_DI Points

Purpose With DO_Feedback_DI points, one user address (the DO_Feedback_DI point, a pseudopoint) can control up to three digital outputs with up to three digital inputs (all six points are physical points). The digital inputs register the feedback of the outputs 1 through 3 (Stages). The point assignments in CARE are permanent. The digital output points are normally open (N.O.) and are only assigned to boards without switches (for example, XI529).

For example, you can implement a three-stage switch using the following digital outputs:

Status	DO1	DO2	DO3
0	0	0	0
1	1	0	0
2	0	1	0
3	0	0	1

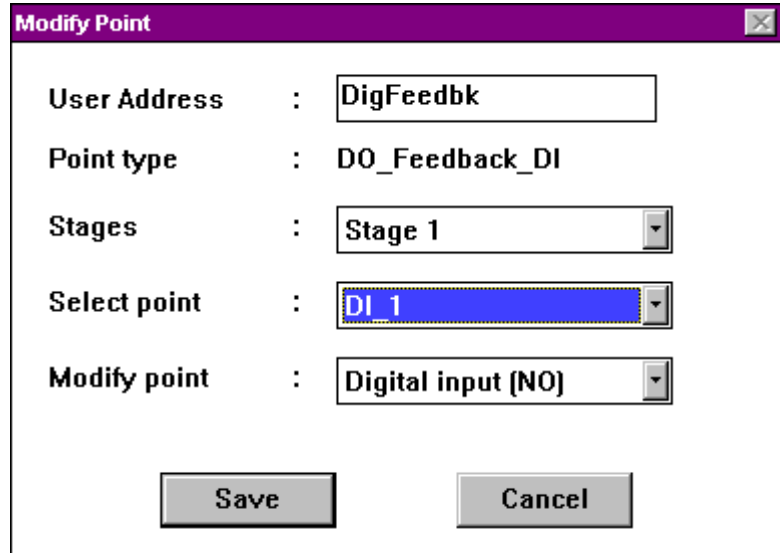
You can define the attributes of these points later using the Data Point Description Editor described in the Editors chapter. The point type for these points in the Editor is "Flex".

Deviation If a deviation occurs between the digital output and its associated digital input, then the controller software will switch down this point type until a "non-alarm" state is reached. In extreme cases and if the flex point has just 1 stage, it may be switched to the off position.

Defaults The default for these points is three stages with digital inputs that are normally open. To change the number of stages or the normally open default, use the following procedure.

- Procedure**
1. Click Edit, then drop-down item Modify hardware point. Or, press **F5**.
 2. Select the DO_Feedback_DI point in the plant schematic by clicking on the light blue arrow pointing up.

RESULT: The Modify point dialog box displays.



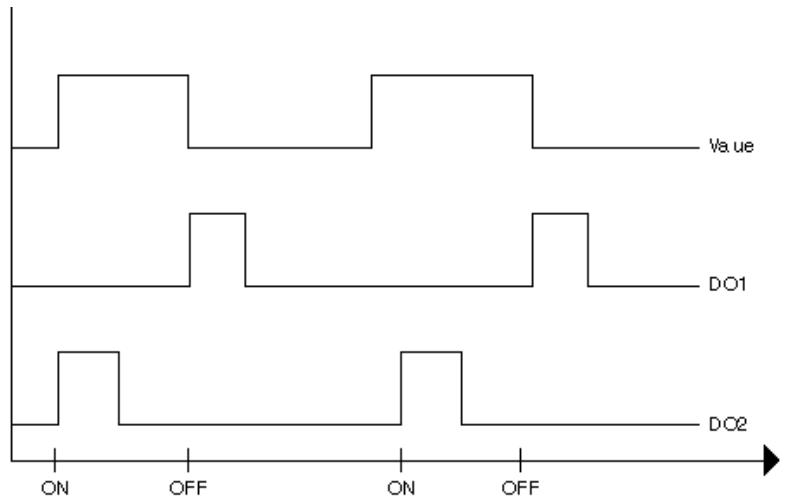
3. Click the down arrow in the Stages box to display the three choices. Click desired number of stages. Software assigns 1, 2, or 3 digital inputs and outputs according to the number of stages you select.
4. To modify a digital input point from normally open to normally closed or vice versa, click the down arrow in the Select point box to display point choices. Click the name of the desired digital input point. Then click the down arrow in the Modify point box to display the normally open/normally closed choices. Click desired choice to select it.

If the Modify point text and box are gray, the Select point box has a digital output point selected. You must select a digital input point to enable the Modify point option.

5. Click **Save** to save changes, then click **Cancel** to close the dialog box. To close the dialog box without changing the point, just click **Cancel**.

Pulse_2 Points

Purpose Pulse_2 points use two terminals with one user address (the Pulse_2 point) that has momentary outputs. The digital output points are normally open (N.O.) and are only assigned to boards without switches (for example, XI529). The following diagram shows output action:



One pulse is generated per point status change (positive edge triggered). A transition of 0 to 1 sets the pulse on DO2. A transition of 1 to 0 sets the pulse on DO1.

A change of state of the value can retrigger all outputs.

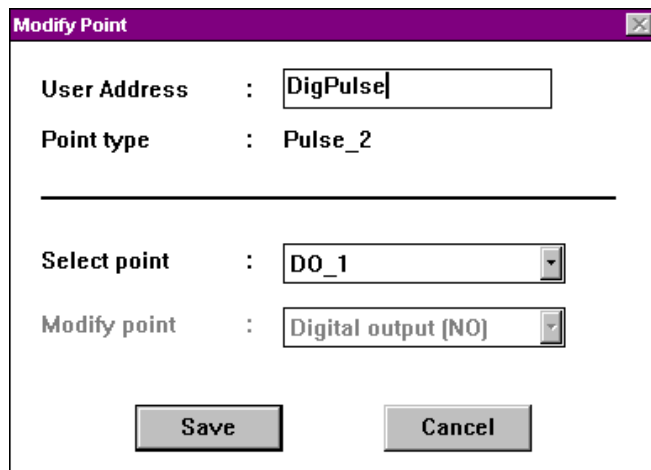
You can define the attributes of these points later using the Data Point Description Editor described in the Editors chapter. The point type for these points in the Editor is "Flex".

Defaults The default for these points is two normally open digital outputs. You cannot change this selection. However, to see the user address for these points, you can display the Modify Point dialog box. The following procedure describes how to do that.

The Pulse Duration default is one second. To modify the pulse duration, use the Data Point Description Editor described in the Editors chapter.

- Procedure**
1. Click Edit, then drop-down item Modify hardware point. Or, press **F5**.
 2. Select the Pulse_2 point in the plant schematic by clicking on the light blue arrow pointing up.

RESULT: The Modify point dialog box displays.



3. Click the down arrow for the Select point drop-down list box to see the user address of the other point..
4. Click **Save** to save changes, then click **Cancel** to close the dialog box. To close the dialog box without changing the point, just click **Cancel**.

Multistage Points

Purpose With Multistage points, one user address (the Multistage point, a pseudopoint) can control up to six outputs (all six points are physical points). CARE positions all physical points on the same hardware module and numbers them sequentially one after the other. Multistage outputs can only be normally open (N.O.) and are only assigned to boards without switches (for example, XI529).

Stage operation is:

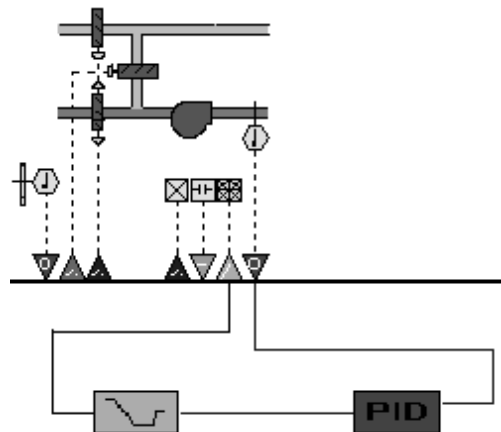
Value		Status of Stages					
0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0
2	1	1	0	0	0	0	0
3	1	1	1	0	0	0	0
4	1	1	1	1	0	0	0
5	1	1	1	1	1	1	0
6	1	1	1	1	1	1	1

You can define the attributes of these points later using the Data Point Description Editor described in the Editors chapter. The point type for these points in the Editor is "Flex".

Hysteresis For each analog command value of 0.0 through 6.0, there is a hysteresis value of 0.4. The following table lists ranges for each value:

Input Range Switching Up	Displayed Value	Input Range Switching Down
0.00-0.699	0	0-0.299
.7-1.699	1	.3-1.299
1.7-2.699	2	1.3-2.299
2.7-3.699	3	2.3-3.299
3.7-4.699	4	3.3-4.299
4.7-5.699	5	4.3-5.299
5.7-higher	6	5.3-higher

Example:



There is no logic to prohibit the multistaged operator from being driven from one end to the other. You may want to add a Ramp operator during the Control Strategy process to prevent this action.

Defaults The default for these points is six output points. To change the number of output points, use the following procedure.

- Procedure**
1. Click Edit, then drop-down item Modify hardware point. Or, press **F5**.
 2. Select the Multistage point in the plant schematic by clicking on the light blue arrow pointing up.

RESULT: The Modify point dialog box displays.

3. Click the down arrow in the Stages box to display the six choices. Click desired number of stages. Software assigns the corresponding number of outputs according to the number of stages you select.
4. To display the names of the output points, click the down arrow in the Select point box.

The Modify point text and box are always gray because the Multistage points are always N.O. output points.

5. Click **Save** to save changes, then click **Cancel** to close the dialog box. To close the dialog box without changing the point, just click **Cancel**.

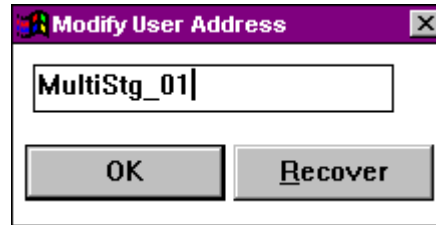
User Address Changes

Definition CARE preassigns default user addresses to all points. You can change these user addresses, if desired.

You use the user addresses when creating the control strategy and switching logic.

You may want to change user addresses to provide for easier wild card searches at operator terminals such as the Excel Building Supervisor operator terminal. Wild card searches separate upper and lower case letters alphabetically, for example, AHU1 and ahu1 do not sort the same.

- Procedure**
1. Select the point to be modified from the plant schematic.
RESULT: The point triangle changes color to black.
 2. Click Edit, then drop-down item Modify user address. Or, press **F7**.
RESULT: The Modify user address dialog box displays showing the current address.



3. To enter a new user address, click the current address and type a new address. To just add to the current address, click behind the current address to place the cursor at the end of the address, and type new letters. To just change part of the current address, highlight that part and type new letters.

To “highlight” letters, click just in front of the first letter you want to highlight, hold down the mouse button, and drag the cursor over all the letters you want to highlight (“select”). Release the mouse button when all the letters are selected.

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

4. Click **OK** to save the address.

If you do not click **OK**, the new address is not saved. You can retrieve the original user address by clicking **Recover**.

RESULT: The dialog box remains on display so you can continue changing addresses.

5. To change another user address, select the point on the plant schematic and click the editing field in the dialog box.

RESULT: The address for the newly selected point appears in the editing field in the dialog box.

6. Enter the new user address and click **OK**. You can continue changing user addresses in this way.

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

If you do not click **OK**, the new address is not saved. You can retrieve the original user address by clicking **Recover**.

7. To end modifications to user addresses, double-click the Ventilator icon in the upper left corner of the dialog box.

Or, click Schematic menu item Edit. Note that a check mark is next to Modify user address to indicate that the function is active. Click Modify user address to remove the check mark and stop the function.

Deselecting a Point

To deactivate a point selected in error:

- a. Move the mouse pointer to the point level on the plant schematic or to another point.
- b. Click the mouse button once.

RESULT: The point returns to its normal color.

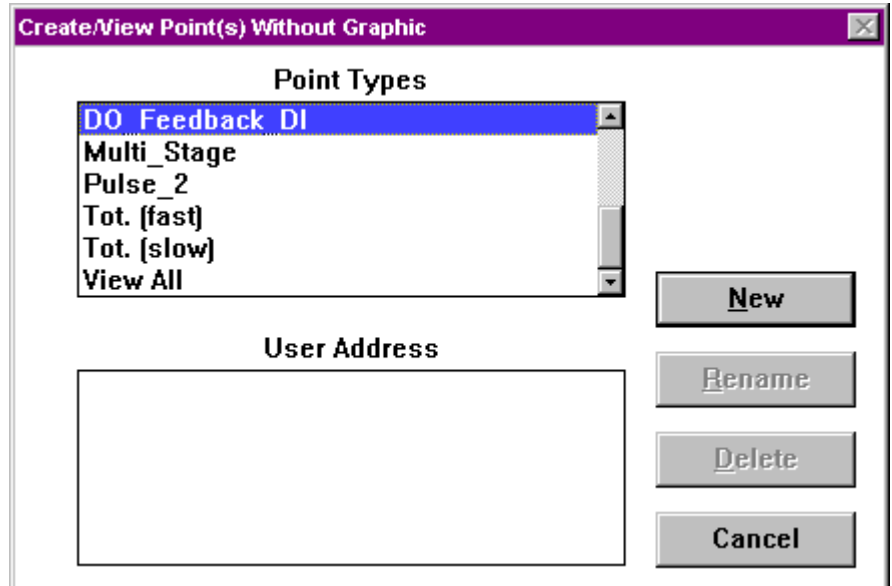
Points Without a Graphic

Purpose The "Point without graphic" function allows you to add points to a plant schematic even though no segment exists for the point.

A point without a graphic can be an input such as an occupancy sensor or a window switch.

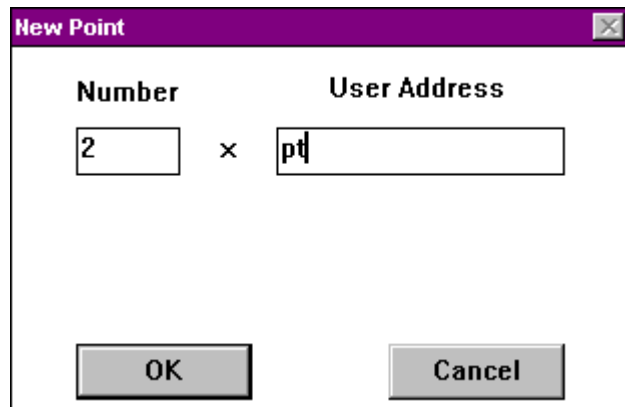
Procedure 1. Click Edit, then drop-down item Point without graphic. Or, press **F8**.

RESULT: The Create/View point(s) without graphic dialog box displays.



2. Select point type. Click **New**.

RESULT: The New Point dialog box displays.



This dialog box always contains the Number and User Address fields, but it may also display other fields depending on the type of point selected.

3. Enter the number of data points of this type to be established as a "Point without graphic" in the Number editing field. Tab to User address field.
4. Type a user address in the User address editing field. If you are adding more than one point, software automatically numbers the corresponding user addresses sequentially to guarantee unique user addresses. For example, if you enter pt and request two points, software creates two points named pt1 and pt 2. Only use alphabetic characters. Do not use blanks. The user address can be a maximum of 15 characters. Software adds an increment number to

the end of the user address you enter. If it creates an address greater than 18 characters, software truncates enough characters at the end of the name to reduce it to 15. For example, if you entered Room_one_space_tmp (18 characters) and wanted to make 20 points, software would create 20 points named Room_one_space_1 (15 characters plus the increment number) through Room_one_space_20.

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

If the dialog box contains With Switches and/or Pulsed check boxes, check appropriate choices as described in the following text.

The *With Switches check box* indicates whether or not the digital output is on a board with switches:

- If the digital output is on an XF524 board with hand/off/auto switches, the check box should have a checkmark.
- Otherwise, the check box should be empty.

Click the check box to change it from checked to blank and vice versa.

The *Pulsed check box* indicates whether or not the output is a momentary output. The duration of the output can be from 1 to 255 seconds. The following diagram illustrates pulse action:



Click the check box to change it from checked to blank and vice versa.

NOTE: Do not select Pulsed if you select With Switches.

You can set the duration of the output later using the Data Point Description Editor described in the Editors chapter.

5. Click **OK** to add the point(s) to the end of the plant schematic. Software always adds the points to the end.
6. Click **Cancel** to close the dialog box and return to the schematic.

Alternative Points Some plant types have a segment called POINTS that is simply a point. Selecting a POINTS segment allows you to place a point without a graphic anywhere in the schematic, rather than just at the end of the graphic as the Point without graphic function does.

Point Modification To change some default values for the points, use the Modify functions available under the Edit menu item. See the Physical Point Types and/or the Flex Points sections for more information about the types of modifications you can make.

Plant Information

Purpose Display and check plant information in case you need to make changes before continuing with the next CARE step.

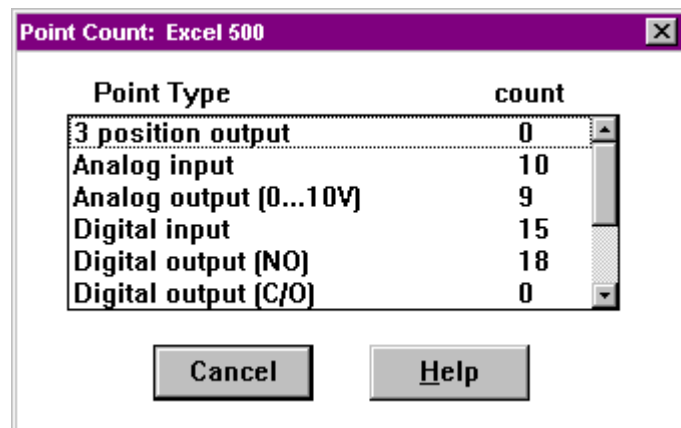
You can generate a point count for the controller, display assigned user addresses, list segment blocks, view additional text, and display controller input/output information.

Assumption This step assumes that you have already selected or created a plant and the CARE window has project name, plant name, and plant type as well as a menu bar with the Schematic menu item. See the Plants Definition and Management chapter for procedure.

Point Count

Procedure 1. Click View, then drop-down item Point count.

RESULT: The Point Count window displays with the type of controller in the title, the number of available inputs and outputs as well as the types of inputs and outputs. Example:



2. To close the Point Count window, click **Cancel**.

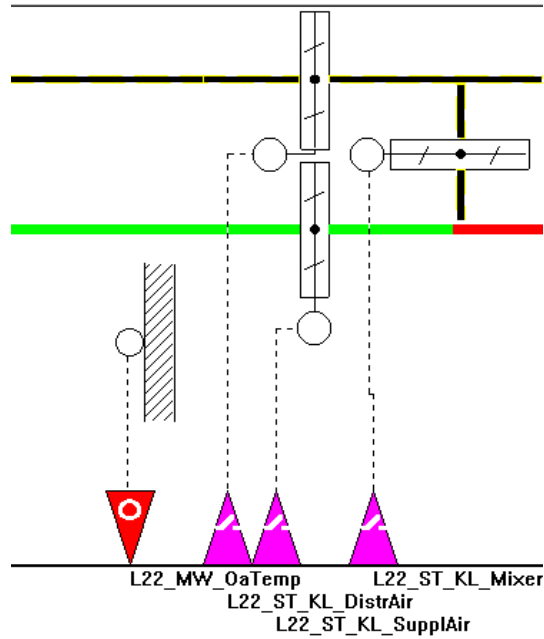
Or, click View again. Note that a check mark appears next to the Point count function to indicate that it is active. Click Point count to remove the check mark and stop the function.

RESULT: The Point Count window closes.

User Addresses

Procedure 1. Click View, then drop-down item User address.

RESULT: The user addresses of the selected plant display under the plant schematic.



The first letter of every user address is just below the plant schematic symbol for the input/output triangle to which the user address belongs.

2. To end this function, click View again. Note that a check mark appears next to the User address function to indicate that it is active. Click User address to remove the check mark and stop the function.

RESULT: The user addresses disappear from the screen.

Single User Address Display

If you move the cursor over a triangle and press and hold the left-hand mouse button down, the user address for the point displays. When you release the mouse button, the display disappears.

Segment Information

Purpose Display the list of components in a selected segment.

- Procedure**
1. Select the required segment from the plant schematic.

RESULT: Software frames the segment.

2. Click View, then drop-down item Segment list.

RESULT: The Segment list dialog box displays below the schematic.



3. To view the list of components for another segment, select the segment in the plant schematic.
4. To end this function, double-click the Ventilator icon in the upper left corner of the window.

Or, click View again. Note that a check mark appears next to the Segment list function to indicate that it is active. Click Segment list to remove the check mark and stop the function.

RESULT: The Segment list dialog box disappears from the screen.

Extra Text

- Purpose** Display additional information about a selected segment.
- Procedure**
1. Select the required segment from the plant schematic.
 RESULT: Software frames the segment.
 2. Click View, then drop-down item Extra text.
 RESULT: The Extra text dialog box displays below the schematic. For example, in the following dialog box, the extra text specifies the default sensor type.



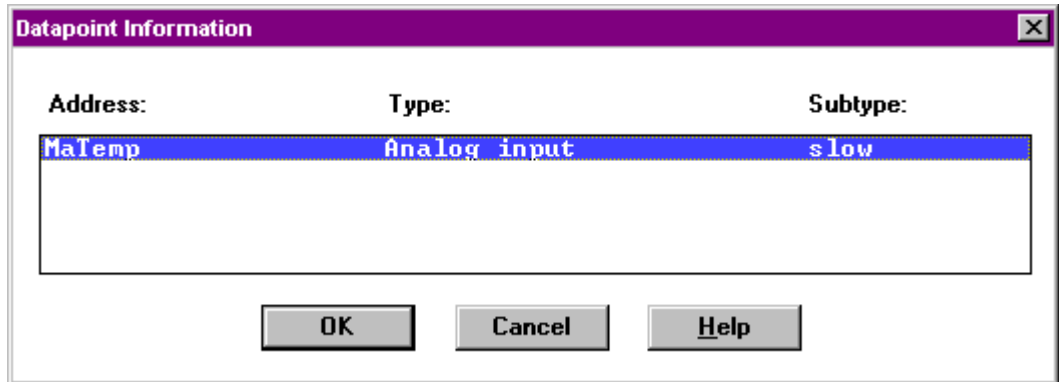
3. To view additional information for another segment, select the segment in the plant schematic.
4. To end this function, double-click the Ventilator icon in the upper left corner of the window.

Or, click View again. Note that a check mark appears next to the Extra text function to indicate that it is active. Click Extra text to remove the check mark and stop the function.

RESULT: The extra text disappears from the screen.

Controller Input/Output Information

- Purpose** Display information about controller inputs and outputs.
 The type of input or output you select displays. All user addresses assigned to these inputs or outputs display.
- Procedure**
1. Double-click desired input or output on the plant schematic.
 RESULT: The Datapoint information dialog box displays.



2. Click **OK** or **Cancel** to close the dialog box.

NOTE: Later when you set up control strategy and switching logic for the plant, you use this dialog box to specify which user address to tie to a function. The extra addresses for feedback points do not appear on the schematic, so you need this dialog box to find and select them.

Schematic Redraws

Purpose Redisplay the plant schematic on the screen so all recent changes appear.

Procedure Click Edit, then drop-down item Redraw Schematic. Or, press **F6**.

RESULT: Software redraws the plant schematic .

Print Plant Schematic

To print a plant schematic see Print Documentation chapter.

Schematic Function Exit

Purpose Close the Schematic function and return to the CARE main window.

Procedure Click File, then drop-down item End.

RESULT: The main CARE window displays.

CONTROL STRATEGY

NOTE: The Control Strategy chapter applies to CARE XL-5000 only.

Purpose The control strategy for a plant consists of control loops that monitor the environment and adjust equipment operation to maintain comfort levels. For example, a control loop for an air handling system can turn on a return air fan when discharge air temperature in the return air duct is greater than or equal to 68F (20 °C).

Control loops consist of a series of “control icons” that dictate a sequence of events. Control icons provide preprogrammed functions and algorithms to implement sequences of control in a plant schematic. Examples of control icons include a Proportional-Integral-Derivative (PID) function and a Maximize function. Appendix A lists the available control icons. Excel CARE Control Icons User Guide 74-5577 (US) / EN2B-0184 (Europe) provides complete descriptions and application examples for each control icon.

Control Strategy Capacities

- Each plant can have more than one control loop.
- Each controller can have a maximum of 128 control icons for all plants attached to the controller. In other words, if there are three plants, the total of control icons used by all three plants cannot exceed 128.
- Each controller can have a maximum of 40 PID control icons for all plants attached to the controller. In other words, if there are three plants, the total of PID control icons used by all three plants cannot exceed 40.
- Free programming and XFMs must not be used together in one and the same control loop.

Incomplete Loop Warning

If you exit the Control Strategy function with incomplete control loops, you cannot attach or translate the plant.

Chapter Contents

Control Strategy Window

Control Loop Selection (New Control Loops or Existing Control Loops)

Control Loop Functions, including:

- Select and Place a Control Icon
- Connect Control Icons to Plant
- Connect Two Control Icons
- Examples
- Delete a Control Icon and Its Connections
- Delete a Completed Connection
- Delete an Incomplete Connection

Pseudopoints and Flags, including:

- Create/Assign New Pseudopoints and Flags
- Load/Assign Pseudopoints and Flags
- Search for Pseudopoints and Flags via Keyboard
- Modify Pseudopoint and Flag User Address
- Delete Pseudopoints and Flags
- Connect a Pseudopoint or Flag to a Control Loop
- Change a Pseudopoint or Flag User Address

XFMs, including:

- Map Software Point to XFM Parameter
- Map Software Point to an XFM Internal Datapoint
- Create User Address of the Same Name and Map to XFM Internal Datapoint
- Unmap Mapped Software Point from an XFM Parameter
- Modify XFM Parameter

Plant Information Displays

- Loop Management Functions, including:

- Copy a Control Loop
- Delete a Control Loop
- Check a Control Loop
- Print a Control Loop
- Control Strategy Exit

See Also ⇒ Getting Started chapter for procedures to start and exit CARE

Plant Schematics chapter for procedures to create and/or modify a plant schematic

File Management chapter for procedures to back up and restore plant files

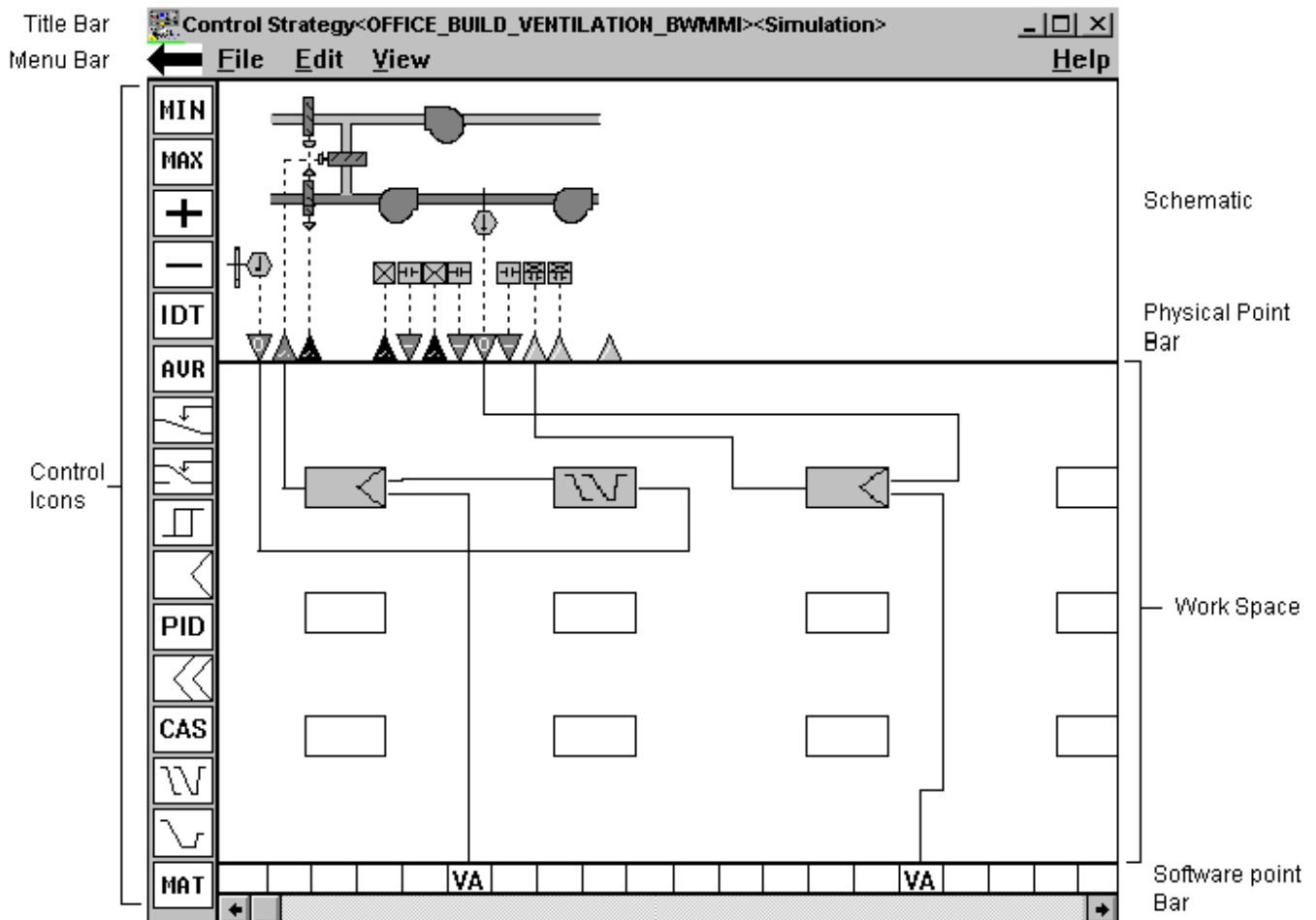
Control Strategy Window

Purpose Provide standard control functions for analog points in the plant schematic.

Assumption The plant schematic is done.

- Procedure**
1. In the logical plant tree, click on the plant.
 2. Click menu item Plant, then drop-down item Control Strategy. Or click the Control Strategy button in the button bar below the menu bar.

RESULT: The control strategy workspace displays. The following example shows the workspace with a control loop that has two PID operators and a Sequence operator connected to physical points and a pseudopoint.



Title Bar	Plant name (in this case, ah1) displays in the window title bar. To the right is a pair of brackets where the control loop name appears. The brackets are empty until you select or define a loop (menu item File, drop-down item New or Open).
Menu Bar	The left arrow and View menu items are only available after you define or select a control loop.
Left arrow	Change control icon column to show other control choices.
File	<p>New... Create a new control loop.</p> <p>Load... Add an existing control loop to the plant.</p> <p>Copy... Copy selected control loop and give it a new name.</p> <p>Delete... Delete unnecessary loop.</p> <p>Check loop... Verify control loop operation.</p> <p>Print with Schematic Output a print of the current control loop with schematic Print with User Address Output a print of the current control loop with user addresses.</p> <p>Exit Stop control strategy function and return to main window.</p> <p>Information... Copyright and program authors.</p>
Edit	<p>Modify Pseudo User Address Change the user address for a selected pseudopoint.</p> <p>Delete Symbol Erase the currently selected control icon and all its connections.</p> <p>Connect Symbol... Display the icon dialog box for the currently selected symbol.</p> <p>Symbol Parameters... Display the parameters dialog box for the currently selected symbol.</p> <p>Load Software Points... If pseudopoints are defined in the switching logic chapter for inclusion in the plant control strategy, you must load them into the control strategy. The pseudopoints and Flags section explains how to use this function.</p> <p>Delete Unused SW Points... Display the unused software points window for a list of unused software points. You can delete one or more, if desired. See the Unused Software Points note for details.</p>
View	Display physical user addresses or pseudopoint user addresses.

Help Display topic list for on-line user guide. The Getting Started chapter describes the help function.

Plant Schematic This area displays the schematic created via the Schematic function.

Physical Point Bar This area displays the physical points required for the schematic.
 If you move the cursor over a triangle and press and hold the left-hand mouse button down, the user address for the point displays with either a red exclamation symbol or a green check mark symbol. When you release the mouse button, the display disappears. The red exclamation symbol appears for:

- hardware points with one allowable connection that are used in an XFM
- digital outputs that are connected to a symbol
- flex points that are connected to a symbol
- software points that are connected to an output pin of a symbol.

Once you display a physical address, you must “clear” the display mode before you can display an address in the other point bar. To clear display mode, click the triangle again, but this time with the right-hand mouse button.

If you double-click a triangle, the Datapoint information window displays for the point.

Work Space This area is where you place control icons after you select them. You can assign a control icon to each rectangle. You can connect the rectangles to each other, to physical points, and to pseudomonas.

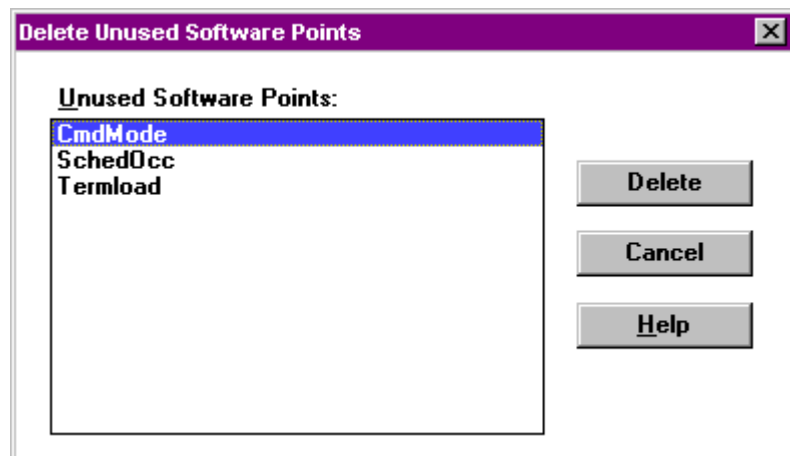
Softwarepoint Bar Display abbreviations for pseudopoints related to the control loop. These abbreviations appear after you add a pseudopoint to the control loop.

If you move the cursor over an abbreviation and press and hold the left-hand mouse button down, the user address for the point displays with either a red exclamation symbol or a green check mark symbol. When you release the mouse button, the display disappears.

The red exclamation symbol appears for software points that are connected to an output pin of a symbol.

Control Icons Standard control functions available for assignment to the plant schematic. Appendix A lists the available control icons. Excel CARE Control Icons User Guide 74-5577 (US) / EN2B-0184 (Europe) provides complete descriptions and application examples for each control icon. This section describes how to place and connect them.

Unused Software Points To delete unused software points, in other words, points which are not connected to a control strategy symbol in the plant schematic, select menu item Edit, then drop-down item Delete Unused SW Points.. The Delete Unused Software Points dialog box displays with a list of those points and an option to delete them, if desired. For example:



Click the points you want to delete (hold down the **Shift** key while you click to select multiple points). Then click **Delete** for software to delete these unused points. (The **Delete** key is not active until you select at least one point.)

Click **Continue** to close the dialog box. Points that you did not delete remain in the plant. Points assigned to the software bar but not connected become unassigned.

Control Loop Selection

Purpose Name a control loop. You must define a name for a loop or select an existing loop before you can select any control icons.

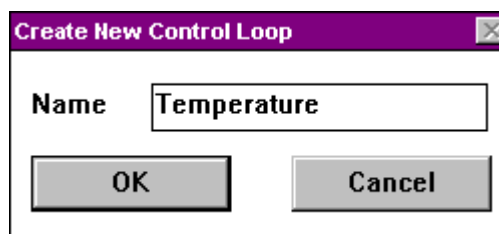
There are two ways to name a loop. You can name a new loop and begin from scratch. Or, you can load an existing control loop and modify as required.

New Control Loops

Purpose Name a new control sequence for the selected plant.

Procedure

1. Click File, then drop-down item New.
RESULT: The Create new control loop dialog box displays.



2. Type a new control loop name in the Name editing field.
3. Click **OK**.
Or, to close the dialog box without creating a loop, click **Cancel**.

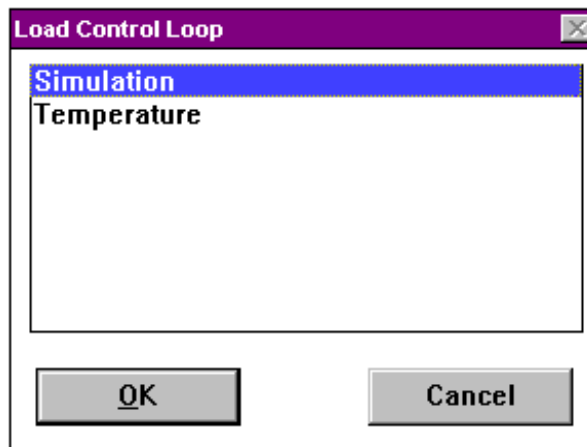
RESULT: The control loop name displays, in brackets, next to the plant name on the window title. You can now select the control icons down the left hand window border. The Control Loops section provides procedures.

Existing Control Loops

Purpose Use an existing control loop to speed creation of control functions for a plant.

Procedure

1. Click File, then drop-down item Load.
RESULT: The Load control loop dialog box displays.



2. Select the control loop to be modified from the list of existing control loops.

3. Click **OK**.

Or, to not load the loop, click **Cancel**.

RESULT: The control loop name displays to the right of the plant name on the window title bar. The loop icons display in the work space. You can now modify the control loop as required. The next section, Control Loop Functions, provides procedures.

Control Loop Functions

Purpose Build or modify a control loop by adding and deleting control icons and connecting them together and with physical points and pseudopoints.

This section contains the following procedures:

- Select and Place a Control Icon
- Connect Control Icons to the Plant
- Connect Two Control Icons
- Examples (sample control loops with clear and confusing connections)
- Delete a Control Icon and its Connections
- Delete a Completed Connection
- Delete an Incomplete Connection

Select and Place a Control Icon

Procedure 1. Click a control icon symbol in the icon column.

RESULT: The mouse cursor assumes the shape of the control icon.

Tip ⇒ If you do not see the required control icon in the icon column, click the left arrow, ←, in the menu bar. The column changes to show other available icons.

2. Click a free rectangle in the control strategy work space to place the control icon in the rectangle. See the Examples section for guidelines.

RESULT: Software places the symbol in the rectangle and changes its color to red. It also places a thick gray bar around it to indicate it is the currently selected icon.

Software may then display a dialog box that asks for “internal parameter” information relevant to the control icon. For example, the PID icon asks for proportional band, derivative time, integral action, minimum output, and maximum output.

Tip ⇒ To cancel selection of an icon that you have not yet placed, click the right-hand mouse button.

3. If an internal parameters dialog box displays, type or select information as required. Excel CARE Control Icons User Guide 74-5577 (US) / EN2B-0184 (Europe) provides complete descriptions and application examples for each control icon.

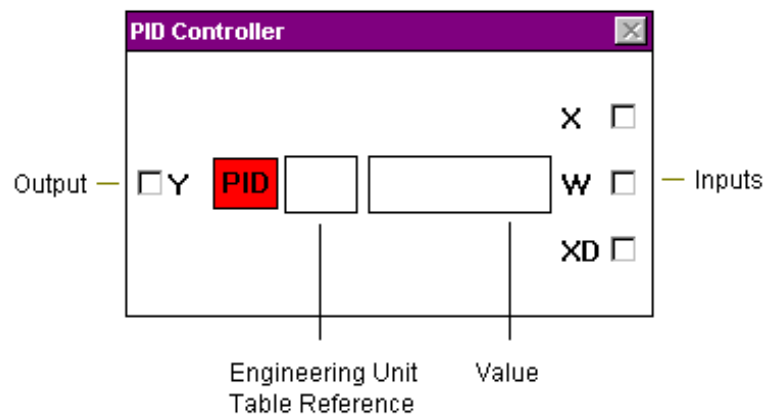
Click **OK** to save the information and close the dialog box.

Or, click **Cancel** to close the dialog box without saving the information.

Tip ⇒ To redisplay an internal parameters dialog box, click the right-hand mouse button when the cursor is over the desired icon. Or, click menu item Edit, drop-down item Symbol parameters. The parameters dialog box displays for the currently selected icon (a gray box surrounds a selected icon).

4. Connect the icon to required inputs and outputs. Double-click the icon (left-hand mouse button) to display an input/output dialog box that requests required variables. The dialog box always shows output variables on the left, the control icon in red, and input variables on the right.

For example, the PID icon displays the following dialog box:



The Y, X, and W variables need connection to either physical points, pseudopoints, and/or other control icons. Variables on the left (Y in this case) are outputs. Variables on the right (X and W in this case) are inputs. The PID description in Excel CARE Control Icons User Guide 74-5577 (US) / EN2B-0184 (Europe) defines the type of connection that is valid for each variable.

The two blank rectangles in the dialog box are editing fields where you can enter values to replace the physical connections. For example, in the PID dialog box, you can type an engineering unit table reference and value for the W variable, instead of connecting W to a point or control icon. For engineering unit, enter the corresponding index number. Appendix B lists engineering units and their index numbers.

If a variable does not have editing fields next to it, you cannot type values for a connection; you must connect to another icon or a point.

The following sections describe how to connect the variables.

Connect Control Icons to Plant

Purpose Make connections between control icons and the plant.

You can connect control icons to:

- Physical points (each physical output point can connect to only one icon)
- Pseudopoints
- Flags
- Other control icons

See the Pseudopoints and Flags section for procedures to create and load pseudopoints and flags. The section also defines these items.

Procedure

The steps required depend on the type of control icon you select. Each type has a different set of inputs and outputs. Excel CARE Control Icons User Guide 74-5577 (US) / EN2B-0184 (Europe) describes the requirements for each icon.

The following steps summarize typical operations that connect an icon to a plant via points.

1. Select and place desired control icons in the control strategy work space. See the previous section, Select and Place Control Icons, for procedure and tips.

RESULT: Icon symbols in the work space are red to indicate that they do not yet have connections to required inputs and outputs. A thick gray box surrounds the currently selected icon.

2. Click the arrow head of a point that is either an input to or output from one of the control icons.

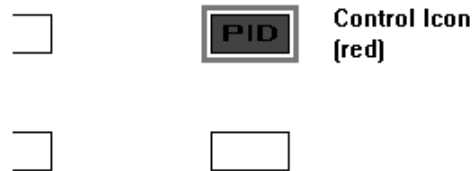
NOTE: Each physical output point can connect to only one icon.

Feedback

Points

If the schematic has feedback points that you want to connect to control icons, *double-click* the digital output point to access these hidden points and their user addresses.

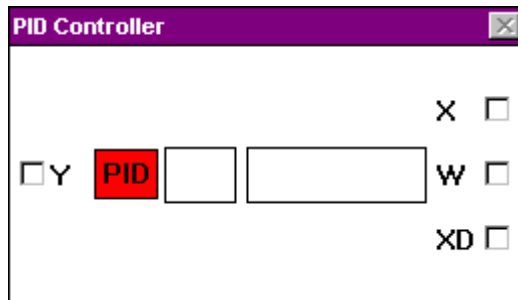
RESULT: The arrow head turns black.



3. Double-click the desired control icon in the work space. Or, if the desired control icon is the currently selected icon (a gray box surrounds it), click menu item Edit, then drop-down item Connect symbol.

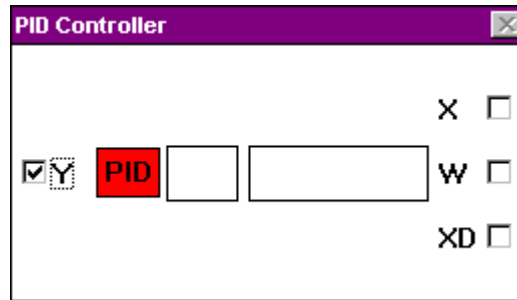
RESULT: The control icon input/output dialog box that lists requirements for inputs and outputs displays.

For example, the PID dialog box prompts for Y, X, and W:



4. Click the input/output type that corresponds to the point you selected.

RESULT: A check mark appears in the check box to indicate its selection. For example, if you click the Y variable in the PID dialog box:



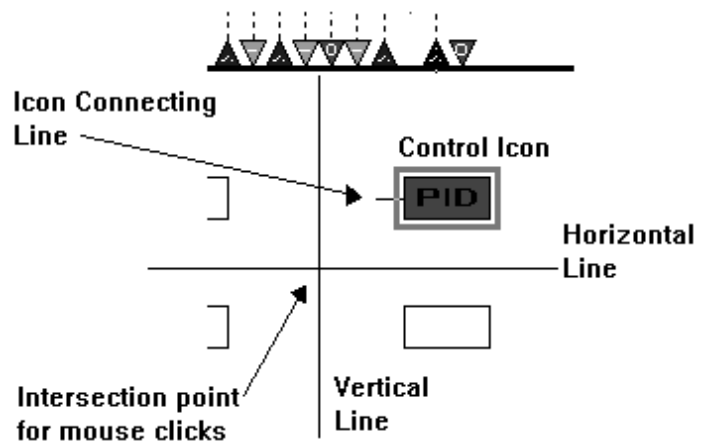
No checkmark If a checkmark does not appear, you do not have the appropriate point type for the variable. Close the dialog box and select a different point.

Tip ⇒ To close the dialog box without selecting a variable, click the icon symbol in the dialog box.

5. Click the control icon symbol *in the dialog box*.

RESULT: a. The dialog box closes.
 b. The active control icon changes color to dark blue.
 c. Software adds a short connecting line next to the icon on the left (outputs are always on the left).
 d. Two lines appear in the work space. One line is vertical; one is horizontal. Where they intersect each other is the focus point for mouse clicks. You can move these lines by moving the mouse:

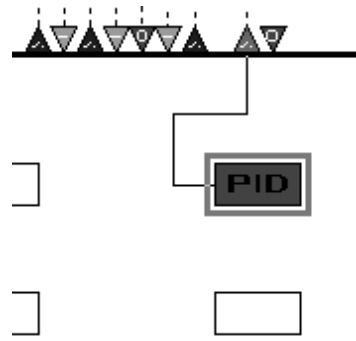
- When you move the mouse left or right, the vertical line moves left or right.
- When you move the mouse up or down, the horizontal line moves up or down.



If these actions do not occur, the point you selected was not appropriate for the variable you selected in the icon dialog box. Select a different point arrow head or double-click the icon again and select a different variable.

6. Move and click the intersection point to create connecting lines. See the Routing Connecting Lines note for details. Move the intersection point over the point arrow head until a cross, +, appears. Click the left-hand mouse button to complete the connection.

RESULT: Software connects the point and icon. (If it doesn't, see the No Connection note following this procedure.)



7. Repeat this sequence with the other inputs and outputs the control icon requires.

RESULT: After all connections are done, the control icon changes color to light blue to indicate that the loop is completely connected.

Routing Connecting Lines

Connecting lines sometimes pass through other control icons or cross other connecting lines. This may make the control strategy confusing.

To route connecting lines around icons:

- a. Move the intersection point to just before an icon and click.

RESULT: Software creates a line just that long.

- b. Move the intersection point down below the icon and click again.

RESULT: Software creates another connecting line.

- c. Move the intersection point past the icon and click again to create another short line.

Every time you click, software creates a line. By moving the intersection point around other icons and clicking at the angles, you can avoid crossing other icons and lines.

Also see the Examples section for more tips on creating connections.

No Connection

If you click new points before software has a chance to create a connecting line, software may not be able to make the final connection when you reach the point arrow head. To prevent this, wait after you click until a gray-colored line appears. Then, move the intersection point to another point and click.

Also, make sure you line up the intersecting line and the last red line before you click again. Otherwise, software cannot create the next line.

If you are in a situation where software is not making the final connection, delete all lines that you made for this connection and start over again.

No Diagonals

Connections can only run vertically or horizontally. They cannot run diagonally.

Connect Two Control Icons

Purpose

Connect several control icons together so that the output from one icon is an input to the second.

Procedure

1. Select the first control icon and place it in the work space.
2. Select a second control icon and place it in the work space.
3. Double-click each icon, in turn, from left to right, to display their input/output dialog boxes.

4. Select a variable from each box. One variable should be an output; the other, an input.
5. Click the icon symbol *in the dialog box* on the left to close both dialog boxes.
 RESULT: The icon on the left displays with a short connecting line. The intersection lines display.
6. Move the intersection point over the left edge of the icon on the right.
7. Click to make the connection.

Example

To connect the output of an Add icon with one of the PID controller inputs:

1. Place the PID controller icon in the work space.
2. Place the Add icon in the work space to the right of the PID controller icon.
3. Double-click the PID controller icon.
 RESULT: The PID controller icon input/output dialog box displays.
4. Double-click the Add icon.
 RESULT: The Add icon dialog box displays.
5. Click the Y check box in the Add icon dialog box.
 RESULT: A check mark appears in the check box.
6. Click the X check box in the PID controller dialog box.
 RESULT: A check mark appears in the check box.
7. Click the red PID controller icon in the PID controller dialog box.
 RESULT: Both dialog boxes close. Both icons in the work space turn dark blue. A short connecting line appears on the right side of the PID icon. The intersection lines appear in the work space.
8. Place the intersection point on the Add icon. Move the mouse so the horizontal line overlaps the short connecting line from the PID icon.
9. Click to complete the connection.
 RESULT: Both control icons turn red and a line connects the two icons.

Dialog Box Closing

In general, dialog boxes close when you select the icon symbol *in the dialog box* on the left.

Multiple Inputs

An output from a control icon can connect to many inputs of other control icons. For example, continually click the YD check box of the digital output until it turns gray. Make the connection as described in this procedure.

Examples

Plan the placement of control icons and pseudopoints so you can make necessary connections clearly. This section presents examples of good connections and confusing connections.

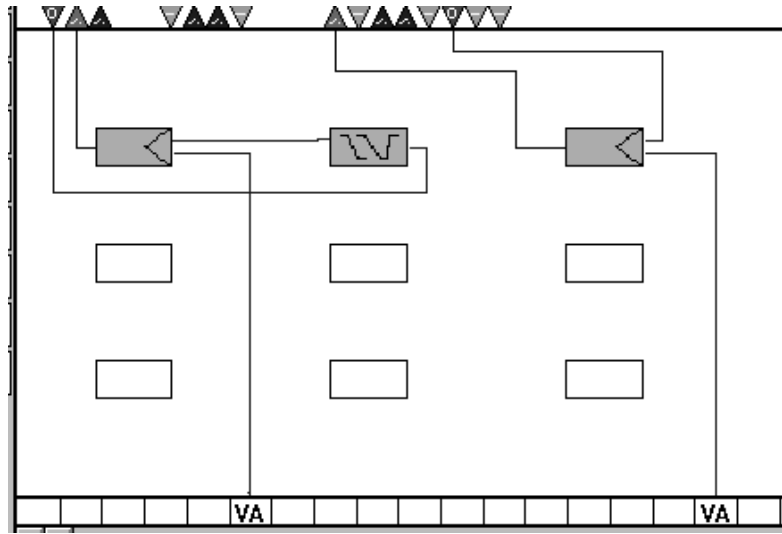
Placement Tips

Position control icons just below their related equipment. It helps if output points or icons are to the left of the control icon and input points or icons are to the right of the control icon.

Make connections to physical and pseudopoints as you place control icons. If you place all the icons first, and then try to make connections, you may need to reposition some icons to make less confusing connections.

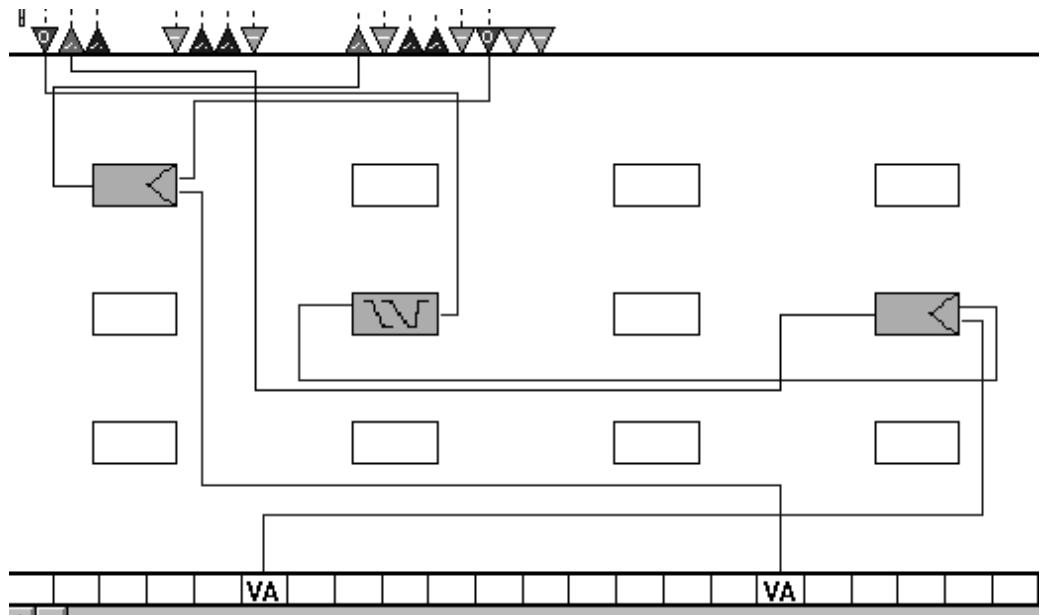
Example with Clear Connections

The following diagram includes three control icons with connections to physical points, pseudopoints, and each other. Note that the connection lines cross a minimum amount of times so that the control strategy is easy to read.



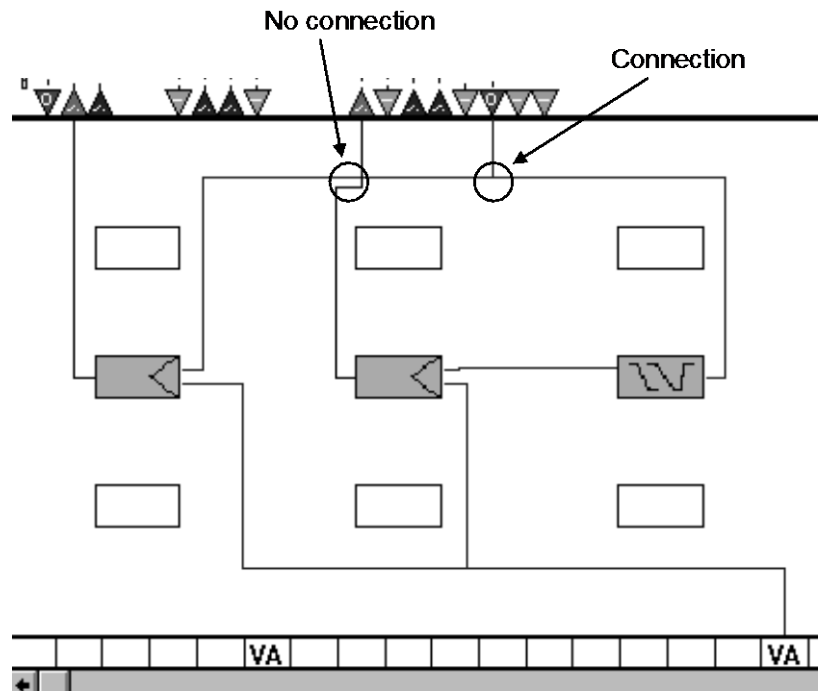
Example with Confusing Connections

The following diagram has the same three icons and points as the previous example, but because of the placement of the icons and connections, it is very confusing.



How to Cross Lines

The following example presents a method of crossing lines that do not connect so that it is obvious that they do not connect. The idea is to draw lines next to each other for a short distance instead of directly crossing the lines.



Delete a Control Icon and its Connections

Procedure

1. Click the icon you want to delete to select it (if not already selected).

RESULT: a gray box surrounds the currently selected icon.

2. Click Edit, then drop-down item Delete symbol.
Or, hold down **Ctrl** key and press **Delete** key.

RESULT: A Question dialog box displays that asks "Delete Symbol: Are you sure?"

3. Click **Yes** to delete, or **No** to cancel the operation.

RESULT: If you click **Yes**, software deletes the control icon with all its connections.

Delete a Completed Connection

Procedure

1. Double-click the control icon in the work space that has the connection to be deleted.
Or, if the icon is the currently selected icon (a gray box surrounds it), click menu item Edit, drop-down item Connect symbol.

RESULT: The related input/output dialog box displays.

2. Click the check box to which the connection was made until the check mark disappears and the box is white.
3. Click the red control icon in the control icon dialog box.

RESULT: Software deletes the connection and closes the dialog box.

Delete an Incomplete Connection

1. Place the intersection point on the end point of a connection that is not yet complete.

2. Click the right-hand mouse button once.

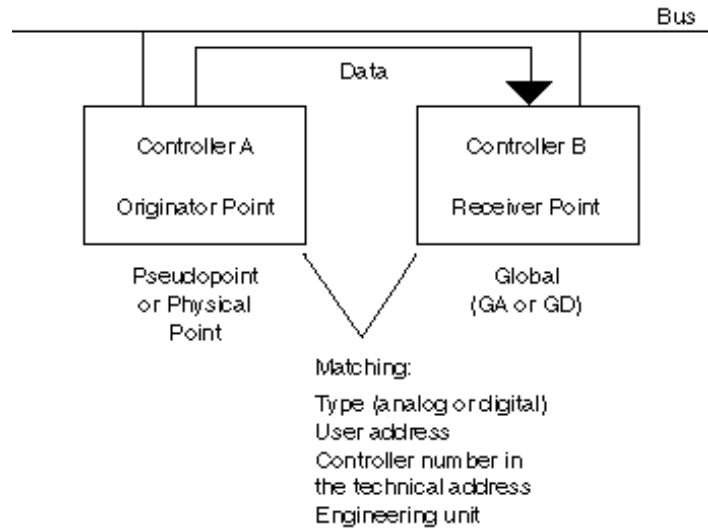
RESULT: Software deletes the connection.

Each time you click the right-hand mouse button, software deletes a further connection. You do not have to move the mouse.

The control icon turns red.

Pseudopoints and Flags

Definition	Pseudopoints and flags have no physical basis and, therefore, no technical address. CARE calculates the value of a pseudopoint. You assign a user address to a pseudopoint to be able to use and display them like physical points. The difference between physical points and pseudopoints is that pseudopoints do not have a technical address.
Example	The calculated flow temperature setpoint of a heating plant is a pseudopoint.
Types	<p>There are seven types of pseudopoints and flags:</p> <ul style="list-style-type: none"> • VA for Pseudo analog • VD for Pseudo digital • VT for Pseudo totalizer • GA for Global analog • GD for Global digital • FA for Flag analog • FD for Flag digital <p>Pseudopoints can be analog, digital, or totalizer. They represent calculated values within the controller. Flags can be analog or digital and represent z-registers within the RACL application program.</p>
Limitations	<p>Each controller can have a maximum of 256 pseudopoints. Three digital pseudopoints are reserved (STARTUP, SHUTDOWN, and EXECUTING_STOPPED), leaving 253 free for user assignment. The max limits changed for controller OS > 2.03 to 253 + 3 internal.</p> <p>There is no maximum number for flags.</p>
Globals	<p>Global points are a type of pseudopoint (GA or GD) that can be either an input or output. The purpose of global points is to share point information across controllers on a bus.</p> <p>Global inputs receive information from a point in another controller. Use a global input when one controller has a point that should be global to many other controllers.</p> <p>Global outputs send information to other points in other controllers. Use a global output when one controller has a point that is global to only one point in another controller. You can also use global outputs for some control icons that only connect to outputs and the output must be global. Global outputs can only be associated with pseudopoints or output points (not input points).</p>
Centrals Note	Central PCs such as the Excel Building Supervisor (XBS) and Excel Building Supervisor-Integrated (XBS-i) only read global originator points. The values of global receiver points are only available via the B port of the controller.
Global Inputs	Each global input is associated with a pseudopoint or physical point (originator point) somewhere on the bus and has the same user address, controller number in the technical address, engineering unit, and type (analog or digital) as the point. The originator point cannot be a global point. The technical address for a pseudopoint is 99.99.



You select the correct type and enter the correct user address when you create the global point. To set the appropriate controller number in the technical address and the engineering unit, use the Data Point Description Editor described in the Editors chapter in this manual. You can edit point data after you attach the plant.

Global Input Point Operation

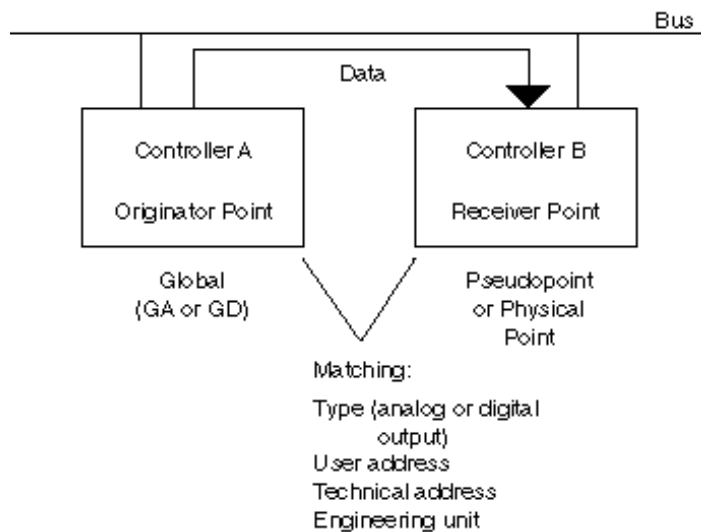
The system updates global inputs every 2 minutes. It also updates global analog inputs when the originator point changes significantly. If the point value is greater than 20, the change must be at least 1 percent. If the point value is less than or equal to 20, the change must be at least .2 units. For example:

Point Value	Change
100	1
200	2
50	.5
10	.2
5	.2

For global digital points, a change of state triggers an update.

Global Outputs

Each global output is associated with a pseudopoint or physical point (“receiver” point) somewhere on the bus and has the same user address, technical address, engineering unit, and type (analog or digital output) as the point. The technical address for a pseudopoint is 99.99.



You select the correct type and enter the correct user address when you create the global point (next section, New Pseudopoints and Flags). To set the appropriate technical address, output type, and engineering unit, use the Data Point Description Editor described in the Editors chapter in this manual. You can edit point data after you attach the plant.

To use a physical point as the originator, use the IDT icon to convert the physical point value to a global point (GA or GD).

Global Output Point Operation

The system updates the receiver points when the global analog outputs change significantly. If global value is greater than 20, the change must be at least 1 percent. If global value is less than or equal to 20, the change must be at least .2 units. For example:

Global Value	Change
100	1
200	2
50	.5
10	.2
5	.2

For global digital points, a change of state triggers an update. There is no automatic 2-minute refresh for global output points.

Flags *Flags* are pseudopoints that only appear in the CARE work space. They are not accessible later through the Datapoint Editor and any other operator terminal but through Live CARE.

Deletions Software displays a message that it will delete pseudopoints and flags that are not required when the plant is assigned to a controller (Attach Controller function). You can accept or reject the deletion. In addition, you can use the Delete unused software points function under the Edit menu item in Control Strategy to delete flags.

Special Pseudopoints There are three special pseudopoints, STARTUP, SHUTDOWN, and EXECUTING_STOPPED, that CARE automatically attaches to each EXCEL 5000 controller. Each point has an engineering unit of Normal/Alarm. Following is a description of each point. You can use the Data Point Editor to enhance these points. For example, by making the STARTUP point an alarm point and changing the active/passive flag, the point will go into alarm, if the application program stops.

NOTE: The following descriptions assume the controller application is both the time schedules and the RACL code.

STARTUP has a value of 1 (alarm) when the controller application is running and a value of 0 (normal) when the application is not running. When a database is downloaded to the controller, the application attempts to start. If there are fatal CPU errors, the application does not run. If there is a power failure and the battery maintains the application in memory, the application again attempts to restart. You can use the Stop Application function in XBS or XI584 to set this point to a zero value. You can use the Start Application function in XBS or XI584 to attempt to restart the application.

SHUTDOWN has a value of 0 (normal) when the controller application is running and a value of 1 (alarm) when the controller application is not running. The only way to get this point set to 1 (other than manually fixing it) is to use the Stop Application function in XBS or XI584. If RACL software stops this point, the point remains set to zero.

EXECUTING_STOPPED has a value of 0 (normal) when the RACL program in the controller is running and a value of 1 (alarm) when RACL has stopped. If the controller detects an error condition that will cause RACL to halt (such as a disabled point), software sets the point to a value of 1. If you manually fix this point to a value of 1, RACL execution halts and all outputs are frozen at their last value. You cannot restart RACL by fixing this point back to zero or by putting it in the automatic mode.

You can only restart RACL with a power reset or by using the Start Application function in XBS or XI584.

A typical application of the STARTUP point is to stage loads when the controller application program first starts. For example, if the RACL program in the controller calls for three large chiller plants to be on after the first cycle when the controller starts, you can use the STARTUP point in a switching table to delay the outputs with different times to keep from starting all three chillers at exactly the same time.

Section Contents

This section includes:

- General Steps
- Create New Pseudopoints and Flags
- Load/Assign Pseudopoints and Flags
- Search for Pseudopoints and Flags via Keyboard
- Modify Pseudopoint and Flag User Address
- Delete Pseudopoints and Flags
- Connect a Pseudopoint or Flag to a Control Loop
- Change a Pseudopoint or Flag User Address

General Steps

Working with pseudopoints and flags generally includes the following actions:

- Create a new pseudopoint/flag or load pseudopoints/flags
- Assign the created pseudopoint/flag to the software bar
- Connect the pseudopoint/flag to a control strategy symbol

Refer to the following sections for detailed descriptions.

Software Points Behavior on Software Bar

Existing pseudopoints/flags can be unassigned or assigned to the software point bar. Assigned pseudopoints/flags appear with their point type abbreviations on the software bar. Unassigned points can be accessed from a list (see following sections). Assigned pseudopoints/flags should be connected to control strategy symbols. Only assigned pseudopoints/flags can be connected to control strategy symbols. After connection they are "used".

Points are used when they are:

- connected to control icons
- used as internal points of XFM's
- mapped to XFM parameters
- contained in switching tables
- referenced in time programs

Unassigned pseudopoints/flags that are not used in the application are "unused" software points. Unused software points can be deleted, used points cannot.

CARE automatically updates the software bar. It removes all points from the software bar that are not connected to a control strategy symbol.

NOTE: The points are not deleted. They can still be accessed from a list via the Edit/Load Software Points command.

The software bar will be automatically updated when:

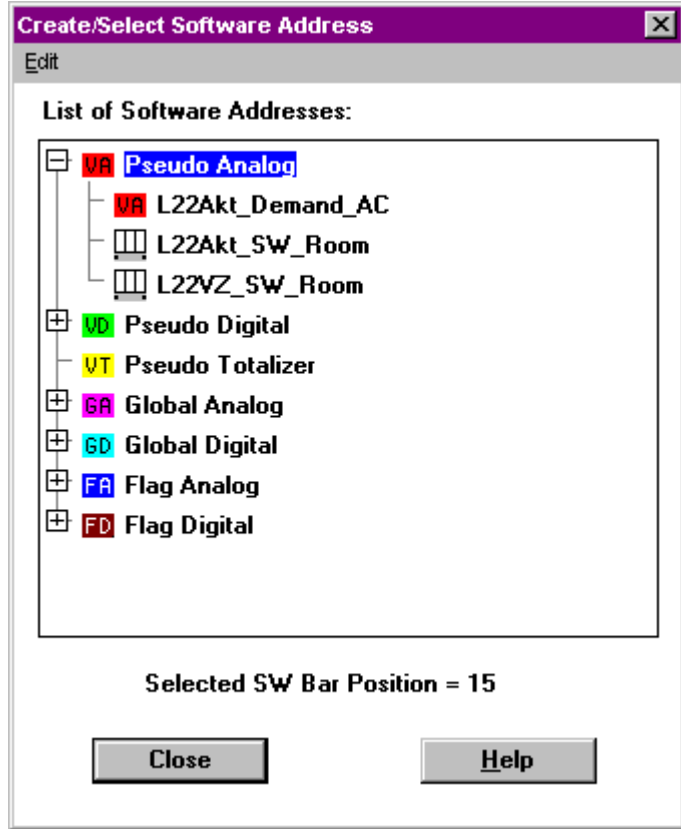
- creating a control loop
- loading a control loop
- deleting a control loop
- deleting a control strategy symbol
- opening and closing the Delete Unused Software Points dialog box even if no software point was deleted.

Create/Assign New Pseudopoints and Flags

Purpose Create a new pseudopoint/flag and assign it to the software bar.

Procedure 1. Click on a free position in the software point bar where you want to place the new pseudopoint/flag. Locate it near the relevant control icon(s).

RESULT: The Create/Select Software Address dialog box displays.



The selected software bar position is displayed at the bottom line of the dialog box. The list displays all existing pseudopoints/flags including unassigned, assigned and connected, assigned and unconnected pseudopoints/flags. Unassigned and assigned points/flags can be distinguished by the following symbols:



Assigned points: Pseudopoints/flags that reside on the software bar.



Unassigned pseudopoints/flags or points in switching tables in folder color with point abbreviation.



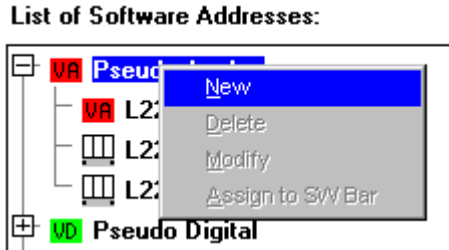
Unassigned software points mapped to internal datapoints of XFM.



Unassigned software points mapped to XFM parameters.

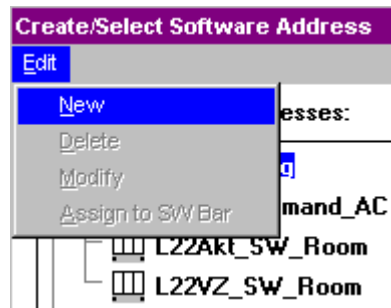
Each pseudopoint/flag type has its own colored folder, which can be empty or contain already created pseudopoints/flags. Folders can be opened by clicking on the + symbol.

2. Click the desired pseudopoint/flag folder or any existing pseudopoint/flag in the open folder.
3. Click right mouse button, and with left mouse button click **New** in the context menu,

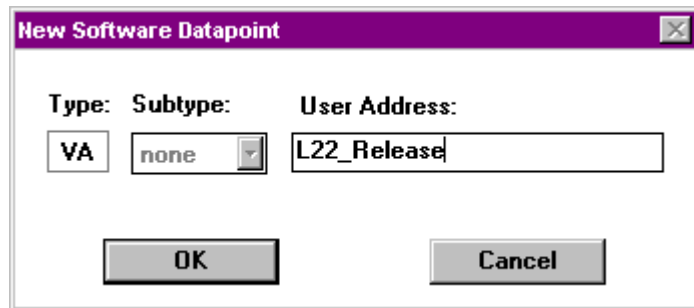


or

click menu item **Edit**, then drop-down item **New**.



RESULT: The New Software Datapoint dialog box displays.



4. Select a point subtype in the Subtype drop-down list box (if available and desired).
5. Enter a user address in the User Address field.

User addresses must include one non-digit character and cannot include tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

If you are creating a global point, enter a user address that matches the pseudopoint or physical point that you want to associate with the global. Also, select the type (analog [GA] or digital [GD]) that matches.

6. Click **OK**.

RESULT: The pseudopoint/flag is automatically assigned to the software point bar and is shown with its abbreviation as follows:

- VA for Pseudo analog
- VD for Pseudo digital
- VT for Pseudo totalizer
- GA for Global analog
- GD for Global digital
- FA for Flag analog
- FD for Flag digital

7. To connect a pseudopoint/flag to a control strategy symbol, see Connect a Pseudopoint or Flag to a Control Loop section.

NOTE: Assigned pseudopoints/flags that are not connected to any control strategy symbol become unassigned points when one of the following is done:

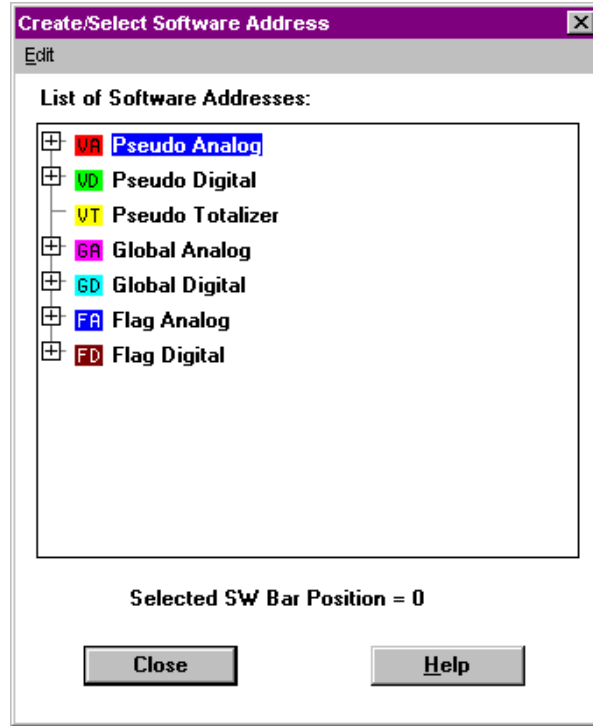
- creating a control loop
- loading a control loop
- deleting a control loop
- deleting a control strategy symbol
- opening and closing the Delete Unused Software Points dialog box even if no software point was deleted.

8. For creating further pseudopoints/flags, click on the desired position in the software bar where the next point is to be created and repeat steps 2 through 6.

NOTE: If you do not select a software point bar position, the pseudopoint/flag is created as unassigned pseudopoint/flag and has to be assigned to the software point bar using the **Assign to SW Bar** command separately (see Load/Assign Pseudopoints and Flags section).

Load/Assign Pseudopoints and Flags

- | | |
|------------------|--|
| Purpose | Load existing pseudopoints or flags created via the switching logic function or from other plants, and assign them to the software bar. |
| Procedure | <ol style="list-style-type: none"> 1. Load a control loop (menu item File, drop-down item Load). 2. Open the Create/Select Software Address dialog box by clicking either on the position in the software point bar where you want to place the pseudopoint/flag or by selecting menu item Edit, then drop-down item Load Software Points. |

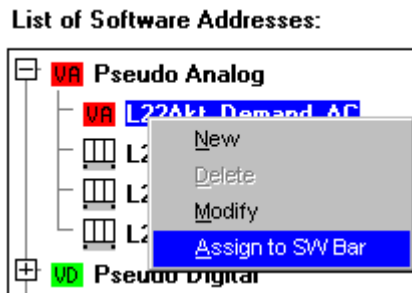


3. Open the pseudopoint/flag folder, and click the pseudopoint/flag you want to assign to the software bar.
4. Select a position on the software bar by clicking left mouse button.

RESULT: The selected software bar position is shown at the bottom line of the dialog box.

NOTE: If you do not select a position on the software bar before assigning the point, CARE will ask you to select a position after step 5.

5. Click right mouse button, and with left mouse button click **Assign to SW Bar** in the context menu, or



click menu item **Edit**, then drop-down item **Assign to SW Bar**.

RESULT: The pseudopoint/flag is assigned to the software bar and its abbreviation appears as follows:

- VA for Pseudo analog
- VD for Pseudo digital
- VT for Pseudo totalizer
- GA for Global analog
- GD for Global digital
- FA for Flag analog
- FD for Flag digital

In the Create/Select Software Address dialog box the pseudopoint/flag gets the assigned symbol at the user address name.



6. To connect a pseudopoint/flag to a control strategy symbol, see Connect a Pseudopoint or Flag to a Control Loop section.

NOTE: Assigned pseudopoints/flags, which are not connected to any control strategy symbol, become unassigned points when one of the following is done:

- creating a control loop
 - loading a control loop
 - deleting a control loop
 - deleting a control strategy symbol
 - opening and closing the Delete Unused Software Points dialog box even if no software point was deleted.
7. For assigning further pseudopoints/flags, click on the desired position on the software point bar where the next point is to be created and repeat steps 4 through 5.

Search for Pseudopoints and Flags via Keyboard

Assumption	The Create/Select Software Address dialog box is open.
Procedure	<ol style="list-style-type: none"> 1. Type the complete name or single characters (search entry) of the name you want to find. <p>RESULT: CARE automatically finds the first name that matches the search entry. CARE searches from the VA through the FD folder and finds matched datapoint names in closed folders too.</p> <p>If a datapoint name you search for is not found, CARE continues searching with the next search entry you enter. CARE does not distinguish between upper-case and lower-case letters except on vowel mutations or country specific characters.</p> 2. To find the next name that matches the same search entry, click the asterisk (*). <p>Example:</p> <p>The following datapoints are available in the Create/Select Software Address dialog box:</p> <p>L22_VA_Release (VA-folder) L22_GA_Setpoint (GA-folder)</p> <p>The search entry "L22" is entered.</p> <p>CARE first finds the L22_VA_Release datapoint name. After entering the asterisk (use SHIFT key) the L22_GA_Setpoint datapoint name is found.</p> 3. To find a different datapoint name, enter the new search entry.

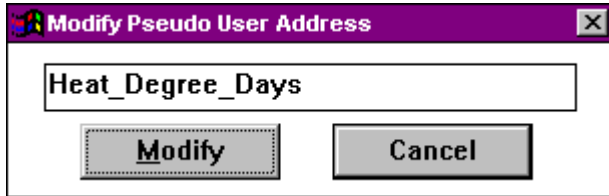
Modify Pseudopoint and Flag User Address

Purpose Modify pseudopoint or flag user address.

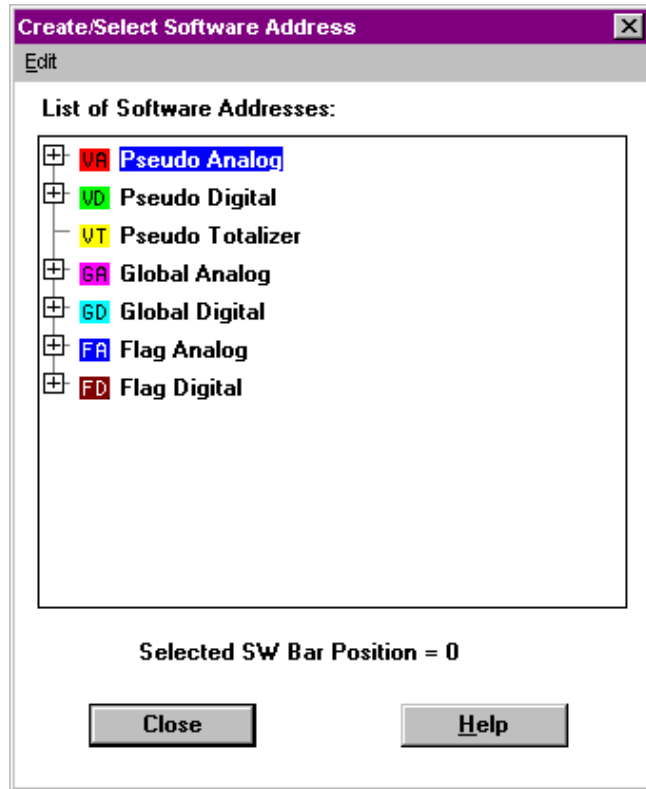
Procedures There are two ways to modify a pseudopoint/flag user address:

- A. By selecting the pseudopoint/flag on the software bar.
 - B. By selecting the pseudopoint/flag in the Create/Select Software Address dialog box.
- A. 1. Select the pseudopoint or flag to be modified from the software point bar.
2. Click menu item **Edit**, then drop-down item **Modify Pseudo User Address**, or press **F5**.

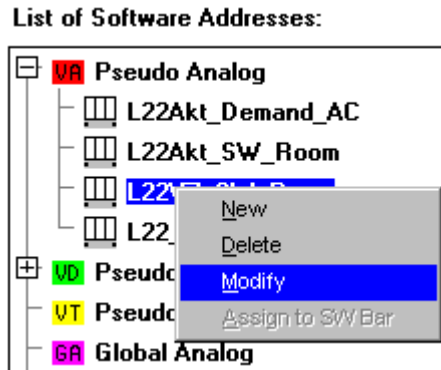
RESULT: The Modify Pseudo User Address dialog box displays.



3. Type to change the address in the editing field.
- User addresses must include one non-digit character and cannot include tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.
4. Click **Modify** to save changes. The dialog box remains open so that you can select other pseudopoints or flags to modify.
5. Click **Cancel** or press **F5** to end the Modify function.
- B. 1. Open the Create/Select Software Address dialog box by clicking on a blank position on the software point bar or by selecting menu item **Edit**, then drop-down item **Load Software Points**.

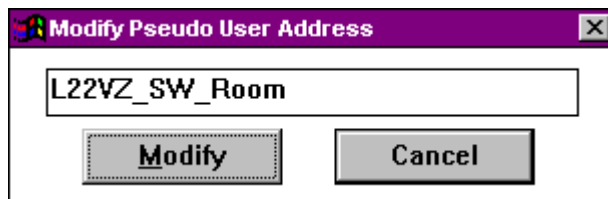


2. Open the pseudopoint/flag folder, and click the pseudopoint/flag you want to modify.
3. Click right mouse button, and with left mouse button click **Modify** in the context menu, or



click menu item **Edit**, then drop-down item **Modify**.

RESULT: The Modify Pseudo User Address dialog box displays.



4. Type to change the address in the editing field.

User addresses must include one non-digit character and cannot include tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

5. Click **Modify** to save changes.
6. To modify further points/flags, repeat steps 2 through 5.

Delete Pseudopoints and Flags

Purpose Delete pseudopoint or flag.

NOTE: Used pseudopoints/flags cannot be deleted.

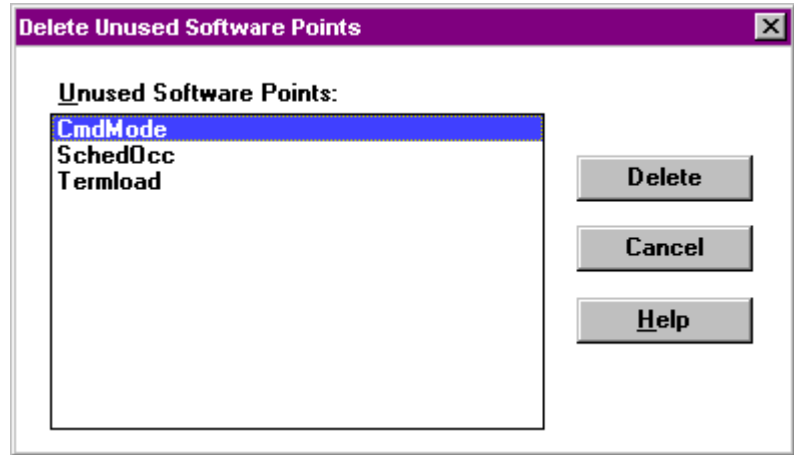
Points are used when they are:

- connected to control icons
- used as internal points of XFMs
- mapped to XFM parameters
- contained in switching tables
- referenced in time programs

Procedures There are two ways to delete pseudopoints/flags:

- A. Via the **Edit/Delete Unused Software Points** command, you can delete one or several pseudopoints/flags.
 - B. Via the **Edit/Load Software Points** command or by clicking on the software bar, you can delete one pseudopoint/flag after another individually.
- A. 1.** Click menu item **Edit**, then drop-down item **Delete Unused SW Points**.

RESULT: The Delete Unused Software Points dialog box displays.



2. Click the points you want to delete (hold down SHIFT key while you click to select multiple points).

3. Click **Delete**.

RESULT: All selected software points are deleted. The deleted points are no longer available on the software points bar.

4. Click **Cancel** to close the dialog box.

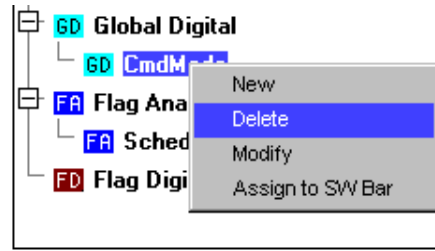
RESULT: Points that you did not delete remain in the plant

- B. 1. Open the Create/Select Software Address dialog box by clicking on a blank position on the software point bar or by selecting menu item **Edit**, then drop-down item **Load Software Points**.



2. Open the pseudopoint/flag folder, and click the pseudopoint/flag you want to delete.

- Click right mouse button, and with left mouse button click **Delete** in the context menu, or



click menu item **Edit**, then drop-down item **Delete**.

RESULT: The selected pseudopoint/flag is deleted. The deleted pseudopoint/flag is no longer available on the software points bar.

Connect a Pseudopoint or Flag to a Control Loop

NOTE: The control icon must already be selected and placed in the work space.

Procedure

- Click the desired pseudopoint on the software point bar.
If you select a physical point on the physical data point bar, you cannot select a pseudopoint.

When creating the connections, pseudopoint type and the control icon's inputs or outputs must match.

RESULT: The box turns red.

- Double-click the control icon in the work space to which the pseudopoint should connect.

Or, if the control icon is the currently selected icon (a gray box surrounds it), click menu item Edit, then drop-down item Connect symbol.

RESULT: The input/output dialog box for the control icon displays.

- Click the check box of the input or output to which the pseudopoint should connect.
- Click the red control icon in the input/output dialog box.

RESULT: The dialog box closes. The control icon turns dark blue. The intersection lines appear.

- Move the intersection point and click to connect the pseudopoint with the control icon (same procedure as in the Connect Two Control Icons section).

XFMs

IMPORTANT

Free programming and XFMs must not be used together in one and the same control loop.

Section Contents

This section includes:

- Map Software Point to XFM Parameter
- Map Software Point to an XFM Internal Datapoint
- Create User Addresses of the Same Name and Map to XFM Internal Datapoint
- Unmap Mapped Software Point from an XFM Parameter
- Modify XFM Parameter

Map Software Point to XFM Parameter

Purpose Assign (map) a software point to an XFM parameter. The following point types can be mapped to an XFM parameter

- Pseudo analog (VA)
- Pseudo digital (VD)
- Pseudo totalizer (VT)

These points can be preassigned to the software point bar or unassigned. They can already be mapped to an internal XFM datapoint.

Hardware points, global points and flags cannot be mapped to XFM parameters.

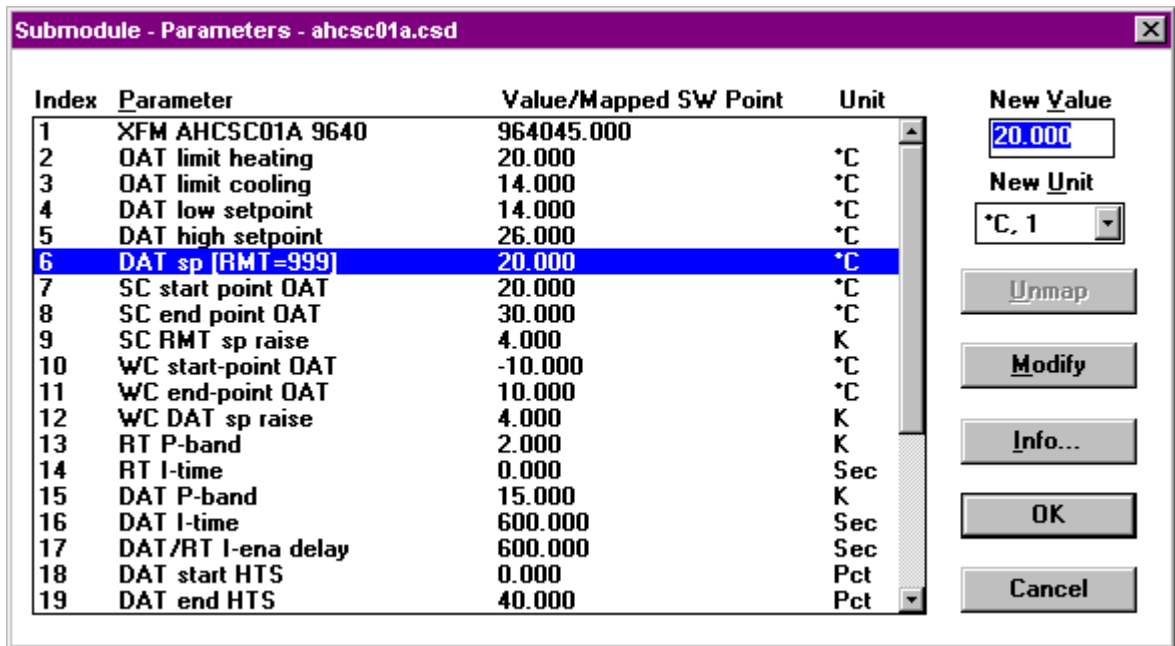
NOTE: Mapped parameters can be displayed and modified in XBS central graphics. Graphics for a Central will be created with an appropriate graphic software program, for example Designer. The user addresses that reference a parameter will be placed in the graphics.

Procedures There are two ways to map a software point to an XFM parameter.

- A. From the software points bar
- B. From the Create/Select Software Address dialog box

Common Steps 1. With right mouse button, click on the XFM control strategy icon.

RESULT: The Submodule - Parameters <XFM name> dialog box displays.

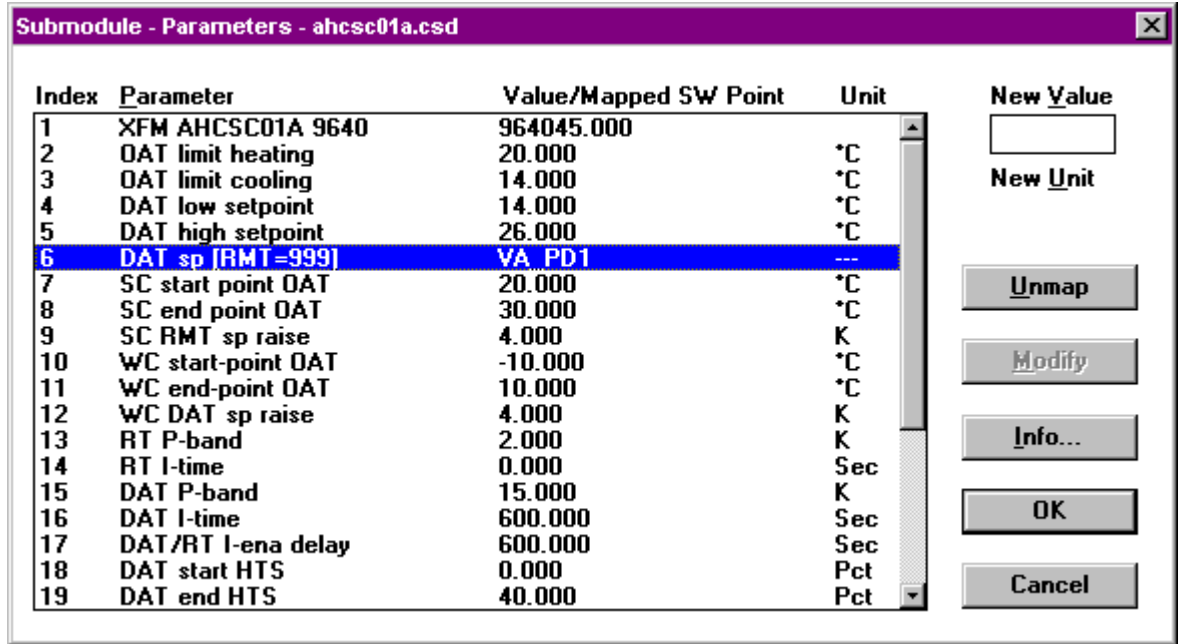


2. In the list, click desired parameter to which you want to map the software point.

Software Points from the Software Points Bar

1. On the software points bar click the software point you want to map to the XFM parameter.

RESULT: For the parameter (highlighted) in the Submodule - Parameters <XFM name> dialog box the software point selected is shown in the Value/Mapped SW Point column. The previous unit of the parameter is invalid indicated by three dashes (---).

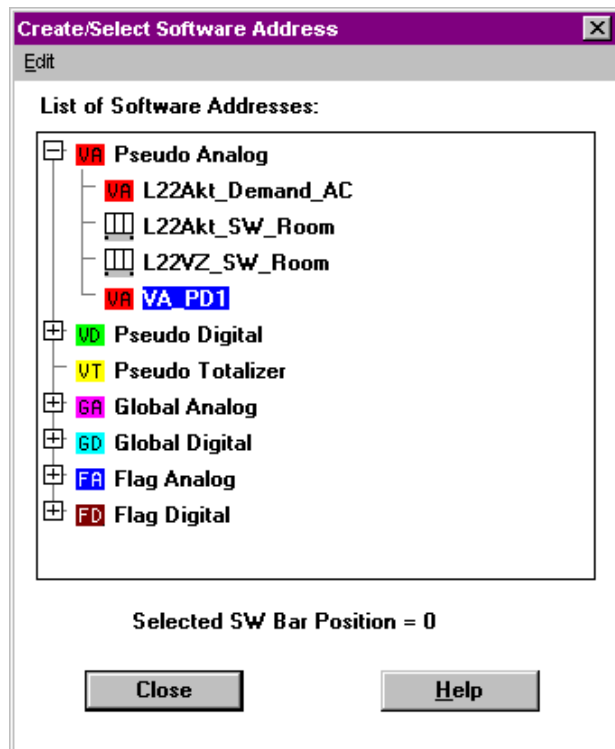


2. Click OK in the Submodule - Parameters <XFM name> dialog box .

RESULT: The software point is mapped to the parameter.

From the Create/Select Software Address Dialog Box

1. Open the Select User Address dialog box by clicking on the software points bar or by the selecting menu item Edit, then drop-down item Load Software Points.



2. Click the software address (software point) you want to map to the XFM parameter selected in step 2 (Common Steps). Software points can already be assigned to the software point bar or unassigned indicated by the following icons at the address:



Assigned point on the software bar. This icon has priority over the others meaning if e. g. a point is an XFM internal datapoint but at the same time assigned to the software bar, this icon will display.



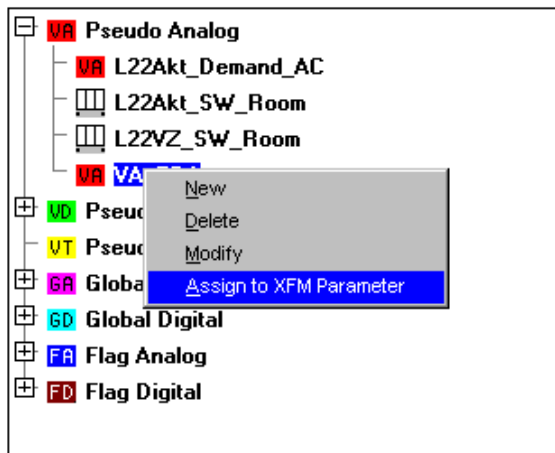
Unassigned software point in folder color with point abbreviation.



Unassigned software point mapped to an XFM internal datapoint.

3. For an assigned point finish with step 5. For an unassigned point continue with step 4.
4. Click right mouse button and with left mouse button click Assign to XFM Parameter in the context menu.

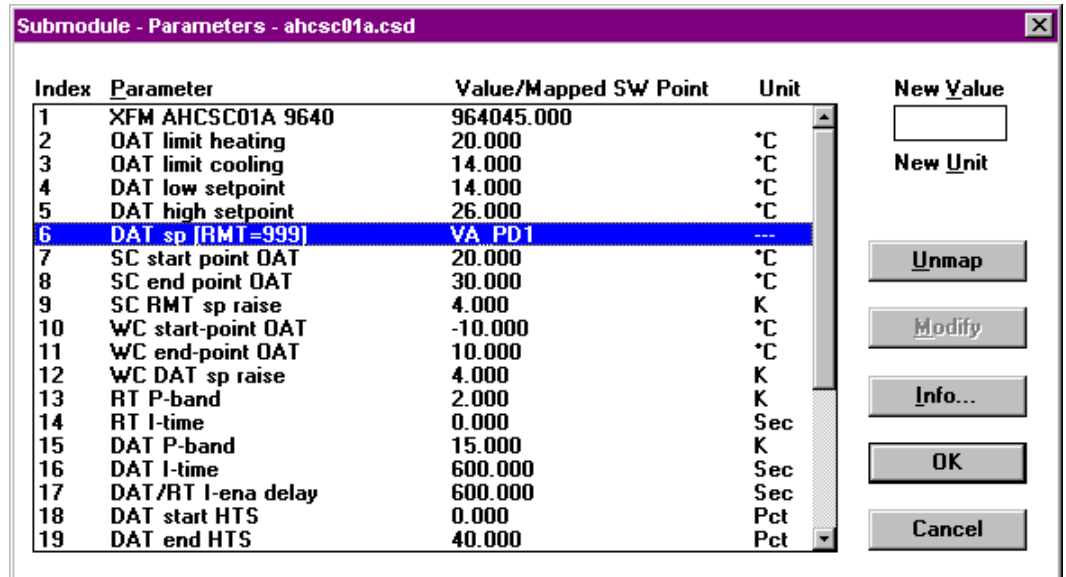
List of Software Addresses:



or

click menu item Edit, then drop-down item Assign to XFM Parameter.

RESULT: For the parameter (highlighted) in the Submodule - Parameters <XFM name> dialog box the software point selected is shown in the Value/Mapped SW Point column. The previous unit of the parameter is invalid indicated by three dashes (---).



5. Click OK in the Submodule - Parameters <XFM name> dialog box .

RESULT: The software point is mapped to the parameter. In the Create/Select Software Address dialog box it is indicated by the icon at the address name changing to the following shape:



This icon change concerns only software points, which are not assigned to the software point bar. Assigned software points are indicated with the following icon and keep this shape after they are mapped to an XFM parameter.



Map Software Point to an XFM Internal Datapoint

Purpose Assign (map) software point to an XFM internal datapoint of the same type. Software points can only be mapped to an XFM internal datapoint of the same type, in other words, pseudo analog to pseudo analog or global analog, pseudo digital to pseudodigital or global digital etc. Compatibility is checked by CARE.

The following point types can be mapped to an XFM internal datapoint, if the point type matches:

- Hardware points
- Global analog (GA)
- Global digital (GD)
- Pseudo analog (VA)
- Pseudo digital (VD)
- Pseudo totalizer (VT)

These points can be preassigned to the software point bar or unassigned.

Flags cannot be mapped to XFM internal datapoints.

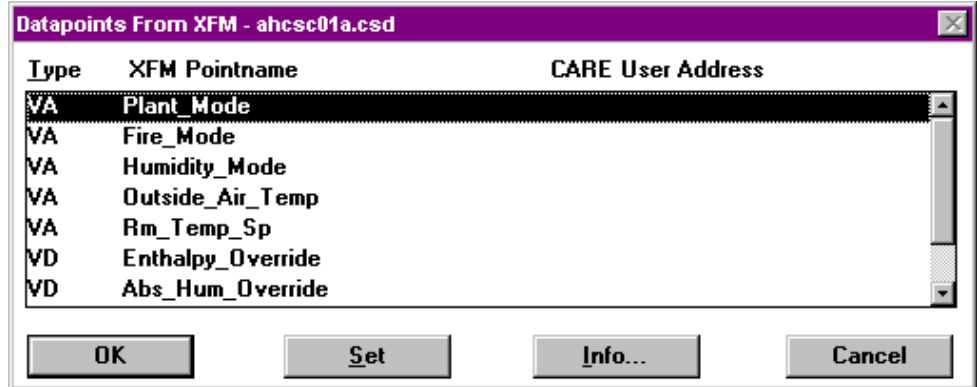
Procedures There are three ways to map a software point to an XFM internal datapoint.

1. From the software points bar
2. From the Create/Select Software Address dialog box
3. By creating and connecting user addresses of the same name to XFM internal datapoints

User Addresses from the Software Points Bar

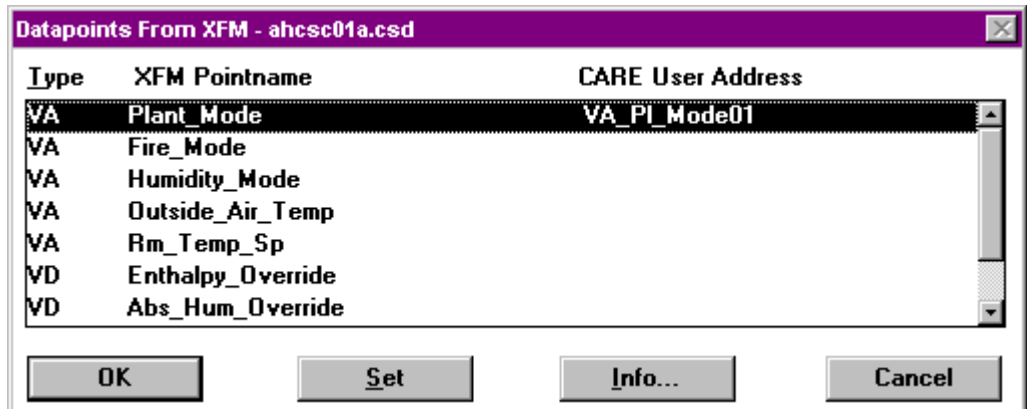
1. Double-click the XFM icon and select the Datapoints button in the XFM I/O dialog box.

RESULT: The Datapoints From XFM <XFM name> dialog box displays showing the internal datapoints.



2. Click the datapoint to which you want to map a software point (CARE point = CARE user address).
3. On the software point bar click the desired software point (CARE point) you want to map to the internal datapoint, or click on a hardware point.

RESULT: The CARE point is located next to the internal datapoint (CARE User Address column).



4. Click OK to confirm.

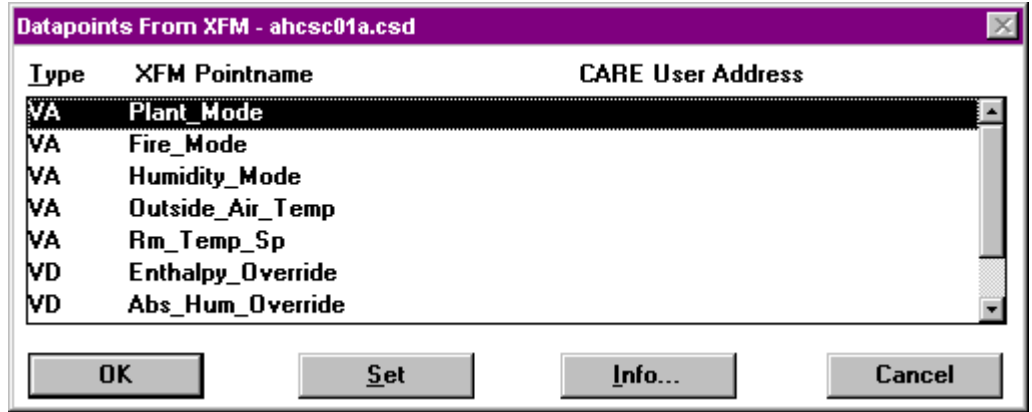
RESULT: The CARE point is mapped.

NOTE: You can change the mapped point by mapping any other compatible point to the XFM datapoint.

From the Select Software Address Dialog Box

1. Double-click the XFM icon and select the Datapoints button in the XFM I/O dialog box.

RESULT: The Datapoints From XFM <XFM name> dialog box displays showing the internal datapoints.



2. Open the Create/Select Software Address dialog box by clicking on the software points bar or by selecting menu item Edit, then drop-down item Load Software Points.
3. Click on the software address (CARE point of the same type!) you want to map to the XFM internal datapoint.

Software addresses can already be assigned to the software point bar or unassigned indicated by the following icons at the user address:



Assigned points: Pseudopoints/flags that reside on the software bar.



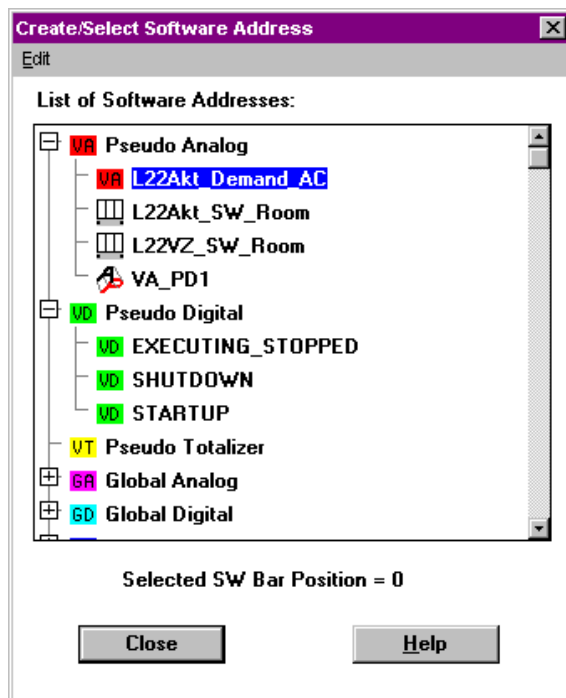
Unassigned software point in folder color with point abbreviation.



Unassigned software point mapped to an XFM internal user address.

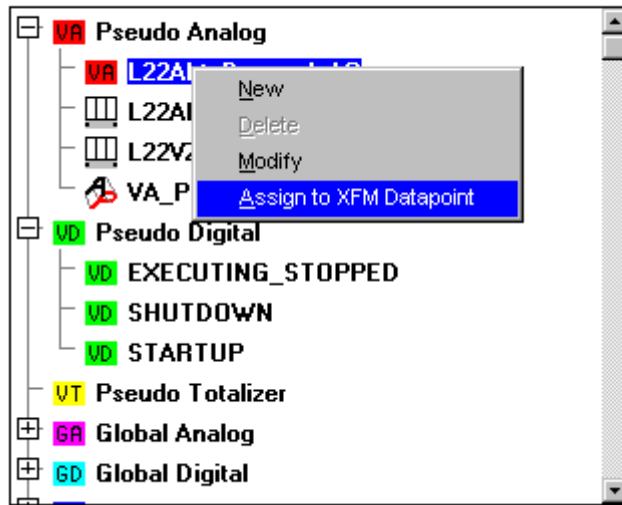


Unassigned software point mapped to an XFM parameter.



- Click right mouse button and click on Assign to XFM Datapoint in the context menu.

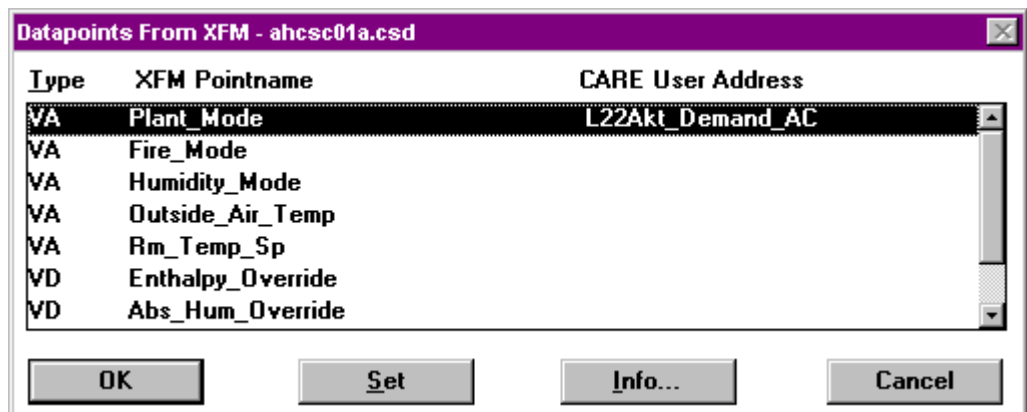
List of Software Addresses:



or

click menu item Edit, then drop-down item Assign to XFM Datapoint.

RESULT: The CARE point is located next to the internal datapoint (CARE User Address column).



- Click OK to confirm.

RESULT: The software point is mapped to the XFM internal datapoint. In the Create/Select Software Address dialog box it is indicated by the icon at the address name changing to the following shape:



This icon change concerns only software addresses, which are not assigned to the software point bar. Assigned software addresses are indicated with the following icon and keep this shape after they are mapped to an XFM internal datapoint.

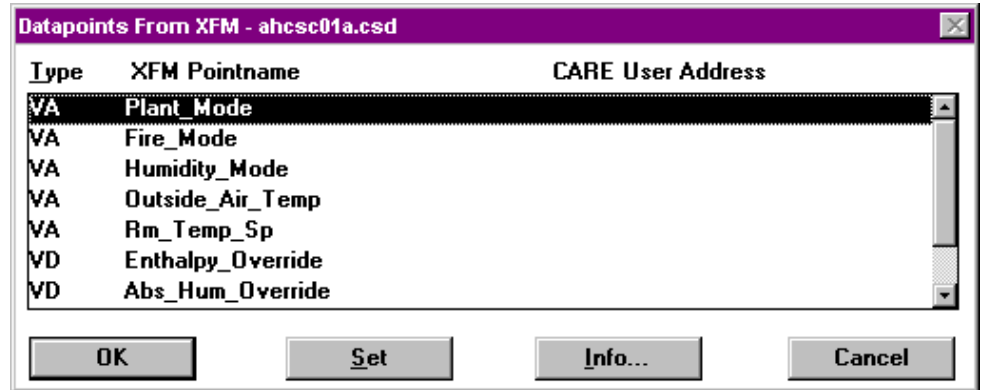


NOTE: You can change the mapped point by mapping any other compatible point to the XFM datapoint.

Automatically Create User Addresses of the Same Name and Map to XFM Internal Datapoint

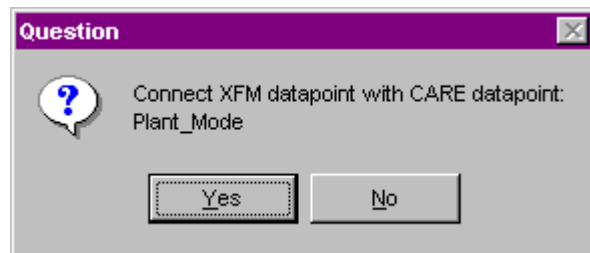
Purpose Create XFM internal user address of the same name and map it to XFM internal datapoint. Using this function, it is possible to automatically create points for exchange of information between XFMs.

Procedure 1. To open the Datapoints From XFM <XFM name> dialog box, double-click the XFM icon and click the Datapoints button.



2. Click the Set button.

RESULT: The Question dialog box displays asking you for confirmation of each XFM datapoint you want to connect to the CARE datapoint of the same name.

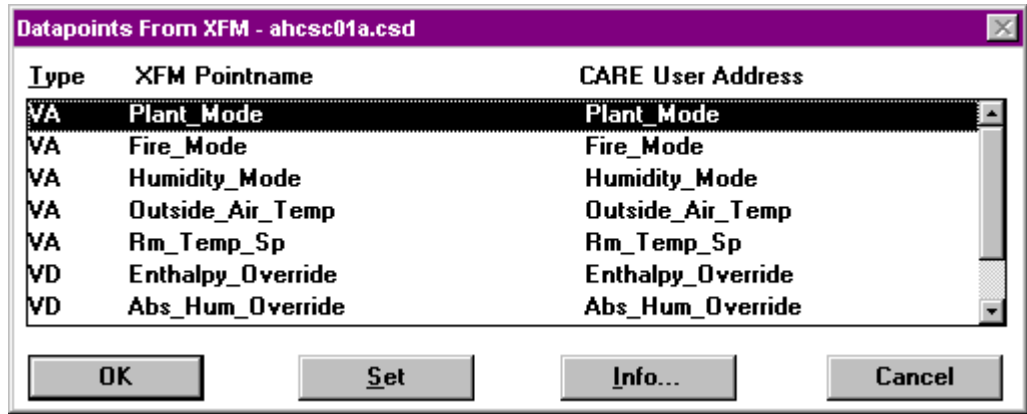


NOTE: This dialog is only displayed, if a corresponding datapoint already exists. If not, a point is automatically created without any question.

3. Click Yes, if you want to connect the XFM datapoint displayed with the existing CARE point of the same name.

4. Click No, if you want to skip this datapoint for connection.

RESULT: The connections between XFM points and CARE datapoints are established.



5. Click OK to confirm.

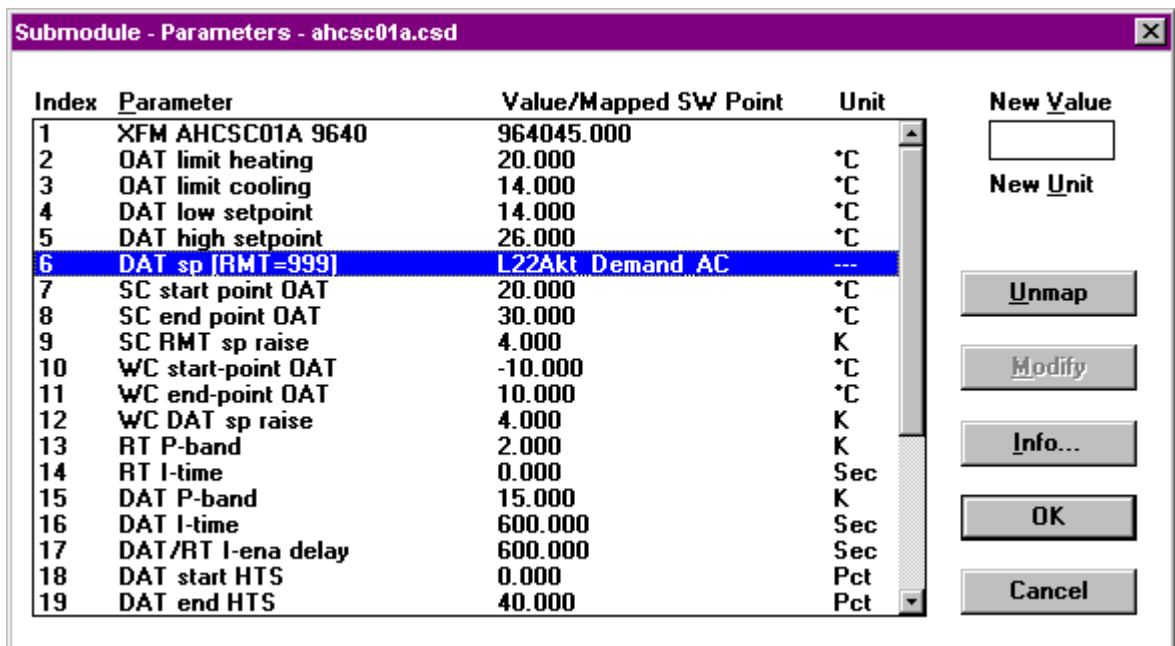
RESULT: The CARE user addresses are mapped to their XFM internal datapoints.

Unmap Mapped Software Point from an XFM Parameter

Purpose Unassign (unmap) a mapped software point from an XFM parameter.

Procedure 1. With right mouse button click on the XFM control strategy icon.

RESULT: The Submodule - Parameters <XFM name> dialog box displays.



2. In the list, click desired parameter, from which you want to unmap the software point.

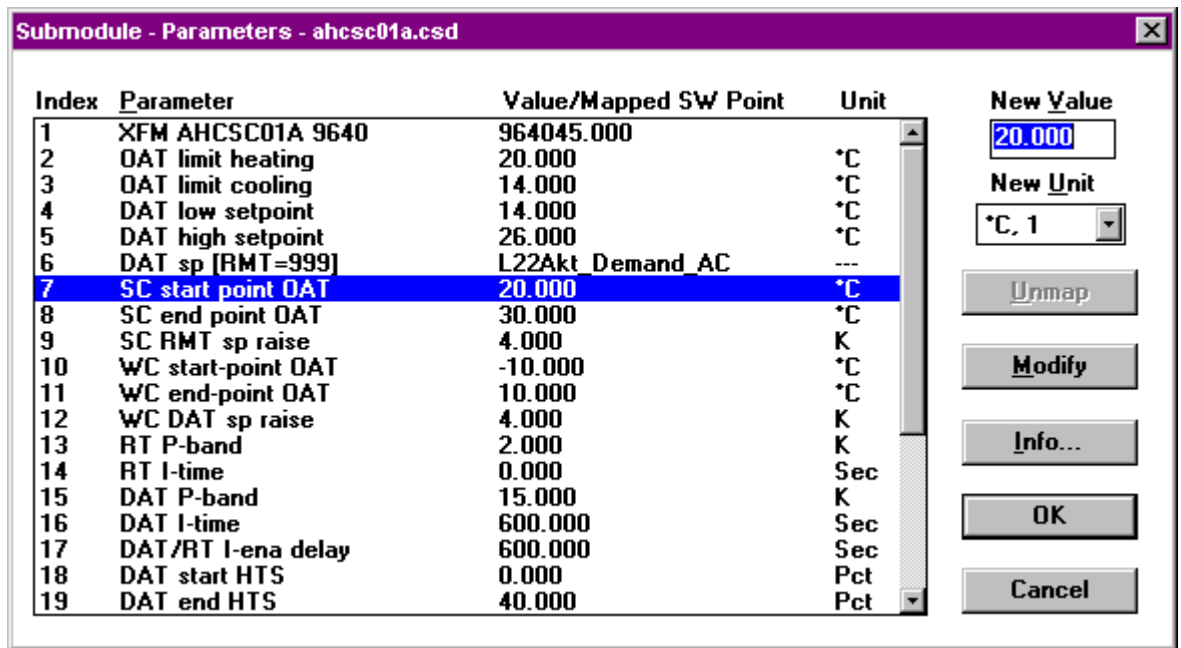
3. Click the Unmap button.

RESULT The mapped software point will be moved from the parameter and the parameter gets his value and unit back. In the Create/Select Software Address dialog box the "mapped" icon at the user address disappears.

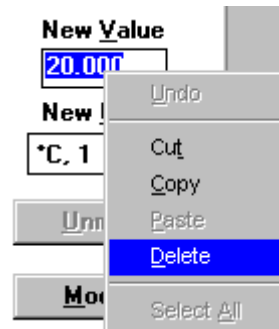
Modify XFM Parameter

- Procedure** 1. With right mouse button click on the XFM control strategy icon.

RESULT: The Submodule - Parameters <XFM name> dialog box displays.



2. In the list box click on the parameter you want to modify.
 3. Edit the parameter in the New Value field. You can use the Cut, Copy, Delete, Paste and Undo functions from the context menu by clicking right mouse button when the field is highlighted.



4. Change the engineering unit of the parameter in the New Unit field, if desired.
 5. Click Modify to confirm the modified parameter.
 6. Click OK to confirm the modification.

Plant Information Displays

You can display the following information:

- Physical points
- Physical point user addresses
- Pseudopoint user addresses

Physical Point Information

- Procedure**
1. *Double* click (left-hand mouse button) the arrow head for the physical data point.
 RESULT: The Datapoint information window displays with user address and point type.
 2. Click **OK** to close window when done viewing the information.

User Addresses

- Procedure**
1. Click View, then drop-down item Physical user address for physical points or Pseudo user address for pseudopoints.
 RESULT: The user addresses for the selected type display under the plant schematic. The first letter of every user address is directly beneath the triangle to which the user address belongs. Software places a check mark next to the Physical (or Pseudo) user address function to indicate that it is on.
 2. To end the function, click View, then drop-down item Physical (or Pseudo) user address again.
 RESULT: The check mark disappears and the user addresses disappear from the screen.

Keyboard Commands

You can hold down the **Ctrl** key and press **p** to display physical addresses or **s** to display pseudopoint addresses. Repeat action to remove the address display.

Physical and Pseudo Point Displays

You cannot display physical point user addresses at the same time as pseudopoint user addresses.

Single Address Display

If you move the cursor over a triangle or pseudopoint abbreviation and press and hold the left-hand mouse button down, the user address for the point displays with either a red exclamation symbol or a green check mark symbol. When you release the mouse button, the display disappears.

The red exclamation symbol appears for:

- hardware points (with one allowable connection) that are used in an XFM
- digital outputs that are connected to a symbol
- flex points that are connected to a symbol
- software points that are connected to an output pin of a symbol.

You cannot display a single address if the View Physical (or Pseudo) user address function is on.

Loop Management

There are several functions that you can use to copy, check, delete, and print loops:

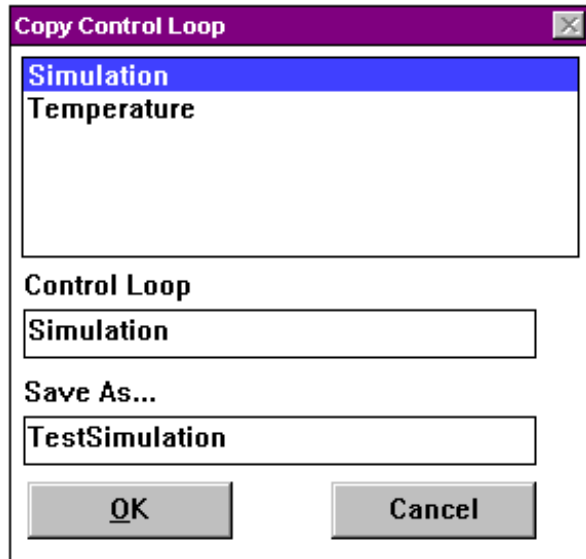
- Copy a Control Loop to reuse it with modifications (or as is).
- Delete a Control Loop if it is no longer necessary.
- Check the Control Loop to make sure all connections are complete.
- Print a Control Loop for documentation purposes.

This section provides procedures for these functions.

Copy a Control Loop

- Purpose** Make a copy of an existing control loop and save it under another name.
- Procedure**
1. Click File, then drop-down item Copy.

RESULT: The Copy control loop dialog box displays.



2. Select the control loop name to be copied from the list of existing control loops.

RESULT: The selected control loop name displays in the Control loop editing field.

3. Click the Save as through editing field

RESULT: The cursor appears in the editing field.

4. Enter the new control loop name in the editing field. The new control loop name cannot already exist.

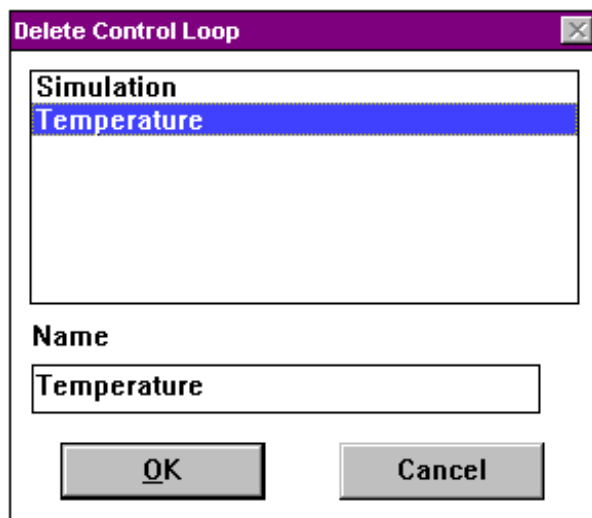
5. Click **OK** to copy and then close the dialog box.

Delete a Control Loop

Purpose Erase a control loop is no longer necessary.

- Procedure**
1. Click File, then drop-down item Delete.

RESULT: The Delete control loop dialog box displays.



2. Select the control loop to be deleted from the list of existing control loops.

RESULT: The control loop name to be deleted displays in the Name editing field.

3. Click **OK** to delete the loop and close the dialog box.

Check a Control Loop

Purpose Verify control loop operation. Software asks whether or not to run this function when you exit the control loop function.

Procedure 1. Click File, then drop-down item Check loop.
RESULT: The Information dialog box displays with a message that the loop is complete or incomplete.

2. Click **OK**.

RESULT: A dialog box displays the number of PID controllers per system.

3. Click **OK** to close dialog box.

Print a Control Loop

For printing a control loop see Print Documentation chapter.

Control Strategy Exit

Procedure 1. Click File, then drop-down item Exit.
RESULT: The End control strategy dialog box displays and asks whether or not you want to check the control loop.

2. Click **Yes** to initiate a software check of the loop. Or, click **No** to skip the check and exit the control strategy function.
RESULT: If **Yes**, software checks the control loops and displays the Information dialog box with loop statistics or an error message about the loop. Click **OK** close the message boxes, exit the control strategy function, and display the CARE main window. Click **Cancel** to remain in the function.

If **No**, software exits the control strategy function and displays the CARE main window.

Incomplete Loop Warning If you exit the Control Strategy function with incomplete control loops, you cannot attach the plant.

SWITCHING LOGIC

NOTE: The Switching Logic chapter applies to CARE XL-5000 only. For information on switching logic in CARE Excel Web, refer to the Control Loops and Switching Table sections.

Purpose Switching logic provides a convenient means to implement digital (Boolean) logic control of a point. An analog or digital point is commanded to a specific value or state if a certain set of conditions are met. Time delays can also be added. For example, switching logic can start a return air fan 30 seconds after a supply air fan starts.

Assumption The plant schematic is done.

Priority Switching logic has a higher priority than the control strategy. Control strategy cannot operate on a point when switching logic has control. When switching logic releases the point, control strategy can then command the point.

Chapter Contents

- Switching Logic Window (areas and functions)
- Switching Table Description (rows, AND logic, OR logic, and time delays)
- Switching Table Creation (including multiple tables for a point, row deletion)
- Result Row (definition and modifications)
- Digital Condition Rows (definition and modifications)
- Analog Condition Rows (definition and modifications, hysteresis)
- MATH Rows (definition and modifications, hysteresis)
- Delays for a Logical AND (Column Delay)
- OR Columns and Exclusive OR Table (COL and XOR functions)
- Pseudopoints
- Switching Logic File Management (including saving, loading, deleting, restoring)
- Macros (including saving and loading)
- Plant Information Displays
- Print Switching Tables
- Switching Logic Function Exit

See Also ⇒ Getting Started chapter for procedures to start and exit CARE

File Management chapter for procedures to back up and restore plant files

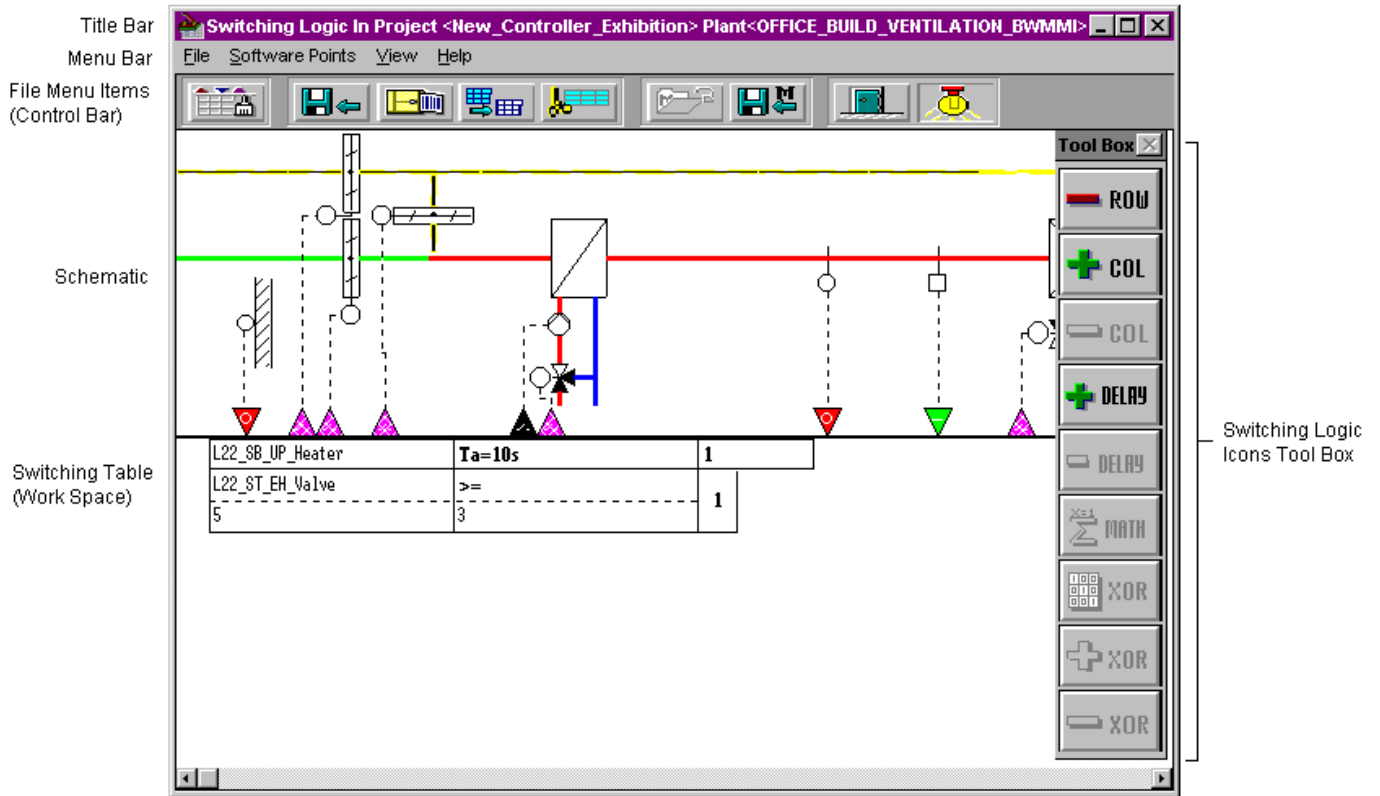
Switching Logic Window

Purpose Provide logical switching actions for digital points in the plant schematic.

Assumption The plant schematic is done.

- Procedure**
1. In the logical plant tree, click on the plant.
 2. Click menu item Plant, then drop-down item Switching Logic. Or click the Switching Logic button in the button bar below the menu bar.

RESULT: The Switching logic window displays with menu items File, Software points, View, and Help as well as a sidebar with logic icons. Example:



- Title Bar** Project and plant names display in the window title bar.
- Menu Bar** The File, Software points, View, and Help menu items provide the following functions (you can also select these functions via the icons below the menu bar):
 - FILE**
 - Delete Erase the displayed switching table.
 - Copy Copy the table to another point (physical or pseudo).
 - Save macro Save the current switching table to the macro library.
 - Save Store the currently displayed switching table. Software names it with the output result (for example, 0, 1, or 100.0)
 - Load macro Recall a saved macro from the macro library.
 - Restore Cancel changes made to the current switching table since the last save.
 - New/Clear End work on current switching table and start another table. Software prompts whether or not to save the current table.
 - Exit Stop switching logic function and return to main window.
 - Print Output a copy of a switching table.
 - SOF POINTS** List of pseudopoint, global, and flag types. Select a type to create a new one.

Also, an option to Delete Unused SW Points. See the Unused Software Points note for more details.

VIEW

Physical user address

Display user addresses for physical points in the schematic.

Show Control Bar

Display the File menu item icons below the menu bar.

Show Tool Box

Display the switching logic icons down the right-hand side of the window.

HELP





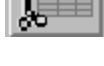
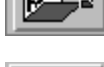



Display the on-line user guide topic list. See Getting Started, On-Line Help chapter, for details on using the help function.

About

Copyright and program authors.

File Menu Items Line (Control Bar)

These symbols allow you to select File functions without clicking File and then selecting a drop-down item. The symbols (from left to right) correspond to the following File functions:

	New/Clear
	Save
	Restore
	Copy
	Delete
	Load macro
	Save macro
	End
	Remove the control bar from the window.

Plant Schematic

This area displays the schematic created via the Schematic function. Outputs for which a switching table exists have white cross-hatching on the input/output triangles.

Physical Point Bar

This area displays the physical points required for the schematic. If an arrowhead is white and cross-hatched, the point has a switching table. Click the arrow head to display the switching table for the point.

If you move the cursor over a triangle and press and hold the left-hand mouse button down, the user address for the point displays with either a red exclamation symbol or a green check mark symbol. The red exclamation symbol appears for inputs. The green check mark displays for outputs. When you release the mouse button, the display disappears.

Work Space

Switching logic tables appear in this area.

Switching Logic Icons (Tool Box)

Standard logic functions available for assignment:

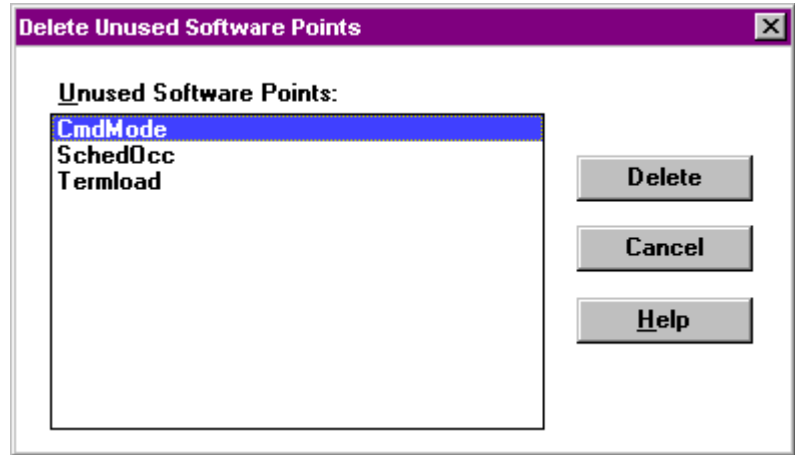
-ROW	Delete a row from the switching table. You cannot delete the first row. Use the File, Delete function to completely delete a table.
+COL	Add a column to the right-hand side of the switching table.
-COL	Delete a column from the switching table.
+DELAY	Add a delay time value to the output of a switching table.
-DELAY	Remove the delay time value row from a switching table.
MATH	Enter a formula for the determination of a value.
XOR	Change multiple OR columns in a switching table to Exclusive OR columns, that is, only one column can be true to produce a true condition for the output. In a non-

exclusive OR table, as long as just one column is true, software produces a true condition for the output.

- +XOR Add a new line to an Exclusive OR table.
- XOR Delete a line from an Exclusive OR table.

Unused Software Points

To delete unused software points in the plant schematic, select menu item Software points, then drop-down item Delete Unused SW Points. The Delete Unused Software Points dialog box displays with a list of those points and an option to delete them, if desired. For example:



Click the points you want to delete (hold down the **Shift** or **Ctrl** key while you click to select multiple points). Then click **Delete** for software to delete these unused points. (The **Delete** key is not active until you select at least one point.)

Click **Cancel** to close the dialog box. Points that you did not delete remain in the plant.

Switching Table Description

Description Switching tables consist of rows and columns. Each row represents a point or output condition and contains user addresses, values, and switching statuses.

First (or Result) Row The first row in a table always specifies the desired output result.

<i>Result Row</i>	Output point user address	Minimum delay time	On or Off
-------------------	------------------------------	-----------------------	-----------

For example, the following line says to turn the Supply_Fan point on after a minimum delay of 30 seconds:

<i>Result Row</i>	Supply_Fan	Te=30s	1
-------------------	------------	--------	---

The point must be an output point, pseudopoint, or flag. For digital outputs, the desired result can be either zero or one. For analog outputs, the result is a value. For example, the following line says to open a damper to 100 percent:

<i>Result Row</i>	Blch_dmpr	100.0
-------------------	-----------	-------

You create the first row in a table by clicking the arrow head for an output point or selecting the Software points menu item and then the desired pseudopoint or flag. Or, if there are existing logic tables that were saved as macros, you can use the Load macro function (under menu item File) to assign them to the plant.

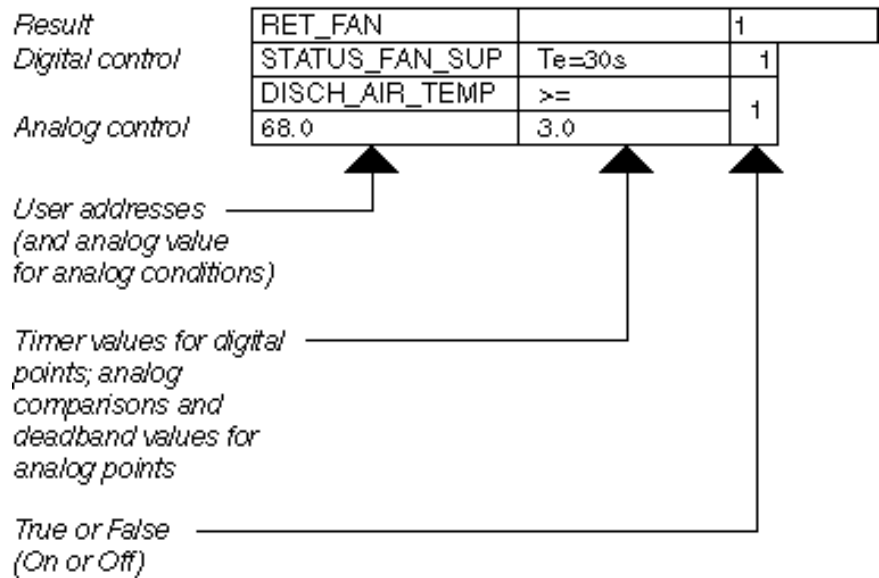
Subsequent Rows

Subsequent rows in a table specify the required conditions to implement the desired output result. All row conditions must be met ("AND" logic) for software to initiate the point change.

"AND" Logic

Software determines whether or not to implement the command in the result row by using AND logic on the rows below the result row. In other words, all conditions in those rows must be true for software to issue the command in the result row.

For example, the following table says to turn on the return air fan if the supply fan has been on for 30 seconds AND the discharge air temperature is greater than or equal to 68F (20C):



The 3.0 value in the last row, second column, creates a deadband of 3 degrees with the 68.0 value to keep the return fan from short cycling due to small changes in temperature. In other words, the temperature has to fall at least to 65 (68 minus 3) to invalidate the condition.

You create subsequent rows in a table by clicking the arrow heads for input or output points, or selecting the Software points menu item and then the desired pseudopoints or flags.

The 1's and 0's in the True or False columns have specific meanings. For analogs, a 1 is true; a 0 is false. For digitals, a 1 is closed for a digital input and powered (energized) for a digital output, no matter what the engineering unit says. A 0 for a digital input means open. A 0 for a digital output means deenergized (not powered).

Digital vs. Analog Rows

A digital point occupies one row, while an analog point occupies two rows.

The first row for an analog point specifies user address and comparison type (for example, greater than or equal to). The second row specifies test value and deadband differential. Switching status is in the last column and applies to both rows.

Limits One switching table can contain a maximum of 11 digital or 5 analog control conditions. Switching tables can only extend as far as the lower window border.

Switching tables can contain a mixture of digital and analog control conditions.

See Also ⇒ Result Row, Digital Condition Rows, Analog Condition Rows, and MATH Rows sections for additional details

“OR” Logic

Tables can also include “OR” logic in additional columns. OR logic tells software to initiate the desired result if just ONE condition is true.

For example, the following table says to turn on the return air fan if the supply fan has been on for 30 seconds OR if the discharge air temperature is greater than or equal to 68F (20C) with a 3.0-degree deadband:

<i>Result</i>	RET_FAN		1
<i>Digital control</i>	STATUS_FAN_SUP	Te=30s	1 -
<i>Analog control</i>	DISCH_AIR_TEMP	>=	- 1
	68.0	3.0	

} OR columns
(- means the condition does not matter)

Limit You can define a maximum of 10 OR columns for one point.

See Also ⇒ OR Columns and Exclusive OR Table section for additional details

Time Delays

Purpose Delay commands and set minimum times for conditions to exist before software acts. Options include:

- Delay for a row condition
For example, a supply fan must be on for at least 30 seconds before software can change its status to true.
- Delay for a logical AND (column delay)
For example, software must wait another 30 seconds after all conditions are met in a column before issuing a command.
- Delay command to the output point of the switching table
For example, software must wait 2 minutes before issuing an OFF command to a fan.

Example The following switching table shows all three timer options:

Cooler_pump	Te=2m	1
Air_cool. t_status	Te=10s	1
Air_cool. t_sen34	>=	1
60	2	
		Te 15s

↑ Delay command to the output point 1

← Delay for a row condition

↑ Delay for a logical AND (column delay)

The Air_cool._t_status point must be on for at least 10 seconds before software changes its status to true.

The AND conditions in this column must be true for at least 15 seconds before software can decide to issue the ON command to the Cooler_pump.

Software must then wait an additional 2 minutes to send the ON command to the Cooler_pump.

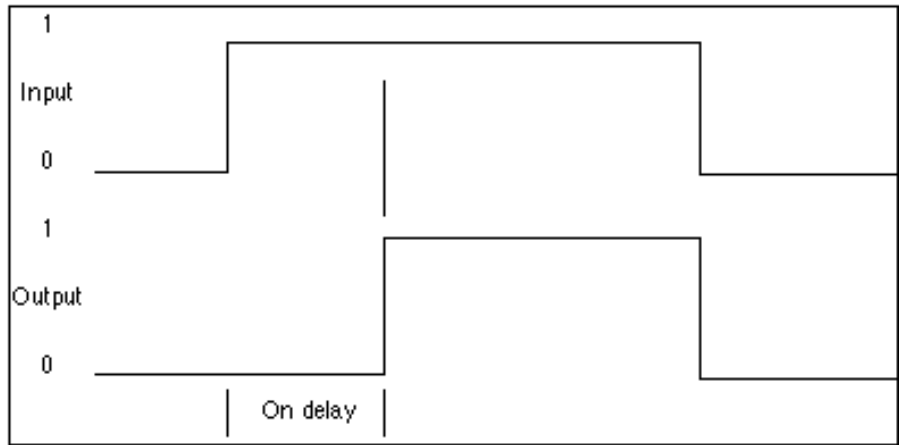
Procedures You add delays in the second box of result and digital rows by clicking the box and selecting delay type and time in the Select time period dialog box that displays. See the Result Row section and/or the Digital Condition Rows section for procedure details.

You add the additional delay in the bottom row by using the +DELAY function. See the Delay for a Logical AND (Column Delay) section for procedures.

Restriction You cannot add delay time to analog rows.

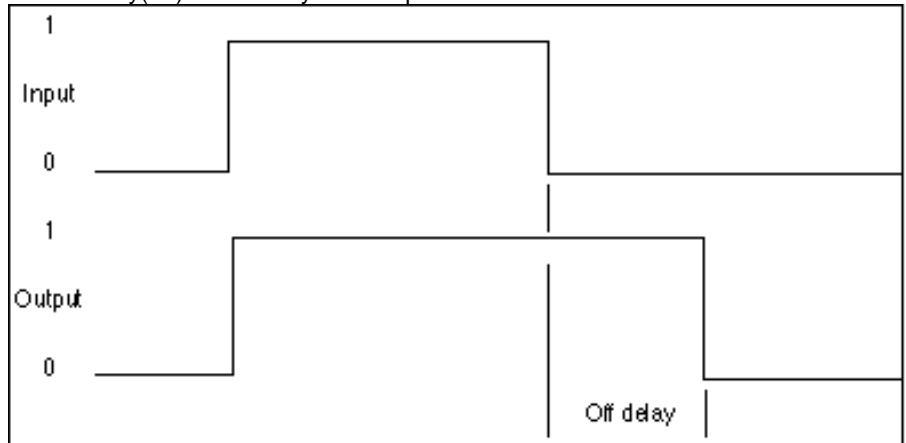
Delay Types When you select a delay time, you also select a delay type. Delay types include On, Off, and Cycle.

An On delay (T_e) value delays the output of an ON command.



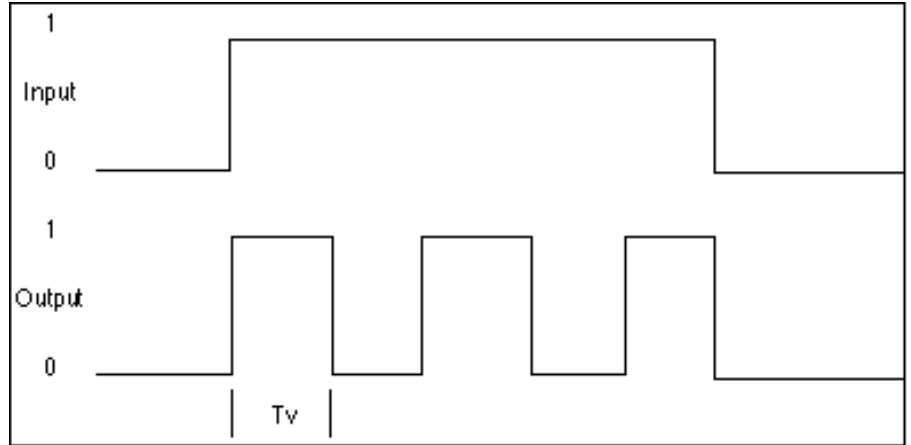
On Delay Operation Diagram

An Off delay (T_a) value delays the output of an OFF command.



Off Delay Operation Diagram

A Cycle delay (T_v) value cycles the ON and OFF times.



Cycle Delay Operation Diagram

On Delay Example

Extract_fan_cmd	Te=30s	1	
Supply_fan_cmd	Te=20s	1	-
Analog_condition	>=	1	-
0	0		
Supply_fan_status	Te=10s	1	-
Manual_override		-	1
		Te	15s

The Supply_fan_cmd must be on for a continuous minimum period of 20 seconds before its 1 appears in the table AND the Analog_condition must be true (delays cannot be assigned to analog conditions) for its 1 to appear in the table AND the Supply_fan_status must be made for a continuous period of 10 seconds before its 1 appears in the table.

All ANDs must be true (1) for a continuous minimum period of 15 seconds before the Extract_fan_cmd receives the ON command. But, the Extract_fan_cmd is delayed for a further 30 seconds before actually starting up.

OR, the Manual_override can start the extract fan with a delay of 30 seconds.

Off Delay Example

Extract_fan_cmd		1
Supply_fan_status	Ta=10s	1

Supply_fan_status remains ON in the table unless its contact goes OFF for a continuous minimum period of 10 seconds. Software then picks up the OFF signal and switches the Extract fan off.

Cycle Delay Example

Cycle a filter cleaner ON for 60 seconds and OFF for 60 seconds if the supply fan command is ON AND the return fan command is ON.

Filter_cleaner	Tv=60s	1
Supply_fan_cmd		1
Return_fan_cmd		1

Antibounce Example

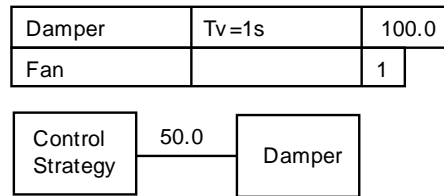
Extract_fan_cmd		1
Supply_fan_cmd		1
Supply_fan_status	Ta=15s	1
Time_program		1
Manual_override		-

When the supply fan first starts, air flow can be intermittently strong and weak causing the supply fan status contact to “bounce” on and off. The Off delay of 15 seconds for the Supply_fan_status causes software to wait for a positive indication of constant air flow.

Control Strategy and Switching Logic Interaction

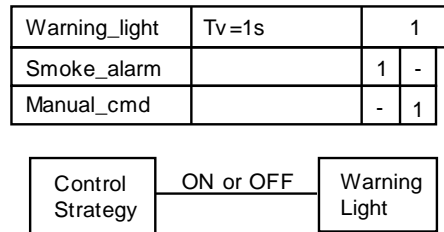
If a switching table and a control strategy are both commanding the same point, the switching table has priority.

Example 1:



In this example, the damper has a value of 100.0 as long as fan equals 1. When fan is not 1, switching logic releases the damper and the control strategy commands damper value to 50.0.

Example 2:



If both the smoke alarm and the manual command are false (0), the control strategy determines whether the warning light is ON or OFF. When the smoke alarm, for example, goes true, the warning light is alternately commanded ON (by the switching table) and commanded to the control strategy output state. So, if the control strategy is outputting the OFF state, the warning light cycles ON for 1 second and OFF for 1 second. But, if control strategy output is ON, the light stays ON continuously.

Switching Table Creation

Purpose Select output points and specify conditions that software should check to determine whether or not to initiate a change to the output point.

This section presents a general procedure that explains how to set up a logic table and then presents examples of specific tables to clarify the procedure.

Tip ⇒ This section explains how to set up a new table. To use an existing table that was saved as a macro, see the Load Macro section.

General Procedure 1. Select the device to be controlled. The device can be a physical output point, pseudopoint, or flag:

To select a physical output point, click the point arrow head on the physical point bar. Output points have an upward-pointing arrow head.

To select an existing* pseudopoint or flag, click menu item Software points, then click desired type. A dialog box displays with a list of available points. Select the desired point/flag from the list. Click **OK** to select the point. Click **Cancel** to close the dialog box.

RESULT: The result row for the new switching table displays in the space below the schematic. The row shows the user address for the

selected point, a blank column for a delay value, and the desired status/value column with a default status/value for the point. Analog points always have a default value of 0.

*To create a new pseudopoint or flag, use the procedure in the Pseudopoints section, then you can select it.

2. Select other points to create rows in the switching table. You can select any physical points, pseudopoints, or flags.

RESULT: New rows appear below the result row:

- Each digital point has one row that shows the user address for the selected point, a blank column, and a status column with a default status of -.
 - Each analog point has two rows that show the user address for the selected point, a default comparison symbol (>=), a status column with a default status of -, and a second row with zeroes.
3. Customize the switching table by setting up time delays, changing defaults, adding OR columns, and/or adding mathematical formulas. Each row operates a little differently. See the row sections for procedures (Result Row, Digital Condition Rows, Analog Condition Rows, MATH Rows).

Multiple Tables for a Point

Purpose Allow an output point to be driven to multiple states or various logical conditions.

For example, a damper must be open when a fan is ON, but closed when there is a fire. To ensure this, set up multiple switching tables for the damper point.

Digital Tables Tip Complementary digital switching tables should not be used unless a control strategy also controls the digital point. Switching tables that command the point to the one state automatically toggle the point to the zero state or to the control strategy output when its conditions become false. When a control strategy controls a digital point, a zero switching table is the only way to drive the point to the zero state.

Example 1

Dig_out		1
Condition		1

Example 2

Dig_out		1
Condition		0

In Example 1, if condition goes to 0, the table sets Dig_out to 0 automatically. In Example 2, if condition goes to 1, the table sets Dig_out to 0 automatically.

Zero digital switching tables DO NOT have this same feature.

Example 1

Dig_out		0
Condition		1

Example 2

Dig_out		0
Condition		0

In Example 1, if condition goes to 0, Dig_out remains 0.
 In Example 2, if condition goes to 1, Dig_out remains 0.
 This feature is useful in an application where toggling is not desired, for example, in the case of freeze alarms. If a freeze stat alarm causes a condition and the return-to-normal of the freeze stat causes a condition, you would not want the command result to toggle. Instead, you would require a manual override.

Table Identifiers

Each switching table for a point has a different result command. The result command is how software distinguishes the tables. For a digital command table, there can only be two tables, 0 and 1. Analog command tables can have multiple tables depending on the point's range of values.

Procedure

1. Set up the first switching table for the point and save it via menu item File, drop-down item Save.

RESULT: Software saves the table with the value of the output result (the table is also associated with the output point). For example, if the output result is 1, table name is 1.

2. To create another table for the same output point, change the result command. For example, the following table commands a damper to 100 percent open:

Damper		100.0
Fan		1

To create another table for the damper point, click 100.0. Software turns the background light blue. Type a new value, for example, 0.0.

Damper		0.0
Fan		1

Make other changes to the table as desired. For example, change Fan status or add other conditions.

3. Use menu item File, drop-down item Save, to save the new table when done with modifications.

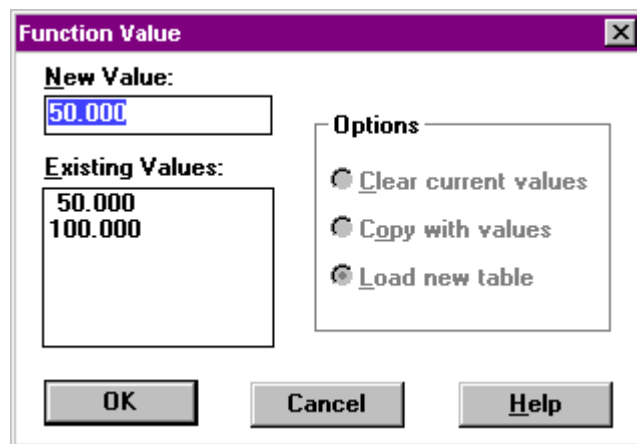
RESULT: There are now two tables for the damper point.

To Recall a Table

To display a specific table for a point with multiple tables:

1. Clear the window (menu item File, drop-down item New/Clear).
2. Click the arrow head for the point.

RESULT: Software displays the Function Value dialog box that lists the available tables.



3. Select desired table by clicking a value in the Existing values list. Then click **OK**.

You can also select a value by clicking the down arrow next to the New Value box and selecting the desired value.

RESULT: The Function value dialog box closes and the selected table displays in the switching logic work space.

There are other options in the Function value dialog box that allow you to create new tables for a point and display a different table. These options are not available unless there is a table on display.

To redisplay the Function value dialog box from a table, click the value in the result row. You may want to move the dialog box to see the table better. Click on the title bar and hold down the mouse button as you move the dialog box to a different position.

The types of actions that you can perform include:

- Erase all parameters in the current table (Clear current values).
- Copy the current table to another table with or without its parameter values (Copy with values or Clear current values).
- Close current table and open another table that already exists (Load new table).

Procedures for each of these actions follow.

Erase all parameters in the current table

- Do not change the table selection in the New Value field
- Select Clear current values, then click **OK**.

RESULT: Software asks first whether or not you really want to clear values. If you click **OK**, software erases all parameters from all rows. For example, if the following table was on display:

Extract_fan_cmd	Te=30s	1	
Supply_fan_cmd	Te=20s	1	0
Analog_condition	>=	0	1
68.0	3.0		

And you selected Clear current values, the dialog box closes and the table redisplay as follows:

Extract_fan_cmd		1	
Supply_fan_cmd		-	-
Analog_condition	>=	-	-
0	0		

NOTE: If you do not change the table selection, the Copy with values and Load new table options just close the dialog box and redisplay the current table.

Copy the current table to another table

- To copy a table to another table, display the table you want to copy.
- Click the result row value to display the Function value dialog box.
- Select the table that you want to receive a copy of the displayed table.

Select Clear current values to copy the current table WITHOUT its values. Select Copy with values to copy the current table WITH its values. (If you select Load new table, software simply closes the current table and displays the selected table.)

- Click **OK**.

RESULT: Software first asks whether you want to clear or replace, as appropriate. If you click **OK**, software copies as directed and displays the changed table.

For example, if there were two tables representing values 100.0 and 50.0 (as follows):

Extract_fan_dmpr	Te=30s	100.0	
Supply_fan_cmd	Te=20s	1	0
Analog_condition	>=	0	1
68.0	3.0		

Extract_fan_dmpr	Te=30s	50.0	
Supply_fan_cmd	Te=20s	0	1
Analog_condition	>=	1	0
85.0	5.0		

And you decided to copy the 100.0 table over the 50.0 table and keep the values from the 100.0 table, the following table would display:

Extract_fan_dmpr	Te=30s	50.0	
Supply_fan_cmd	Te=20s	1	0
Analog_condition	>=	0	1
68.0	3.0		

If you decided to copy over the 50.0 table WITHOUT the values in the 100.0 table, the following table would display:

Extract_fan_dmpr		50.0	
Supply_fan_cmd		-	-
Analog_condition	>=	-	-
0	0		

Close current table and open another table that already exists

- Select a table number in the Existing values box.
- Select Load new table.
- Click **OK**.

RESULT: Software closes the current table and displays the selected table. If you made changes to the current table, software asks first whether or not it should save the changes before it closes it.

Damper/Fire Example

The following example controls a damper with multiple tables (opposite states in each table) to ensure action for a priority situation such as a fire.

Closed
↓

EA_dmpr		0.000	
Supply_fan_cmd		0	-
Flow_status_S.fan		-	0
Fire		0	0

Open
↓

EA_dmpr		100.00	
Fire		1	

OFF and ON Tables If there are two tables for a point, one OFF and one ON, but no control strategy, the ON table has priority and turns the point both ON and OFF. Therefore the OFF table is unnecessary.

If there is a control strategy but no ON table (only an OFF table), the control strategy operates the point unless the OFF table is triggered. Then, switching logic turns the point off. Switching logic always takes precedence.

If there is only an OFF table (no ON table or control strategy), there is nothing to turn the point back on after the OFF table turns it off.

Row Deletion

Purpose Eliminate an unnecessary row (other than the result row).

Procedure

1. Click the -ROW icon in the list down the right-hand side of the window.
 RESULT: The switching table function turns red.
2. Select the input condition (row) to be deleted from the switching table.
 RESULT: Software removes the input condition from the switching table. For a digital input condition, the switching table becomes one row shorter. For an analog input condition, it becomes two rows shorter.

To Cancel Without Deleting To cancel without deleting the row, click the -ROW icon with the right-hand mouse button.

Restriction You cannot delete the result row with this function. Use menu item File, drop-down item Delete, to erase the entire switching table.

Result Row

Purpose The result row specifies the output that software should command when table conditions are true. It can also specify a time delay for a digital commands. The result row is always the first row in a table.

<i>Result Row</i>	Output point user address	Minimum delay time	Digital or Analog value
-------------------	---------------------------	--------------------	-------------------------

Example For example, the following line says to turn the Supply_Fan point on after a minimum delay of 30 seconds:

<i>Result Row</i>	Supply_Fan	Te=30s	1
-------------------	------------	--------	---

Point Type The point must be an output point, pseudopoint, or flag. For digital outputs, the desired result can be either zero or one. For analog outputs, the result is a value. For example, the following line says to open a damper to 100 percent:

<i>Result Row</i>	Bld1_dmpr		100.0
-------------------	-----------	--	-------


Row Changes The following sections explain how to change the output command for the point (digital or analog value) and how to set delay time.

Command Changes

Purpose Modify the resulting command software sends to the selected point.

Digital Points Click the command in the row to change its value.
For example, the 1 in the following row is the click area to change the command output for the table:

Supply_Fan	Te=30s	1
------------	--------	---

Click area 


Whenever you click a command, it changes. For example, a two-position point changes between 1 and 0. A multi-stage point can have seven states, so the command can change from 0 to 1 to 2 to 3 to 4 to 5 to 6.

The command numbers (0, 1, etc) refer to the digital engineering unit table (see Appendix B: Engineering Units, Digital section). For example, the first digital engineering unit table entry assigns ON to 1 and OFF to 0. Therefore, a switching table command to 1 in this example is an ON command and a command to 0 is an OFF command.

This action assumes the Active State flag for the point is enabled. See the Editors chapter, Point Attributes Dialog Boxes, for more details on the Active State attribute.

Analog Points 1. Click the command value.

Bld1_dmpr		100.00
-----------	--	--------

Click area 

RESULT: The background in the value box turns blue.

2. Type a new value.

RESULT: The new value displays in the box.

Analog Command Tip Actual analog output commands depend on point characteristics. The following example illustrates this function.

Ana_out_1		50.0
Condition		1

Ana_out_1 I/O characteristics are:

2V = 0 percent
10V = 100 percent

If no other controls are acting on the Ana_out_1 point (for example, control strategy or other switching logic), the following actions occur:

- If the condition is true, software commands Ana_out_1 to 50.0 (actual command 6V).
- If the condition is false, software commands Ana_out_1 to the lower value of the point's engineering unit range, 0 (2V).

If the point's I/O characteristic were reversed:

2V = 100 percent
10V = 0 percent

Software would still command the point to 0 when the condition is false, but the actual command would be 10V.

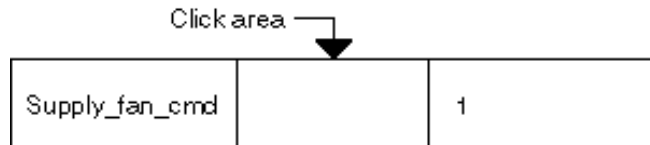
As a further example, if the point's I/O characteristic were 20 to 80 percent (4V to 7V), software would command the point to 20 (4V) when the condition is false.

Delay Command to a Digital Output Point

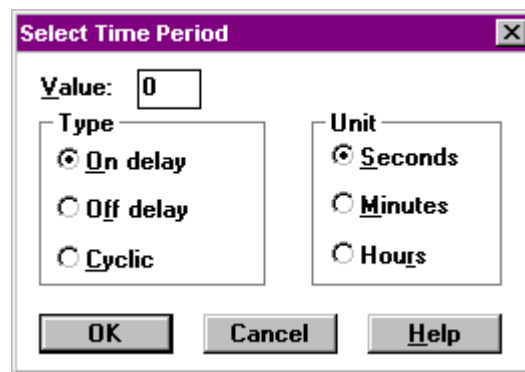
Purpose Add a delay for a digital command result in a switching table. For example, if a switching table commands a supply fan on when conditions are met, you can add a delay of 30 seconds before software actually issues the command.

This function only applies to digital outputs.

Procedure 1. Click the rectangle in the second column of the result row in the switching table (top row). For example:

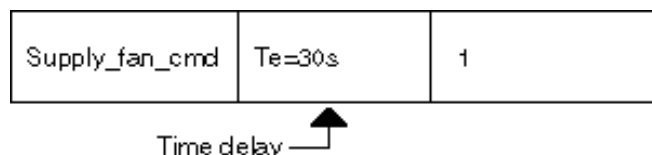


RESULT: The Select Time Period dialog box displays.



2. Type a number for the desired period of time in the Value box. Press **Tab** to go to the Type box.
3. Click desired type of delay:
On delay—Minimum time (T_e in table) that software should add a delay to a start command.
Off delay—Minimum time (T_a in table) that software should add a delay to a stop command.
Cyclic—Cycle time (T_v in table) tells software to alternate ON and OFF times.
4. Press **Tab** to go to the Unit box. Click desired unit of time (Seconds, Minutes, or Hours).
5. Click **OK** to save changes and close dialog box. Or, to close the dialog box without saving changes, click **Cancel**.

RESULT: The selected timer value with its value and unit displays. For example, if you selected 30-second On delay:



To Delete Timer Value

1. Click the timer value to be deleted (in this example, $T_e=30s$).

RESULT: The Select Time Period dialog box displays.

2. Enter 0 (zero) in the Value field.
3. Click **OK**.

RESULT: Software deletes the selected timer value from the row.

See Also ⇒ Digital Condition Rows, Delay for a Row Condition subsection, for procedure to add timer delays to digital conditions

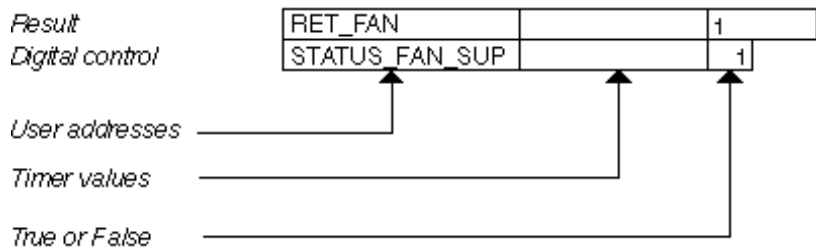
Delay for a Logical AND (Column Delay) section for a procedure to add a delay time to an AND Column

Switching Table Description, Time Delays subsection, for a summary of optional delay actions.

Digital Condition Rows

Purpose Specify required digital conditions to implement the desired output result.

For example, the following table says to turn on the return air fan if the supply air fan is on:

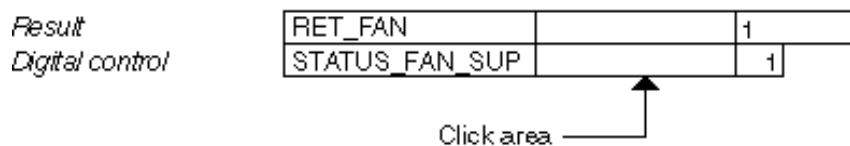


Row Changes The following sections explain how to set delay time and how to change the True or False status for the row.

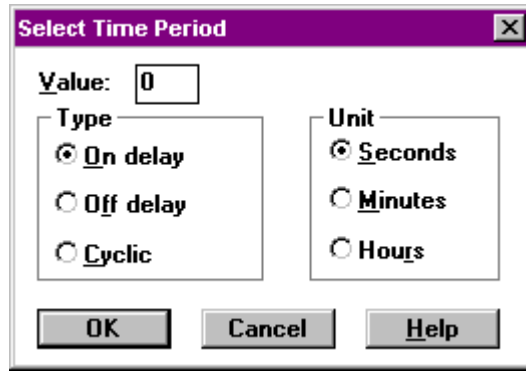
Delay for a Row Condition

Purpose Require a condition to be true for a minimum amount of time before software changes its status to true. For example, a supply fan must be on for at least 30 seconds before software can change its status to true.

Procedure 1. Click the rectangle in the second column of the input condition. For example:



RESULT: The Select Time Period dialog box displays..



2. Type a number for the desired period of time in the Value box. Press **Tab** to go to the Type box.
3. Click desired type of delay:

On delay—Minimum time (T_e in table) that a condition must be on before software should change its status to true.

Off delay—Minimum time (T_a in table) that a condition must be off before software should change its status to true.

Cyclic—Cycle time (T_v in table) tells software to alternate ON and OFF times.

4. Press **Tab** to go to the Unit box. Click desired unit of time (Seconds, Minutes, or Hours).
5. Click **OK** to save changes and close dialog box. Or, to close the dialog box without saving changes, click **Cancel**.

RESULT: The selected timer value with its value and unit displays in the selected field. For example, if you added a 20-second On delay:

Result
Digital control

RET_FAN		1
STATUS_FAN_SUP	Te=20s	1

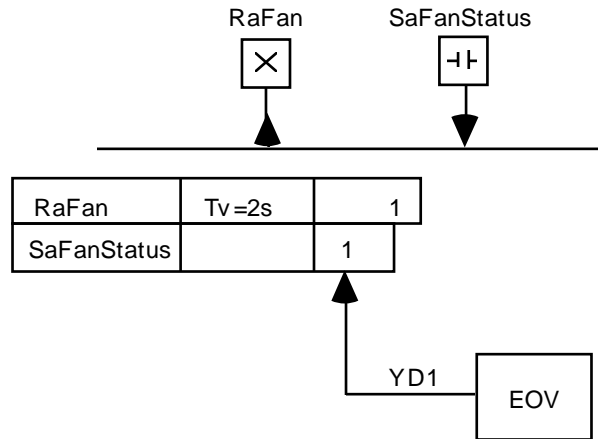
Time delay →

Multiple Row Conditions

If a switching table has more than one digital condition and you assign delays to each condition, the lowest delays may be irrelevant. For example, if digital 1 has a delay of 10 seconds and digital 2 has a delay of 15 seconds, software cannot mark the column as true for at least 15 seconds (the longest time) since all conditions must be true (AND logic) for software to mark the column as true. If a switching table has more than one digital condition plus OR columns, multiple delay times may still be useful since an OR column needs only one condition to be true.

Cycle Timer

Cyclic timers have priority over Control Strategy loops only during the active condition of their cycle. For example, the following figure shows a digital output point, RaFan, being commanded by a switching table that is controlled by the status of a digital input called SaFanStatus. The RaFan point is also controlled by an EOVS operator in a Control Strategy loop.



Scenario 1: SaFanStatus is true; EOv output is false.

RaFan turns on for 2 sec and then releases priority. This action has the effect of turning the point off (standard switching table logic).

Scenario 2: SaFanStatus is true; EOv output is true.

RaFan stays on continuously because switching logic turns the output on for 2 sec and then releases priority to the EOv, which wants the point on. Therefore, it looks like the output is no longer cycling.

To Delete Timer Value

1. Click the timer value to be deleted in the switching table. In the previous example, Te=20s.

RESULT: The Select Time Period dialog box displays.

2. Enter 0 (zero) in the Value field.

3. Click **OK**.

RESULT: Software deletes the selected timer value.

True or False Changes

Purpose

Modify the required status for the point. This status determines how software ANDs the rows.

For example, in the following table, if the supply fan status point (STATUS_FAN_SUP) is on (1) AND the supply fan command point (SUP_FAN_CMD) is on (1), software calculates a True value for the table. If either point is off, software calculates a False value for the table.

RET_FAN		1
STATUS_FAN_SUP		1
SUP_FAN_CMD		1


If you change the required status for one of the points, software calculates the True/False value differently. For example:

RET_FAN		1
STATUS_FAN_SUP		0
SUP_FAN_CMD		1

Now software calculates a True value only if the supply fan status point is off and the supply fan command point is on.

Procedure Click the status in the row to change it to another value. True is 1; False is 0; Not applicable is -.

For example, if the following row were in a table and you clicked 1, the command would change to 0. If you clicked again, it would change to -. Each time you clicked it, it would change.

Click area 

Supply_Fan	Te=30s	1
------------	--------	---




Analog Condition Rows

Purpose Specify required analog conditions to implement the desired output result.

Description Each analog condition requires two rows. The first row specifies user address and comparison type (for example, greater than or equal to). The second row specifies comparison value and deadband differential. Switching status is in the last column and applies to both rows.

For example, the following table says to turn on the return air fan if the supply fan has been on for 30 seconds AND the discharge air temperature is greater than or equal to 68F (20C). The DISCH_AIR_TEMP row is the analog condition:

<i>Result</i>	RET_FAN		1
<i>Digital control</i>	STATUS_FAN_SUP	Te=30s	1
<i>Analog control</i>	DISCH_AIR_TEMP	>=	1
	68.0	3.0	

User addresses (and analog value for analog conditions) 
Timer values for digital points; analog comparisons and deadband values for analog points 
True or False (On or Off) 

The 3.0 value in the last row, second column, creates a deadband of 3 degrees with the 68.0 value to keep the return fan from short cycling due to small changes in temperature. In other words, the temperature has to fall at least to 65 (68 minus 3) to invalidate the condition.

Row Changes The following sections explain how to set comparison type (>=), comparison value, and deadband value, and how to change the True or False status for the row.

Comparison Type

Purpose Select a less than or greater than comparison for the analog point.

Procedure Click the comparison symbol to change it to the other symbol. Only two are available, >= (greater than or equal to) and <= (less than or equal to).

<i>Result</i>	RET_FAN		1
<i>Digital control</i>	STATUS_FAN_SUP	Te=30s	1
<i>Analog control</i>	DISCH_AIR_TEMP	>=	1
	68.0	3.0	

Click area 

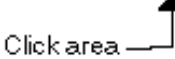
RESULT: The symbol changes to the other symbol. Each click changes the symbol back and forth.

Comparison Value

Purpose Select a point or enter a value for software to compare with the analog control point.

Procedure 1. Click the comparison value box. Initially, the box always shows 0. For example:

<i>Result</i>	RET_FAN		1
<i>Digital control</i>	STATUS_FAN_SUP	Te=30s	1
<i>Analog control</i>	DISCH_AIR_TEMP	>=	1
	0		

Click area 

RESULT: The background in the box turns light blue.

2. Select a physical analog point or a pseudopoint, or enter a value, or enter a mathematical formula using one of the following methods:

- To enter a value (for example, 68.0), type the value.

The value appears in the box and the blue disappears.

- To select a physical analog point, click the point arrow head on the physical point bar.

The user address for the point appears in the box and the blue disappears.

NOTE: If you select an incompatible point (for example, a digital), nothing happens.

- To select an existing* pseudopoint or flag, click menu item Software points, then click desired type. A dialog box displays with a list of available points. Select the desired point/flag from the list. Click **OK** to close the dialog box.

*To create a new pseudopoint or flag, use the procedure in the Pseudopoints section, then you can select it.

The user address for the point appears in the box and the blue disappears.


- To use a mathematical formula for multiple analog points, select the MATH icon. The Mathematical Editor window displays. Enter the required formula. See Excel CARE Control Icons User Guide 74-5577 (US) / EN2B-0184 (Europe) for details on MATH operation. The formula name displays in the comparison value field.

Deadband (or Hysteresis) Value

Purpose Enter a value that creates a range for the comparison value.

For example, in the following table, discharge air temperature is compared to the value 68.0. There is also a deadband (or hysteresis) of 3.0. The deadband value tells software to mark this condition as true as long as discharge air temperature is between 65 and 68. If discharge air temperature falls below 65, software invalidates the condition. Using a deadband prevents frequent command changes.

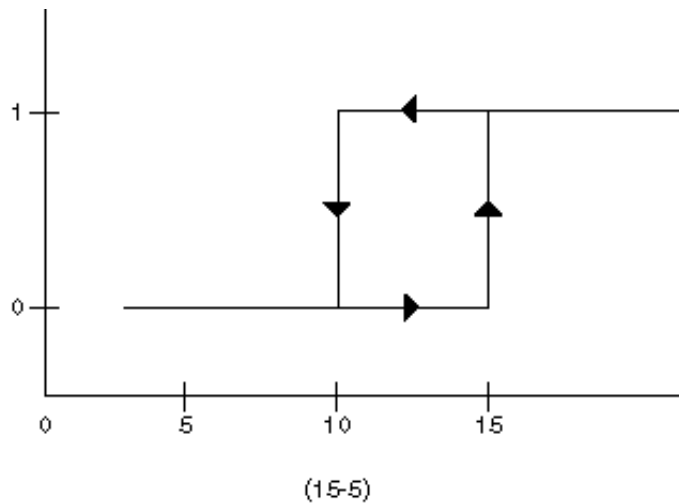
<i>Result</i>	RET_FAN		1
<i>Digital control</i>	STATUS_FAN_SUP	Te=30s	1
<i>Analog control</i>	DISCH_AIR_TEMP	>=	1
	68.0	3.0	

Deadband value 

As another example, you can control a fan based on a temperature as follows:

FAN		1
TEMP_1	>=	1
15	5	

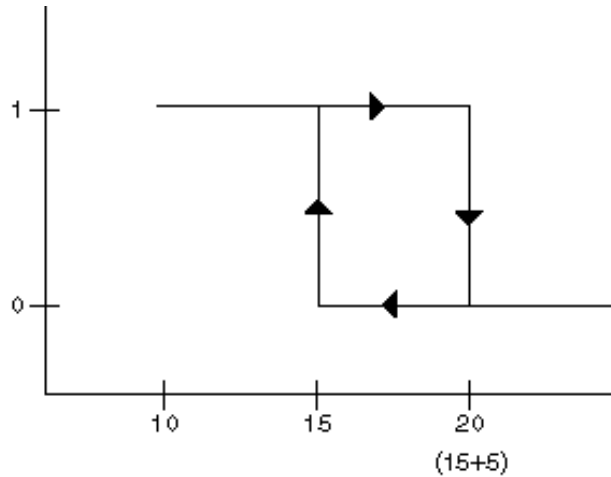
The following operation occurs:



If you reverse the TEMP_1 >= sign to <=:

FAN		1
TEMP_1	<=	1
15	5	

The following operation occurs:



Procedure

1. Click the deadband box.

RESULT: The background in the box turns light blue.

2. Select a physical analog point or a pseudopoint, or enter a value, or enter a mathematical formula using one of the following methods:

- To enter a value (for example, 3.0), type the value.

The value appears in the box and the blue disappears.

- To select a physical analog point, click the point arrow head on the physical point bar.

The user address for the point appears in the box and the blue disappears.

NOTE: If you select an incompatible point (for example, a digital), nothing happens.

- To select an existing* pseudopoint or flag, click menu item Software points, then click desired type. A dialog box displays with a list of available points. Select the desired point/flag from the list. Click **OK** to close the dialog box.

*To create a new pseudopoint or flag, use the procedure in the Pseudopoints section, then you can select it.

The user address for the point appears in the box and the blue disappears.

- To use a mathematical formula for multiple analog points, select the MATH icon. The Mathematical Editor window displays. Enter the required formula. See Excel CARE Control Icons User Guide 74-5577 (US) / EN2B-0184 (Europe) for details on MATH operation. The formula name displays in the deadband field.

True or False Changes

Purpose

Modify the required status for the point. This status determines how software ANDs the rows.

For example, in the following table, if the supply fan status point (STATUS_FAN_SUP) is on (1) AND discharge air temperature (DISCH_AIR_TEMP) is greater than or equal to 65 (1), software calculates a True value for the table. If the status point is off or discharge air temperature is below 65, software calculates a False value for the table.

<i>Result</i>	RET_FAN		1
<i>Digital control</i>	STATUS_FAN_SUP	Te=30s	1
<i>Analog control</i>	DISCH_AIR_TEMP	>=	1
	68.0	3.0	

If you change the required status for one of the points, software calculates the True/False value differently. For example:


<i>Result</i>	RET_FAN		1
<i>Digital control</i>	STATUS_FAN_SUP	Te=30s	0
<i>Analog control</i>	DISCH_AIR_TEMP	>=	1
	68.0	3.0	

Now software calculates a True value only if the supply fan status point is off and discharge air temperature is greater than or equal to 65.

Procedure Click the status in the row to change it to another value. True is 1; False is 0; Not applicable is -.

For example, if the following row were in a table and you clicked 1, the command would change to 0:

Supply_Fan	Te=30s	1
------------	--------	---

Click area 

If you clicked again, it would change to -. Each time you clicked it, it would change.

MATH Rows

Purpose Create a calculated value to replace a variable in a switching table.

Procedure 1. To replace an existing variable in a switching table, click the variable name/value to highlight it. Then, click the MATH icon in the Tool Bar to display the Math Editor window.
To create an analog row in a switching table so that you have a variable to replace with a calculated value, either create an analog pseudopoint or flag (via the Software points menu item) or click a physical point in the schematic.

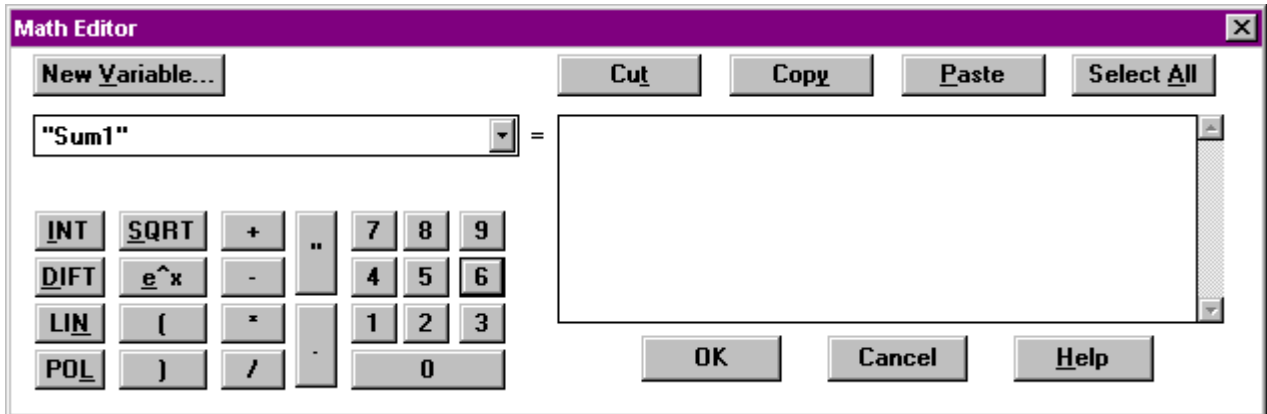
NOTE: After you create a math calculation for a variable, software replaces the point/pseudopoint name with the name of the math variable. Therefore, if you used a pseudopoint/flag, you can delete it during the attach process since it is no longer needed. If you used a physical point, no further action is required.

For example, the following switching table shows three variables, t1, 0, and 0. The t1 variable can be a physical point or an analog pseudopoint or flag defined via the Software points menu item. The zero values automatically display when you create a pseudopoint/flag or click a physical point in a schematic. You can highlight the zero values and click the MATH icon to create calculated values for them, also.

do		1
t1	>=	1
0	0	

RESULT: The Math Editor dialog box displays.

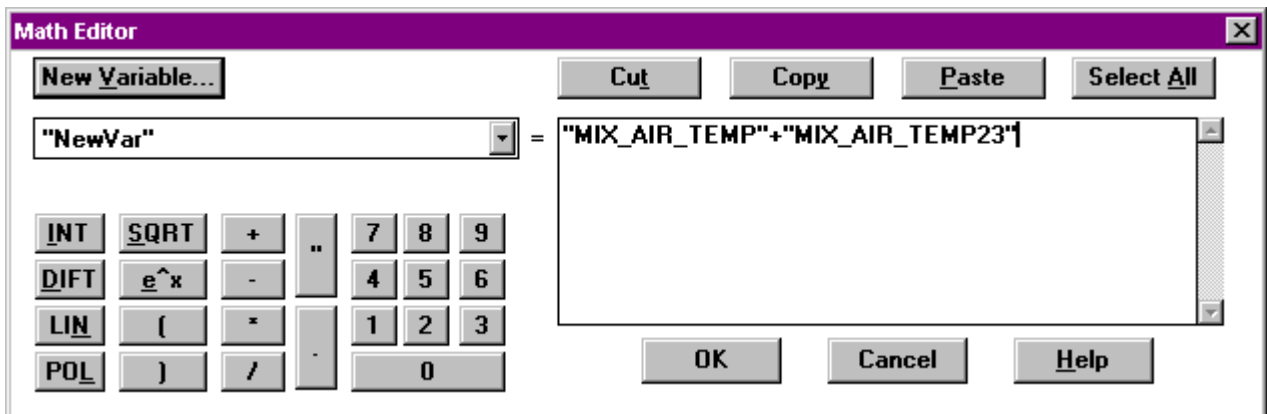
TIP: You can also display the Math Editor dialog box by double-clicking a formula.



2. Click New Variable to enter a new formula name or select an existing formula from the box below New Variable. Click the down arrow in the box to display a list of available variable names. Click one to select it. Its formula displays in the box next to it.

You can now start selecting points from the hardware point triangles or Software points menu, and mathematical functions or values from the calculator pad. See Excel CARE Control Icons User Guide 74-5577 (US) / EN2B-0184 (Europe) for MATH Control Icon details.

Example:



3. Click **OK**.

RESULT: The window closes and the switching table redisplay with the math variable name instead of the original variable name (for example, t1 or zero).

Delay for a Logical AND (Column Delay)

Purpose

Add a delay for a column in a switching table. For example, if a switching table commands a supply fan on when conditions are met, you can add a delay of 30 seconds before software actually issues the command.

Procedure


1. Click the +DELAY icon from the icon list in the right-hand column.

RESULT: Software adds a row for the timer value to the bottom of the switching table.

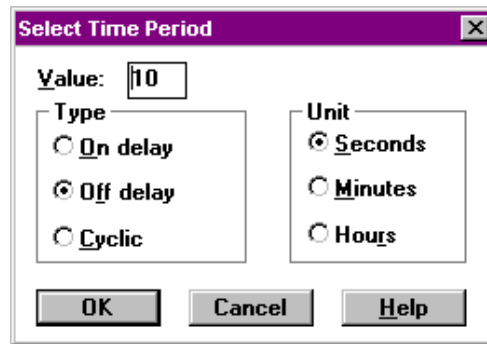
NOTE: If you insert more entries into the switching table later, software adds them above the timer value entry.

- Click the box below the column where you want to add a delay. For example:

Cooler_pump		1
Air_cool_t_status		1
Air_cool_t_sen34	>=	1
60	2	

Click area 

RESULT: The Select time period dialog displays.



- Type a number for the desired period of time in the Value box. Press **Tab** to go to the Type box.
- Click desired type of delay:
 - On delay*—Minimum time (Te in table) that all column conditions must be true before software should add the delay time to the switching table output ON command.
 - Off delay*—Minimum time (Ta in table) that all column conditions must be true before software should add the delay time to the switching table output OFF command.
 - Cyclic*—Cycle time (Tv in table) tells software to alternate ON and OFF times.
- Press **Tab** to go to the Unit box. Click desired unit of time (Seconds, Minutes, or Hours).
- Click **OK** to save changes and close dialog box. Or, to close the dialog box without saving changes, click **Cancel**.

RESULT: The selected timer value with its value and unit displays in the selected field.

To Delete Result Delay

The -DELAY function is available only after you define a delay via the +DELAY function.

- Click the -DELAY icon from the list down the right-hand window column.
 - Software removes the last row containing delay time.

OR Columns and Exclusive OR Columns

Purpose The OR function tells software to command a point when at least one of the conditions in the switching table is true.

For example, the following table says to command the supply fan on if there is a manual override command (for example, from an operator), or Time program 1 commands it on, or the low limit sensor for frost is less than or equal to 2 (with a deadband of 1):

Supply_fan_cmd		1		
man_oride		1	-	-
Time_prog_1		-	1	-
frost_low_limit	<=			
2	1	-	-	1

If Column 1 is true or Column 2 is true or Column 3 is true, command this point

Limits Each table can have a maximum of 10 OR columns and a maximum of eight rows.

Procedure

1. Click the +COL icon in the list down the right-hand window border.

RESULT: Software adds a new OR column to the right-hand edge of the switching table.

2. Click the statuses in the columns to create the appropriate true (1), false (0), and not applicable (-) statuses. Each click changes the status (0 to 1 to - and back to 0).

To Remove a Column

1. Click the -COL icon in the list down the right-hand window border.

RESULT: The switching table function turns red.

2. Click the OR column that you want to delete.

RESULT: Software removes the column from the switching table.

Tip ⇒ To cancel a deletion, click the -COL icon again with the *left-hand* mouse button.

Exclusive OR Tables

Purpose

An Exclusive OR table only allows one true condition in a switching table with OR columns.

A switching table must already have OR columns before you can define an Exclusive OR table.

For example, if you have a switching table with the following OR columns:

Dig_out		1		
Condition 1		1	-	-
Condition 2		-	1	-
Condition 3		-	-	1

You can click XOR to create the following table:

Dig_out		1		
	1	0	0	
	0	1	0	
	0	0	1	

This table tells software to turn Dig_out on if **ONLY ONE** of the three conditions is true. If any two are true, the table is false.

Limits Each table can have a maximum of 10 XOR columns.

- Procedure**
1. Click the XOR icon in the list down the right-hand window border.
 RESULT: The normal switching table disappears and the Exclusive OR table appears.
 2. You can modify the table:
 - To change the True/False values, click any of the 0's and 1's. Each click changes it to the opposite (0 to 1, 1 to 0).
 - To insert a line in the table, click the +XOR icon in the list in the right-hand window border.
 - Software adds the new line to the end of the Exclusive Or table. All entries are preassigned as zero.
 - To delete a line from the table, click the -XOR icon in the right-hand window border. The icon turns red.
 - Click the line to be deleted in the Exclusive Or table. Software deletes the line.
 - To cancel deletion, click the -XOR icon again using the *left-hand* mouse button.

Restriction You cannot delete the Exclusive Or table header (first row).

+XOR and -XOR Functions To use these functions after you establish an Exclusive OR table, redisplay the table by clicking XOR. You can then select a function.
XOR Table Changes There is no indication in a switching table if there is an XOR table assigned to it. The only way to know is to click the XOR button to see if a table appears.

If you change a switching table that has an Exclusive OR table assigned to it, the resulting table action may not be acceptable. Always check whether there is a table and then adjust the table to achieve the desired result.

For example, you can make changes to the following switching table and even though it has an Exclusive OR table assigned, software does not warn you.

pd_2		1	
di_1		1	0
di_2		0	1

XOR table:

pd_2		1	
		1	0
		0	1

If you added an analog line as follows:

pd_2		1	
di_1		1	0
di_2		0	1
ai_1	>=	1	-
5.0	0.5		

Software will AND the analog condition with the di_1 condition before doing the Exclusive or.

Pseudopoints

Definition A pseudopoint is a calculated value; it has no physical basis in the system. It contains a process or control variable required by the switching logic or control strategy. The controller calculates the value while the program is running.

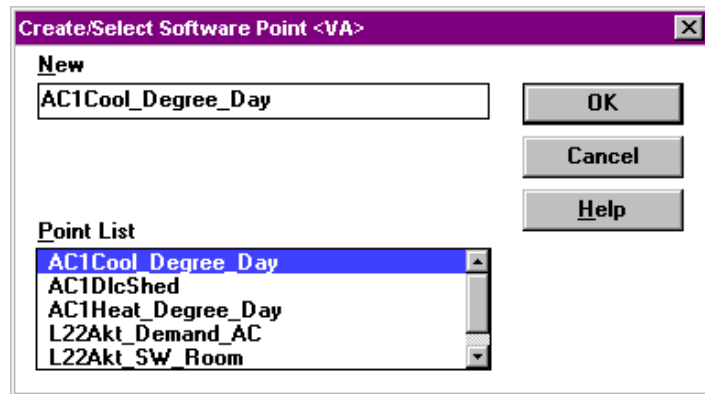
Procedure 1. Click menu item Software points.

RESULT: The pseudopoint types list displays. Types include:

- Pseudo analog (VA)
- Pseudo digital (VD)
- Pseudo totalizer (VT)
- Global analog (GA)—see Globals note.
- Global digital (GD)—see Globals note.
- Flag analog (FA)
- Flag digital (FD)

2. Click required pseudopoint type.

RESULT: The Create/Select Software Point dialog box displays.



3. To create a new pseudopoint, type a new name in the New editing field. New names cannot already exist. Click **OK**.

RESULT: The name of the newly created pseudopoint appears in the list box.

4. To select an existing pseudopoint (or your new one) for inclusion into the currently displayed table, double-click its name. (Or, single-click the name and then click **OK**.)

RESULT: Row(s) for the pseudopoint appear at the bottom of the switching table. One row appears for digitals; two rows for analogs.

5. To end the pseudopoint function and close the dialog box, click **Cancel**.

NState Pseudo digital (VD) points have two subtype choices, 2State and NState. Select the NState if the point has more than two states, for example, OFF, ON, Open, Close, etc.

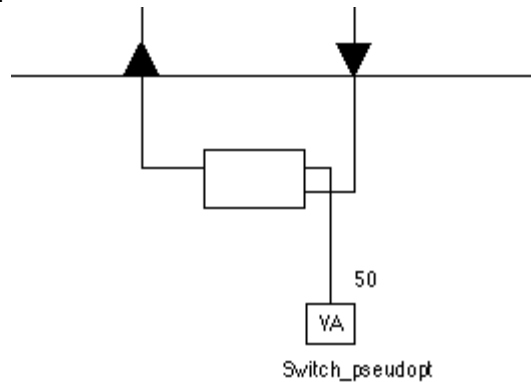
Globals When you create a global, you must match user address and type (analog or digital) with the associated pseudopoint or physical point. The Pseudopoints and Flags subsection in the Control Strategy chapter of this manual describes global points in detail.

Control Strategy Tip If you save the switching table to a pseudopoint, you can also use the pseudopoint in the Control strategy for the plant. For example, if you set up a switching table for an analog pseudopoint so that software commands it to 50 under certain conditions, you can then use the pseudopoint in the control strategy as an input to a function for switching purposes.

Switching table:

Switch_pseudopt		50
condition 1		1
condition 2		1

Control strategy:



Switch_pseudopt acts as an input switch to the control icon.

Switching Logic File Management

Purpose Save, load, delete, and restore switching tables. The File menu item provides drop-down items for these functions:

- Save a Switching Table
- Copy a Switching Table to Another Point
- Load a Switching Table
- Delete a Switching Table
- Restore a Switching Table
- Start a New Switching Table

Save a Switching Table

Purpose Save the currently displayed switching table.

Procedure

1. Click File, then drop-down item Save.

RESULT: The Acknowledge dialog box displays.

2. Click **OK**.

RESULT: The arrow head associated with the output point is cross-hatched in white.

Macro Option

You can also save switching tables in the Macro library for later use in other systems. See the Macros section for details.

Copy a Switching Table to Another Point

Purpose Copy the switching table and assign it to another point (physical or pseudo).

NOTE: The type of point (analog or digital, input or output) you select for reassignment must be compatible with the type of point for which the switching table was created.

Procedure to save to a pseudopoint

1. Click File, then drop-down item Copy.

RESULT: Software highlights the switching table.

2. Click menu item Software points.

RESULT: The list of pseudopoint types displays.

3. Select the required pseudopoint type .

NOTE: The type of point to which the switching table is assigned must be compatible with the type of point for which the switching table was created.

RESULT: The Software points dialog box displays.

4. Select an existing pseudopoint or create a new one.

NOTE: If you create a new point, you must also assign it a place on the software bar in the Control strategy. See Control Strategy, Pseudopoints and Flags section, for procedure. You can assign the point after you complete the switching logic.

5. Click **OK** to assign the point.

RESULT: The Acknowledge dialog box displays, confirming the switching table has been successfully saved. The switching table is no longer highlighted.

NOTE: If the switching table is still highlighted, you selected an incompatible point type. Select a compatible point.

6. Click **OK**.

7. Click **Cancel**.

Tip ⇒ To cancel the storage of the switching table before you finish, click **Cancel** instead of **OK** in Step D. After the dialog box closes, click the right-hand mouse button once. Software removes the highlighting from the table.

Procedure to save to a physical point

1. Click File, then drop-down item Copy.

RESULT: Software highlights the switching table.

2. Select the desired physical point from the plant schematic .

NOTE: The type of point you select must be compatible with the type of point for which the switching table was created.

RESULT: The Acknowledge dialog box displays confirming successful storage.

3. Click **OK**.

RESULT: Software removes the highlighting from the switching table. The physical point symbol is cross-hatched in white.

Control Strategy Tip

If you save the switching table to a pseudopoint, it is available in the Control strategy for the plant.

Load a Switching Table

Purpose Redisplay a previously saved switching table to modify or view it. The outputs for switching tables that already exist are recognizable by the white cross-hatching on the physical point bar.

Procedure Click the desired output arrow head in the plant schematic.

If there is only one switching table for the point, it displays.

If there is more than one table for the point, software displays a dialog box that lists the names of the tables. Click desired table name, then click **OK**. Software displays the selected table.

Delete a Switching Table

- Purpose** Remove an unnecessary switching table.
- Procedure** When the unnecessary table is on display in the window, click File, then drop-down item Delete.

Software deletes the switching table.

See the Load a Switching Table section if you do not know how to display a desired table.

Restore a Switching Table

- Purpose** Cancel modifications made to currently displayed switching table since it was last saved.
- Procedure** Click File, then drop-down item Restore.

The stored version of the switching table displays.

Start a New Switching Table

- Purpose** End the processing of the current switching table and start a new one.
- Procedure**
 1. Click File, then drop-down item New/Clear.

RESULT: The Note dialog box displays.
 2. Click **OK** to save the current switching table and remove it from display. Or, to remove it without saving, click **Cancel**.
 3. Select a point to start a new table.

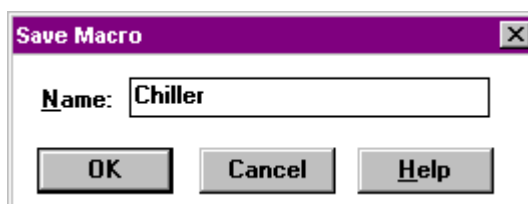
Macros

- Purpose** Save switching tables in a Macro library with descriptive names for reuse throughout the system. All macros are available for all plant types.

Save the Switching Table as a Macro

- Procedure**
 1. Click File, then drop-down item Save macro.

RESULT: The Macro name dialog box displays



2. Click the Name editing field.
3. Enter the name of the macro in the Name editing field.

NOTE: The name may not already exist.

4. Click **OK**.

RESULT: The Acknowledge dialog box confirms the macro has been saved.

5. Click **OK** to close the dialog box.

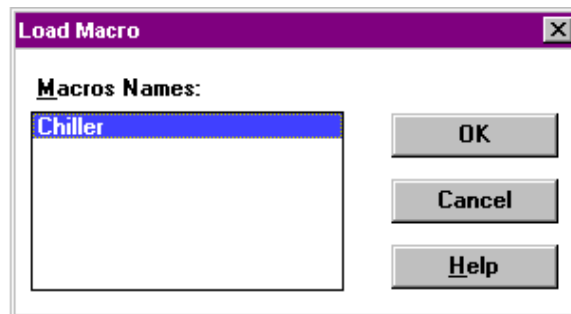
Load a Macro

NOTE: You can only load a macro if no other switching table is currently in the window. Use menu item File, drop-down item New/Clear to clear the window.

Procedure

1. Click File, then drop-down item Load Macro.

RESULT: The Load Macro dialog box displays.



2. Select the macro to be copied from the list of existing macros.

3. Click **OK**.

RESULT: The switching table defined in the macro displays without a point name in the result row.

4. Click menu item File, then drop-down item Copy.

RESULT: Software highlights the switching table.

5. Click the arrow head for the point you want in the result row, that is, the point the switching table should control.

RESULT: The Acknowledge dialog box displays with a message that software copied the switching table.

6. Click **OK** to close the dialog box.

RESULT: The switching table remains as is on the screen (no point in the result row). To see the table with the point in the result row, clear the screen (File, drop-down item New/Clear), then click the arrow head of the point to display the new table.

7. If you use a macro that was created for a different plant, you must change the user addresses stored in the macro to match the new plant. Select the user address to be modified in the switching table.

NOTE: The user addresses included in the macro can be physical as well as pseudopoints. You can only replace user addresses with compatible point types. CARE does not accept incompatible types.

RESULT: The selected field turns light blue.

8. Change the address in the same way you would if you were creating a new switching table. For example:
 - To assign a physical point, click the arrow head for the point in the physical point bar.
 - To assign a pseudopoint, click menu item Software points. The pseudopoint types list displays. Select the required pseudopoint type. The Software points dialog box displays. Select the required pseudopoint. Click OK, then click Cancel.
 - To assign or modify a mathematical relationship between analog user addresses, click the MATH icon. The Mathematical Editor window displays. Enter (or change) the formula. Click **OK**.

RESULT: The selected point user address displays in the selected field.

9. Make any other changes, as desired. Then, save the switching table as usual (menu item File, drop-down item Save).

Plant Information Displays

Physical Point Information

- Procedure**
1. Double-click the physical point about which more information is required.
RESULT: The Data Point Information window displays.
 2. Click **OK** to close dialog box after you finish viewing the information.
RESULT: The dialog box disappears from the screen.

User Addresses

- Procedure**
1. Click View, then drop-down item Physical user address.

RESULT: The user addresses display under the plant schematic. The initial letter of the user address is located vertically below the physical point to which it belongs.
 2. To remove user addresses display, click View, then drop-down item Physical user address again.

RESULT: The user addresses disappear from the screen.

Restriction You cannot select any switching logic functions while the user addresses are on display.

Single Address Display If you move the cursor over a triangle and press and hold the left-hand mouse button down, the user address for the point displays with either a red exclamation symbol or a green check mark symbol. When you release the mouse button, the display disappears.
The red exclamation symbol appears for:

- hardware points with one allowable connection that are used in an XFM
- digital outputs that are connected to a symbol
- flex points that are connected to a symbol
- software points that are connected to an output pin of a symbol.

Print Switching Tables

For printing switching tables see Print Documentation chapter.

Switching Logic Function Exit

- Purpose** Return to the main CARE screen.
- Procedure**
1. Click File, then drop-down item Exit.
RESULT: The Note dialog box displays.
 2. Click **OK** to save the switching table and exit.
Or, to exit without saving, click **No**.
Or, to remain in the Switching Logic function, click **Cancel**.
RESULT: The main CARE menu displays.

EDITORS

Purpose CARE includes several Editors which provide the following:

Datapoint Editor

Assign and/or modify attributes to points. Attributes are, for example, texts defined via Miscellaneous Text Editor (descriptors etc.), user address, technical address, delay time, LON attribute etc. They depend on the point type.

NOTE: The Datapoint Editor is only available after a plant has been attached to a controller. The Editors apply to items on a controller basis, not system-wide.

See Datapoint Editor section.

Miscellaneous Text Editor

Define and/or edit default and custom texts as:

- Point descriptors
- Alarm texts
- Engineering units
- Characteristics
- Multi-state texts

See Miscellaneous Text Editor (CARE XL-5000) section for editing texts of Excel 50/80/100/500/600/800/Smart/ELink/XLink/OLink and OPS controllers.

See Miscellaneous Text Editor (CARE XL-Web) section for editing texts of the Excel Web controller.

Network Variables (NV) Editor

Create/Edit network variables (NVs) for CARE datapoints. Map datapoints to NVs and define value conversion tables for controllers.

See Edit Excel 500/800 Network Interface Manually section.

Time Program Editor

Create daily, weekly and yearly time programs (see Time Program Editor section).

Default Text Editor

Customize project defaults for use in a specific area or region (see Default Text Editor section).

User Address Search Templates Editor

Define general search templates to enable operators using XI581/XI582 Bus-Wide Operator Interface Terminals to quickly search for a set of user addresses (see User Address Search Templates Editor section).

OPS Template Editor

Create templates for OPS controllers, consisting of subsystem drivers, subsystem controllers, and subsystem points (see OPS Controller section).

Point Definitions

A point is a variable that contains information about the system and provides control over system operation. There are two types of points, physical and pseudo:

Physical vs. Pseudo

Physical points refer to controller equipment such as sensors and actuators that sample and modify the environment, for example, space temperature sensors, heating and cooling valves, and dampers. *Pseudopoints* refer to calculation results of software programs.

Point Types

Points, called datapoints, can also be input or output as well as analog, digital, or totalizer:

Input points represent sensors that measure and report conditions in the environment (for example, temperature, relative humidity, airflow).

Output points represent actuators that perform some function in the environment (for example, cooling valves, heating valves, dampers, start/stop relays).

Analog points are controller inputs or outputs with a continuous signal characteristic, that is, a range of values. For example, a thermometer can range from below 0 to over 100. An analog point can be physical or pseudo, input or output, and/or global.

Digital points are controller inputs or outputs with a discrete signal characteristic, that is, three or four states. For example, a pump can have two states, ON and OFF, and a pulsed transducer can have electrical signals that monitor flow. A digital point can be physical or pseudo, input or output, and/or global.

Totalizer points are controller inputs that process pulsed inputs up to 24V dc, for example, metered utility consumption. Totalizer points are always input (not output). A totalizer point can be physical or pseudo. It can also be global.

Globals

Global points are a type of pseudopoint that can be either an input or output. The purpose of global points is to share point information across controllers on a bus. Global inputs *receive* information from a point in another controller. Use a global input when one controller has a point that should be global to many other controllers.

Global outputs *send* information to other points in other controllers. Use a global output when one controller has a point that is global to only one point in another controller. You can also use global outputs for some control icons that only connect to outputs and the output must be global. Global outputs can only be associated with pseudopoints or output points (not input points).

For more details on the operation of global points, see Global Analog Point Editor Dialog Box later in this section.

Point Addresses

The system tracks points via technical addresses that locate and define the point. Operator's command and display points via user addresses.

User Address

Point name (maximum of 18 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. Examples: Rmtempfl1 and FlotempG/fl. This name and the descriptor further define the point. The name, not the descriptor, must be unique within a controller.

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

Technical Address

Internal six-digit number that defines and locates a point in the system. The number is composed of three pairs representing controller number (0-30), module number (1-16), and terminal number (1-12). Example: 010310 meaning Controller 1, Module 3, terminal 10.

Datapoint Editor

Purpose

Define and/or modify attributes for points. Attributes are descriptive information for points and depend on the type of point. For example, analog points specify high and low warning and alarm limits, while digital points specify runtime values.

Edit Datapoints

The Datapoint Editor is accessible via logical plant tree.

Procedure

1. In the logical plant tree, click on desired datapoint, you want to edit

RESULT: On the right pane, the Properties tab displays the datapoint attributes.

The screenshot displays the Datapoint Editor interface. On the left, there are two hierarchical trees. The top tree shows the structure: DebisStuttgart_Stage2 > CONT01 > BlockA > Analog Input > AI1 (selected). Below it, other options like AI2, AI3, AI4, AI5, Analog Output, Digital Input, Digital Output, and Pseudo Digital 2 Stage are visible. The bottom tree shows a different view: DebisStuttgart_Stage2 > Bus > LON-Works > Channels > Channel_1 > Default System > CONT01 > W7751-VAV2 > W7753-UV.

The right pane is the Properties panel for the selected datapoint (AI1). It is divided into several sections:

- Type:**
 - User Address: AI1
 - Technical Address: 01/90/00
 - Point Role: (empty)
 - Point Subtype: AI Slow
 - Lon Point: NV - Input
 - NV Type: (Input) SNVT_temp_p, (Output) none
 - VCT: none
- Misc. Editor Functions:**
 - Engineering Unit: V
 - Descriptor: (empty)
 - Alarm Text: (empty)
 - Characteristic: Linear Input
- Special Values:**
 - Operator Access Level: 3
 - Write Protect Priority: 0
 - Sensor Offset: 0,000000
 - High Alarm Limit: 100,0 V
 - High Warning Limit: 98,0 V
 - Low Warning Limit: 2,0 V
 - Low Alarm Limit: 0,0 V
 - Alarm Delay: 10 sec
 - Alarm Hysteresis: 1,0 V
 - Trend Hysteresis: 1,0 V
 - Trend Cycle: 0 minut.
- Checkboxes:**
 - Critical Alarm Type
 - Supress Alarm
 - Hide Point






2. For getting an introduction in datapoint editing, refer to the Basic Working Techniques section. To firstly define/modify texts, see the Miscellaneous Text Editor (CARE XL-5000) and Miscellaneous Text Editor (CARE XL-Web) sections.

Basic Working Techniques

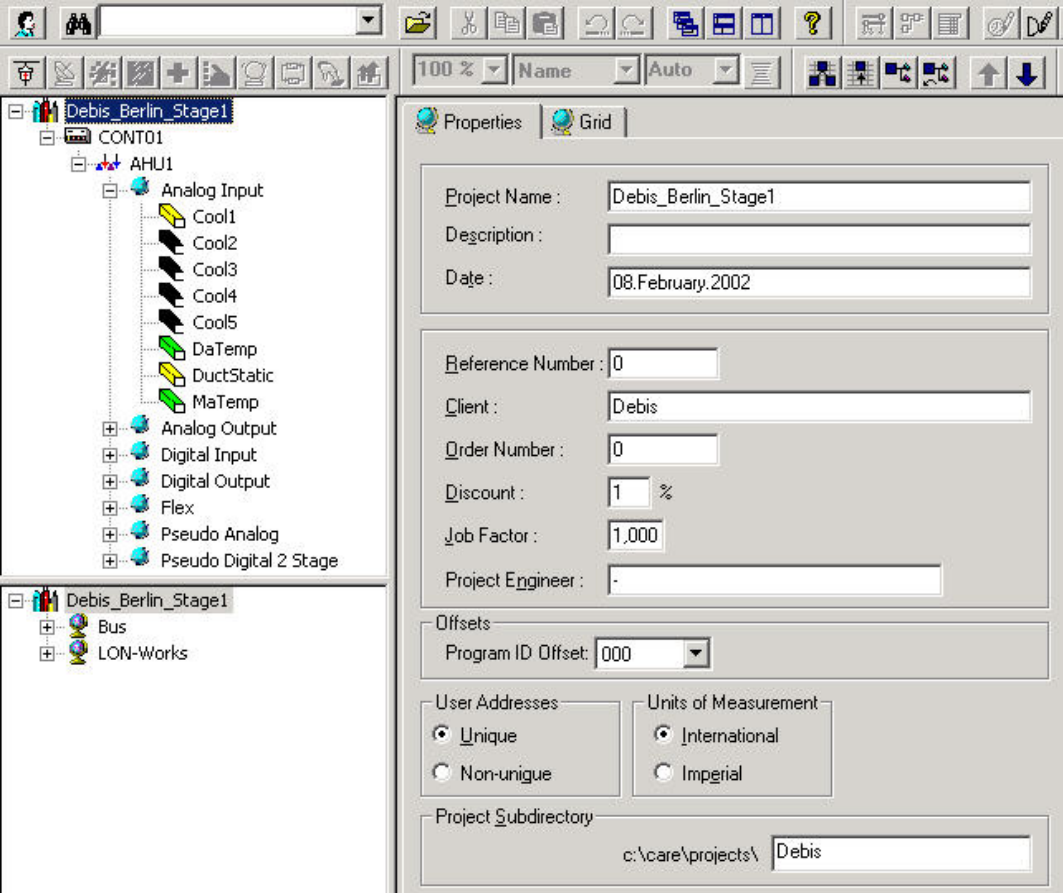
Tree and Information Display

Hierarchical Tree


In the logical plant tree, the project is available as hierarchical tree with the following objects:

-  Project (max. one)
-  Controller(s)
-  Plant(s)
-  Point Types
-  Single Points

Open and navigate through the tree via common Windows techniques, that is double-clicking on the icon or the + and - symbols at the object icons.



The screenshot shows the CARE software interface. On the left, there is a tree view for a project named 'Debis_Berlin_Stage1'. The tree is expanded to show a controller 'CONT01' containing a plant 'AHU1'. Under 'AHU1', there are several point types: Analog Input (with sub-items Cool1, Cool2, Cool3, Cool4, Cool5, DaTemp, DuctStatic, MaTemp), Analog Output, Digital Input, Digital Output, Flex, Pseudo Analog, and Pseudo Digital 2 Stage. Below the tree, there is a summary view showing 'Bus' and 'LON-Works'. On the right, the 'Properties' and 'Grid' panels are visible. The 'Properties' panel contains fields for Project Name (Debis_Berlin_Stage1), Description, Date (08.February.2002), Reference Number (0), Client (Debis), Order Number (0), Discount (1 %), Job Factor (1,000), and Project Engineer. The 'Grid' panel shows 'Program ID Offset' (000), 'User Addresses' (Unique selected, Non-unique unselected), 'Units of Measurement' (International selected, Imperial unselected), and 'Project Subdirectory' (c:\care\projects\Debis).

In the *Standard* toolbar, the filter on/off icon  allows to apply a freely definable filter.

Information Display

Clicking on the desired object (project, controller, plant, point type, point) in the tree, displays the corresponding information on the corresponding right-sided tab. The information of an object can be displayed differently and depends on the selected display type. You have the following possibilities:

- Itemized Display from within tree
- Grid Display (table)

In the itemized display, you can do the following:

- Display project, controller, and plant information
- Edit attributes of individually selected points
- In addition to the possibility of editing points in itemized display, all points of the same kind can be displayed and edited in grid display when selecting the respective point type icon in the tree.

In the grid display you can do the following:

- Display all points of a project, plant, controller, or point type as grid and edit point attributes in the grid (table).
- Optionally you can display a point in itemized display from within the grid.
- In addition to the possibility of editing all points in grid display, an individual point is always displayed and can be edited in itemized display when selecting it in the tree.

Examples:

Project in Itemized Display (Project Information)

The screenshot displays the CARE software interface for project information. The left pane shows a tree view of the project 'Debis_Berlin_Stage1' with sub-items like CONT01, AHU1, and various point types. The right pane shows the 'Properties' tab with fields for Project Name, Description, Date, Reference Number, Client, Order Number, Discount, Job Factor, Project Engineer, Offsets, User Addresses, Units of Measurement, and Project Subdirectory.

Tree View (Left Pane):

- Debis_Berlin_Stage1
 - CONT01
 - AHU1
 - Analog Input
 - Cool1
 - Cool2
 - Cool3
 - Cool4
 - Cool5
 - DaTemp
 - DuctStatic
 - MaTemp
 - Analog Output
 - Digital Input
 - Digital Output
 - Flex
 - Pseudo Analog
 - Pseudo Digital 2 Stage

Properties Tab (Right Pane):

- Project Name: Debis_Berlin_Stage1
- Description: [Empty]
- Date: 08.February.2002
- Reference Number: 0
- Client: Debis
- Order Number: 0
- Discount: 1 %
- Job Factor: 1,000
- Project Engineer: -
- Offsets: Program ID Offset: 000
- User Addresses: Unique, Non-unique
- Units of Measurement: International, Imperial
- Project Subdirectory: c:\care\projects\ Debis

Point in Itemized Display (invoked from within tree)

The screenshot displays the CARE software interface. On the left, a tree view shows the project structure: **Debis_Berlin_Stage1** (expanded) contains **CONT01** (expanded), which contains **AHU1** (expanded). Under **AHU1**, there is an **Analog Input** category containing **Cool1**, **Cool2**, **Cool3**, **Cool4**, **Cool5**, **DaTemp** (selected), **DuctStatic**, and **MaTemp**. Below this are **Analog Output**, **Digital Input**, **Digital Output**, **Flex**, **Pseudo Analog**, and **Pseudo Digital 2 Stage**. A second tree view below shows **Debis_Berlin_Stage1** containing **Bus** and **LON-Works**.

The **Properties** dialog box is open, showing the following configuration for the selected **DaTemp** point:

- Type**
 - User Address: DaTemp
 - Technical Address: 01/01/01
 - Point Role: [Empty]
 - Point Subtype: AI Slow
 - Lon Point: NV - Input
 - NV Type: (Input) SNVT_temp_p
 - (Output) none
- Misc. Editor Functions**
 - Engineering Unit: Deg
 - Descriptor: [Empty]
 - Alarm Text: [Empty]
 - Characteristic: PT 1000 Type FA
- Special Values**
 - Operator Access Level: 3
 - Write Protect Priority: 0
 - Sensor Offset: 0,000000
 - Critical Alarm Type:
 - Suppress Alarm:
 - Hide Point:
 - High Alarm Limit: 140,0 Deg
 - High Warning Limit: 130,0 Deg
 - Low Warning Limit: 50,0 Deg
 - Low Alarm Limit: 40,0 Deg
 - Alarm Delay: 10 sec
 - Alarm Hysteresis: 3,0 Deg
 - Trend Hysteresis: 1,0 Deg

Controller in Grid Display

Debis_Berlin_Stage1

- CONT01
 - AHU1
 - Analog Input
 - Cool1
 - Cool2
 - Cool3
 - Cool4
 - Cool5
 - DaTemp
 - DuctStatic
 - MaTemp
 - Analog Output
 - Digital Input
 - Digital Output
 - Flex
 - Pseudo Analog
 - Pseudo Digital 2 Stage

- Debis_Berlin_Stage1
- Bus
- LON-Works

Properties Grid Terminal Assignment for Controller: CONT01

Point	User Address	Techn. Address	Sensor Offset	Bus	Characteristic	Engineering Unit	Descriptor	Alarm Text	Oper. Access Level	Suppr. Alarm	Critical Alarm (Type)	Alarm Point	Alarm Delay	High Alarm Limit
Filter														
AO	A01	01.02.01		IP	LINEAR_GRAPH	Pct			3	<input checked="" type="checkbox"/>				
AO	A010	01.02.02		IP	LINEAR_GRAPH	Pct			3	<input checked="" type="checkbox"/>				
AO	A02	01.02.03		IP	LINEAR_GRAPH	Pct			3	<input checked="" type="checkbox"/>				
AO	A03	01.02.04		IP	LINEAR_GRAPH	Pct			3	<input checked="" type="checkbox"/>				
AO	A04	01.02.05		IP	LINEAR_GRAPH	Pct			3	<input checked="" type="checkbox"/>				
AO	A05	01.90.02		IP	LINEAR_GRAPH	Pct			3	<input checked="" type="checkbox"/>				
AO	A06	01.06.01		IP	LINEAR_GRAPH	Pct			3	<input checked="" type="checkbox"/>				
AO	A07	01.06.02		IP	LINEAR_GRAPH	Pct			3	<input checked="" type="checkbox"/>				
AO	A08	01.06.03		IP	LINEAR_GRAPH	Pct			3	<input checked="" type="checkbox"/>				
AO	A09	01.06.04		IP	LINEAR_GRAPH	Pct			3	<input checked="" type="checkbox"/>				
AO	ClgVlv	01.90.03		IP	LINEAR_GRAPH	Pct			3	<input checked="" type="checkbox"/>				
AI	Cool1	01.01.04	0,000000	IP	Linear Input	V			3	<input type="checkbox"/>	<input type="checkbox"/>		10	100,0
AI	Cool2	01.01.05	0,000000	IP	Linear Input	V			3	<input type="checkbox"/>	<input type="checkbox"/>		10	100,0
AI	Cool3	01.01.06	0,000000	IP	Linear Input	V			3	<input type="checkbox"/>	<input type="checkbox"/>		10	100,0
AI	Cool4	01.01.07	0,000000	IP	Linear Input	V			3	<input type="checkbox"/>	<input type="checkbox"/>		10	100,0
AI	Cool5	01.01.08	0,000000	IP	Linear Input	V			3	<input type="checkbox"/>	<input type="checkbox"/>		10	100,0
DI	DaFitAlm	01.90.09		IP		Normal			3	<input type="checkbox"/>	<input checked="" type="checkbox"/>		10	
AI	DaTemp	01.01.01	0,000000	IP	PT 1000 Type F.1	Deg			3	<input type="checkbox"/>	<input type="checkbox"/>		10	140,0
FF	Do_Feedback_DI1	DI3				On								
FF	Do_Feedback_DI2	DI3				On								
FF	Do_Feedback_DI3	DI3				On								
AI	DuctStatic	01.90.05	0,000000	IP	Pressure 0-3"	lnw			3	<input type="checkbox"/>	<input checked="" type="checkbox"/>		30	2,00
DI	FrzStat	01.90.10		IP		Normal			3	<input type="checkbox"/>	<input checked="" type="checkbox"/>		10	
AO	HtgVlv	01.03.02		IP	LINEAR_GRAPH	Pct			3	<input checked="" type="checkbox"/>				
AO	MaDmpr	01.90.04		IP	LINEAR_GRAPH	Pct			3	<input checked="" type="checkbox"/>				
AI	MaTemp	01.01.02	0,000000	IP	PT 1000 Type F.1	Deg			3	<input type="checkbox"/>	<input type="checkbox"/>		10	90,0
DO	SaFan	01.05.01		IP		On			3	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
DI	SaFanStatus	01.90.00		IP		Off			3	<input type="checkbox"/>	<input type="checkbox"/>		10	
AO	SaFanVolCtrl	01.90.01		IP	LINEAR_GRAPH	Pct			3	<input checked="" type="checkbox"/>				
PD2	EXECUTING_STOPPED					Normal			3	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
PD2	SHUTDOWN					Normal			3	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
PD2	STARTUP					Normal			3	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
PA	static_setpoint					°C	Static setpoi		3	<input checked="" type="checkbox"/>	<input type="checkbox"/>			99999

Point in Itemized Display (invoked from within Grid Display)

Data Point			
Type			
User Address:	L22_MW_DischarTemp	DIO/LON	
Technical Address:	22/91/01	Controller:	BWMMI_MUKD
Point Role:		Plant Info:	OFFICE_BUILD_VEN
Point Subtype:	AI Slow	Point ID:	
Lon Point:	none		
NV Type: (Input)	none		
(Output)	none		
Misc. Editor Functions			
Engineering Unit:	°C		
Descriptor:	FAX		
Alarm Text:	CHECK SENSOR		
Characteristic:	NTC		
Special Values			
Operator Access Level:	3	High Alarm Limit:	50 °C
		High Warning Limit:	40 °C
		Low Warning Limit:	10 °C
Write Protect Priority:	0	Low Alarm Limit:	5 °C
Sensor Offset:	49.861111	Alarm Delay:	10 sec
<input type="checkbox"/> Critical Alarm Type		Alarm Hysteresis:	0 °C
<input checked="" type="checkbox"/> Suppress Alarm		Trend Hysteresis:	0 °C
<input type="checkbox"/> Hide Point		Trend Cycle:	0 minut.

The display type is set up by the grid configuration function (see Configure Grid section).

Configure Grid

Purpose Configuring the grid includes the following:

- Set up kind of display, itemized or grid display
- Select columns to show in grid and number of frozen columns
- Set up zoom factor and filter line display

Procedure 1. Click on menu item Options, then drop-down item Grid Configuration

or,

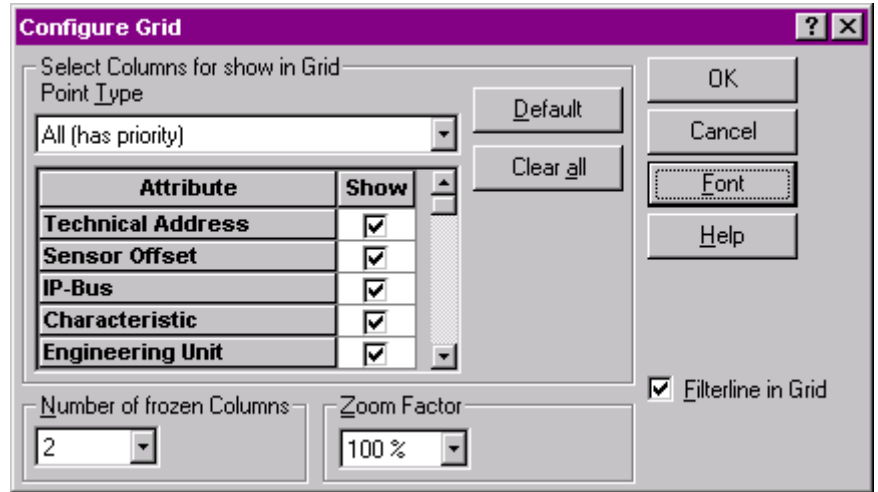
click Configure Grid button  on the toolbar

or,

when in grid display, point cursor over the grid.

Click right mouse button, select Options and click on Grid in the context menu.

RESULT: The Configure Grid dialog box displays.



2. Select desired options under:

Select Columns for Show in Grid

Here you define which attributes for which point types will be displayed in the columns. It is possible to select attributes to be displayed for all points and individually for different point types. This provides the display of single attributes (columns) for all points and to differentiate for which point types the general selected attributes should be displayed or not.

Point Type

In the drop-down list select the point type for which you want to define the attributes that should be displayed. In the attributes list below check the attributes for the point type in the Show column. Use the default button, if you want to check all attributes. Use the Clear all button, if you want to uncheck all attributes.

In the grid, fields will be grayed and disabled for point types which have not the attribute at all and/or have not checked the attribute for show in the grid.

Options: All (has priority), Analog Input etc.

The settings made for the All (has priority) option are valid for all points and have priority over the settings made for individual point types. But attributes checked for the All (has priority) option will only be displayed as columns, if the same attributes are checked for minimum one point type.

Example:

If the characteristic is checked for the All (has priority) option and is not checked for the Analog Input point type and Analog Output point type, the Characteristic column will not be displayed. Vice versa the same is true, that is, even if the characteristic is checked for the analog input and output point types, and for All (has priority) the characteristic is not checked, the Characteristic column will not be displayed.

All (has priority) Characteristic checked
 Analog Input Characteristic checked
 Analog Output Characteristic checked

All (has priority) Characteristic checked
 Analog Input Characteristic checked
 Analog Output Characteristic **not** checked

Point	User Address	Techn. Address	Characteristic
Filter			
AI	L22_MW_DischarTemp	22/01/04	NTC Type F
AI	L22_MW_Frosttemp	22/01/02	Direct Out 0-100%
AI	L22_MW_OaTemp	22/01/01	NTC
AI	L22_MW_RoomTemp	22/01/05	Roomsensor
AI	L22_MW_SupplyTemp	22/01/03	NTC
AO	L22_ST_EH_Valve	22/02/04	LINEAR_GRAPH
AO	L22_ST_KL_DistrAir	22/02/03	0-10 Volt
AO	L22_ST_KL_Mixer	22/02/02	LINEAR_GRAPH
AO	L22_ST_KL_SupplAir	22/02/01	PT 1000 Type C/I
AO	L22_ST_KÜ_Valve	22/02/05	PT 1000 Type F/I
DI	L22_BM_But_Climate	22/03/03	
DI	L22_BM_FireAlarm	22/03/09	
DI	L22_SM_Frostwatch	22/03/07	
DI	L22_SM_Smokedetect	22/03/08	
DI	L22_SM_UP_Heater	22/03/10	
DI	L22_SM_Vent_DcAir	22/03/05	
DI	L22_SM_Vent_SupAir	22/03/04	
DI	L22_SM_Watch_Sp_Dc	22/03/06	
DO	L22_SB_UP_Chiller	22/04/02	
DO	L22_SB_UP_Heater	22/04/01	
DO	L22_SB_Vent_DcAir	22/04/04	
DO	L22_SB_Vent_SupAir	22/04/03	
TO	L22_BM_ElectrMeter	22/03/01	
TO	L22_BM_WaterMeter	22/03/02	
FF	DO_Feedback_DI	DI3	
FM	Multi	DO6	
FP	Pulse2	DO2	
PA	L22Akt_Demand_AC		
PA	L22Akt_SW_Room		
PA	L22VZ_SW_Room		
PD2	EXECUTING_STOPPED		
PD2	SHUTDOWN		
PDn	STARTUP		
PT	PT1		
PT	PT2		
GA	GA1	00/00/00	

Points without the Characteristic attribute

Point	User Address	Techn. Address	Characteristic
Filter			
AI	L22_MW_DischarTemp	22/01/04	NTC Type F
AI	L22_MW_Frosttemp	22/01/02	Direct Out 0-100%
AI	L22_MW_OaTemp	22/01/01	NTC
AI	L22_MW_RoomTemp	22/01/05	Roomsensor
AI	L22_MW_SupplyTemp	22/01/03	NTC
AO	L22_ST_EH_Valve	22/02/04	
AO	L22_ST_KL_DistrAir	22/02/03	
AO	L22_ST_KL_Mixer	22/02/02	
AO	L22_ST_KL_SupplAir	22/02/01	
AO	L22_ST_KÜ_Valve	22/02/05	
DI	L22_BM_But_Climate	22/03/03	
DI	L22_BM_FireAlarm	22/03/09	
DI	L22_SM_Frostwatch	22/03/07	
DI	L22_SM_Smokedetect	22/03/08	
DI	L22_SM_UP_Heater	22/03/10	
DI	L22_SM_Vent_DcAir	22/03/05	
DI	L22_SM_Vent_SupAir	22/03/04	
DI	L22_SM_Watch_Sp_Dc	22/03/06	
DO	L22_SB_UP_Chiller	22/04/02	
DO	L22_SB_UP_Heater	22/04/01	
DO	L22_SB_Vent_DcAir	22/04/04	
DO	L22_SB_Vent_SupAir	22/04/03	
TO	L22_BM_ElectrMeter	22/03/01	
TO	L22_BM_WaterMeter	22/03/02	
FF	DO_Feedback_DI	DI3	
FM	Multi	DO6	
FP	Pulse2	DO2	
PA	L22Akt_Demand_AC		
PA	L22Akt_SW_Room		
PA	L22VZ_SW_Room		
PD2	EXECUTING_STOPPED		
PD2	SHUTDOWN		
PDn	STARTUP		
PT	PT1		
PT	PT2		
GA	GA1	00/00/00	

Number of frozen Columns

In the drop-down list, select the number of frozen columns. These columns remain and will always be displayed when you horizontally scroll in the grid. The max. are 4 columns, but you also can select no columns to be frozen.

Zoom Factor

Select the zoom factor within the range of 60 through 135 %.

Default

To check all attributes for display in the grid, click this button.

Clear all

To uncheck all attributes, click this button. No attributes will be displayed in the grid.

Font

To select a different font for the grid display, click this button and select desired font in the Fonts dialog box

Filterline in Grid

To display the filterline in the grid, check this option. To hide the filterline, uncheck this option (see Use Filterline in Grid chapter).

3. Click OK to save settings.
4. Click on desired object (project, controller, plant, point type, point) in the tree. The display is updated.

Edit Points in Grid Display

The grid displays all points of the project sorted in rows with their attributes ordered in columns.

Point	User Address	Techn. Address	Sensor Offset	Bus	Characteristic	Engineering Unit	Descriptor	Alarm Text
Filter								
AI	L22_MW_DischarTemp	22/01/04	30,	IP	NTC Type F	K	FAX	YOU HAVE CHANGED
AI	L22_MW_Frosttemp	22/01/02	0,0	IP	Direct Out 0-10	°C	FAX	Error
AI	L22_MW_OaTemp	22/01/01	0,0	IP	NTC	°C	VENTILATIONPLANT-OFFICE	CHECK SENSOR
AI	L22_MW_RoomTemp	22/01/05	23,	IP	Roomsensor	°C	VENTILATIONPLANT-OFFICE	YOU HAVE CHANGED
AI	L22_MW_SupplyTemp	22/01/03	0,0	IP	NTC	GPM	FAX	CHECK SENSOR
AO	L22_ST_EH_Valve	22/02/04		IP		°C	text 21	
AO	L22_ST_KL_DistrAir	22/02/03		IP			VENTILATIONPLANT-OFFICE	
AO	L22_ST_KL_Mixer	22/02/02		IP		Inw	VENTILATIONPLANT-OFFICE	
AO	L22_ST_KL_SupplAir	22/02/01		IP		Inw	VENTILATIONPLANT-OFFICE	
AO	L22_ST_KÜ_Valve	22/02/05		IP		Inw	text 45	
DI	L22_BM_But_Climate	22/03/03		IP		ON	VENTILATIONPLANT-OFFICE	YOU HAVE CHANGED
DI	L22_BM_FireAlarm	22/03/09		IP		ON	VENTILATIONPLANT-OFFICE	FIREALARM
DI	L22_SM_Frostwatch	22/03/07		IP		NORMAL	VENTILATIONPLANT-OFFICE	!!! A L A R M !!!
DI	L22_SM_Smokedetect	22/03/08		IP		NORMAL	VENTILATIONPLANT-OFFICE	FIREMESSAGE
DI	L22_SM_UP_Heater	22/03/10		IP		NORMAL	VENTILATIONPLANT-OFFICE	! MALFUNCTION !
DI	L22_SM_Vent_DcAir	22/03/05		IP		NORMAL	VENTILATIONPLANT-OFFICE	! MALFUNCTION !
DI	L22_SM_Vent_SupAir	22/03/04		IP		On	VENTILATIONPLANT-OFFICE	! MALFUNCTION !
DI	L22_SM_Watch_Sp_Dc	22/03/06		IP		NORMAL	VENTILATIONPLANT-OFFICE	FANBELT-DAMAGE
DO	L22_SB_UP_Chiller	22/04/02		IP		ON	COOLING INDEX	
DO	L22_SB_UP_Heater	22/04/01		IP		ON	text 49	
DO	L22_SB_Vent_DcAir	22/04/04		IP		ON		
DO	L22_SB_Vent_SupAir	22/04/03		IP		ON		
TO	L22_BM_ElectrMeter	22/03/01		IP		FPM	ELECTRICITY_METER-OFFICEBUILDING	
TO	L22_BM_WaterMeter	22/03/02		IP		bar	WATERMETER-OFFICEBUILDING	
FF	DO_Feedback_DI	DI3				Manual		
FM	Multi	DO6				AUTO		
FP	Pulse2	DO2				On		
PA	L22Akt_Demand_AC					K	MIXED AIR FLAPS	YOU HAVE CHANGED
PA	L22Akt_SW_Room					°C	VENTILATIONPLANT-OFFICE	
PA	L22VZ_SW_Room					°C	HEATINGPLANT-OFFICE	
PD2	EXECUTING_STOPPED					On	OFFICEBUILDING	
PD2	SHUTDOWN					On	OFFICEBUILDING	
PDn	STARTUP							
PT	PT1							
PT	PT2							
GA	GA1	00/00/00						

On the left point abbreviations bar the points are displayed by the following abbreviations:

- AI Analog Input
- AO Analog Output
- DI Digital Input
- DO Digital Output
- FA Flag Analog
- FO Flag Digital
- FF Flex DO_Feedback_DI
- FM Flex Multistage
- FP Flex Pulse2
- GA Gobal Analog
- GD2 Gobal Digital 2state
- GDn Gobal Digital Nstate
- PA Pseudo Analog

PD2 Pseudo Digital 2state
 PDn Pseudo Digital Nstate
 PT Pseudo Totalizer
 TO Totalizer

Change rows and column width

Point cursor between two row/column titles till the cursor turns into the divider symbol. Change size as desired

Freeze columns

Click on menu item Options, then drop-down item Grid... to display the Configure Grid dialog box.

Under Number of frozen columns select the number of columns you want always to be displayed while scrolling horizontally within the grid.

Click OK.

Sort columns

You can sort certain columns alphabetically in ascending (A to Z) or descending (Z to A) order.

Double-click the column you want to sort. This affects the order of all other columns.

Edit fields

Formats

Disabled fields are grayed in all or their text is grayed. Negative values are red-marked. Shared points are blue-marked. The thousand digit is displayed with a dot, the hundred digit with a comma.

Field types

There are two different field types you can meet while working in the grid, the simple fields, and the dynamic fields.

Simple fields

Simple fields do not show a down arrow. They typically display numeric values. After pointing over the field a few seconds a yellow tool tip displays the range the attribute value in the field can have, and the engineering unit. For example, the tool tip below displays the min. and max. value for the High Warning Limit.

High Warning Limit	Low Warning Limit	Low Alarm Limit
40,0	30,0	5,0
40	20	5
40	30	5
Unit: °C, min : -25,0 max : 112,5		
40,0	30,0	5,0

Locate the point in the point abbreviations bar.

Point a few seconds over the field in the row.

Click into the field and enter the value within the range displayed in the tool tip.

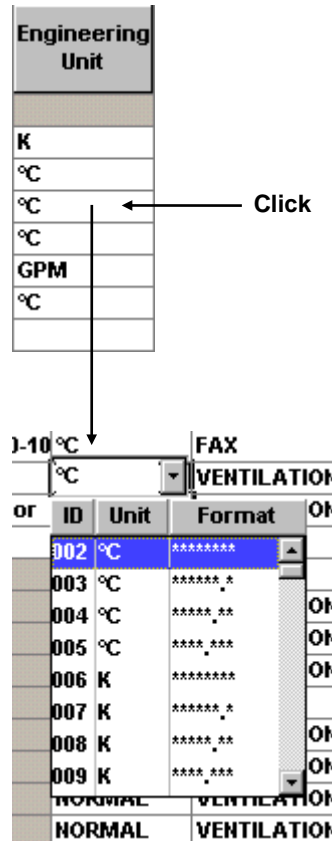
Click outside the field or press ENTER key to confirm.

NOTE: You cannot enter values outside the range.

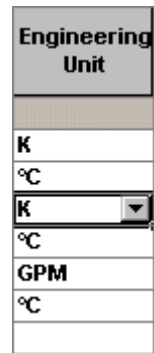
Dynamic fields

At first glance dynamic fields look like simple fields.

But after clicking them they get the behavior and look of a drop-down list. That is, they get a down-arrow on the right side to display a drop-down list for selecting an option. The list shows a detailed column wise description of the choices for the attribute (e. g. ID, Unit, Format for the Engineering Unit field).



After selecting an option the down arrow is still displayed.

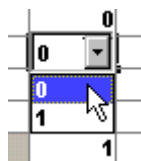


After quitting the field, the down arrow disappears.

Select Options

Drop-down lists

To select an option from a drop-down list, click on the down arrow at the field and select option from the list.



Check boxes

To select an option via check boxes, click on the check box at the desired option.

Point Disab.	Suppr. Alarm
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

Change of Engineering Units' Format

The analog and digital engineering units' format is displayed in a tool tip when pointing over the field.

In case of changing the format for an engineering unit all corresponding fields (indicated by the engineering unit next to the field) are updated instantly. According to this the decimal places will be cut, if the engineering unit currently selected has less decimal places than the prior selected engineering unit..

IMPORTANT

When changing an engineering unit of the same kind, for example, hrs into min a conversion of the absolute values in the respective fields does not take place. Change the absolute value.

Change of Characteristics

In case of changing a characteristic, either by selecting another characteristic or by changing the reference values via Miscellaneous Text Editor, the high and low alarm and warning limits will be updated due to that change.

IMPORTANT

Change values of the previous, but currently displayed limits, if they are not within the range of the new and updated limits, caused by the change of the characteristics.

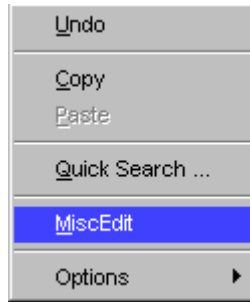
Define and Edit texts

Texts are engineering units, descriptors, alarm texts, and characteristics and they can be defined and edited in the Miscellaneous Text Editor.

Select controller in the logical plant tree.

Position mouse cursor over the grid.

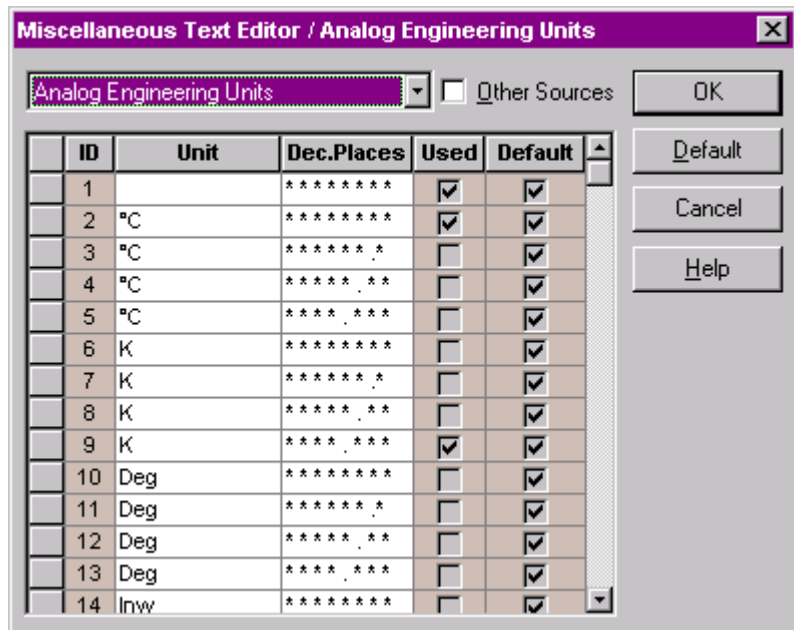
Click right mouse button, and then MiscEdit in the context menu.



or,

click on menu item Options, then drop-down item Edit Text, and desired text (Analog. Eng. Units, etc.)

The Miscellaneous Text Editor dialog box displays.



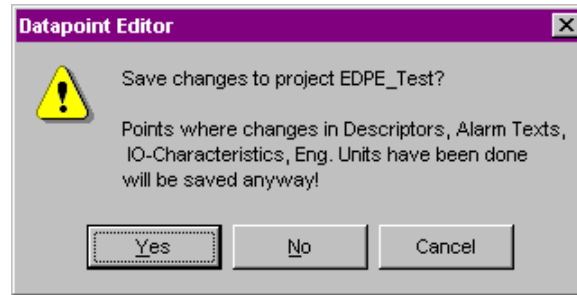
For detailed description of the Miscellaneous Text Editor functions, please refer to the Miscellaneous Text Editor section.

Save Changes

When working in the grid display, changes you have made, are automatically saved without the need to confirm the changes.

IMPORTANT

*When closing the project or the Datapoint Editor, software asks if you want to save or discard the last changes that have been done in the **current** grid display. Note that even if you discard changes, points that were changed in descriptors, alarm texts, engineering units, or I/O characteristics will be saved anyway.*



Edit Points in Itemized Display from within Tree

Click on the point in the tree to display point attributes in itemized display. You exit the dialog by selecting another object in the tree.

Properties	
Type	
User Address:	L22_Mw_DischargAir IP
Technical Address:	22/01/04 Controller: BWMMI_MUKO_EN
Point Role:	Plant Info: BUILDING_A_VENTILAT
Point ID:	Point ID:
Point Subtype:	AI Slow
Lon Point:	NV - Input & Output
NV Type: (Input)	SNVT_temp VCT: Demo
(Output)	SNVT_amp_ac VCT: none
Misc. Editor Functions	
Engineering Unit:	°C
Descriptor:	FAX
Alarm Text:	CHECK SENSOR
Characteristic:	NTC
Special Values	
Operator Access Level:	3
High Alarm Limit:	50 °C
High Warning Limit:	40 °C
Low Warning Limit:	10 °C
Low Alarm Limit:	5 °C
Write Protect Priority:	0
Sensor Offset:	49,000000
Alarm Delay:	10 sec
<input type="checkbox"/> Critical Alarm Type	Alarm Hysteresis: 0 °C
<input checked="" type="checkbox"/> Suppress Alarm	Trend Hysteresis: 0 °C
<input type="checkbox"/> Hide Point	Trend Cycle: 0 minut.

Edit fields

Formats

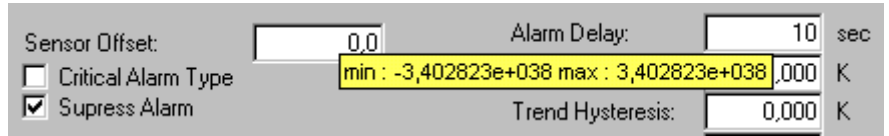
Disabled fields are grayed in all or their text is grayed. Negative values are red-marked. The thousand digit is displayed with a dot, the hundred digit with a comma.

Field types

There are two different field types you can meet while working in the itemized display, the simple fields, and the dynamic fields..

Simple fields

Simple fields do not show a down arrow. They typically display numeric values. After pointing over the field a few seconds a yellow tool tip displays the range the attribute value in the field can have. For example, the tool tip below displays the min. and max. value for the Sensor Offset. The meaning of +038 is exponent superscript 38.



Locate the point in the point abbreviations bar.
Point a few seconds over the field in the row.

Click into the field and enter the value within the range displayed in the tool tip.

Click outside the field or press ENTER key to confirm.

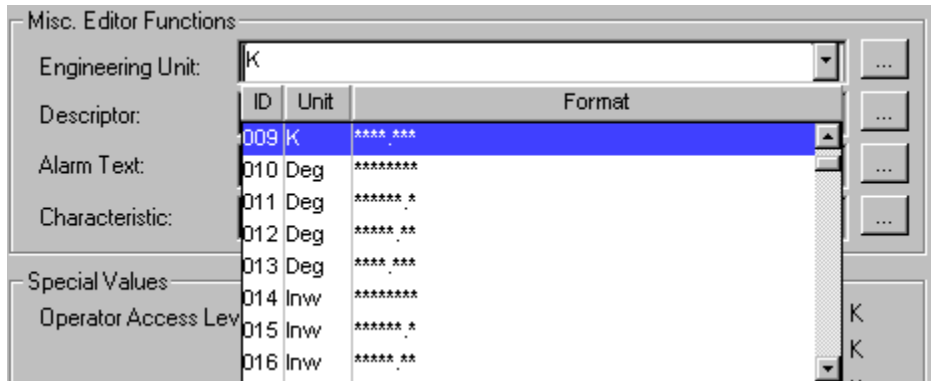
NOTE: You cannot enter values outside the range.

Dynamic fields

At first glance dynamic fields look like simple fields.



But after clicking them they get the behavior and look of a drop-down list. That is, they get a down-arrow on the right side to display a drop-down list for selecting an option. The list shows a detailed column wise description of the choices for the attribute (e. g. ID, unit, format for the Engineering Unit field).



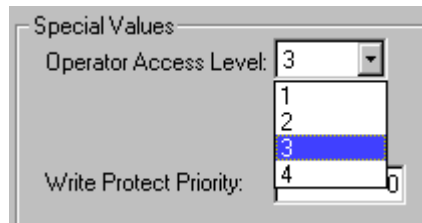
After selecting an option the down arrow is still displayed.



After quitting the field, the down arrow disappears.

Select Options**Drop-down lists**

To select an option from a drop-down list, click on the down arrow at the field and select option from the list.

**Check boxes**

To select an option via check, click on the check box at the desired option.

Point Disab.	Suppr. Alarm
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>


Radio buttons

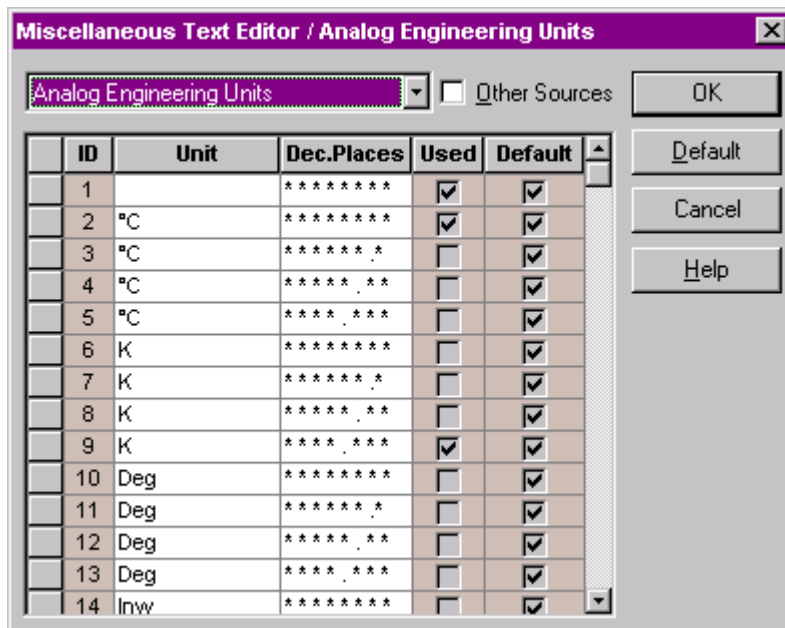
To select an option via radio button, click on the radio button at the desired option.

**Define and Edit texts**

Texts are engineering units, descriptors, alarm texts, and characteristics and they can be defined and edited in the Miscellaneous Text Editor.

Click on the datapoint in the tree.

On the Properties tab on the right, click dotted button  in the Misc. Text Editor area to open the Miscellaneous Text Editor dialog box.



For detailed description of the Miscellaneous Text Editor functions, please refer to the Miscellaneous Text Editor section.

Change of Engineering Units' Format

The analog and digital engineering units' format is displayed in a tool tip when pointing over the field.

In case of changing the format for an engineering unit all corresponding fields (indicated by the engineering unit next to the field) are updated instantly. According to this the decimal places will be cut, if the engineering unit currently selected has less decimal places than the prior selected engineering unit.

IMPORTANT

When changing an engineering unit of the same kind, for example, hrs into min a conversion of the absolute values in the respective fields does not take place. Change the absolute value.

Change of Characteristics

In case of changing a characteristic, either by selecting another characteristic or by changing the reference values via Miscellaneous Text Editor, the high and low alarm and warning limits will be updated due to that change.

IMPORTANT

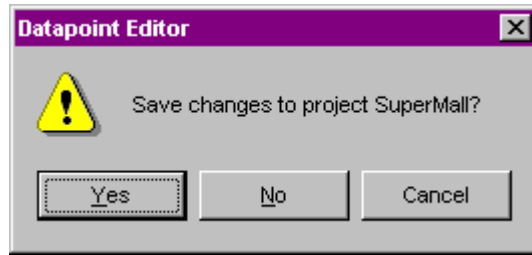
Change values of the previous, but currently displayed limits, if they are not within the range of the new and updated limits, caused by the change of the characteristics.

Save Changes

When working in the itemized display from within the tree, changes you have made are automatically saved without the need to confirm the changes.

IMPORTANT

*When closing the project or the Datapoint Editor, software asks, if you want to save or discard the **last** changes that have been done to the **current** point displayed. Note that all changes that have been done to points prior to the current point are already saved and cannot be discarded.*



Edit Points in Itemized Display from within Grid

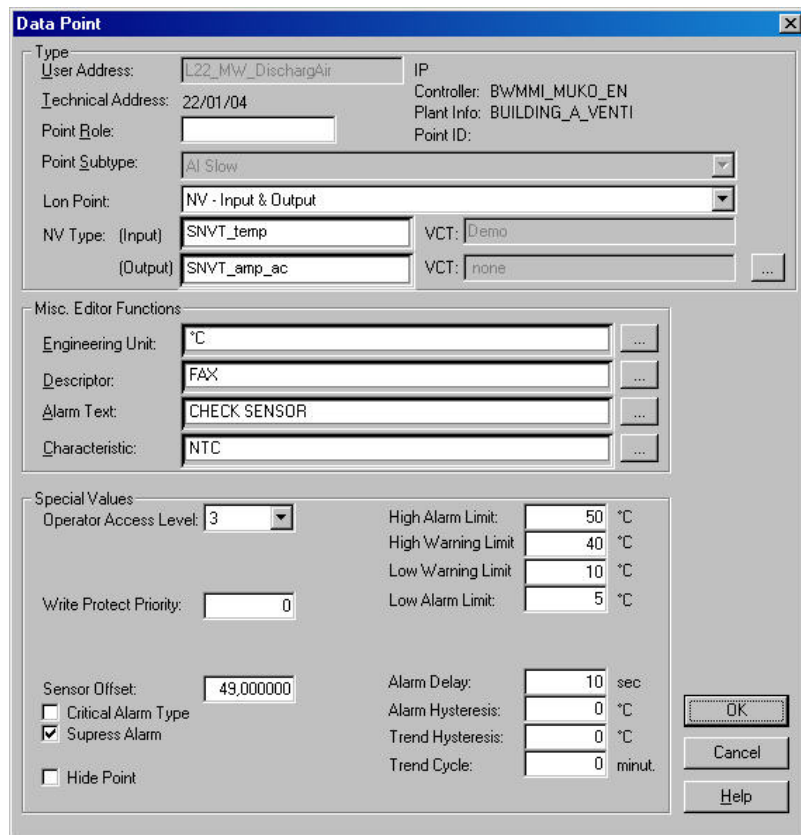
Purpose Additional feature to edit a point in itemized display, when working in Grid display. .

Procedure 1. In the grid, double-click on the point in the point abbreviations bar.

RESULT: The corresponding dialog box is displayed showing all attributes like in itemized display. In opposite to the Itemized display, where changes are automatically saved, you must confirm your changes by clicking OK.





Point	User Address	Techn. Address
Filter		
AI	L22_MW_DischarTemp	22/01/04
AI	L22_MW_Frosttemp	22/01/02
AI	L22_MW_OaTemp	22/01/01
AI	L22_MW_RoomTemp	22/01/05
AI	L22_MW_SupplyTemp	22/01/03
AO	L22_ST_EH_Valve	22/02/04

Double-Click →





2. Edit the values as described in the Edit Point in Itemized Display section.
3. Confirm your actions by clicking OK.

Expand and Collapse the Tree

Purpose	Quickly expanding or collapsing the tree.
Procedure	<p>Expanding/collapsing the whole tree</p> <p>When expanding the whole tree every hierarchical level is displayed. When collapsing the whole tree only the project name is visible.</p> <ol style="list-style-type: none"> 1. Click any object in the tree (project, controller, etc.) 2. Click menu item Edit, then drop-down item Tree expand all or, click Tree expand all icon  on the toolbar, if you want to see all hierarchical levels of the tree. <p>or,</p> <p>click menu item Edit, then drop-down item Tree collapse all or, click Tree collapse all icon  on the toolbar, if you want to see only the project name in the tree.</p> <p>Expanding/collapsing parts of the tree</p> <p>When expanding/collapsing parts of the tree every hierarchical level below the object selected in the tree, is displayed/closed.</p> <ol style="list-style-type: none"> 1. In the tree, click the object (project, controller, etc.), which hierarchical levels below should be displayed/closed (not displayed) 2. Click menu item Edit, then drop-down item Tree expand from here or, click Tree expand from here icon  on the toolbar, if you want to see all hierarchical levels below the object selected in the tree. <p>or,</p> <p>Click menu item Edit, then drop-down item Tree collapse from here or, click Tree collapse from here icon  on the toolbar, if you want to close all hierarchical levels below the object selected in the tree.</p>

Navigate in the Tree

Purpose	Navigate in the tree by moving from one object to the next/previous object.
Procedure	<p>Starting from the current cursor position in the tree, click on the</p> <p>Next item icon  , if you want to move downwards to the next object in the tree.</p> <p>or,</p> <p>Previous item icon  , if you want to move upwards to the previous object in the tree.</p>

Arrange Windows

Purpose	When more than one project is opened, you can arrange the windows to fit your needs.
----------------	--

Procedure Click menu item Window, then desired drop-down item:

Cascade, if you want to display the windows in a cascade.
or,
Tile Horizontally, if you want to display the windows one below the other.
or,
Tile Vertically, if you want to display the windows side by side.
or,
Arrange Icons, to order the windows, which were closed before and displayed as icons on the bottom of the screen.

View/Hide Toolbar

Purpose Display/Hide toolbar and/or status bar. The tool bar provides menu functions as icons. The status bar displays messages of software actions, e.g. creating grid, etc.

Procedure Click menu item View, and then check/uncheck desired drop-down item:

Toolbar, if you want to display/hide the toolbar under the menu bar
and/or,
Status bar, if you want to display/hide the status bar on the bottom.

RESULT: Depending on the previous selection of the menu item (checked or unchecked), the bar will be displayed or hidden.

Point Descriptions

Point Descriptions

The following describes how to display and modify attributes for the different point types.

Excel 500/800 Points

Analog Input Point

- Purpose** Display and/or modify the attributes for a selected analog input point.
- Procedure** In the tree, click desired point to display current values on the right Properties tab (itemized display).

Properties

Type

User Address: A1 IP
 Technical Address: 01/90/04 Controller: DEMO
 Point Role: Plant Info: hvac
 Point ID:
 Point Subtype: AI Fast
 Lon Point: none
 NV Type: (Input) none VCT:
 (Output) none VCT:

Misc. Editor Functions

Engineering Unit: °C
 Descriptor:
 Alarm Text:
 Characteristic: NTC

Special Values

Operator Access Level: 3
 High Alarm Limit: 100.0 °C
 High Warning Limit: 98.0 °C
 Low Warning Limit: 2.0 °C
 Low Alarm Limit: 0.0 °C
 Write Protect Priority: 0
 Alarm Delay: 10 sec
 Alarm Hysteresis: 1.0 °C
 Trend Hysteresis: 1.0 °C
 Trend Cycle: 0 minut
 Sensor Offset: 0.000000
 Critical Alarm Type
 Suppress Alarm
 Hide Point
 Comment:

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, edit desired values in the fields, and/or select/deselect desired options.

Modules	You can assign "slow" analog input points to slow or fast input modules (XF521 and XFL521 or XF526). You can assign "fast" analog input points only to fast input modules (XF526) (see Terminal Assignment Tool chapter).	
Attributes description	User Address	<p>Point name (maximum of 18 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. Examples: Rmtempf1 and FlotempG/fl. The user address and the descriptor further define the point. This name must be unique within a controller. User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.</p> <p>IMPORTANT <i>Note that the max. length of the user address for Lon points should not exceed 18 characters (see Lon point attribute).</i></p> <p>Behind the user address field the bus type (IP bus or LON-bus) where the point resides, is displayed.</p>
	Technical Address	<p>Internal six-digit number that defines and locates a point in the system. The technical address is composed of three pairs representing controller number (0-30), module number (1-16), and terminal number (1-12). Example: 010310 meaning Controller 1, Module 3, terminal 10. Operators use the User Address to refer to points.</p> <p>For LON points the module number is 90. When the number of LON points (terminals) exceeds 99, the module number will change to 91 and the next LON point gets number 1.</p> <p>To change the technical address see the Terminal Assignment Function chapter.</p>
	Controller Name	Name of controller where the point is assigned. Display only. This assignment is done during plant attachment.
	Plant Info	Plant name
	Point Role	Point Role created via an external tool like Win EDS. The point role can be edited.
	Point ID	Point ID created via an external tool like Win EDS.
	Point Subtype	Type of point. List of choices depends on input module type where the point is assigned.
	Lon Point	<p>Define whether the datapoint should be a LON point. Select from the list under:</p> <p>NV-Input Creates input NV.</p> <p>NV-Output Creates output NV.</p> <p>NV-Input & Output Creates both, Input and output NV.</p> <p>Manual Mapping Provides selection of this datapoint for mapping to NVs in the NV-Editor.</p>

NV Type	<p>Define the NV-type for the LON point. From the Input and/or Output drop-down lists select desired type.</p> <p>To edit a LON point, open the NV-Editor by clicking the dotted button on the right.</p>
VCT	<p>Displays whether or not a value conversion table (VCT) is assigned to the NV-Input Type or NV-Output Type.</p>
Engineering Unit	<p>List of choices displays engineering units with ID, unit, and format.</p> <p>To add and change units in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter)</p>
Descriptor	<p>Supplemental point information (maximum of 32 characters). Each Excel Controller has a unique set of descriptors (64 for Ver. 1.2 Controllers; 255 for Ver 1.3 and greater Controllers) that can be assigned to its user addresses to further describe them. Example: user address "Rmtempfl1" can have a descriptor of "Heating circuit, West wing" to help define its location.</p> <p>List of choices displays descriptors with ID and text.</p> <p>To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Alarm Text	<p>Alarm text that displays on point alarm.</p> <p>List of choices displays alarm texts with ID and text.</p> <p>To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Characteristic	<p>Input and output characteristics of the associated sensor.</p> <p>List of choices displays characteristics with ID and text.</p> <p>To add and change characteristics in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Operator Access Level	<p>Access level (1 through 4) that an operator must have to modify point data via an operator terminal. For example, if a point has an Operator Access Level of 2, only operators with Access Level 2 and higher can change point attributes.</p>
Initial. Value	<p>Value of the point on initial start-up.</p>
Write Protect Priority	<p>Prevent lower-level operators from changing point attributes that a higher-level operator changed. For example, if a point has an Access attribute of 2 and an operator with Access Level 3 changes an attribute, software restricts future changes to operators with at least Level 3 access. Write protection prevents any Level 1 operators from overwriting higher-level operator changes. Default is 0. Valid range is 0 to 255.</p>
Sensor Offset	<p>Sensor offset value. It can be set to 0.</p> <p>IMPORTANT</p> <p>When controller OS 2.06.00 – 2.06.04 has been chosen, note the following restrictions and malfunctions:</p>

Smart I/O modules

The sensor offset value entered here, is not processed by the Smart I/O module. To assure proper working, enter the sensor offset in the network tree for the UCPT.

Critical Alarm Type

Whether the point alarm condition is critical or not. Critical alarms display on the central PC when they occur. Noncritical alarms do not display software only writes them to the alarm printer and alarm history file.

Suppress Alarm

Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the alarm and warning limits.

Hide Point

Whether the point is visible or hidden. If a point is hidden, it will not be displayed to the user when performing online wildcard search on a central (only for controller OS greater Ver. 2.0).

High Alarm Limit
High Warning Limit
Low Warning Limit
Low Alarm Limit

High (max) and low (min) limits for point value. Limit values must be between the limits for the associated Characteristics. Limit values must also maintain the following relationship:

$$\text{High Alarm} \geq \text{High Warning} > \text{Low Warning} \geq \text{Low Alarm}$$

If you change the Characteristics assignment, the High limits default to the maximum characteristic value (if larger than the new max) and the Low limits default to the minimum characteristic value (if smaller than the new min). The limits change only if they are outside the range of the new characteristic.

Alarm Delay

How long (0 through 3600 seconds) an alarm condition must exist before software generates an alarm.

Alarm Hysteresis

Available for controller OS Ver. greater than 1.5. This value is the amount that an analog point must change before software reports an alarm or return-to-normal. Value range is 0 or x to y where x is determined by the engineering unit decimal position and y is determined by the difference of the high warning limit - low warning.

Engineering Unit

Decimal Position	Min. Value (x)
0	1.0
1	0.1
2	.01
3	.001

Diff: = high warning limit - low warning.

For example, if the analog point has the following values:

engineering unit = Degrees with one decimal point
high alarm limit = 85.0
high warning limit = 82.0
low warning limit = 68.0
low alarm limit = 65.0

$$\text{Diff} = 82.0 - 68.0 = 14.0$$

Therefore, the valid range is .01 to 14.
 Default varies between 1 and 5 depending on schematic element. If the value is zero, fixed hysteresis applies.

Trend Hysteresis

Available for controller OS Ver. greater than 1.5. The value that the point must change (negative or positive) before software writes it to the trend buffer. Valid range is 0 or x to 100,000,000 (selected by entering 99999999). The value of x is determined by the engineering unit of the point as follows:

Engineering Unit	
Decimal Position	Min. Value (x)
0	1.0
1	0.1
2	.01
3	.001

If the value is 0, the trend behaves as in OS Ver. lower than 1.5 and is as follows:
 If value is greater than 20, the change must be at least 1 percent. If the value is less than 20, the change must be at least .2 units

Default is 0 for points that are not part of an element. To lessen or turn off the transmission of trend data, assign a high number to this value or assign a value to the Trend Cycle field. The Trend Cycle value takes precedence over the Trend Hysteresis value. Software sends trend data based on either hysteresis value or time, not both.

Trend Cycle

Available for controller OS greater than Ver. 2.03. This value is similar to the Trend Hysteresis value, but is based on time. The range is 0 to 65535 minutes. A value of 0 disables time-based trending. Any value greater than 0 enables time-based trending. Time-based trending takes precedence over Trend Hysteresis value. Software sends trend data based on either hysteresis value or time, not both.

Comment

Allows the input of a comment

Analog Output Point

Purpose Display and/or modify the attributes for the selected analog output point.

Procedure In the tree, click desired point to display current values on the right Properties tab (itemized display).

The screenshot shows the 'Properties' dialog box for an analog output point. It is organized into three main sections:

- Type:**
 - User Address: AO1
 - Technical Address: 01/90/07
 - Point Role: (empty)
 - Point Subtype: AO Continuous without Switches
 - Lon Point: none
 - NV Type: (Input) none, (Output) none
 - VCT: (empty)
- Misc. Editor Functions:**
 - Engineering Unit: Pct
 - Descriptor: (empty)
 - Characteristic: LINEAR_GRAPH
- Special Values:**
 - Operator Access Level: 3
 - Safety Position: Last Valid Position
 - Write Protect Priority: 0
 - Time to Open: 120 sec
 - Time to Close: 120 sec
 - Trend Hysteresis: 1.0 Pct
 - Trend Cycle: 0 minut.
 - Suppress Alarm
 - Hide Point
 - Comment: (empty)

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, edit desired values in the fields, and/or select/deselect desired options.

Modules You can assign analog output points only to analog output modules. If the point requires a switch, you can assign the point only to a location that has a switch. If the point does not require a switch, you can still assign it to a location with a switch and later move it to a location without a switch.

Attributes Description

User Address	Point name (maximum of 18 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. Examples: AO1 and MADMPRFL1. This name and the descriptor further define the point. This name must be unique within a controller. User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are
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allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not. Behind the user address field the bus type (IP bus or LON-bus) where the point resides, is displayed.

IMPORTANT

Note that the max. length of the user address for Lon points should not exceed 18 characters (see Lon point attribute).

Technical Address	<p>Internal six-digit number that defines and locates a point in the system. The number is composed of three pairs representing controller number (0-30), module number (1-16), and terminal number (1-12).</p> <p>Example: 010310 meaning Controller 1, Module 3, terminal 10. Operators use the User Address to refer to points.</p> <p>For LON points the module number is 90. When the number of LON points (terminals) exceeds 99, the module number will change to 91 and the LON point gets number 1.</p> <p>To change the technical address see the Terminal Assignment Function chapter.</p>
Controller Name	Name of controller where the point is assigned. This assignment is done during plant attachment.
Plant Info	Name of plant.
Point Role	Point Role created via an external tool like Win EDS. The point role can be edited.
Point ID	Point ID created via an external tool like Win EDS.
Point Subtype	Type of point. List of choices depends on output module type where the point is assigned.
Lon Point	<p>Define whether the datapoint should be a LON point. Select from the list under:</p> <p>NV-Input Creates input NV.</p> <p>NV-Output Creates output NV.</p> <p>NV-Input & Output Creates both, input and output NV.</p> <p>Manual Mapping Provides selection of this datapoint for mapping to NVs in the NV-Editor.</p>
NV Type	<p>Define the NV-type for the LON point. From the Input and/or Output drop-down lists select desired type.</p> <p>To edit a LON point, open the NV-Editor by clicking the dotted button on the right.</p>
VCT	Displays whether or not a value conversion table (VCT) is assigned to the NV-Input Type or NV-Output Type.
Engineering Unit	List of choices displays engineering units with ID, unit, and format.

To add and change units in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter)

Descriptor Supplemental point information (maximum of 32 characters). Each Excel Controller has a unique set of descriptors (64 for Ver. 1.2 Controllers; 255 for Ver 1.3 and greater Controllers) that can be assigned to its user addresses to further describe them. Example: user address "MADMPRFL1" can have a descriptor of "Mixed air damper, Floor 1" to help define its location.

List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).

Characteristic Input and output characteristics of the associated sensor. List of choices displays characteristics with ID and text. To add and change characteristics in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).

Operator Access Level Access level (1 through 4) that an operator must have to modify point data via an operator terminal. For example, if a point has an Operator Access Level of 2, only operators with Access Level 2 and higher can change point attributes.

Safety Position The safety position is the position the device is commanded to if the controller does not deliver a value (no response). It can be selected under:

- 5 %
- 50 %
- 100 %
- Last valid Position

The safety position is affected by the characteristic used for the controller modules. For particular characteristics there is no linear correlation between percentage value and voltage output:

DP Type	Listbox number	Characteristic	Safety position (%)	
			0	50 100
			in DP values	in Volts
AO	1..10	User defined		0 5 10
AO	9	0-100%=2-10V	-25 37.5 100	0 5 10
AO	10	100-0%=2-10V	125 62.5 0	0 5 10
AO	12	LINEAR GRAPH	0 50 100	0 5 10
AO	24	0-10V=0-100%	0 50 100	0 5 10
AO	25	2-10V=0-100%	0 50 100	2 6 10
DO	--	DO on AO	OFF / ON	0 10
MOT	12	LINEAR GRAPH	0 50 100	0 5 10

NOTE: The user-defined characteristics 1 through 10 can be changed; in this context, characteristics 3, 4, 5, 6, 9, 10 are pre-defined by CARE (default

characteristics) and characteristics 1 and 2 are not pre-defined. The default characteristics 3 through 6 are pressure input characteristics which should not be used for an analog output.

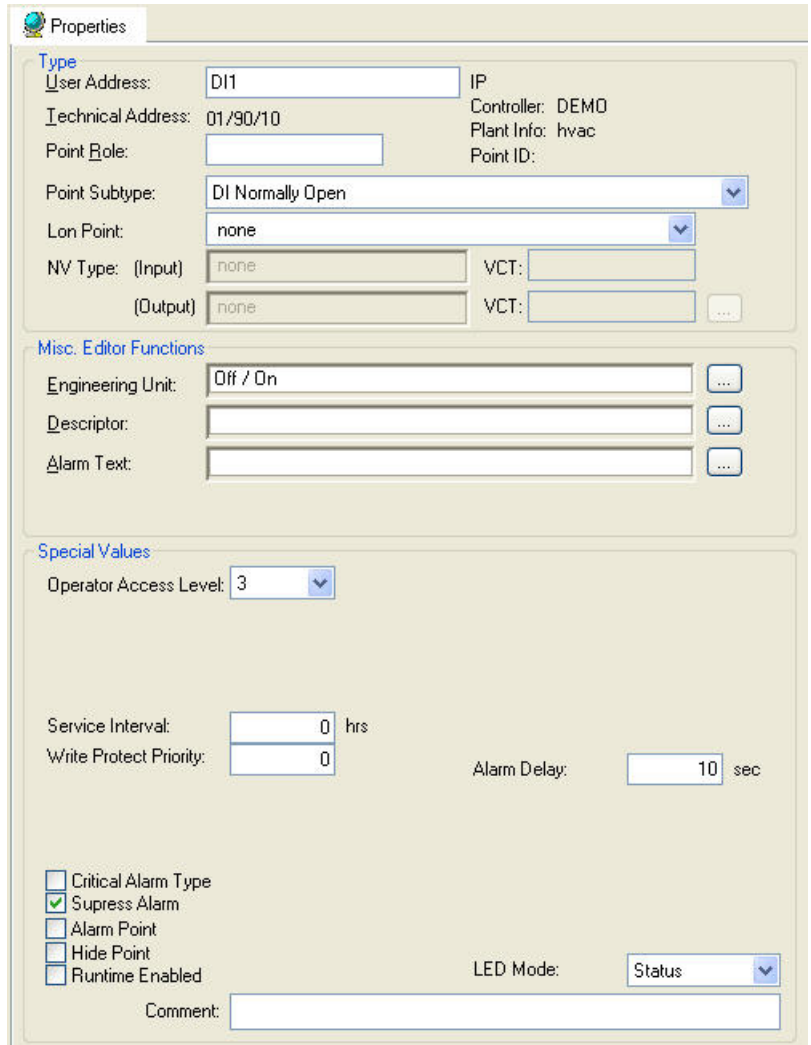
In general, for the user-defined characteristics 1 through 10, the safety positions 0%, 50%, 100% do always mean 0V, 5V, 10V; in this context the datapoint values for characteristics 9 and 10 are deviant.

Initial. Value	Value of point on initial start-up.												
Write Protect Priority	Prevent lower-level operators from changing point attributes that a higher-level operator changed. For example, if a point has an Access attribute of 2 and an operator with Access Level 3 changes an attribute, software restricts future changes to operators with at least Level 3 access. This protection prevents any Level 1 operators from overwriting higher-level operator changes. Default is 0. Valid range is 0 to 255.												
Suppress Alarm	Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the alarm and warning limits.												
Hide Point	Whether the point is visible or hidden. If a point is hidden, it will not be displayed to the user when performing online wildcard search on a central (only for controller OS greater than Ver. 2.0).												
Time to Open	Time (integer, 0 through 999 seconds) required for the actuator of a three-position output to motor from the closed to the open state.												
Time to Close	Time (integer, 0 through 999 seconds) required for the actuator of a three-position output to motor from the open to the closed state.												
Trend Hysteresis	<p>Available for controller OS Ver. greater than 1.5. The value that the point must change (negative or positive) before software writes it to the trend buffer. Valid range is 0 or x to 100,000,000 (selected by entering 99999999). The value of x is determined by the engineering unit of the point as follows:</p> <table border="0" style="margin-left: 40px;"> <thead> <tr> <th style="text-align: left;">Engineering Unit</th> <th></th> </tr> <tr> <th style="text-align: left;">Decimal Position</th> <th style="text-align: left;">Min. Value (x)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">1.0</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">0.1</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">.01</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">.001</td> </tr> </tbody> </table> <p>If the value is 0, the trend behaves as in OS Ver. lower than 1.5 and is as follows: If value is greater than 20, the change must be at least 1 percent. If the value is less than 20, the change must be at least .2 units.</p> <p>Default varies between 1 and 5 depending on schematic element.</p> <p>To lessen or turn off the transmission of trend data, assign a high number to this value or assign a value to the Trend Cycle Minutes field. The Trend Cycle value takes precedence over the Trend Hysteresis value. Software sends trend data based on either hysteresis value or time, not both.</p>	Engineering Unit		Decimal Position	Min. Value (x)	0	1.0	1	0.1	2	.01	3	.001
Engineering Unit													
Decimal Position	Min. Value (x)												
0	1.0												
1	0.1												
2	.01												
3	.001												

Trend Cycle	Available for controller OS greater than Ver. 2.03. This value is similar to the Trend Hysteresis value, but is based on time. The range is 0 to 65535 minutes. A value of 0 disables time-based trending. Any value greater than 0 enables time-based trending. Time-based trending takes precedence over Trend hysteresis value. Software sends trend data based on either hysteresis value or time, not both.
Comment	Allows the input of a comment

Digital Input Point

- Purpose** Display and/or modify the attributes for the selected digital input point.
- Procedure** In the tree, click desired point to display current values on the right Properties tab (itemized display).



or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, edit desired values in the fields, and/or select/deselect desired options.

Modules You can assign digital input points only to digital input modules.

Attributes description User Address Point name (maximum of 18 alphanumeric characters) assigned to a point for operator use in locating and commanding the point.

Examples: D11 and HWTRPUMPST. This name and the descriptor further define the point. This name must be unique within a controller.

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-

Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

IMPORTANT

Note that the max. length of the user address for Lon points should not exceed 18 characters (see Lon point attribute).

Behind the user address field the bus type (IP bus or LON-bus) where the point resides, is displayed.

Technical Address	<p>Internal six-digit number that defines and locates a point in the system. The number is composed of three pairs representing controller number (0-30), module number (1-16), and terminal number (1-12). Example: 010310 meaning Controller 1, Module 3, terminal 10. Operators use the User Address to refer to points.</p> <p>For LON points the module number is 90. When the number of LON points (terminals) exceeds 99, the module number will change to 91 and the LON point gets number 1.</p> <p>To change the technical address see the Terminal Assignment Function chapter.</p>
Controller Name	Name of controller where the point is assigned. This assignment is done during plant attachment.
Plant Info	Name of plant.
Point Role	Point Role created via an external tool like Win EDS. The point role can be edited.
Point ID	Point ID created via an external tool like Win EDS.
Point Subtype	Type of point. List of choices depends on input module type where the point is assigned.
Lon Point	<p>Define whether the datapoint should be a LON point. Select from the list under:</p> <p>NV-Input Creates input NV.</p> <p>NV-Output Creates output NV.</p> <p>NV-Input & Output Creates both, input and output NV.</p> <p>Manual Mapping Provides selection of this datapoint for mapping to NVs in the NV-Editor.</p>
NV Type	<p>Define the NV-type for the LON point. From the Input and/or Output drop-down lists select desired type.</p> <p>To edit a LON point, open the NV-Editor by clicking the dotted button on the right.</p>
VCT	Displays whether or not a value conversion table (VCT) is assigned to the NV-Input Type or NV-Output Type.
Engineering Unit	List of choices displays ID, number of states, and active and passive state texts for the point, for example, On and

	<p>Off. Software determines these texts from the assigned engineering unit.</p> <p>To add and change units in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Descriptor	<p>Supplemental point information (maximum of 32 characters). Each Excel Controller has a unique set of descriptors (64 for Ver. 1.2 Controllers; 255 for Ver 1.3 and greater Controllers) that can be assigned to its user addresses to further describe them. Example: user address "HWTRPUMPST" can have a descriptor of "Heating circuit, West wing" to help define its location.</p> <p>List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Alarm Text	<p>Alarm text that displays on point alarm.</p> <p>List of choices displays alarm texts with ID and text. To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Operator Access Level	<p>Access level (1 through 4) that an operator must have to modify point data via an operator terminal. For example, if a point has an Operator Access Level of 2, only operators with Access Level 2 and higher can change point attributes.</p>
LED Mode	<p>Toggles the LED between status mode and alarm mode with the following indication:</p> <p>Status Yellow = ON, No color = OFF</p> <p>Alarm Red = Alarm, Green = No alarm</p> <p>This attribute applies to XF8.. and XFL8.. modules only. The XF8.. panel modules can also be toggled in the terminal assignment tool (TAF).</p> <p>LED Mode applies to Excel 800 only.</p>
Service Interval	<p>Number of log hours after which software generates a maintenance alarm. Enter zero for no alarm message. Runtime Enabled must be enabled (Yes). Note that runtime accumulates only if the point is in the active state.</p>
Write Protect Priority	<p>Prevent lower-level operators from changing point attributes that a higher-level operator changed. For example, if a point has an Access attribute of 2 and an operator with Access Level 3 changes an attribute, software restricts future changes to operators with at least Level 3 access. This protection prevents any Level 1 operators from overwriting higher-level operator changes. Default is 0. Valid range is 0 to 255.</p>
Critical Alarm Type	<p>Whether the point alarm condition is critical or not. Critical alarms display on the central PC when they occur. Noncritical alarms do not display; software only writes them to the alarm printer and alarm history file</p>

- Suppress Alarm Whether or not software should suppress alarm messages.
- Alarm Point Whether or not software should monitor point changes from active to passive.
- Hide Point Whether the point is visible or hidden. If a point is hidden, it will not be displayed to the user when performing online wildcard search on a central (only for controller OS greater than Ver. 2.0).
- Runtime Enabled Whether or not to maintain a count of hours run (resolution one hour).
- Alarm Delay Length of time (integer, 0 through 3600 seconds) an alarm condition must exist before software generates an alarm.
- Active State State that determines which point state (Logic 0 or 1) is the active ("normal") state. The other state is the passive ("alarm") state.

The following table shows the relationship between active and passive states and statuses as well as between N.O. and N.C.

Hardware Condition	Logical State		Active State Value	
	DI (NC)	DI (NO)	0	1
No voltage at screw terminal. See Note 1.	1	0	Active Text, normal	Passive Text, alarm
Voltage at screw terminal. See Note 2.	0	1	Passive Text, alarm	Active Text, normal

NOTES:

1. On an Excel 500 or 100, this is an open contact. On an Excel 80, this is a closed contact.
2. On an Excel 500 or 100, this is a closed contact. On an Excel 80, this is an open contact.

The active state flag affects the alarm state and engineering units that display for digital inputs. The point type (NO/NC) affects the logical operation of the point.

Note that software monitors point state only if the Alarm Point field is checked.

Active State only applies to controller OS Ver. lower than 2.04 (see Upgrade Controller to OS 2.04 section in Appendix D)

- Comment Allows the input of a comment

Digital Output Point

- Purpose** Display and/or modify the attributes for the selected digital output point.
- Procedure** In the tree, click desired point to display current values on the right Properties tab (itemized display).

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, edit desired values in the fields, and/or select/deselect desired options.

- Modules** You can assign digital output points only to digital output modules. If the point requires a switch you can assign the point only to a location that has a switch. If the point does not require a switch, you can still assign it to a location with a switch and later move it to a location without a switch.

Attributes Description	User Address	Point name (maximum of 18 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. Example: DONOSWITCH1. This name and the descriptor further define the point. This name must be unique within a controller.
-------------------------------	--------------	--

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

IMPORTANT

Note that the max. length of the user address for Lon points should not exceed 18 characters (see Lon point attribute).

Behind the user address field the bus type (IP bus or LON-bus) where the point resides, is displayed.

Technical Address	<p>Internal six-digit number that defines and locates a point in the system. The number is composed of three pairs representing controller number (0-30), module number (1-16), and terminal number (1-12). Example: 010310 meaning Controller 1, Module 3, terminal 10. Operators use the User Address to refer to points.</p> <p>For LON points the module number is 90. When the number of LON points (terminals) exceeds 99, the module number will change to 91 and the LON point gets number 1.</p> <p>To change the technical address see the Terminal Assignment Function chapter.</p>
Controller Name	Name of controller where the point is assigned. This assignment is done during plant attachment.
Plant Info	Name of plant.
Point Role	Point Role created via an external tool like Win EDS. The point role can be edited.
Point ID	Point ID created via an external tool like Win EDS.
Point Subtype	Type of point. List of choices depends on output module type where the point is assigned.
Lon Point	<p>Define whether the datapoint should be a LON point. Select from the list under:</p> <p>NV-Input Creates input NV.</p> <p>NV-Output Creates output NV.</p> <p>NV-Input & Output Creates both, input and output NV.</p> <p>Manual Mapping Provides selection of this datapoint for mapping to NVs in the NV-Editor.</p>
NV Type	Define the NV-type for the LON point. From the Input and/or Output drop-down lists select desired type.
VCT	Displays whether or not a value conversion table (VCT) is assigned to the NV-Input Type or NV-Output Type.
Engineering Unit	List of choices displays ID, number of states, and active and passive state texts for the point, for example, On and

	Off. Software determines these texts from the assigned engineering unit.
	To add and change units in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
Descriptor	Supplemental point information (maximum of 32 characters). Each Excel Controller has a unique set of descriptors (64 for Ver. 1.2 Controllers; 255 for Ver 1.3 and greater Controllers) that can be assigned to its user addresses to further describe them. Example: user address "DONOSWITCH1" can have a descriptor of "Main Floor Mixed Air Damper" to help define its location. List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
Operator Access Level	Access level (1 through 4) that an operator must have to modify point data via an operator terminal. For example, if a point has an Operator Access Level of 2, only operators with Access Level 2 and higher can change point attributes.
Safety Position	The safety position is the position the device is commanded to if the controller does not deliver a value (no response). It can be selected under: <ul style="list-style-type: none"> - OFF (logical) - ON (logical) <li style="padding-left: 20px;">device is commanded to the selected logical state - Last valid Position <li style="padding-left: 20px;">device is commanded to the last valid position
Service Interval	Number of log hours after which software generates a maintenance alarm. Enter zero for no alarm message. Runtime Enabled must be enabled (Yes). Note that runtime accumulates only if the point is in the active state.
Pulse Duration	Time (sec) of momentary pulse output.).
Critical Alarm Type	Whether the point alarm condition is critical or not. Critical alarms display on the central PC when they occur. Noncritical alarms do not display; software only writes them to the alarm printer and alarm history file.
Suppress Alarm	Whether or not software should suppress maintenance alarm messages.
Hide Point	Whether the point is visible or hidden. If a point is hidden, it will not be displayed to the user when performing online wildcard search on a central (only for controller OS greater than Ver. 2.0).
Runtime Enabled	Whether or not to maintain a count of hours run (resolution one hour). Available only for non-pulsed DOs. This item does not display for pulse-type points.
Active State	State that determines which point state (Logic 0 or 1) is the active ("normal") state. The other state is the passive ("alarm") state.

The following table shows the relationship between active and passive states and statuses, as well as between energized and deenergized.

Hardware Condition	Active State Value	
	0	1
Deenergized	Active Text, Logic 1	Passive Text, Logic 0
Energized	Passive Text, Logic 0	Active Text, Logic 1

The active state flag affects the logical operation and engineering units of digital outputs. The point type (NO/NC) only affects the terminal assignment during you attach the plant.

Active State only applies to controller OS Ver. lower than 2.04 (see Upgrade Controller to OS 2.04 section in Appendix D)

Comment Allows the input of a comment

Purpose Display and/or modify the attributes for the selected flex point.

Procedure In the tree, click desired flex point, but **not** the associated physical point, which is one level below the flex point. The current values are displayed on the right Properties tab (itemized display).

Attribute	Value
Active State	1
Oper. Access Level	3
Suppr. Alarm	<input checked="" type="checkbox"/>
Critical Alarm (Type)	<input type="checkbox"/>
Runt. Enabl.	<input type="checkbox"/>
Service Interval	0
Hide Point	<input type="checkbox"/>
Write Protect Priority	3
Number of Stages	1

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, edit desired values in the fields, and/or select/deselect desired options.

Flex Point Definition Flex points are pseudopoints that represent one or more physical points. They can command and/or display associated physical points and their values via an operator terminal. Flex point types include Pulse_2, Multistage, and Point with Feedback.

The Flex Points subsection in the Plant Schematics chapter describes how to create and modify these points.

This section describes the attributes dialog boxes that you can use to modify flex point attributes.

Common Attributes Description The following are the common attributes similar to the attributes of other points:

User Address Flex point name (maximum of 18 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. Examples: Flex1

and MainRF. This name and the descriptor further define the point. This name must be unique within a controller. User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

Controller Name	Name of controller where the point is assigned. This assignment is done during plant attachment.
Technical Address	List of addresses for the points associated with the flex point.
Engineering Unit	List of choices displays ID, number of states, the state and its corresponding text. Software determines these texts from the assigned engineering unit.
Descriptor	<p>To add and change units in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p> <p>Supplemental point information (maximum of 32 characters). Each Excel Controller has a unique set of descriptors (64 for Ver. 1.2 Controllers; 255 for Ver 1.3 and greater Controllers) that can be assigned to its user addresses to further describe them. Example: user address "DONOSWITCH1" can have a descriptor of "Main Floor Mixed Air Damper" to help define its location.</p> <p>List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Alarm Text	<p>Alarm text that displays on point alarm.</p> <p>List of choices displays alarm texts with ID and text. Applies only to DO_Feedback_DI points.</p> <p>To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Comment	Allows the input of a comment
Special Attributes Description	<p>Point Attribute (Attribute, Value)</p> <p>List of special point attributes that apply to the flex point. The Value column displays current editable values. Read-only attributes are disabled (same color as Attribute column) and cannot be edited.</p>
Active State	State that determines which point state (Logic 0 or 1) is the active ("normal") state. The other state is the "alarm", or passive, state. Applies to multistage points.
Oper. Access Level	Access level (1 through 4) that an operator must have to modify point data via an operator terminal. For example, if a point has an Operator Access Level of 2, only operators with Access Level 2 and higher can change point attributes.
Suppr. Alarm	Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the alarm and warning limits. Click to change from Yes to No and vice versa.

Critical Alarm (Type)	Whether the point alarm condition is critical or not. Critical alarms display on the central PC when they occur. Noncritical alarms do not display; software only writes them to the alarm printer and alarm history file. Click to change from critical to non-critical and vice versa.
Runtime Enabl.	Whether the point is pulsed or non-pulsed. When you assign the point to a schematic, you set this value.
Service Interval	Preset the number of hours that the run-time counter uses.
Hide Point	Whether the point is visible or hidden. If a point is hidden, it will not be displayed to the user when performing online wildcard search on a central (only for controller OS greater than Ver. 2.0).
Write Protect Priority	Access level (0-255) for operators at operator terminals.
Alarm Delay	Software compares the status of the feedback with the output status after this delay time. Applies only to digital input points that are part of DO_Feedback_DI points.
Pulse Duration	Time of the momentary pulse output. Applies only to pulse_2 and DO_Feedback_DI points.
Delay Switch Up	Waiting period between switching the stages of a staged point. Delay time affects every stage. Applies only to DO_Feedback_DI points.
Delay Switch Down	Waiting period between switching down the stages of a staged point. Delay time affects every stage. Applies only to DO_Feedback_DI points.
Switching Down	Sequence to use when switching down. Applies only to DO_Feedback_DI points. There are two sequences: <3,0,2,0,1,0> or <3,2,1,0>. The <3,0,2,0,1,0> sequence switches down using the OFF position. Use this setting for systems that have a high inertia (for example, ventilators). When software switches down one stage, it first turns the switch to OFF. The <3,2,1,> sequence switches down to the next lower stage directly. The OFF phase does not exist (for example, electric air heaters). Each stage is active for the Delay Switch Down, independent of the mode of Switching Down.
Duration Off	Off time value software uses in conjunction with switching point state (down) with a switch to off between states. Applies only to DO_Feedback_DI points.
Feedback Delay Time	Length of time (in seconds) before software checks the input to verify that it follows the associated output. Applies only to DO_Feedback_DI points.
Number Of Stages	Number of stages in this feedback point (1, 2, or 3). Applies only to DO_Feedback_DI points.
Cycle Count-Active State	Value of a counter that represents the number of times a point is commanded to active state. This attribute is read-only.

Global Points

Purpose Display and/or modify the attributes for the selected global analog point.

Definition *Global points* are a type of pseudopoint that can be either an input or output. The purpose of global points is to share point information across controllers on a bus.

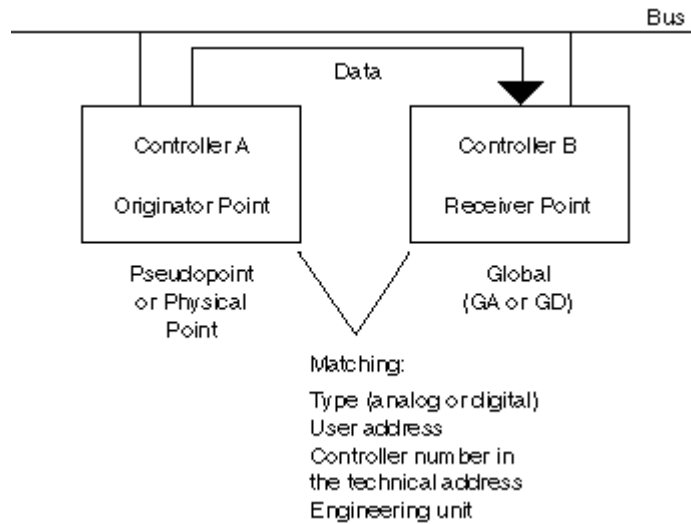
Global inputs *receive* information from a point in another controller. Use a global input when one controller has a point that should be global to many other controllers.

Global outputs *send* information to other points in other controllers. Use a global output when one controller has a point that is global to only one point in another controller. You can also use global outputs for some control icons that only connect to outputs and the output must be global. Global outputs can only be associated with pseudopoints or output points (not input points).

Centrals Note Central PCs such as the Excel Building Supervisor (XBS) and Excel Building Supervisor-Integrated (XBS-i) only read global *originator* points. The values of global receiver points are only available via the B port of the controller.

C-Bus Tunneling Note From Controller OS 2.06 on, it is strongly recommended to use max. 25 global points per system or project. Instead, NV-binding can be used to get global communication between controllers.

Global Inputs Each global input is associated with a pseudopoint or physical point (“originator” point) somewhere on the bus and has the same user address, controller number in the technical address, engineering unit, and type (analog or digital) as the point. The originator point cannot be a global point.



You select the correct type and enter the correct user address when you create the global point. To set the appropriate controller number in the technical address and the engineering unit, use this dialog box.

Global Input Point Operation

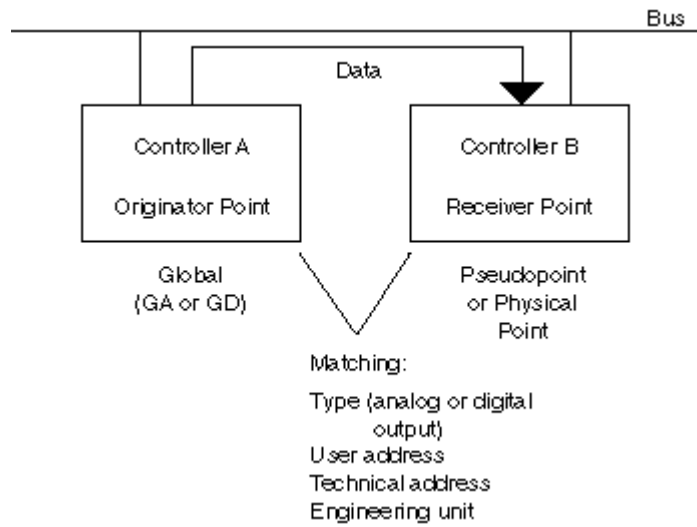
The system updates global inputs every 2 minutes. It also updates global analog inputs when the originator point changes significantly. If point value is greater than 20, the change must be at least 1 percent. If point value is less than or equal to 20, the change must be at least .2 units. For example:

Point Value	Change
100	1
200	2
50	.5
10	.2
5	.2

For global digital points, a change of state triggers an update.

Global Outputs

Each global output is associated with a pseudopoint or physical point (“receiver” point) somewhere on the bus and has the same user address, technical address, engineering unit, and type (analog or digital output) as the point.



You select the correct type and enter the correct user address when you create the global point. To set the appropriate technical address, point subtype, and engineering unit, use this dialog box.

Global Output Point Operation

The system updates the receiver points when the global analog outputs change significantly. If global value is greater than 20, the change must be at least 1 percent. If global value is less than or equal to 20, the change must be at least .2 units. For example:

Global Value	Change
100	1
200	2
50	.5
10	.2
5	.2

For global digital points, a change of state triggers an update.

There is no automatic 2-minute refresh for global output points.

Global Analog Point

Purpose Display and/or modify the attributes for the selected global analog point.

Procedure In the tree, click desired point to display current values on the right Properties tab (itemized display).

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, edit desired values in the fields, and/or select/deselect desired options.

Attributes description

- User Address** Point name (maximum of 18 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. Example: OaTemp. This name and the descriptor further define the point. This name must match the name of the point that is the receiver or originator of information for this global point.
- Technical Address** Internal six-digit number that defines and locates a point in the system. The number is composed of three pairs representing controller number (1-30), module number (1-16), and terminal number (1-12). Example: 010310 meaning Controller 1, Module 3, terminal 10. Operators

use the User Address to refer to points.

Select and type over parts of address to change it.

Technical Address

If it is associated with a physical point, this address must match the associated point. The global definition at the beginning of this section describes addressing rules.

Physical Address

If it is associated with a pseudo point, only the controller number is issued. The other two fields can be blank, 0 or 99.

Controller Name	Name of controller where the point is assigned. This assignment is done during plant attachment.
Plant Info	Name of plant.
Point Role	Point Role created via an external tool like Win EDS. The point role can be edited.
Point ID	Point ID created via an external tool like Win EDS.
Point Subtype	Type of point (input or output).
Engineering Unit	List of choices displays engineering units with ID, unit, and format. To add and change units in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter)
Descriptor	Supplemental point information (maximum of 32 characters. Each Excel Controller has a unique set of descriptors (64 for Ver. 1.2 Controllers; 255 for Ver 1.3 and greater Controllers) that can be assigned to its user addresses to further describe them. Example: user address "OaTemp" can have a descriptor of "outdoor dry bulb temp" to help define its location. List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
Operator Access Level	Access level (1 through 4) that an operator must have to modify point data via an operator terminal. For example, if a point has an Operator Access Level of 2, only operators with Access Level 2 and higher can change point attributes.
Write Protect Priority	Prevent lower-level operators from changing point attributes that a higher-level operator changed. For example, if a point has an Access attribute of 2 and an operator with Access Level 3 changes an attribute, software restricts future changes to operators with at least Level 3 access. This protection prevents any Level 1 operators from overwriting higher-level operator changes. Default is 0. Valid range is 0 to 255
Hide Point	Whether the point is visible or hidden. If a point is hidden, it will not be displayed to the user when performing online wildcard search on a central (only for controller OS greater than Ver. 2.0).

Trend Hysteresis Available for controller OS Ver. greater than 1.5. The value that the point must change (negative or positive) before software writes it to the trend buffer. Valid range is 0 or x to 100,000,000 where x is determined by the engineering unit of the point as follows:

Engineering Unit Decimal Position	Min. Value (x)
0	1.0
1	0.1
2	.01
3	.001

If the value is 0, the trend behaves as in OS Ver. lower than 1.5 and is as follows:
 If value is greater than 20, the change must be at least 1 percent. If the value is less than 20, the change must be at least .2 units. Default is 0.
 To lessen or turn off the transmission of trend data, assign a high number to this value or assign a value to the Trend Cycle Minutes field. The Trend Cycle Minutes value takes precedence over the Trend Hysteresis value. Software sends trend data based on either hysteresis value or time, not both.

Trend Cycle Available for controller OS greater than Ver. 2.03. This value is similar to the Trend Hysteresis value, but is based on time. The range is 0 to 65535 minutes.

A value of 0 disables time-based trending. Any value greater than 0 enables time-based trending. Time-based trending takes precedence over Trend Hysteresis value. Software sends trend data based on either hysteresis value or time, not both.

Broadcast Hyst. Available for controller OS Ver. 1.5. This value is that amount that a point must change before software broadcasts it to other controllers. Value range is 0 or x to 100,000,000 where x is determined by engineering unit decimal position as follows.

Engineering Unit Decimal Position	Min. Value (x)
0	1.0
1	0.1
2	.01
3	.001

If the value is 0, software constantly broadcasts to the controllers. Default is 0. If several global points are assigned to the same physical point, the lowest global point broadcast hysteresis from the assigned global point is used. This value can also be accessed by the RIA and WIA control icons.

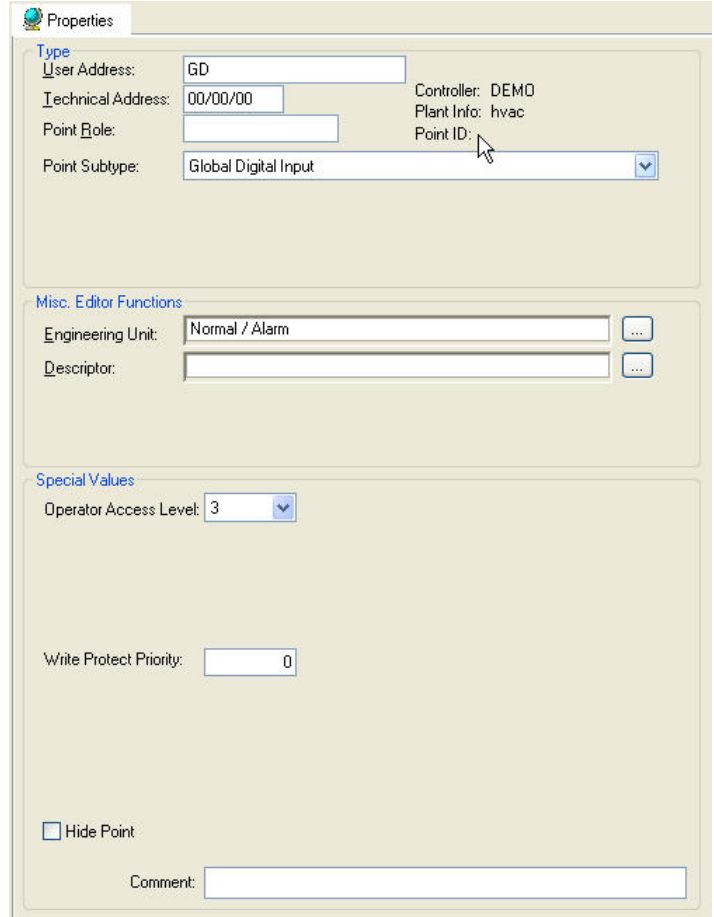
To lessen or turn off the frequency of broadcasts, assign a high number to this value.

Comment Allows the input of a comment

Global Digital Point

Purpose Display and/or modify the attributes for the selected global digital point.
See the Global Points section for a definition of globals and how they operate.

Procedure In the tree, click desired point to display current values on the right Properties tab (itemized display).



or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, edit desired values in the fields, and/or select/deselect desired options.

Attributes Description	User Address	Point name (maximum of 18 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. Example: global_dig. This name and the descriptor further define the point. This name must match the name of the point that is the receiver or originator of information for this global point.
	Technical Address	Internal six-digit number that defines and locates a point in the system. The number is composed of three pairs representing controller number (1-30), module number (1-16), and terminal number (1-12). Example: 010310 meaning Controller 1, Module 3, terminal 10. Operators use the User Address to refer to points.

Select and type over parts of address to change it, if desired

Technical Address

If it is associated with a physical point, this address must match the associated point. The global definition at the beginning of this section describes addressing rules.

Physical Address

If it is associated with a pseudo point, Only the controller number is issued. The other two fields can be blank, 0 or 99.

Controller Name	Name of controller where the point is assigned. This assignment is done during plant attachment.
Plant Info	Name of plant.
Point Role	Point Role created via an external tool like Win EDS. The point role can be edited.
Point ID	Point ID created via an external tool like Win EDS.
Point Subtype	Type of point (input or output).
Engineering Unit	<p>List of choices displays ID, number of states, and active and passive state texts for the point, for example, On and Off. Software determines these texts from the assigned engineering unit.</p> <p>To add and change units in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Descriptor	<p>Supplemental point information (maximum of 32 characters). Each Excel Controller has a unique set of descriptors (64 for Ver. 1.2 Controllers; 255 for Ver 1.3 and greater Controllers) that can be assigned to its user addresses to further describe them. Example: user address "global_dig" can have a descriptor of "occupancy / vacancy mode" to help define its location.</p> <p>List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Operator Access Level	Access level (1 through 4) that an operator must have to modify point data via an operator terminal. For example, if a point has an Operator Access Level of 2, only operators with Access Level 2 and higher can change point attributes.
Write Protect Priority	Prevent lower-level operators from changing point attributes that a higher-level operator changed. For example, if a point has an Access attribute of 2 and an operator with Access Level 3 changes an attribute, software restricts future changes to operators with at least Level 3 access. This protection prevents any Level 1 operators from overwriting higher-level operator changes. Default is 0. Valid range is 0 to 255
Hide Point	Whether the point is visible or hidden. If a point is hidden, it will not be displayed to the user when performing online wildcard search on a central (only for controller OS greater than Ver. 2.0).

Comment

Allows the input of a comment

Pseudo Analog Point

Purpose Display and/or modify the attributes for the selected pseudo analog point.

Procedure In the tree, click desired point to display current values on the right Properties tab (itemized display).

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, edit desired values in the fields, and/or select/deselect desired options.

Attributes Description

User Address

Point name (maximum of 18 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. Example: Room_Average.

This name and the descriptor further define the point.
This name must be unique within a controller.

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

IMPORTANT

Note that the max. length of the user address for Lon points should not exceed 18 characters (see Lon point attribute).

Controller Name	Name of controller where the point is assigned. This assignment is done during plant attachment.
Plant Info	Name of plant.
Point Role	Point Role created via an external tool like Win EDS. The point role can be edited.
Point ID	Point ID created via an external tool like Win EDS.
Point Subtype	None.
Lon Point	Define whether the datapoint should be a LON point. Select from the list under: NV-Input Creates input NV. NV-Output Creates output NV. NV-Input & Output Creates both, input and output NV. Manual Mapping Provides selection of this datapoint for mapping to NVs in the NV-Editor.
NV Type	Define the NV-type for the LON point. From the Input and/or Output drop-down lists select desired type.
VCT	Displays whether or not a value conversion table (VCT) is assigned to the NV-Input Type or NV-Output Type.
Engineering Unit	List of choices displays engineering units with ID, unit, and format. To add and change units in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter)

Descriptor	<p>Supplemental point information (maximum of 32 characters). Each Excel Controller has a unique set of descriptors (64 for Ver. 1.2 Controllers; 255 for Ver 1.3 and greater Controllers) that can be assigned to its user addresses to further describe them. Example: user address "Room_Average" can have a descriptor of "West wing Aug temperature" to help define its location.</p> <p>List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Alarm Text	<p>Alarm text that displays on point alarm.</p> <p>List of choices displays alarm texts with ID and text. To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Operator Access Level	<p>Access level (1 through 4) that an operator must have to modify point data via an operator terminal. For example, if a point has an Operator Access Level of 2, only operators with Access Level 2 and higher can change point attributes.</p>
Initial. Value	<p>Value of the pseudopoint on initial start-up.</p>
Write Protect Priority	<p>Prevent lower-level operators from changing point attributes that a higher-level operator changed. For example, if a point has an Access attribute of 2 and an operator with Access Level 3 changes an attribute, software restricts future changes to operators with at least Level 3 access. This protection prevents any Level 1 operators from overwriting higher-level operator changes. Display only; always defaults to No (0).</p>
Critical Alarm Type	<p>Whether the point alarm condition is critical or not. Critical alarms display on the central PC when they occur. Noncritical alarms do not display; software only writes them to the alarm printer and alarm history file.</p>
Suppress Alarm	<p>Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the alarm and warning limits.</p>
Hide Point	<p>Whether the point is visible or hidden. If a point is hidden, it will not be displayed to the user when performing online wildcard search on a central (only for controller OS greater than Ver. 2.0).</p>
High Alarm Limit High Warning Llimit Low Warning Limit Low Alarm Limit.	<p>High (max) and low (min) limits for point value. Limit values must maintain the following relationship:</p> <p>High Alarm \geq High Warning $>$ Low Warning \geq Low Alarm</p>
Alarm Hysteresis	<p>Available for controller OS Ver. greater than 1.5. This value is the amount that an analog point must change before software reports an alarm or return-to-normal. Value range is 0 or x to y where x is determined by the engineering unit decimal position and y is determined by the difference of the high warning limit - low warning.</p>

Engineering Unit Decimal Position	Min. Value (x)
0	1.0
1	0.1
2	.01
3	.001

Diff: = high warning limit - low warning.

For example, if the analog point has the following values:

engineering unit = Degrees with one decimal point
 high alarm limit = 85.0
 high warning limit = 82.0
 low warning limit = 68.0
 low alarm limit = 65.0

Diff = 82.0 - 68.0 = 14.0

Therefore, the valid range is .01 to 14.

Default varies between 1 and 5 depending on schematic element. If the value is zero, fixed hysteresis applies.

Trend Hysteresis

Available for controller OS Ver. greater than 1.5. The value that the point must change (negative or positive) before software writes it to the trend buffer. Valid range is 0 or x to 100,000,000 (selected by entering 99999999). The value of x is determined by the engineering unit of the point as follows:

Engineering Unit Decimal Position	Min. Value (x)
0	1.0
1	0.1
2	.01
3	.001

If the value is 0, the trend behaves as in OS Ver. lower than 1.5 and is as follows:

If value is greater than 20, the change must be at least 1 percent. If the value is less than 20, the change must be at least .2 units. Default is 0.

To lessen or turn off the transmission of trend data, assign a high number to this value or assign a value to the Minutes field. The Trend Cycle Minutes value takes precedence over the Trend Hysteresis value. Software sends trend data based on either hysteresis value or time, not both.

Trend Cycle

Available for controller OS greater than Ver. 2.03. This value is similar to the Trend Hysteresis value, but is based on time. The range is 0 to 65535 minutes.

A value of 0 disables time-based trending. Any value greater than 0 enables time-based trending. Time-based trending takes precedence over Trend Hysteresis value. Software sends trend data based on either hysteresis value or time, not both.

Comment

Allows the input of a comment

Pseudo Digital Point

Purpose Display and/or modify the attributes for the selected pseudo digital point.

Procedure In the tree, click desired point to display current values on the right Properties tab (itemized display).

The screenshot shows the 'Properties' dialog box for a Pseudo Digital Point. The 'Type' section contains the following fields: 'User Address' (text box with 'PD'), 'Point Role' (text box), 'Point Subtype' (dropdown menu with 'Pseudo Digital 2 Stage'), 'Lon Point' (dropdown menu with 'none'), and 'NV Type' (Input/Output) with 'VCT' (text boxes). The 'Misc. Editor Functions' section includes 'Engineering Unit' (text box with 'Normal / Alarm'), 'Descriptor' (text box), and 'Alarm Text' (text box). The 'Special Values' section includes 'Operator Access Level' (dropdown menu with '3'), 'Initial Value' (dropdown menu with 'Alarm'), 'Service Interval' (text box with '0 hrs'), and 'Write Protect Priority' (text box with '0'). There are also checkboxes for 'Critical Alarm Type', 'Supress Alarm', 'Alarm Point', 'Hide Point', and 'Runtime Enabled', and a 'Comment' (text box).

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, edit desired values in the fields, and/or select/deselect desired options.

Attributes Description

User Address

Point name (maximum of 18 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. Example: pseudo_dig. This name and the descriptor further define the point. This name must be unique within a controller. User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

IMPORTANT

Note that the max. length of the user address for Lon points should not exceed 18 characters (see Lon point attribute).

Controller Name	Name of controller where the point is assigned. This assignment is done during plant attachment.
Plant Info	Name of plant.
Point Role	Point Role created via an external tool like Win EDS. The point role can be edited.
Point ID	Point ID created via an external tool like Win EDS.
Point Subtype	Type of point. PD 2-State or PD-n-State can be selected.
Lon Point	Define whether the datapoint should be a LON point. Select from the list under: NV-Input Creates input NV. NV-Output Creates output NV. NV-Input & Output Creates both, input and output NV. Manual Mapping Provides selection of this datapoint for mapping to NVs in the NV-Editor.
NV Type	Define the NV-type for the LON point. From the Input and/or Output drop-down lists select desired type.
VCT	Displays whether or not a value conversion table (VCT) is assigned to the NV-Input Type or NV-Output Type.
Engineering Unit	List of choices displays ID, number of states, and active and passive state texts for the point, for example, On and Off. Software determines these texts from the assigned engineering unit. To add and change units in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
Descriptor	Supplemental point information (maximum of 32 characters). Each Excel Controller has a unique set of descriptors (64 for Ver. 1.2 Controllers; 255 for Ver 1.3 and greater Controllers) that can be assigned to its user addresses to further describe them. Example: user address "pseudo_dig" can have a descriptor of "Hot water pump status" to help define its location. List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
Alarm Text	Alarm text that displays on point alarm. List of choices displays alarm texts with ID and text. To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
Operator Access Level	Access level (1 through 4) that an operator must have to modify point data via an operator terminal. For example,

if a point has an Operator Access Level of 2, only operators with Access Level 2 and higher can change point attributes.

- Initial Value Value the point should have on initial start-up
- Service Interval Number of log hours after which software generates a maintenance alarm. Enter zero for no alarm message. Runtime Enabled must be enabled.
- Write Protect Priority Prevent lower-level operators from changing point attributes that a higher-level operator changed. For example, if a point has an Access attribute of 2 and an operator with Access Level 3 changes an attribute, software restricts future changes to operators with at least Level 3 access. This protection prevents any Level 1 operators from overwriting higher-level operator changes. Default is 0. Valid range is 0 to 255.
- Critical Alarm Type Whether the point alarm condition is critical or not. Critical alarms display on the central PC when they occur. Noncritical alarms do not display; software only writes them to the alarm printer and alarm history file.
- Suppress Alarm Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the alarm and warning limits.
- Alarm Point Whether or not software should monitor point changes from active to passive.
- Hide Point Whether the point is visible or hidden. If a point is hidden, it will not be displayed to the user when performing online wildcard search on a central (only for controller OS greater than Ver. 2.0).
- Runtime Enabled Whether or not to maintain a count of hours run (resolution one minute).
- Active State State that determines which point state (Logic 0 or 1) is the active ("normal") state. The other state is the passive ("alarm") state.

The following table shows the relationship between active and passive states and statuses, as well as logical states.

Logical State	Active State Value	
	0	1
0	Active Text, normal	Passive Text, alarm
1	Passive Text, alarm	Active Text, normal

The active state flag affects the engineering units and alarm state that displays for digital pseudopoints.

Active State only applies to controller OS Ver. lower than 2.04 (see Upgrade Controller to OS 2.04 section in Appendix D)

- Comment Allows the input of a comment

Pseudo Totalizer Point

Purpose Display and/or modify the attributes for the selected pseudo totalizer input point.

Procedure In the tree, click desired point to display current values on the right Properties tab (itemized display).

The screenshot shows the 'Properties' dialog box for a Pseudo Totalizer Point. The dialog is organized into several sections:

- Type:**
 - User Address:
 - Point Role:
 - Point Subtype:
 - Controller: DEMO
 - Plant Info: hvac
 - Point ID:
- Misc. Editor Functions:**
 - Engineering Unit:
 - Descriptor:
- Special Values:**
 - Operator Access Level:
- Write Protect Priority:**
- Scaling Factor:**
- Interval Limit:**
- Critical Alarm Type
- Suppress Alarm
- Hide Point
- Comment:**

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, enter desired values in the fields, and/or select/deselect desired options.

Attributes Description	User Address	Point name (maximum of 18 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. Example: pseudo_tot. This name and the descriptor further define the point. This name must be unique within a controller.
		User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.
	Controller Name	Name of controller where the point is assigned. This assignment is done during plant attachment.
	Plant Info	Name of plant.
	Point Role	Point Role created via an external tool like Win EDS. The point role can be edited.
	Point ID	Point ID created via an external tool like Win EDS.
	Point Subtype	None.
	Engineering Unit	List of choices displays engineering units with ID, unit, and format. To add and change units in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter)
	Descriptor	Supplemental point information (maximum of 32 characters). Each Excel Controller has a unique set of descriptors (64 for Ver. 1.2 Controllers; 255 for Ver 1.3 and greater Controllers) that can be assigned to its user addresses to further describe them. Example: user address "pseudo_tot" can have a descriptor of "West wing pseudo totalizer" to help define its location. List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
	Operator Access Level	Access level (1 through 4) that an operator must have to modify point data via an operator terminal. For example, if a point has an Operator Access Level of 2, only operators with Access Level 2 and higher can change point attributes.
	Write Protect Priority	Prevent lower-level operators from changing point attributes that a higher-level operator changed. For example, if a point has an Access attribute of 2 and an operator with Access Level 3 changes an attribute, software restricts future changes to operators with at least Level 3 access. This protection prevents any Level 1 operators from overwriting higher-level operator changes. Display only; always defaults to No (0).
	Scaling Factor	Amount of measured unit per incoming transition (0 through 9,999,999).
	Interval Limit	Number of transitions for software to count (0.0 through 99,999,999.9) before generating an alarm.

Critical Alarm Type	Whether the point alarm condition is critical or not. Critical alarms display on the central PC when they occur. Noncritical alarms do not display; software only writes them to the alarm printer and alarm history file.
Suppress Alarm	Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the alarm and warning limits.
Hide Point	Whether the point is visible or hidden. If a point is hidden, it will not be displayed to the user when performing online wildcard search on a central (only for controller OS greater than Ver. 2.0).
Comment	Allows the input of a comment

Totalizer Point

Purpose Display and/or modify the attributes for the selected totalizer input point.

Procedure In the tree, click desired point to display current values on the right Properties tab (itemized display).

The screenshot shows the 'Properties' dialog box for a Totalizer Point. It is organized into three main sections:

- Type:**
 - User Address: TOT
 - Technical Address: 01/90/16
 - Point Role: (empty)
 - Point Subtype: Totalizer Fast
 - Lon Point: none
 - NV Type: (Input) none, (Output) none
 - VCT: (empty)
- Misc. Editor Functions:**
 - Engineering Unit: Cnt
 - Descriptor: (empty)
- Special Values:**
 - Operator Access Level: 3
 - Write Protect Priority: 0
 - Scaling Factor: 1 Cnt
 - Interval Limit: 0 Cnt
 - Critical Alarm Type
 - Suppress Alarm
 - Hide Point
 - Comment: (empty)

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, edit desired values in the fields, and/or select/deselect desired options.

Attributes Description

User Address

Point name (maximum of 18 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. Example: TOT1. This name and the descriptor further define the point. This name must be unique within a controller.

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

IMPORTANT

Note that the max. length of the user address for Lon points should not exceed 18 characters (see Lon point attribute).

Behind the user address field the bus type (IP bus or LON-bus) where the point resides, is displayed.

Technical Address	<p>Internal six-digit number that defines and locates a point in the system. The number is composed of three pairs representing controller number (0-30), module number (1-16), and terminal number (1-12). Example: 010310 meaning Controller 1, Module 3, terminal 10. Operators use the User Address to refer to points.</p> <p>To change the technical address see the Terminal Assignment Function chapter.</p>
Controller Name	Name of controller where the point is assigned. This assignment is done during plant attachment.
Plant Info	Name of plant.
Point Role	Point Role created via an external tool like Win EDS. The point role can be edited.
Point ID	Point ID created via an external tool like Win EDS.
Point Subtype	Type of point. List of choices depends on module type where the point is assigned.
Lon Point	<p>Define whether the datapoint should be a LON point. Select from the list under:</p> <p>NV-Input Creates input NV.</p> <p>NV-Output Creates output NV.</p> <p>NV-Input & Output Creates both, input and output NV.</p>

	<p>Manual Mapping Provides selection of this datapoint for mapping to NVs in the NV-Editor.</p>
NV Type	Define the NV-type for the LON point. From the Input and/or Output drop-down lists select desired type.
VCT	Displays whether or not a value conversion table (VCT) is assigned to the NV-Input Type or NV-Output Type.
Engineering Unit	<p>List of choices displays engineering units with ID, unit, and format.</p> <p>To add and change units in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter)</p>
Descriptor	<p>Supplemental point information (maximum of 32 characters). Each Excel Controller has a unique set of descriptors (64 for Ver. 1.2 Controllers; 255 for Ver 1.3 and greater Controllers) that can be assigned to its user addresses to further describe them. Example: user address "TOT1" can have a descriptor of "West Wing totalizer" to help define its location.</p> <p>List of choices displays descriptors with ID and text.</p> <p>To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Operator Access Level	Access level (1 through 4) that an operator must have to modify point data via an operator terminal. For example, if a point has an Operator Access Level of 2, only operators with Access Level 2 and higher can change point attributes.
Write Protect Priority	Prevent lower-level operators from changing point attributes that a higher-level operator changed. For example, if a point has an Access attribute of 2 and an operator with Access Level 3 changes an attribute, software restricts future changes to operators with at least Level 3 access. This protection prevents any Level 1 operators from overwriting higher-level operator changes. Default is 0. Valid range is 0 to 255.
Scaling Factor	Amount of measured unit per incoming transition (0.0 through 100,000,000.0; the number of decimal places depends on the selected engineering unit).
Interval Limit	Number of transitions for software to count (0 through 99,999,999) before generating an alarm.
Critical Alarm Type	Whether the point alarm condition is critical or not. Critical alarms display on the central PC when they occur. Noncritical alarms do not display; software only writes them to the alarm printer and alarm history file.
Suppress Alarm	Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the alarm and warning limits.
Hide Point	Whether the point is visible or hidden. If a point is hidden, it will not be displayed to the user when performing online wildcard search on a central (only for controller OS greater than Ver. 2.0).
Comment	Allows the input of a comment

Analog and Digital Flag Points

Analog and digital flags cannot and have not to be edited, except by entering a comment.

The image shows a 'Properties' dialog box with a light beige background. At the top left, there is a small globe icon and the text 'Properties'. Below this, the word 'Type' is written in blue. The main area contains several fields: 'User Address:' followed by a text box containing 'FA'; 'Controller: DEMO'; and 'Plant Info: hvac'. Below these fields are three sections, each with a blue header: 'Misc. Editor Functions', 'Special Values', and 'Comment:'. The 'Comment:' section at the bottom has a long, empty text box.

BACnet Points

Analog Points

Analog Input Point

Purpose Display and/or modify the attributes of the selected analog output point.

Procedure In the tree, click desired point to display current values on the right Properties tab (itemized display).

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, enter desired values in the fields, and/or select respectively deselect desired options.

Attributes Description	Datapoint Name	Point name (maximum of 40 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. This name must be unique within a controller.
		Point names must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a datapoint name, but 12 is not.
		IMPORTANT <i>Note that the max. length of the datapoint name for Lon points should not exceed 18 characters (see Lon point attribute).</i>
	BACnet Object Type	Displays the BACnet object type.
	BACnet Object ID	Displays the BACnet object type ID.
	BACnet Instance number	Displays the BACnet instance number.
	Lon Point	(Applies to FALCON controller only) Define whether the datapoint should be a LON point or not. List of choices displays: NV-Input Creates input NV. Manual Mapping Provides selection of this datapoint for mapping to NVs in the NV-Editor.
	Input NV	Define the NV-type for the LON point.
	Engineering Unit	List of choices displays engineering units with ID and unit.
	Descriptor	Supplemental point information. Each project and/or plant has a unique set of descriptors that can be assigned to its datapoint names to further describe them. List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
	Alarm Text	Alarm text that displays on point alarm. List of choices displays alarm texts with ID and text. To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
	IO Configuration	To configure the connected terminal. List of choices displays NTC, PT100 Type F, etc. Analog input and output points must be configured prior to their assignment to a particular terminal on a module. By selecting a configuration such as NTC, PT100 Type F, etc., the configuration properties of the datapoint are automatically set.

	Configure the datapoint before you assign the datapoint to a terminal on the terminal assignment tab. Otherwise you need to rework the configuration properties manually.
Characteristic	Assign and/or build a characteristic (conversion table) if the datapoint is to be mapped to a NV (see Lon point attribute) and the engineering units of both do not match, for example, the NV has °C and the datapoint has °F. To create a characteristic, open the Characteristics dialogbox by clicking the dotted button on the right (see Create and Assign Characteristic to BACnet Point section).
Read Access Write Access	Determine whether the user can read datapoint values respectively write values to the datapoint in the Web Interface. All users having a user level equal or higher than the assigned read access respectively write access of the datapoint, will have this access right enabled in the Web Interface, all others will not (for further details, please refer to the User Access Manager section).
Notification Class	Enable alarming for the datapoint by selecting a notification class with a given priority. By default, the following notification classes with descending priority can be selected: - Urgent - High - Low - Journal Those default notification classes are especially designed for the alarming to the EBI central (for information on notification classes to be used for 3 rd party BACnet clients, please refer to the Notification Class Manager section) Each recipient which is assigned to this notification class will receive the datapoint alarm triggered by the selected notification. But, alarms will only be generated for the enabled transitions (To-Normal, To-OffNormal, and/or To-Fault) of a recipient. Each enabled transition will be propagated with the selected notification. (For further details please refer to the Notification Class Manager section). This connection has not to be mixed up with the transitions selected under Reporting (see Reporting description in the following).
Notify Type	If the notification class Urgent, High, or Low has been selected, the notify type Alarm must be used.
Suppress Alarm	Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the limits.
Alarm Delay	Defines the time delay with which a 'To-Off-Normal' (EAGLE and FALCON controllers) transition and a 'To-Normal' transition (FALCON controller) will be set off.
Alarm Delay Normal	Defines the time delay with which a 'To-Normal' transition will be set off.

High Limit Reporting	If a high limit is exceeded and this condition remains present for at least the defined alarm delay (time), than an alarm of event type 'To-Off-Normal' is set off. Define whether a high limit exceeding should be reported or not.
Low Limit Reporting	If the present value falls below the low limit and this condition remains present for at least the defined alarm delay (time), than an alarm of event type 'To-Off-Normal' is set off. Defines whether a low limit exceeding should be reported or not.
Deadband	Define the value of the deadband in order to set off an alarm of event type 'To-Normal'. For this, the present value must, for at least the defined alarm delay (time), remain within the range: Low limit plus deadband and high limit minus deadband.
Reporting	Define which transition type ((To-Normal, To-OffNormal, and/or To Fault) will be tracked by timestamping in the Web Interface.
Point Role	Point Role created via an external tool like XL Toolkit and imported into CARE. The point role is selected from XL Toolkit database.
Change of Value Increment	Define the change of the value increment (COV). The COV increment specifies the minimum change in present value that causes the controller sending the present value to the Web Interface or other recipients on the BACnet bus (e.g. EBI).
Min. Present Value	Define the minimum value of the graphical bar display in the EBI. Defaults to the Low Limit Reporting value.
Max. Present Value	Define the maximum value of the graphical bar display in the EBI. Defaults to the High Limit Reporting value.
Communication failure	(applies to EAGLE controller only) In case of communication failure or application stop, the device is commanded to one of the following positions if the controller does not deliver a value (no response). - Last Valid Value device is commanded to the last valid position - Safety Value device is commanded to the value entered in Safety Value
Safety Value	(applies to EAGLE controller only) Enter the safety value if Safety Value is selected under Communication Failure (applies to EAGLE controller only)
Sensor offset	(applies to EAGLE controller only) Enter the sensor offset.
Acked Transitions	Allows observing the acknowledgement behavior of a user for To-Off-Normal and To-Fault transition events of the datapoint. CARE checks whether a transition event has been acknowledged or not. If a transition event has not been acknowledged within a definable delay time, an

alarm based on an event enrollment (event enrollment alarm) is sent to a supervisory recipient, for example EBI.

Click **Observe** button to display the *Event Enrollment – Acked Transitions* dialog box.

Event Enrollment - Acked Transitions

Name: EE_AHU01_OATemp.AckedTransitions

Description: [Empty]

Event Type: Change Of BitString

Event Parameters

Bit Mask: To-OffNormal To-Fault Back To-Normal

List Of Values

TRUE = Alarm acknowledged
FALSE = Alarm not acknowledged
- = don't care

Alarm Delay: 1800 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Event Enrollment – Acked Transitions* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note the event type of the event enrollment object is 'change of bitstring'.
4. Under **Event Parameters**, select the transition event(s) that should be checked for acknowledgement. The **List of Values** shows the possible logical values (checked=true, unchecked=false, CARE verifies with negative logic for the false condition) resulting from the comparison of the selected transition event(s) and the underlying bitstring mask. An event enrollment alarm will be sent, if the transition event will **not** be acknowledged within the delay time.
5. In the **Alarm Delay** field, enter an alarm delay in sec. The event enrollment alarm will be sent if the transition event has **not** been acknowledged within the delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent after an unacknowledged transition.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the acknowledgement is missing within the alarm delay;

Back-To-Normal = event notification is sent if the acknowledgement is sent after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Status Flags

Allows observing status flags conditions. To enable observing status flag conditions, click **Observe** button to display the *Event Enrollment – Status Flags* dialog box.

Event Enrollment - Status Flags

Name: EE_C02_AHU01_OATemp.StatusFlags

Description:

Event Type: Change Of BitString

Event Parameters

Bit Mask	In-Alarm	Fault	Overridden	Out-Of-Service
List Of Values	-	-	TRUE	-

TRUE = Datapoint is in checked Status
 FALSE = Datapoint is not in checked Status
 - = don't care

Alarm Delay: 10 Seconds

Notify Type: Alarm

Notification Class: LOW

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID: 37748755 = 2400013h = 9/19

OK Cancel

In the *Event Enrollment – Status Flags* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.

4. Under **Status Flags**, select the flags of which conditions should be observed. The **List of Values** shows the possible logical values (checked=true, unchecked=false) resulting from the comparison of the selected status flags and the underlying bitstring mask.
5. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent for each status flag that is enabled (checked) within the alarm delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
8. Under **Transition Events**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if a

status flag is enabled within the alarm delay;

To-Normal = event notification is sent if a status

flag is disabled after the alarm delay has been

expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Warning Limits

Allows defining warning limits for observing the present value and sending event enrollment alarms in case the present value increases or decreases the warning limits. To define warning limits, click **Define** button to display the *Event Transitions* dialog box.

Warning Limits For Present Value

Name: EE_C02_AHU01_OATemp.Present_Value

Description:

Event Type: Out Of Range

High Warning Limit: 35,000000 [°C]

Low Warning Limit: -10,000000 [°C]

Deadband: 1,000000 [°C]

Alarm Delay: 10 Seconds

Notify Type: Alarm

Notification Class: LOW

Reporting:

- To-OffNormal
- To-Fault
- Back To-Normal

BACnet Object ID: 37748754 = 2400012h = 9/18

OK Cancel

In the *Warning Limits for Present Value* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.
4. In the **High Warning Limit** field, enter the high warning limit value.
5. In the **Low Warning Limit** field, enter the low warning limit value.

NOTE: The warning limits can be below or above the high and low limit reporting values.

6. In the **Deadband** field, enter a deadband value. This defines an additional trigger to set off an alarm. The event enrollment alarm is sent if the following condition is true:
present value must, for at least the defined alarm delay (time), remain within the range: Low limit plus deadband and high limit minus deadband.
7. In the **Alarm Delay** field, enter an alarm delay in sec. The even enrollment alarm is sent if the present value still increases or decreases the warning limits after the time entered here has been elapsed.
7. From the **Notify Type** drop-down listbox, select the notify type.
8. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
9. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the present value exceeds or falls below the high or low warning limits within the alarm delay;
Back-To-Normal = event notification is sent if the present value is within the high or low warning limits after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

10. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Analog Output Point

Purpose Display and/or modify the attributes of the selected analog output point.

Procedure In the tree, click desired point to display current values on the right Properties tab (itemized display).

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, enter desired values in the fields, and/or select respectively deselect desired options.

Attributes Description	Datapoint Name	Point name (maximum of 40 alphanumeric characters) assigned to a point for operator use in locating and
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commanding the point. This name must be unique within a controller.

Point names must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a datapoint name, but 12 is not.

IMPORTANT

Note that the max. length of the datapoint name for Lon points should not exceed 18 characters (see Lon point attribute).

BACnet Object Type	Displays the BACnet object type.
BACnet Object ID	Displays the BACnet object type ID.
BACnet Instance number	Displays the BACnet instance number.
Lon Point	<p>(Applies to FALCON controller only) Define whether the datapoint should be a LON point or not. List of choices displays:</p> <p>NV-Input Creates output NV.</p> <p>Manual Mapping Provides selection of this datapoint for mapping to NVs in the NV-Editor.</p>
Output NV	<p>Define the NV-type for the LON point.</p> <p>Reliability status on the Excel Web HTML Interface:</p> <p>In order to make sure that the Reliability property for the present value works properly, the service type of the point must be set to Acknowledged (Ackd). With acknowledged service, controller - I/O module disconnections are indicated by the relevant reliability 'No Sensor' or 'No Output'. Note, that if a large number of outputs (e.g. all outputs of multiple I/O modules) are set to acknowledged service, the performance on the LON bus may drastically decrease (see "Change Service Type for Excel Web Datapoints" section).</p>
Engineering Unit	<p>List of choices displays engineering units with ID and unit.</p> <p>NOTE: This option must be selected before the point is bound to the module. After the binding, the setting cannot be changed.</p>
Descriptor	<p>Supplemental point information. Each project and/or plant has a unique set of descriptors that can be assigned to its datapoint names to further describe them.</p> <p>List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Alarm Text	Alarm text that displays on point alarm. List of choices displays alarm texts with ID and text.

	<p>To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
IO Configuration	<p>To configure the connected terminal. List of choices displays NTC, PT100 Type F, etc.</p> <p>Analog input and output points must be configured prior to their assignment to a particular terminal on a module. By selecting a configuration such as NTC, PT100 Type F, etc., the configuration properties of the datapoint are automatically set.</p> <p>Configure the datapoint before you assign the datapoint to a terminal on the terminal assignment tab. Otherwise you need to rework the configuration properties manually.</p>
Characteristic	<p>Assign and/or build a characteristic (conversion table) if the datapoint is to be mapped to a NV (see Lon point attribute) and the engineering units of both do not match, for example, the NV has °C and the datapoint has °F. To create a characteristic, open the Characteristics dialogbox by clicking the dotted button on the right (see Create and Assign Characteristic to BACnet Point section).</p>
Read Access Write Access	<p>Determine whether the user can read datapoint values respectively write values to the datapoint in the Web Interface.</p> <p>All users having a user level equal or higher than the assigned read access respectively write access of the datapoint, will have this access right enabled in the Web Interface, all others will not (for further details, please refer to the User Access Manager section).</p>
Notification Class	<p>Enable alarming for the datapoint by selecting a notification class with a given priority. By default the following notification classes with descending priority can be selected:</p> <ul style="list-style-type: none"> - Urgent - High - Low - Journal <p>Those default notification classes are especially designed for the alarming to the EBI central (for information on notification classes to be used for 3rd party BACnet clients, please refer to the Notification Class Manager section)</p> <p>Each recipient which is assigned to this notification class will receive the datapoint alarm triggered by the selected notification. But, alarms will only be generated for the enabled transitions (To-Normal, To-OffNormal, and/or To-Fault) of a recipient. Each enabled transition will be propagated with the selected notification. (For further details please refer to the Notification Class Manager section).</p> <p>This connection has not to be mixed up with the transitions selected under Reporting (see Reporting description in the following).</p>

Notify Type	If the notification class Urgent, High, or Low has been selected, the notify type Alarm must be used.
Suppress Alarm	Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the limits.
Alarm Delay	Defines the time delay with which a 'To-Off-Normal' (EAGLE and FALCON controllers) transition and a 'To-Normal' transition (FALCON controller) will be set off.
Alarm Delay Normal	Defines the time delay with which a 'To-Normal' transition will be set off.
High Limit Reporting	If a high limit is exceeded and this condition remains present for at least the defined alarm delay (time), than an alarm of event type 'To-Off-Normal' is set off. Define whether a high limit exceeding should be reported or not.
Low Limit Reporting	If the present value falls below the low limit and this condition remains present for at least the defined alarm delay (time), than an alarm of event type 'To-Off-Normal' is set off. Defines whether a low limit exceeding should be reported or not.
Deadband	Define the value of the deadband in order to set off an alarm of event type 'To-Normal'. For this, the present value must, for at least the defined alarm delay (time), remain within the range: Low limit plus deadband and high limit minus deadband.
Reporting	Define which transition type ((To-Normal, To-OffNormal, and/or To Fault) will be tracked by timestamping in the Web Interface.
Point Role	Point Role created via an external tool like XL Toolkit and imported into CARE. The point role is selected from XL Toolkit database.
Change of Value Increment	Define the change of the value increment (COV). The COV increment specifies the minimum change in present value that causes the controller sending the present value to the Web Interface or other recipients on the BACnet bus (e.g. EBI).
Relinquish Default	Define the value that will be written to present value, if all values in the priority list are invalid.
Min. Present Value	Define the minimum value of the graphical bar display in the EBI. Defaults to the Low Limit Reporting value.
Max. Present Value	Define the maximum value of the graphical bar display in the EBI. Defaults to the High Limit Reporting value.
Direct/Reverse	(applies to EAGLE controller only) Selection of the polarity which indicates the relationship between the physical state of the input and the logical state represented by the present value. If the polarity is NORMAL, then the ACTIVE state of the present value is also the ACTIVE or ON state of the physical input. If the polarity is REVERSE, then the ACTIVE state of the

present value is the INACTIVE or OFF state of the physical Input.

Polarity	Present Value	Physical State of Input	Physical State of Device
NORMAL	INACTIVE	OFF or INACTIVE	<u>not</u> running
NORMAL	ACTIVE	ON or ACTIVE	running
REVERSE	INACTIVE	ON or ACTIVE	<u>not</u> running
REVERSE	ACTIVE	OFF or INACTIVE	running

Communication failure In case of communication failure or application stop, the device is commanded to one of the following positions if the controller does not deliver a value (no response).

- 0 %
 - 50 %
 - 100 %
 device is commanded to the selected percentage value

- Last Valid Value
 device is commanded to the last valid position

The safety position is affected by the characteristic used for the controller modules. For particular characteristics there is no linear correlation between percentage value and voltage output:

DP Type	Listbox number	Characteristic	Safety position (%)	
			0	50 100
			in DP values	in Volts
AO	1..10	User defined		0 5 10
AO	9	0-100%=2-10V	-25 37.5 100	0 5 10
AO	10	100-0%=2-10V	125 62.5 0	0 5 10
AO	12	LINEAR GRAPH	0 50 100	0 5 10
AO	24	0-10V=0-100%	0 50 100	0 5 10
AO	25	2-10V=0-100%	0 50 100	2 6 10
DO	--	DO on AO	OFF / ON	0 10
MOT	12	LINEAR GRAPH	0 50 100	0 5 10

NOTE: The user-defined characteristics 1 through 10 can be changed; in this context, characteristics 3, 4, 5, 6, 9, 10 are pre-defined by CARE (default characteristics) and characteristics 1 and 2 are not pre-defined. The default characteristics 3 through 6 are pressure input characteristics which should not be used for an analog output.

In general, for the user-defined characteristics 1 through 10, the safety positions 0%, 50%, 100% do always mean 0V, 5V, 10V; in this context the datapoint values for characteristics 9 and 10 are deviant.

Time to Open (applies to 3pos point of EAGLE controller only)
 Defines the time in sec the motor should need to open the controlled device when using a 3 Position Output

Time to Close (applies to 3pos point EAGLE controller only)
 Defines the time in sec the motor should need to close the controlled device when using a 3 Position Output

With Switches
3 Position Output

Define whether the point transmits a continuous signal and is on a board with switches or if the point is a 3 position output.

NOTE:

These options must be selected before the point is bound to the module. After the binding, the settings cannot be changed.

Acked Transitions

Allows observing the acknowledgement behavior of a user for To-Off-Normal and To-Fault transition events of the datapoint. CARE checks whether a transition event has been acknowledged or not. If a transition event has not been acknowledged within a definable delay time, an alarm based on an event enrollment (event enrollment alarm) is sent to a supervisory recipient, for example EBI.

Click **Observe** button to display the *Event Enrollment – Acked Transitions* dialog box.

Event Enrollment - Acked Transitions

Name: EE_AHU01_Clg_Vlv.AckedTransitions

Description: [Empty]

Event Type: Change Of BitString

Event Parameters

Bit Mask: To-OffNormal To-Fault Back To-Normal

List Of Values:

TRUE = Alarm acknowledged
 FALSE = Alarm not acknowledged
 - = don't care

Alarm Delay: 1800 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting: To-OffNormal To-Fault Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Event Enrollment – Acked Transitions* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note the event type of the event enrollment object is 'change of bitstring'.
4. Under **Event Parameters**, select the transition event(s) that should be checked for acknowledgement. The **List of Values** shows the possible logical values (checked=true, unchecked=false, CARE verifies with negative logic for the false condition) resulting from the comparison of the selected transition event(s) and the underlying bitstring mask. An event enrollment alarm will be sent, if the transition event will **not** be acknowledged within the delay time.
5. In the **Alarm Delay** field, enter an alarm delay in sec. The event enrollment alarm will be sent if the transition event has **not** been acknowledged within the delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent after an unacknowledged transition.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the acknowledgement is missing within the alarm delay;

Back-To-Normal = event notification is sent if the acknowledgement is sent after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Status Flags

Allows observing status flags conditions. To enable observing status flag conditions, click **Observe** button to display the *Event Enrollment – Status Flags* dialog box.

Event Enrollment - Status Flags

Name: EE_C02_AHU01_Clg_Vlv.StatusFlags

Description:

Event Type: Change Of BitString

Event Parameters

Bit Mask	In-Alarm	Fault	Overridden	Out-Of-Service
List Of Values	-	-	TRUE	FALSE
	-	-	FALSE	TRUE
	-	-	TRUE	TRUE

TRUE = Datapoint is in checked Status
 FALSE = Datapoint is not in checked Status
 - = don't care

Alarm Delay: 10 Seconds

Notify Type: Alarm

Notification Class: HIGH

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID: 37748752 = 2400010h = 9/16

OK Cancel

In the *Event Enrollment – Status Flags* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.

4. Under **Status Flags**, select the flags of which conditions should be observed. The **List of Values** shows the possible logical values (checked=true, unchecked=false) resulting from the comparison of the selected status flags and the underlying bitstring mask.
5. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent for each status flag that is enabled (checked) within the alarm delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if a

status flag is enabled within the alarm delay;

To-Normal = event notification is sent if a status

flag is disabled after the alarm delay has been

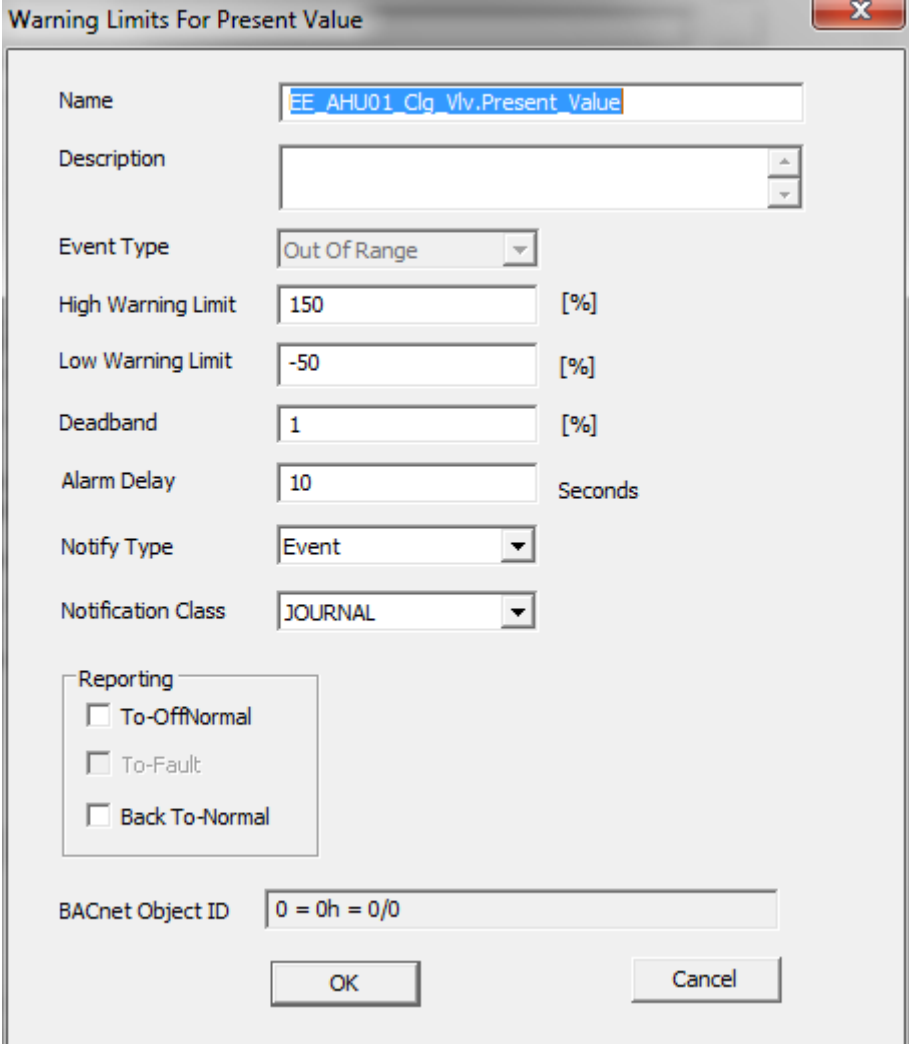
expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Warning Limits

Allows defining warning limits for observing the present value and sending event enrollment alarms in case the present value increases or decreases the warning limits. To define warning limits, click **Define** button to display the *Event Transitions* dialog box.



The image shows a software dialog box titled "Warning Limits For Present Value". It contains several input fields and dropdown menus for configuring alarm parameters. The fields are: Name (text input with "EE_AHU01_Clg_Vlv.Present_Value"), Description (text input), Event Type (dropdown menu with "Out Of Range"), High Warning Limit (text input with "150" and a "[%]" label), Low Warning Limit (text input with "-50" and a "[%]" label), Deadband (text input with "1" and a "[%]" label), Alarm Delay (text input with "10" and a "Seconds" label), Notify Type (dropdown menu with "Event"), and Notification Class (dropdown menu with "JOURNAL"). There is a "Reporting" section with three unchecked checkboxes: "To-OffNormal", "To-Fault", and "Back To-Normal". At the bottom, there is a "BACnet Object ID" field with the value "0 = 0h = 0/0" and two buttons: "OK" and "Cancel".

Name	EE_AHU01_Clg_Vlv.Present_Value
Description	
Event Type	Out Of Range
High Warning Limit	150 [%]
Low Warning Limit	-50 [%]
Deadband	1 [%]
Alarm Delay	10 Seconds
Notify Type	Event
Notification Class	JOURNAL
Reporting	<input type="checkbox"/> To-OffNormal <input type="checkbox"/> To-Fault <input type="checkbox"/> Back To-Normal
BACnet Object ID	0 = 0h = 0/0

In the *Warning Limits for Present Value* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.
4. In the **High Warning Limit** field, enter the high warning limit value.
5. In the **Low Warning Limit** field, enter the low warning limit value.

NOTE: The warning limits can be below or above the high and low limit reporting values.

6. In the **Deadband** field, enter a deadband value. This defines an additional trigger to set off an alarm. The event enrollment alarm is sent if the following condition is true:
present value must, for at least the defined alarm delay (time), remain within the range: Low limit plus deadband and high limit minus deadband.
7. In the **Alarm Delay** field, enter an alarm delay in sec. The even enrollment alarm is sent if the present value still increases or decreases the warning limits after the time entered here has been elapsed.
7. From the **Notify Type** drop-down listbox, select the notify type.
8. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
9. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the present value exceeds or falls below the high or low warning limits within the alarm delay;
Back-To-Normal = event notification is sent if the present value is within the high or low warning limits after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

10. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Analog Value Point

Purpose Display and/or modify the attributes of the selected analog value point.

Procedure In the tree, click desired point to display current values on the right Properties tab (itemized display).

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, enter desired values in the fields, and/or select respectively deselect desired options.

Attributes Description	Datapoint Name	Point name (maximum of 40 alphanumeric characters) assigned to a point for operator use in locating and
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commanding the point. This name must be unique within a controller.

Point names must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a datapoint name, but 12 is not.

IMPORTANT

Note that the max. length of the datapoint name for Lon points should not exceed 18 characters (see Lon point attribute).

BACnet Object Type	Displays the BACnet object type.
BACnet Object ID	Displays the BACnet object type ID.
BACnet Instance number	Displays the BACnet instance number.
Engineering Unit	List of choices displays engineering units with ID and unit.
Descriptor	<p>Supplemental point information. Each project and/or plant has a unique set of descriptors that can be assigned to its datapoint names to further describe them.</p> <p>List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Alarm Text	<p>Alarm text that displays on point alarm. List of choices displays alarm texts with ID and text.</p> <p>To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Read Access Write Access	<p>Determine whether the user can read datapoint values respectively write values to the datapoint in the Web Interface.</p> <p>All users having a user level equal or higher than the assigned read access respectively write access of the datapoint, will have this access right enabled in the Web Interface, all others will not (for further details, please refer to the User Access Manager section).</p>
Notification Class	<p>Enable alarming for the datapoint by selecting a notification class with a given priority. By default the following notification classes with descending priority can be selected:</p> <ul style="list-style-type: none"> - Urgent - High - Low - Journal <p>Those default notification classes are especially designed for the alarming to the EBI central (for information on notification classes to be used for 3rd party BACnet clients, please refer to the Notification Class Manager section)</p> <p>Each recipient which is assigned to this notification class will receive the datapoint alarm triggered by the selected</p>

notification. But, alarms will only be generated for the enabled transitions (To-Normal, To-OffNormal, and/or To-Fault) of a recipient. Each enabled transition will be propagated with the selected notification. (For further details please refer to the Notification Class Manager section).

This connection has not to be mixed up with the transitions selected under Reporting (see Reporting description in the following).

Notify Type	If the notification class Urgent, High, or Low has been selected, the notify type Alarm must be used.
Suppress Alarm	Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the limits.
Alarm Delay	Defines the time delay with which a 'To-Off-Normal' (EAGLE and FALCON controllers) transition and a 'To-Normal' transition (FALCON controller) will be set off.
Alarm Delay Normal	Defines the time delay with which a 'To-Normal' transition will be set off.
High Limit Enable	If a high limit is exceeded and this condition remains present for at least the defined alarm delay (time), than an alarm of event type 'To-Off-Normal' is set off. Define whether a high limit exceeding should be considered or not.
Low Limit Enable	If the present value falls below the low limit and this condition remains present for at least the defined alarm delay (time), than an alarm of event type 'To-Off-Normal' is set off. Define whether a low limit exceeding should be considered or not.
Deadband	Define the value of the deadband in order to set off an alarm of event type 'To-Normal'. For this, the present value must, for at least the defined alarm delay (time), remain within the range: Low limit plus deadband and high limit minus deadband.
Reporting	Define which transition type ((To-Normal, To-OffNormal, and/or To Fault) will be tracked by timestamping in the Web Interface.
Point Role	Point Role created via an external tool like XL Toolkit and imported into CARE. The point role is selected from XL Toolkit database.
Change of Value Increment	Define the change of the value increment (COV). The COV increment specifies the minimum change in present value that causes the controller sending the present value to the Web Interface or other recipients on the BACnet bus (e.g. EBI).
Relinquish Default	Define the value that will be written to present value, if all values in the priority list are invalid.
EOH/EOV Optimisation	Check whether the datapoint should be optimized or not, in case the datapoint is used as setpoint for energy optimized heating or ventilation (EOH/EOV).

- Setpoint Enables the direct change (override) of the current datapoint value in the web interface and the controller HMI without the necessity of setting the datapoint into manual mode.
- Acked Transitions Allows observing the acknowledgement behavior of a user for To-Off-Normal and To-Fault transition events of the datapoint. CARE checks whether a transition event has been acknowledged or not. If a transition event has not been acknowledged within a definable delay time, an alarm based on an event enrollment (event enrollment alarm) is sent to a supervisory recipient, for example EBI.

Click **Observe** button to display the *Event Enrollment – Acked Transitions* dialog box.

Event Enrollment - Acked Transitions

Name: AHU01_Htg_Pump_runtime_vest.AckedTransitions

Description: [Empty]

Event Type: Change Of BitString

Event Parameters

Bit Mask: To-OffNormal To-Fault Back To-Normal

List Of Values: [Table with 3 columns and 2 rows]

TRUE = Alarm acknowledged
FALSE = Alarm not acknowledged
- = don't care

Alarm Delay: 1800 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Event Enrollment – Acked Transitions* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note the event type of the event enrollment object is 'change of bitstring'.
4. Under **Event Parameters**, select the transition event(s) that should be checked for acknowledgement. The **List of Values** shows the possible logical values (checked=true, unchecked=false, CARE verifies with negative logic for the false condition) resulting from the comparison of the selected transition event(s) and the underlying bitstring mask. An event enrollment alarm will be sent, if the transition event will **not** be acknowledged within the delay time.
5. In the **Alarm Delay** field, enter an alarm delay in sec. The event enrollment alarm will be sent if the transition event has **not** been acknowledged within the delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent after an unacknowledged transition.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the acknowledgement is missing within the alarm delay;

Back-To-Normal = event notification is sent if the acknowledgement is sent after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Status Flags

Allows observing status flags conditions. To enable observing status flag conditions, click **Observe** button to display the *Event Enrollment – Status Flags* dialog box.

Event Enrollment - Status Flags

Name: EE_AHU01_Htg_Pump_runtime_yst.StatusFlags

Description:

Event Type: Change Of BitString

Event Parameters

Bit Mask	In-Alarm	Fault	Overridden	Out-Of-Service
List Of Values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TRUE = Datapoint is in checked Status
 FALSE = Datapoint is not in checked Status
 - = don't care

Alarm Delay: 10 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Event Enrollment – Status Flags* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.

4. Under **Status Flags**, select the flags of which conditions should be observed. The **List of Values** shows the possible logical values (checked=true, unchecked=false) resulting from the comparison of the selected status flags and the underlying bitstring mask.
5. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent for each status flag that is enabled (checked) within the alarm delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if a status flag is enabled within the alarm delay;

To-Normal = event notification is sent if a status flag is disabled after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Warning Limits

Allows defining warning limits for observing the present value and sending event enrollment alarms in case the present value increases or decreases the warning limits. To define warning limits, click **Define** button to display the *Event Transitions* dialog box.

Warning Limits For Present Value X

Name:

Description:

Event Type:

High Warning Limit: [sec]

Low Warning Limit: [sec]

Deadband: [sec]

Alarm Delay: Seconds

Notify Type:

Notification Class:

Reporting

- To-OffNormal
- To-Fault
- Back To-Normal

BACnet Object ID:

In the *Warning Limits for Present Value* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.
4. In the **High Warning Limit** field, enter the high warning limit value.
5. In the **Low Warning Limit** field, enter the low warning limit value.

NOTE: The warning limits can be below or above the high and low limit reporting values.

6. In the **Deadband** field, enter a deadband value. This defines an additional trigger to set off an alarm. The event enrollment alarm is sent if the following condition is true:
present value must, for at least the defined alarm delay (time), remain within the range: Low limit plus deadband and high limit minus deadband.
7. In the **Alarm Delay** field, enter an alarm delay in sec. The even enrollment alarm is sent if the present value still increases or decreases the warning limits after the time entered here has been elapsed.
7. From the **Notify Type** drop-down listbox, select the notify type.
8. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
9. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the present value exceeds or falls below the high or low warning limits within the alarm delay;
Back-To-Normal = event notification is sent if the present value is within the high or low warning limits after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

10. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Binary Points

Binary Input Point

- Purpose** Display and/or modify the attributes of the selected binary input point.
- Procedure** In the tree, click desired point to display current values on the right Properties tab (itemized display).

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, enter desired values in the fields, and/or select respectively deselect desired options.

Attributes Description	Datapoint Name	Point name (maximum of 40 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. This name must be unique within a controller.
		Point names must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a datapoint name, but 12 is not.
		IMPORTANT <i>Note that the max. length of the datapoint name for Lon points should not exceed 18 characters (see Lon point attribute).</i>
	BACnet Object Type	Displays the BACnet object type.
	BACnet Object ID	Displays the BACnet object type ID.
	BACnet Instance number	Displays the BACnet instance number.
	Lon Point	(Applies to FALCON controller only) Define whether the datapoint should be a LON point or not. List of choices displays: NV-Input Creates input NV. Manual Mapping Provides selection of this datapoint for mapping to NVs in the NV-Editor.
	Input NV	Define the NV-type for the LON point.
	Active/Inactive Text	Assign text which will be displayed for the corresponding active respectively inactive state of the point. List of choices displays active/inactive (passive) texts with ID, and number of states. To add texts to the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (Excel Web Controller, Miscellaneous Text Editor chapter).
	Descriptor	Supplemental point information. Each project and/or plant has a unique set of descriptors that can be assigned to its datapoint names to further describe them. List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
	Alarm Text	Alarm text that displays on point alarm. List of choices displays alarm texts with ID and text. To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
	Read Access Write Access	Determine whether the user can read datapoint values respectively write values to the datapoint in the Web Interface. All users having a user level equal or higher than the assigned read access respectively write access of the datapoint, will have this access right enabled in the Web

Notification Class	<p>Interface, all others will not (for further details, please refer to the User Access Manager section).</p> <p>Enable alarming for the datapoint by selecting a notification class with a given priority. By default the following notification classes with descending priority can be selected:</p> <ul style="list-style-type: none"> - Urgent - High - Low - Journal <p>Those default notification classes are especially designed for the alarming to the EBI central (for information on notification classes to be used for 3rd party BACnet clients, please refer to the Notification Class Manager section)</p> <p>Each recipient which is assigned to this notification class will receive the datapoint alarm triggered by the selected notification. But, alarms will only be generated for the enabled transitions (To-Normal, To-OffNormal, and/or To-Fault) of a recipient. Each enabled transition will be propagated with the selected notification. (For further details please refer to the Notification Class Manager section).</p> <p>This connection has not to be mixed up with the transitions selected under Reporting (see Reporting description in the following).</p>
Notify Type	If the notification class Urgent, High, or Low has been selected, the notify type Alarm must be used
Suppress Alarm	Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the limits.
Alarm Delay	Defines the time delay with which a 'To-Off-Normal' transition will be set off.
Alarm Delay Normal	Defines the time delay with which a 'To-Normal' transition will be set off.
Alarm Value	To set the status, 0 or 1, when an alarm should be reported, in case the binary input value changes.
Reporting	Define which transition type ((To-Normal, To-OffNormal, and/or To Fault) will be tracked by timestamping in the Web Interface.
Point Role	Point Role created via an external tool like XL Toolkit and imported into CARE. The point role is selected from XL Toolkit database.
LED Mode	<p>(for EAGLE controller: applies to points on panel I/Os only)</p> <p>Toggles the LED between status mode and alarm mode with the following indication:</p> <p>Status Yellow = ON, No color = OFF</p> <p>Alarm Red = Alarm, Green = No alarm</p>

This attribute applies to Excel 800 with XF8.. and XFL8.. modules only. The XF8.. panel modules can also be toggled in the terminal assignment tool (TAF).

Polarity

Selection of the polarity which indicates the relationship between the physical state of the Input and the logical state represented by the present value. If the polarity is NORMAL, then the ACTIVE state of the present value is also the ACTIVE or ON state of the physical input.

If the polarity is REVERSE, then the ACTIVE state of the present value is the INACTIVE or OFF state of the physical Input.

Present Value	Polarity	Physical State of Input	Physical State of Device
INACTIVE	NORMAL	OFF or INACTIVE	<u>not</u> running
ACTIVE	NORMAL	ON or ACTIVE	Running
INACTIVE	REVERSE	ON or ACTIVE	<u>not</u> running
ACTIVE	REVERSE	OFF or INACTIVE	running

Communication failure

(applies to EAGLE controller only)
In case of communication failure or application stop, the device is commanded to one of the following positions if the controller does not deliver a value (no response).

- Last Valid Value
device is commanded to the last valid position
- Safety Value
device is commanded to the value (logical state) that can be selected in Safety Value

Safety Value

(applies to EAGLE controller only)
Select the safety value if Safety Value is selected in Communication Failure. The selectable values depend on the state text definitions (see State Texts field description).

Acked Transitions

Allows observing the acknowledgement behavior of a user for To-Off-Normal and To-Fault transition events of the datapoint. CARE checks whether a transition event has been acknowledged or not. If a transition event has not been acknowledged within a definable delay time, an alarm based on an event enrollment (event enrollment alarm) is sent to a supervisory recipient, for example EBI.

Click **Observe** button to display the *Event Enrollment – Acked Transitions* dialog box.

Event Enrollment - Acked Transitions

Name: EE_AHU01_Alarm_Cond_Hum.AckedTransitions

Description:

Event Type: Change Of BitString

Event Parameters

Bit Mask: To-OffNormal To-Fault Back To-Normal

List Of Values:

TRUE = Alarm acknowledged
 FALSE = Alarm not acknowledged
 - = don't care

Alarm Delay: 1800 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Event Enrollment – Acked Transitions* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note the event type of the event enrollment object is 'change of bitstring'.
4. Under **Event Parameters**, select the transition event(s) that should be checked for acknowledgement. The **List of Values** shows the possible logical values (checked=true, unchecked=false, CARE verifies with negative logic for false the condition) resulting from the comparison of the selected transition event(s) and the underlying bitstring mask. An event enrollment alarm will be sent, if the transition event will **not** be acknowledged within the delay time.
5. In the **Alarm Delay** field, enter an alarm delay in sec. The event enrollment alarm will be sent if the transition event has **not** been acknowledged within the delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent after an unacknowledged transition.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the acknowledgement is missing within the alarm delay;

Back-To-Normal = event notification is sent if the acknowledgement is sent after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Status Flags

Allows observing status flags conditions. To enable observing status flag conditions, click **Observe** button to display the *Event Enrollment – Status Flags* dialog box.

Event Enrollment - Status Flags

Name: EE_AHU01_Alarm_Cond_Hum.StatusFlags

Description:

Event Type: Change Of BitString

Event Parameters

Bit Mask	In-Alarm	Fault	Overridden	Out-Of-Service
List Of Values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TRUE = Datapoint is in checked Status
 FALSE = Datapoint is not in checked Status
 - = don't care

Alarm Delay: 10 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Event Enrollment – Status Flags* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.

4. Under **Status Flags**, select the flags of which status should be observed. The **List of Values** shows the possible logical values (checked=true, unchecked=false) resulting from the comparison of the selected status flags and the underlying bitstring mask.
5. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent for each status flag that is enabled (checked) within the alarm delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if a status flag is enabled within the alarm delay;

To-Normal = event notification is sent if a status flag is disabled after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Runtime
(Elapsed Active Time)

Allows observing the state of the elapsed runtime. To enable the observation of the state of the elapsed runtime, click the **Observe** button to display the *Alarming for Elapsed Active Time* dialog box.

Alarming For Elapsed Active Time

Name: EE_AHU01_Alarm_Cond_Hum.ElapsedActiveTime

Static: [Empty]

Event Type: Unsigned Range

High Limit: 0 Seconds

Low Limit: 0 Seconds

Alarm Delay: 10 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting:

- To-OffNormal
- To-Fault
- Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Alarming for Elapsed For Elapsed Active Time* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Static** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.
4. In the **High Limit** field, enter the high limit value for the elapsed active (elapsed) runtime, respectively the number of state count changes.
5. In the **Low Limit** field, enter '0' for the elapsed active (elapsed) runtime respectively the number of state count changes.
6. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent if the elapsed active (elapsed) runtime, respectively the number of state count changes increases the high or low limit within the alarm delay time.
7. From the **Notify Type** drop-down listbox, select the notify type.
8. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
9. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the elapsed active (elapsed) runtime value, respectively number of state count changes value exceeds the high within the alarm delay;

To-Normal = event notification is sent if the elapsed active (elapsed) runtime, respectively number of state count changes takes a value within the high or low limit after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

10. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Count Limits

Allows observing the state of the count limits. To enable the observation of the state of the elapsed runtime or count limits, click the relevant **Observe** button to display the *Alarming for Change of State Count* dialog box.

Alarming for Change of State Count

Name: EE_AHU01_Alarm_Cond_Hum.ChangeOfStateCount

Description:

Event Type: Unsigned Range

High Limit: 0

Low Limit: 0

Alarm Delay: 10 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting:

- To-OffNormal
- To-Fault
- Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Alarming for Change of State Count* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.
4. In the **High Limit** field, enter the high limit value for the elapsed active (elapsed) runtime, respectively the number of state count changes.
5. In the **Low Limit** field, enter '0' for the elapsed active (elapsed) runtime respectively the number of state count changes.
6. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent if the elapsed active (elapsed) runtime, respectively the number of state count changes increases the high or low limit within the alarm delay time.
7. From the **Notify Type** drop-down listbox, select the notify type.
8. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
9. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the elapsed active (elapsed) runtime value, respectively number of state count changes value exceeds the high within the alarm delay;

To-Normal = event notification is sent if the elapsed active (elapsed) runtime, respectively number of state count changes takes a value within the high or low limit after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

10. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Binary Output Point

- Purpose** Display and/or modify the attributes of the selected binary output point.
- Procedure** In the tree, click desired point to display current values on the right Properties tab (itemized display).

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, enter desired values in the fields, and/or select respectively deselect desired options.

Attributes Description	Datapoint Name	Point name (maximum of 40 alphanumeric characters) assigned to a point for operator use in locating and
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commanding the point. This name must be unique within a controller.

Point names must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a datapoint name, but 12 is not.

IMPORTANT

Note that the max. length of the datapoint name for Lon points should not exceed 18 characters (see Lon point attribute).

BACnet Object Type	Displays the BACnet object type.
BACnet Object ID	Displays the BACnet object type ID.
BACnet Instance number	Displays the BACnet instance number.
Lon Point	<p>(Applies to FALCON controller only) Define whether the datapoint should be a LON point or not. List of choices displays:</p> <p>NV-Output Creates output NV.</p> <p>Manual Mapping Provides selection of this datapoint for mapping to NVs in the NV-Editor.</p>
Output NV	<p>Define the NV-type for the LON point.</p> <p>Reliability status on the Excel Web HTML Interface:</p> <p>In order to make sure that the Reliability property for the present value works properly, the service type of the point must be set to Acknowledged (Ackd). With acknowledged service, controller - I/O module disconnections are indicated by the relevant reliability 'No Sensor' or 'No Output'. Note, that if a large number of outputs (e.g. all outputs of multiple I/O modules) are set to acknowledged service, the performance on the LON bus may drastically decrease (see "Change Service Type for Excel Web Datapoints" section).</p>
Active/Inactive Text	<p>Assign text which will be displayed for the corresponding active respectively inactive state of the point. List of choices displays active/inactive (passive) texts with ID, and number of states.</p> <p>To add texts to the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (Excel Web Controller, Miscellaneous Text Editor chapter).</p>
Descriptor	<p>Supplemental point information. Each project and/or plant has a unique set of descriptors that can be assigned to its datapoint names to further describe them.</p> <p>List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Alarm Text	Alarm text that displays on point alarm. List of choices displays alarm texts with ID and text.

	To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
Read Access Write Access	Determine whether the user can read datapoint values respectively write values to the datapoint in the Web Interface. All users having a user level equal or higher than the assigned read access respectively write access of the datapoint, will have this access right enabled in the Web Interface, all others will not (for further details, please refer to the User Access Manager section).
Notification Class	Enable alarming for the datapoint by selecting a notification class with a given priority. By default the following notification classes with descending priority can be selected: <ul style="list-style-type: none"> - Urgent - High - Low - Journal <p>Those default notification classes are especially designed for the alarming to the EBI central (for information on notification classes to be used for 3rd party BACnet clients, please refer to the Notification Class Manager section)</p> <p>Each recipient which is assigned to this notification class will receive the datapoint alarm triggered by the selected notification. But, alarms will only be generated for the enabled transitions (To-Normal, To-OffNormal, and/or To-Fault) of a recipient. Each enabled transition will be propagated with the selected notification. (For further details please refer to the Notification Class Manager section).</p> <p>This connection has not to be mixed up with the transitions selected under Reporting (see Reporting description in the following).</p>
Notify Type	If the notification class Urgent, High, or Low has been selected, the notify type Alarm must be used.
Suppress Alarm	Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the limits.
Alarm Delay	Defines the time delay with which a 'To-Off-Normal' (EAGLE and FALCON controllers) transition and a 'To-Normal' transition (FALCON controller) will be set off.
Alarm Delay Normal	Defines the time delay with which a 'To-Normal' transition will be set off.
Reporting	Define which transition type ((To-Normal, To-OffNormal, and/or To Fault) will be tracked by timestamping in the Web Interface.
Point Role	Point Role created via an external tool like XL Toolkit and imported into CARE. The point role is selected from XL Toolkit database.
Polarity	Selection of the polarity which indicates the relationship between the physical state of the Input and the logical

state represented by the present value. If the polarity is NORMAL, then the ACTIVE state of the present value is also the ACTIVE or ON state of the physical input.

If the polarity is REVERSE, then the ACTIVE state of the present value is the INACTIVE or OFF state of the physical Input.

Present_Value	Polarity	Physical State of Input	Physical State of Device
INACTIVE	NORMAL	OFF or INACTIVE	not running
ACTIVE	NORMAL	ON or ACTIVE	Running
INACTIVE	REVERSE	ON or ACTIVE	not running
ACTIVE	REVERSE	OFF or INACTIVE	running

Communication failure

In case of communication failure or application stop, the device is commanded to one of the following positions if the controller does not deliver a value (no response).

- Last Valid Value
device is commanded to the last valid position

- OFF (logical)
- ON (logical)
device is commanded to the selected logical state

with Switches

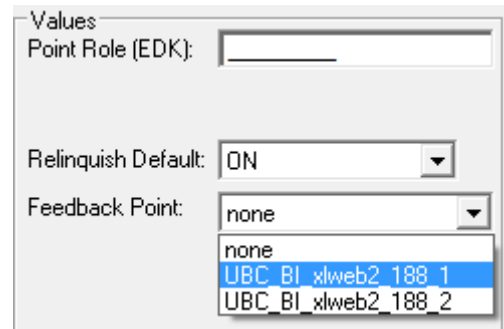
Define whether the point transmittes a continous signal and is on a board with switches or not.

Relinquish Default

Define the value that will be written to present value, if all values in the priority list are invalid.

Feedback Value

Define the datapoint that should provide the value for feedback control in case of BACnet fault and command failure alarms. The feedback point must be a binary input. The selected feedback point will not be available on the controller HMI and web interface.



NOTE:

The feedback point must not be used in a control loop since as a result the control loop will not be executed properly.

Status Flags

Allows observing status flags conditions. To enable observing status flag conditions, click **Observe** button to display the *Event Enrollment – Status Flags* dialog box.

Event Enrollment - Status Flags

Name: EE_AHU01_Htg_Pump.StatusFlags

Description:

Event Type: Change Of BitString

Event Parameters:

Bit Mask	In-Alarm	Fault	Overridden	Out-Of-Service
List Of Values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TRUE = Datapoint is in checked Status
 FALSE = Datapoint is not in checked Status
 - = don't care

Alarm Delay: 10 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting:

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Event Enrollment – Status Flags* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.

4. Under **Status Flags**, select the flags of which status should be observed. The **List of Values** shows the possible logical values (checked=true, unchecked=false) resulting from the comparison of the selected status flags and the underlying bitstring mask.
5. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent for each status flag that is enabled (checked) within the alarm delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if a status flag is enabled within the alarm delay;

To-Normal = event notification is sent if a status flag is disabled after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Runtime
(Elapsed Active Time)

Allows observing the state of the elapsed runtime or the count limits. To enable the observation of the state of the elapsed runtime or count limits, click the relevant **Observe** button to display the *Alarming For Elapsed Active Time* dialog box.

Alarming For Elapsed Active Time

Name: EE_AHU01_Htg_Pump.ElapsedActiveTime

Static: [Empty]

Event Type: Unsigned Range

High Limit: 0 Seconds

Low Limit: 0 Seconds

Alarm Delay: 10 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting:

- To-OffNormal
- To-Fault
- Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Alarming For Elapsed Active Time* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Static** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.
4. In the **High Limit** field, enter the high limit value for the elapsed active (elapsed) runtime, respectively the number of state count changes.
5. In the **Low Limit** field, enter '0' for the elapsed active (elapsed) runtime respectively the number of state count changes.
6. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent if the elapsed active (elapsed) runtime, respectively the number of state count changes increases the high or low limit within the alarm delay time.
7. From the **Notify Type** drop-down listbox, select the notify type.
8. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
9. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the elapsed active (elapsed) runtime value, respectively number of state count changes value exceeds the high within the alarm delay;

To-Normal = event notification is sent if the elapsed active (elapsed) runtime, respectively number of state count changes takes a value within the high or low limit after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

10. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Count Limits

Allows observing the state of the elapsed runtime or the count limits. To enable the observation of the state of the elapsed runtime or count limits, click the relevant **Observe** button to display the *Alarming for Elapsed Active Time* respectively the *Alarming for Change of State Count* dialog box.

Alarming for Change of State Count

Name: EE_AHU01_Htg_Pump.ChangeOfStateCount

Description:

Event Type: Unsigned Range

High Limit: 0

Low Limit: 0

Alarm Delay: 10 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting:

- To-OffNormal
- To-Fault
- Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Alarming for Change of State Count* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.
4. In the **High Limit** field, enter the high limit value for the elapsed active (elapsed) runtime, respectively the number of state count changes.
5. In the **Low Limit** field, enter '0' for the elapsed active (elapsed) runtime respectively the number of state count changes.
6. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent if the elapsed active (elapsed) runtime, respectively the number of state count changes increases the high or low limit within the alarm delay time.
7. From the **Notify Type** drop-down listbox, select the notify type.
8. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
9. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the elapsed active (elapsed) runtime value, respectively number of state count changes value exceeds the high within the alarm delay;

To-Normal = event notification is sent if the elapsed active (elapsed) runtime, respectively number of state count changes takes a value within the high or low limit after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

10. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Binary Value Point

- Purpose** Display and/or modify the attributes of the selected binary value point.
- Procedure** In the tree, click desired point to display current values on the right Properties tab (itemized display).

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, enter desired values in the fields, and/or select respectively deselect desired options.

Attributes Description	Datapoint Name	Point name (maximum of 40 alphanumeric characters) assigned to a point for operator use in locating and
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commanding the point. This name must be unique within a controller.

Point names must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a datapoint name, but 12 is not.

IMPORTANT

Note that the max. length of the datapoint name for Lon points should not exceed 18 characters (see Lon point attribute).

BACnet Object Type	Displays the BACnet object type.
BACnet Object ID	Displays the BACnet object type ID.
BACnet Instance number	Displays the BACnet instance number.
Active/Inactive Text	<p>Assign text which will be displayed for the corresponding active respectively inactive state of the point. List of choices displays active/inactive (passive) texts with ID, and number of states.</p> <p>To add texts to the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (Excel Web Controller, Miscellaneous Text Editor chapter).</p>
Descriptor	<p>Supplemental point information. Each project and/or plant has a unique set of descriptors that can be assigned to its datapoint names to further describe them.</p> <p>List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Alarm Text	<p>Alarm text that displays on point alarm. List of choices displays alarm texts with ID and text.</p> <p>To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Read Access Write Access	<p>Determine whether the user can read datapoint values respectively write values to the datapoint in the Web Interface.</p> <p>All users having a user level equal or higher than the assigned read access respectively write access of the datapoint, will have this access right enabled in the Web Interface, all others will not (for further details, please refer to the User Access Manager section).</p>
Notification Class	<p>Enable alarming for the datapoint by selecting a notification class with a given priority. By default the following notification classes with descending priority can be selected:</p> <ul style="list-style-type: none"> - Urgent - High - Low - Journal <p>Those default notification classes are especially designed for the alarming to the EBI central (for information on notification classes to be used for 3rd party</p>

BACnet clients, please refer to the Notification Class Manager section)

Each recipient which is assigned to this notification class will receive the datapoint alarm triggered by the selected notification. But, alarms will only be generated for the enabled transitions (To-Normal, To-OffNormal, and/or To-Fault) of a recipient. Each enabled transition will be propagated with the selected notification. (For further details please refer to the Notification Class Manager section).

This connection has not to be mixed up with the transitions selected under Reporting (see Reporting description in the following).

Notify Type	If the notification class Urgent, High, or Low has been selected, the notify type Alarm must be used.
Suppress Alarm	Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the limits.
Alarm Delay	Defines the time delay with which a 'To-Off-Normal' (EAGLE and FALCON controllers) transition and a 'To-Normal' transition (FALCON controller) will be set off.
Alarm Delay Normal	Defines the time delay with which a 'To-Normal' transition will be set off.
Alarm Value	To set the status, 0 or 1, when an alarm should be reported, in case the binary input value changes
Reporting	Define which transition type ((To-Normal, To-OffNormal, and/or To Fault) will be tracked by timestamping in the Web Interface.
Point Role	Point Role created via an external tool like XL Toolkit and imported into CARE. The point role is selected from XL Toolkit database.
Relinquish Default	Define the value that will be written to present value, if all values in the priority list are invalid.
EOH/EOV Optimization	Check whether the datapoint should be optimized or not, in case the datapoint is used as setpoint for energy optimized heating or ventilation (EOH/EOV).
Setpoint	Enables the direct change (override) of the current datapoint value in the web interface and the controller HMI without the necessity of setting the datapoint into manual mode.
Acked Transitions	Allows observing the acknowledgement behavior of a user for To-Off-Normal and To-Fault transition events of the datapoint. CARE checks whether a transition event has been acknowledged or not. If a transition event has not been acknowledged within a definable delay time, an alarm based on an event enrollment (event enrollment alarm) is sent to a supervisory recipient, for example EBI.

Click **Observe** button to display the *Event Enrollment – Acked Transitions* dialog box.

Event Enrollment - Acked Transitions

Name: EE_AHU01_AlarmLamp.AckedTransitions

Description: [Empty]

Event Type: Change Of BitString

Event Parameters

Bit Mask: To-OffNormal To-Fault Back To-Normal

List Of Values: [Table with 3 columns and 3 rows]

TRUE = Alarm acknowledged
 FALSE = Alarm not acknowledged
 - = don't care

Alarm Delay: 1800 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting: To-OffNormal To-Fault Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Event Enrollment – Acked Transitions* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note the event type of the event enrollment object is 'change of bitstring'.
4. Under **Event Parameters**, select the transition event(s) that should be checked for acknowledgement. The **List of Values** shows the possible logical values (checked=true, unchecked=false, CARE verifies with negative logic for false the condition) resulting from the comparison of the selected transition event(s) and the underlying bitstring mask. An event enrollment alarm will be sent, if the transition event will **not** be acknowledged within the delay time.
5. In the **Alarm Delay** field, enter an alarm delay in sec. The event enrollment alarm will be sent if the transition event has **not** been acknowledged within the delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent after an unacknowledged transition.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the acknowledgement is missing within the alarm delay;

Back-To-Normal = event notification is sent if the acknowledgement is sent after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Status Flags

Allows observing status flags conditions. To enable observing status flag conditions, click **Observe** button to display the *Event Enrollment – Status Flags* dialog box.

Event Enrollment - Status Flags

Name: EE_AHU01_AlarmLamp.StatusFlags

Description:

Event Type: Change Of BitString

Event Parameters

Bit Mask	In-Alarm	Fault	Overridden	Out-Of-Service
List Of Values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TRUE = Datapoint is in checked Status
 FALSE = Datapoint is not in checked Status
 - = don't care

Alarm Delay: 10 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Event Enrollment – Status Flags* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.

4. Under **Status Flags**, select the flags of which status should be observed. The **List of Values** shows the possible logical values (checked=true, unchecked=false) resulting from the comparison of the selected status flags and the underlying bitstring mask.
5. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent for each status flag that is enabled (checked) within the alarm delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if a

status flag is enabled within the alarm delay;

To-Normal = event notification is sent if a status

flag is disabled after the alarm delay has been

expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Runtime
(Elapsed Active Time)

Allows observing the state of the elapsed runtime. To enable the observation of the state of the elapsed runtime, click the **Observe** button to display the *Alarming for Elapsed Active Time* dialog box.

Alarming For Elapsed Active Time

Name: EE_AHU01_AlarmLamp.ElapsedActiveTime

Static: [Empty]

Event Type: Unsigned Range

High Limit: 0 Seconds

Low Limit: 0 Seconds

Alarm Delay: 10 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting:

- To-OffNormal
- To-Fault
- Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Alarming for Elapsed For Elapsed Active Time* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Static** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.
4. In the **High Limit** field, enter the high limit value for the elapsed active (elapsed) runtime, respectively the number of state count changes.
5. In the **Low Limit** field, enter '0' for the elapsed active (elapsed) runtime respectively the number of state count changes.
6. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent if the elapsed active (elapsed) runtime, respectively the number of state count changes increases the high or low limit within the alarm delay time.
7. From the **Notify Type** drop-down listbox, select the notify type.
8. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
9. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the elapsed active (elapsed) runtime value, respectively number of state count changes value exceeds the high within the alarm delay;

To-Normal = event notification is sent if the elapsed active (elapsed) runtime, respectively number of state count changes takes a value within the high or low limit after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

10. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Count Limits

Allows observing the state of the count limits. To enable the observation of the state of the elapsed runtime or count limits, click the relevant **Observe** button to display the *Alarming for Change of State Count* dialog box.

Alarming for Change of State Count

Name: EE_AHU01_AlarmLamp.ChangeOfStateCount

Description:

Event Type: Unsigned Range

High Limit: 0

Low Limit: 0

Alarm Delay: 10 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting:

- To-OffNormal
- To-Fault
- Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Alarming for Change of State Count* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.
4. In the **High Limit** field, enter the high limit value for the elapsed active (elapsed) runtime, respectively the number of state count changes.
5. In the **Low Limit** field, enter '0' for the elapsed active (elapsed) runtime respectively the number of state count changes.
6. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent if the elapsed active (elapsed) runtime, respectively the number of state count changes increases the high or low limit within the alarm delay time.
7. From the **Notify Type** drop-down listbox, select the notify type.
8. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
9. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the elapsed active (elapsed) runtime value, respectively number of state count changes value exceeds the high within the alarm delay;

To-Normal = event notification is sent if the elapsed active (elapsed) runtime, respectively number of state count changes takes a value within the high or low limit after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

10. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Multi-State Points

Multi-State Input Point

Purpose Display and/or modify the attributes of the selected multi-state input point.

Procedure In the tree, click desired point to display current values on the right Properties tab (itemized display).

Properties

Datapoint Name: BACnet Object Type:
 BACnet Object ID: BACnet Instance Number:

Lon Mapping

Misc. Editor Functions

State Texts: ...
 Descriptor: ...
 Alarm Text: ...
 Characteristic: ...

Access Rights

Read Access Level: Write Access Level:

Alarming

Notification Class: Notify Type:
 Suppress Alarm Alarm Delay: [sec]
 Alarm Delay Normal: [sec]

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

Event Enrollments

Acked Transitions (To-Off/Normal/To-Fault): Enabled
 Status Flags (Out Of Service/Overridden): Enabled

Values

Point Role (EDK):

Multi-State Properties

Number of States:

States	In Alarm	Fault
1	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, enter desired values in the fields, and/or select respectively deselect desired options.

Attributes Description	Datapoint Name	Point name (maximum of 40 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. This name must be unique within a controller.
		Point names must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a datapoint name, but 12 is not.
		<p>IMPORTANT <i>Note that the max. length of the datapoint name for Lon points should not exceed 18 characters (see Lon point attribute).</i></p>
	BACnet Object Type	Displays the BACnet object type.
	BACnet Object ID	Displays the BACnet object type ID.
	BACnet Instance number	Displays the BACnet instance number.
	Lon Point	<p>(Applies to FALCON controller only) Define whether the datapoint should be a LON point or not. List of choices displays:</p> <p>NV-Input Creates input NV.</p> <p>Manual Mapping Provides selection of this datapoint for mapping to NVs in the NV-Editor.</p>
	Input NV	Define the NV-type for the LON point.
	State Texts	Assign state texts which will be displayed for the corresponding state of the point. List of choices displays the number of states and the first two states of state sequences which may include more than two states. Further texts of state sequences, will be shown by the yellow tooltip. Entries are arranged by ID. To add texts to the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (Excel Web Controller, Miscellaneous Text Editor chapter).
	Descriptor	Supplemental point information. Each project and/or plant has a unique set of descriptors that can be assigned to its datapoint names to further describe them. List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
	Alarm Text	Alarm text that displays on point alarm. List of choices displays alarm texts with ID and text. To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
	Characteristic	Assign a characteristic (conversion table) if the datapoint is to be mapped to a NV (see Lon point attribute). For Multi-State Inputs, the characteristic +1, for Multi-State Outputs, the characteristic -1, is provided by CARE by

default. These default characteristics must be used if the multi-state points are considered to be mapped to NVs.

Read Access
Write Access

Determine whether the user can read datapoint values respectively write values to the datapoint in the Web Interface.

All users having a user level equal or higher than the assigned read access respectively write access of the datapoint, will have this access right enabled in the Web Interface, all others will not (for further details, please refer to the User Access Manager section).

Notification Class

Enable alarming for the datapoint by selecting a notification class with a given priority. By default the following notification classes with descending priority can be selected:

- Urgent
- High
- Low
- Journal

Those default notification classes are especially designed for the alarming to the EBI central (for information on notification classes to be used for 3rd party BACnet clients, please refer to the Notification Class Manager section)

Each recipient which is assigned to this notification class will receive the datapoint alarm triggered by the selected notification. But, alarms will only be generated for the enabled transitions (To-Normal, To-OffNormal, and/or To-Fault) of a recipient. Each enabled transition will be propagated with the selected notification. (For further details please refer to the Notification Class Manager section).

This connection has not to be mixed up with the transitions selected under Reporting (see Reporting description in the following).

Notify Type

If the notification class Urgent, High, or Low has been selected, the notify type Alarm must be used.

Suppress Alarm

Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the limits.

Alarm Delay

Defines the time delay with which a 'To-Off-Normal' (EAGLE and FALCON controllers) transition and a 'To-Normal' transition (FALCON controller) will be set off.

Alarm Delay Normal

Defines the time delay with which a 'To-Normal' transition will be set off.

Reporting

Define which transition type ((To-Normal, To-OffNormal, and/or To Fault) will be tracked by timestamping in the Web Interface.

Point Role

Point Role created via an external tool like XL Toolkit and imported into CARE. The point role is selected from XL Toolkit database.

Multi-State Properties Check in which state the point should be in the Alarm and/or in the Fault condition. If enabled, the alarm text of the corresponding Reporting is displayed.(see Alarm text).

Acked Transitions Allows observing the acknowledgement behavior of a user for To-Off-Normal and To-Fault transition events of the datapoint. CARE checks whether a transition event has been acknowledged or not. If a transition event has not been acknowledged within a definable delay time, an alarm based on an event enrollment (event enrollment alarm) is sent to a supervisory recipient, for example EBI.

Click **Observe** button to display the *Event Enrollment – Acked Transitions* dialog box.

In the *Event Enrollment – Acked Transitions* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note the event type of the event enrollment object is 'change of bitstring'.
4. Under **Event Parameters**, select the transition event(s) that should be checked for acknowledge-mint. The **List of Values** shows the possible logical values (checked=true, unchecked=false, CARE verifies with negative logic for false the condition) resulting from the comparison of the selected transition event(s) and the underlying bitstring mask. An event enrollment alarm will be sent, if the transition event will **not** be acknowledged within the delay time.
5. In the **Alarm Delay** field, enter an alarm delay in sec. The event enrollment alarm will be sent if the transition event has **not** been acknowledged within the delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent after an unacknowledged transition.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the acknowledgement is missing within the alarm delay;

Back-To-Normal = event notification is sent if the acknowledgement is sent after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Status Flags

Allows observing status flags conditions. To enable observing status flag conditions, click **Observe** button to display the *Event Enrollment – Status Flags* dialog box.

Event Enrollment - Status Flags

Name: EE_AHU01_MI_XS.StatusFlags

Description:

Event Type: Change Of BitString

Event Parameters

Bit Mask	In-Alarm	Fault	Overridden	Out-Of-Service
List Of Values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TRUE = Datapoint is in checked Status
 FALSE = Datapoint is not in checked Status
 - = don't care

Alarm Delay: 10 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Event Enrollment – Status Flags* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.

4. Under **Status Flags**, select the flags of which status should be observed. The **List of Values** shows the possible logical values (checked=true, unchecked=false) resulting from the comparison of the selected status flags and the underlying bitstring mask.
5. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent for each status flag that is enabled (checked) within the alarm delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if a status flag is enabled within the alarm delay;

To-Normal = event notification is sent if a status flag is disabled after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Multi-State Output Point

- Purpose** Display and/or modify the attributes of the selected multi-state output point.
- Procedure** In the tree, click desired point to display current values on the right Properties tab (itemized display).

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, enter desired values in the fields, and/or select respectively deselect desired options.

Attributes Description	Datapoint Name	Point name (maximum of 40 alphanumeric characters) assigned to a point for operator use in locating and
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commanding the point. This name must be unique within a controller.

Point names must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a datapoint name, but 12 is not.

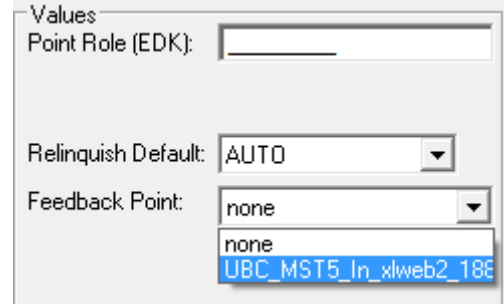
IMPORTANT

Note that the max. length of the datapoint name for Lon points should not exceed 18 characters (see Lon point attribute).

BACnet Object Type	Displays the BACnet object type.
BACnet Object ID	Displays the BACnet object type ID.
BACnet Instance number	Displays the BACnet instance number.
Lon Point	<p>(Applies to FALCON controller only) Define whether the datapoint should be a LON point or not. List of choices displays:</p> <p>NV-Output Creates output NV.</p> <p>Manual Mapping Provides selection of this datapoint for mapping to NVs in the NV-Editor.</p> <p>Reliability status on the Excel Web HTML Interface:</p> <p>In order to make sure that the Reliability property for the present value works properly, the service type of the point must be set to Acknowledged (Ackd). With acknowledged service, controller - I/O module disconnections are indicated by the relevant reliability 'No Sensor' or 'No Output'. Note, that if a large number of outputs (e.g. all outputs of multiple I/O modules) are set to acknowledged service, the performance on the LON bus may drastically decrease (see "Change Service Type for Excel Web Datapoints" section).</p>
Output NV	Define the NV-type for the LON point.
State Texts	<p>Assign state texts which will be displayed for the corresponding state of the point. List of choices displays the number of states and the first two states of state sequences which may include more than two states. Further texts of state sequences, will be shown by the yellow tooltip. Entries are arranged by ID.</p> <p>To add texts to the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (Excel Web Controller, Miscellaneous Text Editor chapter).</p>
Descriptor	<p>Supplemental point information. Each project and/or plant has a unique set of descriptors that can be assigned to its datapoint names to further describe them.</p> <p>List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Alarm Text	Alarm text that displays on point alarm. List of choices displays alarm texts with ID and text.

Characteristic	<p>To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter). Assign a characteristic (conversion table) if the datapoint is to be mapped to a NV (see Lon point attribute). For Multi-State Inputs, the characteristic +1, for Multi-State Outputs, the characteristic -1, is provided by CARE by default. These default characteristics must be used if the multi-state points are considered to be mapped to NVs.</p>
Read Access Write Access	<p>Determine whether the user can read datapoint values respectively write values to the datapoint in the Web Interface.</p> <p>All users having a user level equal or higher than the assigned read access respectively write access of the datapoint, will have this access right enabled in the Web Interface, all others will not (for further details, please refer to the User Access Manager section).</p>
Notification Class	<p>Enable alarming for the datapoint by selecting a notification class with a given priority. By default the following notification classes with descending priority can be selected:</p> <ul style="list-style-type: none"> - Urgent - High - Low - Journal <p>Those default notification classes are especially designed for the alarming to the EBI central (for information on notification classes to be used for 3rd party BACnet clients, please refer to the Notification Class Manager section)</p> <p>Each recipient which is assigned to this notification class will receive the datapoint alarm triggered by the selected notification. But, alarms will only be generated for the enabled transitions (To-Normal, To-OffNormal, and/or To-Fault) of a recipient. Each enabled transition will be propagated with the selected notification. (For further details please refer to the Notification Class Manager section).</p> <p>This connection has not to be mixed up with the transitions selected under Reporting (see Reporting description in the following).</p>
Notify Type	<p>If the notification class Urgent, High, or Low has been selected, the notify type Alarm must be used.</p>
Suppress Alarm	<p>Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the limits.</p>
Alarm Delay	<p>Defines the time delay with which a `To-Off-Normal` (EAGLE and FALCON controllers) transition and a `To-Normal` transition (FALCON controller) will be set off.</p>
Alarm Delay Normal	<p>Defines the time delay with which a `To-Normal` transition will be set off.</p>
Reporting	<p>Define which transition type (To-Normal, To-OffNormal, and/or To Fault) will be tracked by timestamping in the Web Interface.</p>

Point Role	Point Role created via an external tool like XL Toolkit and imported into CARE. The point role is selected from XL Toolkit database.
Relinquish Default	Define the value that will be written to present value, if all values in the priority list are invalid.
Feedback Value	Define the datapoint that should provide the value for feedback control in case of BACnet fault and command failure alarms. The feedback point must be a binary input. The selected feedback point will not be available on the controller HMI and web interface.



NOTE:
 The feedback point must not be used in a control loop since as a result the control loop will not be executed properly.

Multi-State Properties	Check in which state the point should be in the Alarm and/or in the Fault condition. If enabled, the alarm text of the corresponding Reporting is displayed.(see Alarm text).
Status Flags	Allows observing status flags conditions. To enable observing status flag conditions, click Observe button to display the <i>Event Enrollment – Status Flags</i> dialog box.

Event Enrollment - Status Flags

Name: EE_AHU01_MO_XS.StatusFlags

Description:

Event Type: Change Of BitString

Event Parameters

Bit Mask	In-Alarm	Fault	Overridden	Out-Of-Service
List Of Values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TRUE = Datapoint is in checked Status
 FALSE = Datapoint is not in checked Status
 - = don't care

Alarm Delay: 10 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Event Enrollment – Status Flags* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.

4. Under **Status Flags**, select the flags of which status should be observed. The **List of Values** shows the possible logical values (checked=true, unchecked=false) resulting from the comparison of the selected status flags and the underlying bitstring mask.
5. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent for each status flag that is enabled (checked) within the alarm delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if a status flag is enabled within the alarm delay;

To-Normal = event notification is sent if a status flag is disabled after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Multi-State Value Point

Purpose Display and/or modify the attributes of the selected multi-state value point.

Procedure In the tree, click desired point to display current values on the right Properties tab (itemized display).

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, enter desired values in the fields, and/or select respectively deselect desired options.

Attributes Description	Datapoint Name	Point name (maximum of 40 alphanumeric characters) assigned to a point for operator use in locating and
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commanding the point. This name must be unique within a controller.

Point names must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a datapoint name, but 12 is not.

IMPORTANT

Note that the max. length of the datapoint name for Lon points should not exceed 18 characters (see Lon point attribute).

BACnet Object Type	Displays the BACnet object type.
BACnet Object ID	Displays the BACnet object type ID.
BACnet Instance number	Displays the BACnet instance number.
State Texts	<p>Assign state texts which will be displayed for the corresponding state of the point. List of choices displays the number of states and the first two states of state sequences which may include more than two states. Further texts of state sequences, will be shown by the yellow tooltip. Entries are arranged by ID.</p> <p>To add texts to the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (Excel Web Controller, Miscellaneous Text Editor chapter).</p>
Descriptor	<p>Supplemental point information. Each project and/or plant has a unique set of descriptors that can be assigned to its datapoint names to further describe them.</p> <p>List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Alarm Text	<p>Alarm text that displays on point alarm. List of choices displays alarm texts with ID and text.</p> <p>To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).</p>
Read Access Write Access	<p>Determine whether the user can read datapoint values respectively write values to the datapoint in the Web Interface.</p> <p>All users having a user level equal or higher than the assigned read access respectively write access of the datapoint, will have this access right enabled in the Web Interface, all others will not (for further details, please refer to the User Access Manager section).</p>
Notification Class	<p>Enable alarming for the datapoint by selecting a notification class with a given priority. By default the following notification classes with descending priority can be selected:</p> <ul style="list-style-type: none"> - Urgent - High - Low - Journal

Those default notification classes are especially designed for the alarming to the EBI central (for information on notification classes to be used for 3rd party BACnet clients, please refer to the Notification Class Manager section)

Each recipient which is assigned to this notification class will receive the datapoint alarm triggered by the selected notification. But, alarms will only be generated for the enabled transitions (To-Normal, To-OffNormal, and/or To-Fault) of a recipient. Each enabled transition will be propagated with the selected notification. (For further details please refer to the Notification Class Manager section).

This connection has not to be mixed up with the transitions selected under Reporting (see Reporting description in the following).

Notify Type	If the notification class Urgent, High, or Low has been selected, the notify type Alarm must be used.
Suppress Alarm	Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the limits.
Alarm Delay	Defines the time delay with which a 'To-Off-Normal' (EAGLE and FALCON controllers) transition and a 'To-Normal' transition (FALCON controller) will be set off.
Alarm Delay Normal	Defines the time delay with which a 'To-Normal' transition will be set off.
Reporting	Define which transition type ((To-Normal, To-OffNormal, and/or To Fault) will be tracked by timestamping in the Web Interface.
Point Role	Point Role created via an external tool like XL Toolkit and imported into CARE. The point role is selected from XL Toolkit database.
Relinquish Default	Define the value that will be written to present value, if all values in the priority list are invalid.
EOH/EOV Optimization	Check whether the datapoint should be optimized or not, in case the datapoint is used as setpoint for energy optimized heating or ventilation (EOH/EOV).
Setpoint	Enables the direct change (override) of the current datapoint value in the web interface and the controller HMI without the necessity of setting the datapoint into manual mode.
Multi-State Properties	Check in which state the point should be in the Alarm and/or in the Fault condition. If enabled, the alarm text of the corresponding Reporting is displayed.(see Alarm text).
Acked Transitions	Allows observing the acknowledgement behavior of a user for To-Off-Normal and To-Fault transition events of the datapoint. CARE checks whether a transition event has been acknowledged or not. If a transition event has not been acknowledged within a definable delay time, an alarm based on an event enrollment (event enrollment alarm) is sent to a supervisory recipient, for example EBI.

Click **Observe** button to display the *Event Enrollment – Acked Transitions* dialog box.

Event Enrollment - Acked Transitions

Name: AHU01_LON_status_XFL821_AI.AckedTransitions

Description: [Empty]

Event Type: Change Of BitString

Event Parameters

Bit Mask: To-OffNormal To-Fault Back To-Normal

List Of Values: [Empty Table]

TRUE = Alarm acknowledged
FALSE = Alarm not acknowledged
- = don't care

Alarm Delay: 1800 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Event Enrollment – Acked Transitions* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note the event type of the event enrollment object is 'change of bitstring'.
4. Under **Event Parameters**, select the transition event(s) that should be checked for acknowledgement. The **List of Values** shows the possible logical values (checked=true, unchecked=false, CARE verifies with negative logic for false the condition) resulting from the comparison of the selected transition event(s) and the underlying bitstring mask. An event enrollment alarm will be sent, if the transition event will **not** be acknowledged within the delay time.
5. In the **Alarm Delay** field, enter an alarm delay in sec. The event enrollment alarm will be sent if the transition event has **not** been acknowledged within the delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent after an unacknowledged transition.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the acknowledgement is missing within the alarm delay;

Back-To-Normal = event notification is sent if the acknowledgement is sent after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Status Flags

Allows observing status flags conditions. To enable observing status flag conditions, click **Observe** button to display the *Event Enrollment – Status Flags* dialog box.

Event Enrollment - Status Flags

Name

Description

Event Type

Event Parameters

Bit Mask	In-Alarm	Fault	Overridden	Out-Of-Service
List Of Values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TRUE = Datapoint is in checked Status
 FALSE = Datapoint is not in checked Status
 - = don't care

Alarm Delay Seconds

Notify Type

Notification Class

Reporting

To-OffNormal

To-Fault

Back To-Normal

BACnet Object ID

OK Cancel

In the *Event Enrollment – Status Flags* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.

4. Under **Status Flags**, select the flags of which status should be observed. The **List of Values** shows the possible logical values (checked=true, unchecked=false) resulting from the comparison of the selected status flags and the underlying bitstring mask.
5. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent for each status flag that is enabled (checked) within the alarm delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if a

status flag is enabled within the alarm delay;

To-Normal = event notification is sent if a status

flag is disabled after the alarm delay has been

expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Pulse Converter Point

Purpose Display and/or modify the attributes of the selected pulse converter point.

Procedure In the tree, click desired point to display current values on the right Properties tab (itemized display).

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, enter desired values in the fields, and/or select respectively deselect desired options.

Attributes Description

Datapoint Name

Point name (maximum of 40 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. This name must be unique within a controller.

Point names must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a datapoint name, but 12 is not.

IMPORTANT

Note that the max. length of the datapoint name for Lon points should not exceed 18 characters (see Lon point attribute).

BACnet Object Type	Displays the BACnet object type.
BACnet Object ID	Displays the BACnet object type ID.
BACnet Instance number	Displays the BACnet instance number.
Lon Point	(Applies to FALCON controller only) Define whether the datapoint should be a LON point or not. List of choices displays: NV-Input Creates input NV. Manual Mapping Provides selection of this datapoint for mapping to NVs in the NV-Editor.
Input NV	Define the NV-type for the LON point.
Engineering Unit	List of choices displays engineering units with ID and unit.
Descriptor	Supplemental point information. Each project and/or plant has a unique set of descriptors that can be assigned to its datapoint names to further describe them. List of choices displays descriptors with ID and text. To add and change descriptors in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
Alarm Text	Alarm text that displays on point alarm. List of choices displays alarm texts with ID and text. To add and change alarm texts in the list, open the Miscellaneous Text Editor by clicking the dotted button on the right (see Miscellaneous Text Editor chapter).
Scaling Factor	Assign and/or create a scaling factor (characteristic), if the datapoint is mapped to a NV (see Lon point attribute). To create a scaling factor, open the Characteristics dialogbox by clicking the dotted button on the right (see Create and Assign Characteristic to BACnet Point section).
Read Access Write Access	Determine whether the user can read datapoint values respectively write values to the datapoint in the Web Interface. All users having a user level equal or higher than the assigned read access respectively write access of the datapoint, will have this access right enabled in the Web Interface, all others will not (for further details, please refer to the User Access Manager section).
Notification Class	Enable alarming for the datapoint by selecting a notification class with a given priority. By default the following notification classes with descending priority can be selected: - Urgent

- High
- Low

Those default notification classes are especially designed for the alarming to the EBI central (for information on notification classes to be used for 3rd party BACnet clients, please refer to the Notification Class Manager section)

Each recipient which is assigned to this notification class will receive the datapoint alarm triggered by the selected notification. But, alarms will only be generated for the enabled transitions (To-Normal, To-OffNormal, and/or To-Fault) of a recipient. Each enabled transition will be propagated with the selected notification. (For further details please refer to the Notification Class Manager section).

This connection has not to be mixed up with the transitions selected under Reporting (see Reporting description in the following).

Notify Type	If the notification class Urgent, High, or Low has been selected, the notify type Alarm must be used.
Suppress Alarm	Whether or not software should suppress alarm messages for changes in Fixed Mode and exceeding the limits.
Alarm Delay	Defines the time delay with which a `To-Off-Normal` (EAGLE and FALCON controllers) transition and a `To-Normal` transition (FALCON controller) will be set off.
Alarm Delay Normal	Defines the time delay with which a `To-Normal` transition will be set off.
High Limit Enable	If a high limit is exceeded and this condition remains present for at least the defined alarm delay (time), than an alarm of event type `To-Off-Normal` is set off. Define whether a high limit exceeding should be considered or not.
Low Limit Enable	If the present value falls below the low limit and this condition remains present for at least the defined alarm delay (time), than an alarm of event type `To-Off-Normal` is set off. Defines whether a low limit exceeding should be considered or not.
Deadband	Define the value of the deadband in order to set off an alarm of event type `To-Normal`. For this, the present value must, for at least the defined alarm delay (time), remain within the range: Low limit plus deadband and high limit minus deadband.
Reporting	Define which transition type ((To-Normal, To-OffNormal, and/or To Fault) will be tracked by timestamping in the Web Interface.
Point Role	Point Role created via an external tool like XL Toolkit and imported into CARE. The point role is selected from XL Toolkit database.
Change of Value Increment	Define the change of the value increment (COV). The COV increment specifies the minimum change in present value that causes the controller sending the

present value to the Web Interface or other recipients on the BACnet bus (e.g. EBI). Defines the amount of time in seconds between the periodic transmissions of the present value. This property can be used alone or in combination with the Increment property. When the period property is used in combination with the increment property, the present value will always be updated periodically independent on the transmissions of the present value due to the COV setting.

Example:

Increment	Period	Present Value Update
0,2 K		when present value has changed by 0,2 K or more
	3 s	every 3 s
0,2 K	3 s	every 3 s and when present value has changed by 0,2 K or more

Acked Transitions

Allows observing the acknowledgement behavior of a user for To-Off-Normal and To-Fault transition events of the datapoint. CARE checks whether a transition event has been acknowledged or not. If a transition event has not been acknowledged within a definable delay time, an alarm based on an event enrollment (event enrollment alarm) is sent to a supervisory recipient, for example EBI.

Click **Observe** button to display the *Event Enrollment – Acked Transitions* dialog box.

Event Enrollment - Acked Transitions

Name: EE_AHU01_Count_Htg.AckedTransitions

Description:

Event Type: Change Of BitString

Event Parameters

Bit Mask: To-OffNormal To-Fault Back To-Normal

List Of Values:

TRUE = Alarm acknowledged
FALSE = Alarm not acknowledged
- = don't care

Alarm Delay: 1800 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Event Enrollment – Acked Transitions* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note the event type of the event enrollment object is 'change of bitstring'.
4. Under **Event Parameters**, select the transition event(s) that should be checked for acknowledgement. The **List of Values** shows the possible logical values (checked=true, unchecked=false, CARE verifies with negative logic for the false condition) resulting from the comparison of the selected transition event(s) and the underlying bitstring mask. An event enrollment alarm will be sent, if the transition event will **not** be acknowledged within the delay time.
5. In the **Alarm Delay** field, enter an alarm delay in sec. The event enrollment alarm will be sent if the transition event has **not** been acknowledged within the delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent after an unacknowledged transition.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the acknowledgement is missing within the alarm delay;

Back-To-Normal = event notification is sent if the acknowledgement is sent after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Status Flags

Allows observing status flags conditions. To enable observing status flag conditions, click **Observe** button to display the *Event Enrollment – Status Flags* dialog box.

Event Enrollment - Status Flags

Name: EE_AHU01_Count_Htg.StatusFlags

Description:

Event Type: Change Of BitString

Event Parameters

Bit Mask	In-Alarm	Fault	Overridden	Out-Of-Service
List Of Values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TRUE = Datapoint is in checked Status
 FALSE = Datapoint is not in checked Status
 - = don't care

Alarm Delay: 10 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Event Enrollment – Status Flags* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.

4. Under **Status Flags**, select the flags of which conditions should be observed. The **List of Values** shows the possible logical values (checked=true, unchecked=false) resulting from the comparison of the selected status flags and the underlying bitstring mask.
5. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent for each status flag that is enabled (checked) within the alarm delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if a

status flag is enabled within the alarm delay;

To-Normal = event notification is sent if a status

flag is disabled after the alarm delay has been

expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Warning Limits

Allows defining warning limits for observing the present value and sending event enrollment alarms in case the present value increases or decreases the warning limits. To define warning limits, click **Define** button to display the *Event Transitions* dialog box.

Warning Limits For Present Value

Name: EE_AHU01_Count_Htg.Present_Value

Description:

Event Type: Out Of Range

High Warning Limit: 99999 [m^3]

Low Warning Limit: 0 [m^3]

Deadband: 1 [m^3]

Alarm Delay: 10 Seconds

Notify Type: Event

Notification Class: JOURNAL

Reporting:

- To-OffNormal
- To-Fault
- Back To-Normal

BACnet Object ID: 0 = 0h = 0/0

OK Cancel

In the *Warning Limits for Present Value* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.
4. In the **High Warning Limit** field, enter the high warning limit value.
5. In the **Low Warning Limit** field, enter the low warning limit value.

NOTE: The warning limits can be below or above the high and low limit reporting values.

6. In the **Deadband** field, enter a deadband value. This defines an additional trigger to set off an alarm. The event enrollment alarm is sent if the following condition is true:
present value must, for at least the defined alarm delay (time), remain within the range: Low limit plus deadband and high limit minus deadband.
7. In the **Alarm Delay** field, enter an alarm delay in sec. The even enrollment alarm is sent if the present value still increases or decreases the warning limits after the time entered here has been elapsed.
7. From the **Notify Type** drop-down listbox, select the notify type.
8. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
9. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the present value exceeds or falls below the high or low warning limits within the alarm delay;
Back-To-Normal = event notification is sent if the present value is within the high or low warning limits after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

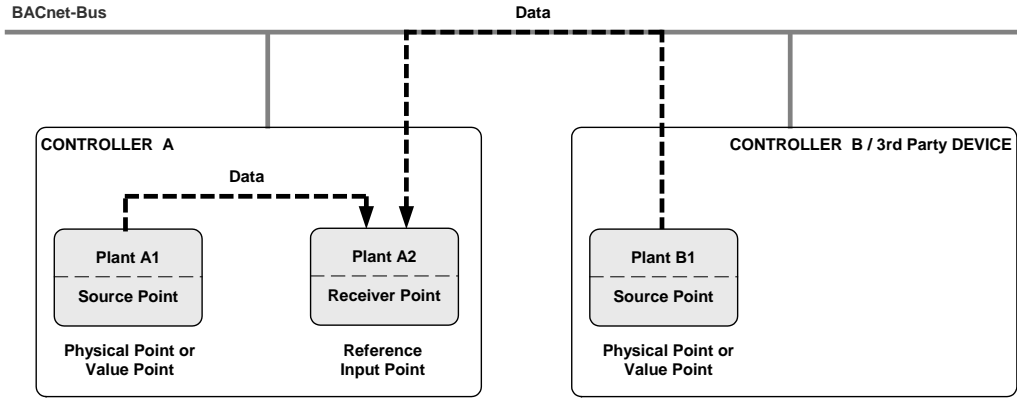
10. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Reference Datapoints

If your control and monitoring system contains more than one controller, the controllers communicate with one another via BACnet/IP and/or via BACnet MS/TP. This enables one controller both to read and set the datapoints from other

controllers, and to read values of 3rd-party BACnet devices of the project and external BACnet devices which are not in the project.

This data communication is realized via so-called reference input/output points. They always originate in or write to another plant and may originate in or write to another controller. For data communication between 2 controllers or between a controller and 3rd party devices, reference datapoints can be used in control loops (see "Working with Reference Datapoints" in the CONTROL LOOPS chapter). Data communication between a controller and 3rd party devices can also be established by assigning BACnet datapoint objects to reference datapoints of the controller (see "Create BACnet 3rd Party Device" in the BACnet NETWORK ENGINEERING chapter).



NOTE: Controllers / 3rd Party Devices can be in the same or in different projects.

Example: data exchange via reference input datapoint

Reference Input Point

Purpose Display and/or modify the attributes of the selected reference input point.

Procedure In the tree, click desired point to display current values on the right Properties tab (itemized display).

The screenshot shows a 'Properties' window for a 'Reference Input (136)' BACnet object. The 'Datapoint Name' is 'Ref_UBC_AV_Sinus_In_01' and the 'BACnet Object ID' is '0'. The 'Reference' field is set to 'IP-Subnet 1.Rambla_C3.UBC_Receive_189.UBC'. The 'Initial Value' is '0,00' and the 'Poll Rate' is '10 s'. The 'Property' dropdown is set to 'Present Value'. Under 'Access Rights', the 'Read Access Level' is 'Guest (0)' and the 'Write Access Level' is 'Tenant (32)'. There are 'Add' and 'Del' buttons next to the Property dropdown.

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, enter desired values in the fields, and/or select respectively deselect desired options.

Attributes Description Datapoint Name Point name (maximum of 40 alphanumeric characters) assigned to a point for operator use in locating and

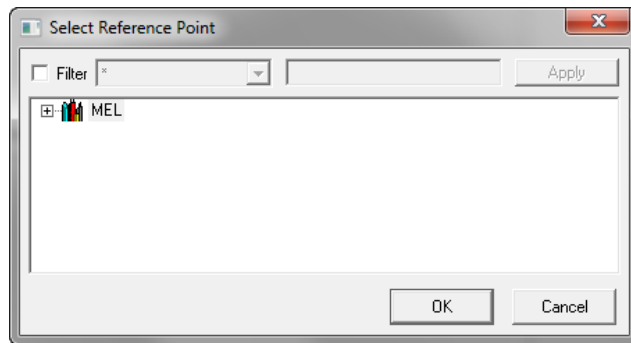
commanding the point. This name must be unique within a controller.

Point names must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a datapoint name, but 12 is not.

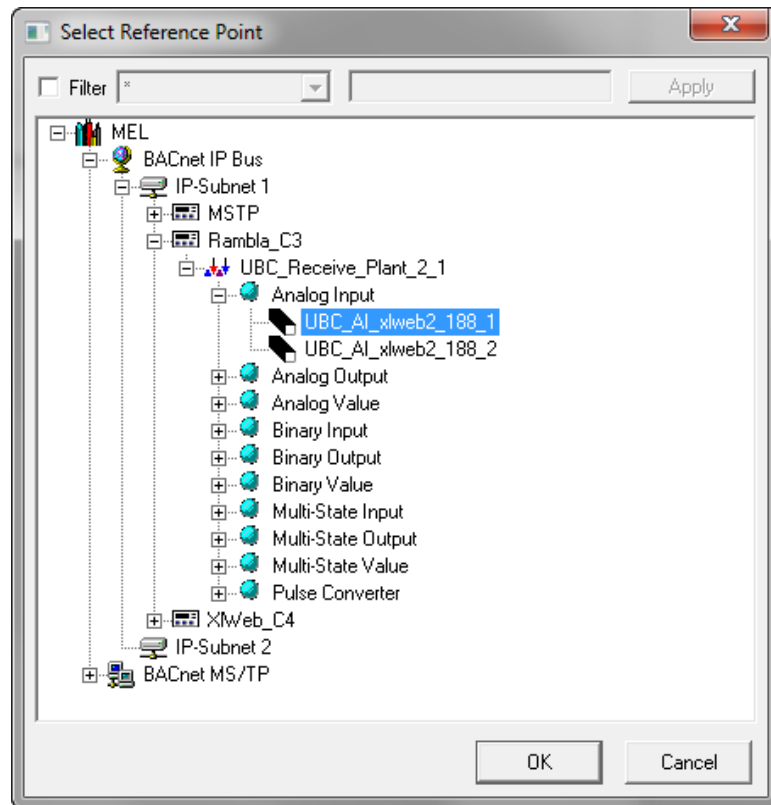
IMPORTANT

Note that the max. length of the datapoint name for Lon points should not exceed 18 characters (see Lon point attribute).

BACnet Object ID	Displays the BACnet object ID.
BACnet Object Type	Displays the BACnet object type.
BACnet Instance Number	Displays the BACnet instance number.
Reference	Select reference (source) point, the reference input (receiver) should be assigned to. To add a point, click Add button right to the Property field.



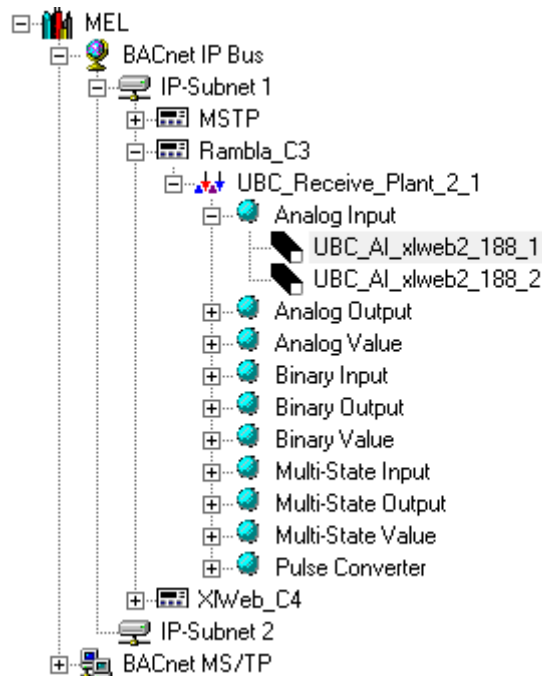
In the *Select Reference Point* dialog box displayed, expand the project tree.



Select the point, and then click OK.

NOTE:

If the reference point is already assigned to a source point, the source point is highlighted in the project tree. You can select another source point in the tree.



The assigned source point is displayed in the **Reference** field on the *Properties* tab of the reference input.

Reference: Property:

Initial Value:

Individual Poll Rate: s

To delete a point, click **Del** button and select the point in the same way as for adding a point in the *Select Reference Point* dialog box.

Property	Displays the present value property
Initial Value	Enter an initial value, which will be utilized at system startup if the reference input has not yet received a value from the connected point.
Individual	Check the check box to enter the value for the poll rate.
Poll rate	In case the connected datapoint does not support COV, the poll rate defines the interval in sec, that the reference input polls the connected data point. If the connected data point does support COV, then the poll rate has no effect. So the poll rate does not ensure a fault signal within the poll rate time when a connection is lost. In case of a loss of communication, the fault flag will be set latest after 30 minutes
Read Access Level Write Access Level	Determine whether the user can read datapoint values respectively write values to the datapoint in the Web Interface. All users having a user level equal or higher than the assigned read access respectively write access of the datapoint, will have this access right enabled in the Web Interface, all others will not (for further details, please refer to the User Access Manager section).

Reference Output Point

- Purpose** Display and/or modify the attributes of the selected reference output point.
- Procedure** In the tree, click desired point to display current values on the right Properties tab (itemized display).

Properties

Datapoint Name: BACnet Object Type:

BACnet Object ID: BACnet Instance Number:

Reference: Property:

Initial Value: Priority for writing:

Individual Max send: s Send on delta:

Access Rights

Read Access Level: Write Access Level:

or,

in the tree, click on any object (project, controller, plant) which the point belongs to, and which is in grid display.

To modify values, enter desired values in the fields, and/or select respectively deselect desired options.

Attributes Description	Datapoint Name	Point name (maximum of 40 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. This name must be unique within a controller.
		Point names must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a datapoint name, but 12 is not.
		IMPORTANT <i>Note that the max. length of the datapoint name for Lon points should not exceed 18 characters (see Lon point attribute).</i>
	BACnet Object ID	Displays the BACnet object ID.
	BACnet Object Type	Displays the BACnet object type.
	BACnet Instance Number	Displays the BACnet instance number.
	Reference	Select reference point, the reference input should be assigned to. To add or delete a point, please refer to the corresponding description of the reference input point.
	Initial Value	Enter an initial value, which will be utilized at system startup if the reference output has not yet received a value from the connected point.
	Individual	Check the check box to enter then values for max. send time and/or Send on delta.
	Max. send time	The max. send time defines the maximum period of time in sec. that must be expired before the datapoint automatically transmits the current value.
	Send on delta	Send on delta determines the minimum amount of change of the sensed value before a new value is sent
	Priority for Writing	Select the priority for writing.
	Read Access Level	Determine whether the user can read datapoint values
	Write Access Level	respectively write values to the datapoint in the Web Interface. All users having a user level equal or higher than the assigned read access respectively write access of the datapoint, will have this access right enabled in the Web Interface, all others will not (for further details, please refer to the User Access Manager section).

Copy Attribute Values within the Grid

Purpose Copy one or a number of attribute values from one or several points to one or more other points. Values can be numeric values, for example delay time, or text, for example, alarm text. The source and target point must be of the same kind, that is, it is possible to copy attributes from analog inputs to analog inputs but you cannot copy attributes from analog inputs to analog outputs, etc. You also cannot copy the same kind of attribute value from different points to another point. That is, you cannot copy the sensor-offset values of two different analog inputs to another analog input.

- Procedure**
1. In the grid, click the attribute you want to copy.
 2. If you want to copy a number of attributes, press STRG key and hold it while clicking further attributes.

Point	User Address	Techn. Address	Alarm Point	Alarm Delay	High Alarm Limit	High Warning Limit	Low Warning Limit	Low Alarm Limit
AI	L22_MW_DischarTemp	22/01/04		10	50,0	40,0	30,0	5,0
AI	L22_MW_Frosttemp	22/01/02		5	50	40	20	5
AI	L22_MW_OaTemp	22/01/01		10	10	10	10	10
AI	L22_MW_RoomTemp	22/01/05		10	10	10	10	10
AI	L22_MW_SupplyTemp	22/01/03		10	10,0	10,0	10,0	10,0

3. Release STRG key.
4. Select menu item Edit, and click Copy
or,
with right mouse button, click **outside** the last field you have selected, and then Copy in the context menu.
5. In the point abbreviations bar, click the target point(s) you want the selected attributes copy to.

RESULT: The rows are highlighted.

Point	User Address	Techn. Address	Alarm Point	Alarm Delay	High Alarm Limit	High Warning Limit	Low Warning Limit	Low Alarm Limit
AI	L22_MW_DischarTemp	22/01/04		10	50,0	40,0	30,0	5,0
AI	L22_MW_Frosttemp	22/01/02		5	50	40	20	5
AI	L22_MW_OaTemp	22/01/01		10	10	10	10	10
AI	L22_MW_RoomTemp	22/01/05		10	10	10	10	10
AI	L22_MW_SupplyTemp	22/01/03		10	10,0	10,0	10,0	10,0

6. Click right mouse button and then Paste in the context menu or, select menu item Edit, then drop-down item Paste.

RESULT: In the selected rows, the attributes are pasted into the corresponding fields.

Point	User Address	Techn. Address	Alarm Point	Alarm Delay	High Alarm Limit	High Warning Limit	Low Warning Limit	Low Alarm Limit
AI	L22_MW_DischarTemp	22/01/04		10	50,0	40,0	30,0	5,0
AI	L22_MW_Frosttemp	22/01/02		5	50	40	20	5
AI	L22_MW_OaTemp	22/01/01		5	50	40	30	5
AI	L22_MW_RoomTemp	22/01/05		5	50	40	30	5
AI	L22_MW_SupplyTemp	22/01/03		5	50,0	40,0	30,0	5,0

Simply Copy Values and Texts without Validity Checking




To simply copy a value or text from one field to another without validity checking you can use the Copy, Cut and Paste icons on the button bar.

IMPORTANT

When using the Copy, Cut and Paste icons for copying values/texts, software does not perform validity checking, that is, you have to realize which value/text you are copying to which field.

- Procedure**
1. In the grid, click the field from which you want to copy (or cut) the value or text.

NOTE: When using the Cut icon, the value/text will be deleted in the field.

2. On the button bar, click copy  (or cut)  icon.
3. In the grid, click the field to which you want to paste the value or text.
4. On the button bar, click Paste  icon.

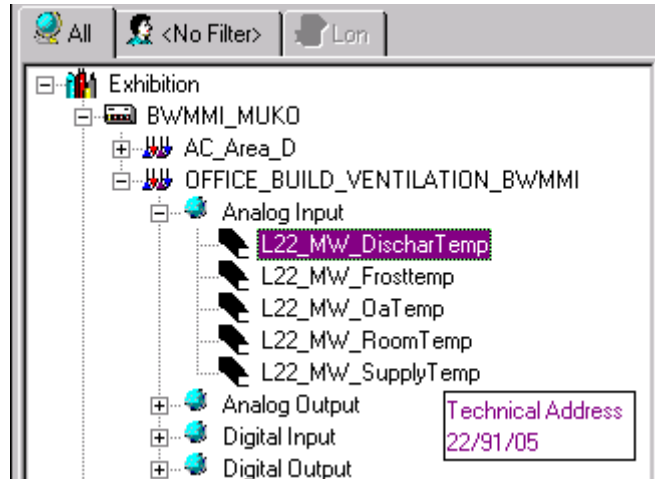
RESULT: The copied and cut value/text respectively is pasted into the field. The current value/text will be overwritten.

5. To copy the same value/text to further fields repeat steps 3 to 4.

Copy Attribute Values per Drag and Drop within the Tree

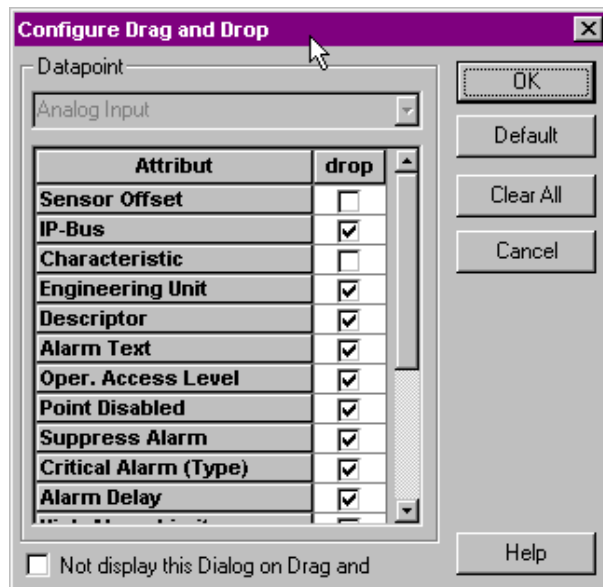
Purpose Copy one or max. all attributes values from one point to one or more other points of the same kind. The source and target point(s) must be of the same kind, that is, it is possible to copy attributes from analog inputs to analog inputs but you cannot copy attributes from analog inputs to analog outputs, etc. This function is suitable for quickly copying many (at most all) attributes of one point to another point or a high number of points.

- Procedure**
1. In the tree, select the point, which you want to copy the attributes from.
 2. On the right, check the attribute values and correct some, if desired.
 3. With left mouse button, click already selected point in the tree, and drag it to the desired target point of the same kind. While dragging, a plus symbol is displayed at the cursor indicating that dropping of the attributes on the point where the cursor currently stands, is possible. The current technical addresses are displayed in tool tips. Invalid target points where attributes cannot be dropped on are indicated by the forbidden symbol at the cursor.



- Over the target point, release left mouse button.

RESULT: The Configure Drag and Drop dialog box displays.



- In the list, select the attributes you want to drop on the target point by checking the corresponding check boxes. Use Default button to select all attributes. Use Clear All button to deselect all attributes and reselect desired attributes.

RESULT: The selected attributes are dropped on the target point (cursor position). In grid display, the grid will be concurrently updated.

To generally configure Drag and Drop options for point types, please refer to the Configure Drag and Drop section.

Search and Replace Attribute Settings

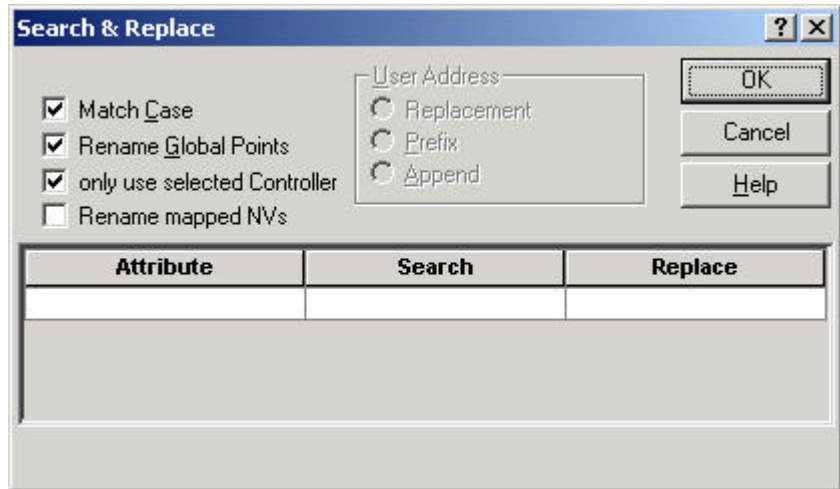
Purpose Modify all or selected attribute settings in a controller by searching and replacing. Attribute values can be of very different type, for example: Alarm Text = Firealarm, Alarm Delay = 10 sec, Hide Point = checked, etc. You can search for any type of attribute and replace its setting. For example, you can search for points that have the alarm delay of 10 sec and replace it with 5 sec.
Examples:

Selected Attribute	Search Entry / Selection	Replace Entry
Alarm Text	Firealarm or *F	Phone 733
Alarm Delay	10	5
Hide Point	= checked	=unchecked

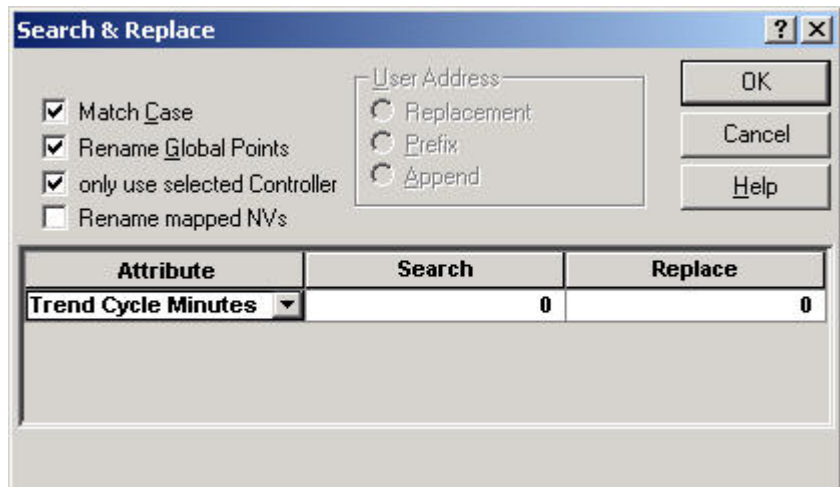
Procedure

1. In the logical plant tree, click on desired controller in the tree.
2. Click menu item Edit, then drop-down item Search & Replace...

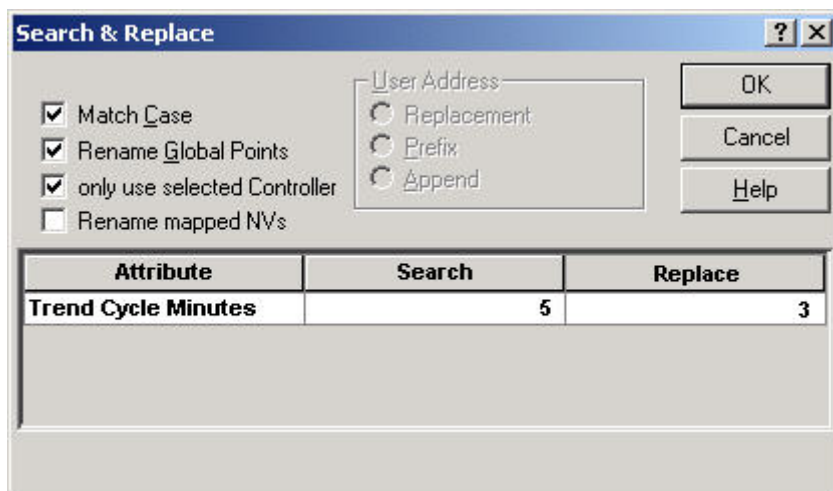
RESULT: The Search & Replace dialog box displays.



3. Click into the Attribute field and select desired attribute, you want to change the settings for.



4. In the Search field, enter the search string (whole term or part of the term) for the attribute setting.
5. In the Replace field, enter/select the setting you want to replace with.



6. Check Match Case, if you want to consider the case (only applicable for user address attribute, see Rename Points and NVs section).
7. Check Rename Global Points, if desired (only applicable for user address attribute, see Rename Points and NVs section).
8. Check only use selected controller if you only want to search in the selected Controller. If this option is unchecked, software searches in the whole tree including all controllers.
9. Check Rename mapped NVs if you want to rename NVs in the same way as the mapped datapoints (only applicable for user address attribute, see Rename Points and NVs section).

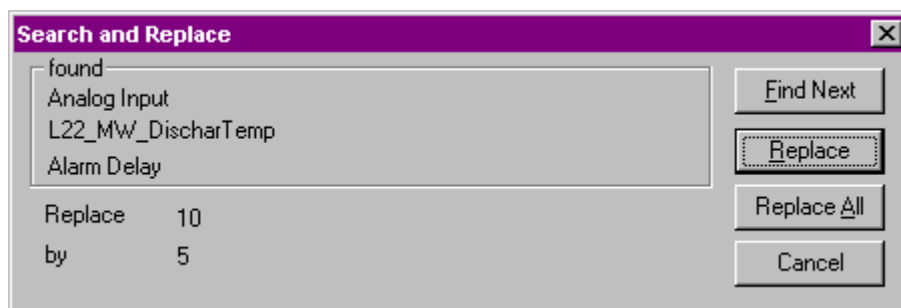
IMPORTANT

When only "use selected Controller" is checked and "Rename Global Points" too, global points may not find the referenced points in the other controller.

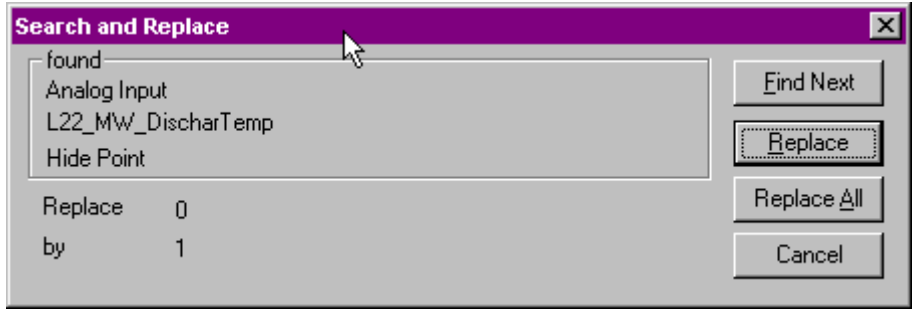
10. Click OK to initiate the first Search.

RESULT: If software does not find any matches, it displays a message to that effect. You can change the search string to initiate other searches. If software finds a matching setting, the Search and Replace dialog box opens showing the point with the setting you have searched for. Depending on the selected attribute the Search & Replace dialog box displays different results:

For attributes with simple values, for example alarm delay, the respective values will be shown.



For attributes which can have two alternative states, for example, checked or unchecked, the state will be shown as 1 for checked and 0 for unchecked.



11. To change the setting for the found user address as specified in the Replace string, click Replace.

To find the next user address that matches the criteria, click Find Next.

To change the found user address plus all other addresses that match the criteria, click Replace All.

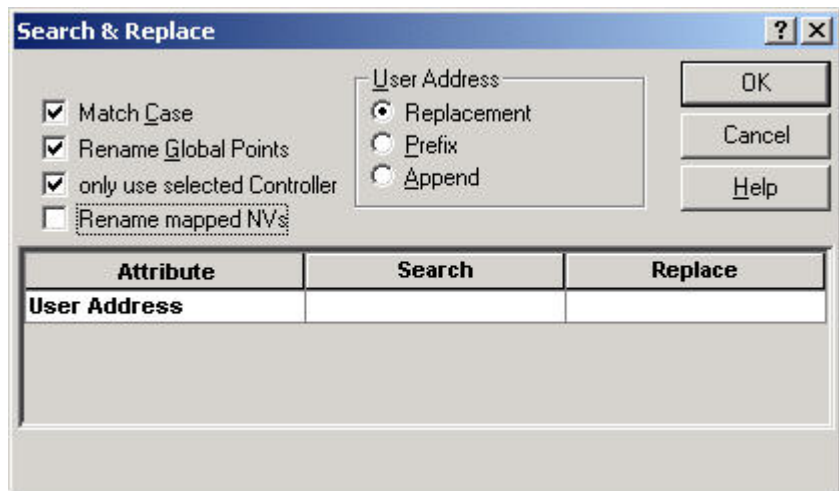
RESULT: Software changes the attribute settings as specified.

Rename Points and NVs

Purpose Modify all or selected user addresses in a controller either by searching for strings (whole user address or alphanumeric items: e.g. L22, RoomTemp, etc.) and replacing them or by adding characters to the beginning or end of user addresses. To directly rename a point, refer to the Edit User Address section.

- Procedure**
1. In the logical plant tree, click on desired controller in the tree.
 2. Click menu item Edit, then drop-down item Search & Replace...

RESULT: The Search & Replace dialog box displays.



3. Check Match Case if character strings should be find that match upper and lower case letters. For example, if you check Match Case and enter a search string of Oa, software does not find OA or oa.
4. Check Rename Global Points, if global datapoints should be renamed too.
5. Check only use selected Controller if only the names in the currently selected controller should be changed.

IMPORTANT

When "only use selected Controller" is checked and "Rename Global Points" too, global points may not find the referenced points in the other controller.

6. Check Rename mapped NVs if mapped NVs should be changed in the same way as their datapoints.

Example:

User address of datapoint: BaTemp becomes DaTemp
 NV name of mapped datapoint: nviaBaTemp becomes nviDaTemp

7. Choose whether to search for and replace special strings in user addresses or just add characters to the beginning or to the end of user addresses by using the corresponding option under:

Replacement

If this option is selected, the string (characters) of user addresses entered in the Search field will be replaced with the string entered in the Replace field.

Example:

In the Search field, type *Oa to search for all user addresses that contain the letters Oa. In the Replace field, type the characters you want to substitute when software finds the search string. For example, type Ra to replace the string Oa.

Prefix

If this option is selected, the user addresses that match the string (characters) entered in the Search field will be prefixed with the string entered in the Replace field. That is, the string entered in the Replace field will be added to the beginning of user addresses.

Example:

In the Search field, type *L22, and in the Replace field, type CPU1_. The item CPU1 is added to the beginning of the user address that matches the criteria L22, independent where L22 stands within the user address.

Append

If this option is selected, the string entered in the Replace field will be appended to the end of the user addresses that match the string (characters) entered in the Search field.

Example:

In the Search field, type *L22, and in the Replace field, type _DEMO. The item Demo is added to the end of the user address that matches the criteria L22, independent where L22 stands within the user address.

8. Click into the Attribute field and select User Address.
9. In the Search field, enter the search string (whole or part of the user address), and in the Replace field, enter the string, which should replace the search string or should be added to the beginning (Prefix) or to the end (Append) of the user address.

Search String Conventions

To search successfully, you **must** either enter the whole name of the user address or use the wildcard ? or the joker * for a string, which is naturally shorter than to enter the whole user address. The joker * stands for any number of characters, the wildcard ? stands for one character. When using the wildcard ?, the string including the ? must match the exact wording and sequence as it is in the user address. They have to be entered in one of the following ways:

Example:

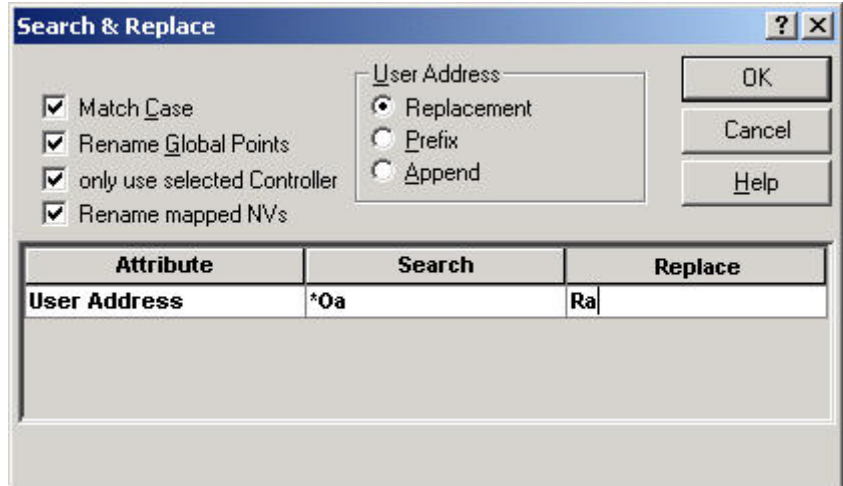
Search (within) the string LMM22:

*LMM22
 ?MM22
 LMM2?
 ?M???

IMPORTANT

Although when creating user addresses * and ? cannot be used, this joker and wildcard has to be used for the **Search** string. Do not use them for the Replace string.

When searching for and replacing user addresses, the search string will be found at any location within the user address (see Valid User Addresses Note at the end of this section). For example, when applying the search criterion "D*", both, user addresses such as DO_Feedback where the "D" appears at the beginning and user addresses such as "L08Zone1Dmpr" where the "D" appears in the middle will be found. When using the **Replace All** button then it may result in undesired user addresses.



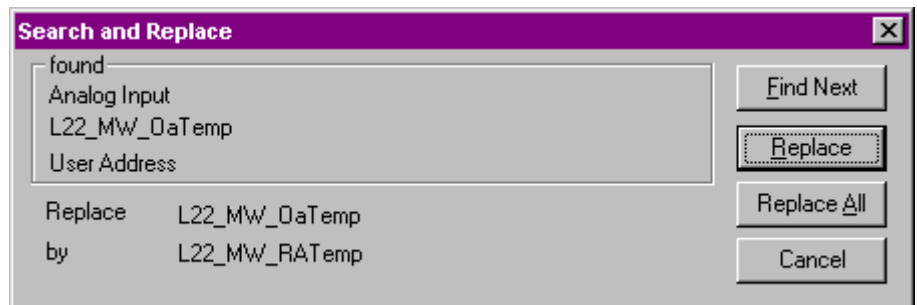
10. Enter desired criteria for renaming the user addresses. Keep in mind the rules for user address name; see the Valid User Addresses note that follows this procedure.
11. Click OK to initiate the first Search.

RESULT: If software does not find any matches, it displays a message to that effect. You can change the search string to initiate other searches.

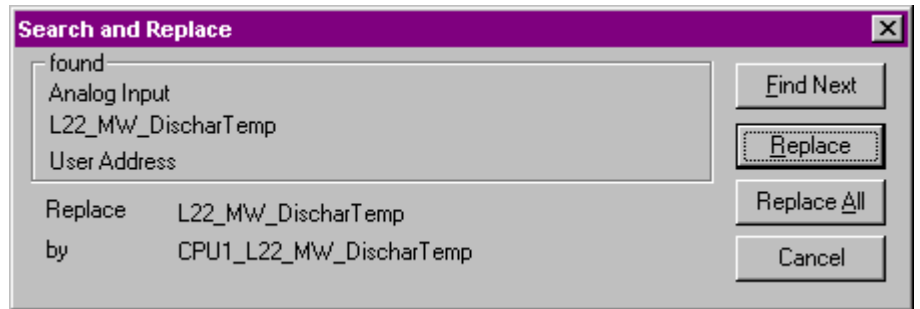
If software finds a matching user address, it displays it in the Search and Replace dialog box. The search results are different depending on the option, which was selected (Replacement, Prefix, Append).

Search result examples:

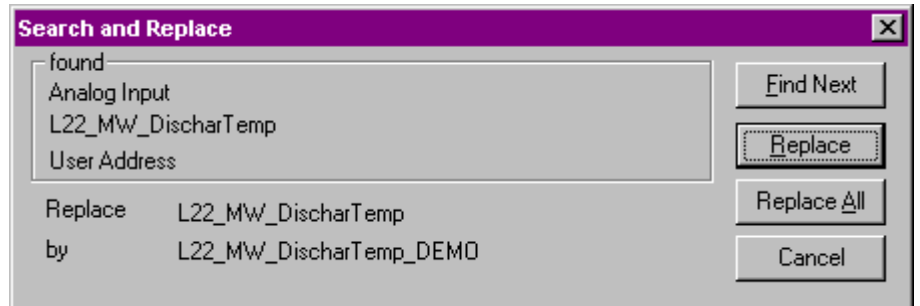
Replacement function



Prefix function



Append function



12. To change the found user address as specified in the Replace string, click Replace.

To find the next user address that matches the criteria, click Find Next.

To change the found user address plus all other addresses that match the criteria, click Replace All.

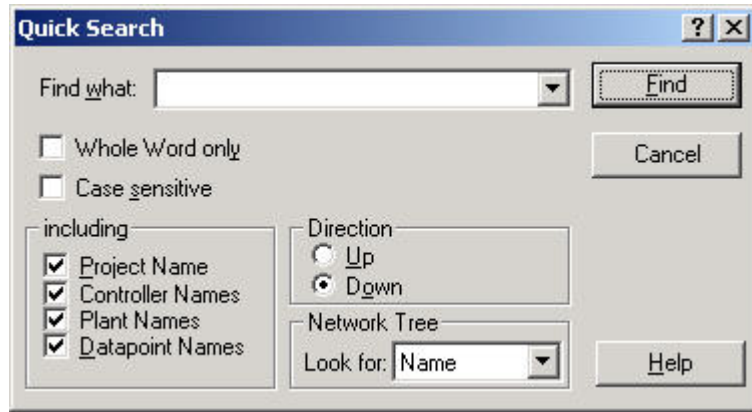
RESULT: Software changes the user addresses as specified.

Valid User Addresses

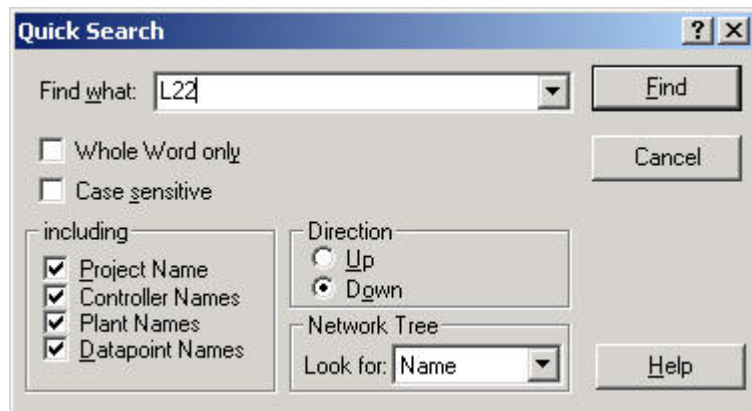
User addresses can be a maximum of 18 characters and must include one non-digit character. They cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

Quick Search in Tree

- Purpose** Quickly search in the tree. You can search for user addresses, projects, controllers, plants, names of NVs, CPTs, and program Ids and neuron Ids of devices.
- Procedure**
1. In the logical plant tree or in the network tree, click on desired item (project, controller, etc.) where the search should start.
 2. Click on menu item Edit, then drop-down item Quick Search
- or,
- when in grid display, point cursor over the grid.
Click right mouse button and click on Quick Search in the context menu.
- RESULT: The Quick Search dialog box displays.



3. In the Find what field, enter the item you want to search for.



4. Select desired options under:

Whole Word only

If this option is checked, software searches for occurrences that are whole words, and not part of a larger word. If this option is unchecked, software searches for occurrences of the search item in any word that includes the search item.

Case sensitive

If this option is checked, software distinguishes between upper and lower case letters.

Including

Project Name

If this option is checked, all project names are included in the search.

Controller Names

If this option is checked, all controller names are included in the search.

Plant Names

If this option is checked, all plant names are included in the search.

Datapoint Names

If this option is checked, all datapoints (user addresses) are included in the search.

Direction

Check desired direction, Up or Down, by clicking the corresponding radio button. The search starts from the highlighted item in the tree.

Network Tree

By selecting one of the options in the Look for drop-down listbox, you can search for items in the network tree, such as names of NVs, CPTs etc., and program Ids and neuron Ids of devices that reside in the network tree.

5. Click Find button.

NOTE: Make sure that you have selected the appropriate tree (logical plant tree, network tree) and the desired item in the network tree (e.g. project, controller) to which the software should apply the search.

RESULT: In the toolbar, the search item is displayed in the Quick Search field.



The Quick Search field allows searching more quickly later without opening the Quick Search dialog box from the Edit menu. When using this function keep in mind the settings of the Quick Search dialog box.

If the search is successful, the Quick Search dialog box closes, and software highlights the first found item in the tree or grid.

If no text is found, that matches the search item, a corresponding message is displayed. Confirm the message and try again by entering a new search item in the Find what field.

6. To continue a successful search with the same search item, press ENTER key. If more items match the search criteria, the next found item is highlighted, etc.

Use Filters

Purpose Display points which have equal attribute settings. For example, you can display all hidden points, all points, which reside on module 3, or all points that have a delay time of 10 sec. The filter function can be used in both, the tree and the grid, and they can be used together. The filter function for the tree is more extensive whereas the filter function for the grid can be used quicker. Refer to the following sections for detailed descriptions of the filter functions.

Apply Filter in Tree

Purpose Display points which have equal attribute settings. For example, you can display all disabled points, or all points that have a delay time of < 10 sec, or a trend hysteresis value of >15 °C, etc. You can also combine filter criteria that is for example, you can display all disabled points, which have a delay time of < 10 sec. In addition to the operator =, the operators <, >, ≤, ≥, not= can be used. In opposite to the filter function in the grid, you can define filters and save them for reuse. Saved filters can be deleted.

- Procedure**
1. In the logical plant tree, click on the project, controller or plant.
 2. Click on menu item Options, then drop-down item Filter Configuration

or,

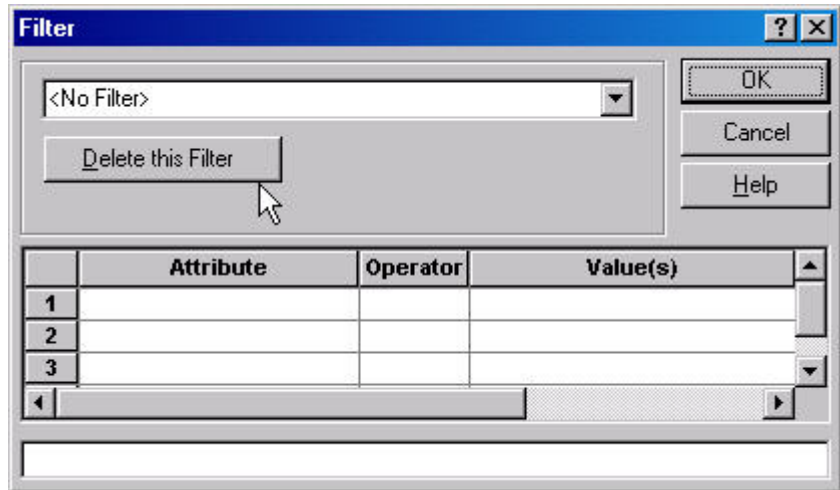
click Configure Filter button  on the toolbar

or,

when in grid display, point cursor over the grid.

Click right mouse button, select Options and click on Filter in the context menu.

RESULT: The Filter dialog box is displayed.



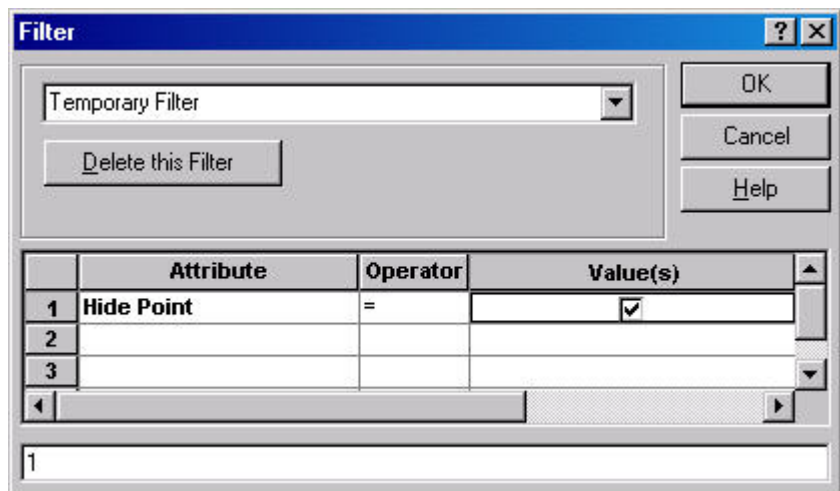
3. In the first line, click in the Attribute field and select desired attribute.

Example:

You want to display all hidden points, that is, all points, which have the attribute 'Hide Point' checked.

Select Hide Point in the Attribute field.

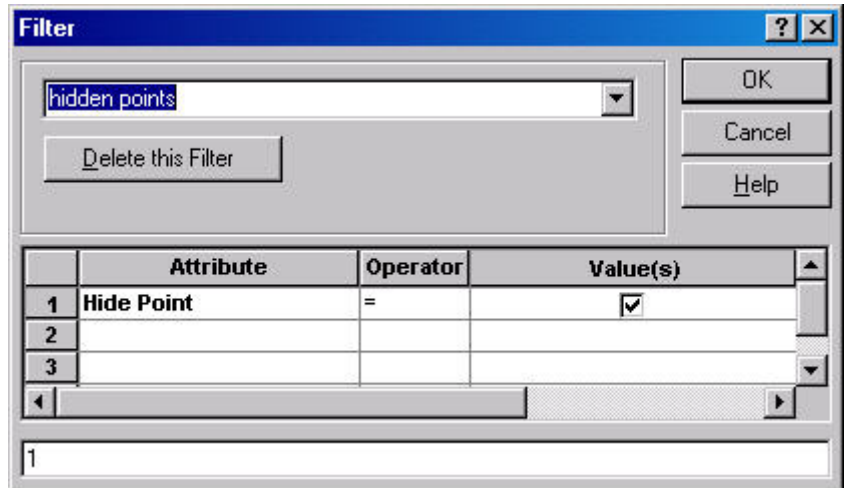
4. In the Operator field, select the operator. Operators are depending on the selected attribute. For the attribute Hide Point the operator = is available.
5. In the Value(s) field, enter/select the value the attribute should have. Values are depending on the selected attribute. To display hidden points in the tree, check the check box in the Value(s) field.



RESULT: In the filterline below, the term entered in line one is indicated by its line number (1). When entering additional lines, the terms (lines) will be automatically combined via ANDs and displayed, for example, as follows: 1 and 2 (see AND and OR combination at the end of the section).

The filter is defined as temporary filter. This is shown by the word temporary Filter in the top list box field. A temporary filter will not be saved when closing the dialog box by clicking OK. It must be redefined for the next application.

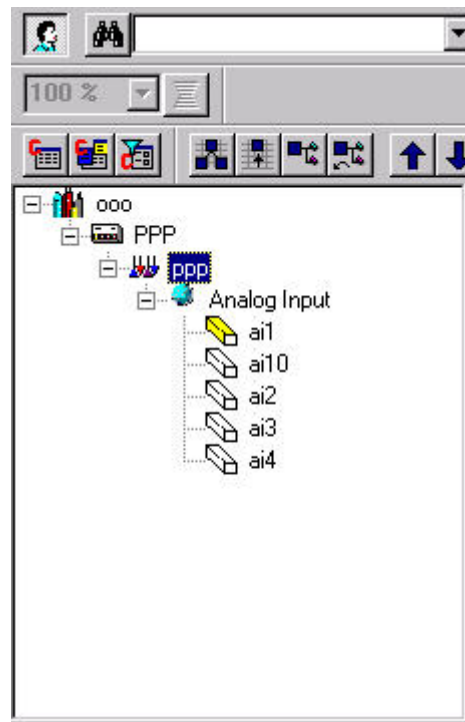
6. To save the filter, click into the top list box field, highlight current entry, press key, and enter the name for the filter you want to define, e.g. hidden points.



7. Confirm by clicking OK.

8. In the *Standard* toolbar, click on the filter on/off icon .

RESULT: All points matching the defined filter, in this case, all hidden points, are displayed in the tree.



Delete Filter

Select filter in the drop-down list box and click Delete this Filter.

AND and OR combination

When entering more than one line, the lines are automatically combined via ANDs. But, lines can also be combined via ORs. To combine two lines via OR, click into the line, delete “and” and enter “or”. It is recommended to use brackets.

Example:

(1 or 2) and 3

Apply Filter in Grid

Purpose Display points, which have equal attribute settings. For example, you can display all disabled points, all points that have a delay time of 10 sec, or a trend hysteresis value of 15 °C, etc. In opposite to the filter function in the tree, you cannot define filters and save them for reuse. After quitting the current grid by selecting another object in the tree, the filter will be discharged. You can use the operators <, >, ≤, ≥, and not=.

- Procedure**
1. Select menu item Options, then drop-down item Grid configuration to open the Configure Grid dialog box.
 2. Check Filterline in Grid.
 3. If not already done, display the desired grid by selecting the corresponding object in the tree (see Tree and Information Display section).

RESULT: In the first row of the grid, the Filter line is displayed.

Point	User Address	Techn. Address	Sensor Offset	Bus	Characteristic	Engineering Unit	Descriptor
Filter							
AI	L22_MW_DischarTemp	22/01/04	0,00	IP	PT 1000 Type C/A	K	FAX
AI	L22_MW_Frosttemp	22/01/02	0,00	IP	Direct Out 0-100%	°C	FAX

In the Filter line you can enter the filter criteria into the respective attribute fields. When entering more than one criterion they will be combined to an AND. Grayed fields are disabled.

Example:

You want to display all points on module 4, which have active state = 1.

4. In the Filter line, click on the Techn. Address field and replace the two jokers in the middle with 04.

Point	User Address	Techn. Address
Filter		**/04/**

5. With scroll bar on the bottom, scroll to the Active State column.
6. In the Filter line, click on the Active State field and select 1.



RESULT: Just after leaving the Techn. Address field and while editing the Active State field, all points on module 4 are displayed.

Point	User Address	Techn. Address	Alarm Text	Active State
Filter		**/04/**		*
DO	L22_SB_UP_Chiller	22/04/02		*
DO	L22_SB_UP_Heater	22/04/01		0
DO	L22_SB_Vent_DcAir	22/04/04		1
DO	L22_SB_Vent_SupAir	22/04/03		1

After leaving the Active State field with desired selection, all points on module 4 with the Active State attribute set to 1, are displayed in the grid.

Point	User Address	Techn. Address	Descriptor	Alarm Text	Active State	Oper. Access Level	Point Disab.
Filter		**/04/**			1	*	
DO	L22_SB_Vent_DcAir	22/04/04			1	3	<input type="checkbox"/>
DO	L22_SB_Vent_SupAir	22/04/03			1	3	<input type="checkbox"/>

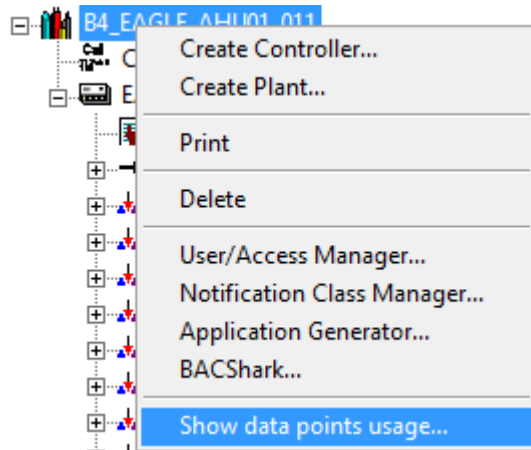
- To discard the filter, enter/select the original settings or, click on any object in the tree.

Create Report

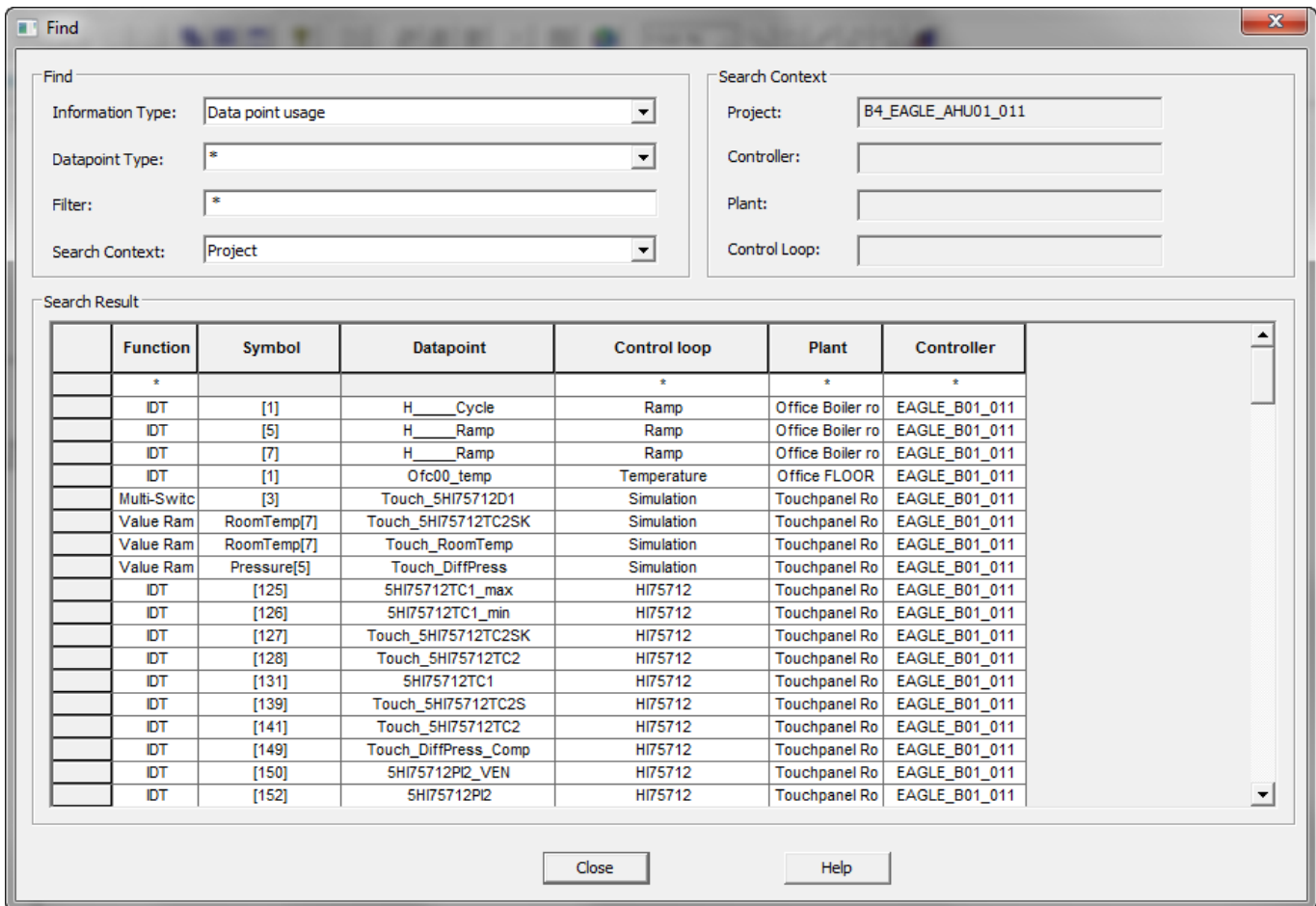
Purpose In large applications it can be necessary to find specific information of datapoints. You can search for the usage of datapoints on project, controller, plant and control loop level. Found datapoints can be detected in the control loop by double-clicking from within the report displayed.

Procedure

- Right-click the level (*project, controller, plant or control loop*) in which you want to search for the used datapoints, and then click **Show datapoints usage** in the context menu.



RESULT: The Find dialog box displays.




2. In **Information Type**, the applied search command is pre-selected. The information type Datapoints usage searches for datapoints that match the datapoint type pre-selection and the filter criteria (see below). If datapoint attributes are part of functions or time programs the functions and time programs will also be listed.
3. From the **Datapoint Type** drop-down listbox, you can select a datapoint type for which you want to search specifically.
4. In **Filter**, you can enter a search string using wildcards to narrow down further the result.
5. In **Search Context**, select the level (project, controller, plant and control loop) on which the search should be executed. Note that software searches in the selected level and automatically in the levels that are hierarchically below the selected level. Under **Search Context** on the right, the levels are displayed.

RESULT: Under **Search Result** the found items are displayed and automatically updated according to the selected information type. The following properties are shown:

- Function
function type
- Symbol
instance name
- Datapoint
datapoint name
- Control loop
control loop the found item belongs to
- Plant
plant the found item belongs to

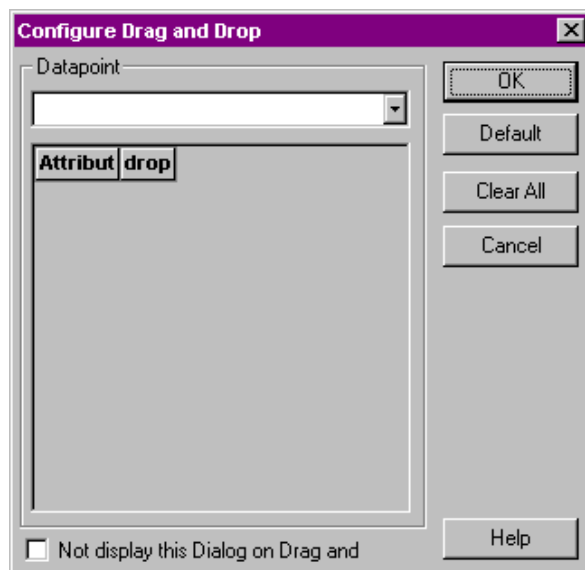
- Controller
controller the found item belongs to
6. To detect a found item in the control loop, double-click the item in the list.
RESULT: The item is selected in the control loop.
 7. To apply various searches, change the search criteria under **Find** as desired.
RESULT: The list will be updated automatically.

Configure Drag and Drop

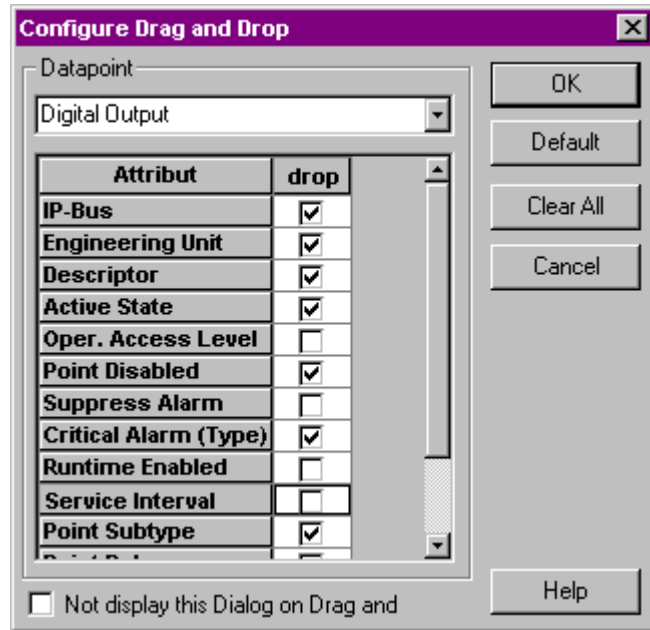
- Purpose** Define attributes, which should be copied from one, point to one or more other points of the same kind via drag and drop function within the tree.
- Procedure**
1. Click on menu item Options, then drop-down item Drag and Drop...
or,
click Configure Drag and Drop button  on the toolbar
or,
when in grid display, point cursor over the grid.

Click right mouse button, select Options and click on Drag and Drop in the context menu.

RESULT: The Configure Drag and Drop dialog box displays.



2. In the drop-down list, select the point type.
RESULT: The Attributes for the point type display in a list.



3. In the drop column check the attributes, which should be dropped on the target point(s). Use Default button to select all attributes. Use Clear All button to deselect all attributes and reselect desired attributes.
4. Check Not display this Dialog on Drag and Drop, if you do not want to display the Configure Drag and Drop dialog box during Dragging and Dropping. In this case keep in mind, which attributes are enabled/disabled for drag and drop.

or,

uncheck Not display this Dialog on Drag and Drop, if you want to display the Configure Drag and Drop dialog box during every Dragging and Dropping. In this case, you can check, which attributes are enabled/disabled before finally dropping the attributes to target point(s). If desired, you can change settings.

5. Confirm by clicking OK.

For detailed instructions of the Drag and Drop function, please refer to the Copy Attribute Values per Drag and Drop within the Tree section

Assign Color Map to Datapoint

- Purpose** Assign a color map to a datapoint. Color maps provide the possibility to assign colors to different states of a datapoint. When viewing the datapoint on a central, the datapoint is visualized in colors depending on its current state.
- Prerequisites** The color map must be created using the Miscellaneous Text Editor (see "Miscellaneous Text Editor (CARE BACnet)" section) before you can assign it to a datapoint.
- Procedure**
1. In the logical plant tree, right-click the datapoint, and then click **Assign Color Map ...** in the context menu.
RESULT: The Assign Color Maps dialog box displays.
 2. In the Color map name column, select the color map from the drop-down list box.
RESULT: On the right, the color map properties (State, Min Value, Max Value, and Color) are displayed. If the values need to be changed, invoke the Miscellaneous Text Editor and change the color map as desired.
 3. Click **OK**.
RESULT: The dialog box is closed and the color map is assigned to the datapoint.
-

Print Datapoint Descriptions

To print Datapoint descriptions see Print Documentation chapter.

Miscellaneous Text Editor (CARE XL-5000)


Purpose Provide functions to define, edit, copy, and replace Engineering Units, Point Descriptors, Alarm Texts, and Characteristics. These functions can only be accessed from within the Datapoint Editor in three ways:

- via menu **Options**, drop-down item **Edit Text**
- from within the itemized display for a point
- from within the grid via right mouse button

General Procedure

1. Select the controller in the logical plant tree.
2. Click on menu item **Options**, then drop-down item **Edit Text**, and text type (**Analog Eng. Units**, **Descriptors**, etc.) you want to edit.

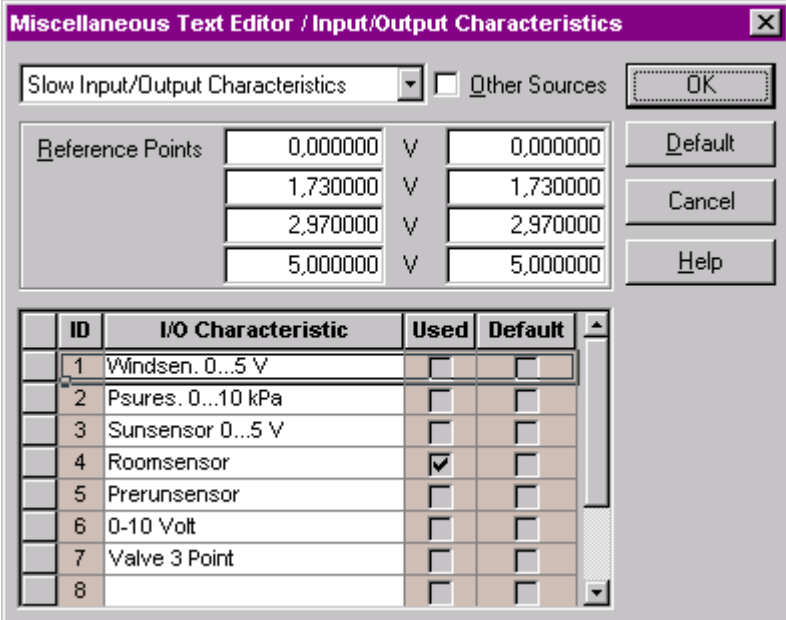
or,

if you are working on a point in itemized display, click corresponding dotted button  in the Misc. Text Editor area.

or,

if you are working in the grid, select corresponding text field (**Engineering unit**, **Descriptor**, etc.), click right mouse button, and then **MiscEdit** in the context menu.

RESULT: The *Miscellaneous Text Editor* dialog box is displayed. The dialog box title is named according to the text type selected in the **Edit Text** menu or where the dotted button refers to. The corresponding texts are listed and indicated by their IDs. For characteristics, the reference points are displayed additionally. Default texts are displayed with a check mark in the **Default** column, customized texts do not. Texts, which are already used by at minimum one point are displayed with a check mark in the **Used** column (only display). Both, used and unused texts can be edited.



ID	I/O Characteristic	Used	Default
1	Windsen. 0...5 V	<input type="checkbox"/>	<input type="checkbox"/>
2	Psures. 0...10 kPa	<input type="checkbox"/>	<input type="checkbox"/>
3	Sunsensor 0...5 V	<input type="checkbox"/>	<input type="checkbox"/>
4	Roomsensor	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	Prerunsensor	<input type="checkbox"/>	<input type="checkbox"/>
6	0-10 Volt	<input type="checkbox"/>	<input type="checkbox"/>
7	Valve 3 Point	<input type="checkbox"/>	<input type="checkbox"/>
8		<input type="checkbox"/>	<input type="checkbox"/>

- Create new text**
3. To create a new text, select an empty line and enter desired text. For engineering units select options in the additional fields (decimal places, number, and state). For characteristics enter reference point values.

- Edit text**
1. Make step 1 of General Procedure.

2. Make step 2 of General Procedure.
3. To edit text, locate line, click into the field and write over text.

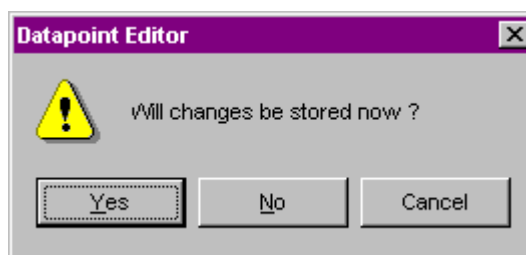
and/or,

change options for engineering units in the additional fields (decimal places, number, and state). For characteristics change reference point values.

NOTE: If the text is originally indicated as default text (checked check box in the **Default** column), then any changes and deletions (blank text field) are indicated by an unchecked check box in the **Default** column.

4. To display and edit different texts than currently displayed, click down arrow at the top and select desired text type.

RESULT: A Message is displayed asking for the storage of your changes.



5. Click **Yes**, if you want to save the changes you did to the previously selected text type.

Click **No**, if you want to discard the changes you did to the previously selected text type.

RESULT: The *Miscellaneous Text Editor* dialog box displays the new text type.

Replace text

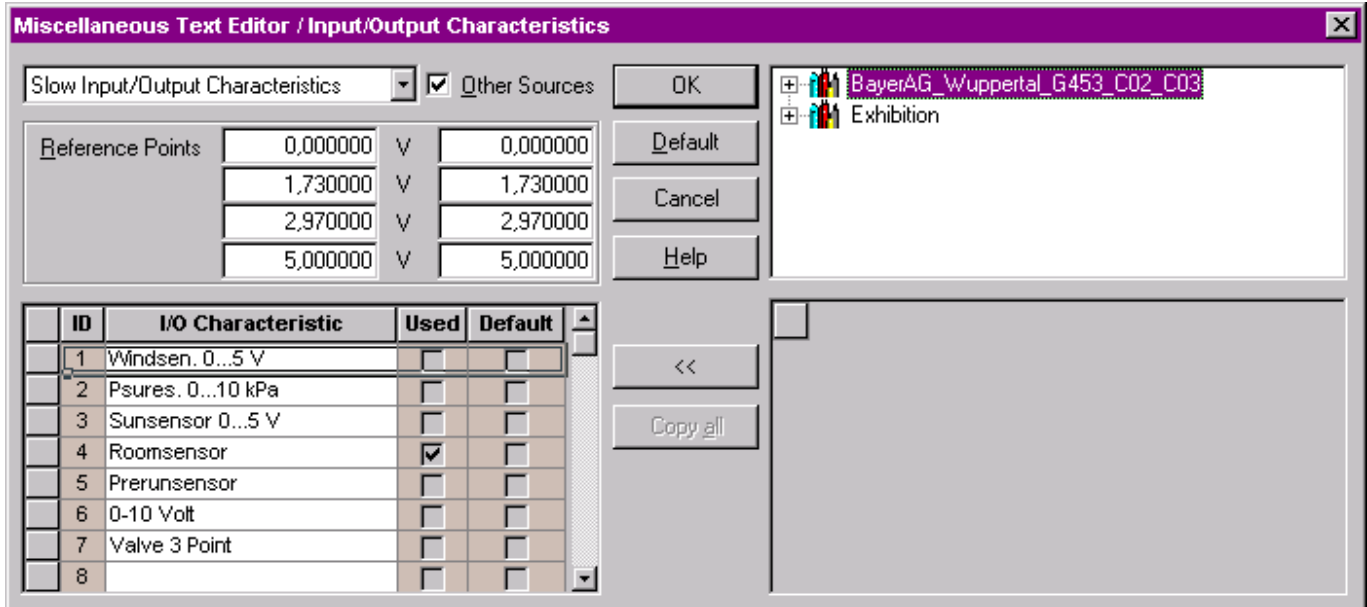
1. Make step 1 of General Procedure.
2. Make step 2 of General Procedure.
3. Select text, you want to replace by clicking on the tiled bar on the left.
4. Click **Default** button.
5. Confirm by clicking OK.

NOTE: You cannot remove any of the default texts from the system. You can only replace the default text with custom text. When you select a text and click **Default** button, software replaces the custom text with the original default text. This is indicated by a checked check box in the **Default** column.

Copy texts from other controllers

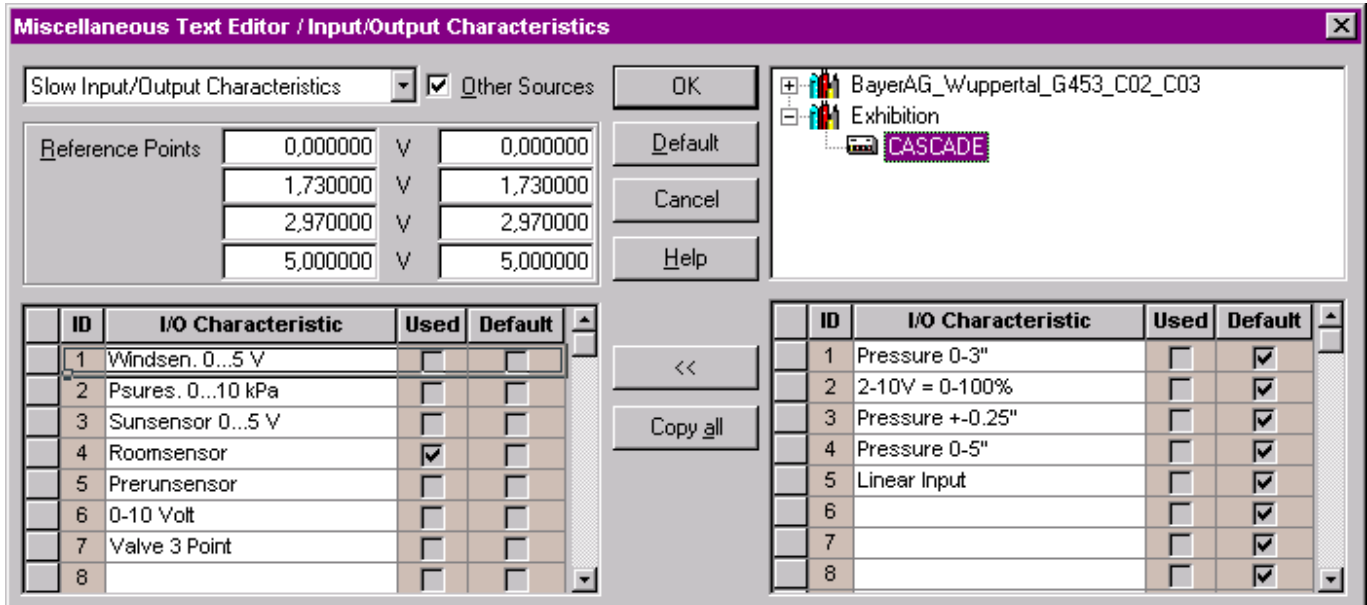
1. Make step 1 of General Procedure.
2. Make step 2 of General Procedure.
3. If you want to copy texts from other controllers of the same project or from other projects, check the **other Sources** check box.

RESULT: The dialog box is expanded and all controllers (projects) are available in a tree on the right side.



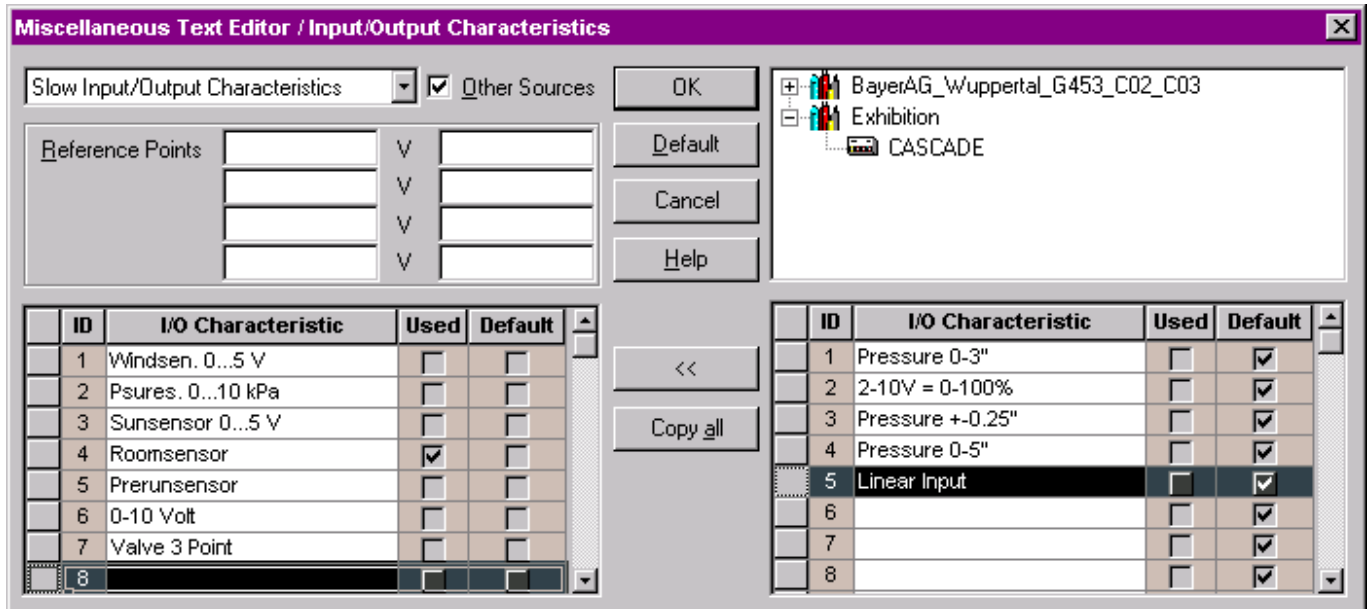
- Open project with desired controller and click on the controller (source).

RESULT: The corresponding texts are displayed below.



- In the list on the right, select the text you want to copy to the controller (target) you currently work with by clicking on the tiled bar. Press SHIFT key, if you want to select more than one text.
- In the list on the left, click the line where the text should be copied to (target). If you have selected more than one text for copying, you must select the same number of lines in the left list.

NOTE: If the lines you selected on the left show already texts, these will be overwritten by the ones from the source controller.

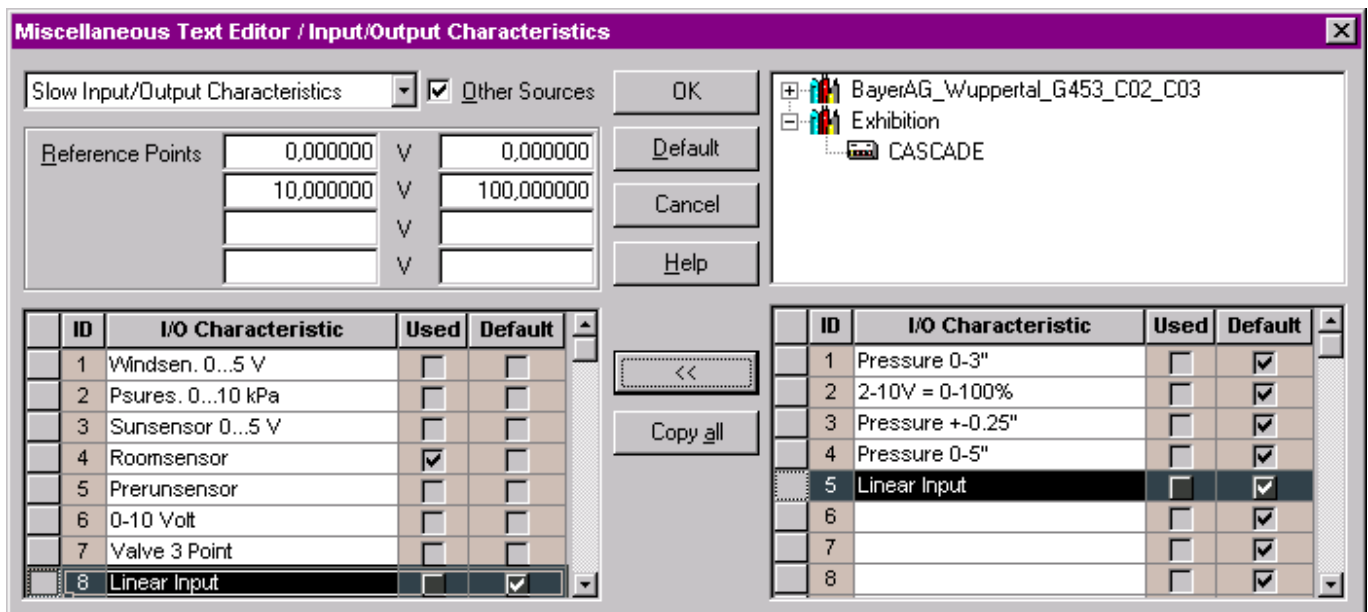


7. Click on the button with the double arrow.

or,

click on the **Copy all** button, if you want to copy all texts from the source controller to the current target controller.

RESULT: The texts are copied.



8. Click OK to confirm the copying.

For detailed descriptions of creating, editing, and deleting analog and digital engineering units, descriptors, alarm texts, and characteristics, refer to the respective following sections.

Analog Engineering Units

Create Analog Engineering Units
Edit Analog Engineering Units
Copy Analog Engineering Units from Other Controllers
Replace Analog Engineering Units

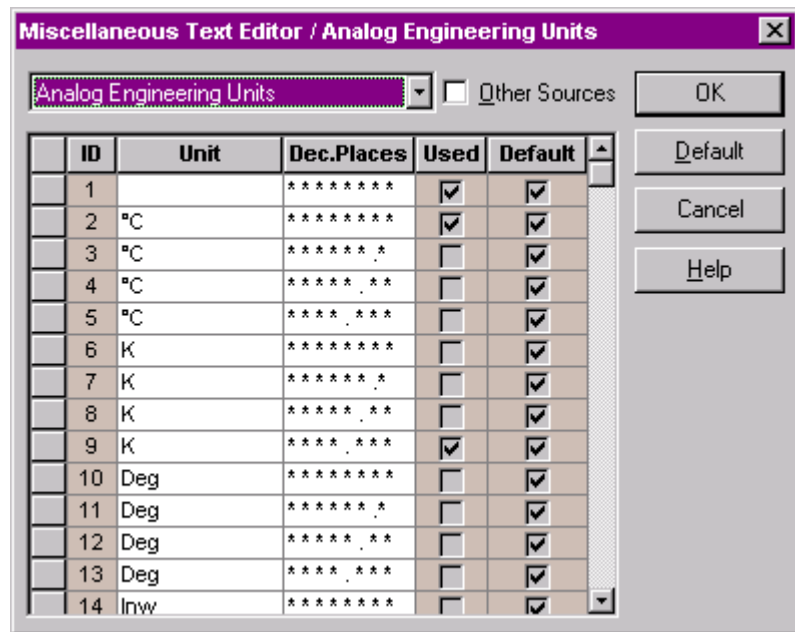
Purpose Create, edit, copy, and/or replace analog units of measurement. Analog engineering units specify an abbreviation for a unit of measurement (for example, degrees, inches, centimeters) and the number of decimal places allowable for the measurement.

For example, an analog input for a temperature sensor can be in Fahrenheit with an accuracy of two decimal places.

This dialog box defines the text that displays for each engineering unit as well as its decimal places. There are a maximum of 254 analog engineering units.

Procedure 1. In the logical plant tree, click on the controller. Click menu item **Options**, then drop-down item **Edit Text**, and then **Analog Eng. Units**.

RESULT: The *Miscellaneous Text Editor / Analog Engineering Units* dialog box is displayed. Default engineering units are displayed with a check mark in the **Default** column, customized engineering units do not. Engineering units, which are already used by at minimum one point are displayed with a check mark in the **Used** column (only display). Both, used and unused engineering units can be edited.

**Create new analog engineering unit**

2. Select an empty line and enter the text into the **Unit** field.
3. In the **Dec.Places** column, click into the field and select the format.
4. Confirm by clicking OK.

Edit analog engineering unit

1. Make step 1 of Procedure.
2. Locate engineering unit, you want to edit.
3. In the **Unit** column, click into the field and write over the existing text.
4. In the **Dec.Places** column, click into the field and select another format.

NOTE: If the unit is originally indicated as default text (checked check box in the **Default** column), then any changes or deletion (blank field) in the

Unit or **Dec.Places** field are indicated by an unchecked check box in the **Default** column.

Copy analog engineering units from other controllers

5. Confirm by clicking OK.

1. Make step 1 of Procedure.
2. If you want to copy analog engineering units from other controllers of the same project or from other projects, check the **other Sources** check box. For detailed instructions, please refer to "Copy texts from other controllers" in the "General Procedure" section.

Replace analog engineering unit

1. Make step 1 of Procedure.
2. Select engineering unit, you want to replace by clicking on the tiled bar on the left.
3. Click **Default** button.
4. Confirm by clicking OK.

NOTE: You cannot remove any of the default units from the system. You can only replace the default unit with the custom unit. When you select an engineering unit and click **Default** button, software replaces the custom unit with the original default unit. This is indicated by a checked check box in the **Default** column.

Digital Engineering Units

- Create Digital Engineering Units**
- Edit Digital Engineering Units**
- Copy Digital Engineering Units from Other Controllers**
- Replace Digital Engineering Units**

Purpose

Create, edit, copy, and/or replace digital units. Digital engineering units identify the switching status of a digital point. A digital point can either be active ("normal") or passive ("alarm"). Active state can be 0 or 1 depending on the Active State attribute for the point.

For example, a digital output connected to a pump can indicate ON when active (normal) and OFF when passive (alarm).

Points can have more than two states. For example, OFF/ON is two states. OFF, ON, POS-1, POS-2, and POS-3 are five states.

This dialog box defines the text that displays for each state. There are 20 default sets of texts (listed in Appendix).

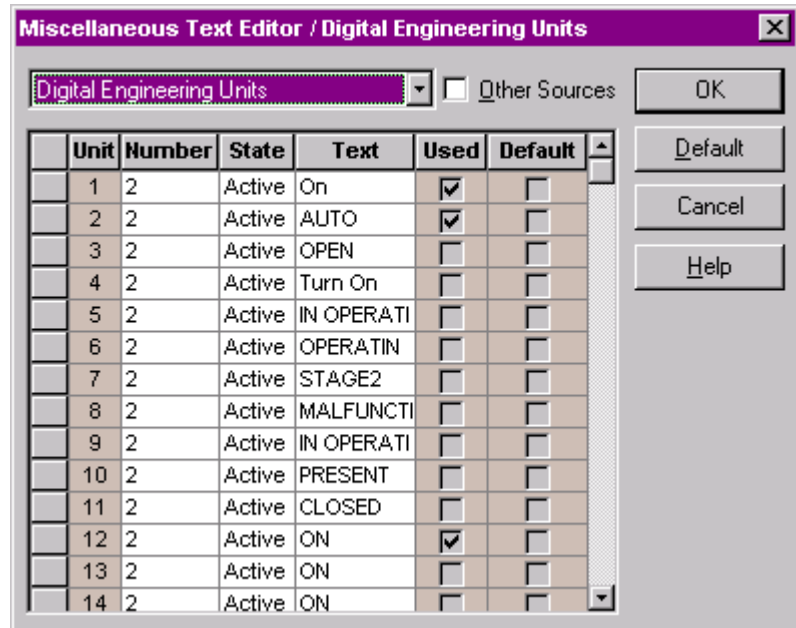
Maximum Number of Engineering Units

The range of numbers varies depending on controller version. For Ver. 1.2 Controllers, the range is 1-20. For Ver. 1.3 and greater Controllers, the maximum range is 1-127. The actual range depends on the total number of states assigned to the units. If all units are two-state, then you can assign 127 digital engineering units. If some units are three-state, the number is reduced by the number of extra states used. For example, if engineering units 1 and 2 are three-state units, then the maximum number of units is reduced by two to 125. Software keeps track of the total number of states (maximum 255) and displays a warning message, if you try to assign an engineering unit after the total number of states is reached. The range of numbers always shows 1-127 even though you may have already used all 255 states. After the warning message is displayed, you must delete a line with the **DELETE** key, not with the **Default** button, which does not necessarily reduce the states.

Procedure

1. In the logical plant tree, click on the controller. Click menu item **Options**, then drop-down item **Edit Text**, and then **Digital Eng. Units**.

RESULT: The *Miscellaneous Text Editor / Digital Engineering Units* dialog box is displayed. Default engineering units are displayed with a check mark in the **Default** column, customized engineering units do not. Engineering units, which are already used by at minimum one point are displayed with a check mark in the **Used** column (only display). Both, used and unused engineering units can be edited.



Create new digital engineering unit

2. Select an empty line.
3. In the **Number** column, select the number of states.
4. In the **State** column, select the first number, and enter the corresponding text in the text field beside.
5. Assign text to all other states analogously as described in step 4.
6. Confirm by clicking OK.

Edit digital engineering unit

1. Make step 1 of Procedure.
2. Locate engineering unit, you want to edit.
3. You can edit a digital engineering unit in one of the following ways:

Change state by selecting another state in the **State** column.

and/or,

change text for a state by overwriting the existing text.

and/or,

change the number of states in the **Number** column. In the **State** column, select the additional numbers one after the other and assign the texts in the **Text** field beside. Select from the newly created states in the **State** column.

NOTE: If the unit is originally indicated as default text (checked check box in the **Default** column), then any changes or deletion (blank field) in the **Number** or **Text** field are indicated by an unchecked check box in the **Default** column.

4. Confirm by clicking OK.

Copy digital engineering units

1. Make step 1 of Procedure.

from other controllers

2. If you want to copy digital engineering units from other controllers of the same project or from other projects, check the **other Sources** check box. For detailed instructions, please refer to “Copy texts from other controllers” in the “General Procedure” section.

Replace digital engineering unit

1. Make step 1 of Procedure.
2. Select engineering unit, you want to replace by clicking on the tiled bar on the left.
3. Click **Default** button.
4. Confirm by clicking OK.

NOTE: You cannot reduce the number of default units in the system. There are 20 sets of text for Ver. 1.2 Controllers; 255 sets (range 1-127) for Ver. 1.3 and greater Controllers. You can only replace the default unit with the custom unit and change the number of states a unit can have. When you select a line and click **Default** button, software replaces the custom unit with the original default unit. This is indicated by a checked check box in the **Default** column.

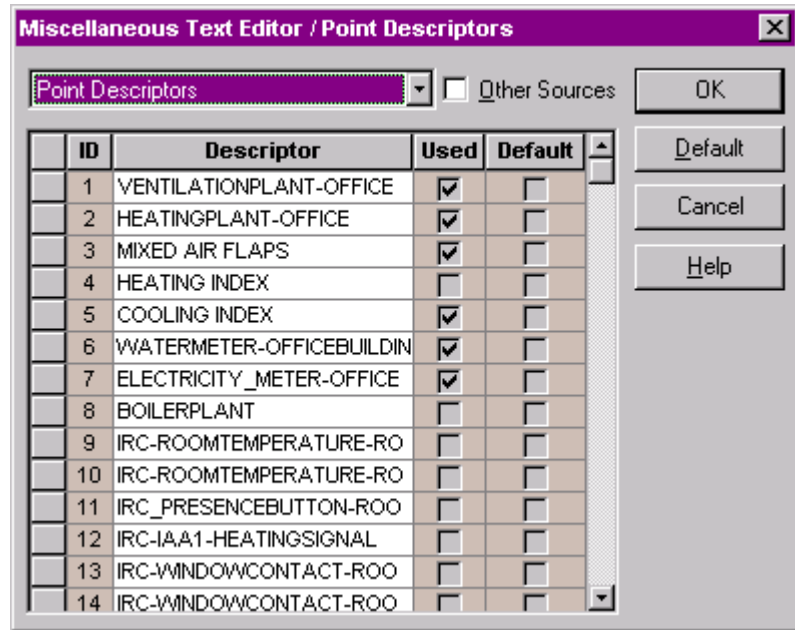
Point Descriptors

- Create Point descriptors**
- Edit Point descriptors**
- Copy Point descriptors from Other Controllers**
- Replace Point descriptors**

Purpose Create, edit, copy, and/or replace point descriptors. Point descriptors are descriptive information that you can add to user addresses. For example, you can assign “CHILLER1” to a point to more fully specify point location.

Procedure 1. In the logical plant tree, click on the controller. Click menu item **Options**, then drop-down item **Edit Text**, and then **Point Descriptors**.

RESULT: The *Miscellaneous Text Editor / Point Descriptors* dialog box is displayed. Default point descriptors are displayed with a check mark in the **Default** column, customized point descriptors do not. Point descriptors, which are already used by at minimum one point are displayed with a check mark in the **Used** column (only display). Both, used and unused point descriptors can be edited.

**Create new point descriptor**

2. Select an empty line and enter the text into the **Descriptor** field.
3. Confirm by clicking OK.

Edit point descriptor

1. Make step 1 of Procedure.
2. Locate point descriptor, you want to edit.
3. In the **Descriptor** column, click into the field and write over the existing text.
4. Confirm by clicking OK.

NOTE: If the descriptor is originally indicated as default text (checked check box in the **Default** column), then any changes or deletion (blank field) in the **Descriptor** field are indicated by an unchecked check box in the **Default** column.

Copy point descriptors from other controllers

1. Make step 1 of Procedure.
2. If you want to copy point descriptors from other controllers of the same project or from other projects, check the **other Sources** check box. For detailed instructions, please refer to "Copy text from other controllers" in the "General Procedure" section.

Replace point descriptor

1. Make step 1 of Procedure.
2. Select point descriptor, you want to replace by clicking on the tiled bar on the left.
3. Click **Default** button.
4. Confirm by clicking OK.

NOTE: You cannot remove any of the descriptors from the system. There are always 64 descriptors with OS Version 1.2; with Version 1.3 and higher, there are 255 descriptors. You can only replace the default descriptor with the custom descriptor. When you select a descriptor and click **Default** button, software replaces the custom descriptor with the original default descriptor. This is indicated by a checked check box in the **Default** column.

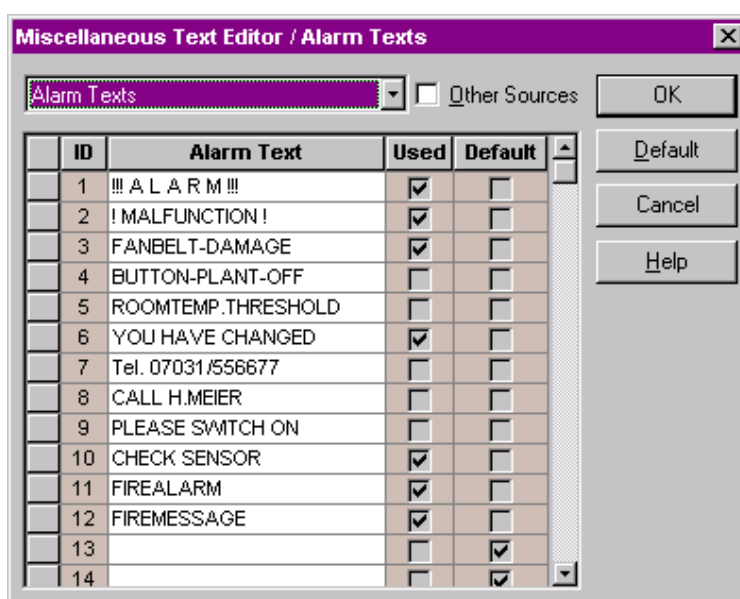
Alarm Texts

[Create Alarm Texts](#)
[Edit Alarm Texts](#)
[Copy Alarm Texts from Other Controllers](#)
[Replace Alarm Texts](#)

Purpose Create, edit, copy, and/or replace alarm texts. Alarm texts are information for operators to see when alarms occur. These alarms appear on the operator interface connected to the controller (varies according to system). For example, you can specify a phone number to call or a person to contact.

Procedure 1. In the logical plant tree, click on the controller. Click menu item **Options**, then drop-down item **Edit Text**, and then **Alarm Texts**.

RESULT: The *Miscellaneous Text Editor / Alarm Texts* dialog box is displayed. Default alarm texts are displayed with a check mark in the **Default** column, customized alarm texts do not. Alarm texts, which are already used by at minimum one point are displayed with a check mark in the **Used** column (only display). Both, used and unused alarm texts can be edited.

**Create new alarm text**

1. Make step 1 of Procedure.
2. Select an empty line and enter the text into the **Alarm Text** field.
3. Confirm by clicking OK.

Edit new alarm text

1. Make step 1 of Procedure.
2. Locate alarm text, you want to edit.
3. In the **Alarm Text** column, click into the field and write over the existing text.

NOTE: If the alarm text originally indicated as default text (checked check box in the **Default** column), then any changes or deletion (blank field) in the **Alarm Text** field are indicated by an unchecked check box in the **Default** column.

4. Confirm by clicking OK.

Copy alarm texts from other controllers

1. Make step 1 of Procedure.
2. If you want to copy alarm texts from other controllers of the same project or from other projects, check the **other Sources** check box. For detailed

instructions, please refer to “Copy text from other controllers” in the “General Procedure” section.

Replace alarm text

1. Make step 1 of Procedure.
2. Select alarm text, you want to replace by clicking on the tiled bar on the left.
3. Click **Default** button.
4. Confirm by clicking OK.

NOTE: You cannot remove any of the alarm texts from the system. There are always 128 possible messages in a Ver. 1.2 controller; Ver. 1.3 and greater controllers have 255. You can only replace the default alarm text with the custom alarm text. When you select an alarm text and click **Default**, software replaces the custom alarm text with the original default alarm text. This is indicated by a checked check box in the **Default** column.

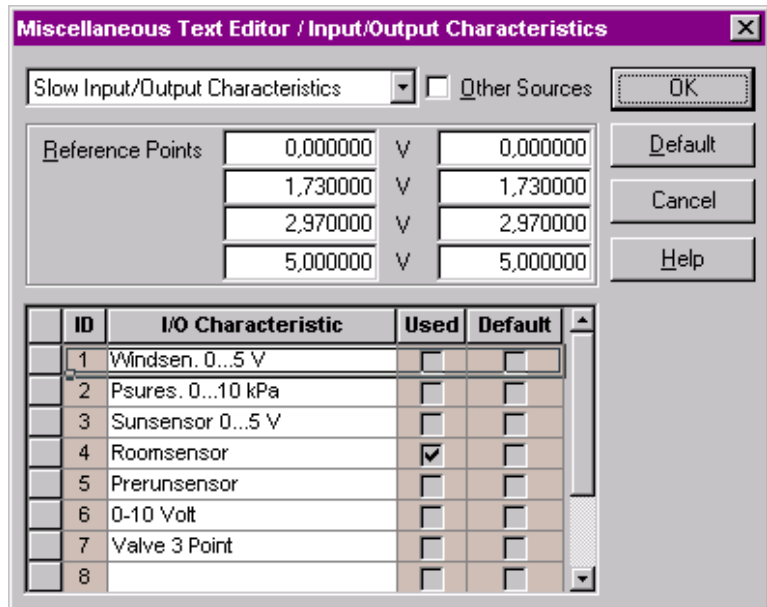
Characteristics

- Create Characteristics**
- Edit Characteristics**
- Copy Characteristics from Other Controllers**
- Replace Characteristics**

Purpose Create, edit, copy, and/or replace input/output characteristics. This dialog box allows you to define conversion values for analog points to match the characteristics of their sensors and assign the appropriate characteristics to analog points when required.

Procedure 1. In the logical plant tree, click on the controller. Click menu item **Options**, then drop-down item **Edit Text**, and then **Input/Output Characteristics**.

RESULT: The *Miscellaneous Text Editor / Input/Output Characteristics* dialog box is displayed.



In the list below, the default characteristics (max. of 10) are listed. Each characteristic has an ID (1 through 10), the name, for example, Sun sensor 0...5 V, and a maximum of four reference points (V=values that determine the characteristic curve) . Respective reference points are displayed after selecting the characteristic in the list. A minimum of two reference points can

define a linear characteristic. A maximum of four reference points can define a nonlinear characteristic. Default characteristics are displayed with a check mark in the **Default** column, customized characteristics do not. Characteristics, which are already used by at minimum one point are displayed with a check mark in the **Used** column (only display). Both, used and unused characteristics can be edited.

Create new characteristic

2. Select an empty line and enter the text into the **I/O Characteristic** field. Type a name that is easy to recall, for example, Pressure 0-3" stands for differential pressure, zero through three inches.
3. In the **Reference Points** fields, type desired values. Values represent reference points that determine sensor value at various points in its range. Enter sets of values from the smallest to the largest (or largest to smallest). You should enter values in all four sets. If you have only two reference points, enter only two sets, for example, for a linear characteristic of -40 to 100 °C and 0 through 10 V.
0 V - 40
10 V 100
4. Confirm by clicking OK.

Edit new characteristic

1. Make step 1 of Procedure.
2. Locate characteristic, you want to edit.
3. In the **I/O Characteristic** column, click into the field and write over the existing text.

and/or,

in the **Reference Points** fields, change corresponding values.

NOTE: If the characteristic is originally indicated as default text (checked check box in the **Default** column), then any changes or deletion (blank field) in the **Reference Points** or **I/O Characteristic** field are indicated by an unchecked check box in the **Default** column.

4. Confirm by clicking OK.

Copy characteristics from other controllers

1. Make step 1 of Procedure.
2. If you want to copy characteristics from other controllers of the same project or from other projects, check the **other Sources** check box. For detailed instructions, please refer to "Copy text from other controllers" in the "General Procedure" section.

Replace characteristic

1. Make step 1 of Procedure.
2. Select characteristic, you want to replace by clicking on the tiled bar on the left.
3. Click **Default** button.
4. Confirm by clicking OK.

NOTE: You cannot remove any of the characteristics from the system. There are always 10 characteristics. You can only replace a default characteristic with a custom characteristic. When you select a line and click **Default** button, software replaces the custom characteristic with the original default characteristic. This is indicated by a checked check box in the **Default** column.

Default Characteristics

Default characteristics are delivered with the software, but they can be edited with the Default Text Editor to meet local requirements. The following shows examples:

1	Pressure 0-3 "	0 to 11.0 V
3	Pressure ±0.25 "	0 to 11.0 V
4	Pressure 0-5 "	0 to 11.0 V
9	Direct Out 0-100 %	0 to 11.0 V
10	Reverse Out 0-100 %	11.0 to 0 V

Note that the voltage ranges are wider than actual device input to account for possible miscalibration of the device. Devices 1 through 4 and 9 range from 2 to 10 V. Device 10 ranges from 10 to 2 V.

Fixed Characteristics

The following fixed characteristics cannot be edited in the Miscellaneous Text Editor. They can only be selected and assigned to points in the Datapoint Editor, and are available under the IDs 11 through 15 for slow subtype points, and under the IDs 11 through 29 for fast subtype points.

CARE Subtype Index		XL-Online Index	Characteristic	
Slow	Fast		Name	Specification
15	23	253	NTC Type F	-58.0 to 302.0 F Negative temperature coefficient degrees F
11	11	255	NTC	-50.0 to 150.0 C Negative temperature coefficient degrees C
12	12	254	LINEAR_GRAPH	0 to 10 V
13	19	249	PT1000 Type F/I	-58.0 to 302.0 F
14	20	250	PT1000 Type C/I	-50.0 to 150.0 C
	17	247	PT1000 Type F/II	32 to 752.0 F
	18	248	PT1000 Type C/II	0.0 to 400.0 C
	21	251	PT100 Type F	-58.0 to 302.0 F
	22	252	PT100 Type C	-50.0 to 150.0 C
	15	245	PT3000 Type F	-58.0 to 302.0 F
	16	246	PT3000 Type C	-50.0 to 150.0 C
	13	243	BALCO Type F	-58.0 to 302.0 F
	14	244	BALCO Type C	-50.0 to 150.0 C
	24	241	0-10 V	0-10 V
	25	242	2-10V = 0-100 %	2-10V = 0-100 %
	26	237	NI 1000 TK5000 F	-22.0 to 266.0 F Positive temperature coefficient degrees F
	27	238	NI 1000 TK5000	-30.0 to 130.0 C Positive temperature coefficient degrees C
	28	239	NTC-10 F	-22.0 to 212.0 F Negative temperature coefficient degrees F
	29	240	NTC-10	-30.0 to 130.0 C Negative temperature coefficient degrees C

Miscellaneous Text Editor (CARE-BACnet)

Purpose

Provide functions to create, edit, copy, and delete state texts, descriptors, alarm texts and color maps for datapoints. The following table shows the availability of text types for the various datapoint types.

	Analog Points	Binary Points	Multi-State Points
State Texts		x	x
Descriptors	x	x	x
Alarm Texts	x	x	x
Color Maps	x	x	x

The various text functions can be applied on database, project and plant levels.

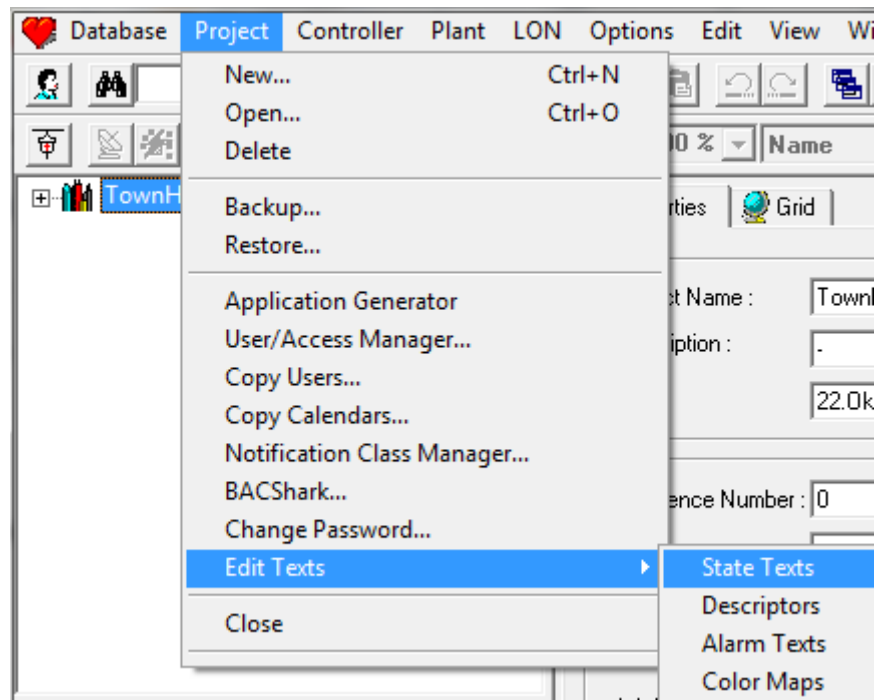
The BACnet Miscellaneous Text Editor can be accessed in three ways:

- via menu **Database**, drop-down item **Edit Texts** ("Project" selected in tree)
- via menu **Project**, drop-down item **Edit Texts** (Project selected in tree)
- via menu **Plant**, drop-down item **Edit Texts** (Plant selected in tree)

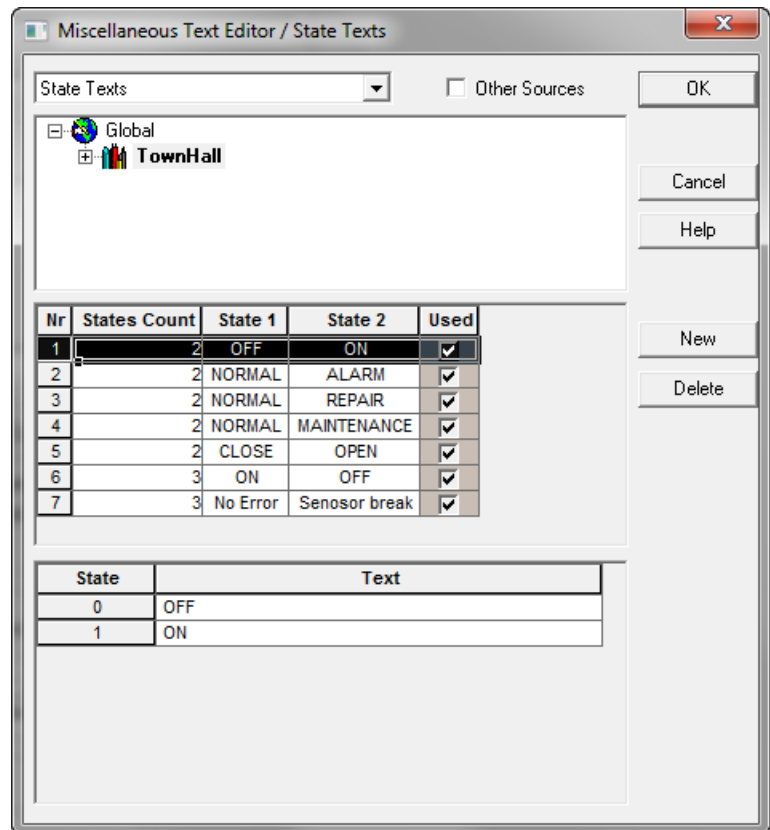
For all levels the procedures are the same. Only invoking the Miscellaneous Text Editor in the first step is different (see above).

Procedure

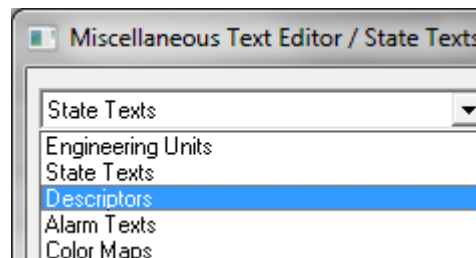
1. In the logical plant tree, select the level (folder) for which you want to define/edit texts. E.g. select the project folder if you want to work with texts included in the project.
2. In accordance with the selected level (database, project or plant), click on the menu item **Project**, **Database**, or **Plant**, then submenu item **Edit Texts**, and then the text type (**State Texts**, **Descriptors**, etc.).



RESULT: The *Miscellaneous Text Editor* dialog box is displayed. The dialog box title is named according to the text type selected in the **Edit Texts** menu.



In the example above, 'State Texts' has been selected in the **Project/Edit Texts** submenu. In the title line and the drop-down listbox on the top the name of the selected text type is shown. If desired, at this point another text type can still be selected from the drop-down listbox.



NOTE: Engineering Units can be selected but cannot not be edited on any level.

According to the selection in the CARE project tree, the corresponding folder is highlighted below the text selection drop-down listbox.



At this point you can still select other levels such as a plant or the database by expanding the tree and clicking the corresponding folder.



Note that the database level is represented by the Global icon.

In the following, the handling of the different text types is shortly described.

State Texts

If the type 'State Texts' is selected, all state text items are summarized in a table in the area below the tree.

State Texts □

Global

- TownHall

Nr	States Count	State 1	State 2	Used
1	2	OFF	ON	✓
2	2	NORMAL	ALARM	✓
3	2	NORMAL	REPAIR	✓
4	2	NORMAL	MAINTENANCE	✓
5	2	CLOSE	OPEN	✓
6	3	ON	OFF	✓
7	3	No Error	Sensor break	✓

All text types, which are already used by at minimum one point are displayed with a check mark in the **Used** column (only display). Both, used and unused texts can be edited. Used text types cannot be deleted.

In the area below the Summary table, the texts of the highlighted item in the Summary table are displayed in a Details table. They can be edited in this table.

Nr	States Count	State 1	State 2	Used
1	2	OFF	ON	✓
2	2	NORMAL	ALARM	✓
3	2	NORMAL	REPAIR	✓
4	2	NORMAL	MAINTENANCE	✓
5	2	CLOSE	OPEN	✓
6	3	ON	OFF	✓
7	3	No Error	Sensor break	✓

State	Text
0	OFF
1	ON

For state texts of binary and multi-state datapoints, the states count (2 ...32) can be defined in the **States Count** column of the upper Summary table.

Descriptors

Point descriptors are displayed in a Summary table only and can be edited directly in this table.

Descriptors Other Sources

Global

- TownHall
 - XLWEB_Sec_A
 - Air_Handling_Unit
 - Cooling
 - Heating

Nr	Descriptor	Used
1	AHU01 Outside Air Temperature	<input checked="" type="checkbox"/>
2	AHU01 Supply Air Temperature after Heating Coil	<input checked="" type="checkbox"/>
3	AHU01 Supply Air Humidity	<input checked="" type="checkbox"/>
4	AHU01 Return Air Temperature	<input checked="" type="checkbox"/>
5	AHU01 Supply Air Temperature after Humidifier	<input checked="" type="checkbox"/>
6	AHU01 Return Air Humidity	<input checked="" type="checkbox"/>
7	AHU01 Supply Air Fan command	<input checked="" type="checkbox"/>

Alarm Texts

As state texts, alarm texts are shown in a Summary and Details table. In the **Event Object Type** column of the Summary table, you can select alarm texts for analog or digital datapoints. In the lower Details table, you can enter/change the alarm texts for the different events.

Alarm Texts Other Sources

Global
TownHall

Nr	Event Object Type	Event 1	Event 2	Used
1	Digital	Normal Operation	Sensor Break	<input type="checkbox"/>

Nr	Event	Alarm Text
1	Fault to Normal	Normal Operation
2	Normal to Fault	Sensor Break
3	Off Normal to Normal	
4	Normal to Off Normal	
5	Fault to Off Normal	
6	Off Normal to Fault	

Color Maps

Color maps provide the possibility to assign colors to different states of a datapoint. When viewing the datapoint on a central, the datapoint is visualized in colors depending on its current state. As state texts, color maps are shown in a Summary and Details table.

Miscellaneous Text Editor / Color Maps Other Sources

Color Maps Other Sources

Global
B4_AHU01

Nr	Name	States Count	Used
1	Room Temperature	3	<input type="checkbox"/>

State	Min Value	Max Value	Color	Selection
0	0,00	12,00	Blue	Select
1	12,10	25,00	Green	Select
2	25,10	40,00	Red	Select

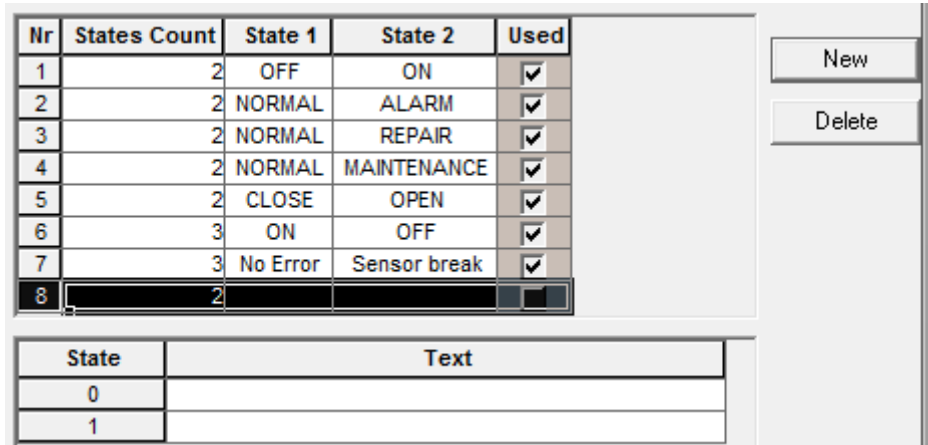
Buttons: OK, Cancel, Help, New, Delete

In the **Name** column of the upper Summary table, you can enter a name for the color map. In the **States Count** column, you can define the number of states of the datapoint to which the color map will be mapped.

In the lower Details table, you enter min and max values for each state and select a color to be assigned to each state.

Create New Text

3. To create a new text entry, click the **New** button. An empty row is inserted in the Summary table.



4. In case of text type 'State Texts', select the number of states from the **States Count** drop-down listbox. In the Details table, assign the texts to the states by entering the texts in the **Text** column (see figures in "State Texts" section above).
5. In case of text type 'Descriptors', enter the descriptive text in the **Descriptor** column of the Summary table (see figure in "Descriptors" section above).
6. In case of text type 'Alarm Texts', select the type, 'Analog' or 'Digital', from the **Event Object Type** drop-down listbox. In the Details table below, enter the alarm texts in the **Alarm Text** column (see figure in "Alarm Texts" section above)
7. In case of text type 'Color Maps', enter the name in the **Name** column of the upper Summary table. In the **States Count** column, define the number of states of the datapoint to which the color map will be mapped. In the lower Details table, enter **Min Value** and **Max Value** for each state and map a color by clicking the **Select** button in the **Selection** column (see figure in "Color Maps" section above).
8. Click OK.

RESULT: The *Miscellaneous Text Editor* dialog box saves the settings and is closed.

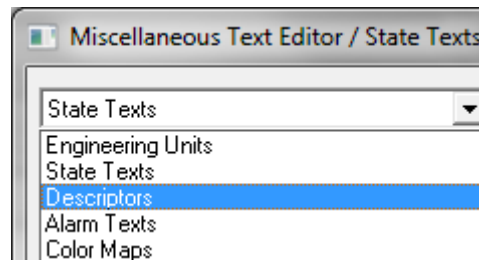
Edit Text

9. Apply the desired steps of the previous Procedure.
10. To edit text, locate the row, click into the field and write over the text.

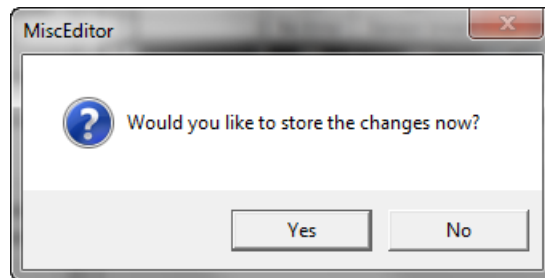
Nr	States Count	State 1	State 2	Used
1	2	OFF	ON	<input checked="" type="checkbox"/>
2	2	NORMAL	ALARM	<input checked="" type="checkbox"/>
3	2	NORMAL	REPAIR	<input checked="" type="checkbox"/>
4	2	NORMAL	ON	<input checked="" type="checkbox"/>
5	2	CLOSE	OPEN	<input checked="" type="checkbox"/>
6	3	ON	OFF	<input checked="" type="checkbox"/>
7	3	No Error	Sensor break	<input checked="" type="checkbox"/>

State	Text
0	NORMAL
1	ON

- To display and edit different texts than currently displayed, click drop-down arrow at the top and select the desired other text type.



RESULT: A message is displayed asking for the storage of your changes.



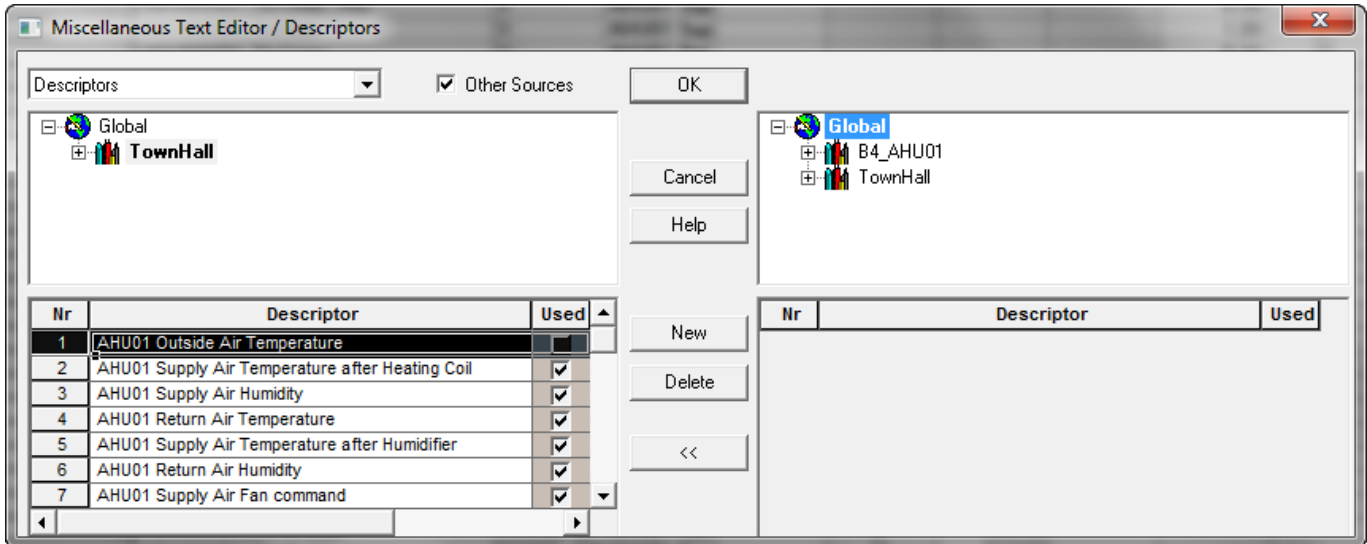
- Click **Yes**, if you want to save the changes you did to the previously selected text type.
- Click **No**, if you want to discard the changes you did to the previously selected text type.

RESULT: The *Miscellaneous Text Editor* dialog box displays the new text type.

Copy Texts from Other Projects or Plants

- Open the source project from which you want to copy the texts.
- Make the target project to which you want copy the texts the active project.
- Apply the desired steps of the previous Procedure.
- Check the **Other Sources** check box.

RESULT: The dialog box is expanded and all opened projects are available in a tree on the right side.



17. In the left tree, select the target, database (Global), project or plant to which you want to copy the source texts.

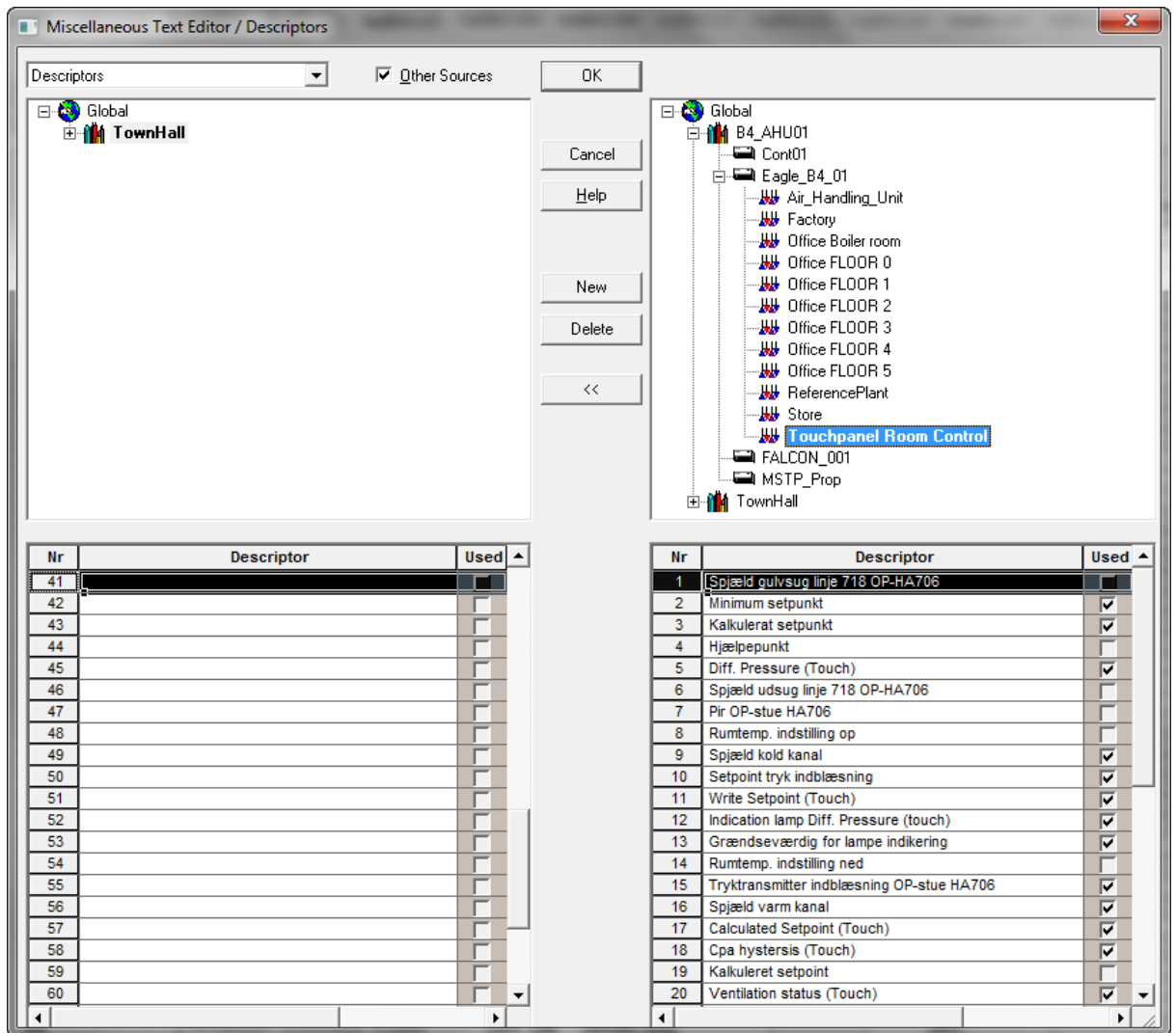
RESULT: The available texts are displayed on the bottom.

18. Open the right tree and navigate to the source project or plant.

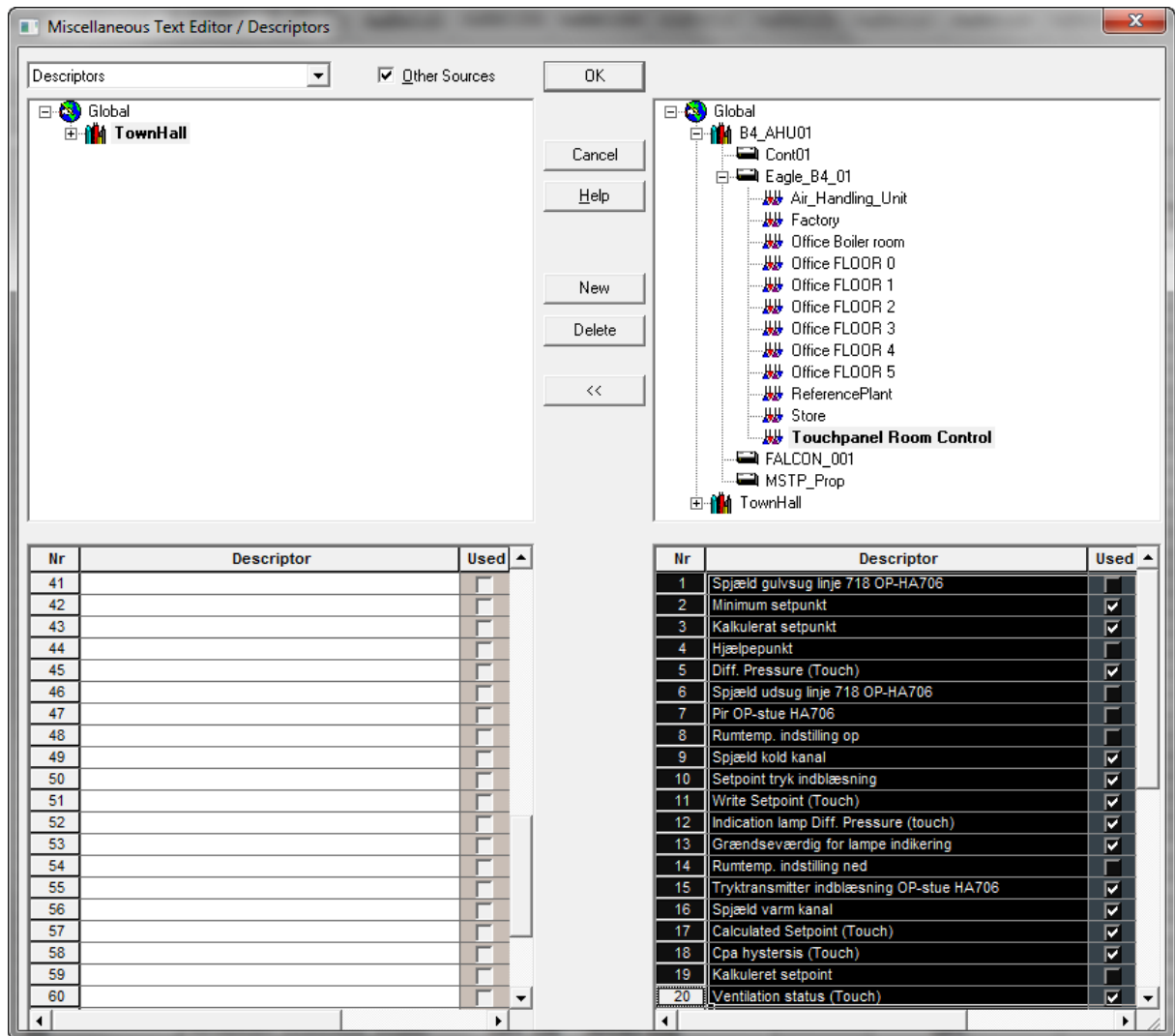
RESULT: The available texts are displayed on the bottom.

NOTE: When copying texts from a source, the target texts can be kept or overwritten.

19. If the target texts should be kept, add the corresponding number of new rows by clicking the **New** button repeatedly.

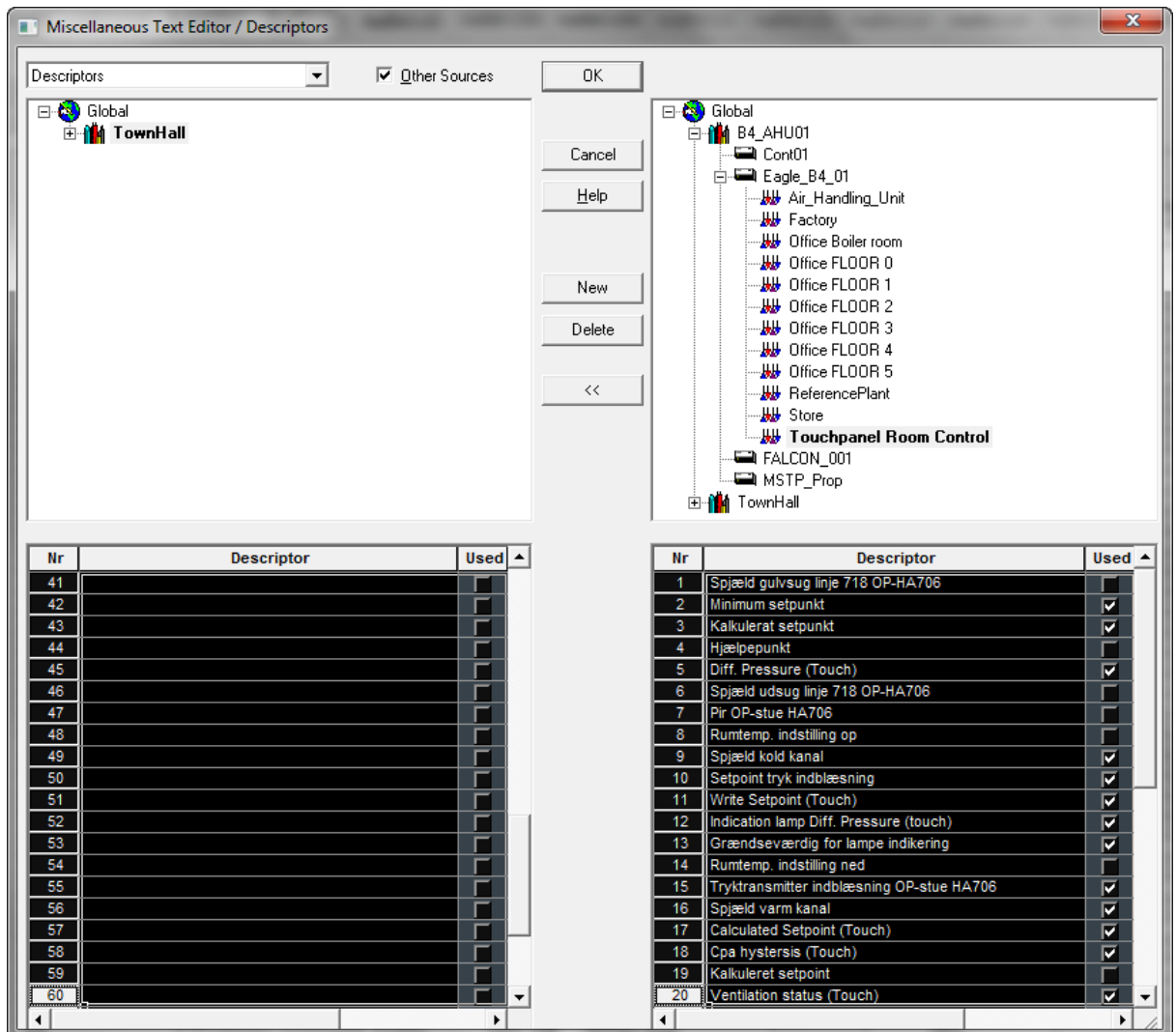


20. On the right, highlight the source texts. Multi-selection by using the STRG or SHIFT key simultaneously is possible.



21. On the left, highlight the (empty) target rows to which the texts should be copied. Multi-selection by using the STRG or SHIFT key simultaneously is possible.

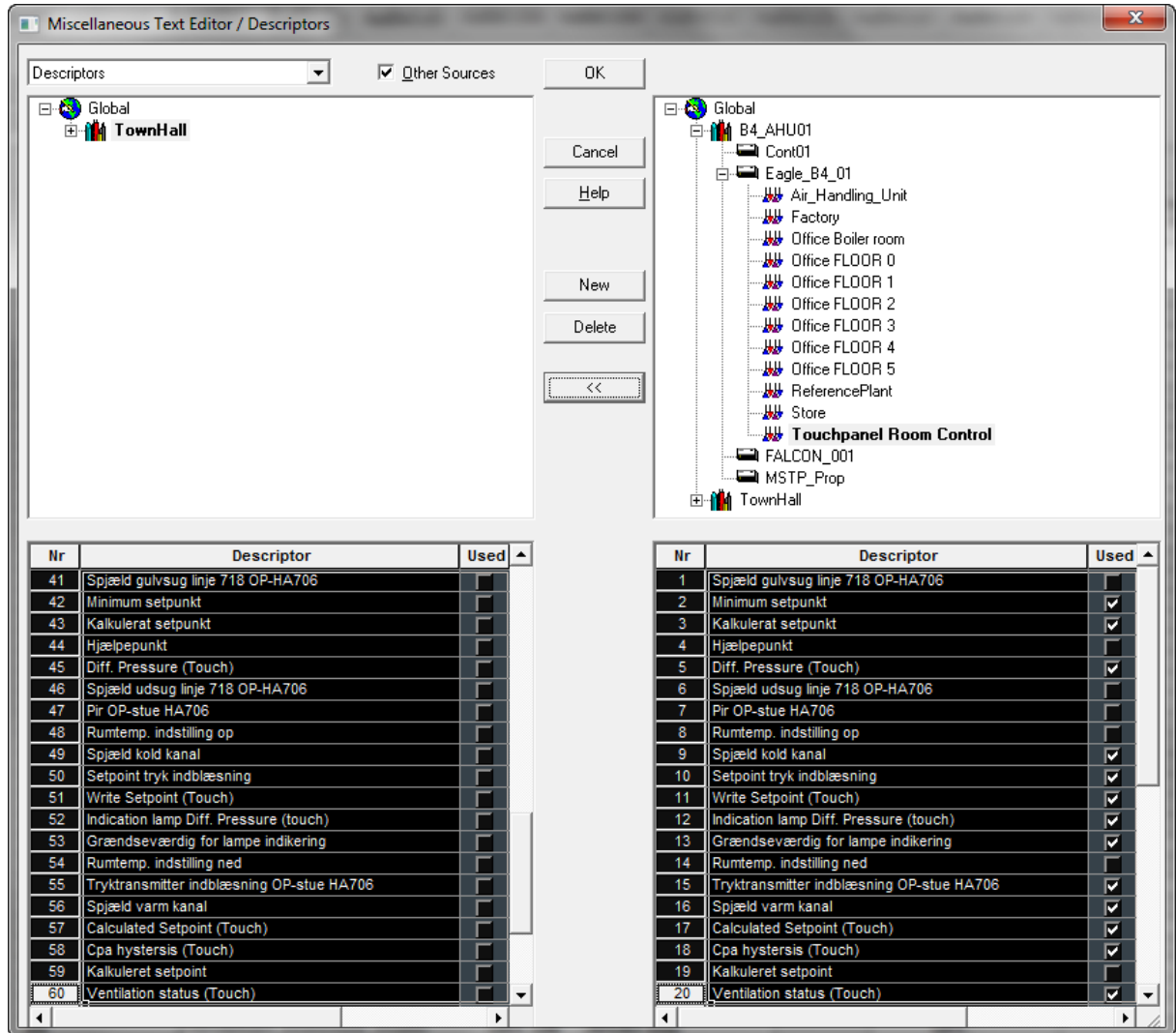
NOTE: If the selected rows on the left already show texts, these texts will be overwritten by the source texts.



22. Click the **Copy** button  .

RESULT: The texts are copied. Selected empty rows on the left will contain the new copied texts. Selected rows with existing texts will be overridden with the copied texts.

23. Click OK to confirm the copying.



Configure BACnet Point

Purpose Configuration of analog input and analog output points. Analog input and output points must be configured prior to their assignment to a terminal on a hardware module on the terminal assignment tab. By selecting a configuration such as NTC, PT100 Type F, etc., the corresponding configuration properties of the datapoint are automatically set correctly for the terminal.

IMPORTANT

Configure the datapoint before you assign the datapoint to a terminal on the Terminal Assignment tab. Otherwise you need to rework the configuration properties manually.

Procedure 1. Select the datapoint in the logical plant tree.

RESULT: On the *Properties* tab on the right, the properties are displayed.

Properties

Datapoint Name: ANA_Input01 BACnet Object: Analog Input (0)
 BACnet Object ID: 0 BACnet Instance: 0

Lon Mapping
 Lon Point: none
 Input NV: none
 Output NV: none

Misc. Editor Functions
 Engineering Unit:
 Descriptor:
 Alarm Text:
 IO Configuration: 0-10V Characteristic: none

Access Rights
 Read Access Level: Guest (0) Write Access Level: Guest (0)

Alarming
 Notification Class: none Alarm Delay: 0 [s]
 Notify Type: Alarm High Limit Reporting: 80
 Low Limit Reporting: -15
 Deadband: 1
 To-Off Normal
 To Fault
 Back-To-Normal

Values
 Point Role (EDK): Change of Value Increment: 1

- From the **I/O Configuration** drop-down listbox, select the configuration for the datapoint. Default is 0-10V.

Create and Assign Characteristic to BACnet Point

Purpose When selecting an IO configuration, an appropriate characteristic is automatically assigned if provided by CARE. But, for particular application scenarios, the usage and creation of specific characteristics might become necessary.

Examples:

- customizing a default characteristic provided by CARE
- converting different engineering units used by a datapoint and its mapped NV
- building a value conversion table for a datapoint and its mapped Modbus point

These characteristics can be defined by the user to fulfill the requirements of the particular application scenario.

Notes for Special Datapoints

For the multi-state input and output points, please refer to the Multi-State Input/Output Note and for the scaling factor of a pulse converter point, please refer the Scaling Factor for Pulse converters Note at the end of the procedure.

Example A: An analog input datapoint is mapped to an NV and their temperature engineering units (°C and °F) are different. The Input NV has °C, the analog input datapoint should display the values in °F. Hence, the engineering unit °C must be converted

into the engineering unit °F. The conversion will be defined by creating a new characteristic that contains a conversion table for the engineering units.

Procedure see below (page 508)

Example B: A pressure sensor is connected to an analog input terminal that is configured as 0-10 V w/o pull-up (IO configuration). The corresponding analog input datapoint should convert the voltage into a pressure with the range of 0 through 1000 Pa.

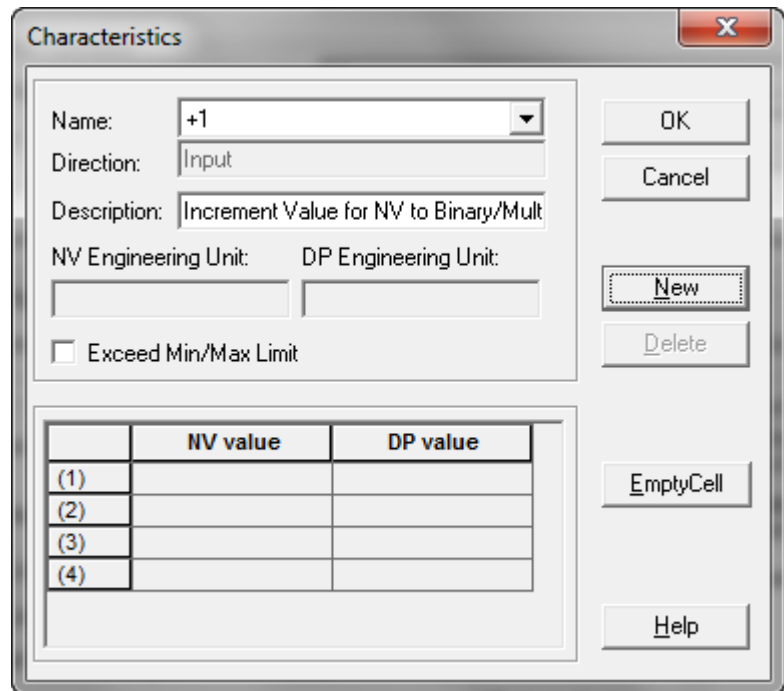
Procedure see page 511

Procedure Example A 1. Click the dotted button on the right of the **Characteristic** drop-down listbox.

The screenshot shows the 'Properties' dialog box for a datapoint. The 'Datapoint Name' is 'BL3', 'BACnet Object Type' is 'Analog Input (0)', and 'BACnet Object ID' is '0'. The 'Lon Mapping' section shows 'Lon Point' as 'NV - Input', 'Input NV' as 'SNVT_temp', and 'Output NV' as 'none'. The 'Misc. Editor Functions' section shows 'Engineering Unit' as '°C', 'Descriptor' as an empty field, 'Alarm Text' as an empty field, 'IO Configuration' as 'none', and 'Characteristic' as 'none'. A dotted button is visible next to the 'Characteristic' dropdown menu.

RESULT: The *Characteristics* dialog box displays.

In the **Name** drop-down listbox, all default characteristics provided by CARE and user defined characteristics are selectable. Since you want to create a new characteristic, continue with step 2.

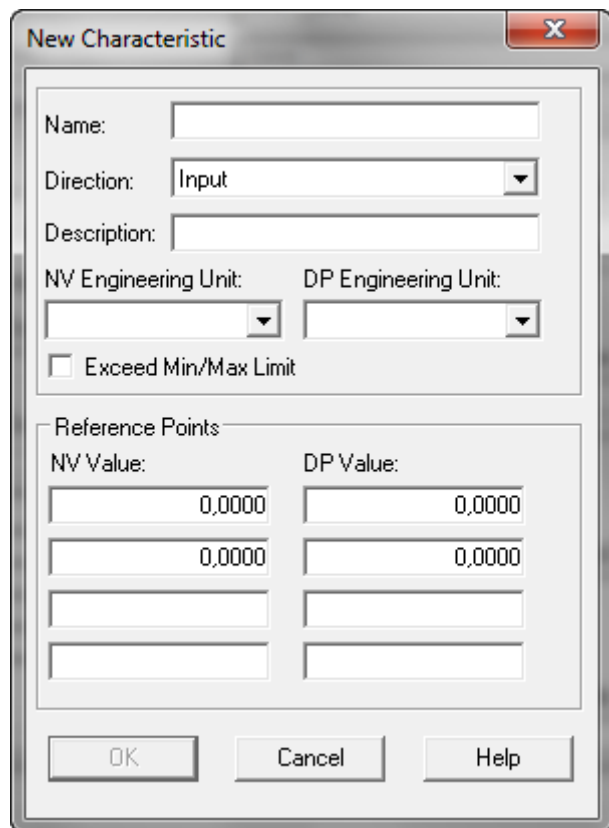


The **Characteristics** dialog box contains the following fields and controls:

- Name:** A dropdown menu with the value `+1`.
- Direction:** A dropdown menu with the value `Input`.
- Description:** A text field containing `Increment Value for NV to Binary/Mult`.
- NV Engineering Unit:** An empty text field.
- DP Engineering Unit:** An empty text field.
- Exceed Min/Max Limit**
- Buttons:** `OK`, `Cancel`, `New` (highlighted with a dashed border), `Delete`, `EmptyCell`, and `Help`.
- Table:** A table with 2 columns: **NV value** and **DP value**. It has 4 rows, each starting with a number in parentheses: (1), (2), (3), and (4).

- Click the **New** button.

RESULT: The *New Characteristic* dialog box displays.



The **New Characteristic** dialog box contains the following fields and controls:

- Name:** An empty text field.
- Direction:** A dropdown menu with the value `Input`.
- Description:** An empty text field.
- NV Engineering Unit:** A dropdown menu.
- DP Engineering Unit:** A dropdown menu.
- Exceed Min/Max Limit**
- Reference Points:** A section with two columns: **NV Value:** and **DP Value:**. Each column has three text fields, with the first two containing the value `0,0000`.
- Buttons:** `OK`, `Cancel`, and `Help`.

- In the **Name** field, enter a name for the new characteristic.
- From the **Direction** drop-down listbox, select `Input` for inputs respectively input NVs, or `Output` for outputs respectively output NVs.
- In the **Description** field, enter an additional description if desired.

6. From the **NV Engineering Unit** drop-down listbox, select the same engineering unit (source) as assigned to the NV via the **Input NV** respectively **Output NV** drop-down listbox under **Lon Mapping** on the **Properties** tab.
7. From the **DP Engineering Unit** drop-down listbox, select the engineering unit to which the source engineering should be converted (target).
8. If values outside the minimum and maximum limits as displayed in the table (see next step) should be considered, check the **Exceed Min/Max Limit** check box.
9. In the **Reference Points** fields, enter the value pairs (left = NV value, right=datapoint value).

NOTE: Negative values will be highlighted in red.

New Characteristic

Name: LON_Temp_Conv

Direction: Input

Description: Converts Celsius to Fahrenheit

NV Engineering Unit: °C

DP Engineering Unit: °F

Exceed Min/Max Limit

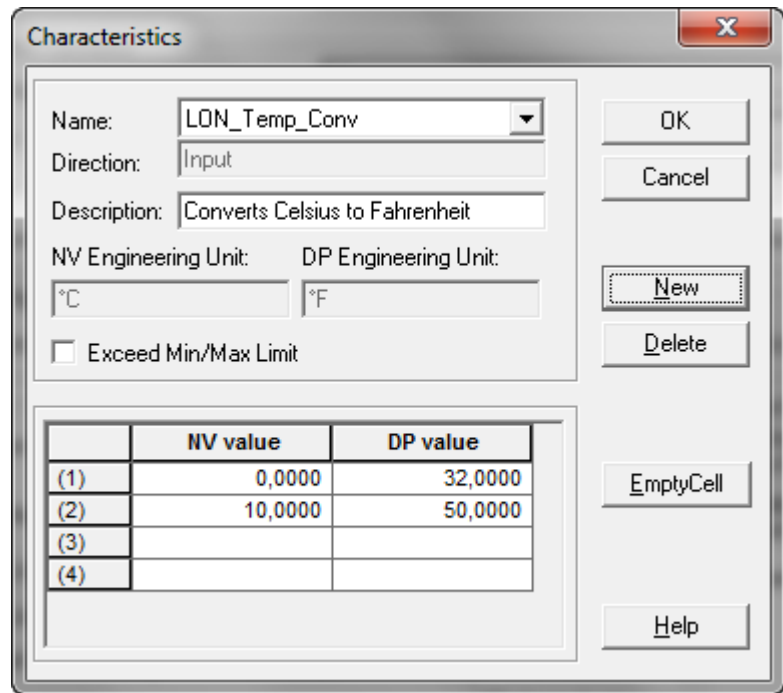
Reference Points

NV Value:	DP Value:
0,0000	32,0000
10,0000	50,0000

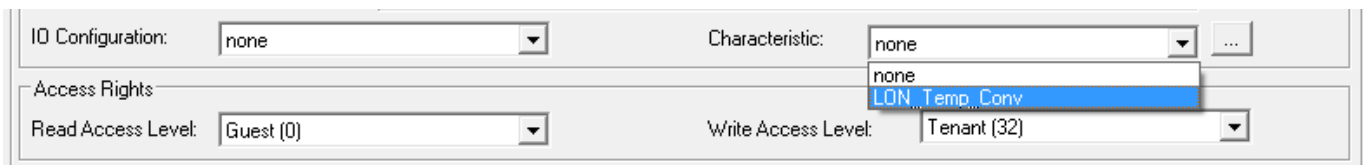
OK Cancel Help

10. Click OK.

RESULT: The *User Defined Characteristics* dialog box redisplay.

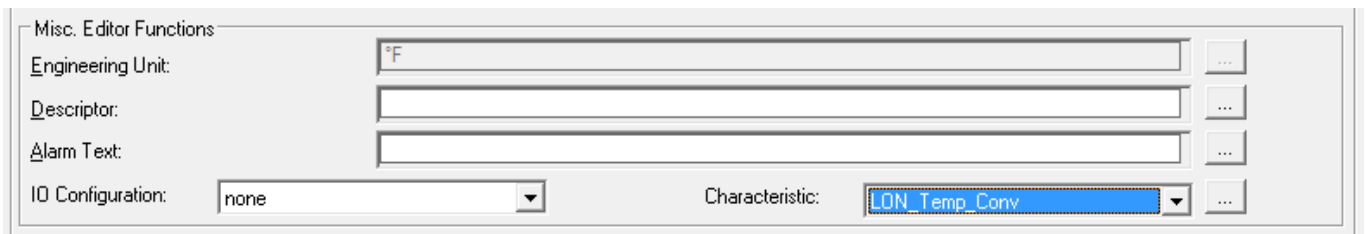


RESULT: The characteristic can now be selected from the **Characteristic** drop-down listbox.



11. Assign the characteristic by selecting it.

RESULT: The destination engineering unit is displayed in the **Engineering Unit** field.



Procedure Example B 1. From the **IO Configuration** drop-down list box, select 'AI 0..10V w/o pull-up'.

Properties

Datapoint Name: BACnet Object Type: Bus Number:
 BACnet Object ID: BACnet Instance Number: Tech. Address:

Lon Mapping

Misc. Editor Functions

Engineering Unit: ...
 Descriptor: ...
 Alarm Text: ...
 ID Configuration: Characteristic: ...

- Click the dotted button on the right of the **Characteristic** drop-down listbox.

RESULT: The *User Defined Characteristics* dialog box displays. In the Name drop-down listbox, a default characteristic is selected which converts % into V.

User Defined Characteristics

Name: ...

Description:

Source Engineering Unit: Destination Engineering Unit:

Exceed Min/Max Limit

	Source Value	Destination Valu
(1)	0,0000	0,0000
(2)	100,000	10,0000
(3)		
(4)		

OK
 Cancel
 New
 Delete
 EmptyCell
 Help

- Click the **New** button.

RESULT: The *New Characteristic* dialog box displays.

The image shows a 'New Characteristic' dialog box with the following fields and controls:

- Name:** A text input field.
- Description:** A text input field.
- Source Engineering Unit:** A dropdown menu.
- Destination Engineering Unit:** A dropdown menu.
- Exceed Min/Max Limit:** A checkbox.
- Reference Points:** A table with two columns: 'Source Value' and 'Destination Value'.

Source Value	Destination Value
0,0000	0,0000
0,0000	0,0000

At the bottom of the dialog are three buttons: 'OK', 'Cancel', and 'Help'.

4. In the **Name** field, enter a name for the new characteristic.
5. In the **Description** field, enter an additional description if desired.
6. From the **Source Engineering Unit** drop-down listbox, select the same source engineering unit as assigned by the default characteristic, in this case '%' .
7. From the **Destination Engineering Unit** drop-down listbox, select the engineering unit in which the source should be converted, in this case 'Pa' .
8. If values outside the minimum and maximum limits as displayed in the table (see next step) should be considered, check the **Exceed Min/Max Limit** check box.
9. In the **Reference Points** fields, enter the value pairs (left = source value, right=destination value).

NOTE: Negative values will be highlighted in red.

New Characteristic

Name:

Description:

Source Engineering Unit: Destination Engineering Unit:

Exceed Min/Max Limit

Reference Points

Source Value:	Destination Value:
<input type="text" value="0,0000"/>	<input type="text" value="0,0000"/>
<input type="text" value="100,0000"/>	<input type="text" value="1000,0000"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

9. Click OK.

RESULT: The *User Defined Characteristics* dialog box redisplay.

User Defined Characteristics

Name:

Description:

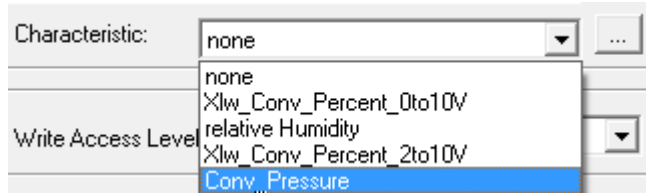
Source Engineering Unit: Destination Engineering Unit:

Exceed Min/Max Limit

	Source Value	Destination Value
(1)	0,0000	0,0000
(2)	100,000	1000,00
(3)		
(4)		

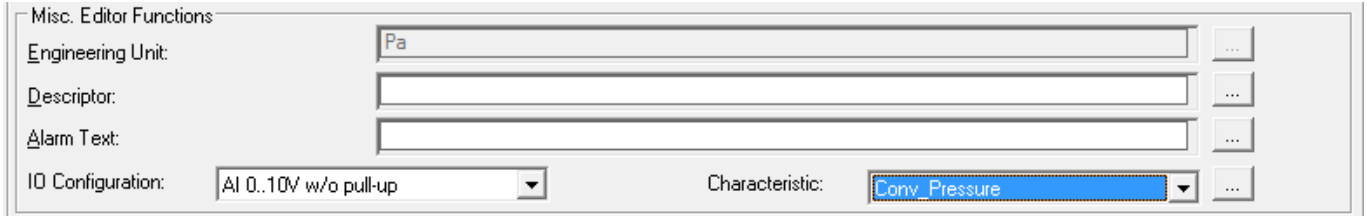
10. Click OK.

RESULT: The characteristic can now be selected from the **Characteristic** drop-down listbox.



11. Assign the characteristic by selecting it.

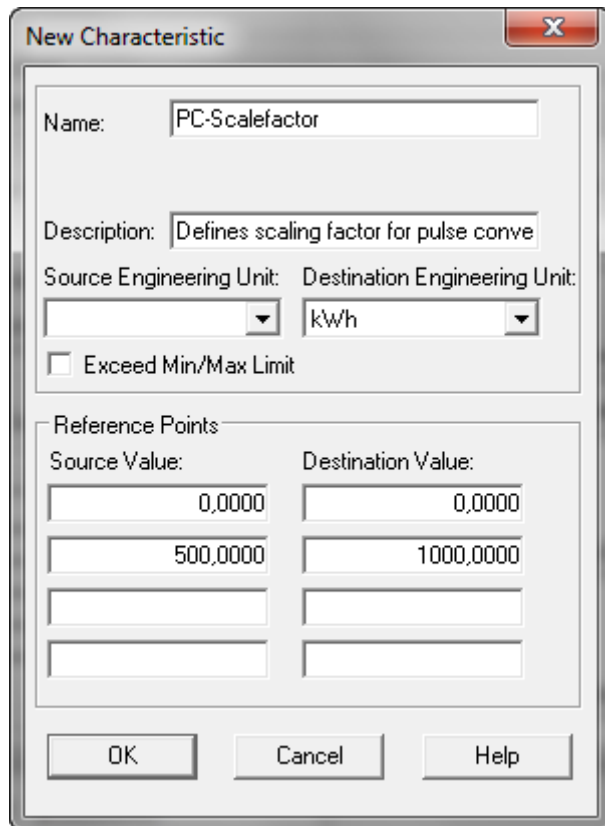
RESULT: The destination engineering unit is displayed in the **Engineering Unit** field.



Scaling Factor for Pulse Converter's Note

For the definition of the scaling factor for a pulse converter point, the following must be considered:

- Since the SNVTs of a pulse converter point do not have an engineering unit, an engineering unit has not to be selected here.
- The DP Engineering Unit must be the same as the one selected on *Properties* tab of the point.
- The first reference point pair must be 0,0000 – 0,0000
- It is sufficient to enter one second reference point pair to define the scaling factor.



Multi-State Input/Output Note

For Multi-State Inputs, the characteristic +1, for Multi-State Outputs, the characteristic -1, is provided by CARE by default. These default characteristics must be used if the multi-state points are considered to be mapped to NVs.

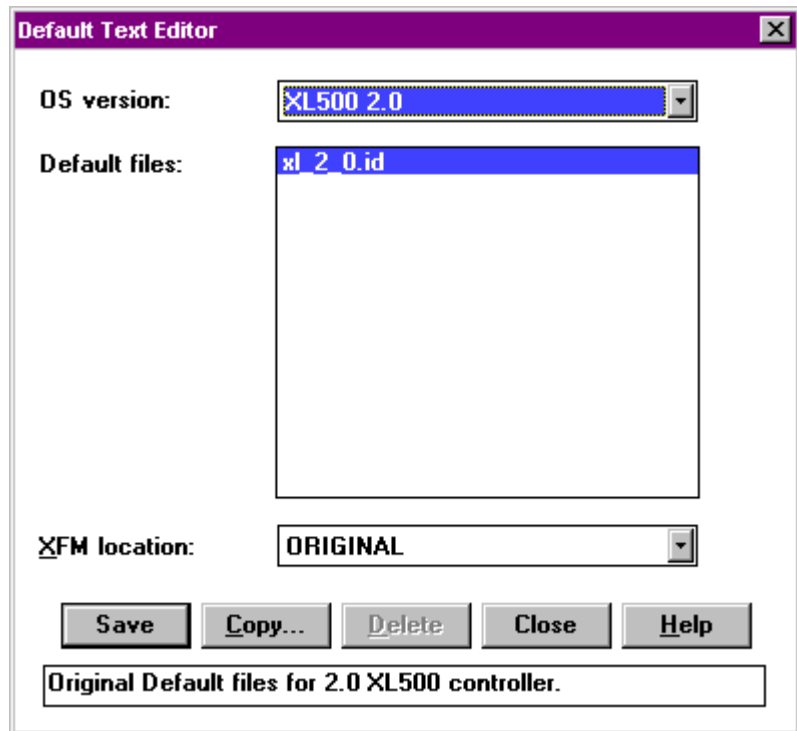
Default Text Editor

Purpose Customize project defaults for use in a specific area or region. After you create a modified file, you can use it for any project created by that CARE PC.

Default files have a file extension of ID. Default files correspond to different versions of controllers. For example, the default file for Excel 500 Controllers, OS Version 1.2, is called xl_1_2.id. For OS Version 1.3, the file is called xl_1_3.id.

Procedure 1. Click menu item Database, then submenu item Default Editor.

RESULT: The Default Text Editor window displays. Example:



OS version List of OS versions that you can choose (down arrow):

Controller	OS											
	1.0	1.01	1.1	1.2	1.3/1.4	IRC-Map	1.5	2.0/2.1	2.03	2.04	2.06	3.00
XL50								x	x	x	x	
XL80			x	x	x	x	x					
XL100			x	x	x	x	x	x	x	x	x	
XL500			x	x	x	x	x	x	x	x	x	
XL600				x	x							
XL800												x
XL Smart								x	x	x	x	
ELINK	x	x										

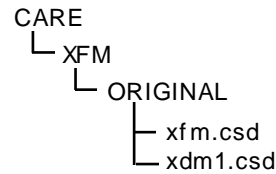
Default files

List of default files available for the selected OS Version. The xl_1_2.id file is the standard default file for Excel 500 OS version 1.2. You can change this list by selecting a different OS version (previous field).

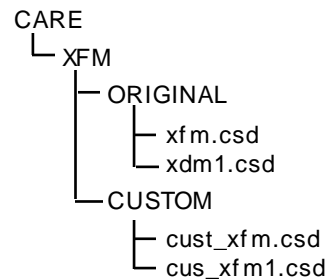
XFM

location XFM files are installed in subdirectories under the CARE directory. This field shows the location (subdirectory) where the XFM files are located.

For example, the standard location is named ORIGINAL:



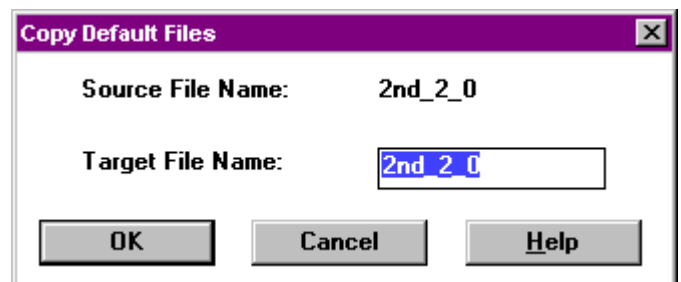
You can create additional subdirectories under CARE\XFM if a different subset of XFM files is required, but they must be located in the CARE\XFM\ directory. Example with a new subdirectory called CUSTOM:



The CUSTOM subdirectory displays in the XFM location field. You can have a custom set of XFM files for each default file, if required.

Save Use the currently selected default file and open the Default Text Editor main window after selecting Close. You can now edit the selected file.

Copy Create a new default file by copying the selected default file. You can then name and edit the new file to have different defaults. The Copy Default Files window displays. Example:



Enter a name for the new file in the highlighted Target File Name box. Click **OK** to save and then open the main Default Text Editor window.

Delete Erase the currently selected default file.

Close Close this window.

Help Display the on-line help topic for this window.

Original... Information line about the currently selected default file.

2. Select a default file, click **Save** and **Close**. Or, **Copy** a default file.

RESULT: The main CARE Default Editor window displays so you can edit the selected/new file. File name displays in the title bar. Example:

File	<p>Two drop-down items display:</p> <p>Select redisplay the first Default Text Editor window so you can choose a different default file.</p> <p>Exit closes the Default Text Editor and returns to CARE.</p>
Edit	<p>The following dropdown items display so you can edit the default text values for the selected file.</p> <p>Engineering Unit (analog and digital) I/O Characteristics Point Descriptors Alarm text System Alarm *XL10 Alarms</p> <p>The edit windows that display are the same as the ones described in the Editors chapter of this manual. See that chapter for details.</p> <p>*XL10 Alarms only applies when ELINK 1.01 was selected. This item allows for changes to the standard alarm messages that are part of the new VAV2 Controllers programmed by the E-Vision tool. This item allows you to change the text in the alarm messages to a different language, if required.</p>
Help	<p>Two dropdown items display:</p> <p>Help displays the on-line help topic for this window.</p> <p>About displays the About dialog box that shows software version number and available memory.</p>

3. Select each Edit item and modify as desired. When through, click File, Exit to close this window and return to CARE.

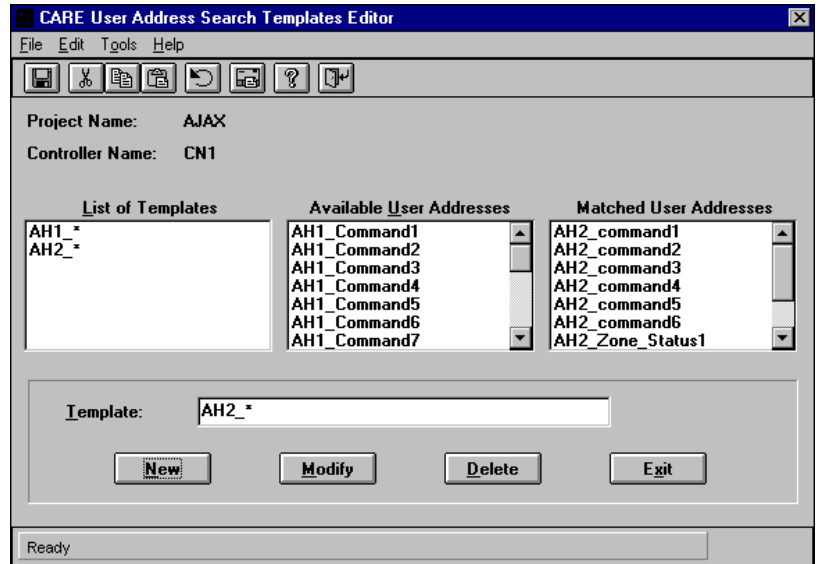
CARE User Address Search Templates Editor

NOTE: This function applies to CARE XL-5000 only, but cannot be used for the ELink, OLink and XLink controllers in CARE XL-5000.

Purpose Define general search templates to enable operators using XI581/XI582 Bus-Wide Operator Interface search templates to search for a set of user addresses. See XI581AH/XI582AH Operator Terminals Operator Manual 74-3554 for details on using search templates.

- Procedure**
1. In the logical plant tree, click on the controller.
 2. Click menu Controller, then drop-down item Edit/Search Templates.

RESULT: The CARE User Address Search Templates Editor window displays. Example:



Initially, the List of Templates is blank. In this example, there are two entries, AH1_* and AH2_*, to show what templates look like. The selected controller, CN1, has two fan systems (plants), AH1 and AH2. User addresses have the plant name as a prefix (AH1_, AH2_). All user addresses in the controller display in the Available User Addresses column.

In this case, the AH2_* template tells the operator terminal to find all user addresses that begin with "AH2_". The Matched User Addresses column shows what addresses fit the template.

In general, to define templates:

- Click a suitable address in the Available User Addresses column. The address appears in the Template box below the column.
- Edit the selected address so that it applies to a group of points. An asterisk, *, is a wild card that represents any number of characters. You can also use a question mark, ?, to represent just one character. For example, the template AH?_C* selects all AH1 and AH2 command addresses.
- When the template is complete, click New. The new template appears in the List of Templates column.
- Highlight a template to display the user addresses that match it in the Matched User Addresses column. If the matched addresses are not what you want, click Modify to change the template until it produces the correct list.
- Save the template(s) by clicking the Save icon in the button bar (first icon), or clicking File, Save.
-

The following text describes the window in detail.

Menu Bar

The menu bar provides the following additional functions.

File

Display two drop-down menu items:

Save saves the newly defined templates.

Exit closes this windows and returns to CARE.

Edit

Provide editing functions (Undo, Cut, Copy, and Paste) in the Template box to aid in editing new template names. For example, you can copy part of a template name and paste it back in the template name if you need a name with duplicate parts such as AH2_AH2_.

Tools

Provide a Copy From Controller function to copy existing templates from another controller to this one. This function is a convenient shortcut.

Help Display two drop-down menu items:
Contents displays the on-line help file for this window.

About displays the About box for this software. The About box shows software version.

Button Bar The button bar provides clickable buttons for the menu bar and window functions in the following order:

Save (templates)
 Cut (text in Template box)
 Copy (text in Template box)
 Paste (text in Template box)
 Undo (text changes in Template box)
 Copy templates from another controller
 Display About box
 Exit window

Work Area The window's work area contains the following information and fields.

Project and
 Controller The names of the selected Project and Controller. The templates you create are unique to these selections.

List of
 Templates List of all templates for the selected controller.

Available User
 Addresses All user addresses in the selected controller.

Matched User
 Addresses List of user addresses in the controller that match the highlighted template in the List of Templates.

Template Edit box for the entry of a new template name and editing.

Command Buttons Command buttons for the following functions:

New Add template from the Template box to the List of Templates.

Modify Copy selected template from the List of Templates to the Template box to edit it.

Delete Erase the template selected in the List of Templates.

Exit Close the window and return to CARE.

Status Line The status line displays messages as you move the cursor over the window and as software performs functions.

TIME PROGRAM EDITOR

NOTE: The Time Program Editor chapter applies to CARE XL-5000 only. For information on time programming in CARE Excel Web, refer to the Schedules and Calendars section.

Purpose Create time sequences for controller operation of devices. For example, set HVAC start and stop times.

Time Programs implement these command schedules. A controller can have a maximum of 20 Time Programs.

Each Time Program specifies a list of points to command and a *Weekly Program*. This Weekly Program defines the normal daily activity of the system by specifying which Daily Programs a controller should use for each day of the week (Sunday through Saturday). The Weekly Program applies for each week of the year. There is only one Weekly Program per Time Program.

Daily Programs list points and point actions and times for the controller to implement.

Yearly Programs define time periods with special daily programs. Yearly programs are suited to consider specific local conditions, for example, regional vacation and public /religious festivals. Yearly programs can be defined for more than one year.

Required Steps Use the Editors (see Editors chapter) to establish required point types before setting up Time Programs.

⇒ The Editors (Time Program Editor included) are only available after a plant has been attached to a controller.

Example Controller 1
 Time Program 1
Point Assignments
 hvac_ctrl
 min_hvac

<i>Weekly Program</i>	<i>Daily Program Name</i>
Monday	normal_daily
Tuesday	normal_daily
Wednesday	normal_daily
Thursday	normal_daily
Friday	normal_daily
Saturday	Weekend
Sunday	Weekend

Where the **normal_daily** Daily Program includes the following items (time, user address, command):

06:00	hvac_ctrl	on
18:00	hvac_ctrl	off

And the **Weekend** Daily Program includes the following items (time, user address, command):

12:01	min_hvac	on
23:59	min_hvac	off

You can also assign Time Programs 2 through 20 to the controller. For each Time Program, you assign a set of points and a set of Daily Programs for its Weekly Program.

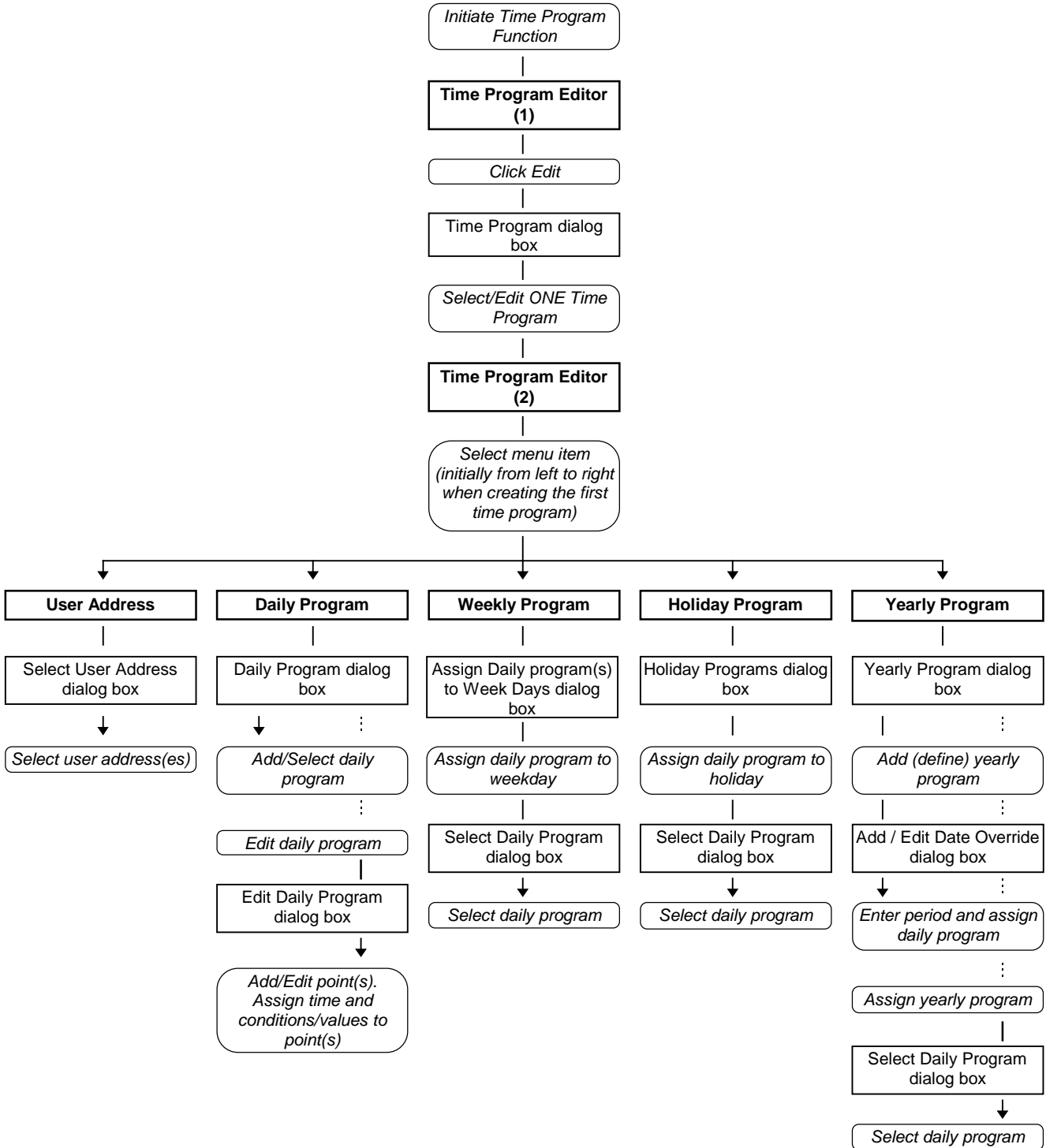
Holidays Each Time Program can also specify a list of holidays and which Daily Program each holiday should use.

If a holiday occurs that is not in the Time Program holiday list, the system uses the normal Daily Program for the day of the week the holiday falls on.

Point Restriction Time programs cannot include analog input, digital input, or totalizer points.

Daily Programs Daily programs can only specify points assigned to the controller.

Flowchart The following flowchart summarizes the menu structure and procedure for the Time Program function.



Examples Time Program Editor functions:

Edit	Time Programs List Example	Daily Program	Daily Program Example
	ADMIN BLOCK RESTAURANT ANNEX		07:20 S_FAN ON 17:00 S_FAN OFF 07:20 SETPOINT 20.0 12:00 SETPOINT 18.0 16:00 SETPOINT 20.0 17:00 SETPOINT 15.0
User address	Point List Example	Weekly Program	Weekly Program Example
	# S_FAN # SETPOINT R_FAN OA_SENSOR DA_SENSOR		Monday NORMAL_DAILY Tuesday NORMAL_DAILY Wednesday NORMAL_DAILY Thursday NORMAL_DAILY Friday NORMAL_DAILY Saturday WEEKEND Sunday WEEKEND
Daily Program	Daily Programs List Example	Holiday Program	Holiday Schedule Example
	NORMAL_DAILY EARLY_OFF WEEKEND HOLIDAY		New Year Christmas HOLIDAY Christmas Eve Labor Day Easter HOLIDAY Good Friday HOLIDAY

Initiate Time Program Function

- Purpose** Begin Time Program functions such as adding, changing, and deleting Time Programs, point assignments, and schedules.
- Assumption** The currently selected plant is attached to a controller and translated. You cannot use the Time Programs function on a plant that is not already attached to a controller and translated. After a plant is attached, the Schematic, Control Strategy, and Switching Logic functions are not available.
- Procedure** 1. In the logical plant tree, select the controller:
2. Click menu item Controller, then submenu items Edit, Time Program Editor.
- Or, click the Time Program Editor button in the button bar below the menu bar.
- RESULT:** The Time Program window displays with two menu items:

- File**
Display the following dropdown items:
- Print to
File Output selected Time Program(s) to an ASCII text file.
- Print to

- | | |
|----------------|--|
| Printer | Print selected Time Program(s). |
| Change Printer | Select a different printer. |
| Exit | Close the Time Program function and return to the CARE window. |

Edit

Create, modify, and delete Time Programs. The Time Program dialog box displays to select, create, rename, edit, or delete a Time Program. The next section describes these procedures.

Help

Display the following dropdown items:

- | | |
|-------|---|
| About | Display the About dialog box. |
| Help | Display the help topic for Time Programs. |

Select a Time Program

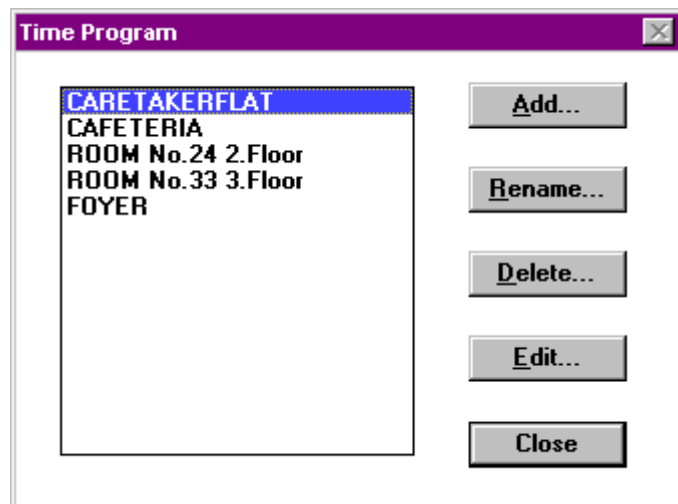
Create Time Programs

Rename Time Programs

Modify Time Programs

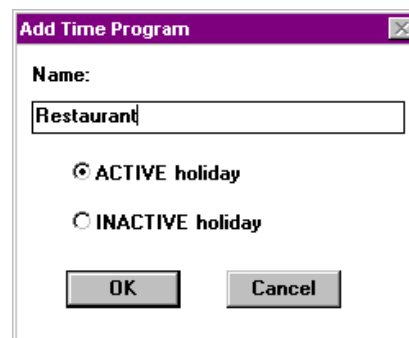
Delete Time Programs

- Purpose** Select, create, rename, modify, and/or delete Time Programs.
- Subsections** This section also contains the following procedures that are available after you select a Time Program:
- Assign/Unassign User Addresses (User Address function)
 - Define and/or Modify Daily Programs (Daily program function)
 - Define and/or Modify Weekly Program (Weekly program function)
 - Assign/Unassign Holidays (Holiday program function)
 - Define and/or Modify Yearly Program (Weekly program function)
 - Exit Time Program Editor (Return function)
- Procedure**
1. In the Time Program window, click menu item Edit. (See Initiate the Time Program Function procedure to display the window, if not already done.)
- RESULT:** The Time Program dialog box displays with a list of existing Time programs. If there are none, the list box is empty.



2. To create a new Time Program:

- a. Click **Add**.
The Add Time Program dialog box displays.



- b. Type a descriptive name for the new Time Program, for example, weekend or weekday.

The **ACTIVE holiday** button enables the Holiday Program. To disable the Holiday Program, click the **INACTIVE holiday** button. If holiday is inactive, this Time Program uses the Daily Programs, as set up by the Weekly Program, on holidays.

Click **OK** to add the Time Program. (Or, click **Cancel** to close the dialog box without saving the new Time Program name.)

If you click **OK**, the Time Program dialog box redisplay with the new Time Program name highlighted.

- c. Click **Edit** to begin the process of assigning schedules to the Time Program.
The Time Program Editor window displays with the User Address, Daily program, Weekly program, Holiday program, Yearly program, and Return menu items. See the following sections for procedures.

To rename an existing Time Program:

- a. Click Time Program name in the list box to select it. Then, click **Rename**.
The Rename Time Program dialog box displays with the old name and a box to enter a new name.



- b. Type a new name. Click **OK**.
Or, click **Cancel** to close the dialog box without saving the new Time Program name.
If you click **OK**, the Time Program dialog box redisplay with the new Time Program name highlighted.
- c. Click **Edit** to modify the Time Program, if desired.
The Time Program Editor window displays with the User Address, Day, Week, Holiday, and Return menu items. See the following sections for procedures.
Or, click **Close** to close this dialog box and return to the main Time Program window.

To delete a Time Program:

- a. Click a Time Program name in the list box to select it. Then, click **Delete**.
A confirmation dialog box displays to check whether or not you really want to erase the Time Program.
- b. Click Yes to erase, No to cancel.
If you click Yes, the Time Program dialog box redisplay without the deleted Time Program. If you click No, the Time Program dialog box redisplay and still has the selected Time Program.

To modify a Time Program or assign schedules to a new Time Program:

Click Time Program name to select it. Then, click **Edit**. (Or, double-click Time Program name.)

The Time Program Editor window displays with the User Address, Daily program, Weekly program, Holiday program, Yearly Program and Return menu items:

User address	Assign points to the selected Time Program.
Daily program	Create and/or modify Daily Programs that specify points, times, and commands.
Weekly program	Assign Daily Programs to the Weekly Schedule for the controller.
Holiday program	Assign Daily Programs to system holidays. Holidays are preset. You cannot change them with CARE.
Yearly program	Define time periods with special daily programs for local and national needs (vacation, festivals).
Return	Exit the Edit function.

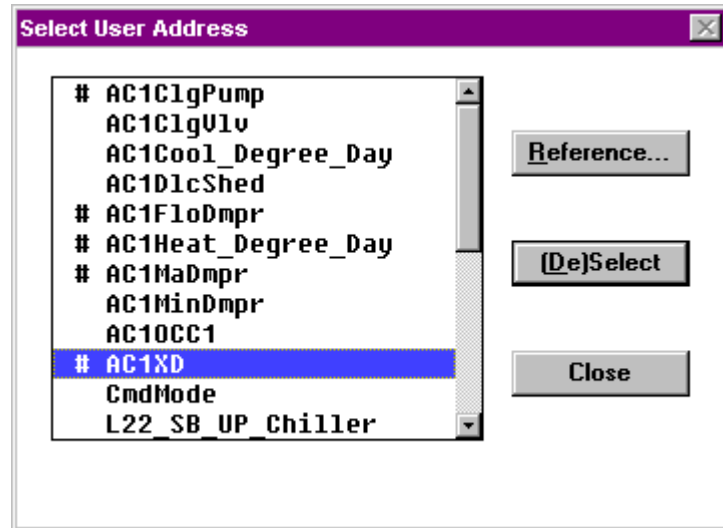
The following sections describe these functions.

3. To close this dialog box and return to the main Time Program window, click **Close**.

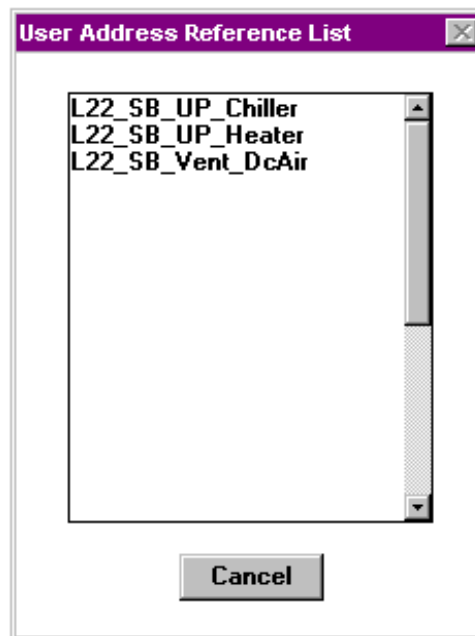
User Address Function

Assign/Unassign User Addresses

Purpose	Assign and unassign points to and from a time Program. Each time program must have a list of assigned points before you can set up Daily Programs....
Procedure	<ol style="list-style-type: none"> 1. Select desired Time Program (see Select a Time Program section for procedure). RESULT: The Time Program Editor window displays with the User Address menu item. 2. Click User Address. RESULT: The Select User Address dialog box displays with a list of existing user addresses. The user addresses were previously specified using the data point editor (see the Editors chapter for procedure). User Addresses marked with a pound sign, are already assigned to the selected Time Program.



You can assign each user address to only one Time Program. Click **Reference** to display user addresses that are already assigned (User Address Reference List dialog box)



Click **Cancel** to close the dialog box when through checking the point assignments..

- To assign an unassigned address (no pound sign, #), click user address name. Then click **(De)Select**. The (De)Select button acts as a **Select** when you click unassigned addresses.

Tip ⇒ Double-clicking an address selects and deselects it.

RESULT: Software assigns the user address to the Time Program and adds a pound sign, #, next to the selected user address to mark it as assigned.

- To unassign assigned user addresses, click user address name and then click **(De)Select**. The (De)Select button acts as a **Deselect** when you click assigned addresses.

Tip ⇒ Double-clicking an address selects and deselects it.

RESULT: Software unassigns the user address from the Time Program and removes the pound sign, #, next to it. Software does not delete the user address from the point description file.

5. Click **Close** to end the function.

RESULT: Software closes the dialog box. The Time Program Editor window redisplay. You can now select the Daily program function to define Daily Programs.

Daily Program Function

Create Daily Program

Rename Daily Programs

Delete Daily Programs

Copy Daily Programs

Modify Daily Programs

Purpose Define, rename, delete, copy, and/or modify Daily Programs and assign point commands and command times to each Daily Program. Each Daily Program covers a 24-hour period.

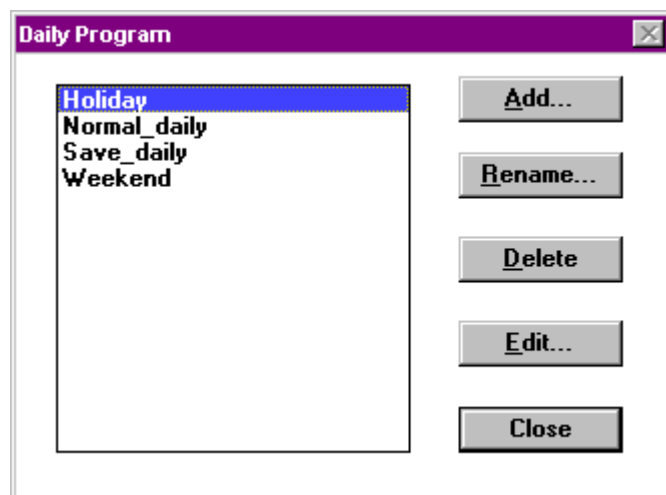
Daily Programs specify switching times, setpoints, and switching status for selected points.

- Procedure**
1. Select desired Time Program (see Select a Time Program section for procedure).

RESULT: The Time Program Editor window displays with the Day menu item.

2. Click Daily program.

RESULT: The Daily Program dialog box displays.



3. To create a new Daily Program:

- a. Click **Add**.
The Add Time Program dialog box displays.
- b. Type a descriptive name for the new program, for example, Saturday or Sunday. Then, click **OK**.
The dialog box closes and the Daily Program dialog box redisplay with the new name highlighted.

- c. To begin defining times, setpoints, and statuses for the new Daily Program, go to Step d and just click **Edit** (the Daily Program is already selected).

To rename a Daily Program:

- a. Click its name to select it. Then, click **Rename**. The Rename dialog box displays.
- b. Type a new name. Name can be a maximum of 18 characters and must be unique to the selected Time Program.
- c. Click **OK** to save the new name. The dialog box closes and the Daily Program dialog box redisplay with the new name highlighted.
- d. To modify times, setpoints, and statuses for the Daily Program, go to Step d and just click **Edit** (the Daily Program is already selected).

Or, Click **Close** to close this dialog box and return to the Time Program main window.

To delete a Daily Program:

- a. Click its name, then click **Delete**. Software asks whether or not you really want to delete the entry. Click **Yes** to delete; **No** to cancel. The name disappears from the list box. When software deletes a program, it deletes all its data.
- b. Click **Close** to close this dialog box and return to the Time Programs main window. Or, continue with other Time Program modifications.

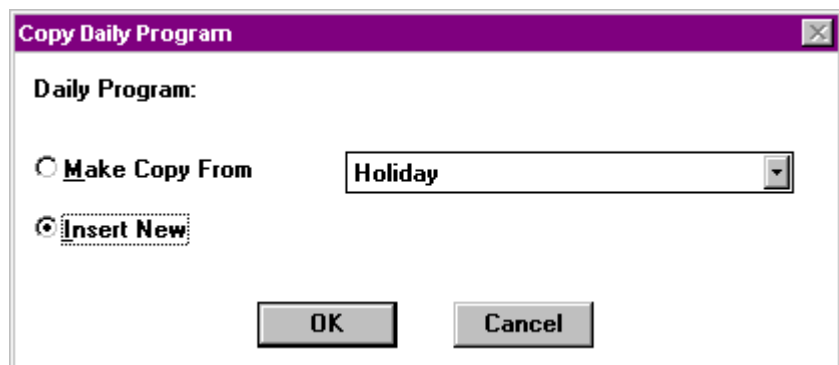
4. *To select and modify a Daily Program:*

Click its name and then click **Edit**. (Or, double-click name.)

Tip ⇒ To select a name, type the first letter of the name, then the second letter, and so on, until software highlights the desired name.

The Edit Daily Program dialog box displays with the current list of times, points, and commands assigned to the selected Daily Program.

If there are no time, points, and commands assigned to the Daily Program, the Copy Daily Program dialog box displays (unless there are no other Daily Programs):



5. If the Copy Daily Program dialog box displays, select one of the following actions:

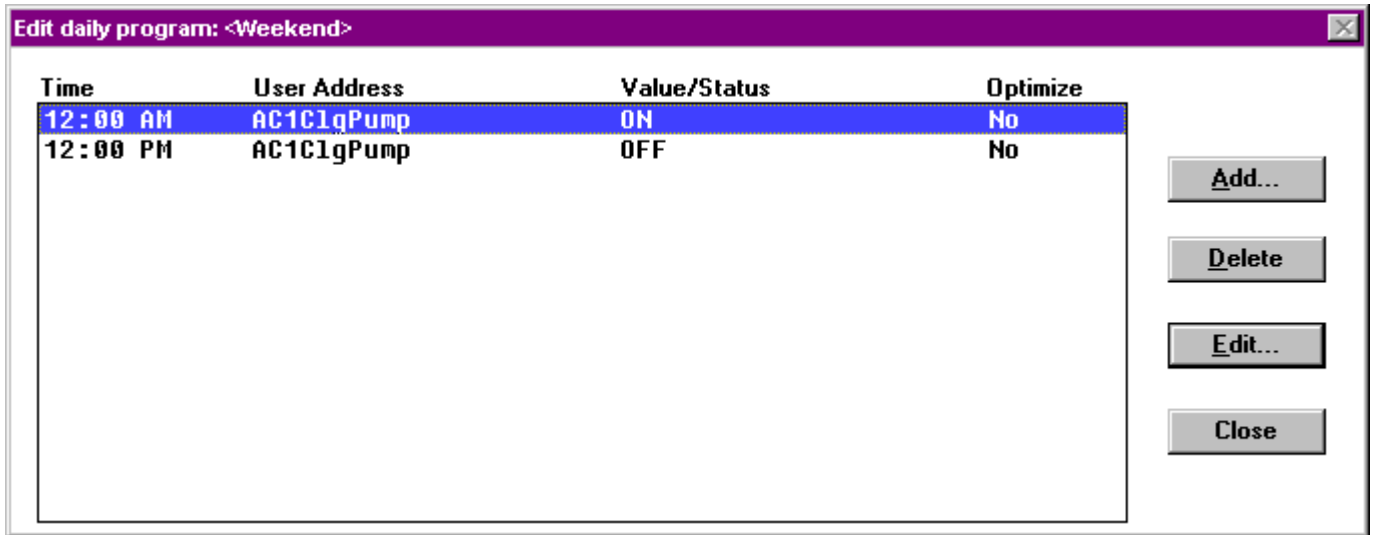
- a. Click **Insert New**, then **OK** to close the dialog box and return to the Edit Daily Program dialog box to assign all new items.
- b. Click **Make Copy From**, then click the down arrow in the box to the right to display a list of Daily Programs.

- c. Click desired program name. Click scroll bars and/or arrows to display other Daily Program names if the name you want is not in the list box. Click **OK**. (Or, click **Cancel** to close the dialog box without selecting a program.)

The dialog box closes and the Edit Daily Program dialog box redisplay with the copied entries from the selected Daily Program. You can change the entries as desired.

- d. Click **Cancel** to just close the dialog box and return to the Edit Daily Program dialog box.

RESULT: The Edit Daily Program dialog box displays. If you copied a Daily Program, its commands display in the list box. Each line in the list box represents one command. Each command specifies time, user address, and value or status command.

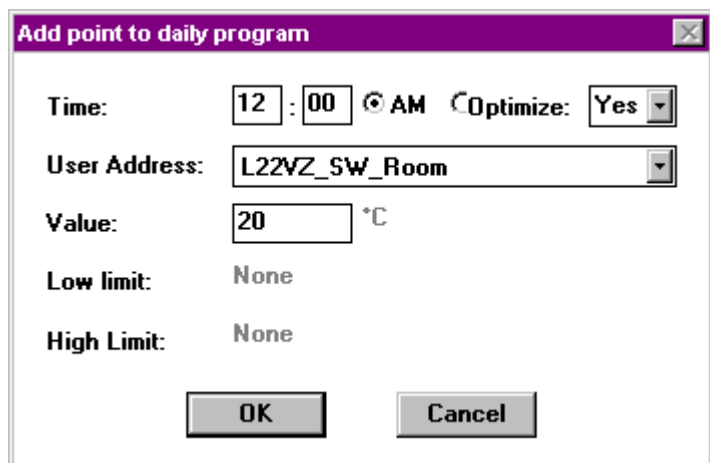


- 6. **Delete existing entries** by clicking the line you want to delete and then clicking **Delete**.

All command data in the Daily Program for the point is gone. The dialog box remains so you can continue adding, changing, and deleting other entries.

Create new entries by clicking **Add**.

RESULT: The Add point to daily program dialog box displays.



- e. Select user address in the User Address dropdown list box and enter value in the Value field.
- f. Enter time in the Time field and select appropriate radio button AM or PM.
- g. For switching points select optimization or not by clicking the corresponding item in the dropdown list box Optimized.

Change existing entries by clicking **Edit**.

RESULT: The Edit point in daily program dialog box displays.

7. Type a time value, for example, 06:30. Time format can be in 12- or 24-hour format (Windows™ Control Panel setting). Hours and minutes must be two digits, not one. For example, 06, not 6. Time can only include hours and minutes (no seconds).

Press **Tab** to go to the User Address box. Click the down arrow to display the list of user addresses assign to this Time Program (see User Address function). Click desired address to select it.

Press **Tab** to go to the Value box. Type a status if the point is digital (for example, ON or OFF). Type a value if the point is analog (for example, 3).

The Low limit and High limit values display only for analog points. The characteristic for the point determines limits. If there is no characteristic, there are no limits.

8. Click **OK** to save your entries.
Or, **Cancel** to close the dialog box without saving.

RESULT: Software saves the entry. See Engineering Unit note.

The Edit Daily Program dialog box redisplay for entry and/or modification of other points and commands.

9. Click **OK** to save the new Daily Program with the currently displayed entries and close the dialog box.
Or, click **Cancel** to close the dialog box without saving the changes.

RESULT: The Daily Program dialog box redisplay.

Engineering Unit Default

If no engineering unit is assigned to the point, software assigns spaces and three decimal places to analog points and the strings "State text 0", "State text 1", etc, to digital points.

Weekly Program Function

Define Weekly Program

Modify Weekly Program

Purpose Assign and unassign Daily Programs to days of the week.

Every Time Program has one Weekly Program that specifies a Daily Program for each day of the week.

Software uses the Weekly Program to generate the annual program. The Annual Program is a repeat of the Weekly Programs for each week of the year.

Default Daily Program

If you do not assign a Daily Program to a weekday, the Time Program uses the Daily Program for the previous weekday. The default assignments display after you exit the Weekly program function and then reselect it.

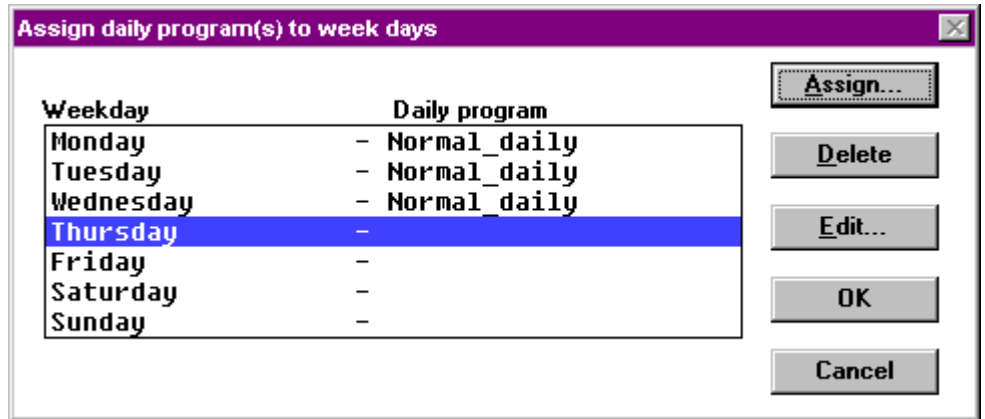
Procedure

1. Select desired Time Program (see Select a Time Program section for procedure).

RESULT: The secondary Time Programs window displays with the Weekly program menu item.

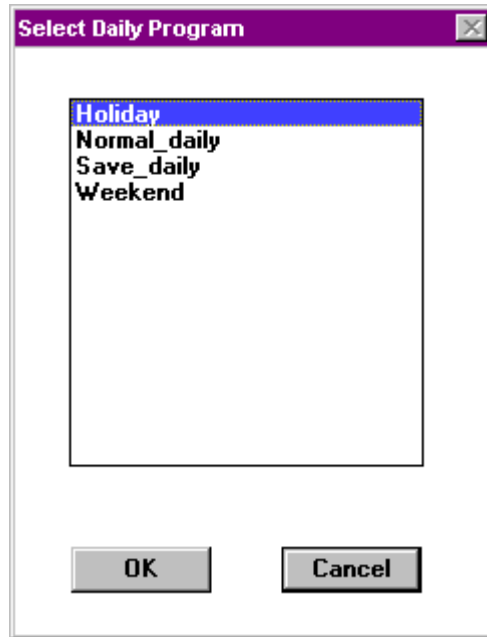
2. Click Weekly program.

RESULT: The Assign daily program(s) to weekdays dialog box displays. The existing daily programs assigned to the weekdays for the selected Time Program display in the list box. For a new Weekly Program, there are no daily program assignments.



3. To assign a Daily Program to a weekday , click Daily Program name, then click **Assign**. (Or, double-click Daily Program name.)

RESULT: The Select Daily Program dialog box displays. The existing daily programs for the Time Program display in the list box.



Click desired program name, then click **OK** to complete the selection. Click scroll bars and/or arrows to display other Daily Program names if the name you want is not in the list box. (Or, click **Cancel** to close the dialog box without selecting a program.)

RESULT: The dialog box closes and the Assign daily program(s) to weekdays dialog box redisplay. The new Daily Program assignment is in the list box.

4. To delete an assignment, click Weekday item in the list box. Then click **Delete**.

RESULT: Software unassigns the Daily Program. After you finish assigning Daily Programs and close the dialog box, software replaces all default assignments with the Daily Program for the previous day.

5. To make changes to a Daily Program without exiting this function and going to the Day function, click the desired Daily Program name in the list box and then click **Edit**.

RESULT: The Edit daily program dialog box displays. Modify Daily Program as desired. See Daily Program Function section for procedure. When you exit, the Assign daily program(s) to weekdays dialog box redisplay.

6. When through assigning Daily Programs, click **OK**.

RESULT: The dialog box closes and software assigns the last-assigned Daily Program to the weekdays that were not specified. For example:

Monday	Weekday
Tuesday	Holiday
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	

Software assigns "Holiday" to Wednesday through Sunday because Holiday was the last Daily Program assigned.

The Time Program window redisplay. To see what all the weekday assignments are, reselect the Weekly program function.

Holiday Program Function

Define Holiday Program

Modify Holiday Program

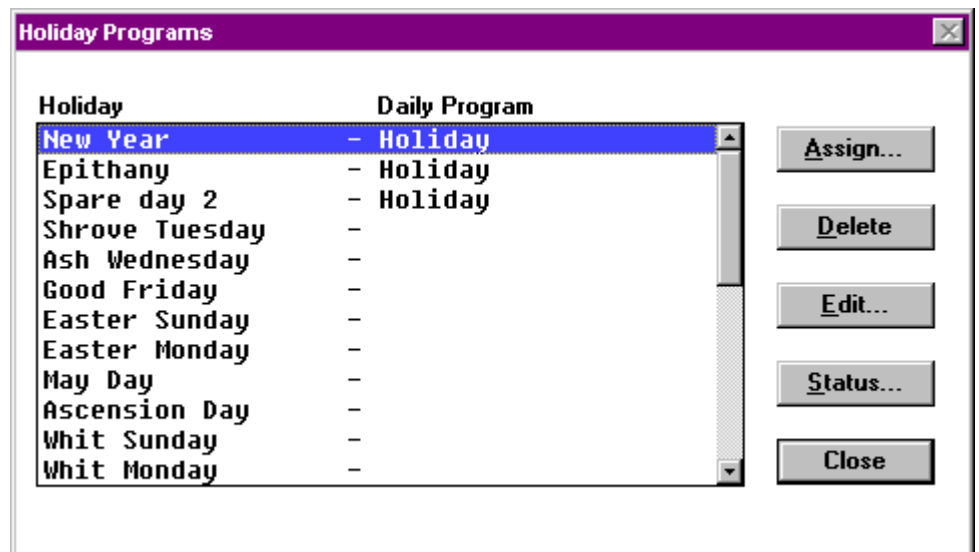
Inactivate Holiday Program

Purpose Assign and unassign Daily Programs to holidays such as Christmas and Easter. Since holidays usually do not require occupancy-type schedules, software uses Holiday Program assignments for holidays instead of the Weekly Program schedules. The daily program will then apply on a holiday every year.

NOTE: "Spare day" holidays are NOT available for programming specific holidays.

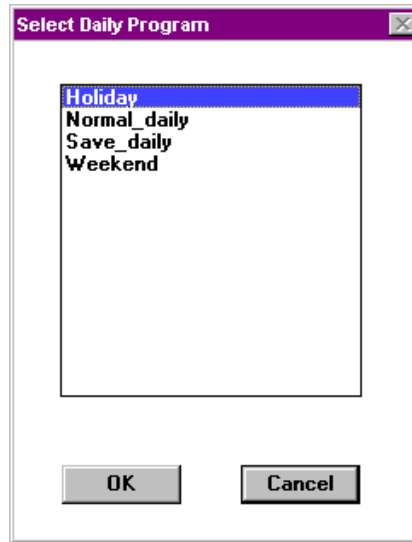
Default Daily Program If you do not assign a Daily Program to a holiday, the Weekly Program uses the Daily Program for that weekday.

- Procedure**
1. Select desired Time Program (see Select a Time Program section for procedure).
 RESULT: The secondary Time Programs window displays with the Week menu item.
 2. Click Holiday program.
 RESULT: The Holiday Programs dialog box displays. The existing daily programs assigned to the holidays for the selected Time Program display in the list box. If you do not assign a Daily Program to a holiday, the Weekly Program uses the Daily Program for that weekday.).



3. To assign a Daily Program to a holiday , click Daily Program name, then click **Assign**. (Or, double-click Daily Program name.)

RESULT: The Select Daily Program dialog box displays. The existing daily programs for the Time Program display in the list box.



Click desired program name, then click **OK** to complete the selection. Click scroll bars and/or arrows to display other Daily Program names if the name you want is not in the list box. (Or, click **Cancel** to close the dialog box without selecting a program.)

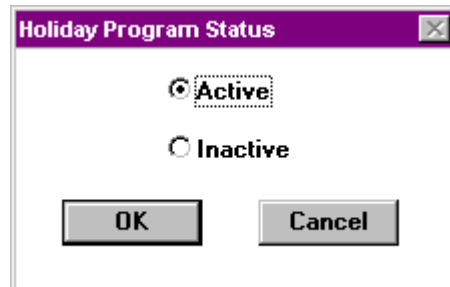
RESULT: The dialog box closes and the Holiday Programs dialog box redisplay. The new Daily Program assignment is in the list box.

4. To delete an assignment, click Holiday item in the list box. Then click **Delete**.

RESULT: Software unassigns the Daily Program.

5. To make the Holiday Program inactive for this Time Program, click **Status**.

RESULT: The Holiday Program Status dialog box displays.



The Active button enables the Holiday Program.

The Inactive button disables the Holiday Program so that this Time Program uses the Daily Programs as set up by the Weekly Program.

Click desired status button.

Then, click **OK** to save change and exit.

Or, click **Cancel** to exit without saving change.

6. To make changes to a Daily Program without exiting this function and going to the Daily program function, click the desired Daily Program name in the list box and then click **Edit**. (Or, double-click Daily Program name.)

RESULT: The Edit Daily Program dialog box displays. Modify Daily Program as desired. See Daily Program Function section for procedure. When you exit, the Holiday Programs dialog box redisplay.

7. When through assigning Daily Programs, click **Close**.

RESULT: The dialog box closes and the Time Program window redisplay.

Yearly Program Function

Define Yearly Program

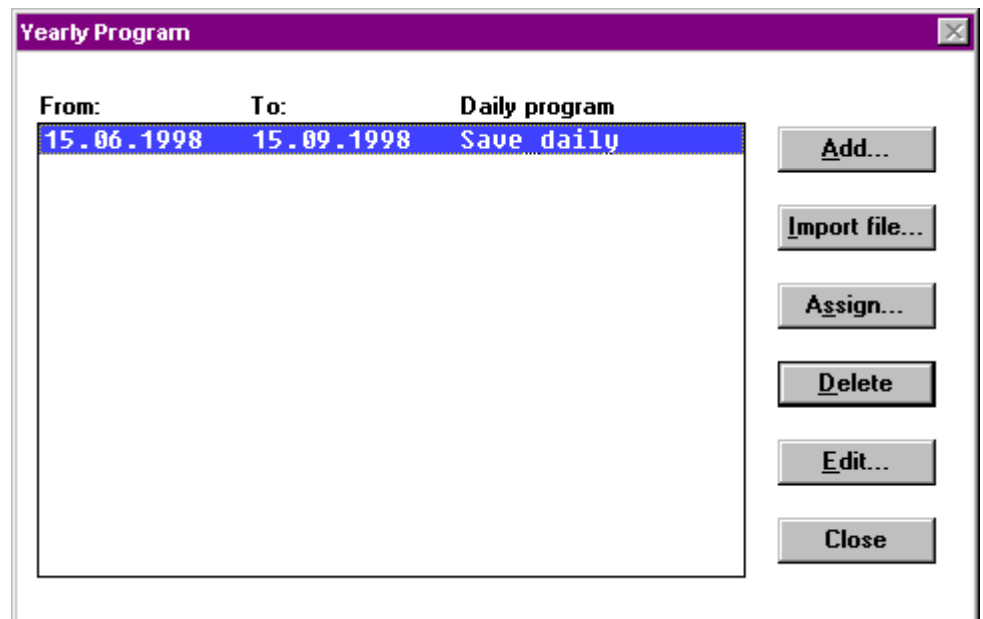
Modify Yearly Program

Delete Yearly Program

Import File

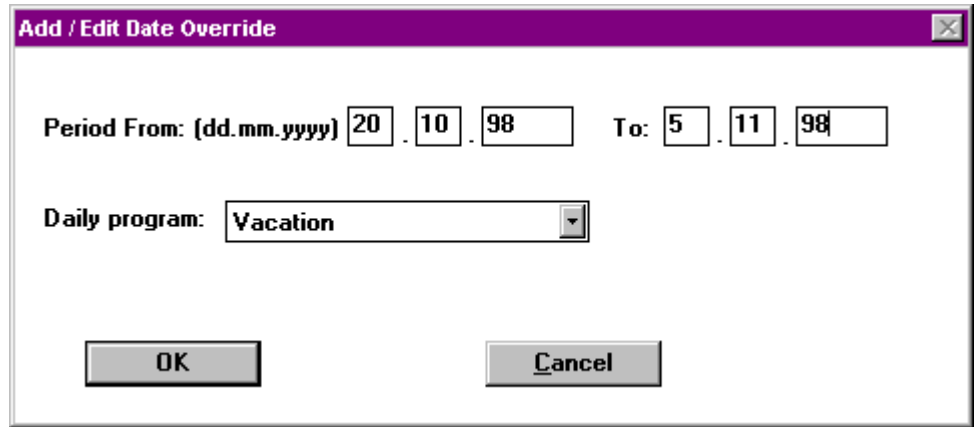
Purpose Define time periods with special daily programs. Yearly programs are suited to consider specific local conditions, for example, regional vacation and public /religious festivals. Yearly programs can be defined for more than one year. It is therefore not necessary to define a yearly program every new year as you have to do with the holiday program function. Yearly programs have higher priority than the weekly program, which is used to generate the annual program.

- Procedure**
1. Select desired Time Program (see Select a Time Program section for procedure).
 RESULT: The secondary Time Programs window displays with the Yearly Program menu item.
 2. Click Yearly program.
 RESULT: The Yearly Program dialog box displays. The existing yearly programs with their assigned daily program are summarized.



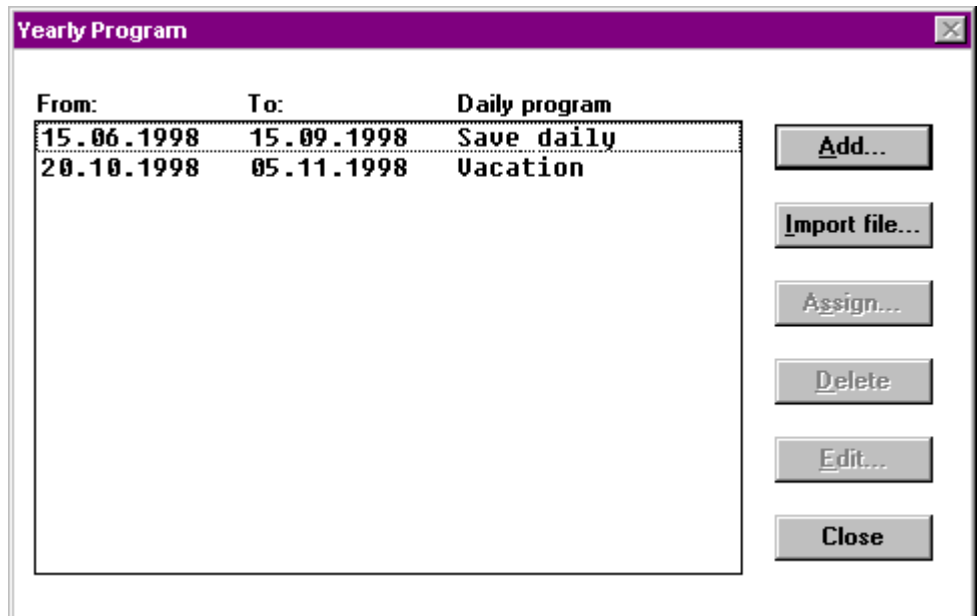
3. To define a new Yearly Program and assign a daily program to it, click **Add**.

RESULT: The Add/Edit Date Override dialog box displays.



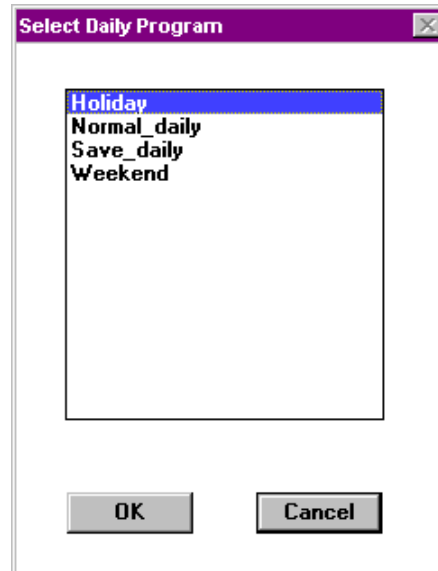
Enter the time range into the Period From and To fields. Select the desired daily program from the Daily program dropdown list box, then click **OK**.

RESULT: The dialog box closes and the Yearly Program dialog box redisplay. The new Yearly Program is in the list box.



3. To assign another Daily Program to an existing Yearly program, click Yearly Program name, then click **Assign**.

RESULT: The Select Daily Program dialog box displays. The existing daily programs for the Time Program display in the list box.



4. Click desired daily program and click OK.

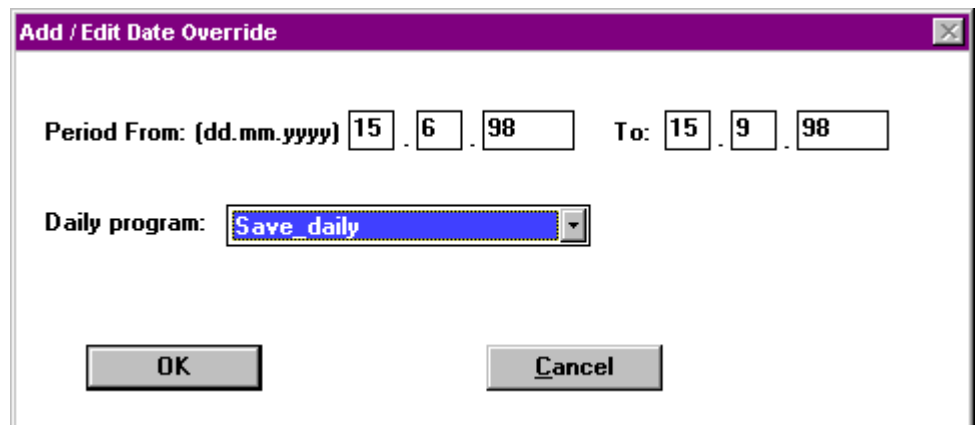
RESULT: Software assigns the selected Daily Program to the Yearly Program.

5. To delete an Yearly Program, click program item in the list box. Then click **Delete**.

RESULT: Software deletes the Yearly Program.

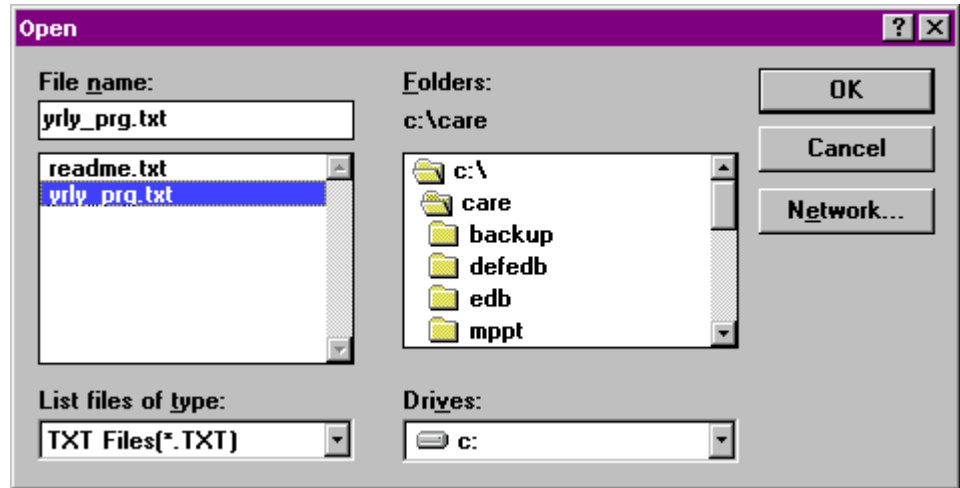
6. To make changes to a Yearly Program without exiting this function, click the desired Yearly Program in the list box and then click **Edit**.

RESULT: The Add / Edit Date Override dialog box displays. Modify the Yearly Program as desired.



Click OK to return to the Yearly Program dialog box.

7. To use yearly programs through a range of several years, click the Import file... button and open the predefined text file, for example, yrly_prgr.txt.



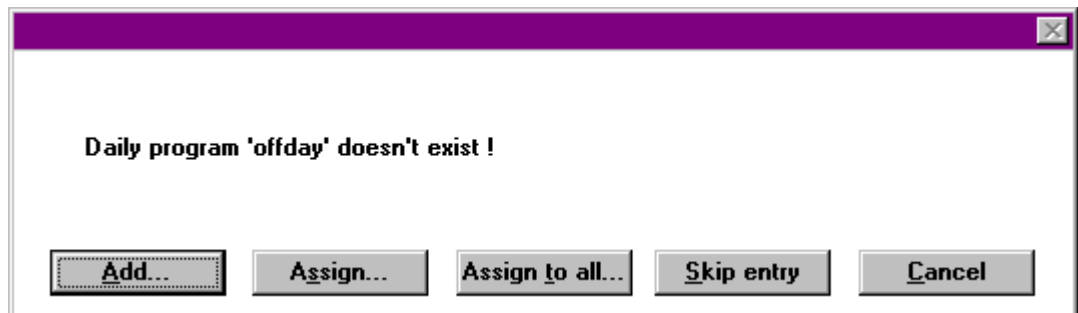
To define a text file for import see Imported File example at the end of this section.

After opening the *.txt file you will get the following message, if you have already defined yearly programs:



Click OK.

RESULT: If a daily program defined for a yearly program in the *.txt file does not still exist in the time program, the following message dialog box displays.



Clicking the Add... button opens the Daily Program dialog box to add the missing daily program to the time program. After adding the daily program you can assign this or a different, existing daily program to the yearly program defined in the txt.file.

Clicking the Assign... button opens the Select Daily Program dialog box to assign a daily program to the yearly program that corresponds to the daily program displayed in the message dialog box. Only daily programs other than the one displayed can be assigned to the corresponding yearly program because the daily program displayed is not yet added. Use Add... button to add the appropriate daily program.

Clicking the Assign to all... button opens the Select Daily Program dialog box to assign one daily program to all yearly programs defined in the *.txt file.

NOTE: The daily program is only assigned to yearly programs, which do not yet have daily programs, assigned to them.

Clicking the Skip entry button ignores the entry indicated with the daily program in the message dialog box and continues with the next entry.

Clicking the Cancel button returns to the Yearly Program dialog box. All the yearly programs will be inserted into the list to which daily programs were assigned (as defined in the txt.file or different ones).

8. When through defining Yearly Programs, click **OK**.

Imported File example

To define repeatedly yearly programs that may last over a period of several years, you create a txt.file with a text editor like Notepad. See the following description included in the text file example for creating yearly program entries.

```
*****
;
****
```

; YRLY_PRG.txt Example Definition File for Yearly Time Program

```
*****
;
****
```

```
; This txt file is an example import file for the yearly time program.
; Each date override entry with its fields from, to and daily program have to list in
one line.
; The fields are separated with spaces or tabs. The order is from, to, daily_program
name.
; Syntax: From_Date To_Date [Daily_Prog_Name]
; The daily program name is optional. If the daily program name is omitted or
; if the given name does not yet exist upon definition file import, the time program
editor
; asks for resolution of the conflict.
; The date format is dd/mm/[yyyy]
; If the year is omitted, the date override is repeated for the next 5 years.
; The timeframe for repetition of date overrides can be adjusted by changing the
"RepeatCounter" setting.
; A comment-line starts with ';'.
```

; Examples:

```
RepeatCounter=5
;The above line specifies that a date override is repeated for the next 5 years,
;in case the year is omitted in the data specification
```

```
19.5.1997 19.5.1997      offday
; the above line shows how to insert a date override on May/19th/1997 with daily
program offday
```

```
1.5          1.5          may1
; a date override on May, 1st. for the next five years with daily program may1
```

```
2.5.1997 6.5.1997holiday
; date override from May/2nd/1997 to May/6th/1997 with daily program holiday
```

```
7.2          11.2
; date override from Feb/7th to Feb/11th for the next five years,
; Import will ask for user interaction to assign/create daily program
```

Return Function**Exit Edit**

Purpose Save Time Program changes and exit the Time Program function.

Procedure 1. Click menu item Return.

RESULT: The Time Program editor window displays.

2. Click File, dropdown item Exit to close the Time Program Editor and return to the main CARE window.

Or, click File and one of the Print dropdown items to print selected Time Program(s). See the next section for procedures.

Print Time Programs

To print time programs see Print Documentation chapter.

TERMINAL ASSIGNMENT

The Terminal Assignment Function (TAF) is a graphical tool that can be used to display and modify existing controller target I/O hardware configurations.

The Terminal Assignment Function supports Excel 50, 80, 100, 500, 600, 800, Excel Smart, and Excel Web as well as Honeywell and 3rd party LON devices and allows:

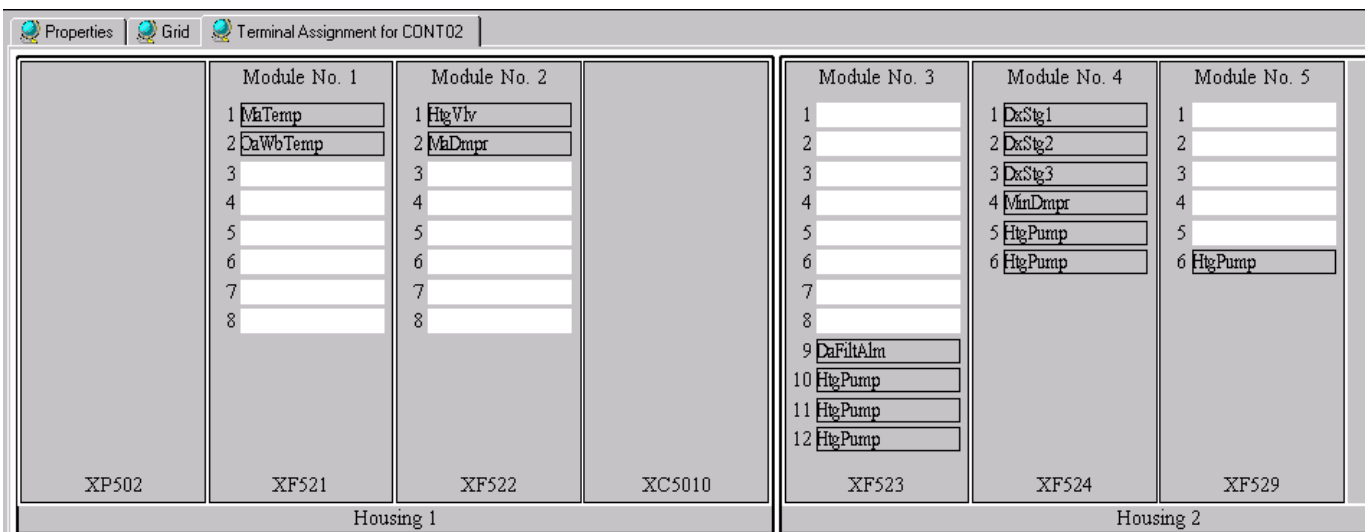
- Adding controller housings
- Inserting modules into housings
- Adding and connecting LON devices
- Copying LON devices
- Changing the position and the types of Excel 800/500/600 modules (for example, DO with switches by DO without switches)
- Setting/Changing neuron IDs of distributed I/O modules
- Assigning points to modules or shifting points between modules
- Mapping datapoints/NVs to NVs

Module types in Excel 50, 80, and Excel 100 controllers are fixed and, therefore, not changeable.

Invoke TAF

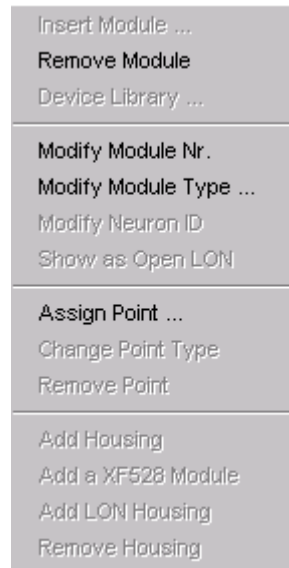
- Procedure**
1. In the logical plant tree, click on the controller
 2. On the right pane, click on the Terminal Assignment tab.

RESULT: The current terminal Assignment of the selected controller is displayed.



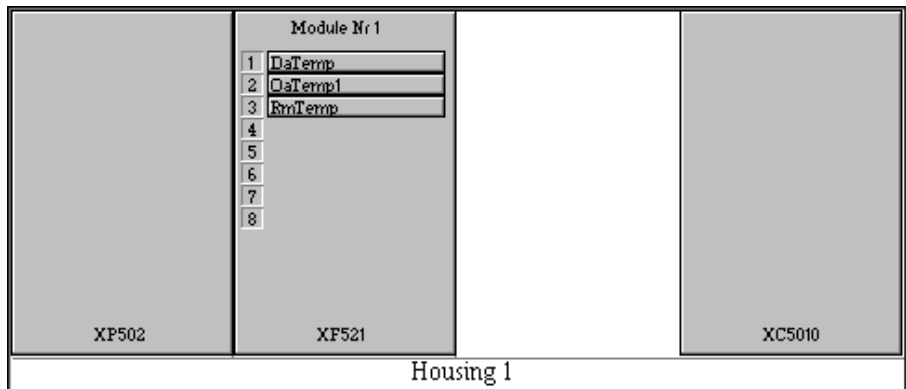
Using the Context Menu

The important functions you need for working within the TAF are quickly available via context menu, which is displayed by clicking the right mouse key at the appropriate position on the terminal assignment tab.



Working With Housings

A controller contains at least one housing, a basic housing with a power supply (PS), a central processing unit (CPU), and at least one module.



In order to take in further modules, the following housing types can be added to the existing basic housing:

- Standard housings for max. 4 IP modules (XF521 etc)
- LON housings for max. 10 DIO modules (XFL521 etc)
- XF528 housings for max. 5 high-density I/O modules (XF528)

A maximum of 16 modules (IP, DIO, and/or high density modules) can be inserted into the appropriate housings in total.

Housings can be removed as well. Before removing the housing, the existing modules of the housing to be removed have to be moved to another housing, otherwise the assigned points will automatically get boardless.

NOTE: The basic housing can never be removed.

Add Housing

- Purpose** Add housing. Each housing to be added is an empty housing, except the XF528 housing, and can take in the maximum module number of the corresponding module types.
- Procedure**
1. Click right mouse key on the terminal assignment tab, then click desired **Add** command in the context menu, or

click **Add Housing** button on the button bar, then click desired **Add** command in the context menu.
- RESULTS:
- Add Housing** adds a standard housing with 4 empty slots to insert up to 4 IP modules.
- Add a XF528 Module** adds a XF528 housing with one XF528 high-density module already inserted and 4 empty slots. Up to 4 further XF528 modules can be inserted.
- IMPORTANT**
An empty slot in a XF528 housing means that the corresponding DIP-switches of this module have to be switched off.
- Add LON Housing** adds a LON housing with 10 empty slots to insert up to 10 DIO modules.

Remove Housing

- Purpose** Remove housing. Both, empty as well as filled housings can be removed. When removing a filled housing, all points will get boardless.
- NOTE: When exiting TAF, all empty housings will be removed automatically.
- Procedure**
1. If you want to empty the housing before removing it, move any inserted modules to another housing.
 2. Position the cursor on the housing you want to remove, click right mouse key, then click **Remove Housing**, or

Click **Remove Housing** button on the button bar, then click the housing you want to remove. The housings are displayed with their names and numbers.
- RESULT: TAF removes the housing.
- For moving or removing modules, refer to Working With Modules section.

Working With Modules

Modules can be inserted in housings, moved in or between housings, or removed from housings. TAF supports standard modules like XF521, XF522, LON modules like XFL521, XF522, and the special XF528 module.

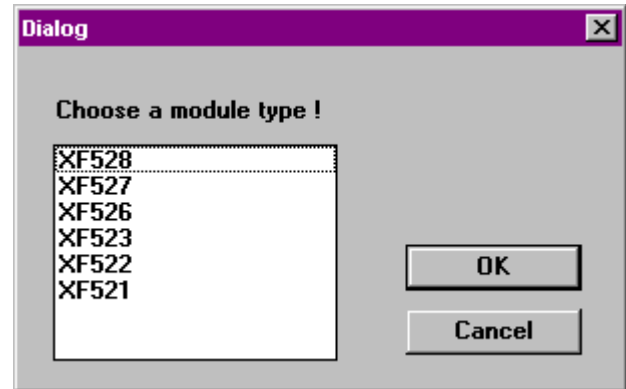
Insert Standard Module

- Purpose** Insert standard module. Standard modules are modules of the type XF521, XF522 etc. Standard modules can be inserted into empty slots of a standard and the basic housing.
- Procedure**
1. Click right mouse key in appropriate housing slot, then click **Insert Module** (highlighted).

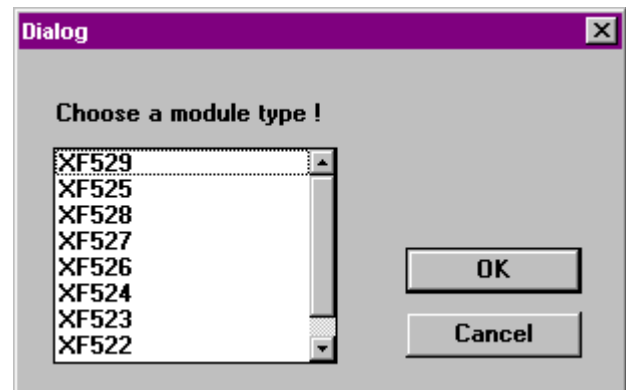
NOTE: The basic housing provides only two slots in which default modules can be inserted, because it always contains a power supply and a central processing unit.

RESULT: TAF displays a module type dialog box to select a valid module type for the currently selected slot. When inserting modules into basic housings, the dialog box displays different module types than when inserting modules into an empty standard housing.

Module type dialog box for basic housings:



Module type dialog box for standard housings:



2. Select appropriate module type and click **OK**.

RESULT: TAF inserts the selected module into the housing and assigns a module number to the inserted module automatically.

For changing module number, refer to Modify Module Number section.

For changing module type, refer to Modify Module Type section.

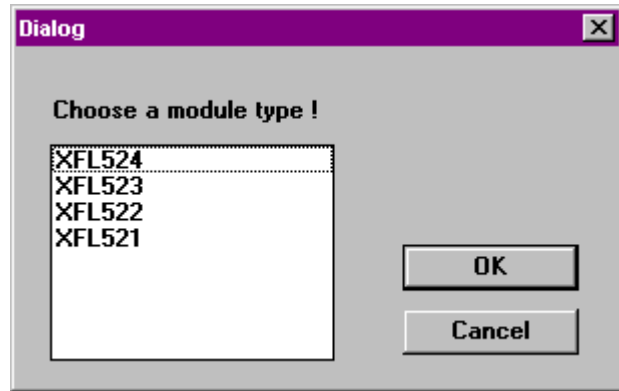
For assigning points to the inserted module, refer to Working with Points section.

Insert LON Module

Purpose Insert LON module into empty slots of a LON housing. LON modules are modules of the type XFL521, XFL522 etc.

Procedure 1. Click right mouse key in appropriate housing slot, then click **Insert Module** (highlighted).

RESULT: TAF displays a module type dialog box to select a valid module type for the currently selected slot.



2. Select appropriate module type and click **OK**.

RESULT: TAF inserts the selected module into the housing and assigns a module number to the inserted module automatically.

For changing module number, refer to Modify Module Number section.

For changing module type, refer to Modify Module Type section.

For assigning points to the inserted module, refer to Assign Point section.

Insert XF528 Module

- Purpose** Insert XF528 module. The XF528 module is a special module providing five modules of the type XF523 each in a single slot in the XF528 housing.
- Procedure**
1. Click right mouse key in appropriate housing slot, then click **Insert Module** (highlighted).
- RESULT:** TAF inserts a XF528 (XF523) module into the housing and assigns a module number to the inserted module automatically.
- For changing module number, refer to Modify Module Number section.
- For changing module type, refer to Modify Module Type section.
- For assigning points to the inserted module, refer to Assign Point section.

Modify Module Type

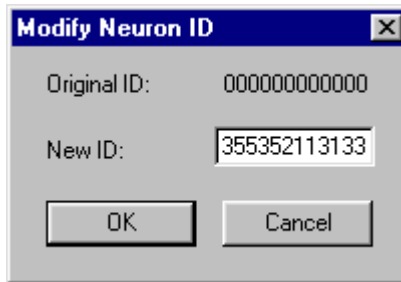
- Purpose** Modify module type. Standard and LON modules can be changed to modules of the same or different family.
- To change a module type to a module of the same family, in other words, Standard to Standard or LON to LON, the modules have to be free from points, except the XF521 module, which can be changed directly to the XF526 module even if there are points assigned to it.
- To change a module type to a module of a different family, in other words, Standard to LON or vice versa, the modules do not have to be free from points.
- Module type XF521 with assigned points can only be changed to module type XF526.
- Module type XF529 can be changed to module type XF524 if no pulsed point is assigned to it.
- For further information, refer to Combine Point and Module section.

Set/Modify Neuron ID for DIO Module

In a shared system architecture every distributed I/O module must have its unique twelve-digit neuron ID. The neuron ID is displayed at the bottom of the module. By default the neuron ID is set to 0, in other words, to a 12-digit number of 0. The neuron ID can be changed and will be kept even when changing the target I/O hardware from DIO to Standard I/O.

- Procedure**
1. Point on LON module, then click right mouse key.
 2. Click **Modify Neuron ID**.

RESULT: TAF displays the Modify Neuron ID dialog box.



3. In the New ID field, enter the desired neuron ID for the module, then click **OK**.

NOTE: The neuron ID must have twelve digits.

RESULT: TAF displays the modified Neuron ID at the bottom of the module.

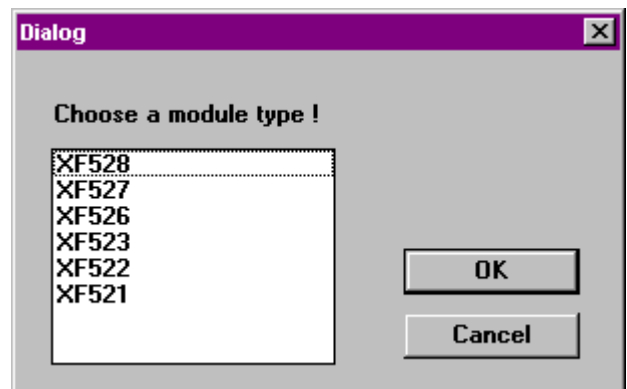
Modify Module Type to Same Family of Module

Purpose Modify standard module type to any other standard module type, e.g. XF522 to XF527 and modify LON module type to any other LON module type, e.g. XFL522 to XFL524.

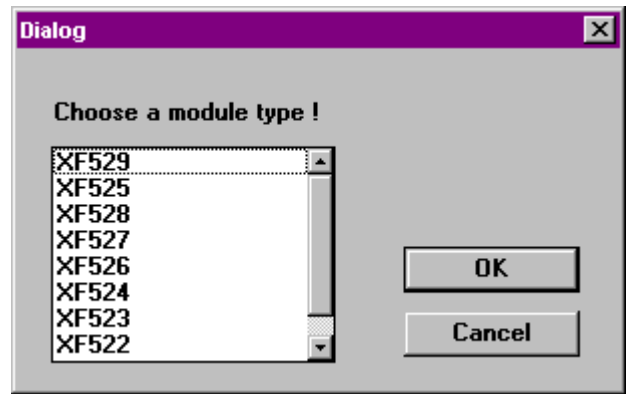
- Procedure**
1. Free module from points (see Move Point section; not necessary for XF521 and XF529 modules).
 2. Click right mouse key on the module to be modified, then click **Modify Module Type** (highlighted).

RESULT: TAF displays a module type dialog box showing all module types to which the selected module can be changed.

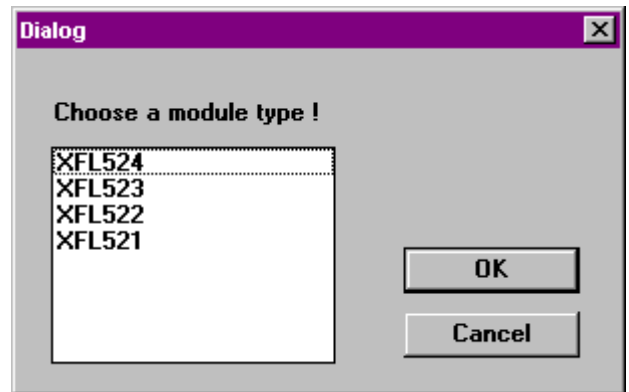
Module type dialog box for basic housings:



Module type dialog box for standard housings:



Module Type dialog box for LON housings:



3. Select the appropriate module type and click **OK**.

RESULT: TAF replaces the module type with the selected new module type.

After changing the module type, points have to be assigned to the module (refer to Assign Point section).

Modify Module Type to Different Family of Module

Purpose Modify standard module type to equivalent LON module type, e.g. XF522 to XFL522 or vice versa, by moving the module into a different housing type (standard housing and LON housing respectively).

The following list shows the movement possibilities:

Standard		XF528		LON
XF523	↔	XF528	↔	XFL523
XF521	↔	↔	↔	XFL521
XF522	↔	↔	↔	XFL522
XF523	↔	↔	↔	XFL523
XF524	↔	↔	↔	XFL524
XF526	→	→	→	XFL521
XF527	→	→	→	XFL522
XF529	→	→	→	XFL524

- Procedure**
1. Click left mouse key on the module (e.g. standard) to be modified, drag it to an empty slot of the different housing type (LON), and then drop it.

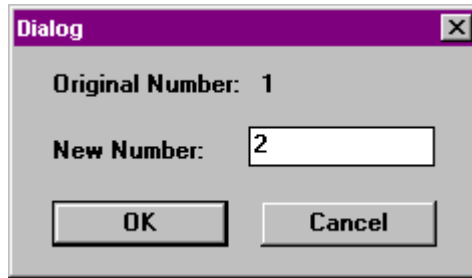
RESULT: TAF changes the module type and all points remain on their original terminations as far as possible. If modifying a module results in any invalid point assignments, the corresponding points will automatically get boardless as indicated in the logical plant tree.

Modify Module Number

Purpose Modify module number.

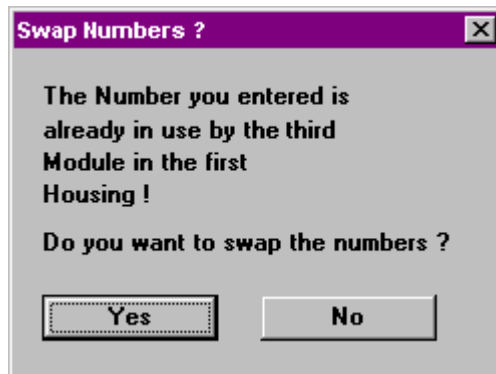
Procedure 1. Click right mouse key on the module for which the module number has to be modified, then click **Modify Module Type** (highlighted).

RESULT: TAF displays the module number dialog box to select the new module number.



2. Select appropriate module number and click **OK**.

RESULT: TAF modifies the module number of the selected module. If the module number already exists, TAF opens the Swap Numbers ? dialog box.



3. Select **YES** if numbers should be swapped, or select **NO** and choose another number not used before.

NOTE: TAF explains where the selected module number has been defined before to allow swapping of the numbers.

RESULT: TAF swaps the module numbers of the appropriate modules.

Move Module

Purpose Move a module from one slot of a housing to any other empty slot of the same or another housing by Drag&Drop.

You can move standard modules from their housings to LON housings or XF528 module housings, and vice versa.

The following list shows the movement possibilities:

Standard		XF528		LON
XF523	↔	XF528	↔	XFL523
XF521	↔	↔	↔	XFL521
XF522	↔	↔	↔	XFL522
XF523	↔	↔	↔	XFL523
XF524	↔	↔	↔	XFL524
XF526	→	→	→	XFL521
XF527	→	→	→	XFL522
XF529	→	→	→	XFL524

Moving modules between LON and standard housings results in the following:

TAF changes the module type and all points remain on their original terminations as far as possible. In case module modifying results in any invalid point assignment, the corresponding points will automatically get boardless as indicated in the logical plant tree.

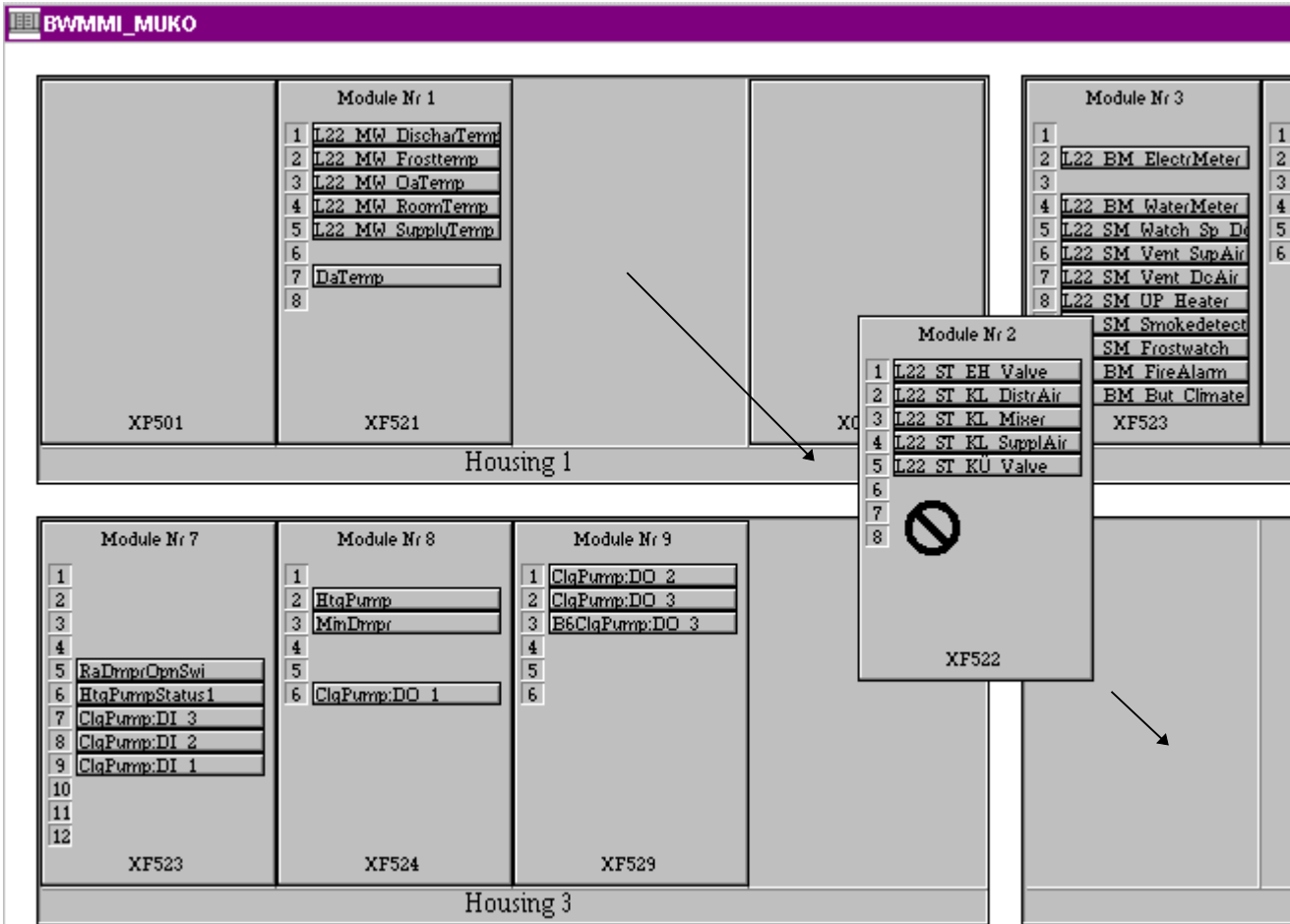
Procedure

1. Drag module by clicking and holding the left mouse key on the appropriate module. Drag the module to the target slot, then drop it by releasing the mouse key.

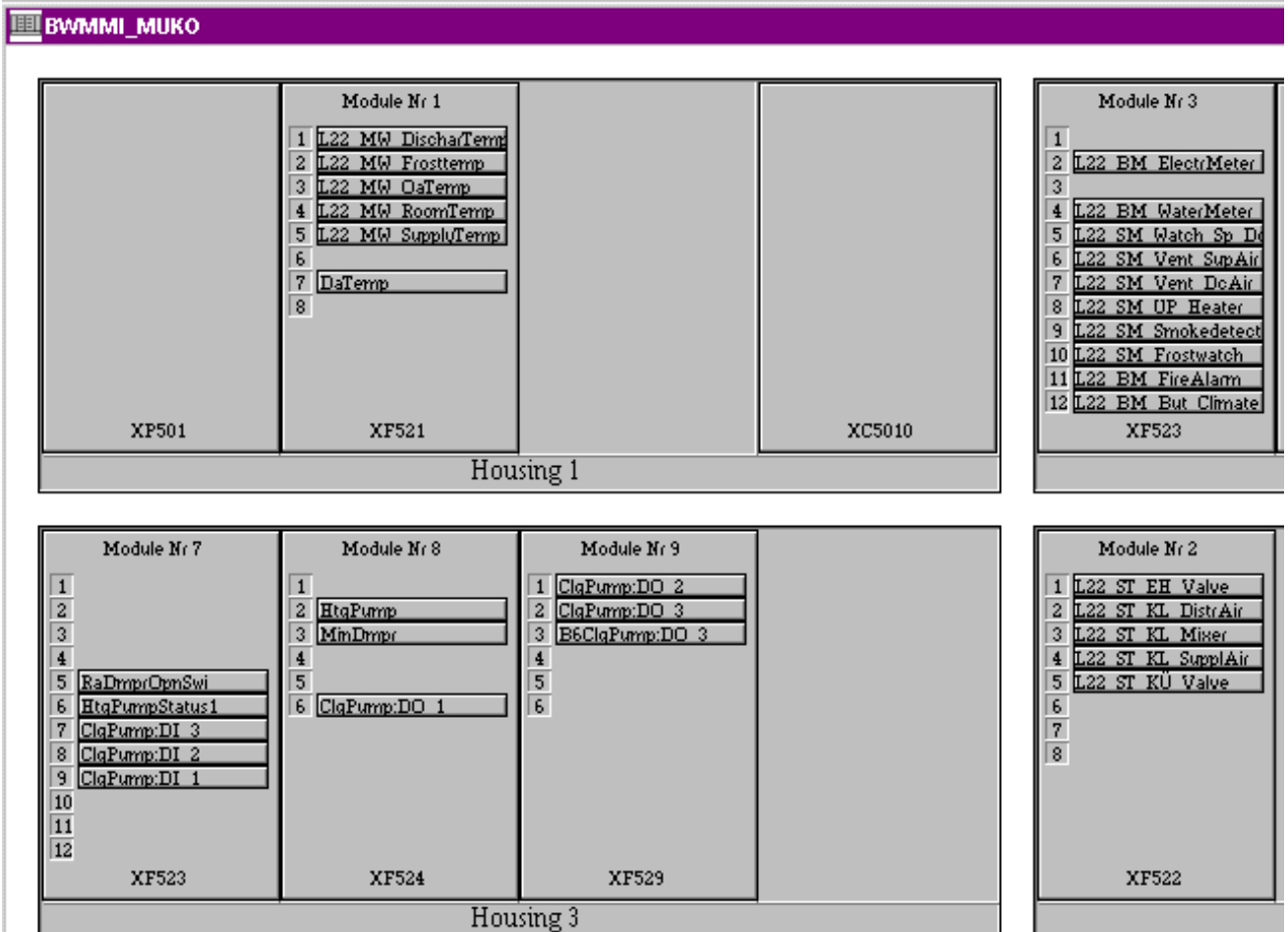


NOTE: A module cannot be inserted into an occupied slot or outside a housing.

The cursor will change to "Prohibited" to indicate that dropping is not possible.



RESULT: TAF inserts the selected module with its points in the target slot.



Remove Module

Purpose Remove module. When removing a module where datapoints are still assigned to, they will be removed.

The necessary re-assignment may be avoided by assigning the points to another module before removing the module.

Procedure 1. Click right mouse key on the module to be removed, then click **Remove Module** (highlighted).

RESULT: If points are still remaining on the module, they will be concurrently removed with the module and indicated in the logical plant tree as follows:

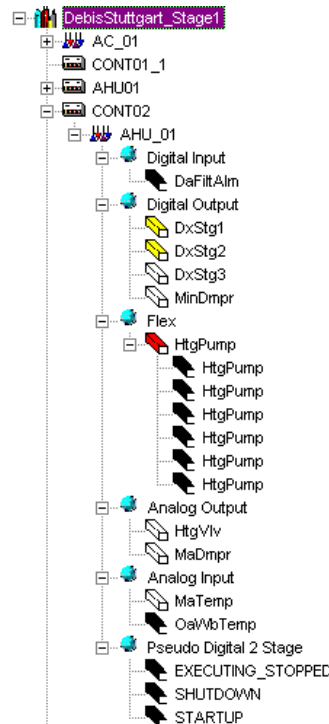
On board	black
Boardless	white
On board and mapped	yellow
Boardless and mapped	yellow
Boardless Flexpoint	red

Working With Points

Points can be assigned to modules, removed from modules, and shifted between modules or between terminals on the same module. In addition their types can be changed.

Depending on their status, points are displayed in different colors in the logical plant tree:

Point Display	Point status/type	Color
	On board	black
	Boardless	white
	On board and mapped	yellow
	Boardless and mapped	yellow
	On board, mapped and bound	green
	Boardless, mapped and bound	green
	Boardless Flexpoint	red



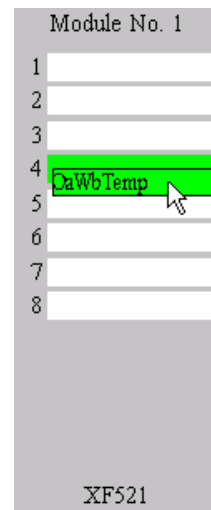
Assign Point to IP or DIO Module

Purpose Assign a point to a module. Points can be assigned manually from the logical plant tree to a module by Drag&Drop.

NOTE: Points of an XF528 module can be assigned to an XF523 module and vice versa. For combinations of points and modules, refer to Combine Point and Module section.

- Procedure**
1. In the logical plant tree, click on the datapoint you want to assign to a physical terminal.
 2. Drag it to the desired terminal.

RESULT: When moving the datapoint over the terminals, any terminal that matches to the datapoint is displayed in green. Non-matching terminals show the "Prohibited" symbol.



3. Drop the point at the desired terminal.

Assign Point/NV to LON device

Purpose The assignment of CARE points or NVs to a LON device is the basic procedure to connect LON devices with each other (see Connect CARE datapoints/NVs to NVs section).

Move Point

Purpose Move point.

Points can be moved from one terminal to another by using Drag&Drop.

- Points can be dragged and dropped on a free terminal on the same or another identical module.
- Points can be dragged and dropped on different module types, which results in setting of the corresponding subtypes.
- Points will automatically get boardless if the module is deleted by removing.

NOTE: A point cannot be moved to:

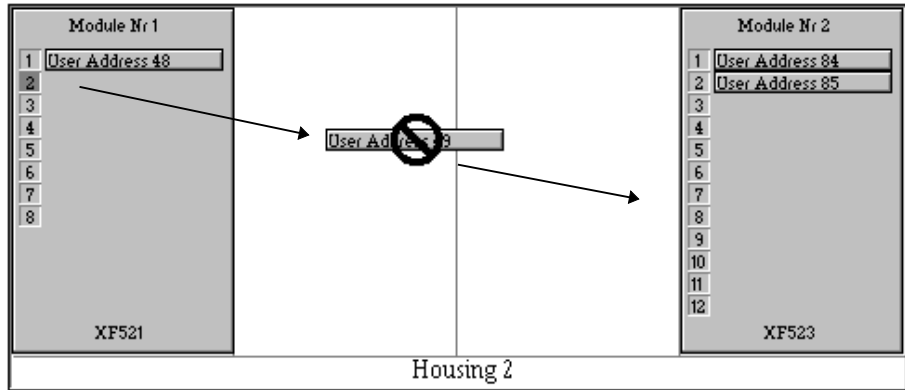
- An occupied terminal
- A free terminal on another module not the same family of type
- Another place in the module graphic
- Outside a housing

For combinations of points and modules, refer to Combine Point and Module section.

Procedure

1. Drag point by clicking and holding the left mouse key on the appropriate terminal. Drag the point to the free target terminal, then drop it by releasing the mouse key.

NOTE: A point can only be moved on a free module terminal. The cursor will change to "Prohibited" to indicate that dropping is not possible.



RESULT: TAF inserts the selected point on the target terminal, in this case terminal 7 on module 2. The original terminal number will be kept highlighted as long as no other point has been clicked.



Remove Point

Purpose

Remove point from module/LON device. The point will get boardless.

Procedure

1. Click on the point on the module.
2. Click right mouse key and with left mouse key, click on Remove Point in the context menu.

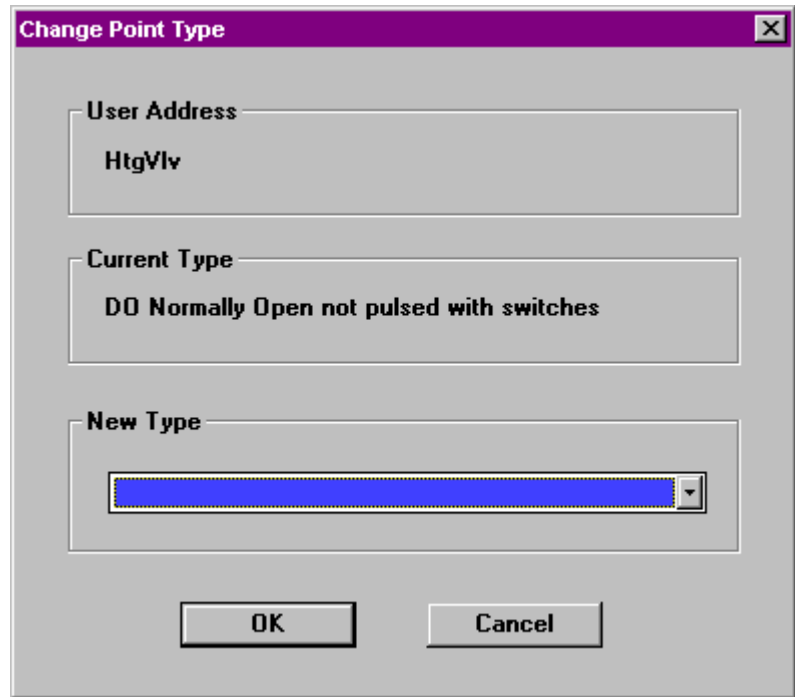
RESULT: The point is removed from the module and indicated in the logical plant tree as follows:

Point status/type	Color
On board	black
Boardless	white
On board and mapped	yellow
Boardless and mapped	yellow
On board, mapped and bound	green
Boardless, mapped and bound	green
Boardless Flexpoint	red

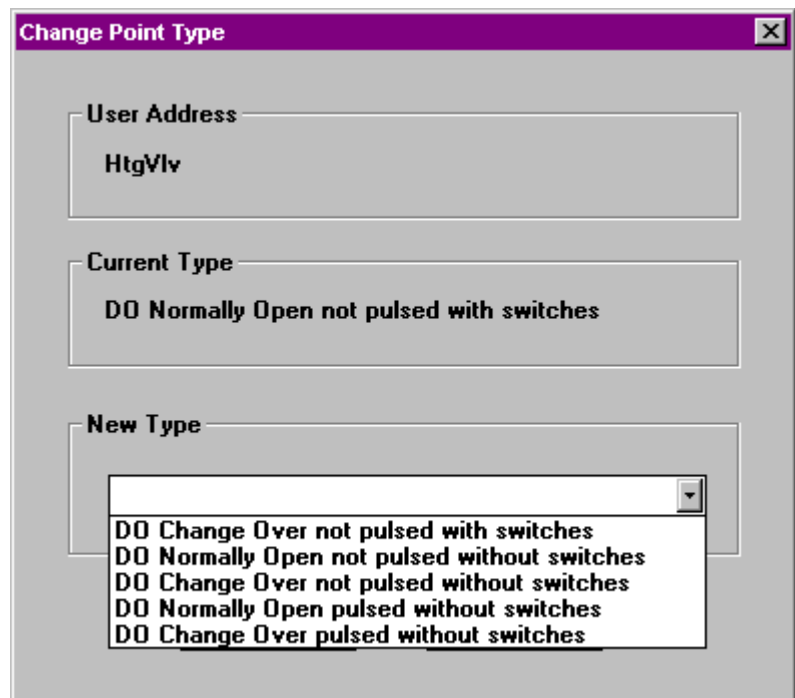
Display/Change Point Type

- Purpose** Display/Change point type of points placed in a module.
- Procedure**
1. Click right mouse key on a the point.
 2. If the point resides on a module, click **Change Point Type** (highlighted).

RESULT: TAF displays the Change Point Type dialog box of the appropriate point and the current point type is displayed.



3. To change point type, select the appropriate point type from the New Type drop-down list box.



4. Click **OK**.

RESULT: TAF assigns the point to the appropriate module terminal.

For combinations of points and modules, refer to Combine Point and Module section.

Combine Point and Module

Combinations between possible points and modules are listed in the following tables.

Modules of Excel 500/600 Controllers.

IP Modules	
XF521	Slow analog input card
XF526	Fast analog input card
XF522	Analog output card with switches
XF527	Analog output without switches
XF523	Lo digital input card
XF528	Hi digital input card
XF524	Digital output card with switches
XF529	Digital output without switches
XF525	Mot card (3 position)
DIO Modules	
XFL521	Slow analog input card
XFL522	Analog output card
XFL523	Digital input card
XFL524	Digital output card
Basic Modules	
XP501,XP502	Power supply cards
XC5010C, XCL5010, XC6010	CPU cards

Assigned Points of Excel 500/600 Controllers

Module Type	Point Type	Care Subtype	Point Module Type	Other Possible Subtypes	Other Possible Care Types	Valid Terminals
IP (normal bus modules)						
XF521	AI	AI_SLOW	-	-	-	1-8
Slow AI	DI_NC	-	-	-	DI_NO	1-8
	DI_NO	-	-	-	DI_NC	1-8
XF526	AI	AI_SLOW	-	AI_FAST	-	1-8
Fast AI		AI_FAST	-	AI_SLOW	-	1-8
	DI_NC	-	-	-	DI_NO	1-8
	DI_NO	-	-	-	DI_NC	1-8

Module Type	Point Type	Care Subtype	Point Module Type	Other Possible Subtypes	Other Possible Care Types	Valid Terminals
IP (normal bus modules)						
XF522 AO with switches	AO	-	W	-	MOT	1-5
		-	O	-	MOT	1-8
	CHANGE	PULSED	O	NOT_PULSED	-	1-8
		NOT_PULSED	W	-	-	1-5
			O	PULSED	-	1-8
	SWITCH	PULSED	O	NOT_PULSED	-	1-8
		NOT_PULSED	W	-	-	1-5
			O	PULSED	-	1-8
MOT	-	-	-	AO	1-8	
XF527 AO without switches	AO	-	O	-	MOT	1-8
	CHANGE	PULSED	O	NOT_PULSED	-	1-8
		NOT_PULSED	O	PULSED	-	1-8
	SWITCH	PULSED	O	NOT_PULSED	-	1-8
		NOT_PULSED	O	PULSED	-	1-8
	MOT	-	-	-	AO	1-8
XF523 DI	DI_NC	-	-	-	DI_NO	1-12
	DI_NO	-	-	-	DI_NC	1-12
	S_COUNT	-	-	-	-	1-12
	F_COUNT	-	-	-	-	1-2
XF528 DI high density	DI_NC	-	-	-	DI_NO	1-12
	DI_NO	-	-	-	DI_NC	1-12
	S_COUNT	-	-	-	-	1-12
	F_COUNT	-	-	-	-	1-2
XF524 DO with switches	CHANGE	NOT_PULSED	W	-	-	1-5
			O	-	-	1-5
	SWITCH	PULSED	O	-	-	6
			NOT_PULSED	W	-	1-6
			O	-	-	1-6
XF529 DO without switches	CHANGE	PULSED	O	PULSED	-	1-5
		NOT_PULSED	O	NOT_PULSED	-	1-5
	SWITCH	PULSED	O	NOT_PULSED	-	1-6
		NOT_PULSED	O	PULSED	-	1-6
XF525 3 Pos	MOT	-	-	-	-	1-3
		-				

Module Type	Point Type	Care Subtype	Point Module Type	Other Possible Subtypes	Other Possible Care Types	Valid Terminals		
DIO (LON bus modules)								
XFL521 AI	AI	AI_SLOW				1-8		
	DI_NC				DI_NO	1-8		
	DI_NO				DI_NC	1-8		
XFL522 AO with switches	AO		W		MOT	1-8		
			O		MOT	1-8		
	CHANGE	PULSED	O		NOT_PULSED	CHANGE	1-8	
					PULSED	SWITCH	1-8	
					NOT_PULSED	SWITCH	1-8	
			W		NOT_PULSED	SWITCH	1-8	
				O	PULSED	CHANGE	1-8	
					PULSED	SWITCH	1-8	
	SWITCH	PULSED	O		NOT_PULSED	SWITCH	1-8	
					PULSED	CHANGE	1-8	
					NOT_PULSED	CHANGE	1-8	
			W		NOT_PULSED	CHANGE	1-8	
				O	PULSED	SWITCH	1-8	
					PULSED	CHANGE	1-8	
	MOT					AO	1-8	
XFL523 DI low	DI_NC				DI_NO	1-12		
	DI_NO				DI_NC	1-12		
	S_COUNT				F_COUNT	1-12		
	F_COUNT				S_COUNT	1-12		
XFL524 DO with switches	CHANGE	NOT_PULSED	O	NOT_PULSED	CHANGE			
				PULSED	SWITCH			
	W			NOT_PULSED	SWITCH	1-6		
			O	PULSED	SWITCH	1-6		
				NOT_PULSED	SWITCH	1-6		
				PULSED	CHANGE	1-6		
			SWITCH	O		NOT_PULSED	CHANGE	1-6
						PULSED	CHANGE	1-6
					NOT_PULSED	SWITCH	1-6	
	W				NOT_PULSED	CHANGE	1-6	
				O	NOT_PULSED	CHANGE	1-6	
					PULSED	CHANGE	1-6	
			PULSED	SWITCH				

W: Point module type with switches
O: Point module type without switches

NOTE: Point Module Type can generally be changed from W to O and vice versa for all point types and CARE sub types that can have a module type, except for CARE sub type "PULSED"; this sub type can only be used together with module type "without switches".

Flexible subpoints will be treated like the corresponding digital outputs or inputs. However, for the outputs, only the combination "SWITCH/NOT_PULSED/without switches" is supported.

Unassigned Points of Excel 500/600 Controllers

Module Type	Point Type	CARE Subtype	Point Module Type	Other Possible Subtypes	Other Possible CARE Types	Terminals	Other Module Type
Unassign.	AI	AI_SLOW	-	AI_FAST	-	n/a	n/a
AI		AI_FAST	-	AI_SLOW	-	n/a	n/a
Unassign.	AO	-	W	-	AO	n/a	O
AO		-	O		AO	n/a	W
		-	W		MOT	n/a	n/a
		-	O		MOT	n/a	n/a
Unassign.	MOT	-	-	-	AO	n/a	O
3 Pos							
Unassign. DI	DI_NC	-	-	-	DI_NO	n/a	n/a
	DI_NO	-	-	-	DI_NC	n/a	n/a
	S_COUNT	-	-	-	F_COUNT	n/a	n/a
	F_COUNT	-	-	-	S_COUNT	n/a	n/a
Unassign. DO	CHANGE	PULSED	O	PULSED	SWITCH	n/a	O
		PULSED	O	NOT_PULSED	CHANGE	n/a	O
		PULSED	O	NOT_PULSED	CHANGE	n/a	W
		PULSED	O	NOT_PULSED	SWITCH	n/a	O
		PULSED	O	NOT_PULSED	SWITCH	n/a	W
		NOT_PULSED	O	NOT_PULSED	SWITCH	n/a	O
		NOT_PULSED	O	NOT_PULSED	CHANGE	n/a	W
		NOT_PULSED	O	NOT_PULSED	SWITCH	n/a	W
		NOT_PULSED	O	PULSED	CHANGE	n/a	O
		NOT_PULSED	O	PULSED	SWITCH	n/a	O
		NOT_PULSED	W	NOT_PULSED	SWITCH	n/a	W
		NOT_PULSED	W	NOT_PULSED	CHANGE	n/a	O
		NOT_PULSED	W	NOT_PULSED	SWITCH	n/a	O
		NOT_PULSED	W	PULSED	CHANGE	n/a	O
	NOT_PULSED	W	PULSED	SWITCH	n/a	O	
	SWITCH	PULSED	O	PULSED	CHANGE	n/a	O
		PULSED	O	NOT_PULSED	SWITCH	n/a	O
		PULSED	O	NOT_PULSED	SWITCH	n/a	W
		PULSED	O	NOT_PULSED	CHANGE	n/a	O
		PULSED	O	NOT_PULSED	CHANGE	n/a	W
		NOT_PULSED	O	NOT_PULSED	CHANGE	n/a	O
		NOT_PULSED	O	NOT_PULSED	SWITCH	n/a	W
		NOT_PULSED	O	NOT_PULSED	CHANGE	n/a	W
		NOT_PULSED	O	PULSED	SWITCH	n/a	O
NOT_PULSED		O	PULSED	CHANGE	n/a	O	
Unassign. DO	SWITCH	NOT_PULSED	W	NOT_PULSED	CHANGE	n/a	W
		NOT_PULSED	W	NOT_PULSED	SWITCH	n/a	O
		NOT_PULSED	W	NOT_PULSED	CHANGE	n/a	O
		NOT_PULSED	W	PULSED	SWITCH	n/a	O
		NOT_PULSED	W	PULSED	CHANGE	n/a	O

W: Point module type with switches
 O: Point module type without switches

NOTE: Point Module Type can generally be changed from W to O and vice versa for all point types and CARE sub types that can have a module type, except for CARE sub type "PULSED"; this sub type can only be used together with module type "without switches".

Flexible subpoints will be treated like the corresponding digital outputs or inputs. However, for the outputs, only the combination "SWITCH/NOT_PULSED/without switches" is supported.

Points of Excel 80/100 Controllers

Module Type	Point Type	Valid Terminals	Differences for XL80 Controllers
Module One (AI)	AI Slow	1-8	-
	DI Normally Closed	1-8	
	DI Normally Open	1-8	
Module Two (AI)	AI Slow	1-4	-
	DI Normally Closed	1-4	
	DI Normally Open	1-4	
Module Three (DI)	DI Normally Closed	1-12	Module does not exist in XL80 controllers
	DI Normally Open	1-12	
	Totalizer Slow	1-12	
	Totalizer Fast	1-2	
Module Four (AO)	AO Continuous	1-8	-
	DO Change Over, pulsed Without Switches	1-8	
	DO Change Over, not pulsed Without Switches	1-8	
	DO Normally Open, pulsed Without Switches	1-8	
	DO Normally Open, not pulsed Without Switches	1-8	
	AO 3 Pos	1-8	
Module Five (AO)	AO Continuous	1-4	-
	DO Change Over, pulsed Without Switches	1-4	
	DO Change Over, not pulsed Without Switches	1-4	
	DO Normally Open, pulsed Without Switches	1-4	
	DO Normally Open, not pulsed Without Switches	1-4	
	AO 3 Pos	1-4	

Flexible points of the types Multistage and Pulse2 and the DO subpoints of DO_FEEDBACK_DI flexpoints are handled like normal points of the following type:

"DO Normally Open, not pulsed Without Switches"

The DI subpoints of DO_FEEDBACK_DI flexpoints can have the following types and are handled like normal points of the same type:

"DI, Normally Open"
 "DO, Normally Closed"

Working With LON Devices

In addition to the physical assignment of CARE datapoints to IP or distributed I/O modules, the logical assignment of LON devices will be performed on the terminal assignment tab.

Configure Display

Purpose To configure the display of LON devices on the terminal assignment tab.

The display configuration can be varied by the following concurrently applicable means:

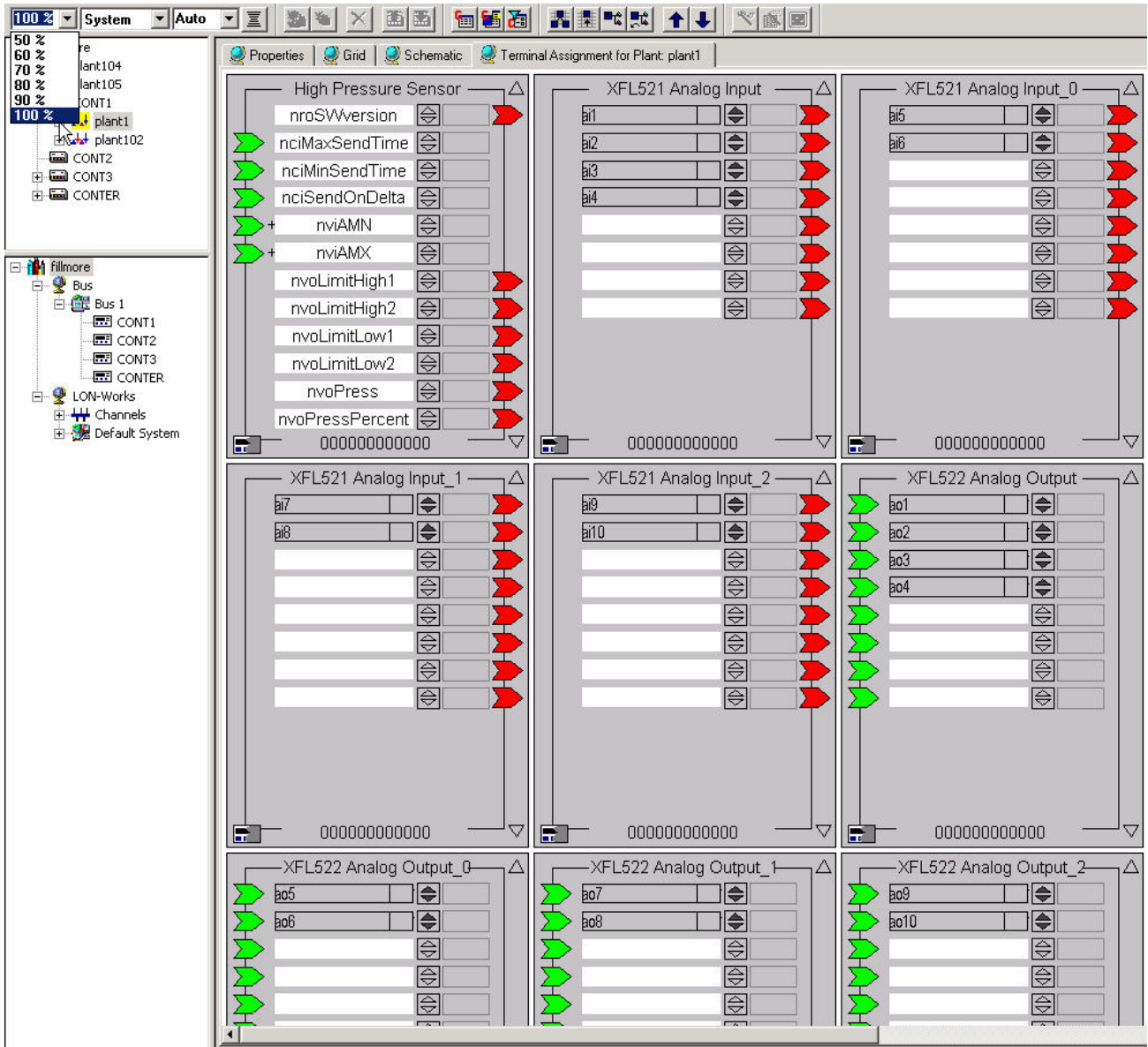
- Zoom, to reduce or enlarge the display with a magnification between 50 and 100 percent
- Column configuration to define the number of devices per row
- Sort order of devices by name, channel and system

NOTE: Zoom also applies to the variable display of LON housings with DIO modules.

Procedures

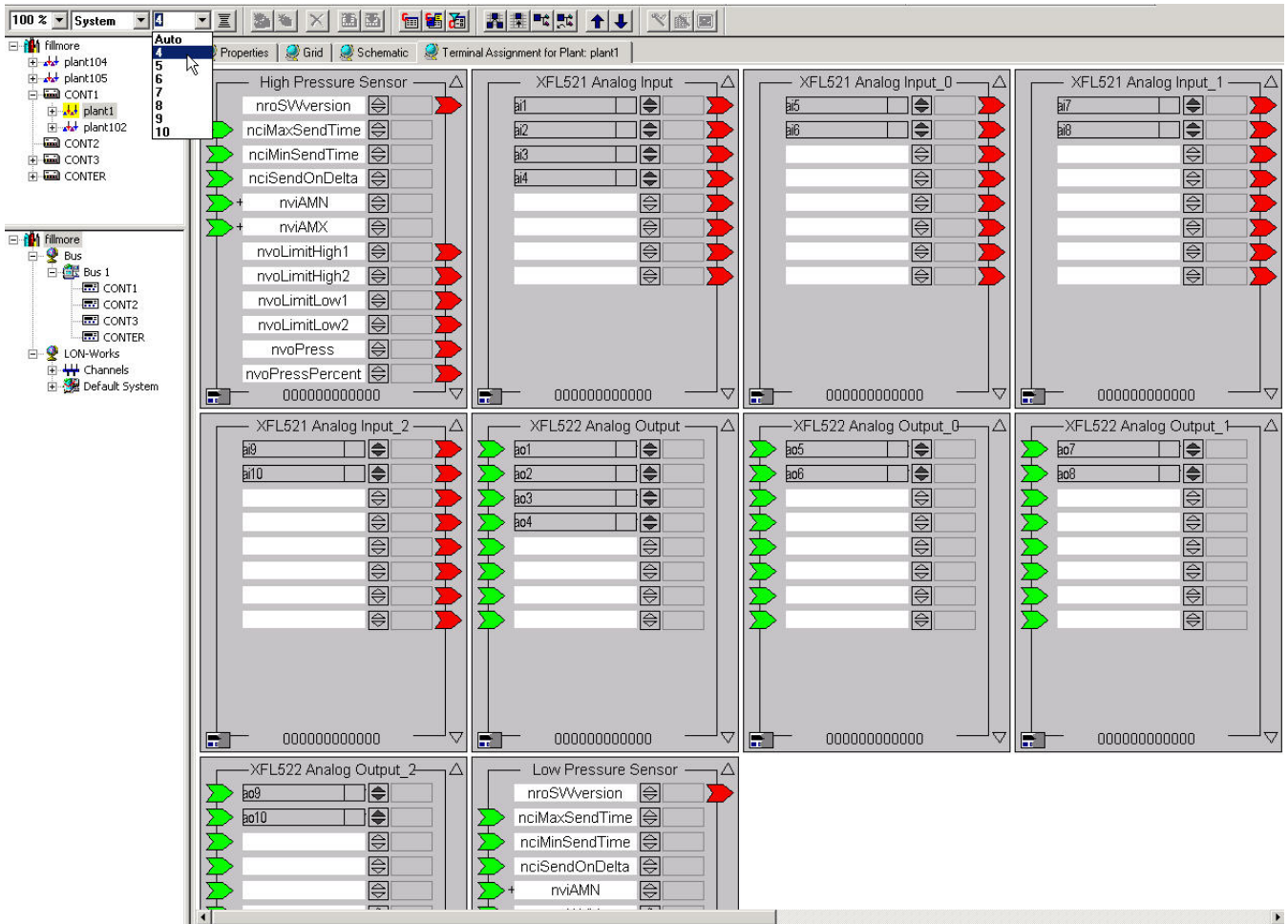
1. To determine the zoom, select the magnification from the Zoom drop-down listbox in the toolbar. When the magnification once has been selected in the drop-down listbox you can use the mouse wheel for continuously adjusting the magnification.

RESULT: The devices will be displayed according to the selected magnification and to the configured number of columns. In case Auto has been selected for the column configuration, CARE optimizes the column number so that no device will be cut vertically from display. You might scroll vertically to view further devices. In case a certain number of columns (4 to 10 by default, a user-defined number can be entered) has been selected, CARE always displays the devices in that defined column number independent from the magnification.



2. To determine the column number, select the number from the Column Number drop-down listbox in the toolbar. When the column number once has been selected in the drop-down listbox you can use the mouse wheel for continuously selecting the column number.

RESULT: The devices will be displayed according to the selected column number and magnification. In case Auto has been selected for the column configuration, CARE optimizes the column number so that no device will be cut vertically from display. In case a certain number of columns (4 to 10) has been selected, CARE always displays the devices in that defined column number independent from the magnification.



- To determine the sort order, select desired option from the Sort Order drop-down listbox in the toolbar:

Name

All bound devices of the controller will be sorted by name

Channel

All bound devices of the controller will be sorted by their channel assignment.

System

All bound devices of the controller will be sorted by their system assignment

When the sort order once has been selected in the drop-down listbox you can use the mouse-wheel for continuously changing the sort order.

RESULT: The devices will be displayed according to the selected sort order option whereas the magnification and the column configuration applies concurrently.

LON device is concurrently added to three locations s concurrently

AL ASSIGNMENT FUNCTION

CARE

The devices are sorted by System as follows;

Default System Subsystem_A

Logical Assignment of LON devices

For the logical assignment of LON devices, please refer to the Assign LON devices (Binding) section.

FILE MANAGEMENT

Chapter Contents This chapter includes the following procedures.

Back Up Functions

CARE Database (including projects, plants and device library)
Projects (including plants)

Restore Functions

CARE Database (including plants and device library)
Projects (including plants)

Import/Export Functions

Import/Export the Element Library (CARE XL-5000 only)

Import Controller Files (to copy operator changes made to controller files, CARE XL-5000 only)

Export Graphic Files (Schematic, Control Strategy, Switching Logic, CARE XL-5000 only).
For graphic files export, please refer to the DOCUMENTATION chapter.

Controller Upload/Download

For controller upload/download information, please refer to the ONLINE SERVICE AND COMMISSIONING chapter.

Backups / Restores The CARE database contains files that pertain to all projects and plants as well as files that pertain to individual projects and plants.

When you back up the CARE database, software copies all necessary files for current projects and plants in CARE and creates a single file named CARExxxx.DB where xxx is a sequencing number to allow more than one database backup to exist in a directory.

When you back up a project, software copies all the files relevant to just that project and creates a backup file with an extension of .PJT.

NOTE: It is recommended to backup the database, or at least the project after any CARE session to avoid the loss of work.

For backups and restores in CARE the following files can be purposefully included/excluded from the backup and restore process

- Pic files (segment graphics in the plant schematics)
- Default files
- Controller files
- XFMs
- Element library

By default the files necessary for the respective backup will be included. By default all files which were backed up will be automatically included in the respective restore.

Restoring old Backups When backing up databases, projects, or plants in CARE versions lower than 3.01.00, the above-mentioned files were not backed up automatically.

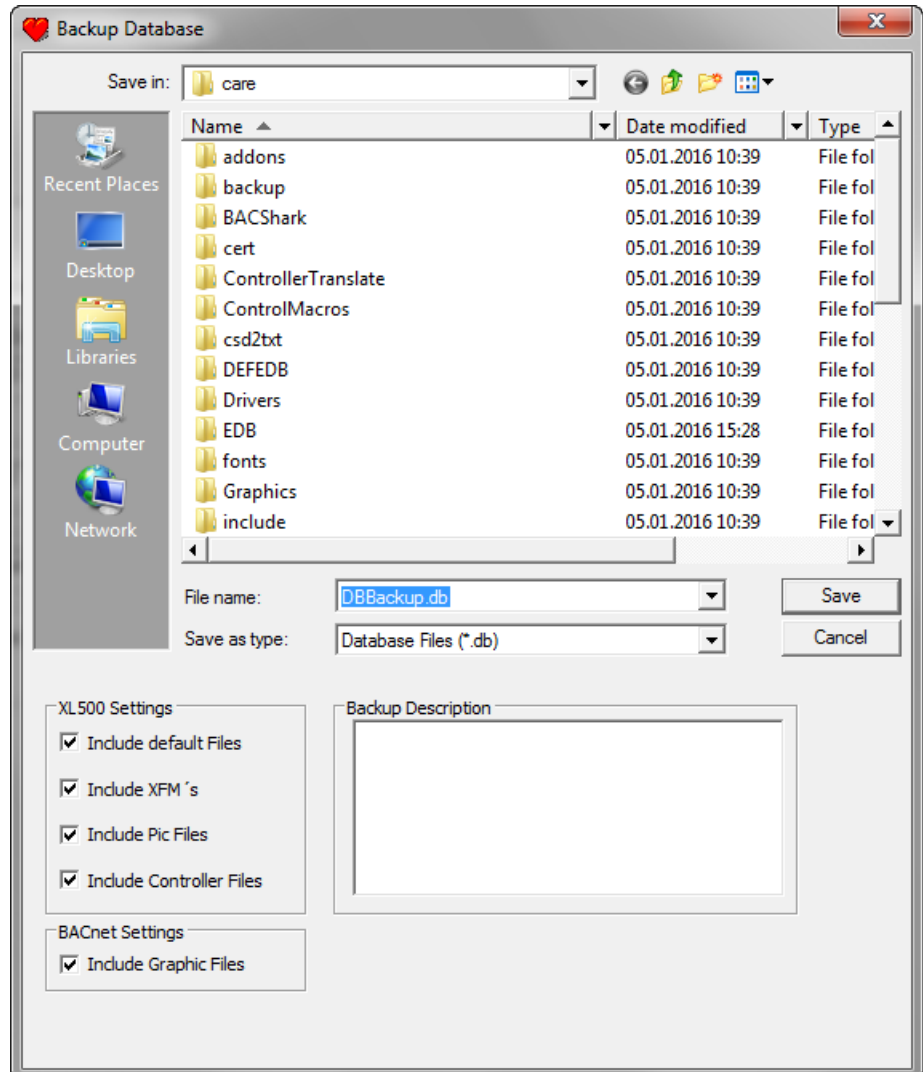
If any of these files are missing or different to the corresponding files of CARE 3.01.00 it may become necessary to copy it separately into the respective folders under the CARE directory to complete the restore process and get the desired results.

Back Up the CARE Database

Purpose Copy CARE database files in case they are needed to replace corrupted database files. When you back up the CARE database, software copies all necessary files for current projects and plants in CARE and creates a single file named CARExxxx.DB where xxxx is a sequencing number to allow more than one database backup to exist in a directory.

Procedure 1. Click menu item Database, then drop-down item Backup.

RESULT: The Backup Database dialog box displays. The target folder displayed in **Save in** is the folder that will receive the copies of the files. The target folder can be defined as default in the *Global Options* dialog, see “Set Global CARE Options” section.



2. In **Save in**, select a different drive and/or folder if desired. If you want to save the files in subfolders that may be displayed in the list, double-click the desired subfolder.

3. In **File Name**, enter the name for the backup file.

4. Under **XL500 Settings**, all those files are checked which have been pre-defined for inclusion in the *Global Options* dialog (see “Set Global CARE Options” section). If desired, uncheck files you want to be excluded from the database backup.

NOTE: It is recommended to include all files.

5. Under **BACnet Settings**, the *Include Graphic Files* option is checked which saves all graphic files in the database backup. If desired, uncheck this option if you want graphic files to be excluded from the database backup.
6. Under **Backup Description**, enter additional information about the database you want to backup, if desired.
7. Click **OK** to initiate backup.

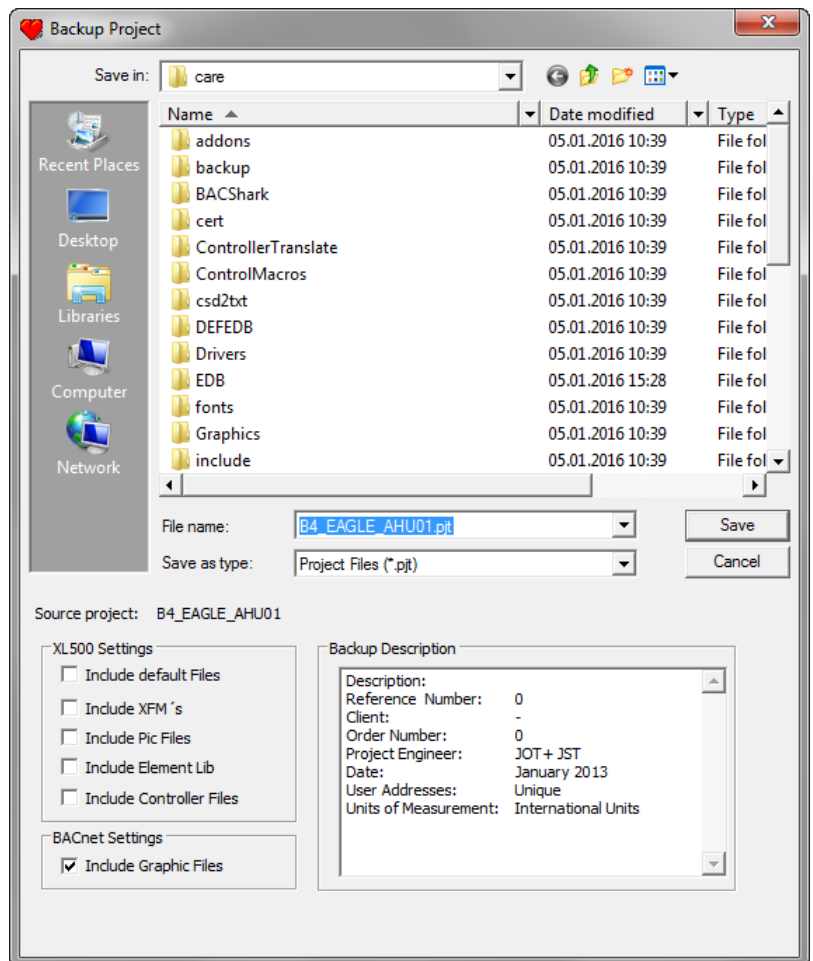
RESULT: A Backup window displays with percentage (or number of records) completed as well as an **Abort** button in case you want to stop the process. When the backup is complete, the message box disappears and the main CARE window redisplay.

Back Up a Project

Purpose Copy project files to a backup directory or diskette. Keeping a "good" copy of project files is useful if the project is changed incorrectly or if the files become corrupt. Use the Restore a Project procedure to retrieve these files when required.

- Procedure**
1. Click menu item Project, then drop-down item Backup.

RESULT: The Backup Project dialog box displays. The name of the currently selected project is shown under **Source project** in the middle left area. The target folder displayed in **Save in** is the folder that will receive the copies of the files. The target folder can be defined as default in the *Global Options* dialog, see "Set Global CARE Options" section.



2. In **Save in**, select a different drive and/or folder if desired. If you want to save the files in subfolders that may be displayed in the list, double-click the desired subfolder.
3. In **File Name**, enter the name for the backup file.
4. Under **XL500 Settings**, all those files are checked which have been pre-defined for inclusion in the *Global Options* dialog (see "Set Global CARE Options" section). If desired, uncheck files you want to be excluded from the database backup.

NOTE: It is recommended to include all files.

5. Under **BACnet Settings**, the *Include Graphic Files* option is checked which saves all graphic files in the database backup. If desired, uncheck this option if you want graphic files to be excluded from the database backup.
6. Under **Backup Description**, enter additional information about the project you want to backup, if desired.
7. Click **OK** to initiate backup.

RESULT: A Backup window displays with percentage (or number of records) completed as well as an **Abort** button in case you want to stop the process. When the backup is complete, the message box disappears and the main CARE window redisplay.

Naming Convention

Backup software uses the project name to create a file name with the first five characters of the project name, a sequencing number, and an extension of PJT. Examples:

Project Name	Backup File Name
STD1	STD1001.PJT
HONEYWELL	HONEY003.PJT

Each time you back up a project, software increments the numbers in the file name, for example, the first backup for the STD1 project is STD1001.PJT; the next backup is STD1002.PJT; the next, STD1003.PJT, etc. Each file is a different version of the same project.

Restore the CARE Database

Purpose	Replace CARE database files with the backup copies made with the Back Up the CARE Database procedure.
Restoring old Backups	<p>If you restore a CARE database that was backed up with CARE software prior to Version 1.4.1, CARE first does a complete database backup before the restore operation is attempted. This action is done so that in case of a restore failure or user abort, the database can be restored to its state before the restore was attempted.</p> <p>If there is a restore failure or user abort, restore software initiates a new restore from the automatic backup. A message displays that a restore of the backup file is occurring.</p> <p>If there is a catastrophic failure (PC is turned off or an application generates a General Protection Fault error and only Windows™ or DOS is active), the restore will not have time to retrieve the backup. In that case, restart CARE and first do a restore of the backup since the CARE database may be corrupt. To restore the backup, use the standard restore procedure described in this section and navigate to the CARE\TEMP directory. That directory holds the automatic backup that restore originally did.</p> <p>Restores of backups done with software Version 1.4.1. or later are also protected but with a different, more efficient mechanism.</p>

When backing up databases in CARE versions lower than 3.01.00, the following files were not backed up automatically:

- Element library
- Pic files (segment graphics in the plant schematics)
- Default files
- Controller files
- XFMs

If any of these files are missing or different to the corresponding files of the CARE version 3.01.00 or higher it may become necessary to copy it separately into the respective folders under the CARE directory to complete the restore process and get the desired results.

Directories

Pic files	<drive:>\care\pic
Default files	<drive:>\care\pcbstd
Xfms	<drive:>\care\xfm\original
Controller files	<drive:>\care\<project name>
Element library	If the import of an element library of previous version is necessary it must be done via the Import Element library menu item. Please refer to the Import Element Library section.

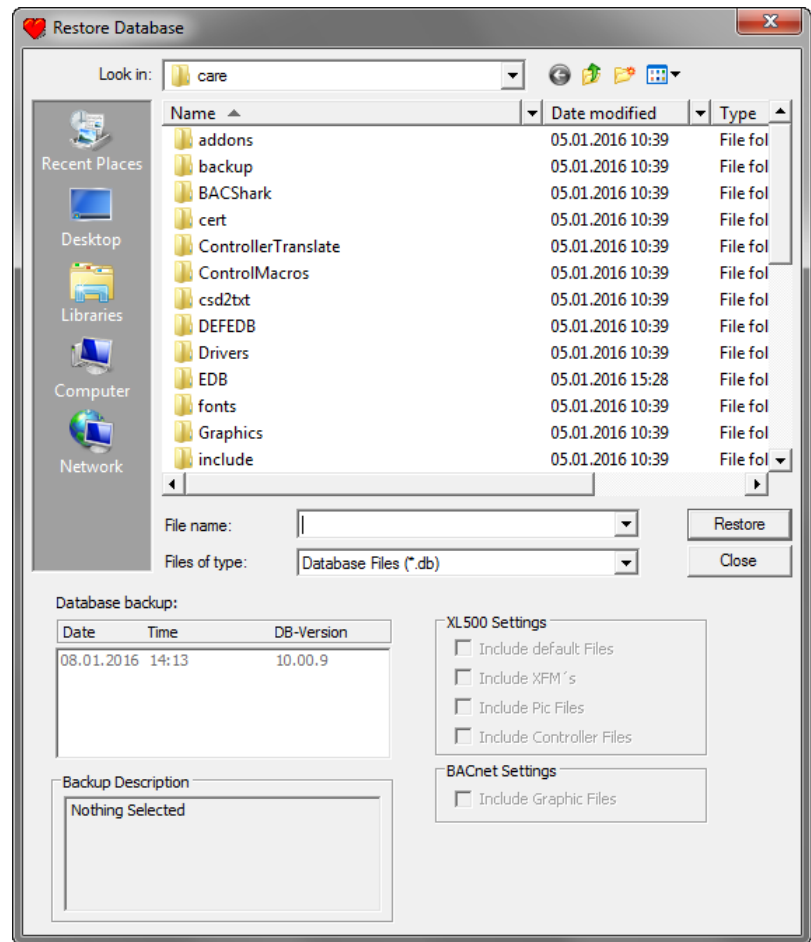
Restoring CARE Backups of Ver. 3.01.00 and higher

Since CARE Ver. 3.01.00 it is up to you to include/exclude certain files such as the element library, pic files (segment graphics in the plant schematics), default files, XFMs, and controller files for the backup process. Any file that was backed up will be automatically restored unless you exclude it.

Procedure

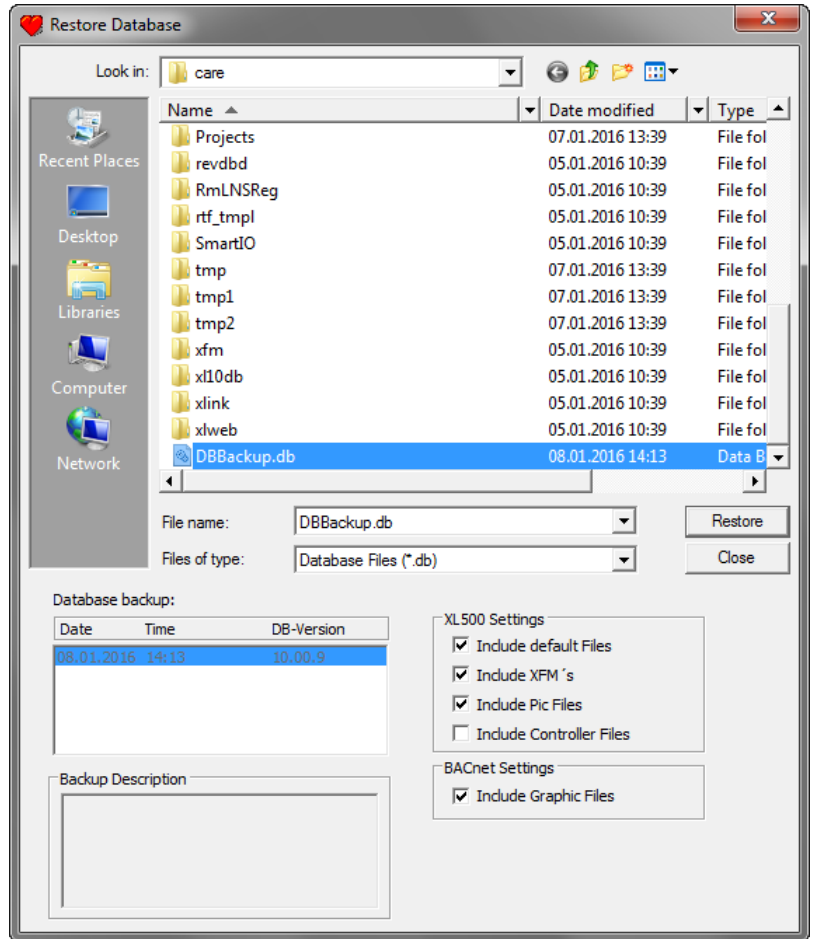
1. Click menu item Database, then drop-down item Restore.

RESULT: The *Restore Database* dialog box displays with the default source folder as defined in the *Global Options* dialog, see "Set Global CARE Options" section. The default folder as defined in the *Global Options* dialog should contain the backup files.



2. If the database backup file is in another folder, open the folder by using the **Find in** field and selecting a different drive and/or main folder if desired. If the database backup file is in a subfolder displayed in the list, double-click the desired subfolder.

RESULT: Under *Database backup*, all available *.DB* files are shown with date, time, and DB-Version.



- Click the date, time, and version line of the backup that you want to copy.
- Under **XL500 Settings**, all those files are checked which have been pre-defined for inclusion in the *Global Options* dialog (see "Set Global CARE Options" section). If desired, uncheck files you want to be excluded from the database restore.

NOTE: It is recommended to include all files.

- Under **BACnet Settings**, the *Include Graphic Files* option is checked which restores all graphic files included in the database. If desired, uncheck this option if you want graphic files to be excluded from the database restore.
- Click **OK** to initiate backup.

NOTE: It is recommended to include all files.

- Click **OK** to initiate restore.

RESULT: A Restore window displays with percentage (or number of records) completed as well as an **Abort** button. The Abort button is gray (disabled) because once the database restore begins, no recovery to the original database contents is possible (unless the original database was backed up before the restore was attempted).

When the restore is complete, the message box disappears and the main CARE window redisplay.

Delete Button You can also delete a backup file by selecting it and clicking the **Delete** button.

Delete Button You can also delete a backup file by selecting it and clicking the **Delete** button.

Restore a Project

Purpose Retrieve a copy of a project to place it in the PC. This procedure is useful if the PC files are corrupt or if changes were made that need to be erased.

Cannot Replace Current Project Files

Software does not restore a project to a directory if there are already project files with the same name in the directory. Either delete the project that already exists or, to get another copy of that project, change the name of the Target project in the Restore Project dialog box (see Procedure).

Restoring old Backups

If you restore a project that was backed up with CARE software prior to Version 1.4.1, CARE first does a complete database backup before the restore operation is attempted. This action is done so that in case of a restore failure or user abort, the database can be restored to its state before the restore was attempted.

If there is a restore failure or user abort, restore software initiates a new restore from the automatic backup. A message displays that a restore of the backup file is occurring.

If there is a catastrophic failure (PC is turned off or an application generates a General Protection Fault error and only Windows™ or DOS is active), the restore will not have time to retrieve the backup. In that case, restart CARE and first do a restore of the backup since the CARE database may be corrupt. To restore the backup, use the standard restore procedure described in this section and navigate to the CARE\TEMP directory. That directory holds the automatic backup that restore originally did.

Restores of backups done with software Version 1.4.1. or later are also protected but with a different, more efficient mechanism.

When backing up projects in CARE versions lower than 3.01.00, the following files were not backed up automatically:

- Element library
- Pic files (segment graphics in the plant schematics)
- Default files
- Controller files
- XFMs

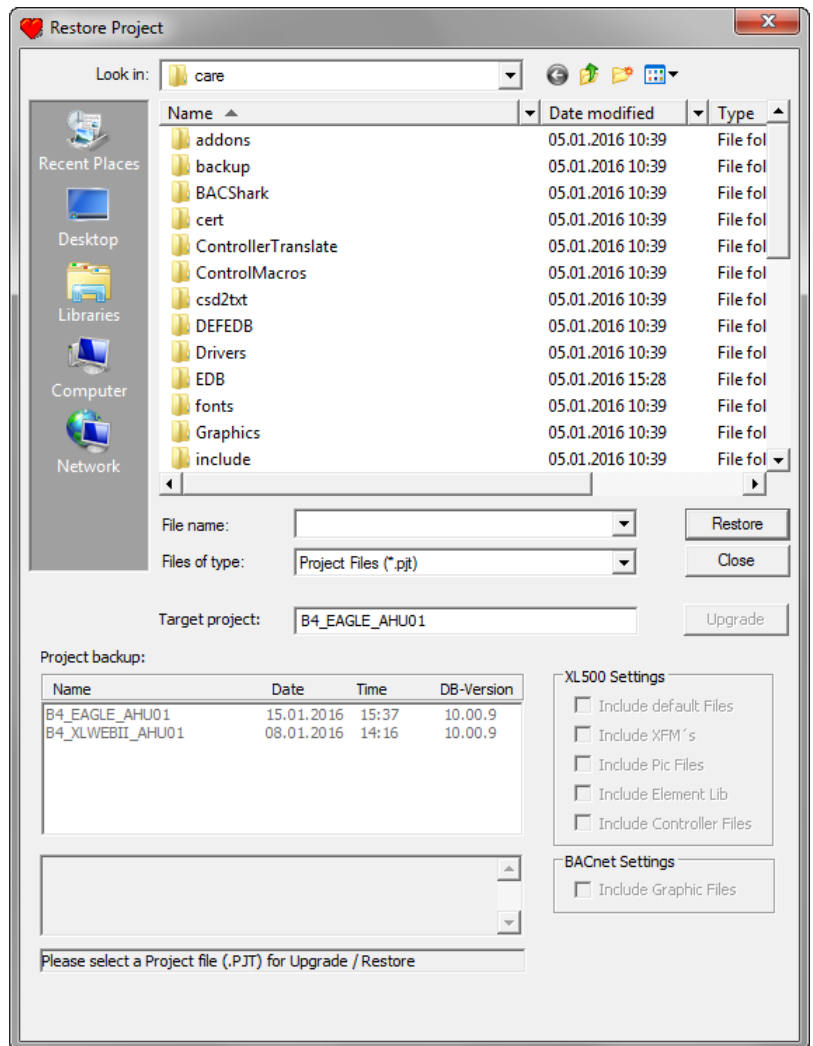
If any of these files are missing or different to the corresponding files of CARE version 3.01.00 or higher it may become necessary to copy it separately into the respective folders under the CARE directory to complete the restore process and get the desired results.

Directories

Pic files	<drive:>\care\pic
Default files	<drive:>\care\pcbstd
Xfms	<drive:>\care\xfm\original
Controller files	<drive:>\care\<project name>
Element library	If the import of an element library of previous version is necessary it must be done via the Import Element library menu

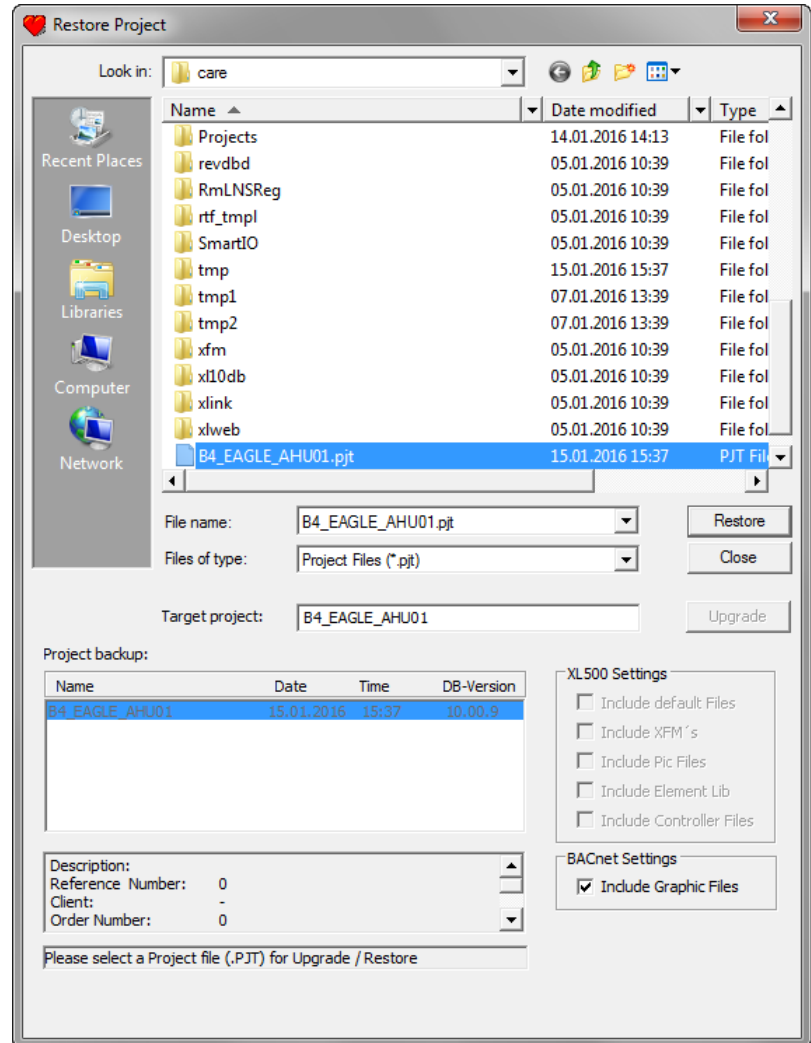
Procedure 1. Click menu item Project, then drop-down item Restore.

RESULT: The *Restore Project* dialog box displays with the default source folder as defined in the *Global Options* dialog, see “Set Global CARE Options” section. The default folder as defined in the *Global Options* dialog should contain the backup files.



- If the project backup file is in another folder, open the folder by using the **Find in** field and selecting a different drive and/or main folder if desired. If the project backup file is in a subfolder displayed in the list, double-click the desired subfolder.

RESULT: Under *Project backup*, all available *.PJT* files are shown with name, date, time, and DB-Version.



3. Click name of project that you wish to use as source.

RESULT: Software writes the name in **Target project**.

4. To change the name of the resulting project, type a new name in **Target project**.

5. Select the desired project backup file.

RESULT: If the backup file is lower than Version 10.08.01, the **Upgrade** button becomes active and the **Restore** button becomes inactive.

6. If the **Upgrade** button is active, click it to convert the lower version file to the current CARE version.

RESULT: Software adds a converted backup file of the current version to the list in the Project backup field.

7. Under **XL500 Settings**, all those files are checked which have been pre-defined for inclusion in the *Global Options* dialog (see "Set Global CARE Options" section). If desired, uncheck files you want to be excluded from the project restore.

NOTE: It is recommended to include all files.

8. Under **BACnet Settings**, the *Include Graphic Files* option is checked which restores all graphic files of the project. If desired, uncheck this option if you want graphic files to be excluded from the project restore.

9. Click **Restore** to initiate restore.

RESULT: A Restore window displays with percentage (or number of records) completed as well as an **Abort** button in case you want to stop the process. When the restore is complete, the dialog box redisplay in case you want to do more restores.

If a message displays that there is missing element information and the restore fails, you need to import the missing elements from the CARE database where the project originated. See the Import the Element Library section for details.

NOTE: If the project is already in the directory, software displays a message that it already exists. Click **OK** to close the message box and return to the Project restore dialog box.

10. Click **Close** to remove the Project restore dialog box and return to the CARE main window.

Export the Element Library

NOTE: This section applies to CARE XL-5000 only.

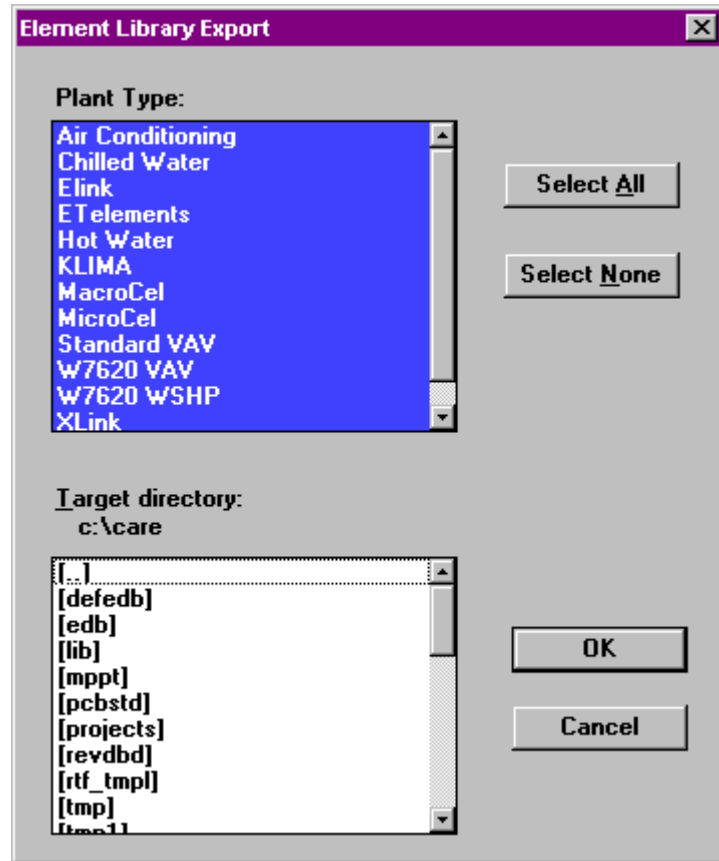
Purpose Output element records from the CARE database for use in other CARE databases.

"Elements" are source records for the segments that are available for each type of plant. For example, an air conditioning plant can have fan, sensor, and damper segments. The fan segment can include return and supply air fans in single and multiple configurations.

CARE Element Editor software (a separate software package) provides functions to modify elements and/or create new elements. You use this Export function to create a backup file of element records that can be copied to other CARE databases. See the Import the Element Library section for details.

Procedure 1. Click menu item Database, then drop-down items Export, Element Library.

RESULT: The Element Library Export dialog box displays. The Target directory is the drive and directory that will receive copies of the files. The dialog box example shows c:\care.



2. In the Plant Type list all plant types are selected. Click on plant types you do not want to export. Use Select All and Select None buttons to select/deselect desired plant types.
3. Typically, you export to a diskette so you can transport the elements to another CARE database on another PC. To select a different drive and directory, use Windows™ techniques.

RESULT: The Target directory shows the desired drive and directory name.

4. Click **OK** to initiate export.

RESULT: An Export window displays with percentage (or number of records) completed as well as an **Abort** button in case you want to stop the process. When the export is complete, the message box disappears and the main CARE window redisplay.

Import the Element Library

NOTE: This section applies to CARE XL-5000 only.

Purpose Read an Element Library file that was exported from a CARE database to obtain new element records and place them in another CARE database for use in the Schematic function..

"Elements" are source records for the segments that are available for each type of plant. For example, an air conditioning plant can have fan, sensor, and damper segments. The fan segment can include return and supply air fans in single and multiple configurations.

CARE Element Editor software (a separate software package) provides functions to modify elements and/or create new elements. If you want to copy the new elements you create to other CARE databases, you can use this Import function to merge

new elements from the modified CARE database with element records in another CARE database.

Import Process The Import process only copies backup elements that are new to the target database. It does not copy backup elements that are already in the target database, but are changed in the backup. The rules for considering an element "new" to a database are:

1. If any of the following fields in a backup element are different from those for any element in the target database:
 - a. Plant type
 - b. Main group name or group name
 - c. Element name
 - d. PIC file name
 - e. Width of element
 - f. Text that displays in the segment menu
 - g. Next-group name (that is, the drop-down if the element has one)
 - h. CARE type and user address for each default point in the element
2. If plant type is missing, software assumes it to be a new plant type and creates it in the target database.
3. If main group name or group name is missing (within a plant type), software assumes the group to be new and creates it in the target database.
4. If element name is missing (within a group and plant type), software assumes it to be a new element and creates it in the target database along with all its default point information.

If plant type, group name, and element name match but any of the other criteria fail to match, software creates a new element under the same plant type and group. Software assigns a new name to this element by prefixing the old name with an x_. The new element includes the same default point information as the backup element.

If the above criteria match exactly, software does NOT write the element to the target database.

For example, if a backup element only has a different engineering unit from a target database element, software will NOT overwrite the target database element.

Restore Failures CARE project and plant restores can fail because the backup file may not contain all the necessary element information. CARE project and plant backups only contain element information to restore element connection at restore time. If you try to restore a project or plant to a CARE database that does not contain the appropriate elements, the restore fails. This situation may occur if you were trying to share a project or plant backup with another user who does not have an up-to-date Element Library.

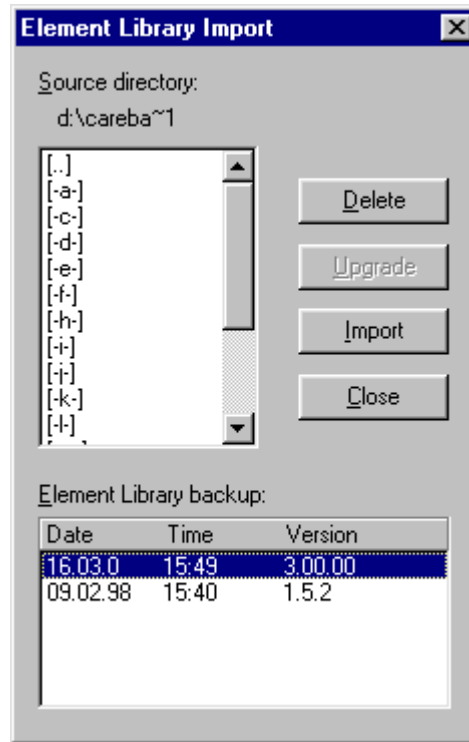
To enable a successful restore, perform the following steps:

1. Export the Element Library from the CARE database where the original project or plant resided. Export to a diskette. The next section, Export the Element Library, explains this process.
2. Import the Element Library to the target database from the export diskette generated in Step 1. Use the following procedure.

Procedure

1. Insert the diskette that contains the exported Element Library into a PC drive.
2. Click menu item Database, then drop-down items Import, Element Library.

RESULT: The Element Library Import dialog box displays with a default Source directory (usually, the CARE directory) and a list of available backup files (date, time, version number) in the Source directory.



- To select a different Source directory, in this case, the diskette, click the drive name where you inserted the diskette. Use other Windows™ techniques as necessary to display the appropriate Source directory and Element Library backup data.

RESULT: The Source directory shows the desired drive and directory name. The Database backup box shows the date, time, and version of the backup files you want.

- If the source files were created with CARE 2.02 or a lower version, click **Upgrade** to convert the files to the current CARE version, in this case to version 3.00.00.

RESULT: Two backup sets display in the dialog box, one for the lower CARE version and one for 3.00.00.

- Click the date, time, and version line of the backup that you want to copy.

- Click **Import** to initiate import.

RESULT: An Import window displays with percentage (or number of records) completed as well as an **Abort** button in case you want to stop the process. Software first decompresses the backup files (0-100%), then does the restore (0-100%). When the import is complete, the message box disappears and the main CARE window redisplay.

Import Controller Files

NOTE: This section applies to CARE XL-5000 only.

Purpose Update controller files in the CARE database based on uploaded files from a controller. Or, you can just create a report of the differences between the controller files and the CARE database files for the controller. Operators can change point, parameter, and Time Program data in controller data files via Excel Online, or Excel Building Supervisor (XBS) operator terminals.

You can use this Import function to copy those changes into the original CARE database for the controller. If you subsequently need to reload the controller from CARE, the reload will include the operator changes. See Appendix: Point Attributes Tables for information about the types of point information that are available to the import function.

Parameter Mismatches Parameter mismatches occur if outdated controller files are imported. If the controller files in the CARE database have been changed and/or retranslated but not downloaded to the controller, a mismatch of parameters could occur after an import of the uploaded, out-of-date controller files. The translation procedure can change the file number and index number of a plant parameter, so that CARE would no longer have the correct mapping of parameters to switching tables and control loops and could put the parameters in the wrong place.

Verify that the controller files are the current translation of the CARE controller files before uploading and importing them.

Controller Files Upload via XI584 For CARE versions lower 4.01.00 only running on Windows 95/98, the controller files upload was performed using the XI584 operator tool. For detailed description on the upload and import procedures, please refer to the Online help and/or the user guide of the corresponding CARE version 74-5587-3 GE51 R0998, and the Controller Data File Changes section in the XI584 Operator Manual 74-3555. The procedure described in the following only applies to the Excel Online usage.

RACL Parameter Imports CARE 8.03.00 imports all editable (on-line and off-line) point attributes and time programs. It can also import the Recursive Algorithmic Control Language (RACL) parameters in certain circumstances. RACL parameters are used to generate the RACL control programs that run in a controller.

IMPORTANT

The RACL parameters are not imported if the control strategies and switching tables for the controller are not available in the target CARE database, for example, if the controller was originally engineered in or restored from a different CARE database from where you are currently importing it (see following description of the two scenarios).

Scenario 1 **CARE can import** the RACL parameters if you are importing controllers (Ver. 1.1 and 1.2 OS) that were engineered with CARE 1.3.x or 1.4.x into the same CARE database (upgraded to 8.03.00) where they were engineered or restored.

After the import, when you translate the imported controllers, CARE creates Ver. 1.2 OS controllers just as it does for non-imported controllers. CARE supports upward compatibility (Ver. 1.1 controllers become Ver 1.2) but not downward compatibility (cannot create Ver. 1.1 controllers).

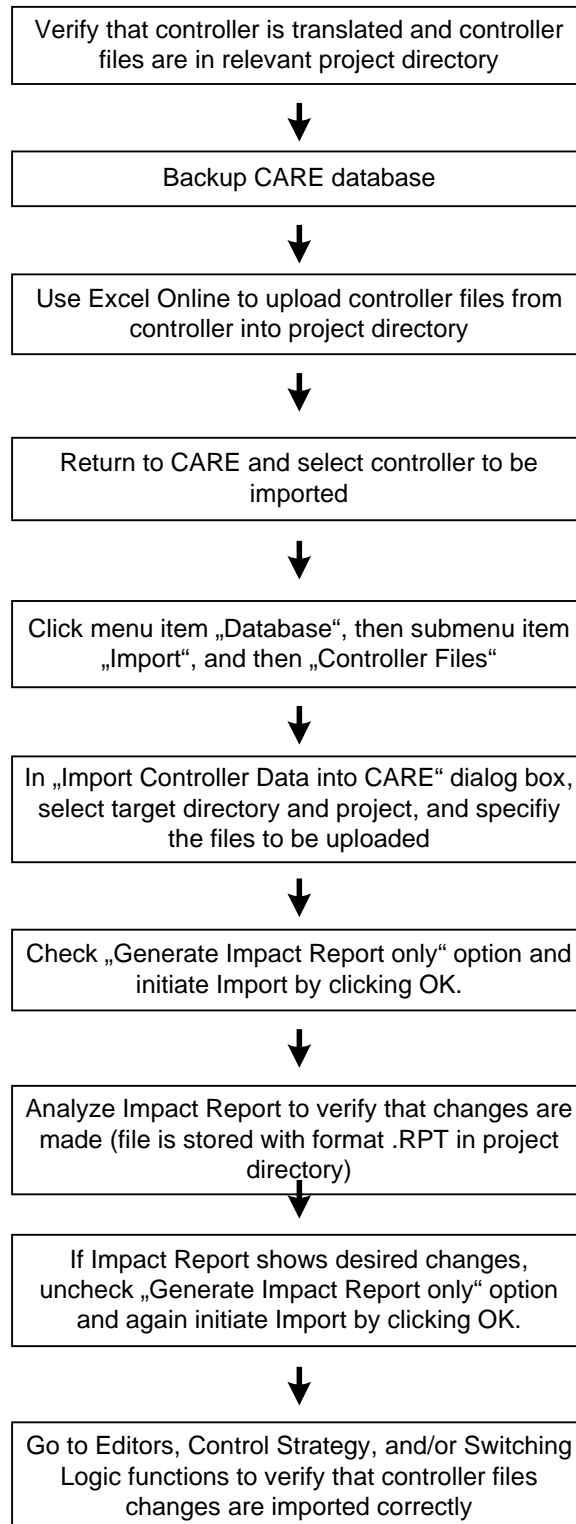
Note that CARE does not "reverse engineer" control strategies and switching tables from generated RACL programs (equivalent to trying to generate source code from compiled C code). Reverse engineering is not necessary as long as the control strategies and switching tables are still in the database. All CARE functions are available for controllers imported to their original database.

Scenario 2 **CARE cannot import** the RACL parameters if you are importing controllers into a different CARE database from the one where they were engineered or restored. To be able to import RACL parameters, CARE must have the control strategies and switching tables from which they are generated. Since the controllers were originated elsewhere, the control strategies and switching tables are not available in the database.

The only CARE functions available for this kind of imported controller are the Editors, Documentation, and Translation only of the point files (IPL generation The Schematic, Control Strategy, Switching Table, and Translation of RACL parameters (RACL generation) functions are not possible.

The following flowchart and procedure only applies to the import of the controller files using Excel Online. For Controller Files Upload via XI584, please refer to the Controller Files Upload via XI584 Note in the previous sections.

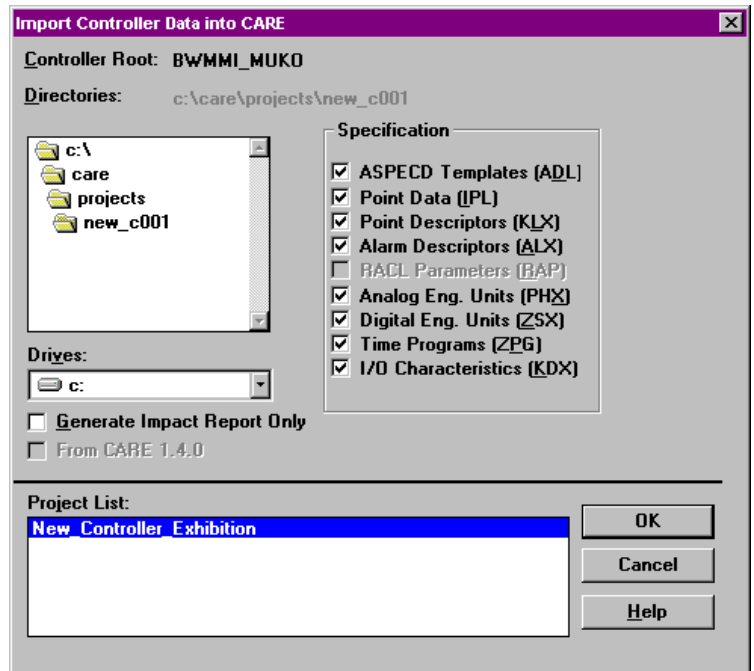
Import Controller Files Flowchart



Procedure

1. Make sure that you have translated the controller and that the controller files for the controller you want to import are in the project folder. As a precaution, back up the CARE database (see Back Up CARE Database section).
2. Use Excel Online to upload the controller files. See Upload Controller in ONLINE SERVICE AND COMMISSIONING section for details.
3. If not already done, open the project in CARE and then select the controller.
4. Click menu item **Database**, then drop-down items **Import** and **Controller**.

RESULT: The Import Controller Data into CARE dialog box displays.



In Controller Root displays the name of the currently selected controller. This name should be the destination controller. In Project List field, the associated project name should be displayed.

5. In Drives, select the drive and in Directories, browse to the directory where the desired uploaded controller files are stored. The directory defaults to the project directory of the selected controller.
6. In Specification, click the types of files that you want to import (copy) or check via impact report (see next step).
7. Check From CARE 1.4.0 if the controller files originate from a project created with CARE 1.4.0. If the controller files originate from projects created with any other CARE version, this option must be unchecked.
8. Check Generate Impact Report Only to firstly create an impact report before importing the changes. The impact report summarizes the differences between the CARE database files and the uploaded controller files. See the Impact Report Example Note following the procedure for a sample report.

IMPORTANT

It is strongly recommended to always run and analyze an impact report before doing an import.

9. Click **OK** to generate the impact report.

RESULT: When the import is done, an information box displays stating 'Import complete'. The impact report is saved as text file with .RPT format (<application name>000.rpt) in the project folder along with the later imported controller files.

- 10. Click **OK** to close the message box.
- 11. Open the .rpt file and review the report result with a text reader program, e.g. Notepad.
- 12. If the result is satisfactory, uncheck Generate Impact Report Only, and then click **OK** to import the controller files.

RESULT: When the import is done, an information box displays stating 'Import complete'.

- 13. Click **OK** to close the message box. Then, click **Close** to close the Import Controller Data into CARE dialog box.
- 14. Go to the Editors, Control Strategy, and/or Switching Logic functions to verify that the changes in the controller were imported correctly into the CARE database.

Impact Report Example

Import Controller Impact Report

Date: 7-7-2008
 Project: Honeywell Center
 Controller: Third_Floor
 Imported Controller File: CNTRL03

Point Data (.IPL) Report

Point Name: Outside Air Temperature
 Technical Address: 1-3-1
 Point Type : Analog Input

<u>Data Field</u>	<u>Originally</u>	<u>Updated to</u>
Descriptor	Room 301 point 10	Room 302 point 10
Engineering Units	Degree F	Percent
Operating Mode	Manual	Automatic
Suppress Alarm	Enabled	Disabled
Alarm Text	Shut Down System	Call For Help
Alarm Delay	1	2
High Alarm Limit	100	90
High Warning Limit	95	85
Low Warning Limit	40	50
Low Alarm Limit	30	40

User Address: Damper Setpoint
 Technical Address: 1-4-1
 Point Type : Analog Output

<u>Data Field</u>	<u>Originally</u>	<u>Updated to</u>
Descriptor	Room 101 point 10	Room 102 point 10
Engineering Units	Degree F	Percent
Operating Mode	Manual	Automatic
Suppress Alarm	Enabled	Disabled
Close to Open Time	0700	0600
Open to Close Time	1700	1800

Point Name: Calculated BTU
 Technical Address: 30,1,1,11,1
 Point Type : Pseudo Analog

DOCUMENTATION

Purpose Print reports showing system operation and parameters. Also, you can output a variety of file types to supplement job documentation. For example, you can create graphic metafiles (.WMF extension) that are a plant's schematics, control loops, and switching tables. You can also create spreadsheet files that contain information useful for pricing (Data Export function).

Report Inclusions The documentation function is available after the selection of a project. You can print reports for a project, one or more plants (whether attached or unattached), and/or one or more controllers. The scope of each report depends on report type and the current selections (project, plant, and/or controller). The following table describes these conditions and their results.

Report Type		Current Selection			
		Project Only	Project and Controller	Project and Unattached Plant	Project, Controller, and Attached Plant
Project	Project Datasheet	always the selected project			
Controller	Controller Summary, Parameter Lists, Termination, Point Data, Plant to Controller	all controllers in selected project	selected controller	all controllers in selected project	selected controller
Plant	Plant Schematic, Control Strategy, Switching Logic, Math Function	all plants in selected project	all plants for selected controller	selected plant	selected plant

Chapter Contents Export Graphic Files
 Print Documentation
 Technical Information
 Point Type Abbreviations
 Frequently Asked Questions

Export Graphic Files

Purpose Create graphic files in a metafile format (.WMF) from a plant's schematic, control strategy loops, and switching tables. These graphic files can be used in a CAD/CAM operation or opened by software such as Micrografx Designer. The files provide a form of documentation in addition to printed reports.

NOTE: If a control loop is multiple pages long, applications such as Designer cannot display the exported graphic file.

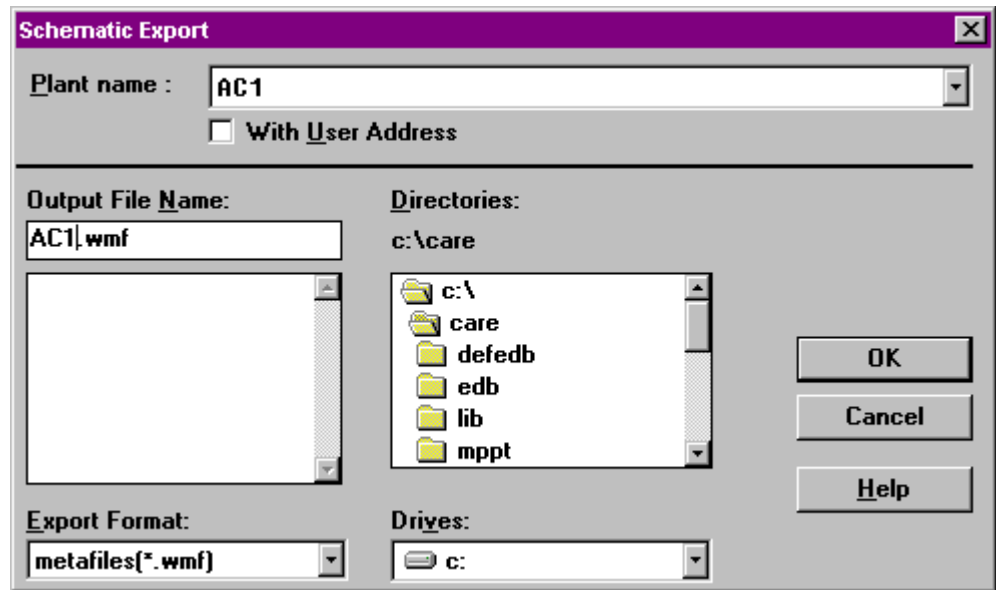
Procedure 1. Click menu item Database, then dropdown items Export, Graphic.

RESULT: A list displays for selection of schematic, control strategy, or switching logic files.

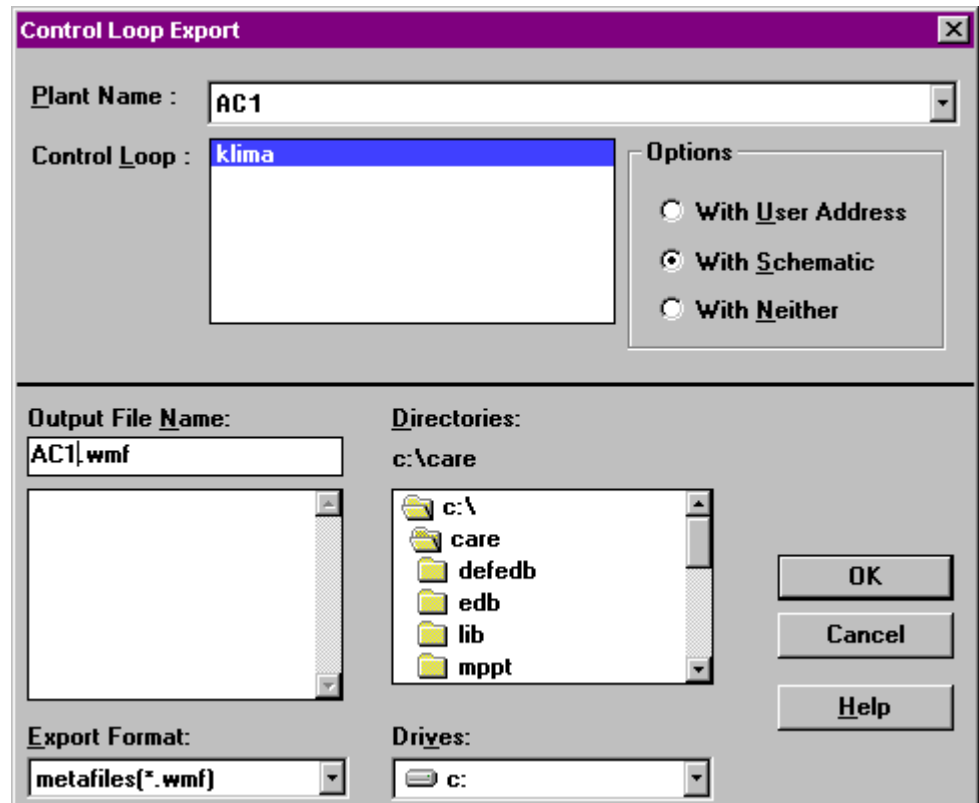
3. Click desired information type.

RESULT: An export dialog box displays that is related to the information type. Following are examples of each type of dialog box. The dialog boxes are very similar. They differ in the print options available to the function. For example, you can export a schematic with or without its user addresses. You can select the control loop to export and also whether or not to export it with its user addresses, schematic, or neither item. You can select the switching table to export and whether or not to export it with its schematic.

Schematic Export Dialog Box



Control Loop Export Dialog Box



Switching Table Export Dialog Box

Switching Table Export

Plant name : AC1

Switching Table :	User Address	Value

With Schematic

Output File Name: AC1.wmf

Directories: c:\care

- c:\
- care
- defedb
- edb
- lib
- mppt

Export Format: metafiles(*.wmf)

Drives: c:

OK
Cancel
Help

4. Select desired plant name. Click down arrow to display list of available plants.
5. Select desired options for the information type (with/without user addresses, control loop and its options, or switching table and its options).
6. Click Output File Name and type a name for the exported file. The file must have the WMF file extension.

The directory where software will save the file is listed under the word Directories. If it is not the directory you want, use the listbox below it to choose a different directory (and drive, if desired).

The Export Format defaults to metafiles (*.wmf). You should not change this setting.

7. Click **OK** to begin the export process.

RESULT: A Graphic Export message box displays while software creates the file. When done, it displays the message "Export is completed".

8. Click **OK** to close the message box.

RESULT: The export dialog box remains on display.

9. Click **Close** to close the export box. Or, select another file to export and repeat the process.

Print Documentation

Purpose CARE provides printing of:

- Complete projects
- Controller(s) with attached plants
- Individual attached or unattached plants

IMPORTANT!

For printing complete projects with multiple controllers it is recommended to print individual files for each controller because otherwise it would result in Word documents that may exceed 1000 pages and file in excess of 40 Megabytes. Such large documents may cause Word for Windows™ to become very slow.

Procedure 1. Click menu item **Database**, then submenu item **Print**.

Or, in the logical plant tree, right-click on the controller, plant or project and with left mouse key, click on **Print** in the context menu.

RESULT: The printout main dialog box is displayed showing the options for printout.

NOTE: Depending on the CARE version, XL5000 or BACnet and the item (project, plant, and controller) selected, not all options are available.
For example, for plants you can only print the table of contents, project data sheet, plant schematic, control strategy loops, switching logic tables and parameter list sorted by usage. In XL5000, fast access lists are not available.

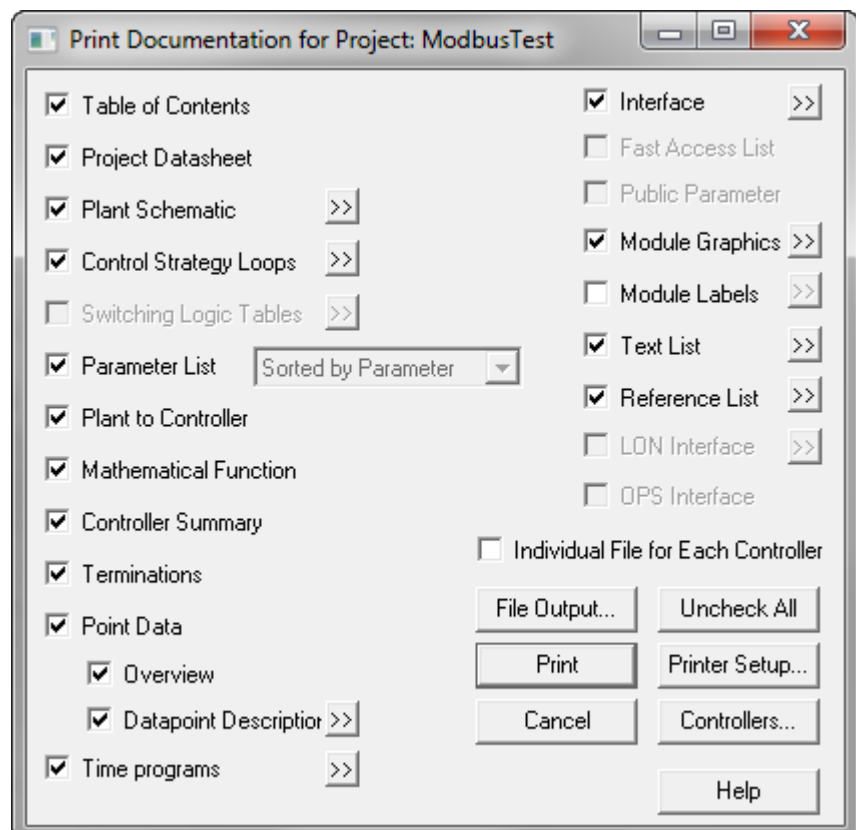


Fig. 1 Print Documentation dialog box of XL 5000 project

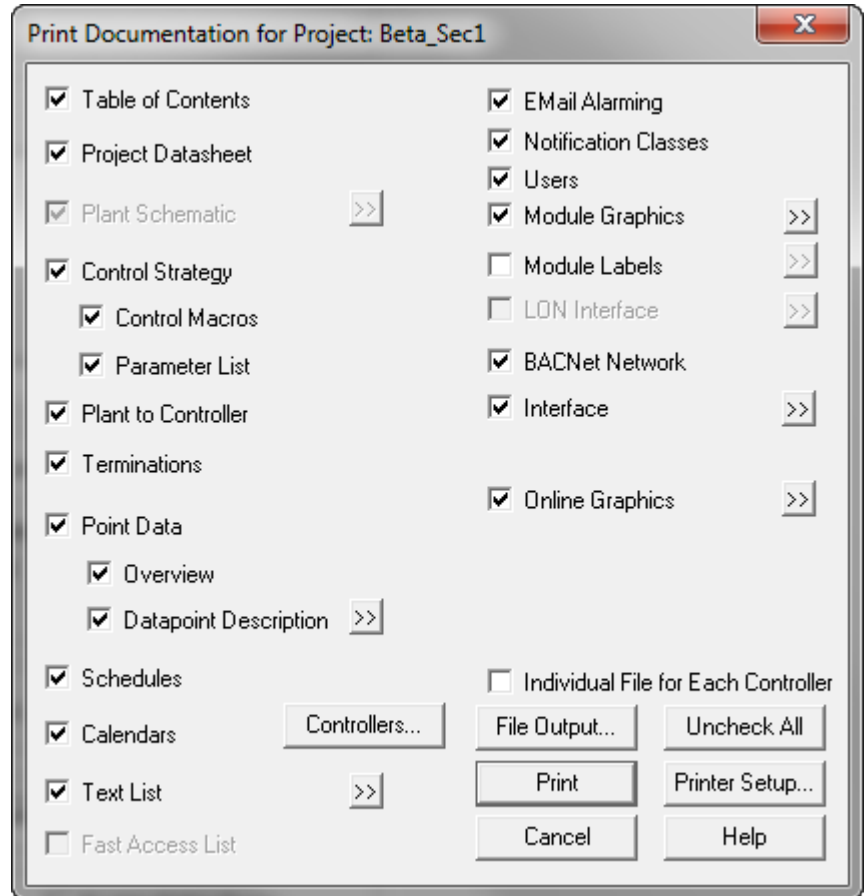

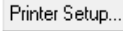





Fig. 2 Print Documentation dialog box of BACnet project

2. If the project is selected and you want to print information of individual controllers, click the **Controllers...** button  and select /unselect the controllers.
3. For printing complete projects with multiple controllers it is recommended to print into individual files for each controller. Therefore, check **Individual File for Each Controller**.
4. If you want to print directly to a printer, click the **Printer Setup...** button , select the printer and define the printer settings in the *Print Setup* dialog box.
5. Check the options that you want to print (refer to Select Print Options section for detailed description). Or, use the **Uncheck All** button  and re-check individual options for changing the option choice.
6. Click the **Browse** button  at the corresponding options to specify details of an option.
7. Do any of the following:

To print directly to a printer, click the **Print** button .

Or, to print into file, click the **File Output...** button , and save the print as *rtf* file that can be edited in Word.

NOTES: You may want to have different page breaks or change the layout of tables, etc. To optimize the page breaks and document layout, Microsoft Word for Windows™ can be used to edit the document.

RTF (Rich Text Format) is a text format that can be accessed by Word. This format has been selected for the printout, because it is much more reliable than the DOC format. After loading a file into Word, it might be saved also as DOC or any other Word supported file format (refer to the Word user's manual).

Select General Pre-Settings

Before selecting the specific options you want to print such as Table of Contents, Project Datasheet, etc., you adjust the following general settings:

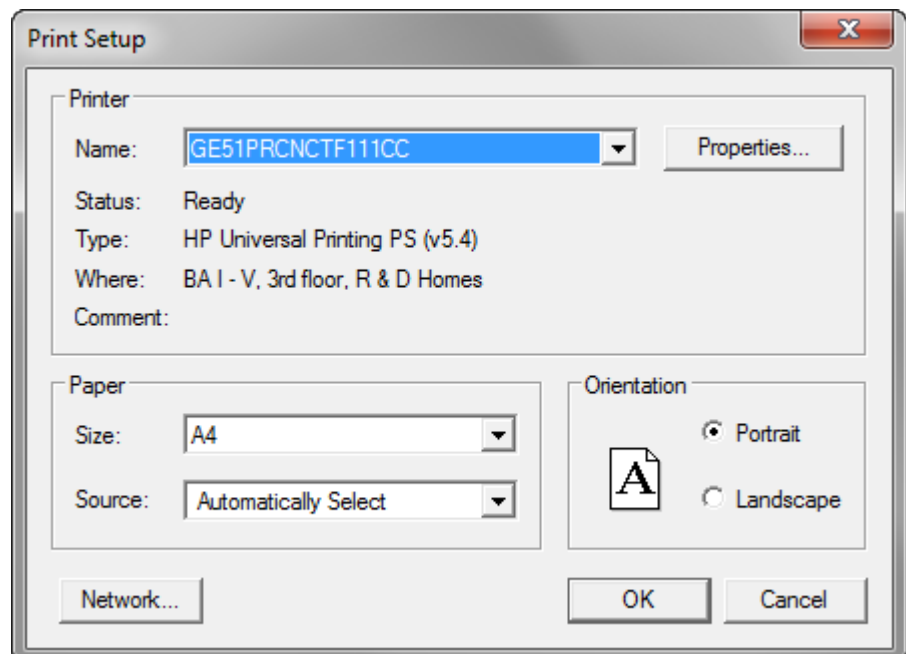
- setup printer
this should be done in case of direct printing
- select controllers
this can be done in case you want to print documentation of particular controllers only
- single file or multiple file output
this should be applied in case of file output print mode usage.

Printer Setup

For direct printing on a printer, the printer can be selected and configured.

Procedure

1. Click **Printer Setup...** button  in the *Print documentation for Project...* dialog box to open the *Print Setup* dialog box.



NOTE: The *Print Setup* dialog box is a standard Windows™ feature and always displays in the language of the installed Windows™ version.

2. In **Name**, select the printer.

- Under **Orientation**, select the printing format (**Portrait** or **Landscape**).

NOTE: Word always prints in landscape format, even if portrait is selected. This is defined by the printout templates and is necessary because of the size of the printout.

- Under **Paper**, select the **Paper size** and the **Source** (tray) to be used. The following paper sizes are supported: DIN A4, Letter and "User defined" paper size. All paper sizes other than DIN A4 and Letter, which are available in the dropdown list box, are seen as User defined. Each of these three paper sizes can be set by default in the caredoc.ini file. When opening the *Print Setup* dialog box, the caredoc.ini file default setting is displayed. If you now change the size, it will be saved in the caredoc.ini file. When opening the *Print Setup* dialog box next time, this setting is displayed by default (see the Technical Information/Special Printer section).
- The **Properties...** button may be used to set further printer options.
- The **Network...** button may be used to connect to a network printer.

NOTE: The selection of the printer type is stored in the caredoc.ini file and recovered when the printout is used the next time.

- Click **OK** to confirm the settings.

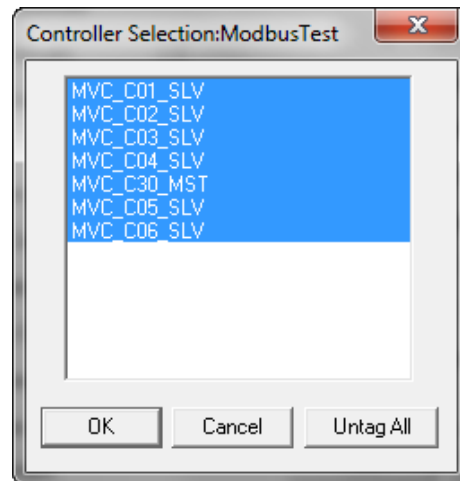
Select Individual Controllers from a Project

If the project is selected for printout, all controllers of the project will be pre-selected by default. This function allows printing documentation of individual controllers.

NOTE: The **Controllers...** button is grayed, if only a single controller has been selected before calling the printout.

Procedure

- Click the **Controllers...** button  in the *Print documentation for Project...* dialog box to open the *Controller Selection:...* dialog box.



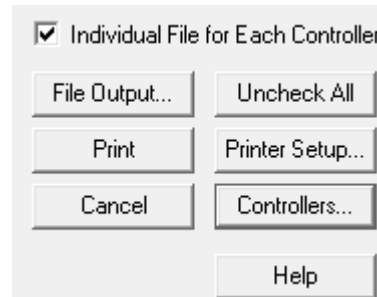
Selected controller names display in white characters on blue background. Unselected controller names display in black characters on white background.

- Select an unselected controller by clicking on it with the left mouse button.
- Deselect a selected controller by clicking on it with the left mouse button.
- Use the **Tag All/Untag All** button to select/deselect all controllers.
- Click **OK**.

Select Individual File for Each Controller

For printing complete projects with multiple controllers it is recommended to print individual files for each controller because otherwise it would result in Word documents that may exceed 1000 pages and file in excess of 40 Megabytes.

- Procedure**
1. In the *Print documentation for Project...* dialog box, check **Individual File for Each Controller**.

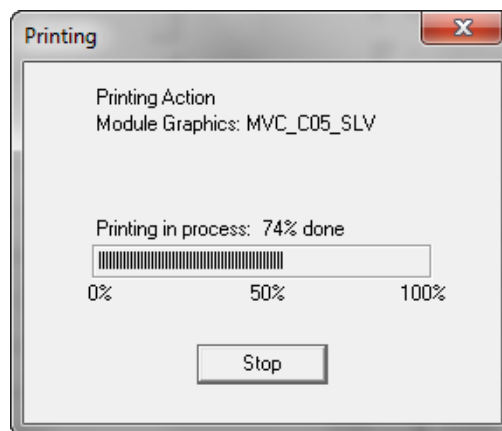


Printing Modes

You can either print directly to a printer (**Print** button) or into a file (**File Output...** button).

- Direct Print Procedure**
1. Click the **Print** button in the *Print Documentation for Project...* dialog box.

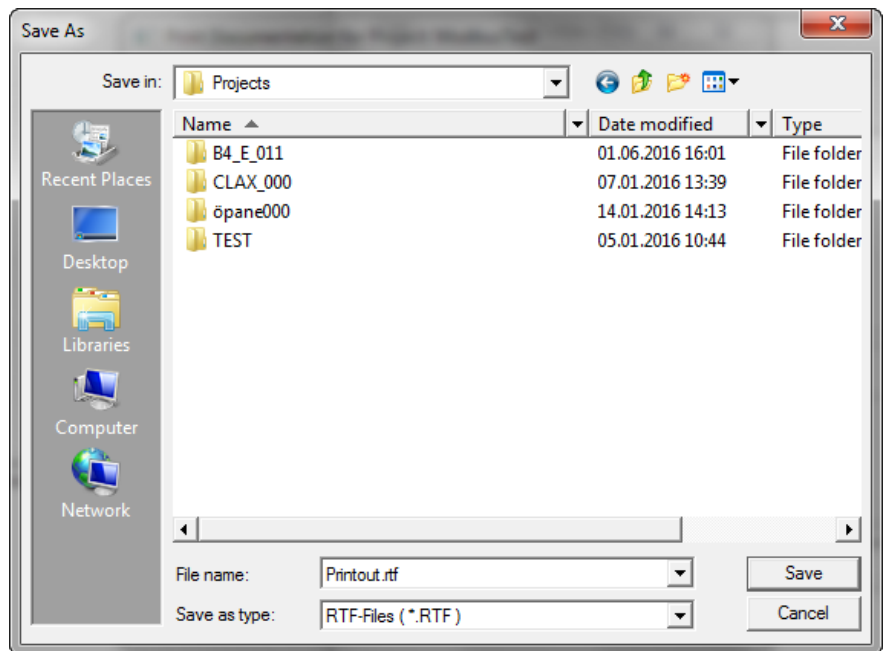
RESULT: CARE generates a file called "PRINTOUT.RTF" in the CARE directory. During file creation, the currently generated application part from CARE is displayed in a status window (for example, "Printing Action: Time Programs..."). The percentage of completion is also displayed.



After finishing with the *rtf*. file creation, Word is started and you can print the file.

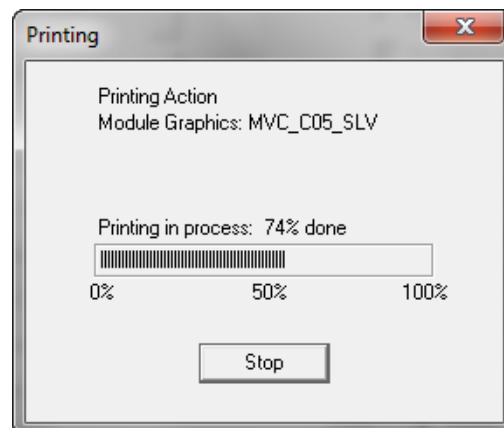
- File Output Procedure**
1. Click the **File Output...** button in the *Print Documentation for Project...* dialog box.

RESULT: The Save As dialog box displays.



2. Enter a filename or select an existing file.

RESULT: CARE generates the file. During file creation, the currently generated application part from CARE is displayed in a status window (for example, "Printing Action: Time Programs..."). The percentage of completion is also displayed.



3. Open the Word file and print it.

Select Print Options

Before printing, you have to decide which information you want to print.

After selecting **Database/Print...** the *Print Documentation for Project...* dialog box is displayed with its various selection possibilities.

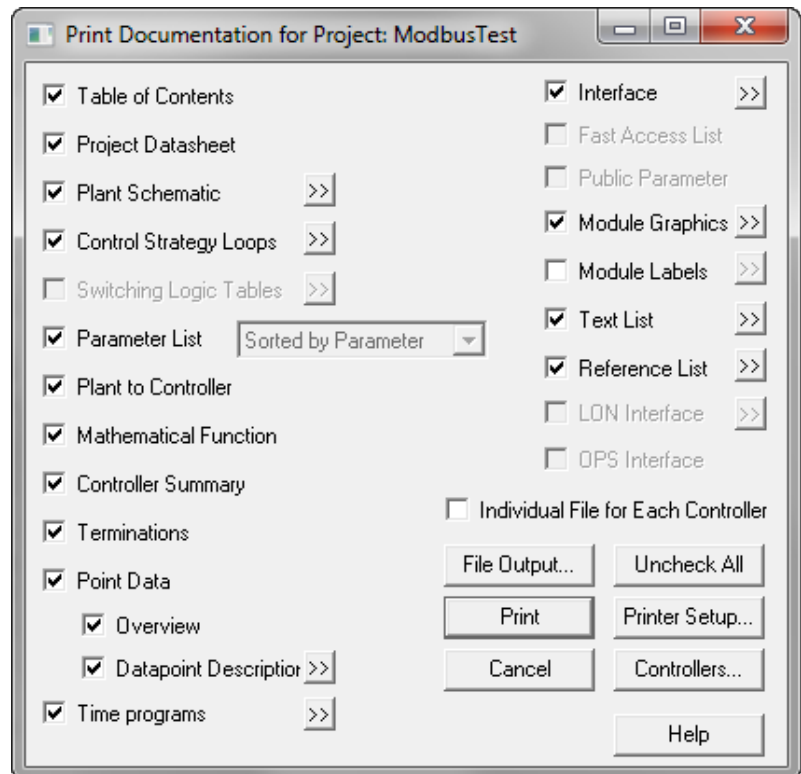


Fig. 1 Print Documentation dialog box of XL 5000 project

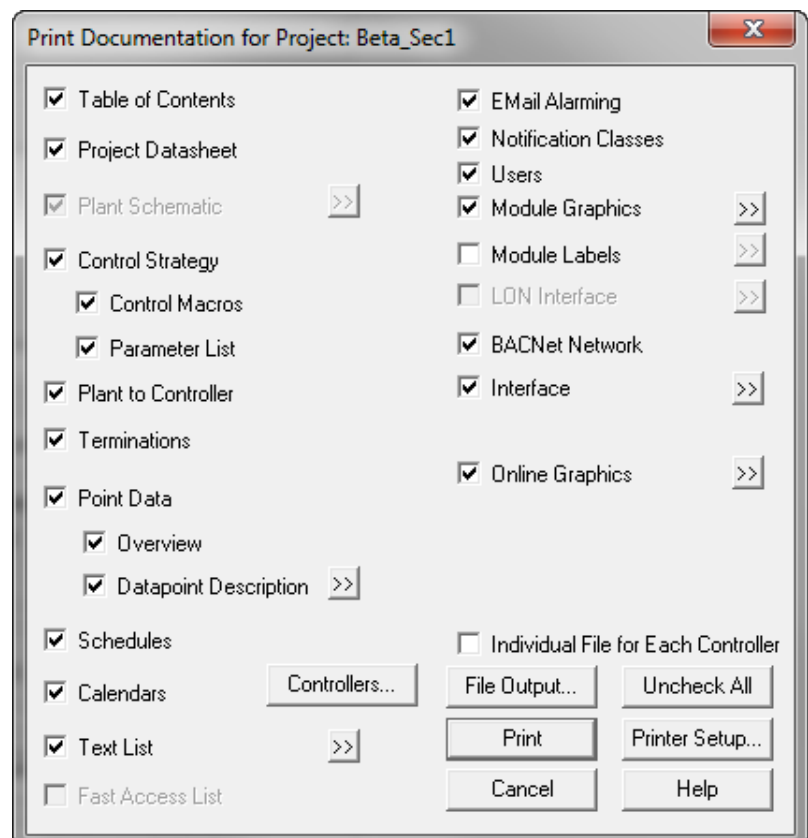


Fig. 2 Print Documentation dialog box of BACnet project

Each selection checkbox is described in detail in the subsequent sections.

Print Table of Contents

If this checkbox is marked, a table of contents is printed as the first chapter in the documentation. The table of contents is a Word field and, therefore, it can be automatically updated, if the page breaks change.

NOTE: Through the caredoc.ini file, the printout of the table of contents can be adjusted to be printed without page numbers. To do so, find the section [Table Of Contents] and set **Page Numbers= NO**.

The following Word operations can be used to work with the table of contents (refer to the Word user manual for details).

Update Table of Contents

1. Click on the table of contents with the right mouse button
2. From the context menu, select **Update Field**.
3. From the dialog box, determine whether you want to update only the page numbers or whether you want to create a new table of contents.
4. Click **OK** to perform operation.

Change Layout

The layout of the table of contents may be changed (for example, to display more/less levels of detail, display or remove page numbers, etc.).

1. Select the table of contents by clicking on it with the left mouse button.
2. Select **Insert/Index and Tables**.
3. In the subsequent dialog box, adjust the layout of the table of contents as you like.
4. Click **OK** to accept your selections.
5. Word asks, if you want to replace the existing table of contents. Click **YES**.

RESULT: The existing table of contents is updated to the new format.

Project Data sheet

The project data sheet contains general information about the project. This information has been entered in CARE upon creation of the project.

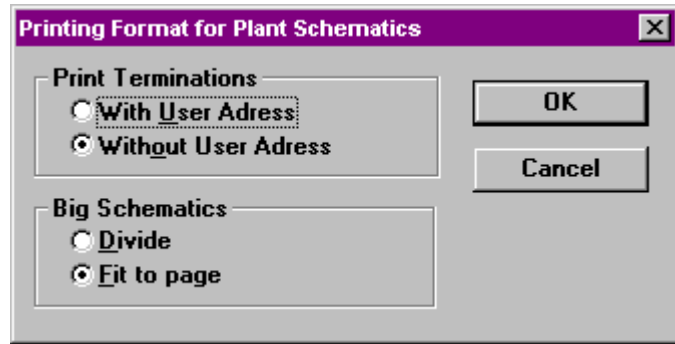
Example:

Project:	PH Exhibition
Project Description:	Air_Handling_Units_Sect5
Project Reference Number:	1273634
Client:	Trade PH
Order Number:	213434534
Percent Discount:	0
Job Factor:	1.5
Project Engineer:	B. McNeal
Date:	03.06.98
Project Default Engineering Unit:	International
Project Subdirectory	PH

Plant Schematic

If this checkbox is marked, the plant schematics are printed.

The printout of the plant schematics may be adjusted by clicking on the >> button, which opens the **Printing Format for Plant Schematics** dialog box:



Print Terminations

With User Address prints the plant schematic with the user addresses assigned to each hardware point.

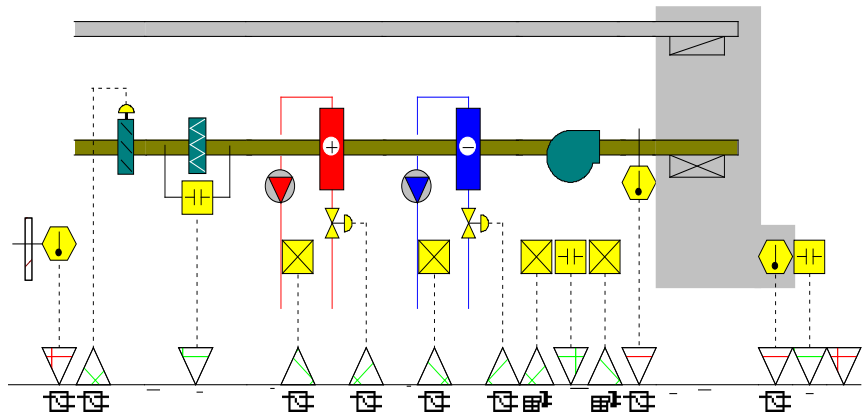
Without User Address prints the plant schematic without user addresses.

Big Schematics

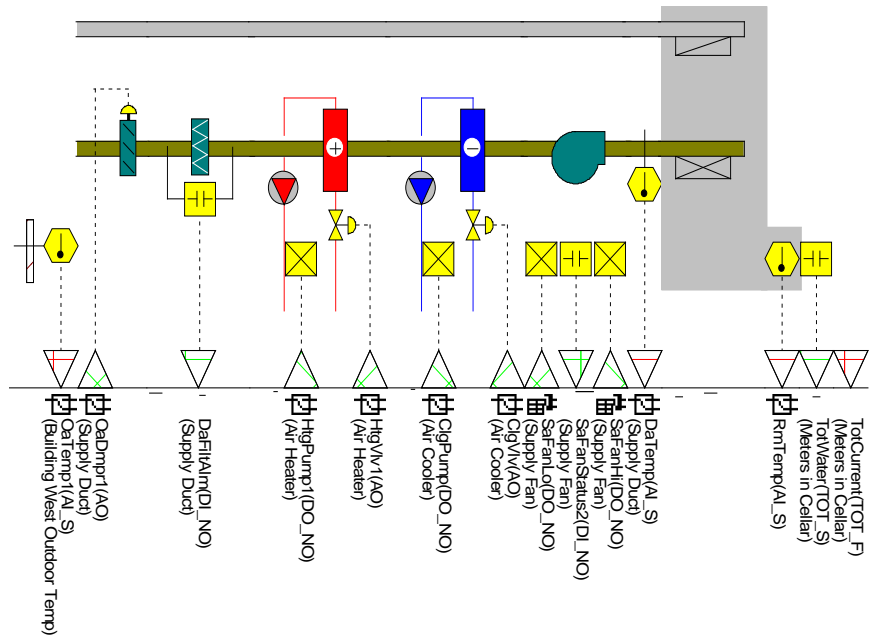
Divide automatically splits the schematic across multiple pages.

Fit to Page rescales the schematics so that they fit on one page.

The following is an example of a plant schematic printout without user addresses.



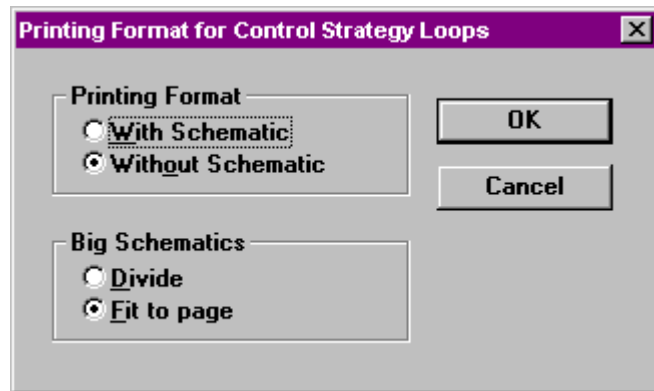
The following is an example of a plant schematic printout with user addresses. User addresses (and their descriptors, if available) are printed vertically next to the corresponding input or output hardware point.



Control Strategy Loops

If this checkbox is marked, the control strategy loops are printed.

The printout may be adjusted by clicking on the >> button, which opens the **Printing Format for Control Strategy Loops** dialog box:



Printing Format

With Schematic prints the plant schematic. User addresses are only printed for software points.

Without Schematic does not print the plant schematics, but only the datapoints and their assigned user addresses.

Big Schematics

Divide automatically splits the control loop across multiple pages.

Fit to Page rescales the control loop so that it fits on one page.

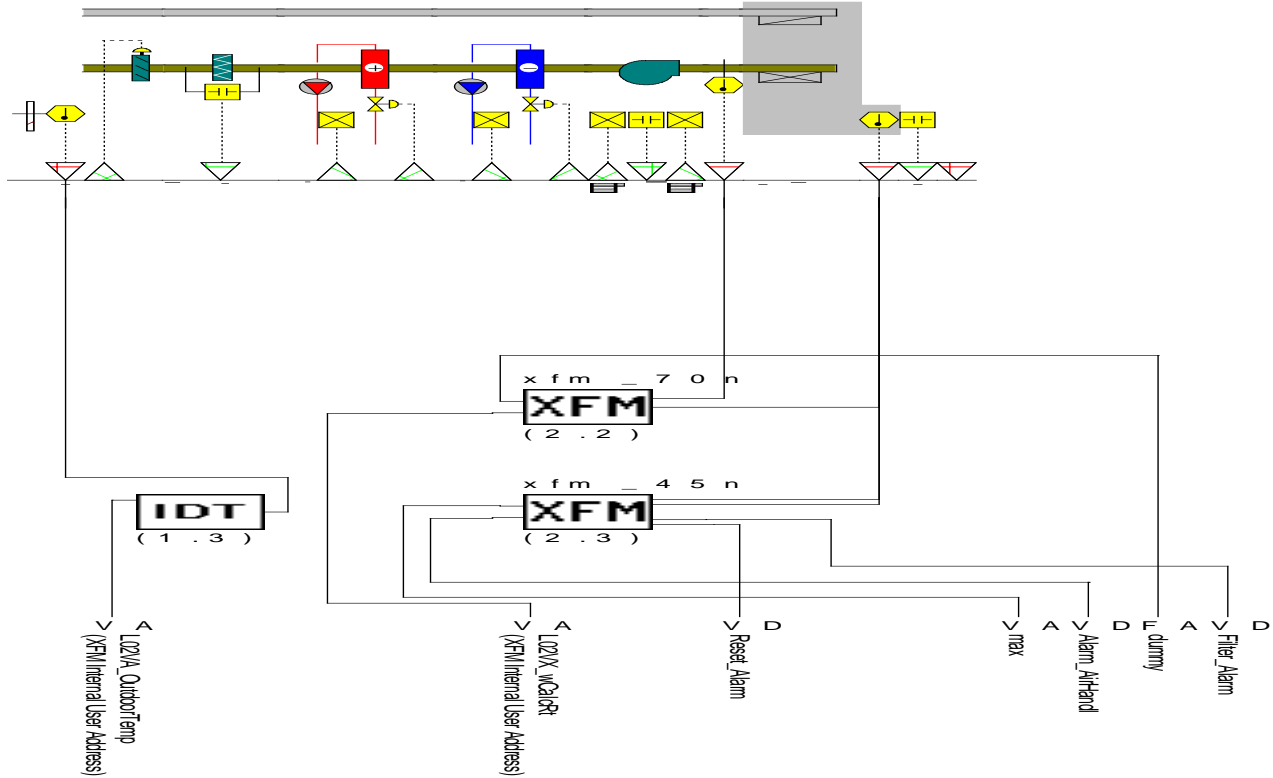
The following is an example of a control strategy printout with schematic. The schematic is printed above the control strategy. User addresses (and their descriptors, if available) are printed only for software points.

HONEYWELL
PRINTING DATE: 5/13/98
PRINTING TIME: 4.4 PM6

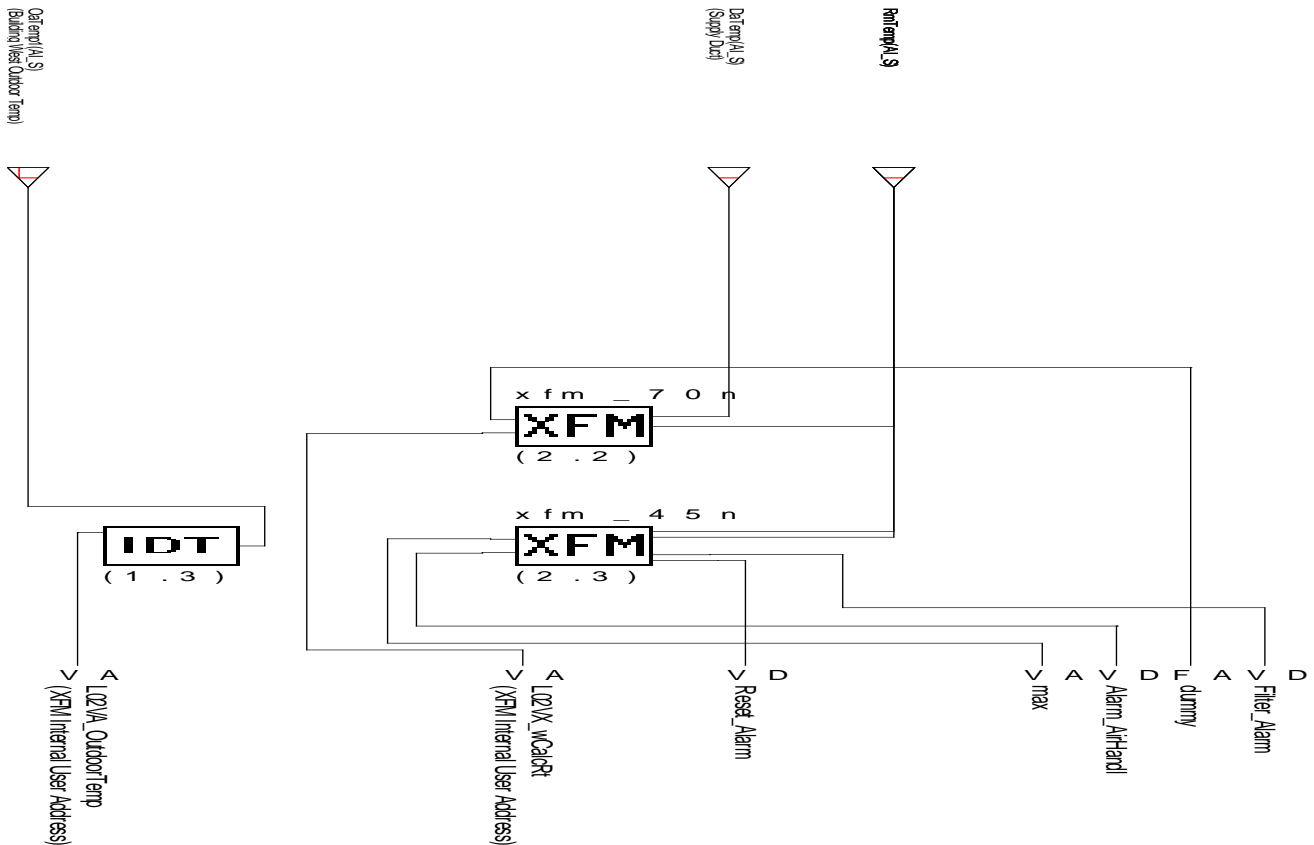
PROJECT PRINTOUT
CONTROLLERNAME:M C05
CONTROLLER NO: 5 OS VERSION: 2.0

PROJECT NAME: CARE_T2

3.8.2.2.2 CONTROL STRATEGY SIMULATION



The following is an example of a plant schematic printout with user addresses and plant schematic. User addresses and type abbreviation (and their descriptors, if available) are printed vertically next to the corresponding hardware or software point.



See the Point Type Abbreviations appendix for point type abbreviations.

XFM's with Internal User Addresses

If a control strategy contains XFM's with internal user addresses, a table with the internal user addresses is printed as part of the control strategy loop.

The following table contains: The XFM name, (submodule name), the XFM position, the type of the internal user address, the name of the internal XFM default user address, the name of the connected CARE user address and the CARE descriptor for this user address.

Example:

Sub module	Position	Type	XFM Internal User Address	CARE User Address	CARE Descriptor	
xfm_70n	2.2	VA	L00VA_Aussentemp	L02VA_OutdoorTemp	XFM Internal User Address	
		VA	L00VZ_SwAbTemp	L02VZ_wRt	XFM Internal User Address	
		VD	L00VD_BetriebAnl	L02VD_PlantRuns	XFM Internal User Address	
		VA	L00VA_XcTemp	L02VA_SeqCntrl	XFM Internal User Address	
xfm_45n	2.3	VA	L00VZ_FrgStufen	L02VZ_FanDemand	XFM Internal User Address	
		VD	L00VZ_BelegOptim	L02VZ_PlantOn	XFM Internal User Address	
		VA	L00VA_Aussentemp	L02VA_OutdoorTemp	XFM Internal User Address	
		VA	L00VX_ErrSwRt	L02VX_wCalcRt	XFM Internal User Address	
		VD	L00VS_Störung	L02VS_Alarm	XFM Internal User Address	
		VD	STARTUP	STARTUP		
		VD	L00VD_BetriebAnl	L02VD_PlantRuns	XFM Internal User Address	
		VA	L00VA_AutoAnlage	L02VA_AutoPlant	XFM Internal User Address	
		VD	L00VD_FrgMikl	L02VD_EnbIDamp	XFM Internal User Address	
		VD	L00VD_FrgLh	L02VD_EnbIAH	XFM Internal User Address	
		VD	L00VD_FrgLkT	L02VD_EnbIACT	XFM Internal User Address	

Mathematical Functions

If a control strategy contains mathematical functions and the printout of mathematical functions is enabled, the functions are printed as part of the control strategy (Refer also to *Mathematical Functions* section).

Example:

Average = ("Temp_1"+"Temp_2"+"Temp_3")/3
Smooth = INRT["difference",128,1440m]
difference = "DelayedOutdoorTemp"-"CurrentOutdoorTemp"

Parameters If **Parameters sorted by Usage** is enabled, the parameters of each icon are printed as part of the control strategy. Refer to *Parameters Sorted by Usage* section.

The Parameters of WIA/RIA icons are listed in a separate table as part of the control strategy, if **Parameters sorted by Usage** or **Sorted by Parameter** is enabled.

NOTE: The Math Icon internal parameters are not printed as part of the control strategy.

Parameters are printed with the statement position and type, the description of the parameter, the parameter value and engineering unit, the parameter file number, the parameter index and the user address of the software point, which the parameter is mapped to.

Example:

Position	Type	Description	Value	Eng./ Unit	User Value	Parameter File	Parameter Index	Point Mapping onto:
2.1	SEQ	Min value sequence 1	10.000			1	3	SW_Point_Test1
2.1	SEQ	Max value sequence 1	100.000			1	5	SW_Point_Test2
2.1	SEQ	Slope sequence 1	0.900			1	4	SW_Point_Test4
2.1	SEQ	y-axis intersection sequence 1	10.000			1	1	SW_Point_Test3
2.1	SEQ	Min value sequence 2	100.000			1	8	SW_Point_Test7
2.1	SEQ	Max value sequence 2	10.000			1	9	SW_Point_Test6
2.1	SEQ	Slope sequence 2	-0.900			1	2	SW_Point_Test5
2.1	SEQ	y-axis intersection sequence 2	100.000			(Not Generated)*		
2.1	SEQ	Min value sequence 3	100.000			(Not Generated)*		
2.1	SEQ	Max value sequence 3	10.000			(Not Generated)*		
2.1	SEQ	Slope sequence 3	-0.900			(Not Generated)*		
2.1	SEQ	y-axis intersection sequence 3	100.000			(Not Generated)*		
2.1	SEQ	Internal Parameter 10/12	100.000			(Not Generated)*		

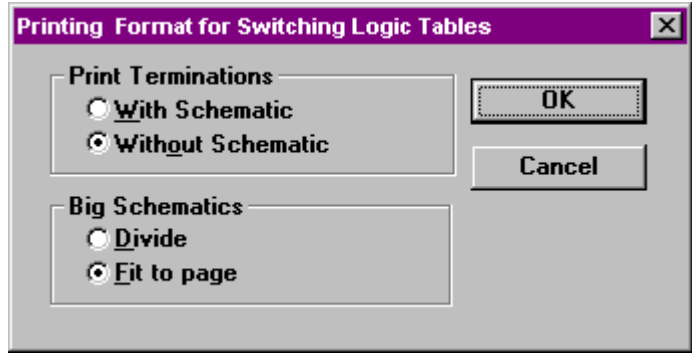
NOTES:

- *If optional parameters exist for a statement (such as for example input parameters), and the user does not use these parameters, the printout shows the entry "Not Generated". The printout of not generated parameters can be suppressed by the caredoc.ini file.
- Engineering units for parameters in the control strategy are only printed for XFMs.

Switching Logic Tables

If this checkbox is marked, the switching tables are printed.

The printout may be adjusted by clicking on the >> button, which opens the **Printing Format for Switching Logic Tables** dialog box:



Print Terminations

With Schematic prints the plant schematic. The points that are controlled by switching tables are marked with the number of the switching table.

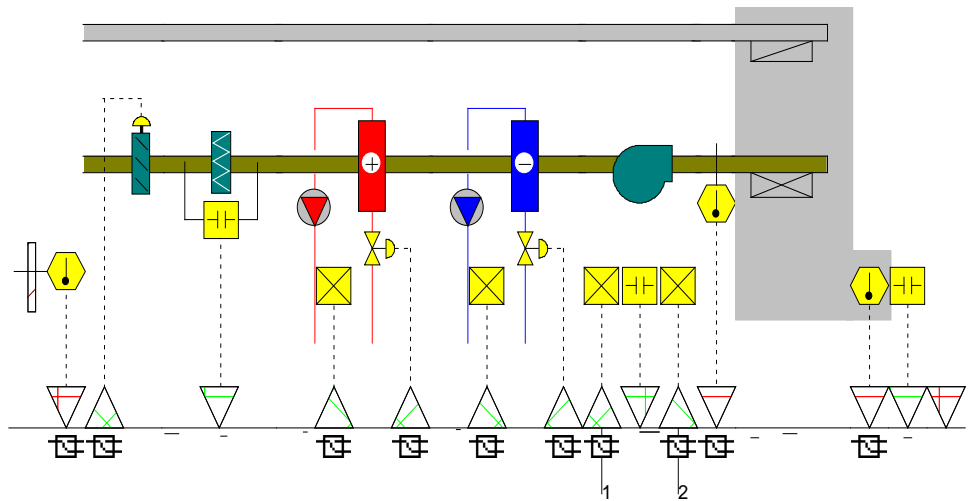
Without Schematic does not print the plant schematics, but only the switching tables.

Big Schematics

Divide automatically splits the control loop across multiple pages.

Fit to Page rescales the control loop so that it fits on one page.

The following is an example of a switching table printout with schematic. Each hardware point that is controlled by a switching table is marked with the number of the switching table.



NOTE: The switching tables are headed with
 — output point user address
 — output point type abbreviation *)
 — output point descriptor
 — output value

Each user address shows type abbreviation and descriptor (if assigned) in round brackets.

See the Point Type Abbreviations section for point type abbreviations

Examples:

Switching Table 1 : SaFanLo (DO_NO)(Supply Fan) = 1

SaFanLo (DO_NO) (Supply Fan)		1 [9][3]
Filter_Alarm (VD)		0

Switching Table 2 : SaFanHi (DO_NO)(Supply Fan) = 1

SaFanHi (DO_NO) (Supply Fan)		1 [10][3]
Filter_Alarm (VD)		0

Switching Table 3 : Alarm_AirHandl (VD) = 1

Alarm_AirHandl (VD)	Te = 10s [11][6]	1 [11][7]
DaTemp (AI_S) (Supply Duct)	>=	1 ')
38 [11][5]	hysteresis	

NOTE: The last column of the switching table is smaller for tables with XOR tables than for tables without XOR tables.

Mathematical Functions

If a switching table contains mathematical functions in a condition row and the printout of mathematical functions is enabled, the functions are printed as part of the switching tables (Refer also to *Mathematical Functions* section).

Example:

```
hysteresis = "DaTemp"*0.1
```

Parameters

In switching tables, the parameter file number and index is displayed in square brackets directly behind the corresponding parameter. The first value in brackets represents the file number and the second value in brackets represents the parameter index.

Example:

Alarm_AirHandl (VD)	Te = 10s [11][6]	1 [11][7]
DaTemp (AI_S) (Supply Duct)	>=	1
38 [11][5]	hysteresis	

Te = 10s [11][6] means that the on delay value of **10** seconds is stored in parameter file **11** in parameter number **6**.

If **Sorted by Parameter** is enabled, the parameters of the complete controller are printed in a separate table with description of the parameter usage.

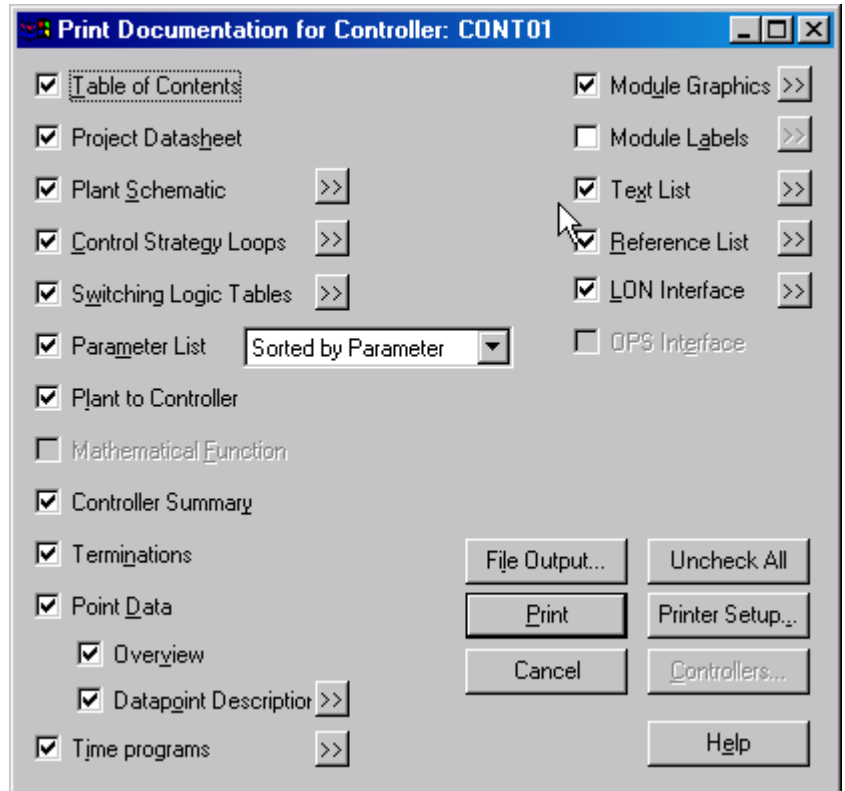
NOTE: The Math equations internal parameters are not printed as part of the switching tables.

Parameter List

If this checkbox is marked, the application parameters are printed.

NOTE: The Printout function supports the ANSI character set in the parameter list.

Parameter lists can be printed **Sorted by Parameter** and **Sorted by Usage**. The selection can be made from a dropdown list box.



Sorted by Parameter

If this selection is made, the parameters are printed in a separate chapter and not as part of each control strategy. Only those parameters that are available in the controller are printed.

NOTE: Printout sorted by parameter requires translation of the controller in CARE prior to the printout attempt, because during translation the <controller>.txt file is created which is used as an input file for the parameter printout.

The parameter tables are sorted by parameter file number.

Examples:

Parameter table of the main module.

- The header contains the main module name and the parameter file number 0.
- The column P. No. contains the parameter number.
- The column Description contains the parameter description.
- The column Value + Eng. Unit contains the parameter value and engineering unit (only for XFMs)
- The column Symbol Reference, Plant, Control Strategy contains the position and the input number of the control icon that uses the parameter (for example 4 - 2.3 means this parameter is used for input number 4 of a control statement on the position 2.3 [the second column and the third row of the corresponding control strategy]), the plant reference and the control strategy name.

NOTE: **User Value** is an extra blank column. The startup technician can use it to fill in the values he changes during plant startup.

Main module M0					Parameter file number 0
P.No.	Description	Value + Eng.Unit	User Value	Symbol Reference, Plant, Control Strategy	
1	Internal use	0.000			
2	Internal use	1.000			
3	Input 1	1.000		1- 2.2, STARTUP_5, STARTUP	
4	Input 3	50.000		3- 2.2, XL20_5, AirConStrategy	
5	Input 3	0.000		3- 2.3, XL20_5, AirConStrategy	
6	Input 4	0.000		4- 2.3, XL20_5, AirConStrategy	
7	Input 2	-50.000		2- 2.2, XL20_5, CoolerFan	
8	Input 1	50.000		1- 2.2, XL20_5, HeaterDamper	
9	Input 2	50.000		2- 2.2, XL20_5, HeaterDamper	
10	Input 1	-50.000		1- 1.1, XL20_5, HeaterDamper	
11	Input 3	-50.000		3- 1.1, XL20_5, HeaterDamper	

Parameter table of a control strategy sub module.

- The header contains the plant name, the sub module name (only for XFMs), the control loop name and the parameter file number.
- The column P. No. contains the parameter number.
- The column Description contains the parameter description.
- The column Value + Eng. Unit contains the parameter value and engineering unit (only for XFMs).
- The column Symbol Reference contains the position and the input number of the control icon that uses the parameter, for example 4 - 2.3 means this parameter is used for input number 4 of a control statement on the position 2.3 (the 2nd column and the 3rd row of the corresponding control strategy).
- The column Mapped SW Point contains the user address name of the software point, which the parameter is mapped to.

NOTE: **User Value** is an extra blank column. The startup technician can use it to fill in the values he changes during plant startup.

Plant STARTUP		Sub module xfm_90.csd	Control loop STARTUP	Parameter file number 1	
P.No.	Description	Value + Eng.Unit	User Value	Symbol Reference	Mapped SW Point
1	Delay Time	60.000 s		2.2	TestPoint_01
2	Version	1.000 I		2.2	TestPoint_06
3	XFM_Number	90.000 I		2.2	TestPoint_11

Parameter table of a switching table sub module.

- The header contains the plant name, the switching table name (name of the switched point) and the parameter file number.
- The column P. No. contains the parameter number.
- The column Description contains the parameter description.
- The column Value + Eng. Unit contains the parameter value and engineering unit (only for XFMs).
- The column Symbol Reference contains the line of the switching table that contains the parameter, where 0 means the table header and 1 means the 1st line.

NOTE: **User Value** is an extra blank column. The startup technician can use it to fill in the values he changes during plant startup.

Plant XL20_3		Switching table Alarm_AirHandl	Parameter file number 11		
P.No.	Description	Value + Eng.Unit	User Value	Symbol Reference	
1	Internal use	0.000			
2	Internal use	1.000			
3	Internal use	48.000		1	
4	Hysteresis (MAT) Line 1 Table 1	0.100		1	
5	Comparison Value 2 Line 1 Table 1	38.000		1	
6	Comp. Value 2 (MAT) Line 2 Table 1	10.000		2	
7	Output On-Delay Table 1	10.000		0	
8	Output Value Table 1	1.000		0	

NOTE: Engineering units for parameters are only printed for XFMs.

Sorted by Usage

If this selection is made, the parameters are printed as part of the control strategy to which they belong.

NOTE: **Parameters Sorted by Usage** can only be selected, if control strategy or switching table printout was selected previously.

For switching tables, the parameter file number and index is printed directly behind the corresponding parameter, so that in this case no separate parameter table is required.

Parameters are printed with the statement position and type, the description of the parameter, the parameter value and engineering unit, the parameter file number, the parameter index and the user address of the software point, which the parameter is mapped to.

NOTE: There is an extra column **User Value** that is blank. The startup technician can fill in the values he changes during plant startup.

Example:

Position	Type	Description	Value	Eng./ Unit	User Value	Parameter File	Parameter Index	Point Mapping onto:
2.1	SEQ	Min value sequence 1	10.000			1	3	SW_Point_Test1
2.1	SEQ	Max value sequence 1	100.000			1	5	SW_Point_Test2
2.1	SEQ	Slope sequence 1	0.900			1	4	SW_Point_Test4
2.1	SEQ	y-axis intersection sequence 1	10.000			1	1	SW_Point_Test3
2.1	SEQ	Min value sequence 2	100.000			1	8	SW_Point_Test7
2.1	SEQ	Max value sequence 2	10.000			1	9	SW_Point_Test6
2.1	SEQ	Slope sequence 2	-0.900			1	2	SW_Point_Test5
2.1	SEQ	y-axis intersection sequence 2	100.000			(Not Generated)*		
2.1	SEQ	Min value sequence 3	100.000			(Not Generated)*		
2.1	SEQ	Max value sequence 3	10.000			(Not Generated)*		
2.1	SEQ	Slope sequence 3	-0.900			(Not Generated)*		
2.1	SEQ	y-axis intersection sequence 3	100.000			(Not Generated)*		
2.1	SEQ	Internal Parameter 10/12	100.000			(Not Generated)*		

NOTES:

1. *If optional parameters exist for a statement (for example input parameters), and the user does not use these parameters, the printout shows the entry "Not Generated".
2. Engineering units for parameters in the control strategy are only printed for XFMs.
3. **Parameters sorted by Usage** does not print the parameters of mathematical functions.

Parameters of WIA/RIA

If Control Strategy is enabled, the parameters of WIA/RIA are printed as part of the control strategy loop for each option, sorted by parameters or sorted by usage.

Icon Type	Position	Connected User Address	Type	Descriptor	Attribute
WIA	1.1	L02VD_PlantRuns_5	VD		1: Operational Mode 2: Hide Point 3: No Response
RIA	1.2	L02VA_SeqCntrl_5	VA		1: Operational Mode 2: No Response 3: IO Remote

If this checkbox is marked, the plants that are assigned to the selected controller are printed as shown below.

The printed table contains:

- All plant names that belong to the specific controller
- The corresponding type (for example, Air Conditioning/Hot Water) for each plant name
- All assigned control strategies for each plant

Example:

Plant name	Plant Type	Control Strategy Name
STARTUP	Air Conditioning	STARTUP
XL20_3	Air Conditioning	AirConStrategy
		CoolerFan
		Plant Feedback
		HeaterDamper

Mathematical Function

Mathematical functions can be found in control strategies and/or switching tables. If there is not any mathematical function in control strategies and/or switching tables, this checkbox cannot be enabled. In case of existing mathematical functions, they are only printed, if **Control Strategy Loops** and/or **Switching Logic Tables** is enabled.

Control Strategies

If a control strategy contains mathematical functions and the printout of mathematical functions and control strategy loops is enabled, the functions are printed as part of the control strategy (Refer also to *Control Strategy Loop* section).

Example:

Average = ("Temp_1"+"Temp_2"+"Temp_3")/3
Smooth = INRT["difference",128,1440m]
Difference = "DelayedOutdoorTemp"-"CurrentOutdoorTemp"

Switching Tables

If a switching table contains mathematical functions in a condition row and the printout of mathematical functions and of switching tables is enabled, the functions are printed as part of the switching tables (Refer also to *Switching Logic Tables* section).

Example:

hysteresis = "DaTemp"*0.1

Controller Summary

If this checkbox is marked, a summary for each selected controller is printed. The controller summary shows which module type is plugged into which housing. For each I/O module, the technical address of the module is printed (refer to *Terminal Assignment Function*).

Example:

ÎP Housing 1

IP Housing 2

XP502	XF521	XF522	XC5010	XF523	XF524	(Empty)	(Empty)
	No : 1	No : 2		No : 3	No : 4		

Note: Number states technical address of module.

XF528 Housing 2

XF528(1)	XF528(2)	XF528(3)	XF528(4)	XF528(5)
No : 7	No : 8	No : 9	No : 10	No : 11

Note: Number states technical address of module.

LON Bus Housing 1

XFL523	XFL523	XFL523	XFL521	XFL522	XFL523	XFL524
No : 7	No : 8	No : 9	No : 10	No : 11	No : 12	No : 13

→ Slot 7-10
graphically
not presented

Note: Number states technical address of module.

Terminations

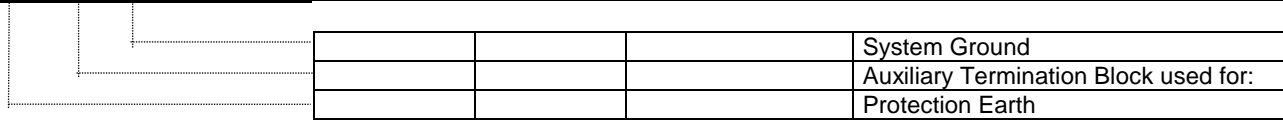
If this checkbox is marked, all terminations of the selected controller(s) are printed.

Example for standard module terminations:

Device/ Terminal	Installation	Cable Type	Cable No.	Wire Identification	Housing Number 1 Module Number 5 Module Type XF521
					<input type="radio"/> 01 AC1MaTemp (22 / 5 / 1)
					<input type="radio"/> 02 COM
					<input type="radio"/> 03 AC1OaTemp (22 / 5 / 2)
					<input type="radio"/> 04 COM
					<input type="radio"/> 05 AC1RmTemp (22 / 5 / 3)
					<input type="radio"/> 06 COM
	Coding Pin				<input checked="" type="radio"/> 07
					<input type="radio"/> 08 AC1SolarHeat (22 / 5 / 4)
					<input type="radio"/> 09 COM
					<input type="radio"/> 10
					<input type="radio"/> 11 COM
					<input type="radio"/> 12
					<input type="radio"/> 13 COM
					<input type="radio"/> 14
					<input type="radio"/> 15 COM
					<input type="radio"/> 16
					<input type="radio"/> 17 COM
					<input type="radio"/> 18 10 V

Example for LON module terminations:

			Cable Type	Cable No.	Wire Identification	Module Number 1 Module Type XFL521 on XSL513
PE	35					
	36	18				
	37	19		1		L22_MW_DischarTemp (22 / 1 / 1)
	38	20		2		L22_MW_Frosttemp (22 / 1 / 2)
	39	21		3		L22_MW_OaTemp (22 / 1 / 3)
	40	22		4		L22_MW_RoomTemp (22 / 1 / 4)
	41	23		5		L22_MW_SupplyTemp (22 / 1 / 5)
	42	24		6		
	43	25		7		
	44	26		8		
	45	27		9		10 V
	<input checked="" type="radio"/> 46	28		10		10 V
	47	<input checked="" type="radio"/> 29		11		10 V
	48	30		12		10 V
	49	31		13		10 V
	50	32		14		10 V
	51	33		15		10 V
	52	<input checked="" type="radio"/> 34		16		10 V
				17		10 V



Example for Excel 50 terminations (screw terminals):

Port A						
Power	24Vac-	24Vac+				
24VAC	1	2				
Relay outputs	24VAC	24VAC	Datapoint Name	Descriptor	Field Device	
DO1	3	4	do_fb_di_1 (2 / 4 / 1)			
DO2	5	6	do_fb_di_1 (2 / 4 / 2)			
DO3	7	8	do_fb_di_1 (2 / 4 / 3)			
DO4	9	10	do_fb_di_2 (2 / 4 / 4)			
DO5	11	12	do_fb_di_2 (2 / 4 / 5)			
DO6	13	14	do_fb_di_2 (2 / 4 / 6)			
Port B						
Control Outputs	Y	COM	24VAC	Datapoint Name	Descriptor	Field Device
AO1	15	16 & 1	2			
AO2	17	18 & 1	2			
AO3	19	20 & 1	2			
AO4	21	22 & 1	2			
Contacts Input	Y	COM (dry contact)	COM (powered contact)	Datapoint Name	Descriptor	Field Device
DI1	23	32	24	do_fb_di_2 (2 / 3 / 1)		
DI2	25	32	26	do_fb_di_1 (2 / 3 / 2)		
DI3	27	32	28	do_fb_di_1 (2 / 3 / 3)		
DI4	29	32	30	do_fb_di_1 (2 / 3 / 4)		
Universal Inputs	Y	COM	24VAC or URef	Datapoint Name	Descriptor	Field Device
UI1	33	34 & 1*	2* (31**)	do_fb_di_2 (2 / 1 / 1)		
UI2	35	36 & 1*	2* (31**)	do_fb_di_2 (2 / 1 / 2)		
UI3	37	38 & 1*	2* (31**)			
UI4	39	40 & 1*	2* (31**)			
UI5	41	42 & 1*	2* (31**)			
UI6	43	44 & 1*	2* (31**)			
UI7	45	46 & 1*	2* (31**)			
UI8	47	48 & 1*	2* (31**)			

*Non NTC sensors means active sensor

**for DI on AI board

Point Data

If this checkbox is enabled, an overview of the point data and the datapoint description for all points are printed.

Overview If this checkbox is marked, the quantity of each module and the quantity of the physical datapoints on the corresponding module are printed.

Example:

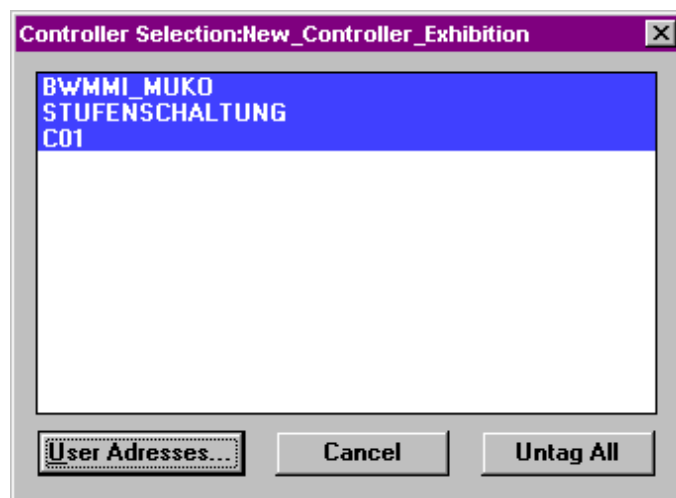
Quantity of Modules		Quantity of Physical Data points	
Quantity DI Modules (XF523)	5	Quantity Digital Inputs	49
Quantity DO Modules (XF524)	4	Quantity Analog Inputs	24
Quantity 3 Position Modules (XF525)	0	Quantity Analog Outputs	20
Quantity AI Modules (XF521)	3	Quantity 3 Position Outputs	0
Quantity AO Modules (XF522)	4	Quantity Totalizers (fast)	0
Quantity Fast AI Modules (XF526)	0	Quantity Totalizers (slow)	0
Quantity AO Modules (w/o switches) (XF527)	0	Quantity Digital Outputs (NO)	0
Quantity DO Modules (w/o switches) (XF529)	0	Quantity Digital Outputs (C/O)	17
Quantity High Density DI Modules (XF528)	0		
Total IP-Bus Modules	16	Total Physical Datapoints	110

Quantity AI LON Modules (XFL521)	0	Quantity Pseudo Analog Points	0
Quantity DI LON Modules (XFL522)	0	Quantity Pseudo Digital Points	3
Quantity AO LON Modules (XFL524)	0	Total Pseudo Data Points	3
Quantity DO LON Modules (XFL523)	0		
Total LON Modules	0	Quantity Global Analog Points	1
		Quantity Global Digital Points	1
Total IO Modules	16	Total Global Points	2

Quantity Control Loops	0	Quantity DO_Feedback_DI Points*	0
Quantity PID Controllers	0	Quantity Multi_Stage_Points*	0
Country Code	GERMANY	Quantity Puls_2 Points*	0
Engineering Units	International	Total Special Points	0
Default File Set	xl_1_5		
Installation	Normal	Quantity Analog Flags	1
Power Supply	XP 502	Quantity Digital Flags	1

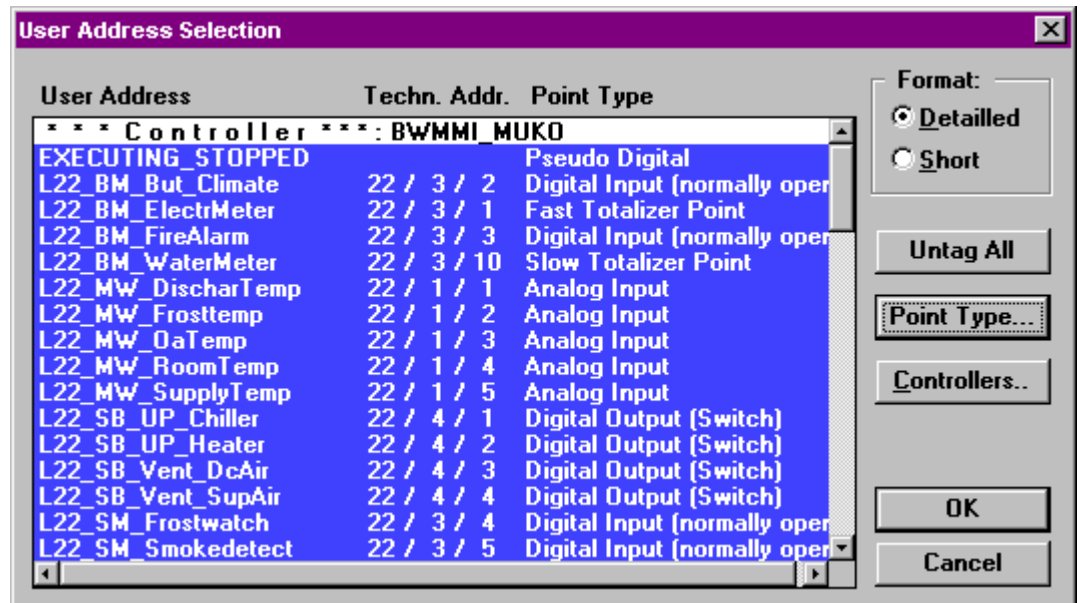
NOTE: The subpoints of these special points are included in the quantity of physical datapoints.

Datapoint Description If this checkbox is marked, the datapoint description of the selected controller is printed. The printout may be adjusted by clicking on the >> button.
If a project was selected for printout, clicking on the >> button opens the **Controller Selection** dialog box to select controllers for printout.



Highlight desired controller(s) you want to print datapoint description for and click the **User Addresses...** button to open the **User Address Selection** dialog box for the selected controllers.

If a single controller or attached plant was selected for printout, clicking on the >> button opens the **User Address Selection** dialog box directly:



By default all user addresses are highlighted for printing. Deselect addresses you do not want to print by clicking on with left mouse key, or reselect. Use Untag/Tag button for (de)selection of all addresses.

In addition to the **User Address Selection** dialog box, the printing Format, Point Type or Controllers can be selected.

With the **Format** radio buttons, the user can select **Detailed** or **Short** format for the printout:

Detailed Format

The detailed format prints a table for each datapoint that contains all its attributes and their values.

The user addresses for each selected point type are printed. Within each point type, the user addresses are sorted by alphabetical order.

If no datapoint exists for a selected type, the corresponding chapter is not printed.

For flags the user address, the z-register file and index numbers are printed. If there is no valid file and index number available, the flag is indicated as "not assigned".

Short Format

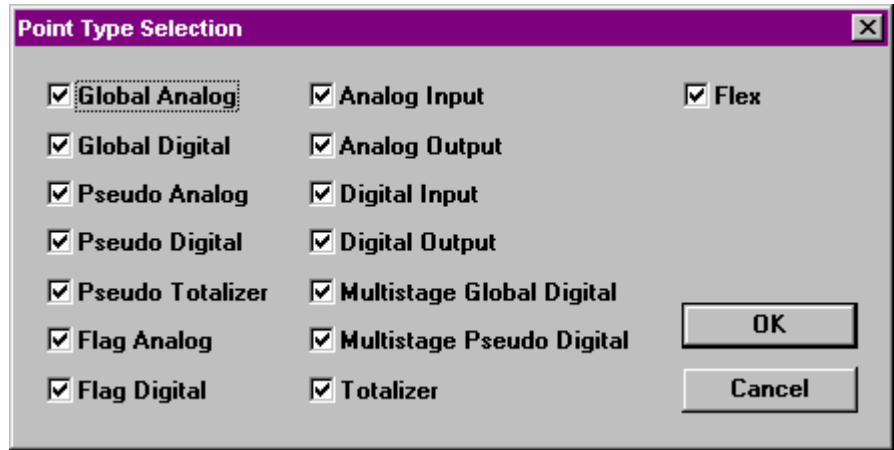
The short format prints no attributes of the datapoints. The printout is sorted by alphabetical order.

Controllers...

After clicking on the **Controllers...** button, the user can switch to the **Controller Selection** dialog box (only possible, if a project with multiple controllers has been selected for printout).

Point Type...

After clicking on the **Point Type...** button the **Point Type Selection** dialog box is displayed.



In the **Point Type Selection** box, datapoints can be (de)selected by type (for example all AIs, all DIs and/or all Multistage Global Digital points). Only selected point types will be shown in the User Address Selection dialog box.

See Point Type Abbreviations section for a list of point type abbreviations.

Click OK to close the Point Type dialog box.

Clicking OK in the User Address Selection dialog box prints the following:

- User Address
- Descriptor
- Point Type Abbreviation
- Technical Address

Example: Datapoint Description (Short Format)

User Address	Descriptor	Point Type	Technical Address
DaTemp	Supply Duct	AI_S	1 / 1 / 1
OaTemp1	Building West Outdoor Temp	AI_S	1 / 1 / 2
RmTemp		AI_S	1 / 1 / 3
CigVlv	Air Cooler	AO	1 / 2 / 1
HtgVlv1	Air Heater	AO	1 / 2 / 2
OaDmpr1	Supply Duct	AO	1 / 2 / 3
L02VA_AutoPlant	XFM Internal User Address	VA	
L02VA_OutdoorTemp	XFM Internal User Address	VA	
L02VA_SeqCntrl	XFM Internal User Address	VA	
L02VA_SuplDemand	XFM Internal User Address	VA	
L02VX_wCalcRt	XFM Internal User Address	VA	
L02VZ_FanDemand	XFM Internal User Address	VA	
L02VZ_wRt	XFM Internal User Address	VA	
GA		GA_I	0 / 0 / 0
DaFiltAlm	Supply Duct	DI_NO	1 / 3 / 12
SaFanStatus2	Supply Fan	DI_NO	1 / 3 / 11
CigPump	Air Cooler	DO_NO	1 / 4 / 1
HtgPump1	Air Heater	DO_NO	1 / 4 / 2
SaFanHi	Supply Fan	DO_NO	1 / 4 / 5
SaFanLo	Supply Fan	DO_NO	1 / 4 / 4
Alarm_AirHandl		VD	
EXECUTING_STOPPED		VD	
Filter_Alarm		VD	
L02VD_EnblACT	XFM Internal User Address	VD	
L02VD_EnblAH	XFM Internal User Address	VD	
L02VD_EnblDamp	XFM Internal User Address	VD	
L02VD_PlantRuns	XFM Internal User Address	VD	
L02VS_Alarm	XFM Internal User Address	VD	
L02VZ_Maintenance	XFM Internal User Address	VD	

User Address	Descriptor	Point Type	Technical Address
L02VZ_PlantOn	XFM Internal User Address	VD	
ManOff		VD	
Reset_Alarm		VD	
SHUTDOWN		VD	
STARTUP		VD	
TotCurrent	Meters in Cellar	TOT_F	1 / 3 / 1
TotWater	Meters in Cellar	TOT_S	
Dummy_yFO		FA	
Dummy_St3		FD	
FD		FD	
ZERO		FD	

Example: Datapoint Description for Flags

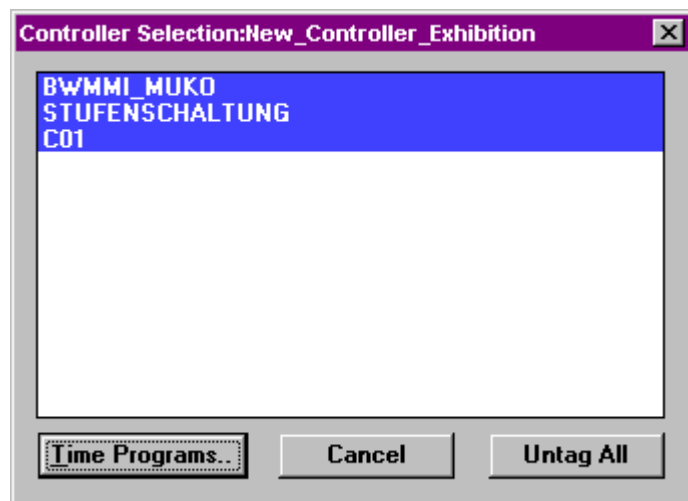
L22FD_Release	(unassigned)
L22FD_Temp	(FileNo.: 5/IndexNo. 8)

Time Programs

If this checkbox is marked, the time programs of the selected controllers are printed.

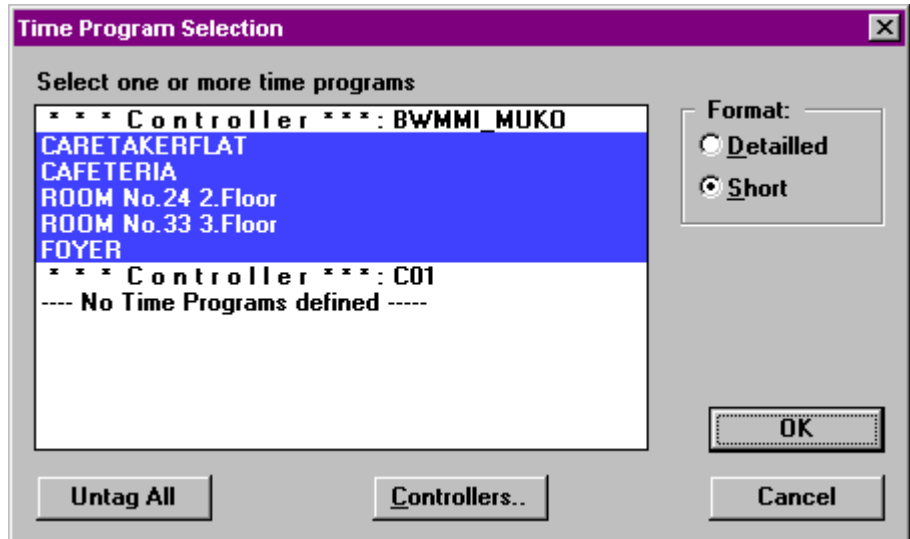
The printout may be adjusted by clicking on >> button.

If a project was selected for printout, clicking on the >> button opens a dialog box to select controllers for printout.



From this dialog box, the **Time Programs** button opens the **Time Program Selection** dialog box for the selected controllers.

If a single controller or attached plant was selected for printout, clicking on the >> button opens the **Time Program Selection** dialog box directly:



In the **Time Program Selection** dialog box, the user can make multiple selections:

- From the list of available time programs, the user can deselect time programs from printing by clicking on already highlighted items with the left mouse button.
- With the Format radio buttons, the user can select Detailed or Short format for the printout (see below).
- With the Controllers... button, the user can switch to the *Controller Selection* dialog box (only possible, if a project with multiple controllers has been selected for printout).

Detailed Format

The detailed format prints a table with the following information for each time program:

- A list of all points that are assigned to this time program with
 - user address
 - descriptor
 - type of each point.
- A list of all daily programs that belong to the time program with
 - daily program name
 - switching time
 - user address of the point that is switched
 - descriptor of the point that is switched in round brackets behind the user address
 - value/status to which the point is commanded.
 - optimized status for switching points.
- A list of the weekdays (Monday to Friday) with the corresponding daily programs assigned to them.
- A list of public holidays with the corresponding daily programs assigned to them.

NOTE: The holiday program table is only printed, if there is a daily program assigned to one of the holidays.

Short Format

The short format prints a table with the following information for each time program:

- A list of all points that are assigned to this time program with
 - user address
 - descriptor
 - type of each point.
- A list of all daily programs that belong to the time program with
 - daily program name
 - switching time
 - user address of the point that is switched

- descriptor of the point that is switched in round brackets behind the user address
- value/status to which the point is commanded.
- A list of the weekdays (Monday to Friday) with the corresponding daily programs assigned to them and for each daily program:
 - switching time
 - user address of the point that is switched
 - descriptor of the point that is switched in round brackets behind the user address
 - value/status to which the point is commanded.
 - optimized status for switching points.
- A list of public holidays with the corresponding daily programs assigned to them

NOTE: The holiday program table is only printed, if they have a daily program assigned to one of the holidays

Example (weekly schedule in short format):

Weekday (Daily program name)	Time	User Address of Switching Point	Value/State	Optim
Monday (everyday)	06:00	L02VZ_PlantOn (XFM Internal User Address)	Occupied	YES
	22:00	L02VZ_PlantOn (XFM Internal User Address)	Unoccupied	YES
Tuesday (everyday)	06:00	L02VZ_PlantOn (XFM Internal User Address)	Occupied	NO
	22:00	L02VZ_PlantOn (XFM Internal User Address)	Unoccupied	YES
Wednesday (everyday)	06:00	L02VZ_PlantOn (XFM Internal User Address)	Occupied	YES
	22:00	L02VZ_PlantOn (XFM Internal User Address)	Unoccupied	YES
Thursday (everyday)	06:00	L02VZ_PlantOn (XFM Internal User Address)	Occupied	YES
	22:00	L02VZ_PlantOn (XFM Internal User Address)	Unoccupied	YES
Friday (everyday)	06:00	L02VZ_PlantOn (XFM Internal User Address)	Occupied	YES
	22:00	L02VZ_PlantOn (XFM Internal User Address)	Unoccupied	YES
Saturday (weekend)	00:00	L02VZ_PlantOn (XFM Internal User Address)	Unoccupied	YES
Sunday (weekend)	00:00	L02VZ_PlantOn (XFM Internal User Address)	Unoccupied	NO

NOTE: It is recommended that the time programs are printed in short format to save paper.

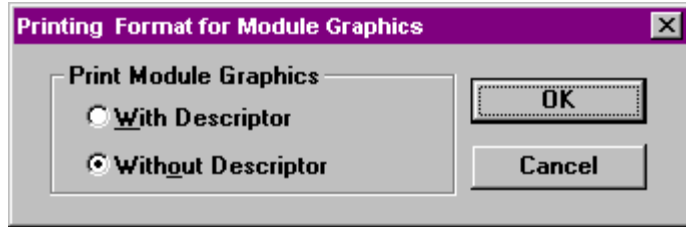
Controllers... After clicking on the **Controllers...** button the **Controller Selection** dialog box is displayed to select controllers for which the time programs will be printed.

Module Graphics

If this checkbox is enabled, standard and LON modules respectively are printed as a graphic. The graphic shows which user address resides on which switch or lamp, so that the operator can easily find datapoints on the controller. The printout may be put in the cabinet for easy reference to the datapoints. Additionally, the setting of the HEX address switch is displayed.

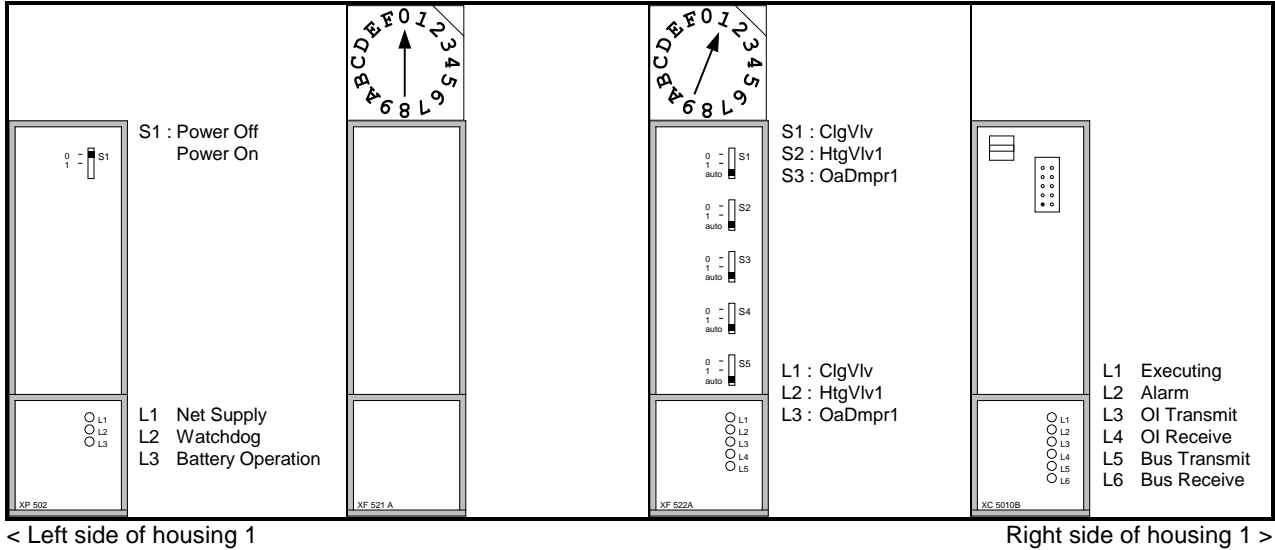
Module graphics can be printed with or without point descriptors. The printout of modules with point descriptors consumes more space and therefore only two modules are printed per page. The printout without point descriptors prints four modules on the same page.

Click the >> button to select the format in the Printing Format for Module Graphics dialog box.



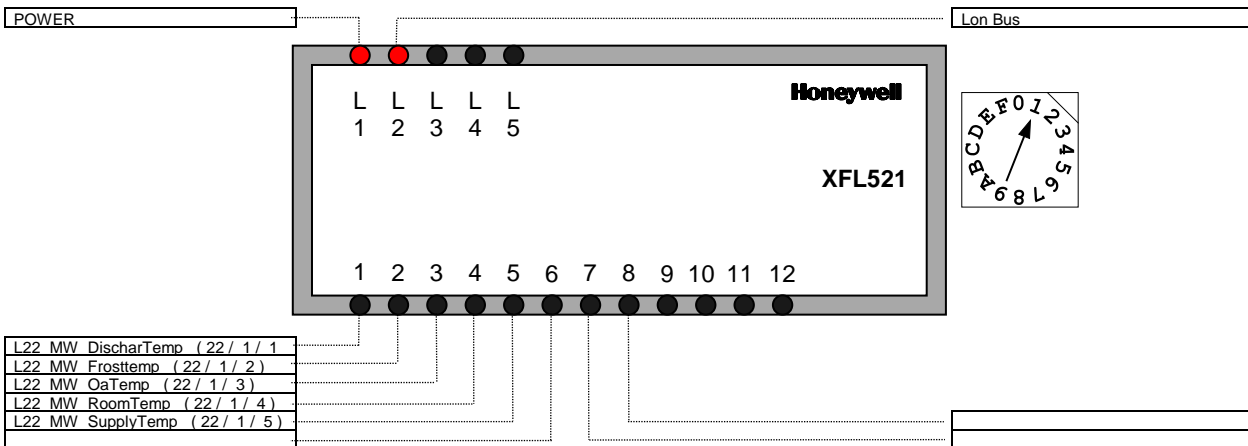
Example (standard module graphics without descriptors):

Module Graphics for Housing 1

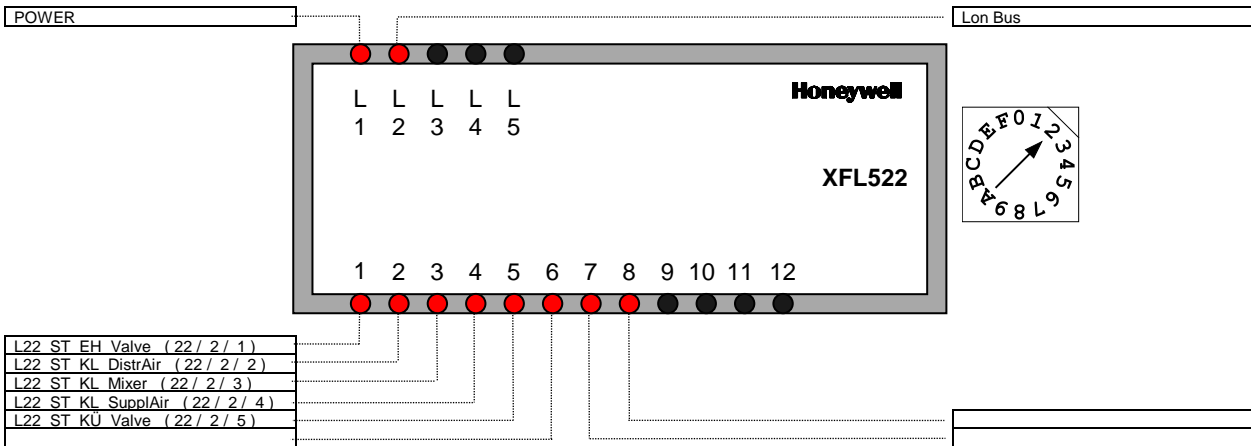


Example (LON module graphics without descriptors):

Module Graphics for LON module No.: 1

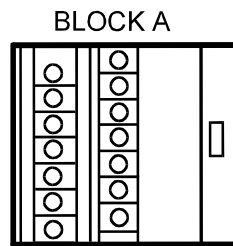


Module Graphics for LON module No.: 2



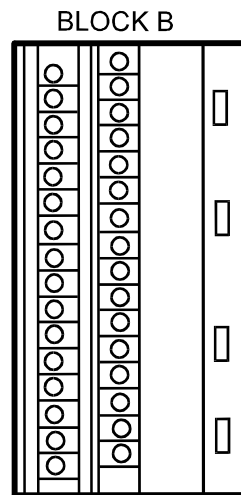
Example (Excel 50 Screw Terminals):

2:24 V AC
4:24 V AC
6:24 V AC
8:24 V AC
10:24 V AC
12:24 V AC
14:24 V AC



1:24 V AC (Common)
3:do_fb_di_1 (2 / 4 / 1)
5:do_fb_di_1 (2 / 4 / 2)
7:do_fb_di_1 (2 / 4 / 3)
9:do_fb_di_2 (2 / 4 / 4)
11:do_fb_di_2 (2 / 4 / 5)
13:do_fb_di_2 (2 / 4 / 6)

16:GND
18:GND
20:GND
22:GND
24:GND
26:GND
28:GND
30:GND
32:DI-Power
34:GND
36:GND
38:GND
40:GND
42:GND
44:GND
46:GND
48:GND



15:
17:
19:
21:
23:do_fb_di_2 (2 / 3 / 1)
25:do_fb_di_1 (2 / 3 / 2)
27:do_fb_di_1 (2 / 3 / 3)
29:do_fb_di_1 (2 / 3 / 4)
31:+10V Ref
33:do_fb_di_2 (2 / 1 / 1)
35:do_fb_di_2 (2 / 1 / 2)
37:
39:
41:
43:
45:
47:

Module Labels

CARE allows you to print both standard and LON module labels for the module front plates. These labels can be printed on self-adhesive stickers and put on the modules to describe the individual I/Os.

The labels contain the input/output user address for each terminal. For labels with switches, holes are marked. These holes can be cut out using a special cutting tool. Alternatively, the individual user addresses can be cut from the sticker and can be put on the front plate individually.

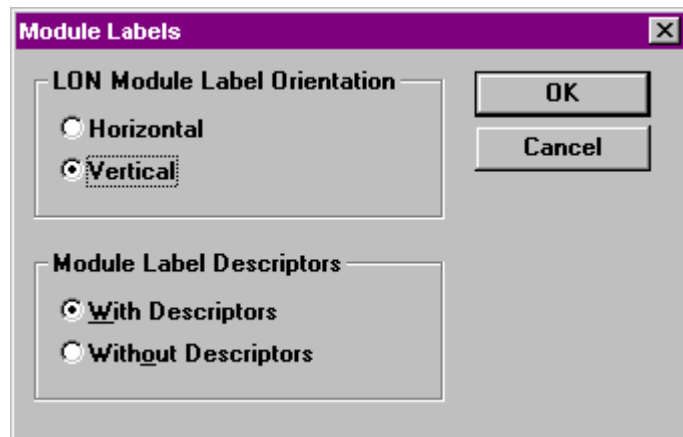
NOTES: It is possible that the user addresses are too long for a module label, causing the module label text to look scrambled. In which case, you can edit the printout file that contains the module labels before printing to the self-adhesive stickers. For example, a smaller font can be used or the user address can be abbreviated.

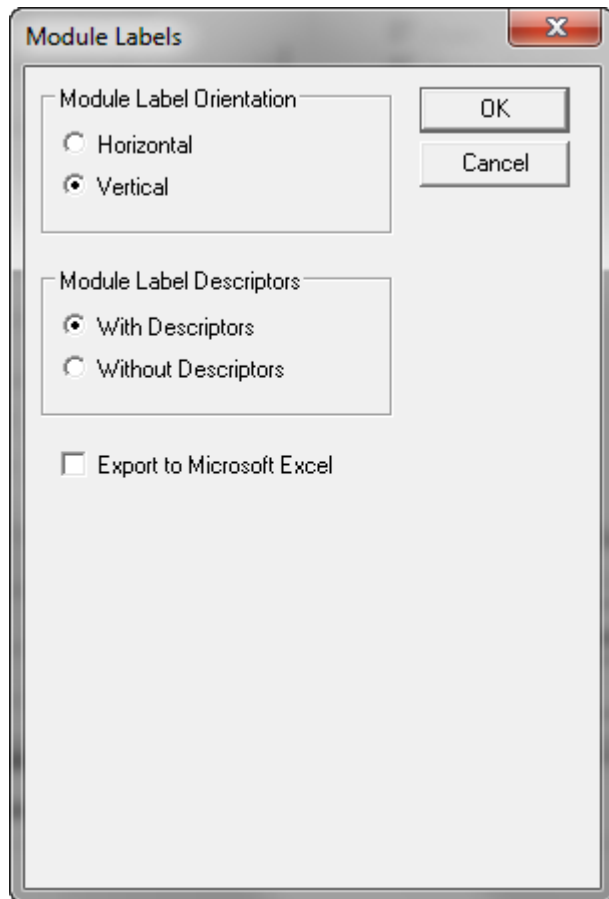
Module label printing for Excel 80/100 controllers is not available

Select the Module Labels checkbox to print module labels.

RESULT: All other options from the Print Documentation... dialog box are disabled, because module labels require self-adhesive stickers to be put in the printer.

Click >> button to open the Module Labels dialog box.





Select the orientation (horizontal or vertical).

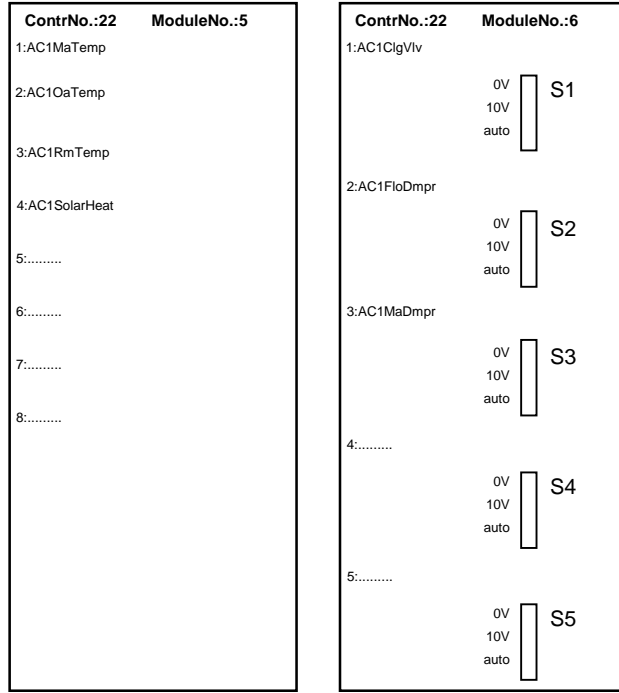
Select, if you want to print with or without descriptors.

Check Export to Microsoft Excel, and then check the options you want to be appear in the Excel sheet.

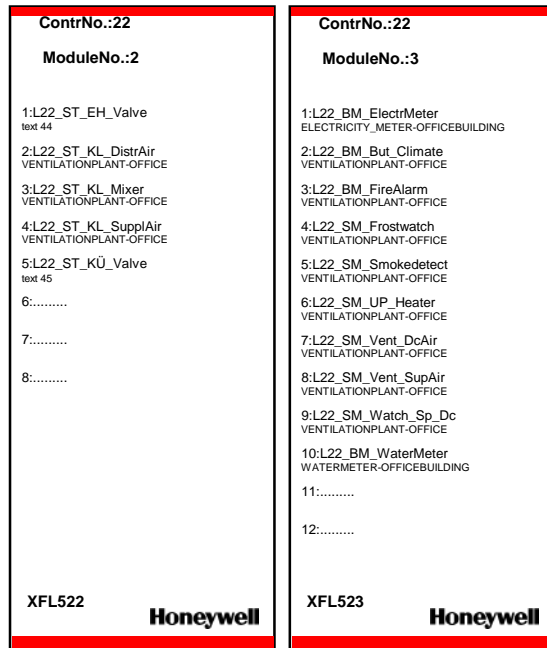


Click **OK** to confirm.

Example (Vertical standard module labels with descriptors):



Example (Vertical LON module labels with descriptors):



NOTE: First print the module labels to a file, then put the self-adhesive paper for the stickers into the printer and print them one by one.

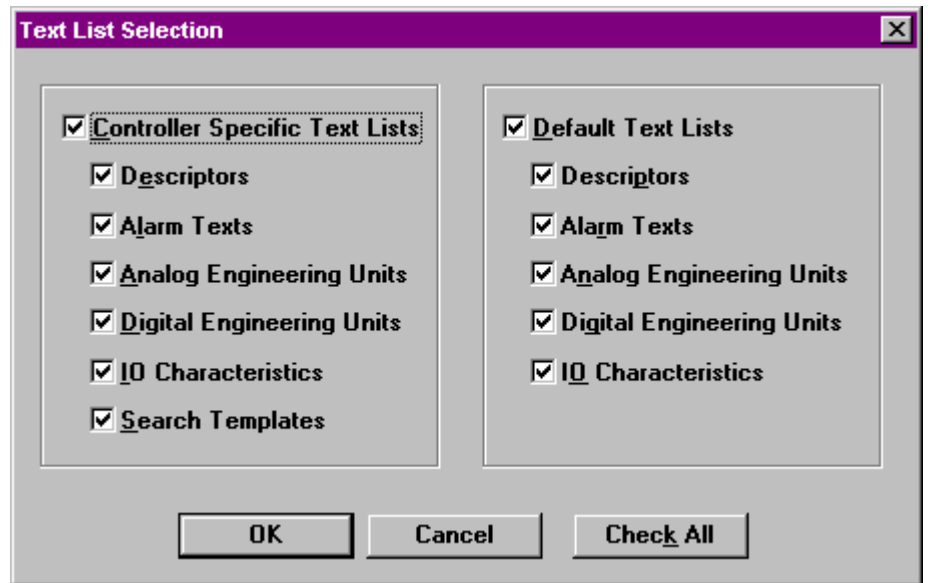
Example (Export to Microsoft Excel):

<p>Honeywell Contr:11 Bus:2 Module:1 XFR822A</p> <p>1: 5HI75712SM2 / Spjæld kold kanal</p> <p>2: 5HI75712SM4 / Spjæld varm kanal</p> <p>3: AHU01_Htg_Vlv / AHU01 Heating Valve</p> <p>4: AHU01_Clg_Vlv / AHU01 Cooling Valve</p> <p>5: AHU01_Hum_Vlv / AHU01 Humidifier Valve</p> <p>6: AHU01_Econovent / AHU01 Control Econovent</p> <p>7:</p> <p>8:</p>	<p>Honeywell Contr:11 Bus:2 Module:1 XF823A</p> <p>1: AHU01_Warn_FiltOutAir / AHU01 Warning Outside Air Filter</p> <p>2: AHU01_Alarm_HtgPu / AHU01 Alarm Heating Pump</p> <p>3: AHU01_Alarm_Frost / AHU01 Alarm Freeze Protection</p> <p>4: AHU01_Alarm_SaFan / AHU01 Alarm Supply Air Fan</p> <p>5: AHU01_Alarm_Rep_SaFan / AHU01 Supply Air Fan Repair Switch</p> <p>6: AHU01_AlarmPD_SaFan / AHU01 Supply Air Fan Difference Pressure</p> <p>7: AHU01_Feedb_SaFan / AHU01 Feedback Supply Air Fan</p> <p>8: AHU01_Count_Htg / AHU01 Energy meter</p> <p>9:</p> <p>10:</p> <p>11:</p> <p>12:</p>
--	---

Text Lists

If this checkbox is enabled, the text lists of the selected controllers are printed.

The different text lists can be selected in the *Text List Selection* dialog box by clicking on the >> button.



Controller Specific Text Lists prints the text as they have been defined in the miscellaneous editor.

Default Text Lists prints the texts that are stored in the EXCEL default files in the PCBSTD directory.

For either choice, the following information may be printed:

- Descriptors
- Alarm Texts
- Analog Engineering Units

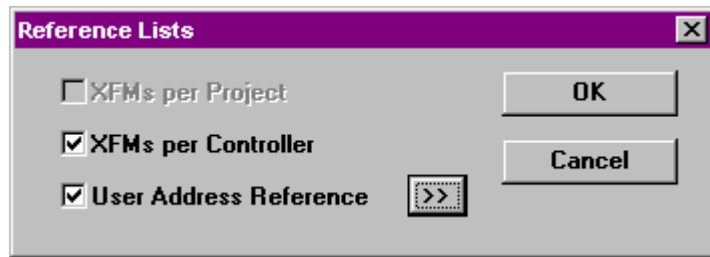
- Digital Engineering Units
- I/O Characteristics
- Search Templates (for controller specific text lists only)

Reference List

If this checkbox is enabled, reference data of the selected controllers are printed. Reference data include used XFMs per project, per controller and a user address reference table that shows for each point in which plant, control strategy, switching table and time program it is used.

NOTE: Printing a reference list can take time. “Don’t worry, be patient or print separately”.

Clicking the >> button at the Reference List item opens the Reference Lists dialog box where different reference lists can be selected.



XFMs per project

This option is only available, if a project was selected in CARE for printing out. Enabling this check box creates a table showing used XFMs with their names and corresponding paths/filenames for the selected project.

Example:

XFMs used in this Project

XFM Name	Path/Filename
ramp	C:/CARE/XFM/ORIGINAL/ramp
enth	C:/CARE/XFM/ORIGINAL/enth
gndda01a	C:/CARE/XFM/ORIGINAL/gndda01a

XFMs per Controller

Enabling this check box creates a table showing used XFMs with their names and corresponding paths/filenames for the selected controller(s).

Example:

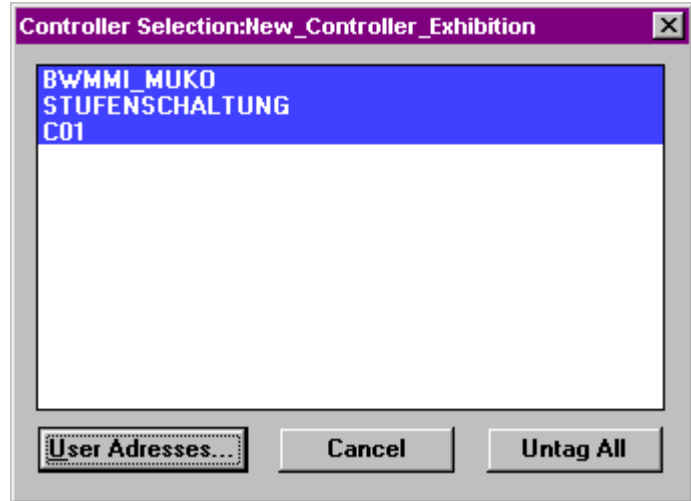
XFMs used in Controller BWMMI_MUKO

XFM Name	Path/Filename
ramp	C:/CARE/XFM/ORIGINAL/ramp
enth	C:/CARE/XFM/ORIGINAL/enth
gndda01a	C:/CARE/XFM/ORIGINAL/gndda01a

User Address Reference

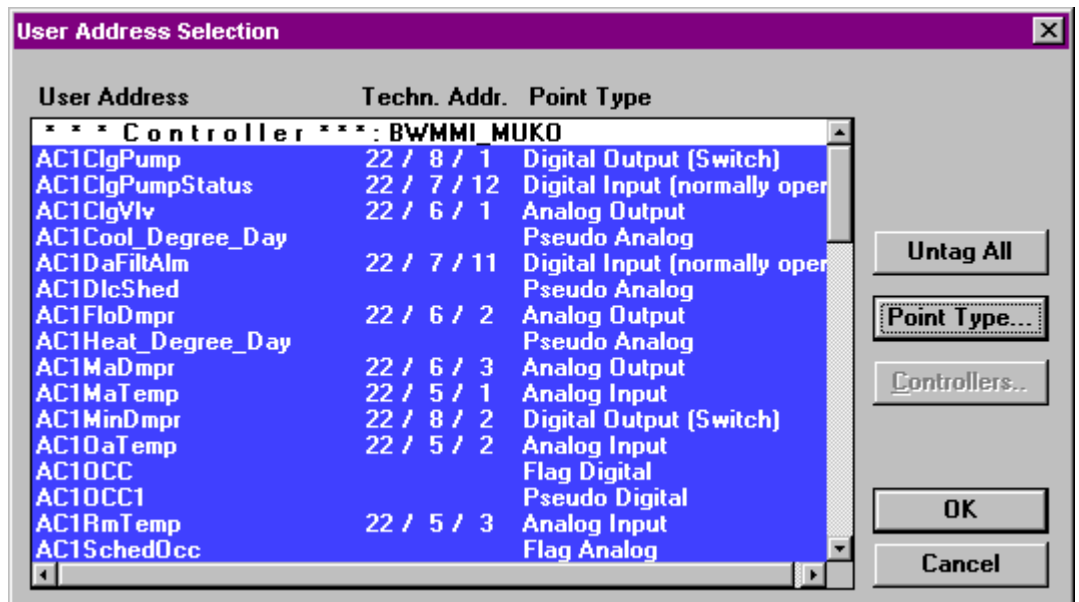
Enabling this check box creates a table showing the locations for each user address in the corresponding plant, switching table, control strategy and time program.

If a project was selected for printout, clicking on the >> button opens the **Controller Selection** dialog box to select controllers for printout.



Highlight desired controller(s) you want to print reference lists for and click the **User Addresses...** button to open the **User Address Selection** dialog box for the selected controllers.

If a single controller or attached plant was selected for printout, clicking on the >> button opens the **User Address Selection** dialog box directly:



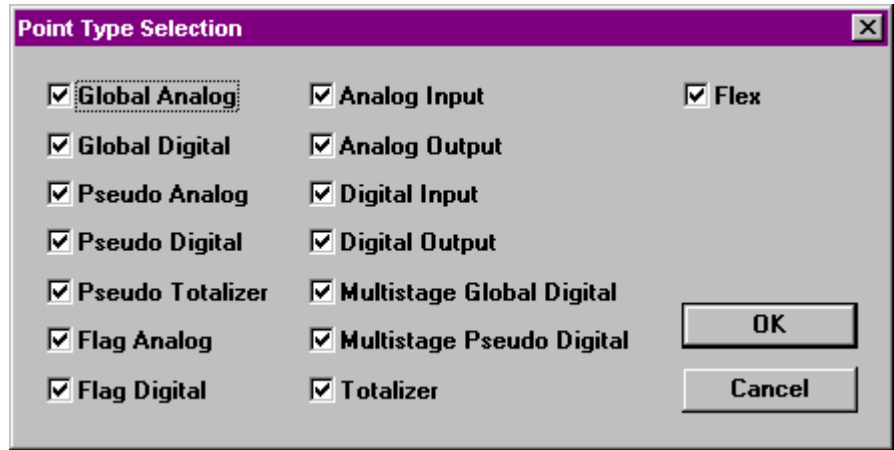
By default all user addresses are highlighted for printing. Deselect addresses you do not want to print by clicking on with left mouse key, or reselect. Use Untag/Tag button for (de)selection of all addresses.

Controllers...

After clicking on the **Controllers...** button, the user can switch to the **Controller Selection** dialog box (only possible, if a project with multiple controllers has been selected for printout).

Point Type...

After clicking on the **Point Type...** button the **Point Type Selection** dialog box is displayed.



In the **Point Type Selection** box, datapoints can be (de)selected by type (for example all AIs, all DIs and/or all Multistage Global Digital points). Only selected point types will be shown in the User Address Selection dialog box.

See Point Type Abbreviations section for a list of point type abbreviations.

Click OK to close Point Selection dialog box and click OK to close User Address Selection dialog box.

Clicking OK in the Reference Lists dialog box prints the following for each selected user address.

Example:

User Address ReferenceBWMMI_MUKO

User Address	Plant	Switching Table	Control Strategy	Time Programs (Daily Programs)
Analog Input Points				
AC1MaTemp	AC1		klima	
AC1OaTemp	AC1		klima	
L22_MW_DischarTemp	OFFICE_BUILD_VENTILATSimulation		Simulation	Restaurant (Monday)
L22_MW_Frosttemp	OFFICE_BUILD_VENTILATSimulation		Simulation	Restaurant (Monday)
L22_MW_OaTemp	OFFICE_BUILD_VENTILATSimulation		Simulation	Restaurant (Monday)
L22_MW_RoomTemp	OFFICE_BUILD_VENTILATCascade_Temperature		Caskade_Temperature	Room_01 (workday)
	OFFICE_BUILD_VENTILATL22_ST_EH_Valve	L22_ST_EH_Valve		
	OFFICE_BUILD_VENTILATL22_SB_Vent_SupAir	L22_SB_Vent_SupAir		
L22_MW_SupplyTemp	OFFICE_BUILD_VENTILATSimulation		Simulation	
Analog Output Points				
AC1ClgVlv	AC1		klima	
AC1FloDmpr	AC1		klima	
AC1MaDmpr	AC1		klima	
L22_ST_EH_Valve	OFFICE_BUILD_VENTILATCascade_Temperature		Caskade_Temperature	Room_01 (workday)
	OFFICE_BUILD_VENTILATL22_ST_EH_Valve	L22_ST_EH_Valve		
	OFFICE_BUILD_VENTILATL22_SB_UP_Heater	L22_SB_UP_Heater		
L22_ST_KL_DistrAir	OFFICE_BUILD_VENTILATCascade_Temperature		Caskade_Temperature	Room_01 (workday)
	OFFICE_BUILD_VENTILATL22_ST_KL_DistrAir	L22_ST_KL_DistrAir		
L22_ST_KL_Mixer	OFFICE_BUILD_VENTILATCascade_Temperature		Caskade_Temperature	Room_01 (workday)
	OFFICE_BUILD_VENTILATL22_ST_KL_Mixer	L22_ST_KL_Mixer		
L22_ST_KL_SupplAir	OFFICE_BUILD_VENTILATCascade_Temperature		Caskade_Temperature	Room_01 (workday)
	OFFICE_BUILD_VENTILATL22_ST_KL_SupplAir	L22_ST_KL_SupplAir		
L22_ST_KÜ_Valve	OFFICE_BUILD_VENTILATCascade_Temperature		Caskade_Temperature	Room_01 (workday)
	OFFICE_BUILD_VENTILATL22_ST_KÜ_Valve	L22_ST_KÜ_Valve		

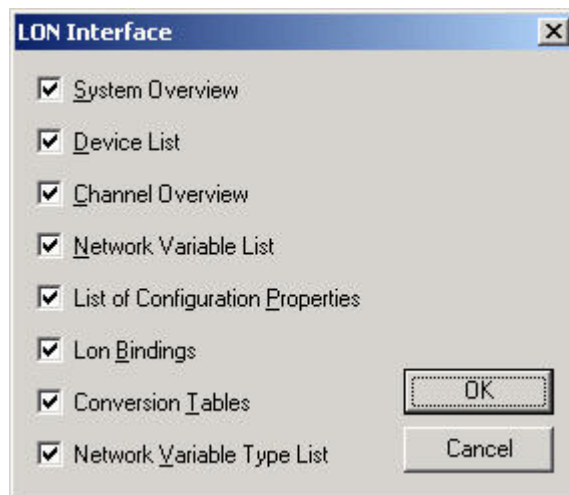
User Address	Plant	Switching Table	Control Strategy	Time Programs (Daily Programs)
	OFFICE_BUILD_VENTILATL22_SB_UP_Chiller	L22_SB_UP_Chiller		

LON Interface

If this checkbox is enabled, the LON interface information of the selected controllers is printed. LON interface data may include

- Overview of the system and the channels
- Lists of network variables, network variables types, devices, and configuration properties
- value conversion tables
- and LON bindings.

Clicking the >> button at the LON interface item opens the LON Interface dialog box where LON Interface data can be selected.

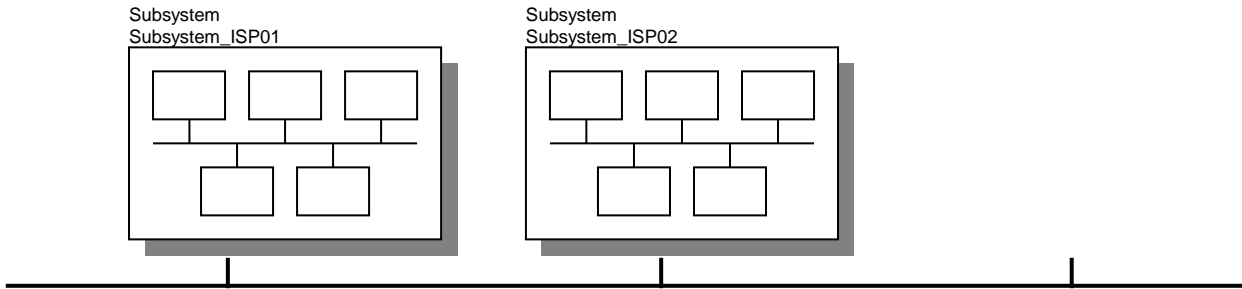


System Overview Enabling this checkbox prints out a system overview of the project

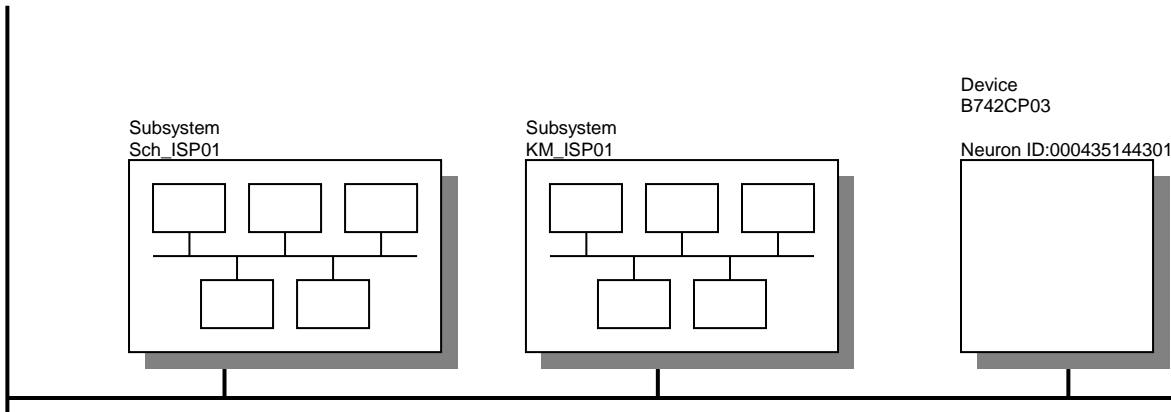
Subsystem LON-Works



Subsystem VW_H45_Kälte



Subsystem Subsystem_ISP01

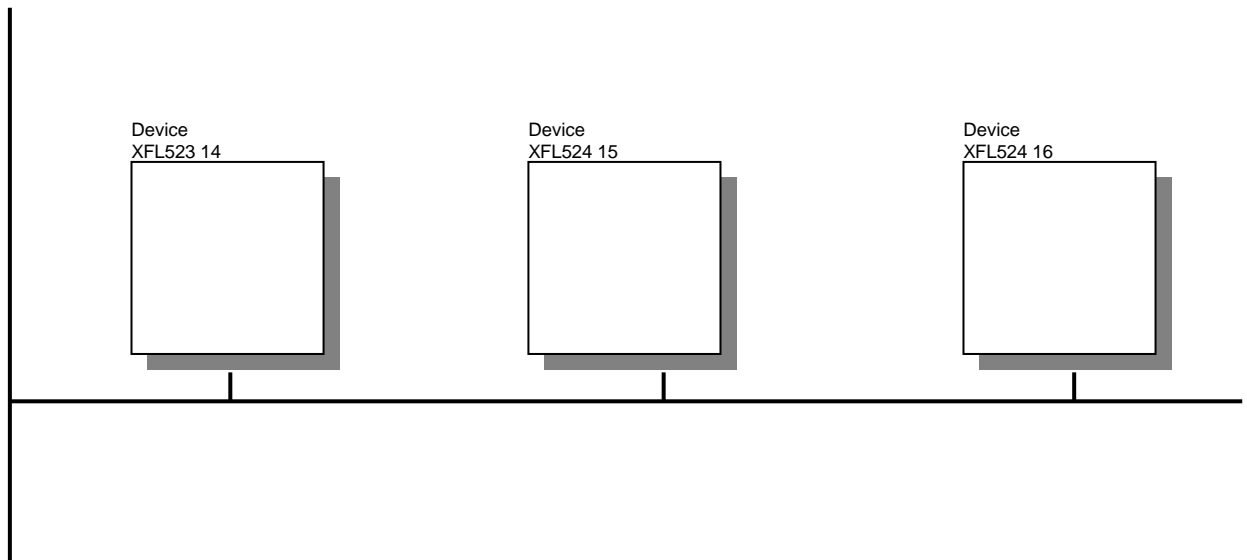


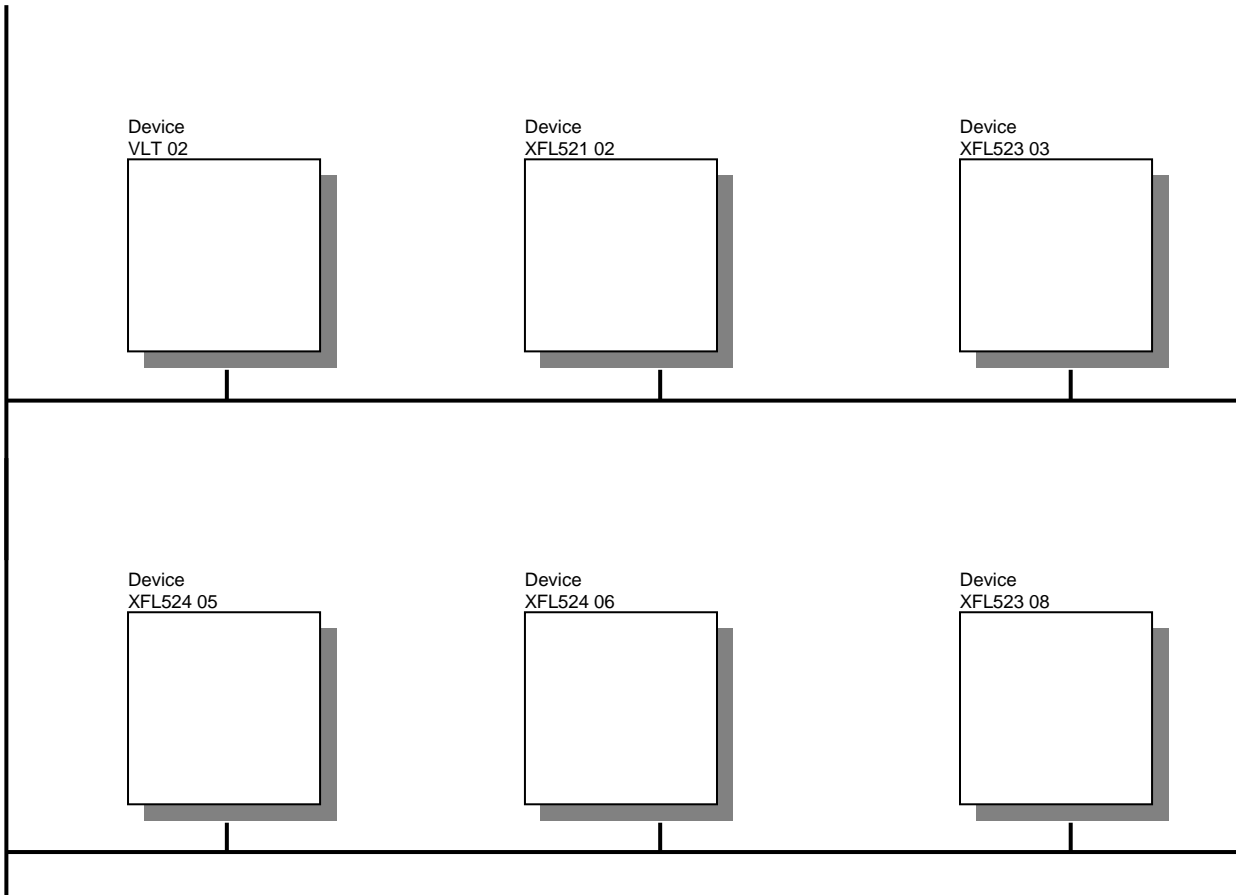
Device List Enabling this checkbox prints out a list of all devices of the project.

Device	System Path	Channel	Neuron ID:
B742CP03	LON-Works.VW_H45_Kälte.Subsystem_ISP01	VW_H42	000435144301
XFL521 05	LON-Works.VW_H45_Kälte.Subsystem_ISP01.Sch_ISP01	VW_H42	00A116745501
KM	LON-Works.VW_H45_Kälte.Subsystem_ISP01.KM_ISP01	VW_H42	000867564000
B742CP04	LON-Works.VW_H45_Kälte.Subsystem_ISP02	VW_H42	00A115561301
XFL523 14	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_FU	VW_H42	043B0C8F0100
XFL524 15	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_FU	VW_H42	046194DE0000
XFL524 16	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_FU	VW_H42	04BB9ADE0000
VLT 01	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_FU	VW_H42	046F5BE10000
VLT 02	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_FU	VW_H42	04CBA1D20000
XFL521 02	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_Bestand	VW_H42	00A122370801
XFL523 03	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_Bestand	VW_H42	047934F20000
XFL523 04	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_Bestand	VW_H42	04431DF30000
XFL524 05	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_Bestand	VW_H42	0445A7D40000
XFL524 06	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_Bestand	VW_H42	047F3B020100
XFL523 08	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_Bestand	VW_H42	042ABFAD0100
XFL523 09	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_Bestand	VW_H42	04F434F20000
XFL524 10	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_Bestand	VW_H42	04F2BAD30000
XFL524 11	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_Bestand	VW_H42	044195DE0000
XFL522 13	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_Bestand	VW_H42	04B8028F0100
XFL521 01	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_Bestand	VW_H42	00C049353301
XFL521 07	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_Bestand	VW_H42	000468181201
XFL521 12	LON-Works.VW_H45_Kälte.Subsystem_ISP02.Sch_ISP02_Bestand	VW_H42	000468139901

Channel Overview Enabling this checkbox prints out a graphical channel overview.

Channel VW_H42





Network Variable List Enabling this checkbox prints out all network variables of the controller.

NV name:	nviRequest	NV type:	SYS_nviRequest	Direction:	input
Selfdoc String		Config Class:	<none>		
failure detec	<input checked="" type="checkbox"/>	auth_config	<input checked="" type="checkbox"/>	priority_conf	<input checked="" type="checkbox"/>
		service_type	<input checked="" type="checkbox"/>	offline	<input type="checkbox"/>
				polled	<input type="checkbox"/>
				sync	<input checked="" type="checkbox"/>
				ext_rec	<input type="checkbox"/>

List of Configuration Properties Enabling this checkbox prints out the configuration properties.

LON Object Open Loop Sensor 1

CP Name:	UCPTSensorConfig	NV type:	80000C050103040E_UCPT_1
Description			
Selfdoc String		Config Class:	<none>
		Value	0..10 V with pullup



CP Name:	UCPTSendOnDelta	NV type:	80000C050103040E_UCPT_2
Description			
Selfdoc String		Config Class:	<none>
		Value	2

CP Name:	UCPTWireOffset	NV type:	80000C050103040E_UCPT_3
Description			
Selfdoc String		Config Class:	<none>
		Value	0

Lon bindings Enabling this checkbox prints out the Lon bindings.

Controller B742CP03

Device XFL521 05

Data point	Value conversion	NV name:		NV name:	NV type:	LON Object
KW42-01-MW44a		nviKW42_01_MW05b1	 	nvoAiTemp[1]	SNVT_temp_p	Open Loop Sensor 2

KW42.01-MW03		nviKW42_01_MW03			nvoAiTemp[2]	SNVT_temp_p	Open Loop Sensor 3
KW42-01-MW05		nviKW42_01_MW05			nvoAiTemp[3]	SNVT_temp_p	Open Loop Sensor 4
KW42-01-MW44b		nviKW42_01_MW05b2			nvoAiTemp[4]	SNVT_temp_p	Open Loop Sensor 5
KW42-01-MW44c		nviKW42_01_MW05b3			nvoAiTemp[5]	SNVT_temp_p	Open Loop Sensor 6
KW42-01-MW44d		nviKW42_01_MW05b4			nvoAiTemp[6]	SNVT_temp_p	Open Loop Sensor 7

The subscripts in this table indicate multiple bindings of a data point.

Conversion Tables Enabling this checkbox prints out the definition of value conversion tables.

VCT Name:	DI_TEST	Direction:	input	NV type:	SNVT_lev_percent
Description:					
	NV Value:	DP Value:			
=	1.00	1.00			
>=	1.00	1.00			
>=	4.00	8.00			
>=	6.00	12.00			
>=	8.00	24.00			
>=	10.00	40.00			
>=	20.00	80.00			

Network Variable Type List Enabling this checkbox prints out a detailed description of the network variable types.

NVT Name::	UNVT_ubyte	Type:	UNVT	Basic Type:	Integer
Detailed Description: Unsigned Short (8 bit)					
Selfdoc NVT Index:	0	Internal NVT Index:	0	Eng. Unit:	
System NVT:	NO	Size:	1	Hidden:	NO
Initial Value:	0	Minimum Value:	0	Maximum Value: 254	

OPS Interface

Network Variable Type List Enabling this checkbox prints out the interface of the OPS controller.

OPS data for Controller PM500_EZ

Subsystem Driver Name: MBUS	OPS Ports Assignment: RS485(DBUSCU)
Initialization Block: 024,E,8,03,00000000,1	

Subcontroller Name: 2WR5_231	Subcontroller Address: 231,1,0,0,0,0
-------------------------------------	---

User Address	OPS Point Name: CntPnt_2WR5	Subpoint Address: 0,0,0,0,0
Value Format: Float(65)	Scaling Factor: 1.000000	Scaling Offset: 0.000000
Scan Priority: 1	Access Mode: Readable, Writable	

User Address	OPS Point Name: Energy_St0_T0_____	Subpoint Address: x0C06,0,0,0,2
Value Format: Float(65)	Scaling Factor: 1000.000000	Scaling Offset: 0.000000
Scan Priority: 1	Access Mode: Readable	

User Address	OPS Point Name: Power_____	Subpoint Address: x0B2E,0,0,0,2
Value Format: Float(65)	Scaling Factor: 1.000000	Scaling Offset: 0.000000
Scan Priority: 1	Access Mode: Readable	

Technical Information

CAREDOC.INI File Settings

Each user has local or personal preferences regarding the kind of information he wants to print. To satisfy these individual requirements, the CARE printout is configurable via an INI file.

NOTE: The INI file for the printout is called "CAREDOC.INI" and is located in the CARE directory.

Default Selections

As each user may require different information for the printout, the caredoc.ini file allows one to specify the default selections, which are made when the printout main dialog box is started. Default selections specify which checkboxes or radio buttons are selected by default.

The default selections are adjustable via the entries in the **[selections]** section.

1. Open the CAREDOC.INI file.
2. Look for the **[selections]** section.
3. Change the items you want to select by default to **YES**. Change the items you want to deselect by default to **NO**.
4. Save the CAREDOC.INI file.

The following checkboxes and radio buttons can be set as defaults:

[Selections]

Table of Contents=YES	YES: selects table of contents
Project Datasheet=YES	YES: selects project datasheet
Plant Schematics=YES	YES: selects plant schematic
Control Strategy=YES	YES: selects control strategies
Switching Logic=YES	YES: selects switching logic tables
Parameter List=YES	YES selects parameter list
Plant to Controller=YES	YES: selects plant to controller table
Mathematical Functions=YES	YES: selects mathematical functions
Controller Summary=YES	YES: selects controller summary
Terminations=YES	YES: selects terminations
Point Data=YES	YES: selects point data
Default Datapoint Overview=YES	YES: selects the default point data overview
Default Datapoint Description =YES	YES: selects the default point data Description
Overview=YES	YES: selects the point data overview (only valid, if Point Data is also selected)
Datapoint Description=YES	YES: selects the point datapoint description (only valid, if Point Data is also selected)
Time Programs=YES	YES: selects the time programs
Module Labels=NO	YES: selects module labels.
LON Module Labels Horizontal=NO	YES: selects horizontal orientation No: selects vertical orientation
Module Labels with descriptor=YES	YES: selects module labels with descriptor NO: selects module labels without descriptor
Module Graphics=YES	YES: selects the module graphics
Module Graphics with Descriptor=NO	YES: selects module graphics with descriptor NO: selects module graphics without descriptor

Important

If module labels are selected, all other items are automatically deselected.

Text List=YES	YES: selects text lists
XL10 Reports Detailed=YES	YES: Select detailed XL10 reports
XL10 Reports Short=YES	YES: Selects short format XL10 reports
ELink Reports=YES	YES: Selects ELink mapping and commissioning reports

Important

The following settings are ignored, if **Text List** is not **YES**:

Default Text List=YES	YES: Selects default text lists
Controller Specific Text List=YES	YES: Selects controller specific text lists

Important

The following settings are ignored, if the **Default Text List** is not set to **YES**:

Default Descriptors=YES	YES: Selects the default descriptors
Default Alarms=YES	YES: Selects the default alarm texts
Default Ana Eng Units=YES	YES: Selects the default analog engineering units
Default DEU Eng Units=YES	YES: Selects the default digital engineering units
Default IO Characteristic=YES	YES: Selects the default I/O characteristics
Search Templates=YES	YES: Selects the search templates

Important

The following settings are ignored, if the **Controller Specific Text List** is not set to **YES**:

Contr Spec Descriptors=YES	YES: Selects the controller specific descriptors
Contr Spec Alarms=YES	YES: Selects the controller specific alarms
Contr Spec Ana Eng Units=YES	YES: Selects the controller specific analog engineering units
Contr Spec DEU Eng Units=YES	YES: Selects the controller specific digital engineering units
Contr Spec IO Characteristic=YES	YES: Selects the controller specific I/O characteristics

Important

The following setting is ignored, if the **Time Programs** entry is not set to **YES**:

Format Time Programs Detailed=YES	YES: Selects detailed format for the time program
	NO: Selects short format for the time program

Important

The following setting is ignored, if the **Datapoint Description** entry is not set to **YES**:

Format User Addresses Detailed=YES	YES: Selects detailed format for the datapoint description.
	NO: Selects short format for the datapoint description

Important

The following settings are ignored, if the **Plant Schematics** entry is not set to **YES**:

Format Plant Schematic with User Addresses=NO	YES: Selects schematic with user addresses
	NO: Selects schematic with plant graphic
Format Plant Schematic Divide=NO	YES: Divides big schematics and spreads them over several pages
	NO: Rescales schematics so that they fit on one page

Important

The following settings are ignored, if the **Control Strategy** entry is not set to **YES**:

Format Control Strategy with Schematic=NO YES: Prints control strategies with schematic
NO: Prints control strategies with user addresses

Format Control Strategy Divide=NO YES: Divides big control strategies and spreads them over several pages
NO: Rescales control strategies so that they fit on one page

Important

*The following settings are ignored, if the **Switching Logic** entry is not set to **YES**:*

Format Switching Logic Tables with Schematic=NO YES: Prints a schematic for the switching tables
NO: Prints only the switching tables

Format Switching Logic Tables Divide=NO YES: Divides big schematics and spreads them over several pages
NO: Rescales schematics so that they fit on one page

Important

*The following settings are ignored, if the **Datapoint Description** entry is not set to **YES**:*

Pseudo Totalizers=YES YES: Prints the pseudo totalizers as part of the datapoint description
Analog Input=YES YES: Prints the analog inputs as part of the datapoint description
Analog Output=YES YES: Prints the analog outputs as part of the datapoint description
Digital Input=YES YES: Prints the digital inputs as part of the datapoint description
Digital Output=YES YES: Prints the digital outputs as part of the datapoint description
Flag Analog=YES YES: Prints the analog flags as part of the datapoint description
Flag Digital=YES YES: Prints the digital flags as part of the datapoint description
Flex=YES YES: Prints the flexible points as part of the datapoint description
Global Analog=YES YES: Prints the global analog points as part of the datapoint description
Multistage Global Dig=YES YES: Prints the multistage global digital points as part of the datapoint description
Global Digital=YES YES: Prints the global digital points as part of the datapoint description
Pseudo Analog=YES YES: Prints the pseudo analog points as part of the datapoint description
Pseudo Digital=YES YES: Prints the pseudo digital points as part of the datapoint description
Multistage Pseudo Dig=YES YES: Prints the multistage pseudo digital points as part of the datapoint description
Totalizer=YES YES: Prints the totalizers as part of the datapoint description
Reflist Pseudo Totalizers=YES YES: Prints the pseudo totalizers as part of the reference list
Reflist Analog Input=YES YES: Prints the analog inputs as part of the reference list
Reflist Analog Output=YES YES: Prints the analog outputs as part of the reference list
Reflist Digital Input=YES YES: Prints the digital inputs as part of the reference list

Reflist Digital Output=YES	YES: Prints the digital outputs as part of the reference list
Reflist Flag Analog=YES	YES: Prints the analog flags as part of the reference list
Reflist Flag Digital=YES	YES: Prints the digital flags as part of the reference list
Reflist Flex=YES	YES: Prints the flexible points as part of the reference list
Reflist Global Analog=YES	YES: Prints the global analog points as part of the reference list
Reflist Multistage Global Dig=YES	YES: Prints the multistage global digital points as part of the reference list
Reflist Global Digital=YES	YES: Prints the global digital points as part of the reference list
Reflist Pseudo Analog=YES	YES: Prints the pseudo analog points as part of the reference list
Reflist Pseudo Digital=YES	YES: Prints the pseudo digital points as part of the reference list
Reflist Multistage Pseudo Dig=YES	YES: Prints the multistage pseudo digital points as part of the reference list
Reflist Totalizer=YES	YES: Prints the totalizers as part of the reference list
Auto Exit CARE Doc=YES	YES: Printout main dialog box is closed automatically after successful printout NO: Printout main dialog box remains open until closed by user

Printing Order

As in most affiliates, customer documentation is provided in a standardized binder with standardized chapters in which the order of specific chapters of the printout can be adjusted individually.

The printing order is adjustable through entries in the "[printing order]" section and other subsequent sections.

A figure defines the location of the corresponding chapter within the document:

- **Datapoint Description=1** means that the datapoint description is the first chapter to be printed after the table of contents.
- **Datapoint Description=4** means that the datapoint description is the fourth chapter to be printed after the table of contents.

NOTE: If **NO** is entered instead of a number, the corresponding chapter is never printed, even though it might be selected.

1. Open the CAREDOC.INI file.
2. Look for the **[printing order]** section or subsequent order sections.
3. Change the printing order by changing the numbers.

NOTE: Make sure that no number is repeated and that no figure is missing in the sequence. Otherwise an error message will occur during printout and the default printing order will be used.

4. Save the CAREDOC.INI file.

Printing Order ("main chapter")

This section defines the order of the main chapters.

```
[Printing Order]
Controller Summary=1
Point Data Overview=2
Terminations=3
Plant To Controller=4
Time Programs=5
Datapoint Description=6
Module Labels=7
Plant Related Data=8
Parameter List=9
```

E Link Long=10
 Text List=11
 XFMs per Controller=12
 UAReferenc=13

Plant Printing Order This section defines the order within the plant related data.

[Plant Printing Order]
 Plant Schematic=1
 Control Strategy=2
 Switching Logic=3
 XL10 Short=4 NOTE: This entry has no specific function and is only used to ensure compatibility to older versions
 XL10 Long=5 NOTE: This entry has no specific function and is only used to ensure compatibility to older versions

Control Strategy Printing Order This section defines the order within the control strategy related data.

[Control Strategy Printing Order]
 Control Strategy=1
 User Address=2
 Mathematical Functions=3
 Parameter List=4
 WIA RIA=5

Switching Logic Printing Order This section defines the order within the switching logic related data.

[Switching Logic Printing Order]
 Switching Logic=1
 Mathematical Functions=2
 Parameter List=3

Time Program Printing Order These sections define the order within the time programs' related data. There are separate sections for long and short formats.

[Time Program Short Printing Order]
 Assigned Points=1
 Daily Schedule=2
 Weekly Schedule=3
 Holiday Programs=4

[Time Program Long Printing Order]
 Assigned Points=1
 Daily Schedule=2
 Weekly Schedule=3
 Holiday Programs=4

**Datapoint Description
 Printing Order**

This section defines the order within the datapoint description and is valid for both short and detailed formats.

[Datapoint Description Printing Order]
 Analog Inputs=1
 Analog Outputs=2
 Pseudo Analog=3
 Global Analog=4
 Digital Inputs=5
 Digital Outputs=6
 Pseudo Digital=7
 Multistage Pseudo Digital=8
 Global Digital=9
 Multistage Pseudo Digital=10
 Totalizer=11
 Pseudo Totalizer=12
 Flex DO Feedback DI=13
 Flex Pulse 2=14
 Flex Multistage=15
 Flag Analog=16
 Flag Digital=17

Text List Printing Order This section defines the order within the text lists for both controller related texts and default texts.

```
[Text List Printing Order]
Descriptors=1
Alarm Text=2
Analog Engineering Units=3
Digital Engineering Units=4
IO Characteristic=5
Search Templates=6
Default Descriptors=7
Default Alarm Text=8
Default Analog Engineering Units=9
Default Digital Engineering Units=10
Default IO Characteristic=11
```

UAREf List Order This section defines the order within the reference list.

```
[UAREf List Order]

Analog Input=1
Analog Output=2
Digital Input Normally Open=3
Digital Input Normally Closed=4
Digital Output Switch=5
Digital Output Change=6
Mot=7
Pseudo Digital=8
Pseudo Analog=9
Global Analog=10
Global Digital=11
Pseudo Totalizer=12
Fast Totalizer=13
Slow Totalizer=14
Flag Analog=15
Flag Digital=16
Flex=17
Multistage Global Digital=18
Multistage Pseudo Digital=19
Pseudo Puls=20
```

Print Table of Contents

The table of contents can be printed with or without page numbers. This can be adjusted through an CAREDOC.INI file setting.

1. Open the CAREDOC.INI file.
2. Look for the **[Table Of Contents]** section.
3. If you want to print the table with page numbers, set **Page Numbers= YES**. If you want to print the table without page numbers, set **Page Numbers= NO**.
4. Save the CAREDOC.INI file.

Suppress "Not Generated" Parameters

When printing parameters sorted by usage, usually all parameters of all statements are printed. However, some statements contain optional parameters that may or may not be used by the CARE programmer. Those parameters that are optional and are not used by the CARE programmer are marked with an entry **Not Generated** in the printout (refer to chapter Parameters sorted by usage). These parameters do not show up in the controller.

The INI file allows suppression of the printout of not generated parameters by a special setting to reduce the paper consumption significantly.

1. Open the CAREDOC.INI file.
2. Look for the **[Parameters by Usage]** section.
3. If you want to suppress the **Not Generated** parameters, set **Suppress Not Generated Parameters= YES**.

If you want to print the **Not Generated** parameters, set **Suppress Not Generated Parameters= NO**.

- 4.
5. Save the CAREDOC.INI file.

Printer Settings

The printer settings in the caredoc.ini file are automatically created and saved according to the settings selected in the Print Setup dialog box. On the other hand, the settings in the ini.file can be edited and these default the settings for the Print Setup dialog box when restarting the printout.

The settings are automatically saved in the following section:

[Special Printer]

Driver=(retrieved from Print Setup or manually entered)

Device=(retrieved from Print Setup or manually entered)

Port=(retrieved from Print Setup or manually entered)

Default Printer= (0=specific printer, 1=default printer)

Paper Format=(DIN A4 or Letter or User defined)

UserDefinedPaperLength=(only valid when Paper format=User defined, value in mm)

UserDefinedPaperWidth=(only valid when Paper format=User defined, value in mm)

Point Type Abbreviations

To distinguish point types more exactly, a type abbreviation is included in some parts of the printout:

- In the plant graphics in round brackets behind the user address
- In the switching tables in round brackets behind the user address
- In the datapoint description/short format in the point type field
- In the datapoint description detailed format in the point subtype field

The point type abbreviations are defined as follows:

Abbreviation	Definition
DI_NO	Digital Input (normally open)
DI_NC	Digital Input
DO_NO	Digital Output (NO)
DO_CO	Digital Output (C/O)
AI_S	Analog Input Slow
AI_F	Analog Input Fast
AO	Analog Output
3POS (MOT)	3 Position Output
VD	Pseudo Digital
VA	Pseudo Analog
VT	Analog Input Fast
GD_I	Global Digital Input
GD_O	Global Digital Output
GA_I	Global Analog Input
GA_O	Global Analog Output
FA	Flag Analog
FD	Flag Digital
MS	Multistage
P2	Pulse_2
DO_F_DI	DO_Feedback_DI
TOT_F	Fast Totalizer Point
TOT_S	Slow Totalizer Point
MGD_I	Multistage Global Digital Input
MGD_O	Multistage Global Digital Output
MVD	Multistage Pseudo Digital

Frequently Asked Questions

- Question 1** Sometimes, if I print a project or controller the “Parameter” chapter is not printed, yet the corresponding **Parameter Sorted by...** checkbox has been enabled. Why is this?
- Answer** The parameters can only be printed, if the <CPU name>.txt file exists in the CARE directory. Translate the corresponding controller by selecting **Controller/Translate** in CARE.
- Question 2** The printout of parameters “sorted by usage” sometimes shows “not generated” instead of the parameter filename/index. I do not understand this text. The customer should not see such an entry. Can this be prevented?
- Answer** Some CARE icons provide the capability to enter a parameter value for an input. You can either enter a parameter or connect the input to the output of another icon. When connecting the input to another icon, the parameter is not used and the CARE printout shows “not generated.” The printing of “not generated” parameters can be suppressed by setting **Suppress not generated parameters=Yes** in the caredoc.ini file.
- Question 3** Sometimes when trying to print to a file, an existing destination file is overwritten without warning. Can this be prevented?
- Answer** This happens only, if the filename is longer than 8 characters (an invalid DOS filename). This problem will be solved in an upcoming release.
- Question 4** When printing a reference list, the printing process seems to stop and one could think, CARE seemed to be crashed.
- Answer** Printing reference lists takes a long time.

CONTROLLERS

EXCEL 800 / 600 / 500 / SMART / 100 / 80 / 50 CONTROLLERS

EXCEL 10 (ELINK, XLINK, AND VAV2) CONTROLLERS

EXCEL OLINK CONTROLLER

EXCEL OPS CONTROLLER

FALCON/EAGLE CONTROLLER

EXCEL 800 / 600 / 500 / SMART / 100 / 80 / 50 CONTROLLERS

The engineering process of the Excel 800 / 600 / 500 / Smart / 100 / 80 / 50 controllers in CARE XL-500 are as follows:

1. Create Project
2. Set Global CARE Options
3. Create Controller
4. Create Plant
5. Create Plant Schematic
6. Modify Datapoints
7. Assign Datapoints to Controller
8. Develop Control Strategy
9. Develop Switching Logic
10. Create Time Program
11. Design and Configure C-Bus
12. Startup Controller
13. Generate Documentation

For a brief introduction to these procedures, please refer to the Quick Tours chapter.

For further information, please refer to the following chapters:

- PROJECT DEFINITION AND MANAGEMENT for detailed information on project management
- SET GLOBAL CARE OPTIONS for setting default settings for the project and the Excel 500 controller
- CONTROLLER DEFINITION, ATTACHMENT AND MANAGEMENT for detailed information on controller management
- PLANT DEFINITION AND MANAGEMENT for detailed information on plant management
- PLANT SCHEMATICS for detailed information of creation on plant schematics
- EDITORS chapter for detailed information on the assignment and editing of datapoint attributes
- TERMINAL ASSIGNMENT FUNCTION chapter for detailed information on the display and modification of controller hardware configurations
- CONTROL STRATEGY for detailed information on control strategy development
- SWITCHING LOGIC for detailed information on switching logic development
- TIME PROGRAM EDITOR for detailed information on time program creation
- DOCUMENTATION for detailed information on generating documentation
- LONWORKS NETWORK ENGINEERING chapter for detailed information on the engineering process of LON controllers

EXCEL 10 CONTROLLERS

Q7752A2 Zone Manager Controller / ELink Controller

To provide communication between the EXCEL 5000 C-bus and an E-Bus with Excel 10 Controllers an Excel 10 Zone Manager Controller is used as interface.

To provide point mapping between the C-bus and the E-Bus, the Excel 10 Zone Manager Controller has the functionality of an Excel 100, except that it has no physical points.

Excel 10 applications cover the Q7750A1xxx (1000-series) devices used with VAV 1 (Standard VAV) applications and the 2000-series including the Q7752A2xxx Zone Manager and its corresponding controllers such as VAV 2 and FCU.

The CARE process for Excel 10 applications is substantially different from that for other Excel Controllers.

CARE 4.00.00 and higher can only be applied to the engineering of 2000-series applications. The process is partly done in CARE and completed within the E-Vision software tool.

Purpose Applications using the C- and E-Bus need to be done within CARE and the E-Vision software tool. The CARE part is to define the C-Bus portions. This includes the following:

- Restore (Mapping) plants
- Time schedules
- Control strategies
- Switching tables
- Export to E-Vision

The E-Vision part includes the rest of the process like:

- Configuration
- Commissioning
- Check out
- Calibration

See the E-Vision User Guide 74-2588 for an overview of the use of both CARE and E-Vision for 2000-series Excel 10 applications. The following sections describe the CARE steps.

Step and Action	CARE Window and Menu Item Selections	Excel 10 Considerations
1. Install a CARE version lower than 3.00.00 and E-Vision on your PC		The E-Vision installation saves mapped point plant backups in the CARE directory.
2. Start CARE and create an Excel 10-ZM project.	Main window: Project, New ...	Unique is recommended.
3. Restore Excel 10 Mapped Point Plant Backup. For example: CVA1S.	Project window: Plant, Restore	The E-Vision installation saves mapped point plant backups in the CARE directory. Type the name of the target plant (use upper case characters), select the particular plant to restore based on the XL10 device type, and select the Use plant backups radio button. Restore all plants

4. Backup the Excel 10-ZM project	Main window: Project, Backup ...	The project backup provides the restored plants for a CARE project since in CARE 4.00.00 a plant restore is no longer possible
5. De-install current CARE version and install CARE version 4.00.00 or higher		
6. Restore the Excel 10-ZM project	Main window: Project, Restore ...	The project restore provides the backed up plants of CARE version lower than 3.00.00
7. Create new project	Project window: Project, New ...	The plants can be copied to the new project by the Replicate function.
8. Create the Excel 10-ZM Controller. For example: ELINK1.	Project window: Controller, New ...	Use upper case characters for controller name. Set Controller Type equal to Elink. Choose Version 1.01 for Controller OS. The Power Supply and Installation Type fields are gray because you do not define them for Excel 10-ZM Controllers. Select alarm files as E-VISION (default file setting).
9. Create an Elink Plant. For example: ELNKPLT.	Project window: Plant, New ...	Use upper case characters for plant name. Set Plant Type equal to Elink. Choose Version 1.01 for Controller OS. This plant is used for control strategy and switching logic.
10. Customize Excel 10 Mapping Points in the mapped plant (in this example, CVA1S).	Points can be deleted using any of the CARE Delete Software Point functions.	Enter the Switching Logic screen and use the "Delete unused SW points" function to reduce the list to the desired mapped points. Use this plant as a template for replication. Plant must be replicated to create unique user addresses in CARE.
11. Replicate Mapped Plant (in this example, CVA1S).	Plant window: Plant, Replicate	Replicate the Excel 10 plant as many times as the job requires. The plant replicate operation prefixes the user addresses in the plant with the target plant name, ensuring uniqueness of user addresses in CARE. Note that Excel 10 Controllers use some of the same user addresses, for example, a VAV II and a CVAHU can both use FAN_OUT. To make sure the user addresses are unique, replicate the plants (VAV II or CVAHU) and attach the replicated plants to the Excel 10-ZM Controller.
12. Attach Excel 10 Mapping Plant (in this example, CVA1S) to Excel 10-ZM Controller.	Controller window: Controller, Edit, Attach/Detach Plants	Select one or more plants to attach to the selected Excel 10-ZM Controller. During the attach, CARE prompts you to delete unused software points. Select Cancel for each plant.
13. Customize Excel 10 Point Attributes in the mapped plant (in this example, CVA1S).	Controller window: Controller, Edit, Data Point Editor	Points in mapping plants supplied with E-Vision come preset with analog and digital engineering units.
14. Attach Elink Plant (in this example, ELNKPLT) to Zone Manager Controller (in this example, ELINK1).	Controller window: Controller, Edit, Attach/Detach Plants	Select one or more plants to attach to the particular Zone Manager controller. During attach, software detects any duplicate user addresses and prompts you to make them unique.

<p>15. Create Custom Control Strategy (if required). In this example, in ELNKPLT.</p>	<p>Plant window: Plant, Control Strategy</p>	<p>Create control strategies only when confident that the selection of mapped points is correct. Create all custom control strategies in a separate Elink plant, not directly in the Excel 10 Mapping Plants. Create a new control loop by selecting File, New, and specifying a name for the new control loop. Place software points on the Zone Manager controller software bar by selecting Edit, Load Existing Software Points, selecting the appropriate point type, and selecting the point of interest from the list box of available points of the specified type. After you place a software point on the software bar, it can be used in a control strategy the same way as other software points.</p> <p>Software points to be used as the source of a Command Multiple Point relationship, or the destination of a Read Multiple Points relationship, are also created in control strategy by selecting a location on the software bar, selecting the desired point type, and providing a user address for the software point.</p>
<p>16. Create Custom Switching Logic (if required). In this example, in ELNKPLT.</p>	<p>Plant window: Plant, Switching Logic</p>	<p>Create custom Switching Logic tables in a separate Elink plant, not directly in the Excel 10 Mapping Plants. Software points in the Excel 10-ZM Controller can then be used in a switching table by selecting Software Points, selecting the point type of the desired point, and selecting the point of interest from the list box of available points of the specified type.</p>
<p>17. Create Custom Time Programs (if required). In this example, in ELNKPLT.</p>	<p>Controller window or attached plant window: Plant, Time Programs</p>	<p>Specify Time programs to control the software points in the Excel 10-ZM Controller. See the CARE Time Schedules section (Page 650) for methods to create time schedules that control Excel 10s.</p>
<p>18. Translate Excel 10-ZM. In this example, ELINK1.</p>	<p>Controller window or attached plant window: Controller, Translate</p>	<p>Translate generates the C-Bus controller files and skeleton E-bus controller files that are later populated by E-Vision.</p>
<p>19. Export C-Bus Mapped Point Information from CARE.</p>	<p>Project, Export to E-Vision</p>	<p>Select the Excel 10-ZM project to export. The Export Zone Manager dialog box displays. See the next section for a description. Exported files have the extension .ZMX and are stored in the CARE directory.</p>

Mapped Point Plant Note

The Excel 10 Mapped Point Plant Backup file is a predefined CARE plant that contains standard point mappings. When E-Vision is installed, it places one backup file for each Excel 10 controller type into the CARE directory. Plants are named the same as the controller they represent with a PLT extension, for example, FCU2S.PLT (Fan Coil unit) and CVA1E.PLT (Constant volume AHU). Note that the 5th character is either S for International System of Units (SI, also known as metric) or E for English units of measurement.

In addition there are new “default” files required to work with these plants. These default files are as follows:

- E-VISION.ADL
- E-VISION.ALX
- E-VISION.ID
- E-VISION.KDX
- E-VISION.KLX
- E-VISION.PHX

These default files are installed in C:\CARE\PCBSTD\EI_1.1 by the E-Vision installation program.

Plant Name Changes

If a plant name is changed in CARE and reimported into E-Vision, E-Vision cannot track this change and mapping errors will result in the plant to device C-bus point mapping. If it is necessary to rename a plant in CARE,

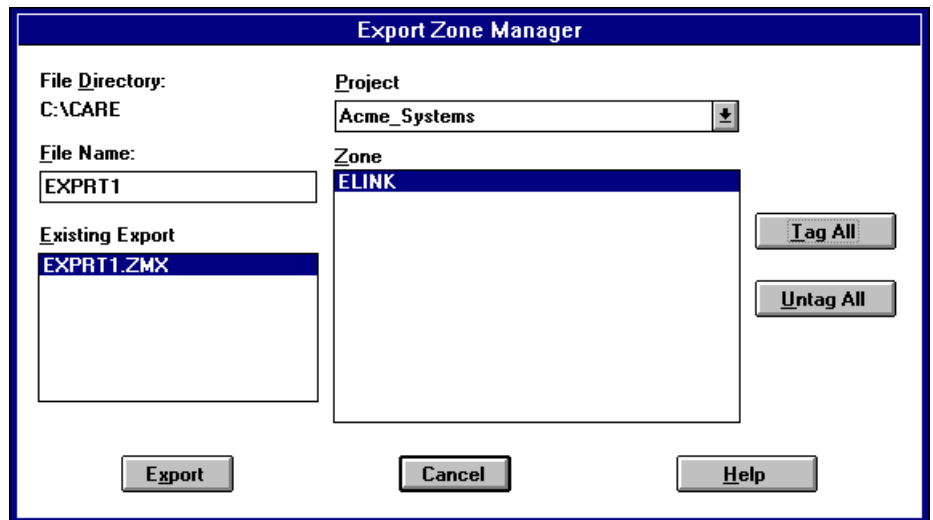
manually unmap the plant in E-Vision from all relationships, then reimport the modified CARE data. Complete the plant to device C-bus point mapping as necessary.

Export Zone Manager File to E-Vision

Purpose Export all points from one or more Zone Managers to a user-defined file. The information in this file is used to map between C-Bus points and E-Bus points..

Procedure 1. Within CARE, open the Excel 10-ZM project. Select menu items Project, Export to E-Vision.

RESULT: The Export Zone Manager dialog box appears. File Directory displays the location of the export file; its default is the location where CARE is installed.



2. Enter or select the desired file name for the controller in E-Vision. The Existing Export box lists all ZMX files in the CARE directory. Name must be between 2 and 8 characters long and a valid DOS file name. File extension is .ZMX (for Zone Manager Export). The **Export** button is disabled if the file name is invalid.

3. In the Project field, select the CARE project that has the Excel 10-ZM Controller. Click the down arrow to view a list of projects.

RESULT: The Zone box lists all the Zone Managers within the project. Note that any Zone Managers that have VAV 1 controllers (Standard) assigned to them in CARE are not in this list. This omission means that you cannot create a Zone Manager in CARE, assign VAV 1 Controllers to the Zone Manager, and then also use E-Vision to assign other devices to that same Zone Manager.

4. Select one or more desired Zone Managers. To select all, click **Tag All**. To deselect all, click **Untag All**.

5. Click **Export** to perform the export. The Export button is enabled when a valid file name is entered and one or more Zone Managers are selected.

RESULT: Software creates the desired export file. If one already exists with the same name, a warning message appears.

Stand-alone Operation

You can initiate Export Zone Manager outside of CARE by executing the EXPEV.EXE file in the E-Vision directory.

CARE Time Schedules

There are two acceptable methods to create time schedules to control Excel 10s. The first method is a Command Multiple relationship. The second method places points from each mapping plant directly in a time schedule.

Command Multiple Mechanism

1. Always remove points to be used in a Command Multiple relationship from the Mapping Plants. If a point is MAPPED, it cannot be used in a Command Multiple relationship. For instance, if SchedOcc for the CVAHU is to be used in a Command Multiple relationship, it must be deleted from the mapping plant. Follow the CARE procedure outlined earlier in this section.
2. Use the Switching Logic mode to add a VD point. Match the number of states and digital engineering units to the Excel 10 points to be controlled.
3. Place this point in a time schedule following the Time Schedule procedure outlined in the CARE literature.
4. Translate and export to E-Vision.
5. Launch E-Vision. Create and configure the network.
6. Import from CARE.
7. Select Command Multiple from the Network menu.
8. Set up a Command Multiple relationship for the time schedule point..

Time Schedule Controlling a Mapped Point Directly

1. DO NOT delete the point to be controlled by the time schedule from the mapping plant.
2. Place this point directly in a time schedule. Multiple points can be placed in a single time schedule. Follow the Time Schedule procedure outlined in the CARE literature.
3. Translate and export to E-Vision.
4. Launch E-Vision. Create and configure the network.
5. Import from CARE.
6. Select Map C-Bus Points from the Network menu to verify that the point was automapped.

CAUTION

A Command Multiple relationship can only be used for controllers of the same type. For example, CVAHU and FCU controllers cannot be commanded by the same time schedule point.

DO NOT create a time schedule point that controls a number of Excel 10 controllers from switching logic tables. The point DestSchedOcc is related to other points. Tuncos and TodEventNext are automatically updated by the time schedule program. The point DestSchedOcc must be controlled directly from a time schedule or via a command multiple relationship in order for Tuncos and TodEventNext to update correctly.

EXCEL LINK (XLINK) CONTROLLER

Purpose Process description of engineering an Excel Link (XLink) application. Excel Link enables the connection of controllers on a Honeywell Control Network Automation Protocol ("C-NAP" or "CNAP") bus to an EXCEL 5000 C-bus. C-NAP bus controllers can include Excel MicroCel, Excel MacroCel, Excel W7620, and W7600 Controllers.

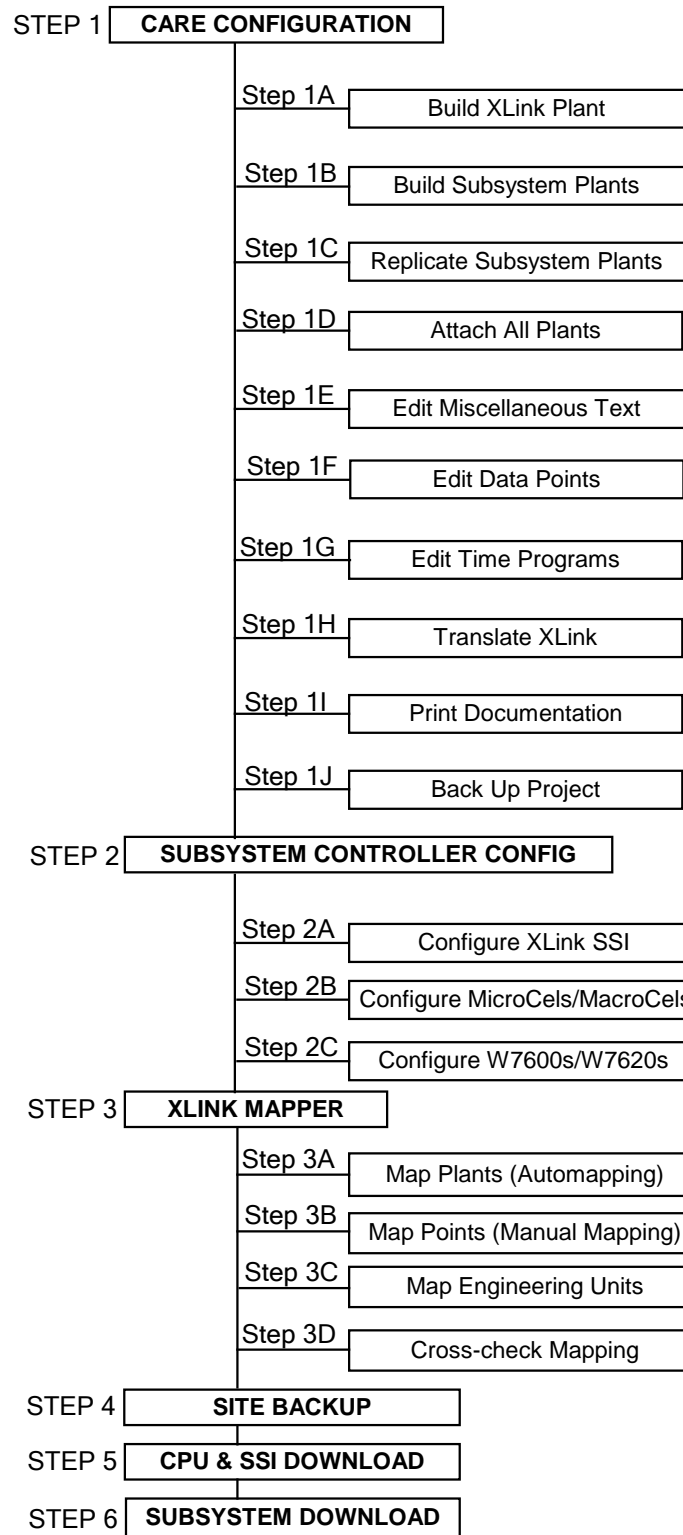
Requirements You must be familiar with CARE software and either M-PPT software for MicroCel/MacroCel Controllers or ZM 7601, 3, or 4 software for W7620/W7600 Controllers.

Steps

- Step 1** CARE configuration of Excel Link plant and subsystem plants
- Step 2** Subsystem controller configuration
- Step 3** Excel Link Configurator/Mapper
- Step 4** Subsystem site backup
- Step 5** Excel Link CPU and SSI download
- Step 6** Subsystem controller download

Steps 1 through 4 are "off-line" procedures that you can do without the controller. Steps 5 and 6 are "on-line" procedures that require the controller.

Excel Link Flowchart The following flowchart diagrams the necessary steps and sub steps.



Step 1 CARE Configuration

Purpose Define an Excel Link plant and its schematic, control strategy, and switching logic. Then, define subsystem plants (MicroCel/MacroCel, W7600, and/or W7620) and their schematics. Control strategies and switching logic for the

subsystem plants are not necessary. Finally, complete the CARE process through the documentation step and back up the completed project.

This section details the required CARE steps as follows:

- Step 1A** Build the Excel Link plant.
- Step 1B** Build the subsystem plants.
- Step 1C** Replicate the subsystem plants.
- Step 1D** Attach the plants to the Excel Link controller.
- Step 1E** Edit Excel Link descriptors, messages, engineering units, and I/O characteristics in the Excel Link controller.
- Step 1F** Edit Excel Link points.
- Step 1G** Set up Time Programs in the Excel Link controller.
- Step 1H** Translate Excel Link controller.
- Step 1I** Print documentation.
- Step 1J** Back up project.

Step 1A Build the Excel Link Plant

Procedure The CARE process for Excel Link controllers is nearly the same as for other C-bus controllers. The following paragraphs detail the CARE process and note where there are Excel Link options.

Project and Plant Definition Define a project as usual.

Define a plant as usual. Select XLINK as plant type. It may be useful to name the plant to identify it as the Excel Link plant, for example, XLINK01.

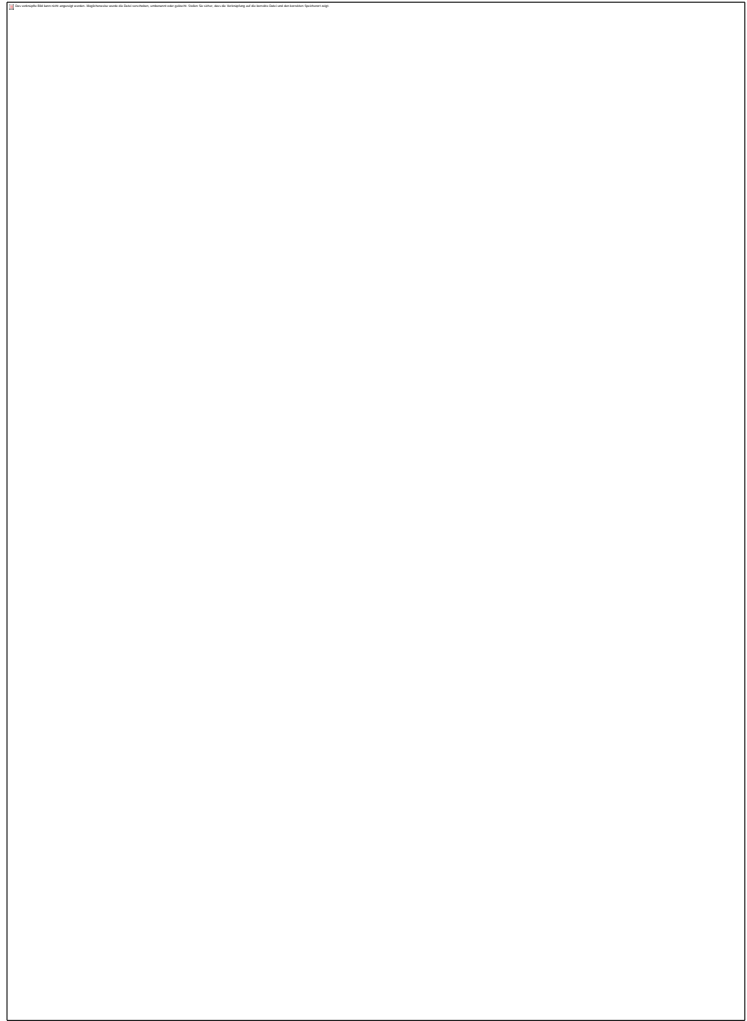
This plant is optional and contains the "system" points to be mapped from the C-bus to the C-NAP bus and vice versa. Typical mapping points are outdoor air temperature, discharge air temperature, bypass, morning warm-up, min/max/average space temperature, occupancy/nonoccupancy, and restore/shed. Later, you manually map these points via the XLink Configurator/Mapper.

Schematic Create a plant schematic by selecting segments that meet the point requirements of the subsystem. These segments (listed by controller type) have simple elements that represent the points you need to map to and from the C-bus. Use the Point without graphic function if you need to map a point not represented in the segment lists.

If there are global input points (for example, DaTemp, Warmup) in the Xlink CPU that come from another C-bus controller, they cannot be directly mapped to a C-NAP point. You must run them into IDT icons and out to a pseudopoint. Then, map the pseudopoint to the C-NAP point.

Control Strategy If required, create a control strategy for the plant. Control strategy rules are the same for Excel Link plants as they are for other plants. Control sequences that cannot be accomplished in the subsystem controllers can reside in this plant.

You cannot directly map global input points (for example, DaTemp, Warmup) in the Xlink CPU that come from a C-bus controller to a C-NAP point. You must input them to IDT icons and output them to a pseudopoint. Then, map the pseudopoint to a C-NAP point.



Switching Logic If required, create switching logic for the plant. Switching logic rules are the same for Excel Link plants as they are for other plants.

Procedure **Step 1B Build the Subsystem Plants**
The CARE process for subsystem controllers is similar to that for other C-bus controllers. Note that control strategy and switching logic are not required.

Project and Plant Definition Use the same project as set up for the Excel Link plant.

Define a new plant as usual. Name the plant the same as (or similar to) its corresponding controller on the C-NAP bus. For example, name the plant Rm102 for a C-NAP controller located in Room 102. To save time later, make the plant and controller names identical. If the names are not identical, you have to match each plant to its corresponding controller when you use the Excel Link Configurator/Mapper.

- Plant name plus any point user addresses within the plant must not exceed 18 characters. CARE truncates user addresses to 18 characters. The Replicator (Step 1C) combines each point user address with its plant name to form a complete user address.

Select the appropriate plant type (W7620 VAV, W7620 WSHP, MicroCel, or MacroCel). Use standard Air Conditioning or Chiller Water plants for W7600 applications.

- Points generated in these plant schematics are associated with specific C-NAP point numbers. If you use custom programs or modified standard programs in a C-NAP controller, automapping (Step 3) may not be accurate.

The following tables list the C-NAP point numbers associated with each CARE element that is automapped in ZM5001. The CARE User Address column lists default user addresses. You can modify these addresses in CARE without affecting the automapping function.

- Table 1.: MacroCel Automapping
- Table 2.: MicroCel Automapping
- Table 3.: W7620 Variable Air Volume (VAV) Automapping
- Table 4.: W7620 Water Source Heat Pump (WSHP) Automapping

Schematic Create a plant schematic. Select segments that represent the equipment the zone controller is handling. Excel Link can map a total of 768 points. Do not exceed this number when building the schematics.

For W7620, MicroCel, and MacroCel controllers only, use the Optional Points segment to add other points associated with the controller.

Use Modify user address under the **Edit** menu item to change default user addresses, if needed. As noted in the Project and Plant Definition note, the Replicator combines plant name and user addresses. The combination user address must not exceed 18.

Use **Point Without Graphic** under the **Edit** menu item to add points not represented by a standard segment.

Control Strategy Not required for W7600, W7620, MicroCel, and MacroCel plant types. The subsystem controller is self-sufficient.

Switching Logic Not required for W7600, W7620, MicroCel, and MacroCel plant types. The subsystem controller is self-sufficient. If you need to create pseudopoints that are not covered in a schematic element, Switching Logic is a convenient place to do so. Select Software Points, create the names, and exit Switching Logic without saving the switching table.

TABLE 1: MACROCEL AUTOMAPPING

Segment Name	CARE Schematic Element Name	CARE User Address	CNAP Pt. No.
Dampers	1. Outdoor Air Modulating	MaDmpr	22
	2. Outdoor Air 2-Position	MaDmpr	8
	3. Outdoor Air Floating Series 60	MaDmpr	61
Coils-Pre Heat	1. Analog Modulating	PrehtVlv	71
	2. Analog Floating (series 60)	PrehtVlv	71
Coils-Heating	1. Analog Modulating	HtgVlv	71
	2. Analog Floating (series 60)	HtgVlv	71
Coils-Cooling	1. Analog Modulating	ClgVlv	70
	2. Analog Floating (series 60)	ClgVlv	70
Supply Fan	1. Digital Status	SaFanStatus	56
	2. Variable Volume	SaFanVane	23
	2. Analog Sensor	SaFanDiffPres	11

Segment Name	CARE Schematic Element Name	CARE User Address	CNAP Pt. No.
Return Fan	1. Digital Status	RaFanStatus	58
	2. Variable Volume	RaFanVane	17
	2. Analog Sensor	RaFanDiffPres	40
Time-EMS	1. Standard Stop/Stop Schedules 1	SsSched1	95
	2. Standard Stop/Stop Schedules 2	SsSched2	96
	3. Unoccupied Override via Mark Time	UnoccOvrd	32
	4. Unoccupied Override via PB	UnoccOvrd	3
	5. Night Cycle Control	NightCycle	87
Filter-Return Air	1. Status/Alarm Contact	RaFiltAlm	62
	2. Differential Pressure Sensor	RaFiltPres	37
Filter-Supply Air	1. Status/Alarm Contact	SaFiltAlm	62
	2. Differential Pressure Sensor	SaFiltPres	37
Humidifier	1. Humidifier	DaHumidVlv	19
Discharge Air Setpoints (SPTS)	1. Outdoor Air Reset High	OaRstHi	75
	2. Outdoor Air Reset Low	OaRstLo	76
	3. Reset Setpoint High	DaRstHi	74
	4. Reset Setpoint Base	DaRstBase	73
	5. Return Air Reset High	RaRstHi	75
	6. Return Air Reset Low	RaRstLo	76
	7. Discharge Reset Enable	DaRstEn	77
	8. Auto Setpoint	DaTempAutoStpt	72
	9. Manual Setpoint	DaTempManStpt	73
Mixed Air Setpoints (SPTS)	1. Outside Air Reset High	MaOaRstHi	66
	2. Outside Air Reset Low	MaOaRstLo	67
	3. Reset Setpoint High	MaRstHi	65
	4. Reset Setpoint Base	MaRstBase	64
	5. Return Air Reset High	MaRaRstHi	66
	6. Return Air Reset Low	RaMaRstLo	67
Temperature Sensors	1. Mixed Air	MaTemp	49
	2. Discharge Air	DaTemp	50
	3. Return Air	RaTemp	55
	4. Outside Air	OaTemp	48
	5. Space	RmTemp	53
Humidity Sensors	1. Return Air	RaRh	25
	2. Discharge Air	DaRh	14
	3. Outside Air	OaRh	31
Static Pressure Sensor	1. Discharge	DaPres	11

Segment Name	CARE Schematic Element Name	CARE User Address	CNAP Pt. No.
CO2 Sensors	4. Return Air CO2 Sensor	RaCo2	34
Safeties	1. Freezestat Alarm	LoTempLim	38
	2. Fire Stat or High Temp Status	HiTempLim	26

TABLE 2: MICROCEL AUTOMAPPING

Segment Name	CARE Schematic Element Name	CARE User Address	CNAP Pt. No.
Single Duct Pressure Independent	1. Flow Only	DuctFlo	60
	2. Setpoint Only	DuctFloStpt	61
	3. Flow + Setpoint	DuctFlo	60
	3. Flow + Setpoint	DuctFloStpt	61
Single Duct Pressure Dependent	1. Flow Setpoint (Damper)	DmprFlowStpt	61
Dual Duct Pressure Independent	1. Cold + Hot Duct Flow Only	ClgDuctFlo	60
	1. Cold + Hot Duct Flow Only	HtgDuctFlo	69
	2. Cold + Hot + Total Flow Only	ClgDuctFlo	60
	2. Cold + Hot + Total Flow Only	HtgDuctFlo	69
	2. Cold + Hot + Total Flow Only	DuctFlo	59
	3. Cold + Hot Duct Setpoint Only	ClgDuctStpt	61
	3. Cold + Hot Duct Setpoint Only	HtgDuctStpt	70
	4. 2 + 3	ClgDuctFlo	60
	4. 2 + 3	HtgDuctFlo	69
	4. 2 + 3	ClgDuctFloStpt	61
	4. 2 + 3	HtgDuctFloStpt	70
	4. 2 + 3	DuctFlo	59
	5. Total Flow Only	DuctFlo	59
Single Duct Damper Actuator	1. Position Only	DuctDmprPos	62
	2. Control Only	DuctDmprCtrl	63
	3. Position + Control	DuctDmprPos	62
	3. Position + Control	DuctDmprCtrl	63
Dual Duct Damper Actuator	1. Position Only	ClgDmprPos	62
	1. Position Only	HtgDmprPos	71
	2. Control Only	ClgDmprCtrl	63
	2. Control Only	HtgDmprCtrl	72
	3. Position + Control	ClgDmprCtrl	63
	3. Position + Control	HtgDmprCtrl	72
	3. Position + Control	ClgDmprPos	62
	3. Position + Control	HtgDmprPos	71

Segment Name	CARE Schematic Element Name	CARE User Address	CNAP Pt. No.
Terminal Fan - Series	1. Output By Point 8	TermFan	8
	2. Output By Point 16	TermFan	16
Terminal Fan - Parallel	1. Output By Point 8	TermFan	8
	2. Output By Point 16	TermFan	16
Terminal Heat - Electric	1. One Stage	HtgStg1	9
	2. Two Stages	HtgStg1	9
	2. Two Stages	HtgStg2	16
	3. Three Stages	HtgStg1	9
	3. Three Stages	HtgStg2	16
	3. Three Stages	HtgStg3	17
Terminal Heat - Modulating	1. Position Only	HtgVlvPos	70
	2. Control Only	HtgVlvCtrl	71
	3. Position + Control	HtgVlvCtrl	71
	3. Position + Control	HtgVlvPos	70
Room Temperature	1. Temperature Only	RmTemp	49
	2. Setpoint Only	RmTempStpt	50
	3. Temperature + Setpoint	RmTemp	49
	3. Temperature + Setpoint	RmTempStpt	50
Miscellaneous - Flow Setpoints	1. Max Cooling Setpoint	MaxClgStpt	64
	2. Min Cooling Setpoint	MinClgStpt	65
	3. Reheat (Max) Heat Setpoint	MaxHtgStpt	66
	4. Min Heating Setpoint	MinHtgStpt	67
	5. Fan Flow Control Setpoint	FanFloStpt	68
Miscellaneous - Temperature Setpoints	1. Local Setpoint	LocRmStpt	51
	2. Remote Setpoint	RmTempRemStpt	2
	3. Occupied Cooling Setpoint	OccClgStpt	51
	4. Unoccupied Cooling Setpoint	UnoccClgStpt	53
	5. Occupied Heating Setpoint	OccHtgStpt	52
	6. Unoccupied Heating Setpoint	UnoccHtgStpt	54
Miscellaneous - Energy Monitoring	1. Cooling BTU	ClgBtu	72
	2. Heating BTU	HtgBtu	73
	3. Override Runtime (Cooling)	ClgOvrRunTime	74
	4. Override Runtime (Heating)	HtgOvrRunTime	75
	5. Percent Terminal Load	PctTermLoad	94

Segment Name	CARE Schematic Element Name	CARE User Address	CNAP Pt. No.

Miscellaneous	1. Occupied Status	OccStatus	55
	2. Control Status	HtgClgStatus	47
	3. Override Max Duration	OvrdMaxDur	57

TABLE 3.: W7620 VARIABLE AIR VOLUME (VAV) AUTOMAPPING

Segment Name	CARE Schematic Element Name	CARE User Address	CNAP Pt. No.
Single Duct Pressure Independent	1. Flow Only	DuctFlo	61
	2. Setpoint Only	DuctFloStpt	62
	3. Flow and Setpoint	DuctFlo	61
	3. Flow and Setpoint	DuctFloStpt	62
Dual Duct Pressure Independent	1. Cold + Hot Deck Flow Only	ClgDuctFlo	61
	1. Cold + Hot Deck Flow Only	HtgDuctFlo	65
	2. Cold + Hot Deck + Total Flow Only	ClgDuctFlo	61
	2. Cold + Hot Deck + Total Flow Only	HtgDuctFlo	65
	2. Cold + Hot Deck + Total Flow Only	DuctFlo	60
	3. Cold + Hot Deck Setpoint Only	ClgDuctStpt	62
	3. Cold + Hot Deck Setpoint Only	HtgDuctStpt	66
	4. 2 And 3	ClgDuctFlo	61
	4. 2 And 3	HtgDuctFlo	65
	4. 2 And 3	ClgDuctFloStpt	62
	4. 2 And 3	HtgDuctFloStpt	66
	4. 2 And 3	DuctFlo	60
Single Duct-Damper Actuator	1. Position Only	DuctDmprPos	63
	2. Control Only	DuctDmprCtrl	64
	3. Position And Control	DuctDmprPos	63
	3. Position And Control	DuctDmprCtrl	64
Dual Duct-Damper Actuator	1. Position Only	ClgDmprPos	63
	1. Position Only	HtgDmprPos	67
	2. Control Only	ClgDmprCtrl	64
	2. Control Only	HtgDmprCtrl	68
	3. Position + Control	ClgDmprCtrl	64
	3. Position + Control	HtgDmprCtrl	68
	3. Position + Control	ClgDmprPos	63
	3. Position + Control	HtgDmprPos	67

Segment Name	CARE Schematic Element Name	CARE User Address	CNAP Pt. No.
Terminal Fan-Series	1. Program S1	TermFan	9
	2. Program S2	TermFan	8
	3. Program S3	TermFan	18
	4. Program S4	TermFan	7
Terminal Fan-Parallel	1. Program S1	TermFan	9
	2. Program S2	TermFan	8
	3. Program S3	TermFan	18
	4. Program S4	TermFan	7
Terminal Heat-Electric	1. One Stage	HtgStg1	8
	2. Two Stages	HtgStg1	8
	2. Two Stages	HtgStg2	16
	3. Three Stages	HtgStg1	8
	3. Three Stages	HtgStg2	16
	3. Three Stages	HtgStg3	17
Terminal Heat-Modulating	1. Position Only	HtgVlv	67
	2. Control Only	HtgVlvCtrl	68
	3. Position + Control	HtgVlvCtrl	68
	3. Position + Control	HtgVlv	67
Space Sensor	1. Temperature Only	RmTemp	1
	2. Setpoint Only	RmTempStpt	50
	3. Temperature + Setpoint	RmTemp	1
	3. Temperature + Setpoint	RmTempStpt	50
Optional-Flow Setpoints	1. Maximum Cooling Setpoint	MaxClgFloStpt	71
	2. Minimum Cooling Setpoint	MinClgFloStpt	72
	3. Maximum Reheat Setpoint	MaxRhtFloStpt	73
	4. Minimum Reheat Setpoint	MinRhtFloStpt	74
Optional-Temperature Setpoints	1. Local Temp Setpoint	LocTempStpt	50
	2. Remote Temp Setpoint	RemTempStpt	2
	3. Occupied Heating Setpoint	OccHtgStpt	52
	4. Unoccupied Heating Setpoint	UnoccHtgStpt	54
	5. Unoccupied Cooling Setpoint	UnoccClgStpt	53
	6. Occupied Cooling Setpoint	OccClgStpt	51
Optional-Miscellaneous	1. Heating/Cooling Mode	HtgClgMode	47
	2. Occupied Status	OccStatus	56
	3. Terminal Load	TermLoad	59

TABLE 4.: W7620 WSHP AUTOMAPPING

Segment Name	CARE Schematic Element Name	CARE User Address	CNAP Pt. No.
Water Coil	1. Water Coil	HtgClgMode	47
	1. Water Coil	StagesOn	96
Zone Coil	1. Fan Start/Stop DO #6	HtgPumpFan	6
	2. Fan Start/Stop DO #16	HtgPumpFan16	16
Space Sensor	1. Temperature Only	RmTemp	1
	2. Setpoint Only	RmTempStpt	50
	3. Temperature + Setpoint	RmTemp	1
	3. Temperature + Setpoint	RmTempStpt	50
Optional Points	1. Resistive Input A	RstrInptA	10
	2. Voltage Input A	VoltInA	11
	3. Digital Input A	DigInA	12
	4. Resistive Input B	RstrInptB	13
	5. Voltage Input B	VoltInB	14
	6. Digital Input B	DigInB	15
	7. Remote Temp Setpoint	RmtRmStpt	2
	8. Occupied Clg Setpoint	OccClgStpt	51
	9. UnOccupied Clg Setpoint	UnoccClgStpt	53
		A. Occupied Htg Setpoint	OccHtgStpt	52
	B. UnOccupied Htg Setpoint	UnoccHtgStpt	54
	C. Setpoint Select	StptSelect	48

Step 1C Replicate the Subsystem Plants

Purpose To easily create more subsystem plants, duplicate the ones you created Step 1B. This step is optional; use if convenient.

Procedure For more details and examples of the replication process, please refer to the "Replicate Plants" section

Step 1D Attach the Plants to the Excel Link Controller

Purpose Attach the Excel Link plant and the replicated plants to the Excel Link controller.

When creating a plant it is automatically attached to the selected controller. When replicating attached plants they will be automatically detached and must be re-attached afterwards. To create unattached plants in the beginning, the project, instead of the controller must be selected. Plants can be detached or re-attached by simply dragging&dropping them to the desired destination (controller, project)

Procedure

1. To attach a plant, click on the unattached plant in the logical plant tree,
2. Drag the unattached plant to the controller, which you want attach the plant to, and drop it.

RESULT: The Plant will be added one level below the controller in the logical plant tree.

Software creates links between the Excel Link plant and the subsystem plants.

For detailed information on attaching/detaching plants, see "Attach/Detach Plant" section.

Step 1E Edit Excel Link Point Characteristics

- Purpose** Customize point descriptors, alarm messages, engineering units, and I/O characteristics as desired.
- Procedure** See "Miscellaneous Text Editor" section.
- I/O Characteristics** Make sure there are linear I/O characteristics that cover the types of ranges that can occur for each analog input and analog output point to be attached to the Excel Link controller. If you have VAV boxes, you need to create a characteristic with a span which covers the CFM range of your job.

Step 1F Edit Excel Link Points

- Purpose** Customize point attributes as desired.
- Procedure** see "Datapoint Editor" section for details.
- Alarm Delays** All CARE points that are mapped to a C-NAP alarming point must have the CARE 'Alarm Delay' attribute set to ZERO seconds. This rule applies to digital alarm points and analog input points with high and low limits. The Excel Link SSI controller has an inherent unprogrammable alarm delay of approximately 1 to 120 seconds, depending on the size of the application and when the alarm point was last read by the SSI. Digital points for status, not alarm, can have a time delay as usual.
- Engineering Units** All points require an engineering unit. You can set up bus-to-bus engineering unit conversion in Step 3C. For example, a point can read in degrees Fahrenheit on the C-NAP bus and in degrees Celsius on the C-bus.
- I/O Characteristic** Choose an I/O characteristic that has a span that covers the range of the C-NAP point.
- Alarm Delay** If a point will be generating an alarm, the delay time MUST be set to zero.
- Other Point Attributes** All other point attributes, for example, trending, runtime, descriptors, alarm limits, apply to Excel Link points in the same way as C-bus points.

Step 1G Set Up Time Prog in Excel Link Controller

- Purpose** Set up scheduling functions as desired.
- Procedure** See "Time Program Editor" section for details.

NOTE Set up Time Programs just as you would for non-Excel Link plants. Time Programs for the central air handling unit plant(s) that serve the subsystem controllers attached to the Excel Link plant must reside here (if you are using SSI TOD Programs). The C-NAP subsystem controllers need the occupancy/nonoccupancy points associated with these Time Programs.

IMPORTANT

The SSI TOD program assumes its CARE schedule point's active state represents occupied mode whether the active state attribute is 1 or 0. This assumption cannot be changed.

For the CARE schedule point, assign CARE engineering unit 17 (Occupied/active, Unoccupied/passive). It is recommended to set the CARE schedule point's active state to 1 to correctly match the C-NAP NFO point and set up these values: Occ=1=Active=On and Unocc=0=Passive=Off.

Step 1H Translate Excel Link Controller

Purpose Convert the plants to code.

Procedure See "Translate Controller" in "Quick Tours" section.

Step 1I Print Documentation

See "Documentation" section for details on documentation in general.

Step 1J Back Up Excel Link Project

Purpose Copy ("back up") project to disk to save it before proceeding to the next step.

This step is not required, but is recommended.

See "File Management" section for procedure.

IMPORTANT

If you make CARE and ZM7604 backups to be restored together later, make sure they are backed up together. If you back up one and then make changes to the other and back it up, the Excel Link may produce numerous alarms during start-up.

Step 2 Subsystem Controller Configuration

Purpose Set up the files for the subsystem controllers. Depending on controller types, there are two or three steps to do this with Step 2A required in all cases:

Step 2A Subsystem Interface Setup

Set up the Excel Link controller subsystem interface (SSI). This step is required no matter which subsystem controllers are on the C-NAP bus.

Step 2B MicroCel/MacroCel Controller Setup

If there are MicroCel/MacroCel controllers on the C-NAP bus, do "MPPT" application programming, configuration, and loading.

Step 2C W7620 Controller Setup

If there are W7600 or W7620 controllers on the C-NAP bus, set up the files for these controllers.

Requirement The starting point for each step is the Excel Link controller, that is, first select the Excel Link controller in the logical plant tree.

Step 2A Subsystem Interface Setup

Purpose Set up the Excel Link controller (SSI) for the interface to the subsystem controllers. This step is required no matter which subsystem controllers are on the C-NAP bus. See ZM7604 Excel Link SSI CNAP Configurator and ZM5001 CNAP Configurator User's Guide 74-5588 for more information.

Procedure

1. Select the Excel Link controller in the logical plant tree. Click the Controller menu item, then drop-down items Tools, Xlink ZM 7604 Configuration.

RESULT: The main menu displays.

2. Select **Configure**, then drop-down item **Site**.

3. Enter a new site name, for example, XLink01. A site corresponds to one C-NAP bus.

Rules: Project name must be exactly the same as the project name in CARE.

Site Name can be the same as the Excel Link controller name in CARE to clarify the relationship.

4. Select menu item **Configure**, then drop-down item **System**. This information applies only to the PC software, not the controllers. Change if necessary.
5. Select menu item **Configure**, then drop-down item **Communications**. Click the appropriate communication port. This setting is for downloading (writing) to the Excel Link controller.
6. Select menu item **File**, then drop-down item **Open Site**. Select the Excel Link site.
7. Select menu item **Configure**, then drop-down item **Controller**. Select **New Controller**. Type equal to XLink.

The Excel Link controller name can be the same as the site name.

Type the C-NAP Network Number (same as C-bus node number), range is 1-30. C-NAP Node Number range is 1-3. Always use 1 because the Excel Link must be the C-NAP master. These settings must match the DIP switches on the SSI hardware.

Program the Global Assignments for points such as outdoor air temperature, discharge air temperature, bypass, morning warm-up, occupancy/nonoccupancy, and restore/shed. There are defaults for these points. Modify them, as necessary.

CAUTION

If you are going to program global points in M-Cel Point Programming (MPPT, Step 2B), be aware that they use the same global point numbers as listed in the SSI. There will be a conflict if you configure a global point function in MPPT that uses a number already being used for a different function in the SSI.

8. At this point, configure the subsystem controllers as described in "Step 2B MicroCel/MacroCel Controller Setup" and "2C". Then, return to this procedure and complete Steps 9 through 12.
9. Select menu item **Configure**, then drop-down item **Controller Groups**. Group controllers in a logical manner, for example, by AHU or zone.
10. If desired, select menu item **Configure**, then drop-down item **Point Groups**. This step is optional. You can use point groups to view one group of points by selecting only one point, using the ZM7604 software on-line.
11. Select menu item **Configure**, then drop-down item **Controller**. Select XLink. In the Command Center, set up Alarm Conditions as usual for C-NAP. Use this window to configure unmapped point alarms to show up as critical alarms on the C-bus. Otherwise, unmapped point alarms show up as noncritical on the C-bus. See ZM7604 Excel Link SSI CNAP Configurator and ZM5001 CNAP Configurator User's Guide 74-5588 for more details.

Alarm messages operate as follows:

Only the present value of a subsystem (C-NAP) point transfers across the Excel Link to the C-bus. You program all alarming attributes (high alarm, low alarm, etc.) in CARE. For a type of alarm like Sensor Open, the C-NAP generic alarm text and C-bus system alarm descriptor appears on the C-bus. A user must connect to the site with ZM7604 to pinpoint the problem sensor.

12. Also in the Command Center, select TOD Input/Output. Create a time-of-day (TOD) program for each zone, or controller group, as necessary. TOD programs apply only to W7620 Controllers, not MicroCel/MacroCels.
13. Also in the Command Center, set up Data Sharing as usual for C-NAP bus points ONLY. Data Sharing here does not apply to mapped points. See Excel Link System Engineering Manual 74-5591 for details on data sharing.

Step 2B MicroCel/MacroCel Controller Setup

Purpose Set up the MicroCel/MacroCel controller files for the interface to the Excel Link. This step is required only when MicroCel/MacroCel controllers are on the C-NAP bus.

Note that DeltaNet M-Cel PPT (MPPT) software must be properly installed and your PC must have sufficient base memory in order to run MPPT.

Procedure 1. Select the Excel Link controller in the logical plant tree. Click the Controller menu item, then drop-down items Tools, Xlink MPPT Configuration.

RESULT: The *M-PPT* window opens.

2. Perform typical off-line application programming, configuration, and loading as detailed in DeltaNet M-Cel PPT Software User Guide 77-0165, "Excel Link" Mapper section.

Give each controller the exact same name as its corresponding Plant Name assigned in CARE when you replicated the plants, if you plan to automap the MicroCel/MacroCel points.

Remember that MPPT point programming must match the CARE schematic for automapping to be accurate. If you do not use standard MicroCel/MacroCel programs, do not plan on automapping.

Step 2C W7600/W7620 Controller Setup

Purpose Set up the W7600/W7620 controller files for the interface to the Excel Link. This step is required only when W7600 or W7620 controllers are on the C-NAP bus.

Procedure 1. Select the Excel Link controller in the logical plant tree. Click the Controller menu item, then drop-down items Tools, Xlink ZM 7604 Configuration.

RESULT: The *ZM7604* main menu displays.

2. Select **File**, then drop-down item **Open Site**. Select the Excel Link site.

RESULT: The *ZM7604* main menu redisplay.

3. Select menu item **Configure**, then drop-down item **Controller**. Select **New Controller**. Select applicable Controller Type. Assign the controller the same name as the plant name assigned in CARE when you replicated the plants.

NOTE: For W7600s, see ZM7604 User Guide 74-5588 for configuration information. The rest of this step applies to W7620s.

Assign Serial Number and C-NAP Node Number.

Choose the Algorithm and Copy Sample as required. Choices here must match the choices made when creating the plant in the CARE schematic. If not, there will be errors when writing (downloading) the software application to the controller because the software application will not match the hardware configuration.

4. Select Globals and click **Add** to assign them to the corresponding controller points. Scroll through the **Global** list box to find the appropriate points.

Set the **Global Assignment Mode** to 'All W7620's' in a Controller Group to repeat this function for all controllers in the same controller group. After you set this field, you only need to enter this window once for each controller group.

5. Program the Setpoints, Parameters, Inputs, and Outputs as required.

To copy this controller configuration to others in the same controller group, create a New Sample of the one just programmed, back out, and make a New Controller and then for that new controller, do a Copy Sample of the original. Repeat as many times as necessary. This step is optional.

6. Exit.

Step 3 Excel Link Configurator/Mapper

Purpose Match CARE plants to their corresponding C-NAP controllers. You can also manually map points that were not automatically mapped during the plant-controller matchup and convert engineering units, for example, English to Metric and vice versa. Finally, you can cross-check to verify the Excel Link Configurator/Mapper actions.

The following sections detail Excel Link Configurator/Mapper functions.

Perform each one in the order listed:

- Step 3A Plant-Controller Matchup
- Step 3B User Address-Point Manual Mapping
- Step 3C C-NAP to Eng Unit Conversion Mapping
- Step 3D Configurator Cross-Check

The starting point for each step is the Excel Link controller, that is, first select the Excel Link controller in the logical plant tree.

CAUTION

If, after mapping is complete, you use CARE or ZM7604 to make changes to the database that affect point mapping (for example, detach a plant, add a point), you must RE-DO the mapping.

Step 3A Plant-Controller Matchup

Purpose Match CARE plants and C-NAP controllers. During this process, the software automatically maps points between the plants and controllers. Only W7620, MicroCel, and MacroCel controllers can be automapped; W7600s cannot.

CAUTION

Automapping only works correctly if the subsystem controller points match the tables in Step 1B.

- Procedure**
1. Select the Excel Link controller in the logical plant tree. Click the Controller menu item, then drop-down items Tools, Xlink ZM 5001 Mapper.

RESULT: A *Configurator* dialog box displays for entry of a project name and Excel Link controller name.
 2. Enter appropriate project name and Excel Link controller name.

RESULT: The *Mapper* window displays.
 3. Click **Plants**.

RESULT: A dialog box displays. The upper two list boxes are the CARE plants and C-NAP controllers that are not yet matched. The lower list box shows successfully matched plants and controllers.
 4. If the CARE plants and C-NAP controllers have identical names, click **Match Names**, then click **OK** button.

RESULT: The lower box displays the matches.

If the CARE plants and C-NAP controllers do not have identical names, highlight the CARE plant, highlight its corresponding C-NAP controllers, then click **Add**.

RESULT: The lower box displays the match.

5. To unmatch a plant and controller combination, highlight the matched pair in the lower list box and click **Remove**.

RESULT: The CARE plant moves back to the upper left-hand list box and the C-NAP controller moves back to the upper right-hand list box.

6. When done, click **OK** to close the window and save the changes. Or, click **Cancel** to close the window without saving the changes.

RESULT: The window closes. If you made matches, software maps the points in the CARE plant(s) with the corresponding points in the C-NAP controller(s).

Step 3B User Address-Point Manual Mapping

Purpose

Map points that were not automatically mapped during the preceding step.

Procedure

1. Select the Excel Link controller in the logical plant tree. Click the Controller menu item, then drop-down items Tools, Xlink ZM 5001 Mapper.

RESULT: A *Mapper* dialog box displays for entry of a project name and Excel Link controller name.

2. Enter the XLink and choose menu item **Points**. Scroll through the **CARE Plant Name** box in the upper left-hand list box to choose a plant. The *All user addresses choice* is a comprehensive display.

RESULT: The *CARE User Addresses* box shows all unmapped points for the chosen plant. If you added points to the schematic for a subsystem controller using the **Point Without Graphic** option, software does not automatically map those points. The Point Without Graphic points display here. The bottom box shows all mapped points for the chosen plant (with their corresponding C-NAP points).

3. To manually map these points, highlight the CARE user address, highlight its corresponding C-NAP point, and click **Add**.

RESULT: The points move to the lower box.

4. To unmap a pair of points, highlight the mapped pair in the lower list box and click **Remove**.

RESULT: The CARE user address moves back to the upper left-hand list box and the C-NAP point moves back to the upper right-hand list box.

C-NAP Groups/Wildcard Points Box The Groups/Wildcard points box provides four options for accessing C-NAP points:

1. *Controller Groups* displays the names of all controller groups built during "Step 2, Subsystem Controller Configuration". To map a C-bus point to a controller group point using the Many-to-one logical statements (that is, OR, AND, AVE, MAX, and MIN), highlight the C-bus point, highlight the controller group, and click **Add**. A field of asterisks, *, displays in the mapped point area for the C-NAP point name. Double-click the controller group again and the controllers within the group display. Double-click on any controller and its list of points displays. Click the desired point, then click **Add**. Software maps the highlighted C-bus point to this C-NAP point on all controllers within the controller group.

2. Point Groups displays the names of all point groups built during "Step 2, Subsystem Controller Configuration". Point groups are for viewing only; do not map these.
3. Global Points lists all C-NAP global points built during "Step 2, Subsystem Controller Configuration". To map a C-bus point to a C-NAP global point, highlight the C-bus point, click **Global Points**, highlight the corresponding C-NAP point, then click **Add**.

NOTE: You cannot map globals on the C-bus directly to globals on the C-NAP bus.

4. Controller: Point Wildcard Search is an easy way to use wild cards to find points on C-NAP. Use it, where it will save time, when doing manual mapping.

Step 3C C-NAP to Eng Unit Conversion Mapping

Purpose Set up engineering unit conversions for points mapped from the C-NAP bus to the C-bus. For example, if a C-NAP point uses degrees Fahrenheit and you want the central PC to display in degrees Celsius, use this procedure to establish the conversion. All points that read in degrees F on C-NAP will read in degrees C on the C-bus.

You can also set up automatic mapping of engineering units, that is, all units convert English to Metric, or vice versa.

- Procedure**
1. Select the Excel Link controller in the logical plant tree. Click the Controller menu item, then drop-down items Tools, Xlink ZM 5001 Mapper.

RESULT: A *Mapper* dialog box displays for entry of a project name and Excel Link controller name.
 2. Enter the XLink and choose menu item **Engineering Units**. To map a C-NAP engineering unit to a CARE engineering unit, highlight the C-NAP engineering unit, highlight the corresponding CARE engineering unit, and click **Add**.

RESULT: The mapped pair displays in the lower list box.
 3. To unmap a pair of engineering units, highlight the mapped pair in the lower list box and click **Remove**.

RESULT: The CARE engineering unit moves back to the upper left-hand list box and the C-NAP engineering unit moves back to the upper right-hand list box.
 4. To set up system-wide auto-mapping, select the appropriate CARE Units. You configured the C-NAP units during "Step 2, Subsystem Controller Configuration".

Step 3D Configurator Cross-Check

Purpose Verify XLink Configurator/Mapper steps.

- Procedure**
1. Click Configurator Cross-Check.

RESULT: Results display. When good, back out to the **Xlink Options** menu.

Step 4 Subsystem Site Backup

Purpose Save all subsystem and Excel Link Configurator/Mapper data to diskette/CD. You commission the systems from the medium via a portable PC.

- Procedure**
1. Select the Excel Link controller in the logical plant tree. Click the Controller menu item, then drop-down items Tools, Xlink ZM 7604 Configuration.

RESULT: The ZM7604 main menu displays.

2. Click **Utilities**, then drop-down item **Site Backup** from the main menu. Follow instructions on the screen.

IMPORTANT

Make sure your ZM7604 and CARE backups are done together as compatible databases. Restoring incompatible backups can cause numerous alarms during Excel Link start-up.

Step 5 Excel Link CPU and SSI Download

Purpose Copy each Excel Link application program into the appropriate controller CPU. See Excel Link Checkout & Test 74-3557 for more details.

- Procedure**
1. Using the PC-to-Excel communication cable, connect the portable PC serial port (COM1 or COM2) to the Excel Link RS-232 port (see "Physically Connect to Controller" section).
 2. In CARE, with the Excel Link as the currently selected Controller, click menu item **Controller**, then submenu items **Tools** and **XL Online** (see "Download Controller" section).
 3. For the SSI download, set the C-NAP bus node switch on the SSI hardware to match the selections made in the CPU commissioning and ZM7604 SSI configuration screens.
 4. Click menu item **Controller**, then drop-down items **Tools** and **Excel Link ZM 7604 Configuration**.
 5. Click menu item **File**, then drop-down item **Open Site**.
 6. Select Excel Link site name and click **OK**.
 7. Click menu item **File**, then drop-down item **Connect**.

RESULT: The *Site* box displays.

8. Click **OK** button.

RESULT: The word 'Connected' appears on the top line of the screen after a successful connection.

9. Click menu item **File**, then drop-down item **Write Controller**. Select 'Excel Link'.
10. In the *Write to Controller* box, select Excel Link controller name. Click the **All Files** button. Click **OK** button.

RESULT: An *In Progress* box shows the number of requests pending.

11. Wait until all data is downloaded to the SSI controller (about 7 minutes). The *In Progress* box displays "No requests pending" when complete. Check Total Errors. If not zero, retrace steps and repeat download.

If download is complete and there are no errors, click **Cancel**.

If there are problems, refer to Excel Link System Engineering Manual 74-5591 or Q7645A Excel Link Checkout & Test 74-3557.

12. Exit ZM7604 by selecting, in sequence, **Disconnect**, **Close Site**, and **Exit** under the **File** menu item.

RESULT: The SSI download is complete and the CARE window redisplay.

Step 6 Subsystem Controller Download

Purpose Download subsystem controller application programs as necessary.

MicroCel/MacroCel controllers may not require a download at this time if, during their configuration in "Step 2, Subsystem Controller Configuration", they were downloaded. When the Excel Link starts running, the C-NAP bus activates and the MicroCels and MacroCels begin communicating.

For W7600 and W7620 Controller downloads, use the following procedure.

- Procedure**
1. While still connected to the Excel Link RS-232 port (previous Step 5), start CARE on the portable PC. Select the Excel Link plant. Select menu item Controller, drop-down item Xlink ZM 7604 Configuration.

RESULT: The *ZM7604* main menu displays.

2. Open the site, connect to the site, and write to subsystem controllers (procedure is the same as that in Step 5 for writing to the Excel Link SSI controller).
3. Refer to Q7645A Excel Link Checkout & Test 74-3557 to verify functionality.

Excel VAV2 Controller

The W7751D,F,H are Variable Air Volume (VAV) Controllers in the Excel 10 family product line. These VAV systems provide pressure independent or pressure dependent air flow control and series or induction fan control using single and dual duct applications. VAV systems generally provide cool air only to the zones. The W7751 controllers provide additional outputs that control VAV terminal reheat coils. The heaters can be staged electric or modulating hot water. Supply and exhaust pressurization control are provided on a zone basis.

They can be used in stand-alone applications or be used in combination with Excel 10 Zone Manager (FTT), other Excel Controllers, and the Excel Building Supervisor, to provide a complete room control solution for small to large commercial buildings.

NOTE: This chapter only deals with controllers configured as pressure **independent** systems. For further application details, please refer to the Plug-In online help and the Excel 10 W7751 product literature.

Chapter Overview

- Technical Overview: Airflow Sensing
- Flow Sensor Calibration
- Configuration
- Balancing
- Engineering Scenarios
- Procedures You Should Know
 - 1. Flow Sensor Calibration
 - 2. Balancing
 - 3a. Engineering OEM Balanced Controller
 - 3b. Engineering On-Site Controller (Controller Replacement)

Technical Overview: Airflow Sensing

General

Sensing Airflow begins with the sensing of the pressure within the airflow stream. In its simplest form, the measurement of airflow involves the sensing of the upstream pressure (referred to as the total system pressure), and the sensing of the system static pressure. Figure 1 diagrams a simple sensing device incorporated in most VAV Terminals on the market today.

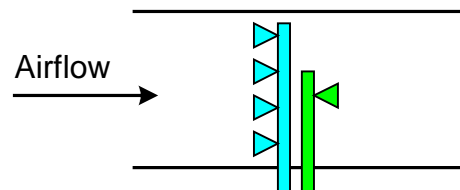


Figure 1: Airflow Sensing Device

The airflow-sensing device shown in figure 1 includes a mechanism that gathers and transmits the upstream pressure of the airflow. This device usually incorporates a group of openings that point upstream and allows the total system pressure to enter. The multiple openings in the upstream sensor are intended to provide an overall average of the upstream pressure. The second mechanism included in the airflow sensing device gathers and transmits the downstream or static pressure. This second mechanism sometimes incorporates more than one opening. By subtracting the downstream pressure from the upstream pressure, a new pressure called velocity pressure is created.

The configuration shown in figure 1 demonstrates the use of two mechanical devices for sensing the pressures within an airflow stream, but the information transmitted by the devices does not allow the actual value of the pressure to be calculated. In order to utilize this information, it must be converted into a value that

represents the actual velocity pressure. Velocity pressure is easily determined by attaching a simple mechanical gauge that will measure the difference between the two pressures and provides a value representing this difference as figure 2 shows.

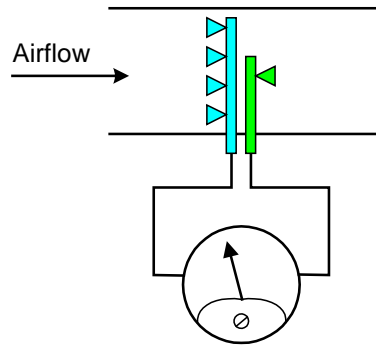


Figure 2: Airflow Sensing Device with Pressure Gauge

If a plot is made of the velocity pressure vs. the actual velocity, a graph is created similar to the graph shown in figure 3. The charts in figure 3 show the resultant velocity as the pressure is varied between 0.0 and 1.0 inches of H₂O (0 to 249 Pa). Here an important fact about the relationship between pressure and velocity is demonstrated; the relationship is a nonlinear function.

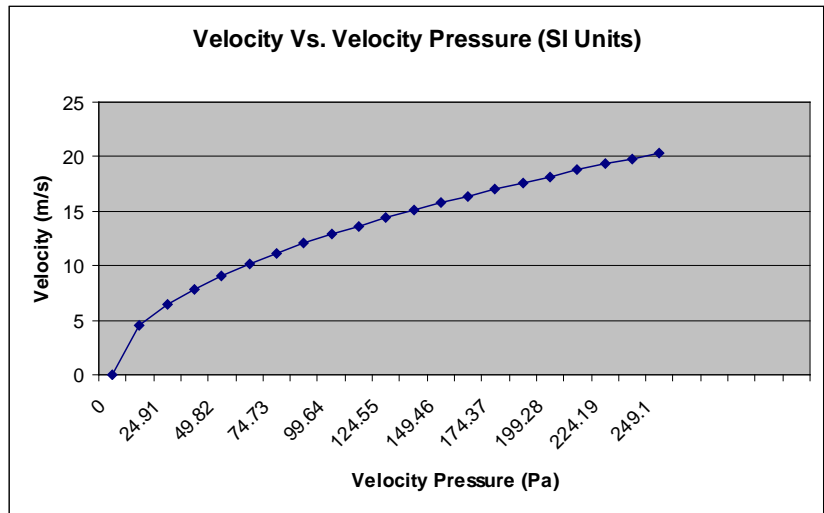


Figure 3: Graph of Velocity Pressure vs. Velocity in SI Units

VAV2 Controller Behavior

The VAV2 controller provides the ability of converting a velocity pressure value into a velocity value and acting upon this value.

In its simplest form, the controller senses the velocity pressure, converts the pressure into a velocity, applies the field balancing correction to the velocity and finally provides this velocity to the control algorithms. The controller also transmits airflow information to users or other controllers through an array of controller network points. A basic information flow diagram, shown in figure 4, outlines the airflow sensing process.

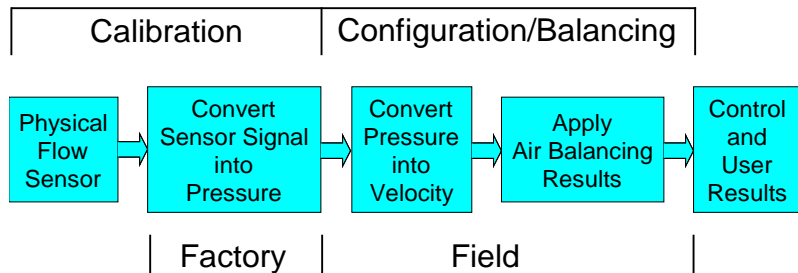


Figure 4: Airflow Sensing Process

The process outlined in figure 4 can be divided into two procedures, calibration and configuration/balancing. These processes are performed during two stages, factory and field.

NOTE: OEM manufacturers do the Balancing in the factory.

Flow Sensor Calibration

Procedure Site Factory

Convert Sensor Signal into Pressure After the VAV2 controller is manufactured, the pressure sensor is calibrated before the controller is released for shipping. The sensor is calibrated to sense pressures between 0.0 to 2.0 inches of H₂O (0 to 498 Pa). This calibration involves a set of parameters, referred to as gain and offset, defining a linear scaling of the sensor as it relates to pressure.

The value calculated by the controller is not in standard pressure units, but in units of volts. The calculated voltage value is related to pressure through the following second set of factor parameters:

Pressure	Parameter
0.0 inches H ₂ O (0 Pa)	Flow Volts Zero
1.0 inches H ₂ O (249 Pa)	Flow Volts Mid
2.0 inches H ₂ O (498 Pa)	Flow Volts High

The ideal values for the flow volts variables can be graphically represented and is shown in the chart in figure 5.

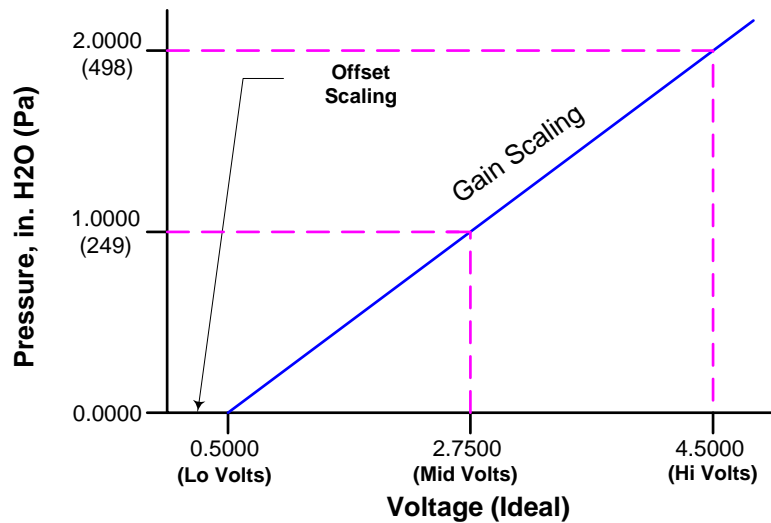


Figure 5: Pressure Vs. Ideal Voltage for Pressure Sensor

The parameters determined during factory calibration are retained in the controller's memory and can be accessed through the network variables:

- nciFactoryCal.FlowGain
- nciFactoryCal.FlowOffset
- nciFactoryCal.FlowVoltsZero
- nciFactoryCal.FlowVoltsMid
- nciFactoryCal.FlowVoltsHigh

It is very important that the parameters determined during manufacturing of the controller are never changed. The information is specific to each controller and cannot be recovered. However, access to the parameters can assist in troubleshooting airflow issues during installation and startup. They are provided as a reference. The final factory state action stores the resulting pressure in units of volts in the network point nvolIO.FlowVolts for information and further processing.

Configuration

Procedure Site OEM Factory, or at the Site

Configuration of the VAV2 controller for airflow control is essential for accurate measurement and control. When a controller is configured as a pressure independent system, the minimum configuration includes the airflow pressure sensor and damper actuator as shown in figure 6 below.

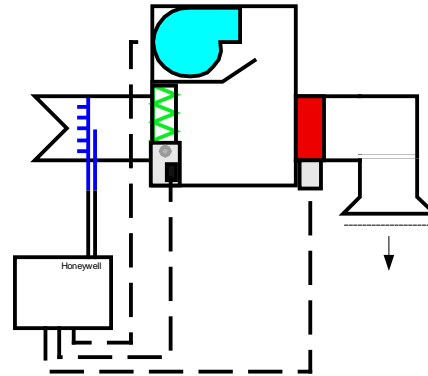


Figure 6: VAV Terminal & Controller Configured as Pressure Independent System

With the pressure independent operation selected, the following configuration parameters are of primary concern:

- Controller Type (Pressure Independent, as mentioned)
- Flow Pickup Table
- Duct Area
- Airflow setpoints
- Proportional Reheat

Flow Pickup Table

Convert Pressure into Velocity

Unlike many control systems currently used on VAV Terminals, the VAV2 controller allows the airflow characteristics to be defined as a flow characteristics curve, so-called flow pickup table. The flow pickup table converts the pressure signal (kPA) into a velocity (m/s) signal. This is accomplished with the application of the unique VAV Terminal flow data provided by the manufacturer. The flow pickup table allows the VAV Terminal velocity to be defined by ten unique points representing a velocity curve similar to the one shown in figure 3.

This detailed definition of airflow velocity results in very high accuracy in the area of VAV Terminal airflow velocity sensing. The actual table values are stored in twenty network variables representing the airflow curve; The flow pickup variable names are:

Point Number	Pressure Variable (kPa)	Velocity Variable (m/s)
PT 1	nciVoltsCal.ubS5[0]	nciFlowCal.siS3[0]
PT 2	nciVoltsCal.ubS5[1]	nciFlowCal.siS3[1]
PT3	nciVoltsCal.ubS5[2]	nciFlowCal.siS3[2]

Point Number	Pressure Variable (kPa)	Velocity Variable (m/s)
PT 4	nciVoltsCal.ubS5[3]	nciFlowCal.siS3[3]
PT 5	nciVoltsCal.ubS5[4]	nciFlowCal.siS3[4]
PT 6	nciVoltsCal.ubS5[5]	nciFlowCal.siS3[5]
PT 7	nciVoltsCal.ubS5[6]	nciFlowCal.siS3[6]
PT 8	nciVoltsCal.ubS5[7]	nciFlowCal.siS3[7]
PT 9	nciVoltsCal.ubS5[8]	nciFlowCal.siS3[8]
PT 10	nciVoltsCal.ubS5[9]	nciFlowCal.siS3[9]

Typically, the user defines a flow curve based on velocity in m/s vs. pressure in kPa; however, the controller uses the equivalent voltage to represent pressure as shown in the point list above. Most tools that configure the VAV2 controller perform the transformation from pressure to voltage for the user. Be aware that voltage values are being displayed when viewed directly in the controller, not pressure values.

The first action during conversion is to adjust the flow volts velocity results from the factory stage by subtracting the zero adjust parameter. This parameter, nciFlowVoltsOffsetS12, is determined whenever the controller is zeroed.

The next action is to locate the flow volts on the flow pickup table.

The installer must either select an existing flow pickup table based on the manufacturer of the VAV Terminal from predefined choices in the configuration tool (easiest method), or define a custom flow pickup table in order for this operation to provide accurate velocity (for detailed information on this method please refer to the VAV2 Controller Plug-in Online Help). Once the flow volts variable has been located on the table, the controller determines velocity by interpolating between the two closest points on the flow pickup table.

If the flow pickup table is defined directly from the manufacturer's current flow data for the type of VAV Terminal the controller is installed on, the flow values will be very close to the real value. However, installation of the VAV Terminal may introduce unexpected variations in the pressure sensing. To compensate for variations in the actual field conditions and installation, the VAV2 controller allows for a final field calibration, so-called balancing that corrects for these variations.

The flow pickup table is based on the following guidelines.

- Air Volume for the first table entry is always zero. This is a fixed requirement; point 1 must be zero flow and pressure.
- The last or tenth table entry should be the maximum allowable flow allowed for the VAV Terminal.
- The second table entry should be the minimum controllable flow allowed for the VAV Terminal.
- The ninth table entry should be between 1.25 times the maximum airflow setpoint selected for the controller.
- The remaining six points should be selected as incremental values between table entries two and nine.

Duct Area

The duct area is defined as the cross sectional area of the duct at the location of the flow sensor. This is graphically shown in figure 7.

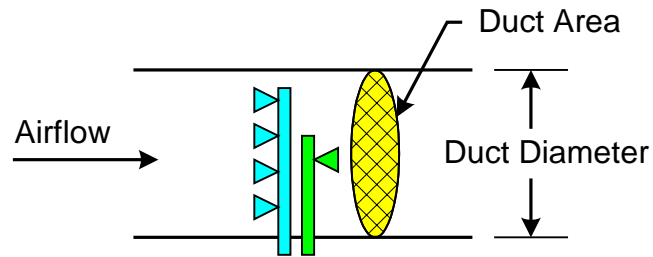


Figure 7: Diagram Defining Duct Area

The duct area is required for the controller so information calculated by the controller can be presented in volume as well as velocity. Airflow volume is the most common way airflow is represented for users. Balancing and other operations are represented in the controller as airflow volume in the units of meters cubed/ hour, m³/h or liters/second (US units are cubic feet per minute, cfm). It is necessary that an accurate area be entered for the duct area in order to minimize errors in the configuration and setup of the controller.

The VAV Terminal manufacturer will list this information in the appropriate units on the VAV terminal itself or in the literature included with the VAV terminal. In either case, the information must be configured in the controller using the correct units for the application, m² for SI or ft² for US. The configuration tool may allow the area to be selected from a standard list of round duct diameters, in which case the tool calculates the correct area.

If the duct where the flow sensor is placed is a non-standard shape or size, then the area may need to be calculated manually. The area can be calculated for standard shapes as follows:

Rectangle:

$$DuctArea = Length \times Height$$

where length and height are meters for SI, feet for US.

Round Duct:

$$DuctArea = \frac{3.1416 \times (diameter)^2}{4}$$

where diameter is meters for SI, feet for US.

Airflow Setpoints

Airflow setpoints are the values used by the controller to make control decisions. With the use of a set of airflow setpoints, a wide range of control options become available. Typically, airflow setpoints are determined for each unique installation. It is the responsibility of the installer to obtain or determine the appropriate setpoints for each installation.

Depending on the configuration of the controller, there are four basic airflow setpoints that can be configured in the controller. The setpoints and their purpose are listed as:

- **Maximum Airflow Setpoint**
The maximum airflow volume (SI m³/h, US cfm) that the controller will deliver in the cooling mode (or heating mode for dual duct, dual controller installations).
- **Minimum Airflow Setpoint**
The minimum airflow volume (SI m³/h, US cfm) that the controller will deliver in the cooling mode (or heating mode for dual duct, dual controller installations).

- Standby Airflow Setpoint**
 This becomes the maximum airflow volume (SI m³/h, US cfm) setpoint whenever the controller is placed in the standby mode.
- Reheat Airflow Setpoint**
 The fixed airflow volume (SI m³/hm, US cfm) maintained by the controller whenever current controller mode is reheat. This parameter typically applies to single controller installation, and is not part of the dual duct, dual controller installations. If this parameter is not enabled for a controller configuration, check that some form of mechanical reheat has been configured.

The setpoints are typically set through a configuration tool, but direct access is possible through the network variables:

Airflow setpoint	Network Variable
Maximum Setpoint	nciMaxFlow
Minimum Setpoint	nciMinFlow
Standby Setpoint	nciMinFlowStdby
Reheat Setpoint	nciMaxFlowHeat

If the setpoints are entered through the configuration tool, a set of rules is applied that prevent incorrect values from being entered. However, if the values are entered directly into the network variable, the user must apply a set of rules to prevent an invalid setpoint error from being generated at the controller. The rules are listed as:

- Minimum Airflow Setpoint < Maximum Airflow Setpoint
- Minimum Airflow Setpoint < Reheat Airflow Setpoint
- Standby Airflow Setpoint < Maximum Airflow Setpoint
- Reheat Airflow Setpoint < Maximum Airflow Setpoint

Proportional Reheat

One misunderstood and overlooked parameter affecting the operation of airflow control is the proportional reheat parameter. This parameter is a simple check box in most configuration tools that enables proportional reheat when checked. The controllers network variable, nciConfig.ReheatPropControl, can be set directly by simply setting the variable to true or false. This parameter affects the operation of single duct, single controllers, with pressure independent configurations. The effects of proportional reheat can best be explained by examining the VAV2 controller’s airflow control setpoint reaction to changes in the space temperature with respect to the space temperature setpoints. The default configuration is proportional reheat disabled or the network parameter value set to false. In this configuration the operation of the airflow control setpoint is outlined in figure 8. In this diagram, the colored lines represent the airflow setpoint with respect to the current space temperature and setpoints.

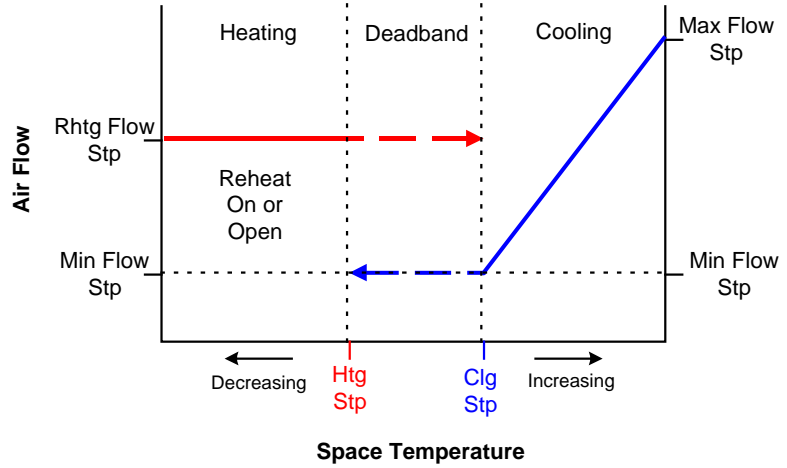


Figure 8: Diagram of Airflow Control Setpoint vs. Space Temperature

Figure 8 clearly illustrates that when the space temperature is above the cooling setpoint, the controller is in the cooling mode and the airflow control setpoint follows the blue line. As the space, temperature falls below the cooling setpoint but is still above the heating setpoint, the controller remains in the cooling mode and the airflow control setpoint is fixed at the minimum airflow setpoint. When the space temperature falls below the heating setpoint, the controller's mode is changed to reheat and the airflow control setpoint follows the red line. This has the effect of fixing the airflow control setpoint equal to the reheat airflow setpoint. This fixed setpoint remains in effect until the space temperature rises above the space cooling setpoint. Note that whenever the space temperature is in the deadband region, no mechanical heating is provided.

In some applications, a fixed reheat airflow setpoint can cause temperature swings and cycle the mechanical heating system when excessive unconditioned air is introduced into the space. One method to correct this issue is by setting the proportional reheat parameter to enable or true. With the proportional reheat parameter enabled, the Airflow control setpoint algorithm is modified and the airflow control setpoint value follows the diagram in figure 9.

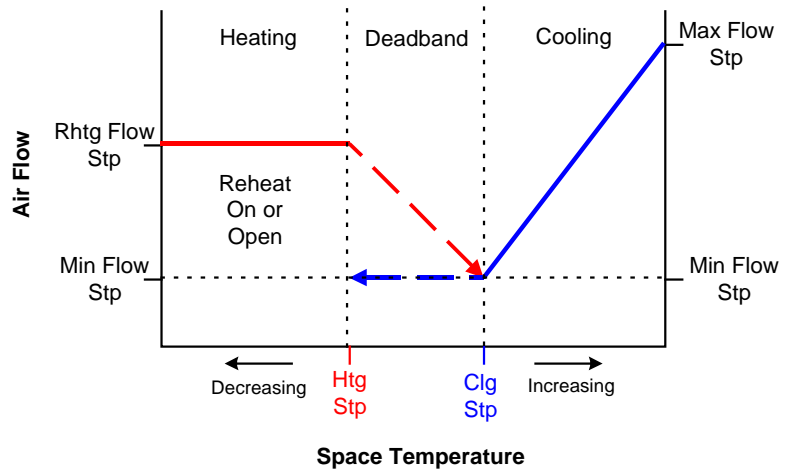


Figure 9: Diagram of Airflow Control Setpoint with Proportional Reheat

With the proportional reheat parameter set to enable, the airflow control setpoint follows the red line when the controller is in the reheat mode. When the space temperature is in the deadband region, the airflow control setpoint is modulated between the reheat airflow setpoint and the minimum airflow setpoint. This can introduce some stability in the deadband region during heating periods. It should be noted that when the VAV Terminal includes a series reheat fan, the proportional reheat parameter should be set to disable or false.

Procedure Site OEM Factory, or at the Site

Airflow Balancing is the final action required to complete the VAV2 controller installation and startup. Balancing is required for a variety of reasons that range from unusual installation conditions, to inaccuracies in the flow pickup table. Through balancing, these installation specific conditions that affect the airflow sensing can be removed.

Prerequisites This phase assumes that the VAV2 controller has been configured and checked for proper operation.

Network Variables Balancing, is performed by measuring the actual airflow volume and correcting the controllers sensed airflow velocity. This is done by comparing the controller's sensed uncorrected (apparent) airflow velocity against the actual velocity measured. The balancing is performed at two flow values, typically maximum and minimum airflow setpoints. The results are stored in a group of field calibration network points and are accessible through the network variable names:

- nciFld3PtCal.siCalActualLowS3
- nciFld3PtCal.siCalApparentLowS3
- nciFld3PtCal.siCalActualMidS3
- nciFld3PtCal.siCalApparentMidS3
- nciFld3PtCal.siCalActualHiS3
- nciFld3PtCal.siCalApparentHiS3

NOTE: OEM manufacturers perform the balancing in the factory.

When the balancing is complete, the network variables contain the results of the calibration in terms of velocity. These six points provide a correction factor to the controller's air velocity that can best be understood in terms of a chart as shown in figure 10.

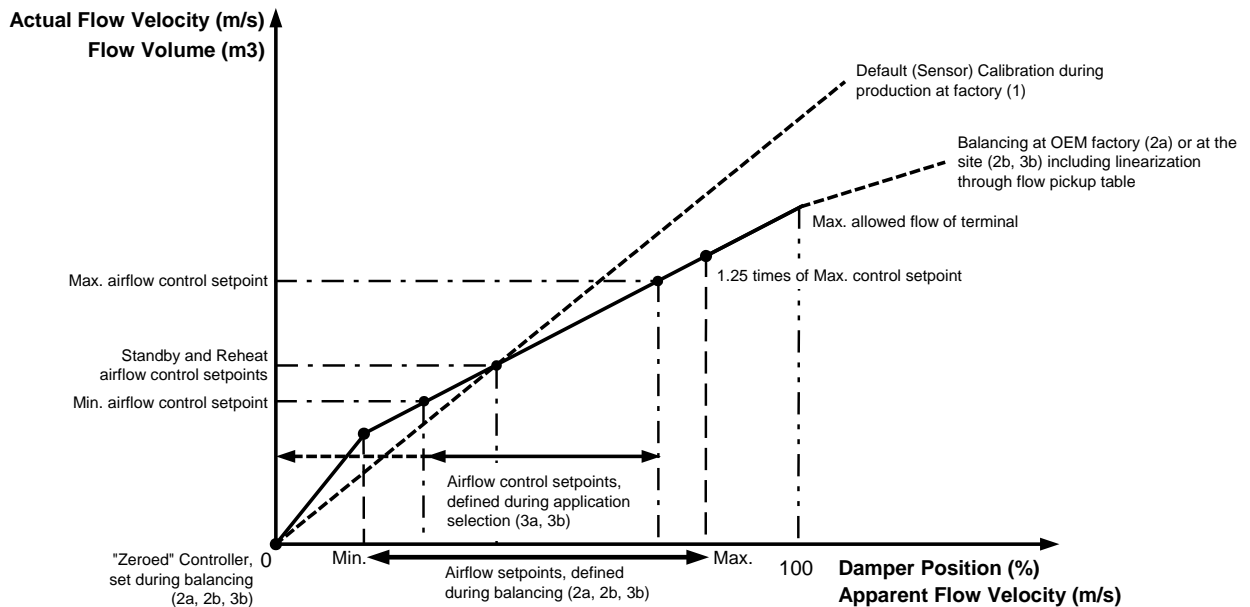


Figure 10: Apparent Controller Velocity Vs. Actual Measured Velocity

The chart shows the controller creating a 3-point correction to the sensed velocity. For sensed velocities that lay between the calibration points, the controller interpolates the velocity based on the closest two calibration points.

It must be stated here, if power is cycled on the VAV2 controller, no attempt should be made to zero or calibrate the controller for a period of not less than 5 minutes. During this period, the sensing process within the controller has not yet stabilized. Any balancing or zeroing of the controller may result in erroneous values and poor accuracy.

In addition, the flow pickup table must have point 1 defined as zero flow and pressure. Erroneous zero offset value will occur without this definition. The flow zero offset value is not an indication of the accuracy of the flow sensor; it is simply the results of comparing the flow volts signal to the flow pickup table zero pressure point.

Process Steps

A diagram of the balancing (calibration) process is shown in figure 11. Note the "repeat ?" feedback item in the diagram. If more than one repeat is required to obtain accurate airflow measurement, the configuration, testing, and calibration process should be reviewed.

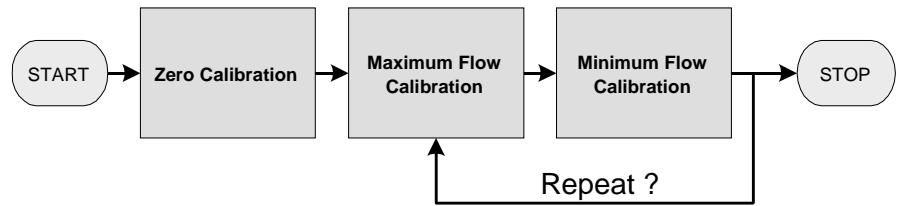


Figure 11: Airflow Balancing Process Diagram

Setting Pressure Sensor Zero

The first step that is required for balancing is to zero the pressure sensor. This places the controller in the manual mode and closes the VAV Terminal damper. Once the damper is closed, the sensor voltage value is compared to the flow pickup table point 1 voltage value and the difference is stored in the network variable nciFlowVoltsOffsetS12. Once the controller has been zeroed, airflow sensing can be calibrated (balancing). The zeroing operation is only required once for the balancing process. Once a good controller zero has been established, the controller will automatically make minor corrections to the zero offset value.

Airflow Balancing

Airflow Balancing is a two-step process: Calibration at Maximum Airflow and Minimum Airflow. These two calibration points are required for proper airflow sensing. Though the order of calibration is not important for most applications, it is recommended that the maximum airflow be performed first.

Maximum Airflow Balancing

This process begins by fixing the airflow control setpoint equal to the maximum airflow setpoint. If the maximum calibration airflow is different from the maximum airflow setpoint, the setpoints can be modified. Begin the calibration process with maximum airflow calibration. The controller will begin to control at the maximum airflow setpoint. Once the configuration tool has determined that stable flow has been reached, the tool will request an independent airflow measurement. This measurement, along with the sensed airflow, will be recorded in the field "calibration network points".

Minimum Airflow Balancing

As stated in the beginning, airflow calibration is a two-step process; the minimum calibration is required. If the controller configuration maintains a fixed airflow setpoint, it is still required that a minimum calibration be performed. It is also recommended that the minimum calibration setpoint be less than half of the maximum calibration setpoint, with a minimum low limit velocity at the flow sensor of 200 fpm (1.016 m/s). Proceed the calibration with minimum airflow calibration. The controller will begin to control at the minimum airflow setpoint. Once the configuration tool has determined that stable flow has been reached, the tool will request an independent airflow measurement. This measurement, along with the sensed airflow, will be recorded in the field "calibration network points".

Engineering Scenarios

Procedures You Should Know

You should you be familiar with the basic VAV2 airflow sensing aspects described in the previous sections. In addition, for proper engineering of VAV2 controllers, you should have basic knowledge of LonWorks Network Engineering in CARE. Please refer especially to the following sections:

- CARE and LNS
- Commission LON device /LonWorks network
- Synchronize with LNS
- Upload Parameters
- LNS Plug-Ins
- The Device Library
- Replace Device
- Configure LON Bus
- EBI Settings
- Keep Device Configuration

In the following, the two basic engineering paths (see diagram next page) including step-by-step procedures for a VAV2 pressure independent air sensing control system are described.

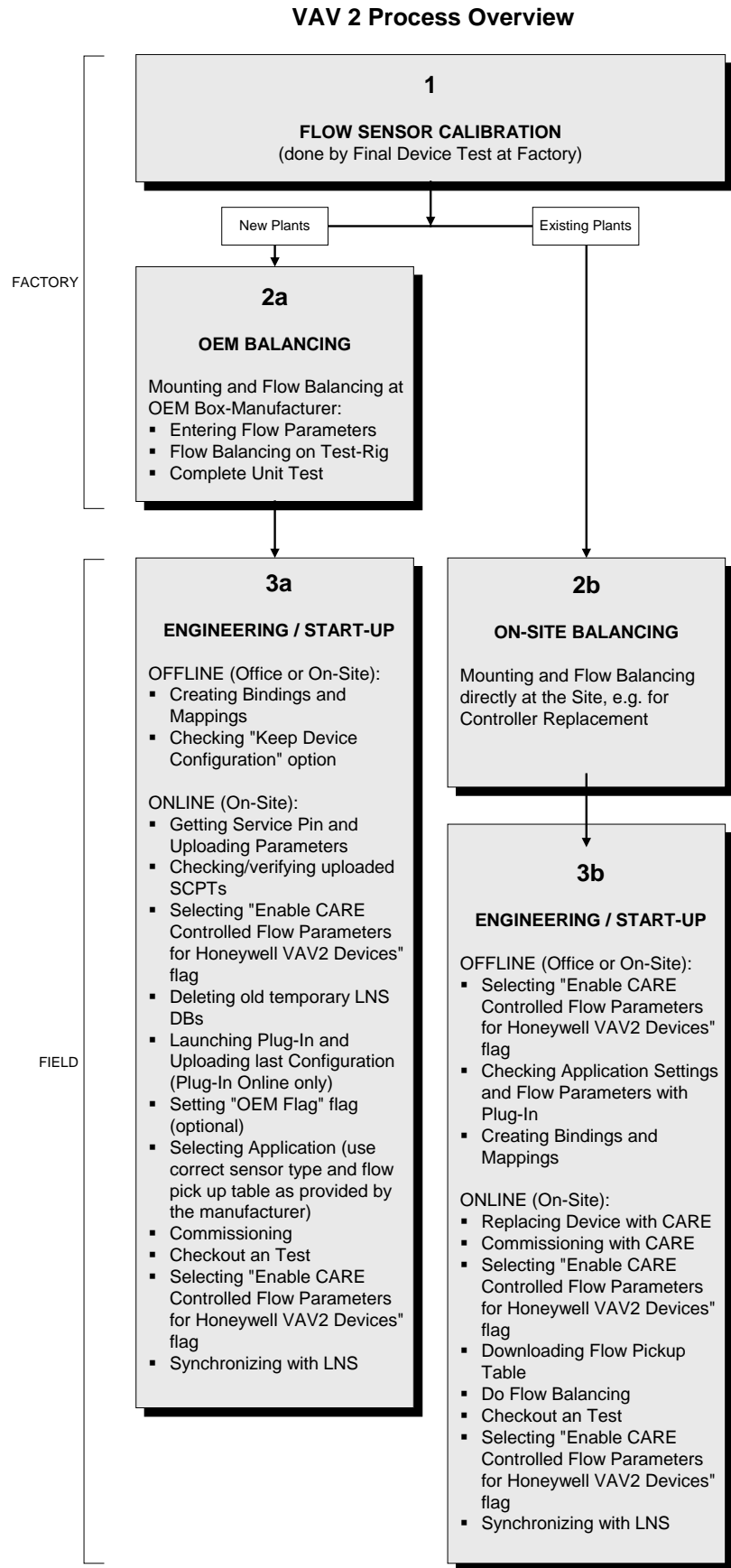


Figure 12: VAV 2 Process Overview

1 Flow Sensor Calibration

For details on general technical aspects on flow sensor calibration, please refer to "Technical Overview: Airflow Sensing" section.

2 Balancing

For details on general technical aspects on balancing, please refer to "Configuration" and "Balancing" sections.

Balancing of a VAV2 controller installed on a terminal is required for two basic reasons:

- Firstly, to resolve the inconsistencies between laboratory settings by which the terminal flow tables were developed and the actual conditions of the terminal's construction and installation.
- Secondly, to resolve electronic variances in the VAV2 controller.

Configuration Parameters

The following configuration parameters affect the control of the air flow and must be adjusted during the balancing procedure:

- Controller Pressure Type
- Flow Pickup Table
- Duct Area
- Airflow setpoints
- Proportional Reheat Flow

Airflow Balancing Rules

Controller Pressure Type

The VAV2 applications chapter in this User Guide applies to pressure **independent** control systems only.

Flow Pickup Table

The flow pickup table is composed of ten groups of two values, pressure and velocity. The easiest method for configuring a flow pickup table is to select one of the standard tables listed in the configuration tool (Plug-In). This selection is based on the manufacturer of the VAV Terminal and is indexed to the model type installed. The second and final method to configure the flow pickup table is by creating a custom flow table within the configuration tool. For detailed instructions on this item, please refer to the VAV2 Controller Online Help. For both methods, the following rules are valid:

- Air Volume for the first table entry is always zero. This is a fixed requirement; point 1 must be zero flow and pressure
- The last or tenth table entry should be the maximum allowable flow allowed for the VAV Terminal
- The second table entry should be the minimum control setpoint resulting in a velocity of at least 1.016 m/s (better than 2.0 m/s)
- The ninth table entry should be between 1.25 times the maximum airflow setpoint selected for the controller
- The remaining six points should be selected as incremental values between table entries

Flow Pickup Table Download

When downloading the flow pickup table, values are converted from pressure into voltage. In addition, there will be new values calculated from the converted values and the factory calibration values coming online from the controller.

NOTE: Due to these facts, each controller is unique from its software configuration and neither can easily be replaced or copied, nor its EPROM can be changed.

Duct Area and Airflow Setpoints

For the duct area and airflow setpoints, the following values must be noted:

- Max. duct area allowed = 0,372 m²
- Maximum airflow setpoint must not result in a duct velocity greater than 3500 17.78 m/s (fpm)
- Minimum airflow setpoint must not result in a duct velocity less than 1.016 m/s (200 fpm).

Available airflow setpoints (Application: 3a, 3b)

- Max airflow setpoint: Maximum control setpoint allowed for the controller
- Min airflow setpoint: Minimum control setpoint allowed for the controller
- Standby airflow setpoint: Minimum control setpoint during standby mode
- Reheat airflow setpoint: Fixed control setpoint during reheat mode

Airflow setpoint Rules (Application: 3a, 3b)

- Minimum airflow setpoint < Maximum airflow setpoint
- Minimum airflow setpoint < Reheat airflow setpoint
- Standby airflow setpoint < Maximum airflow setpoint
- Reheat airflow setpoint < Maximum airflow setpoint

IMPORTANT

The application setpoints are independent of the balancing values. The airflow setpoint rules are independent of the used tool.

All VAV2 controllers must be balanced for zero, minimum and maximum flow. If the controller's final configuration is a constant volume unit, a minimum flow balancing is still required. Apply the following rules to the flow volume setpoints for any controller, even if the calibration setpoints are not the final configuration setpoints.

- Minimum airflow setpoint must be less than 80 % and greater than 20 % of the Maximum airflow setpoint.

NOTE: The more accurate the flow pickup table, the wider the range for the Minimum airflow setpoint. If the controller does not have a minimum airflow setpoint, then a good starting point for a balancing minimum airflow setpoint would be 50 % of the maximum airflow setpoint.

IMPORTANT

Minimum airflow setpoint must not be set to zero for balancing.

- After airflow balancing has been completed, the airflow setpoints can be set to any value that does not violate the required setpoint rules.

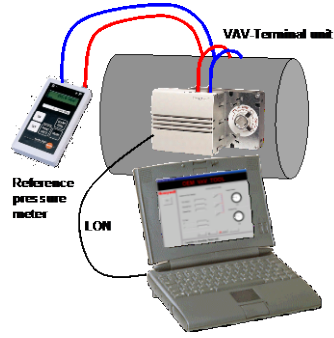
Proportional Reheat

When checked, this parameter enables proportional reheat by affecting the operation of single duct, single controllers, with pressure independent configurations. For detailed description, please refer to the "Proportional Reheat" section.

Tools and Equipment

The following figure shows the common equipment setup:

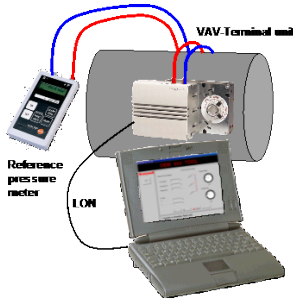
The actual pressure of the flow velocity is converted into a raw electrical sign through the hot-wire mass flow sensor.



2a OEM Balancing

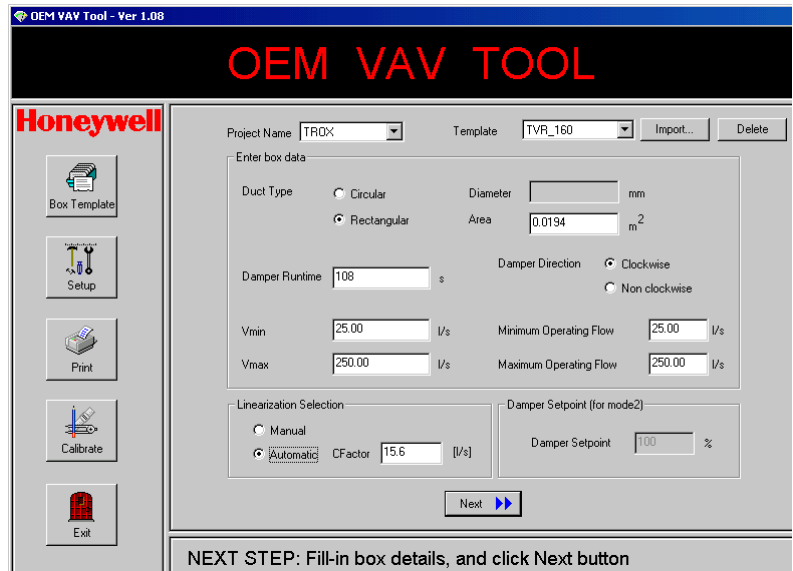
Tools

At the OEM factory, the Honeywell OEM VAV Tool and a reference pressure meter is used for balancing the VAV2 Controller/Terminal.

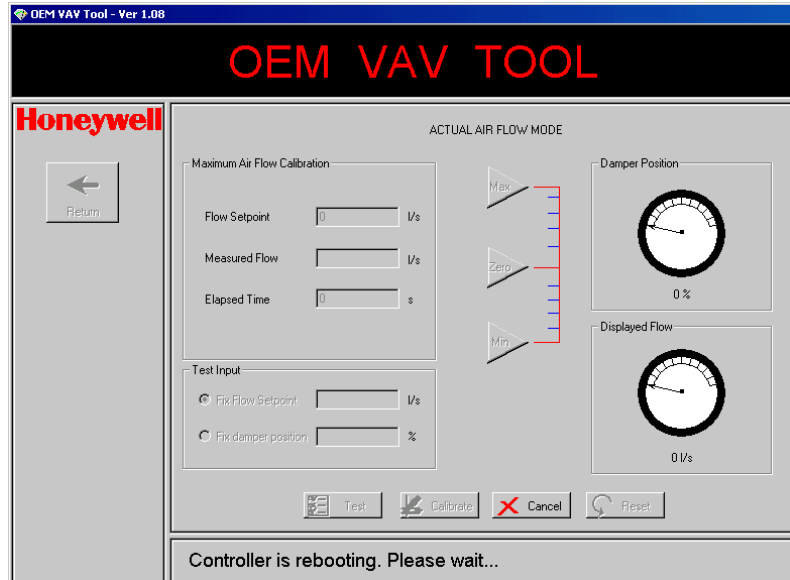


Honeywell OEM VAV Tool Features

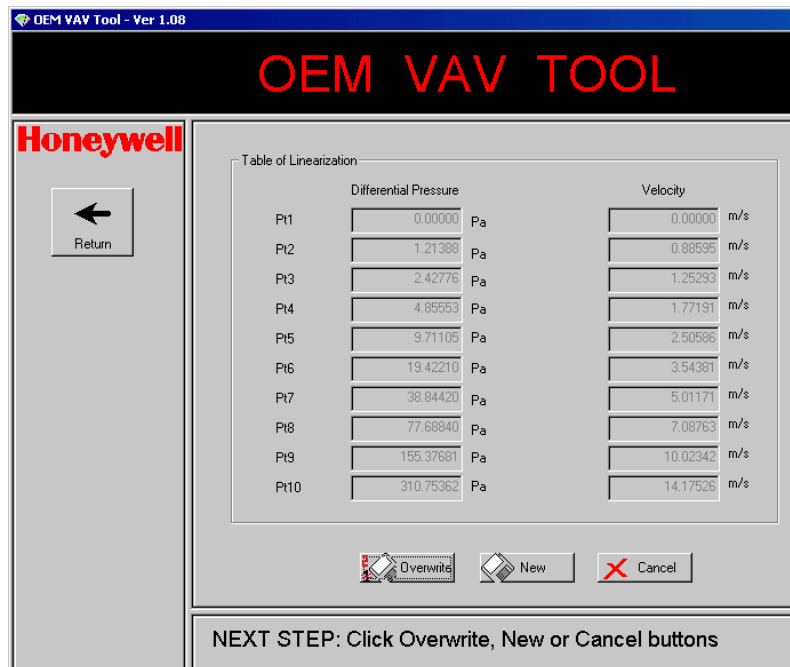
- Designed for use at OEM Factory
- Production orientated
- Works on the Zero Domain only
- Access of all controllers within one segment via Neuron ID



- Allows complete balancing procedure including download of flow pickup table and functional (accuracy) test of the VAV Terminal unit.
- Uses own DB-format for Terminal-Templates etc.



- 2 Different modes for flow pickup table creation (“automatic” based on C-Factor and manual entering)



- two different operator modes are available
 Supervisor mode (customize the process and create Terminal Templates; password protected)
 Operator mode (airflow balancing process on the VAV terminal)

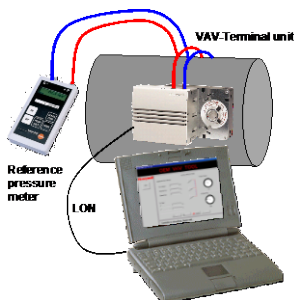
Procedure

1. Select a predefined **Project and Terminal Template** from the drop-down list box.
2. Enter the unique **Job ID** received from the Supervisor.
3. Since the template contains all the configuration information for balancing a terminal, you need to click the **Calibrate** button to load the information into the terminal. It is always a 3-point airflow balancing performed on the terminal irrespective of the method chosen: 1. Controller zeroing, 2. Max airflow setpoint and 3. Min airflow setpoint
4. In order to balance the terminal you first acquire the current terminal's flow and damper position based on the **setpoints**. Begin with controller zeroing and proceed with max airflow setpoint, then finish with min airflow setpoint (see steps 5 to 7).
5. After the flow and damper positions stabilize, take the actual flow reading from a reference meter and enter that in the tool.
6. Press **Calibrate** button. The tool will write the balanced flow offset.
7. Repeat this for min airflow setpoint.
8. If the supervisor has selected **Test** menu option, a test of the balancing accuracy can be performed by clicking the **Test** button.
9. Connect the next terminal and repeat beginning with step 1.
10. Continue with Engineering / Startup the VAV2 controller as described in the "3a Engineering OEM Balanced Controller" section.

2b On-Site Balancing

Tools

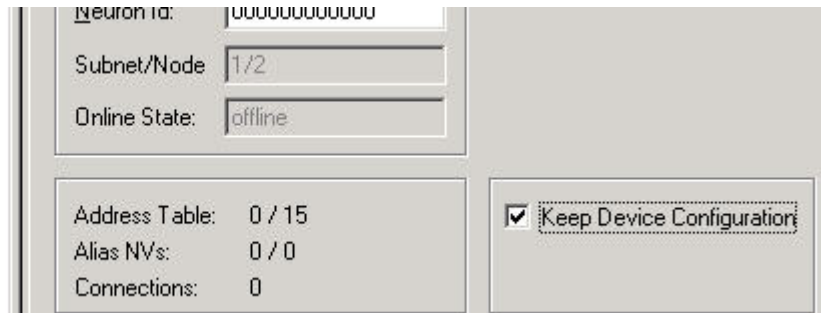
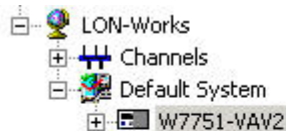
XL 10 VAV2 LNS Plug-In and reference pressure meter. This method is used when the VAV terminal has to be balanced at the site. This procedure is typically part and applied when a VAV2 controller must be replaced. Please refer to the "3b Engineering On-Site Controller (Controller Replacement)" section.



3a Engineering OEM Balanced Controller

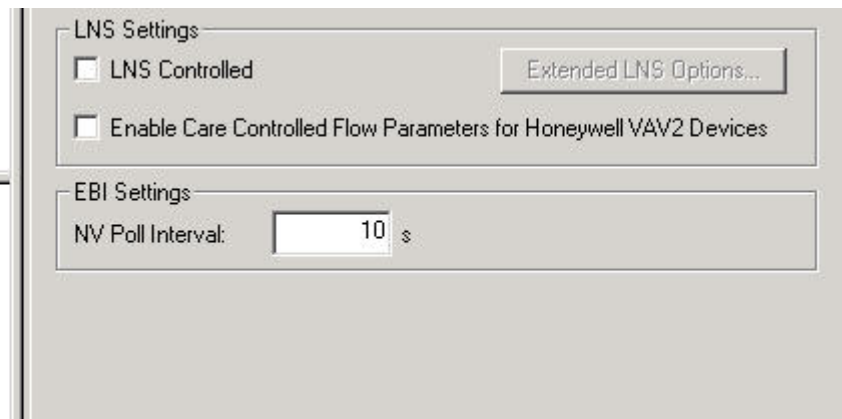
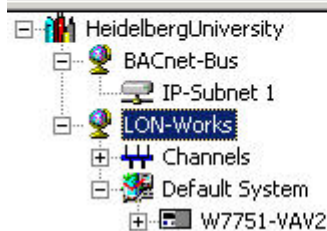
OFFLINE at office, or at site Do the following:

1. In CARE, do the bindings and mappings of the VAV2 controller and the relevant devices.
2. Check the **Keep Device Configuration** flag. This avoids impermissible or unintentional overwritings of the actual device configuration by keeping the actual configuration of the device. The actual configuration of the device cannot be overwritten by CARE (LNS synchronization) as long as the parameters have not been uploaded from the device. In case the **Keep Device Configuration** flag is checked, the plug-in cannot be invoked from within the device and the device cannot be commissioned as long as the parameters have not been uploaded.

**IMPORTANT**

The flow pickup table and the controller type are not uploaded.

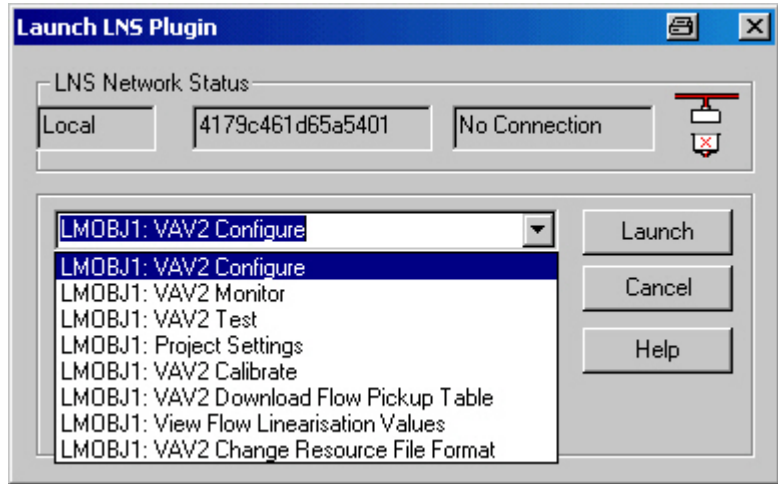
3. Uncheck the **Enable CARE Controlled Flow Parameters for Honeywell VAV2 Devices** flag, if you want to update the LNS database with the current CARE values of the flow parameters 'duct area', 'flow setpoint minimum' and 'flow setpoint maximum'.



ONLINE at site Continue by doing the following:

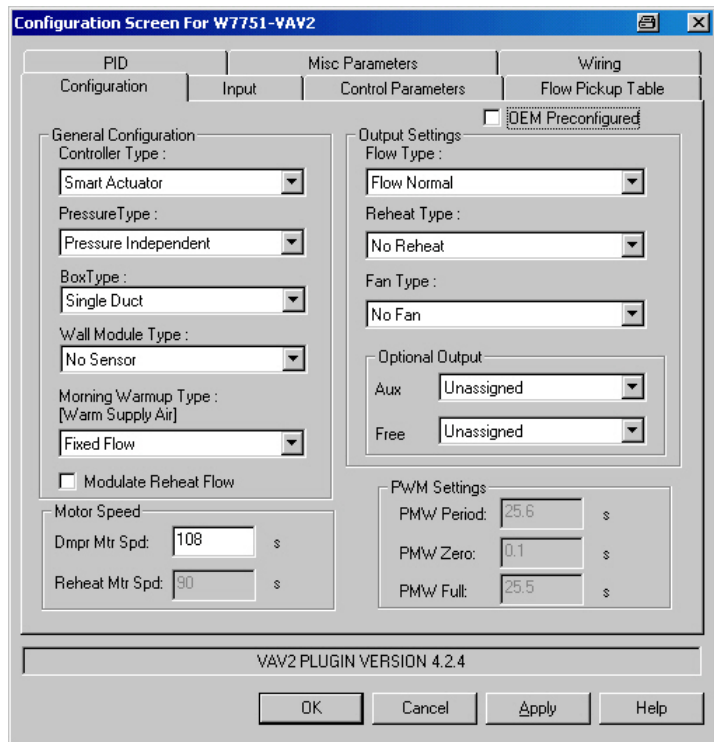
4. In CARE, go Onnet.
5. Get the Service Pin of the VAV2 controller.
6. Upload the parameters from the of the VAV2 controller into CARE. The **Keep Device Configuration** flag is now unchecked, because the device is updated with the current parameters.
7. Check/verify uploaded SCPTs.
8. Check the **Enable CARE Controlled Flow Parameters for Honeywell VAV2 Devices** flag.

9. In CARE, go Offnet.
10. Right-click on the VAV2 controller and select **Plug-Ins Offline** in the context menu.
11. In the *Launch LNS Plugin* dialog box, select **VAV2 Configure...**

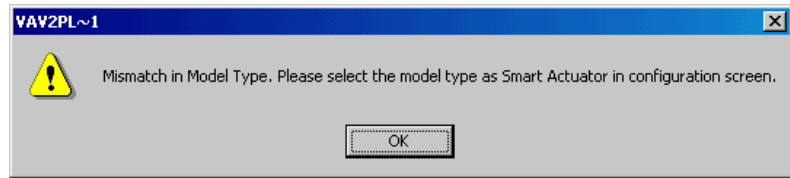


12. Click **Launch** button.

RESULT: The *Configuration Screen* is displayed.



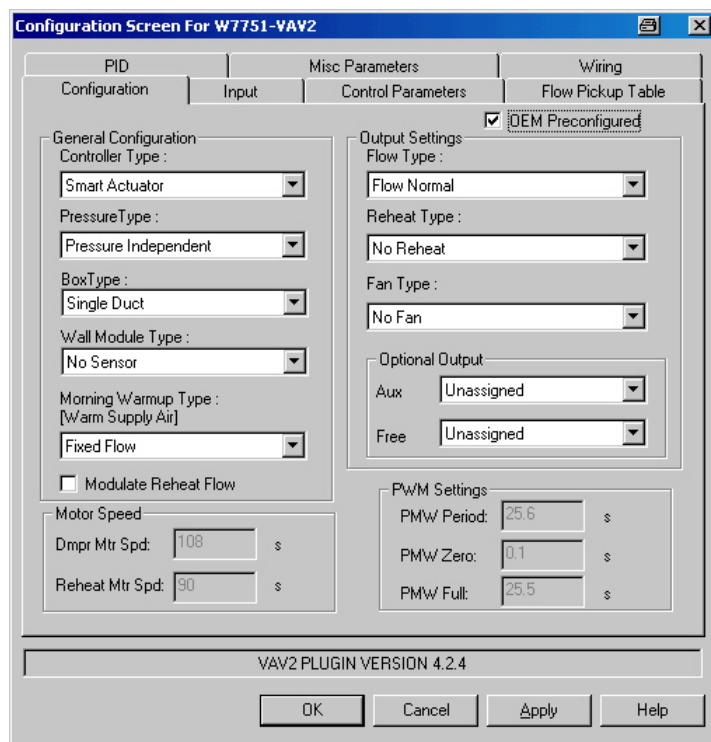
13. On the *Configuration* tab, make sure the **Controller Type** is set to the appropriate type, Standard/OEM or Smart Actuator. This is important if choosing an online option of the Plug-in. If the controller type is not set correctly, the online communication with the Plug-in is not possible as the following message box displays.



- Standard Users**
14. (Optional) If you are a standard user with basic or less knowledge of all the configuration settings, check **OEM Preconfigured** flag. This will prevent overriding values that have already been entered by the OEM terminal manufacturer during the application selection. These values are grayed in the Plug-in as long as this flag is checked. If you are an advanced user with detailed knowledge of all the configuration settings, continue with step 16.

WARNING

DO NOT DOWNLOAD THE FLOW PICKUP TABLE WHEN THE OEM PRECONFIGURED FLAG IS SELECTED. THIS RESULTS IN MALOPERATION OF THE DEVICE.



15. Set the appropriate application settings on the relevant tabs of the *Configuration* screen and continue with step 17.

- Advanced Users**
16. If you are an advanced user with detailed knowledge of all the configuration settings, you may do one of the following (see the following 3 screens):

Change airflow setpoint values (*Control Parameters* tab) according to the actual plant conditions

Adjust duct area diameter according to selected sensor type (*Control Parameters* tab)

Select sensor type (*Flow Pickup Table* tab)

(Re-)enter the correct Flow Pickup Table (*Flow Pickup Table* tab)

IMPORTANT

The last two steps are strongly recommended to minimize maintenance effort and avoid maintenance problems.

Configuration Screen For W7751-VAV2

PID		Misc Parameters		Wiring	
Configuration	Input	Control Parameters		Flow Pickup Table	

Cooling Setpoints

Occupied: 23 Deg C
 Standby: 25 Deg C
 Unoccupied: 28 Deg C

Flow Setpoints

Maximum: 1696 m³/h
 Minimum: 335 m³/h
 Max Reheat: 508 m³/h
 Standby: 360 m³/h

Heating Setpoints

Occupied: 21 Deg C
 Standby: 19 Deg C
 Unoccupied: 16 Deg C

Duct Area

Area: 0.0504 m²
 Dia: CustomArea

Wall Module Setpoint Limits

Low Lim: 12.8 Deg C High Lim: 29.44 Deg C

Special SI Units

Asia Flow Units

SETPOINTS: Unocc Heat < Stdby Heat < Occ.Heat < Occ.Cool < Stdby Cool < Unocc Cool
 FLOW SETPOINTS: Minimum < Max. Reheat < Maximum

VAV2 PLUGIN VERSION 4.2.4

OK Cancel Apply Help

Configuration Screen For W7751-VAV2

PID		Misc Parameters		Wiring	
Configuration	Input	Control Parameters		Flow Pickup Table	

Cooling Setpoints

Occupied: 23 Deg C
 Standby: 25 Deg C
 Unoccupied: 28 Deg C

Flow Setpoints

Maximum: 1696 m³/h
 Minimum: 335 m³/h
 Max Reheat: 508 m³/h
 Standby: 360 m³/h

Heating Setpoints

Occupied: 21 Deg C
 Standby: 19 Deg C
 Unoccupied: 16 Deg C

Duct Area

Area: 0.0201 m²
 Dia: 160 mm

Wall Module Setpoint Limits

Low Lim: 12.8 Deg C High Lim: 29.44 Deg C

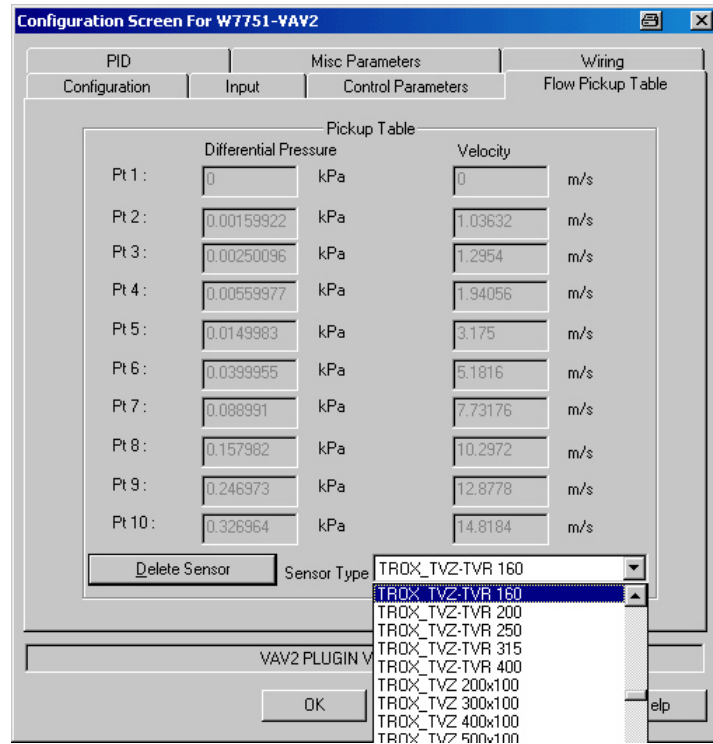
Special SI Units

Asia Flow Units

SETPOINTS: Unocc Heat < Stdby Heat < Occ.Heat < Occ.Cool < Stdby Cool < Unocc Cool
 FLOW SETPOINTS: Minimum < Max. Reheat < Maximum

VAV2 PLUGIN VERSION 4.2.4

OK Cancel Apply Help



17. Click **Apply** button.
18. Click **OK** button.
19. Commission the VAV2 controller.
20. Do the function test using CARE.
21. (Optional) Check the **Enable CARE Controlled Flow Parameters for Honeywell VAV2 Devices** flag if you want to update the LNS database during the Synchronize with the current CARE values of the flow parameters `duct area`, `airflow setpoint minimum` and `airflow setpoint maximum`.

NOTE: This option is global and applies to all VAV2 controllers of the project.

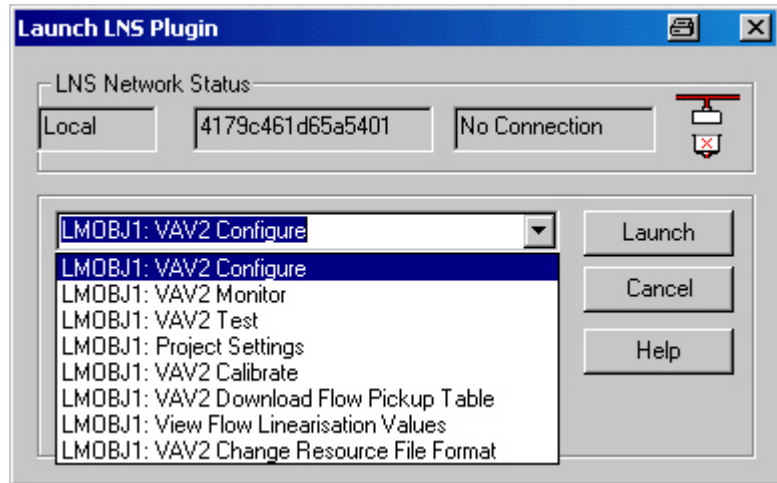
22. (Optional) Perform a Synchronize.

3b Engineering On-Site Controller (Controller Replacement)

OFFLINE at office, or at site

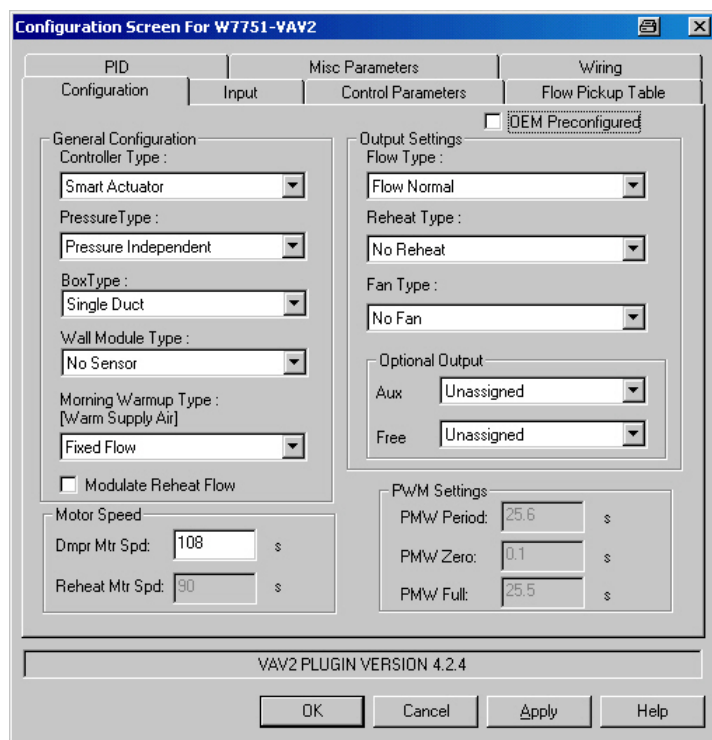
Do the following:

1. In CARE, check the **Enable CARE Controlled Flow Parameters for Honeywell VAV2 Devices** flag.
2. Do the bindings and mappings of the VAV2 controller and the relevant devices.
3. Right-click on the VAV2 controller and select **Plug-Ins Offline** in the context menu.
4. In the *Launch LNS Plugin* dialog box, select **VAV2 Configure...**



- Click **Launch** button.

RESULT: The *Configuration Screen* is displayed.

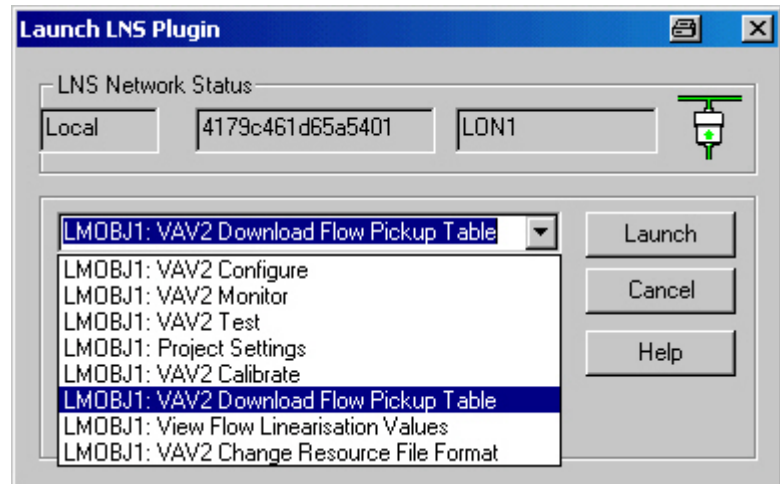


- On the *Configuration* tab, make sure the **Controller Type** is set to the appropriate type, Standard/OEM or Smart Actuator. This is important if choosing an online option of the Plug-in. If the controller type is not set correctly, the online communication with the Plug-in is not possible.
- On the *Control Parameters* and *Flow Pickup Table* tabs, check the application settings, especially the balancing parameters, such as max. flow setpoints, duct area and sensor type.
- Check the **Enable CARE Controlled Flow Parameters for Honeywell VAV2 Devices** option if you want to update the LNS database during the Synchronize with the current CARE values of the flow parameters 'duct area', 'airflow setpoint minimum' and 'airflow setpoint maximum'.

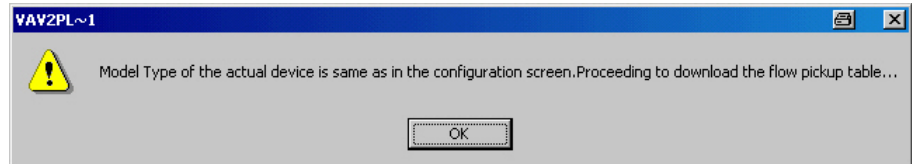
ONLINE at site Continue by doing the following:

- In CARE, go Onnet.

10. Replace the VAV2 controller.
11. Commission the VAV2 controller.
12. Check the **Enable CARE Controlled Flow Parameters for Honeywell VAV2 Devices** flag.
13. In CARE, go Offnet.
14. Right-click on the VAV2 controller and select **Plug-Ins Online** in the context menu.
15. In the *Launch LNS Plugin* dialog box, select **VAV2 Download Flow Pickup Table...**, then click **Launch** button.

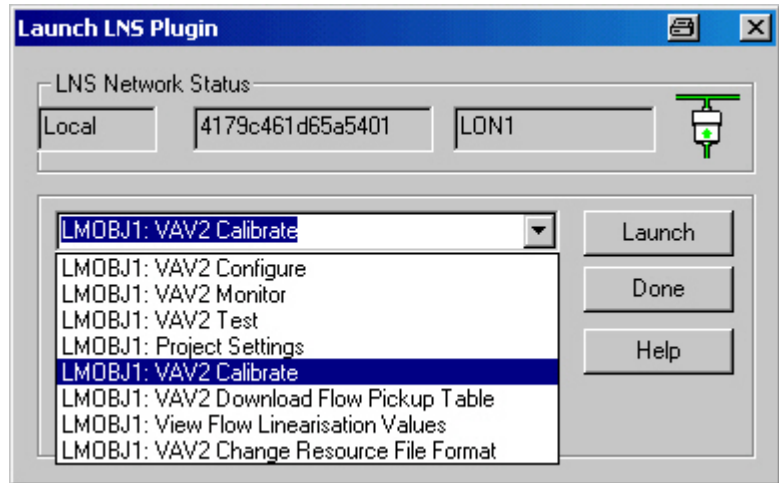


16. Confirm message box by clicking **OK** button.



RESULT: The flow pickup table is downloaded into the physical VAV2 controller. When downloading the flow pickup table, values are converted from pressure into voltage. In addition, there will be new values calculated from the converted values and the factory calibration values coming online from the controller.

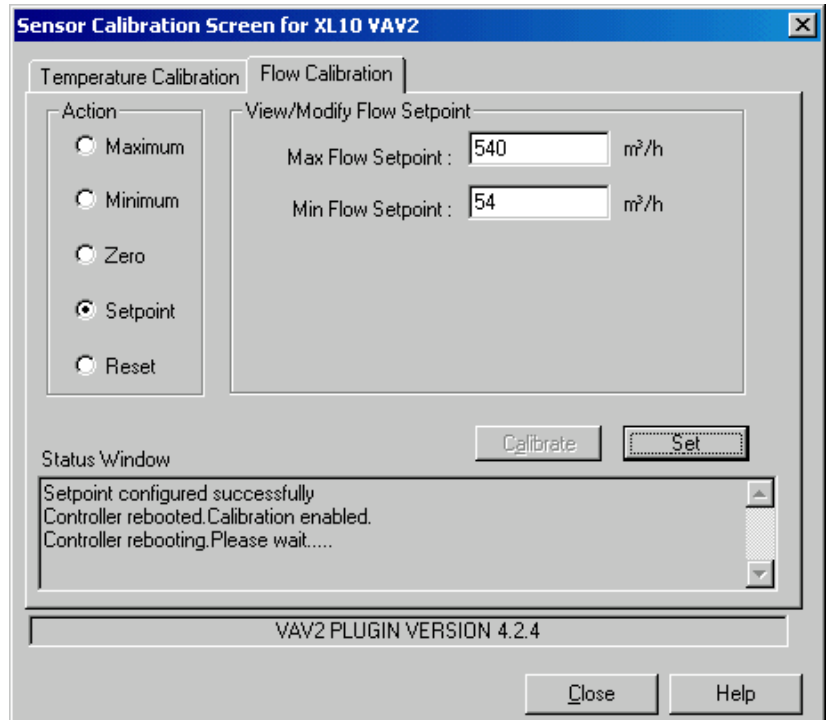
17. Proceed with airflow balancing by selecting **VAV2 Calibrate** in the *Launch LNS Plugin* dialog box.



RESULT: The *Sensor Calibration Screen* is displayed.

18. Select *Flow Calibration* tab.

RESULT: Here the control setpoint values of the application set in the Plug-In are displayed in the **Max. Flow Setpoint** and **Min. Flow Setpoint** fields.

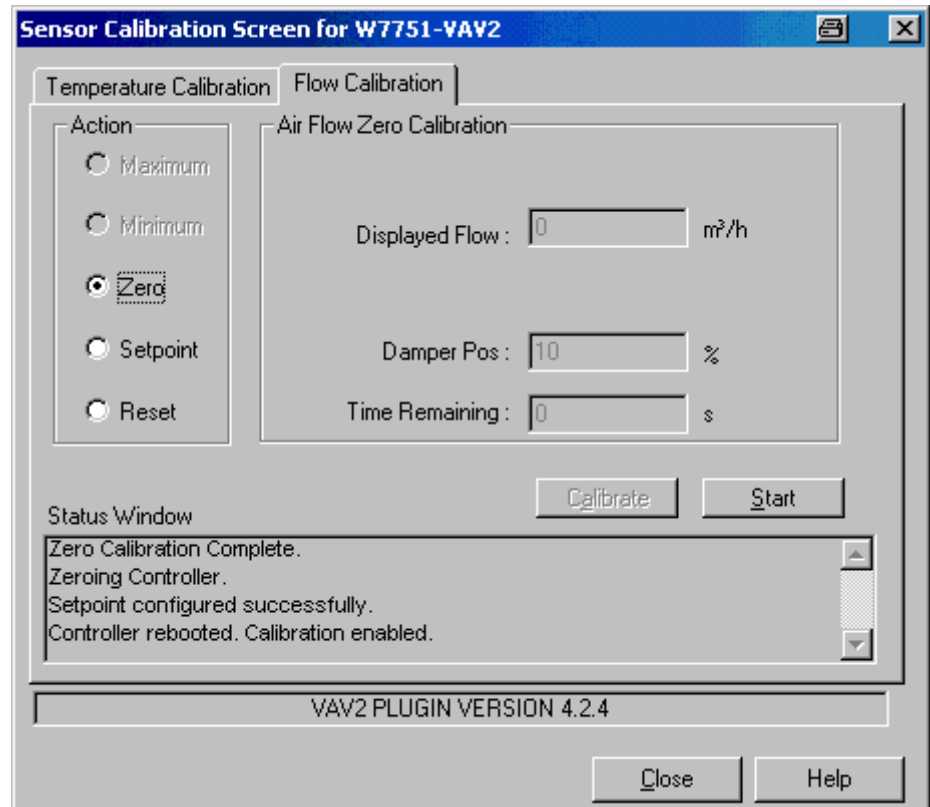


19. (Optional) If the actual plant configuration requires or allows other max. and min values, enter the corresponding values and click **Set** button. For proper values, please note the Airflow Balancing Rules as described in the "2. Balancing" section.

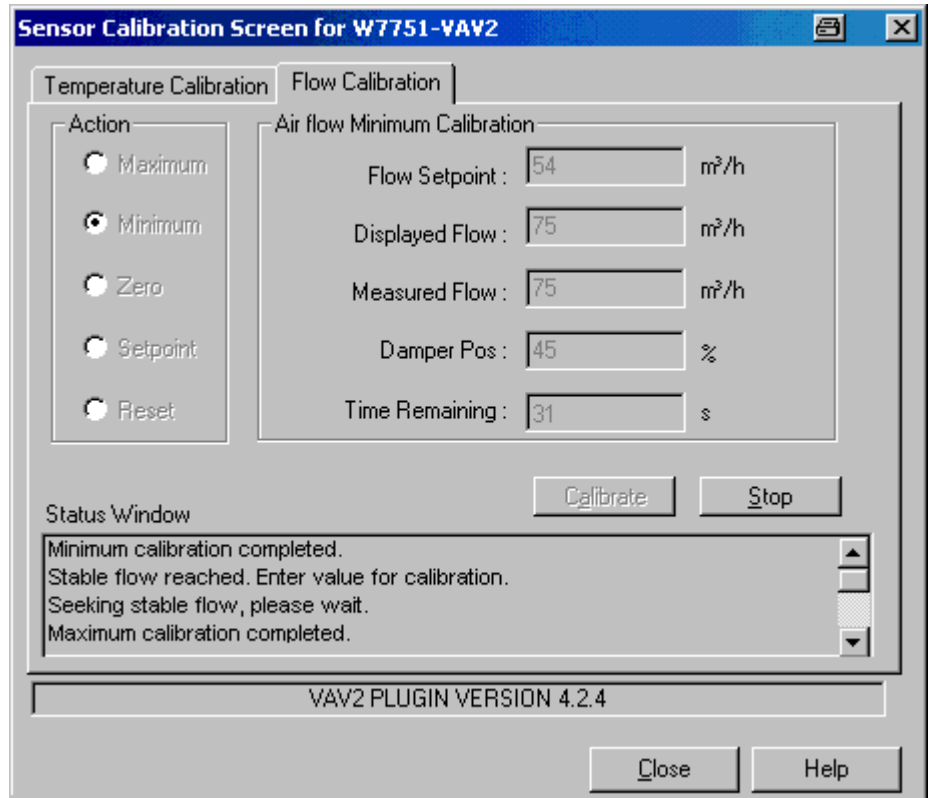
IMPORTANT

When changing min and/or max values, the corresponding values must be changed in the application too, and the VAV2 controller must be commissioned.

20. Proceed with with zeroing by clicking **Zero** radio button, then clicking **Start** button.



21. After zeroing is finished, click **Calibrate** button.
22. Proceed with calibrating at maximum by selecting **Maximum** radio button and clicking **Start** button.
23. After stable flow is reached, enter the flow reading from the reference meter into the **Measured Flow** field and click **Calibrate**.
24. Proceed with calibrating at minimum by selecting **Minimum** radio button and clicking **Start** button.
25. After stable flow is reached, enter the flow reading from the reference meter into the **Measured Flow** field and click **Calibrate**.



26. If the result is not “good enough” for some reason, reset the controller to factory defaults, download the correct flow pickup table and redo the airflow balancing procedure.
27. Close the Plug-In.
28. If not set, check the **Enable CARE Controlled Flow Parameters for Honeywell VAV2 Devices** option if you want to update the LNS database during the Synchronize with the current CARE values of the flow parameters ‘duct area’, ‘airflow setpoint minimum’ and ‘airflow setpoint maximum’.

NOTE: This option is global and applies to all VAV2 controllers of the project.
29. Synchronize the LonWorks network.

Excel 10 Commissioning

The commissioning procedure applies to the following Excel 10 controllers:

- W7750 CVAHU
- W7751 VAV2
- W7752 FCU
- W7754 FCU
- W7753 Unit Vent
- W7761 RIO
- W7762 HYD and
- W7763 CHC

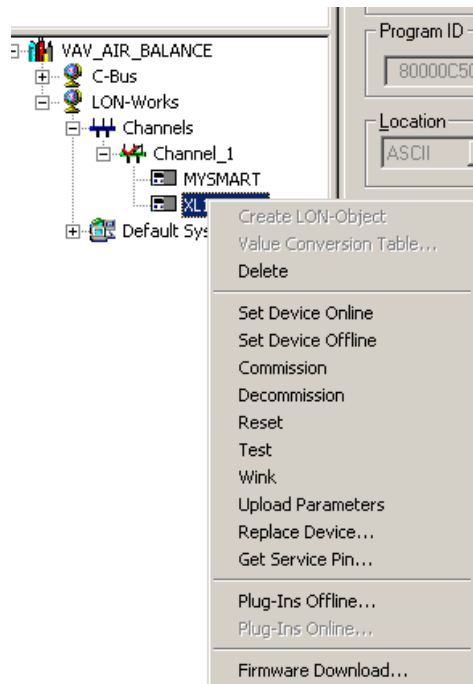
Excel10 controllers are configured with the "Plug-ins Offline" function using the same procedure as all other Excel10 devices. The default engineering units for the plug-ins is Metric. If you want to change this to English, do the following:

Procedure

1. Select Plug-ins Offline
2. Choose **Honeywell Project Settings** and select **English**. This task is done once and changes the engineering units for all Honeywell Plug-ins used in this project.
3. Configure the Excel 10 Controller as follows:
 - a. Launch Plug-ins Offline
 - b. Select Honeywell XL10 Configure.
 - c. The plug-in will present information in a similar format to E-Vision or LonSpec Software.
 - d. Make sure the Controller Type on the Configuration tab is set to appropriate type, Standard/OEM or Smart. Enter also the flow pickup table and duct area.
 - e. Click OK.

- f. Power up the controller(s) and connect each controller via the LonWorks network to the CARE PC.
- g. In CARE, open the project and go Onnet.
- h. Get the service pin for the Excel 10 controller.
This will allow you to hit the service pin on the Excel10 to set the Neuron ID. If the service pin has successfully been read, half of the XL10 controller icon will turn green.

NOTE: The bypass button on the wall module does not send the service pin for the Excel 10 controllers when used with CARE or LonMaker. Pushing the service pin on the controller or manually typing the neuron ID is required. The bypass button service pin functionality will return with future Excel 10 controller firmware upgrades.



- i. Commission each Excel 10 controller individually or all at the same time.
- j. Go Offnet.

OPEN LINK CONTROLLER

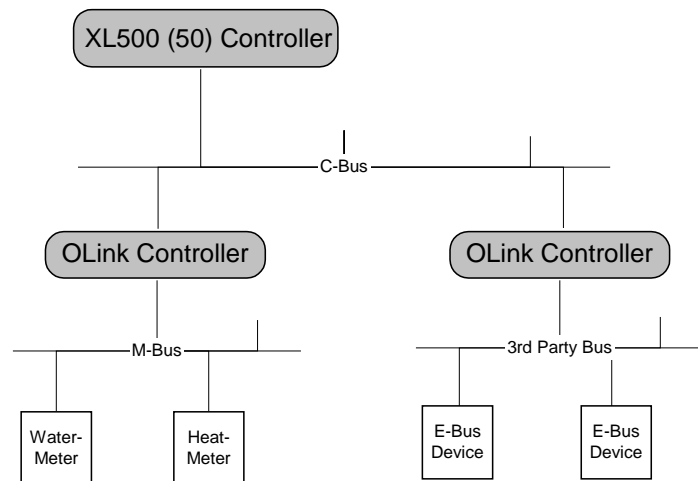
General The OpenLink (OLink) Controller is an application level integrator that facilitates interfacing third party HVAC controller networks (subsystem networks) into the Honeywell EXCEL 5000 system. Equipped with the appropriate vendor network interface (VNI), an OpenLink Controller provides control and/or monitoring of controller points for the subsystem controllers.

The OpenLink controller appears on the C-Bus network as any other Excel 500 controller (rev. 1.2), and occupies one of the standard 30 nodes. There can be up to 30 OpenLink controllers on a C-bus tied to 30 subsystem networks, each subsystem network can support 30 subsystem controllers.

The OpenLink Controller's CPU is configured using CARE and supports the same features as other C-Bus controllers, including schematics, control strategy, and switching logic (optional). A maximum of 768 CARE points (user addresses) can be configured in the OpenLink CPU.

The connection between the OLink controller and the subsystem network is established by the OLink interface that includes the VNI information. The OLink interface data can be stored as a template and then be reused for controllers with equivalent hardware configuration.

The OLink controller will be downloaded via B-port.

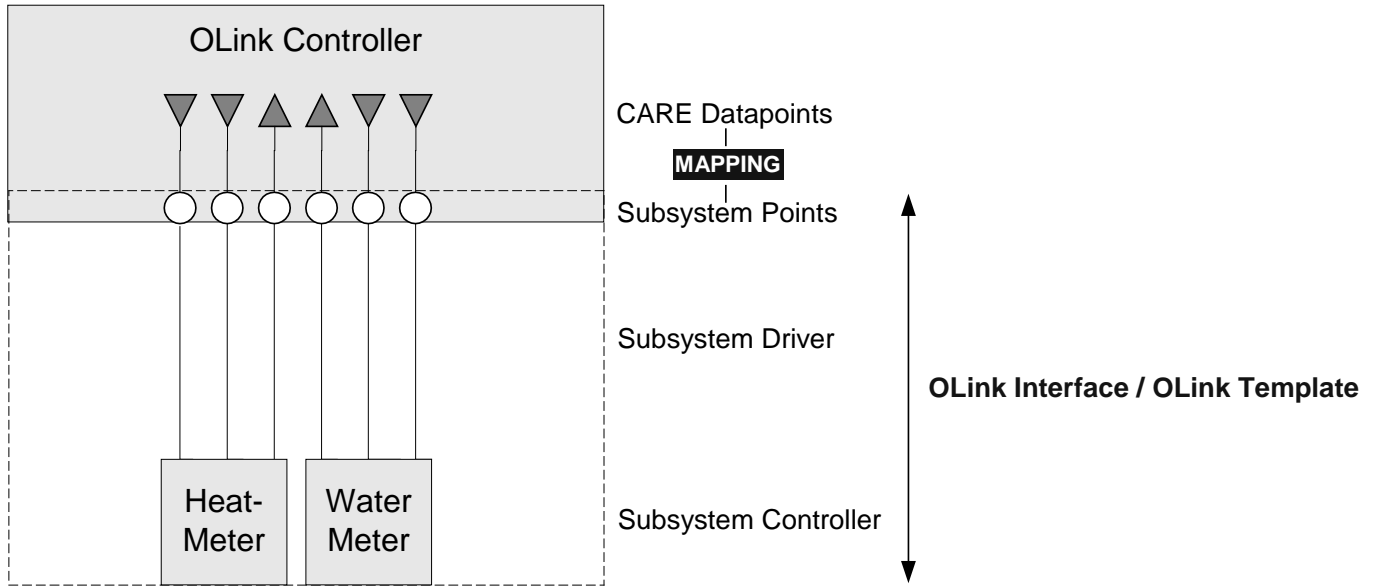


OLink Interface/OLink Template)

The OLink interface represents a vendor-specific subsystem hardware configuration and consists of the following components:

- Subsystem driver (e.g. M-bus)
- Subsystem controllers (e.g. water meter, heat meter)
- Subsystem points = OLink points (e.g. watstat01, heatstat01)

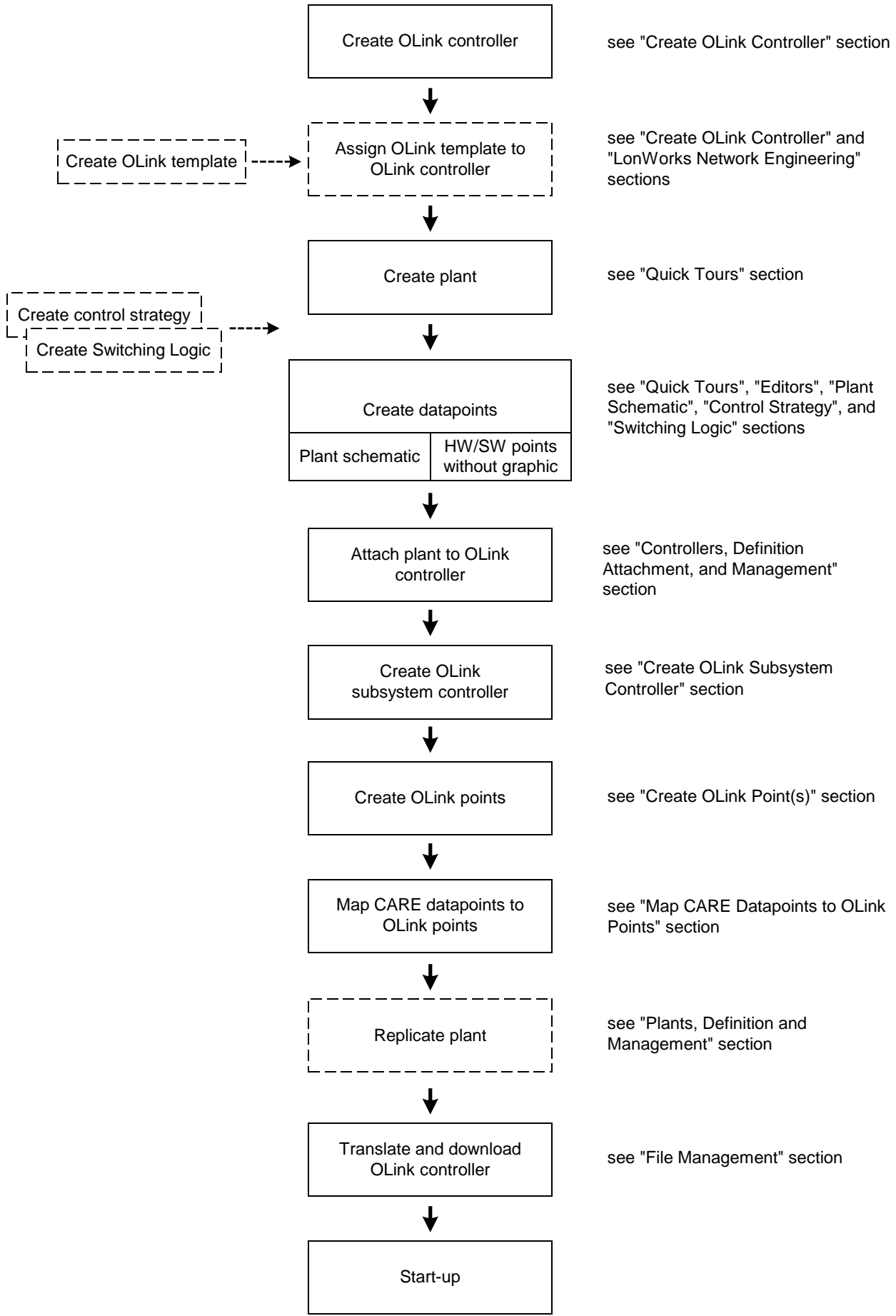
That configuration data may be provided by the vendor via the VNI data (VNI file). The OLink interface can be stored as an OLink template for reusing the hardware configuration many times.



OLink templates can be created in the device library. To create a template see "LonWorks Network Engineering" section.

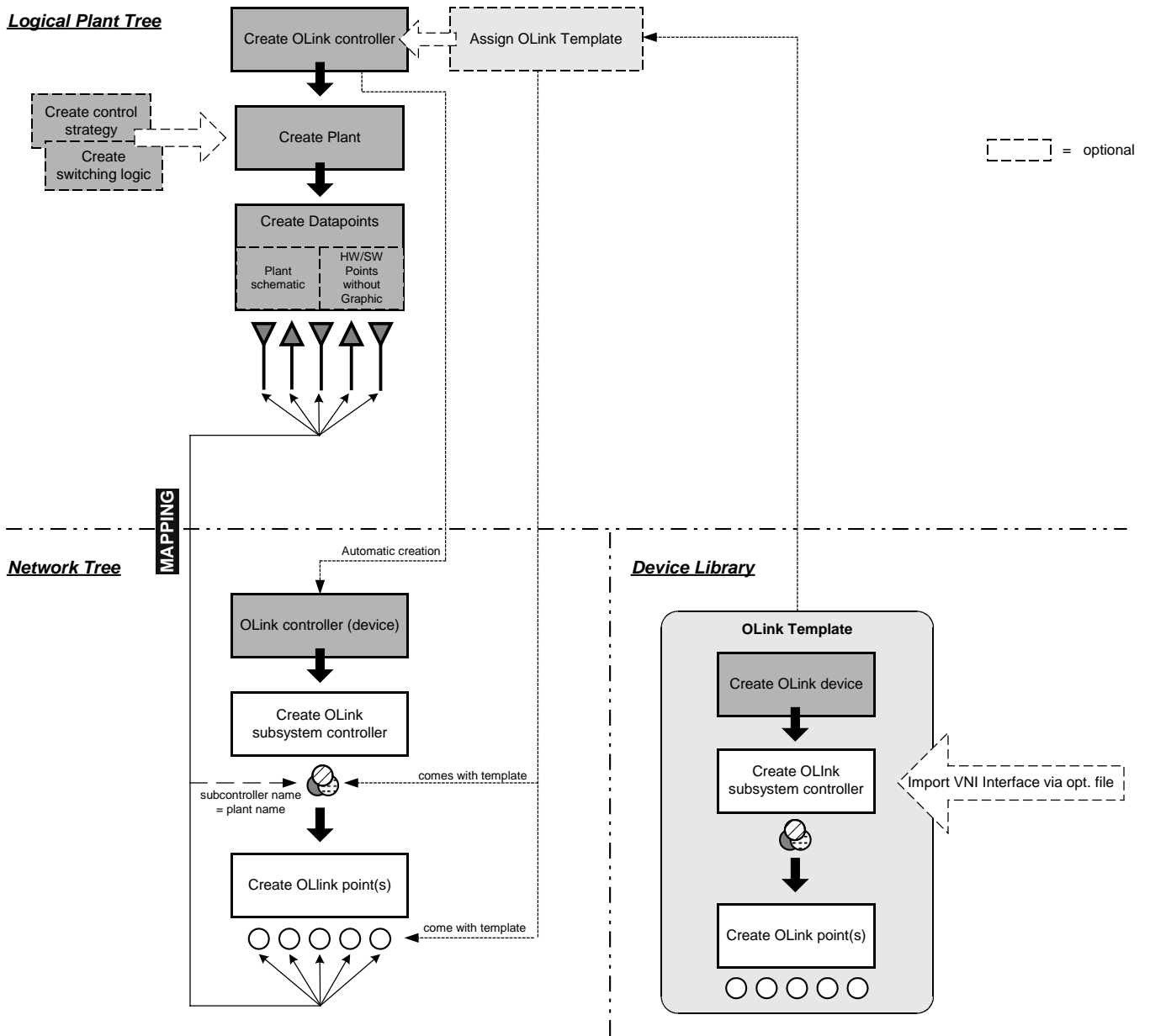
Engineering Process

OLink controller engineering is to be done by the following steps:



CARE Environment View

The following flowchart explains where the OLink specific steps are to be done in the CARE environment.



Create OLink Template

OLink templates are created in the device library and include basically the same steps as creating the OLink subsystem in the C-bus part of the network tree. To create a template see "LonWorks Network Engineering" section. To create the OLink subsystem in the Bus part of the network tree, continue with "Create OLink Controller" section

Create OLink Controller

- Procedure** 1. Select menu item **Controller**, then submenu item **New**.

RESULT: The *New Controller* dialog box displays.

2. Into the **Controller Name** field, enter controller name.
3. From the **Bus Name** drop-down listbox, select the folder where the OLink controller should be saved.
4. From the **Controller Type** drop-down listbox, select 'OLink'.
5. From the **OLink template** drop-down list box, select a template (to create a template see "LonWorks Network Engineering" section).
6. Confirm by clicking **OK** button.

RESULT: The OLink controller (device) is added to the logical plant tree and to the Bus part of the network tree.

7. Click on the OLink device in the Bus part of the network tree and enter basic information on the *Properties* tab on the right as follows:

OLink Device Name

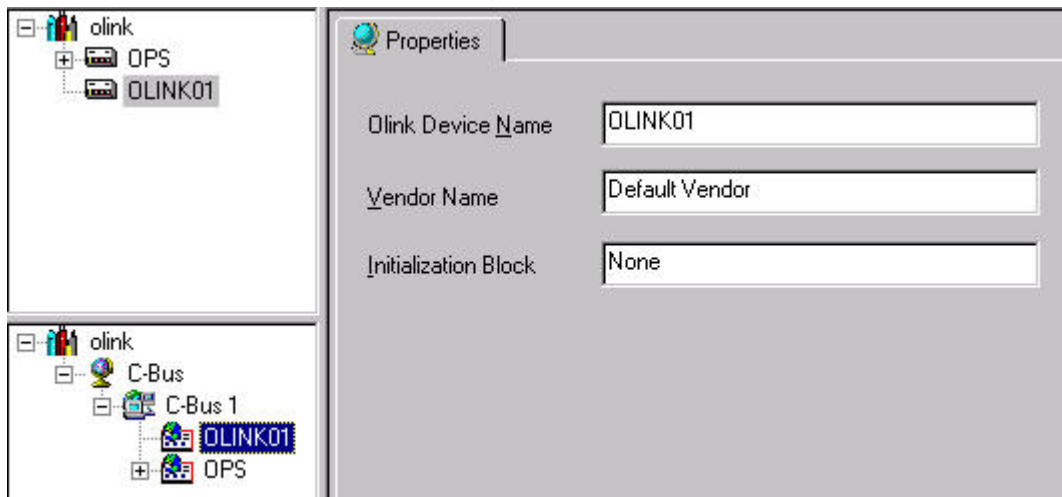
Name can be changed

Vendor Name

Name of vendor of which subsystem is to be connected to the C-Bus

Initialization Block

Contains communication and setup parameters



NOTE: In the Bus part of the network tree you can now add new OLink subsystem controllers and OLink points (right-click to open context menu).

IMPORTANT

Changes on the template done in the Bus part of the network tree or in the device library are not reflected in a template already assigned to a controller. After the template has been assigned to the controller, it cannot be unassigned and replaced by another template.

8. Continue by creating datapoints as described in the "Create OLink Point(s)" section.
9. Continue by creating a plant as described in the "Create OLink Plant" section.

Create OLink Plant

Engineering of the plant including schematic, control strategy switching logic and datapoints is done in the same way as for a standard Excel 500 controller. The OLink plant can be of any type.

For detailed information on how to create a plant, refer to the "Quick Tours" section.

Continue by creating datapoints as described in the "Create CARE Datapoints" section.

Create CARE Datapoints

CARE datapoints for mapping to OLink points can be created as follows:

- Create a plant schematic
- Directly create hardware/software points without a plant schematic

Refer to the "Quick Tours" section for detailed information on these items.

Create Control Strategy and Switching Logic

Control Strategies and Switching Logics for an OLink controller are optional and can be done in the same way as for a standard Excel 500 controller. For detailed information on these items, please refer to the "Control Strategy" and "Switching Logic" sections.

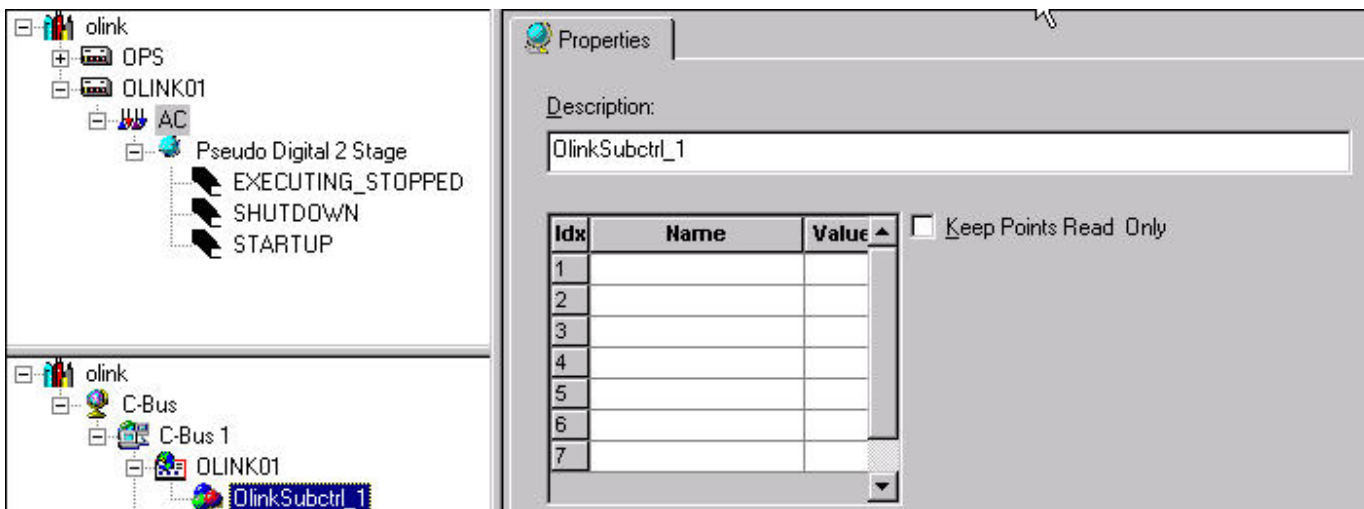
Create OLink Subsystem Controller

Prerequisites The OLink controller has been created.

- Procedure**
1. In the Bus part of the network tree, click on the OLink controller.
 2. Click right mouse key and with left mouse key, click on **Create OLink Subsystem Controller** in the context menu

Or, click menu item **Controller**, then submenu items **OLink** and **Create OLink Subsystem Controller**.

RESULT: The OLink subsystem controller is assigned to the OLink controller in the Bus part of the network tree.



3. On the *Properties* tab on the right, enter a name in the **Description** field.
4. In the list below, enter names and values for the OLink interface in the **Value** and **Name** fields. Therefore you need the VNI description from the vendor which typically includes the list of points which are to be mapped to the C-bus, the engineering units, etc.
5. Check the **Keep Points Read Only** checkbox, if desired. In this case, point values cannot be overwritten.
6. Continue by creating OLink points as described in the "Create OLink Point(s)" section.

Create OLink Point(s)

- Procedure**
1. In the Bus part of the network tree, click on the OLink subsystem controller.
 2. Click right mouse key and with left mouse key, click on **Create OLink Point** in the context menu
- Or, click menu item **Controller**, then submenu items **OLink** and **Create OLink Point**.

RESULT: The OLink point is assigned to the OLink subsystem controller in the Bus part of the network tree.

The screenshot displays the CARE software interface. On the left, there are two tree views showing the OLINK subsystem structure. The top tree shows nodes: olink, OPS, OLINK01, AC, Pseudo Digital 2 Stage, EXECUTING_STOPPED, SHUTDOWN, and STARTUP. The bottom tree shows: olink, C-Bus, C-Bus 1, OLINK01, OlinkSubctrl_1, OLINK, and OPS. On the right, the 'Properties' dialog box is open for an 'OLINK Point'. The 'Description' field contains 'OLINK'. The 'Point Type' is set to 'AI - Analog Input', 'Value Format' is 'float', and 'Engineering Unit' is 'none'. The 'Periodic Write' checkbox is checked. Below these are 'Parameters' and 'Point Mapping' sections. The 'Parameters' section contains a table with 5 rows and 3 columns: Idx, Name, and Addr. The 'Point Mapping' section has a 'CARE Datapoint' dropdown menu set to 'none'.

3. On the *Properties* tab on the right, define settings as follows:

Description

Enter a point name

Point Type

Select point type from drop-down list box

Value Format

Select value format from drop-down list box

Engineering Unit

Select engineering unit from drop-down list box, if desired. Here only those engineering units can be selected which have been especially defined for the OLink subsystem controller of the point. For more information on how to create engineering units for an OLink subsystem controller, refer to the "Define OLink Engineering Units" section.

Periodic Write

Check the checkbox, if you want the value to be written periodically.

Parameters

Enter names and values for the OLink interface in the **Name** and **Value** fields. Therefore you need the VNI description from the vendor which typically includes the list of points which are to be mapped to the C-bus, the engineering units, etc.

Point Mapping

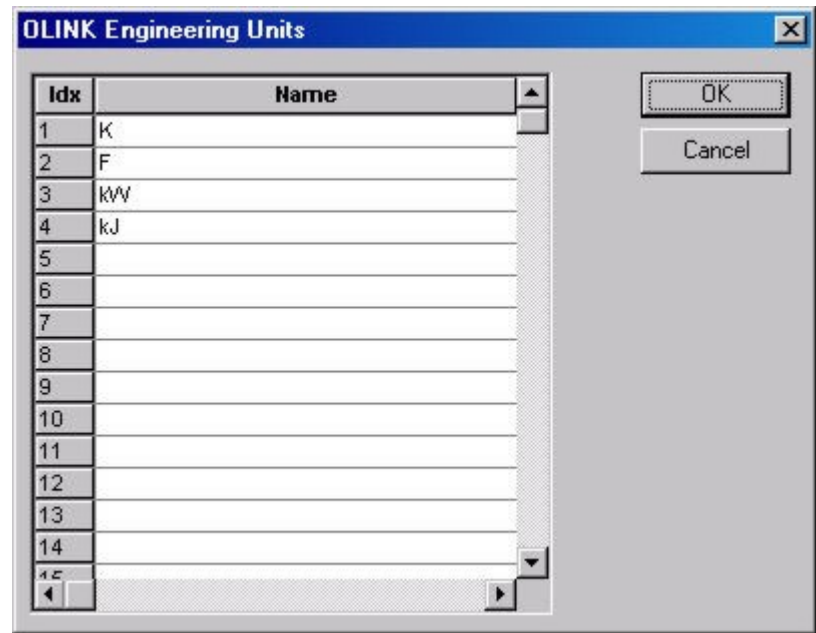
In this area, CARE points are available which have been previously defined as "OLink Manual Mapping" in order to be mapped to OLink points. From the **CARE Datapoint** drop-down listbox, select a datapoint you want to map to the OLink point.

Define OLink Engineering Units

For each OLink controller, engineering units can be defined which allow converting OLink subsystem engineering units to C-bus engineering units through conversion tables.

- Procedure**
1. In the Bus part of the network tree, click on the OLink controller.
 2. Click menu item **Controller**, then submenu items **OLink** and **OLink Engineering Units**.

RESULT: The *OLink Engineering Units* dialog box displays.



3. To define an engineering unit, click in the line and enter the unit.
4. To save the engineering units list, click the **OK** button.

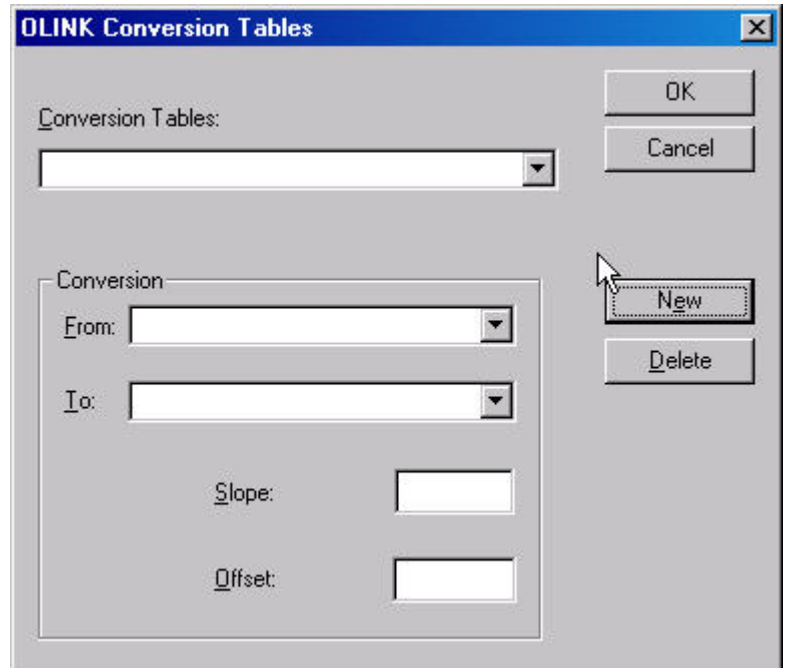
RESULT: Engineering units will be available on OLink point level (see "Create OLink Point(s)" section.) and for use in conversion tables (see "Create OLink Conversion Table" section)

Create OLink Conversion Table

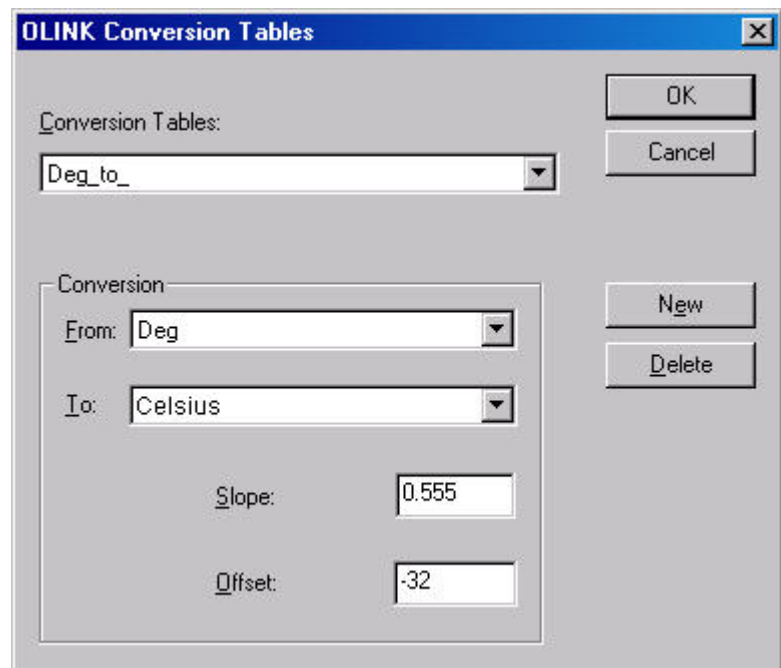
For each OLink controller, a conversion table can be defined. Conversion tables may be necessary for converting engineering units between the OLink subsystem and the C-Bus system. For example, the VNI file provides the temperature in Fahrenheit according to the U.S. American (Imperial) system and the C-bus provides centigrade according to the European (Metric) system.

- Procedure**
1. In the Bus part of the network tree, click on the OLink controller.
 2. Click menu item **Controller**, then submenu items **OLink** and **OLink Conversion Tables**.

RESULT: The *OLink Conversion Tables* dialog box displays.



3. To create a new conversion table, click on the **New** button
4. Under **Conversion**, select OLink subsystem unit engineering unit, for example Deg (F), from the **From** drop-down listbox.
5. Select C-bus engineering, for example Celsius, from the **To** drop-down listbox.
6. In the **Slope** field, enter the slope for the conversion, for example 0.55.
7. In the **Offset** field, enter the offset for the conversion, for example -32.

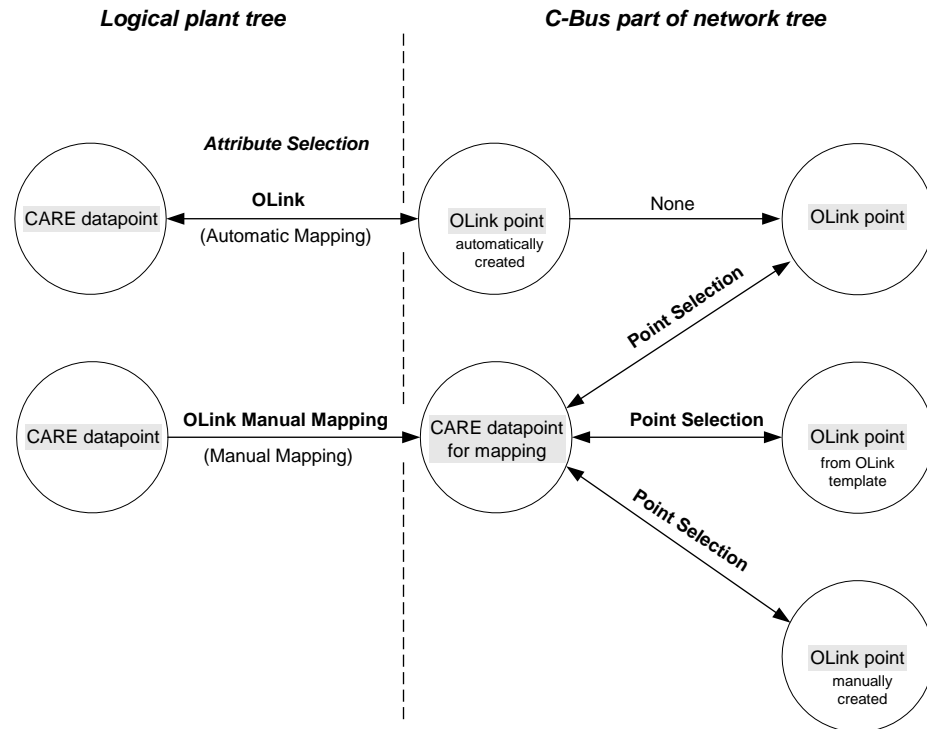


8. To delete the currently displayed conversion table, click **Delete** button.
9. To build further conversion tables, repeat procedure starting with step 3.
10. To save conversion table(s), click the **OK** button.

Map CARE Datapoints to OLink Points

Mapping CARE datapoints to OLink points can be done in the following two ways:

- **Automatic Mapping** by assigning the 'OLink' Attribute to the CARE datapoint (logical plant tree). When mapping a CARE point automatically, the datapoint will be mapped to an unmapped OLink point with the same name as the CARE user address. If such an OLink point does not exist, it will be automatically created.
- **Manual Mapping** by assigning the 'OLink Manual Mapping' attribute to the CARE datapoint (logical plant tree). OLink Manual Mapping is a pre-definition. The datapoint can be mapped later to any unmapped OLink point available in the OLink controller (Bus part of the network tree).



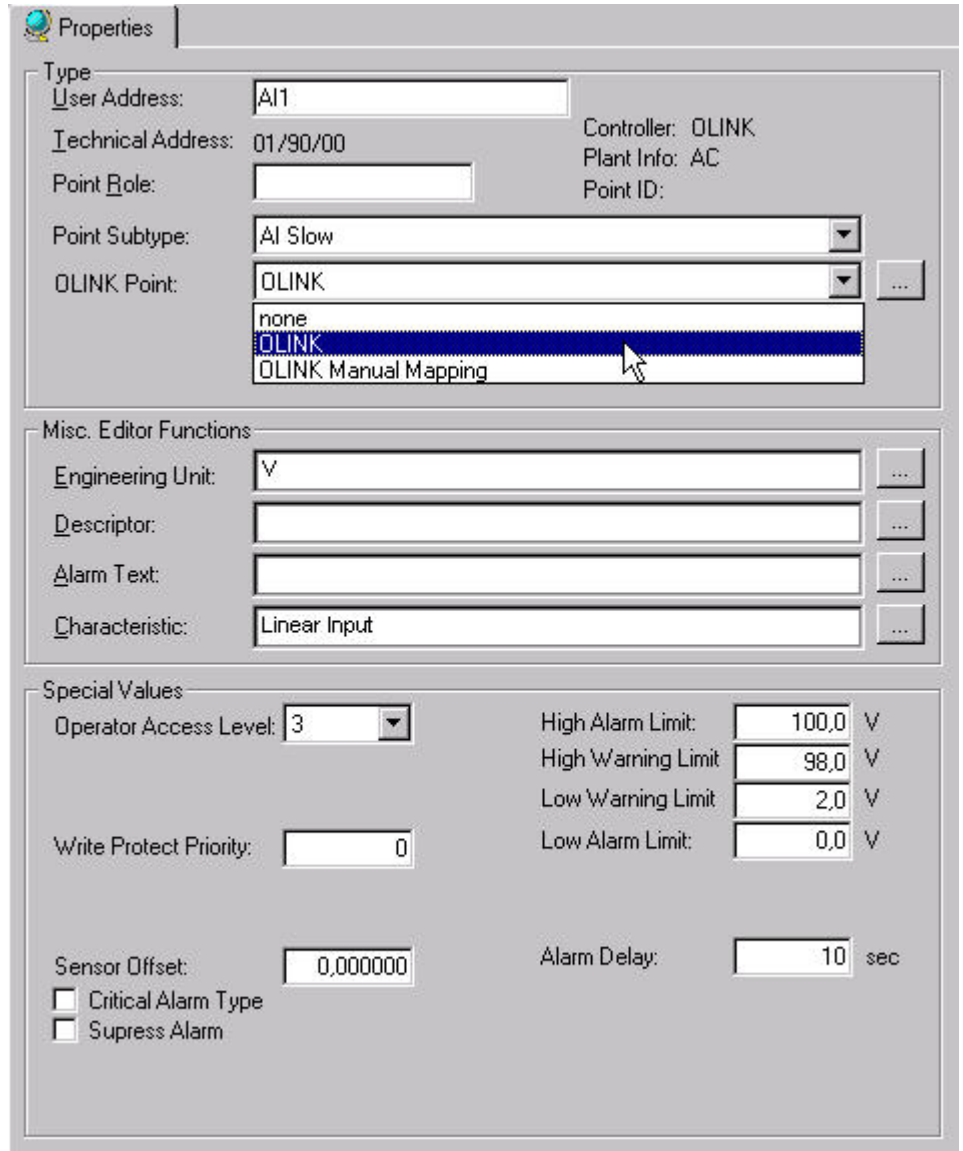
Automatic Mapping

Automatic Mapping between CARE datapoints and OLink points includes the following 2 steps:

- Assign OLink attribute to the datapoint in the logical plant tree.
- Open *OLink Point Information* dialog box or shift to Bus part of the network tree and enter OLink point attributes such as point type, value format, etc.

- Procedure**
- In the logical plant tree, click on the datapoint, you want to have made an OLink point for, in this case for A11.

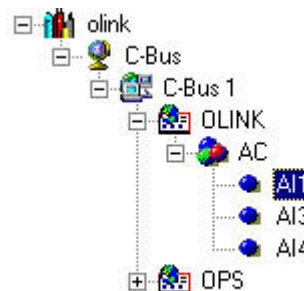
RESULT: On the right, the datapoint attributes are displayed in itemized display.




2. From the **OLink Point** drop-down listbox, select 'OLink'

RESULT: The datapoint will be automatically mapped to an existing or newly created OLink point with the same name as the datapoint.

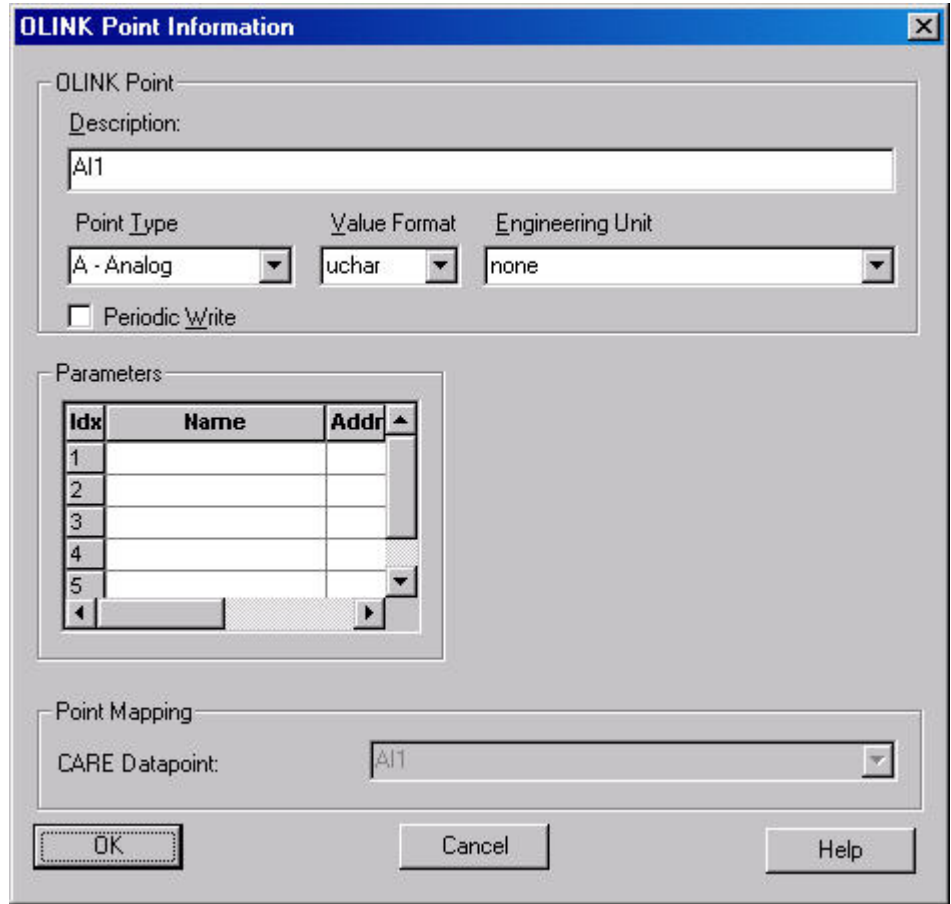
In the logical plant tree, the mapped CARE datapoint is displayed in yellow. In the Bus part of the network tree, the mapped OLink point is added. Mapping status is indicated by a blue globe icon.



- To complete OLink interface creation, additional attributes need to be entered by doing one of the following:

In the itemized display of the CARE datapoint, click on the dotted button  right to the **OLink Point** drop-down listbox.

RESULT: The *OLink Point Information* dialog box displays.



OLINK Point Information

OLINK Point

Description: AI1

Point Type: A - Analog

Value Format: uchar

Engineering Unit: none

Periodic Write

Parameters

Idx	Name	Addr
1		
2		
3		
4		
5		

Point Mapping

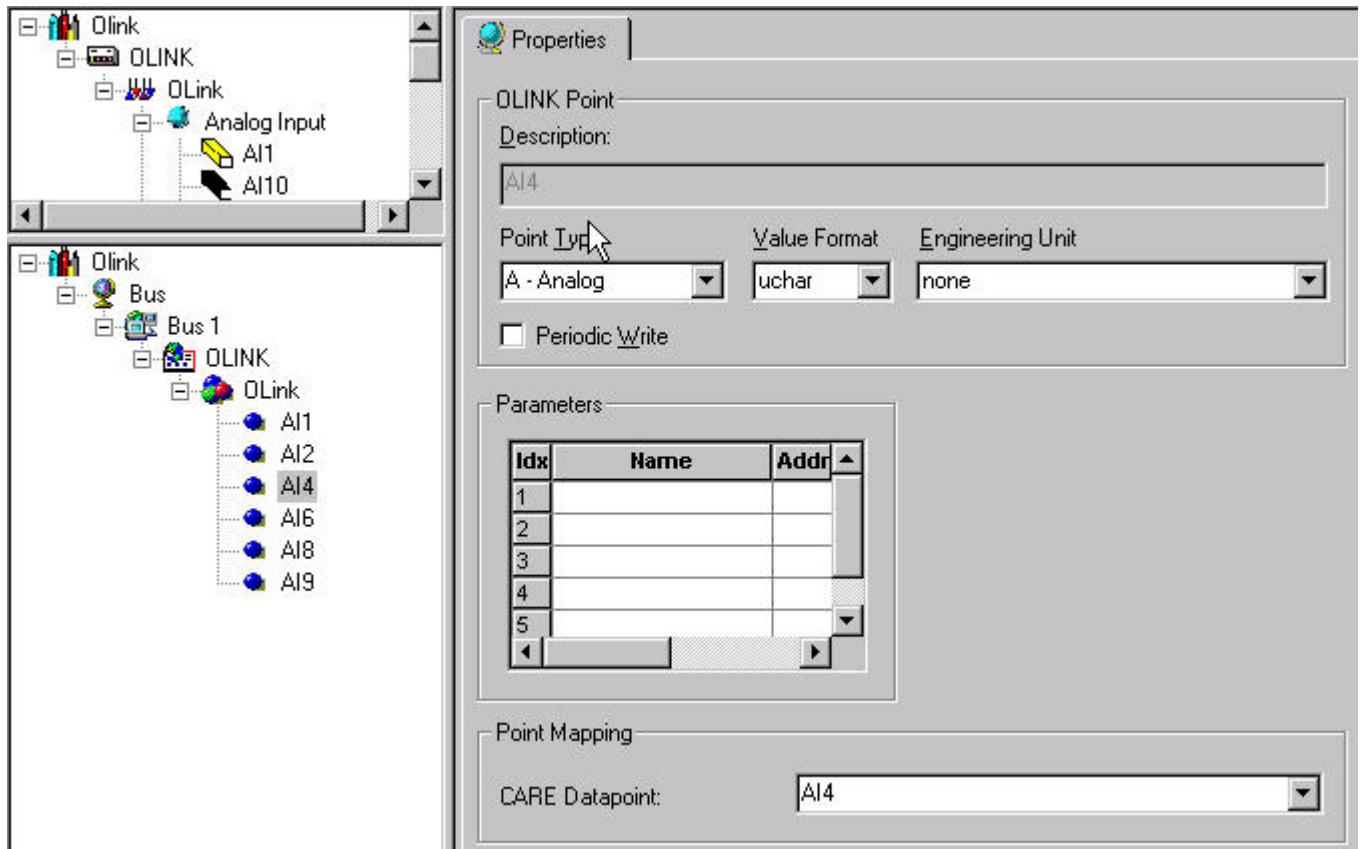
CARE Datapoint: AI1

OK Cancel Help

Enter point type, value format, engineering unit and parameter values and save settings by clicking **OK** button. For detailed description of these attributes, refer to the "Create OLink Point(s)" section.

Or,

To access all OLink points for editing, go to the Bus part of the network tree, browse to the OLink subsystem controller and click on the desired OLink point.



For detailed description of the attributes, refer to the "Create OLink Point(s)" section.

Manual Mapping

Manual Mapping between CARE datapoints and OLink points includes the following 3 steps:

- Assign 'OLink Manual Mapping' attribute to the datapoint in the logical plant tree.
- Go to the Bus part of the network tree and map particular OLink point to this CARE datapoint.
- Enter OLink attributes such as point type, engineering unit, etc. for the OLink point.

Procedure

- In the logical plant tree, click on the datapoint, you want to have made an OLink point for, in this case AI10.


RESULT: On the right, the datapoint attributes are displayed in itemized display.

- From the **OLink Point** drop-down listbox, select 'OLink Manual Mapping'. 'OLink Manual Mapping' is a pre-definition. The datapoint can be mapped later to any unmapped OLink point available in the OLink controller (Bus part of the network tree).

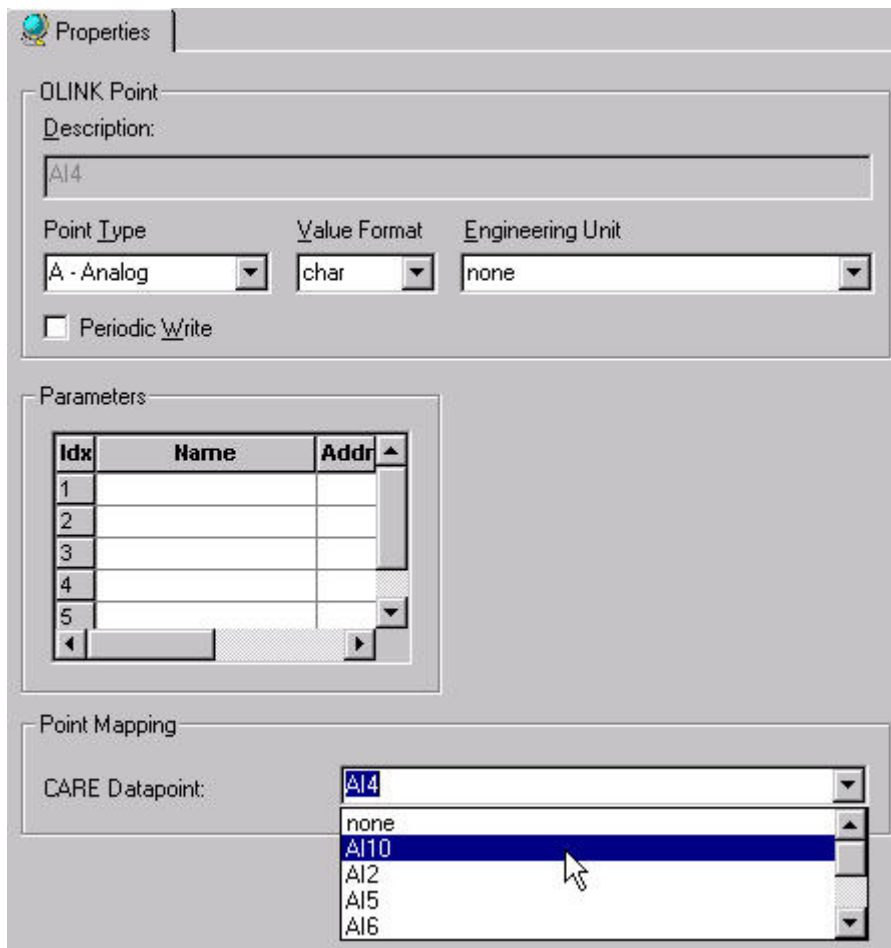
NOTE: No OLink point will be created.


- Browse to the OLink subsystem controller in the Bus part of the network tree.

- In the Bus part of the network tree, select the OLink point to be mapped. An OLink point can originate from the OLink template, the manual creation in the Bus part of the network tree or by automatic creation.

Mapped points are indicated by a blue  icon, unmapped points are indicated by a  icon.

- Under **Point Mapping**, select CARE datapoint from the CARE Datapoint drop-down listbox.



RESULT: The CARE datapoint is mapped to the OLink point. In the Bus part of the network tree, the mapped point is indicated by the blue  icon.

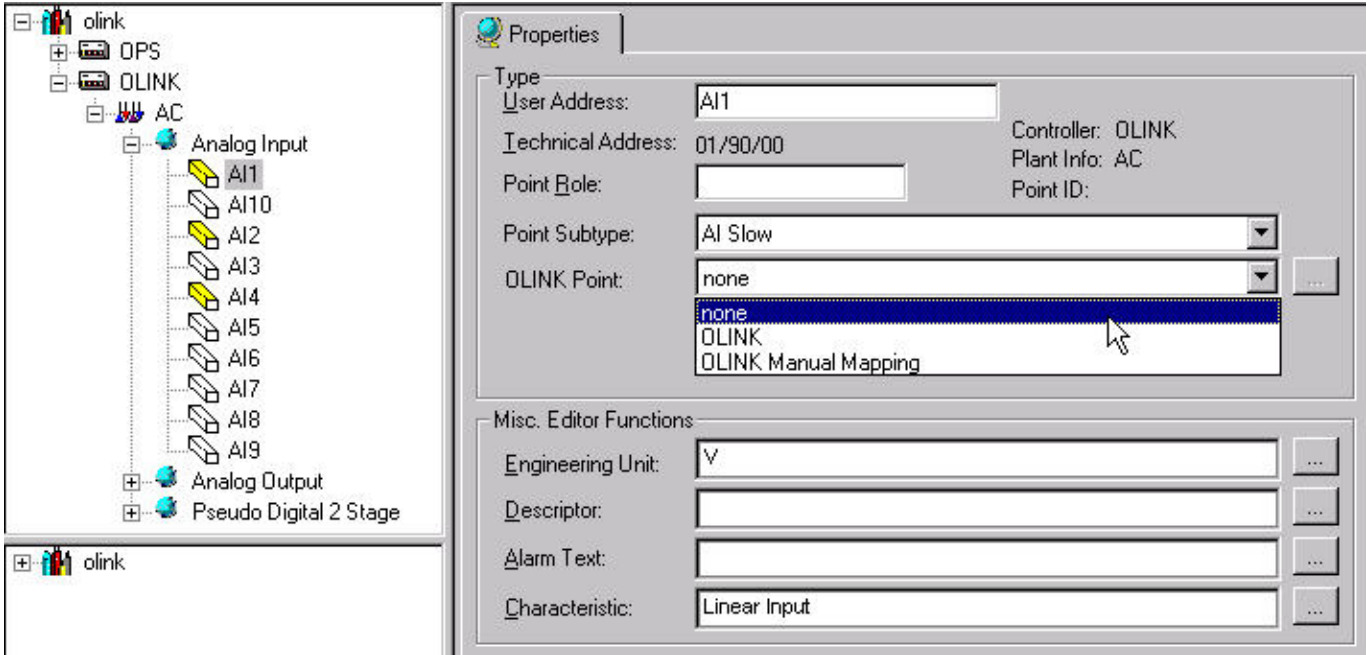
Unmap OLink Points

Procedures

Logical Plant Tree

- In the logical plant tree, click on point you want to unmap.

RESULT: On the right, the datapoint attributes are displayed in itemized display



2. From the **OLink Point** drop-down listbox, select 'None'.

RESULT: The OLink point will be unmapped.

Bus Part of the network tree

1. In the Bus part of the network tree, click on point you want to unmap.

RESULT: On the right, the OLink point attributes are displayed in itemized display.

The screenshot shows the CARE software interface. On the left, there are two network tree views. The top view shows a hierarchy: olink > OPS > OLINK > AC > Analog Input > AI1 through AI9. The bottom view shows: olink > C-Bus > C-Bus 1 > OLINK > AC > AI1 through AI4. On the right, the Properties dialog box is open for an OLink Point. The Description field contains 'AI2'. The Point Type is set to 'A - Analog', Value Format is 'char', and Engineering Unit is 'none'. The 'Periodic Write' checkbox is unchecked. Below this is a 'Parameters' section with a table:

Idx	Name	Addr
1		
2		
3		
4		
5		

At the bottom of the dialog is the 'Point Mapping' section, where the 'CARE Datapoint' dropdown menu is open, showing 'none' selected and other options: AI5, AI6, AI7, AO1.

2. From the **CARE Datapoint** drop-down listbox, select 'None'

RESULT: The CARE datapoint will be unmapped.

Move OLink Point

In the Bus part of network tree, OLink points can be moved between OLink subsystem controllers by Drag&Drop.

Procedure

1. Browse to the OLink subsystem controller (source) in the Bus part of the network tree.
2. Click on OLink point and move it by Drag&Drop to the desired OLink subsystem controller (target).

Delete OLink Subsystem Controller/OLink Point

In the Bus part of the network tree, OLink subsystem controllers and points can be deleted. OLink points can be mapped or unmapped. When deleting a mapped OLink point, the CARE datapoint gets unmapped. This applies also to an OLink subsystem controller deletion.

Procedure

1. In the Bus part of the network tree, click on the OLink subsystem controller respectively the OLink point you want to delete.

2. Click right mouse key and with left mouse key, click on **Delete** in the context menu.

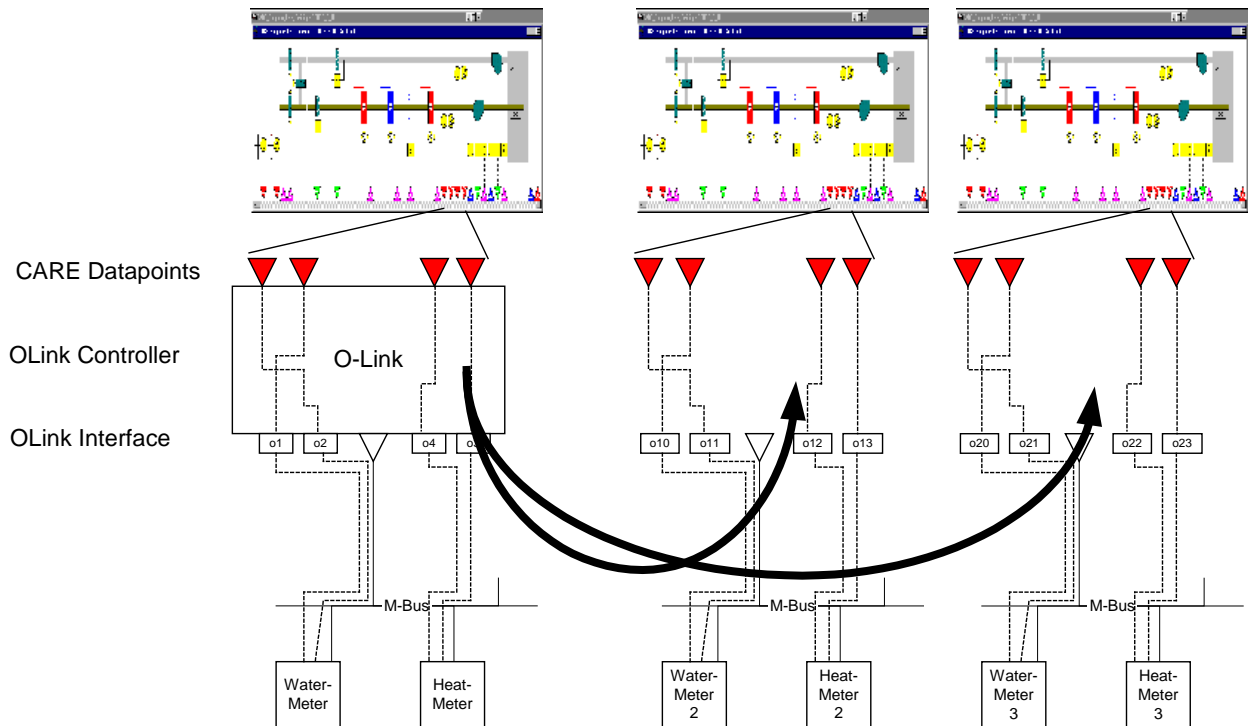
Replicate Plant

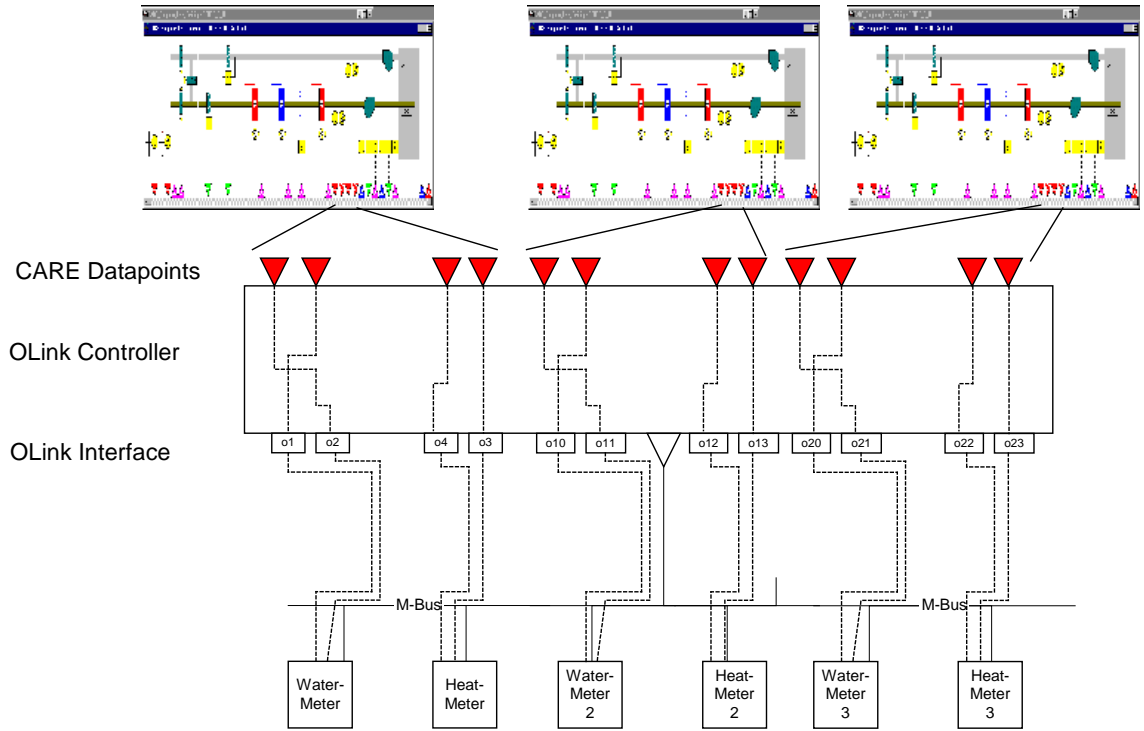
For streamlining the engineering process of OLink controllers, a plant can be replicated multiple times after the mapping has been done.

Replication will include:

- CARE datapoints
- Control strategies and switching tables, if assigned to the plant.
- Subsystem controllers and OLink points

After replication the plants will be available as unattached plants. After attaching the plants a "big" OLink interface will have been created.





Please, refer to the "Plants, Definition and Management" section for detailed information on how to replicate a plant.

Import/Export OLink Controller

An OLink controller can be imported, respectively exported at two points:

- From within the Bus part of the network tree
- From within the device library

When importing/exporting the OLink controller from within the device library, a pure template without any mapping information will be imported/exported whereas when importing/exporting the OLink controller from within the Bus part of the network tree, an OLink controller (OLink device) including all mappings will be imported/exported.

For the import into the OLink controller it means that all current OLink points will be deleted and replaced by the imported OLink points. Mappings between imported OLink points and CARE datapoints of the same name will be re-established.

For the import into the OLink template it means that the current OLink template data are deleted and replaced by the imported OLink controller data. No mapping information will be imported.

Import OLink Controller

Migration Strategy Note

If the Import OLink controller function is part of the migration strategy, first perform steps 1 through 7 from the "Migration Procedure" section.

Import into Current OLink Controller

1. To import OLink controller data into the current OLink controller, browse to the OLink controller in the Bus part of the network tree.
2. Continue with "Common Steps".

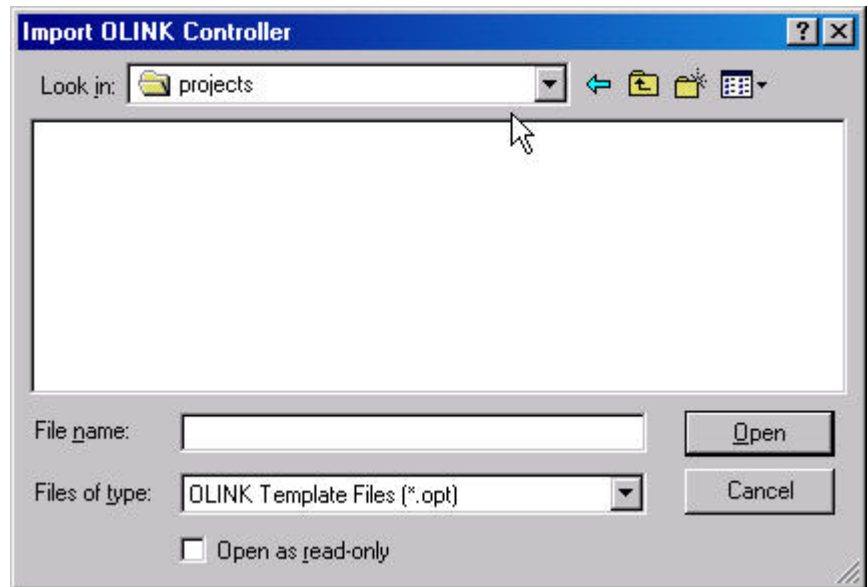
Import into OLink Template

1. To import OLink controller data into an OLink template, open the device library and browse to the OLink controller (see "LonWorks Network Engineering" section).
2. Continue with "Common Steps".

Common Steps

3. In the Bus part of the network tree and device library tree respectively, click on the OLink controller.
4. Click right-mouse key and with left mouse key, click on **Import OLink Controller** in the context menu.

RESULT: The *Import OLink Controller* dialog box displays.



5. Navigate to the folder where the *OPT* file resides and select it.
6. Check the Open as read-only checkbox if desired. .
7. Click **Open** button.

RESULT: The *Import OLink Controller Options* dialog box displays.

8. Select desired option.

RESULT: A message box displays. Note that the existing OLink device (controller) data will be overwritten when selecting **Yes**.

9. Click **Yes**.

RESULT: If the import was successful, a message box informs you about that.

10. Click **OK** button.

RESULT: The OLink information imported is displayed in the tree on the left.

Export OLink Controller

Based on Current OLink Controller

1. To export the OLink controller data based on the current OLink controller, first translate the OLink controller.

2. Browse to the OLink controller in the Bus part of the network tree.
3. Continue with "Common Steps".

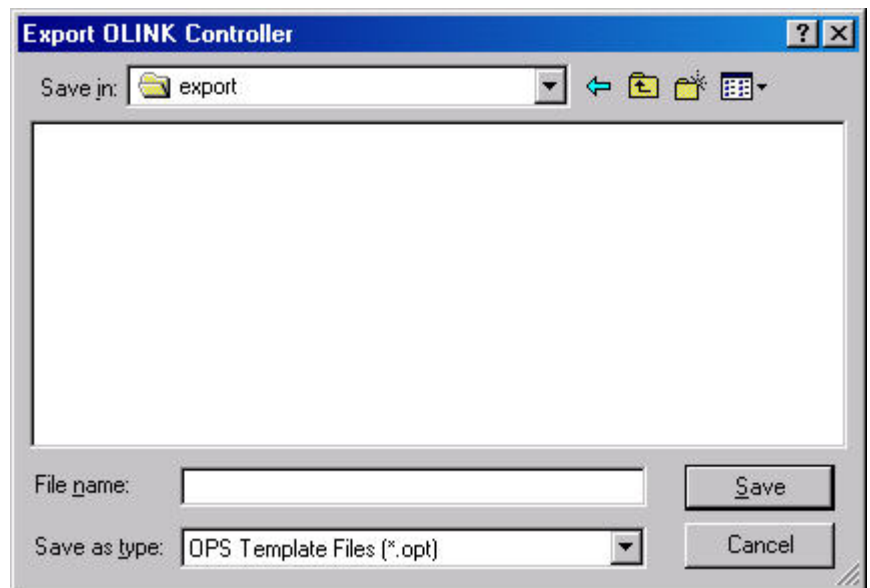
Based on OLink Template

1. To export the OLink controller data based on the OLink template, open the device library and browse to the OLink controller (see Device Library section).
2. Continue with "Common Steps".

Common Steps

3. In the Bus part of the network tree and device library tree respectively, click on the OLink controller.
4. Click right-mouse key and with left mouse key, click on **Export OLink Controller** in the context menu.

RESULT: The *Export OLink Controller* dialog box displays.



5. Navigate to the folder where the *OPT* file should be saved.
6. Into the file name field, enter *OPT* file name.
7. Click **Save** button.

RESULT: A message box informs you about the successful export of the OLink controller.

8. Click **Save** button.

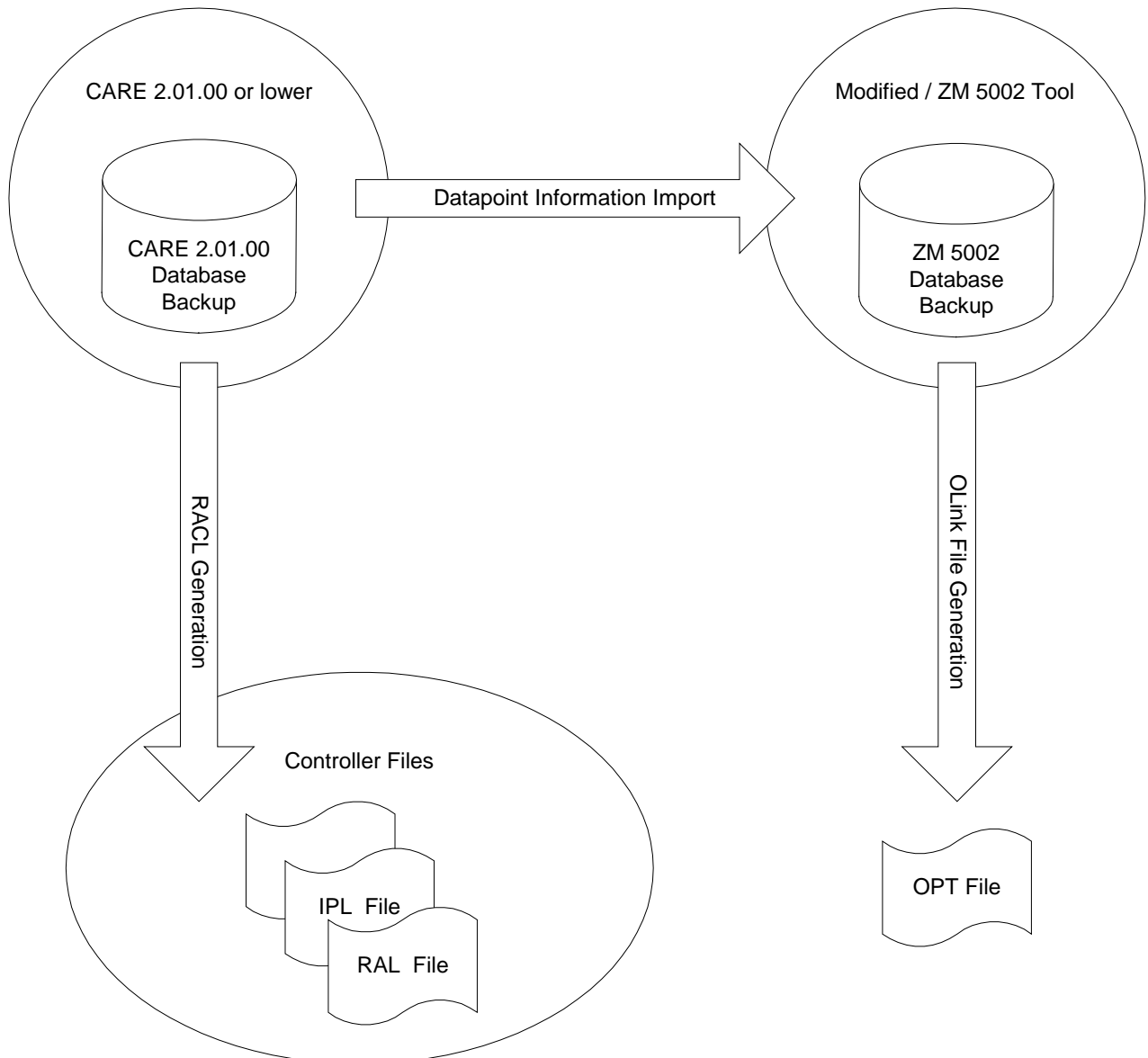
Migration Strategy

CARE 4.02.00 and higher allows upgrading of old OLink projects to CARE 4.02.00 OLink projects. The exported data of the existing OLink project data can be imported in the same file format (*OPT*). An old OLink project consist of two main elements:

- The CARE database (version 2.01.00 or lower) where the OLink controllers and also the datapoints are stored.
- The ZM 5002 database (ZM 5002 project) which fits to this CARE project.

During the upgrade the XLink controller will be transformed to the OLink controller type (see steps 7 and 8). The technical address remains the same.

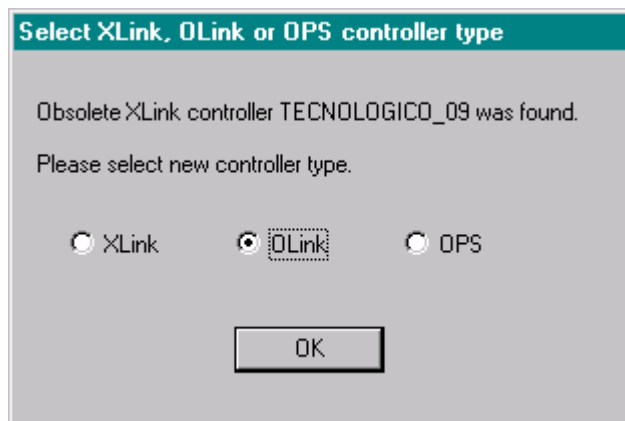
Migration Procedure



1. You need to have CARE 2.01.00 installed first with the OLink controller project in the database.
2. Translate the controller.

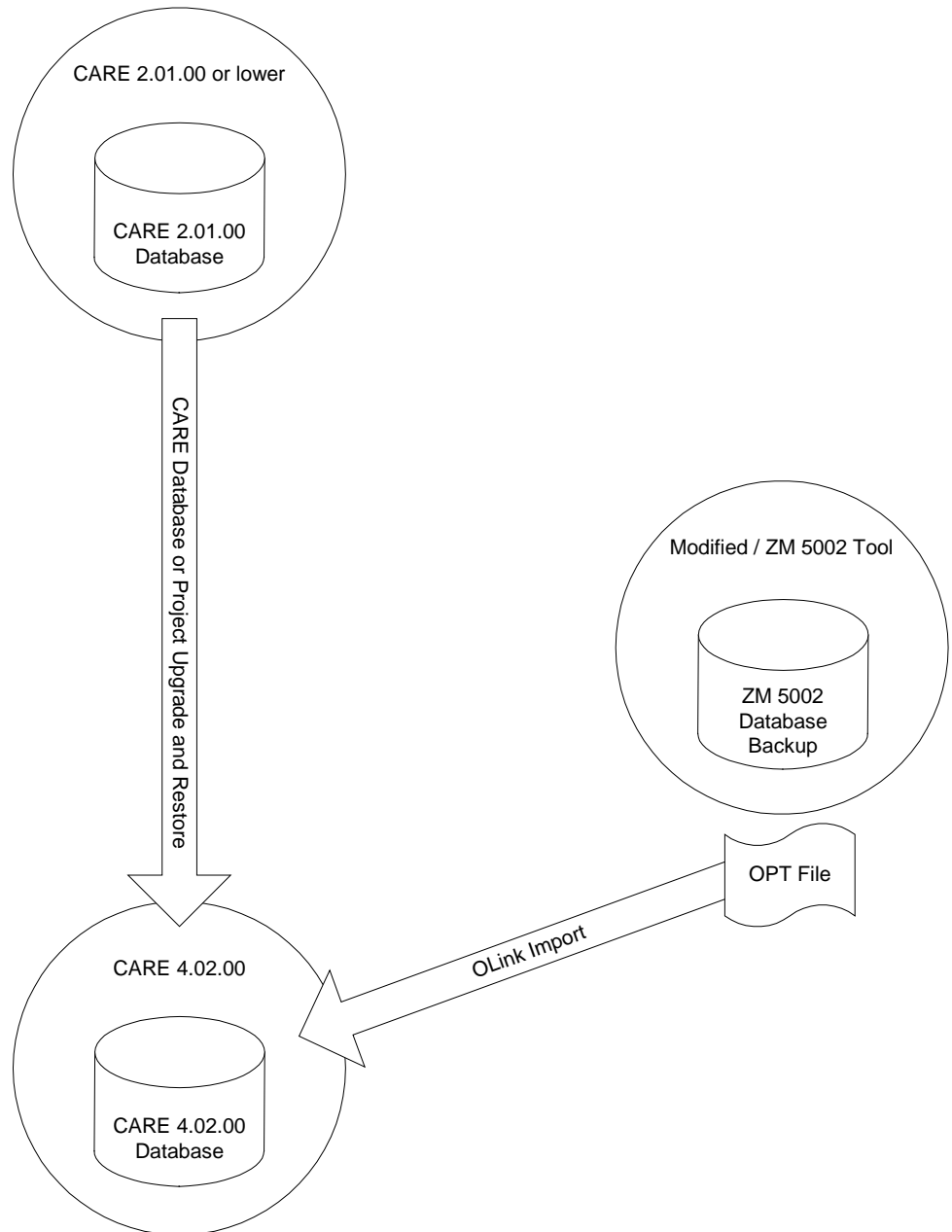
3. Start the modified ZM 5002 Tool, which will be provided by the CARE Team and select the corresponding site.
4. In the modified ZM 5002 tool an additional menu item will be available which allows creating (export) the *OPT* file.
5. Make a database backup of the CARE 2.01.00 database or a project backup.
6. Install CARE **4.02.00** or higher (CARE with OLink support).
7. Within the installed CARE version upgrade the CARE 2.01.00 database (or project) to the highest CARE version and then restore this database (or project).

RESULT: If an old XLink or OLink controller was found during the upgrade, the **Select XLink, OLink or OPS controller type** dialog box displays. An old XLink controller can be kept as XLink type or transformed to an OLink or OPS controller.



8. Select **OLink**, or, if you want to transform the controller to the OPS type, select **OPS**.
9. Click **OK** button.

RESULT: The upgrade will be finished.



10. In the Bus part of the network tree, click on the OLink controller.
11. Click right mouse key and with left mouse key click on **Import OLink Controller** in the context menu (see "Import OLink Controller" section).
12. Import the *OPT* file. All mappings between datapoints to OLink points will now be available.

RESULT: Migration is completed.

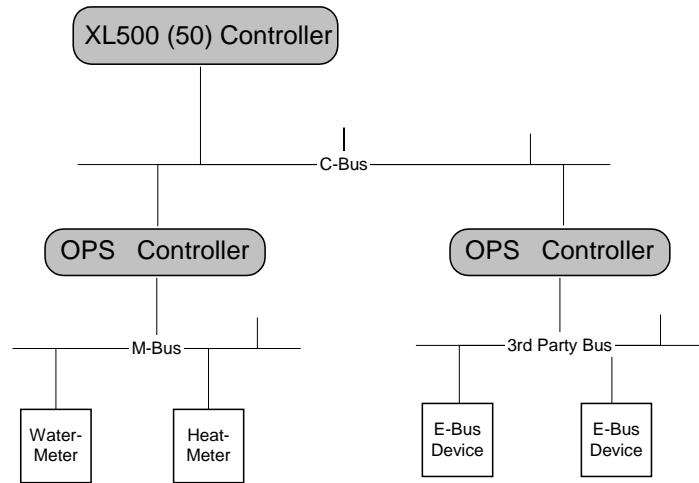
OPS CONTROLLER

Prerequisites

To work with OPS controllers when already using CARE 3.01.00 or higher, you must order a license key from Honeywell, which enables the OPS controller and Replicate functionality. Click menu item **Help**, then submenu item **Registration** and check License Key Info. If OPS and Replicate plant is shown as in the following dialog, you are allowed to work on OPS controllers. If not, order a license key from Honeywell as described in the "Ordering and Registering" section.

General

CARE 3.01.00 and higher supports the OPS (Open Link Point Server) controller as the successor of the OpenLink controller. This controller is a gateway for integrating 3rd party devices of a subsystem running on busses such as Meter-bus or E-bus with the C-bus. The OPS controller is freely programmable in the same way as a standard XL500 controller. Engineering is done in a common way that 3rd party bus information can be mapped easily onto CARE datapoints (see also Migration Strategy section). The OPS controller can have at max. 970 pseudo points, or 128 hardware points of each type. Due to the different datapoint description size of hardware points and pseudopoints, when mixing hardware points and pseudopoints, it's not possible to simply calculate the max. number of the mixture by adding them in a one-to-one correspondence. When the RAM size max. of 64 K is exceeded, then datapoints need to be removed. The connection between OPS controller and the subsystem is established by the OPS interface. OPS interface data can be stored as a template and then be reused for controllers with equivalent hardware configuration.

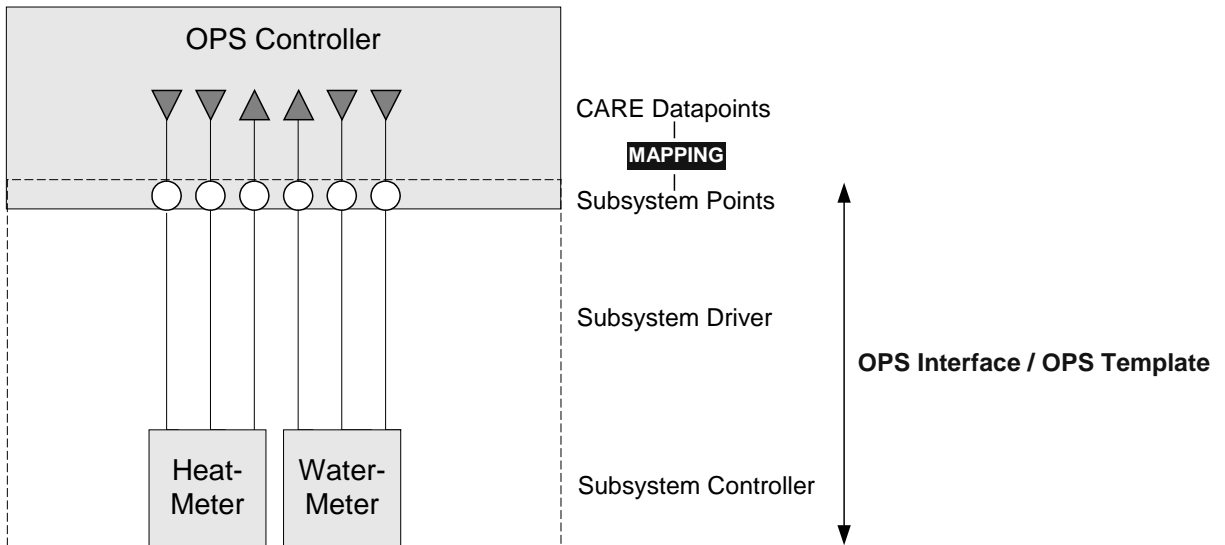


OPS Interface (Template)

The OPS interface represents a special hardware configuration and consists of the following components:

- Subsystem driver (e.g. M-bus)
- Subsystem controllers (e.g. water meter, heat meter)
- Subsystem points = OPS points (e.g. watstat01, heat01)

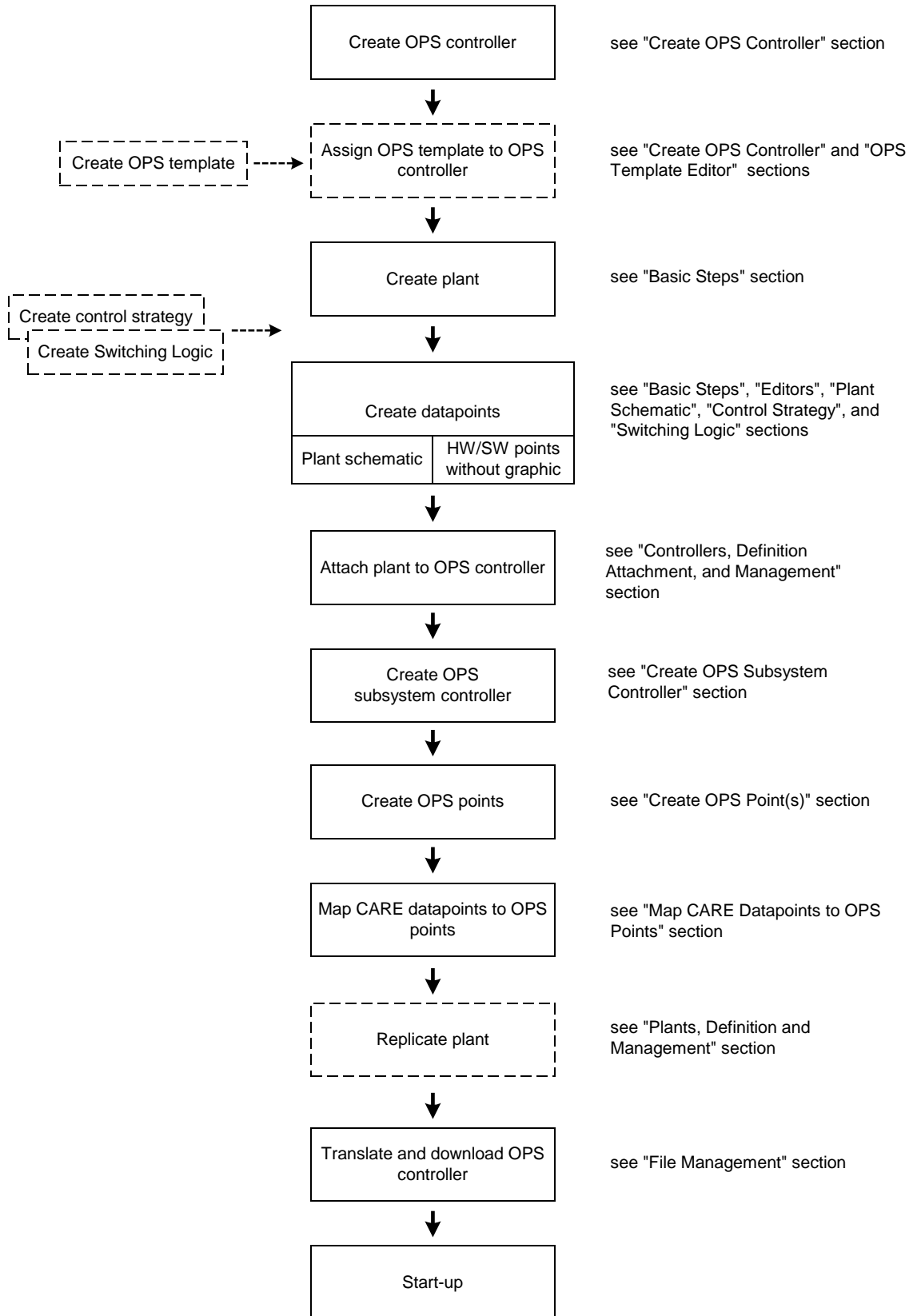
The OPS interface can be stored as a template for reusing hardware configuration many times.



OPS templates are created by using the device library and the OPS Template Editor (see "LonWorks Engineering" and "OPS Template Editor" sections)

Engineering Process

OPS controller engineering is done by the following steps:



OPS Template Editor

An OPS template represents a hardware configuration consisting of one subsystem driver, one or several subsystem controllers and subsystem points. By saving OPS templates, the same hardware configuration can be used many times.

The OPS Template Editor supports the following functions:


- Creating, deleting and renaming of
 - OPS templates
 - Subsystem drivers
 - Subsystem controllers
 - Subsystem points
- Importing/Exporting OPS controllers
- Moving subsystem points between subsystem controllers

Create OPS Template

An OPS template is created by creating an OPS device in the device library first and then editing the OPS device as template in the OPS Template Editor.

Procedures


Create OPS device

1. On the CARE toolbar, click on the Device Library icon .

RESULT: The *Library* dialog window displays.

2. Right-click on the folder, in which you want to create the OPS device (template), in this case, the default folder *OPS*, and click on **Create LON device** in the context menu.

RESULT: The OPS device is inserted into the tree.

3. On the Library toolbar on the top, click the  icon.

RESULT: The *OPS Template Editor* displays and the OPS device is shown in the tree.

4. On the right pane, edit the **Template Name** and enter the subsystem driver into the **Subsystem Driver** field.

5. From the **Port Assignment** drop-down listbox, select hardware interface.

6. Into the **Initialization Block** field, enter initialization block description. The initialization block contains communication and other setup parameters.

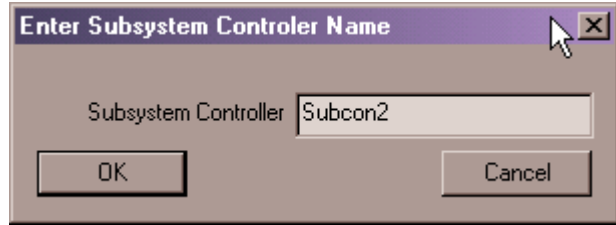
7. If desired, create new subsystem controllers and/or subsystem points as described in the following steps.

Create OPS Subsystem Controller

8. In the tree, click on controller icon, if not already selected.

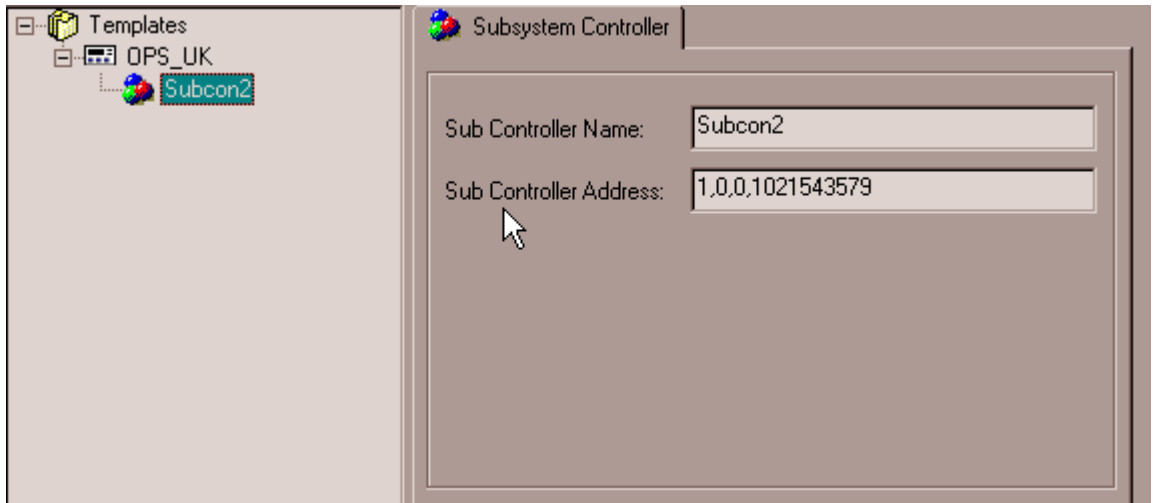
9. Click on  icon.

RESULT: The *Enter Subsystem Controller Name* dialog box displays.




- 10. Enter subsystem controller name.
- 11. Confirm by clicking **OK** button.

RESULT: The subsystem controller (point group) is created and assigned to the OPS device previously selected. On the right, its name and address is displayed.

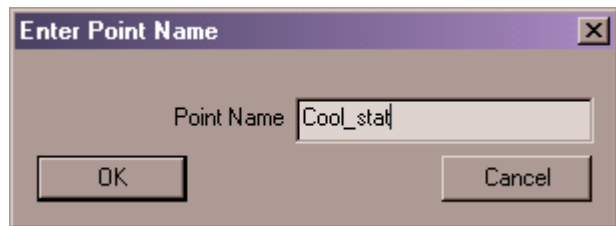


- 12. In the **Sub Controller Address** field on the right, enter/change sub controller address.
- 13. Continue by creating subsystem points as described in the following steps.

Create Subsystem Point

- 14. In the tree, click on subsystem controller, which you want to create the subsystem point for.
- 15. On the OPS Template Editor toolbar, click on .

RESULT: The *Enter Point Name* dialog box displays.



- 16. Enter point name.
- 17. Confirm by clicking **OK** button.

RESULT: The subsystem point is created and assigned to the subsystem controller previously selected.

- 18. In the **Address** field on the right, enter address for subsystem point.

19. Under Scaling, enter value for:

Factor

Defines factor for measurement value amplification

Offset

Defines value for Offset

Value Format

Defines format necessary for compatibility with OpenLink projects.

Scan Priority

Defines whether the point should be scanned with higher priority than others,
1: = normal, >1: = high priority

20. Under Enhanced, check desired options by clicking corresponding check box.

Readable

From OPS point of view, the value is readable


Writable

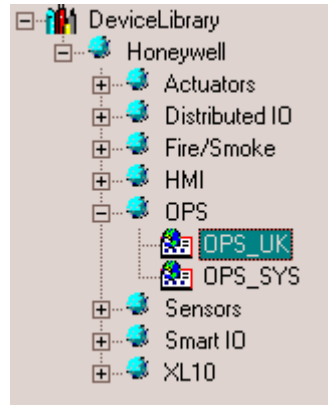
From OPS point of view, the value is writable

Periodic Write

From OPS point of view, the value will be periodically written

21. To save the OPS template, click **OK** button.

RESULT: The *Library* dialog windows redisplay and the OPS device is indicated as template by the  icon in the tree.



22. Click **Exit** button in the *Library* dialog window.


RESULT The template is now available for selection when creating a new OPS controller (see "Create OPS Controller" section)

Save OPS Templates


Procedure 1. On the OPS Template Editor toolbar, click on  or click **OK** button.

RESULT: All templates will be saved.

Rename OPS Template, Subsystem Controller, Subsystem Point

Procedure 1. In the tree, click on item, you want to rename.
2. On the OPS Template Editor toolbar, click on  and rename the item in the tree.

Delete OPS Template, Subsystem Controller, Subsystem Point

Procedure 1. In the tree, click on item, you want to delete.
2. On the OPS Template Editor toolbar, click on .


RESULT: The item will be deleted.


Expand and Collapse the Tree

Purpose Quickly expanding or collapsing the tree.

Procedure **Expanding/collapsing the whole tree**


When expanding the whole tree every hierarchical level is displayed. When collapsing the whole tree only the project name is visible.

1. Click any object in the tree (project, controller, etc.)
2. Click menu item Edit, then drop-down item Tree expand all or, click Tree expand all icon  on the toolbar, if you want to see all hierarchical levels of the tree.


or,
 click menu item Edit, then drop-down item Tree collapse all or, click Tree collapse all icon  on the toolbar, if you want to see only the project name in the tree.

Procedure Expanding/collapsing parts of the tree

When expanding/collapsing parts of the tree every hierarchical level below the object selected in the tree, is displayed/closed.

1. In the tree, click the object (project, controller, etc.), which hierarchical levels below should be displayed/closed (not displayed)
2. Click menu item Edit, then drop-down item Tree expand from here or, click Tree expand from here icon  on the toolbar, if you want to see all hierarchical levels below the object selected in the tree.

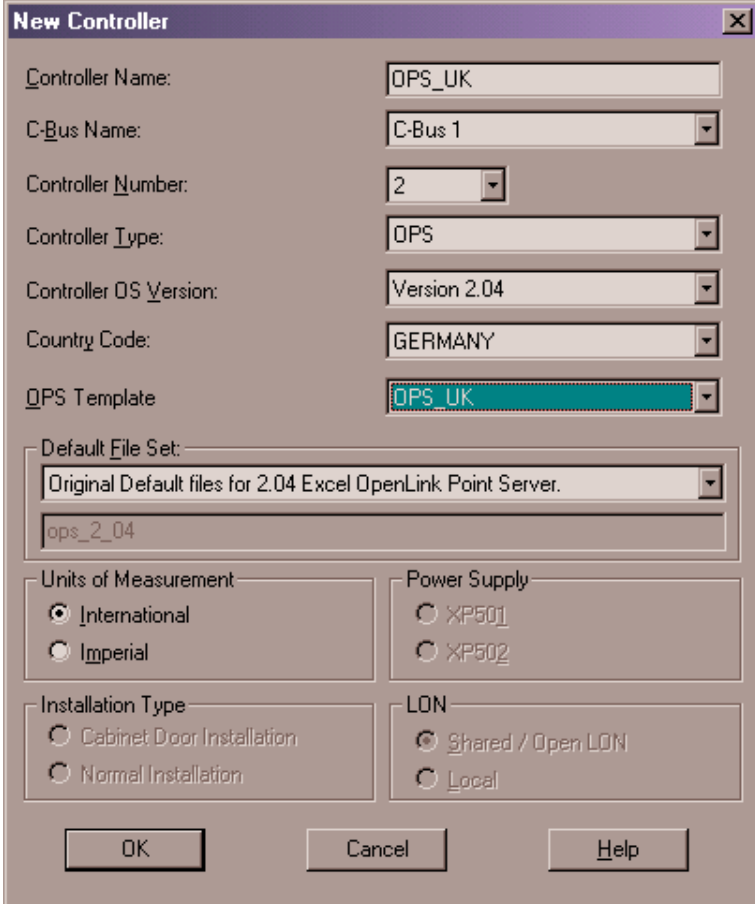
or,

Click menu item Edit, then drop-down item Tree collapse from here or, click Tree collapse from here icon  on the toolbar, if you want to close all hierarchical levels below the object selected in the tree.

Create OPS Controller

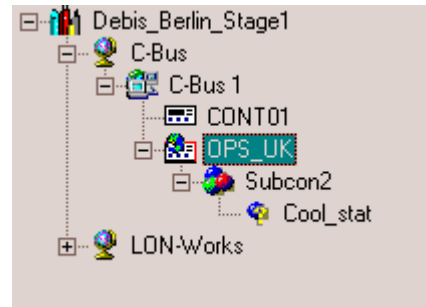
- Procedure** 1. Select menu item **Controller**, then submenu item **Create**.

RESULT: *The New Controller dialog box displays.*



2. Into the **Controller Name** field, enter controller name.
3. From the **C-Bus** drop-down listbox, select the folder where the OPS controller should be saved.
4. From the **Controller Type** drop-down listbox, select OPS.
5. From the **OPS Template** drop-down list box, select a template.
6. Confirm by clicking **OK** button.

RESULT: The OPS device is added to the logical plant tree and the C-bus part of the network tree. The subcontroller and points are displayed as defined in the template.



NOTE: In the C-bus part of the network tree you can now add new subsystem controllers and OPS points (right-click to open context menu).

IMPORTANT

Changes on the template done in the C-bus part of the network tree or in the OPS Template Editor are not considered for a template already assigned to a controller. After the template was assigned to the controller, it cannot be unassigned and replaced by another template.

Create OPS Plant

Engineering of the plant including schematic, control strategy switching logic and datapoints is done in the same way as for a standard Excel 500 controller. The OPS plant can be of any type.

For detailed information on how to create a plant, refer to the "Quick Tours" section.

Continue by creating datapoints as described in the "Create CARE Datapoints" section.

Create CARE Datapoints

CARE datapoints for mapping to OPS points can be created as follows:

- Create a plant schematic
- Directly create hardware/software points without a plant schematic

Refer to the "Quick Tours" section for detailed information on these items.

Create Control Strategy and Switching Logic

Control Strategies and Switching Logics for an OPS controller are optional and can be done in the same way as for a standard Excel 500 controller. For detailed

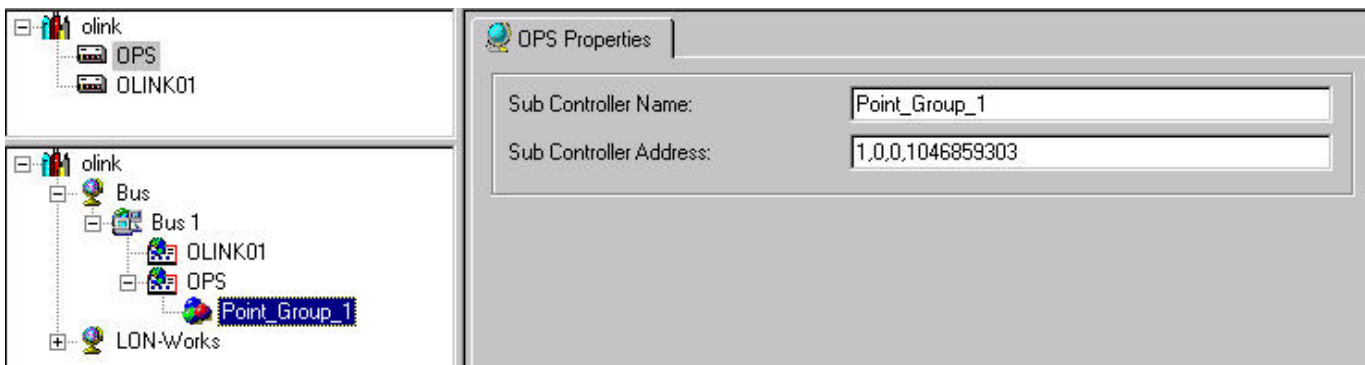
information on these items, please refer to the "Control Strategy" and "Switching Logic" sections.

Create OPS Subsystem Controller

Prerequisites The OPS controller has been created.

- Procedure**
1. In the C-bus part of the network tree, click on the OPS controller.
 2. Click right mouse key and with left mouse key, click on **Create OPS Subsystem Controller** in the context menu
- Or, click menu item **Controller**, then submenu items **OPS** and **Create OPS Subsystem Controller**.

RESULT: The OPS subsystem controller is assigned to the OPS controller in the C-bus part of the network tree.

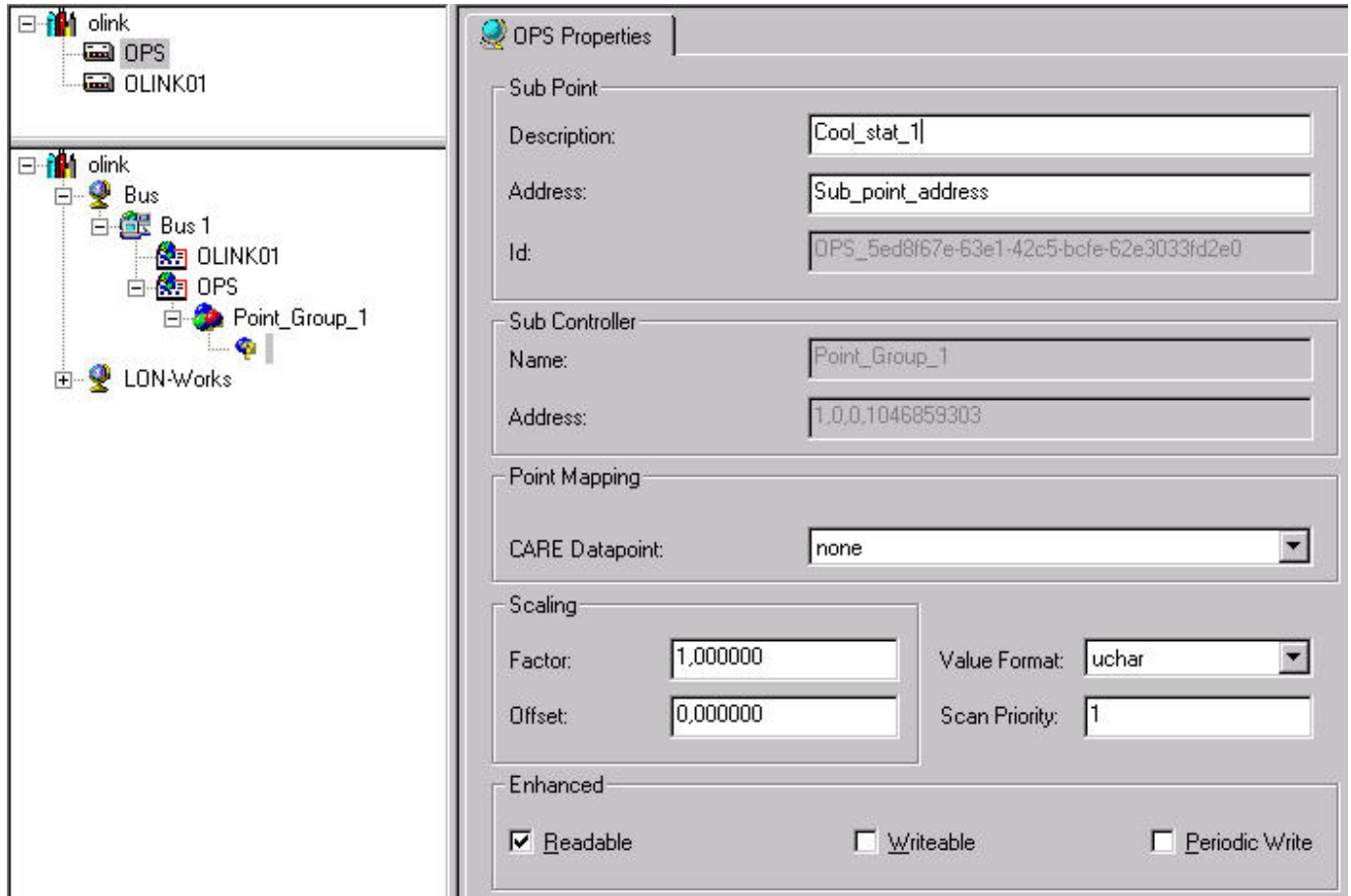


3. On the *OPS Properties* tab on the right, enter/change name in the **Sub Controller Name** field.
4. In the **Sub Controller Address** field, enter/change subcontroller address.
5. Continue by creating OPS points as described in the "Create OPS Point(s)" section.

Create OPS Point(s)

- Procedure**
1. In the C-bus part of the network tree, click on the OPS subsystem controller.
 2. Click right mouse key and with left mouse key, click on **Create OPS Point** in the context menu
- Or, click menu item **Controller**, then submenu items **OPS** and **Create OPS Point**.

RESULT: The OPS point is assigned to the OPS subsystem controller in the C-bus part of the network tree.



3. On the *OPS Properties* tab on the right, define settings as follows:

4. In the **Address** field on the right, enter address for OPS point.

5. Under **Scaling**, enter value for:

Factor

Defines factor for measurement value amplification

Offset

Defines value for Offset

Value Format

Defines format necessary for compatibility with OpenLink projects.

Scan Priority

Defines whether the point should be scanned with higher priority than others, 1: = normal, >1: = high priority

6. Under **Enhanced**, check desired options by clicking corresponding check box.

Readable

From OPS point of view, the value is readable

Writeable

From OPS point of view, the value is writeable

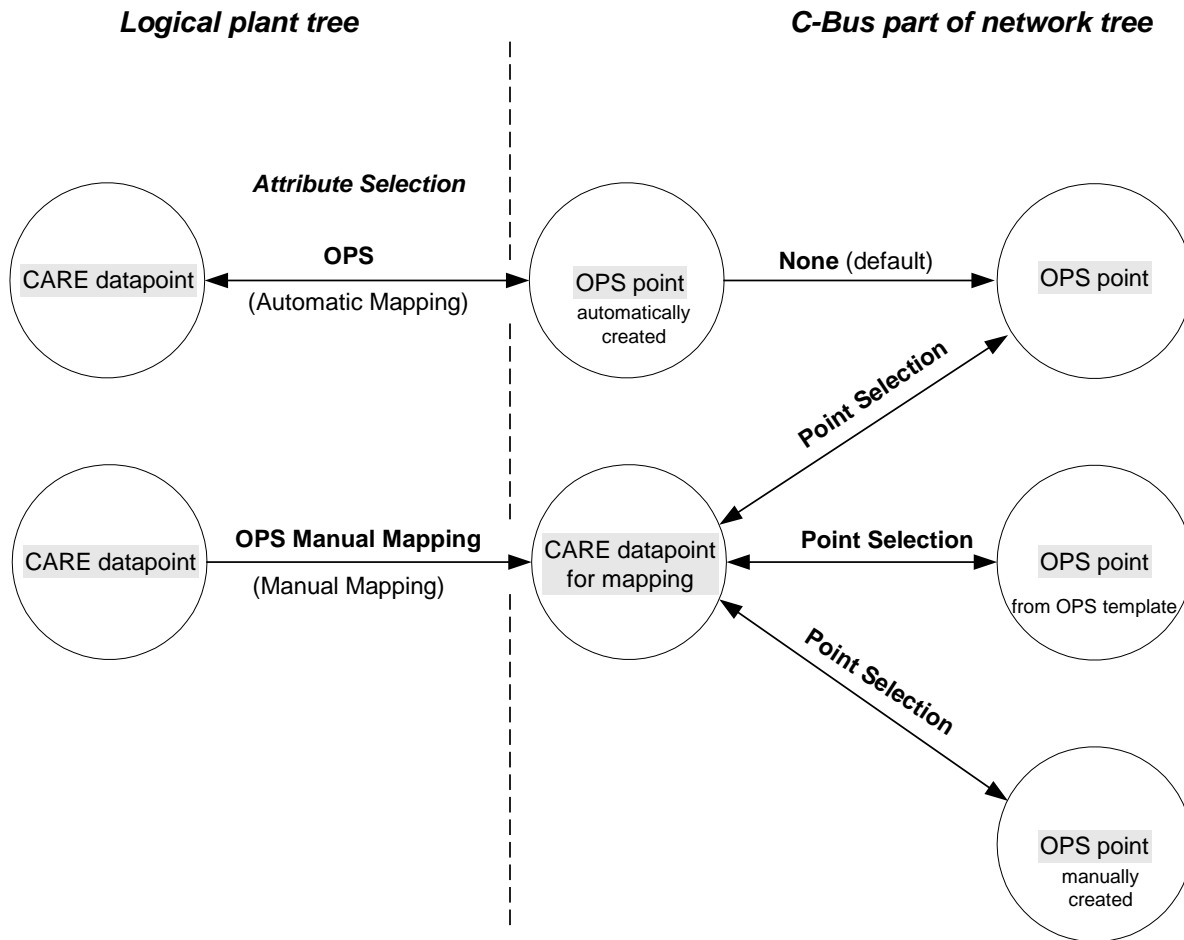
Periodic Write

From OPS point of view, the value will be periodically written

Map CARE Datapoints to OPS Points

Mapping CARE datapoints to OPS points can be done in the following two ways:

- **Automatic Mapping** by assigning the OPS Attribute to the CARE datapoint (logical plant tree). When mapping a CARE point automatically, the datapoint will be mapped to an unmapped OPS point with the same name as the CARE user address. If such an OPS point does not exist, it will be automatically created.
- **Manual Mapping** by assigning the OPS Manual Mapping attribute to the CARE datapoint (C-bus part of the network tree) OPS Manual Mapping is a Pre-Definition. The datapoint can be mapped later to any unmapped OPS point available in the OPS controller (logical plant tree).



OPS Point Naming Terminology

Regarding the Mapping any OPS point is defined by the following attributes:

- Description
- Address
- ID
- Mapped CARE datapoint

The most important attribute is the unique ID number, which will be automatically defined for the OPS point when it was created.

The ID number cannot be changed, whereas the description, the address and the CARE datapoint assignment can be changed.

This results in the following:

A CARE datapoint can only be mapped to one specific OPS point (ID). For this OPS point, the description, the address and the CARE datapoint assignment can be changed. Two different OPS points can have the same description and/or user address, but one CARE datapoint cannot be mapped to multiple OPS points.

When creating an OPS point automatically, the datapoint will be mapped to an unmapped OPS point with the same name as the CARE user address. If such an OPS point does not exist, it will be automatically created.

Automatic Mapping

Automatic Mapping between CARE datapoints and OPS points includes the following 2 steps:


- a. Assign 'OPS' attribute to the datapoint in the logical plant tree.
- b. Open *OPS Point Information* dialog box or shift to C-bus part in the C-bus part of the network tree and enter OPS attributes such as address, Offset, etc. for the OPS point.

Procedure

1. In the logical plant tree, click on the datapoint, you want to have made an OPS point for, in this case for AI1.

RESULT: On the right, the datapoint attributes are displayed in itemized display.

2. From the **OPS Point** drop-down listbox, select OPS Point.

RESULT: The datapoint will be automatically mapped to an existing or newly created OPS point with the same name as the datapoint. In the logical plant tree, the CARE datapoint is displayed in yellow. In the C-bus part of the network tree, the created OPS point is added and indicated by a blue  icon. To complete OPS interface creation, additional attributes need to be entered by doing one of the following:

4. Click on the dotted button  right to the OPS point drop-down listbox.

RESULT: The *OPS Point Information* dialog box displays.

5. Enter **Address**, **Scaling** and **Enhanced** attributes. For detailed description of the attributes refer to the "Create Subsystem Point" section.

Or,

6. To access all OPS points for editing, go to the C-bus part in the C-bus part of the network tree, browse to the subsystem controller and click on the OPS point.

Manual Mapping

Manual Mapping between CARE datapoints and OPS points includes the following 3 steps:

- a. Assign 'OPS Manual Mapping' attribute to the datapoint in the logical plant tree.

- b. Go to the C-bus part of the network tree and map particular OPS point to this CARE datapoint.
- c. Enter OPS attributes such as address, offset, etc. for the OPS point.

Procedure

1. In the logical plant tree, click on the datapoint, you want to have made an OPS point for, in this case AI2.

RESULT: On the right, the datapoint attributes are displayed in itemized display.

3. From the OPS Point drop-down listbox, select 'OPS Manual Mapping'. OPS Manual Mapping is a pre-definition. The datapoint can be mapped later to any unmapped OPS point available in the OPS controller (C-bus part of the network tree).

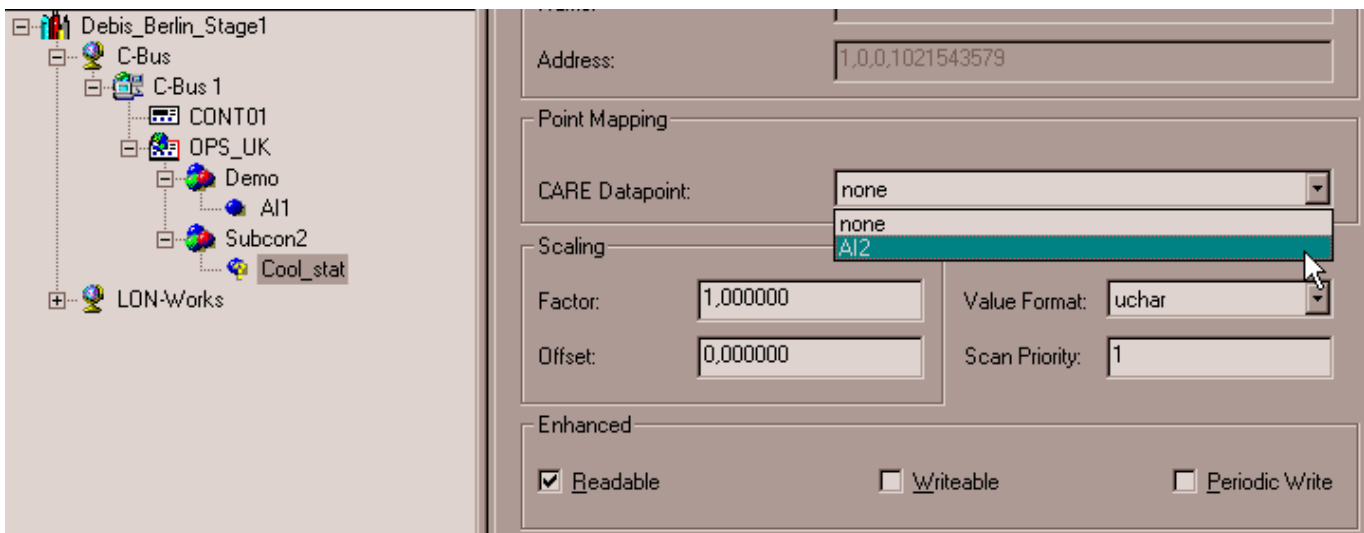
NOTE: No OPS point will be created.

4. Browse to the OPS subsystem controller in the C-bus part of the network tree.

5. In the tree, select OPS point to be mapped. OPS point can originate from the OPS template, manual creation in the tree or by automatic creation.

Mapped points are indicated by the blue icon, unmapped points are indicated by the icon.

6. On the right under *Point Mapping*, select CARE datapoint from the **CARE Datapoint** drop-down listbox.



RESULT: The CARE datapoint is mapped to the OPS point. In the C-bus part of the network tree, the mapped point is indicated by the blue icon.

Unmap OPS Points

Procedures

Logical Plant Tree

1. In the logical plant tree, click on point you want to unmap.

RESULT: On the right, the datapoint attributes are displayed in itemized display.

Type	
User Address:	DigOut
Technical Address:	02/90/08
Point Role:	
Point Subtype:	DO Normally Open not pulsed with switches
OPS Point:	OPS
Controller: KS_CSC	
Plant Info: ops	
Point ID:	
Misc. Editor Functions	
Engineering Unit:	On / Off
Descriptor:	
Special Values	
Operator Access Level:	3
Service Interval:	0 hrs
Write Protect Priority:	0
<input type="checkbox"/> Critical Alarm Type <input checked="" type="checkbox"/> Suppress Alarm <input type="checkbox"/> Hide Point <input type="checkbox"/> Runtime Enabled	

- From the **OPS Point** drop-down listbox, select 'None'.

RESULT: The OPS will be unmapped.

C-bus part of the network tree

- In the C-bus part of the network tree, click on point you want to unmap.

RESULT: On the right, the OPS point attributes are displayed in itemized display.

Sub Point

Description: DigIn

Address: Sub_point_address

Id: OPS_01074e01-1f90-11d5-baac-00508bd7a7cb

Sub Controller

Name: ops

Address: 1,0,0,985353944

Point Mapping

CARE Datapoint: DigIn

Scaling

Factor: 1,000000

Offset: 0,000000

Value Format: uchar

Scan Priority: 1

Enhanced

Readable Writeable Periodic Write

2. From the **CARE Datapoint** drop-down listbox, select 'None'

RESULT: The OPS will be unmapped.

Sub Point

Description: DigIn

Address: Sub_point_address

Id: OPS_01074e01-1f90-11d5-baac-00508bd7a7cb

Sub Controller

Name: ops

Address: 1,0,0,985353944

Point Mapping

CARE Datapoint: none

Scaling

Factor: 1,000000

Offset: 0,000000

Value Format: uchar

Scan Priority: 1

Enhanced

Readable Writeable Periodic Write

Move Subsystem Point

Subsystem points can be moved between subsystem controllers by Drag&Drop in the C-bus part of the network tree.

- Procedures**
1. To move points in the current OPS controller, browse to the OPS subsystem controller in the C-bus part of the network tree.
 2. Click on OPS point and move it by Drag&Drop to the desired subsystem controller.

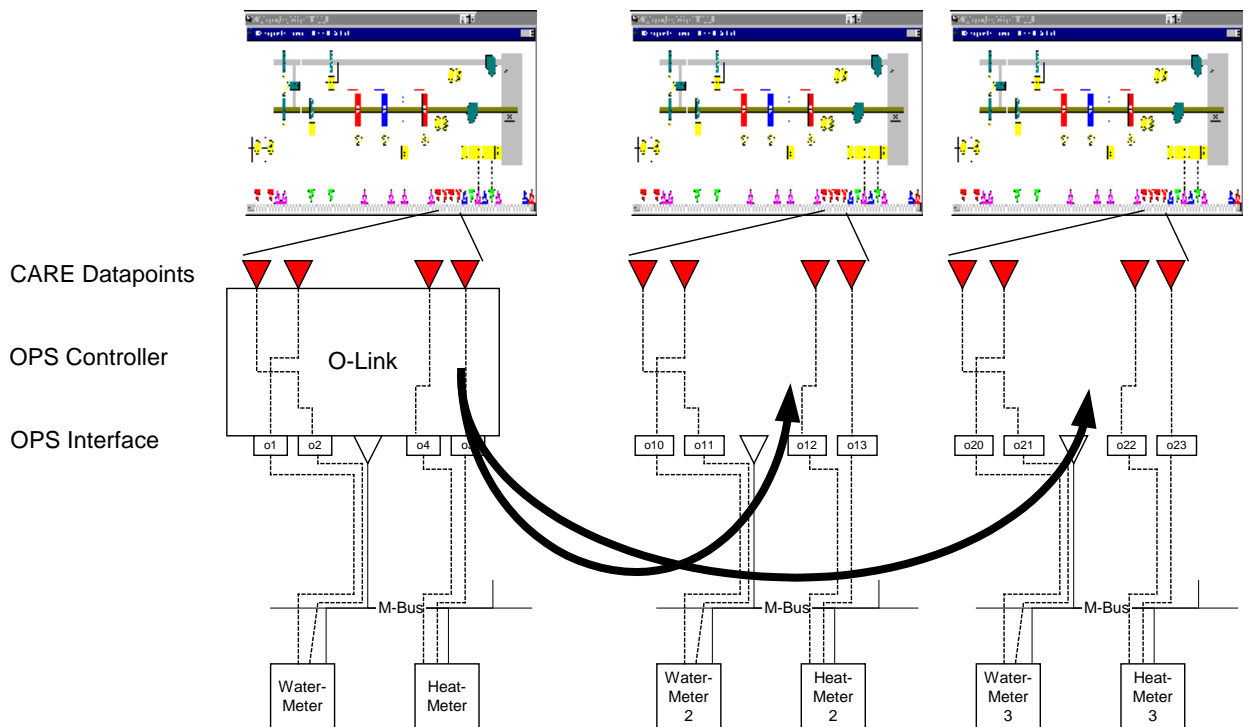
Replicate Plant

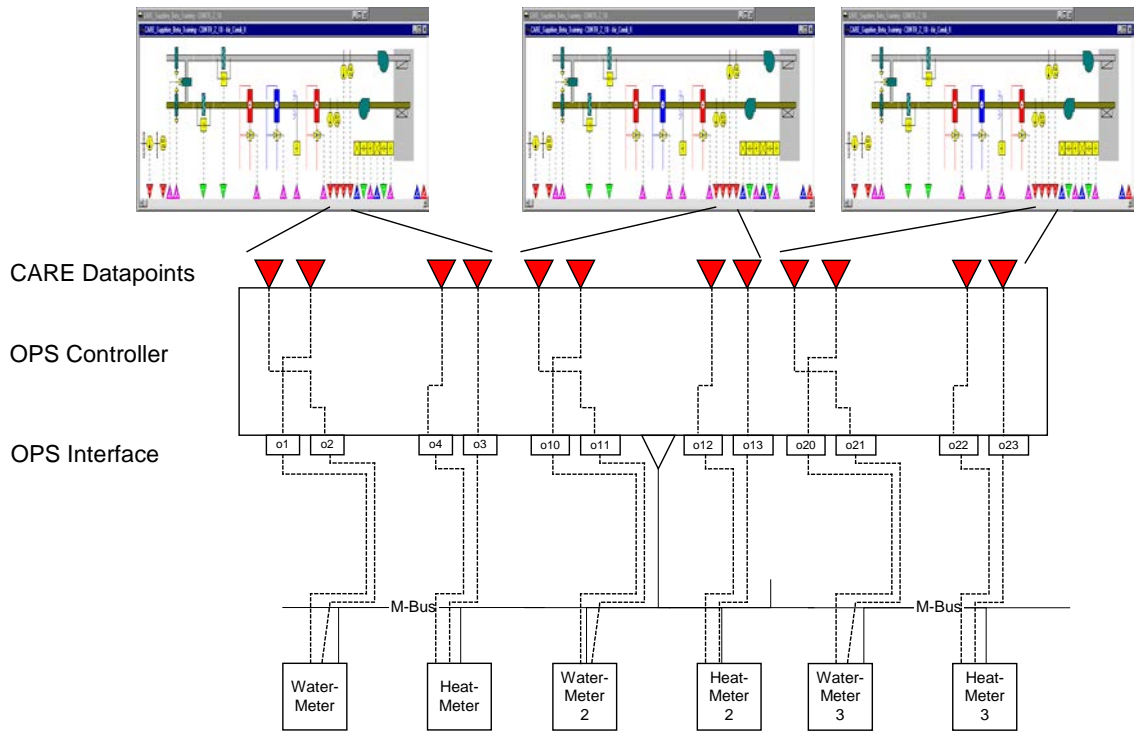
For streamlining the engineering process of OPS controllers, a plant can be replicated multiple times after the mapping has been done.

Replication will include:

- CARE datapoints
- Control strategies and switching tables, if assigned to the plant.
- OPS Subsystem controllers and OPS points

After replication the plants will be available as unattached plants. After attaching the plants a "big" OPS interface will have been created.





Please, refer to the "Plants, Defintion and Management" section for detailed information on how to replicate a plant.

Import/Export OPS Controller

An OPS controller can be imported, respectively exported at two points:

- From within the OPS Template Editor
- From within the C-bus part of the network tree.

When importing/exporting the OPS controller from the OPS Template Editor a pure template without any mapping information will be imported/exported whereas when importing/exporting the OPS controller from within the C-bus part of the network tree an OPS controller (OPS device) including all mappings will be imported/exported.

This means for importing into the OPS device that all current OPS points will be deleted and replaced by the imported OPS points. Mappings between imported OPS points and CARE datapoints of the same name will be re-established.

For importing into the OPS template, the current OPS template data are deleted and replaced by the imported OPS controller data. No mapping information will be imported.

Import OPS Controller

Migration Strategy Note

If the Import OPS controller function is part of the migration strategy, first perform steps 1 through 7 from the "Migration Procedure" section.


Import into Current OPS Controller

1. To import OPS controller data into the current OPS controller, browse to the OPS controller in the C-bus part of the network tree.
2. Continue with "Common Steps".

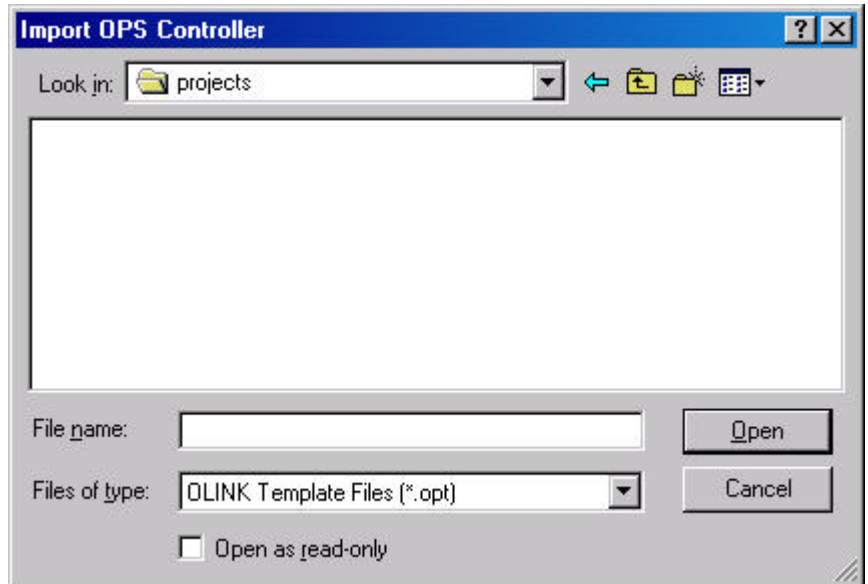
Import into OPS Template

1. To import OPS controller data into the OPS template, open the OPS Template Editor (see "OPS Template Editor" section).
2. Continue with "Common Steps".

Common Steps

3. In the C-bus part of the network tree respectively in the OPS template editor tree, click on OPS controller, respectively on OPS template.
4. On the OPS toolbar, click .

RESULT: The *Import OPS Controller* dialog box displays.



5. Navigate to the folder where the *OPT* file resides and select it.
6. Click **Open** button.

RESULT: The *Import OPS Controller Options* dialog box displays.

7. Select desired option.

RESULT: A message box displays. Note that the existing OPS device (controller) data will be overwritten when selecting Yes.

8. Click **Yes** button.

RESULT: If the import was successful, the following message box informs you about that .

9. Click **OK** button.

RESULT: The OPS information imported is displayed in the tree on the left.

Export OPS Controller**Based on Current OPS Controller**

1. To export the OPS controller data based on the current OPS controller, first translate the OPS controller.
2. Browse to the OPS controller in the C-bus part of the network tree.


3. Continue with "Common Steps".

Based on OPS Template

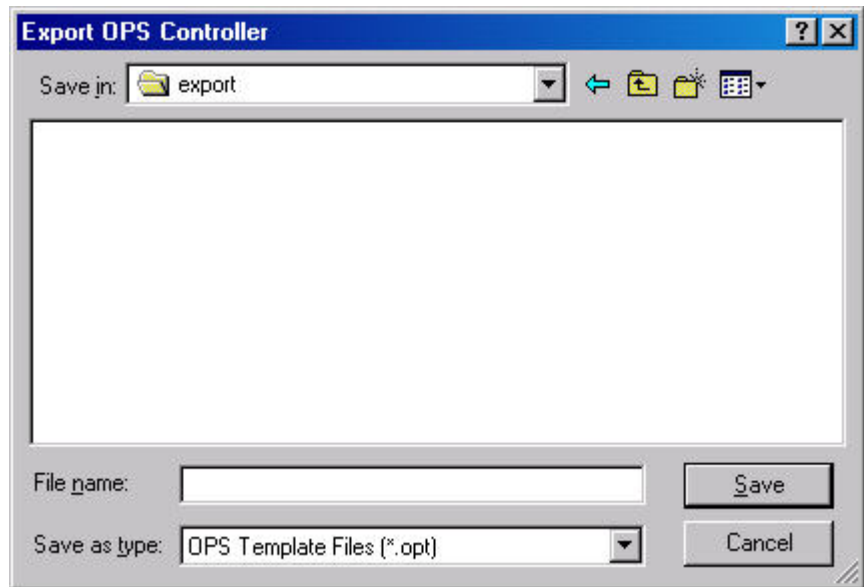
1. To export the OPS controller data based on the OPS template, open the OPS Template Editor (see OPS Template Editor section).
2. Continue with "Common Steps".

Common Steps

3. In the C-bus part of the network tree respectively in the OPS template editor tree, click on OPS controller, respectively on OPS template.

4. On the OPS toolbar, click  .

RESULT: The *Export OPS Controller* dialog box displays.

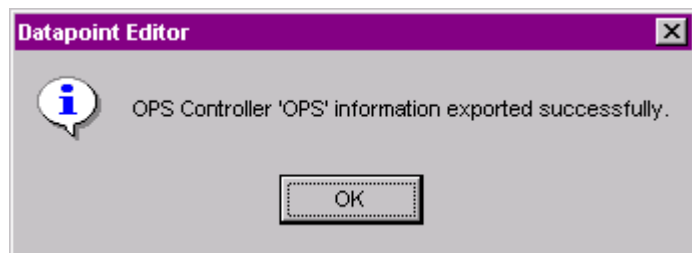


5. Navigate to the folder where the *OPT* file should be saved.

6. Into the **File Name** field, enter file name.

7. Click **Save** button.

RESULT: A message box informs you about the successful export of the OPS controller.



8. Click **Save** button.

Migration Strategy

CARE 3.01.00 and higher allows upgrading existing OLink projects to OPS projects. The exported data of the old OLink project data can be imported in the same file format (*OPT*).

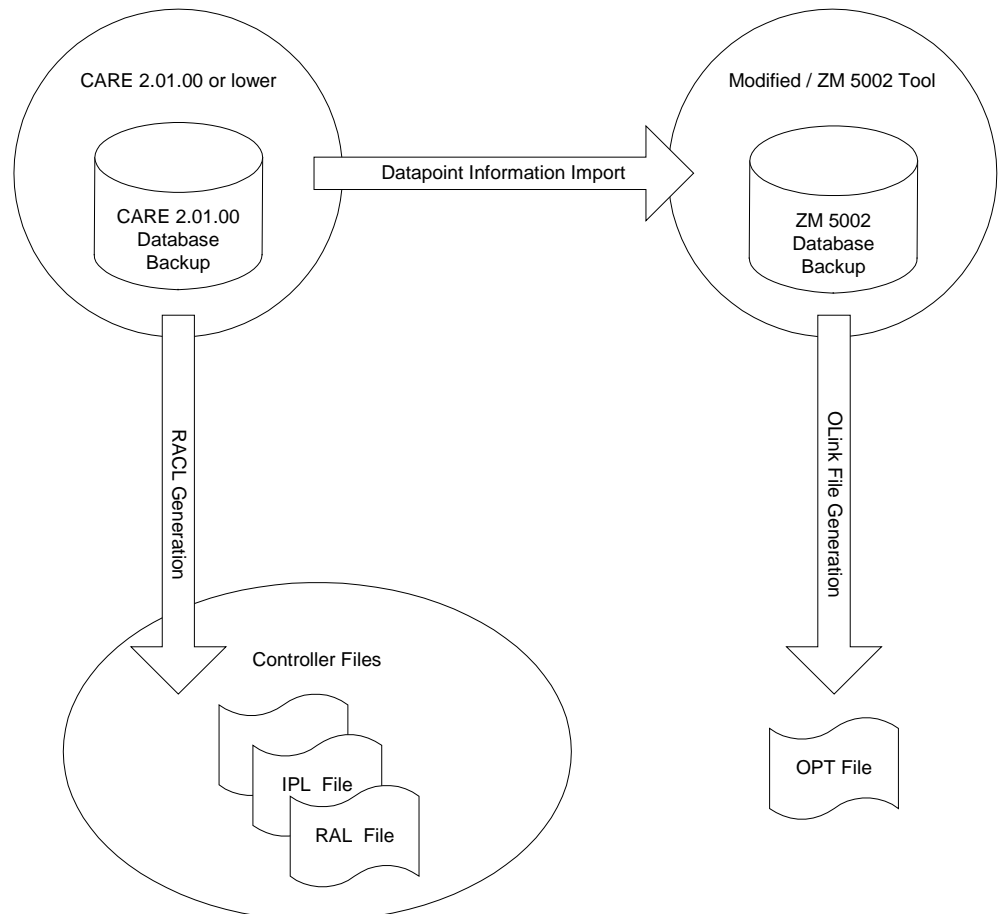
An old OLink Project consist of two main elements:

- The CARE database (version 2.01.00 or lower) where the OLink controllers and also the datapoints are stored.
- The ZM 5002 database (ZM5002 project) which fits to this CARE project.

During the Upgrade the attached XLink plant including control strategies and switching logics gets to Air-conditioning. The XLink controller will be transformed to the OPS controller type and the XLink datapoint technical address gets to standard technical address (see steps 7 and 8).

NOTE: An unattached XLink plant will no longer be supported.

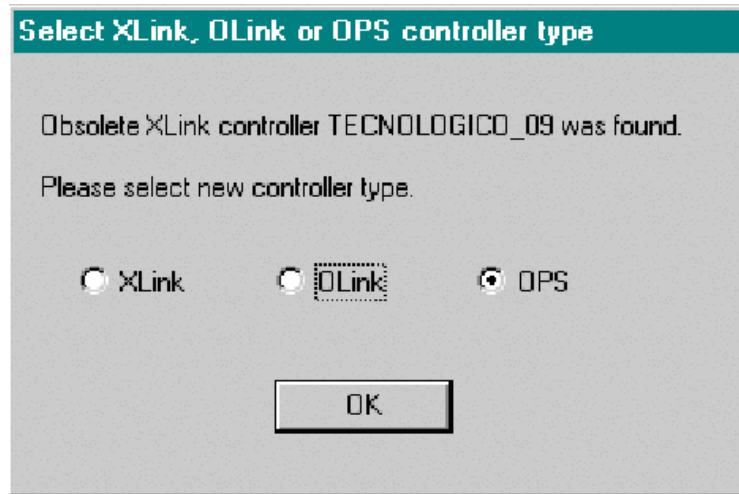
Migration Procedure



1. You need to have CARE 2.01.00 installed first with the OLink controller project in the database.
2. Translate the controller.
3. Start the modified ZM 5002 Tool, which will be provided by the CARE Team and import the CARE controller files.
4. In the modified ZM 5002 tool an additional menu item will be available which allows creating (export) the *OPT* file (opt file = ops file plus binary code).
5. Make a database backup of the CARE 2.01.00 database or a project backup.
6. Install CARE 3.01.00 or higher (CARE with OPS support).

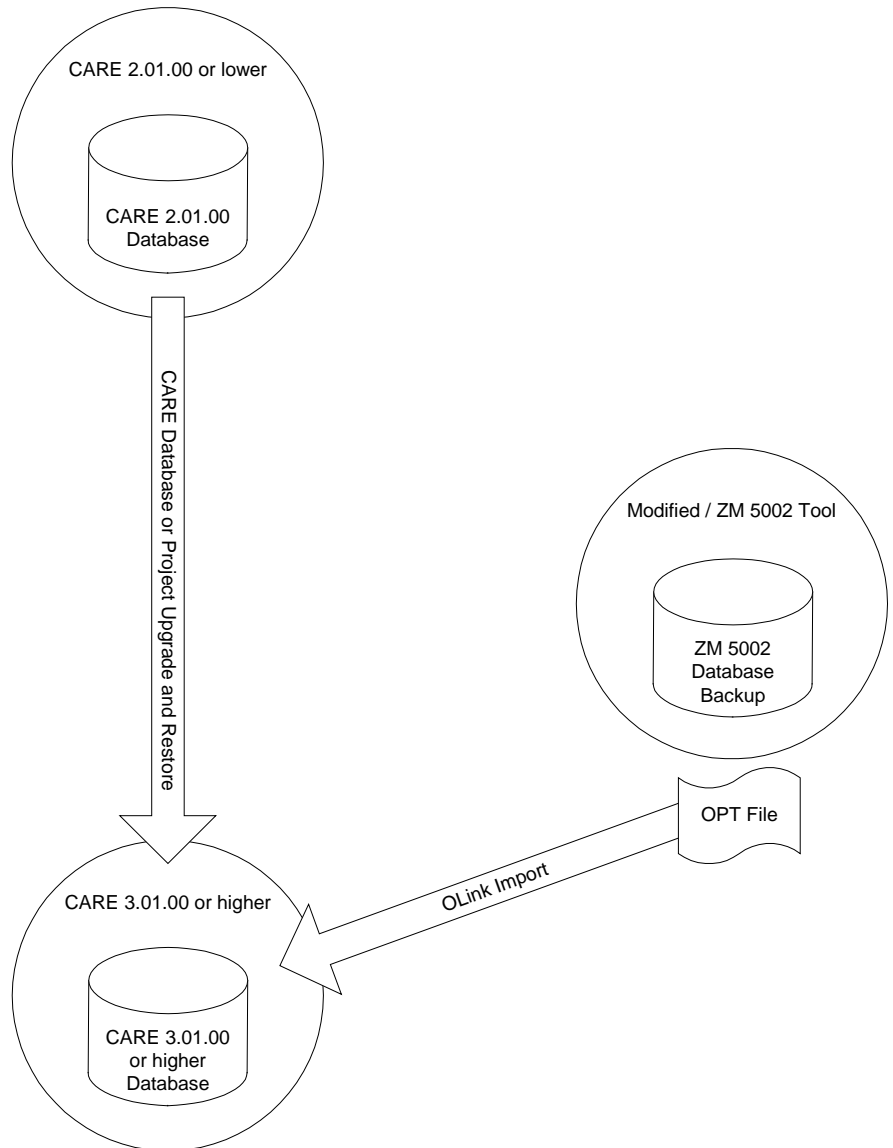
7. Within the installed CARE version upgrade the CARE 2.01.00 database (or project) to the highest CARE version and then restore this database (or project).

RESULT: If an old XLink controller was found during the upgrade, the **Select XLink, OLink or OPS controller type** dialog box displays. An old XLink controller can be kept as XLink type or transformed to an OLink or OPS controller.



8. Select **OPS**, or, if you want to transform the controller to the OLink type, select **OLink**.
9. Click **OK** button.

RESULT: The upgrade will be finished.



10. In the C-bus part of the network tree, click on the OLink controller.
11. Click right mouse key and with left mouse key click on **Import OPS Controller** in the context menu (see "Import OPS Controller" section).
12. Import the *OPT* file. All mappings between datapoints to OLink points will now be available.
13. From menu item **Controller**, click drop-down item **Tools**, then submenu item **NO/NC Upgrade**, since the OPS controller is only supported by the new NO/NC mechanism.

RESULT: Migration is completed.

FALCON AND EAGLE CONTROLLERS

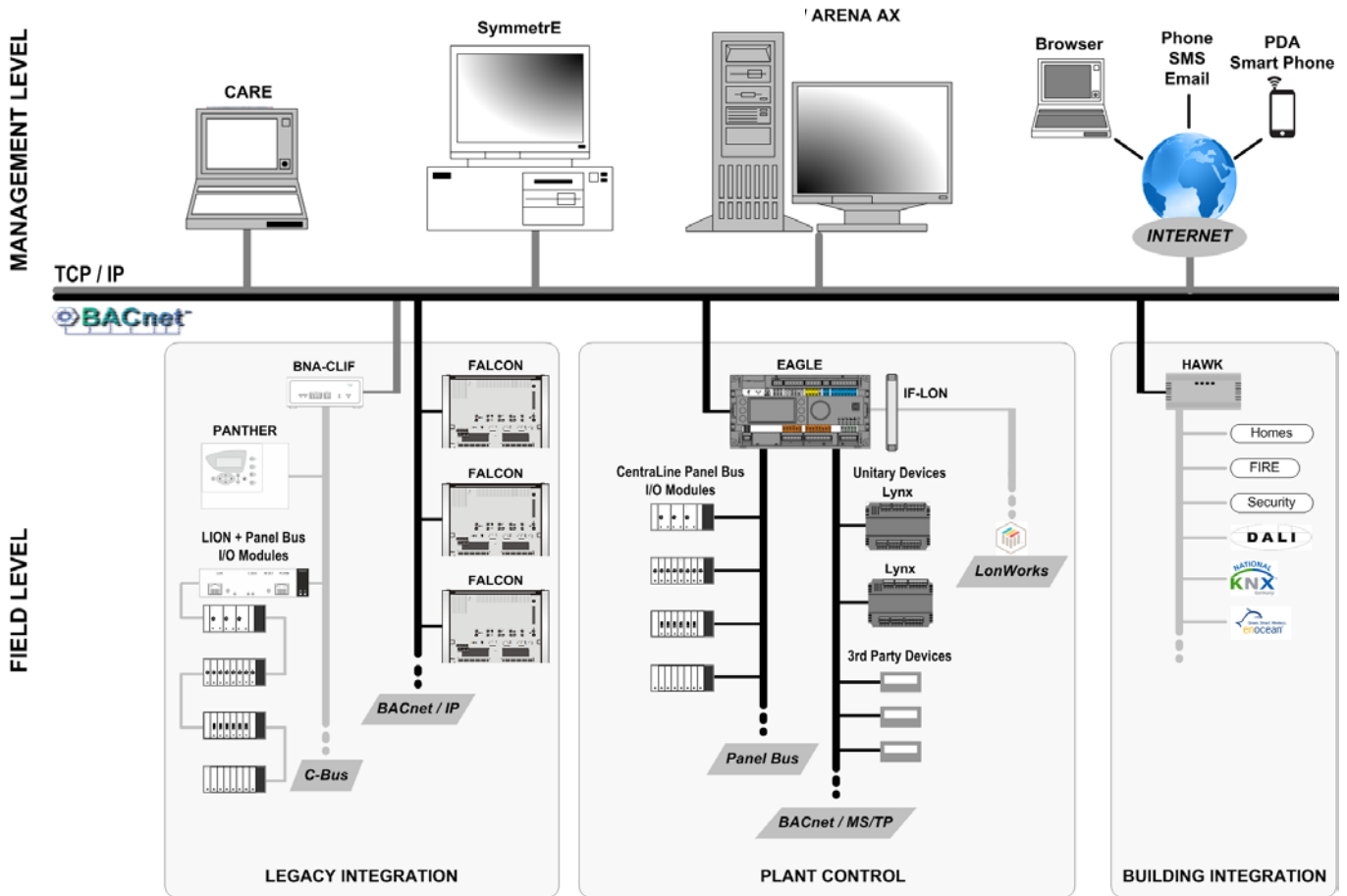
CARE supports two BACnet controllers, the FALCON and the EAGLE controller.

System Architecture

FALCON and EAGLE controllers provide basic BACnet functions for plant controls. The FALCON controller allows plant control on BACnet IP level. The EAGLE controller allows plant control on BACnet IP and additionally on BACnet MS/TP (Master Slave Token Passing) level. Both controllers also support LonWorks building technology. For this, the EAGLE controller uses an external IF-LON interface.

For detailed information on the features and differences of these two controllers, please refer to the corresponding Product Data, EN0Z-0962GE51 (EAGLE controller) and EN0Z-970GE51 (FALCON controller).

The FALCON and EAGLE controllers as part of the CentraLine System BACnet Architecture are shown in the following schematic.



CARE Steps

For BACnet controller engineering, some steps are common with the CARE standard steps such as:

- Creating project
- Creating datapoints
- Terminal assignment
- Assigning panel I/O modules / LON devices to controller

And yet, other individual steps will be performed differently when engineering an HVAC application running in a BACnet controller, for example:

- Creating controller

- Creating plant
- Defining general BACnet-bus properties
- Representing the BACnet topology by creating a skeletal network architecture consisting of subsystems, subnets and channels
- Defining IP address ranges for controllers
- Modeling the network architecture by creating, moving or deleting subsystems, subnets, channels and 3rd party BACnet devices
- Creating schedules and calendars
- Creating control strategy and switching logic
- Configure system status properties
- Configure email alarming
- Setting up controllers
- Defining notification classes for adapting the alarming to the ARENA AX Central and 3rd party BACnet clients
- Defining user access rights

The common and individual engineering steps of the two controllers are described in the following sections.

NOTE: Before starting the engineering of BACnet controllers with CARE, we strongly recommend to get familiar with BACnet technology by reading appropriate basic literature.

Create BACnet Project

Please refer to the PROJECTS DEFINITION AND MANAGEMENT chapter for detailed information on how to create and edit a project.

Create BACnet Controller

NOTE: It is recommended to represent the network topology (BACnet IP, BACnet IP - BACnet MS TP, BACnet MS TP) of the building by defining the subsystems/subnets in the network tree **before** creating controllers. This ensures that you can select the dedicated target network, subsystem and subfolder for the controller when creating the controller. Otherwise, you eventually must position the controller in the network tree manually if the target location was not available from the beginning (see "BACnet Network Engineering" section for detailed information on subnets, subsystems and channels)

Purpose To create a BACnet controller. The BACnet controller will be placed into a BACnet IP Bus subnet selectable when creating the controller. By default, the subnet called 'IP-Subnet 1` is available and can be selected.

Procedure 1. Click menu item Controller, then submenu item New.

Result: The New Controller dialog box displays.

2. In the Controller Name field, enter the controller name.
3. From the Subsystem/Subnet Name drop-down list box, select the desired subnet. By default, IP-Subnet 1 is selected (see "BACnet Network Engineering" section for detailed information on subnets, subsystems and channels).
4. From the Controller Number drop-down list box, select the controller number.
5. From the Controller Type drop-down list box, select the controller type.
6. (applies to FALCON controllers only):
Check FALCON 2.0 application format if you want to apply event enrollments to any of the following items: plant, controller, email alarming, and datapoints, enable email alarming in general, and/or if you want to use the default schedule function for schedules. Check FALCON 1.0 application format if you use controller versions lower than 2.0.

NOTE: Once the Excel 2.0 application format is selected you cannot switch back to the Excel 1.0 application format after the controller was created.

New Controller

Controller Name: Eagle001

Subsystem/Subnet Name: BACnet IP Subnet: IP-Subnet 1

Controller Number: 3000

Controller Type: CLEA2026B01 (with full I/Os, without HMI, with Ethernet)

Location: GERMANY

Units of Measurement

International

Imperial

Interfaces

RS485 1: none

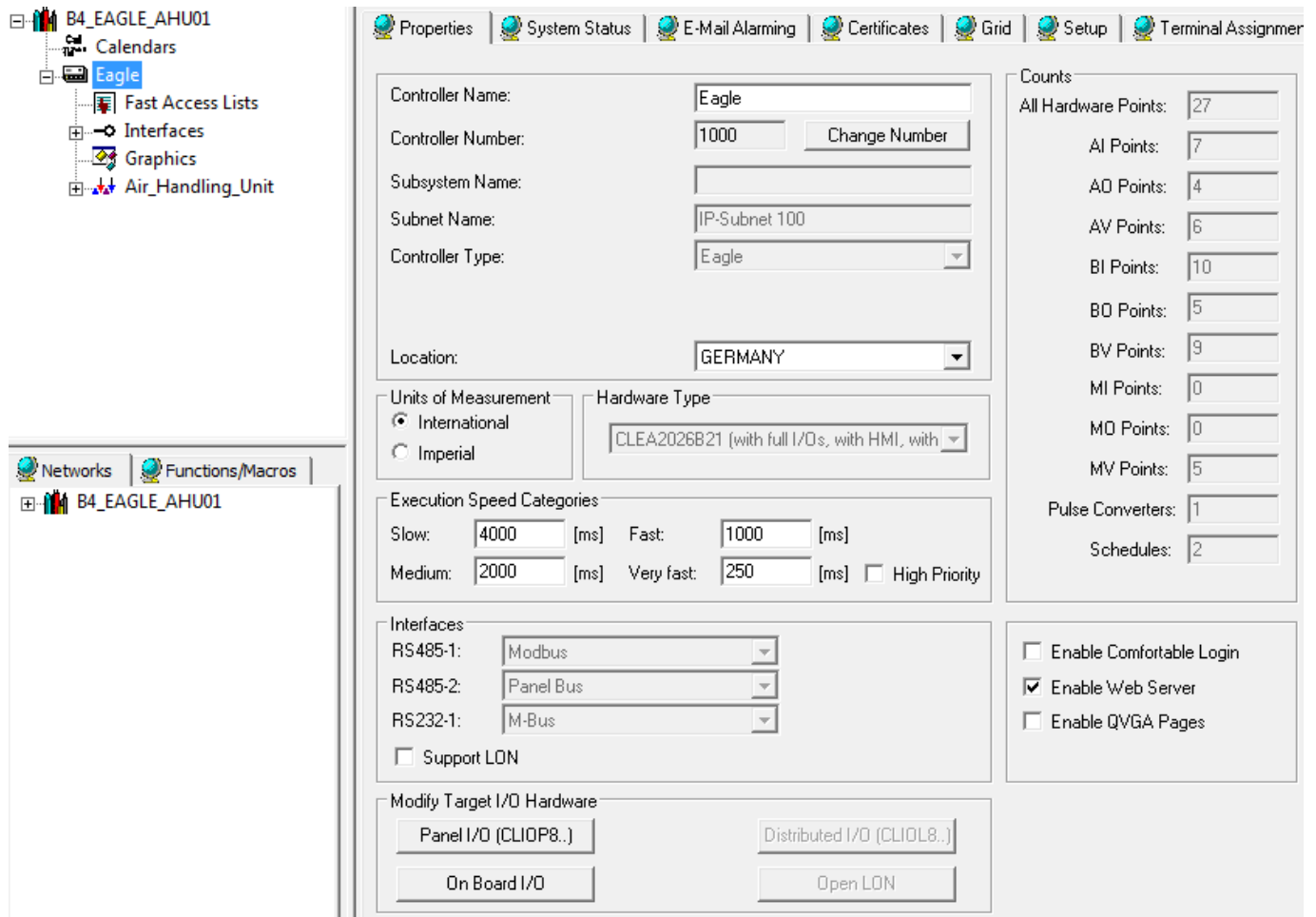
RS485 2: Panel Bus

Support LON Support M-Bus

OK Cancel Help

7. From the Location drop-down list box, select the country code.
8. Under Units of Measurement, select the measurement units under International and Imperial by selecting the corresponding radio button.
9. Under Interfaces, select the buses for the RS485 1 and RS485 2 interfaces by selecting Panel Bus, BACnet MS/TP Bus, or Modbus from the drop-down list boxes. You can select 'None' if the interface should not be connected. Please refer to the "BACnet Network Engineering" and the "Set Global CARE Options" sections that describe the effects on the network structure depending on the selection here.
10. Check the Support LON checkbox if the controller should control LON devices additionally.
11. Check the Support M-Bus checkbox if the controller should control M-Bus devices additionally.
12. Click the OK button.

RESULT: The controller is added to the logical plant tree on the left. Its interfaces are added to the Interfaces folder below the controller icon. On the Properties tab on the right, the properties of the controller are displayed. To modify properties, please refer to the "Display/Modify BACnet Controller Properties" section. The System Status, E-Mail Alarming, Grid, Setup and Terminal Assignment tabs provide further mandatory and optional functions of the created controller. Please refer to the corresponding sections for detailed information.

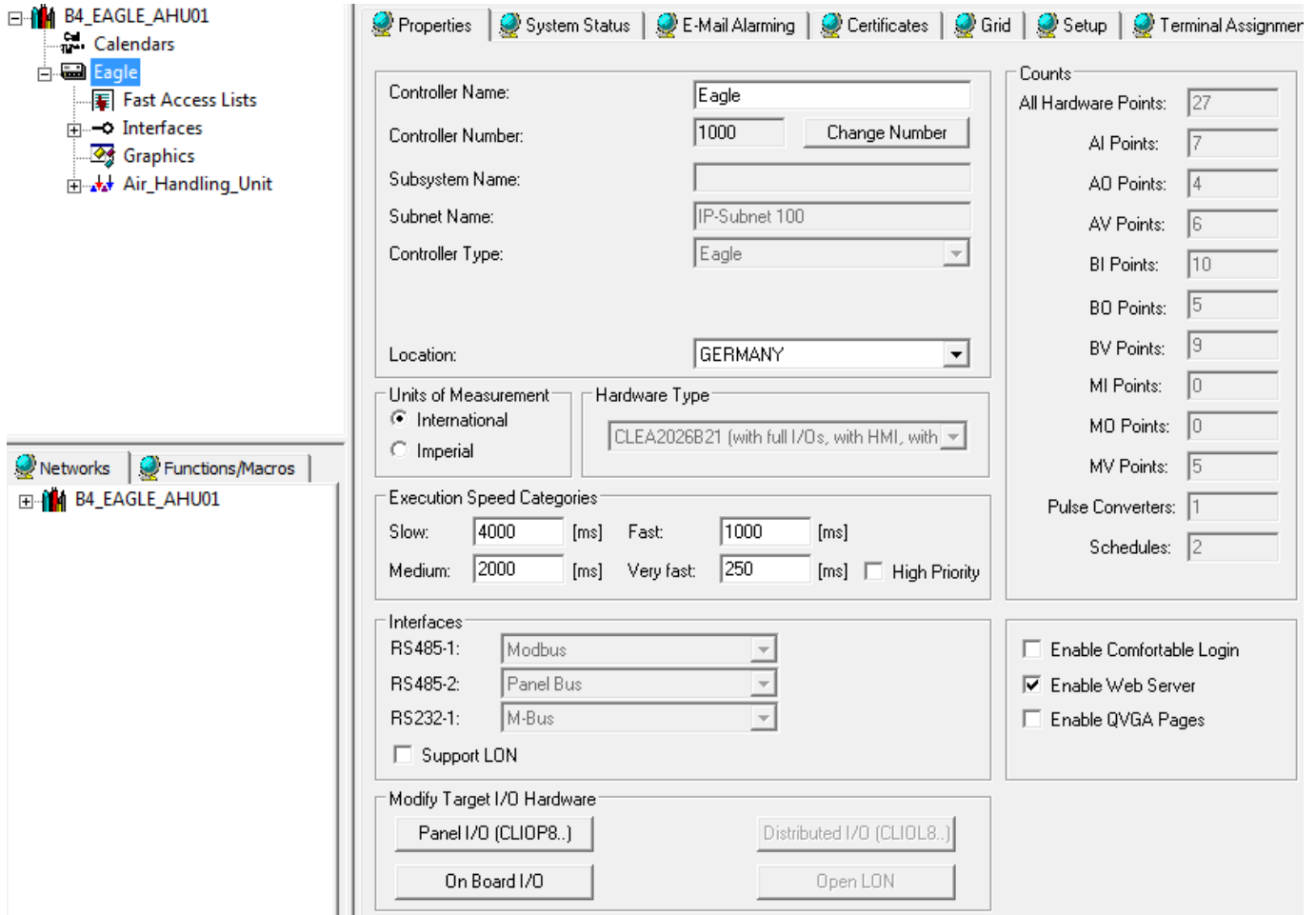


Display/Modify BACNet Controller Properties

Purpose View and/or change controller information such as name, controller number, units of measurement, counts, execution speed categories, interfaces, LON support and target I/O hardware.

- Procedure**
1. In the logical plant tree, click on the controller.
 2. On the right pane, click on the Properties tab.

RESULT: On the Properties tab on the right, the following properties of the controller are displayed:



Controller Name
Change the name if desired.

Controller Number
To change the controller number, see step 3.

Subsystem Name
Displays the name of the subsystem.

Subnet name
Displays the name of the subnet.

Controller Type
Displays the controller type.

Location
To change the country code, select desired country code from the drop-down listbox.

Units of Measurement
To change the measurement units, select desired radio button.

Hardware Type
Displays selected controller hardware type (for details see Product Data EN0B-0970GE51).

Counts
Displays the counts of datapoint types such as AIs, BIs etc, the number of hardware points and the number of schedules.

Execution Speed Categories

Displays the speed categories in ms. An execution speed category (target cycle time) defines how often the loop will be automatically executed by the controller. Execution speed categories are grouped in the following categories: Slow, Medium, Fast, Very Fast. Each control loop is assigned to one of these categories (see "Set Execution Speed Categories" section).

NOTE:

The execution speed category should not be exceeded during control loop execution. Any changes will affect all control loops assigned to the corresponding category.

If a category's actual execution time displayed in the Eagle HTML Interface is permanently greater than the corresponding execution speed category, the controller is overloaded and the execution speed category should be changed by increasing it to higher values than the actual execution time.

To change a speed category, enter the desired value. Note that the default values can only be increased but not decreased.

High Priority

For small application parts with few IOs only, the Very Fast RACL execution category should have the highest priority. For this purpose, the "Very Fast" execution speed defined on the Controller *Properties* tab can be set to the highest priority by checking the "High Priority" check box.

Interfaces

Displays the buses connected to the RS485 1 and RS485 2 interfaces (Panel Bus, BACnet MS/TP Bus, Modbus or None).

Support LON

Check the Support LON checkbox if the controller should control LON devices additionally. Uncheck the Support LON checkbox if the controller should not support LON functionalities.

Support M-Bus

Check the Support M-Bus checkbox if the controller should control M-Bus devices additionally. Uncheck the Support M-Bus checkbox if the controller should not support M-Bus functionalities.

Enable Web Server

If checked, this option provides access to a BACnet controller via Web Interface.

Enable Comfortable Login

If checked, this option provides the login to the web interface without the necessity to enter user name and password each time you are logging in.

 **CAUTION**

If checked, make sure that the controller is operated in a closed network or VPN to avoid misuse through cyber attacks or easy login by other persons not knowing your password and user name.

Enable QVGA Pages If checked, the web pages will be displayed in QVGA (quarter VGA = 320 pixels by 240 pixels) resolution. This is necessary for the proper display of the web pages in the CL Touch panel.

Modify Target I/O Hardware

Change the target I/O hardware for the EAGLE controller if desired as described in the following.

4. To change target I/O hardware, click desired button:

Panel I/O (CLIOP8..)

(applicable to EAGLE only)

Hardware points of this plant will be assigned to CLIOP8.. modules (panel bus).

On Board I/O

(applicable to EAGLE only).

Hardware points of this plant will be assigned to the controller's internal on board I/O terminals.

Distributed I/O (CLIOL8..)

(applicable to EAGLE only).

Hardware points of this plant will be assigned to CLIOL8.. modules (LonWorks-bus).

Open LON

(applicable to EAGLE only).

Hardware points of this plant will be boardless, that is, unassigned

RESULT: At once **all** plants will be automatically detached, all empty hardware modules will be removed and the plant automatically reattached to the selected target hardware. All datapoint attributes remain unchanged except the technical address.

5. Click on the controller in the logical plant tree.

Set Execution Speed Categories

The execution speed category (also called cycle time category in the Eagle HTML Interface) defines the (target) time in ms after a control loop is restarted automatically.

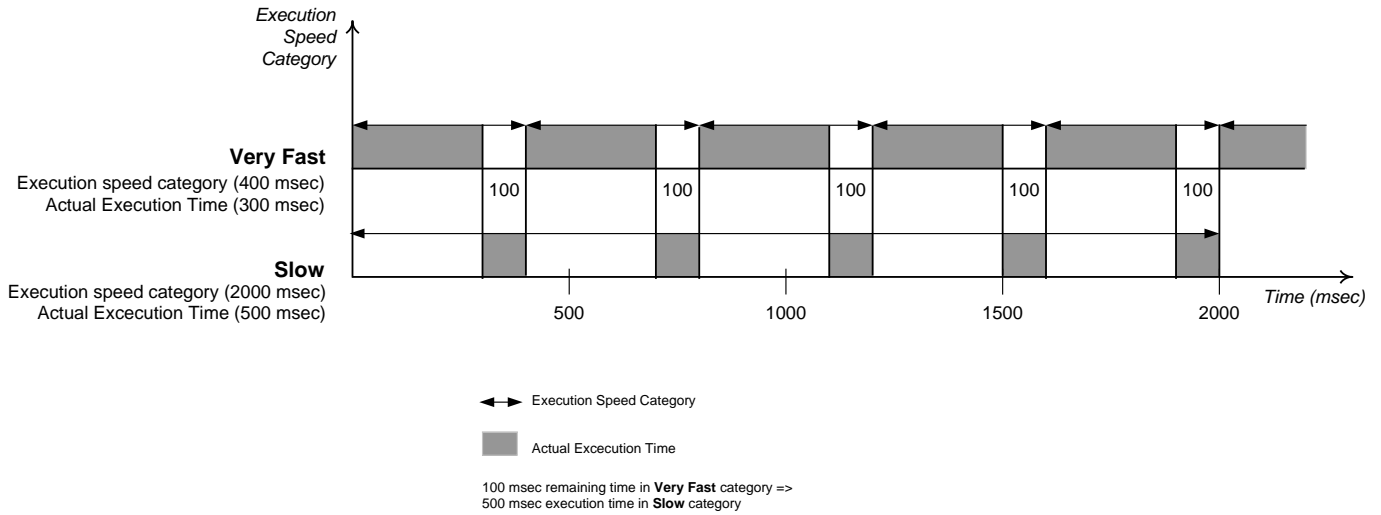
Execution speed categories are grouped in the following types with descending priority:

- Very Fast.
- Fast
- Medium
- Slow

In other words, a control loop which has the very fast category assigned, is executed more often in the same time than a control loop which has a lower category assigned, for example medium.

Each control loop is assigned to one of these categories. Any changes done to the execution speed category will affect all control loops assigned to the corresponding category.

The controller executes multiple control loops simultaneously (multitasking). There is a dynamic relation between the execution speed categories as shown in the following diagram:



The diagram illustrates, that the degree of execution of a control loop having a slow category assigned, depends on the remaining time (=execution speed category time minus actual execution time) provided by a control loop executed in very fast category.

The execution speed category should not be exceeded during control loop execution. If a category's actual execution time is permanently greater than the corresponding execution speed category, the controller is overloaded and the execution speed category should be changed by increasing it to higher values than the actual execution time.

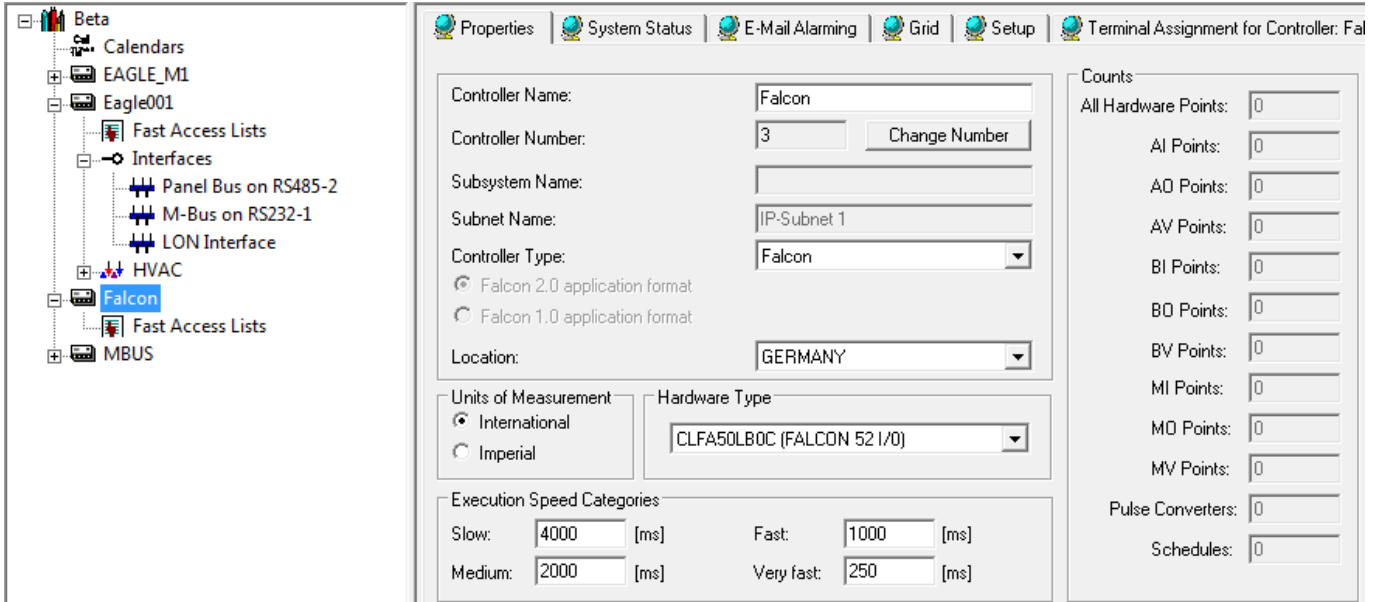
IMPORTANT

It is recommended to set the execution speed categories to between 30 % and 50 % higher than the actual execution times in order to make sure that control loops having medium and slow execution speed categories assigned can be executed in the appropriate time.

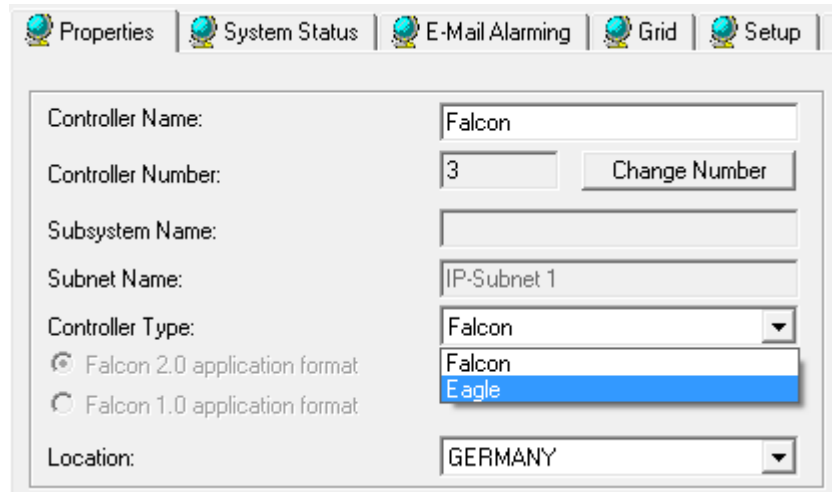
NOTE: The settings done in the Eagle HTML interface will be overwritten after a download with CARE. Hence, upload the application into CARE using Excel XW Online after the plant has been setup.

Upgrade FALCON Controller

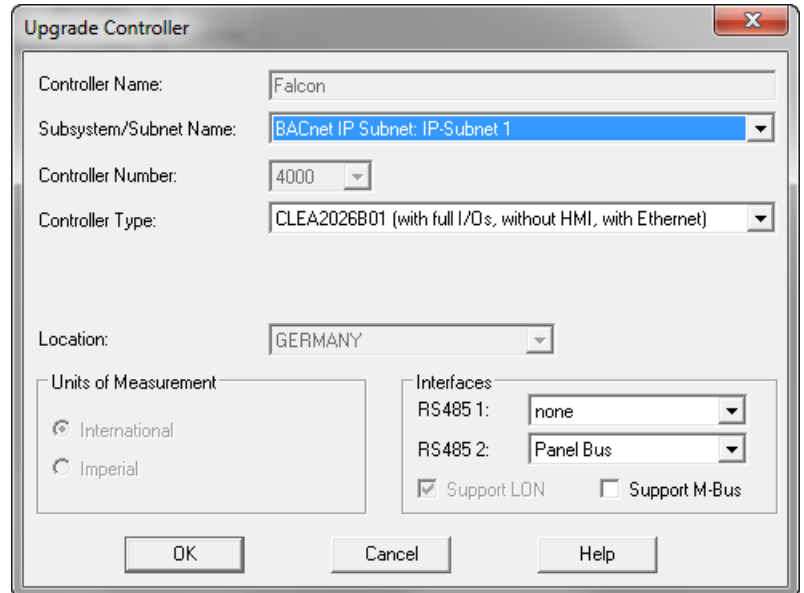
- Purpose** Upgrade a FALCON controller to an EAGLE controller.
- Procedure**
1. In the logical plant tree, click on the controller.
 2. On the right pane, click on the Properties tab.



3. On the Properties tab on the right, select 'Eagle' from the Controller Type drop-down list box.

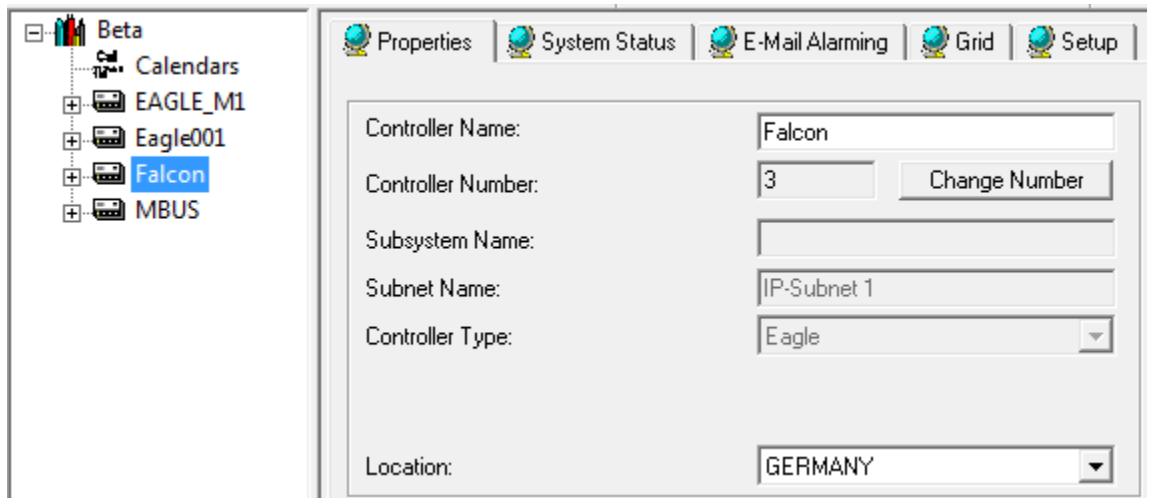


RESULT: The Upgrade Controller dialog box displays.

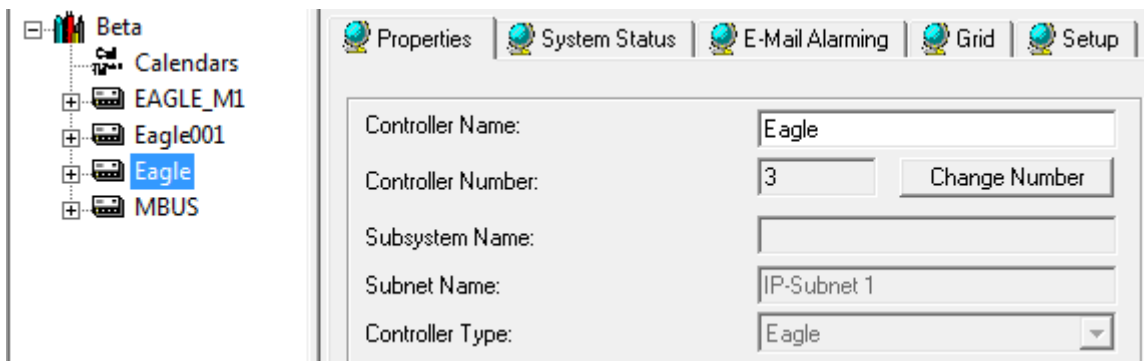


4. In the Upgrade Controller dialog box, select the Subsystem/Subnet, the controller type and the Interface.
5. Click OK button.

RESULT: The Properties tab re-displays. The controller type has been changed to Eagle as indicated in Controller Type. But the name of the controller is still the name of the upgraded FALCON controller.



6. Change the name of the upgraded controller in Controller Name.



Create Plant

Purpose Define a plant name and the units of measurement.

When creating a plant, you can instantly attach the plant to a controller or create it unattached for later attachment.

For detailed information on the plant attachment process, please refer to the "Attach/Detach Plant" section in the CONTROLLERS DEFINITION, ATTACHMENT, AND MANAGEMENT chapter.

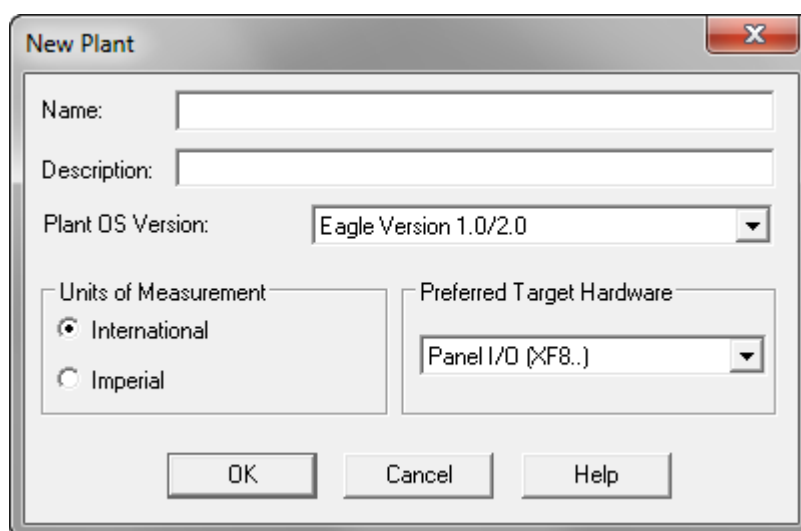
Procedure

1. In the logical plant tree, click on the controller, to which you want attach the plant.
Or, if you want to create an unattached plant for later attachment, click on the project.

NOTE: If the plant is created on controller level, it is not possible to select the units of measurement. Those plant properties can only be selected if the plant is created on project level (not attached to any controller).

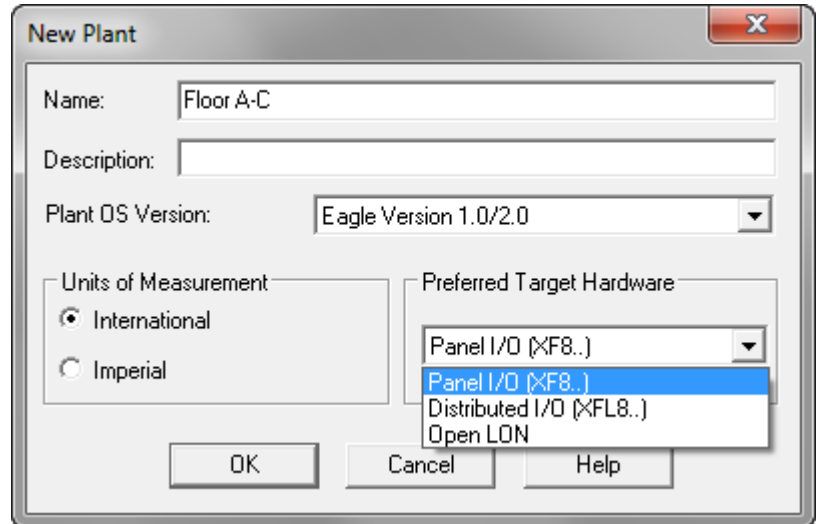
2. Click menu item Plant, then drop-down item New.

RESULT: The New Plant dialog box displays.



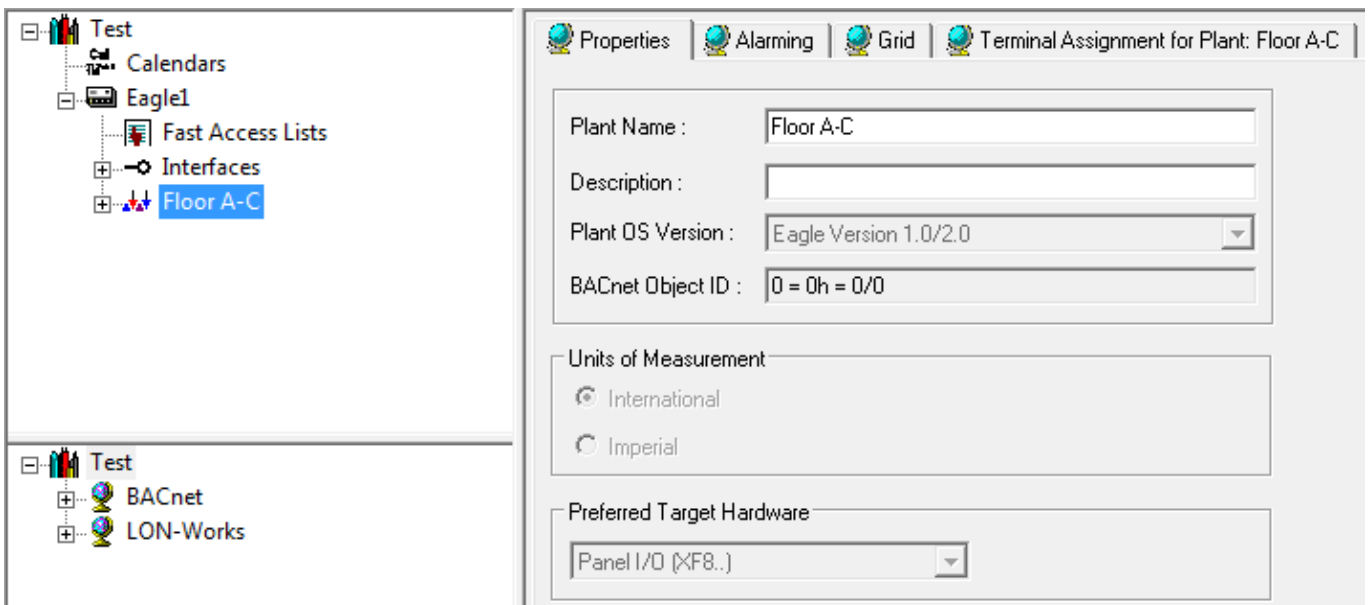
3. Type a plant name in the Name field.
4. Type a description in the Description field if desired.

5. Under Units of Measurement, select the desired type for the plant, International (metric) or Imperial. This selection tells the Control Strategy functions which type of inputs to accept, Celsius or Fahrenheit. Units of Measurement can only be selected if the plant is not attached to the controller yet.
6. From Preferred Target Hardware select the target hardware under Panel I/O (CLIOP8..), Distributed I/O (CLIOL8..) and Open LON. Distributed I/O (CLIOL8..) and Open LON can only be selected if the controller supports LON functionalities (Support LON must be checked in the Controller Properties tab).
 - Distributed IO: XFL modules with automatic assignment
 - OPEN LON: XFL modules with manual assignment



7. Click **OK**.

RESULT: If the new name is acceptable, software closes the dialog box. In the logical plant and network tree, the plant is added below the controller (plant attached) or below the project (plant unattached). Below the plant level, the Schedules and Control Loops folders are automatically created. For applying these functions please refer to the Schedules and Calendars and the Control Loops sections.



Create Datapoints

- Procedure**
1. If not already highlighted in the logical plant tree, select the plant.
 2. Click menu item Plant, then drop-down item Create HW/SW Points.

Or, click right mouse key and with left mouse key, click on Create HW/SW Point(s) in the context menu.

RESULT: The New Point dialog box displays.

3. From the Type drop-down listbox, select the datapoint type.
4. In the Number field, enter the number of points to be created and in the User Address fields enter the name of the datapoint(s) to be created. If you are adding more than one point, software automatically numbers the corresponding user addresses sequentially to guarantee unique user addresses. For example, if you enter pt and request two points, software creates two points named pt1 and pt 2. Only use alphabetic characters. Do not use blanks.
5. From the Default HW Interface drop-down listbox, select the interface to which the datapoints should be assigned by default:
 - On board
points will be assigned to the appropriate board according to the point type
 - Panel bus <RS Interface name>
points will be assigned to the RS interface
 - First free terminal
applies to DI points and Mixed I/O board usage. If this option is selected, DI points will be assigned to the first free terminals on AI boards without the creation of new DI boards.
 - Boardless
points will not be assigned to boards (strongly recommended for M-Bus configurations)
6. Click **OK**.

RESULT: In the upper example, the datapoints are added to the Analog Input type folder in the logical plant tree.

- Depending on the chosen Default HW Interface, the datapoints are automatically assigned to the appropriate module(s). If LON modules are used, continue by mapping datapoints to NVs of appropriate devices as described under "Assign LON devices (Binding)" section.

Add Control Strategy / Switching Logic to Plant

For detailed information please refer to the CONTROL LOOPS section.

Create Fast Access Lists

Purpose Fast access lists are created in CARE for representing suited information to dedicated users (e.g. electrician, project engineer, and tenant) on the controller HMI and web interface.

Fast access lists are lists of grouped datapoints and/or parameters mostly representing a logical part of the application. This allows quick access to a particular part of the application on the controller HMI and web interface via the corresponding datapoints and/or parameters.

A fast access list can be a list of certain datapoints, e.g. all outputs by using a filter template, or a list showing the impact of selected parameter values on datapoints.

Fast access lists can be created on controller level and on plant level. In plant related fast access lists, you can only view datapoints/parameters of this particular plant whereas controller related fast access lists can comprise datapoints/parameters of different plants of the controller.

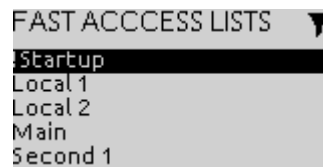


Fig. 1. Fast access lists overview on controller HMI

B4_EAGLE_AHU01_011.EAGLE_B01_011.Fast Access Lists.Fast Access List

Fast Access List

Selected Points List										
Name	Description		Value	Unit	Event State	Type	ALM	FLT	OVR	OOS
AHU01_OATemp	AHU01 Outside Air Temperature		0.00	°C	Fault	AI	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AHU01_RaHum	AHU01 Return Air Humidity		0.00	rel H	Low Limit	AI	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AHU01_RaTemp	AHU01 Return Air Temperature		0.00	°C	Fault	AI	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SHI75712PI2	Tryktransmitter indblæsning OP-stue HA706		0.00	V	Normal	AI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SHI75712TC1	Indblæsningstemperatur OP-stue HK706		8.92	V	Normal	AI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Touch_SHI75712TC2	Room Temperature (Touch)		0.00	°C	Fault	AI	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Selected Parameters List				
Parameter Path	Name	Value	Unit	Symbol Type
.AHU01	Par_Auto_value	3.00		AHU01
.AHU01	Par_manual_value	8.00		AHU01
.Ramp.Cycle	on time	5.00		Cycle
.Ramp.Cycle	off time	5.00		Cycle

Selected Loop Object Parameters List			
Loop Object Name	Parameter Name	Value	Unit
Loop Object_Ext	Derivative Constant (Tv)	0.00	sec
Loop Object_Ext	Integral Constant (Tn)	1000.00	sec
Loop Object_Ext	Proportional Constant (Xp)	3.00	

[< BACK](#) [MODIFY...](#)

Fig. 2. Single fast access list on web interface

Properties Columns Configuration

Fast access list name:

Fast access list type
 Datapoint Filter Selected Points/Parameters

Access rights
 Read Access Level: Write Access Level:

Datapoints

	Plant Name	Point Type	Point Name	Alias name
*	*	*	*	*
1	Air_Handling_Unit	Analog Input	AHU01_OATemp	
2	Air_Handling_Unit	Analog Input	AHU01_RaHum	
3	Air_Handling_Unit	Analog Input	AHU01_RaTemp	
4	Touchpanel Room Control	Analog Input	5HI75712PI2	
5	Touchpanel Room Control	Analog Input	5HI75712TC1	
6	Touchpanel Room Control	Analog Input	Touch_5HI75712TC2	

Parameters

	Plant Name	Control Loop Name	Parameter Name	Symbol	Parameter Path	Alias name
*	*	*	*	*	*	*
1	Air_Handling_Unit	AHU01	Par_Auto_value	AHU01	.AHU01	
2	Air_Handling_Unit	AHU01	Par_manual_value	AHU01	.AHU01	
3	Office Boiler room	Ramp	on time	Cycle	.Ramp.Cycle	
4	Office Boiler room	Ramp	off time	Cycle	.Ramp.Cycle	

Loop Object Parameters

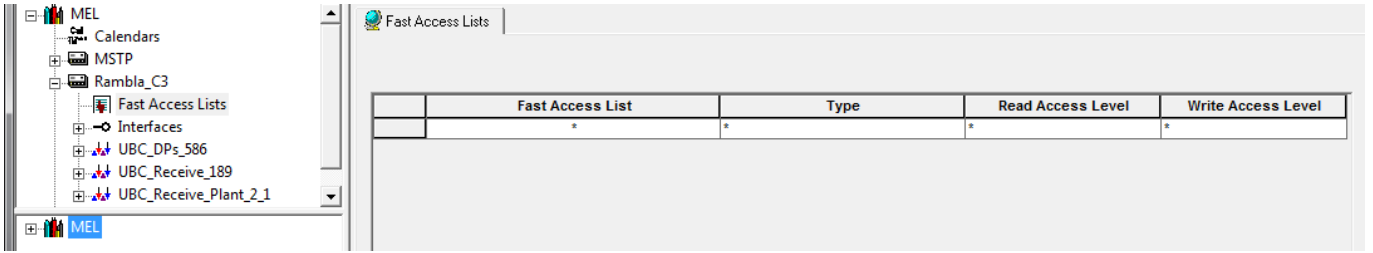
	Plant Name	Loop Object Name	Parameter Name	Alias name
*	*	*	*	*
1	Air_Handling_Unit	Loop Object_Ext	Derivative Constant (Tv)	
2	Air_Handling_Unit	Loop Object_Ext	Integral Constant (Tn)	
3	Air_Handling_Unit	Loop Object_Ext	Proportional Constant (Xp)	

Fig. 3. Fast access list creation in CARE

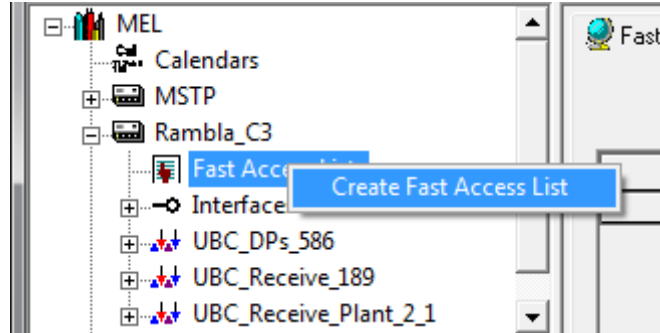
Procedure

1. To create the fast access list, expand the tree and browse to the controller.
2. Click the **Fast Access Lists** folder in the tree.

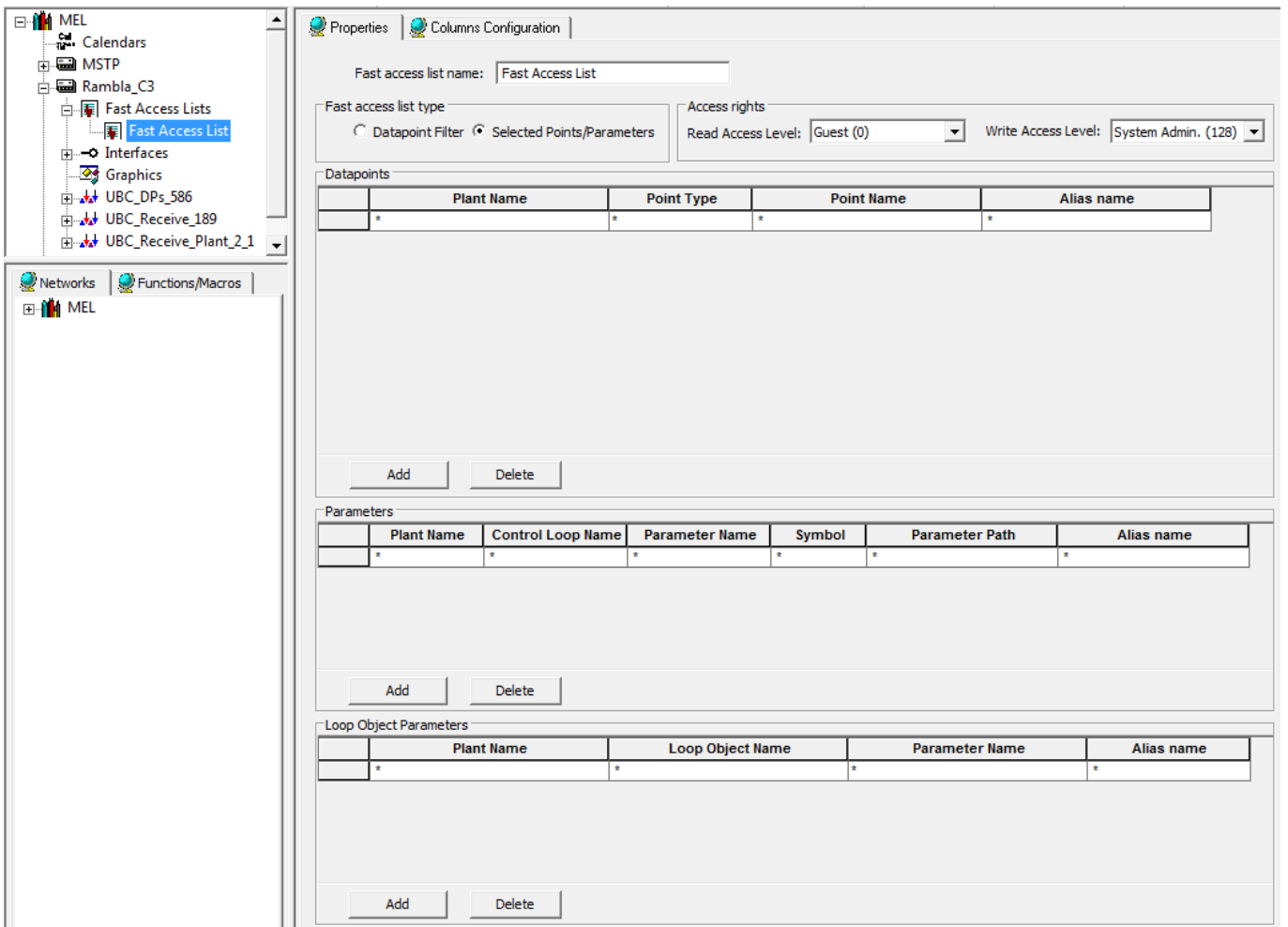
RESULT: On the right pane, the *Fast Access Lists* tab displays which shows all fast access lists created. The *Fast Access Lists* tab corresponds to a so-called "container" fast access list. The name of the container fast access list is not visible on the controller HMI or on the web interface. But each "real" fast access list subsequently created is embedded in the container fast access list and will be visible on the controller HMI and the web interface.



3. Right-click the **Fast Access Lists** folder in the tree, and then click **Create Fast Access List**.



RESULT: A blank fast access list is created. On the right pane you will define the fast access properties and its column configuration.



On the *Properties* tab, you will do the following:

- enter a name
- define access rights
- set the fast access list type (Filter Template or Selected Points/Parameters)
- add datapoints and parameters (Selected Points/Parameters only)

On the *Columns Configuration* tab, you will do the following:

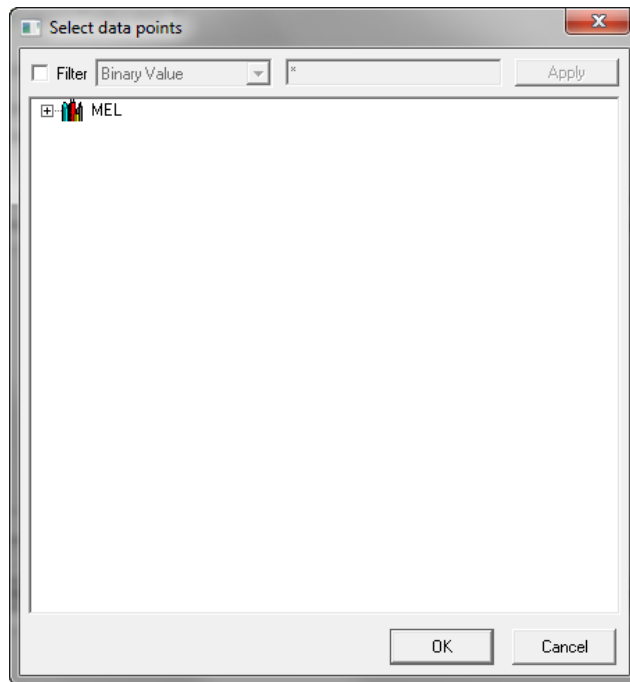
- enable/disable columns for datapoints and parameters to be displayed or hidden in the web interface and the controller HMI
4. On the *Properties* tab, rename the fast access list in the **Name** field, e.g. enter 'Main'
 5. From the **Read Access Level** and **Write Access Level** drop-down list boxes, select the user levels that should have read and write access of the fast access list. Note that only users logged in with the same or a higher password level than the defined access level can view or edit this fast access list on the controller HMI and web interface.

The screenshot shows the 'Columns Configuration' tab with the following settings:

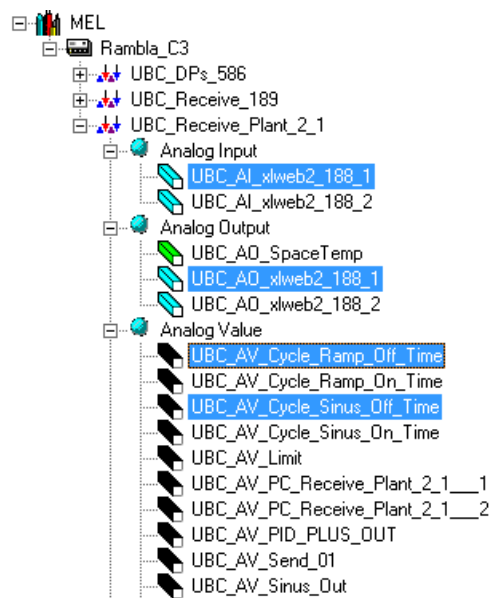
- Fast access list name:** Fast Access List
- Fast access list type:** Selected Points/Parameters (selected)
- Access rights:**
 - Read Access Level: System Admin. (128)
 - Write Access Level: System Admin. (128)

6. Define the fast access list type by doing one of the following:
 - a. select **Selected Points/Parameters** radio button (default).
This option allows watching the impact of changed parameter values on datapoints. The parameter values will be changed online.
 - b. select **Filter Template**.
This option allows quickly displaying certain datapoints of plants
7. If you have selected the fast access list type 'Selected Points/Parameters', continue with step 8. If you have selected the fast access list type 'Filter Template', continue with step 21.
8. If you have selected the fast access list type 'Selected Points/Parameters', click **Add** under **Datapoints**.

RESULT: The *Select data points* dialog box displays.



9. Expand the tree, and then select the datapoints.



10. Click OK.

RESULT: The selected datapoints are added to the **Datapoints** list. The following properties are displayed:

- plant name
- point type
- point name
- alias name (optional)

Datapoints				
	Plant Name	Point Type	Point Name	Alias name
	*	*	*	*
1	UBC_Receive_Plant_2_1	Analog Input	UBC_AI_xlweb2_188_1	
2	UBC_Receive_Plant_2_1	Analog Output	UBC_AO_xlweb2_188_1	
3	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Cycle_Ramp_Off_Time	
4	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Cycle_Sinus_Off_Time	
5	UBC_Receive_Plant_2_1	Binary Input	UBC_BI_xlweb2_188_1	
6	UBC_Receive_Plant_2_1	Binary Output	UBC_BO	
7	UBC_Receive_Plant_2_1	Binary Value	UBC_BV_Start	

11. If desired, enter alias names for the datapoints by clicking in the corresponding cell and entering the alias name. If an alias name is entered, only the alias name but not the point name will be visible on the controller HMI and web interface.

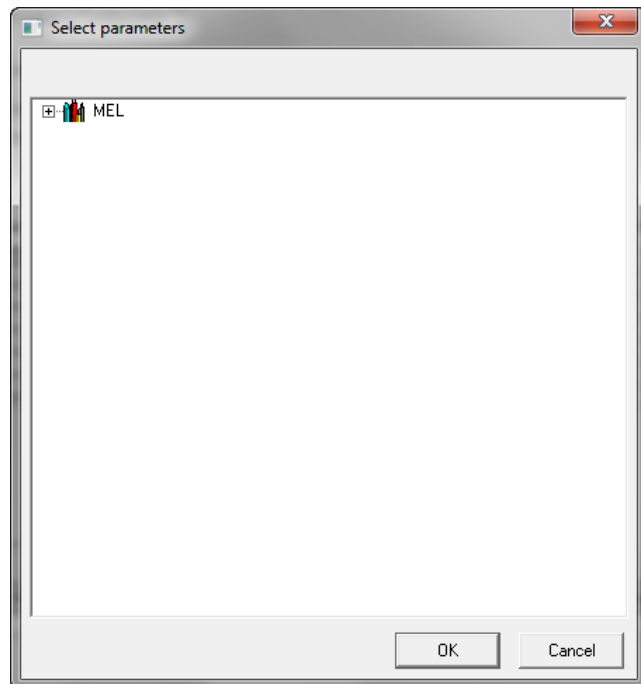
Point Name	Alias name
*	*
UBC_AI_xlweb2_188_1	Outdoor temperature Office 1-5
UBC_AO_xlweb2_188_1	
UBC_AV_Cycle_Ramp_Off_Time	
UBC_AV_Cycle_Sinus_Off_Time	
UBC_BI_xlweb2_188_1	
UBC_BO	Pump
UBC_BV_Start	

12. If desired, you can define a filter for each property (Plant Name, Point Type etc.) of the **Datapoints** list by entering a search string or by selecting criteria from a list in the first row below the column title. By default, no filter is set as indicated by an asterisk *.

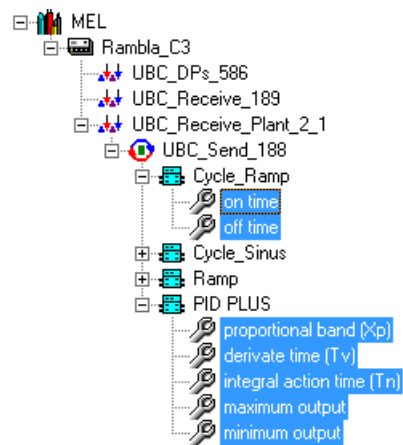
The filter is case-sensitive and wildcards (*) and jokers (?) can be used. The asterisk * can only be used at the beginning or the end of the search entry. By default, the filter shows *, displaying all items. If any text is entered without wildcards, software searches for the exact match.

13. Under **Parameters**, click **Add**.

RESULT: The *Select parameters* dialog box displays.



14. Expand the tree, and then select the parameters.



15. Click OK.

RESULT: The selected parameters are added to the Parameters list. The following properties are displayed:

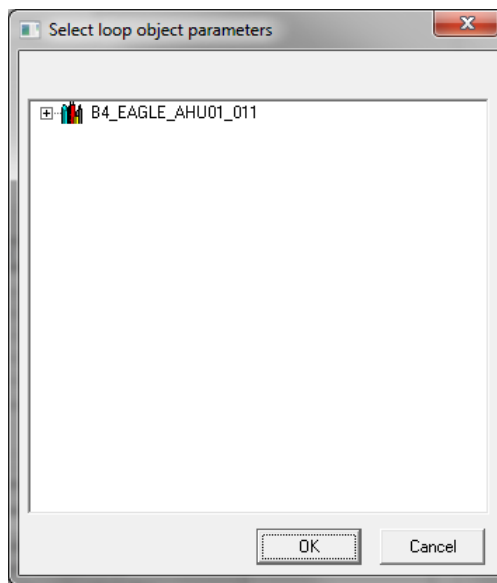
- plant name
- control loop name
- parameter name
- symbol (type)
- parameter path
- alias name (optional)

Parameters						
	Plant Name	Control Loop Name	Parameter Name	Symbol	Parameter Path	Alias name
	*	*	*	*	*	*
1	UBC_Receive_Pla	UBC_Send_188	on time	Cycle	.UBC_Send_188.Cycle_Ramp	
2	UBC_Receive_Pla	UBC_Send_188	off time	Cycle	.UBC_Send_188.Cycle_Ramp	
3	UBC_Receive_Pla	UBC_Send_188	proportional band (Xp)	PID Plus	.UBC_Send_188.PID PLUS	
4	UBC_Receive_Pla	UBC_Send_188	derivate time (Tv)	PID Plus	.UBC_Send_188.PID PLUS	
5	UBC_Receive_Pla	UBC_Send_188	integral action time (Tn)	PID Plus	.UBC_Send_188.PID PLUS	

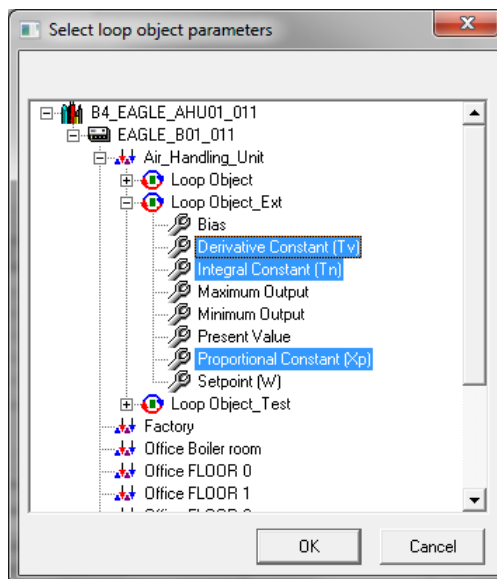
Buttons: Add, Delete

16. If desired, enter alias names for the parameters in the same way as described for the datapoints in step 11.
17. If desired, you can define a filter for each property in the same way as described for datapoints in step 12.
18. Under **Loop Object Parameters**, click **Add**.

RESULT: The *Select parameters* dialog box displays.



19. Expand the tree, and then select the parameters.



20. Click OK.

RESULT: The selected parameters are added to the Loop Object Parameters list. The following properties are displayed:

- plant name
- loop object name
- parameter name
- alias name (optional)

Loop Object Parameters				
	Plant Name	Loop Object Name	Parameter Name	Alias name
	*	*	*	*
1	Air_Handling_Unit	Loop Object_Ext	Derivative Constant (Tv)	
2	Air_Handling_Unit	Loop Object_Ext	Integral Constant (Tn)	
3	Air_Handling_Unit	Loop Object_Ext	Proportional Constant (Xp)	

21. If desired, enter alias names for the loop object parameters in the same way as described for the datapoints in step 11.
22. If desired, you can define a filter for each property in the same way as described for datapoints in step 12.
23. Continue by configuring the columns display for the web interface and controller HMI as described in step 30.
24. To save the fast access list settings, click on any spot outside the pane.
25. If you have selected the fast access list type 'Filter Template', the following pane displays.

Fast access list type: Filter Template Selected Points/Parameters

Access rights: Read Access Level: System Admin. (128) Write Access Level: System Admin. (128)

Template Configuration

Plant:

- UBC_DPs_586
- UBC_Receive_189
- UBC_Receive_Plant_2_1

Type:

- Binary Value
- Multi-State Input
- Multi-State Output
- Multi-State Value
- Pulse Converter
- Flag Point
- Reference Input
- Reference Output

Name: *

Sort Order:

First by: Ascending

Then by: <None> Ascending

Then by: <None> Ascending

Datapoints

	Plant Name	Point Type	Point Name
	*	*	*
1	UBC_DPs_586	Analog Value	UBC_AV_show_DP_001
2	UBC_DPs_586	Analog Value	UBC_AV_show_DP_002
3	UBC_DPs_586	Analog Value	UBC_AV_show_DP_003
4	UBC_DPs_586	Analog Value	UBC_AV_show_DP_004
5	UBC_DPs_586	Analog Value	UBC_AV_show_DP_005
6	UBC_DPs_586	Analog Value	UBC_AV_show_DP_006
7	UBC_DPs_586	Analog Value	UBC_AV_show_DP_007
8	UBC_DPs_586	Analog Value	UBC_AV_show_DP_008
9	UBC_DPs_586	Analog Value	UBC_AV_show_DP_009
10	UBC_DPs_586	Analog Value	UBC_AV_show_DP_010
11	UBC_DPs_586	Analog Value	UBC_AV_show_DP_011
12	UBC_DPs_586	Analog Value	UBC_AV_show_DP_012
13	UBC_DPs_586	Analog Value	UBC_AV_show_DP_013

Under **Template Configuration**, you can filter for datapoints of particular plants to be used in the fast access list. By default, all plants and all datapoint types are shown and pre-selected in **Plant** and **Type**. In **Name**, the asterisk* indicates that no datapoints with a particular name are already filtered for display. Under

Datapoints, the datapoints of the controller are displayed according to the filter settings. All datapoints displayed will be part of the template (fast access list). In **Sort Order**, you can sort the list of datapoints.

26. To configure the template by defining a filter, do any of the following:
 - a. Under **Plant**, select plant(s) of which datapoints you want to be displayed.
 - b. Under **Type**, select specific datapoint types to be included/excluded from the filter.

Multi-selection by using the CTRL or the SHIFT key while selecting with the mouse is possible.

- c. Under **Name**, specific datapoint names can be filtered by entering a search text. By default, all datapoints will be displayed as indicated by an asterisk *. To display specific datapoint (names), enter the appropriate search text.

27. Click **Apply**.

RESULT: In **Datapoints**, all datapoints matching the filter criteria will be displayed.

	Plant Name	Point Type	Point Name
*	*	*	*
1	UBC_Receive_Plant_2_1	Analog Output	UBC_AO_xlweb2_188_1
2	UBC_Receive_Plant_2_1	Analog Output	UBC_AO_xlweb2_188_2
3	UBC_Receive_Plant_2_1	Analog Output	UBC_AO_SpaceTemp
4	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Limit
5	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Send_01
6	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Sinus_Out
7	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Sinus_receive_Xlweb2_18
8	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Cycle_Sinus_Off_Time
9	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Cycle_Sinus_On_Time
10	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Cycle_Ramp_On_Time
11	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Cycle_Ramp_Off_Time
12	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_PID_PLUS_OUT
13	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_PC_Receive_Plant_2_1_

28. Under **Sort Order**, define the sort order for the datapoint list on the controller HMI and the web interface. You can define the sort order for three columns (First by, Then by, Then by). For each column, you can apply ascending or descending sorting mode. Even if under **Datapoints**, the three columns 'Plant Name', 'Point Type' and 'Point Name' are permanent, you can sort for any column provided on the *Columns Configuration* tab, but not displayed as columns under **Datapoints**. For example, you can sort for event state, status flags etc. (see Columns Configuration tab description, step 21).

Sort Order:

First by:

Then by:

Then by:

- <None >
- Point Name
- Point Type
- Description
- Unit
- Point Name**
- Event State
- Status Flag "In Alarm"
- Status Flag "Fault"
- Status Flag "Overridden"
- Status Flag "Out Of Service"

Name:

Sort Order:

First by:

Then by:

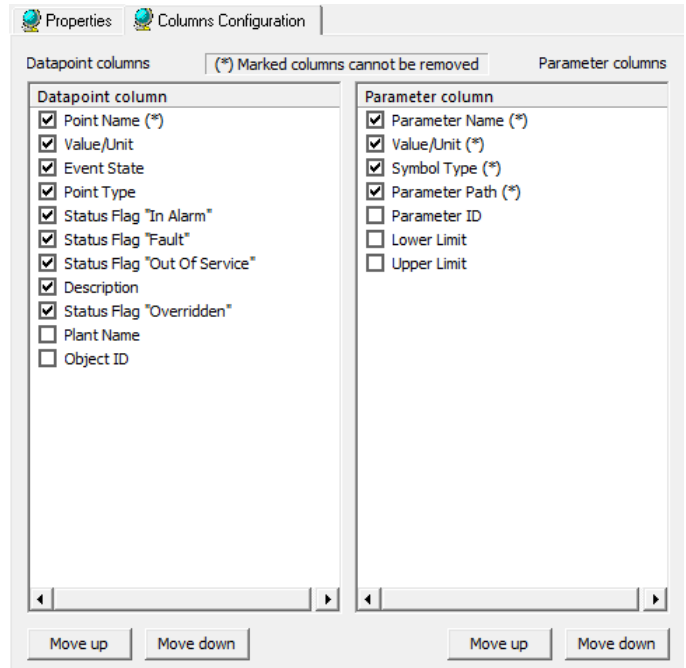
Then by:

29. After setting the sort order options, click **Apply**.

RESULT: In **Datapoints**, the datapoints are sorted according to the defined sort order. Note that only sort order definitions of plant name, point type and point name will be updated in the **Datapoints** list immediately. All other selections will be valid later on the controller HMI and the web interface.

Datapoints			
	Plant Name	Point Type	Point Name
	*	*	*
1	UBC_Receive_Plant_2_1	Analog Output	UBC_AO_xlweb2_188_2
2	UBC_Receive_Plant_2_1	Analog Output	UBC_AO_xlweb2_188_1
3	UBC_Receive_Plant_2_1	Analog Output	UBC_AO_SpaceTemp
4	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Sinus_receive_Xlweb2_18
5	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Sinus_Out
6	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Send_01
7	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_PID_PLUS_OUT
8	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_PC_Receive_Plant_2_1__
9	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_PC_Receive_Plant_2_1__
10	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Limit
11	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Cycle_Sinus_On_Time
12	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Cycle_Sinus_Off_Time
13	UBC_Receive_Plant_2_1	Analog Value	UBC_AV_Cycle_Ramp_On_Time

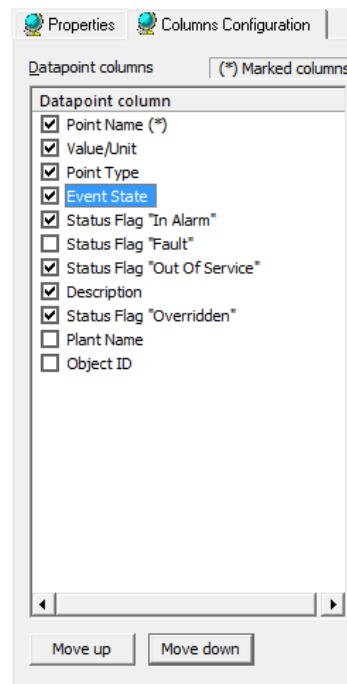
30. To configure the columns display for datapoints and parameters of the fast access list in the controller HMI and web interface, click *Columns Configuration* tab.



By default, particular columns are checked for display in the controller HMI or web interface. Unchecked columns will be removed (hidden) and not displayed. Columns marked with a (*) cannot be unchecked for removal.

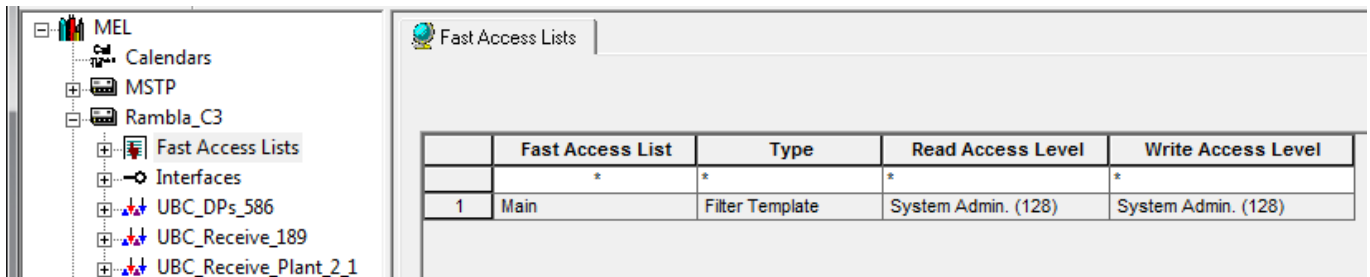
For the datapoints and parameter columns, check the columns you want to be displayed and uncheck the columns you do not want to be displayed.

31. To change the order of the columns, move column(s) within the list by selecting column in the list and clicking **Move up** button once, to move it one step upward, or by clicking **Move down** button once to move it one step downward doing. Multi-selection by using the CTRL or the SHIFT key while selecting with the mouse is possible. Multiple clicking the buttons moves the column multiple steps upwards or downwards.



- Datapoint column
- Point Name (*)
 - Value/Unit
 - Point Type
 - Status Flag "In Alarm"
 - Event State
 - Status Flag "Fault"
 - Status Flag "Out Of Service"
 - Description
 - Status Flag "Overridden"
 - Plant Name
 - Object ID

32. To save the fast access list and show the fast access list overview, click on the **Fast Access Lists** folder in the tree. On the *Fast Access Lists* tab the newly created fast access list is displayed. If desired, you can define a filter for each property (Fast Access List, Type, etc.) by entering a search string or by selecting criteria from a list in the first row below the column title. By default, no filter is set as indicated by an asterisk *.



The filter is case-sensitive and wildcards (*) and jokers (?) can be used. The asterisk * can only be used at the beginning or the end of the search entry. By default, the filter shows *, displaying all items. If any text is entered without wildcards, software searches for the exact match.

Terminal Assignment

Terminal assignment for the FALCON and EAGLE controllers follows the same basic rules as for any other devices in CARE. For detailed information please refer to the TERMINAL ASSIGNMENT section.

Show Datapoints in Grid

Datapoints can be displayed in a grid on the Grid tab for overviewing and editing their properties. This can be done on project, plant, controller and datapoint type level.

Example: Datapoints in Grid on Controller Level

BACnet Object Type	Datapoint Name	Eng. Unit/State	Descriptor	Alarm Test	With Switches	Retain/Inch Default	3 Position	COV Increment	High Limit Reporting	High Limit	Low Limit Reporting	Low Limit	Deadband	Polarity	Alarm Value	Alarm Delay	Notification Class	Off Normal Event Enable		
AI	AHU01 OA Temp	°C	AHU01 Out					0.50	✓	38.00	✓	-25.00	0.00				0	LOW	✓	
AI	AHU01 Sa Temp_Hhg	°C	AHU01 Sup					0.50	✓	50.00	✓	10.00	0.00				0	LOW	✓	
AI	AHU01 Sa Hum	rel H	AHU01 Sup					1.00	✓	70.00	✓	20.00	0.00				0	LOW	✓	
AI	AHU01 Fla Temp	°C	AHU01 Ret					0.50	✓	26.00	✓	14.00	0.00				10	HIGH	✓	
AI	AHU01 Sa Temp_Hum	°C	AHU01 Sup					0.50	✓	30.00	✓	15.00	0.00				15	URGENT	✓	
AI	AHU01 Fla Hum	rel H	AHU01 Ret	Inform Main				1.00	✓	70.00	✓	20.00	0.00				0	LOW	✓	
BO	AHU01 Sa Fan	OFF_ON	AHU01 Sup		✓	OFF								Normal			100000	JOURNAL	✓	
BO	AHU01 Fla Fan	OFF_ON	AHU01 Ret		✓	OFF								Normal			100000	JOURNAL	✓	
BO	AHU01 Hhg Pump	OFF_ON	AHU01 Hese		✓	ON								Normal			100000	JOURNAL	✓	
AO	AHU01 Hhg Vlv	%	AHU01 Hese					1.00	✓	110.00	✓	-15.00	0.00				100000	JOURNAL	✓	
AO	AHU01 Cjg Vlv	%	AHU01 Cooe					1.00	✓	80.00	✓	-15.00	0.00				100000	LOW	✓	
AO	AHU01 Hum Vlv	%	AHU01 Hsi					1.00	✓	99.00	✓	-15.00	4.00				3600	URGENT	✓	
AV	AHU01 SP_Ra Temp	°C	AHU01 Set					21.00	✓	0.50	✓	28.00	0.00				0	LOW	✓	
AV	AHU01 SP_Sa Temp	°C	AHU01 Set					18.00	✓	0.50	✓	40.00	10.00				0	LOW	✓	
BI	AHU01 Alarm_RaFan	NORMAL	AHU01 Alar											Normal	ALARM		0	URGENT	✓	
BI	AHU01 Alarm_Rep_RaFan	NORMAL	AHU01 Ret											Normal	REPAIR		0	URGENT	✓	
BI	AHU01 Alarm_Cond_Hum	NORMAL	AHU01 Con											Reverse	ALARM		0	URGENT	✓	
BI	AHU01 Warm_FaOutAir	NORMAL	AHU01 War											Normal	MAINTENA	60	HIGH	✓		
BI	AHU01 Alarm_HighPr	NORMAL	AHU01 Alar											Normal	ALARM	0	URGENT_ack	✓		
BI	AHU01 Alarm_Frost	NORMAL	AHU01 Alar											Reverse	FROST	0	URGENT_ack	✓		
BI	AHU01 Alarm_SaFan	NORMAL	AHU01 Alar											Normal	ALARM	0	URGENT_ack	✓		
BI	AHU01 Alarm_Rep_SaFan	NORMAL	AHU01 Sup											Normal	REPAIR	0	URGENT_ack	✓		
BI	AHU01 AlarmFD_SaFan	NORMAL	AHU01 Sup											Normal	ALARM	0	URGENT_ack	✓		
BO	AHU01 ExAirDmper	CLOSE_OP	AHU01 Esh		✓	CLOSE								Normal			100000	JOURNAL	✓	
BO	AHU01 OutAirDmper	CLOSE_OP	AHU01 Out		✓	CLOSE								Normal			100000	LOW	✓	
MV (3 States)	AHU01 Plant_Mode	ON_OFF_ALARM	AHU01 Pla														100000	HIGH	✓	
BV	AHU01 Plant_enable	DISABLED	AHU01 Pla														DISABLED	100000	JOURNAL	✓
BV	AHU01 Disable_Alarm	DISABLED	AHU01 Dis														ENABLED	100000	LOW	✓
AV	AHU01 Hhg Pump_runtime_year	sec	AHU01 Hese					0.50	✓	99999.0	✓	99999.0	1.00				100000	LOW	✓	
BV	AHU01 Sum_Win	SUMMER	AHU01 Sum														WINTER	100000	LOW	✓
AI	AHU01 Voltis	rel H						0.50	✓	150.00	✓	-50.00	1.00				100000	LOW	✓	
BI	AHU01 Freeze_SaFan	OFF_ON	AHU01 Free											Normal	ON		100000	LOW	✓	
PC	AHU01 Control_Hhg	no_S	AHU01 Enre					0.50	✓	99999.0	✓	0.00	1.00				100000	LOW	✓	
AI	AHU01 LOH_status	No Error_S		Normal	Err	No Error											10	HIGH	✓	
AV	AHU01 PID_Supd_Air_XP	%	AHU01 Con					0.50	✓	99999.0	✓	99999.0	1.00				100000	LOW	✓	
AV	AHU01 PID_Retr_Air_XP	%	AHU01 Con					20.00	✓	0.50	✓	99999.0	1.00				100000	LOW	✓	
AO	AHU01 Econoverd	%	AHU01 Con					0.50	✓	150.00	✓	-50.00	1.00				100000	LOW	✓	
BV	AHU01 Econoverd_Enable	OFF_ON	AHU01 Enre		✓	OFF											ON	100000	LOW	✓
BV	AHU01 Econoverd_Disable	OFF_ON	AHU01 Enre		✓	ON											OFF	100000	LOW	✓

For detailed information on how to edit datapoint properties in Grid view, please refer to Edit Points in Grid Display in the "Datapoint Editor section"

BACnet Network Engineering

BACnet Topologies

CARE supports 2 BACnet topologies based on the 2 major BACnet communication protocols, BACnet IP and BACnet MS / TP.

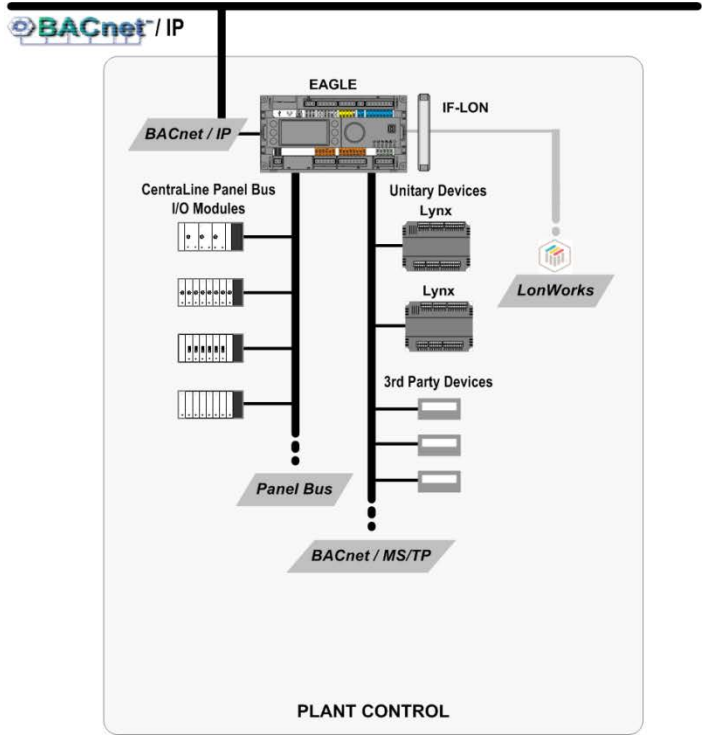
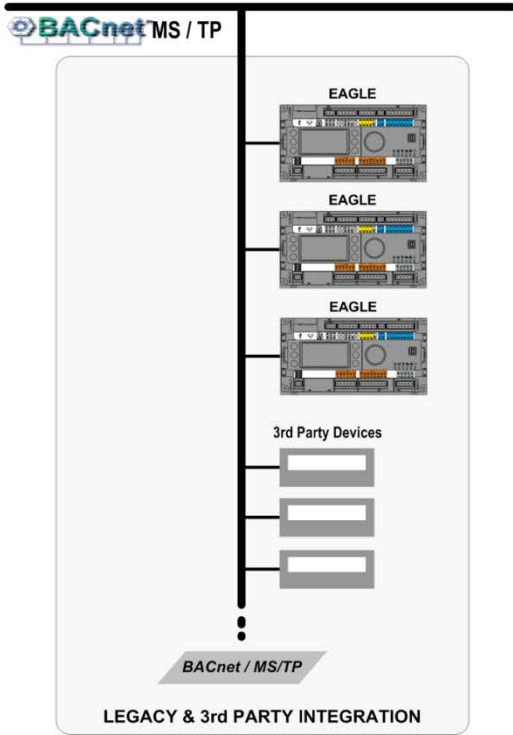
NOTE: The BACnet MS/TP protocol is only supported by the EAGLE controller.

Legacy and 3rd Party Integration

For integrating EAGLE controllers and BACnet 3rd party devices based on an already existing wired building channel, a pure BACnet MS / TP bus topology will be applied.

Plant Control

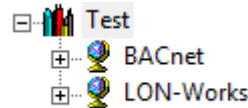
To control plants by taking advantage from the complete EAGLE controller functionality (Panel Bus, MS / TP bus), you apply the basic BACnet / IP bus topology. If an EAGLE controller running on the BACnet IP bus uses also the BACnet MS /TP channel via RS485 interface, it works as a router routing packets to the BACnet devices connected to the subordinate channel.



For detailed information on how to work with the BACnet bus topologies in CARE, please refer to the subsequent sections.

BACnet Network Structure

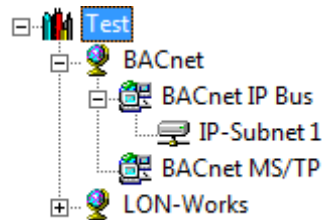
By default, a BACnet project shows the BACnet bus and the LON-Works bus in the network tree.



LonWorks For detailed information on basics of the LonWorks network structure and LonWorks Engineering, please refer to the LonWorks Network Engineering chapter

BACnet-Bus The BACnet network as part of a project is divided in two major bus types:

- BACnet IP and
- BACnet MS/TP



BACnet IP is used for controllers with the main interface on the Ethernet. If they have connected BACnet MS/TP channels, those are located directly under the controller itself.

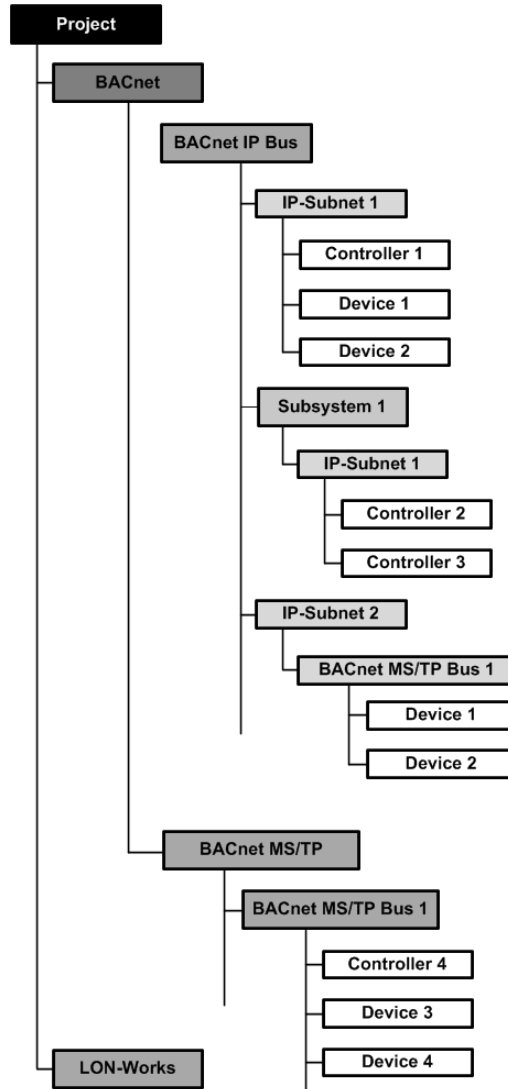
BACnet MS/TP is used for controllers with the main interface on BACnet MS/TP.

The BACnet IP Bus can be further arranged by adding any of the following components:

- Subsystems
- Subnets

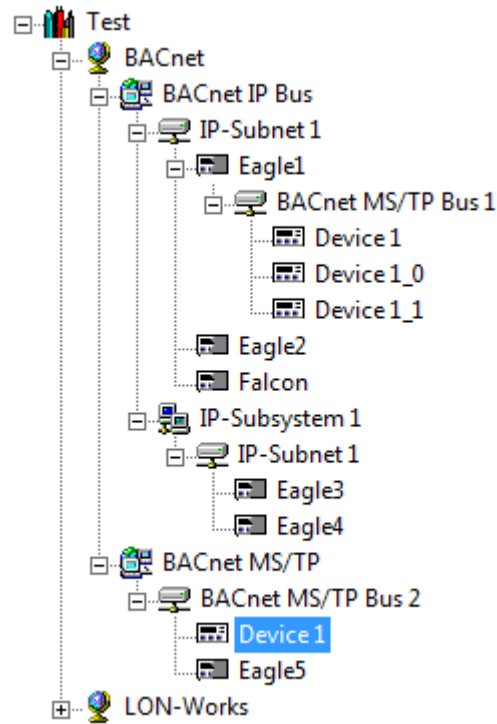
By default, the BACnet IP Bus contains the Subnet 1.

The BACnet MS/TP bus can be further arranged by adding channels. By default the BACnet MS/TP bus is empty. A channel must be added manually. The first added channel is named 'BACnet MS/TP' bus by default.



Subnets represent the BACnet infrastructure of the building and contain the BACnet controllers/devices which control that segment of the building. Subsystems are a logical hierarchical level for grouping multiple subnets to a system requiring communication between the different subnets.

Subnets can be created below subsystems or directly on the BACnet IP-Bus level. Channels can be created on BACnet MS/TP level only. BACnet controllers and devices can be placed in IP subnets and MS/TP channels only.



By default, the BACnet IP Bus folder contains the 'IP Subnet 1' folder and no Subsystem folder. Further created folders will be numbered continuously, for example 'Subnet 2', 'Subnet 3', 'Subsystem 1', etc. The same applies to the BACnet MS/TP channels.

NOTE: The default subsystems, subnets, channels and device names are freely editable.

Design and Configure BACnet Network

Purpose To structure the BACnet network according to conditions in the building.

This includes:

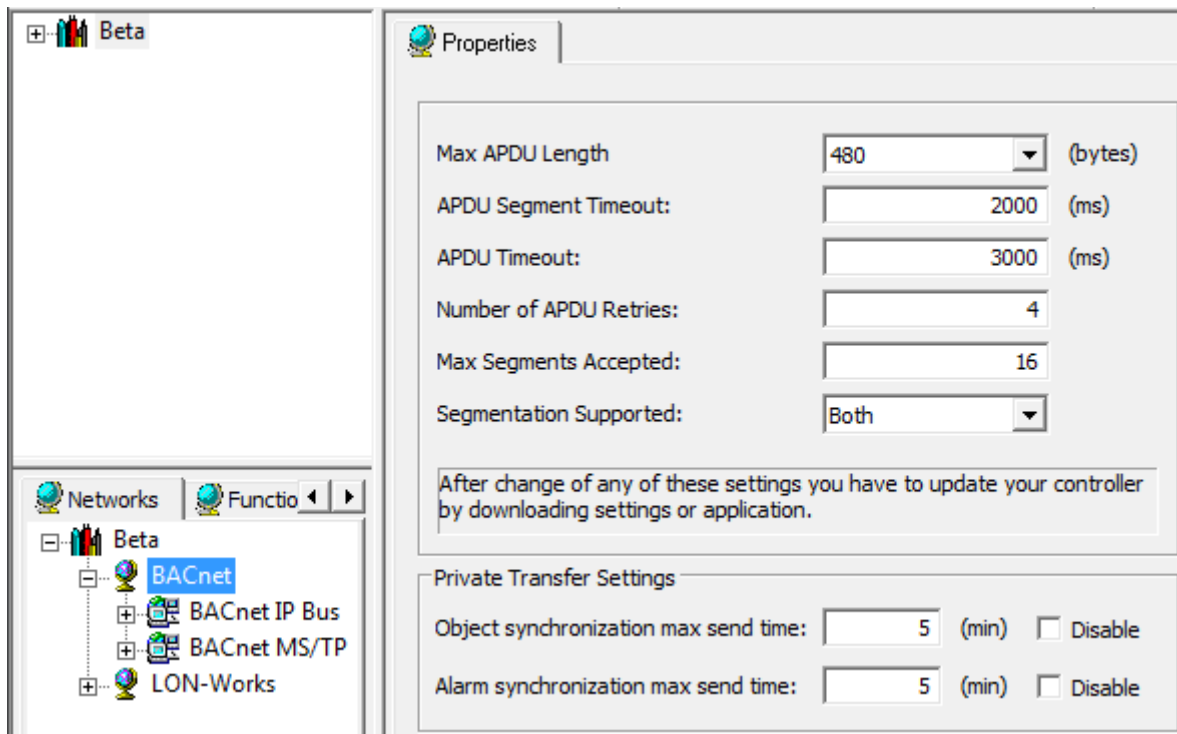
- Definition of general BACnet-bus properties
- Definition of BACnet IP bus properties
- Definition of BACnet MS/TP bus properties
- Creation of subsystems (optional)
- Creation of subnets and definition of IP address ranges for controllers
- Creation of controllers
- Creation of BACnet 3rd party devices
- Arrangement of controllers and BACnet 3rd party devices in this structure

Define General BACnet Bus Properties

Purpose To define the BACnet-Bus settings (e.g., APDU length, APDU time out, etc.) for the BACnet controller(s) and 3rd party BACnet devices.

Procedure 1. With left mouse button, select the BACnet icon in the network tree.

RESULT: The general BACnet-bus properties are displayed on the right Properties pane.



2. Enter/change values and select options for the following general BACnet bus properties:

NOTE: When changing any of the following properties, you must update the controller by downloading the settings and/or application.

MaxAPDU Length

The max. size of data in one packet. For BACnet/IP, the maximum is 1476, for BACnet MS/TP, the maximum is 480. It may be necessary to reduce the size if packets are transmitted over routers or tunnelling to MS/TP devices.

APDU Segment Timeout

The timeout in msec for one single packet (of a segmented) message.

APDU Timeout

The timeout in msec for the whole message (all packets). For proper communication with EBI, the value must be set to 5800 msec.

Number of APDU Retries

Number of retries sent by the BACnet controller to another device if this device does not answer. Too many retries will slow down communication.

Max. Segments Accepted

The maximum number of packets for a segmented message. The product of Max Segments Accepted * Max APDU Length shall not exceed a limit of 16000 bytes.

Segmentation Supported

Specifies if the BACnet controller supports messages with more than one packet:

- Both = segmentation in both directions
- Transmit = BACnet controller cannot receive segmented messages
- Receive = BACnet controller can receive but not send segmented messages
- None = BACnet controller can neither receive nor send segmented messages

Object synchronization max. send time

The Object synchronization max. send time indicates the maximum period of time that expires before a sync message is sent. The max. period of time before a synchronization is repeated, is

object synchronization max. send time * (number of calendars + number of users + 2)

The calendar and user objects will be automatically synchronized by the controllers. Checking 'Disable' disables the synchronization.

In CARE projects with multiple BACnet controllers, each controller instantly sends a private transfer broadcast message if calendar or user data are created, changed or deleted. In addition, synchronization messages are sent cyclically with the max. send time. This keeps all other controllers up-to-date but may cause high bus load in huge plants with multiple controllers. If the CARE project contains only one controller is recommended to disable the synchronization for objects.

Alarm synchronization max. send time

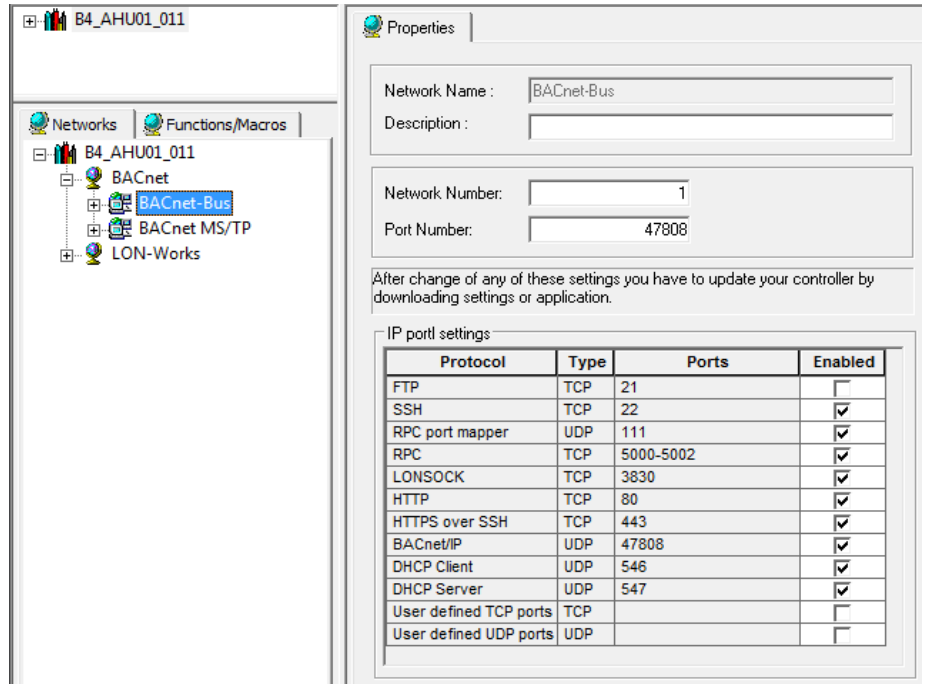
The Alarm synchronization max. send time indicates the maximum period of time that expires before the alarms will be automatically synchronized by the controllers. Checking 'Disable' disables the synchronization.

In plants with multiple BACnet controllers, each controller instantly sends a private transfer broadcast message if the number of point in alarms changes from 0 to >0 or >0 to 0. In addition, the number of points in alarm in a controller is broadcasted cyclically with the max send time. This keeps all other controllers up-to-date (synchronization) but may cause high bus load in huge plants with multiple controllers. If the CARE project contains only one controller is recommended to disable the synchronization.

With these functions you can control the bus load in order to avoid a high bus load which often results in limited performance. If negative effects are noticed on the bus, the value(s) should be increased.

Define BACnet IP Bus Properties

Purpose	To define the settings for the BACnet IP network (e.g. network number, ports, etc.).
Procedure	<ol style="list-style-type: none"> 1. With left mouse button, select the BACnet IP Bus icon in the network tree. <p>RESULT: The BACnet IP network properties are displayed on the right Properties pane.</p>



2. Enter/change text or values and select options for the following BACnet IP Bus properties:

NOTE: When changing any of the following properties, you must update the controller by downloading the settings and/or application.

Description

Additional descriptive text for the BACnet-Bus

Network Number

The number of the network. Network numbers must be unique in a BACnet system.

Port Number

The number of the UDP port for BACnet IP communication

IP Port Settings

Enables or disables the ports for incoming traffic of various IP protocols.

FTP (File Transfer Protocol)

is a standard network protocol used to transfer computer files from one host to another host over a TCP-based network, such as the Internet.

SSH (Secure Shell)

is a cryptographic network protocol for secure data communication, remote command-line login, remote command execution, and other secure network services between two networked computers.

RPC Portmapper, RPC (Remote Procedure Call)

A very general mechanism for client-server applications is provided by RPC package including a collection of tools and library functions.

LONSOCK

CARE supports LON IP Interfaces for the use of IP852 and LonSock Remote Server. Both IP852 and LonSock Remote Server are based on LonSock2 which is the basis for CARE software. IP852 allows the direct and remote diagnostic of networks based on IP852 standard. LonSock Remote Server allows remote access to PCs and Excel Web controllers with a shared network interface on which the RNI server is running

HTTP (Hypertext Transfer Protocol)

HTTP is an application protocol for distributed, collaborative, hypermedia information systems and is the foundation of data communication for the World Wide Web. Hypertext is structured text that uses logical links (hyperlinks) between nodes containing text. HTTP is the protocol to exchange or transfer hypertext.

HTTPS (Hypertext Transfer Protocol Secure)

HTTPS is a communications protocol for secure communication over a computer network, with especially wide deployment on the Internet. Technically, it is not a protocol in and of itself; rather, it is the result of simply layering the Hypertext Transfer Protocol (HTTP) on top of the SSL/TLS protocol, thus adding the security capabilities of SSL/TLS to standard HTTP communications.

BACnet/IP

The BACnet protocol provides mechanisms by which computerized equipment of arbitrary function may exchange information, regardless of the particular building service it performs. As a result, the BACnet protocol may be used by head-end computers, general-purpose direct digital controllers, and application specific or unitary controllers with equal effect.

The BACnet protocol specifies transport over a number of datalink layers including ARCNET, MS/TP (RS-485), PTP (RS-232), LonTalk, and Ethernet. BACnet also specifies communication over UDP/IP which is known as BACnet/IP.

BACnet/IP uses UDP as its transport protocol. The default UDP port for BACnet traffic is 47808, but depending on the project specification other ports are also possible.

DHCP Client / DHCP Server (Dynamic Host Configuration Protocol)

DHCP is a standardized networking protocol used on Internet Protocol (IP) networks for dynamically distributing network configuration parameters, such as IP addresses for interfaces and services. With DHCP, computers request IP addresses and networking parameters automatically from a DHCP server, reducing the need for a network administrator or a user to configure these settings manually.

User-Defined TCP Ports

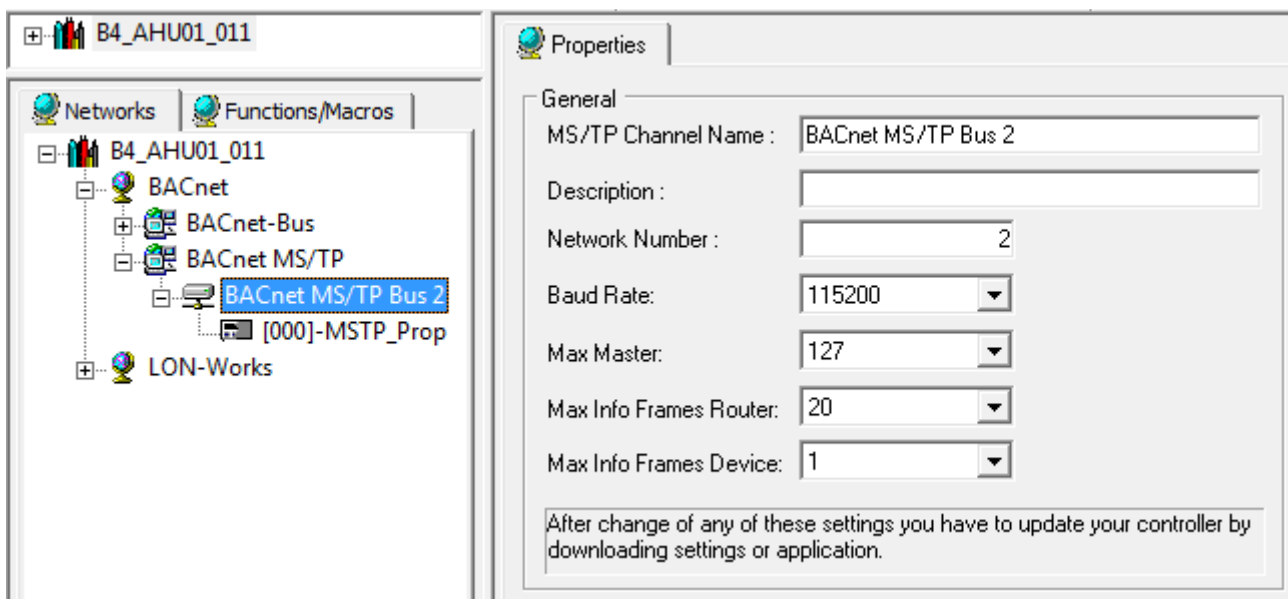
After enabling this option, you can enter any port numbers, e.g. 602, 710-720

User-Defined UDP Ports

After enabling this option, you can enter any port numbers, e.g. 800, 901-909

Define BACnet MS/TP Bus Properties

Purpose	To define the settings for the BACnet MS/TP network (e.g. network number, baudrate, etc.).
Procedure	<ol style="list-style-type: none"> 1. With left mouse button, select the BACnet MS/TP Bus icon in the network tree. <p>RESULT: The BACnet MS/TP bus properties are displayed on the right Properties pane.</p>



2. Enter/change text or values and select options for the following BACnet IP Bus properties:

NOTE: When changing any of the following properties, you must update the controller by downloading the settings and/or application.

MS/TP Channel Name

The name of the MS/TP network

Description

Additional descriptive text for the BACnet-Bus

Baud Rate

Baud rate for data transmission

Max Master

Defines the highest MS/TP master address that can participate in the token-passing.

Max Info Frames Router

Indicates the largest number of frames that will be sent by the router before it releases the token.

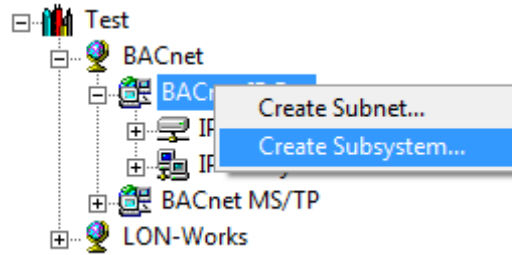
Max Info Frames Device

Indicates the largest number of frames that will be sent by the device before it releases the token.

Create BACnet Subsystem

Purpose To create subsystems for structuring the network logically, e.g. to provide a hierarchy level for the integration of multiple subnets that communicate among themselves.

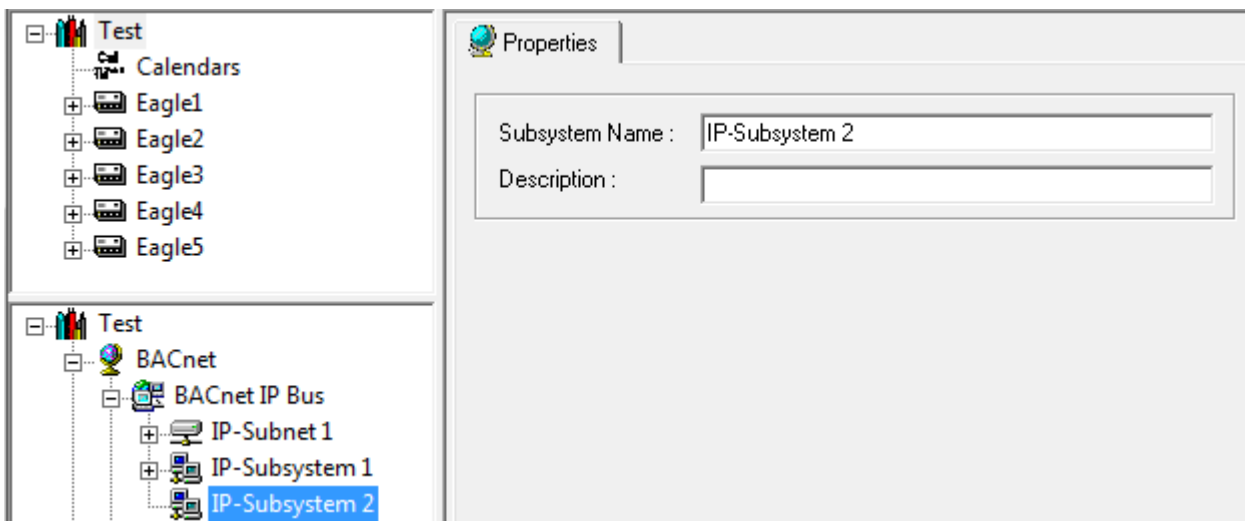
- Procedure**
1. With left mouse button, select the physical BACnet-Bus folder in the network tree.
 2. Click right mouse button and with left mouse button, click Create Subsystem in the context menu.



RESULT: The new subsystem folder will be inserted into the tree.

3. On the Properties tab on the right pane, edit the name in the Subsystem Name field, if desired.
4. If desired, enter an additional description in the Description field. and click on the created subsystem folder in the tree.
5. Click on the created subsystem folder in the tree.

RESULT: The newly named subsystem folder displays.



6. To create subnets for the BACnet-bus, please refer to the Create BACnet-Bus Subnet section.

Create BACnet Subnet / Allocate IP Addresses to Controllers

Purpose To create subnets for representing the physical network of the building and to allocate IP addresses to the controllers located in the subnet.

IMPORTANT:

Contact the network administrator to get the network address(es), the subnet mask(s) and the gateway address(es) for the subnet(s).

You can either define IP address ranges and CARE automatically allocates IP addresses to the controllers while the controllers will be created, or you manually allocate particular IP addresses to controllers. A combination of these two ways is possible.

NOTE: At that time, an IP address has not yet been allocated to the physical controller. The physical controller does not get the IP address until the controller has been setup.

The IP addresses must match the real IP addresses, which you have obtained from the network administrator.

Procedure

1. Depending on where you want to place the subnet, below the BACnet-IP Bus folder or below a subsystem, select the BACnet-IP Bus folder respectively the corresponding subsystem folder with the left mouse button.
2. Click right mouse button and with left mouse button, click Create Subnet in the context menu.

RESULT: The new subnet folder will be inserted into the tree and on the right pane, the Properties tab shows the properties to be defined.

3. Define the properties for the subnet as follows:

4. Under General, edit subnet name and enter an additional description if desired.
5. Under Ethernet, you will ensure the proper allocation of IP addresses to the controllers. While creating a controller, CARE automatically allocates an IP address to each controller that is located in the subnet. The IP addresses will be consecutively issued according to the defined ranges.

Example:

By default CARE defines the network address to "192.168.1.0 / 24" and the gateway address to "192.168.1.1". Under IP Address Ranges, the first range is inserted accordingly. The range can be further divided into sub ranges.

Properties

General

Subnet Name : IP-Subnet 1

Subnet Number : 0

Description :

Ethernet

Network : 192 . 168 . 1 . 0 / 24

Subnet Mask : 255 . 255 . 255 . 0

Gateway Address : 192 . 168 . 1 . 1

DNS Server 1: 0 . 0 . 0 . 0

DNS Server 2: 0 . 0 . 0 . 0

IP Address Ranges :

	First Address	Last Address
Range 1	192.168.1.1	192.168.1.254
Range 2		
Range 3		
Range 4		
Range 5		
Range 6		
Range 7		
Range 8		
Range 9		
Range 10		

One Range In the default example, the network ID "192.168.1.0 / 24" defines the following IP address range and subnet mask:

IP address range (Range 1):
 192.168.1.001 (First Address) to 192.168.001.254 (Last Address)
 There are 254 IP addresses. The IP addresses will be consecutively issued when creating the controllers as follows:

192.168.1.001
 192.168.1.002
 192.168.1.003
 etc.

A particular IP address of a controller can be changed as long as it is within the IP address range.

Subnet mask:
 255.255.255.0.
 The number 24 corresponds to a 3-byte subnet ID, and a one-byte host ID. This is the widely-used subnet mask of class-C networks, which the Eagle Controller typically uses. A class-C network allows up to 254 BACnet devices per system.

Sub ranges If you want to factor out particular ranges, you can divide range 1 into sub ranges. For example (see screenshot):

Properties

General

Subnet Name : IP-Subnet 1

Subnet Number : 0

Description :

Ethernet

Network : 192 . 168 . 1 . 0 / 24

Subnet Mask : 255 . 255 . 255 . 0

Gateway Address : 192 . 168 . 1 . 1

DNS Server 1: 0 . 0 . 0 . 0

DNS Server 2: 0 . 0 . 0 . 0

IP Address Ranges :

	First Address	Last Address
Range 1	192.168.1.1	192.168.1.040
Range 2	192.168.1.81	192.168.1.120
Range 3	192.168.1.160	192.168.1.254
Range 4		
Range 5		
Range 6		
Range 7		
Range 8		
Range 9		
Range 10		

In the above example, IP addresses, which are within the IP address ranges, will be consecutively issued beyond all ranges when creating the controllers:

192.168.1.001
 ...
 192.168.1.040

 192.168.1.081
 ...
 192.168.1.120

 192.168.1.161
 ...
 192.168.1.240

The following IP addresses cannot be assigned to controllers:

192.168.001.**041** to 192.168.001.**080**
 192.168.001.**121** to 192.168.001.**159**

NOTE To divide a range into sub ranges, the complete range (automatically defined by the network ID) must become part of the sub ranges and hence it must be edited first in the Range 1 line.

- Under Ethernet, you can also enter the IP addresses for DNS (Domain Name System) servers if the Eagle should support Email alarming. DNS server IP addresses must be entered here if you have selected the SMTP Server option

and have entered the SMTP server name under Server Settings on the Email Alarming tab.

Enter at least the IP address for DNS Server1. It is recommended to enter an additional IP address for DNS server2 as fallback position if DNS server1 is not in operation.

7. To continue with setting up a controller, please refer to the Setup Eagle Controller section.

Create BACnet MS/TP Bus

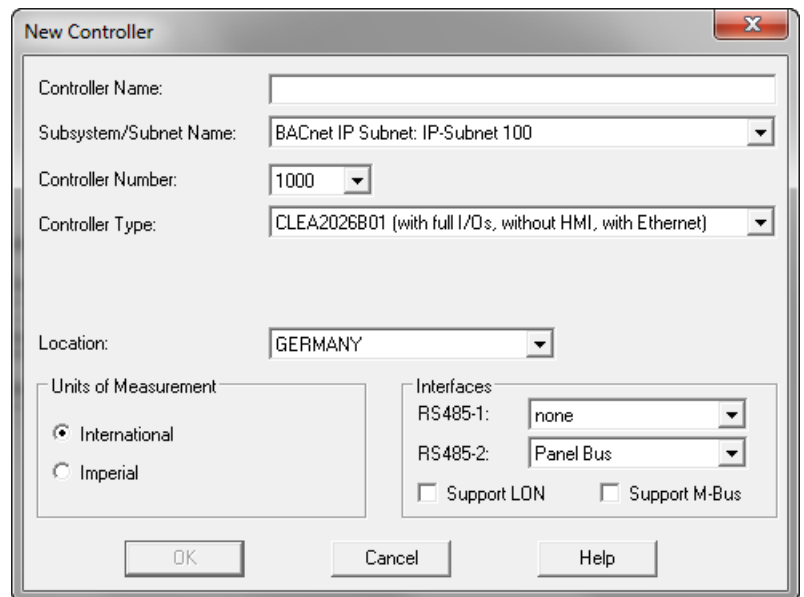
The MS/TP bus can have a pure BACnet MS/TP topology for integrating EAGLE controllers and BACnet 3rd party devices, or it can be part of a BACnet IP network including panel bus and MS/TP bus (mixed BACnet IP / BACnet MS/TP topology).

The BACnet controller allocation in the BACnet network structure is based on procedures to be performed in the following CARE environment:

- New Controller dialog
- BACnet network tree
- Controller Properties tab

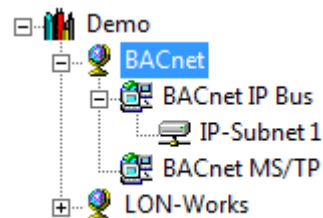
New Controller dialog

When creating a BACnet controller (see "Create BACnet Controller" section), the allocation of the controller in the BACnet network can be pre-defined according to the desired topology. The definition will be done by selecting the **subsystem/subnet** and the **RS485 interface** settings in the *New Controller* dialog.

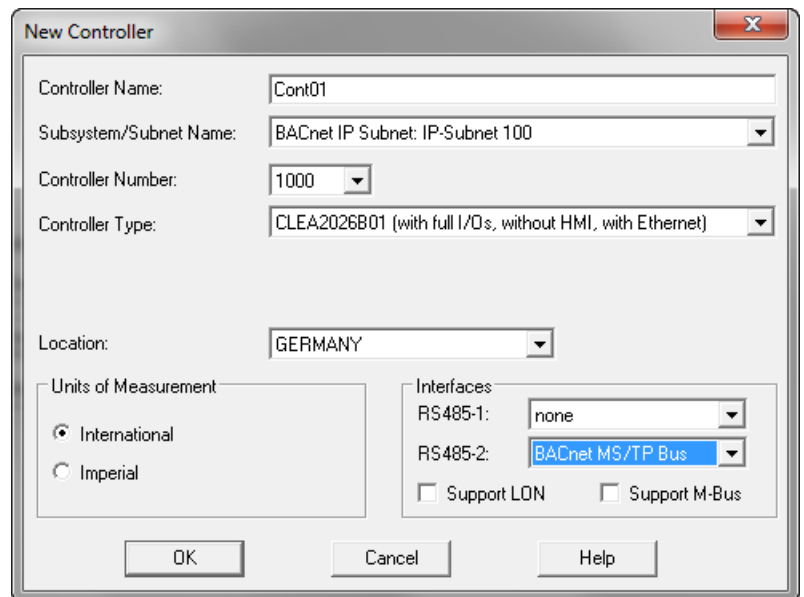


BACnet network tree

In a blank BACnet project, the initial status of the network configuration is as follows:

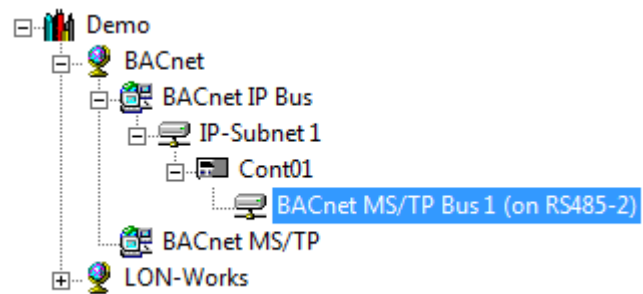


The BACnet network is divided in the BACnet IP Bus with a default IP-Subnet1 and the BACnet MS/TP bus. Both busses are empty.

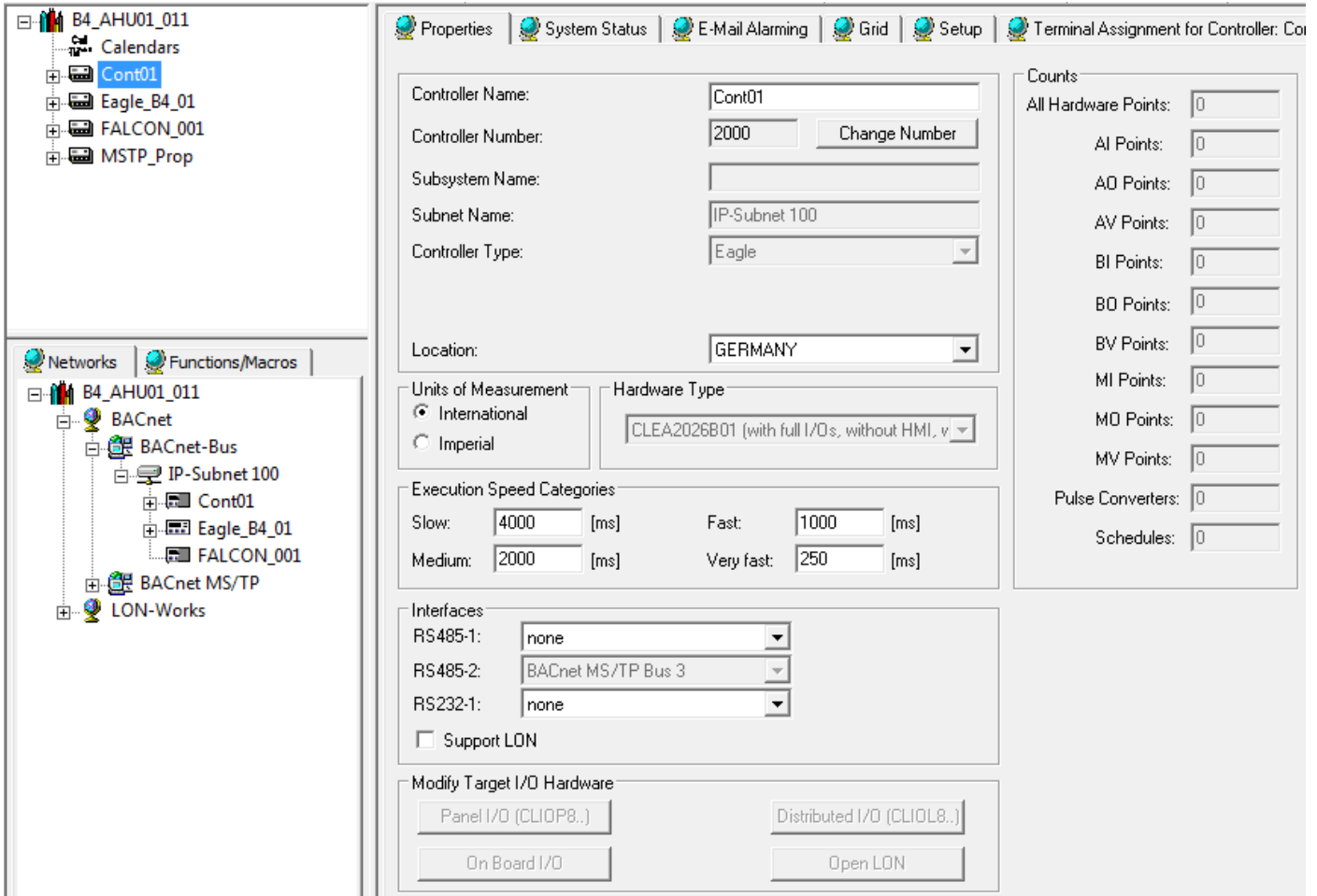


The result of the pre-definition in the New Controller dialog can be changed afterwards in the network tree by

- adding and deleting additional subsystems, subnets, MSTP busses and devices
- by moving controllers and devices within the folders of the network



- Or, it can be changed on the controller's *Properties* tab by selecting a MS/TP or Panel bus for an unassigned RS485 interface (None) under **Interfaces**. An assigned interface can be made unassigned by deleting the MS/TP bus in the network tree. Then it will be free for a new assignment of a MS/TP bus.



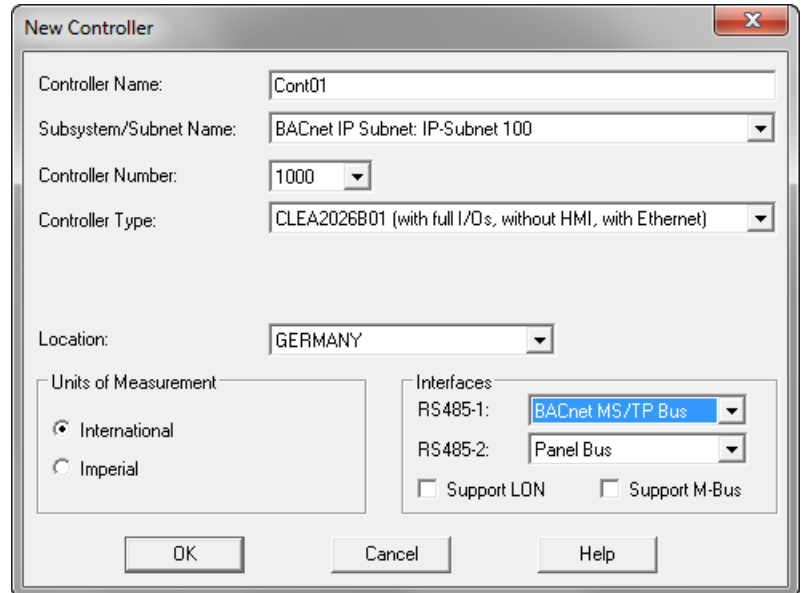
In the following, the BACnet MS/TP bus handling is described. For BACnet IP bus description, please refer to the previous "Create BACnet Subnet / Allocate IP Addresses to Controller" and the "Create BACnet Subsystem" sections. For information on device management such as max. number of devices and assignment of addresses and IDs, please refer to the *BACnet Controller* tab description in the "Set Global CARE Options" section.

BACnet MS/TP Bus Scenarios

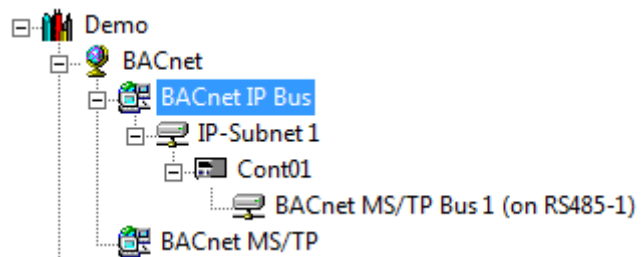
Mixed BACnet IP / MS/TP topology

For a mixed BACnet IP / MS/TP topology, the pre-definition when creating the controller can be any of the following:

- Example 1:
- Controller with one MS/TP bus and one panel bus
 - subsystem/subnet = IP-Subnet 1 (initial default)
 - RS485 1 = BACnet MS/TP bus, RS485 2 = Panel bus



The controller will be placed in the default BACnet IP Subnet and a BACnet MS/TP bus assigned via RS 485-1 will be added to the controller.



NOTE: In this example, it is not possible to create a second BACnet MS/TP bus for the controller via RS485-2 since all interfaces are assigned. For re-assigning MS/TP or panel busses to an RS485 interface (1,2), the interfaces must be made unassigned by deleting the corresponding MS/TP bus (1, 2) in the network tree. If an interface is defined as Panel bus, the interface cannot be made unassigned belatedly.

Rules (Mixed BACnet IP / MS/TP topology)

You can:

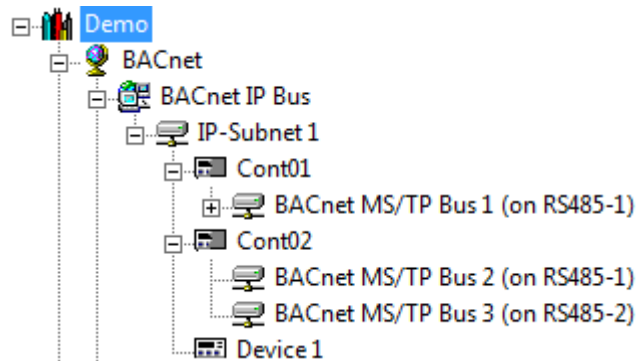
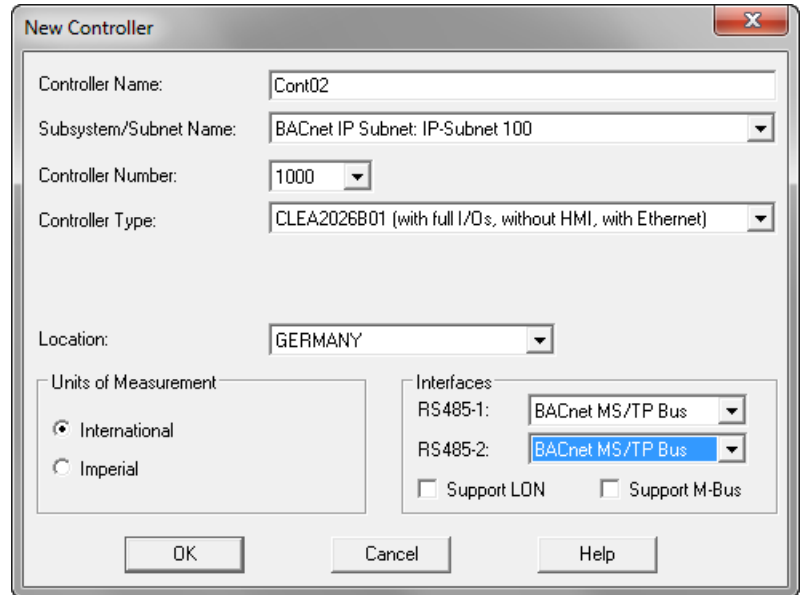
- add BACnet devices to the BACnet IP subsystem/subnet as well as to the BACnet MS/TP bus
- add further subsystem and subnets which will be available for further placement of controllers (New Controller dialog) and devices(network tree)
- move controllers and devices between different subsystems and subnets
- move devices between different BACnet MS/TP busses
- delete an MS/TP bus in the network tree and re-assign an MS/TP or panel bus on the controller's *Properties* tab.

You cannot

- move devices between IP-subsystem/subnets and BACnet MS/TP busses

Example 2:

- Controller with two MS/TP busses
- subsystem/subnet = IP-Subnet 1 (initial default)
- RS485 1 = BACnet MS/TP bus, RS485 2 = BACnet MS/TP bus



NOTE: For this controller it is not possible to delete any of the two BACnet MS/TP busses.

Rules (Mixed BACnet IP / MS/TP topology)

see rules of Example 1.

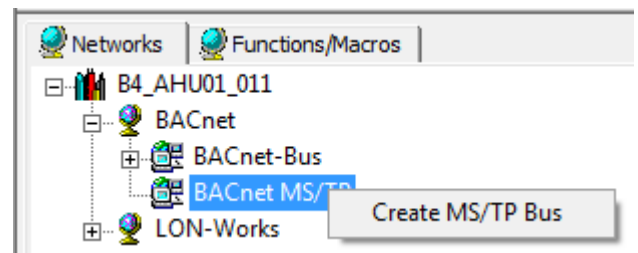
NOTE: Any combinations of controller configurations as a result of selecting different subsystems/subnets and/or interfaces are possible and follow the same rules as described in the above examples.

Pure BACnet MS/TP topology

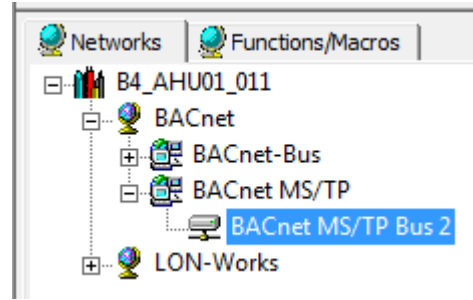
For a pure MS/TP topology, the MS/TP bus must be created in the network tree before you can place controllers in it.

Example: Steps for creating a MS/TP bus, a controller and devices

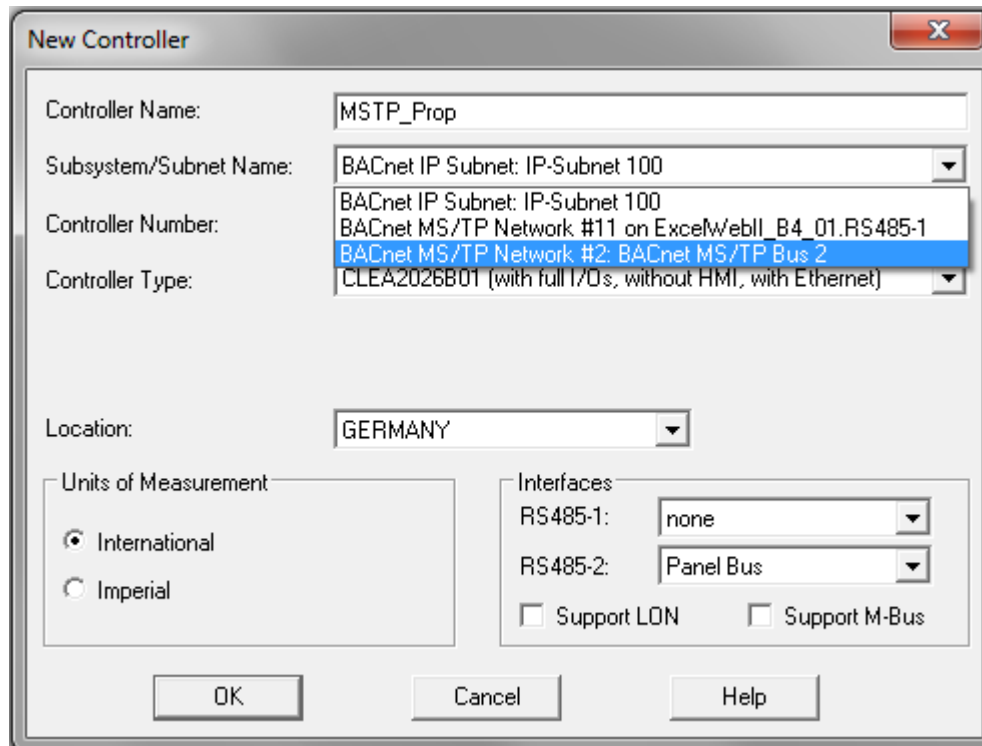
- a. Create MS/TP bus in the network tree.



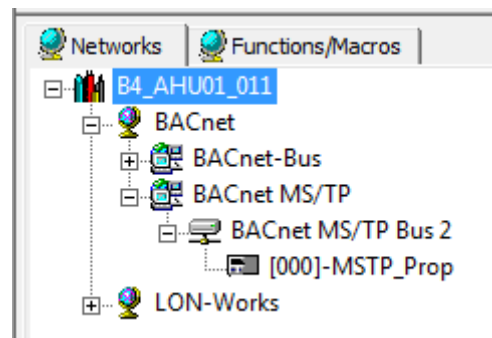
The BACnet MS/TP bus is added to the network



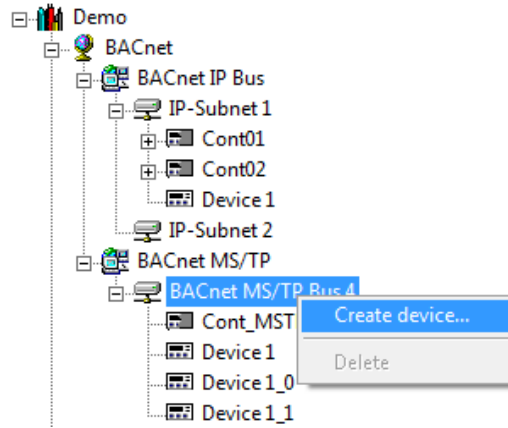
- b. Create a new controller.
- c. In the New Controller dialog, select the previously created BACnet MS/TP bus as subsystem/subnet.
- d. Select a BACnet MS/TP bus for one of the R485 interfaces (mandatory).



The controller will be placed in the BACnet MS/TP bus.



- e. Create a device in the BACnet MS/TP bus.



Rules (Pure BACnet MS/TP topology)

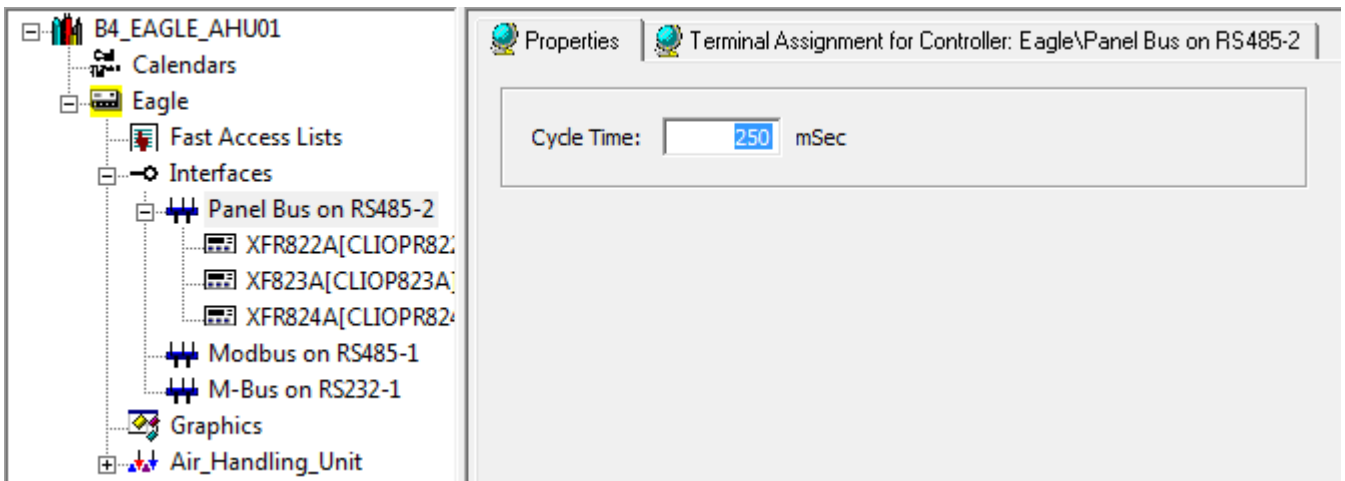
- You can add further BACnet MS/TP busses which will be available for further placement of controllers (New Controller dialog) and devices (network tree).
- You can move controllers and devices between different BACnet MS/TP busses of a pure MS/TP network
- You can move devices between MS/TP busses of mixed and pure topologies
- You can move a MS/TP controller from a pure MS/TP network to a BACnet IP subnet.
- You cannot move controllers and devices between a BACnet IP bus and a BACnet MS/TP bus.

View Panel Bus Cycle Time

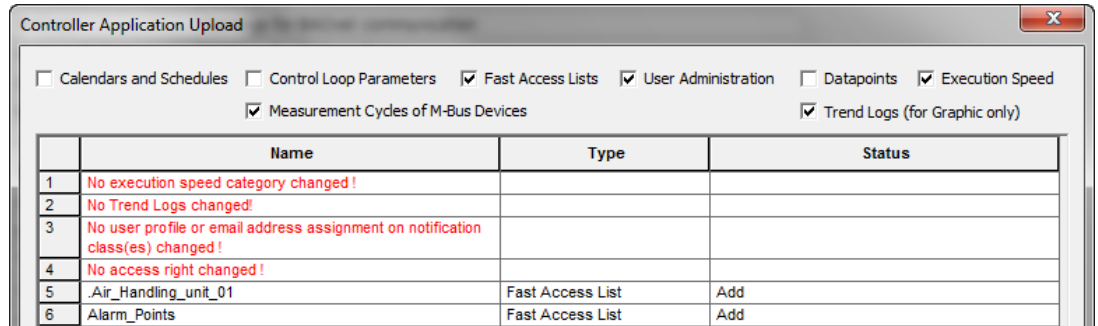
Large panel bus applications need higher cycle times than small and fast panel bus applications (e.g. light control). Hence, the panelbus cycle time will be adopted by the controller. It should not be changed in CARE. If problems occur in the controller, the cycle time can be increased using the Excel Web HTML interface.

Procedure

1. Expand the Interfaces folder, and then click the Panel Bus folder.
2. On the right pane, click the Properties tab. The default cycle time of 250 msec is displayed.



3. If desired, change the cycle time using the Excel Web HTML interface.
4. If desired, upload the application for updating CARE with the current cycle time executed in the controller.



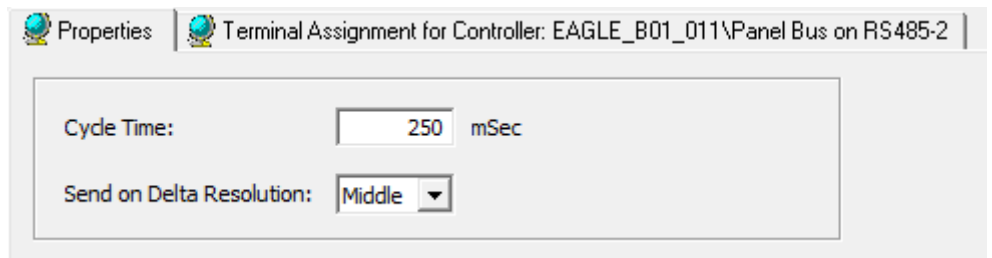
Set Send On Delta Resolution for Panel Bus AI Points

The 'send on delta' setting (resolution) for Panelbus AI points defines the threshold for sending value changes coming from the assigned sensors.

The send on delta resolution can be selected from three categories:

- High: no threshold
 - Medium: threshold = 0.1 K / 50 mV
 - Low: 0.5 K / 100 mV
- Low resolution results in less load on the Panelbus and in the controller CPU.

- Procedure**
1. Expand the Interfaces folder, and then click the Panel Bus folder.
 2. On the right pane, click the Properties tab. The default Send on Delta Resolution 'Middle' is selected.

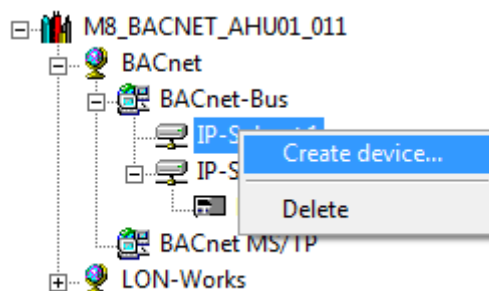


3. If desired, change the Send on Delta Resolution by selecting 'High' or 'Low'.

Create BACnet 3rd Party Device

Purpose To create a BACnet 3rd party device and define its general network specific settings such as Ethernet (LAN) parameters.

- Procedure**
1. With left mouse button, select the BACnet-Bus IP-Subnet in the network tree.
 2. Click right mouse button and with left mouse button, click Create Device in the context menu.



RESULT: The new device will be inserted into the tree.

The screenshot displays a software interface for configuring BACnet devices. On the left, a tree view shows a project named 'M8_BACNET_AHU01_011'. Underneath, there is a 'FalconNNT' folder containing various units like 'Fast Access Lists', 'Air_Handling_Unit', 'Factory', 'Office Boiler room', 'Office FLOOR 0' through 'Office FLOOR 5', 'ReferencePlant', 'Room Control_CHC', 'Store', and 'Touchpanel Room Control'. Below this, another 'M8_BACNET_AHU01_011' folder is expanded to show 'BACnet' components: 'BACnet-Bus', 'IP-Subnet 1' (containing 'Device 1'), 'IP-Subnet 100', 'BACnet MS/TP', and 'LON-Works'. On the right, a 'Properties' dialog box is open. It has two tabs: 'General' and 'Ethernet'. The 'General' tab is active, showing fields for 'Device name' (set to 'Device 1'), 'Device ID' (set to '1'), 'BACnet Object Type' (set to 'Device (8)'), 'Description', and 'Location'. The 'Ethernet' tab shows fields for 'IP Address' (0 . 0 . 0 . 0), 'Subnet Mask' (255 . 255 . 255 . 0), and 'Gateway Address' (0 . 0 . 0 . 0). At the bottom of the dialog, there is an 'Objects' table with columns 'Object ID' and 'Object Name', and three buttons: 'New', 'Edit', and 'Delete'.

3. Under General, enter/view information such as:

Device name

Default name can be edited

Device ID

Object identifier of the BACnet device object. This is a unique ID for any device on the BACnet bus. If the BACnet device is an Eagle controller, the device ID is the same as the controller number.

NOTE:

When integrating 3rd party BACnet devices, it must be ensured that no identical

device IDs exist in the whole BACnet system. For that reason, an offset can be defined. Adding this offset to the controller number generates the device ID.

BACnet Object Type

Name of the BACnet object type according to BACnet convention.

Description

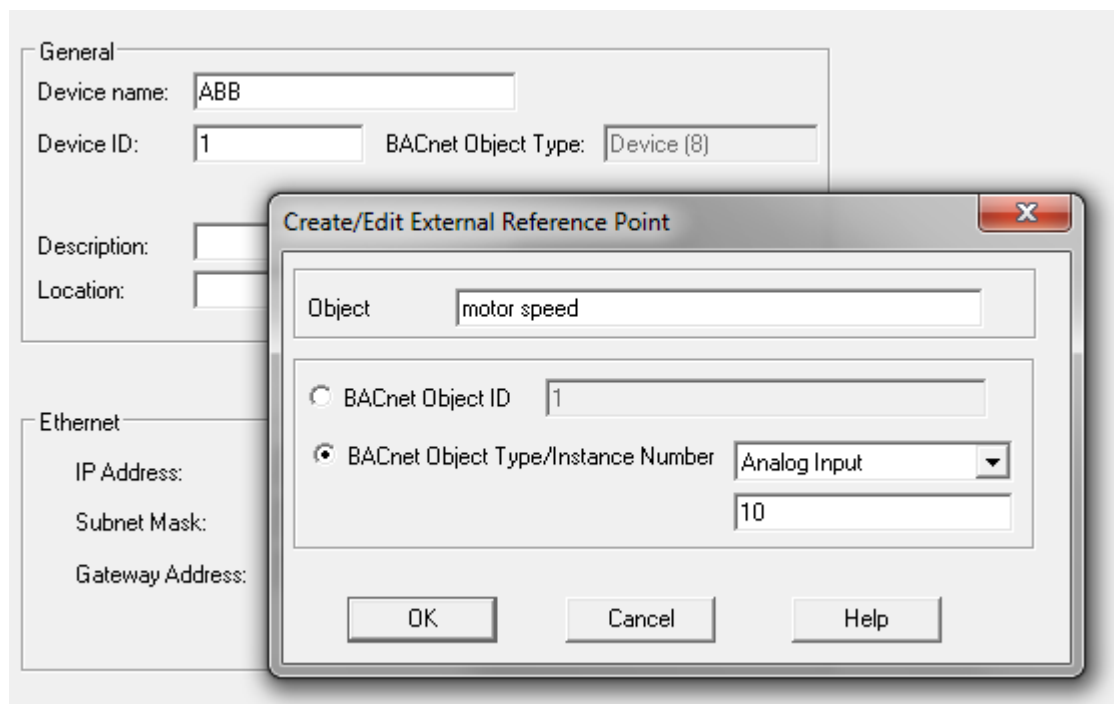
Additional descriptive Text for the device

Location

Additional Text for the device, which indicates the location of the device, e.g. Floor 4, Section Nord.

4. Under Objects, you can define external reference points, which can be used to share point information across BACnet controllers. This can also be done via the "Import from EDE file" function in the device library
5. Click the **New** button.

RESULT: The Create/Edit External Reference Point dialog box displays.



6. In the Object field, enter the object name.
7. Each of the following two options can be used for addressing the device in the BACnet network:
 - BACnet Object ID or
 - BACnet Object Type and its Instance Number

The settings must be provided by or to the project engineer/vendor who is responsible for the 3rd party BACnet device to be added to the CARE project.

The BACnet object ID is a unique ID within a BACnet device and within a CARE project. It is calculated within CARE by the following Standard BACnet formula:

$$\text{BACnet object ID} = \text{BACnet object type} \times 2^{22} + \text{Object Instance number}$$

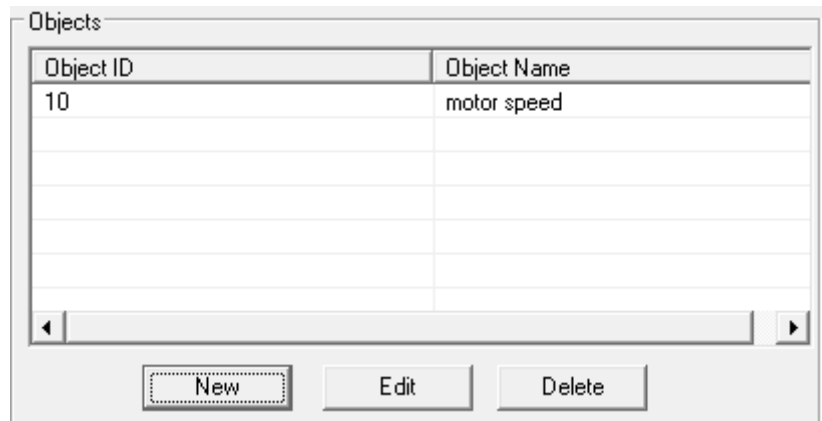
Hence, if the BACnet object ID is not known, you can use the BACnet Object Type and its Instance Number. CARE calculates the BACnet Object ID using these data.

Select the BACnet Object ID radio button and enter the BACnet Object ID into the field.

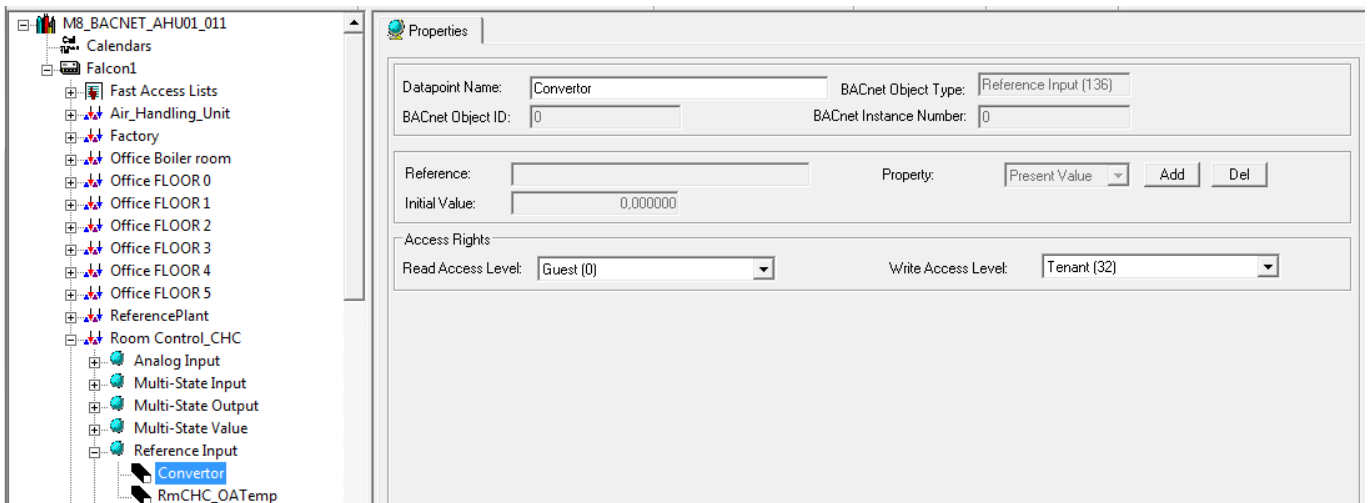
Or, select the BACnet Object Type/Instance Number radio button. From the drop-down listbox, select the BACnet object type and enter the instance number into the field below.

- Click the **OK** button.

RESULT: The object is inserted into the list. To edit an object, select the object in the list and click the **Edit** button. To delete an object, select the object in the list and click the **Delete** button.

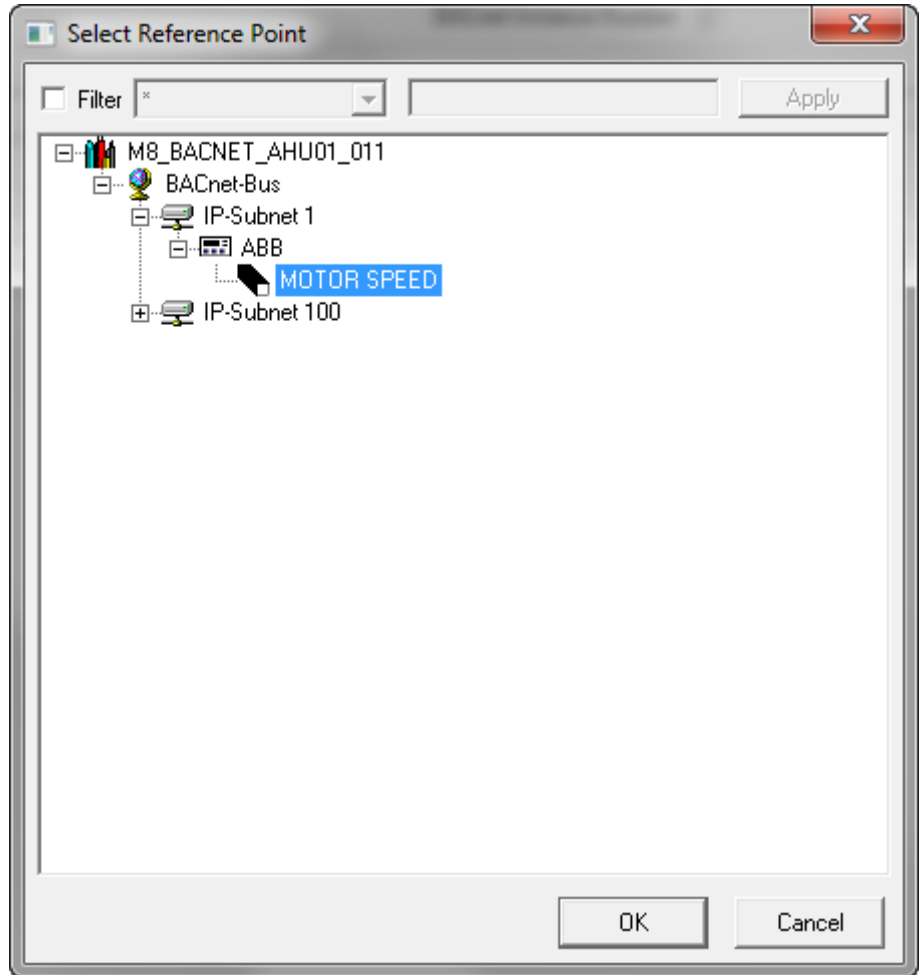


- The created object can now be selected under the Reference Input and Reference Output point types of any BACnet controller of the project.
- To assign an object to a BACnet controller, expand the logical plant tree and then select the reference input, respectively the reference output point.

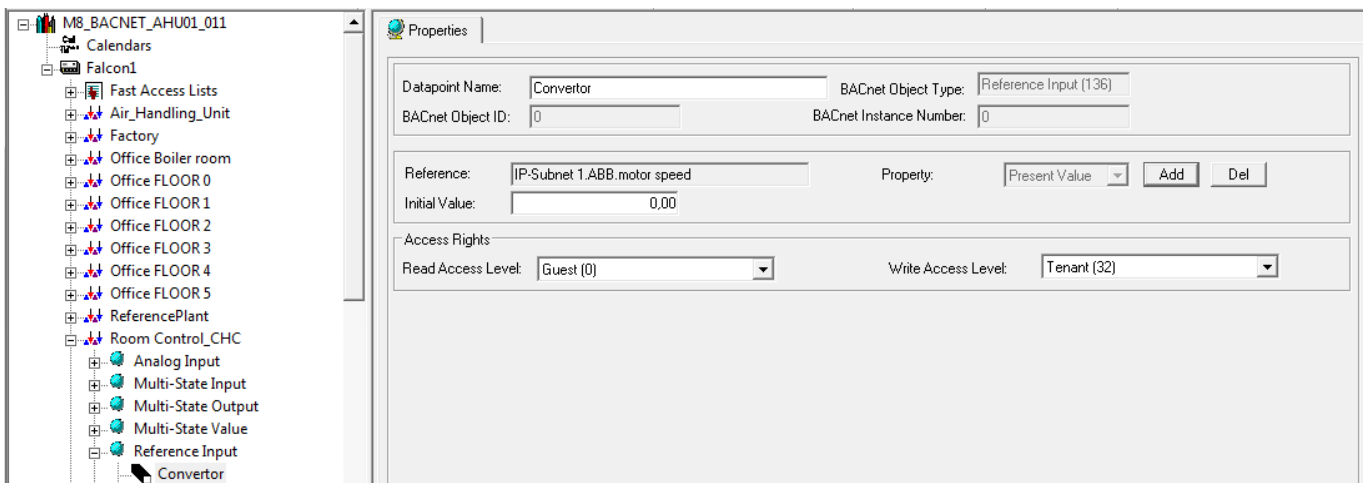


- On the Properties tab, click the Add button.

RESULT: The Select Reference Point dialog box displays.



12. Expand the tree and select the external reference point, and then click OK button.



RESULT: The reference point will now use the value that the object passes.

NOTE: You can add values from any kind of BACnet object or datapoint available in the project.

Set Controller as BBMD Device

When attaching BACnet devices to IP networks, the IP network can be sub-netted to BACnet devices by using IP routers. Most IP routers will not pass broadcast messages which are crucial to BACnet operation.

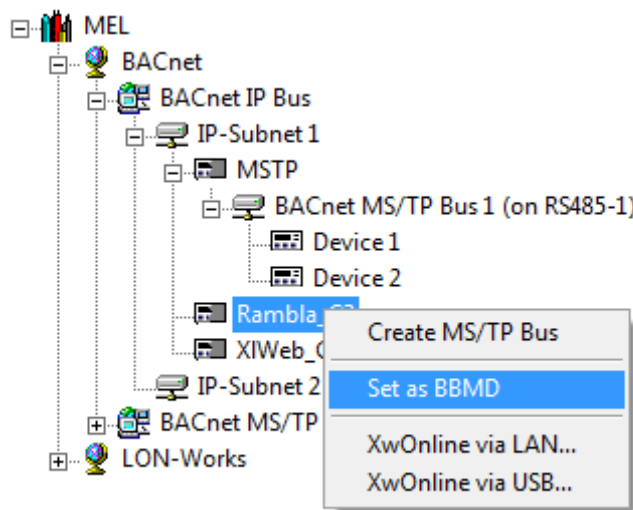
The solution is to incorporate BACnet/IP Broadcast Management Device (BBMD) functionality within the BACnet / IP network. This can be accomplished by enabling BBMD on the IP Router.

In CARE, the EAGLE controller supporting both, BACnet IP and BACnet MS/TP bus via RS485 interface works as a router routing packets to the BACnet devices connected to the subordinate channel.

NOTE: Per subnet, max. one EAGLE controller can incorporate BBMD functionality.

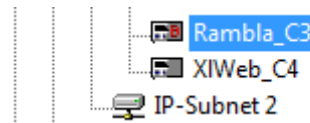
Procedure

1. Expand the network tree and browse to the IP-Subnet where the controller is located.

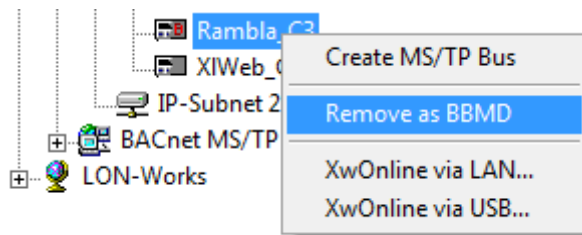


2. Right-click on the controller, and then click **Set as BBMD** in the context menu.

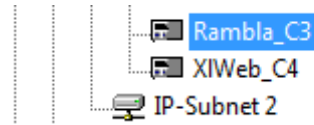
RESULT: The controller is indicated as BBMD device by a tiny red B in the icon.



3. To remove the BBMD functionality from a controller, right-click on the controller, and then click **Remove BBMD** in the context menu.



RESULT: The BBMD functionality and the tiny red B is removed from the controller.



Move BACnet Devices in the Network Tree by Drag&Drop

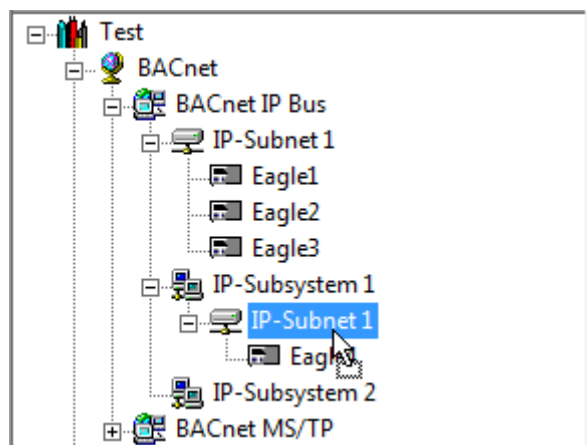
IMPORTANT

Do not move BACnet devices which are already bound to a controller. First, move the controller and then do the binding.

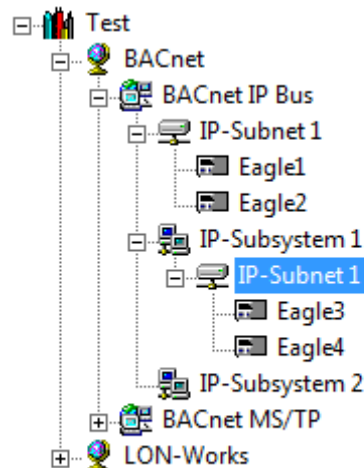
In the BACnet-Bus part of the network tree, controllers and devices can be moved between different subsystem folders.

Procedure

1. In the source folder, select the item (controller or device), drag it to the desired target folder and drop it.



In this example, Eagle3 controller has been moved from the 'IP-Subnet 1' to the 'IP-Subsystem1 - IP-Subnet 1' folder



Delete BACnet Subsystem, Subnet, or Device.

To delete a subsystem or a subnet, it must first be emptied before. That is, to delete a subnet, delete all devices of the subnet. To delete a subsystem, delete all subnets of the subsystem.

- Procedure**
1. In the BACnet network tree, select the item (subsystem, subnet, or device), you want to delete.
 2. Click right mouse button and with left mouse button click on **Delete** in the context menu.
-

Setup BACnet Controller

Setting up a BACnet controller includes the following initial steps:

- Establish physical connection to BACnet controller
- Connect to BACnet controller
- Download settings
- Download firmware
- Download application

The following steps may be necessary during or after initial setup:

- Stop/start controller
 - Upload application
 - Download firmware (upgrade)
 - Download Linux (upgrade, EAGLE controller only)
 - Download settings
-

Establish Physical Connection to BACnet Controller

For setting up the controller, controller must firstly be connected to the CARE PC in one of the following ways:

- **LAN** (remote access)
The controller can be accessed remotely via LAN by allocating a valid IP address to the controller, which is reachable within the LAN. The LAN connection type is recommended and mandatory when using a platform hosting (ARENA AX) for e.g. viewing and editing time programs, trending values, etc. of the other devices of the BACnet/IP network.

Procedure: see "Establish Remote LAN Connection to BACnet Controller" section.

- **Crossover cable** (local access, FALCON controller only)
To locally connect to the FALCON controller via Ethernet, a crossover cable can be used. The crossover cable connection type has the highest transfer rate (100 Mbit/s), but when applied, the IP address settings of the CARE PC need to be changed. Hence, it has temporarily no connection to any other network and the FALCON controller is not reachable in the network.

Procedure: see "Establish Local Ethernet Connection to BACnet Controller via Crossover Cable" section.

- **Remote** (EAGLE controller only)
Allows the setup of a remote controller that resides in an external network by entering the IP address, domain name or host name of the controller.
- **USB** (local access)
To locally connect to the controller via USB interface, an USB cable of type A standard together with a D-Link DUB E100 adapter can be used for the FALCON

controller and an USB cable of type B standard can be used for the EAGLE controller .

The USB connection type is mandatory for the initial setup of a BACnet controller due to a reasonable transfer rate (2 Mbit/s) and because no IP address changes are necessary after installation. The LAN connection can be used further on.

Procedure: see "Establish Local Connection to BACnet Controller via USB Cable" section.

For USB connection, the corresponding USB driver must be installed before. Please refer to the "USB Driver Installation for Windows XP" and the "USB Driver Installation for Windows 7" sections in the CARE Installation Guide EN1Z-0964GE51 for detailed instructions.

IP Address Allocation

To establish any of the provided connections, IP addresses must be allocated to the relevant network components such as CARE PC, BACnet controller(s), network and USB adapters.

IMPORTANT

Ask the network administrator for the dedicated IP addresses (IP address ranges) that are allowed for the network components.

During engineering, the typical procedure to connect to a BACnet controller is as follows:

- Initial access to the controller by connecting via USB cable. When delivering the FALCON or EAGLE controller it has only the default factory IP address allocated that normally do not fit to the IP address range of the customer network. So, in this state, it cannot be accessed via LAN.
- Allocating the dedicated IP address to the controller by downloading the settings into the controller. Now the controller has a valid IP address and it can be reached within the LAN.
- Continual access to the engineered controller by connecting via LAN.

Establish Local Connection to BACnet Controller via USB Cable

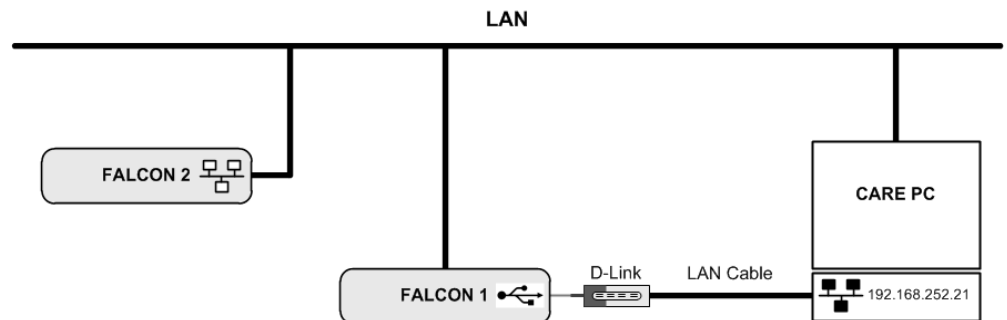
For connecting the FALCON controller to the CARE PC you need a D-Link DUB E100 USB adapter and a standard LAN cable.

For connecting the EAGLE controller to the CARE PC you need a USB cable of type A Male to type B Male (Type B standard).

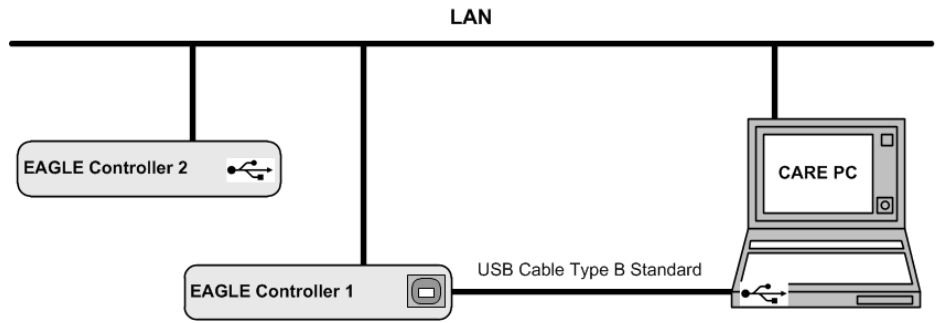
For each USB connection, the corresponding USB driver must be installed before. For detailed instructions, please refer to the "USB Driver Installation for Windows XP" and the "USB Driver Installation for Windows 7" sections in the CARE Installation Guide EN1Z-0964GE51.

Procedure

1. After successful installation of the USB driver (see CARE Installation Guide EN1Z-0964GE51), connect the CARE PC and the controller as shown in the following figures:



USB Connection of FALCON Controller




USB Connection of EAGLE Controller

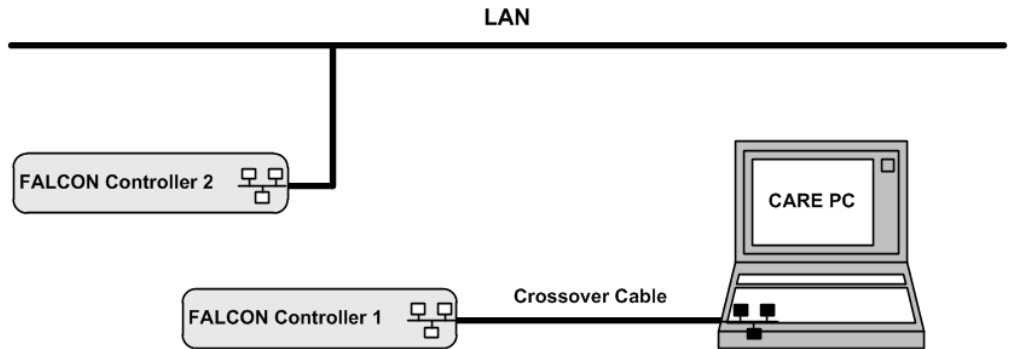
2. Continue with connecting to the controller as described in the "Connect to BACnet Controller" section.

Establish Local LAN connection to BACnet Controller via Crossover Cable

NOTE: This connection type applies to the FALCON controller only.

Procedure

1. Take the crossover cable and connect CARE PC and FALCON controller via Ethernet interface jacks  as shown in the following figure:

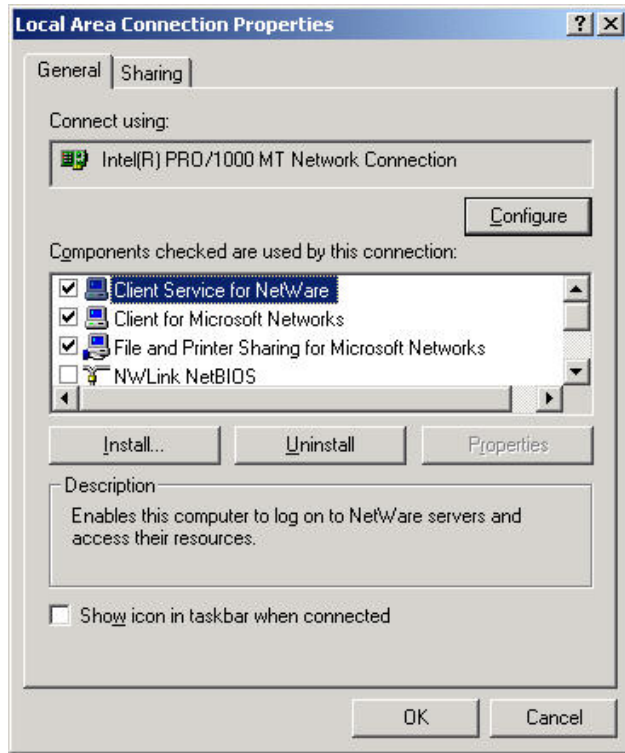


2. On the CARE PC, start the Control Panel by clicking Start menu, then submenu item Settings.
3. In the Control Panel window, double-click on the Network and Dial-up connections icon.

RESULT: The Network and Dial-up Connections window displays.

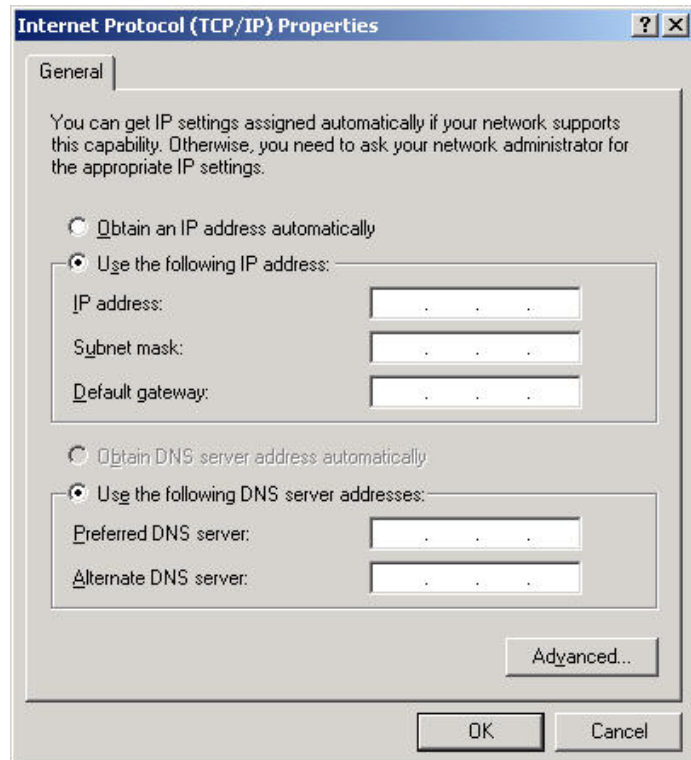
4. In the Network and Dial-up Connections window, right-click on the LAN connection of the CARE PC and with left mouse button, click on Properties.

RESULT: The Local Area Connection Properties dialog box displays.



5. In the list, select Internet Protocol (TCP/IP).
6. Click right mouse button, and with left mouse button, click on Properties.

RESULT: The Internet Protocol (TCP/IP) Properties dialog box displays.



7. Select the Use the following IP address radio button and enter the following IP address: **192.168.253.21**.
8. Click the OK button.

9. The Local Area Connection Properties dialog box re-displays.
10. Click the OK button.

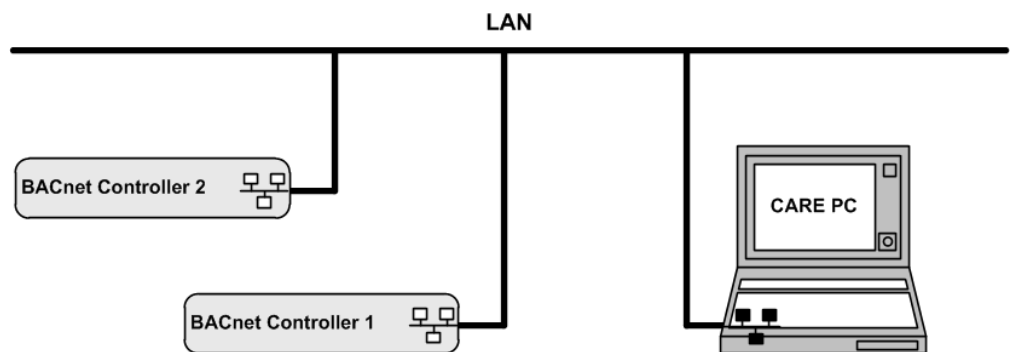
RESULT: The CARE PC now cannot connect to the Internet or to another network. After connecting to the FALCON controller with CARE and completing the required actions, you will have to change the configuration back to the previous settings in order to (subsequently) operate on the office LAN network (again).

11. Continue with connecting to the controller as described in the "Connect to BACnet Controller" section.

Establish Remote LAN Connection to BACnet Controller

Prerequisites To establish a LAN connection, a dedicated IP address must have been assigned to the controller before by using a USB or crossover cable (see "Establish Local Connection to BACnet Controller via USB Cable" and "Create BACnet Bus Subnet" sections).

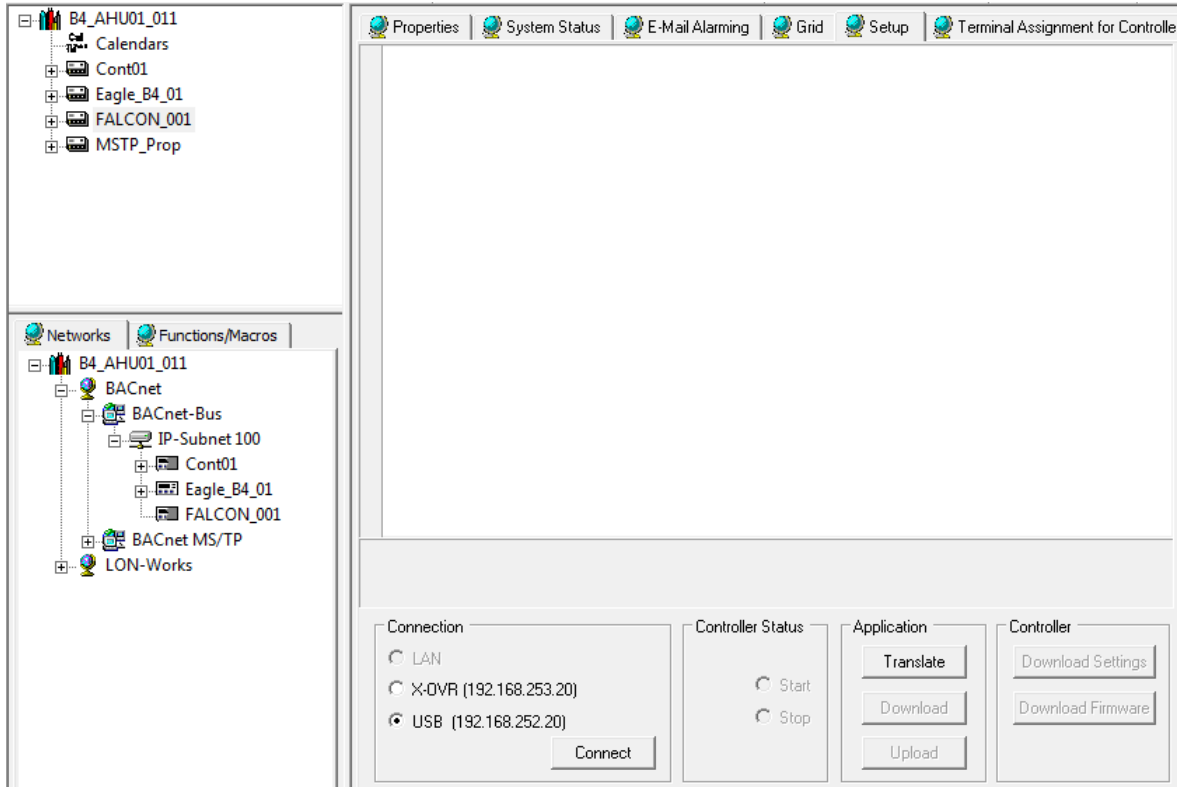
- Procedure**
1. Assign an IP address to the BACnet controller as described in the "Establish Local Connection to BACnet Controller via USB Cable" and the "Create BACnet Bus Subnet" sections.
 2. Physically connect the CARE PC with the controller via LAN as shown in the following figure.



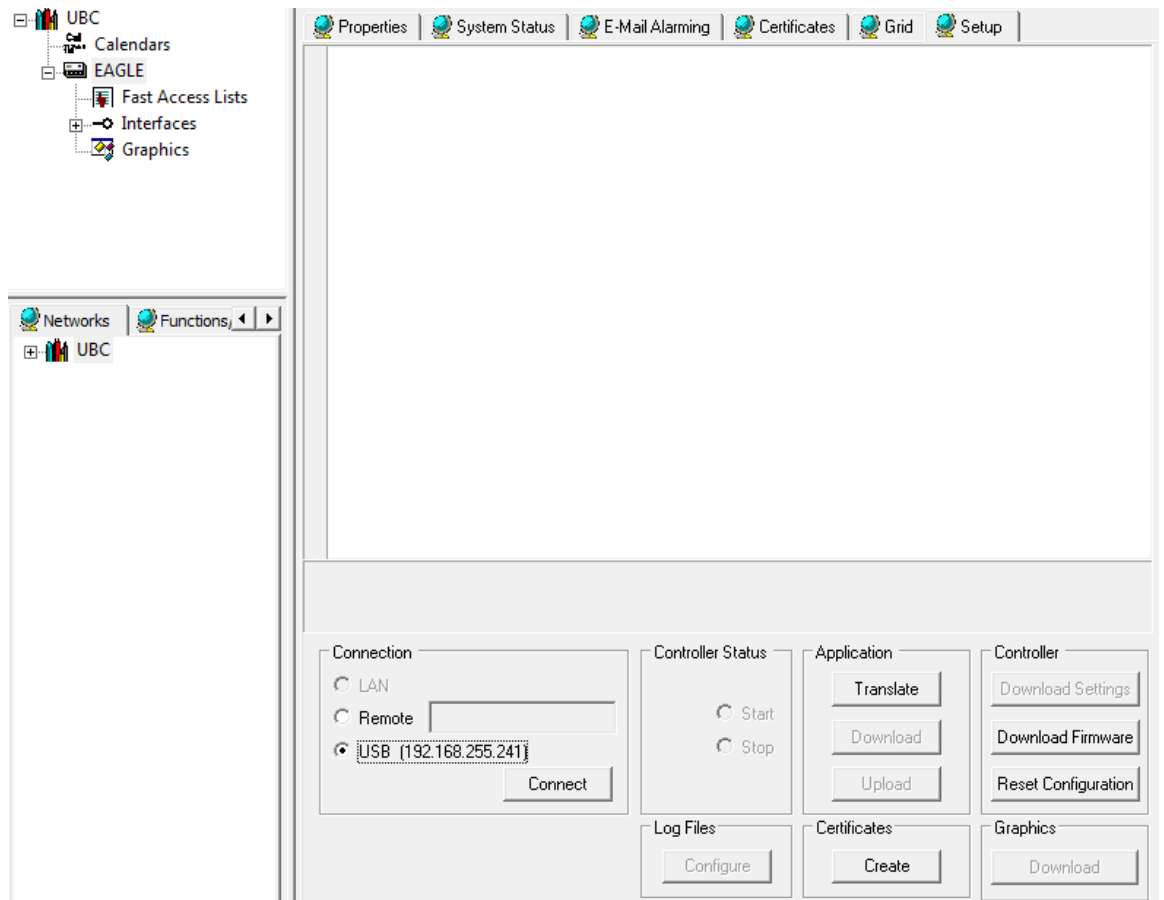
2. Continue with connecting to the controller as described in the "Connect to BACnet Controller" section.

Connect to BACnet Controller

- Purpose** To connect to the controller in order to setup or update the controller by performing the appropriate download function for settings, application, controller firmware, or Linux. After connection the application can also be uploaded.
- Prerequisites** A physical connection between controller and CARE PC must be established (see "Establish Physical Connection to BACnet Controller" section).
- Procedure**
1. In the BACnet-Bus part of the network tree, navigate to the subsystem/subnet and click on the BACnet controller to which you want to connect.
 2. On the right pane, select the Setup tab.



Connect to FALCON Controller



Connect to EAGLE Controller

According to your needs, you have the choice to connect to the controller in one of the following ways:

- **LAN**
Allows continual remote access to the controller once the controller has been accessed via USB or crossover cable connection and has gotten its dedicated IP address by the download of the controller settings. Next time when accessing the Setup pane, the controller's IP address is displayed at the LAN radio button.

If you need to remotely connect to a setup controller with a valid IP address in a running system or test environment in order to do changes to the controller, or if the IP address of a controller has been changed by the network administrator, you can do that by entering the dedicated IP address of the controller on the Properties pane and clicking the Confirm button. This displays the IP address at the LAN radio button.

Note, that by default a BACnet controller has no IP address allocated in delivery state, except its default factory IP addresses (see USB below). Therefore, it cannot be accessed via LAN and the LAN option is disabled.

- **X-OVR (Crossover cable, FALCON controller only)**
Allows initial setup of the controller by local access like with USB cable, but with higher speed and temporary disconnection to the network.
 - **Remote (EAGLE controller only)**
Allows the setup of a remote controller that resides in an external network by entering the IP address, domain name or host name of the controller.
 - **USB**
For initial access to the controller, you must connect via USB. The CARE PC will connect to the controller via USB using the default factory IP address of the BACnet controller (FALCON = 192.168.252.20 and EAGLE = 192.168.255.241). This address is displayed at the USB radio button. The default factory IP addresses are fix and cannot be changed.
3. Select the connection type, USB (recommended local access for initial setup), crossover cable (local access for initial setup), or LAN (continual remote access), and click the Connect button.

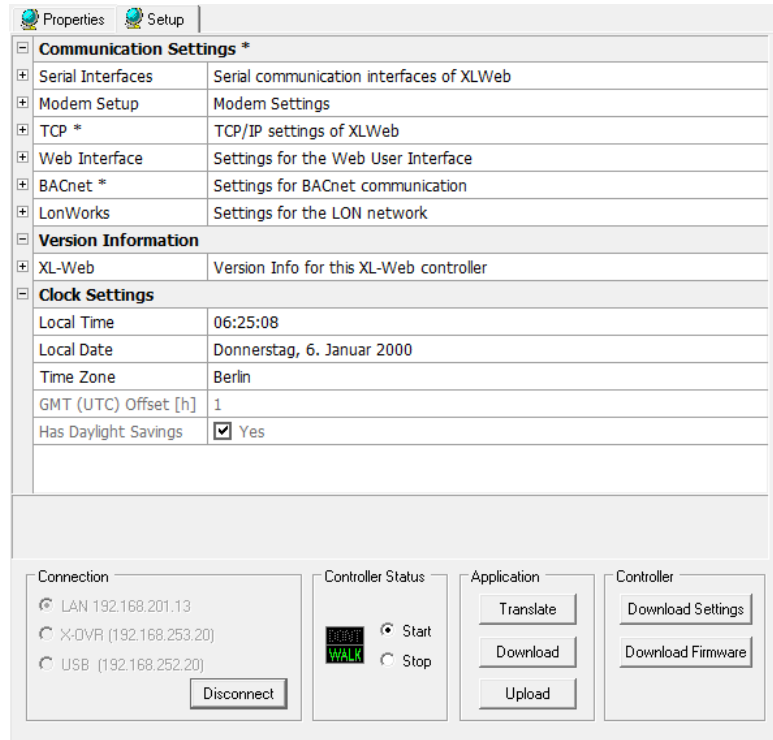
RESULT: CARE connects to the controller. If the connection is successful, the following information is displayed:

- Communication Settings
- Version Information
- Clock Settings

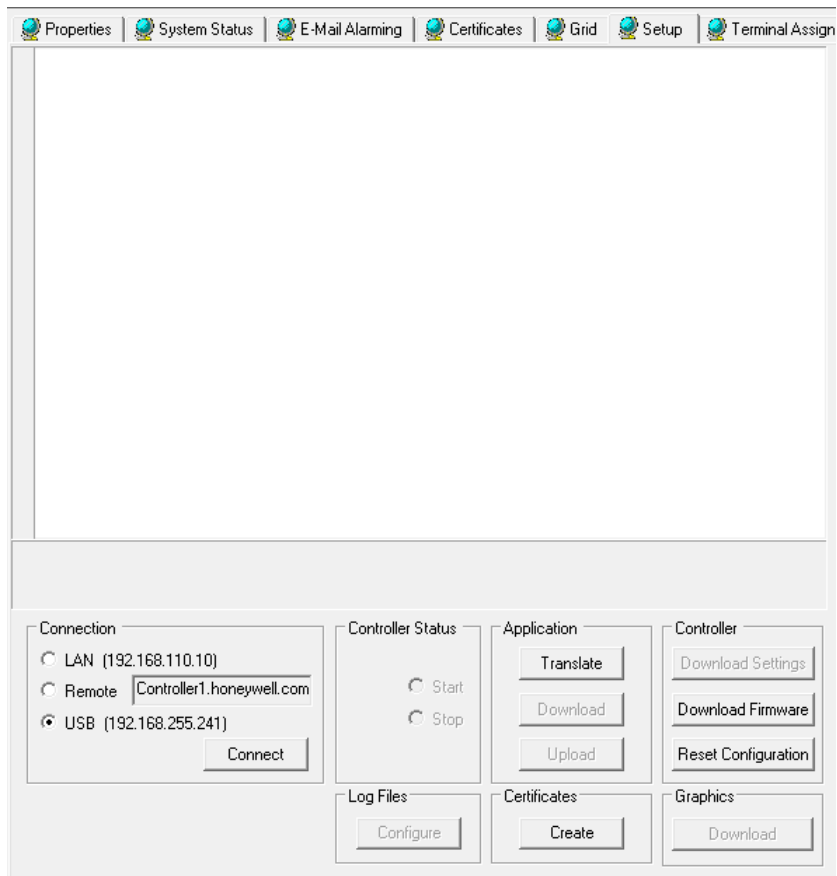
Settings displayed in black can be changed, settings displayed in gray cannot be changed.

IMPORTANT

The shown data is the data of the selected controller in CARE, not the data of the physical controller. Although CARE reads the data from the physical controller, it does not import the data into CARE but compares it with the data of the controller selected in CARE you want do the setup for.



FALCON Controller Settings



EAGLE Controller Settings

Any data variations in the selected controller in comparison to the physically connected controller are indicated by an asterisk (*).

[-] Version Information *	
[+] Controller *	Version info for this controller

- To view sub items, expand the tree by clicking the plus icon at the item.
- To change settings (non-changeable settings are displayed in gray), click in the corresponding item line in the right column.

Example: Expand the Serial Interfaces item and Port 3 subitem, then click in the right column of the Baudrate line and select the desired baudrate.

NOTE: Any changes will be indicated by an asterisk (*).

[-] Communication Settings	
[-] Serial Interfaces	Serial communication interfaces of XLWeb
[-] Port 3	Serial interface for direct(2) or modem(3) connection
Baudrate	115200
[-] Port 2	9600
Baudrate	19200
Baudrate	38400
Baudrate	115200
[+] Modem Setup	Modem Settings
[+] TCP	TCP/IP settings of XLWeb
[+] Web Interface	Settings for the Web User Interface
[+] BACnet	Settings for BACnet communication
[+] LonWorks	Settings for the LON network
[-] Clock Settings *	
[-] Version Information	
[+] XL-Web	Version Info for this XL-Web controller

Communication Settings

Serial Interfaces, Port 2, 3, Baudrate
 Defines the baudrate for direct connection of CARE (port 2) and modem connection (port 3).

Modem Setup, Dial out
 Defines the dial out settings such as wait for dial tone, dial method, idle time, command string and speaker.

TCP
 Displays TCP/IP settings such as IP address, subnet mask, gateway address, and host name.

Web Interface
 Defines logout time, which sets the time after which you will be automatically logged out if no action has been taken in the meantime.

BACnet
 Displays the UDP number which will be used for communication and the network number (see BACnet-Bus Properties).

LonWorks
 Displays the neuron ID of the controller.

Clock Settings

Defines the values for local time, local date and time zone and displays

GMT (UTC) Offset (h), Has daylight savings

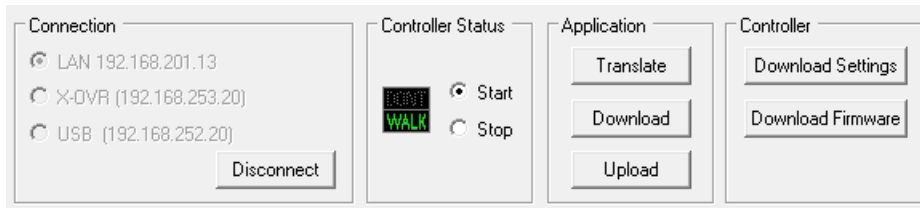
Displays the offset of the Greenwich Mean Time (Universal Time Conversion) and whether the controller has daylight savings or not.

Version Information

XL-Web

Displays the version of the operating system Linux and the BACnet firmware.

- For further information and/or functions, look at the bottom of the Setup tab. Under Controller Status, the current application status is displayed. When CARE has successfully connected to the controller, the application is automatically started as displayed by the permanent icon indication WALK in green color and the selected Start radio button. If for any reason, the application cannot be started, the radio button switches to Stop and the icon displays DON'T WALK in red color. You can stop or start the application manually by clicking the corresponding radio button.



Control Functions of (FALCON) Controller

- Under Application you can translate, download or upload the application (see "Translate Controller", "Download Application into BACnet Controller" and "Upload Controller Application from BACnet Controller" sections). Under Controller you can download the actual displayed communication and clock settings into the controller (see "Download Settings into BACnet Controller" section) and download the controller firmware (see "Download Firmware into BACnet Controller (Upgrade)" section).
- Continue by downloading the settings into the controller as described in the "Download Settings into BACnet Controller" section.

Connect to Particular BACnet Controller

Purpose

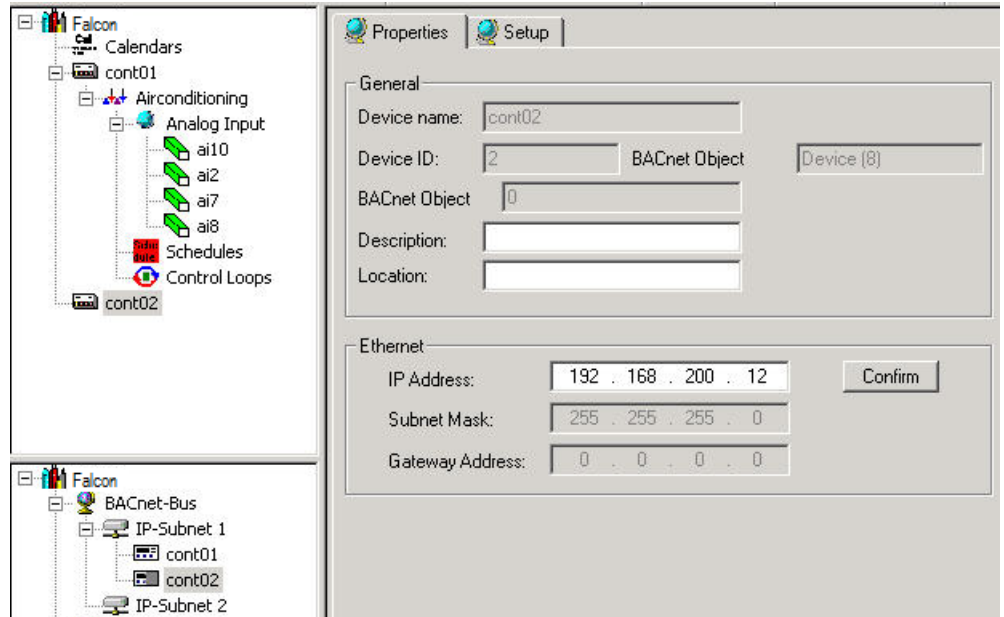
To connect to a setup controller that is reachable in a running system or test environment in order to:

- do remote changes to a particular setup controller of which IP address you know
- remotely connect to a controller whose IP address has been changed e.g. by the network administrator

Note that the IP address must be in the IP address range as defined by the network address.

This procedure makes the local connection via USB unnecessary.

- In the BACnet-Bus network tree, click on the controller.
- In the IP Address field on the Properties tab, enter the IP address of the controller to which you want to connect.



3. Click the Confirm button.

RESULT: One of the following message boxes displays:



If this message box displays, check if the gateway address is correct in order to reach the controller via this IP address, or contact the network administrator for a valid IP address.



If this message box displays, the controller has already been setup and been reached once at a valid IP address. Make sure that the controller can be reached via the IP address you have issued. If you are sure, then click the OK button.



If this message box displays, make sure that the controller can be reached via the IP address you have issued. If you are sure, then click the OK button and continue by setting up the controller.

4. To setup the controller, please refer to the Setup BACnet Controller section.

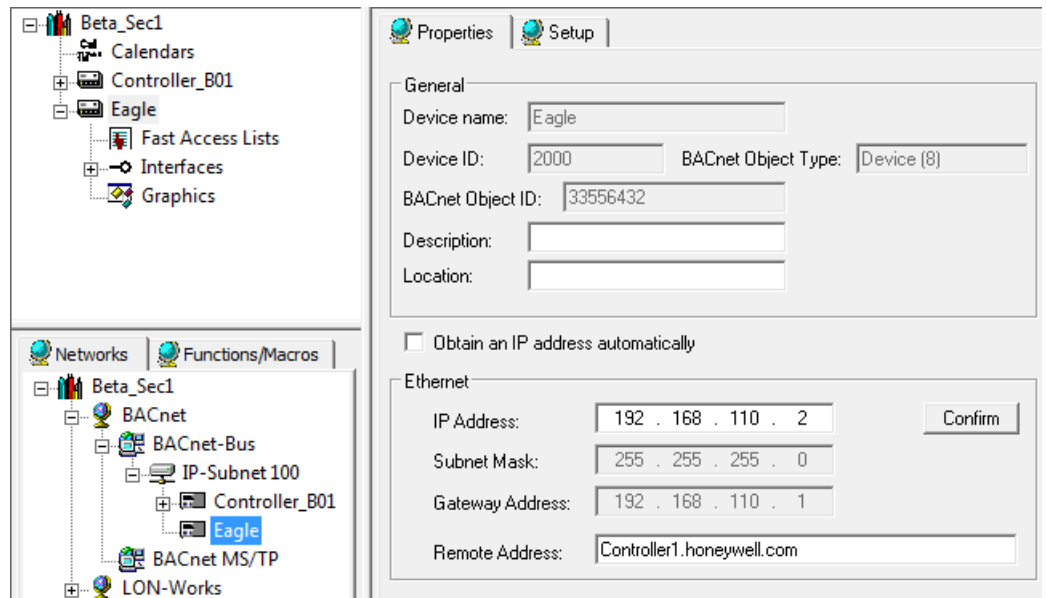
Connect to Remote BACnet Controller

Purpose To connect to a remote controller that resides in an external network by entering the IP address, domain name or host name of the controller.

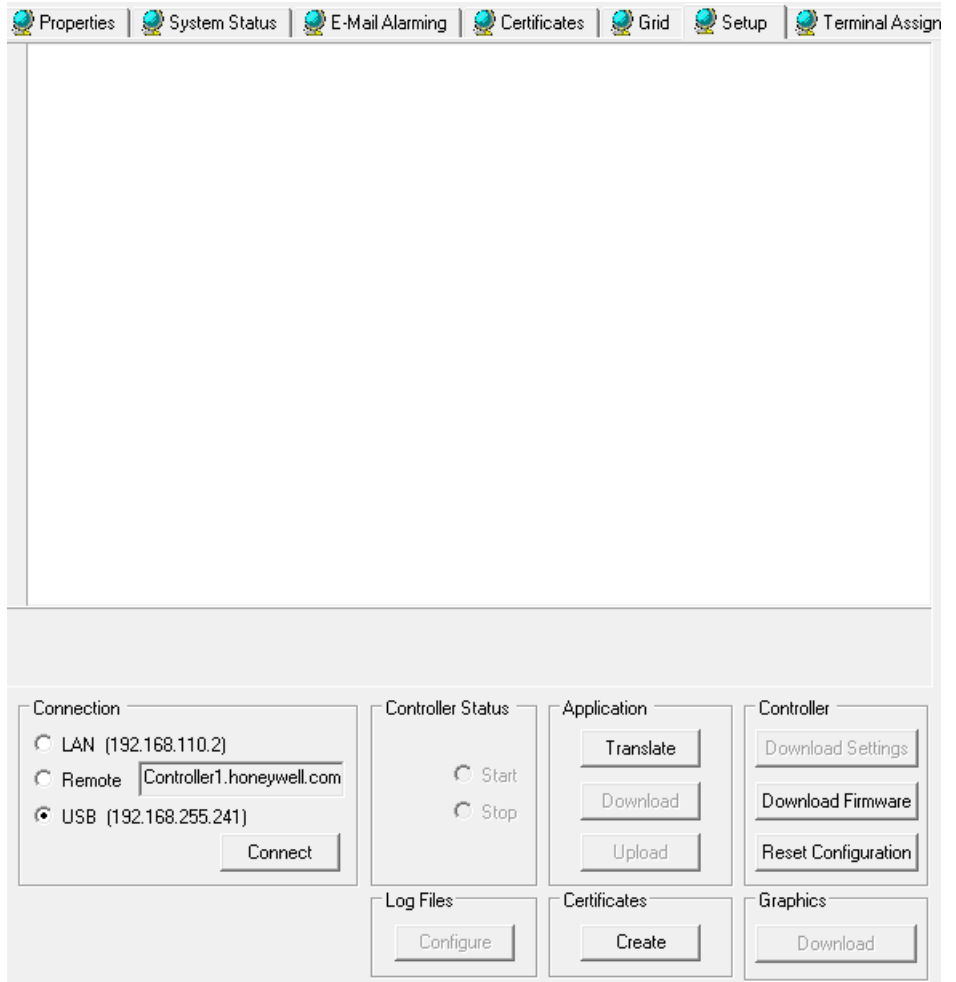
NOTES The IP address has not to be in the IP address range of the subnet.

It is possible to add a different SSH port by adding it after a colon.
 For example, controller1.honeywell.com:23 will connect on port 23 at the URL controller1.honeywell.com.

1. In the BACnet-Bus network tree, click on the controller.
2. In the Remote Address field on the Properties tab, enter the IP address, the domain name or host name of the controller to which you want to connect.

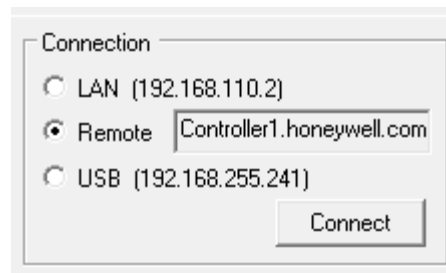


3. Click the Setup tab (see next page).



RESULT: The remote address of the controller is shown under **Connection**

4. Select the **Remote** radio button.



5. Connect to the controller by clicking the **Connect** button.

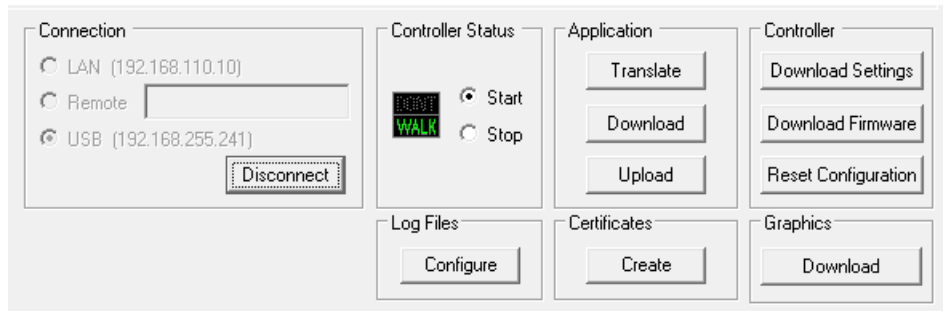
Download Settings into BACnet Controller

Purpose

To download the actual communication and clock settings as displayed on the Setup tab into the physical controller. This function must be performed to continue the initial setup of a BACnet controller, and it can be used for updating the controller in case of changes in the communication or clock settings since the latest download of the settings. After the download, the controller has gotten its dedicated IP address, which allows the continual remote access to the controller. Next time when accessing the Setup pane, the controller's IP address is displayed at the LAN radio button.

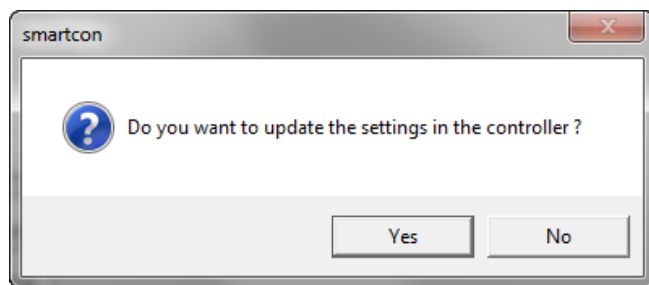
Prerequisites The controller must be physically connected to the CARE PC as described in the "Establish Physical Connection to BACnet Controller" section.

Procedure 1. If not already done, connect to the controller as described in the "Connect to BACnet Controller" section.



2. Click the Download Settings button.

RESULT: The following message box displays.



3. Click the Yes button.

RESULT: The settings are downloaded into the controller.

Download Application into BACnet Controller

Purpose To copy the application files into the physical controller.

Prerequisites The controller must be physically connected to the CARE PC (see "Establish Physical Connection to BACnet Controller" section) and the controller must be translated (see "Translate Controller" section). Please make sure that the connected controller matches the selected controller hardware type in CARE (e.g. for FALCON it is CLFA50LB0C, CLFA100LB0C, CLFA300LB0C, CLFA600LB0C).

All data of a BACnet project are exportable. Data may include:

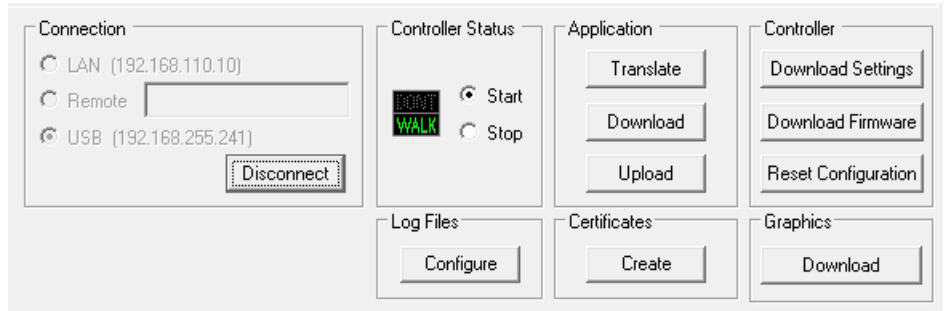
- Plant graphics
- Alarm limits, parameters, and schedules
- etc.

The following data is not part of the application:

- Trend objects will be recovered from the Flash card after export
- All controller runtime data (e.g. present value of a datapoint, last execution time of a control loop object. Those data are re-initialized after export.
- Elapsed active time will be recovered by the battery buffered RAM.

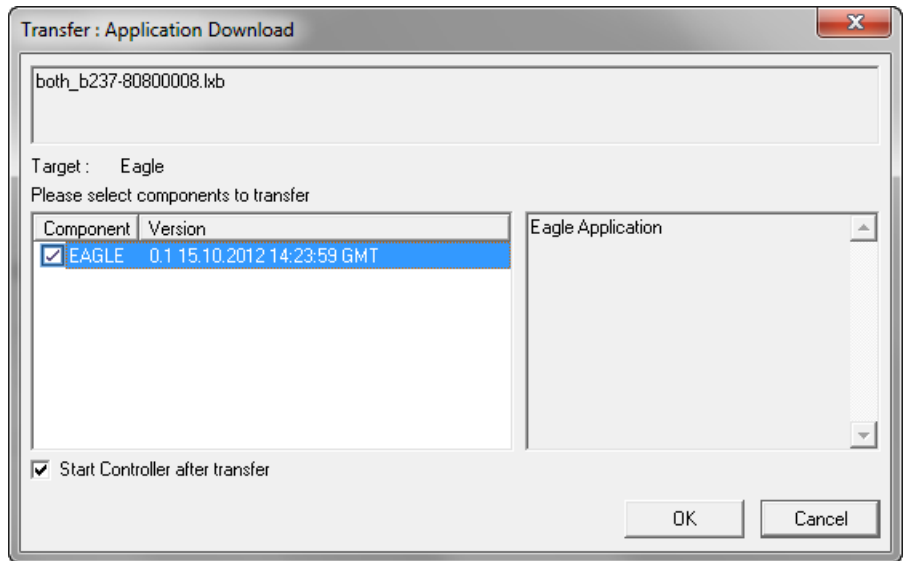
A controller application can only be exported in whole. Parts of an application cannot be exported separately.

Procedure 1. Connect to the controller as described in the "Connect to BACnet Controller" section.



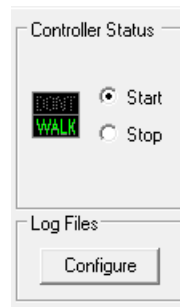
2. Under Application, click the Download button.

RESULT: The Transfer: Application Download dialog box displays showing information such as file name, target, name and version of the components.



3. Select whether the application should be started after the export or not by checking/unchecking the Start XL Web after transfer checkbox.
4. Select whether the network should be commissioned after download or not by checking/unchecking the Do LON Commissioning checkbox. This option is only enabled for selection, when being Onnet with CARE.
5. Click the OK button.

RESULT: The controller is stopped and the application will be downloaded. Status of the export is displayed in the process window. After application download is finished and controller start after transfer was selected, the controller is automatically started as indicated by the Controller Status 'Start'.



Upload Controller Application from BACnet Controllers

Upload Controller Application from FALCON Controller

Purpose To update the CARE database with the application files currently loaded in the controller.

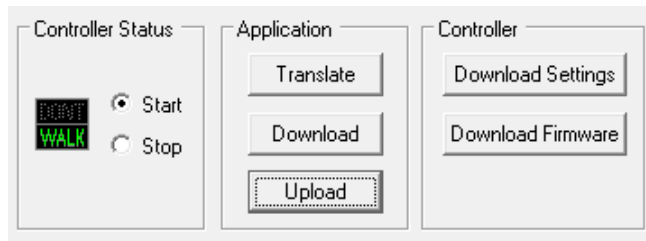
A controller application can only be imported in whole. Parts of an application cannot be imported separately.

▲ WARNING

When uploading an application, all changes, except newly added datapoints, done to the application in the meantime in CARE will be lost.

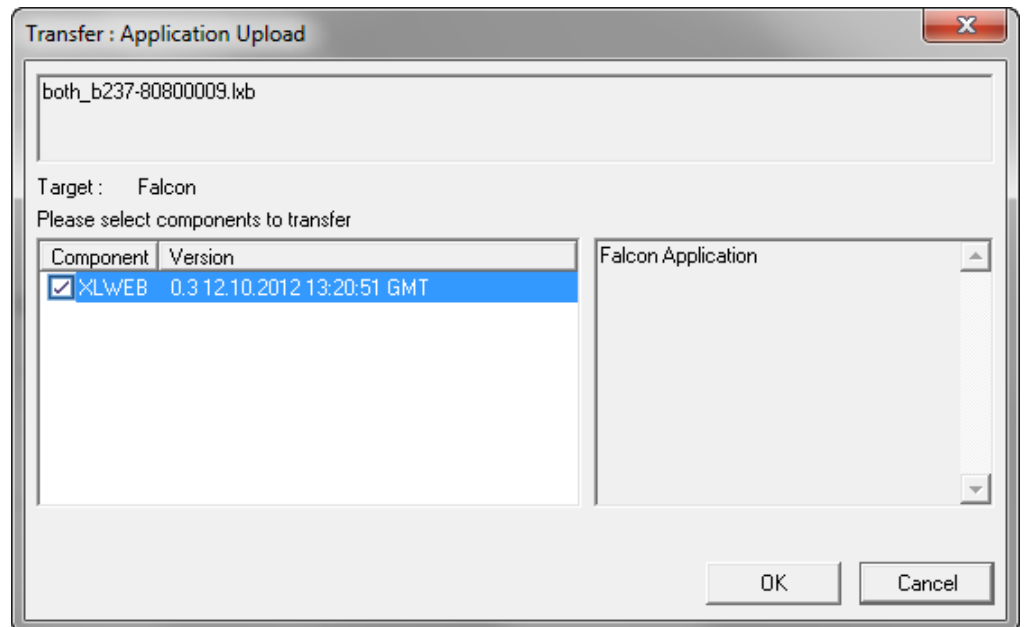
Prerequisites The controller must be physically connected to the CARE PC (see "Establish Physical Connection to BACnet Controller" section) and the application must be downloaded once.

Procedure 1. Connect to the controller as described in the "Connect to BACnet Controller" section.



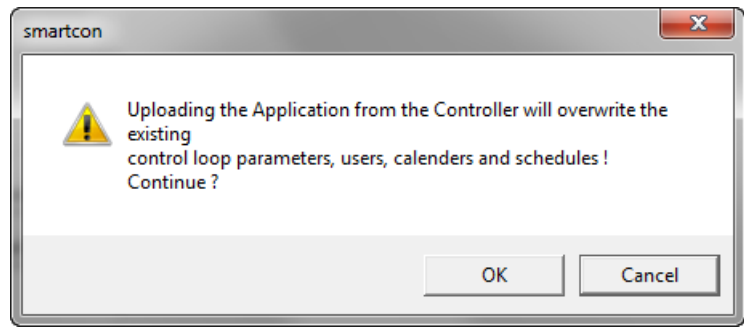
2. Under Application, click the Upload button.

RESULT: The Transfer: Application Upload dialog box displays showing information such as file name, target, name and version of the components.



3. Click the OK button.

RESULT: The following message box displays.



4. Click the OK button.

RESULT: The application will be imported into CARE. Status of the import is displayed in the process window.

Upload Controller Application from EAGLE Controller

Purpose To update the CARE database with the application files currently loaded in the controller.

WARNING

When uploading an application, all changes, except newly added datapoints, done to the application in the meantime in CARE will be lost.

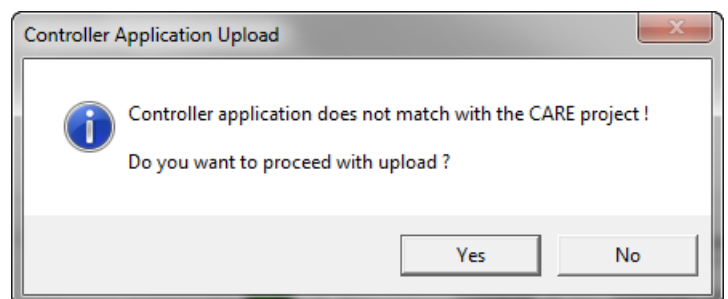
Prerequisites The controller must be physically connected to the CARE PC (see "Establish Physical Connection to BACnet Controller" section) and the application must be downloaded once.

- Procedure**
1. Connect to the controller as described in the "Connect to BACnet Controller" section.



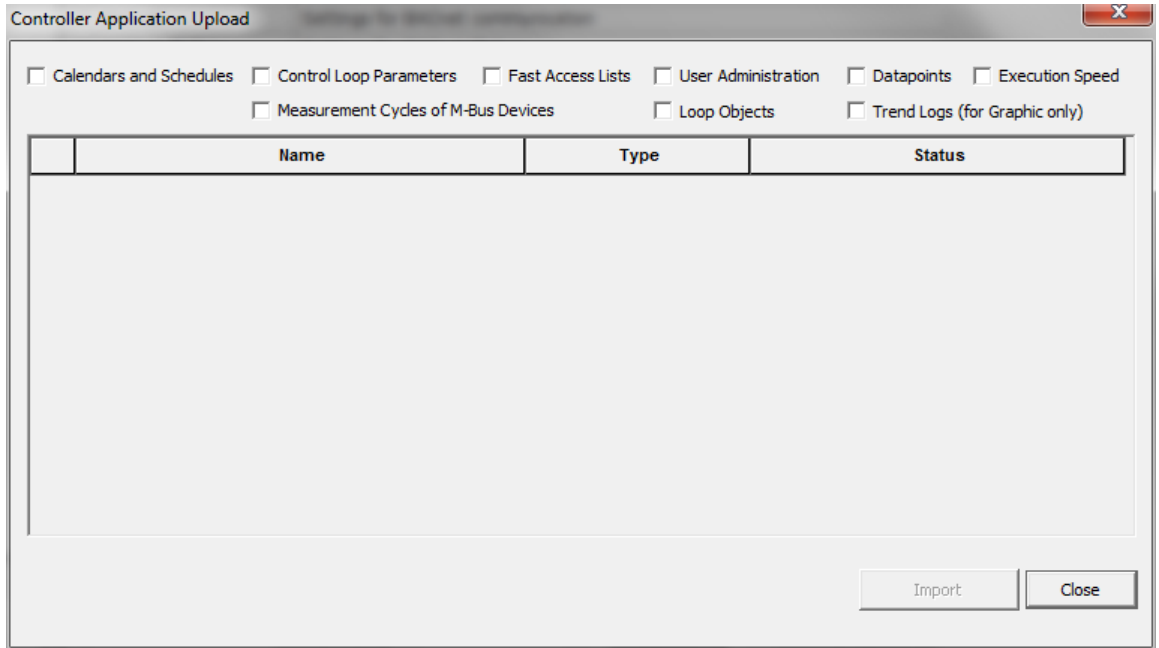
2. Under Application, click the Upload button.

RESULT: The following message box displays if the name of the physical controller does not match the controller name in the CARE project.



3. Click the Yes button if you want to upload anyway.

RESULT: The Controller Application Upload dialog box displays.

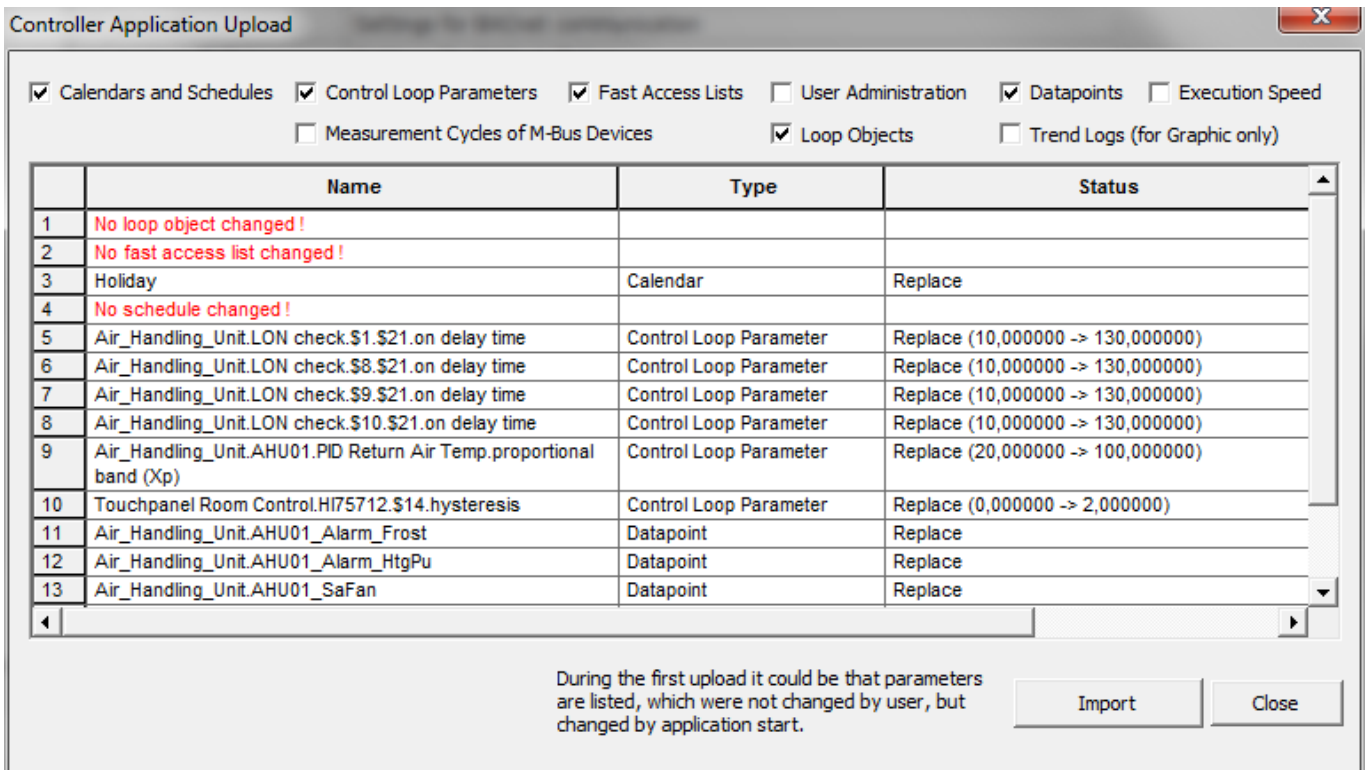


On the top, the uploadable items are shown.

4. Check the items you want to upload. CARE instantly previews the found items in the table below by Name, Type and Status.

NOTE: The listed items are previewed and not uploaded yet. Upload will not be started unless clicking the Import button.

Example: In the following figure, calendars and control loop parameters are selected and previewed. In the Name column, the name of the calendar, schedule or control loop parameter is shown. In the Type column, the selected type 'Calendar' or 'Schedule' is shown.



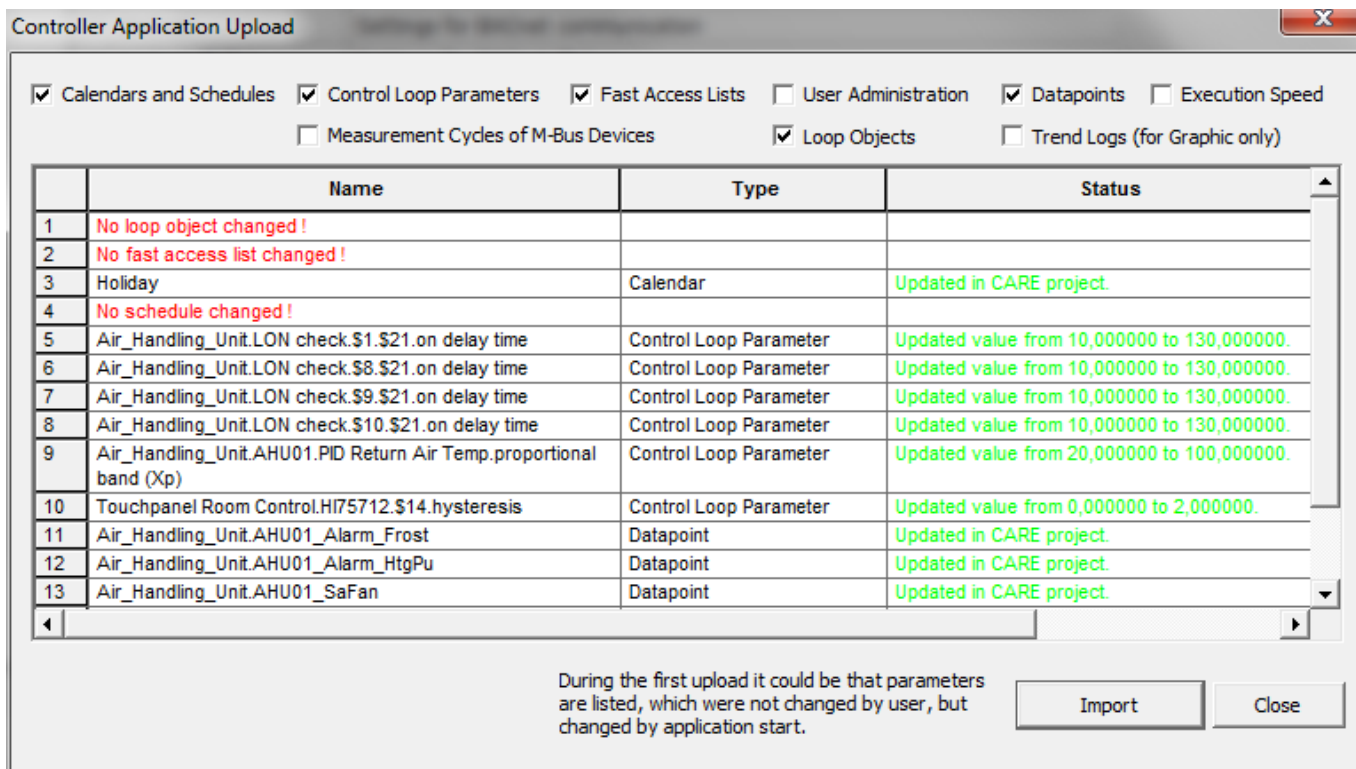
If there is no difference between the uploadable application items in the controller and the items in the CARE application, it is indicated by a red message in the Name column, e.g. No control loop parameter changed !

In the Status column, the type of action that will be applied to the uploadable item is shown. The following actions are possible:

Add
Item will be created in the CARE application

Replace
Item will be replaced in the CARE application

Delete
Item will be deleted in the CARE application



NOTE: Please note the hint at the bottom saying that during first upload, parameters could be listed which were not changed by the user but changed by the application start.

- If you are sure to upload the items previewed in the table, click the Import button. If you want to exclude items from the import, uncheck the corresponding items on the top before clicking the Import button. The table will be updated accordingly.

RESULT: After the import has been finished, the Status column will show the results as follows:

Successfully added (created), replaced or deleted items will be indicated by green text messages, e.g.
Created in CARE project.

If an item could not have been created, replaced or deleted, it is skipped from the upload as indicated by a red warning message, e.g.
Warning: Schedule upload is skipped in CARE project.

	Name	Type	Status
1	Company vacations	Calendar	Created in CARE project.
2	Holiday	Calendar	Created in CARE project.
3	Air_Handling_Unit.Time Program Plant enable	Schedule	Warning: Schedule upload is skipped in CARE project!
4	Air_Handling_Unit.Time Program Setpoint Room Temperature	Schedule	Warning: Schedule upload is skipped in CARE project!
5	No control loop parameter changed !		
6	SystemAdmin	User	Replaced in CARE project.
7	Guest	User	Replaced in CARE project.
8	LAB	User	Created in CARE project.
9	1	User	Created in CARE project.
10	httpuser	User	Created in CARE project.
11	No access right changed !		
12	No execution speed category changed !		

6. After the import (upload) is finished, click the Close button.

Creating and Uploading Log Files of Controller

The controller can save various important data in log files which can be used for support purpose.

In order to provide the appropriate log files to the Honeywell support, you can configure the connected controller by defining which log files should be logged.

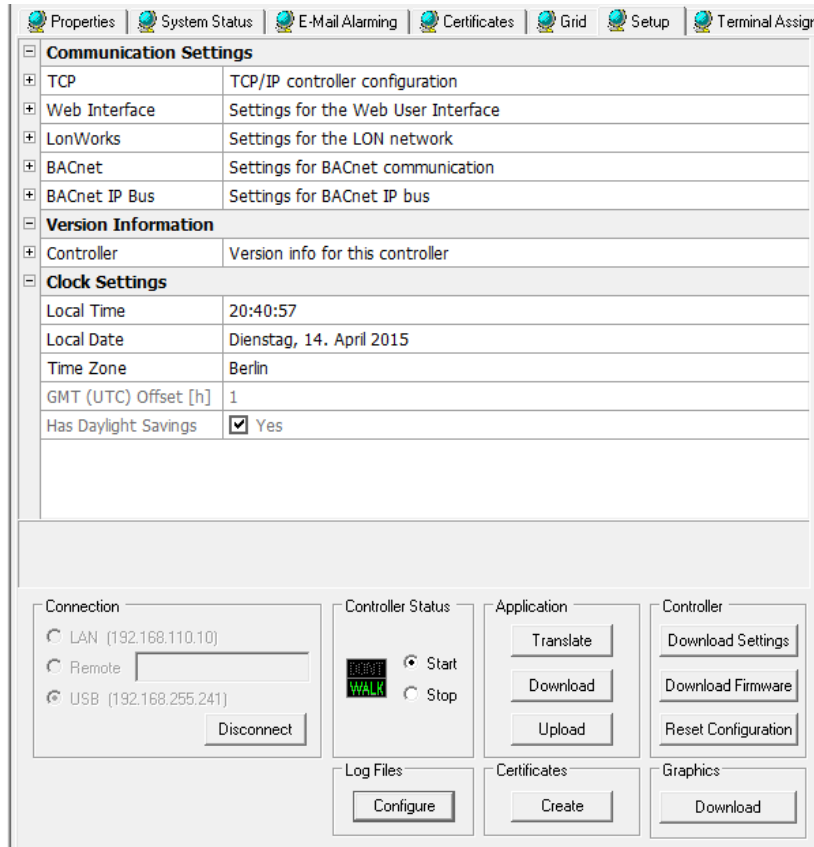
The following log files can be logged:

- System Logs
- Interface Logs
- BACnet device lists
- COV Subscriptions

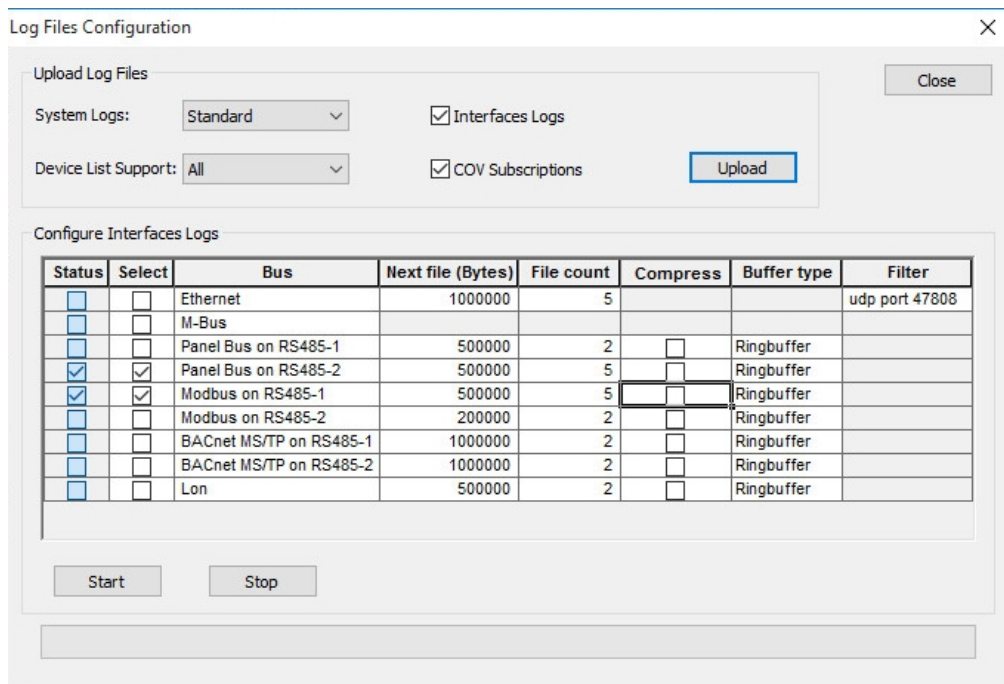
The log files collection includes 3 steps:

- Defining the log files that should be logged
- Starting the logging
- Uploading the log files into the CARE directory

Procedure 1. Select the *Setup* tab of the controller.



2. Connect to the controller.
3. Click **Configure** under **Log Files**.



4. Select desired options under **Upload Log Files**:
 - System Logs
System log files can contain the standard system files or an enhanced set of system log files which include more detailed information additionally.

- Device List
There are 2 types of BACnet device lists. A small one that includes all BACnet devices the controller has "talked" to and a bigger one that includes all BACnet devices on the same bus where the controller resides.
- Interface Logs
These are the log files of the ports. Each port can be individually selected for logging.
- COV Subscriptions
COV subscriptions

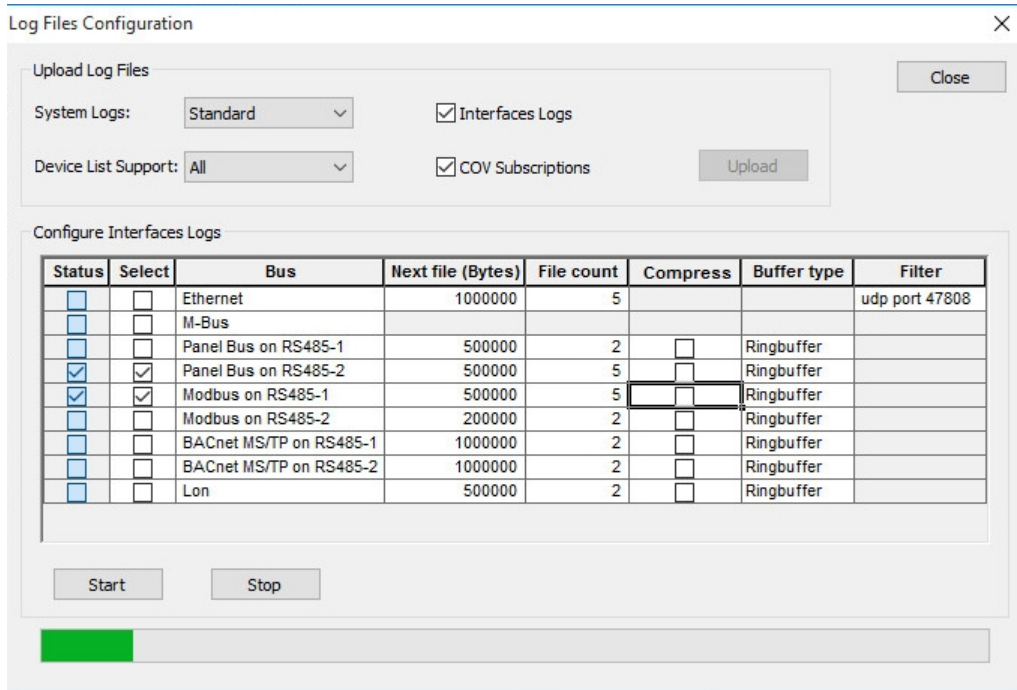
5. Select desired options under **Configure Interface Logs**:

- Status
Shows whether file logging for the port is currently running (checked) or not (unchecked)
- Select
Check the port for which log files should be created.
- Bus
Shows the various bus ports
- Next File
Shows the maximum file size in bytes of the corresponding log file.
- File count
Shows the maximum number of log files before the oldest file will be overwritten
- Compress
Check whether you want to compress the completed log file or not. Compressed and completed log files will be enhanced with timestamp when creating the compressed file. File names of uncompressed log files are extended with numbers 0 ... filecount-1.
- Buffer type
Click in the field to select the buffer type.
 - Ringbuffer
When the file count is exceeded, the oldest file be overwritten.

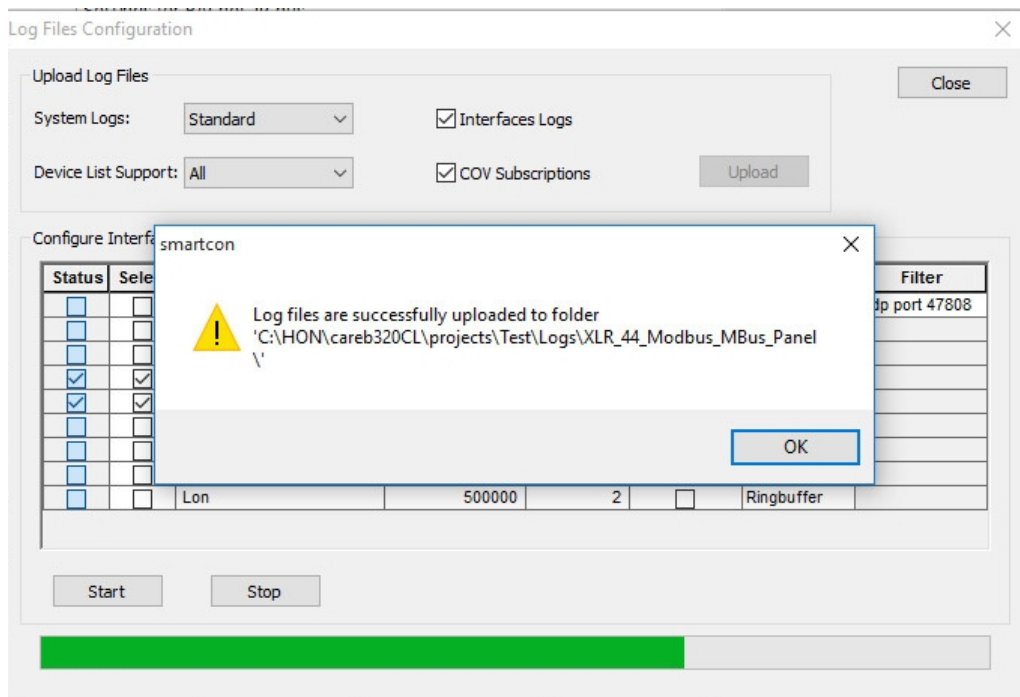
NOTE: If the log file will be compressed (see "Compress" column), there is no limit, that is, logging will be repeated indefinitely
 - Stop when full
The log stops when the file count is exceeded
- Filter
Applies to the Ethernet port only. Shows the default udp port 47808 through which BACnet traffic is logged on Ethernet.

6. Click **Start** button to start the logging function in the controller.

7. When logging is finished, click the **Upload** button.



The log files are uploaded and saved in the "Logs" sub folder of the project.

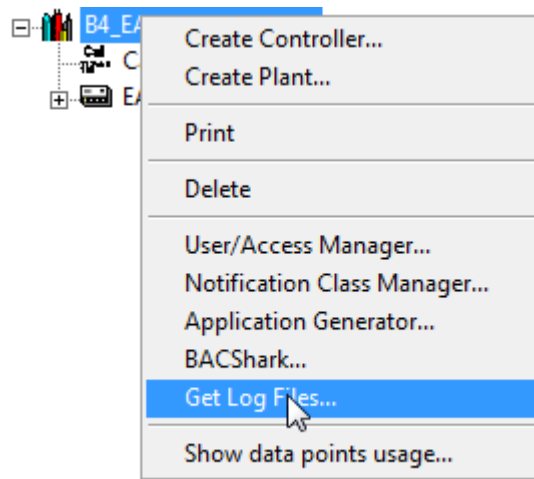


Uploading Log Files of All Controllers in Project

Each controller in a project can be individually configured which log files it should create and log (see "Creating and Uploading Log Files of Controller" section). After controllers have been configured for logging, you can upload the log files of all configured controllers in a project. You can select which log files of which controller you want to upload and which not.

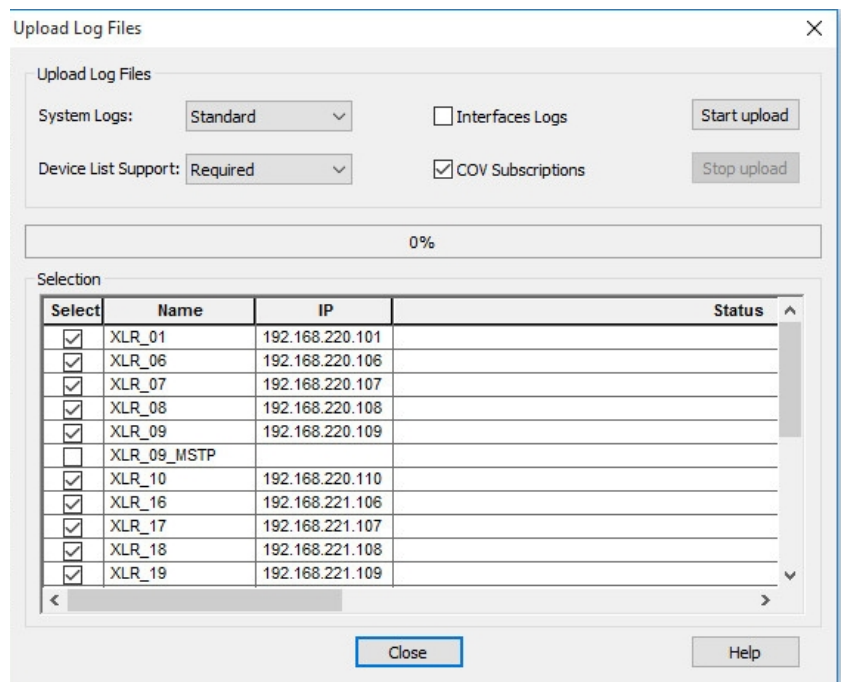
Procedure

1. Connect to the controller.
2. Right-click the Project folder, and then click **Get Log Files** in the context menu.



The *Upload Log Files* dialog box displays. It shows all controllers of the project with their name and IP address.

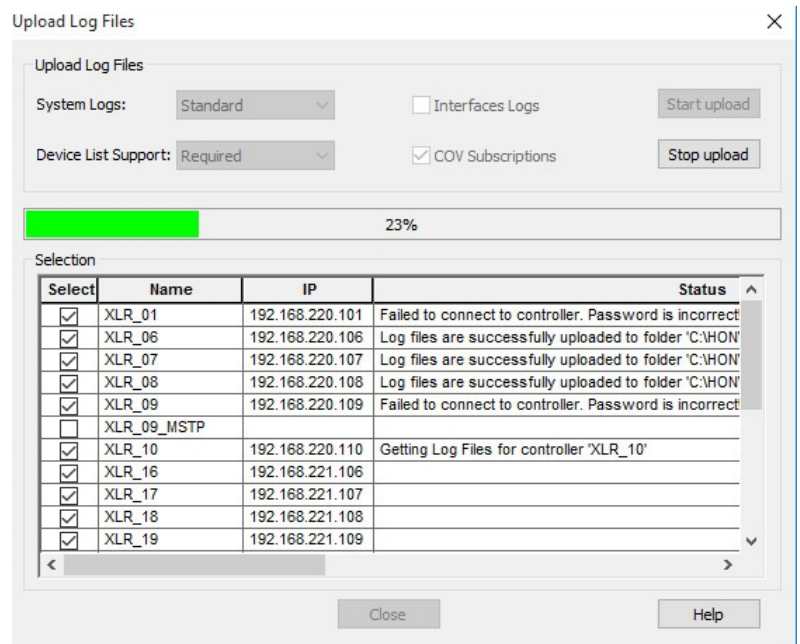
- Under **Selection**, check the controllers of which log files you want to upload. Uncheck the controllers of which log files you do not want to upload.



- Under **Upload Log Files**, select the log files you want to upload for the selected controllers:
 - System Logs
System log files can contain the standard system files or an extended set of system log files which include more detailed information additionally.
 - Device List
There are 2 types of BACnet device lists. A small one (Required) that includes all BACnet devices the controller has "talked" to and a bigger one (All) that includes all BACnet devices on the same bus where the controller resides.
 - Interface Logs
These are the log files of the ports. Each port can be individually selected for logging.

- COV Subscriptions
COV subscriptions

5. Click the **Start upload** button.
The upload process is starting. The controllers will be processed consecutively by connecting and then uploading the log files. In the **Status** column, the current status is displayed with messages.



6. To stop the upload, click the **Stop upload** button.
7. When logging is finished, click the **Close** button.

For each controller, the log files are saved in the "Logs" sub folder of the project.

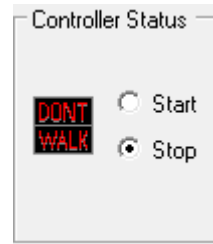
Stop/Start Application

- Purpose** To stop or start the application in the controller.
- Prerequisites** The controller must be physically connected to the CARE PC (see "Establish Physical Connection to BACnet Controller" section).
- Procedure**
1. Connect to the controller as described in the "Connect to BACnet Controller" section.



2. To stop the application in the controller, click the Stop radio button.

RESULT: The icon displays DON'T WALK in red color.



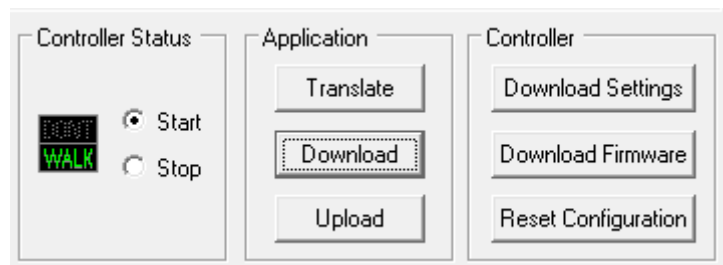
3. To start the application in the controller, click the Start radio button.



RESULT: The icon displays WALK in green.

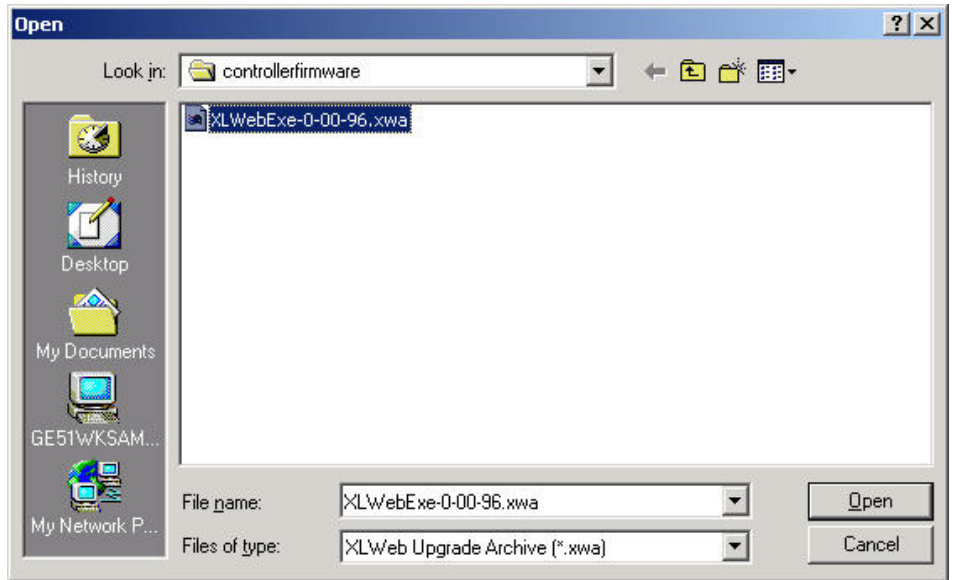
Download Firmware into BACnet Controller (Upgrade)

- Purpose** To download updated firmware in the controller.
- Prerequisites** The controller must be physically connected to the CARE PC (see "Establish Physical Connection to BACnet Controller" section).
- Procedure**
 1. Connect to the controller as described in the "Connect to BACnet Controller" section.

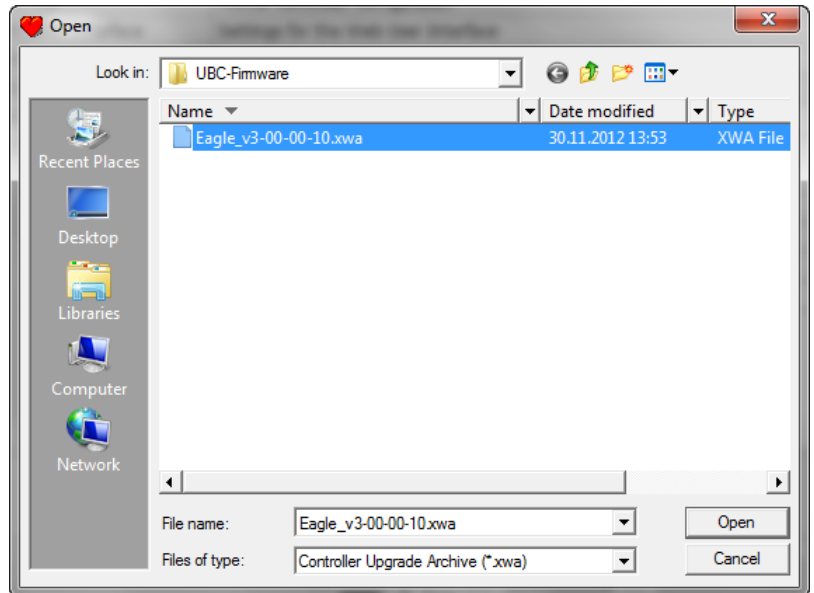


2. Click the Download Firmware button.

RESULT: The Open dialog box displays.



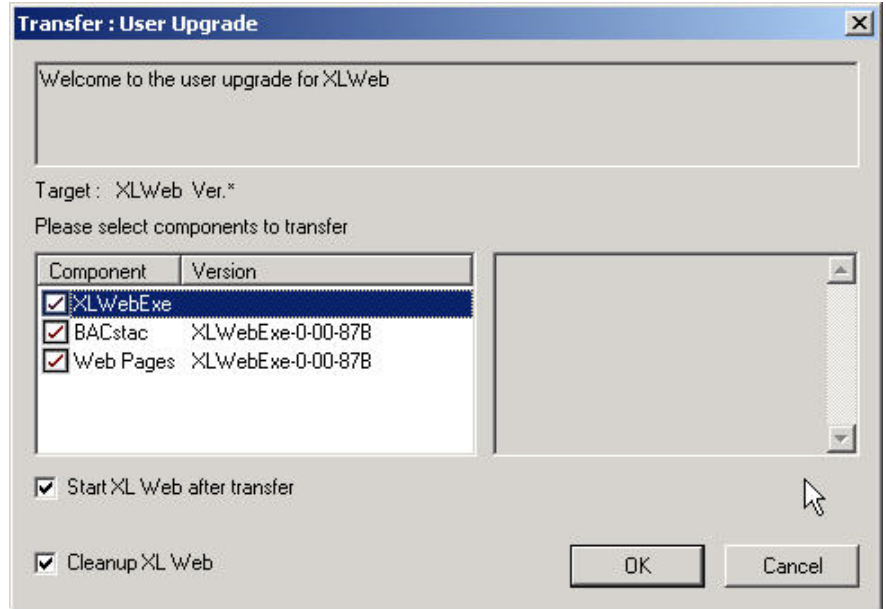
FALCON Firmware File Selection



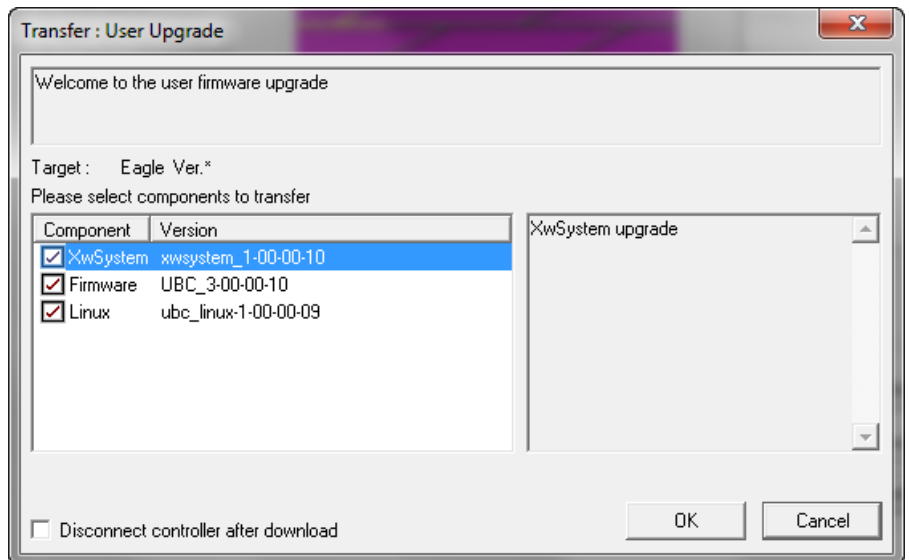
EAGLE Firmware File Selection

3. Navigate to the folder where the firmware file (.xwa) resides and select it.
4. Click the Open button.

RESULT: The Transfer: User Upgrade dialog box displays showing information such as target, name and version of the components.



FALCON Firmware Upgrade



EAGLE Firmware Upgrade

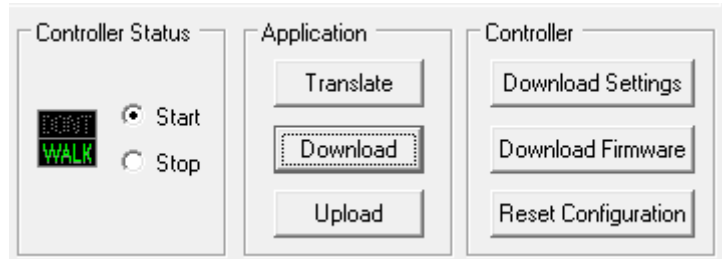
3. Select whether the application should be started after the upgrade or not by checking/unchecking the Start XL Web after transfer checkbox.
4. For the FALCON controller, select whether the controller should be cleaned up or not by checking/unchecking the Cleanup XL Web checkbox. When cleaning the controller, all applications other than the application to be downloaded will be deleted from the flash memory. It is recommended to check the option to save flash memory.
5. Click the OK button.

RESULT: The controller is stopped and the controller firmware will be downloaded. Status of the export is displayed in the process window.

Reset BACnet Controller Configuration

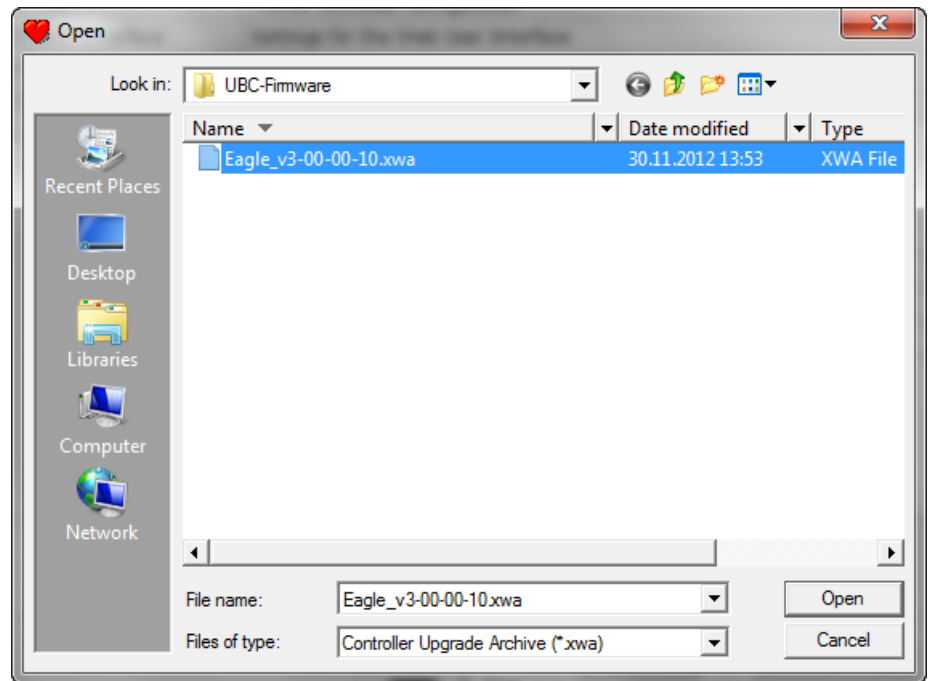
NOTE: This function applies to the EAGLE controller only.

- Purpose** To set the controller to the factory delivery state. This includes the removal of the settings and the application which must be downloaded again after the reset.
- Prerequisites** The Reset function is disabled if the CARE PC is physically connected to the BACnet controller via LAN cable even if the USB connection is currently the active connection between the two devices. To enable the function, remove the LAN connection by unplugging the LAN cable from the controller and/or CARE PC.
- Procedure**
 1. Connect to the controller as described in the "Connect to BACnet Controller" section.



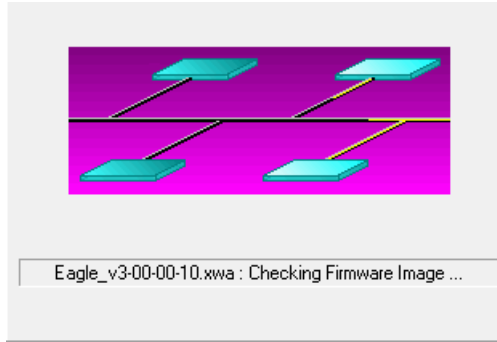
2. Click the Reset Configuration button.

RESULT: The Open dialog box displays.

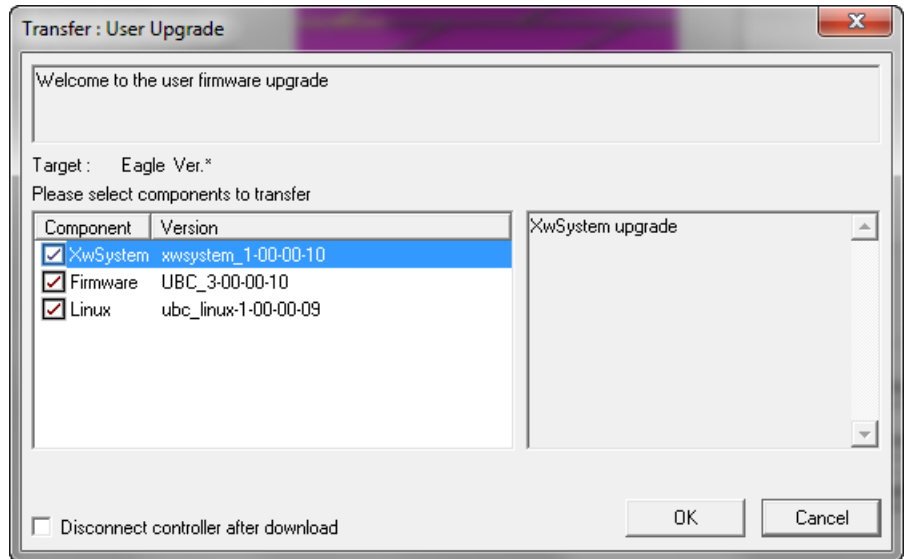


3. Navigate to the folder where the firmware file (.xwa) resides and select it.
4. Click the Open button.

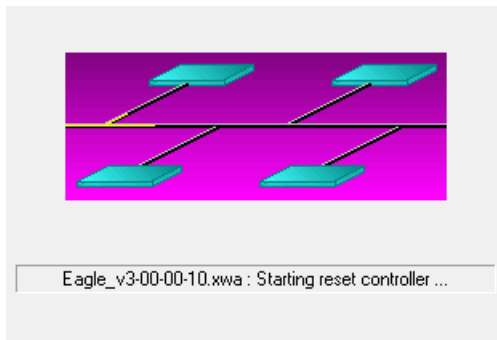
RESULT: CARE is checking the firmware image.



After successful check, the Transfer: User Upgrade dialog box displays showing the components. No components can be selected.



5. Check Disconnect controller after download if you want to reset multiple controllers. Uncheck Disconnect controller after download if you want to continue immediately with the same controller.
6. Click the OK button to start the configuration reset.



RESULT: After the reset has been successfully finished, the following message box is displayed.

Create Certificate

Prerequisites

In the following, basic knowledge of the management of certificates is presumed. Hence, please get familiar with basic knowledge of certificates management by reading the appropriate literature.

In CARE, certificates management includes the following steps:

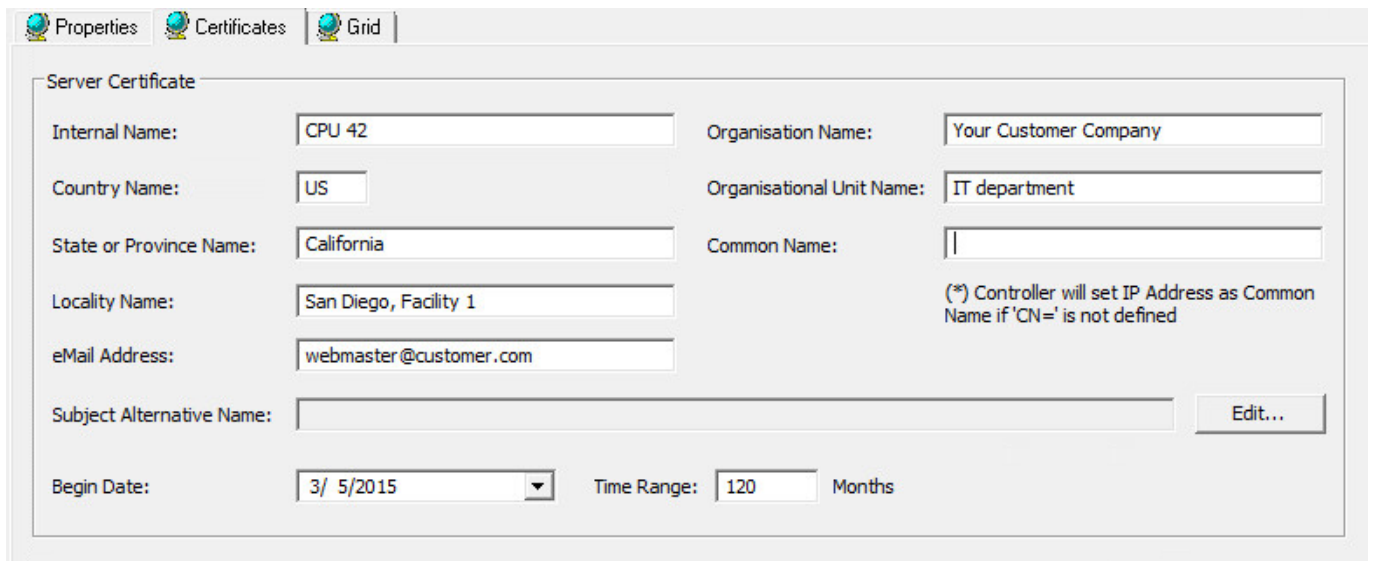
1. add certificate properties
2. create certificate

The properties for certificates can be defined on project and controller level. The certificate properties on project level will automatically applied to all newly created controllers of the project. The properties for a controller are only valid for this particular controller. If the properties on project level are changed they will be not reflected in existing controllers.

NOTE: The certificate properties to be entered on the Certificates tab, should be the data of the network domain owner or the operator not the data of the CARE engineer because the network domain owner or operator is the owner of the controller and the server certificate option.

Procedure

1. In the logical plant tree, select the project or the controller.
2. On the right pane, select the Certificates tab.



Server Certificate

Internal Name: CPU 42 Organisation Name: Your Customer Company

Country Name: US Organisational Unit Name: IT department

State or Province Name: California Common Name: |

Locality Name: San Diego, Facility 1 (*) Controller will set IP Address as Common Name if 'CN=' is not defined

eMail Address: webmaster@customer.com

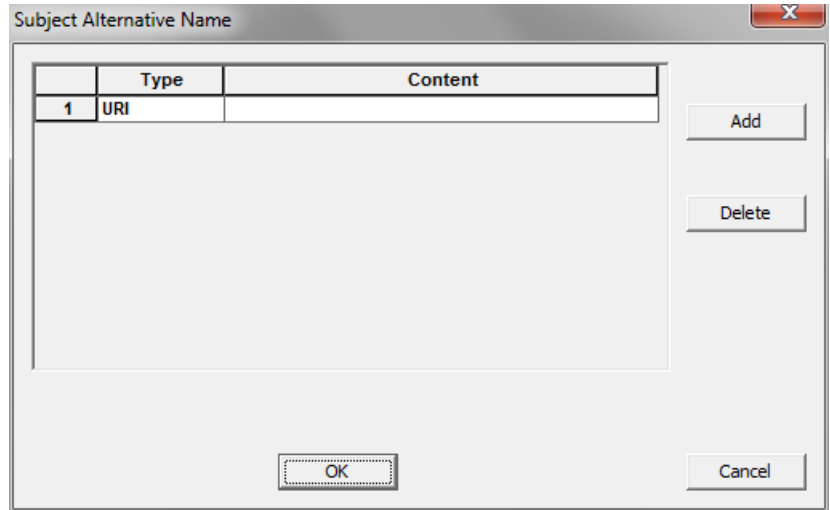
Subject Alternative Name: Edit...

Begin Date: 3/ 5/2015 Time Range: 120 Months

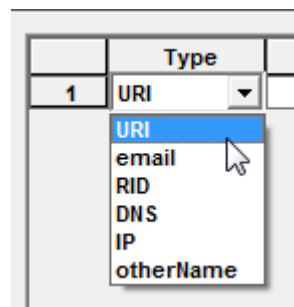
3. Enter the following properties:

- Internal Name
- Country Name
- State of Province Name
- Locality Name
- eMail Address
- Organisation Name
- Organisational Unit Name
- Common Name

4. In **Subject Alternative Name**, click **Edit...** button to define the subject alternative name as follows:

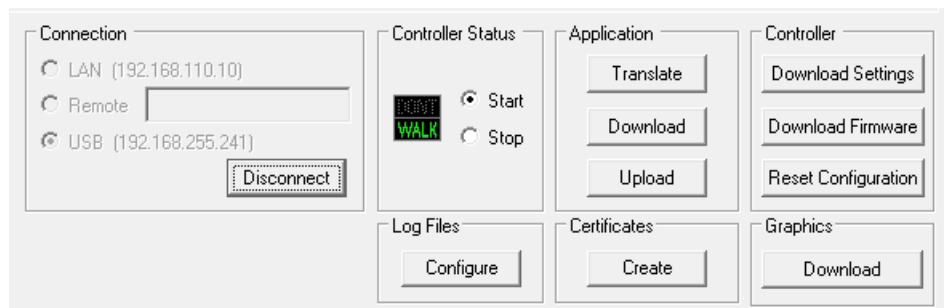


a. In the **Type** column, click into the cell, and then select the type:

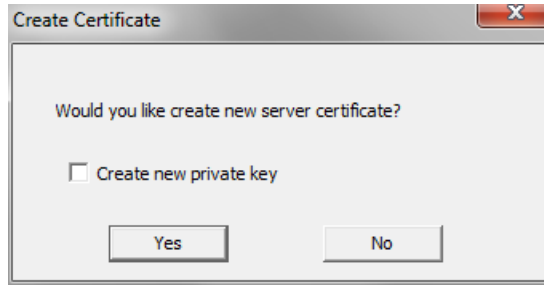


- b. In the **Content** column, enter an address (name).
- c. To add further alternative names, click the **Add** button and repeat steps a and b.
- d. To delete a row, highlight the row, and then click the **Delete** button.
- e. Click OK to save settings.

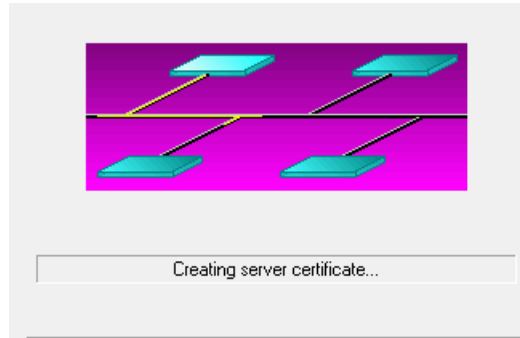
- 5. From the **Begin Date** drop- down listbox, select a start date in the calendar which defines the start of the valid period for the certificate.
- 6. In the **Time Range** field, enter the number of months (default = 120 months).
- 7. Select the controller.
- 8. On the right pane, select the Setup tab.
- 9. Connect to the controller.



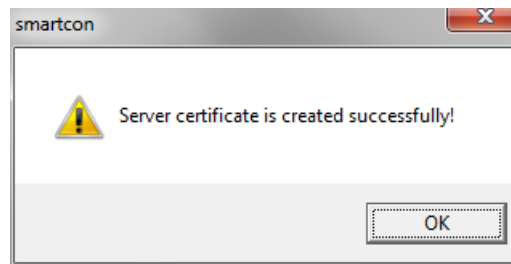
- 10. Under **Certificates**, click the **Create** button.
- 11. In the Create Certificate dialog box, check **Create new private key** if you want to create a new private key. When checking this option, the creation will take longer.



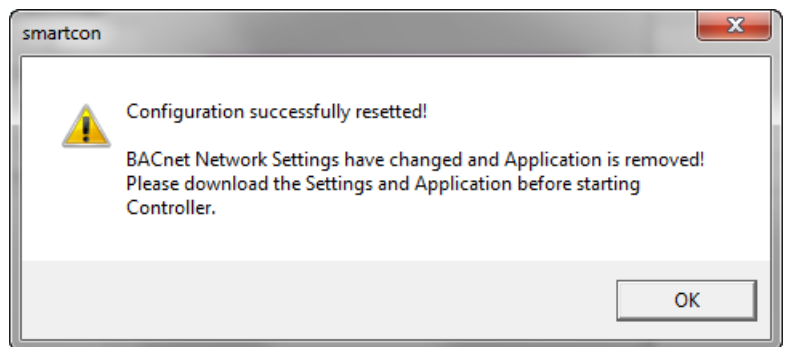
12. Click **OK** to start the creation process. The controller is creating the certificate.



13. The following message box displays after the successful creation.



14. Click **OK** to confirm the message.



15. Click **OK** to close the message box.

16. Continue by downloading the settings and the application.

Purpose Configure BACnet controller for Modbus operation.

Modbus operation is based on a master-slave communication between one Modbus Master device and one or up to 63 Modbus slave devices. Communication between the master and the slave devices will be established via a modbus interface that is defined through bit-addressable data items (Discrete Inputs, Coils) and word-addressable data items (Input Registers, Holding Registers) which can be mapped to datapoints of the BACnet controller application.

NOTE: By default, the BACnet controller operates as a Modbus Master and Modbus devices operate as Modbus slaves. The BACnet controller cannot operate as Modbus slave.

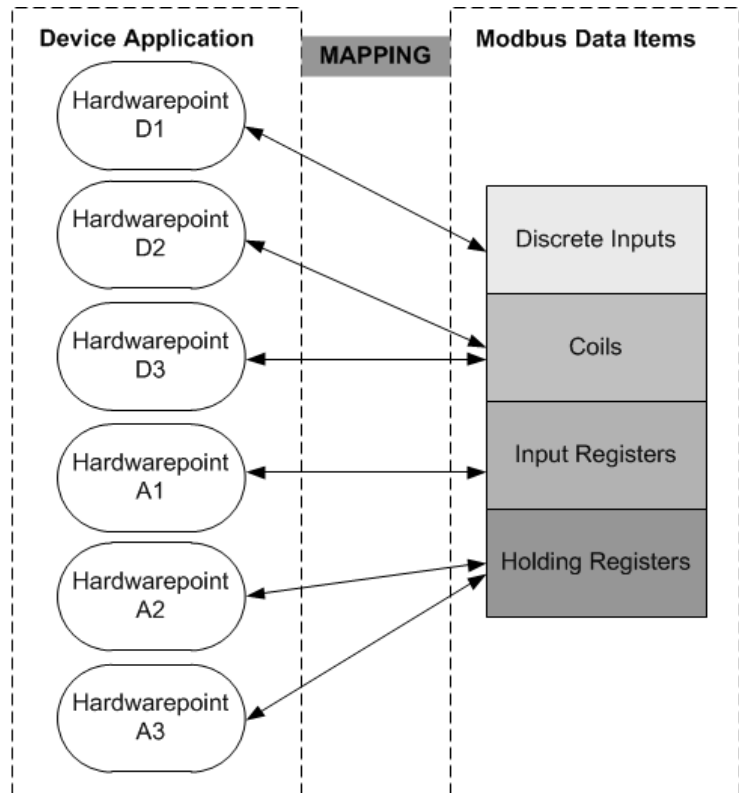


Fig. 4. Modbus Interface / Addressing Model

The following table shows the Modbus data model:

Data Item	Addressing-Type	Read-Write
Discrete Inputs	Bit	Read-Only
Coils	Bit	Read-Write
Input Registers	“Word” (16 Bit or 32 Bit)	Read-Only
Holding Registers	“Word” (16 Bit or 32 Bit)	Read-Write

The physical Modbus communication can be established via the RS485 1 or the RS485 2 interface.

CARE Engineering

In CARE, you create the Modbus master and slave device(s) and map the datapoints of the CARE application to the registers of the Modbus devices. The mappings will be downloaded with the application.

Prerequisites

Please make yourself familiar with common Modbus standards and technology by reading the corresponding standard work:

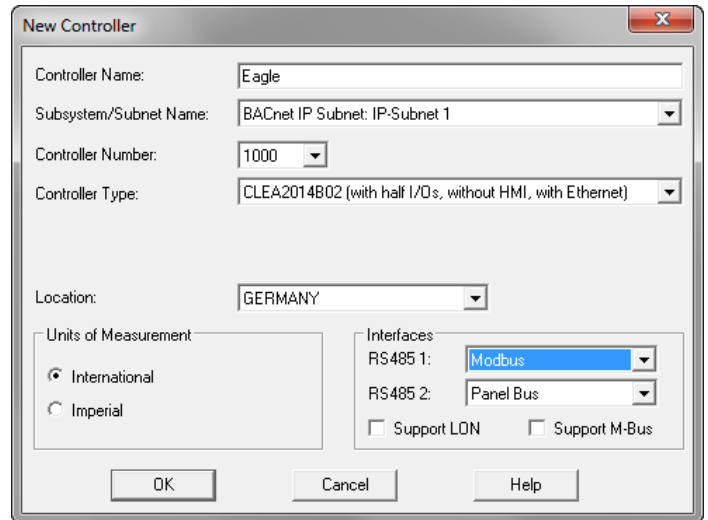
- The Modbus protocol is described in the below listed two documents, which can be found at www.modbus.org :
 - Modbus_over_serial_line_V1_02.pdf
 - Modbus_Application_Protocol_V1_1b.pdf

- The MVC Modbus Troubleshooting Guide can help you also.

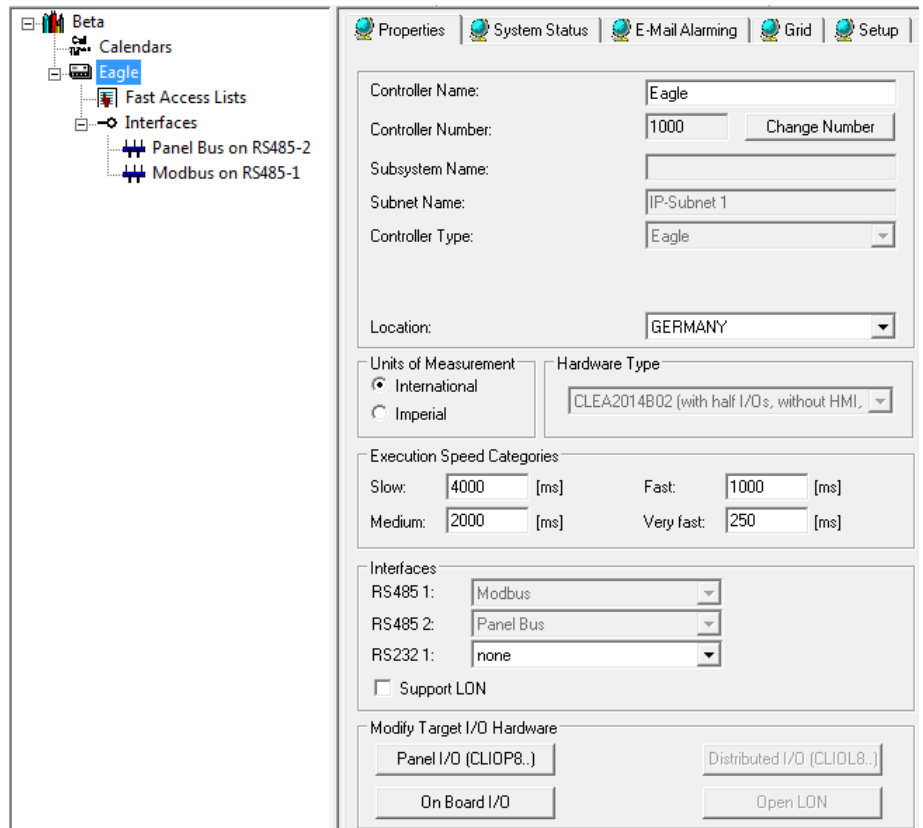
NOTE: Use the up-to-date versions of the documents.

Procedure

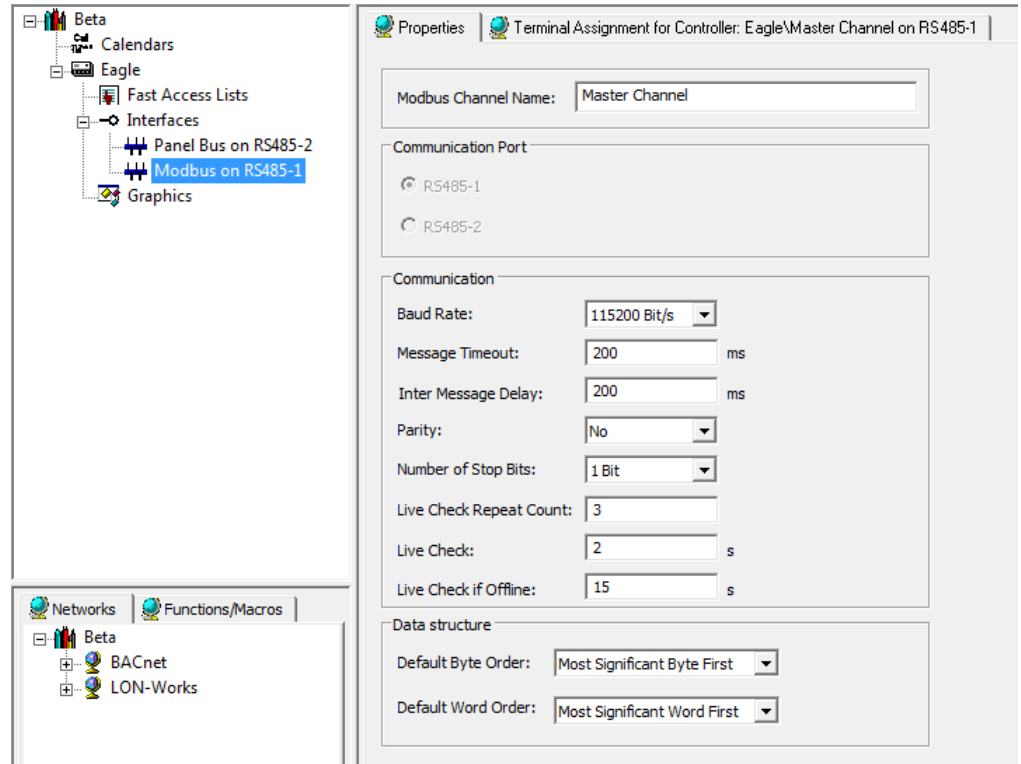
1. Create the BACnet controller with 'Modbus' selected for either the RS485-1 or RS485 2 interface. Note that only one RS 485 (1 or 2) interface can be used for Modbus communication.



RESULT: The controller will be created as master controller. The Modbus interface is created and added to the **Interface** folder in the tree. The controller properties are displayed on the *Properties* pane.



2. In the project tree, select the Modbus interface.



3. On the *Properties* pane, define the Modbus channel properties as follows:
 - a. In **Modbus Channel Name**, enter a name for the channel.
 - b. In **Baud Rate**, select the baud rate.
 - c. In **Message Timeout** (20 ..50000 ms), do not change the default value of 200 ms, unless you need to do so in order to cure response issues with the Modbus slaves. The message timeout is the max. waiting time in ms of a master for a poll response message from a slave. Standard slaves response within 50-100 ms. Please check the documentation of the slave device.
 - d. In **Inter Message Delay** (0 ..1000 ms), leave the default setting or change it if you want to cure response issues with the Modbus slaves. The inter message delay is the time in ms the master waits before it sends the next request. The set value affects bus performance and stability with reciprocal effect. Entering values between 0 ms and 200 ms are suitable for experimenting with performance and stability. When entering 0 ms, you will have the best performance but irregularities in the master-slave communication may occur which results in worse stability. When entering values greater than 200 ms, you will have a high stability but the performance might slow down to an inappropriate level. The default value of 200 ms can be a good value considering both, performance and stability.
 - e. In **Parity**, select the parity for communication error checking from:
 - No
 - Even
 - Odd
 - f. In **Number of Stop Bits**, select the number of stop bits:
 - 1 Bit
 - 2 Bits
 - g. In **Live Check Repeat Count**, enter the number of live check repeats (1..10)
 - h. In **Live Check**, enter the repeat time for a missing response message when the live check repeat count is not off (1.. 20 s).

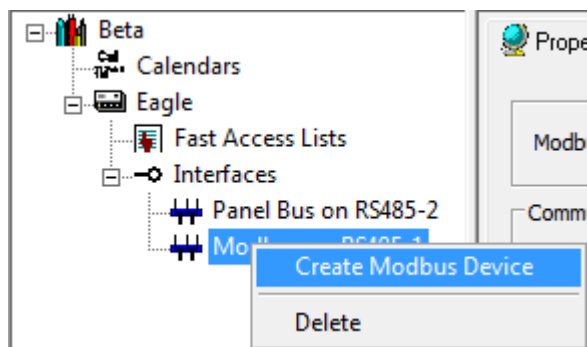
- i. In **Live Check if Offline**, enter the repeat time for a missing message when the live check count is off (2.. 60 s).
- j. In **Default Byte Order**, do not change the default value, unless you need to do so in order to cure response issues with Modbus slaves. If so, select the default byte order from:
 - Most significant Byte First
 - Lower significant Byte First

The byte order is a function of the Modbus device which defines whether the lower or the most significant byte is processed first by the BACnet controller. Each individual slave device may communicate with a different byte order to the BACnet controller for proper operation. The default byte order selection pre-defines the same byte order for all slave devices subsequently created (see following steps). A different byte order can be configured in the **Default Byte Order** menu of each individual slave device.

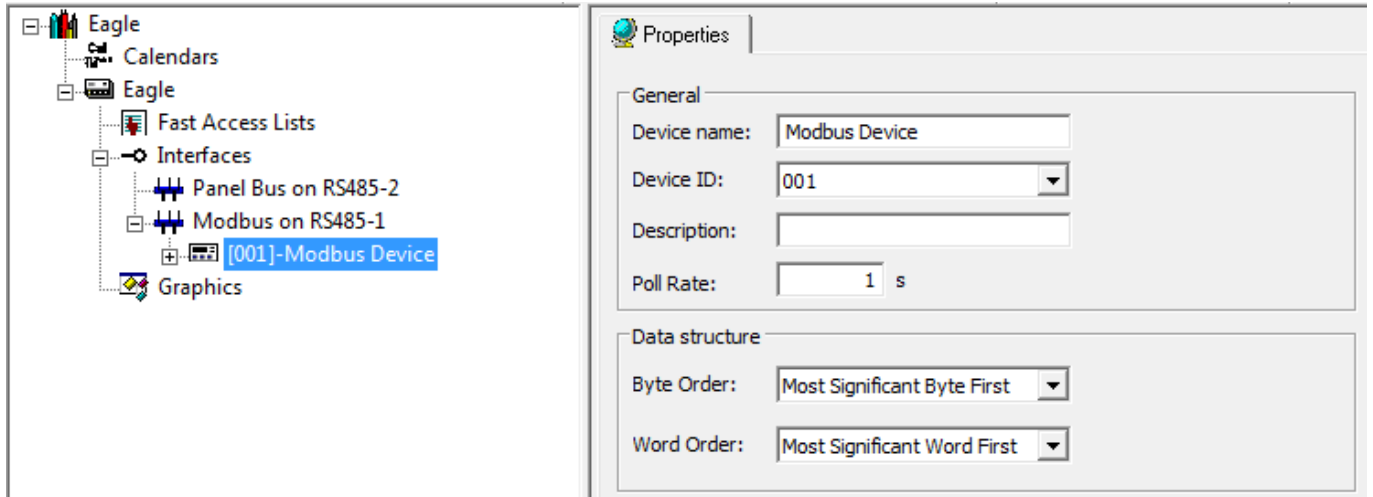
- k. In **Default Word Order**, do not change the default value, unless you need to do so in order to cure response issues with slave devices. If so, select the default word order from:
 - Most significant Byte First
 - Lower significant Byte First

The word order is a function of the slave device which defines whether the lower or the most significant byte is processed first by the BACnet controller. Each individual slave device may communicate with a different word order to the BACnet controller for proper operation. The default word order selection pre-defines the same byte order for all slave devices subsequently created (see following steps). A different byte order can be configured in the **Default Byte Order** menu of each individual slave device.

- 4. Create a slave device, by doing one of the following:
 - Insert an existing Modbus device from the Device Library (see “Insert Modbus device from Device Library” section.
 - or
 - Create a Modbus slave device manually as described in the following steps.
- 5. Right-click on the Modbus interface, and then click **Create Modbus Device**.



RESULT: The slave device is created and its properties are displayed on the *Properties* pane.



6. On the Properties pane, define the properties for the slave device as follows:

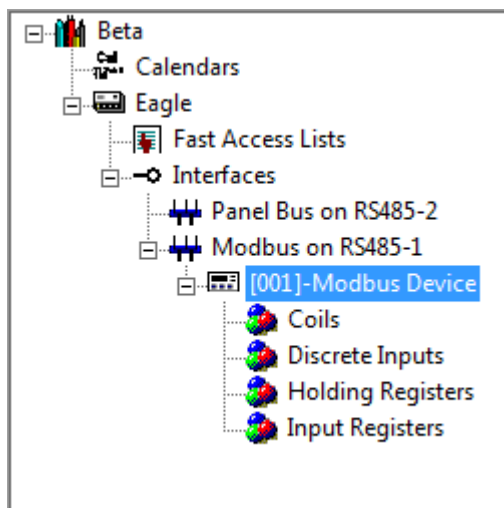
- a. In **Device Name**, enter a name for the slave device.
- b. In **Device ID**, enter the Modbus ID of the slave device. One and the same device ID must not be assigned to multiple devices.
- c. In **Description**, enter a more detailed description if desired.
- d. In **Poll Rate**, enter the time for polling values/states in the slave device (0 .. 6000 s). When entering 0, the devices are polled with 100 ms.
- e. In **Byte Order**, the default byte order as defined for the channel is pre-selected (see Interface properties). Dependent on the slave device specification, change the byte order if necessary and select from:
 - Most significant Byte First
 - Lower significant Byte First

The byte order is a function of the slave device which defines whether the lower or the most significant byte should be processed first by the BACnet controller. Each individual slave device will communicate with its byte order to the BACnet controller for proper operation.

- f. In **Word Order**, the default word order as defined for the interface is pre-selected (see Interface properties). Dependent on the slave device specification, change the word order if necessary and select from:
 - Most significant Byte First
 - Lower significant Byte First

The word order is a function of the slave device which defines whether the lower or the most significant byte should be processed first by the BACnet controller. Each individual slave device will communicate with its word order to the BACnet controller for proper operation.

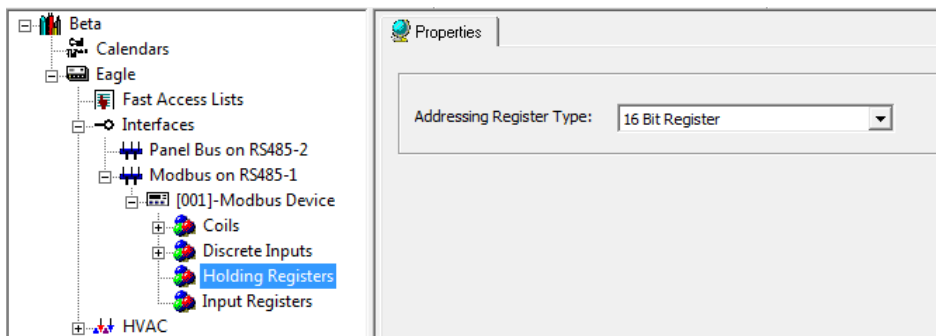
7. Double-click on the slave device to show its data items (coils, inputs and registers).



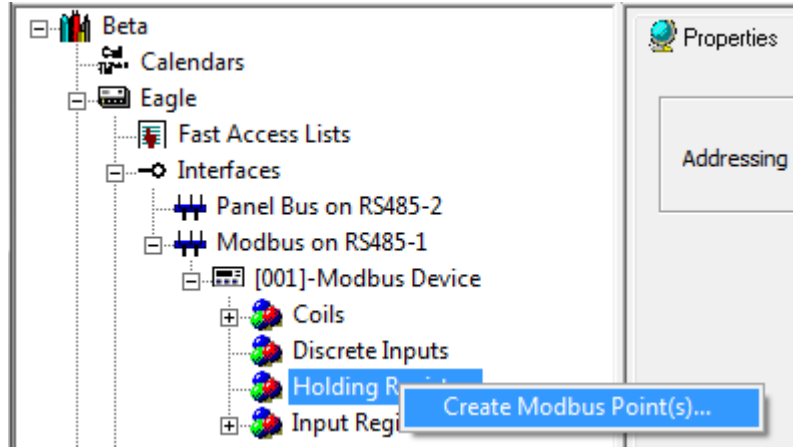
- 8 For the coils and discrete input data items, the addressing register type is pre-defined to '16 Bit Register' and cannot be changed. For the holding and input registers data items, the addressing register type can be defined to 16 Bit or 32 Bit.
9. To define the addressing register type for registers, click the **Holding Registers** or **Input Registers** data item in the tree, and then select the addressing register type from the **Addressing Register Type** drop-down listbox.

NOTE: The addressing register type selection is only possible before modbus points have been created. The selection of the addressing register type pre-defines the choice for the data structure of the modbus points created later. The '32 Bit Register' type only allows 32 Bit data types. The '16 Bit Register' type allows 16 Bit and 2 Bit data types.

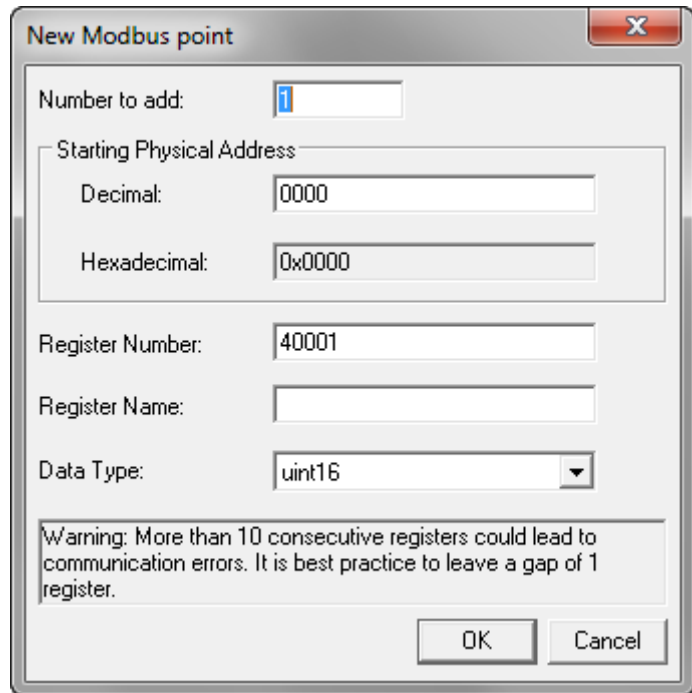
If the addressing register type is set to '16 Bit Register' and later the data type for a modbus point is set to 'int32', 'uint 32', or 'float', 2 physical addresses will be occupied.



10. For each data item (coil, discrete input, register) you can:
 - create Modbus points
 - address Modbus points
 - define the data structure of Modbus points
11. For holding and input registers you can:
 - map analog input points to Modbus points
12. For coils and discrete inputs you can:
 - map binary input points to Modbus points
13. Firstly, right-click on the data item, for example, **Holding Registers** and then click **Create Modbus Point(s)...**



RESULT: The *New Modbus point* dialog box displays.

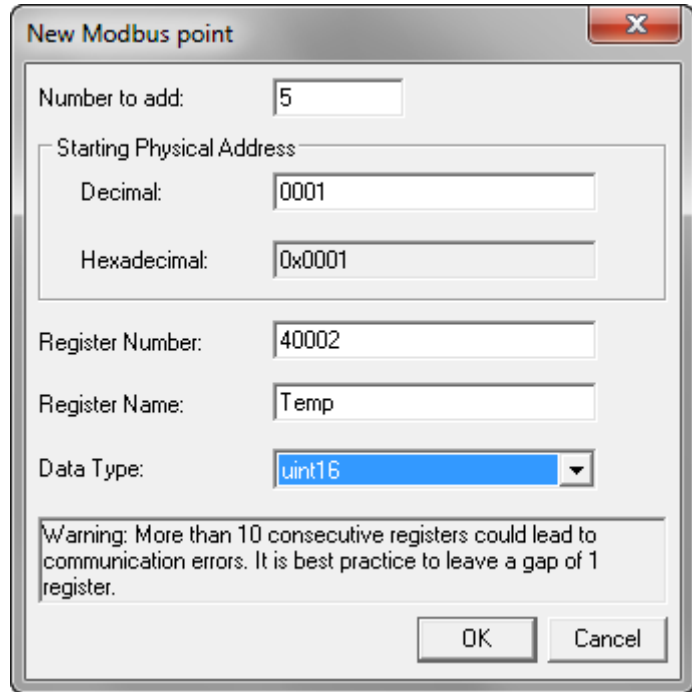


14. Create Modbus points as follows:

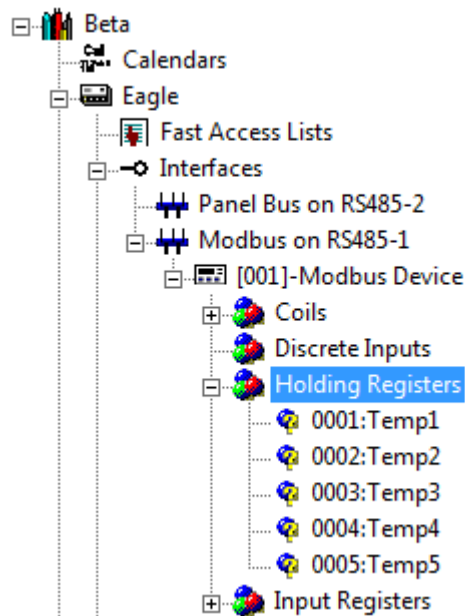
- a. In **Number to add**, enter the number of points you want to create.
- b. In **Decimal**, enter the decimal start number for the first physical address. The addresses will be enumerated consecutively starting with the value entered. In **Hexadecimal** the decimal number is displayed in hexadecimal format. The decimal value will be basis for the register number and vice versa.
- c. In **Register Number**, for holding registers the number is pre-defined in the range of 40001 and 49999 based on the value of the Decimal physical address and increased by 1. You can enter a higher value if desired. The registers will be enumerated consecutively starting with the value entered.
- d. In **Register Name**, enter an additional description if desired. The physical addresses plus the register names will be displayed in the tree.
- e. In **Data Type**, select the data type from:
 - bool
 - int16

- uint16
- int32
- uint32
- float

NOTE: If the addressing register type defaults to '16 Bit Register' and the data type is set to 'int32', 'uint 32', or 'float', 2 physical address entries will be occupied.



RESULT: The Modbus points are added to the **Holding Registers** folder.



15. To continue by defining properties, click the Modbus point in the tree.

The screenshot shows the 'Properties' dialog box for a Modbus point. It is organized into three main sections:

- Addressing:**
 - Register Type: Holding Registers
 - Physical Address:
 - Decimal: 0001
 - Hexadecimal: 0x0001
 - Register Number: 40002
 - Register Name: Temp1
- Data structure:**
 - Data Type: uint16
 - Bit Unpack: 01
 - Message Type: Read Only
- Point Mapping:**
 - CARE Datapoint: none
 - Heartbeat: 0 sec

16. On the *Properties* pane, define the Modbus point properties as follows:


NOTE: Not all properties are available for each data type item.

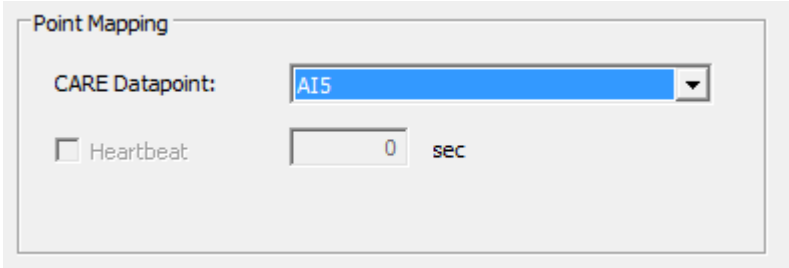
- a. In **Register Type**, the register type is displayed.
- b. In **Physical Address**, you can change the physical address.
- c. In **Register Number**, you can change the number of the register.

Please refer to descriptions in step 14 for information on dependencies of physical address and register number.

- d. In **Register Name**, enter an additional description for the point if desired. The physical address plus the register name is displayed in the tree and will be changed accordingly.
- e. In **Data Type**, you can change the data type by selecting from:
 - bool
 - int16
 - uint16
 - int32
 - uint32
 - float

NOTE: If the addressing register type defaults to '16 Bit Register' and the data type is set to 'int32', 'uint 32', or 'float', 2 physical address entries will be occupied.

- f. In **Bit Unpack**, the unpack bit is displayed.
- g. In **Message Type**, select the message type from:
 - Read Only
 - Read and Write
 - Write Only
- h. In **CARE Datapoint**, select a CARE datapoint for point mapping. As long as no datapoint has been mapped to a Modbus point, the point icon in the tree will demonstrate this by showing a yellow question mark in its icon .
- i. In **Heartbeat**, enter a value in sec. The heartbeat defines the regular time interval in which the datapoint value is sent on the Modbus even if the value has not change. Applies to 'write only' message type for coils and holding registers only.



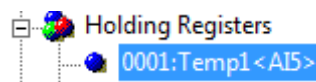
RESULT: The mapped CARE datapoint is added to the Modbus point name and will be shown in the tree as follows:

Modbus point name:<CARE point name>

Example:

0001:Temp1:<A15>


(in this example, the register is named to Temp1)



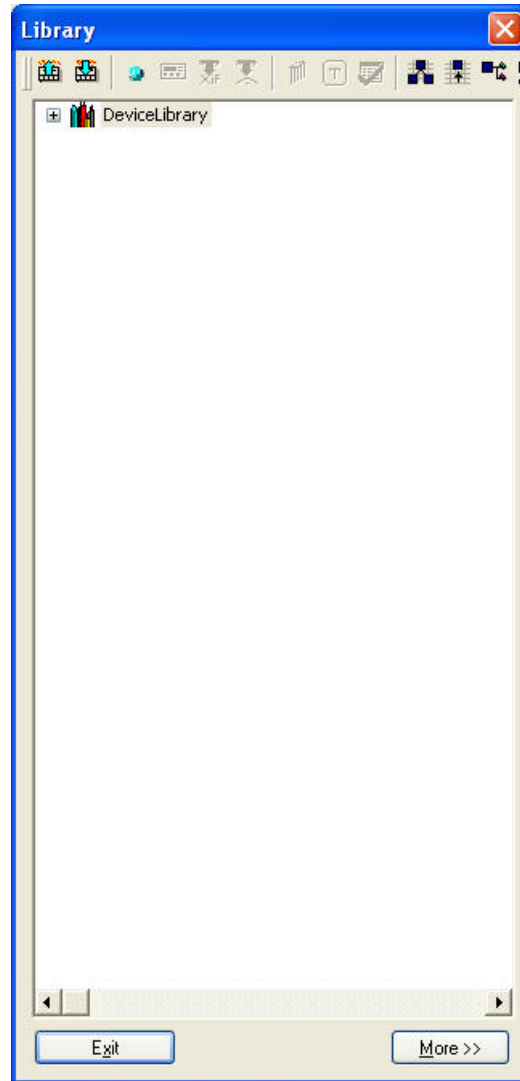
Insert Modbus Device from Device Library

For general introduction into the device library functions, please read the "Device Library" section.

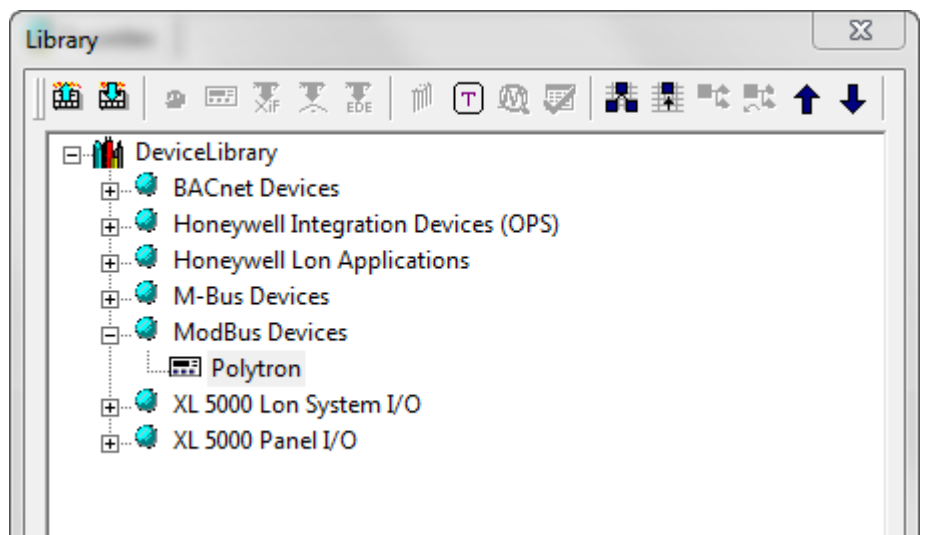
Procedure

1. Open the Device Library by clicking the device library icon  in the CARE tool bar.

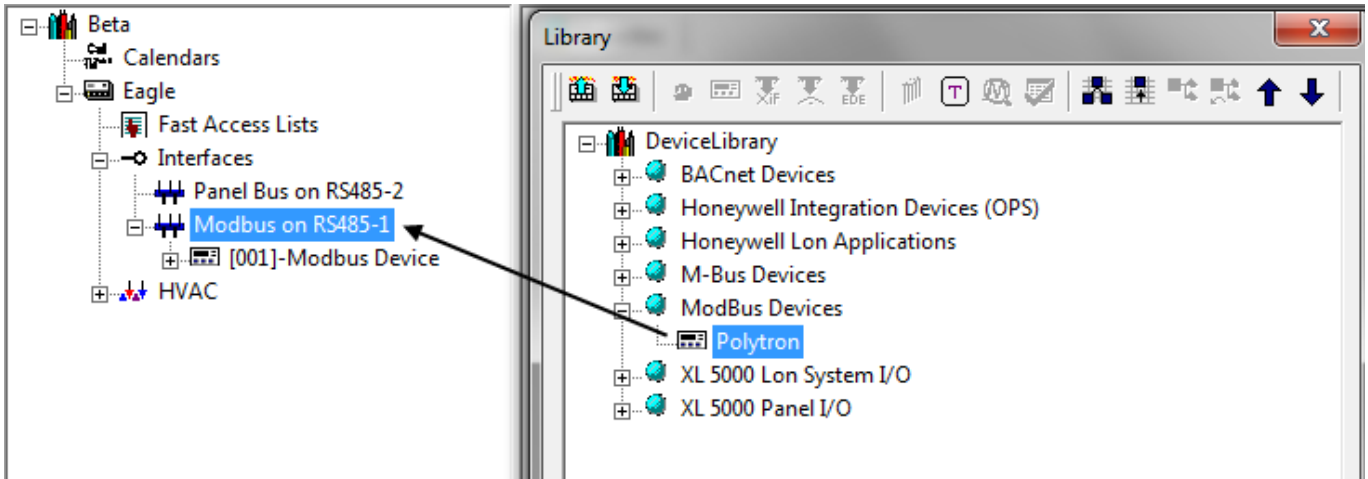
RESULT: The *Library* displays.



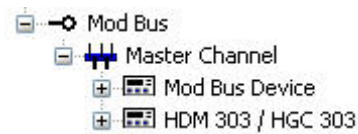
- Expand the **Device Library** tree and browse to the **Modbus Devices** folder.



- Select the Modbus device and drag&drop it to the Modbus interface in the project tree.



RESULT: The Modbus device is inserted to the interface.

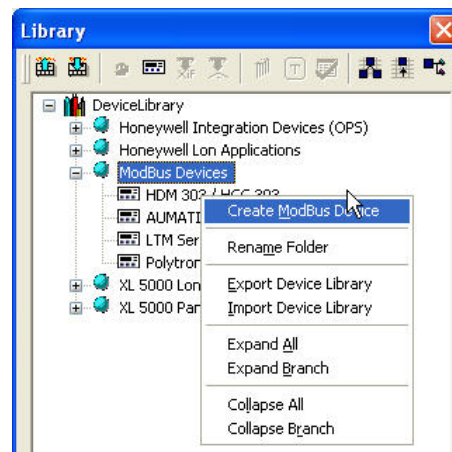


4. If desired, you can change the Modbus device properties as described in the basic procedure for creating a Modbus device in the “Modbus Support” chapter.

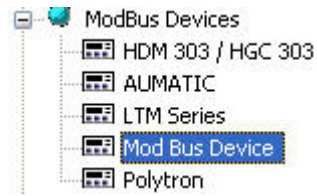
Create Modbus Devices in the Device Library

Procedure

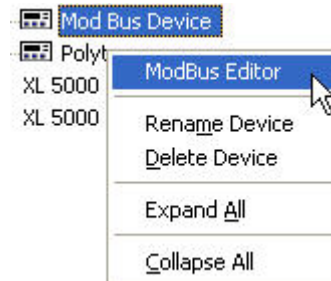
1. In the Library, expand the DeviceLibrary tree.
2. Do one of the following:
 - a. Right-click the **Modbus Devices** folder, and then click **Create Modbus device**.
 - b. Or, select a Modbus device in the project tree and drag&drop it onto the *Modbus Devices* folder in the Library.



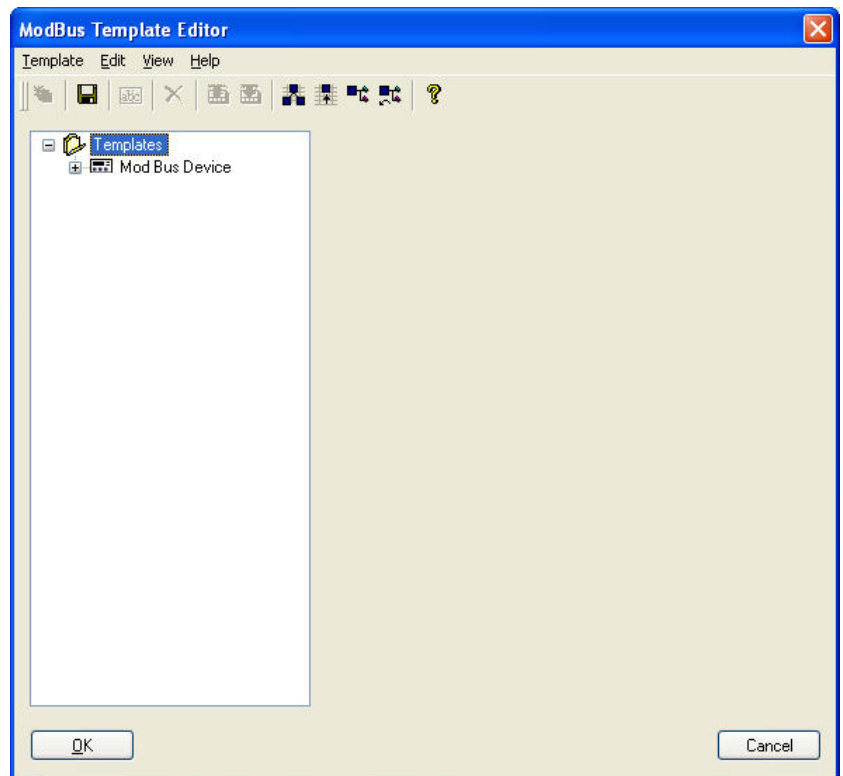
RESULT: A new Modbus device is added to the **Modbus Devices** folder.



3. Right-click the **Modbus Device**, and then click **ModbusEditor**.

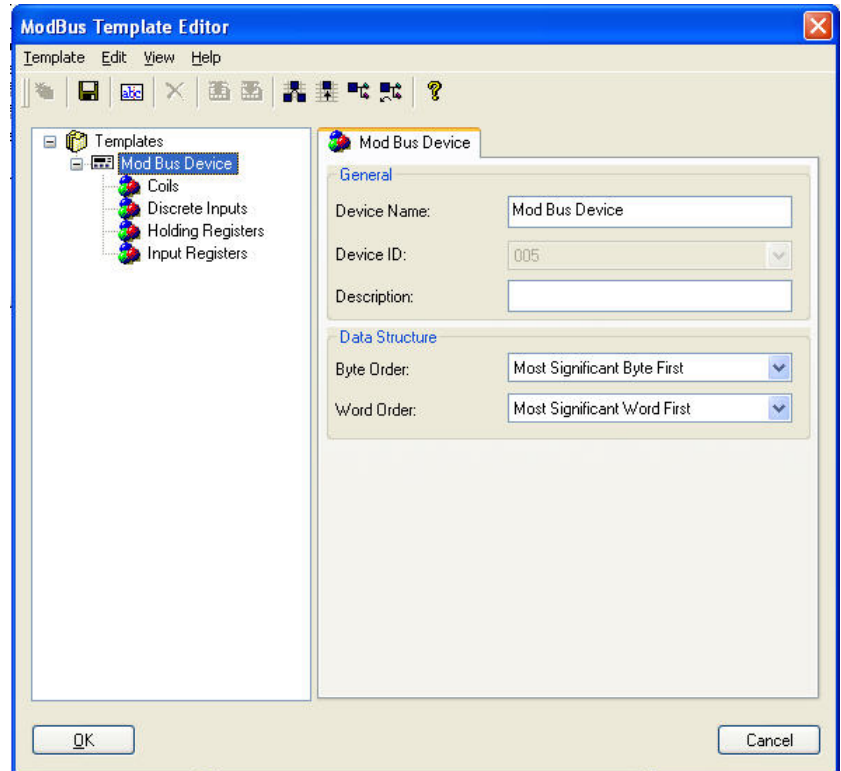


RESULT: The **Modbus Template Editor** displays.



4. Double-click the **Modbus Device**.

RESULT: On the *Modbus Device* pane on the right, the general properties are displayed. In the tree on the left, the device functions are displayed.



5. Configure the Modbus device in the same way as described in the basic procedure in the “Modbus Support” chapter.

After you have finished the creation of the Modbus device via Modbus Template Editor in the Device Library, you can add the device to the Modbus project as described in the “Insert Modbus Device from Device Library” section.

M-Bus Support

Purpose Configure BACnet controller for M-Bus operation.

M-Bus operation is based on a master-slave communication between one M-Bus Master device (BACnet controller) and one or multiple M-Bus slave devices (sensors, actuators). Communication between the master and the slave devices will be established via M-Bus interface that is defined through data records (e.g. energy volume, flow temperature) which can be mapped to datapoints of the BACnet controller application.

The physical M-bus communication is established via the RS232 interface.

Prerequisites

Please make yourself familiar with common M-bus standards and technology by reading the corresponding standard work provided on the following website:

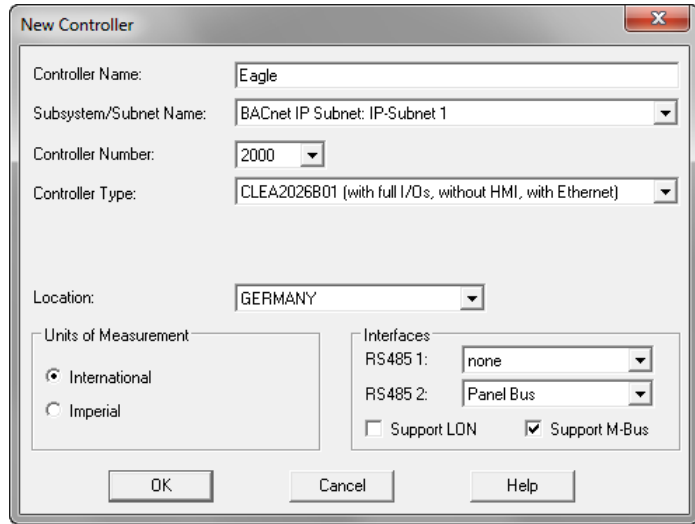
<http://www.m-bus.com/default.php>

CARE Engineering

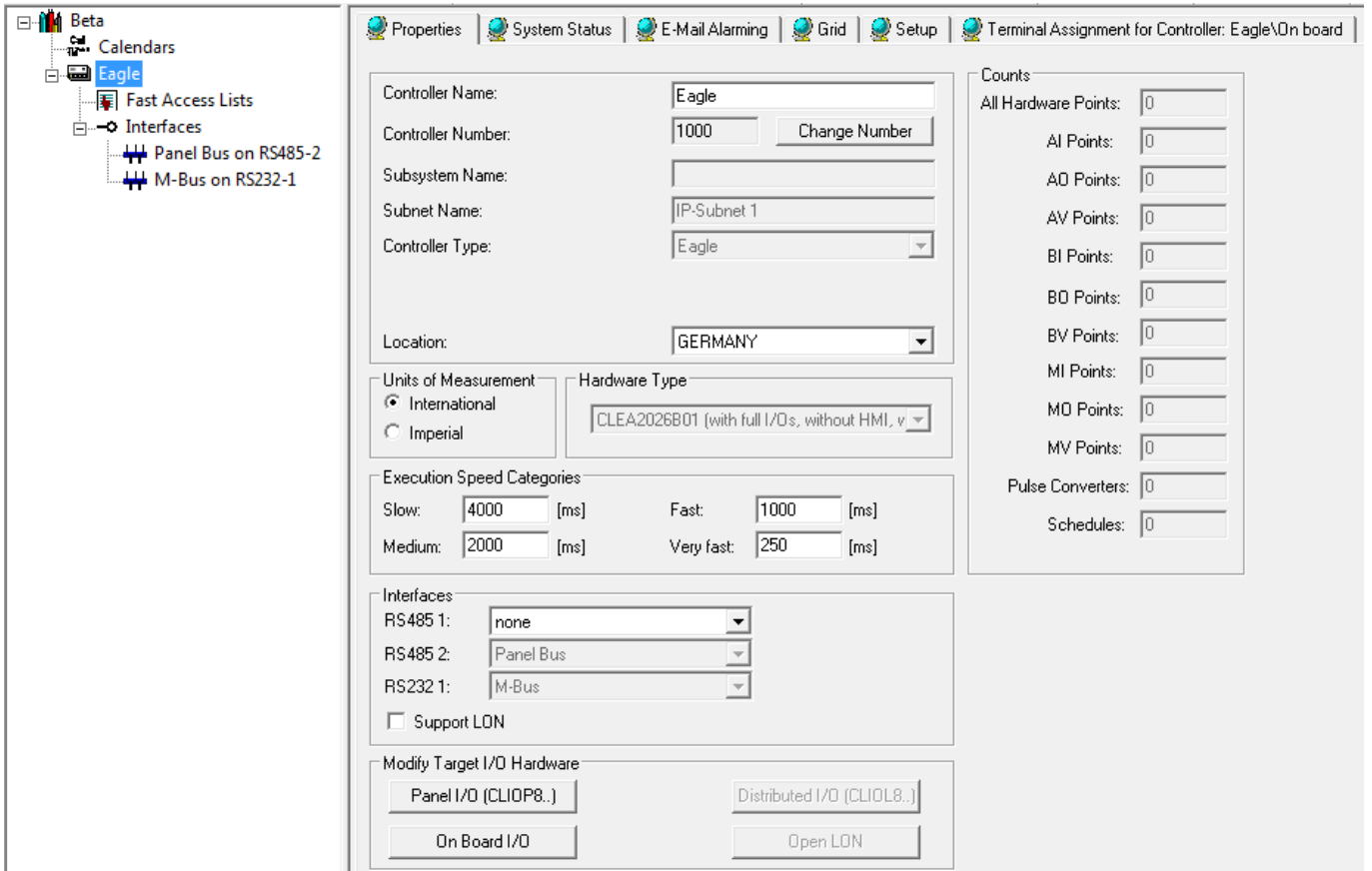
In CARE, you create the M-bus master (BACnet controller) and read the information of the slave device(s) from the M-bus. Then you map the datapoints of the CARE application to the data records of the M-bus devices. The mappings will be downloaded with the application.

Main Procedure

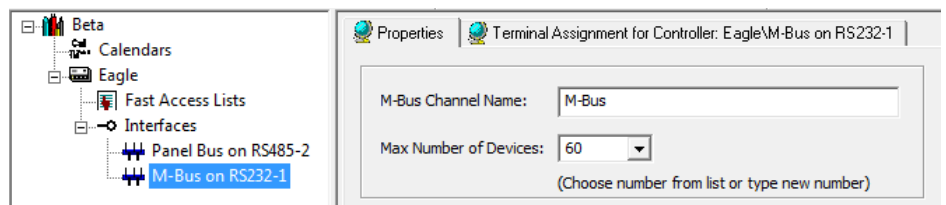
1. Create the BACnet controller with the ‘Support M-bus’ option selected.



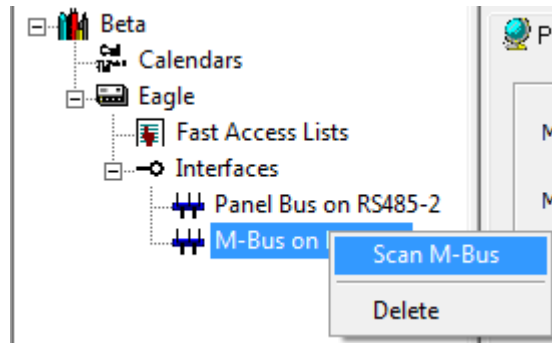
RESULT: The controller and the M-bus interface are created and added to the tree. The controller properties are displayed on the *Properties* pane.



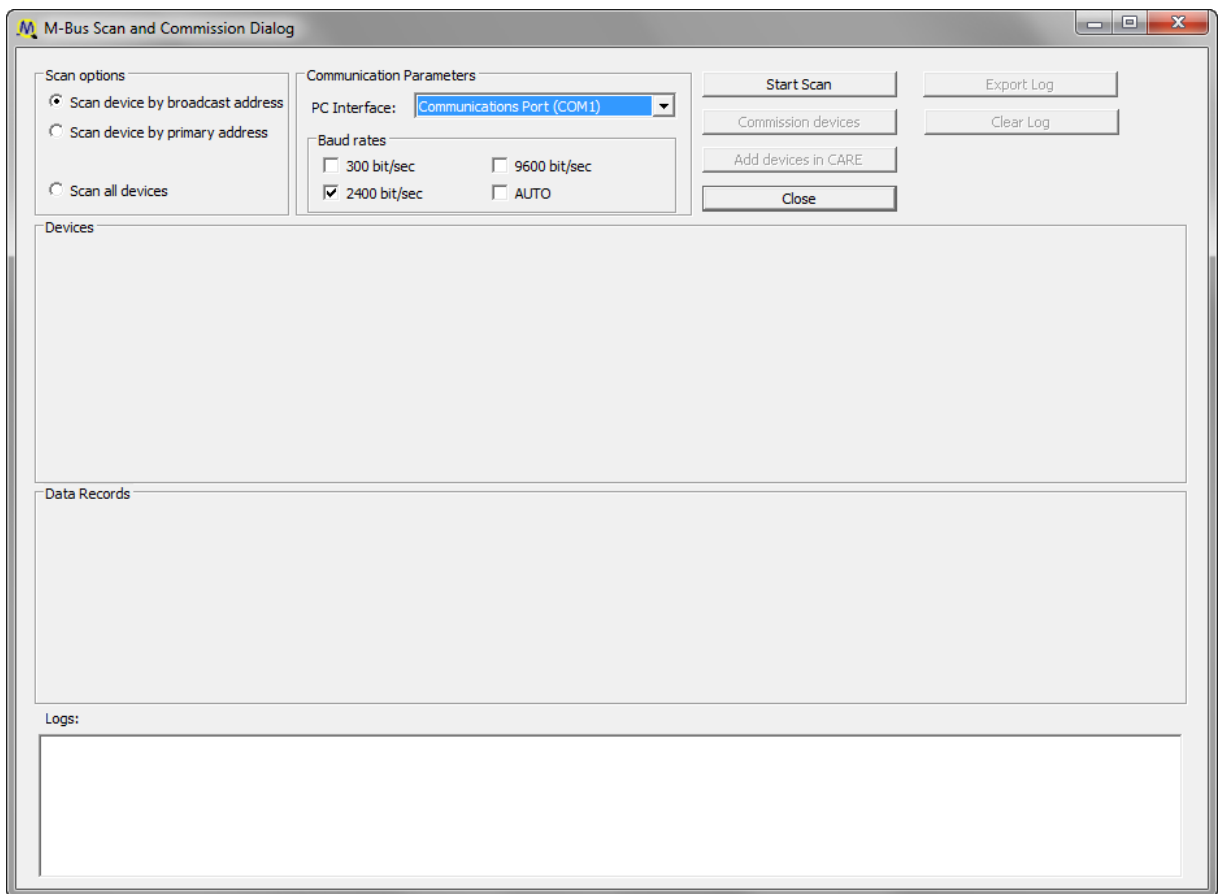
2. In the project tree, select the M-bus interface.



3. On the *Properties* pane, define the M-bus channel properties as follows:
 - a. In **M-bus Channel Name**, enter a name for the channel.
 - b. In **Max. Number of Devices**, select the max. number of devices that should be supported by the M-bus channel.
4. Right-click on the M-bus interface, and then click **Scan M-Bus Device**.



RESULT: The M-Bus Scan and Commission dialog displays. Please make sure that the M-Bus devices are properly wired to the M-Bus using an M-Bus interface such as PW3 and the PC is connected to the M-Bus via RS232 interface.



5. In **Scan Options**, select desired option from:
 - Scan device by broadcast address
M-Bus will be scanned for devices knowing the broadcast address 254. will be found.

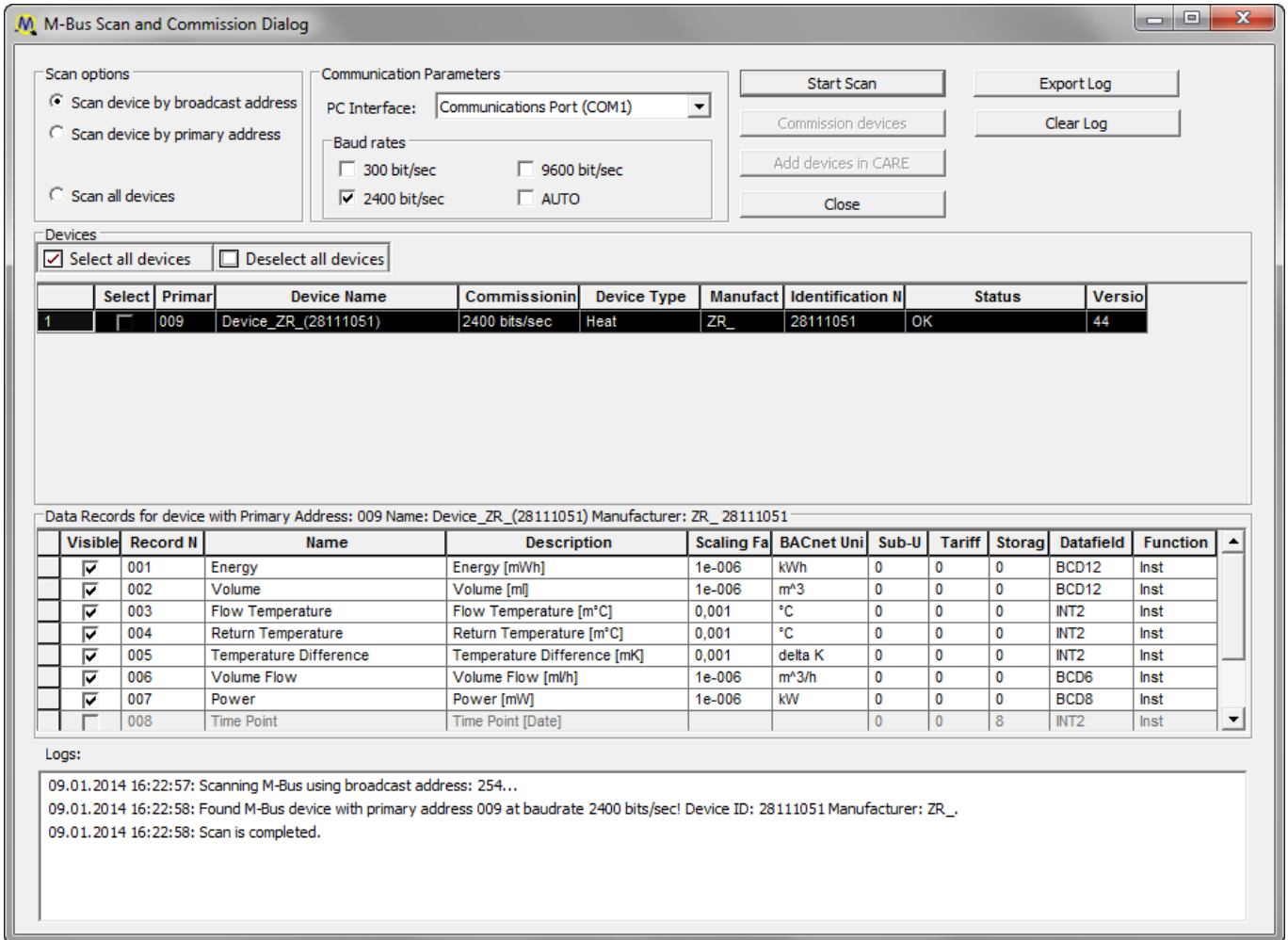
- Scan device by primary address
M-Bus will be scanned for devices having a particular primary address which can be selected from a drop-down listbox.
If multiple devices have the same primary address, only the device found first will be displayed.



NOTE:

If multiple devices that have the same primary address due to their factory setting should be used on the M-Bus, it is strongly recommended to connect, scan and commission each device separately.

- Scan all devices
M-Bus will be scanned sequentially for devices with address 1 through 250.
6. In **Communication Parameters**, do the following:
- PC Interface
By default, COM1 is selected as PC interface to the M-Bus.
 - Baud rates
Check the baudrate in bit/s from:
300, 2400, 9600, AUTO. Auto sequentially scans the M-Bus using the other baud rate options.
7. Click **Start Scan** button.

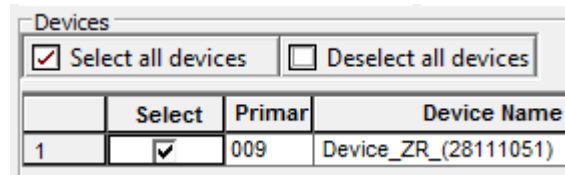


RESULT: All found devices are listed with their major properties under **Devices**. The most relevant data records of the currently highlighted device are displayed in the list below. The **Visible** column defines which data records will be visible in the project tree after the device has been added to the project. By default, all data records are checked for display. Please refer to the M-Bus website and/or the manufacturer information for detailed description of the device properties and data records properties. In the **Logs** area at the bottom, the executed actions are shown. To clear the **Logs** area, click the **Clear Log** button.

8. In the **Visible** column check/uncheck the data records that should be visible/hidden in the project tree and on the terminal after the addition of the device.

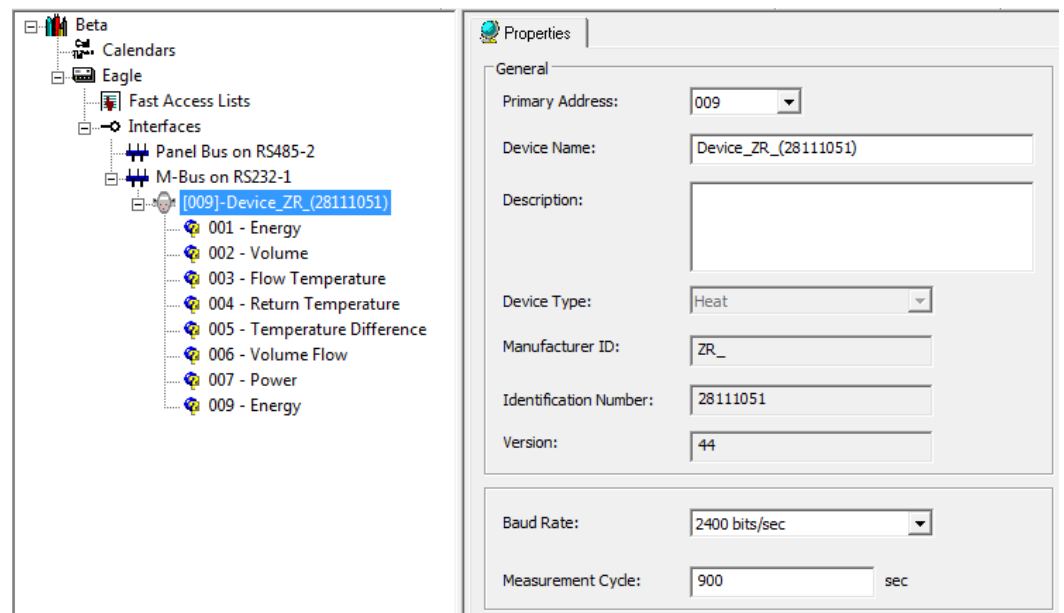
NOTE: Hidden data records are still available in the device. To make data records visible again, please refer to the "Terminal Assignment of M-Bus device" section.

9. For protocolling, you can save the logged actions in a .TXT file. To do so, click the **Export Log** button, and then click **Save** in the Save as dialog box.
10. If you want to change the primary address of the selected device, click the cell in the **Primary** column, and then select the desired address from the drop-down listbox.
11. Check the device in the **Select** column or, click the **Select all devices** icon for selecting all devices.



12. Then, click **Commission devices** button if you have changed the primary address of the device. Confirm the message box displayed by clicking OK.
13. Click **Add devices in CARE** button.
14. Click **Close** button to exit the M-Bus Scan and Commission dialog.

RESULT: The commissioned device is added to the M-Bus interface in the tree. On the right pane, the device properties are shown on the *Properties* tab. In the tree, the data records are displayed.



15. On the *Properties* tab you can do one of the following:
 - a. In **Primary Address**, select a different primary address.
 - b. In **Device Name**, change the device name.
 - c. In **Description**, enter an additional description
 - d. In **Baud Rate**, select the baud rate in bits/sec with which the device should communicate with the BACnet controller.
 - e. In **Measurement Cycle**, enter the value in sec with which the M-bus device should be repeatedly polled by the BACnet controller.

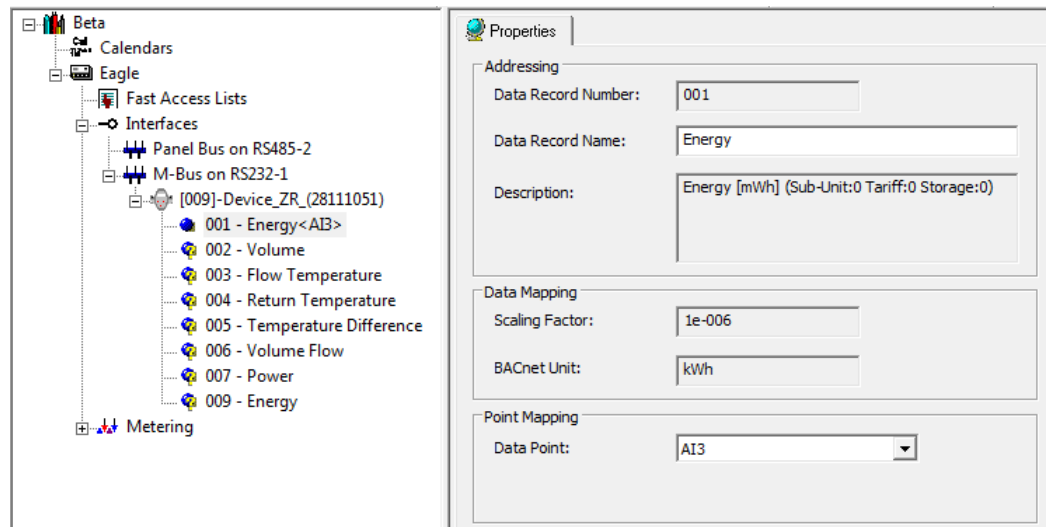
NOTE: If you change properties of the device, the device will be set into uncommissioned state and you must re-commission the device. An uncommissioned device is indicated by 4 red corners at its border.



16. To re-commission a device of which properties have been changed, please refer to the "Commission M-Bus Device in M-Bus Channel" section .
17. To map datapoints to data records, do the following:
 - a. In the tree, click the data record.

- b. On the *Properties* tab on the right, select the datapoint from the Data Point drop-down listbox.

NOTES: Data records can only be mapped to boardless analog input points. Datapoints can also be mapped to data records on the terminal assignment tab (see "Terminal Assignment of M-Bus Device" section).

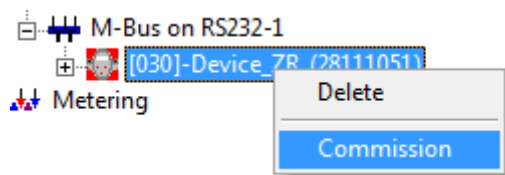


- 18. If desired change the name of the data record in the **Data Record Name** field.

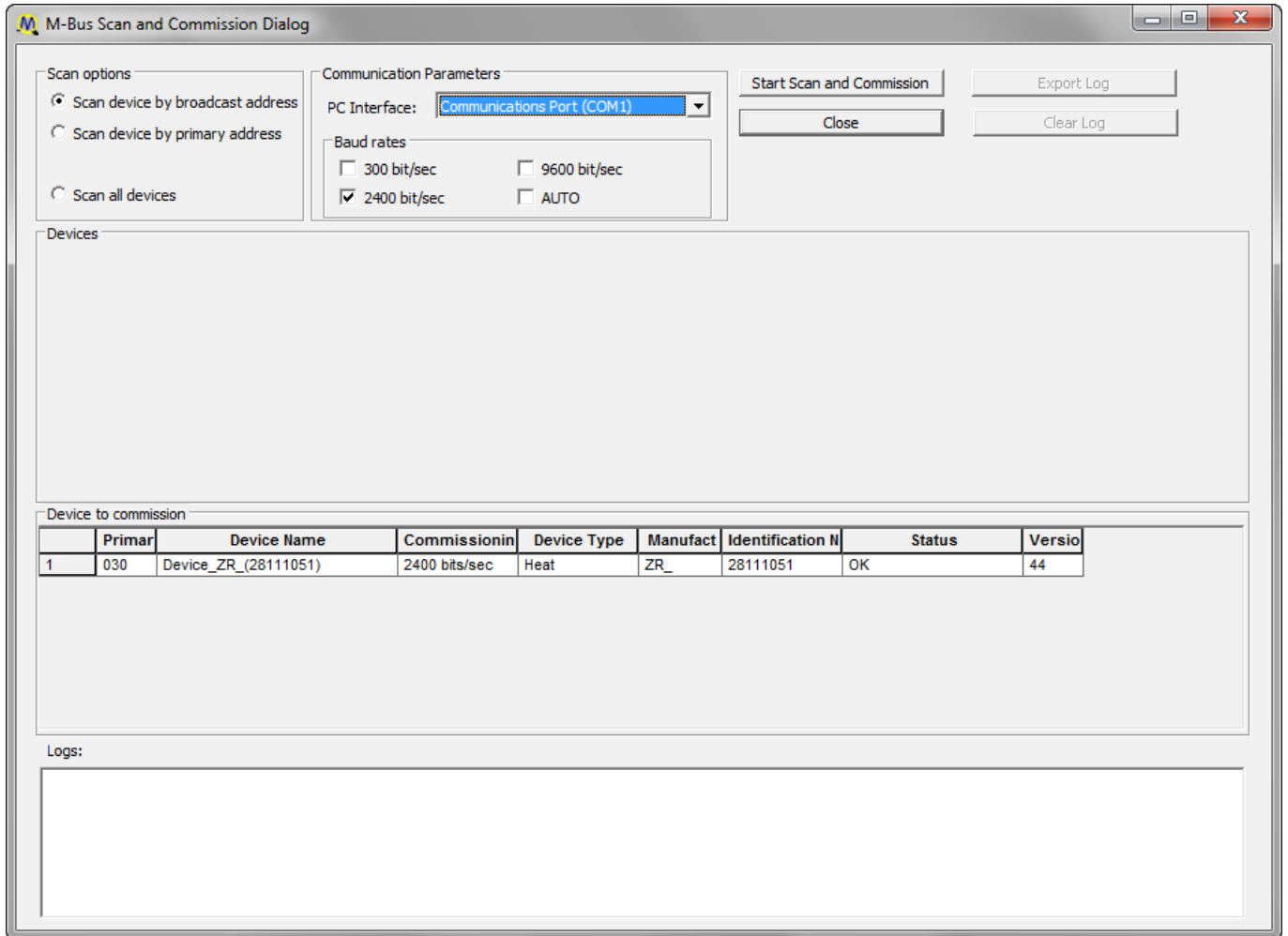
Commission M-Bus Device in M-Bus Channel

Procedure

1. To commission a changed device or a device added from the device library, right-click the device in the M-Bus channel and click **Commission** in the context menu.



RESULT: The M-Bus Scan and Commission dialog displays.

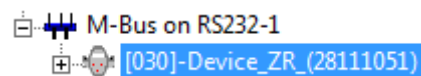


2. Click **Start Scan and Commission** in the context menu.

RESULT: The device will be commissioned.

3. Confirm the message box indicating the successful commissioning by clicking OK.
4. Click **Close** button to exit the M-Bus Scan and Commission dialog.

RESULT: The commissioned device is displayed without red corners at its border.



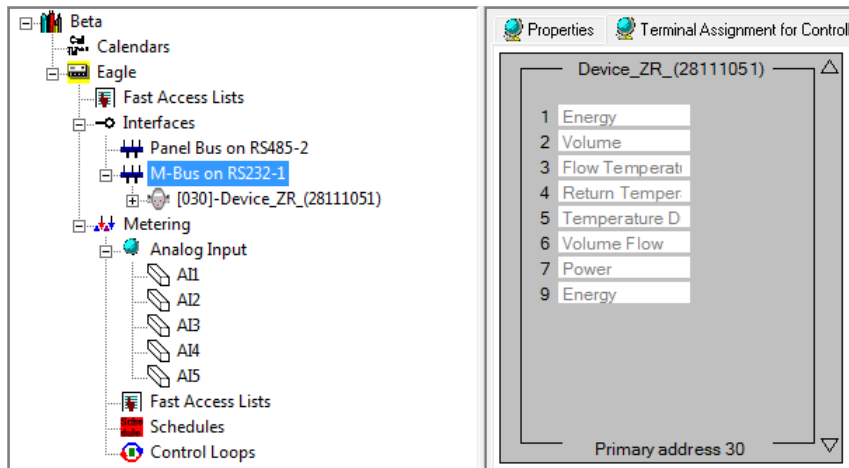
Terminal Assignment of M-Bus Device

The terminal assignment of the M-Bus device by default and initially shows all data records of the device. On the terminal assignment tab, you can then map CARE datapoints (analog inputs) to the data records of the device. Data records can be made visible or hidden.

Procedure

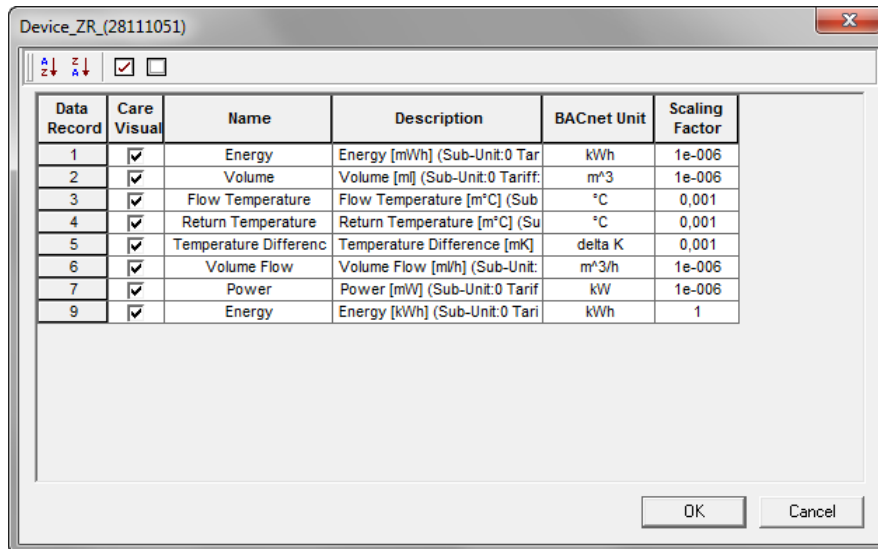
1. In the project tree, click the M-Bus channel.

RESULT: On the right the *Terminal Assignment* tab displays all M-Bus devices with their terminal assignments.



2. To change the display of the data records assigned to the terminals, double-click the device.

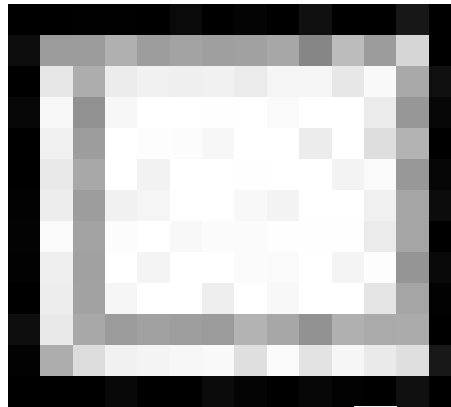
RESULT: The device properties are shown. In this dialog you can define which data records should be visible or hidden and the alphabetic order of the data records on the terminals.





3. In the **Visible** column check/uncheck the data records that should be visible/hidden on the terminal and in the project tree. Use the and icons for selection if desired.

NOTE: Hidden data records are still available in the device.

4. To sort the data records alphabetically, do the following:
 - a. Click the column by which the data records should be sorted, e.g. Name.

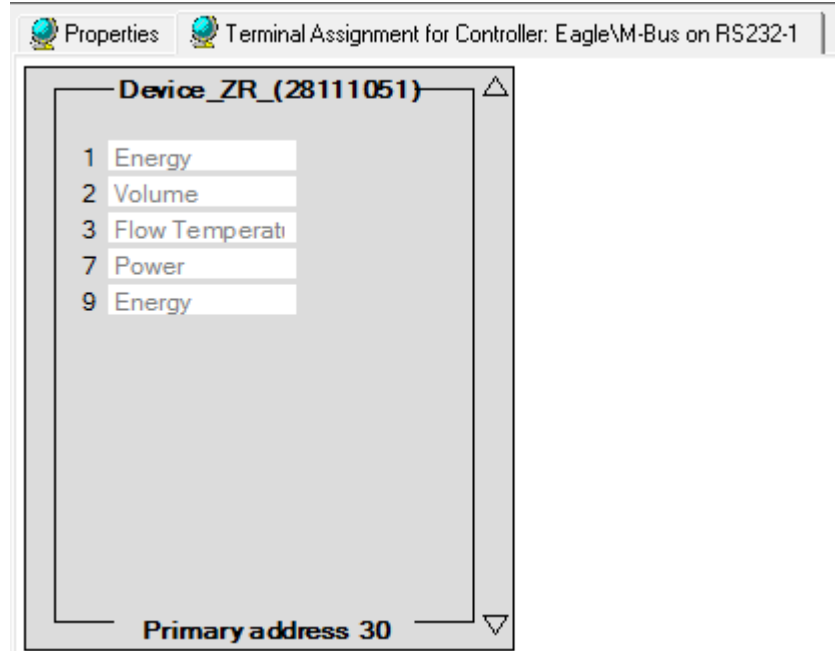


b. Click the sort order icon  for ascending sort order, or the sort order icon  for descending sort order.

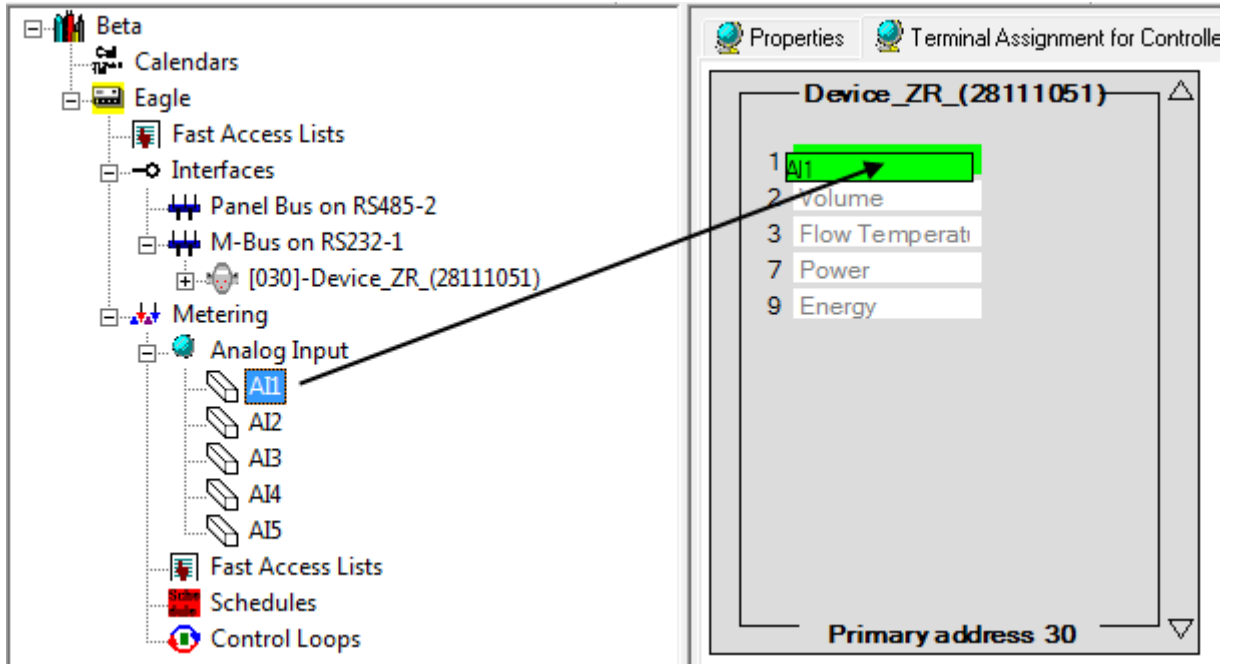
Data Record	Care Visual	Name	Description	BACnet Unit	Scaling Factor
1	<input checked="" type="checkbox"/>	Energy	Energy [mWh] (Sub-Unit:0 Tar	kWh	1e-006
9	<input checked="" type="checkbox"/>	Energy	Energy [kWh] (Sub-Unit:0 Tari	kWh	1
3	<input checked="" type="checkbox"/>	Flow Temperature	Flow Temperature [m°C] (Sub	°C	0,001
7	<input checked="" type="checkbox"/>	Power	Power [mW] (Sub-Unit:0 Tarif	kW	1e-006
4	<input type="checkbox"/>	Return Temperature	Return Temperature [m°C] (Su	°C	0,001
5	<input type="checkbox"/>	Temperature Differenc	Temperature Difference [mK]	delta K	0,001
2	<input checked="" type="checkbox"/>	Volume	Volume [m] (Sub-Unit:0 Tariff:	m^3	1e-006
6	<input type="checkbox"/>	Volume Flow	Volume Flow [m/h] (Sub-Unit:	m^3/h	1e-006

c. Click OK button to close the dialog

RESULT: The Terminal Assignment tab redisplay.

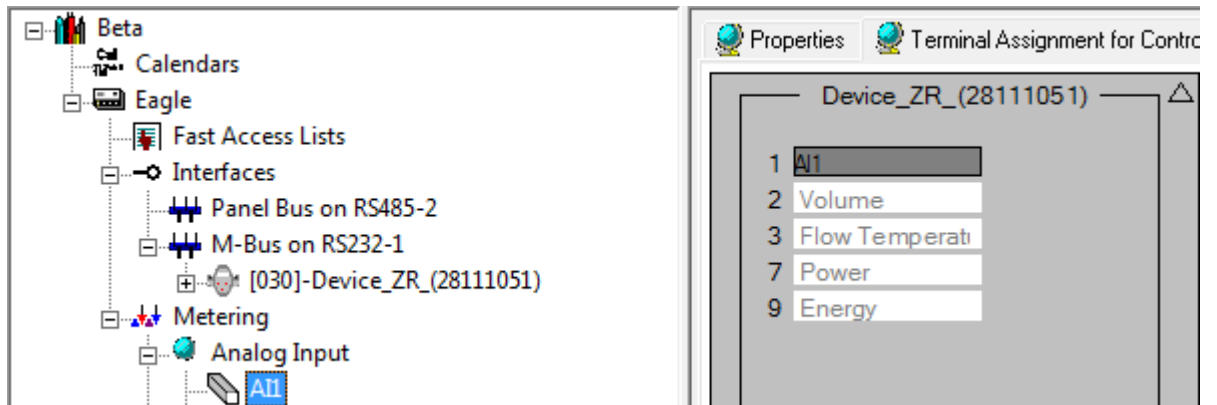


5. To map datapoints to the data records, expand the plant and browse to the **Analog Input** folder.



6. Drag&drop the datapoint to the terminal.

RESULT: The datapoint is mapped to the data record. The mapped datapoint is indicated by gray color on the terminal and in the **Analog Input** folder.




M-Bus Devices Procedures in Device Library

The device library provides the following functions for M-Bus devices:

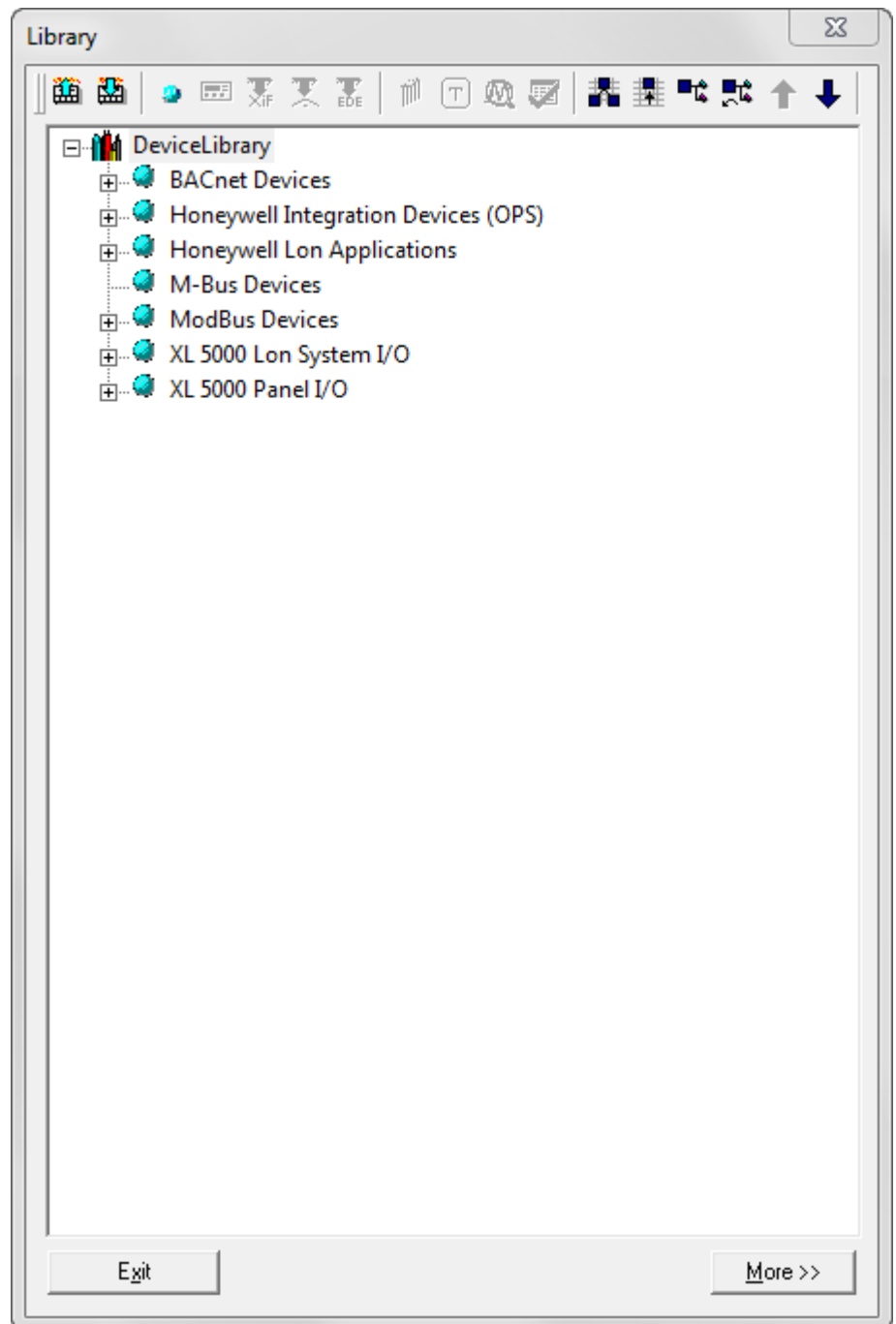
- Add M-bus device to device library via M-Bus-Scan or via drag&drop from the M-Bus channel
- Add M-Bus device from device library to M-Bus channel.

For general introduction into the device library functions, please read the “Device Library” section.

Procedure

1. Open the Device Library by clicking the device library icon  in the CARE tool bar.

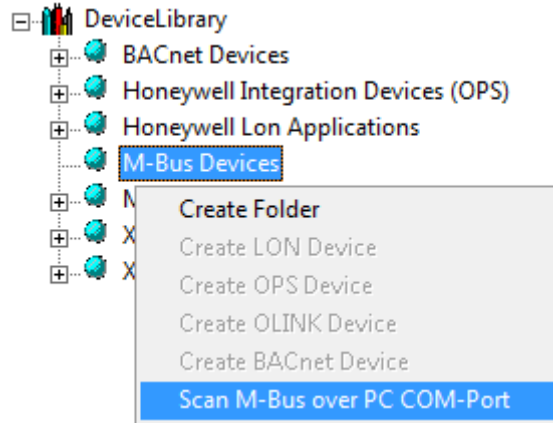
RESULT: The *Library* displays.



2. To add a device to the device library by scanning the M-bus, continue with the procedure described in the "Add M-Bus Device to Device Library via M-Bus Scan" section.
3. To add a device from the M-Bus channel to the device library, continue with the procedure described in the "Add M-Bus Device from M-Bus Channel to Device Library" section.
4. To add a device from the device library to the M-Bus channel, continue with the procedure described in the "Add M-Bus Device from Device Library to M-Bus Channel" section.

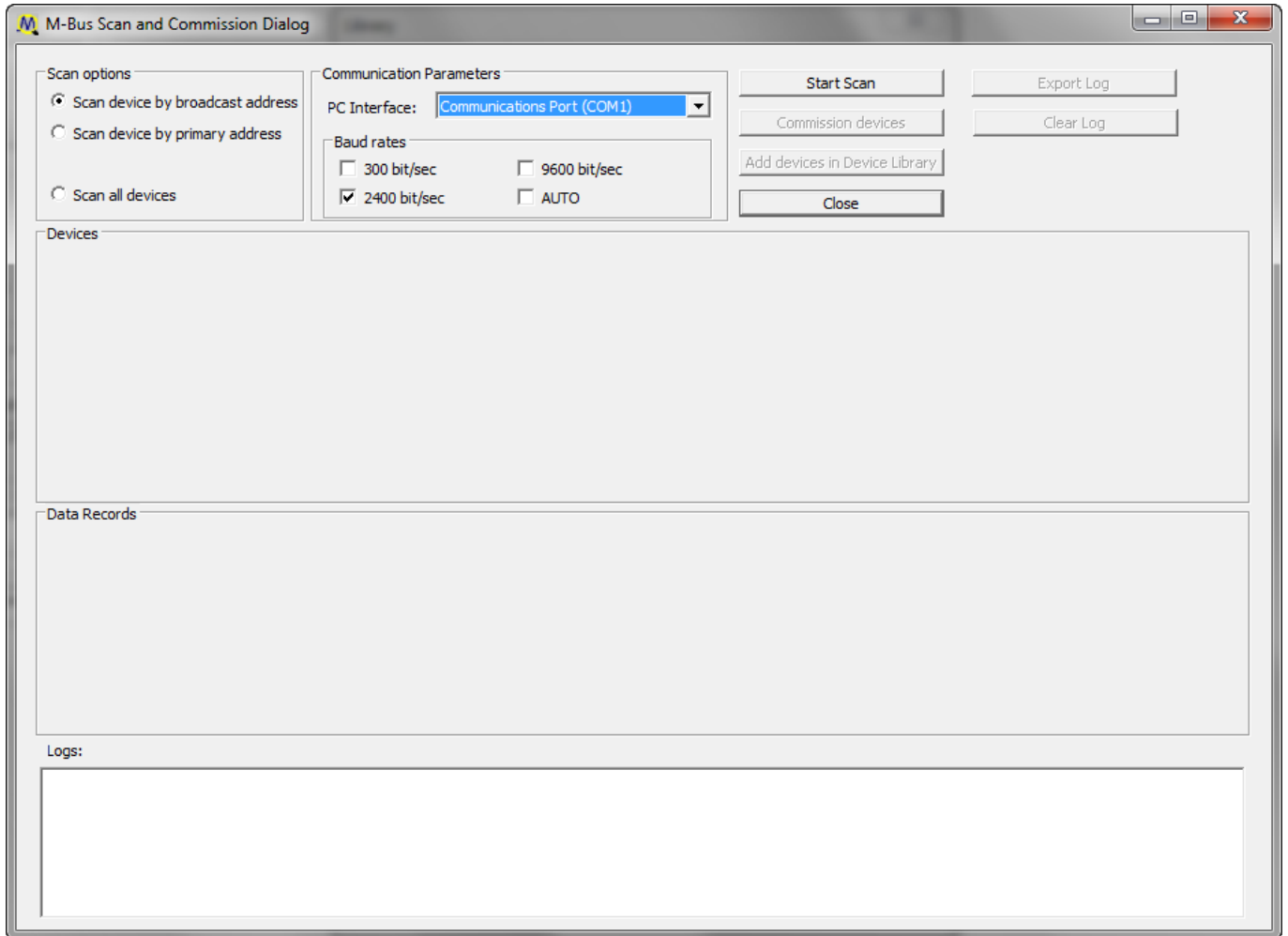
Add M-Bus Device to Device Library via M-Bus Scan**Procedure**

1. Open the device library as described in the "M-Bus Devices Procedures in Device Library" section.
2. In the **Device Library** tree, right-click the **M-Bus Devices** folder, and then click **Scan M-Bus over PC COM-Port** in the context menu.

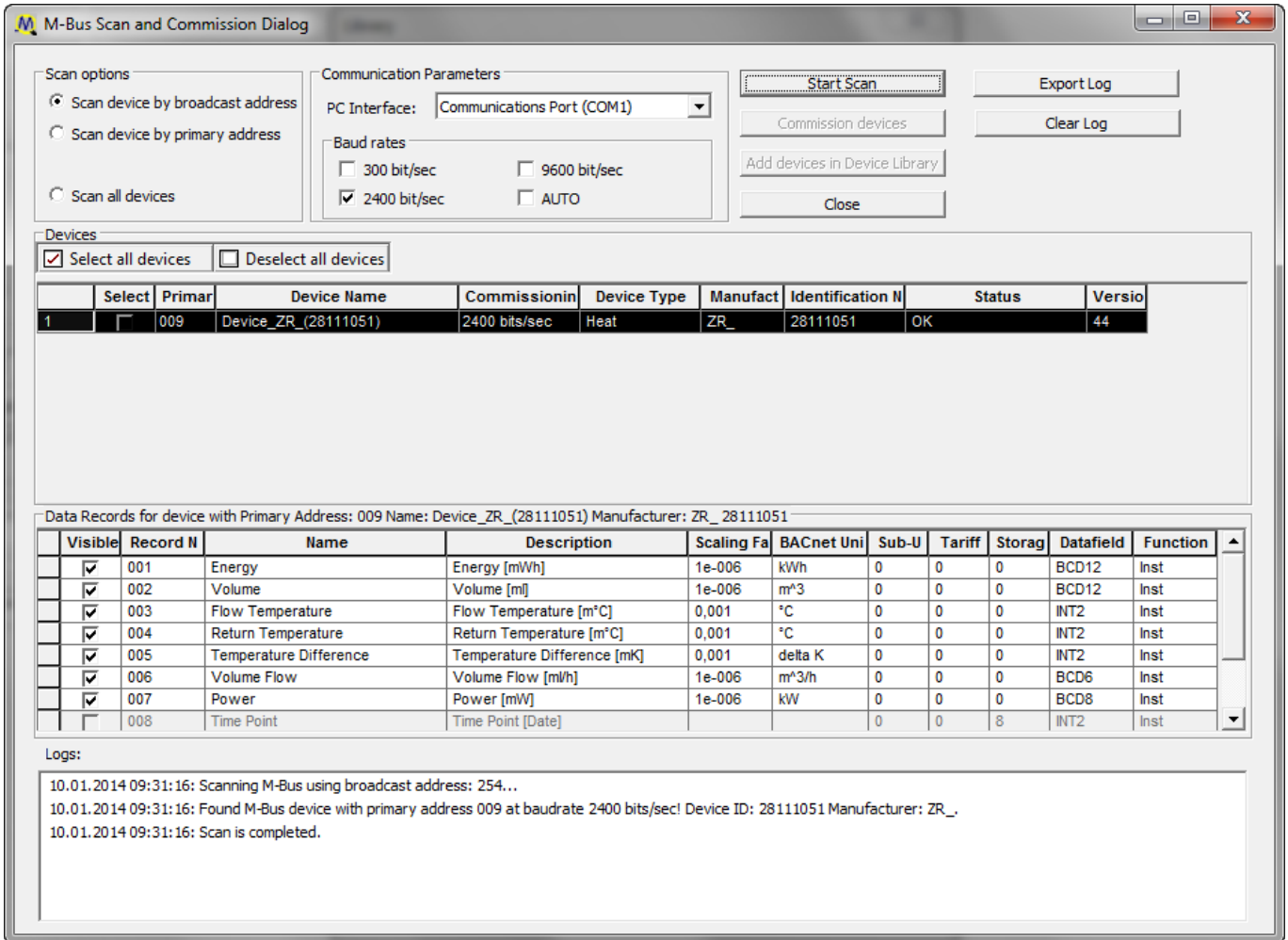


RESULT: The M-Bus Scan and Commission Dialog displays.

3. Please make sure that the M-Bus devices are properly wired to the M-Bus using an M-Bus interface such as PW3 and the PC is connected to the M-Bus via RS232 interface.

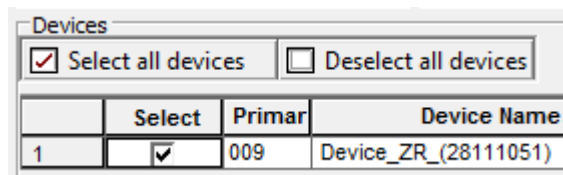


4. For detailed information on the Scan Options and Communication Parameters, please refer to the Procedure step 5 et seq. in the "M-Bus Support" section
5. Click **Start Scan** button.



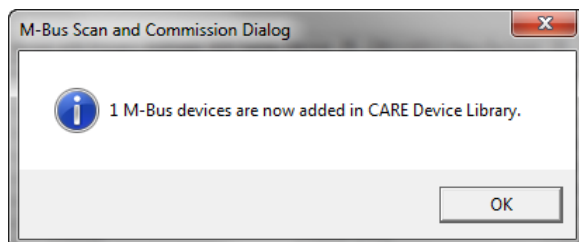
RESULT: All found devices are listed with their major properties under **Devices**. The most relevant data records of the currently highlighted device are displayed in the list below.

- To add the device to the device library, check the device in the **Select** column or for selecting all devices, click the **Select all devices** icon.



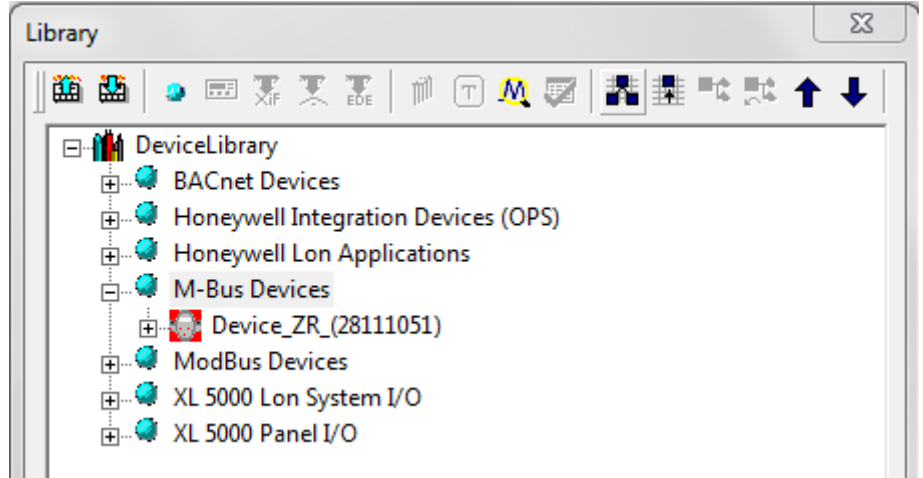
- Then, click **Add devices in Device Library** button.

RESULT: The devices are added to the device library as indicated by the following message box.



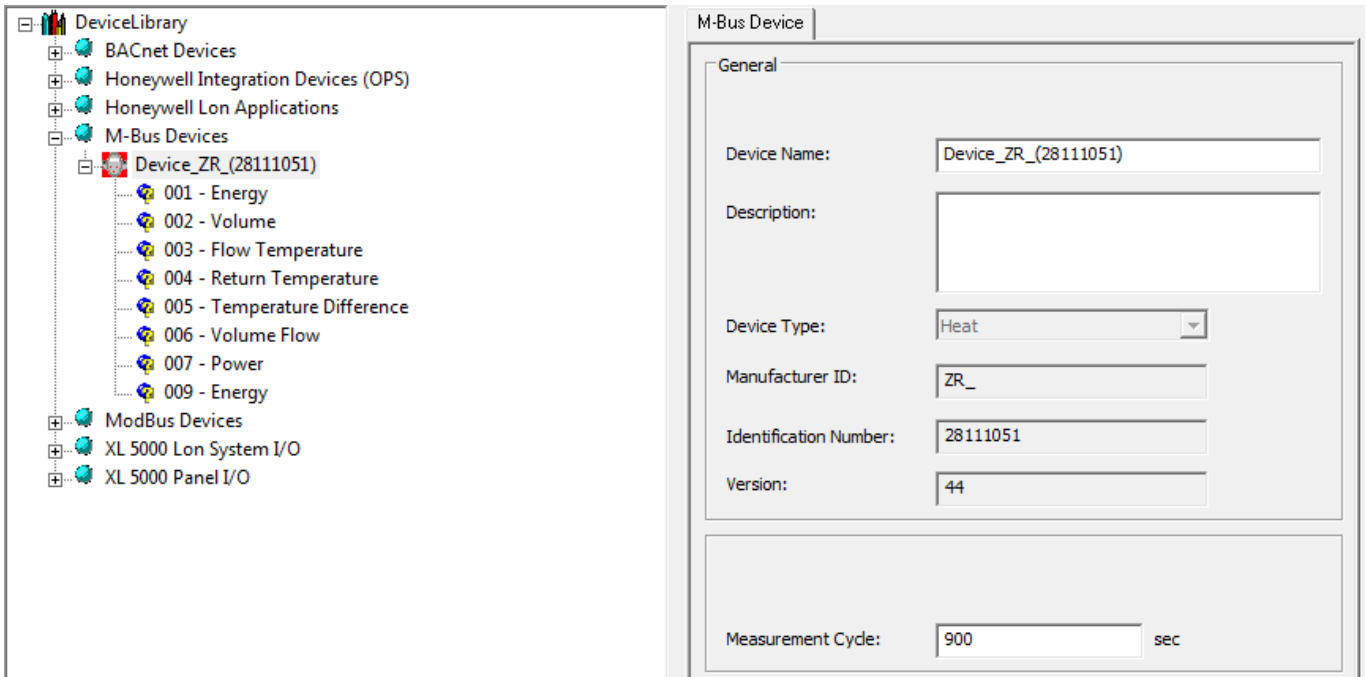
8. Click **OK** button to close the message box, and then click **Close** button in the M-Bus Scan and Commission Dialog to return to the device library.

RESULT: The added device is displayed in the **M-Bus Devices** folder. Note that devices in the device library are uncommissioned and must be commissioned in the M-Bus channel of the project tree.



9. To view and change properties of the device, select the device and then click the **Moore>>** button.

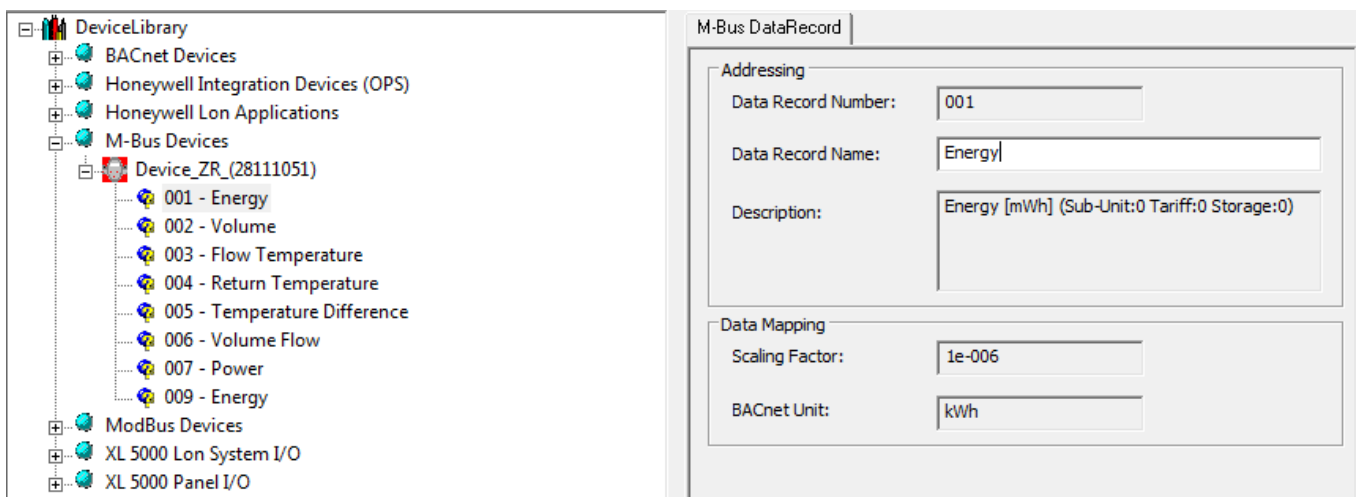
RESULT: The *M-Bus Device* tab displays on the right.



10. If desired, change the name, the description and/or the measurement cycle.
11. To view properties of data records, double-click on the device and then select the data record in the tree.

RESULT: The M-Bus DataRecord tab displays on the right.

12. If desired, change the name of the data record in the **Data Record Name** field.

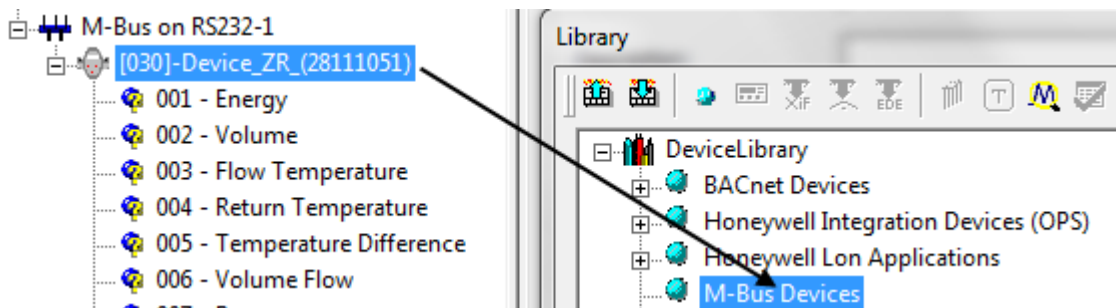


13. Click <<Moore button to close the Properties view, and then click **Exit** button to close the device library.

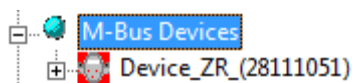
Add M-Bus Device from M-Bus Channel to Device Library

Procedure

1. Open the device library as described in the "M-Bus Devices Procedures in Device Library" section.
2. In the project tree, select the device and drag&drop it to the **M-Bus Devices** folder in the **Device Library** tree.



RESULT: The device is added to the **M-Bus Devices** folder. It is uncommissioned.

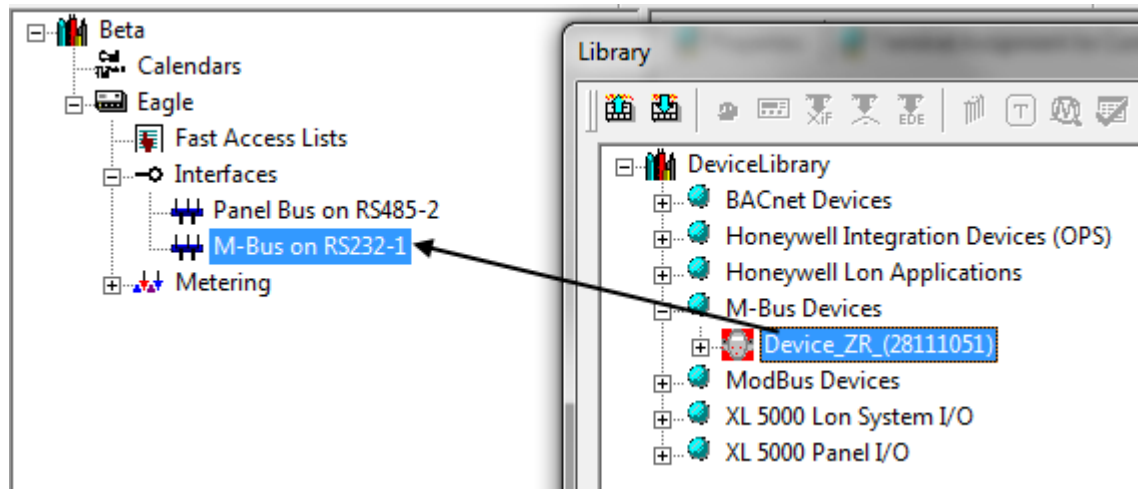


3. To view and change properties of the device, please refer to the "Add M-Bus Device to Device Library via M-Bus Scan", step 9 et seq.

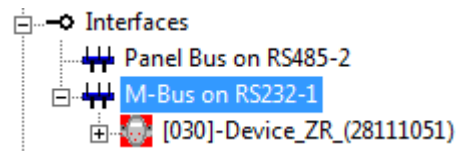
Add M-Bus Device from Device Library to M-Bus Channel

Procedure

1. Open the device library as described in the "M-Bus Devices Procedures in Device Library" section.
2. In the **Device Library** tree, expand the **M-Bus Devices** folder.
3. Select the device and drag&drop it to the M-Bus channel in the project folder.



RESULT: The uncommissioned device is added to the M-Bus channel.



4. If desired, change device properties on the *Properties* tab as described in step 15 et seq. of the Main Procedure of the "M-Bus Support" section .
5. Commission the device as described in the "Commission M-Bus Device in M-Bus Channel" section .

Read M-Bus Records from M-Bus Device

Purpose To read M-Bus records from the M-Bus device by the controller.

There are two ways to read M-Bus records from an M-Bus device by the controller:

- **Time-interval-based Reading**
You can set a particular time interval with which the M-Bus records will be read. E.g. when setting the time interval to 3600 sec, an M-Bus record will be read every 3600 sec beginning after application start and continuing as long as the application is running. This mode can cause irregularities in the M-Bus record times, e.g. in case of application interrupts and re-starts due to changed controller operation status.
- **Clock-time-based Reading**
You can set a fixed clock-time (trigger) in the time program at which the M-Bus records will be read. E.g. when setting the clock-time to 6:00, an M-Bus record will be read at 6:00 a.m., when setting the clock-time to 18:00, an M-Bus record will be read at 6:00 p.m. This results in a synchronous reading process independent of the current application and controller operation status respectively.

Both methods can be applied simultaneously.

NOTE: The time-interval-based reading method can also be applied in the Web Interface

Procedures

Time-interval-based Reading

1. On the Properties tab of the M-Bus device, enter the time interval in **Measurement Cycle**.

The screenshot shows a 'Properties' dialog box with a 'General' tab. The fields are as follows:

- Primary Address: 001
- Device Name: Heat_ZR_28111051
- Description: (empty text area)
- Device Type: Heat
- Manufacturer ID: APT
- Identification Number: 01526560
- Version: 40
- Baud Rate: 2400 bits/sec
- Measurement Cycle: 900 sec
- Enable Application Reset:

NOTE: The default setting is 900 sec. Disable time-interval based reading by entering '0' if you want to exclusively use clock-time-based reading.

Clock-time-based Reading

1. Clock-time-based reading is based on:
 - a binary value datapoint which defines the fixed clock-time in the time program
 - an IDT icon in the control loop that provides the trigger function. In the IDT icon, the binary value datapoint is linked from the input to the trigger function at the output.

For basic descriptions of datapoints, schedules and control loops procedures, please refer to the "Create Datapoints", the "Schedules " and the "Control Loops" sections.

2. Create a binary value datapoint.

Properties

Datapoint Name: Mbus-Schedule BACnet Object Type: Binary Value (5)
 BACnet Object ID: 20971522 BACnet Instance Number: 2

Lon Mapping

Misc. Editor Functions

State Texts: OFF, ON
 Descriptor:
 Alarm Text:

Access Rights

Read Access Level: Guest (0) Write Access Level: Tenant (32)

Alarming

Notification Class: LOW Notify Type: Event
 Suppress Alarm Alarm Delay: [] [sec]

Alarm Value: ON

Reporting

To-DiffNormal
 To-Fault
 Back To-Normal

Event Enrollments

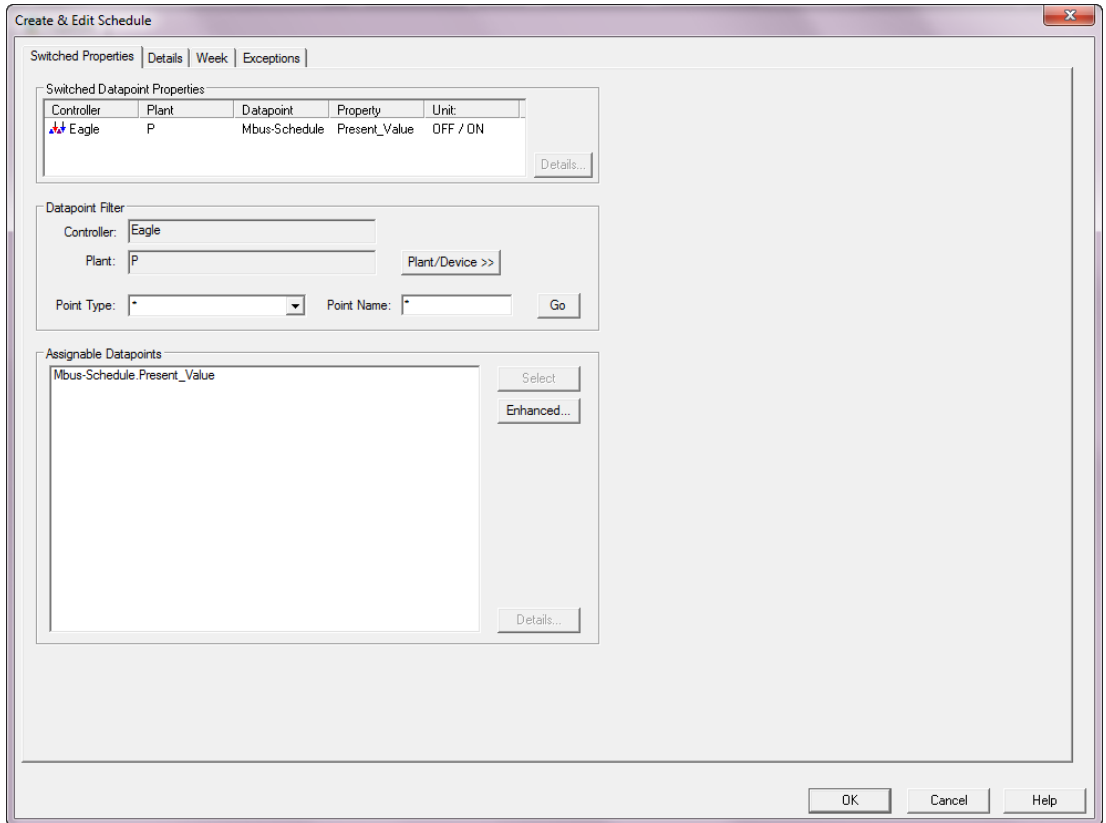
Acked Transitions (To-OffNormal/To-Fault): Observe Enabled
 Status Flags (Out Of Service/Overridden): Observe Enabled
 Runtime (Elapsed Active Time): Observe Enabled
 Count Limits (Change of State Count): Observe Enabled

Values

Point Role (EDK):
 Relinquish Default: OFF

EDH/EOV Optimisation
 Setpoint

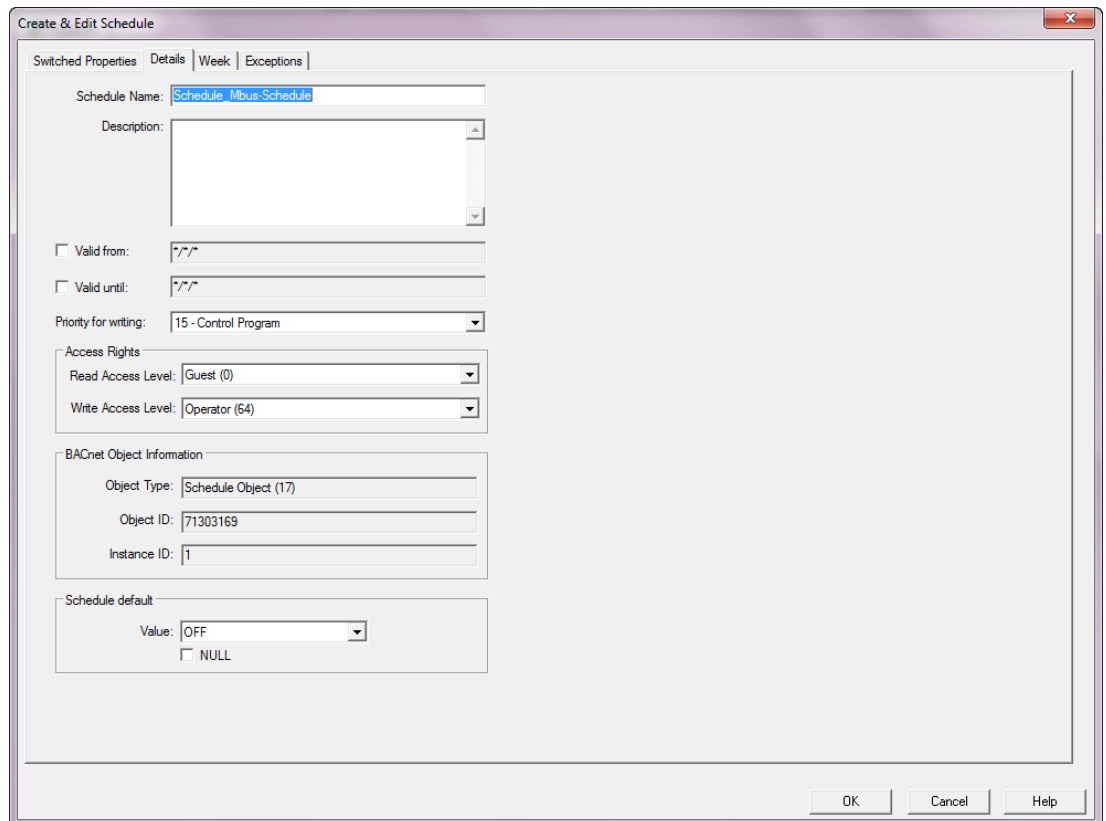
3. Create a schedule and assign the binary value datapoint to the switched datapoint properties.



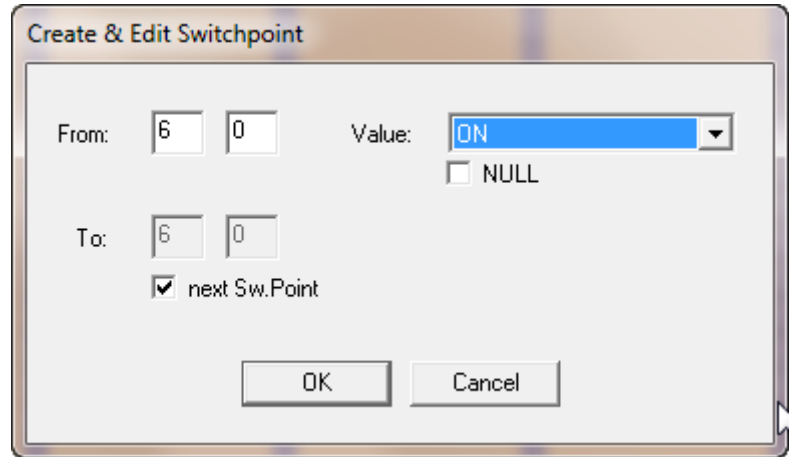
4. Select the schedule default value 'OFF'.

IMPORTANT!

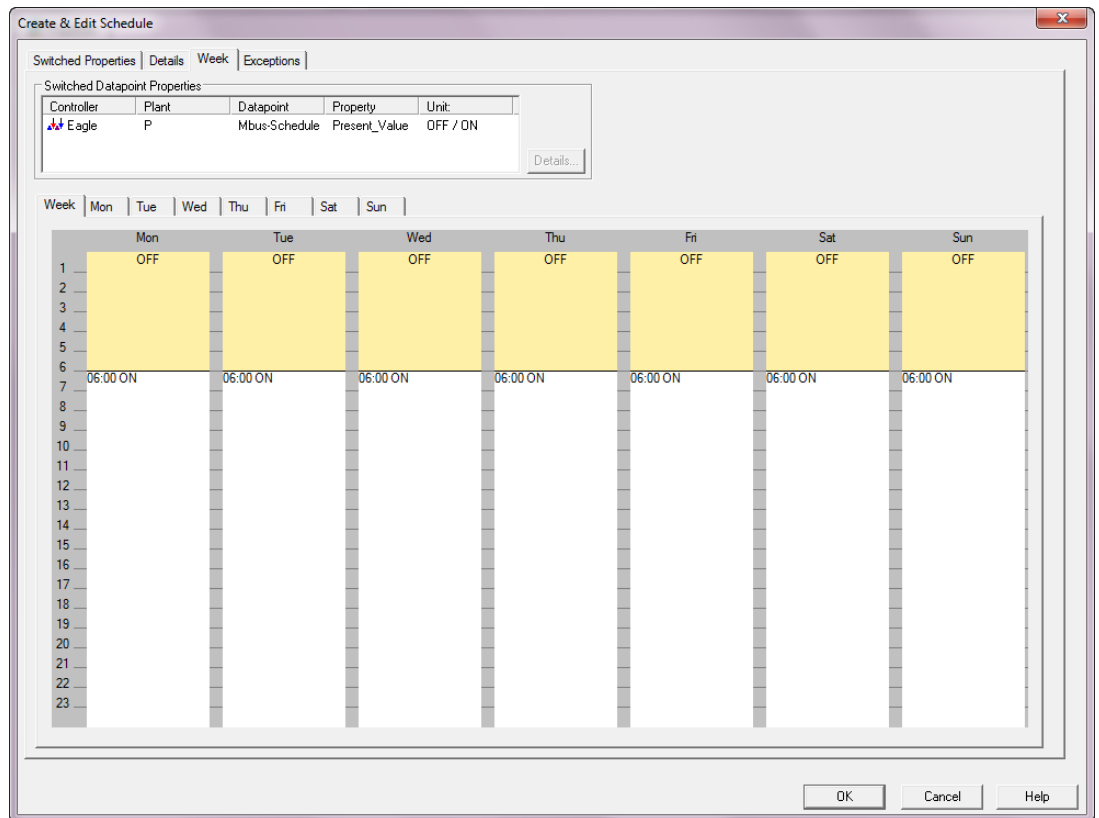
Note that the trigger for reading an M-Bus record is based on an OFF-ON transition. ON-OFF transitions will not be considered.



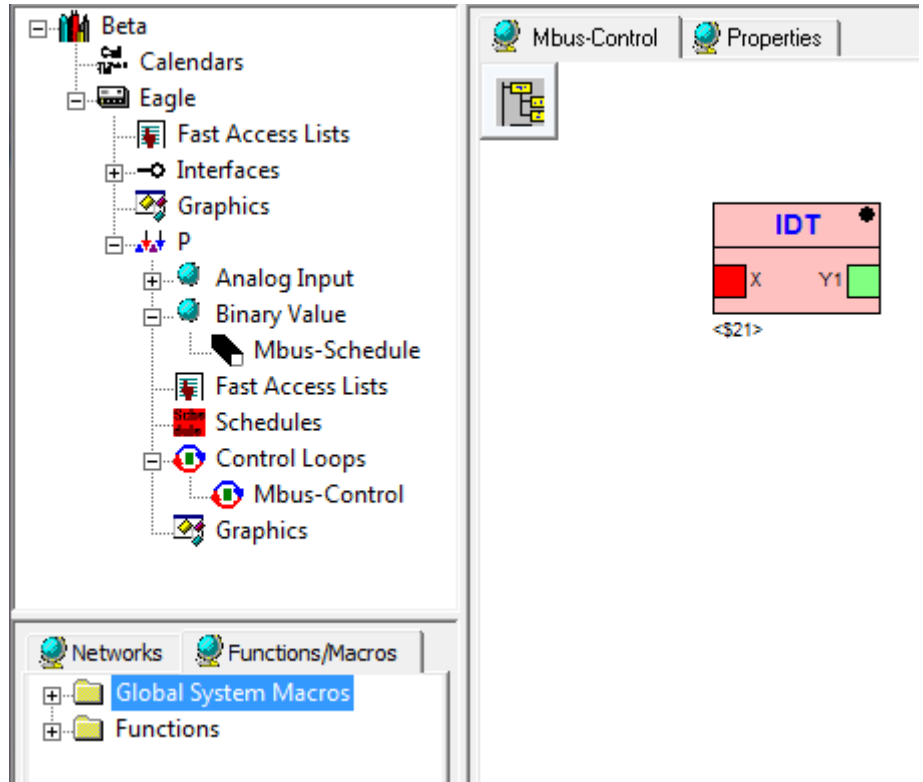
- In the weekly program, create a switchpoint that defines the fixed time when the OFF-ON transition occurs that triggers the M-Bus record reading.



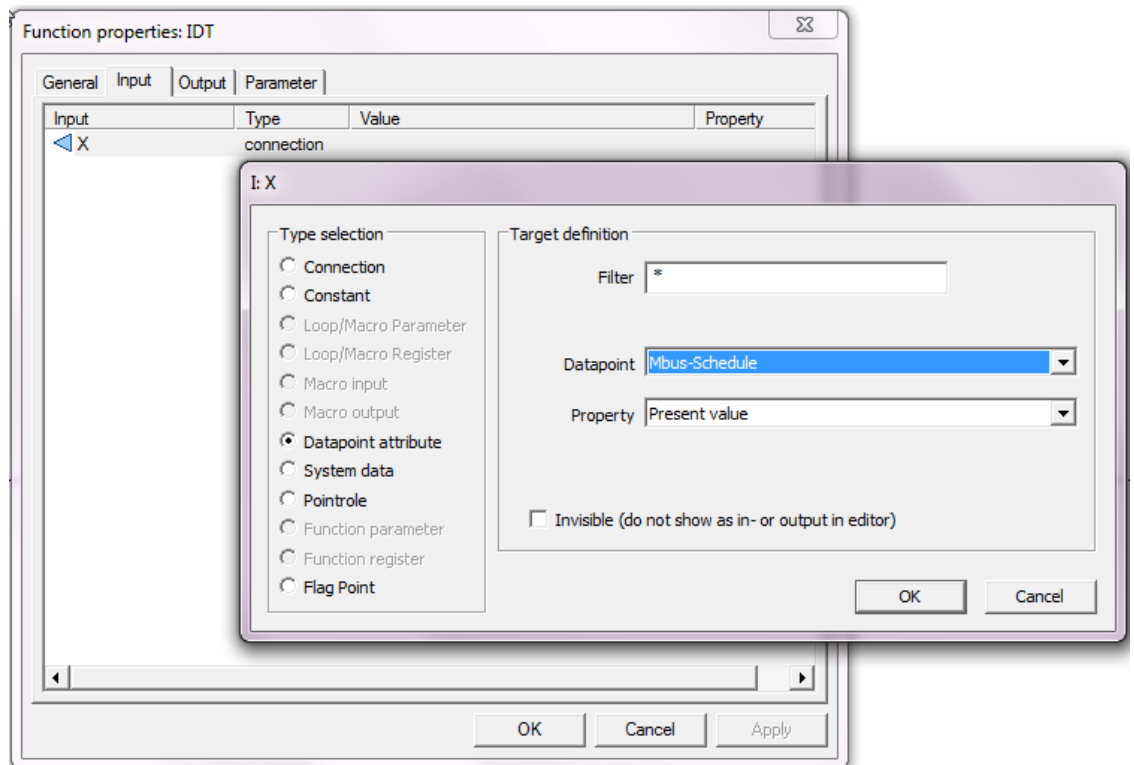
- Copy the switchpoint to the days when M-Bus record reading should be executed.



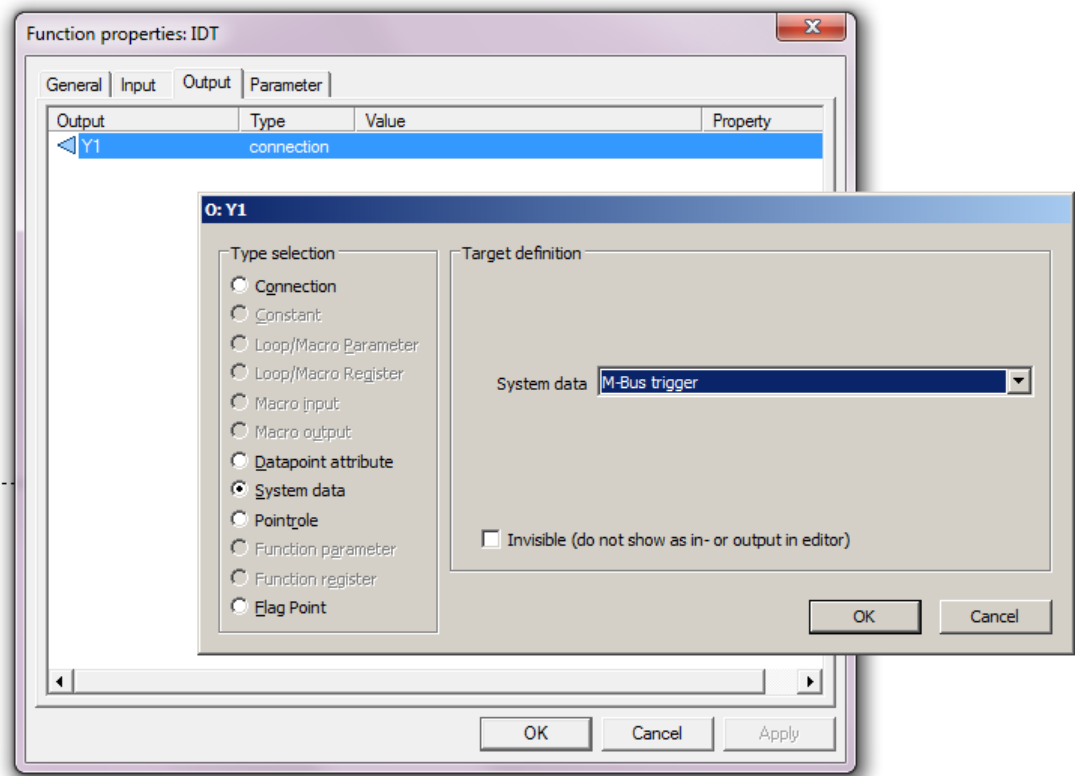
- Create a control loop and add an IDT icon to the workspace.



- On the *Input* tab, select **Datapoint attribute** type and then select the binary value datapoint in **Datapoint**.

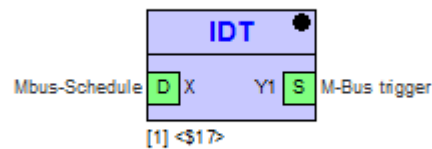


- On the *Output* tab, select **System data** type and then select **M-Bus trigger**.



10. Close all tabs and confirm finally by clicking OK to close the IDT icon.

RESULT: The binary value datapoint is assigned to the input and the M-Bus trigger is assigned to the output. Based on the schedule configuration in this example, M-Bus records will be read daily at 6:00 a.m.



User Access Manager

Purpose To define user rights according to the required functions. This will be done by creating the users and issuing the functions they should have permission for in the Web Interface (user access scheme). In addition to define the language and decimal places of values to display in the Web Interface for each user.

NOTE: All users can operate all controllers of a project.

Copy Users Copying users is not part of the Use Access Manager, but will be done with the Copy users function (see Copy Users section following the User Access Manager functions descriptions)

Access Rights List An access rights list for a complete project will be created by assigning predefined access levels to all executable functions (access rights) of the Web Interface. An access rights list may look as follows:

Access Right	Access level
--------------	--------------

Change Communication Settings	System Admin
Create and Delete Schedules	Building Engineer
Create and Delete Trends	Building Engineer
Display Diagnostics	Tenant
etc.	etc.

The predefined access levels are arranged hierarchically and the sequence with descending priority is as follows:

- System Admin (128)
- Project Admin (115)
- Building Engineer (96)
- Operator (64)
- Tenant (32)
- Guest (0)

Example:

When assigning 'Operator' to 'Create & Delete Calendars', a user having an access level below 'Operator', for example 'Tenant' or 'Guest', is not able to create and delete calendars. A user having a user access level equal to or higher than 'Operator', for example 'Building Engineer' or 'Project Admin' is able to create and delete calendars.

NOTE: When creating a project, the System Admin level is automatically assigned to the user who has created the project. Only the user who has System Admin access level can create new users, edit, or delete existing users.

User Profile

For each user within a project, a user profile with the following properties will be created:

- User name
- Access level
- Language
- Decimal places
- Password
- Access rights
- Email address(es)

A user is identified by its user name. One of the predefined access levels will be appropriately assigned to the user (name).

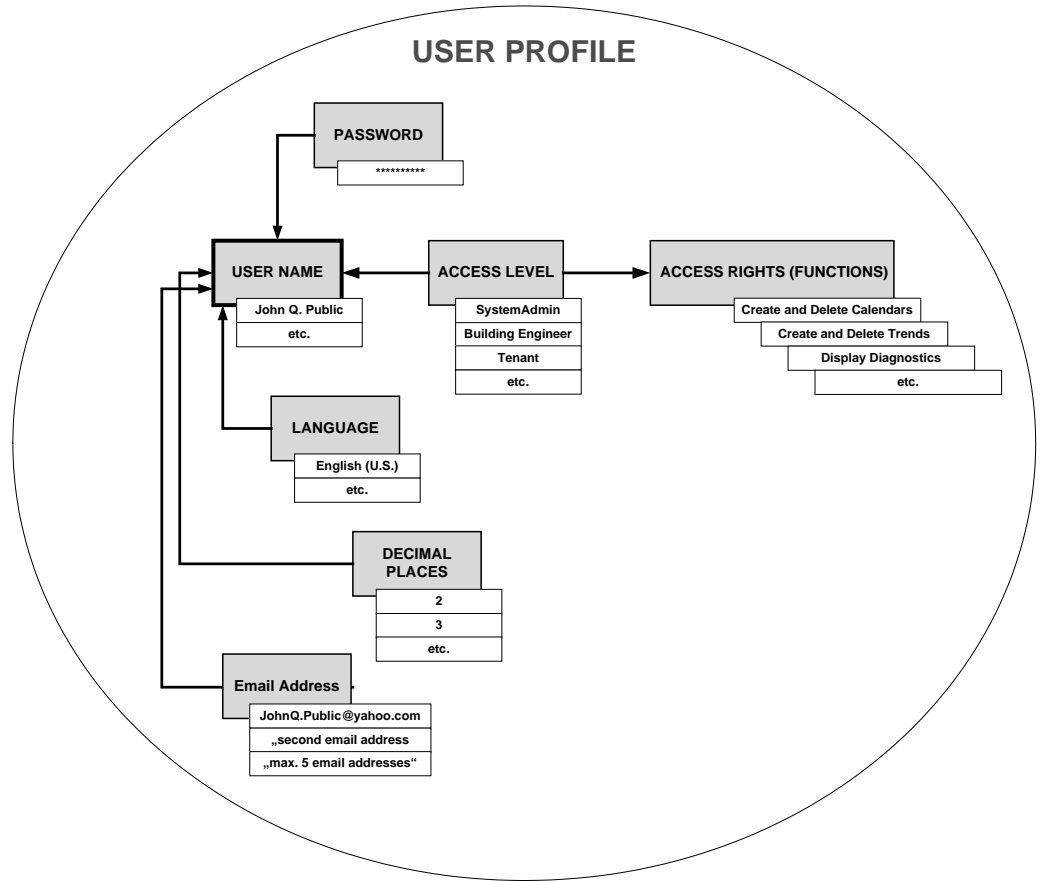
Due to the access rights list definitions, this assignment automatically determines the set of access rights which the user is allowed to execute in the Web Interface.

All users having an access level higher than or equal to the assigned access level will have this access right enabled in the Web Interface, all others will not.

NOTE: A user can carry out his/her assigned access rights in all controllers of the project.

In addition, the user profile includes the settings of the language in which the Web Interface is displayed and the number of decimal places of values to be displayed in the Web Interface.

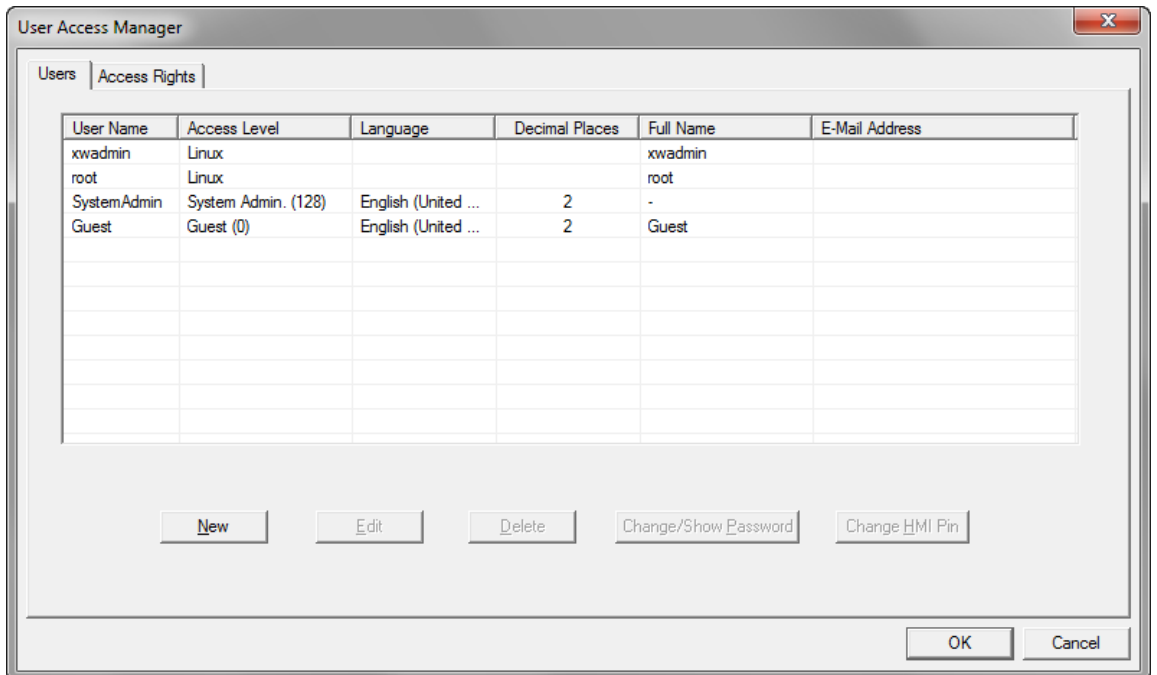
Finally, a password for each user must be issued for secure operation of the Web Interface.



Start User Access Manager

- Procedure** 1. Click menu item Project, then submenu item User/Access Manager.

RESULT: The User Access Manager dialog box displays.

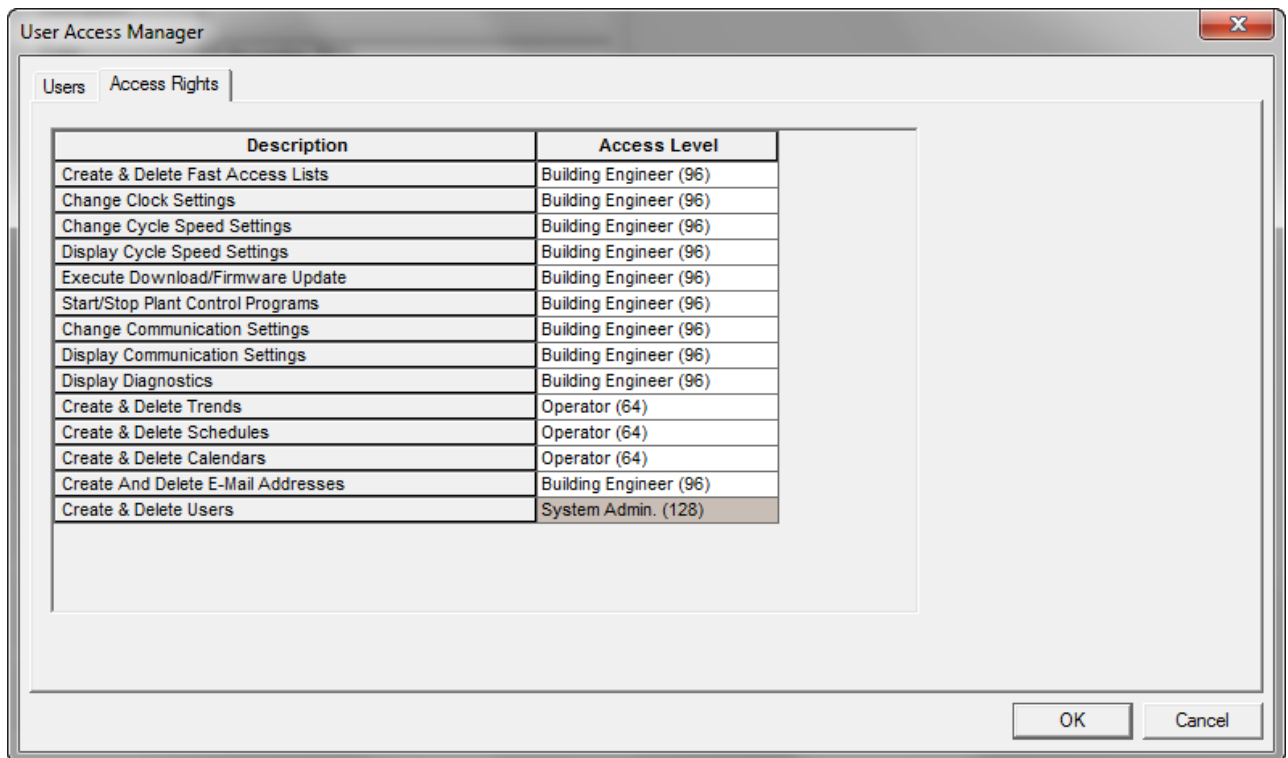


On the Users tab, users can be newly created, edited and deleted. In addition, the user's password can be changed. By default the SystemAdmin, the Guest, the xwadmin and the root users are already available. For each user, the following properties are shown:

- User Name
- Access Level
- Language
- Decimal Places
- Full Name
- E-Mail Address

For detailed information on the properties, please refer to the "Create New User" section.

On the Access Rights tab, the access rights for all users will be defined by assigning the predefined access levels to the executable functions (see Create Access Rights section).

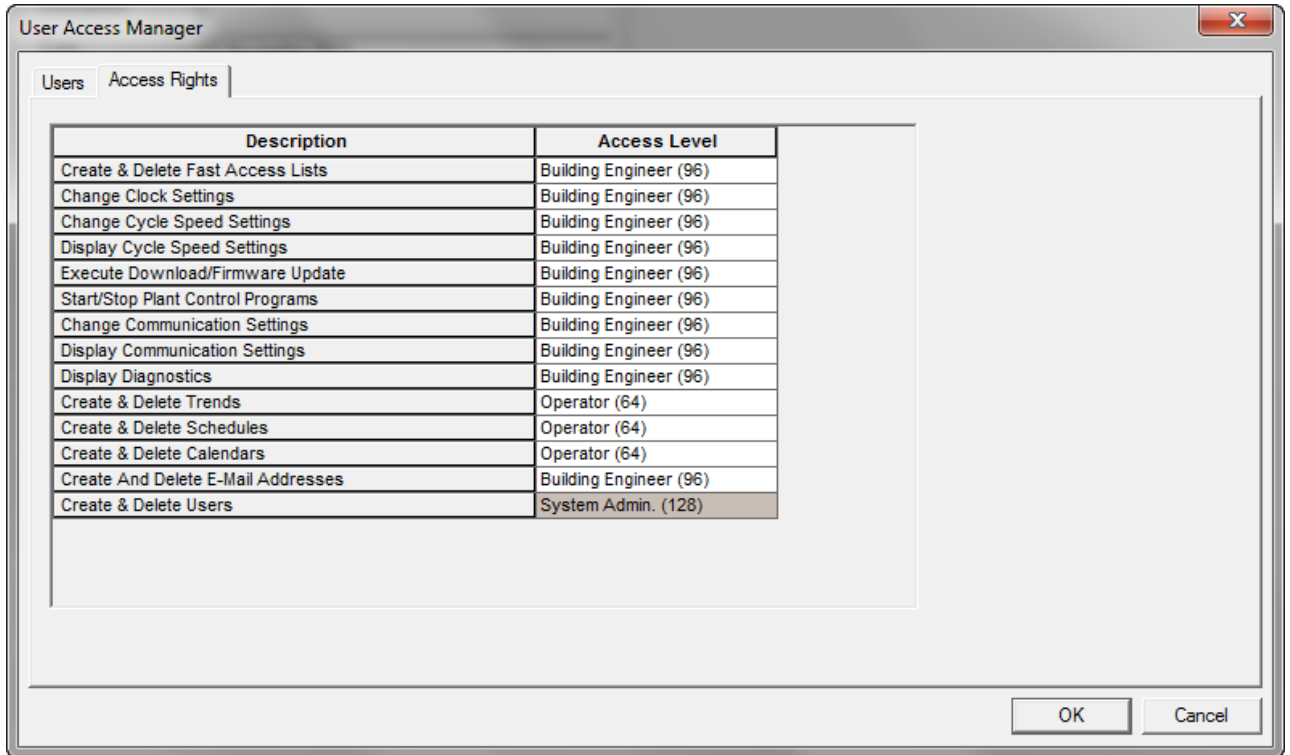


Create Access Rights List

Purpose To assign predefined access levels to all functions to be executed in the Web Interface (access rights).

NOTE: Only the user who has System Admin or Project Admin access level can create or edit access rights.

Procedure 1. In the User Access Manager dialog box, select the Access Rights tab.



- To each function as described in the Description column, assign the appropriate access level by selecting it in the corresponding line in the Access level column.

Note that the access levels are arranged hierarchically with the following sequence of descending priority:

- System Admin (128)
- Project Admin (115)
- Building Engineer (96)
- Operator (64)
- Tenant (32)
- Guest (0)

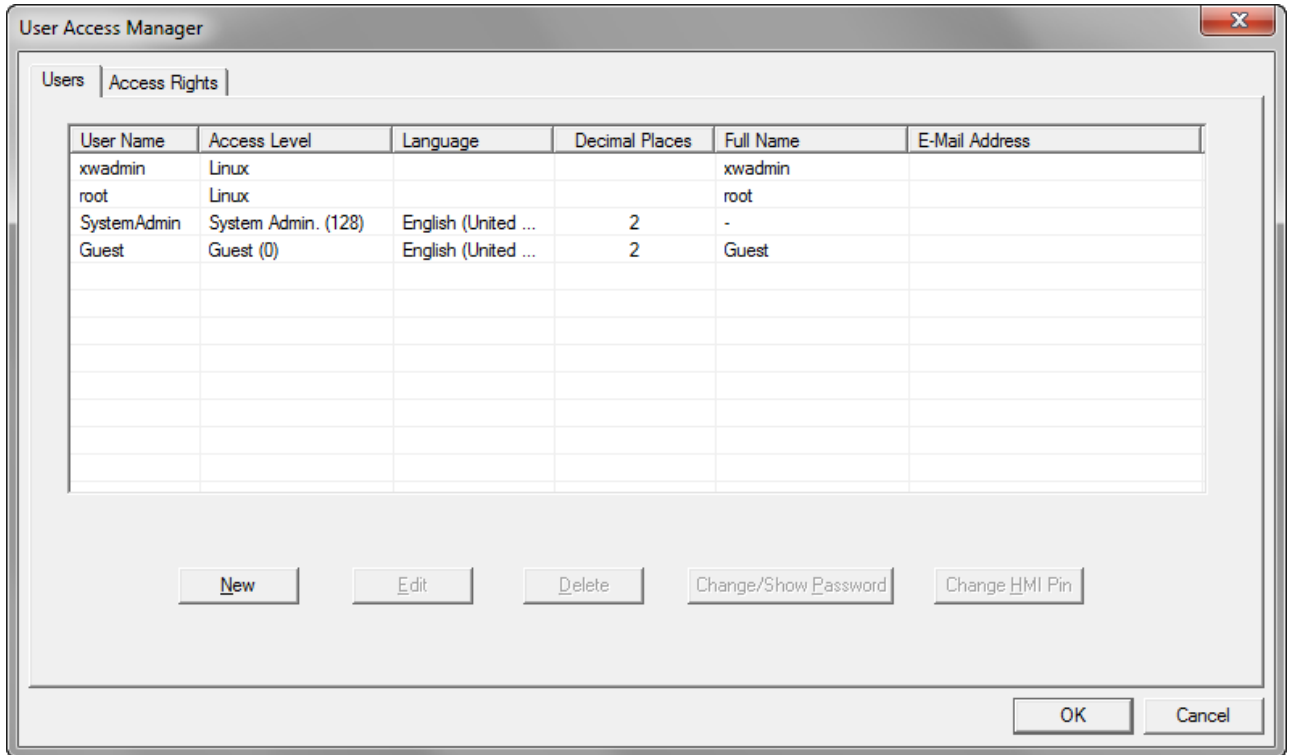
- Click **OK** button to save settings.
- To create a new user, continue as described under the Create New User section.

Create New User

Purpose To create a new user.

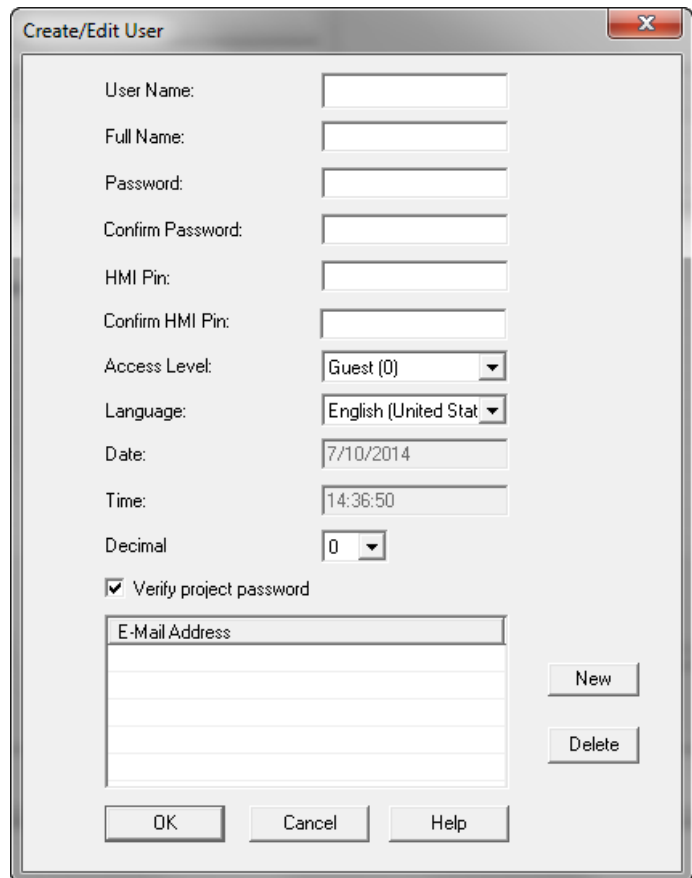
NOTE: Only the user who has System Admin access level can create new users, edit, or delete existing users.

- Procedure**
- In the User Access Manager dialog box, select the Users tab.



2. Click the **New** button.

RESULT: The Create/Edit User dialog box displays.



3. In the User Name field, enter a short form of the full user name.

4. In the Full Name field, enter the full user name.
5. In the Password field, enter the password for the user.
6. In the Confirm Password field, confirm the new password by entering the password again.
7. In the HMI Pin field, enter a 4-digit pin number the user should enter in order to access the BACnet controller via Onboard HMI.
8. In the Confirm HMI Pin field, confirm the pin by entering the same number.
9. From the Access Level drop-down list box, select the access level.

Note that the access levels are arranged hierarchically with the following sequence of descending priority:

- System Admin (128)
- Project Admin (115)
- Building Engineer (96)
- Operator (64)
- Tenant (32)
- Guest (0)

Due to the access rights list definitions (see Create Access Rights section), this assignment automatically determines the set of access rights which the user is allowed to execute in the Web Interface.

10. From the Language drop-down list box, select the language in which the Web Interface should be displayed for the user.

Date Format

Displays the date format. It may be either dd.mm.yyyy or mm/dd/yyyy. The controller stores the date format along with the language setting.

Time Format

Displays the time format. The controller stores the time format along with the language setting.

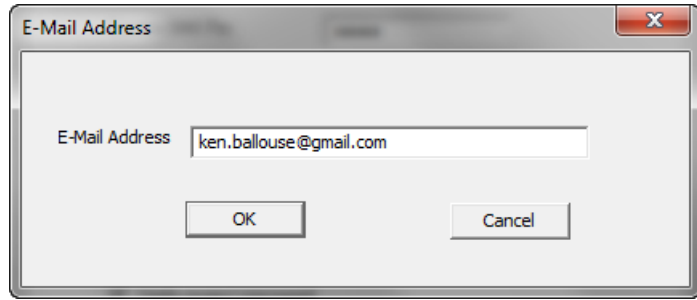
11. From the Decimal drop-down list box, select the number of decimal places for the display of values.
12. By default, the "Verify project password" option is checked. In this case, the password will be verified when opening the project. Entering a wrong password will disable project access.

Uncheck this option if you do not want CARE to proof for correct password input when opening the project. In this case, project access is possible for all users having system admin access level even if the password entered was wrong or is missing.

The selected setting of this option applies to all users having SystemAdmin access level.

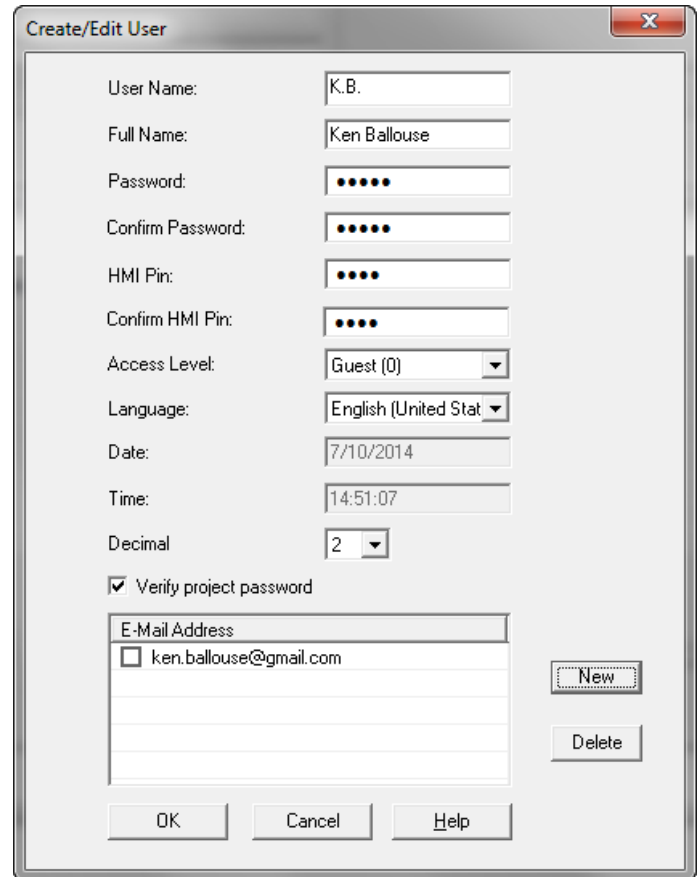
13. Right to the E-Mail Address field, click the **New** button, if you want to add the email address of the user. This step is mandatory if you want apply the Email Alarming function for the controller (see "Email Alarming" section for details).

RESULT: The *E-Mail Address* dialog box displays.



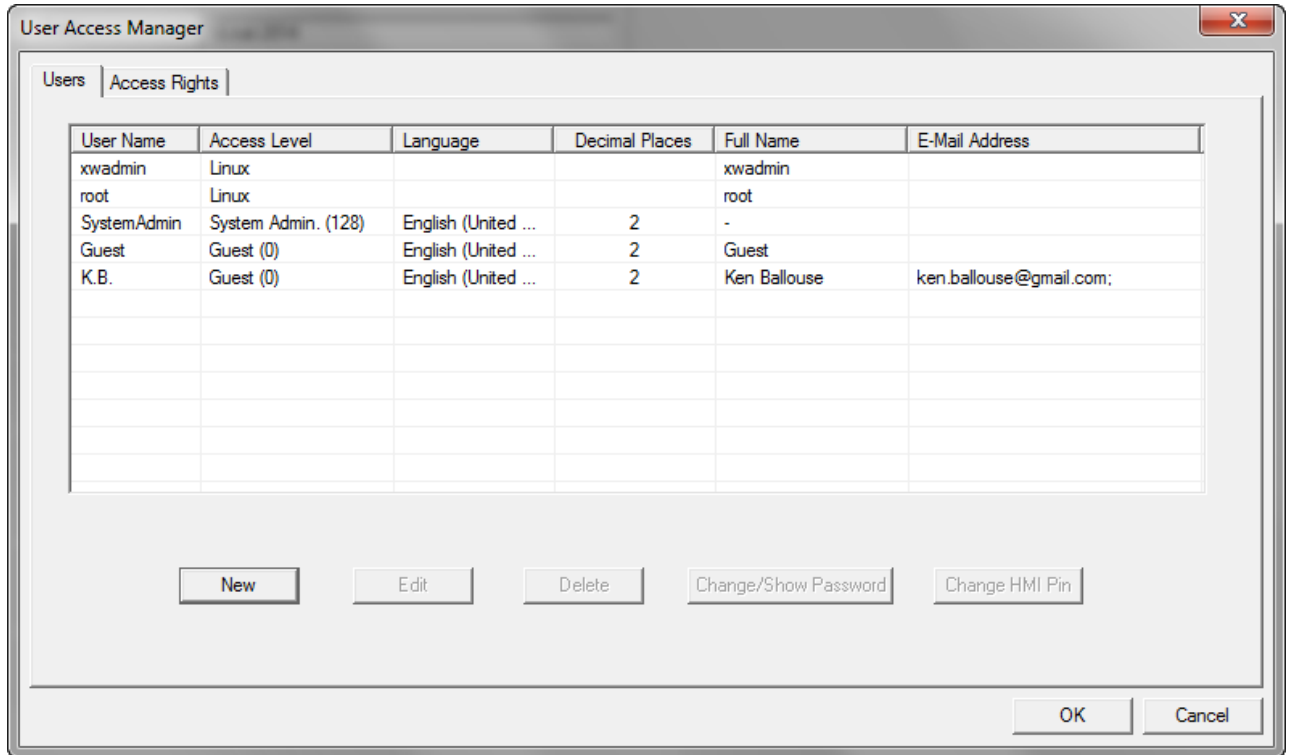
14. Enter the email address, and then click OK.

RESULT: The Create/Edit User dialog box redisplay. The email address is added under **E-Mail Address**.



15. Click OK.

RESULT: The *User Access Manager* box redisplay. The email address is assigned to the user as displayed in the **E-Mail Address** column of the selected user.



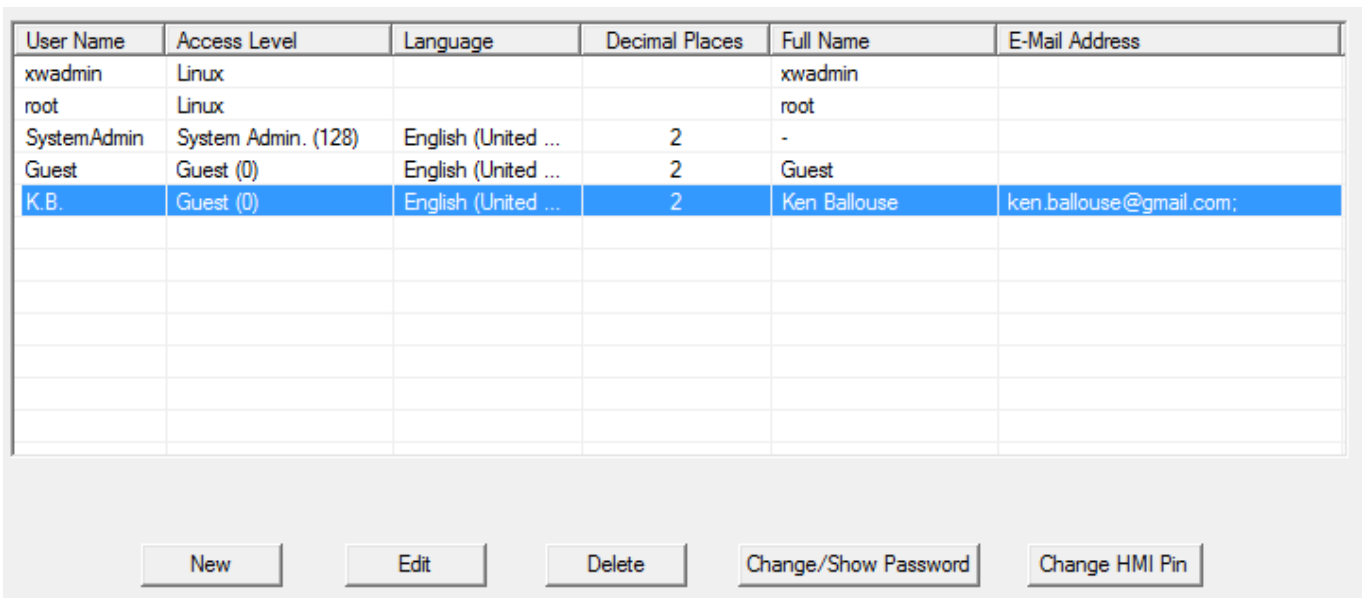
16. In the User Access Manager dialog box, click the **OK** button to save changes.

Edit User

Purpose To edit user name, access level and corresponding access rights, language, or decimal places for a user.

NOTE: Only the user who has System Admin access level can create new users, edit, or delete existing users.

Procedure 1. In the User Access Manager dialog box, select the Users tab.



2. Select the user you want to edit in the list and click the **Edit** button.

RESULT: The Create/Edit User dialog box displays.

The screenshot shows a 'Create/Edit User' dialog box with the following fields and values:

- User Name: K.B.
- Full Name: Ken Ballouse
- Password: (empty)
- Confirm Password: (empty)
- HMI Pin: (empty)
- Confirm HMI Pin: (empty)
- Access Level: Guest (0)
- Language: English (United Stat)
- Date: 7/10/2014
- Time: 14:53:11
- Decimal: 2
- Verify project password
- E-Mail Address list:
 - ken.ballouse@gmail.com
 - (empty)
 - (empty)
 - (empty)

Buttons: New, Delete, OK, Cancel, Help.

3. If desired, change the user name and/or the full name in the fields of the same name.
4. If desired, change the access level by selecting another level from the Access Level drop-down list box.

When changing the access level, note the sequence of descending priority of access levels:

- System Admin (128)
- Project Admin (115)
- Building Engineer (96)
- Operator (64)
- Tenant (32)
- Guest (0)

If the access level has been changed, you should note the current access rights definitions on the Access Rights tab in the User Access Manager dialog box.

5. If desired, change the language in which the Web Interface should be displayed for the user by selecting another language from the Language drop-down list box
6. If desired, change the number of decimal places for the display of values in the Web Interface by selecting another value from the Decimal drop-down list box.
7. If desired, add a new email address by clicking the **New** button (see step 13 in "Create New User" section). Or if you want to delete an email address, select the email address in the list, and then click the **Delete** button.

The 'Create/Edit User' dialog box contains the following fields:

- User Name: K.B.
- Full Name: Ken Ballouse
- Password: (empty)
- Confirm Password: (empty)
- HMI Pin: (empty)
- Confirm HMI Pin: (empty)
- Access Level: System Admin. (128)
- Language: English (United Stat)

8. Click the **OK** button to save settings.

User Name	Access Level	Language	Decimal Places	Full Name	E-Mail Address
xwadmin	Linux			xwadmin	
root	Linux			root	
SystemAdmin	System Admin. (128)	English (United ...	2	-	
Guest	Guest (0)	English (United ...	2	Guest	
K.B.	System Admin. (128)	English (United ...	2	Ken Ballouse	ken.ballouse@gmail.com;

9. In the User Access Manager dialog box, click the **OK** button to save changes.

Delete User

Purpose To delete a user.

NOTE: Only the user who has System Admin access level can create new users, edit, or delete existing users.

Procedure 1. In the User Access Manager dialog box, select the Users tab.

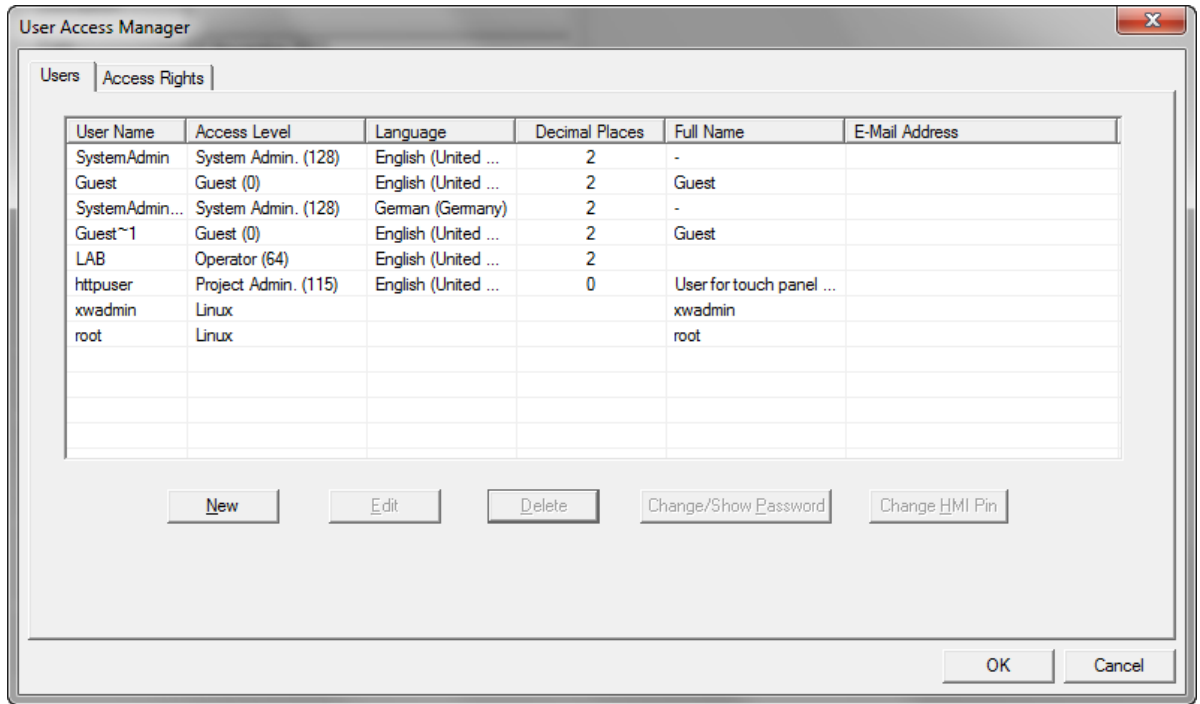
The 'User Access Manager' dialog box has two tabs: 'Users' and 'Access Rights'. The 'Users' tab is active, showing a table of users:

User Name	Access Level	Language	Decimal Places	Full Name	E-Mail Address
SystemAdmin	System Admin. (128)	English (United ...	2	-	
Guest	Guest (0)	English (United ...	2	Guest	
SystemAdmin...	System Admin. (128)	German (Germany)	2	-	
Guest~1	Guest (0)	English (United ...	2	Guest	
LAB	Operator (64)	English (United ...	2		
httpuser	Project Admin. (115)	English (United ...	0	User for touch panel ...	
xwadmin	Linux			xwadmin	
root	Linux			root	
KB	Guest (0)	English (United ...	2	Ken Ballouse	

Below the table are buttons for: **New**, **Edit**, **Delete**, **Change/Show Password**, and **Change HMI Pin**. At the bottom right are **OK** and **Cancel** buttons.

2. Select the user you want to delete in the list and click the **Delete** button.

RESULT: The user is deleted from the list.



3. Click the **OK** button to save settings.

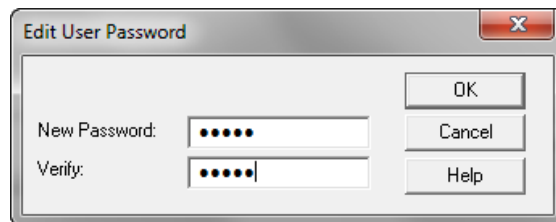
Change Password of "Standard" User

Purpose To change the password of a "standard" user. Standard users are all users except the xwadmin and root users.

- Procedure**
1. In the User Access Manager dialog box, select the Users tab.
 2. Select the user in the list and then click the **Change Password** button.

RESULT: The Edit Project Password dialog box displays.

3. In the New Password field, enter the new password.



4. In the Verify field, enter the same password.
5. Click the **OK** button to save settings.

⚠ CAUTION

For the user 'Guest' or 'guest' it is not allowed to issue the password 'Guest' or 'guest'. Login into the HTML interface using any of those combinations is prohibited in order to protect the controller against cyber attacks. Login is possible using a different user name or a different password.

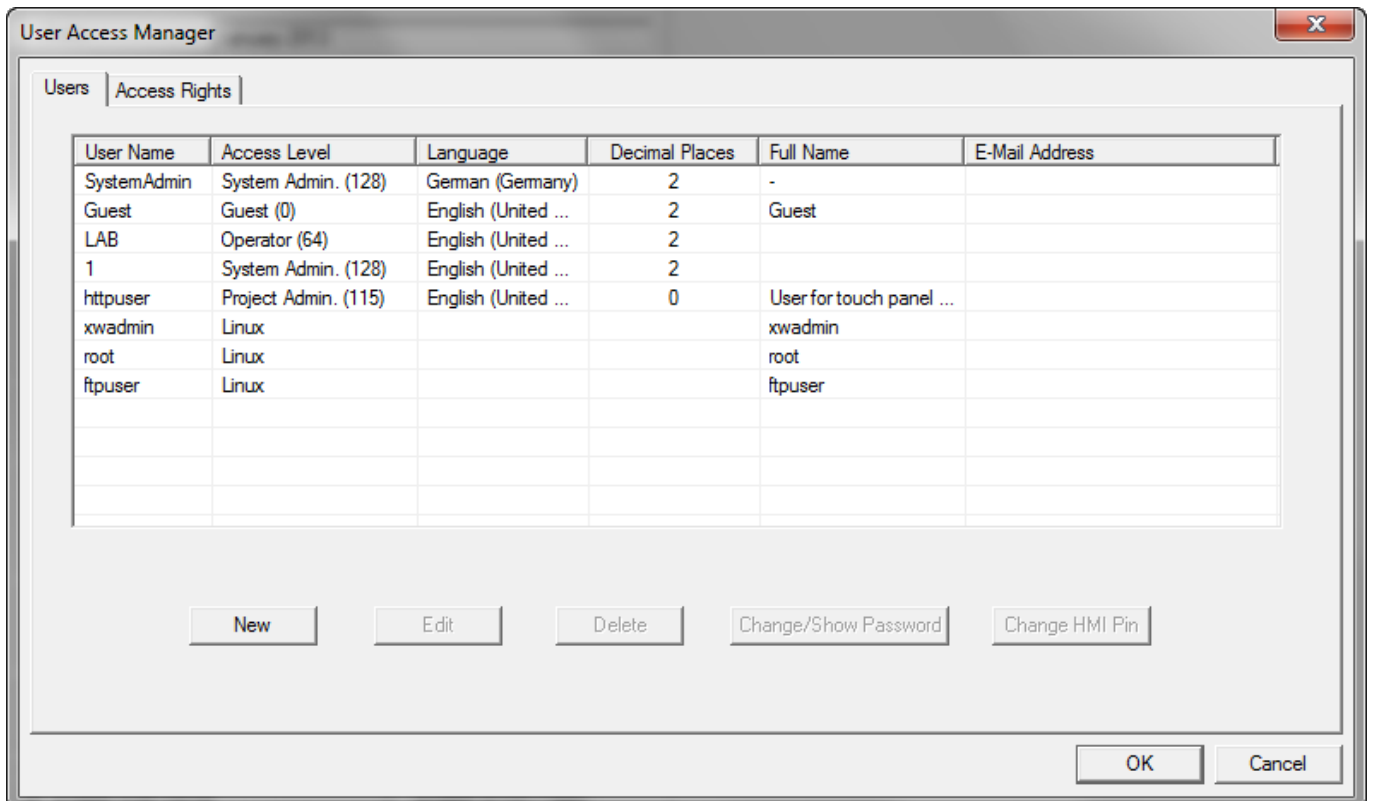
Change Password of Root, FTP and Xwadmin Users

CAUTION

For old projects that include Excel web controllers with firmware earlier than 2.02.12 or Excel web II controllers with firmware earlier than 3.02.00 it is strongly recommended to change the default passwords for the root, ftp, and Xwadmin users in order to protect the controllers from cyber attacks. It is recommended to change these passwords instantly when prompted after opening the project. Otherwise the passwords should be changed here.

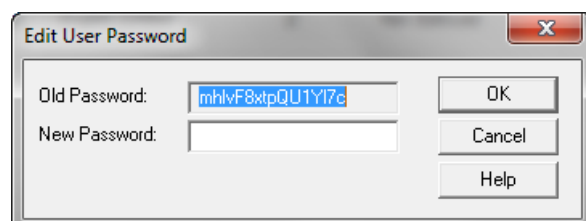
Purpose To change the password of the Root, FTP, and XWAdmin user.

Procedure 1. In the User Access Manager dialog box, select the Users tab.



2. Select the root user, ftpuser or xwadmin user in the list and then click the **Change/Show Password** button.

RESULT: The Edit User Password dialog box displays. The old password is shown.



3. In the New Password field, enter the new password.
4. Click the **OK** button to save settings.

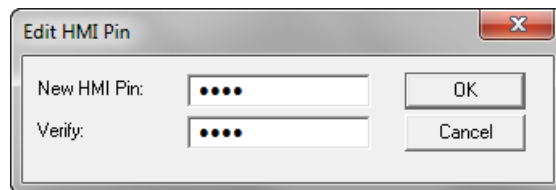
Change HMI Pin of User

NOTE: Only the user who has System Admin access level can change the HMI Pin of a user.

Purpose To change the HMI Pin of a user.

- Procedure**
1. In the User Access Manager dialog box, select the Users tab.
 2. Select the user in the list, and then click the **Change HMI Pin** button.

RESULT: The Edit HMI Pin dialog box displays.



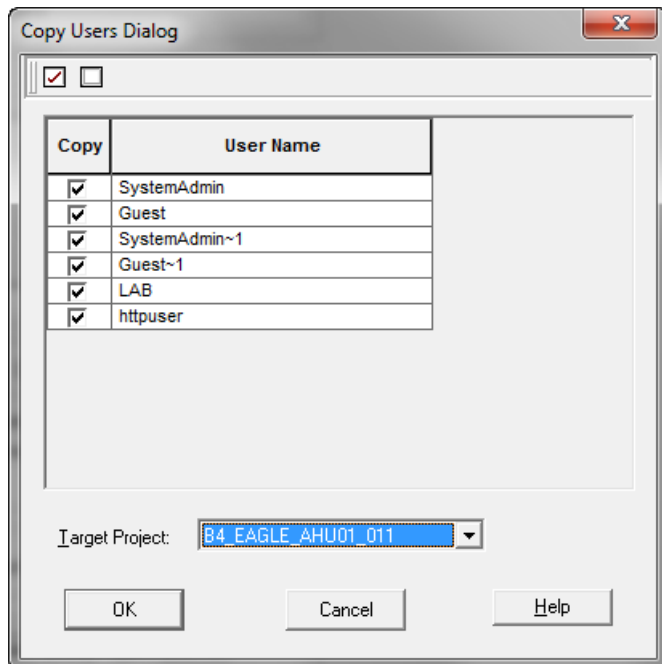
3. In the New HMI Pin field, enter the new pin number.
4. In the Verify field, enter the same pin number.
5. Click the **OK** button to save settings.

Copy Users

Purpose Copying users between different projects.

- Procedure**
1. Open the source project from which you want to copy the users.
 2. Click menu item Project, then submenu item Copy Users.

RESULT: The Copy Users dialog box displays. All users of the source project are displayed in the list. By default, all users are checked for copying in the Copy column.



3. Uncheck the users you do not want to copy. Re-check users you want to copy. You can check all users by clicking the check icon on the top and you can uncheck all users by clicking the blank icon on the top.
4. From the Target Project drop-down listbox, select the project to which you want to copy the users.
5. Click the **OK** button.

RESULT: The Copy Users dialog box is closed. The selected users are copied to the target project and can be administered in the user access manager opened in the target project.

Notification Class Manager

Purpose To adapt alarming to the central and 3rd party BACnet clients according to the requirements.

This will be done by creating, editing and deleting notification class objects. Notification class objects will be assigned to datapoints in order to enable alarming for datapoints.

About the Notification Class Object Types

Notification class objects represent and contain information required for the distribution of event notifications within a BACnet system. Notification Classes are useful for event-initiating objects that have identical needs in terms of how their notifications should be handled, what the recipient(s) for their notifications should be, and how they should be acknowledged.

A notification class defines how event notifications shall be prioritized in their handling according to TO-OFFNORMAL, TO-FAULT, and TO-NORMAL events; whether these categories of events require acknowledgment (nearly always by a human operator); and what recipient devices (e.g. FALCON and EAGLE Web Interfaces) or processes should receive notifications.

The purpose of prioritization is to provide a means to ensure that alarms or event notifications with critical time considerations are not unnecessarily delayed. The possible range of priorities is 0 - 255. A lower number indicates a higher priority. Priorities may be assigned to TO-OFFNORMAL, TO-FAULT, and TO-NORMAL events individually within a notification class.

The purpose of acknowledgment is to provide assurance that a notification has been acted upon by some other agent, rather than simply having been received correctly by another device. In most cases, acknowledgments come from human operators.

TO-OFFNORMAL, TO-FAULT, and TO-NORMAL events may, or may not, require individual acknowledgment within a notification class.

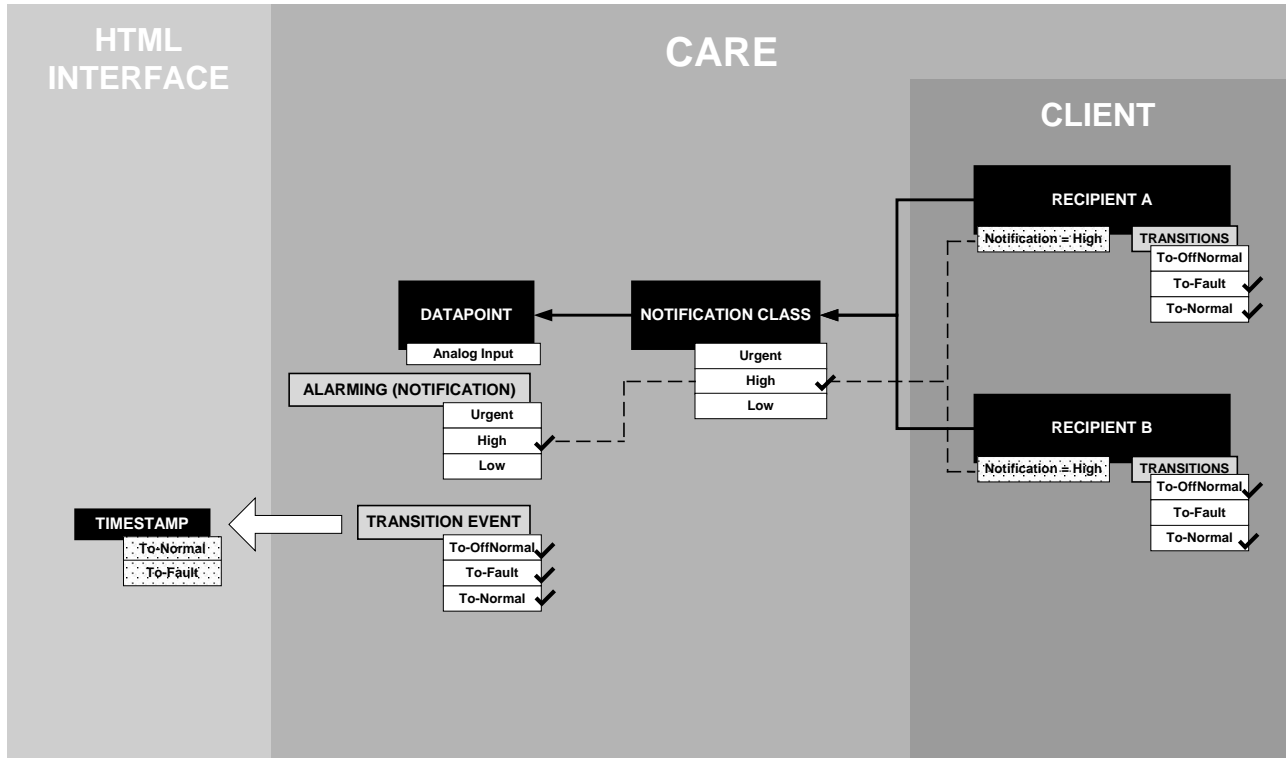
It is often necessary for event notifications to be sent to multiple recipients or to different recipients based on the time of day or day of week. Notification Classes may specify a list of recipients, each of which is qualified by time, day of week, and type of handling. A recipient is specified by a set of days of the week (Monday through Sunday) during which the recipient is considered viable by the Notification Class object. In addition, each recipient has a FromTime and ToTime, which specify a window, on those days of the week, during which the recipient is viable. If an event that uses a Notification Class object occurs and the day is one of the days of the week that is valid for a given recipient and the time is within the window specified for the recipient, then the recipient shall be sent a notification. Recipients may be further qualified, as applicable, by any combination of the three event transitions TO-OFFNORMAL, TO-FAULT, or TO-NORMAL.

The recipient also defines the device to receive the notification and a process within the device. Processes are identified by numeric handles that are only meaningful to the recipient device. The administration of these handles is a local matter. The recipient device may be specified by either its unique Device Object_Identifier or its BACnetAddress. In the latter case, a specific node address, a multicast address, or

a broadcast address may be used. The recipient further specifies whether the notification shall be sent using a confirmed or unconfirmed event notification.

How the notification class assignment is handled in CARE: please see the following graphic.

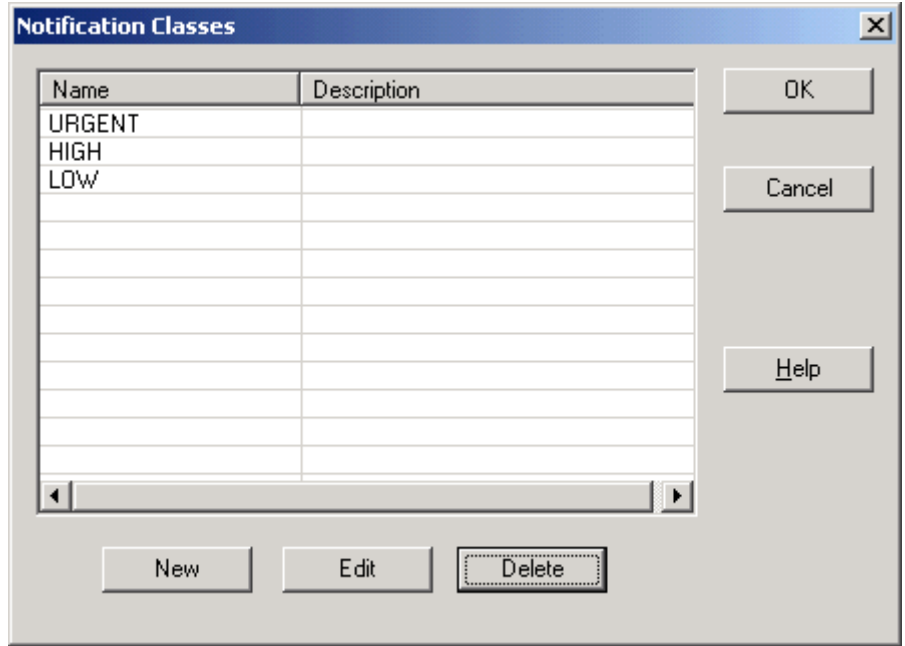
NOTIFICATION CLASSES AND EVENT HANDLING



Start Notification Class Manager

- Procedure** 1. Click menu item Project, then submenu item Notification Class Manager.

RESULT: The Notification Classes dialog box displays.



In the Notification Classes dialog box, the Urgent, High, and Low notification classes are available by default.

NOTE: The default notification classes "urgent", "high", and "low" are especially designed for the alarming to the central. In this case, priorities must not be changed. For 3rd party BACnet clients, new notification classes should be created if the default notification classes do not meet exactly the requirements.

You can create new notification class objects, edit and delete notification class objects (see respective sections in the following).

Notification Class JOURNAL Usage

IMPORTANT

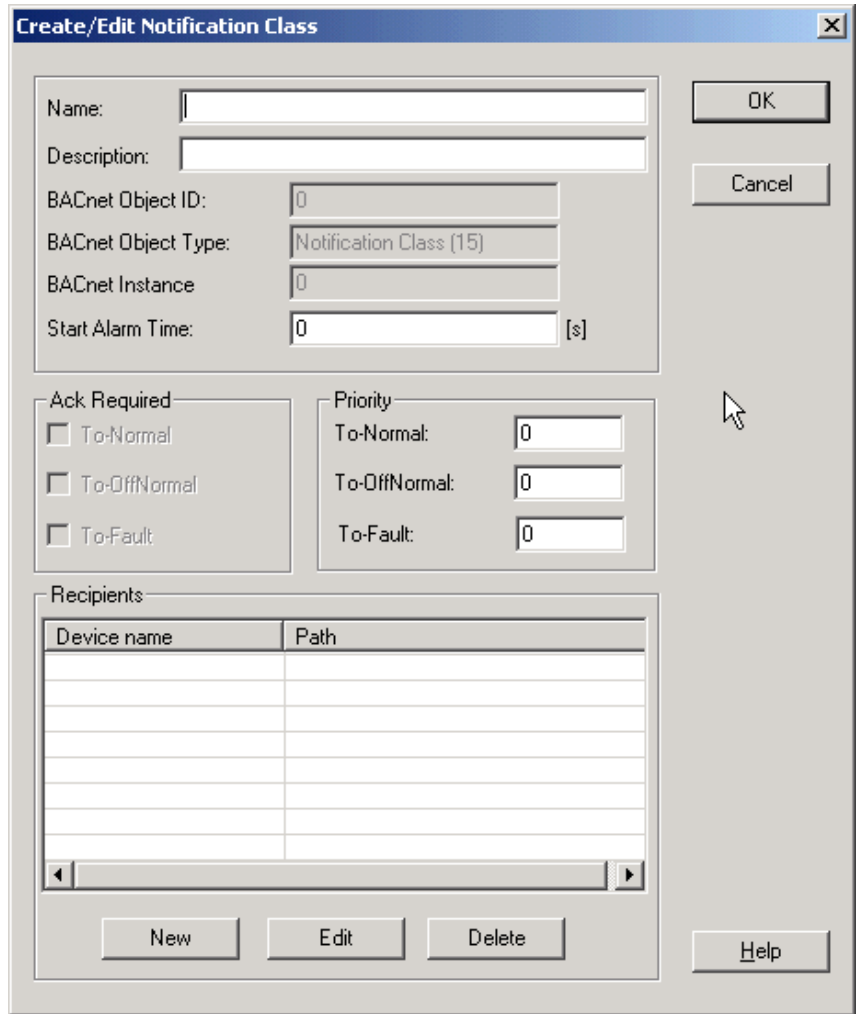
Any application that has been engineered by using the notification class JOURNAL will not lose it. After application upload into CARE, all notification classes which have been previously defined will be available in CARE for further engineering and download.

Create New Notification Class Object

Purpose To create a new notification class in order to adapt the alarming to a 3rd party BACnet client. The default notification classes "urgent", "high", and "low" are especially designed for the alarming to the central.

Procedure 1. To create a new notification class object, click the **New** button in the Notification Classes dialog box.

RESULT: The Create/Edit Notification Class dialog box displays.



2. In the Name field, enter the name for the notification class object.
3. In the Description field, enter a description if desired.
4. In the Start Alarm time field, enter a time during which the notification of alarms is suppressed. The start alarm time will become effective upon every start/restart of the FALCON controller, e.g. power-on, application start, etc. Entering a start alarm time is requested to prevent alarm shower at start/restart of the controller.
5. Under Priority, enter the priority for the transitions. The following table may be helpful for prioritizing:

Event (Alarm) Category	Transitions		
	To Normal	To Off-Normal	To Fault
Urgent (range 0...84)	83	0	42
High (range 85...169)	168	86	127
Low (range 170...250)	250	171	210

6. Under Recipients, the destination devices that should receive the notification will be created and can be edited and deleted.
7. To create a new recipient, click the **New** button.

RESULT: The Create/Edit Recipient dialog box displays.

8. From the Recipient drop-down list box, select the recipient. The recipient is shown by its path and device name, for example Subnet1 Falcon. Herewith Subnet 1 is the path and Falcon the device name as shown in the network tree.
9. Under Valid Days, check the days on which the notification should be sent by clicking the corresponding checkboxes.
10. Under Window of Time, check the time period, during which the notification should be sent. Select All day to send the notification all day long. Enter the time in the From Time and Time fields, if the notification should be sent during a time period shorter than the whole day.
11. Under Transitions, check the transitions that should be sent by selecting the corresponding checkboxes at:
 - To Off-Normal
The alarm reaches off-normal state, that is, the datapoint value exceeds the high limit, respectively remains under the low limit.
 - To Fault
The alarm originates in a fault such as sensor break, etc.
 - To-Normal
The alarm is going to normal state, that is, the value of the datapoint remains under the high limit, respectively exceeds the low limit.
12. Click the **OK** button to save settings.

RESULT: The Create/Edit Notification Class dialog box redisplay.

Create/Edit Notification Class

Name:

Description:

BACnet Object ID:

BACnet Object Type:

BACnet Instance:

Start Alarm Time: [s]

Ack Required

To-Normal

To-OffNormal

To-Fault

Priority

To-Normal:

To-OffNormal:

To-Fault:

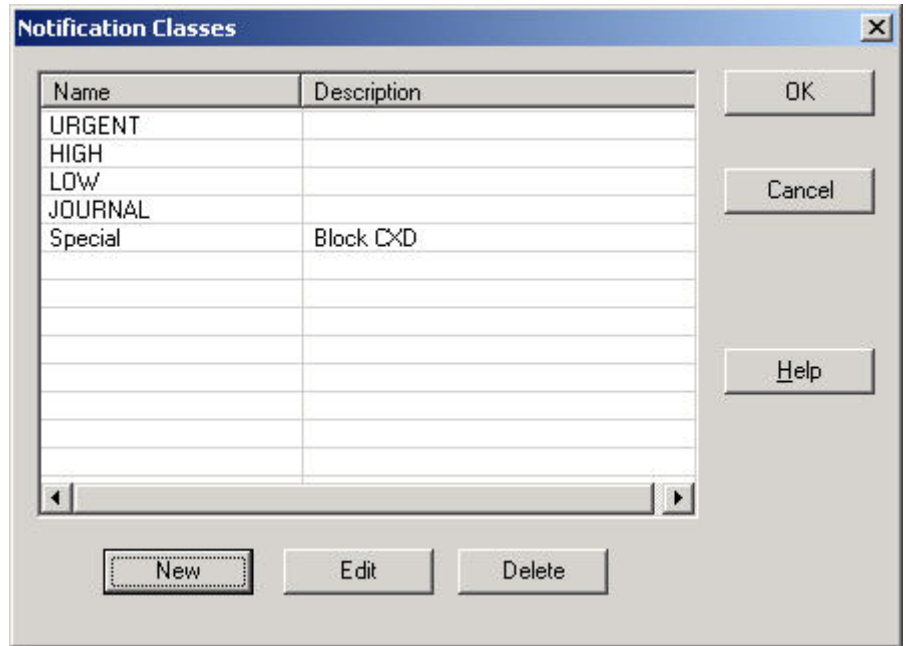
Recipients

Device name	Path
Device 1	IP-Subnet 1

Under Recipients, the device is inserted.

- Click the **OK** button to save settings.

RESULT: The Notification Classes dialog box redisplay.



In the list, the currently available notification class objects are shown by name and description

- Click the **OK** button to save settings.

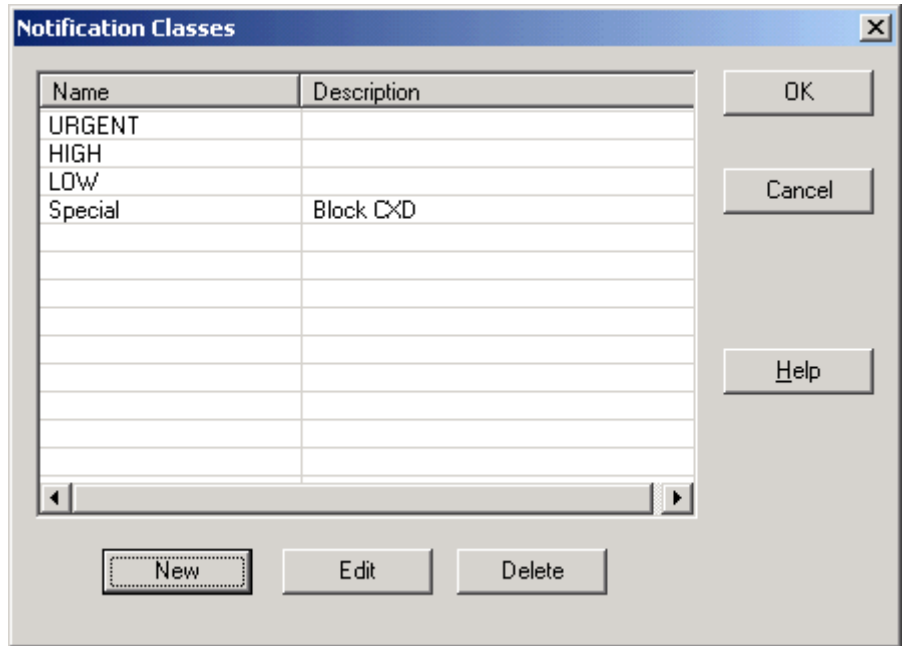
RESULT: The Notification classes are now available for assignment to datapoints.

Edit Notification Class Object

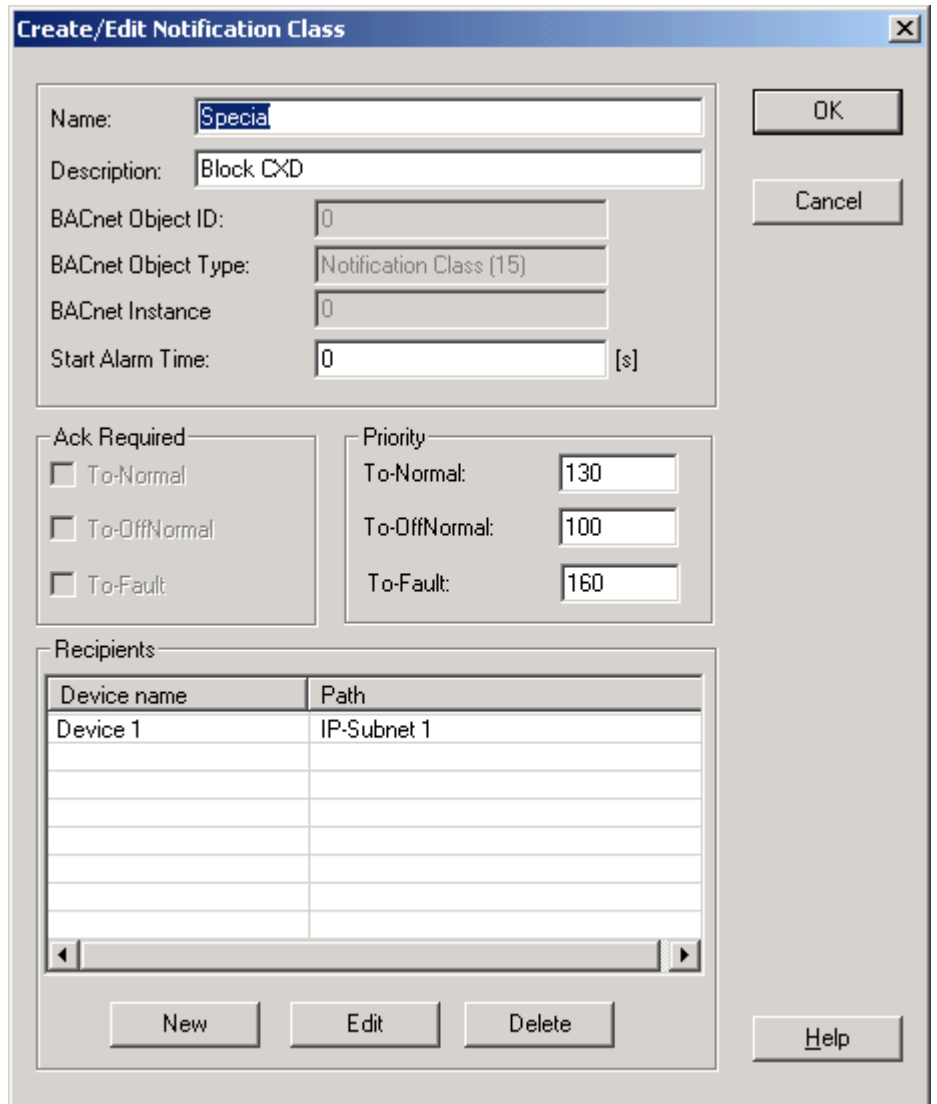
Purpose To edit a notification class object in order to adapt the alarming to a 3rd party BACnet client.

NOTE: The default notification classes "urgent", "high", and "low" are especially designed for the alarming to the central and must not be changed.

- Procedure**
- In the Notification Classes dialog box, select the notification class object in the list and click the **Edit** button.



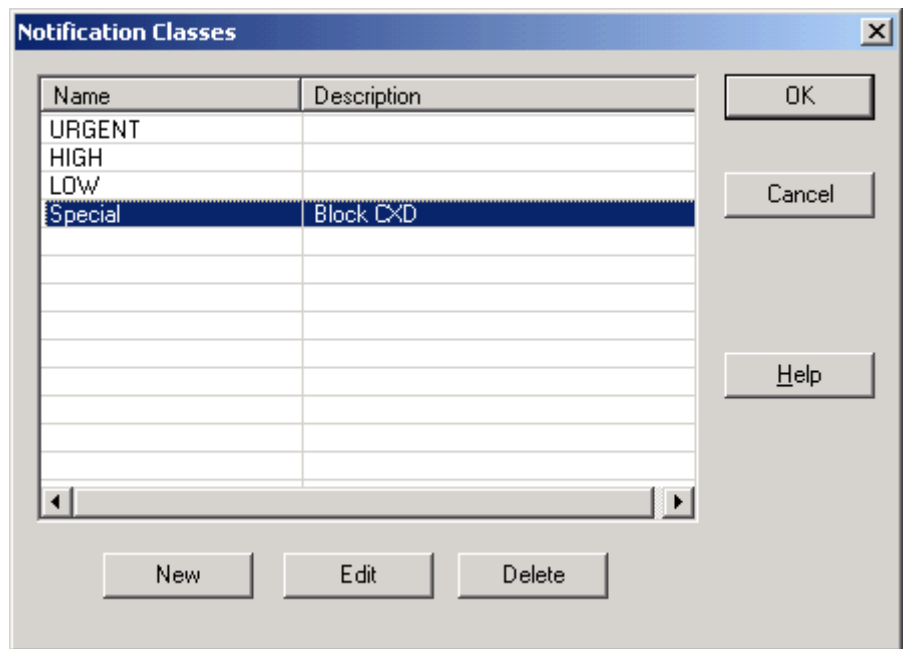
RESULT: The Create/Edit Notification Class dialog box displays.



2. Change the desired options and/or values such as Name or Priority. Edit the recipients list by changing recipients data or deleting recipients from the list (for detailed description of the items see Create New Notification Class Object section).

Delete Notification Class Object

- Purpose** To delete a notification class object.
- Procedure**
1. In the Notification Classes dialog box, select the notification class object in the list and click the **Delete** button.

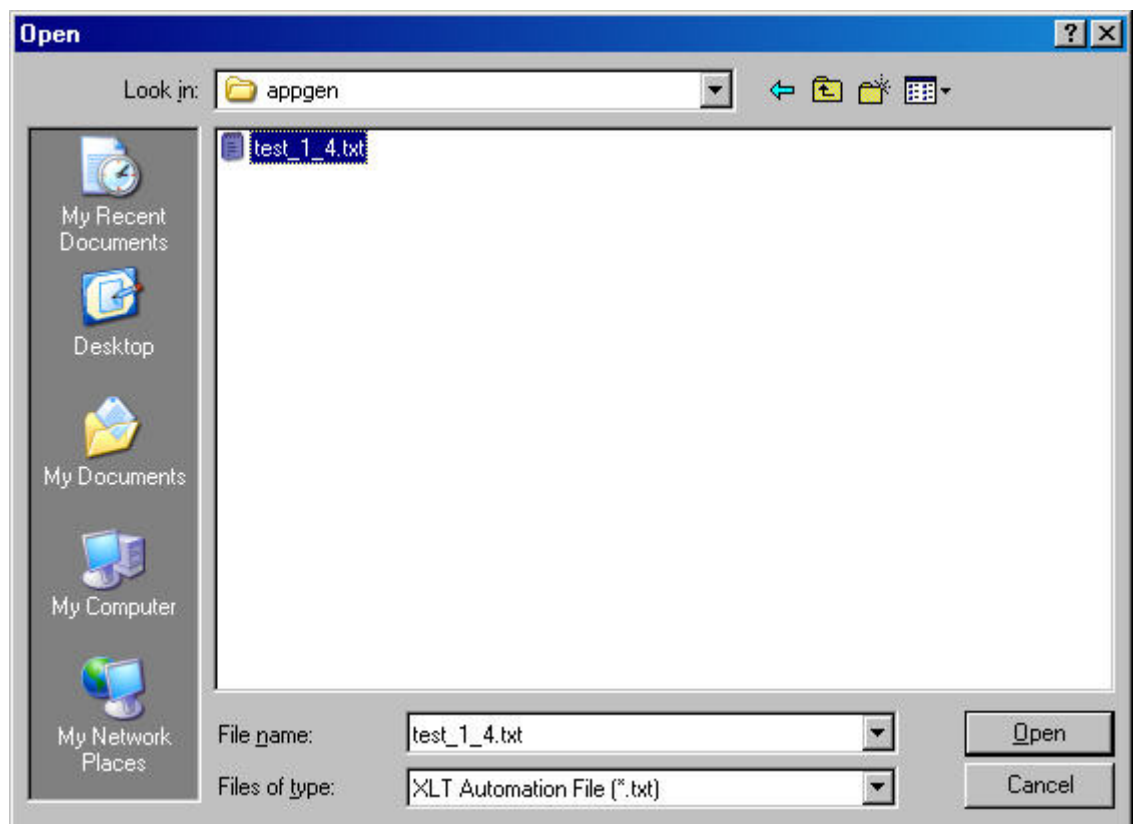


RESULT: The notification class object is deleted from the list.

2. Click the **OK** button to save settings.

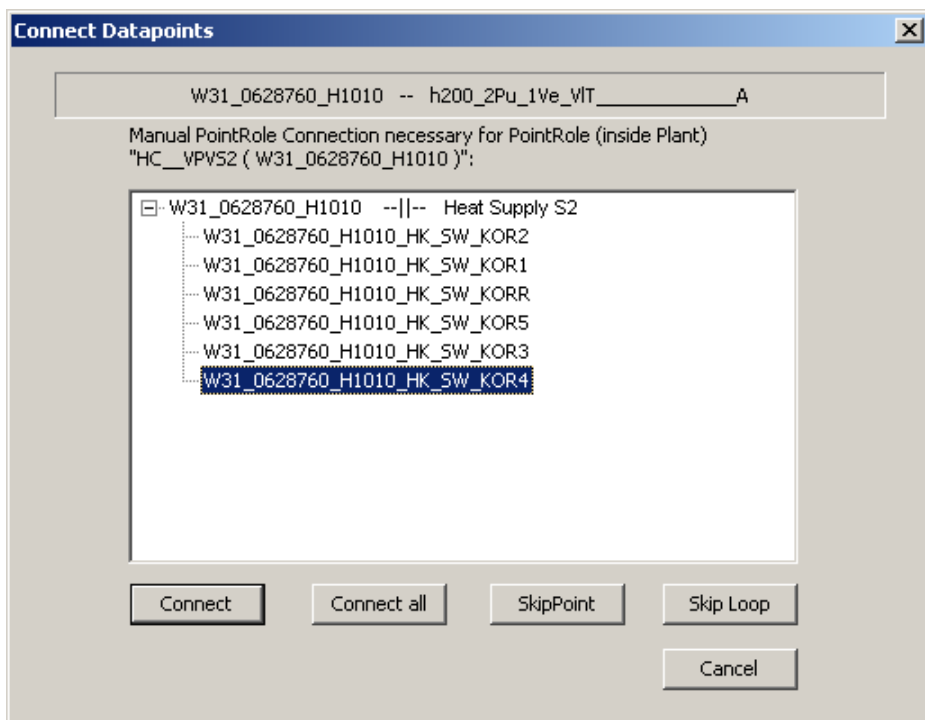
Application Generator

- Purpose** With the application generator you can automatically create applications (control loops) for plants of Excel toolkit projects.
- This includes the connection of macros to datapoints with point roles according to defined rules.
- Applications can be created for a single controller with all its plants or the project which creates applications for all plants of the project.
- Prerequisites** Excel toolkit automation file (XLT) must be available and the macro library must be part of the CARE database.
- Procedure**
1. In the tree, select the controller, for which you want to create applications. Or, select the project if you want to create applications for all controllers.
 2. Click menu item **Controller**, then submenu item **Application Generator**.
- RESULT:** The *Open* dialog box displays.



3. Browse to the folder where the XLT file is saved.
4. Select the XLT file and click **Open**.

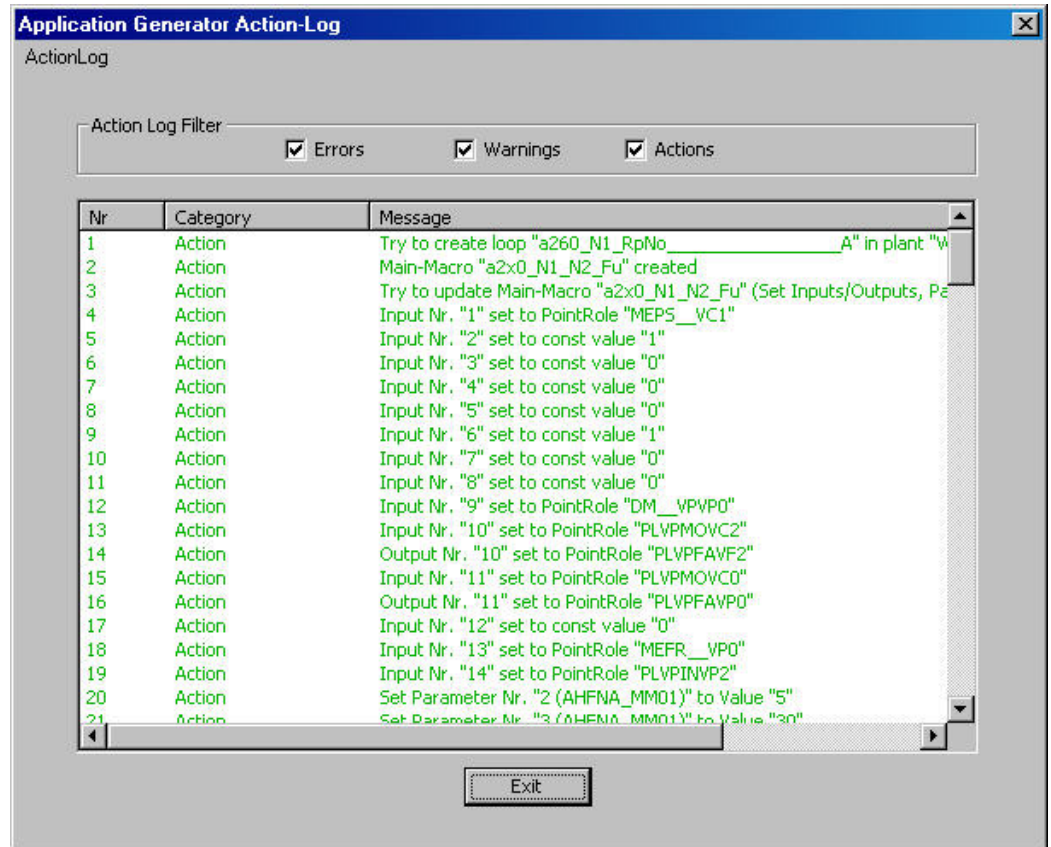
RESULT: If datapoints must be manually connected to macros, the *Connect Datapoints* dialog box displays.



On the top, the name of the current plant and its control loop is shown in bold. In the tree, the plants (main entries of the tree) and their datapoints (subentries of the tree) are shown. When a plant shows multiple datapoints, all datapoints have the same role. The same role can be assigned to multiple datapoints in different plants.

5. Select the datapoint in the tree, and then do one of the following:
 - d. To connect the selected datapoint, click **Connect**.
 - e. To connect all datapoints of the plant having the same EDK, will be connected without any further request, click **Connect all**.
 - f. To skip the connection of a datapoint, click **Skip Point**.
 - g. To skip the connection of the complete control loop, click **Skip Loop**.
 - h. To skip the whole connecting process, click **Cancel**.

RESULT: After the datapoints have been successfully connected, the *Application Generator Action-Log* dialog box displays showing log categories errors, warnings and actions with their messages, caused by the connecting process. Errors have a higher severity than warnings. For example, errors result from the failure of creating a control loop at all, whereas warnings may result from unoccupied inputs or outputs. Actions have no negative impact on the application generation result.



6. To hide a log category, uncheck the corresponding checkbox.
7. To save the action log as *TXT* file, click **ActionLog** on top and click **Export**.
8. In the Save As dialog box, browse to the destination folder, enter a file name in the **File name** field, and then click **Save**.
9. Click **Exit**.

RESULT: If the application generation is successfully done, the control loops are created for the plants.

Event Enrollment Objects / Algorithmic Change Reporting

Event Enrollment Objects

The primary purpose for Event Enrollment objects is to define an event and to provide a connection between the occurrence of an event and the transmission of a notification message to one or more recipients.

The Event Enrollment object contains the event-type description, the parameters needed to determine if the event has occurred (Algorithmic Change Reporting), and a device to be notified. Alternatively, a Notification Class object may serve to identify the recipients of event notifications. A device is considered to be "enrolled for event notification" if it is the recipient to be notified or one of the recipients in a Notification Class object referenced by the Event Enrollment object. Event Enrollment objects are the basics for algorithmic change reporting.

Algorithmic Change Reporting

Algorithmic change reporting enables a BACnet device to provide one or more alarm or event sources, defined by Event Enrollment objects, to generate alarm or event notifications that may be directed to one or more recipients. Any of the standardized algorithms may be used to establish criteria for change reporting.

Once established, occurrences of change may be reported to one or more recipients based on further criteria. Changes of value of specific properties of an object may be programmed to trigger event notifications to be sent to one or more recipients based on a notification class. Typically, event notifications are sent to application programs represented by processes within a notification-client device. The object(s) whose properties are referred to is known as the Reference Object(s). The criteria used to ascertain that an event has occurred are determined by the Event Type, for example, CHANGE OF BITSTRING, CHANGE OF STATE etc.

Enable Event Enrollment Alarming for Plant

- Purpose** Enable the Event Enrollment Alarming for the plant. This allows algorithmic change reporting based on the event enrollment object type. For basic information on Event enrollments, please refer to the "Event Enrollment Objects" section.
- Procedure**
1. In the logical plant tree, click on the plant.
 2. On the right pane, click on the *Alarming* tab.
- RESULT: On the *Alarming* tab on the right, do the following:

The screenshot shows the configuration interface for an HVAC plant. The 'Alarming' tab is selected. The 'Name' field is populated with 'EE_HVAC.PlantStatus'. The 'Event Type' is set to 'Change Of State'. In the 'Program Object States' section, the 'Off-Normal States' are checked, including HALTED, WAITING, IDLE, LOADING, and UNLOADING. The 'Alarm Delay' is set to 10 seconds. The 'Notify Type' is 'Event' and the 'Notification Class' is 'LOW'. The 'Transition Events' section is currently empty, with all options (To-Off-Normal, To-Fault, Back-To-Normal) unchecked.

3. In the **Name** field, change the default name.
4. In the **Description** field, enter a meaningful description.
5. In the **Event Type** field, note that the event type of the event enrollment object for the plant alarming is 'change of state'.
6. Under **Program Object States**, the Normal and Off-Normal States the plant can have are displayed. This is for display only. Event enrollment alarms can be triggered by enabling transitions from Normal to Off-Normal and vice versa under **Transition Events** on this tab.
7. In the **Alarm Delay** field, enter an alarm delay in sec. The event enrollment alarm will be sent after the time entered here has been elapsed.
8. From the **Notify Type** drop-down listbox, select the notify type.
9. From the **Notification Class** drop-down listbox, select the notification class that defines the recipient to which the event enrollment alarm is sent after a transition has occurred.
10. Under **Transition Events**, check the transition events that should trigger the event enrollment alarming. For plants, the 'To-Off-Normal' and the 'Back to Normal' transitions can be selected. Refer to the relevant states listed under **Program Object States**.

Example: When selecting 'To-Off-Normal', each transition from 'RUNNING' (Normal State) to any of the Off-Normal States, for example 'HALTED', will cause an event enrollment alarm.

Enable Event Enrollment Alarming for Controller System Status

Purpose Enable the Event Enrollment Alarming for the controller. This allows algorithmic change reporting based on the event enrollment object type. For basic information on Event enrollments, please refer to the "Event Enrollment Objects" section. .

- Procedure**
1. In the logical plant tree, click on the controller.
 2. On the right pane, click on the *System Status* tab.

RESULT: On the *System Status* tab on the right, do the following:

3. In the **Name** field, change the default name if desired.
4. In the **Description** field, enter a meaningful description.
5. In the **Event Type** field, note that the event type of the event enrollment object for the controller is 'change of state'.
6. Under **Device Object States**, the Normal and Off-Normal States the controller can have, are displayed. This is for display only. Event enrollment alarms of the controller can be triggered by enabling transitions from Normal to Off-Normal and vice versa under **Transition Events** on this tab.
7. In the **Alarm Delay** field, enter an alarm delay in sec. The event enrollment alarm will be sent after the time entered here has been elapsed.
8. From the **Notify Type** drop-down listbox, select the notify type.

9. From the **Notification Class** drop-down listbox, select the notification class that defines the recipient to which the event enrollment alarm is sent after the selected transition has occurred.
10. Under **Transition Events**, check the transition events that should trigger the event enrollment alarming. For the controller, the 'To-Off-Normal' and the 'To Normal' transitions can be selected. Refer to the relevant states listed under **Device Object States**.

Example: When selecting 'To-Off-Normal', each transition from 'RUNNING' (Normal State) to any of the Off-Normal States, for example 'HALTED', will cause an event enrollment alarm.

Email Alarming

Purpose Sending an email to a definable email-recipient in case of alarms of selectable datapoints. Alarms may be generated for each datapoint that has the appropriate notification class assigned and the alarm reporting enabled. The email includes an attachment (.TXT) that shows a detailed description of the alarm data, for example:

```
Democase_Controller
http://192.168.200.10
URGENT (193)
Outdoor_Temperature
2008-March-12 We 14:29:16
Notify Type: Alarm
Event Type: Out Of Range
Description: Smart_IO_AI2
Present Value: 50 °C
Low Limit: 3 °C - High Limit: 40 °C
```

Steps Setting up the email alarming process includes the following major steps summarized in the following procedure:

In CARE

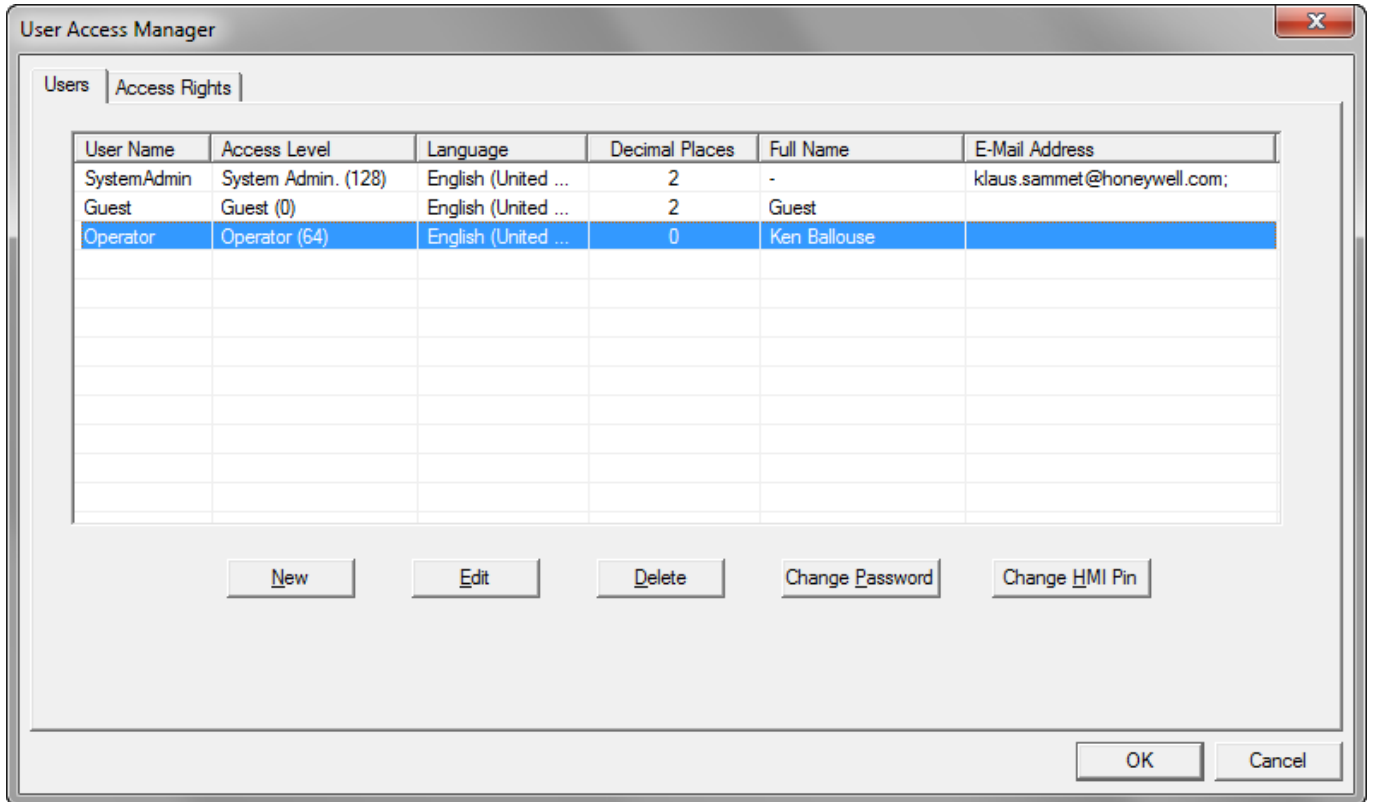
- a. Assign email address to the user that receives the alarm email(s) (recipient)
- b. Assign recipient and email address to the notification class
- c. Define alarming conditions for datapoint(s) that should send alarm emails
- d. Enable enhanced BACnet properties for the controller
- e. Enter E-Mail alarming properties
- f. Connect to controller
- g. Translate and download application
- h. Download controller settings

In the Web Interface

- i. Send Test Email

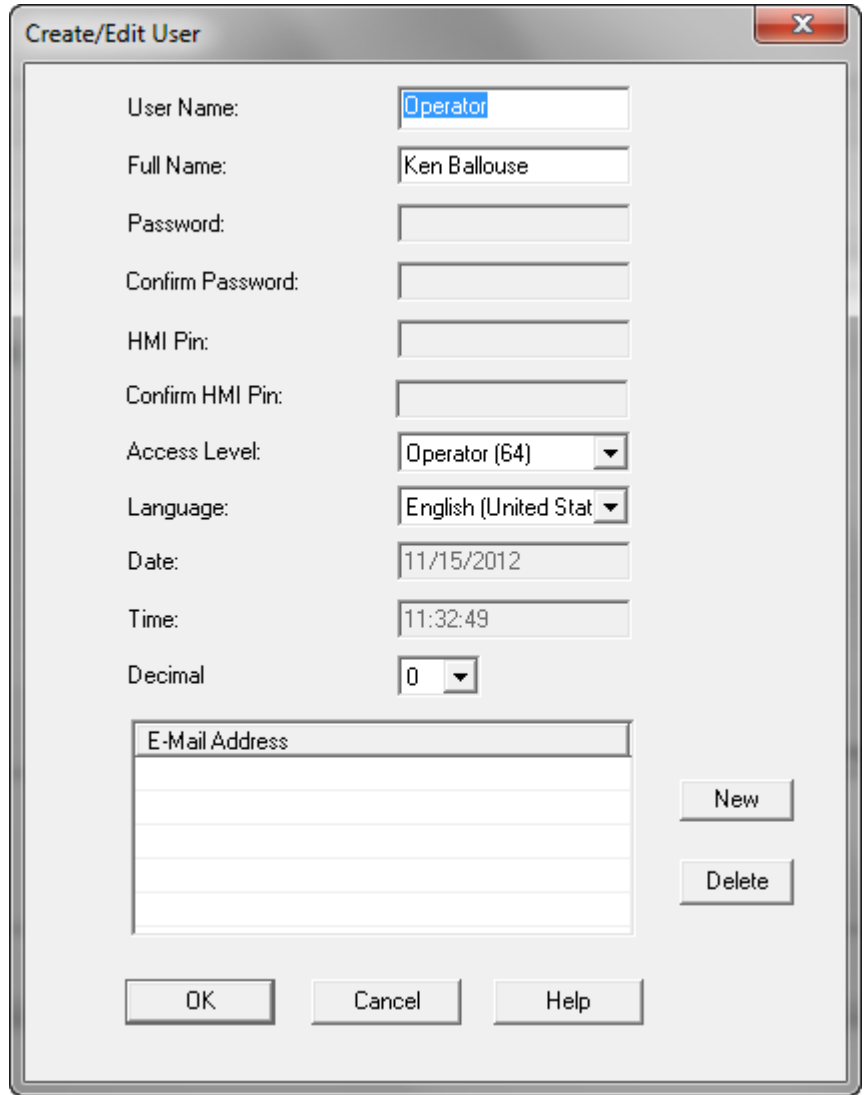
Procedure 1. In CARE, click menu item **Project**, then submenu item **User/Access Manager**.

RESULT: The *User Access Manager* dialog box displays.



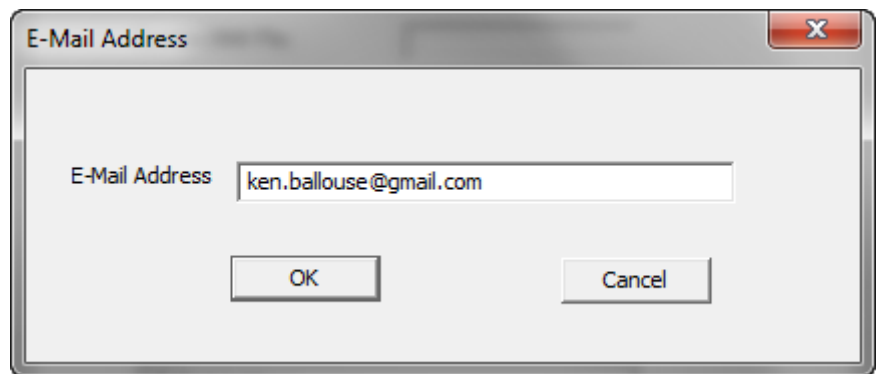
2. Select the user in the list, and then click **Edit** button.

RESULT: The *Create / Edit User* dialog box displays.



3. Click **New** button.

RESULT: The *E-Mail Address* dialog box displays.



4. Enter the email address, and then click OK.

RESULT: The *Create / Edit User* dialog box redisplay. The email address is added under **E-Mail Address**.

5. Click OK.

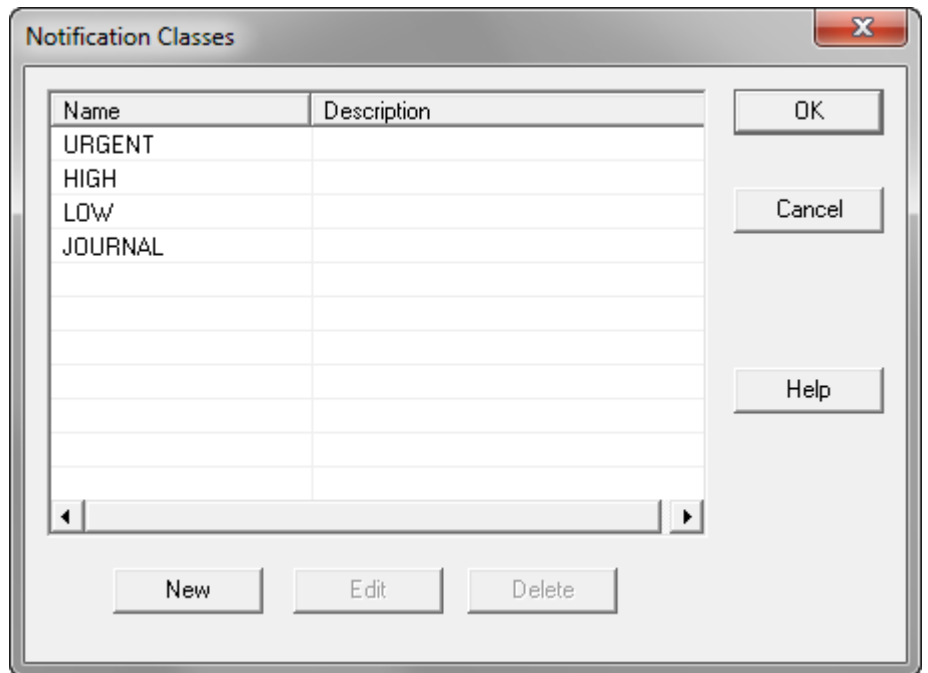
RESULT: The *User Access Manager* box redisplay. The email address is assigned to the user as displayed in the **E-Mail Address** column of the selected user.

User Name	Access Level	Language	Decimal Places	Full Name	E-Mail Address
SystemAdmin	System Admin. (128)	English (United ...	2	-	klaus.sammet@honeywell.com;
Guest	Guest (0)	English (United ...	2	Guest	
Operator	Operator (64)	English (United ...	0	Ken Ballouse	ken.ballouse@gmail.com;

6. Click OK.

7. Click menu item **Project**, then submenu item **Notification Class Manager**.

RESULT: The *Notification Classes* dialog box displays.



8. Double-click the notification class that you want to apply for sending the email alarm, for example, URGENT.

RESULT: The *Create/Edit Notification Class* dialog box displays.

Create/Edit Notification Class

Name:

Description:

BACnet Object ID:

BACnet Object Type:

BACnet Instance:

Start Alarm Time: [s]

Ack Required
 To-Normal
 To-OffNormal
 To-Fault

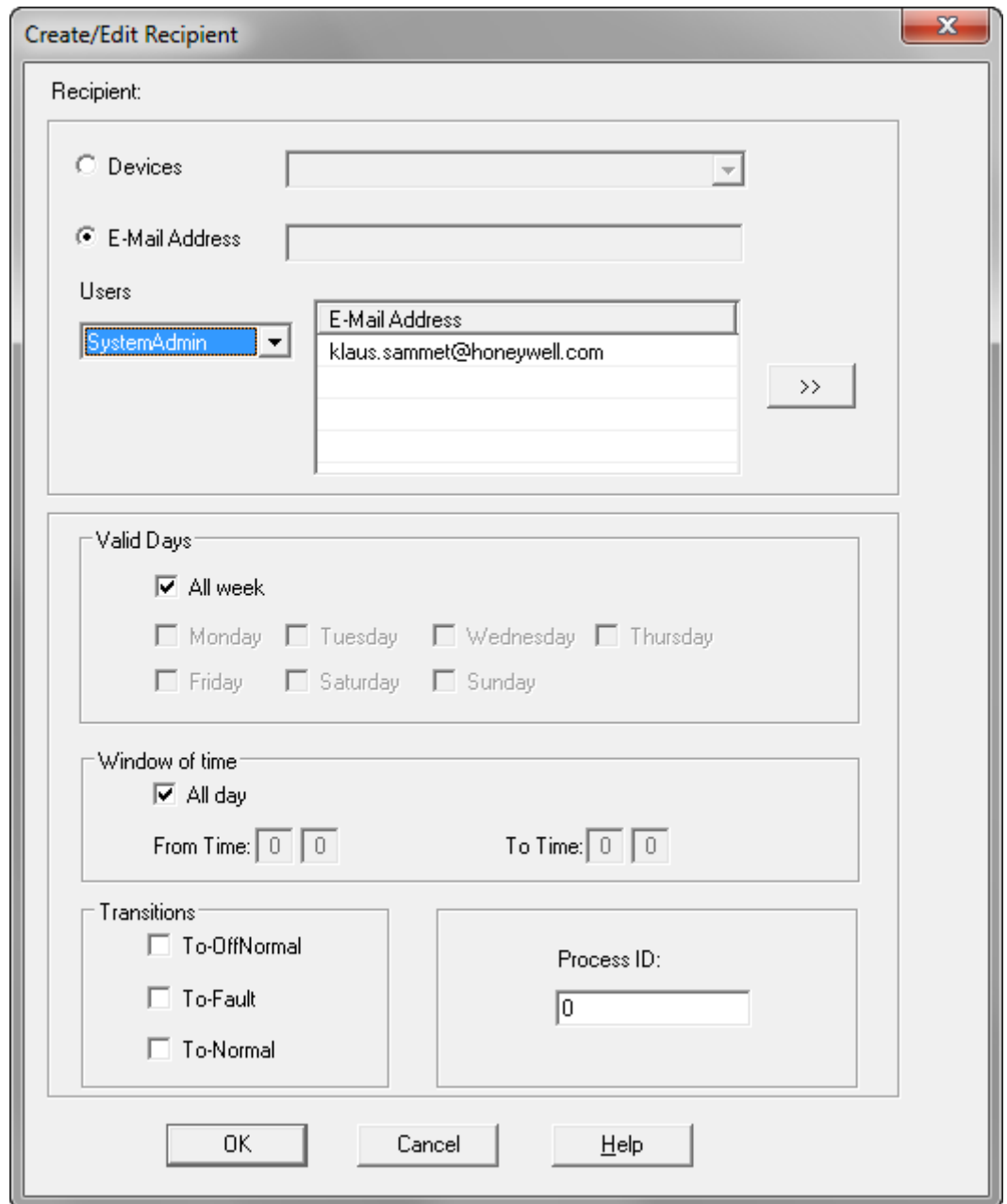
Priority
 To-Normal:
 To-OffNormal:
 To-Fault:

Recipients

Device name / E-Mail Address	Path / User

- Click **New** button to create the recipient that should receive the alarms of the selected notification class.

RESULT: The *Create/Edit Recipient* dialog box displays.



10. Select **E-Mail Address** radio-button.

11. From the **Users** drop-down listbox, select the user.

RESULT: The email address of the selected user as assigned in the *User Access Manager* is displayed in the **E-Mail Address** list.

12. Click the '**Double-Arrow**' button right to the list.

RESULT: The email is inserted in the **E-Mail Address** field above the **E-Mail Address** list.

Create/Edit Recipient

Recipient:

Devices

E-Mail Address

E-Mail Address: klaus.sammet@honeywell.com

Users: SystemAdmin

E-Mail Address: klaus.sammet@honeywell.com

>>

Valid Days

All week

Monday Tuesday Wednesday Thursday

Friday Saturday Sunday

Window of time

All day

From Time: 00 To Time: 00

Transitions

To-OffNormal

To-Fault

To-Normal

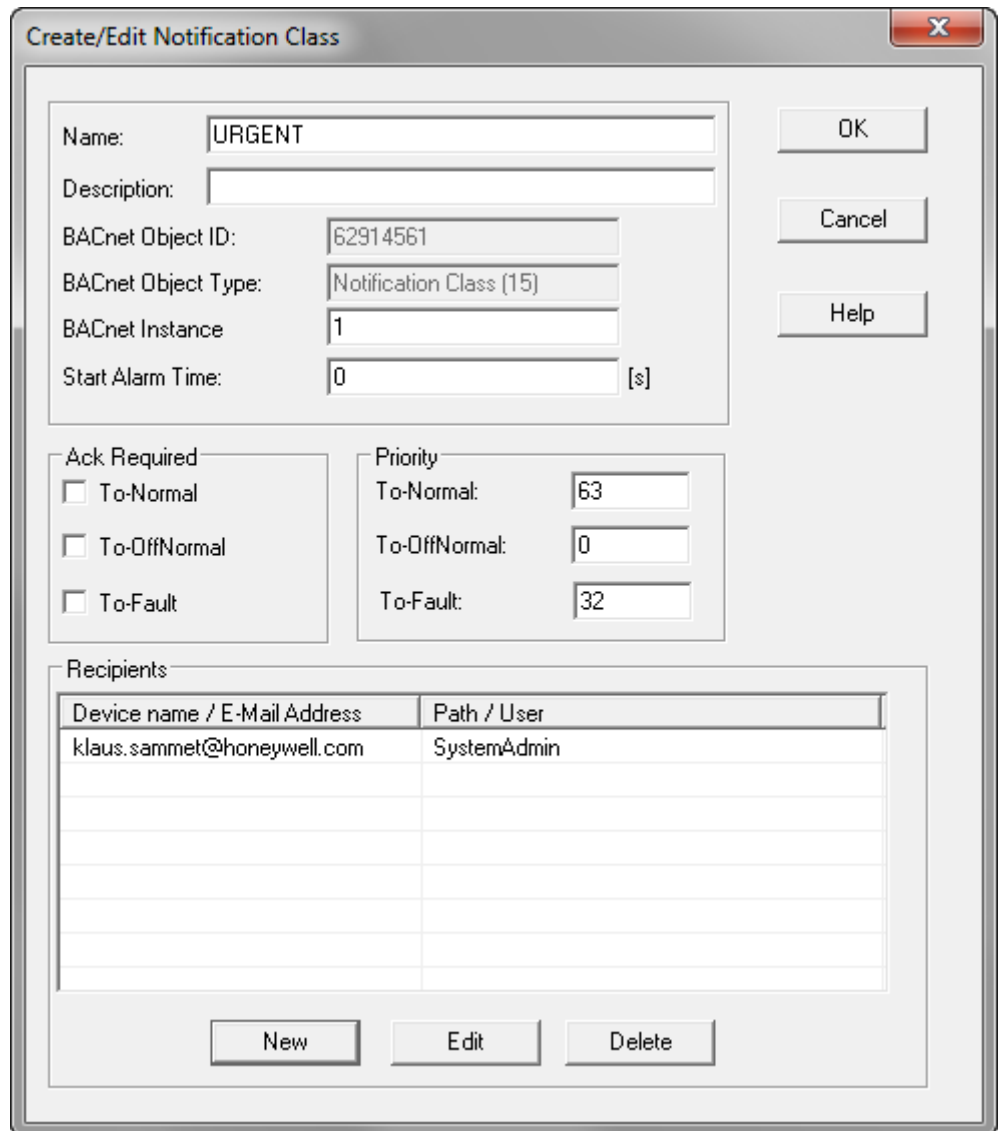
Process ID: 0

OK Cancel Help

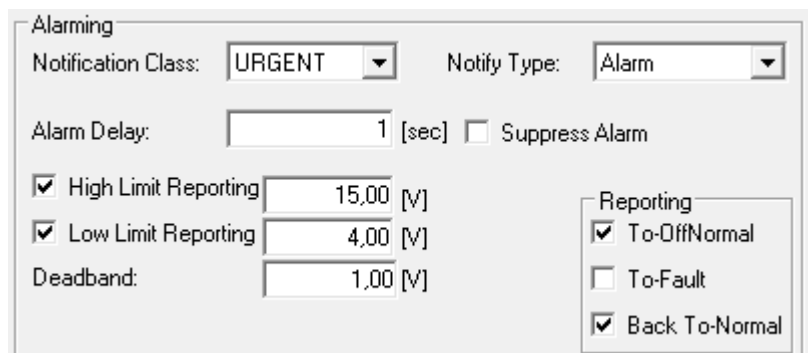
13. Choose options and enter values under **Valid Days**, **Windows of time**, **Transitions**, and **Process ID** according to your needs (for details see "Notification Class Manager" section of this User Guide).

14. Click OK.

RESULT: The *Create/Edit Notification Class* dialog box redisplay. The new recipient with its email address is added under **Recipients**.



15. Click OK.
16. In the *Notification Classes* dialog box, click OK.
17. In the *Logical Plant* tree, expand the tree and select the datapoint for which you want to send emails in case the point gets in alarm.

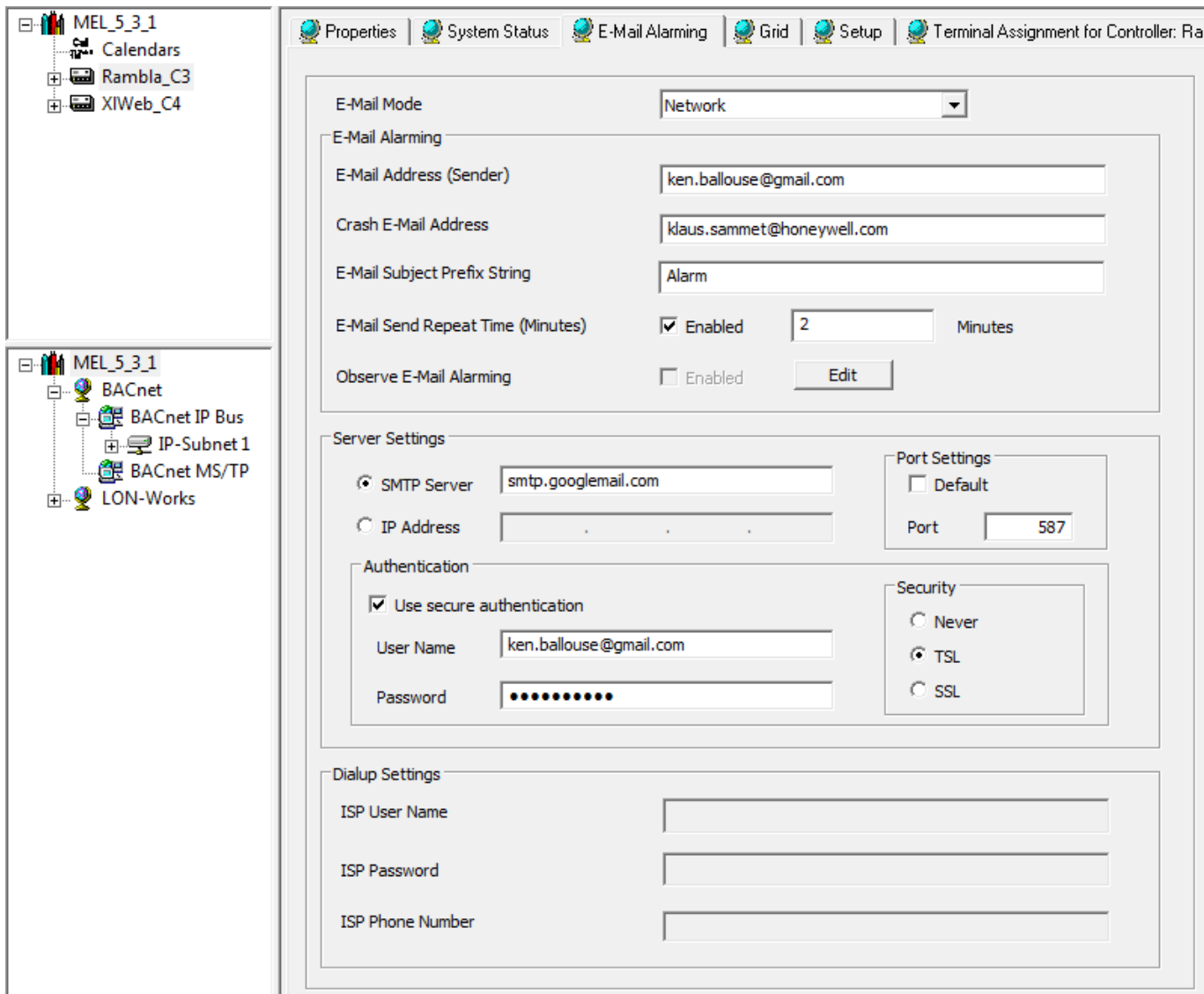


18. Under **Alarming** you set the basic prerequisites for a selected point enabling the controller sending an alarm for the point.

19. From the **Notification Class** drop-down listbox, select the same notification class you have assigned to the email recipient.
NOTE: You must select a notification class in order to enable email alarming. If you do not select the same notification class as assigned to the email recipient, alarm emails will not reach the email recipient.
20. In the **Alarm Delay** field, enter an alarm delay value in second if desired. The alarm delay is the time interval the alarm is sent after the alarm has occurred.
21. Check the **High Limit Reporting** and/or **Low Limit Reporting** check boxes, and if desired change the values.

NOTE: You must enable **High Limit Reporting** and/or **Low Limit Reporting** in order to enable email alarming.
22. Enter/change individual alarm values for the datapoint, for example, for analog inputs, the deadband in the **Deadband** field (see "BACnet Point Descriptions" section for details on datapoint properties).
23. From the **Notify Type** drop-down listbox, select the type of notification, alarm or event.
24. Under **Transition Events**, check the transition events that should be time stamped in the Web Interface.

NOTE: Enabling transition events is no prerequisite for the email alarming function.
25. In the *Logical Plant* tree, expand the tree and select the controller you want to send emails in case of alarms.
26. On the right pane, click the *Properties* tab, and check the **FALCON 2.0 application format** check box. Besides other functions, this provides the email alarming function for the controller.
27. On the right pane, click the *E-Mail Alarming* tab, and enter the following properties:



NOTE: For detailed information on data to be entered here, please ask your network administrator or the responsible person who is in charge of the I.T. environment. Note that, depending on your requirements and your local I.T. environment, not all fields must be filled out.

E-Mail Mode

Select the connection type from:

- Network
Alarm emails are sent via network to the recipient.
- Dialup (not applicable to EAGLE controller)
Alarm emails are sent via modem to the recipient.
- Disabled
No data can be entered on this tab and the controller will not be able to perform email alarming.

E-Mail Alarming

E-Mail Address (Sender)
Enter the email address of the sender.

Crash E-Mail Address
Enter the email address that should receive an email in case the controller crashes.

E-Mail Subject Prefix String

This is the default prefix of the email subject name. Default is `Alarm`. Change the prefix if desired.

E-Mail Send Repeat Time (Minutes) ... Enabled

Checking the Enabled check box enables the controller sending emails when alarms occur.

If E-Mail alarming is enabled, enter the time interval in minutes, the email should be repeatedly sent to the recipient.

NOTE: When firstly setting up the email alarming function, do not check this option unless you have performed the email test with the FALCON HTML Interface. It is recommended to check this option only when you are sure that the entered data are correct and emails will be sent to the right recipient, by using the existing and already tested `email send path`.

Example:

Reuse of the established email send path after application modifications and subsequent application download

Observe E-Mail Alarming

(for details, see "Observe E-Mail Alarming")

Server Settings (`Network` E-Mail Mode only)**SMTP Server**

Select this option, and enter the name of the SMTP server.

NOTE: The addresses for the DNS Server(s) must be entered on the subnet level in the BACnet network tree.

IP Address

Select this option, and enter the IP address of the SMTP server.

Port Settings**Default**

Check this checkbox if you want to use port 25. Uncheck this checkbox if you want use another port.

Port

Uncheck the Default checkbox, and enter the port number.

Authentication**Secure Authentication**

Uncheck this checkbox if the server does not need authentication.

Check this checkbox, if the server needs authentication, and then enter user name and password.

Security

Select one of the following options for email communication:

- Never
no security is provided
- TLS (Transport Layer Security)
This is the successor of SSL
- SSL (Secure Socket Layer)
This is the predecessor of TLS

There are slight differences between TLS and SSL, but they are essentially the same.

Dialup Settings (‘Dialup` E-Mail Mode only; applies to FALCON controller only)

ISP Phone Number

Enter the phone number of the ISP (Internet Service Provider).

ISP User Name

Enter the user name of the ISP (Internet Service Provider).

ISP Password

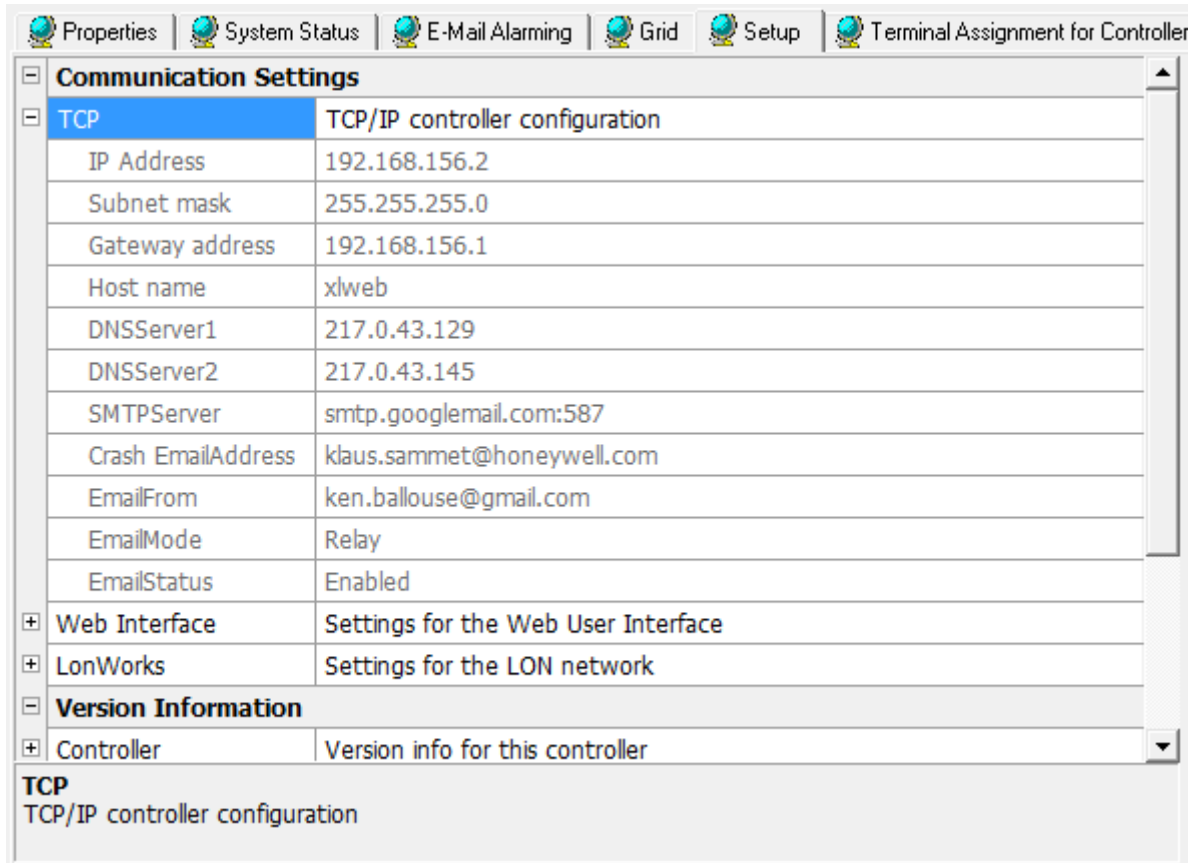
Enter the password of the ISP (Internet Service Provider).

28. On the right pane, click the *Setup* tab.
29. Connect to the controller by clicking the **Connect** button. Make sure the IP address of the controller is correct in case you have problems connecting to the controller.
30. If not already done, translate and/ or download the application by clicking the **Translate** respectively the **Download** button under **Application**.
31. Click the **Download Settings** button under **Controller**.
32. Confirm the message box for updating by clicking OK.
33. Confirm the following message box by clicking OK.



34. Re-Connect to the controller by clicking the **Connect** button.

RESULT: The settings of the controller are updated with the email alarming settings.
35. To check for correct communication settings, click the plus icon at **TCP** and check if the data displayed are consistent with the data you have entered on the *E-Mail Alarming* tab. If not, check the data on the *E-Mail Alarming* tab, modify if necessary, and download the settings again.



36. Start the Web Interface and perform steps as described in the "Email Alarming" section in the Excel Web User Guide EN2B-0289GE51 and EAGLE Web Interface User Guide EN2Z-0970GE51.

Enable Event Enrollment Alarming for Controller E-Mail Alarming

Purpose Enable the Event Enrollment for the Email Alarming of the controller. This allows algorithmic change reporting based on the event enrollment object type for the email alarming. For basic information on Event enrollments, please refer to the "Event Enrollment Objects" section. .

Procedure 1. On the *E-Mail Alarming* tab, click **Edit** button.

RESULT: The *Event Enrollment* dialog box displays.

2. Enable the alarming as follows:

- j. In the **Name** field, change the default name.
- k. In the **Description** field, enter a meaningful description.
- l. In the **Event Type** field, note that the event type of the event enrollment object for the email alarming is 'change of state'.
- m. Under **E-Mail Send States**, the Normal and Off-Normal States the email alarming can have, are displayed. This is for display only. Alarms can be triggered by enabling transitions from Normal to Off-Normal and vice versa under **Transition Events** on this tab.
- n. In the **Alarm Delay** field, enter an alarm delay in sec. The event enrollment alarm will be sent after the time entered here has been elapsed.
- o. From the **Notify Type** drop-down listbox, select the notify type.
- p. From the **Notification Class** drop-down listbox, select the notification class that defines the recipient to which the alarm is sent after a transition has occurred.
- q. Under **Transition Events**, check the transition events that should trigger the event enrollment alarming. For email alarming, the 'To-Off-Normal' and the 'Back to Normal' transitions can be selected. Refer to the relevant states listed under **E-Mail Send States**.

Example: When selecting 'To-Off-Normal', each transition from 'EMAIL_INPROCESS' (Normal State) to any of the Off-Normal States, for example EMAIL_FAILED, will cause an event enrollment alarm.

Control Loops

NOTE: This section applies to the FALCON and EAGLE controllers only.

Purpose The data processing of the controller is programmed in control loops. They are defined by authorized users, using the CARE-software. CARE comes with basic functions; you may order more extensive macros from Honeywell.

A control loop receives the input values from sensors and other hardware components. The controller calculates with these values and determines if a regulation is necessary. In such a case, the controller initiates the predefined reaction by switching the connected hardware on.

Types There are three types of functions:

- Functions
- Functions are basic logic elements with which you can build macros. They cannot be created, edited or removed.
- Macros in plant
- Macros are software modules programmed from functions.
Macros in a plant are available in a single plant. It is in the user's hand to create, edit or remove such macros.
- System Macros
System Macros are provided by Honeywell.
They are available for all projects of the Database. These macros are protected against editing and removing.

Mouse and Function Keys

Purpose Additional navigation tools to the standard window functions are available for more comfortable handling of the macros.

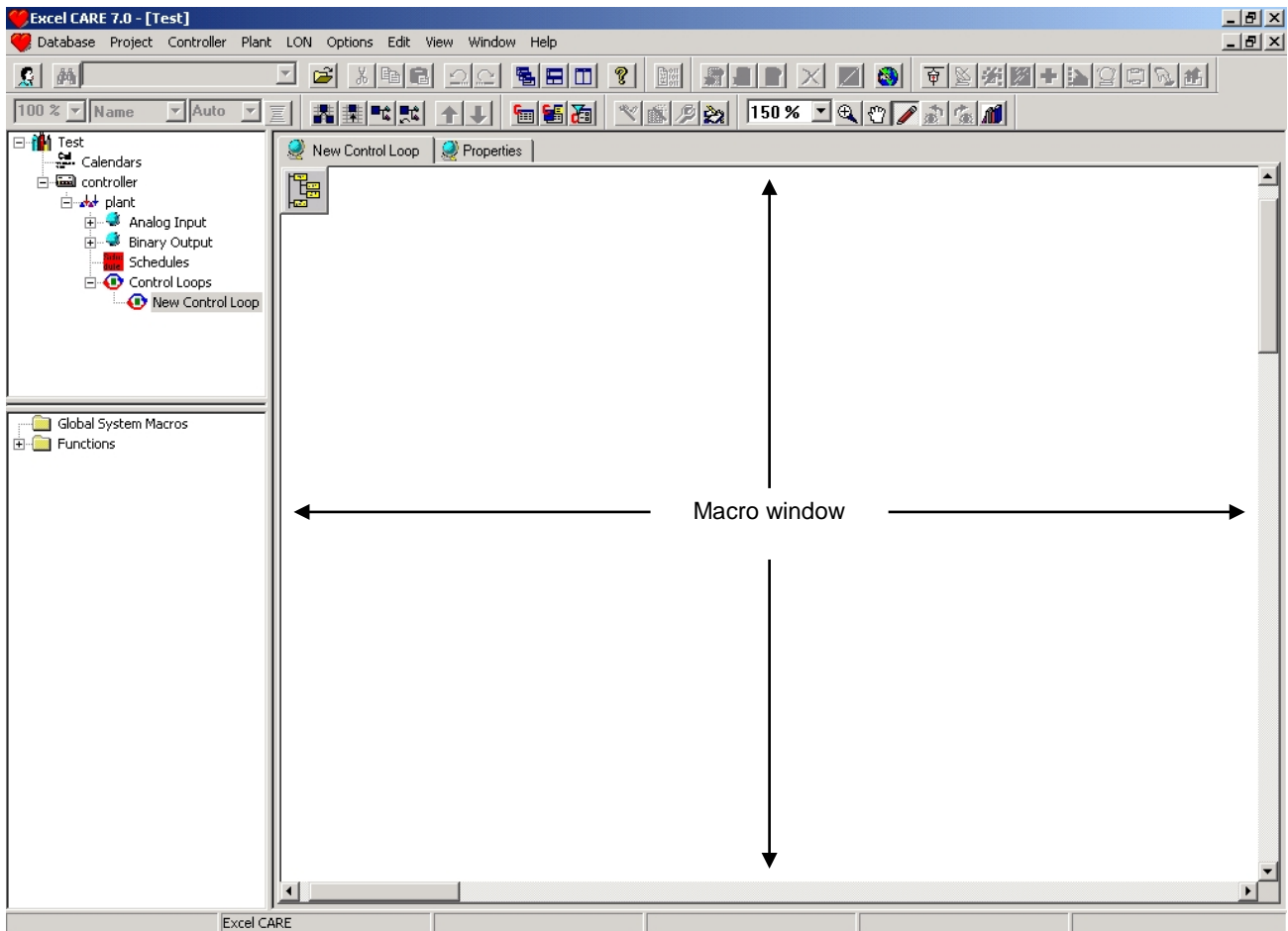
Prerequisites 1. The user is logged in.

Procedure 1. Enter any Macro window:

- Macro window of a control loop.
- Macro window of a macro.
- Macro window of a global macro.

2. Click once into the free space of the Macro window.

RESULT: The Macro window is selected.

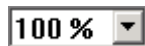


3. Use the following function keys as needed.
Denotation of the function keys:

- F1
Opens the online-help window conform
- F2
Displays the area around the mouse-cursor in the middle. E.g. If the mouse cursor is on the left side, the view will be moved to the right side.
- F3
Zooms out to display the whole window so all used icons are visible.
- F4
Switches the zoom mode on and off.
- F5
Opens the Loop Properties or Macro Properties dialog box.
- F7
Creates a new macro, including all present selected functions and macros.
- F8
Opens the Edit Flags dialog box.
- F9
Sets execution order of control icons manually.
- CTRL + A
Selects all control icons.
- CTRL + F
Opens the Find dialog box.
- CTRL + L
Aligns all selected icons to the left

- CTRL + T
Aligns all selected icons to the top
- CTRL + R
Autoroutes selected lines
- Mouse functions:
- **Shift + mouse wheel**
Hold the Shift key pressed and then scroll with the mouse wheel the view to the left and to the right.
- **Shift + Ctrl + mouse wheel**
Hold the Shift and the Ctrl key pressed and then use the mouse to zoom with wheel the view in and out the area around the mouse cursor.
- **Shift + left mouse key**
Hold the Shift key pressed and then click on icons you want to select.

Toolbar Buttons



Displayed and changed the numerous zoom factor in percent of the whole view, centered by the opened window.



Enables Zoom mode, in which you can zoom the selected items and zooms in the workspace/selected area.



Enables the Move mode, in which you can move the view of the macro window.



Enables the Select/Edit mode, in which you can select and move elements in the Macro window, draw connections between outputs and inputs and insert text into the Macro window.



Switches to the previous view. The last change of the view is reverted.



Switches to the next view. The last undo of the view is reverted.



Opens the global macro library.

General Functions

Insert Text

You may insert text in all the editor views. To insert text, right-click to open the context menu and select "insert text". A dialog opens in which you can type the text and select text attributes.

Mirrored

Control icons can be mirrored. Right-click the context menu and select "mirrored". To insert all icons by default mirrored, select in the main menu "Plant > Control Editor > Add new icons mirrored."

Background

The background is divided into squares. Each square represents the area of one page in the project documentation.

Execution Order

The numbers in brackets, e.g. [15], underneath the icons show the priority of the execution order. The priorities are generated on saving and leaving the control editor. The priorities can be changed

Datapoints

Datapoints can be dragged directly from the project tree and dropped into the control editor. If the datapoint is output or variable the context menu of the datapoint icon allows the toggle between read or write.

IDT Function

The IDT icon has two kinds of views. Regularly the IDT icon has an input and an output. If you set input or output on connection, and the other not, the view of the icon changes to a special view without the title bar (as used for datapoints dropped from the project tree).

Grid Lines

Grid lines can be shown or blanked.

Select in the main menu "Plant > Control Editor > Show grid lines" to toggle between the grid line display mode.

Autorouting Connection Lines

By default, connection lines between control icons are autorouted when they are created and when control icons are moved, that is, they will be optimized for display (short, space consuming). Selected connection lines can be autorouted explicitly, if desired. To autoroute one particular connection line, select the connection line, click right button and click on Autoroute in the context menu, or, to autoroute multiple connection lines, select them and press CTRL + R keys.

Create Control Loop

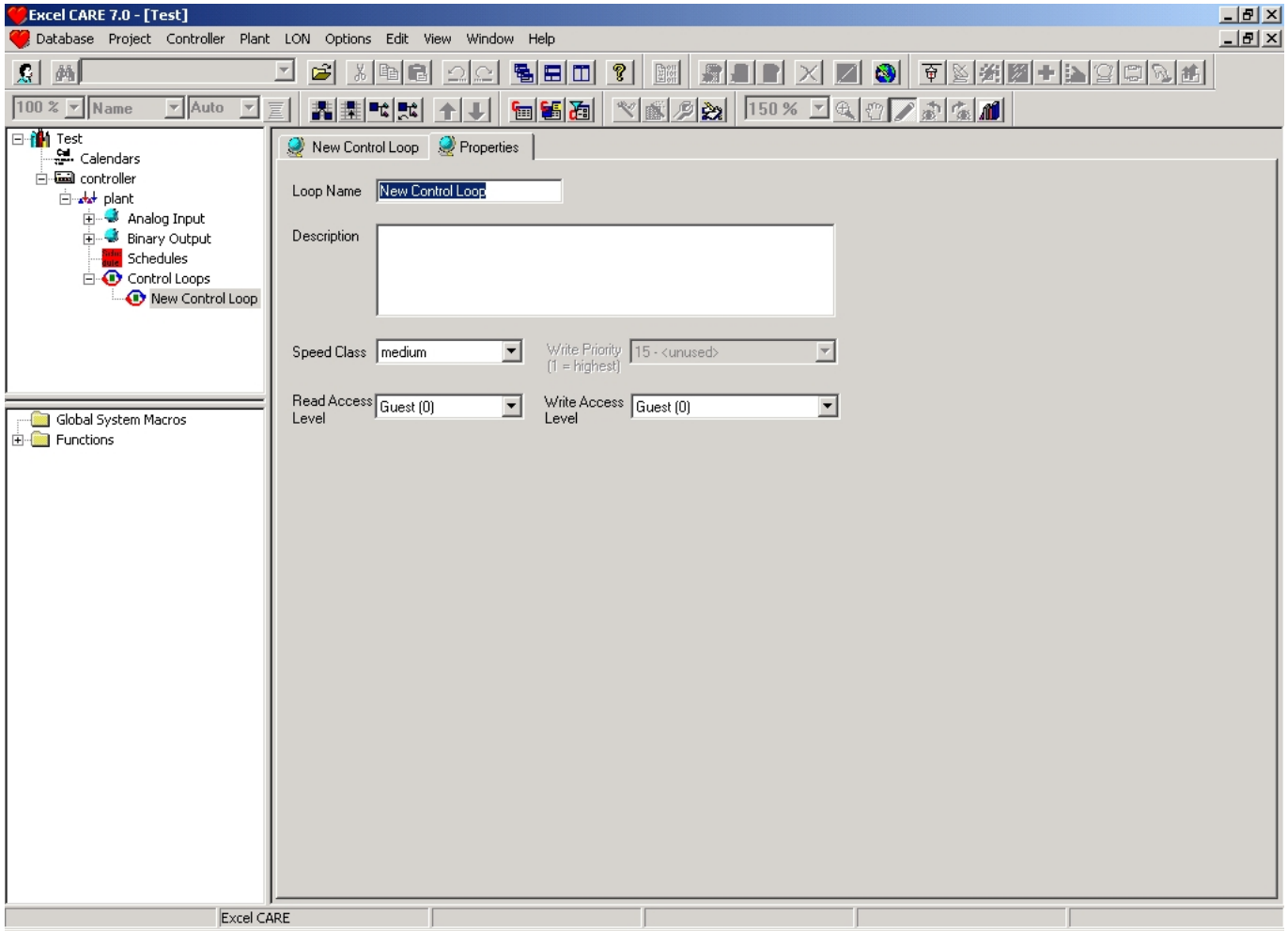
- | | |
|----------------------|--|
| Prerequisites | <ol style="list-style-type: none"> 1. The user is logged in. 2. A project is open. 3. The open project has at least one controller and one plant. |
| Procedure | <ol style="list-style-type: none"> 1. Expand the view of the plant, you want assign a control loop to. 2. Click with the right mouse button on the "Control Loops"-icon.

RESULT: The context menu to create a control loop opens. 3. Click on it with the left mouse button.

RESULT: A new icon "New Control Loop" opens on the left pane. 4. Double-click on the icon of the new control loop.

RESULT: The macros window of the control loop opens on the right pane. 5. Click on the tab "New Control Loop".

RESULT: The Properties window of the control loop opens on the right pane. |



Fill in the fields according to your requirements:

- **Loop Name**
Unique name of the loop. The name should consist of up to 40 characters and/or digits and/or ASCII special characters.
- **Description**
Description of the loop, e.g. what's the function of the loop or which special functions are used within this loop.
- **Speed Class**
Defines how often the loop will be automatically executed by the controller. The time slice of the speed class is defined in the property sheet of the controller (see "Display/Modify Controller Properties" and "Set Execution Speed Categories" sections).
- **Write Priority** (only displayed)
Datapoints for data transfer include a "Write Priority". In case some components write to the same data point, only the value, unequal to zero, with the highest priority will be written to the output. All other values will be stored, but they have no influence for regulation.
- **Read Access Level**
Someone with these, or higher access rights can view this loop (via web-interface).
- **Write Access Level**
Someone with these, or higher access rights can edit this loop (via web-interface).

Fill the input fields according to your requirements.

RESULT: All Inputs are automatically saved.

Now can you define the logic of the new control loop.

Edit Control Loop Properties

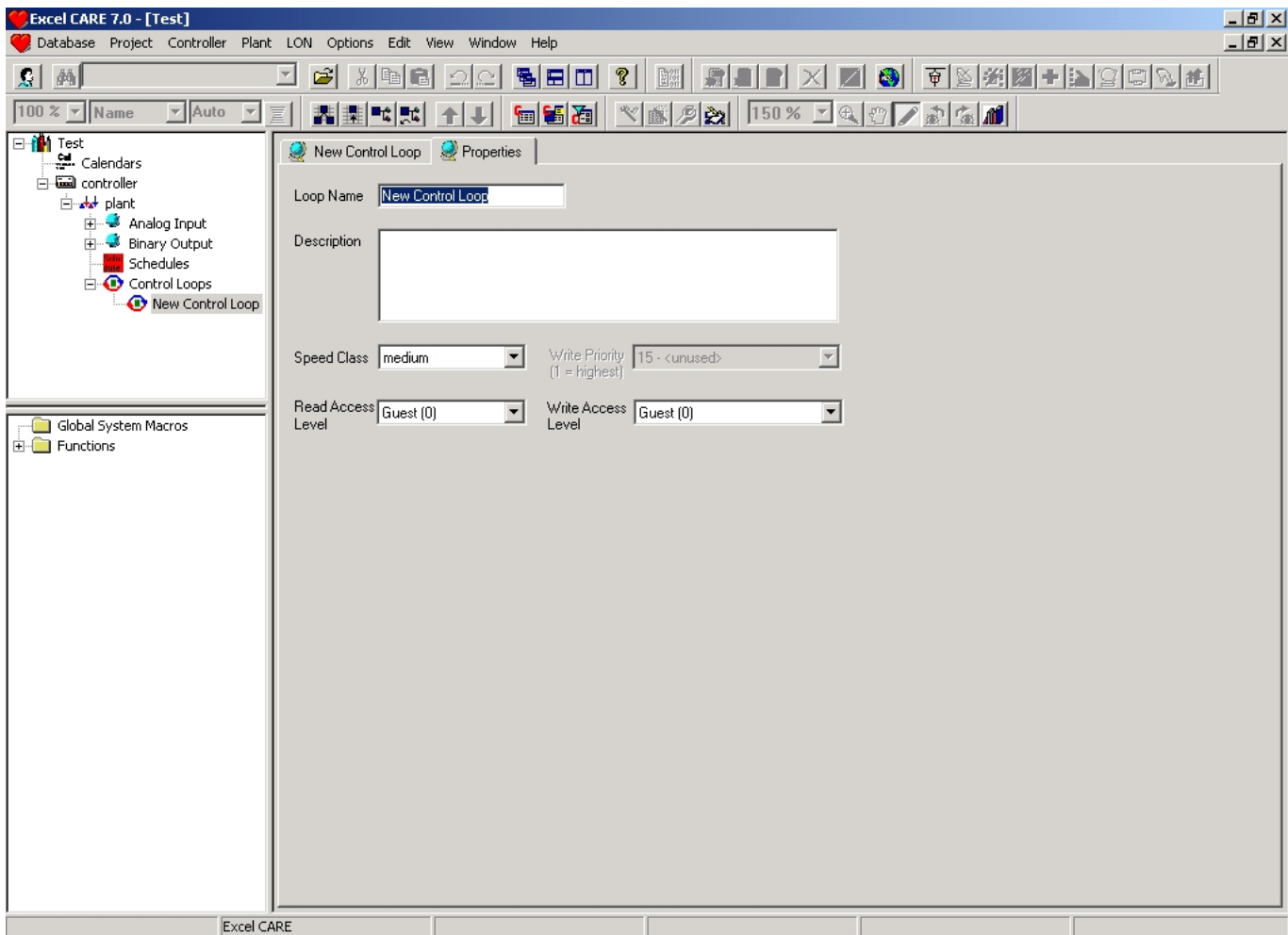
- Prerequisites**
1. The user is logged in.
 2. A project is open.
 3. The open project has at least one controller, one plant and one control loop.

- Procedure**
1. Expand the tree view of the control loops of the plant, the control loop is assigned to.

RESULT: The macros window of the control loop opens in the right pane.

3. Click on tab "<name of the control loop>".

RESULT: The properties of the control loop are open in the right pane.



Change the entries in the following input fields according to your requirements:

- **Loop Name**
Unique name of the loop. The name should consist of up to 40 characters and/or digits and/or ASCII special characters.
- **Description**
Description of the loop, e.g. what's the function of the loop or which special functions are used within this loop.
- **Speed Class**
Defines how often the loop will be automatically executed by the controller. The time slice of the speed class is defined in the property sheet of the

controller. (see “Display/Modify Controller Properties” and “Set Execution Speed Categories” sections).

- **Write Priority** (only displayed)
Datapoints for data transfer include a “Write Priority”. In case some components write to the same data point, only the value, unequal to zero, with the highest priority will be written to the output. All other values will be stored, but they have no influence for regulation.
- **Read Access Level**
Someone with these, or higher access rights can view this loop (via web-interface).
- **Write Access Level**
Someone with these, or higher access rights can edit this loop (via web-interface).

RESULT: All Inputs are automatically saved.

Create and Edit control Loop Logic

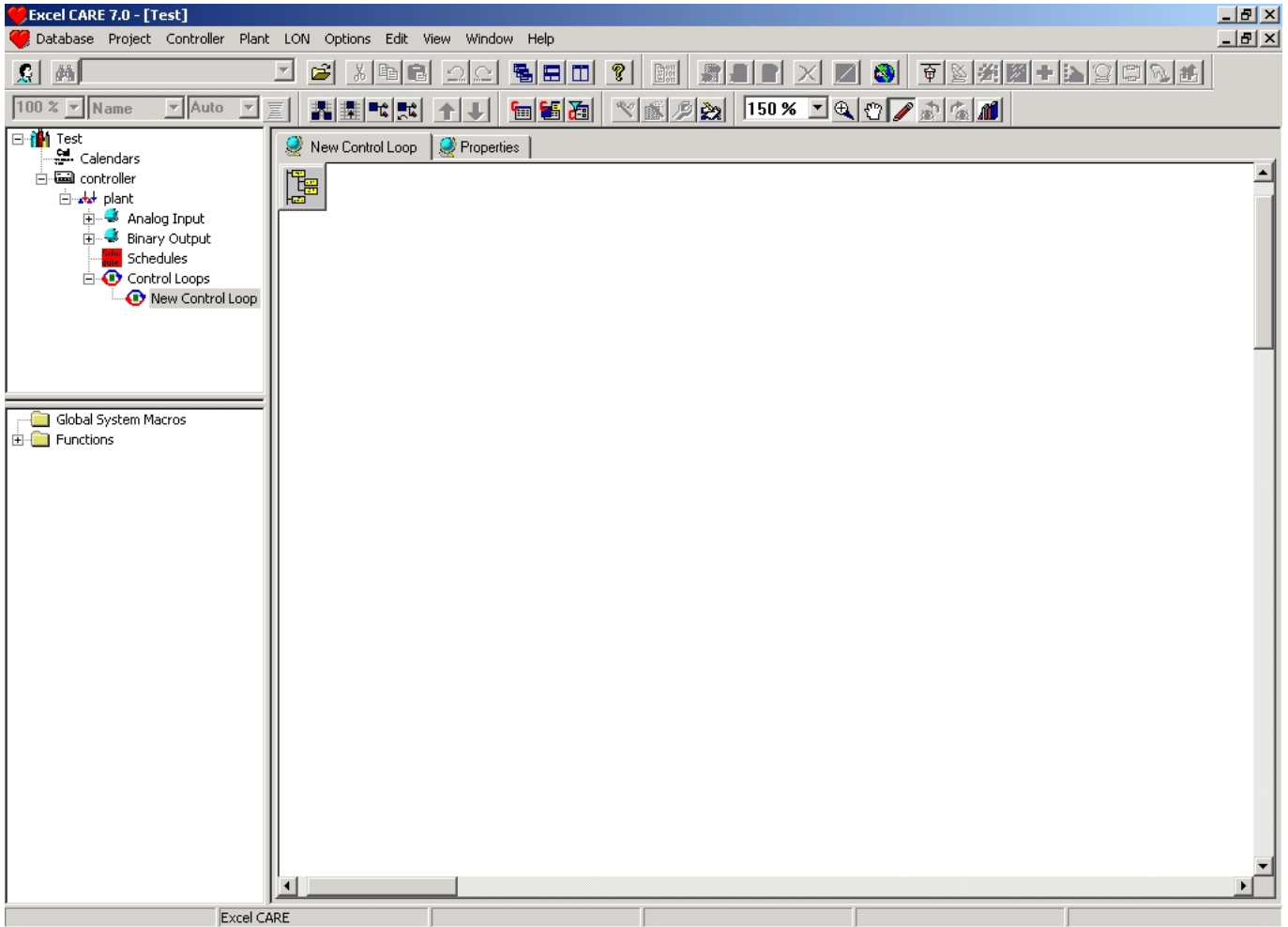
Prerequisites

1. The user is logged in.
2. A project is open.
3. The open project has at least one controller and one plant and one control loop.

Procedure

1. Expand the tree view of the plant for which you want create or edit a control loop.
2. Double-click on the icon of the control loop you want to edit.

RESULT: The Macro window of the control loop opens in the right pane.



3. Define the content of the loop as desired. Assign functions or hardware/software points to the loop by using the window known function of drag & drop:

- Click once on the desired icon and hold the left mouse-button pressed.
- Move the cursor into the Macro window. The cursor becomes a “No Parking”-sign if it is moved in areas, you cannot drop the component into.
- Release the left mouse button.

You are able to transfer elements from the following windows into the Macro window:

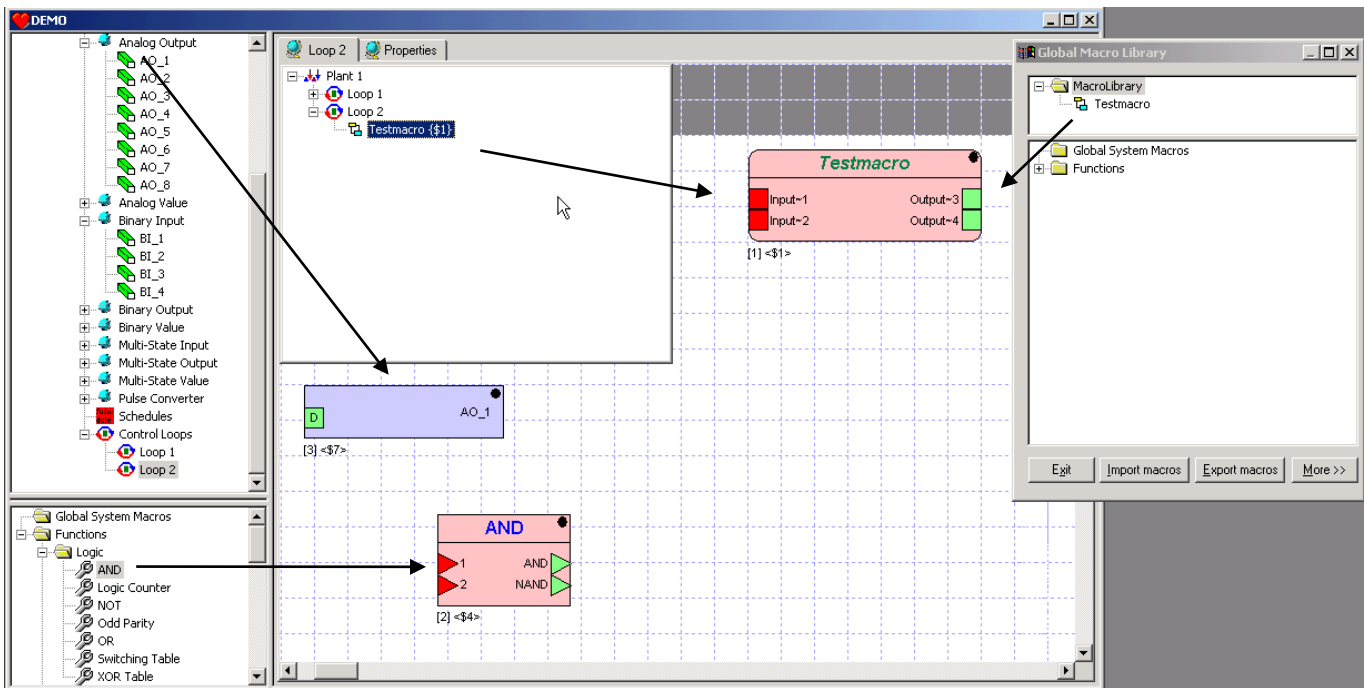
- From the controllers view (upper left from the macro window).
- From the functions view (down left from the macro window).
- From the Macros in plant view. To open the Macros in plant view, move the mouse cursor on the sensitive field in the upper left corner of the macro window:



- From the Global Macro Library. To open the Global Macro library, click menu item Database, then submenu item Macro Library... , or click on button:



RESULT: The function or component displays in the Macro window.



Meaning of the colours:

- **red**
The setup of the icon is incomplete. All inputs must get a value, e.g. by connecting it to an output or by defining it as a constant.
- **blue**
The icon is selected.
- **none colored (light grey)**
The setup of the icon is accomplished, no errors are expected.

For setting up a connection between input and output, see step 8.

4. Apply the procedure written above with all components and functions you want to combine in this loop.
 - All icons in the Macro window can be moved via drag & drop.
 - You can use the windows known short keys, e.g. "Ctrl + A" for selecting all elements in the active window.
 - To enter the menu Plant, make sure, the Macro window is still selected: Click once with the left mouse button in the Macro window.

RESULT: The following buttons and drop-down list in the taskbar are activated (from left to the right):

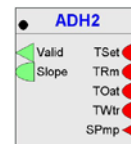


- Zoom: Display and change the numerous zoom factor of the whole view, centered by the opened window.
- Zoom: Use this button(s) to zoom in a selected area.
- Move all: The cursor becomes changed to a hand and you can move the view of the Macro window.
- Select and edit: The cursor becomes changed to standard and you can select elements in the Macro window, draw connections between outputs and inputs and insert text into the Macro window.
- Last view: The last change of the view is reverted.
- Next view: The last undo of the view is reverted.

The elements in the Macro window are displayed in the following manner:
Hardware/software point, in most cases a real input or output of the controller.



Function, indicated by the separated header and input and output ports. The name of the function is displayed in this header.



You can always connect an analog and digital port. The input port translates the input signal into his own format (analog or binary) some information may be lost. A warning informs you about a data mismatch, if you set up a connection between analog and digital ports that have different signal formats.



Digital port. Can have two values: TRUE (1) or FALSE (0).



Any port, this port is not predefined as an analog or digital input. The type of data depends on the further processing.



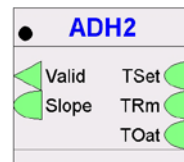
Some types of I/O connections are shown with one or two letters in the connector box. The meanings of these letters are described in the following table:

Letters	Meaning
"P"	Parameter
"I"	Macro input
"O"	Macro output
"C"	Constant
"D"	Datapoint property
"Pr"	Point role
"S"	System data
"pr"	Function p register
"ur"	Function u register
"F"	Flag point

The black point in the header indicates the side of the output ports.



A line at the bottom of the icon indicates hidden (invisible) ports. You can make them visible using the Properties window of these ports.

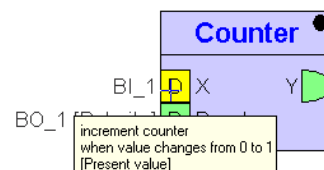
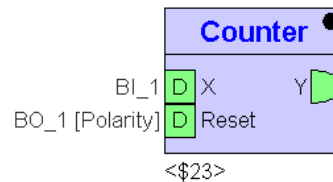


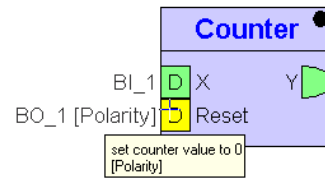
Input ports are red coloured, if they are not connected, if they do not get any input. The color green indicates the accurate connection of the port. Pointroles are not a valid connection and must be changed for translation. Thus pointroles are also red.



The configuration of inputs is indicated as follows:

If an input port is configured as datapoint attribute, the default datapoint property "Present Value" is displayed in the tooltip of the port. If any other property is selected as datapoint attribute, e.g. Polarity, this is shown in the tooltip and additionally in brackets at the port.





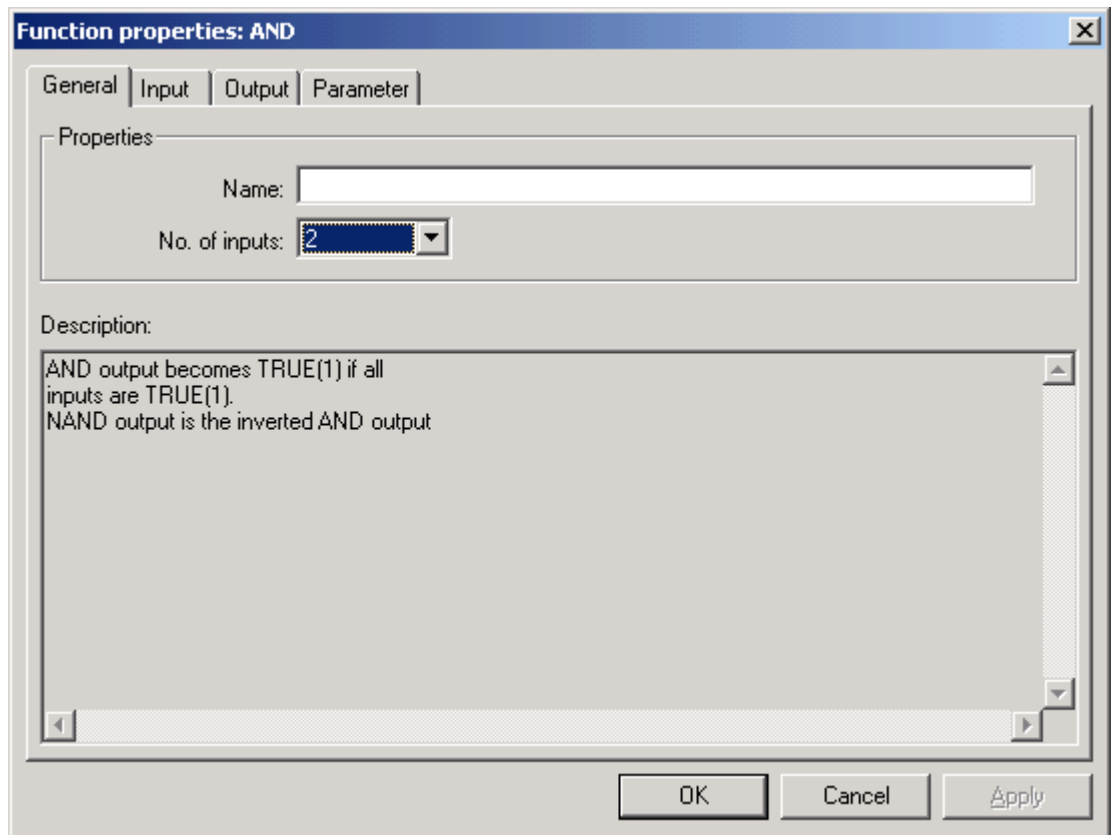
5. Setup the properties of the functions and hardware/software points as follows:

- Click with right mouse button on the element, you want to set up.

RESULT: The context menu of the element displays.

- Click on **Properties**.

RESULT: The Function properties:<name> dialog box of the element opens.



a. In tab **General** are the following input fields:

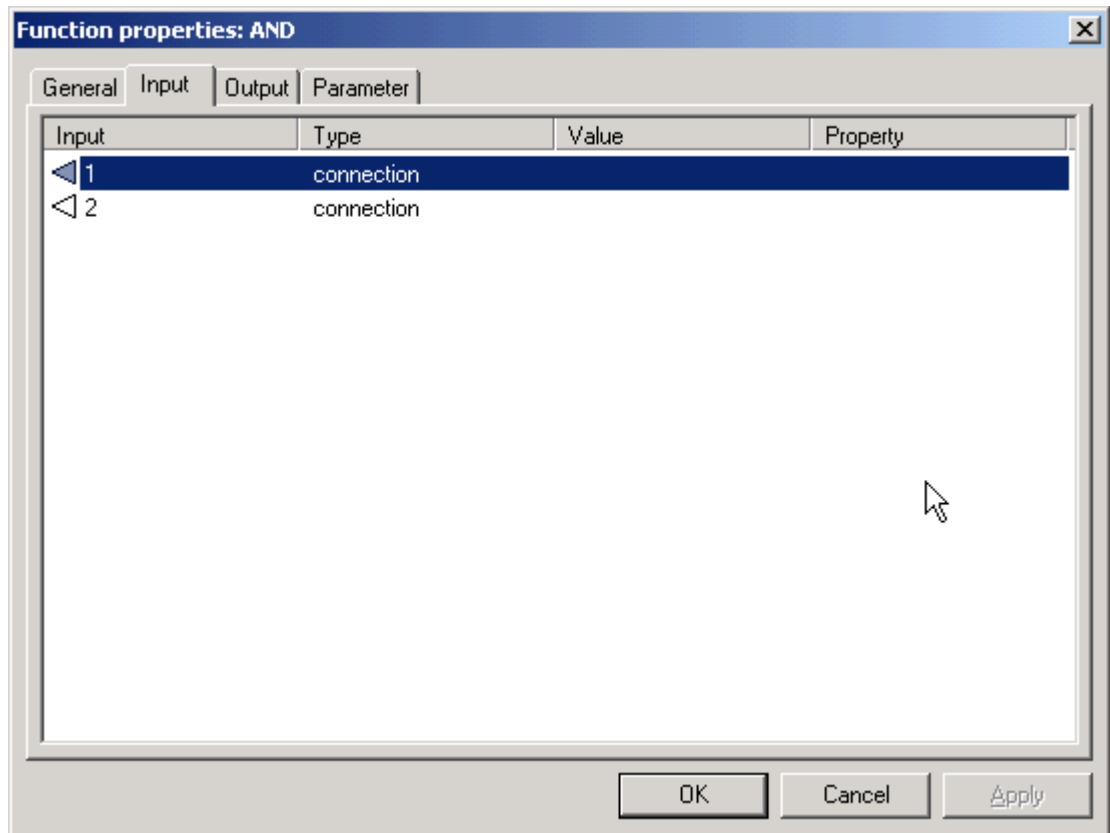
- **Name**
Alias of this element. The alias can consist of up to 32 characters and/or digits. This alias is displayed in the tab Internal Parameter of parent macros (only if the alias-element includes parameters).
- **No. of inputs**
Number of input (in some cases output) connections of the element.

You have to apply changes of the input/output count before you can view the changed number in the input/output tab.

An input always must be filled with a value. The value could be e.g. a connection (to the output of another element) or a data point or system data. It is possible to hide an input/output if it is not a connection.

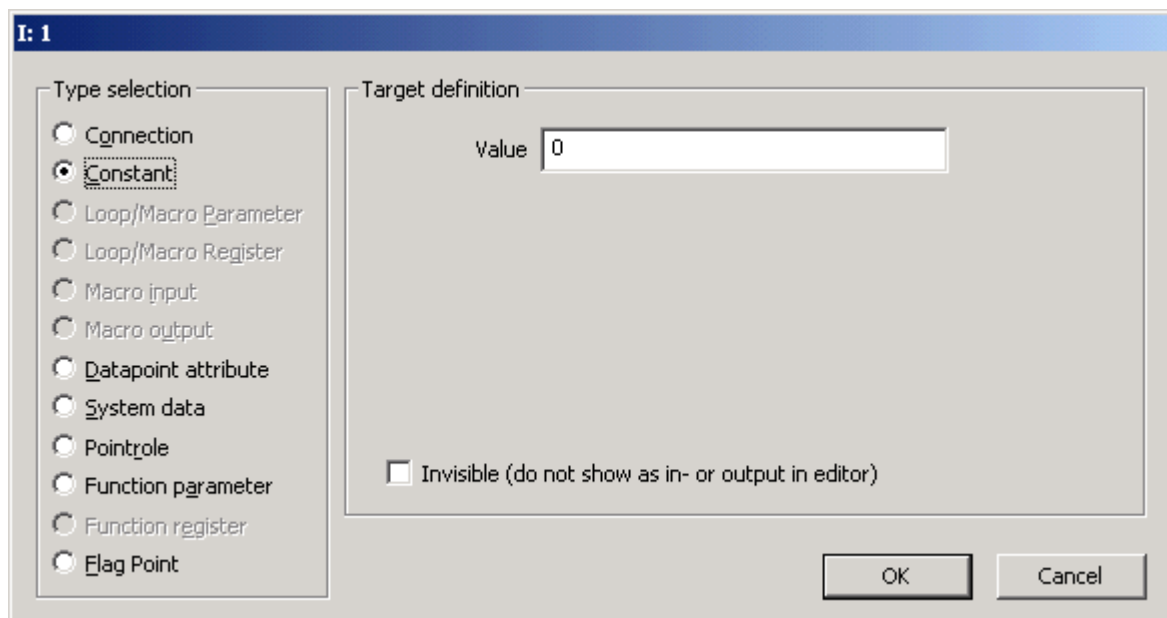
The available input connections are displayed in the tab **Input**.

Select the tab.



Select the properties of the input by double-clicking into the desired row of the table.

RESULT: The configuration dialog box for selecting type and target for the input opens.



- Connection

The input is defined as a connection to one output of another element of this loop. This input will be always displayed in the Macro window.

- Constant

The input is always set up to this value. It is possible to hide this input in the Macro window.

- Loop/Macro Parameter (not available while editing control loop)

A parameter can be used by all functions and macros of this loop/macro without being connected. So it is possible to simplify the displayed connections. The input becomes this value.

It is possible to hide this input in the Macro window.

- Macro input (not available while editing control loop)

- Macro output (not available while editing control loop)

- Data point attribute

The input becomes a value of a data point attribute. Datapoints are hardware/software points, e.g. sensors. The list of available attributes depends on the type of the datapoint and if this attribute is used for an input or output. It is possible to hide this input in the Macro window. For detailed descriptions of the Datapoint attributes, please refer to the Excel Web User Guide EN2B-0289GE51 and the EAGLE Web Interface User Guide EN2Z-0970GE51.

- System data

The input becomes the value of the system function, such as 'clock'. The following system values are stored:

- Alarm status LED

reads the value of the red alarm LED

0 = Off (no alarm)

1 = license status error

2 = USB error (connected USB device draws more than 500 mA)

4 = panel bus error (e.g. I/O module missing)

8 = LON bus error (e.g. I/O module missing)

16 = sensor error on universal input which is used by the application (e.g. sensor short, break)

combinations of values are possible (e.g. 4+8=12: panel bus error and LON bus error at the same time)

- Application LED

reads and writes the status of the application LED

0 = Off

1 = On: permanently

- 2 = On: continuously blinking (on-off)
- 3 = On: 2 times continuously blinking (2 x (on-off), pause ..)
- 4 = On: 3 times continuously blinking (3 x (on-off), pause ..)
- 5 = On: 4 times continuously blinking (4 x (on-off), pause ..)
- 6 = On: 5 times continuously blinking (5 x (on-off), pause ..)

- Cycle Time
reads the set current cycle time of the application part in sec
- Day and month
actual date (=100*month+day)
- Day of week
actual day of the week (monday(1)...saturday(7))
- Hours and minutes
actual time (=100*hours+minutes)
- Minutes since midnight
number of minutes after midnight
- Startup flag
indicates, if the system has been restarted
- Year
actual year

It is possible to hide this input in the Macro window.

- Pointrole

Datapoints can be combined in so called pointroles. It is easier to sort the datapoints by their main properties. Select a data point from the pointrole.

It is possible to hide this input in the Macro window.

- Function parameter

The input changes to the value of a parameter of one function/macro (which includes parameters) included in this control loop. Only functions with parameters are listed. If a function has no (alias) name, an identifier ('\$' followed by a unique number) is assigned. This identifier is also displayed below the symbol as long as no name is set.

It is possible to hide this input in the Macro window.

- Function register

The output sets the hidden stored value of one function/macro included in this macro. If a function has no (alias) name, an identifier ('\$' followed by a unique number) is assigned. This identifier is displayed below the symbol as long as no name is set.

- Flag Point

Flags are points for transferring data between loops of one plant. The input is always set up to this value.

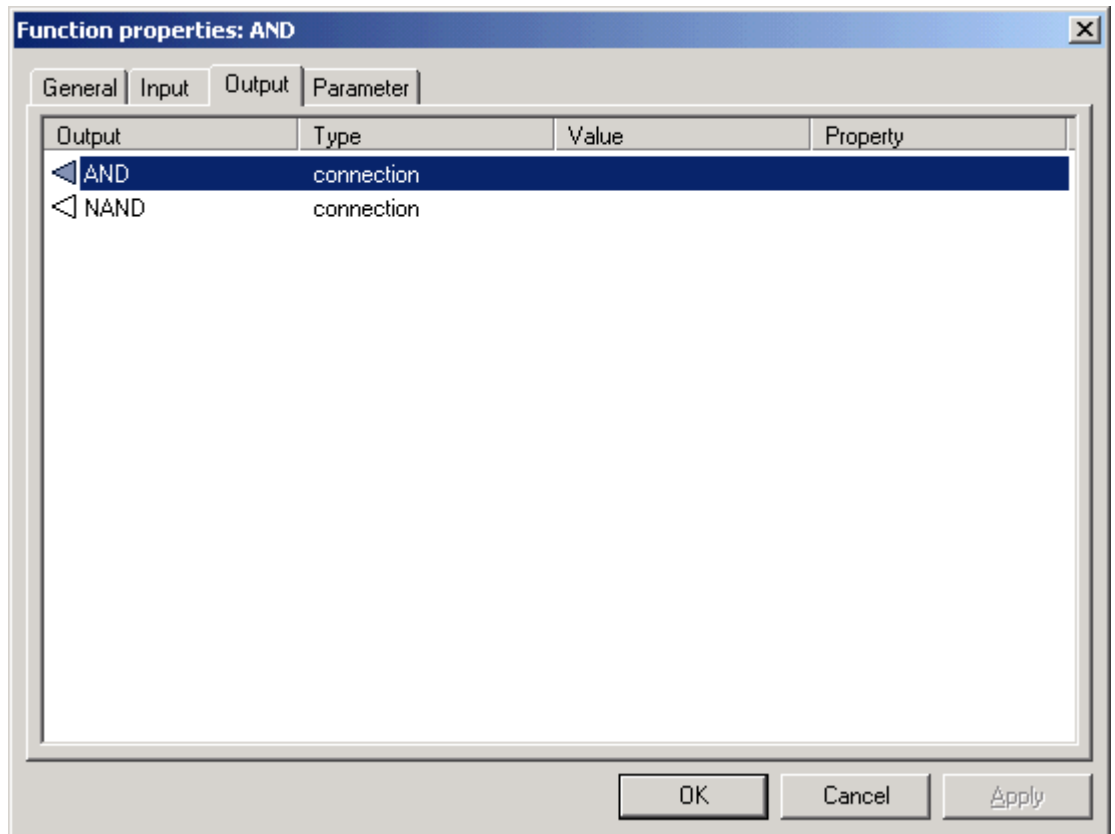
It is possible to hide this input in the Macro window.

- Invisible (do not show as in - or output in editor)

Hides the input or output of the control icon for all types other than "Connection". A line at the bottom of the icon indicates invisible ports.

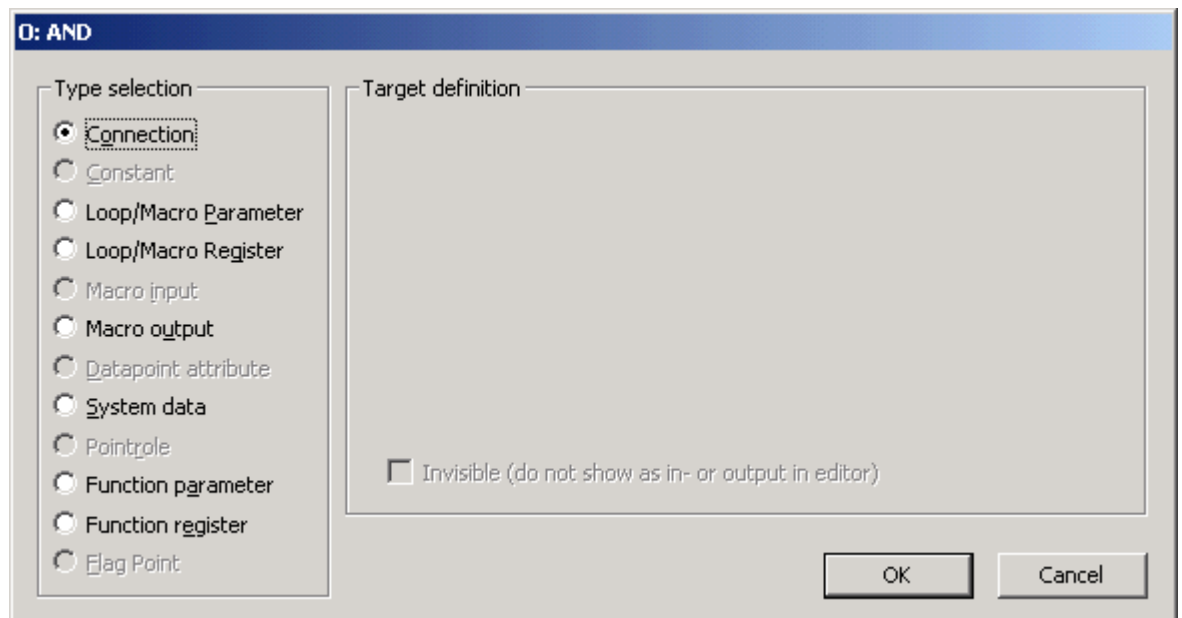
The available output connections are opened in the tab **Output**.

Select the tab.



Select the properties of the output by double-click into the desired rows of the table:

RESULT: The configuration dialog box for selecting type and target for the output opens.



- **Connection**

The output is defined as a connection to one or more inputs of another element of this loop. This output will be always opened in the Macro window.

- Constant

The output always sets up this value. It is possible to hide this output in the Macro window.

- Loop/Macro Parameter

A parameter can be used by all functions and macros of this loop/macro without being connected. It is possible to simplify the displayed connections. The output sets this value. It is possible to hide this output in the Macro window.

- Data point attribute

The input becomes a value of a data point attribute. Datapoints are hardware/software points, e.g. sensors. The list of available attributes depends on the type of the datapoint and if this attribute is used for an input or output. It is possible to hide this input in the Macro window. For detailed descriptions of the Datapoint attributes, please refer to the Excel Web User Guide EN2B-0289GE51 and the EAGLE Web Interface User Guide EN2Z-0970GE51.

- System data

The output sets a system data. The only possible data are:

Application LED

reads and writes the status of the application LED

0 = Off

1 = On: permanently

2 = On: continuously blinking (on-off)

3 = On: 2 times continuously blinking (2 x (on-off), pause ..)

4 = On: 3 times continuously blinking (3 x (on-off), pause ..)

5 = On: 4 times continuously blinking (4 x (on-off), pause ..)

6 = On: 5 times continuously blinking (5 x (on-off), pause ..)

- Startup flag

indicates, if the system has been restarted

- M-Bus trigger

allows the controller reading M-Bus records at a particular time (trigger) defined in the time program. This secures the synchronization of M-Bus records reading process independent of controller operation status.

It is possible to hide this output in the Macro window.

- Pointrole

Datapoints can be combined in so called pointroles. It is easier to sort the datapoints by their main properties. Select a data point from the pointrole.

It is possible to hide this output in the Macro window.

- Function parameter

The output sets the value of a parameter of one function/macro (which includes parameters) included in this control loop. Only functions with parameters are listed. If a function has no (alias) name, an identifier ('\$' followed by a unique number) is assigned. This identifier is also displayed below the symbol as long as no name is set.

It is possible to hide this output in the Macro window.

- Function register

The output sets the hidden stored value of one function/macro included in this macro. If a function has no (alias) name, an identifier ('\$' followed by a unique number) is assigned. This identifier is displayed below the symbol as long as no name is set.

- Flag Point

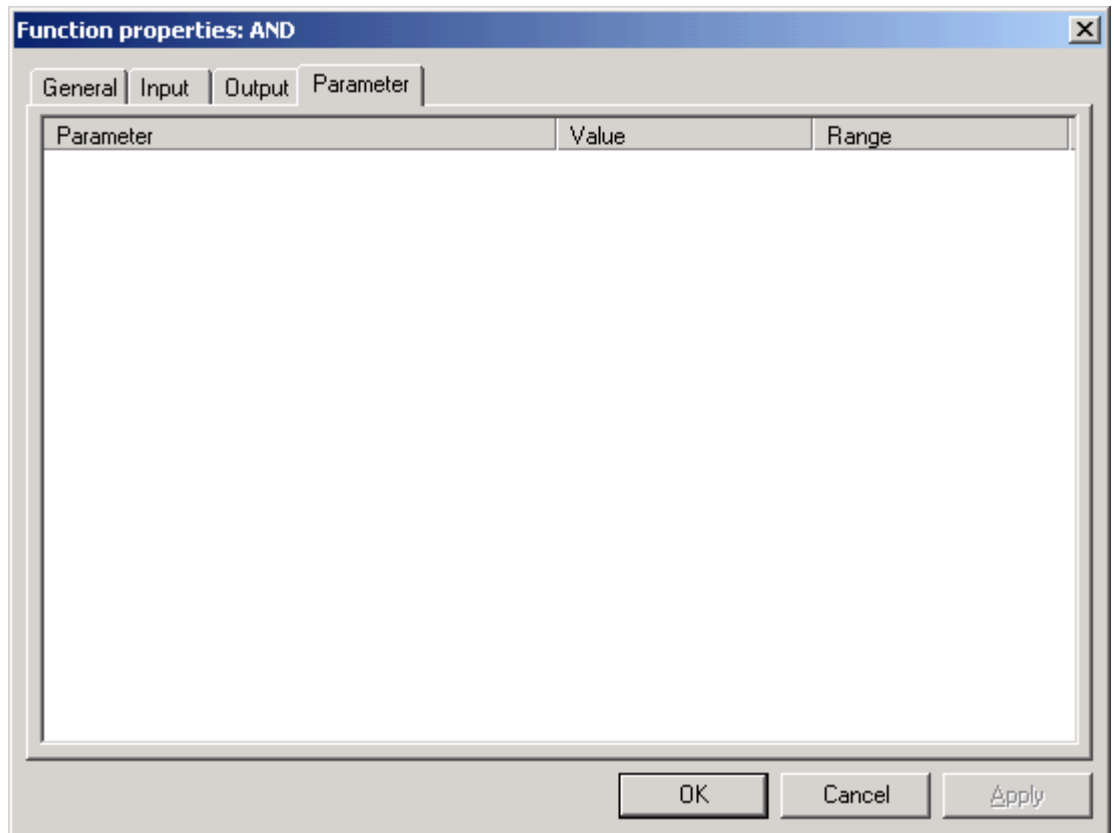
Flags are points for transferring data between loops of one plant. The output always sets up this value.

It is possible to hide this output in the Macro window.

- Invisible (do not show as in - or output in editor)

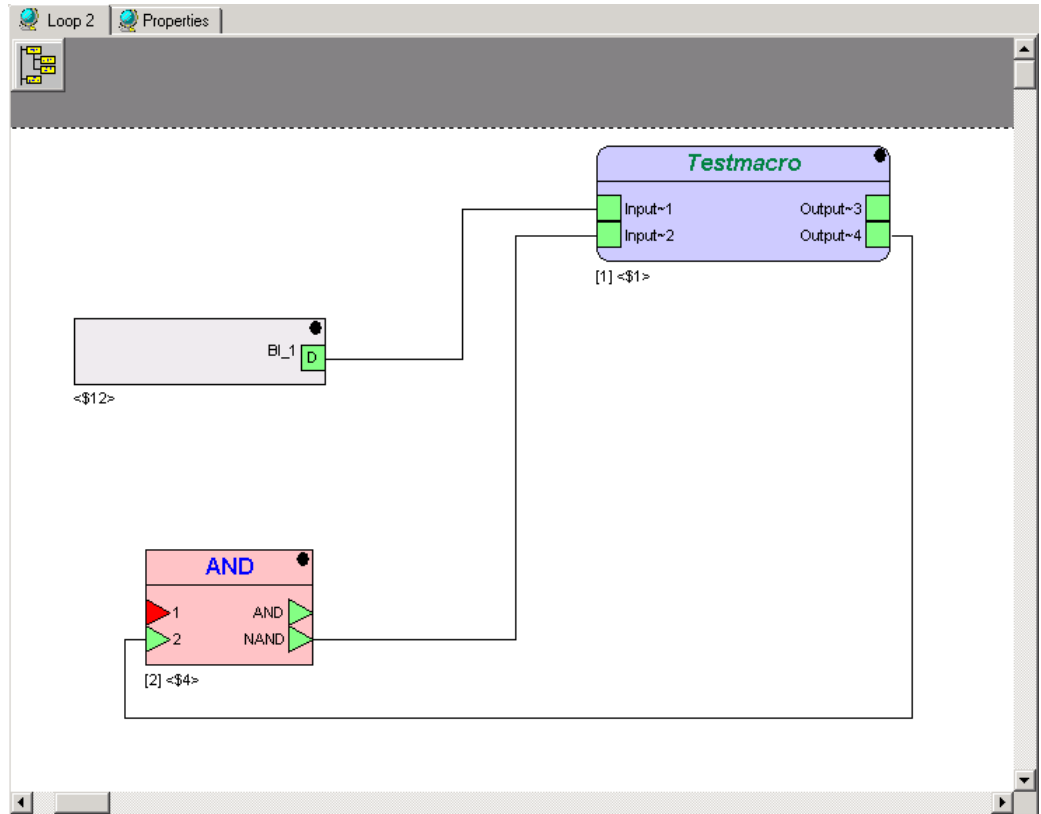
Hides the input or output of the control icon for all types other than "Connection". A line at the bottom of the icon indicates invisible ports.

For some elements it is possible to set up **Parameters** in the so named tab. Select the tab and then double-click on the value field of the parameter table to edit them.

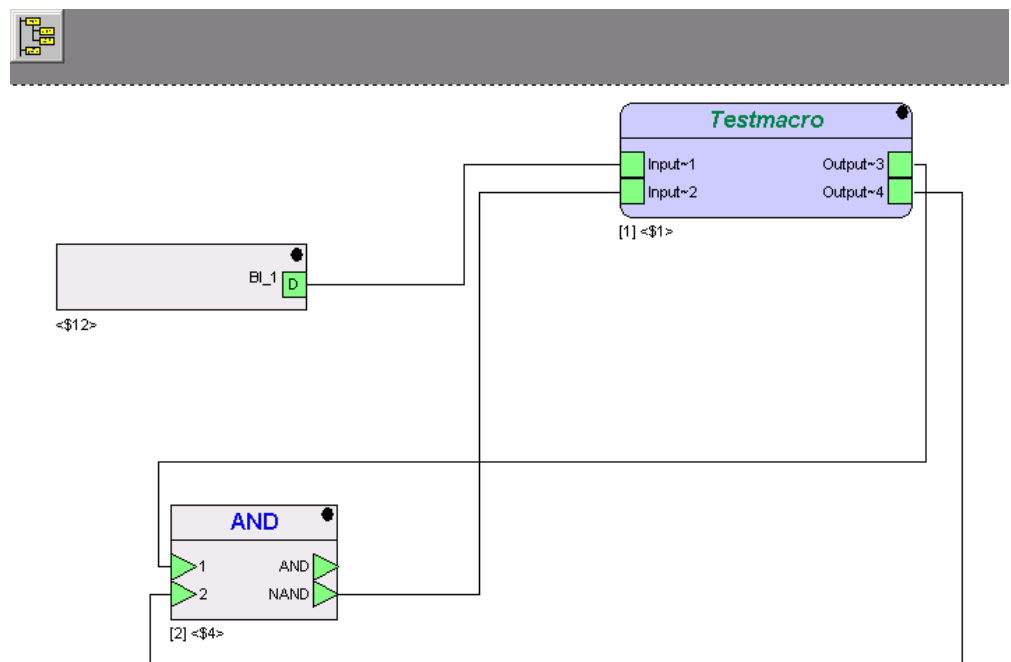


6. Now connect the input and output ports:

- Click once on the first port, you want to connect.
- Move the cursor to the second port and click on it.
- A line will connect the two ports (only in case they are corresponding). One output port can be connected to many input ports. But one input port can always be connected to only one output port.
- Customize the connecting line. While creating the connection you can click the left mouse button into free space and the line becomes a corner there. Clicking the right mouse button removes the last corner.
- After creating you can click the right mouse button at the line and the context menu to split (adding one corner) and to delete segments displays. After selecting the line via clicking on it, each single segment (between two corners) can be moved by clicking on it.



7. Make sure, you have connected all inputs and outputs. Unconnected points are red coloured; all points have to be coloured green.

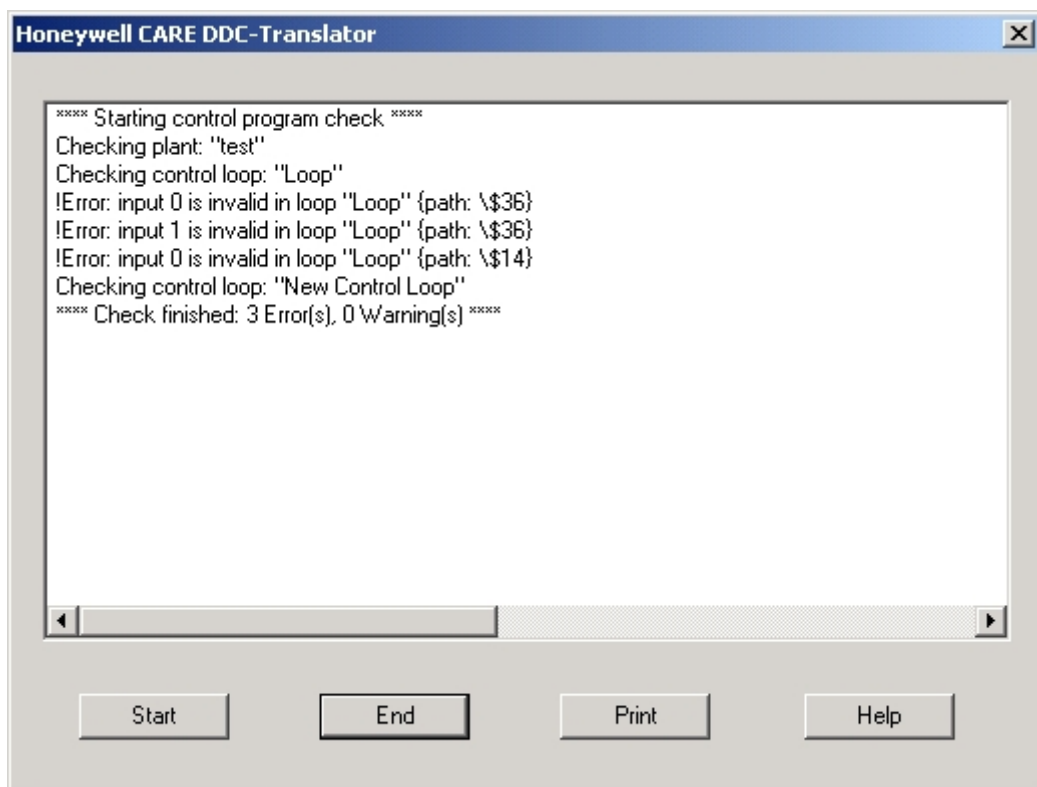


8. Now translate the loop so it can be executed by the controller:

- a. Select the controller by double-click on it.
- b. Click on menu item Controller.

c. Click on submenu item Translate.

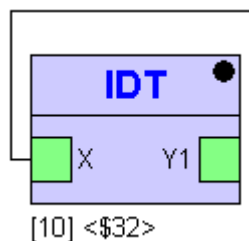
RESULT: The Honeywell CARE DDC-Translator window opens.



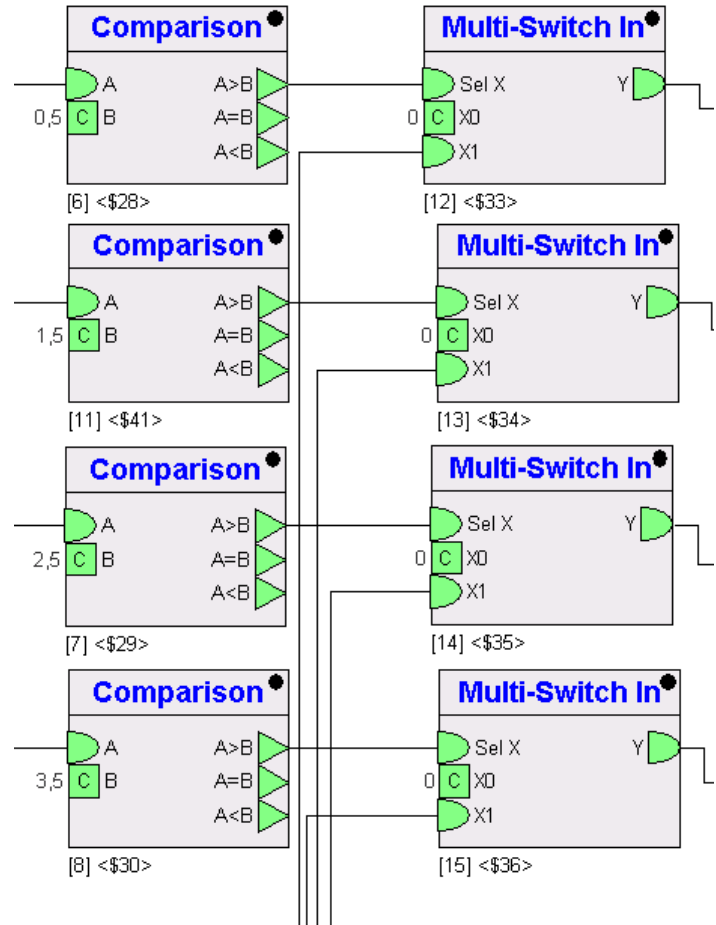
- You receive a log with the result of the translation.
- If the translation failed, use the log in the translation window to identify the mistake(s). Correct them and start the translation again.
- Transfer the software to the controller if the translation was successful.

Set Execution Order of Control Loop Logic

CARE software calculates the execution order of all functions of the control loop in order to optimize the execution time of the complete control loop. The execution order of the control functions and macros are indicated as number in brackets below each icon. For example, the following icon has the execution number 10 which means, that 9 other functions will be calculated before:

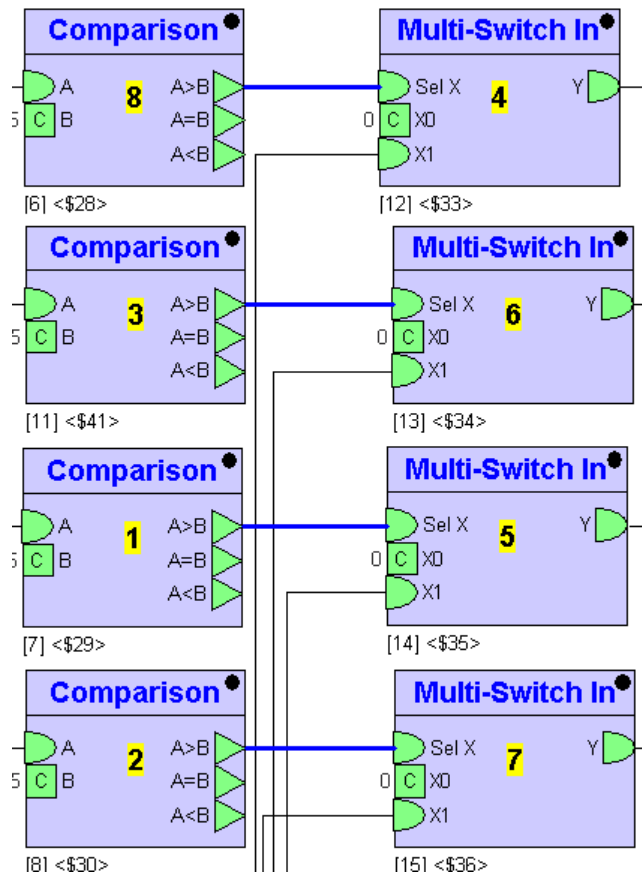


The following picture shows the execution order numbers of multiple functions of a control loop section.



Besides the automatic calculation and optimization of the control loop execution, CARE software allows manually setting the execution order of particular control functions.

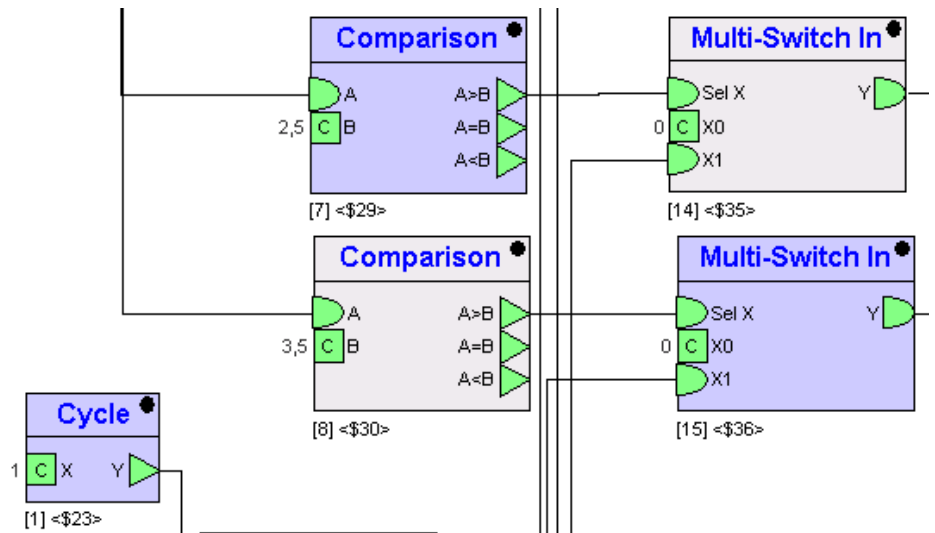
Example: The following control functions will be executed according to their manual order which is indicated by the yellow highlighted numbers. The order is relative, since between each two steps other functions which are not selected manually, are executed due to the optimization by the software. But, the order between two following steps is absolute.



Procedure

1. Select the control functions you want to order manually.

RESULT: The selected control functions are highlighted in blue.



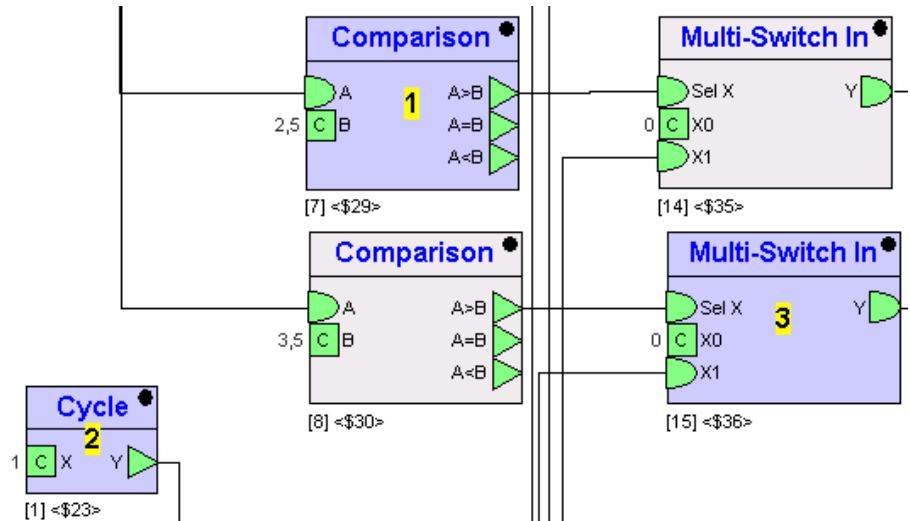
The original order is Cycle = 1, Comparison = 7, and Multi-Switch In = 15.

2. Click on Plant>Control Editor>Manual Execution Order>Set Order, or press F9 key.

RESULT: The Manual execution order dialog box displays. The list shows the optimized order for the selected functions.

3. By default, only the current selected functions (option "Selection" is checked), will be manually ordered and labelled accordingly in the macro logic. To include icons into the ordering, which have been previously but are not currently selected, click the All used radio button.
4. To preview the order of the functions in the control logic, click on the Show button.

RESULT: The functions in the list (selected or all used) are labeled in the control logic.



5. To change the order, select the function in the list and click the Up or Down button. Multiselection by using SHIFT or CTRL keys and left mouse button is possible.
6. To remove a function from manual ordering, select the function in the list and click the Remove button. Multiselection by using SHIFT or CTRL keys and left mouse button is possible.
7. If changes have been done in the list, preview the new order of the functions in the control logic by clicking the Show button again.

RESULT: The functions in the list (selected or all used) are labeled in the control logic.

8. To confirm the previewed order, click the OK button.

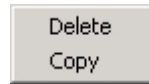
RESULT: The control loop will be executed according to the defined order.

Delete Control Loop

- Prerequisites**
1. The user is logged in.
 2. A project is open.
 3. The opened project has at least one controller, one plant and one control loop.

- Procedure**
1. Expand the tree view of the control loops of the plant, the control loop is assigned to.
 2. Click with the right mouse button on the icon of the control loop you want to delete.

RESULT: The context menu displays.



3. Click on Delete with the left mouse button.

RESULT: The icon of the selected control loop will be removed.

NOTE: The control loop will be removed finally. You cannot use the submenu undo.

Find Element in Control Loop

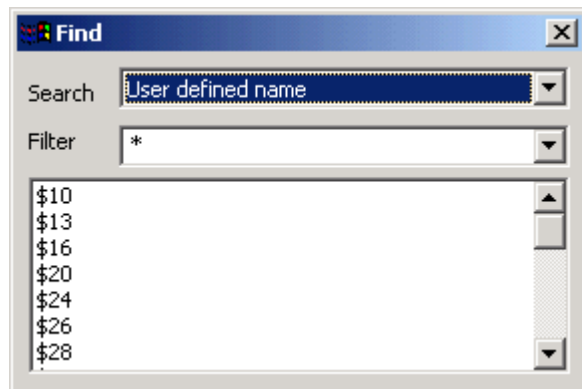
Prerequisites

1. The user is logged in.
2. A project is open.
3. The opened project has at least one controller, one plant and one control loop.

Procedure

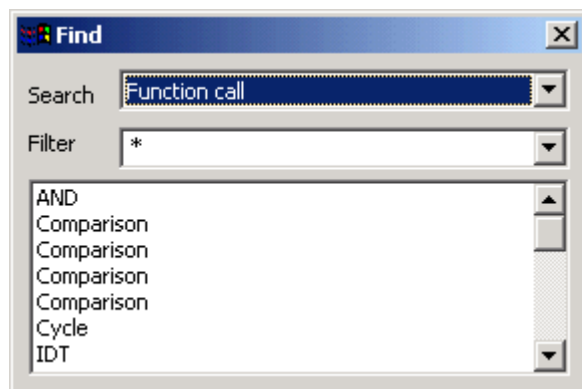
1. Click main menu Plant, then submenu Control Editor, then submenu item Find, or press CTRL + F keys.

RESULT: The Find dialog box displays.

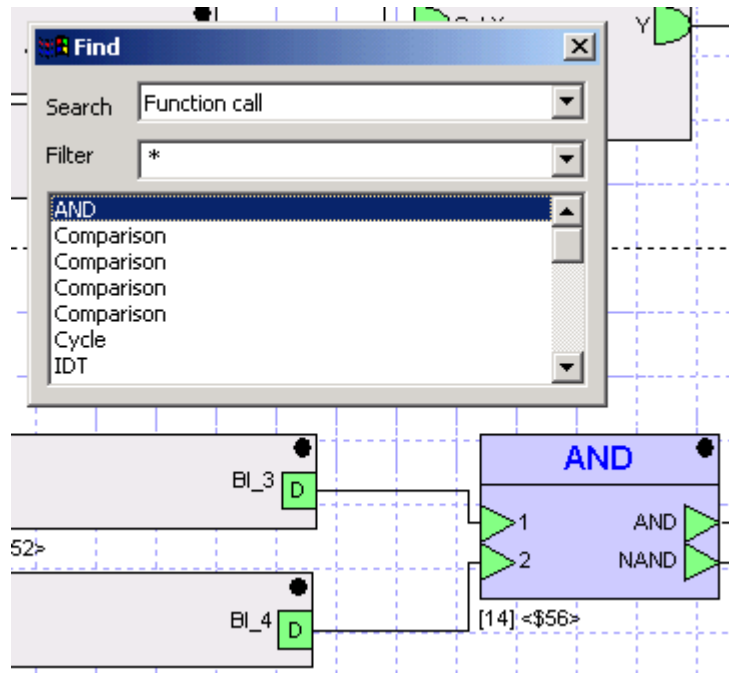


2. From the Search drop-down listbox, select the item you want to find in the control loop displayed.

RESULT: In the list below, all available elements of the selected search item are displayed.



3. To apply a filter to the search result of the list, enter a string in the Filter drop down listbox. By default all elements of the control loop are displayed as indicated by an asterisk *.
4. To find a particular element in the control loop, click on in the list.



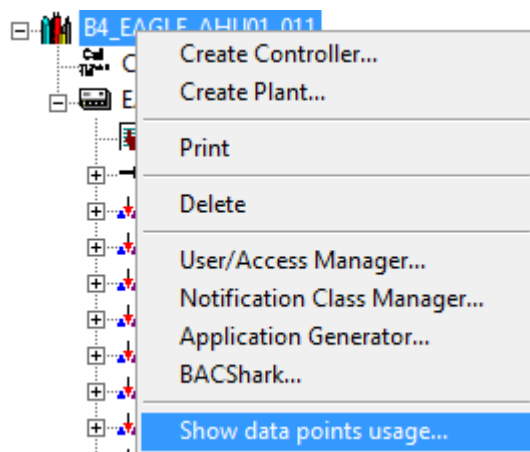
RESULT: The found element will be highlighted. In this case, an AND Function call has been selected in the list and is highlighted in the control loop.

Create Report

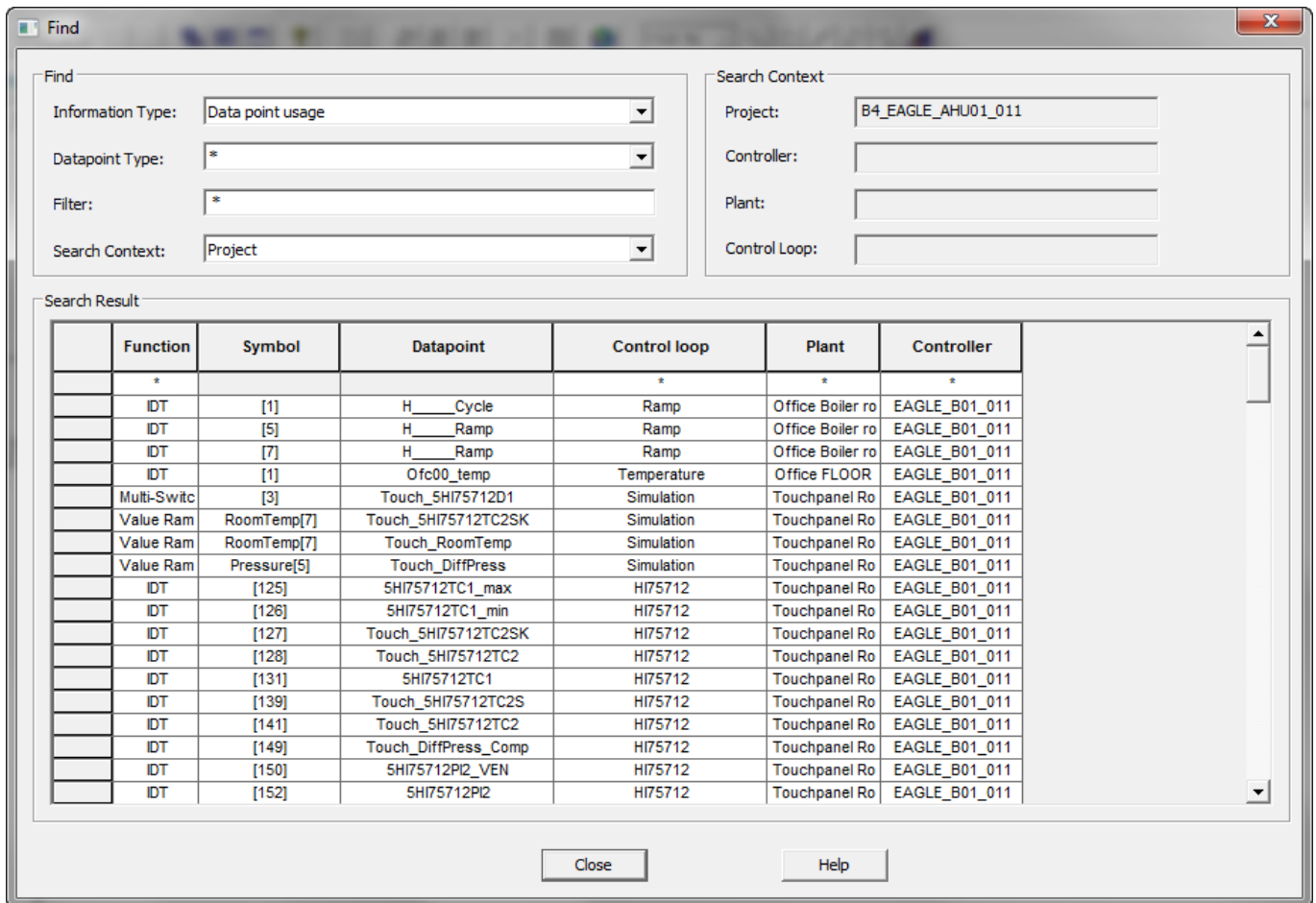
Purpose In large applications it can be necessary to find specific information of datapoints. You can search for the usage of datapoints on project, controller, plant and control loop level. Found datapoints can be detected in the control loop by double-clicking from within the report displayed.

Procedure

1. Right-click the level (*project, controller, plant or control loop*) in which you want to search for the used datapoints, and then click **Show datapoints usage** in the context menu.



RESULT: The *Find* dialog box displays.



2. In **Information Type**, the applied search command is pre-selected. The information type Datapoints usage searches for datapoints that match the datapoint type pre-selection and the filter criteria (see below). If datapoint attributes are part of functions or time programs the functions and time programs will also be listed.
3. From the **Datapoint Type** drop-down listbox, you can select a datapoint type for which you want to search specifically.
4. In **Filter**, you can enter a search string using wildcards to narrow down further the result.
5. In **Search Context**, select the level (project, controller, plant and control loop) on which the search should be executed. Note that software searches in the selected level and automatically in the levels that are hierarchically below the selected level. Under **Search Context** on the right, the levels are displayed.

RESULT: Under **Search Result** the found items are displayed and automatically updated according to the selected information type. The following properties are shown:

- Function
function type
- Symbol
instance name
- Datapoint
datapoint name
- Control loop
control loop the found item belongs to
- Plant
plant the found item belongs to

- Controller
controller the found item belongs to

6. To detect a found item in the control loop, double-click the item in the list.

RESULT: The item is selected in the control loop.

7. To apply various searches, change the search criteria under **Find** as desired.

RESULT: The list will be updated automatically.

Positioning Icons

Icons can be dragged and placed to any desired position in the wire sheet. If desired, supporting grid lines can be shown. In addition, icons can be jogged in definite steps within the grid and dropped at definite positions. When jogging an icon, it snaps 5 times between grid lines. These definite snapping steps are programmed in CARE and cannot be changed.

Procedures

Dragging Icon

1. With left mouse button, click on the icon.
2. With pressed left mouse button, move it to the desired position.
3. At the desired position, release the mouse button.

Jogging Icon

1. With left mouse button, click on the icon.
2. With left mouse pressed, simultaneously press the ALT key and move the icon. While moving the icon, it will snap.
3. At the desired position, release the mouse button and the ALT key.

Connecting Icons

Connecting Icons by Drawing Connecting lines

The following icons can be connected to each other by using connecting lines:

- Function
- XMF
- Datapoint
- Flag

NOTES: Parameters can only be connected to RIA and WIA icons. Please refer to the "Parameters" section.

One output can be connected to several inputs, but one input can be connected to max. one output.

Inputs of Function icons cannot be connected to inputs of other Function icons. This applies to outputs in the same way.

Inputs/outputs of datapoints must be connected to inputs/outputs of Functions and XFM icons.

Example:

The following figure shows the connection between the output Y of the PID icon (1) and the input M of the Subtract icon (2) by the drawn connection line (3).



- When the cursor changes to a cross while pointing on the target input/output, click once.

RESULT: The output/input is connected to the input/output as indicated by the blue completed connection line and the green color of both, the output and the input symbol.



- Continue with connecting all inputs/outputs of the icon.

Drawing Methods

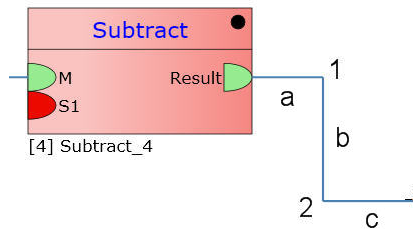
You can draw connecting lines in different ways.

A) As described in the procedure above, you can draw a line in one step by clicking once on the start symbol (input or output) and then clicking a second time on the end symbol (output or input).

B) You can create intermediate points while drawing the connection line as follows:

- First, click the starting point of the connection line (input/output symbol).
- Draw the connection line.
- Click at some intermediate point.
- Repeat steps 2 and 3 as often as desired.
- To finish, click the end point (output/input symbol) of the connection line.

RESULT: The connection line is divided into segments (a, b, c) caused by the intermediate point clicks (1, 2), see also “Manipulating Connecting lines” section.



Connecting lines are always right-angled. That is, connections can only run vertically or horizontally. They cannot run diagonally. A connection line will be “straight” if start and end point between two clicks allow this by accident.

If a connection line crosses an icon, the connection line passes around on the top or at the bottom of the icon. In this case, segments are automatically created.

Cancel Drawing

Pressing the Esc key, cancels the drawing process and removes the whole connection line unless the connection is not completed yet (to delete a completed connection, see “Manipulating Connecting lines” section).

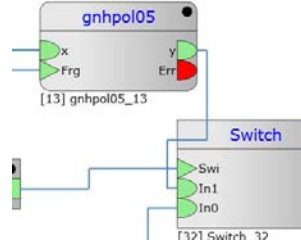
Autrouting Connecting lines

When connecting 2 icons or moving icons within a control loop, software optimizes the display of connecting lines by drawing the shortest connection line, saving space, and avoiding crossing the icon where the connection line has started.

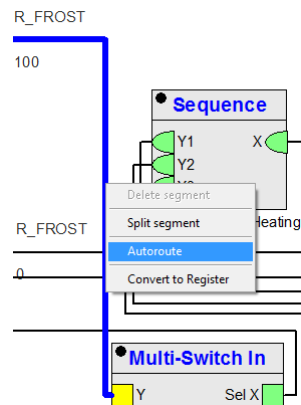
Connecting lines can be autorouted explicitly if desired. To autoroute one particular connection line, select the connection line, right-click and then click on **Autoroute** in the context menu. To autoroute multiple connecting lines, select them and press STRG+R keys simultaneously.

Procedure

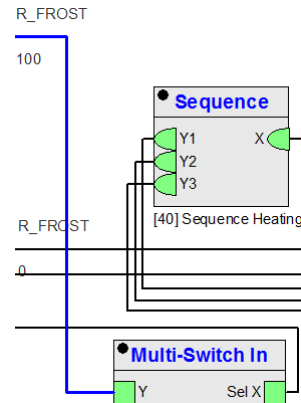
Example: Autorouting a connection line that crosses an icon



- a. Click the blue connection line. The selected connection line gets thick.



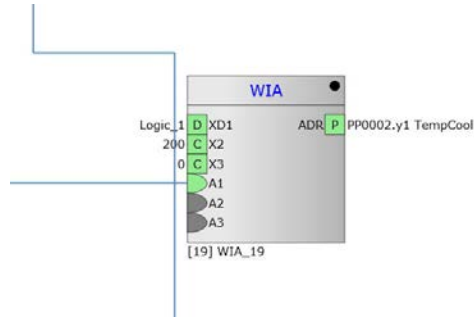
- b. Right-click the connection line, and then click **Autoroute** in the context menu.
RESULT: The connection line is autorouted and passes the control loop icon.



Besides autorouting, you can manually re-position connecting lines as described in the “Manipulating Connecting lines” section.

Manipulating Connecting lines

Connecting lines sometimes pass through other control loop icons or cross other connecting lines. This may make the control strategy confusing.



To optimize the run of the connecting lines, you can manipulate them manually by moving the horizontal and vertical segments individually to the desired position. In addition, you can insert a further segment by splitting a segment into two segments.

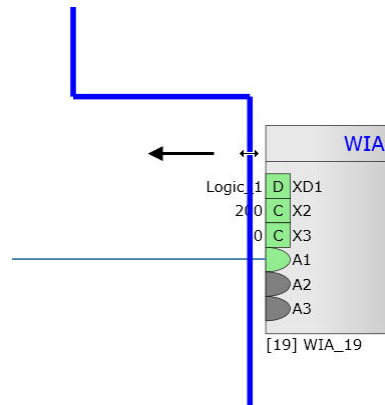
Procedures

Move Segment

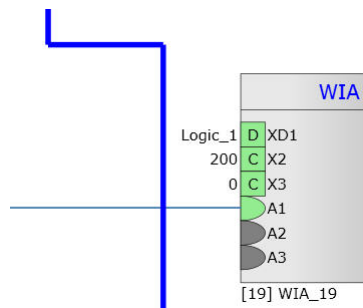
To move horizontal segments up or down or vertical segments to left or right:

Example: Vertical segment movement

- a. Click the blue connection line. The selected connection line gets thick. Then move the cursor along the segment until a double-arrow shows up.



- b. Click again, and with left mouse button pressed down, move the segment to the desired direction as indicated by the double-arrow cursor.
- c. At the final position, release the mouse button.



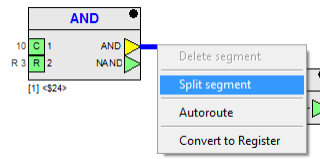
RESULT: The connection line run has changed.

Split Segment

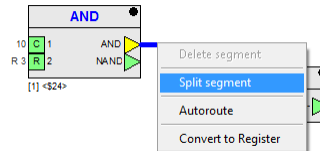
To split a segment into 3 segments by the insertion of one new segment:

Example: Horizontal segment splitting

- a. Click the blue connection line. The selected connection line gets thick.

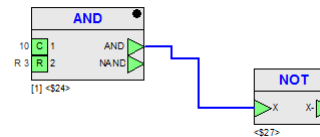


- b. Right-click the section at the point where you want to split the segment. Right-clicking a horizontal segment adds a vertical segment and vice versa.



- c. In the context menu, click **Split segment**.

RESULT: The horizontal segment is split into three segments by the insertion of a new vertical segment into the horizontal segment.

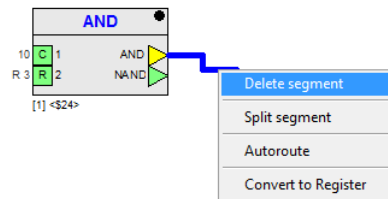


Delete Segment

To delete a segment:

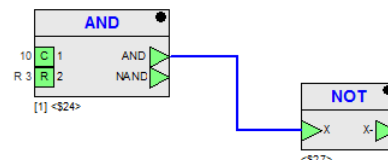
Example: Vertical segment deletion

- a. Click the connection line. The selected connection line gets thick.
- b. Right-click the section you want to delete.



- c. In the context menu, click **Delete segment**.

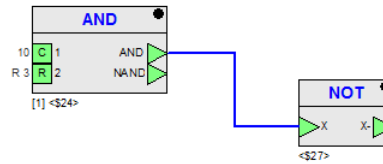
RESULT: The segment is deleted.



Delete Completed Connection – Remove Connection

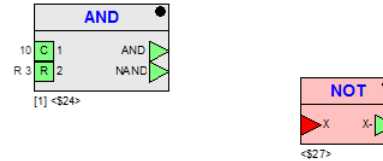
Deletion/removal of a completed connection can be done in one of the following ways:

- A) 1. Click the connection line you want to delete. The selected connection line gets thick.

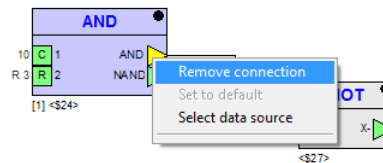


2. Press DELETE key.

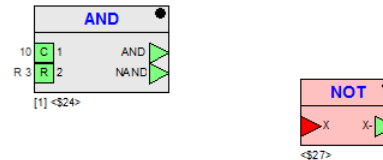
RESULT: The connection line is deleted.



- B) 1. Right-click the input or output symbol on the control loop icon, e.g. Y of the Switch icon.
 2. In the context menu, click **Remove connection**.



RESULT: The connection line is removed.



Delete Incompleted Connection

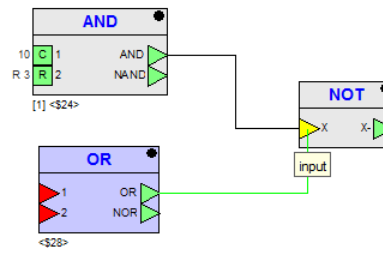
1. Press Esc key while drawing the connection line.

RESULT: The whole connection line is removed unless the connection is not completed yet.

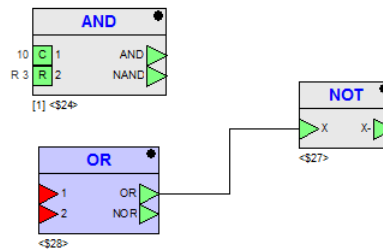
Replace a Connection

An established connection will be replaced when connecting a free input/output from another icon to the occupied input/output of the already connected icon.

1. Connect the free input or output to the desired occupied input or output.



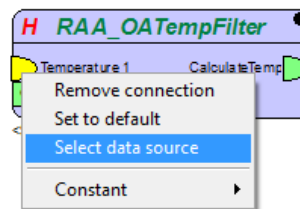
RESULT: The established connection is removed and the new connection is created.



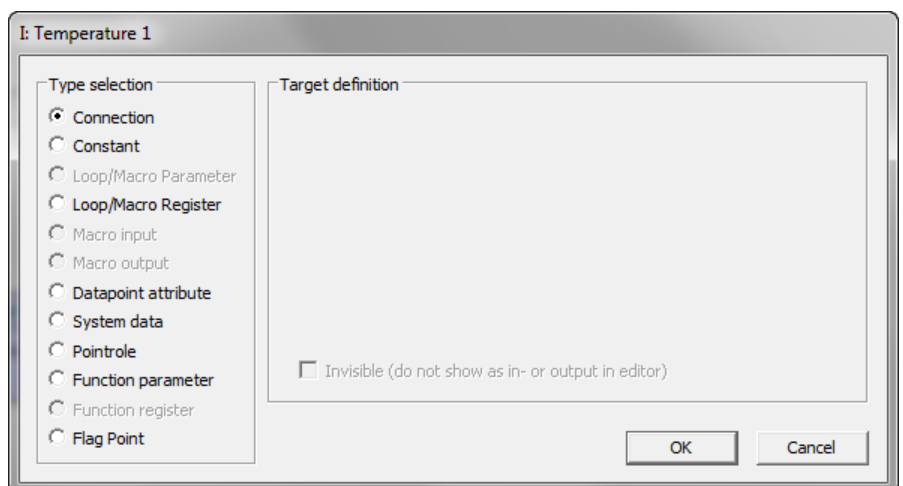
Assign Constant

Purpose To connect (assign) a constant to an input of a Function or XFM icon. Constants do not appear in the controller and cannot be changed online.

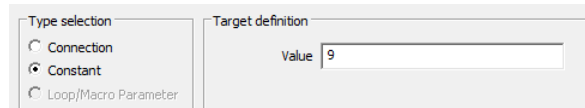
- Procedure**
1. Right-click the input symbol
 2. Click **Select data source** in the context menu.



RESULT: The *Select data source/target* dialog box displays.

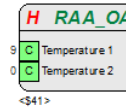


3. Under **Type selection**, select **Constant**.



4. Under **Target definition**, enter a value, and from the drop-down listbox, select an engineering unit if desired.
5. Click **OK** to save settings.

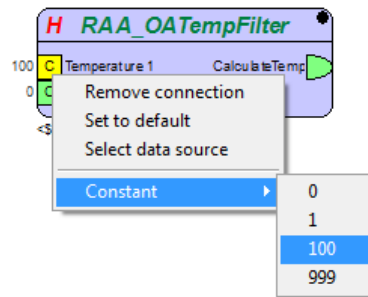
RESULT: The value of the constant is displayed at the input symbol and the input symbol contains a 'C' indicating that the connection is of type 'Constant'.



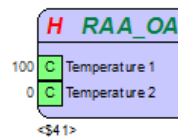
Quick Assignment of Constants

Depending on the input (analog, binary) you can quickly assign an analog constant '0', '1', '100', '999' or binary constant '0' or '1' to an input as follows:

1. Right-click the input symbol
2. Click **Constant** in the context menu, and then click the value (0, 1, 100, or 999)



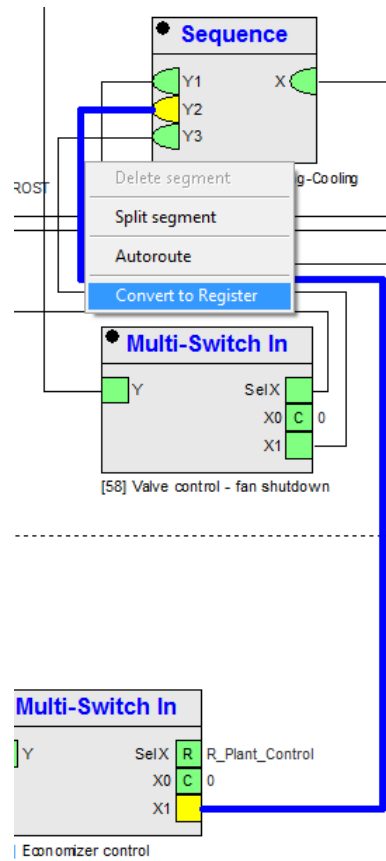
RESULT: The value of the constant is displayed at the input symbol and the input symbol contains a 'C' indicating that the connection is of type 'Constant'.



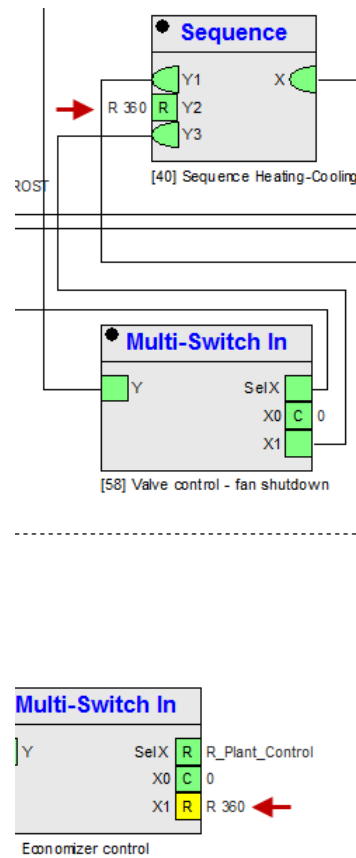
Convert Connection to Register

Purpose To convert a connection (connecting line) into registers and display the register numbers at the input and output. This can be helpful for identifying two control icons with a badly traceable connecting line in a complex schematic.

- Procedure**
1. Right-click the connecting line.
 2. Click **Convert to Register** in the context menu.



RESULT: The connecting line is removed and at the input and output, the same assigned register number is displayed.



Macros

Purpose Macros are functions, built from other functions by the CARE-user (like a loop within a loop). Macros can be used to carry out recommended special functions, e.g. freeze protection (not included in CARE software basic version). The macros can be built and used like a control loop, and can be assigned to a single plant, to a whole project or to the all projects of the data base. Macros are stored in the global macro library, to ensure the transfer between data bases.

Types There are three types of macros:

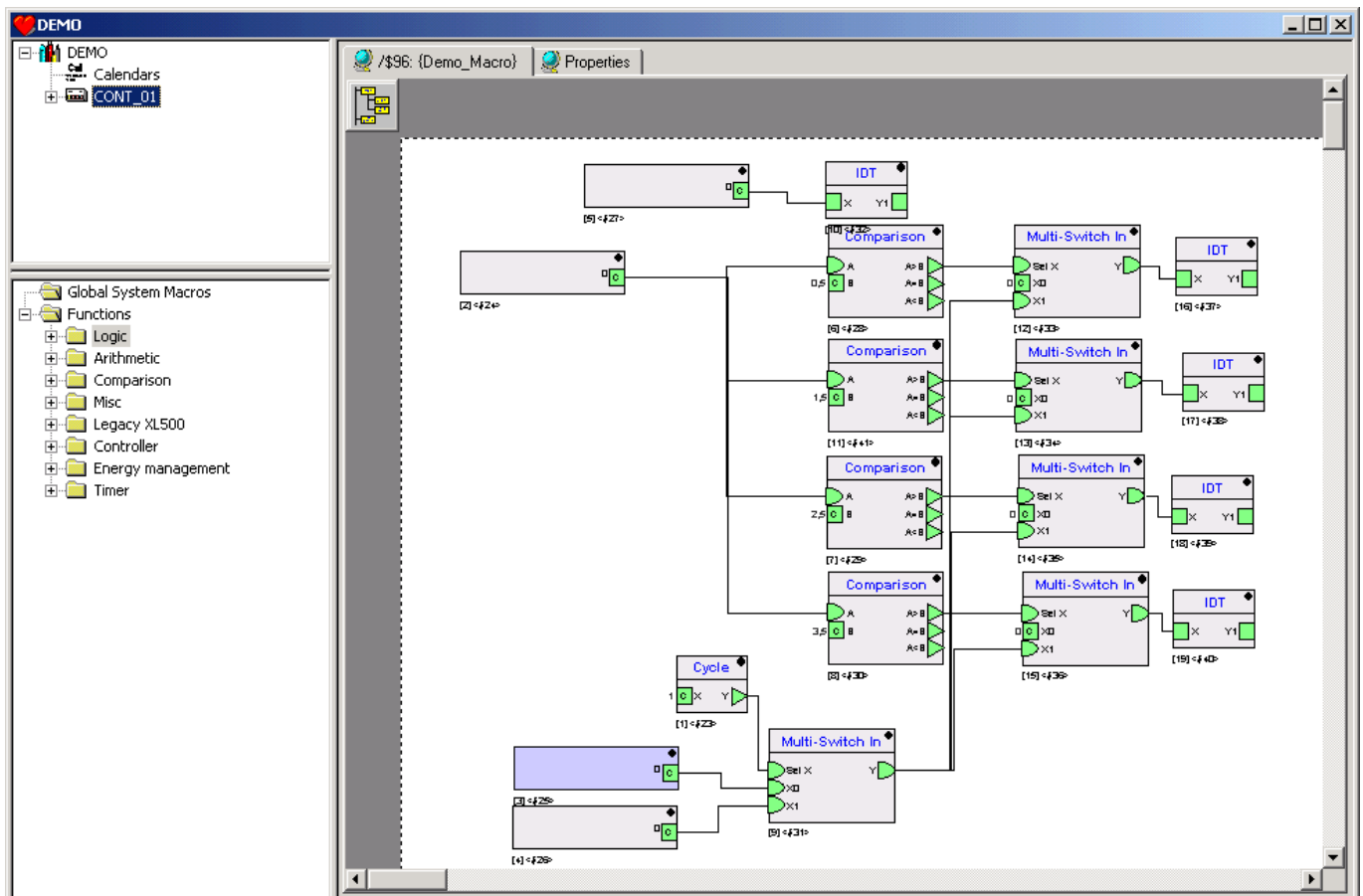
- **Macros in plant**
Macros that are software modules programmed from functions. Macros in plant that are only available in a single plant. It is in the user's hand to create, edit or remove such macros. You can copy the macros of a plant into the global macro library.
- **System Macros**
System Macros are mostly provided by Honeywell. They are available for all projects of a database. Only authorized users have access to these macros.
- **Global Macros**
Global Macros are stored in the global macro library. They are available for all projects of the database. Use the macro library to create, edit, remove and organize these macros.

Create Macro

- Prerequisites**
1. The user is logged in and has a license that includes the “XL Web Macro administrator feature”.
 2. A project is open.
 3. The opened project has at least one controller, one plant and one control loop.

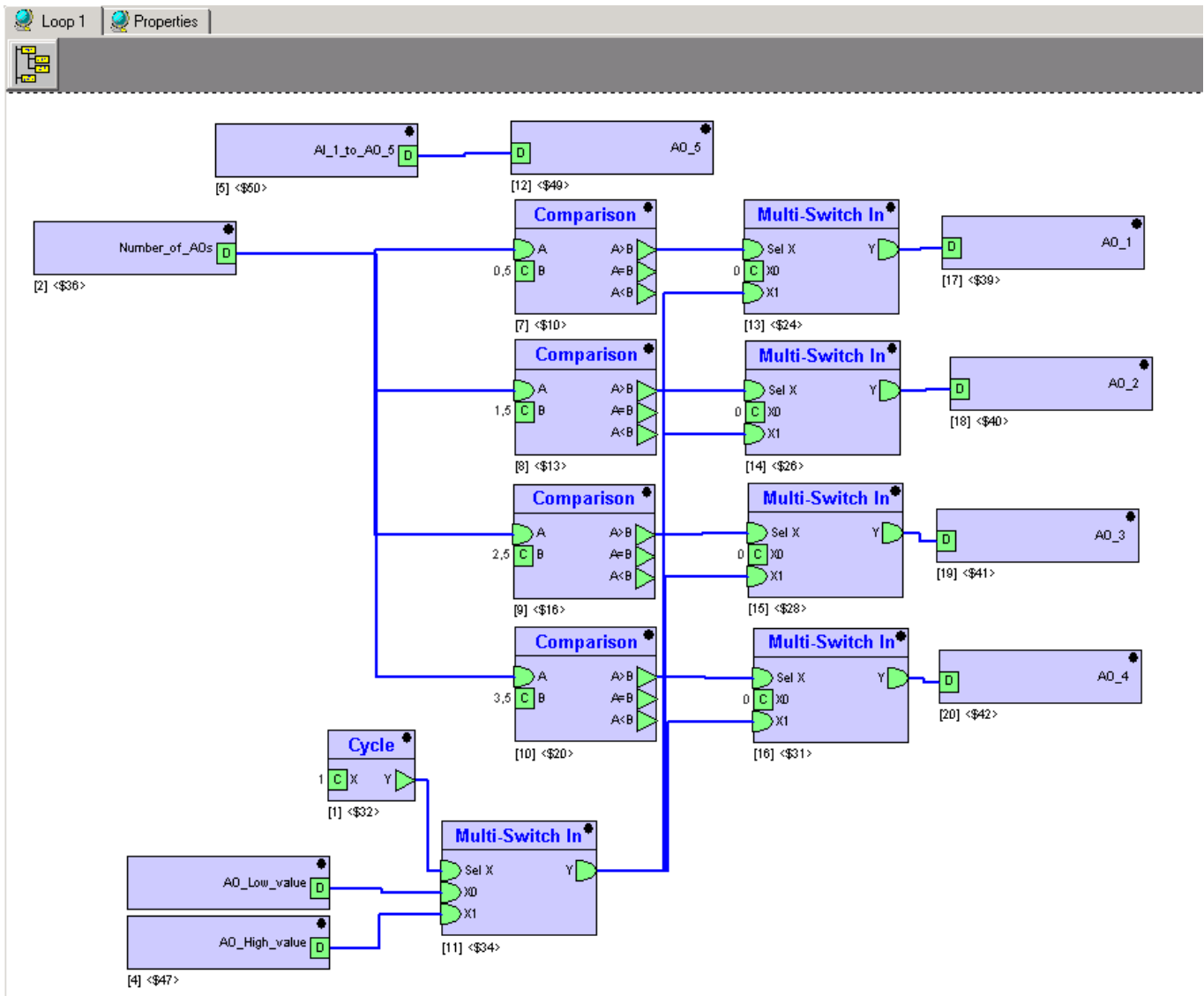
- Procedure**
1. Expand the tree view of the control loops of the plant, the control loop is assigned to.
 2. Double-click on the icon of the control loop for which you want to create a macro.

RESULT: The Macro window of the control loop opens in the right pane.



3. Select the functions, you want to move into a macro:
 - a. Select a single function by clicking on it.
 - b. Select some single functions by clicking on them and hold the Shift-key pressed.
 - c. Select a couple of functions by holding the left mouse button pressed and drawing a rectangle, covering the functions.
 - d. If nothing is selected, the macro stays empty.

RESULT: The selected functions are colored blue.



4. Click menu item Plant, then submenu item Control Editor and then submenu Create new macro... (or press F7)

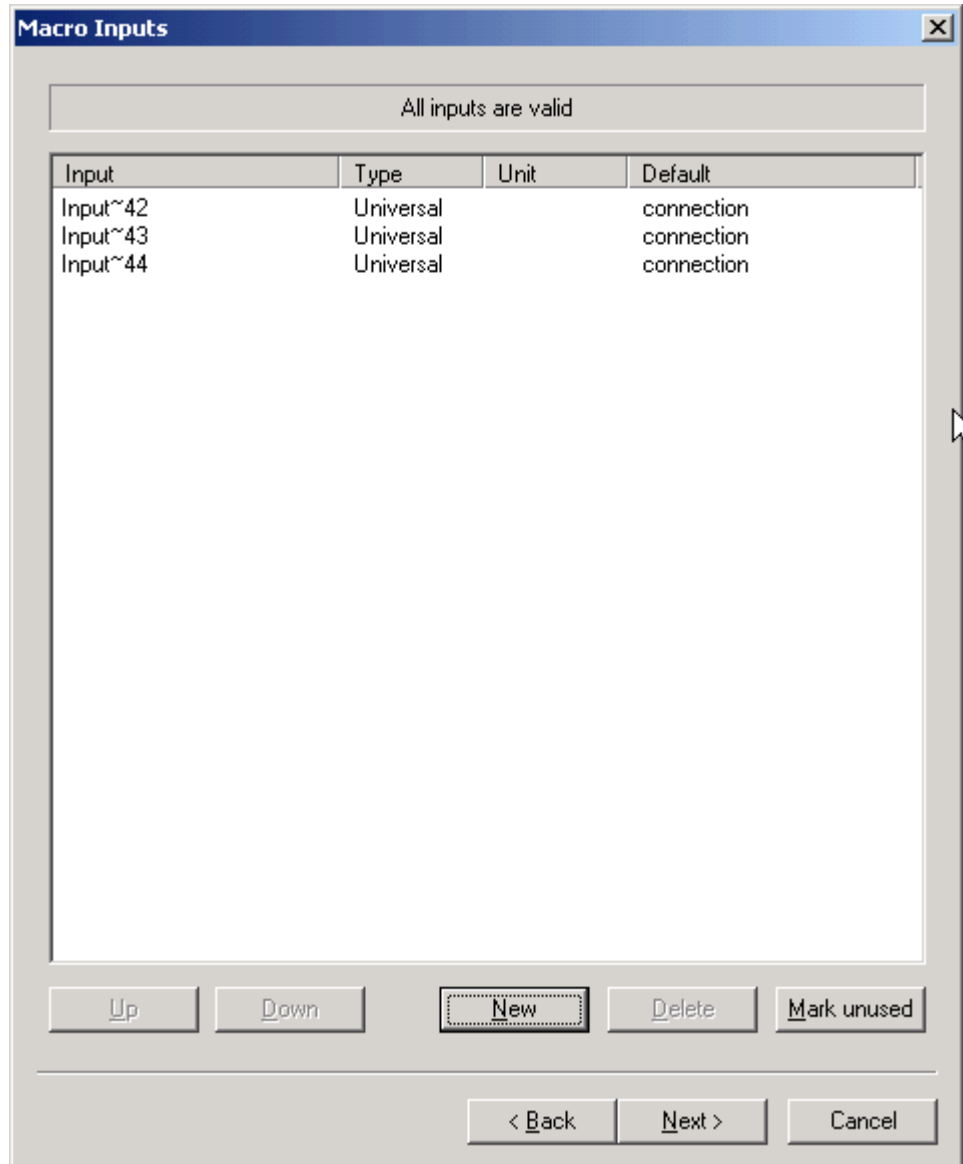
RESULT: The Macro overview dialog box of the macro opens.

Fill out the fields according to your requirements:

- **Please enter a name:**
Unique name of the macro.
- **Description**
Description of the macro, e.g. what's the function of it or which special input/output or parameters are used in this macro.
- **Tooltip**
Descriptive information that will be displayed in the yellow tooltip which displays when moving the cursor over the macro icon.
- **System macro**
Select the checkbox if the macro should be included in the folder "Global System Macros". The macros of this folder are usable for all control loops of this database. Only authorized users can create or access System macros.
- **Version info (read only, set automatically)**
Some information about the macro, similar to file information known from MS-window.

5. Click the **Next** button.

RESULT: The Macro Inputs dialog box of the macro opens. The inputs of the selected functions are predefined as inputs of the macro.



6. Set up the properties of the inputs of the macro by clicking twice into the desired fields of the table:

Meaning of the columns:

- **Input**
Name of the input(s). Click twice into the row of the desired input to change its name.
- **Type**
Type of the input(s). Click twice into the row of the desired input to get the choice between the three input types (analog, binary, universal, or datapoint).
- **Unit**
Unit of the value (e.g. liters, volt, minutes, ...).

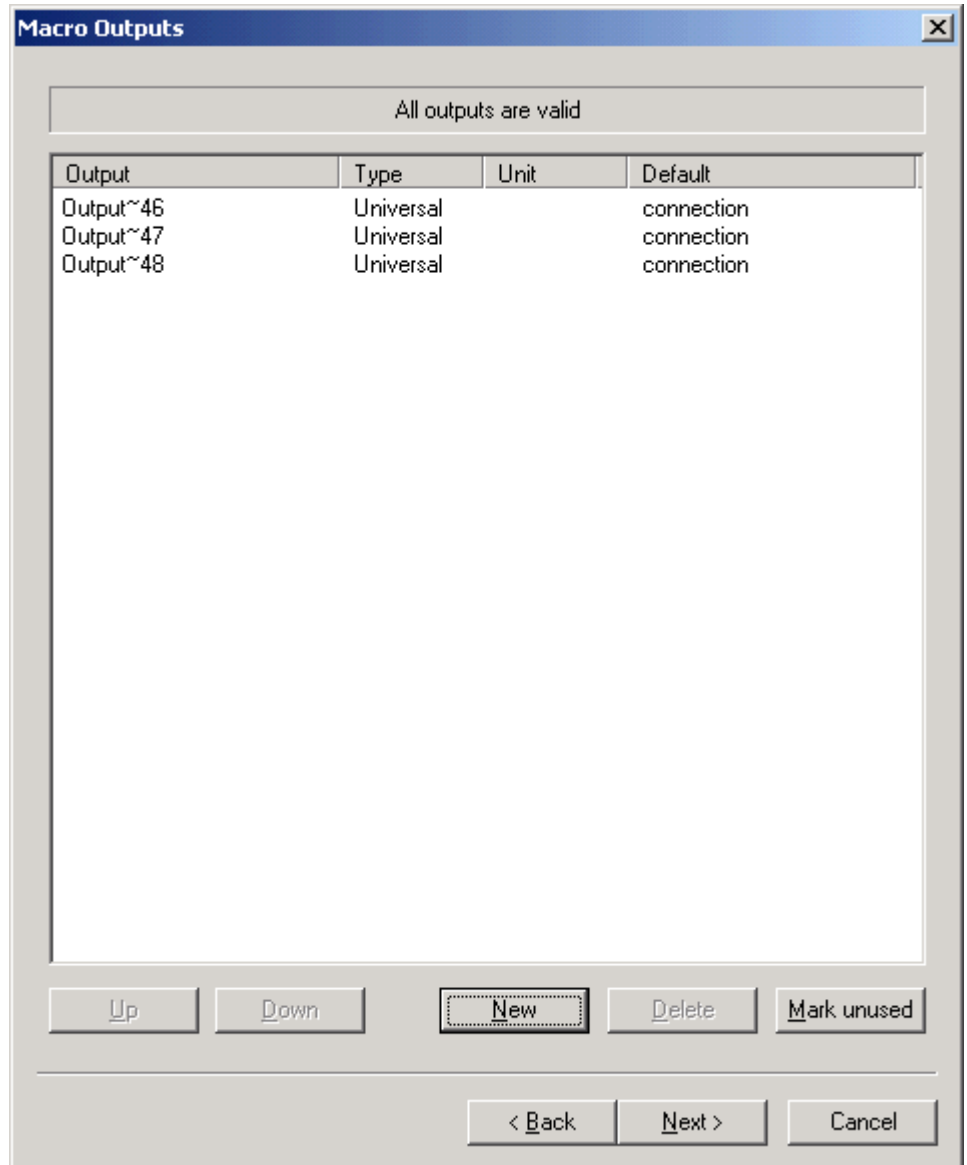
Meaning of the buttons:

- **Up**
Use this button to place the selected input one step up.
- **Down**
Use this button to place the selected input one step down.
- **New**
Use this button to create a new input of the macro.

- **Delete**
The selected input will be removed. Pay attention, only unused inputs can be removed and no undo is possible.
- **Mark unused**
All entries are selected (to delete them).

7. Click the **Next** button.

RESULT: The Macro Outputs dialog box of the macro opens. The outputs of the selected functions are predefined as outputs of the macro.



8. Set up the properties of the outputs of the macro by clicking twice into the desired rows of the table:

- **Output**
Name of the output(s). Click twice into the row of the desired output to change its name.
- **Type**
Type of the output(s). Click twice into the row of the desired output to get the choice between the three output types (analog, binary, universal, or datapoint).

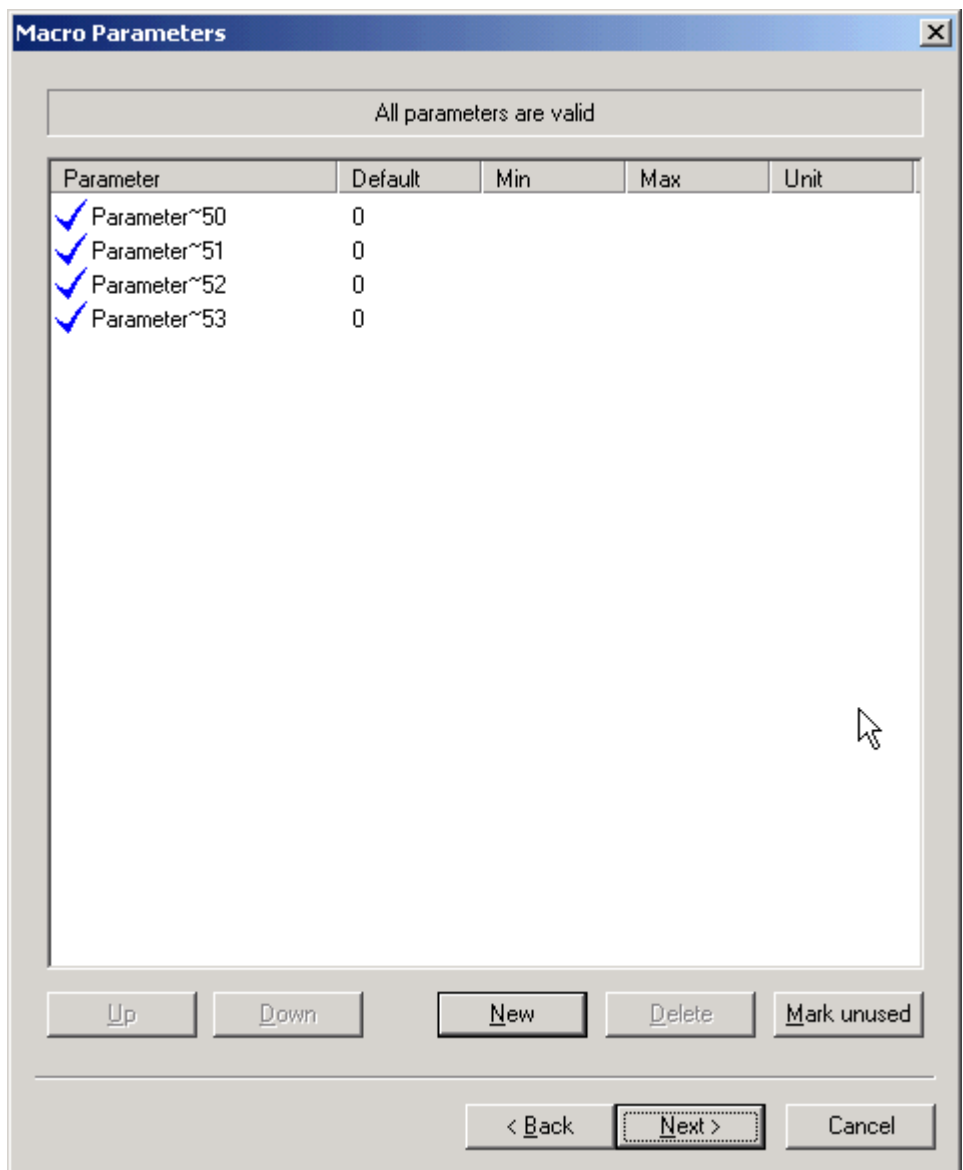
- **Unit**
Unit of the value (e.g. liters, volt, minutes, ...).

Meaning of the buttons:

- **Up**
Use this button to place the selected output one step up.
- **Down**
Use this button to place the selected output one step down.
- **New**
Use this button to create a new output of the macro.
- **Delete**
The selected output will be removed. Pay attention, only unused outputs can be removed and no undo is possible.
- **Mark unused**
All entries are selected (to delete them).

9. Click the **Next** button.

RESULT: The Macro Parameters dialog box of the macro opens.



10. Set up the properties of the parameters of the macro by clicking twice into the desired rows of the table:

Meaning of the columns:

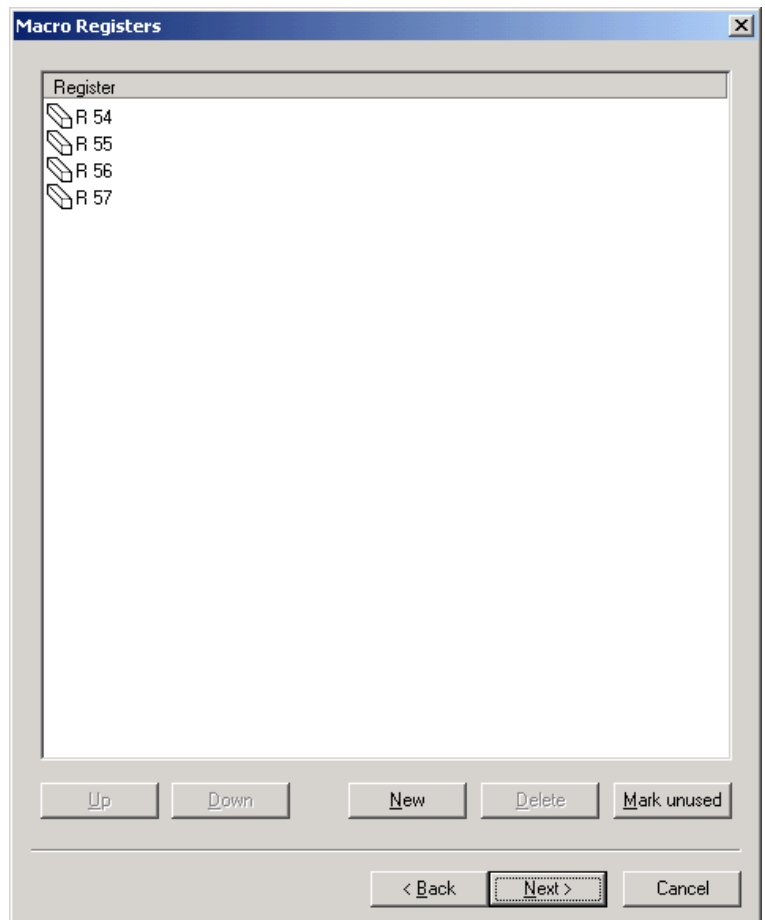
- **Parameter**
Name of the parameter(s). Click twice into the row of the desired parameter to change its name.
- **Default**
Default value of the parameter(s).
- **Min**
Minimum value of the parameter(s).
- **Max**
Maximum value of the parameter(s).
- **Unit**
Unit of the value (e.g. liters, volt, minutes, ...).

Denotation of the buttons:

- **Up**
Use this button to place the selected parameter one step up.
- **Down**
Use this button to place the selected parameter one step down.
- **New**
Use this button to create a new parameter of the macro.
- **Delete**
The selected parameter will be removed. Pay attention, only unused parameters can be removed and no undo is possible.
- **Mark unused**
All entries become selected (to delete them).

11. Click the **Next** button.

RESULT: The Macro Registers dialog box opens.



12. Set up the properties of the registers of the macro by clicking twice into the desired rows of the table:

Meaning of the columns:

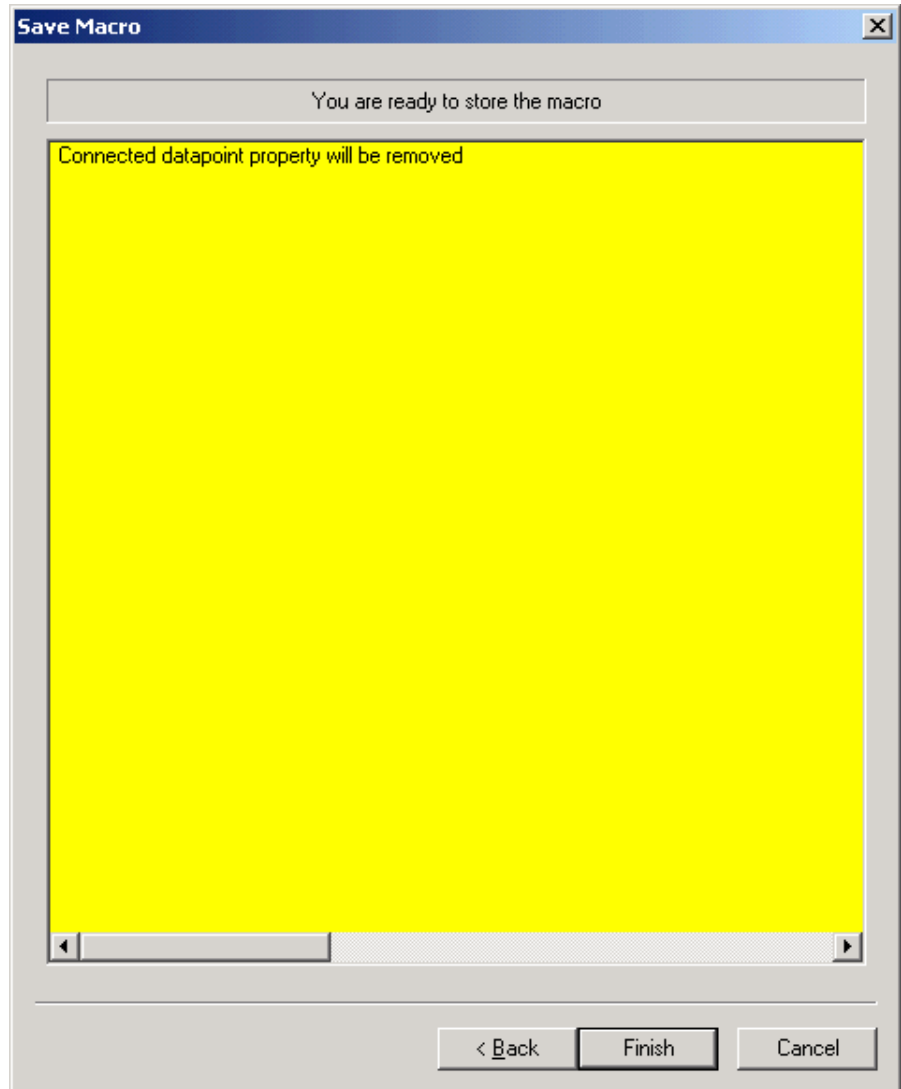
- **Register**
Name of the register(s). Click twice into the row of the desired register to change its name.

Denotation of the buttons:

- **Up**
Use this button to place the selected register one step up.
- **Down**
Use this button to place the selected register one step down.
- **New**
Use this button to create a new register of the macro.
- **Delete**
The selected register will be removed. Pay attention, only unused registers can be removed and no undo is possible.
- **Mark unused**
All entries become selected (to delete them).

13. Click the **Next** button.

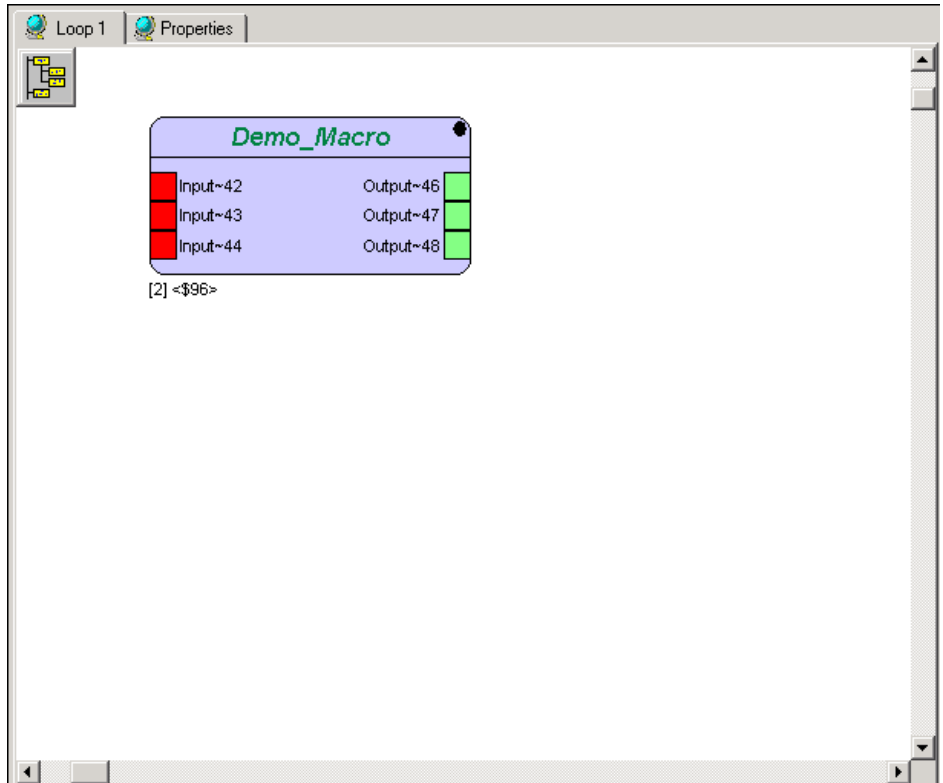
RESULT: The Save Macro dialog box of the macro opens.



NOTE: Please note the information, that connected datapoint properties will be removed.

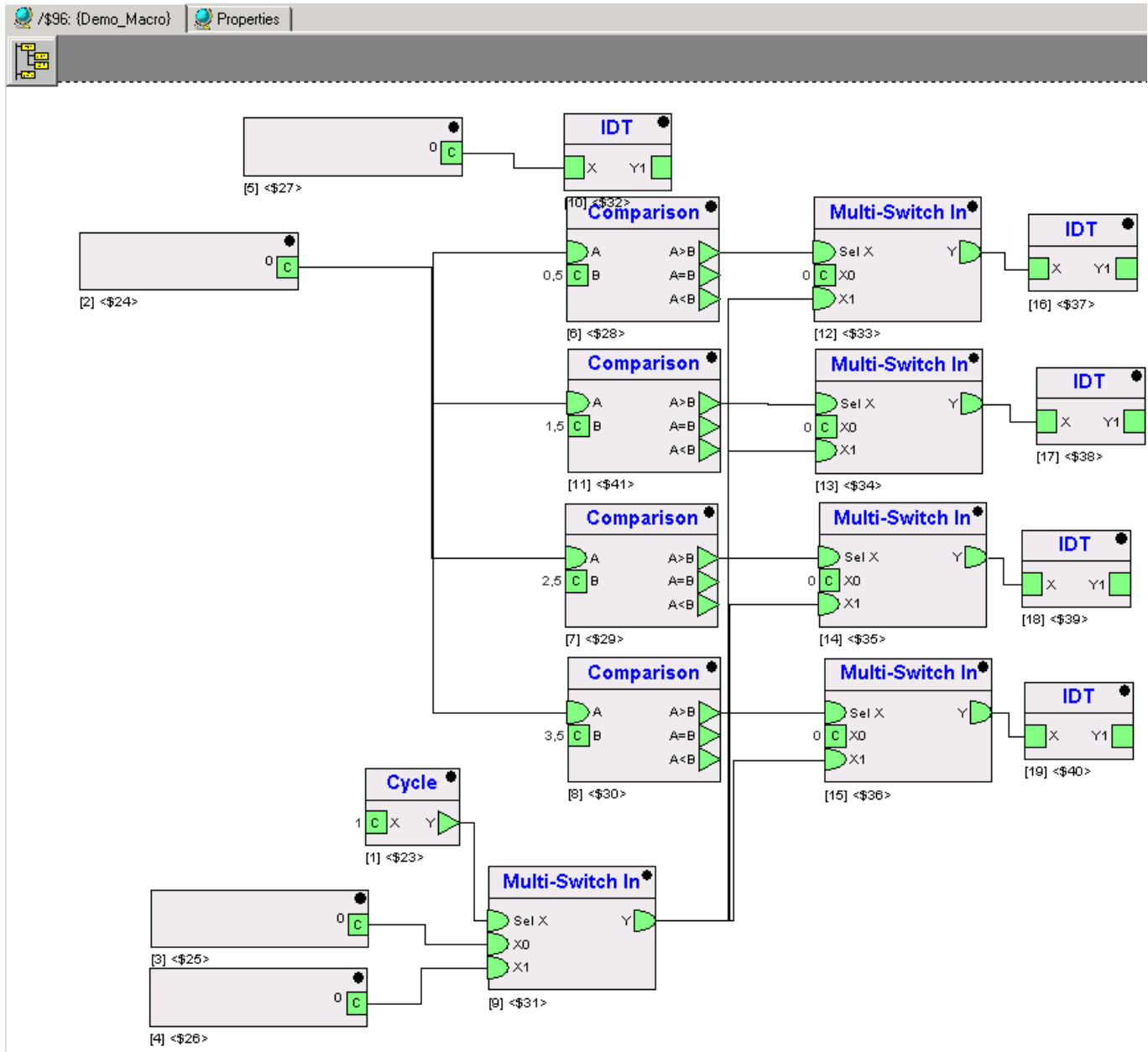
14. Click the **Finish** button.

RESULT: The macro is placed into the macro window.



15. To view the macro logic, select it, click right mouse button and click on **open macro in editor** in the context menu.

RESULT: The macro logic is shown in the macro window. Note that in the following picture, the removed datapoint property has already been reworked by selection of another connection type, e.g. "Constant".



Edit Macro Properties

- Prerequisites**
1. The user is logged in.
 2. A project is open.
 3. The opened project has at least one controller and one plant, one loop and one macro.
- Procedure**
1. Expand the tree view of the control loops of the plant, the macro is assigned to.
 2. Double-click on one of the icons of the control loop, the macro is assigned to.

RESULT: The macro window of the control loop opens in the right pane.
The icon of the macro is displayed in this macro window.
 3. Right-click on the macro icon in the right pane.

RESULT: The context menu of the macro opens.
 4. Click on **Properties**.

RESULT: The properties box of the macro opens.

The screenshot shows a dialog box titled "Macro properties: Demo_Macro". It has five tabs: "General", "Input", "Output", "Parameter", and "Internal Parameter". The "General" tab is selected. Inside the dialog, there is a "Properties" section with a "Name:" text box, a "No. of inputs:" dropdown menu, and a "Conditional call" checkbox. Below this is a "Description:" section with a text area containing the text "Here you can enter additional information" and a "Macro version:" field showing "2 {14.03.2005}". At the bottom of the dialog are three buttons: "OK", "Cancel", and "Apply".

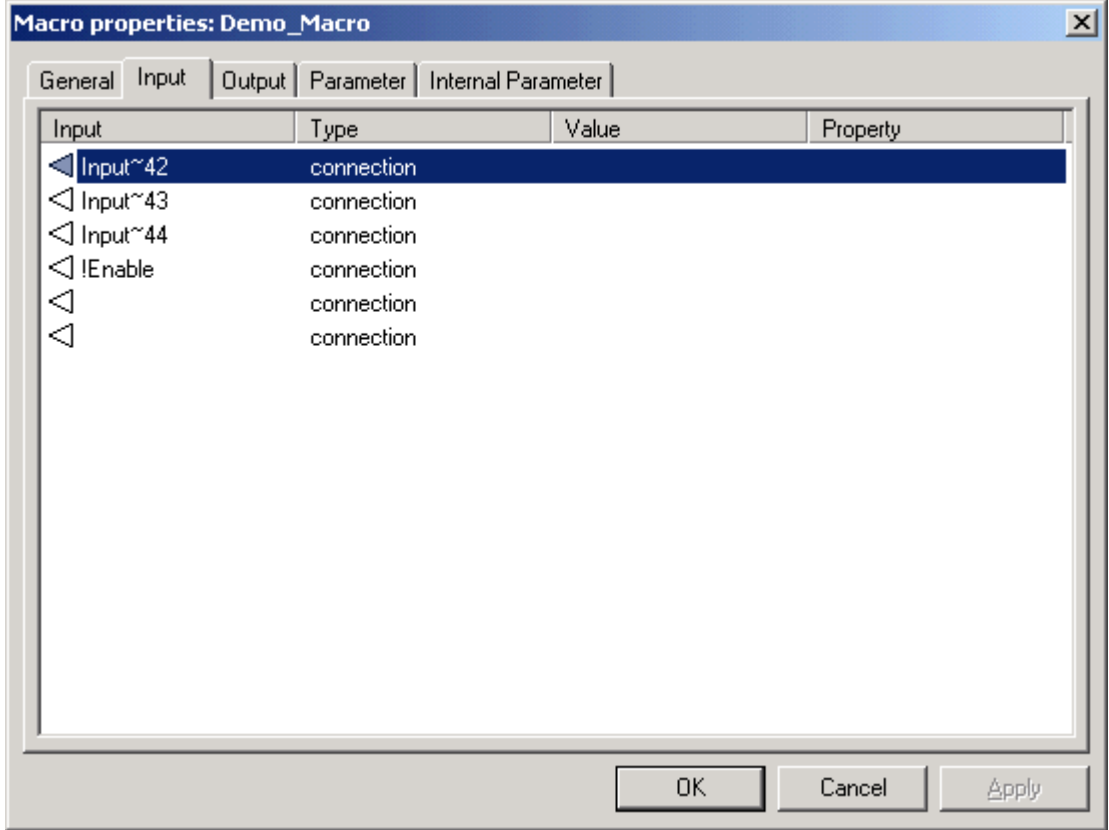
Fill in the fields according to your requirements:

- **Name:**
Alias of this element. The alias can consist of up to 32 characters and/or digits. This alias will be displayed on the tab Internal Parameter of the parent macros (only if the alias-element includes parameters).
- **No. of inputs (read only)**
Number of input connections of the macro.
- **Conditional Call**
Select the checkbox if the condition "macro switch able" should be activated. If selected, the macro will be extended by a further input called !Enable. The macro will not be executed, if !Enable equals FALSE(0). It is not possible to use !Enable as an input of functions inside the macro.

- **Description (read only)**
Description of the macro, e.g. what's the function of it or which special input/output or parameters are used in this macro.

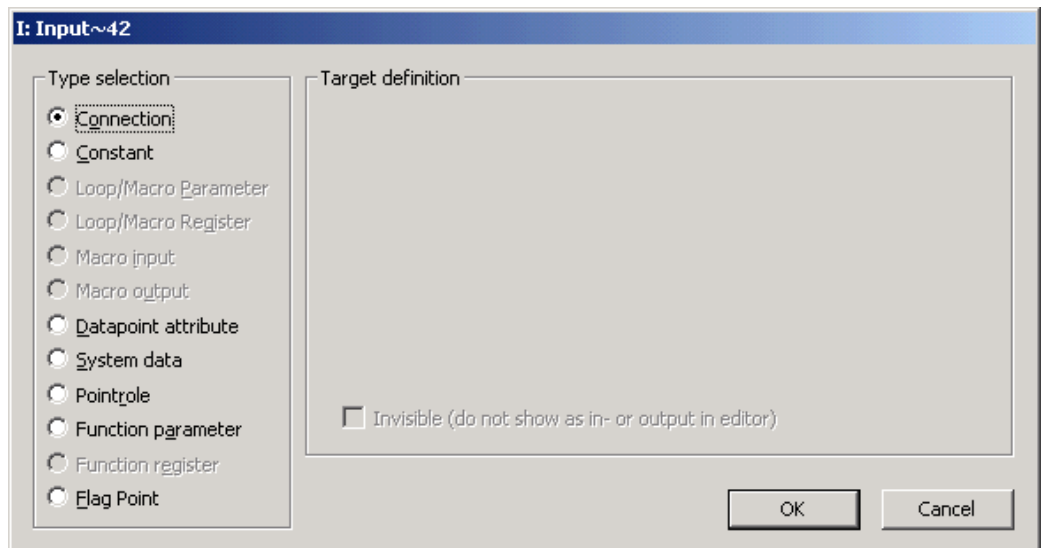
An Input always must be filled with a value. The value could be e.g. a connection (to the output of another element), a data point or system data. It is possible to hide an input/output if it is not a connection.

5. The available input connections are displayed in the tab **Input**. Select the tab.



6. Double-click into the desired rows of the table to set up the properties of the inputs of the macro.

RESULT: The configuration dialog box for selecting type and target for the input opens.



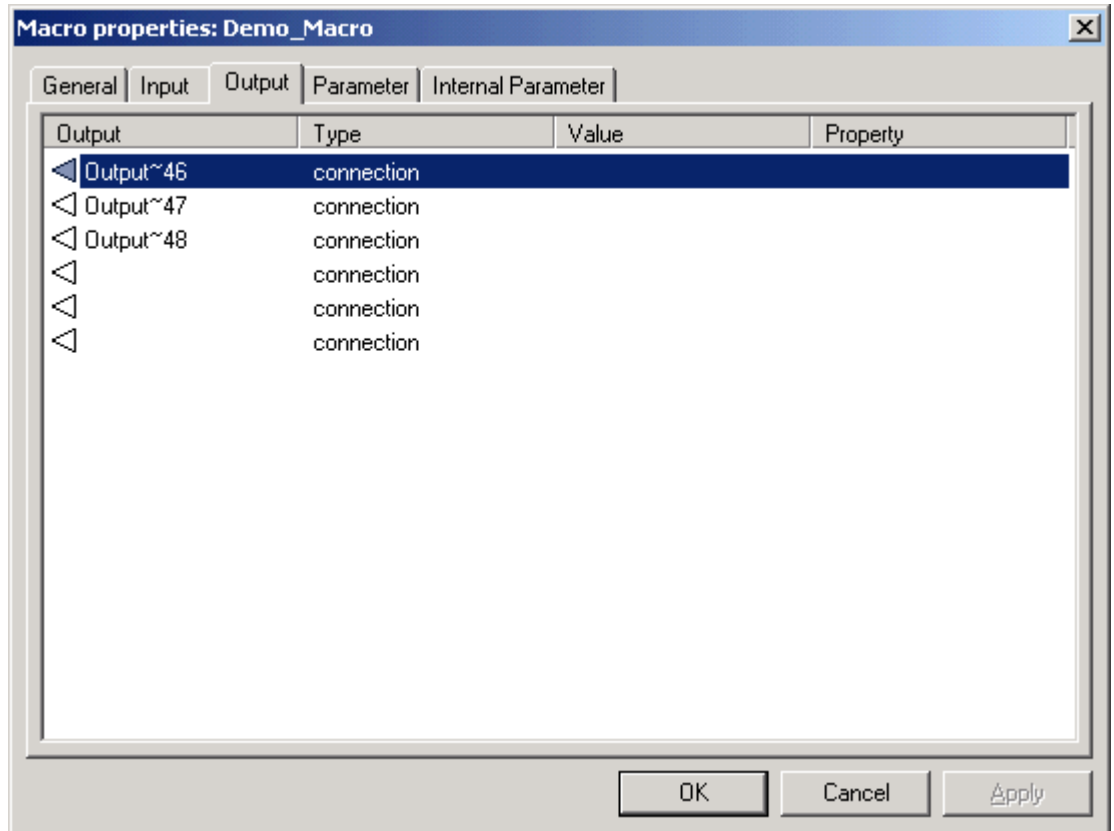
- **Connection**
A connection is defined as the connection from an input to one output of another element of the loop. This input will be always displayed in the macro window.
- **Constant**
The input is always set up to this value. It is possible to hide this input in the Macro window.
- **Loop/Macro Parameter**
The input reads from a parameter of a control loop. If you select the option Loop/Macro Parameter you can select from the existing parameters.
- **Macro input)**
To select this option, you have to be in the macro view. If you select this option you can select from the existing inputs.
- **Macro output**
To select this option, you have to be in the macro view. If you select this option you can select from the existing outputs.
- **Datapoint attribute**
The input becomes a value of a data point attribute. Datapoints are hardware/software points, e.g. sensors. The list of available attributes depends on the type of the datapoint and if this attribute is used for an input or output. For detailed descriptions of the Datapoint attributes, please refer to the Excel Web User Guide EN2B-0289GE51 and the EAGLE Web Interface User Guide EN2Z-0970GE51.
It is possible to hide this input in the Macro window.
- **System data**
The input becomes the value of the system function, such as clock. The following system values are stored:
 - Alarm status LED
reads the value of the red alarm LED
0 = Off (no alarm)
1 = license status error
2 = USB error (connected USB device draws more than 500 mA)
4 = panel bus error (e.g. I/O module missing)
8 = LON bus error (e.g. I/O module missing)
16 = sensor error on universal input which is used by the application (e.g. sensor short, break)
combinations of values are possible (e.g. 4+8=12: panel bus error and LON bus error at the same time)
 - Application LED
reads and writes the status of the application LED
0 = Off
1 = On: permanently
2 = On: continuously blinking (on-off)
3 = On: 2 times continuously blinking (2 x (on-off), pause ..)
4 = On: 3 times continuously blinking (3 x (on-off), pause ..)
5 = On: 4 times continuously blinking (4 x (on-off), pause ..)
6 = On: 5 times continuously blinking (5 x (on-off), pause ..)
 - Cycle Time
reads the set current cycle time of the application part in sec
 - Day and month
actual date (=100*month+day)
 - Day of week
actual day of the week (monday(1)...saturday(7))
 - Hours and minutes
actual time (=100*hours+minutes)
 - Minutes since midnight
number of minutes after midnight
 - Startup flag

indicates, if the system has been restarted

- Year
actual year

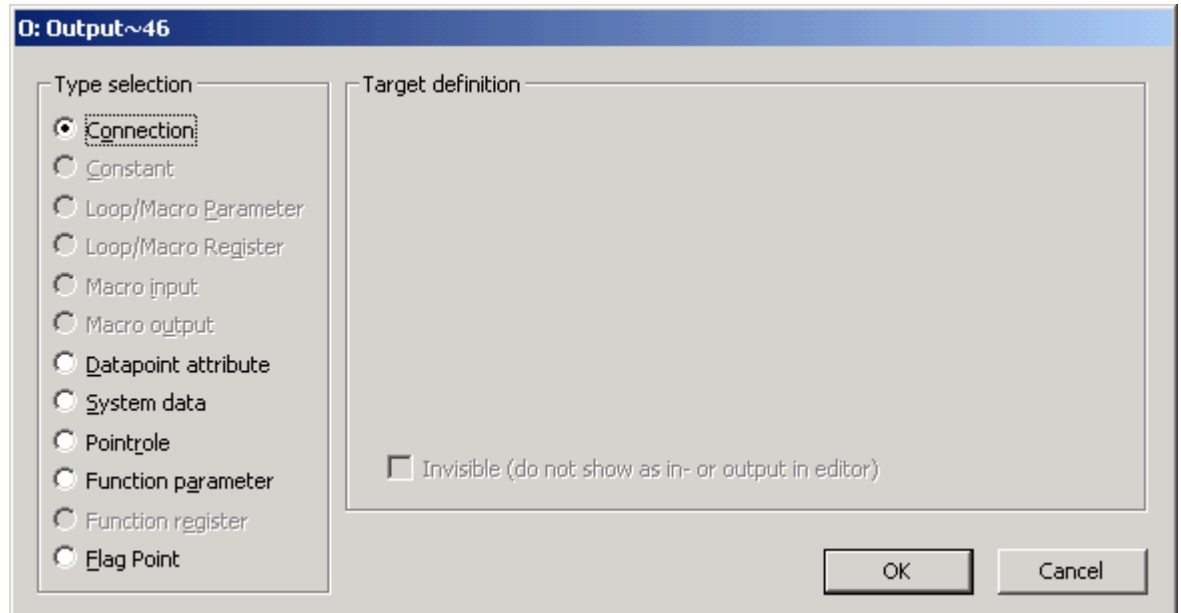
It is possible to hide this input in the Macro window.

- **Pointrole**
Datapoints can be combined in so called pointroles. So it is easier to arrange the datapoints by their main properties. Select a data point from the pointrole.
It is possible to hide this input in the Macro window.
 - **Function parameter**
The input becomes the value of a parameter of one function/macro (which includes parameters) included in this control loop. Only functions with parameters are listed. If a function has no (alias) name, an identifier ('\$' followed by a unique number) is assigned. This identifier is also displayed below the symbol as long as no name is set.
It is possible to hide this input in the Macro window.
 - **Function register**
The output sets the hidden stored value of one function/macro included in this macro. If a function has no (alias) name, an identifier ('\$' followed by a unique number) is assigned. This identifier is displayed below the symbol as long as no name is set.
It is possible to hide this output in the Macro window.
 - **Flag Point**
Flags are points for transferring data between loops of one plant. The input is always set up to this value.
It is possible to hide this input in the Macro window.
 - **Invisible (do not show as in - or output in editor)**
Hides the input or output of the control icon for all types other than "Connection". A line at the bottom of the icon indicates invisible ports.
7. Click the **OK** button to leave the window with saving the settings or click the **Cancel** button to leave the window without saving the settings.
 8. The available output connections are displayed in the tab **Output**. Select the tab.



9. Set up the properties of the outputs of the macro by double-clicking into the desired fields of the table:

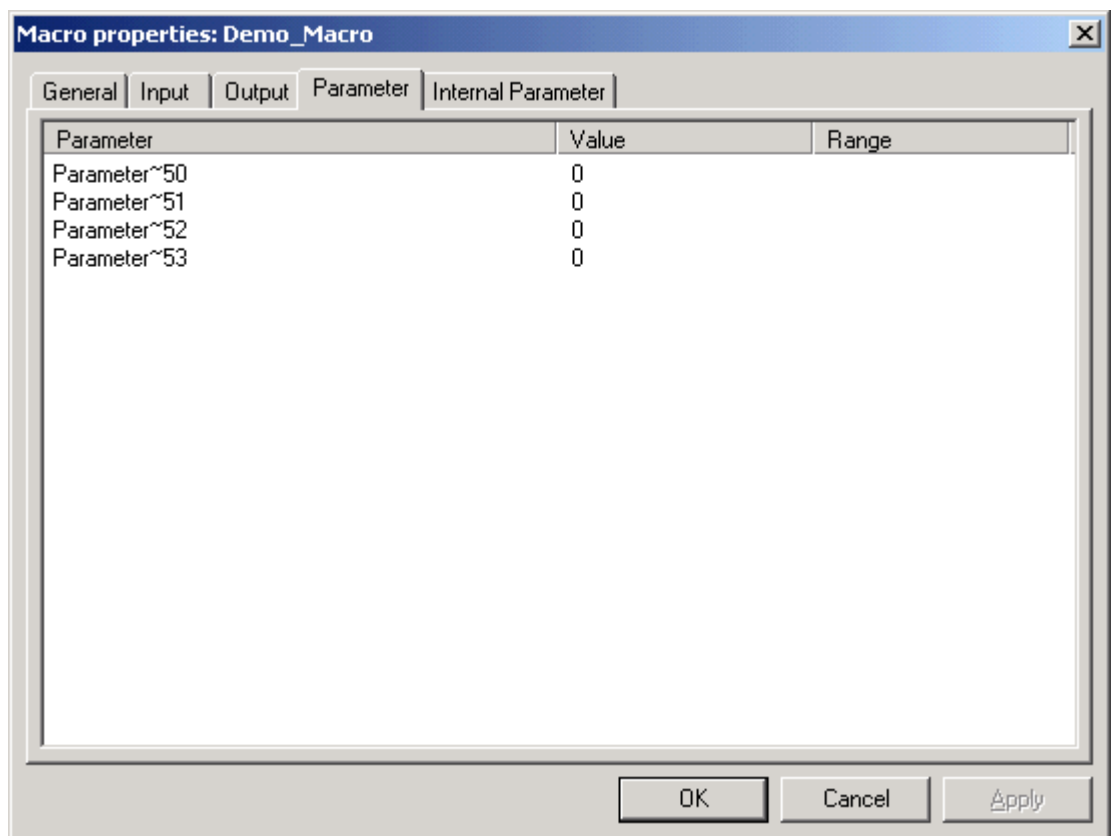
RESULT: The configuration dialog box for selecting type and target for the output opens.



- **Connection**
The output is defined as a connection to one input of another element of this loop. This output will be always displayed in the Macro window.
- **Constant**
The output is always set up to this value. It is possible to hide this output in the Macro window.

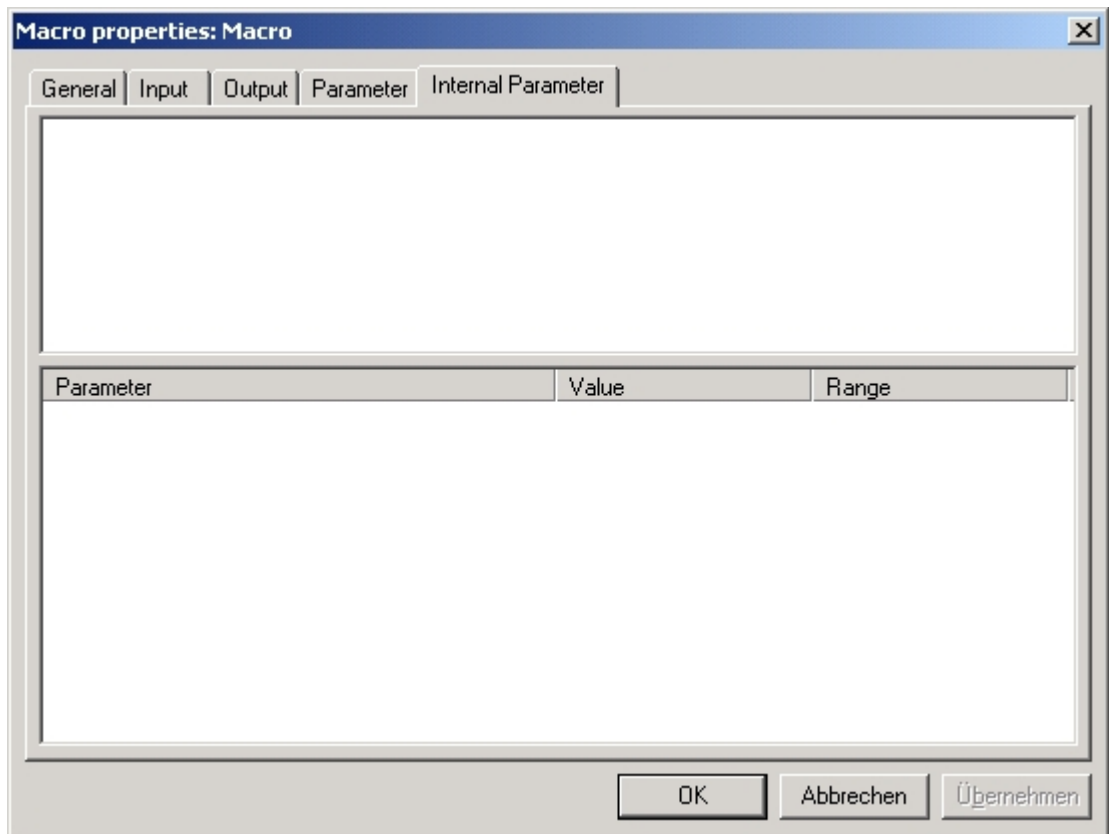
- **Loop/Macro Parameter**
The input reads from a parameter of a control loop. If you select the option Loop/Macro Parameter you can select from the existing parameters.
 - **Macro input)**
To select this option, you have to be in the macro view. If you select this option you can select from the existing inputs. This option is not available if you are in the tab output.
 - **Macro output**
To select this option, you have to be in the macro view. If you select this option you can select from the existing outputs.
 - **Datapoint attribute**
The input becomes a value of a data point attribute. Datapoints are hardware/software points, e.g. sensors. The list of available attributes depends on the type of the datapoint and if this attribute is used for an input or output. For detailed descriptions of the Datapoint attributes, please refer to the Excel Web User Guide EN2B-0289GE51 and the EAGLE Web Interface User Guide EN2Z-0970GE51.
It is possible to hide this input in the Macro window.
 - **System data**
The output sets a system data. The only possible data are:
 - Application LED
reads and writes the status of the application LED
 - 0 = Off
 - 1 = On: permanently
 - 2 = On: continuously blinking (on-off)
 - 3 = On: 2 times continuously blinking (2 x (on-off), pause ..)
 - 4 = On: 3 times continuously blinking (3 x (on-off), pause ..)
 - 5 = On: 4 times continuously blinking (4 x (on-off), pause ..)
 - 6 = On: 5 times continuously blinking (5 x (on-off), pause ..)
 - Startup flag
indicates, if the system has been restarted
 - M-Bus trigger
allows the controller reading M-Bus records at a particular time (trigger) defined in the time program. This secures the synchronization of M-Bus records reading process independant of controller operation status.
- Pointrole**
Datapoints can be combined in pointroles. This makes it easier to arrange the datapoints by their main properties. Select a data point from the pointrole.
It is possible to hide this output in the Macro window.
- **Function parameter**
The output is a value of a parameter of one function/macro included in this control loop. Only functions with parameters are listed. If a function has no (alias) name, an identifier ('\$' followed by a unique number) is assigned. This identifier is displayed below the symbol as long as no name is set.
It is possible to hide this output in the Macro window.

- **Function register**
The output sets the hidden stored value of one function/macro included in this macro. If a function has no (alias) name, an identifier ('\$' followed by a unique number) is assigned. This identifier is displayed below the symbol as long as no name is set.
It is possible to hide this output in the Macro window.
 - **Flag Point**
Flags are points for transferring data between loops of one plant. The output is always set to this value.
It is possible to hide this output in the Macro window.
 - **Invisible (do not show as in - or output in editor)**
Hides the input or output of the control icon for all types other than "Connection". A line at the bottom of the icon indicates invisible ports.
10. Click the button **OK** to leave the window with saving the settings or click the button **Cancel** to leave the window without saving the settings.
 11. The available parameters are displayed in the tab **Parameter**. First select the tab and then double-click on the parameter to edit its properties.



RESULT: The value can be changed.

13. The available internal parameters are displayed in the tab **Internal Parameter**. Select the tab.



In this view the parameters of named macros and functions of the macro are displayed. It is possible to hide parameters which should not be changed. Named functions/macros without parameters will not be displayed.

14. Double-click on the value field of the parameter table to set up the properties of the internal parameters of the macro.

RESULT: The value can be changed.

15. Click the button **OK** to leave the window with saving the settings. Click the button **Cancel** to leave the window without saving the settings. Click the button **Apply** to save the settings, or click on any other tab to edit further properties of the macro.

Edit the Properties of Inputs/Outputs/Parameters/Registers of a Macro

Prerequisites

1. The user is logged in.
2. A project is open.
3. The opened project has at least one controller and one plant, one loop and one macro.

Procedure

1. Expand the tree view of the control loops of the plant, the macro is assigned to.
2. Double-click on one of the icons of the control loops, the macro is assigned to.

RESULT: The Macro window of the control loop opens in the right pane.
The icon of the macro is displayed in the Macro window.

3. Right-click on the macros icon in the right pane.

RESULT: The context menu of the macro opens.

4. Click on **Open macro in editor**.

RESULT: The Macro window switches from control loop-view to macro-view.

NOTE: The always displayed Properties tab does not change to macro-view.
Here the properties of the control loop are displayed.

5. Click menu item Plant > Control Editor > Macro Properties....

RESULT: Tab Macro overview of the Macro properties dialog box of the macro opens.

Macro overview | Macro Inputs | Macro Outputs | Macro Parameters | Macro Registers

All properties are valid

Please enter a name:
Demo_Macro

Description:
Here you can enter additional information

Tooltip:
Here you can enter information to be displayed in the tooltip when moving the cursor over the icon

System macro

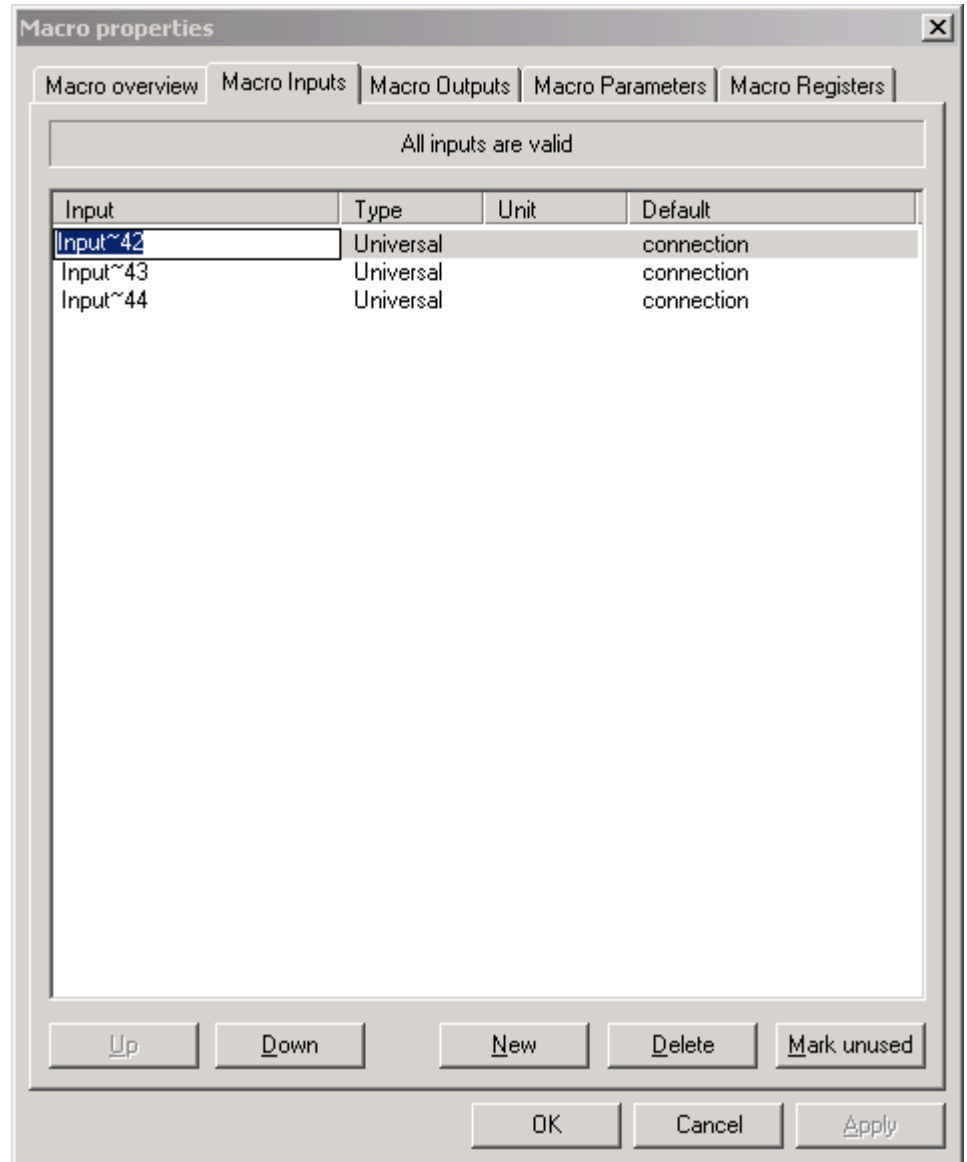
Version info
Version: 2
Last change: 14.03.2005 11:17:46

OK Cancel Apply

Fill in the fields according to your requirements:

- **Please enter a name:**
Unique name of the macro.
- **Description**
Description of the macro, e.g. what's the function of it or which special input/output or parameters are used in this macro.
- **Tooltip**
Descriptive information that will be displayed in the yellow tooltip which displays when moving the cursor over the macro icon.
- **System macro**
Select the checkbox if the macro should be included in the folder "Global System Macros". The macros of this folder are usable for all control loops of this database. Only authorized users can create or access System macros.
- **Version info (read only, set automatically)**
Some information about the macro, similar to file information known from MS-window.

6. The available inputs are displayed in the tab **Macro Inputs**. Select the tab.



7. Click twice into the rows of the table to set up the properties of the input datapoints of the macro:

Denotation of the columns:

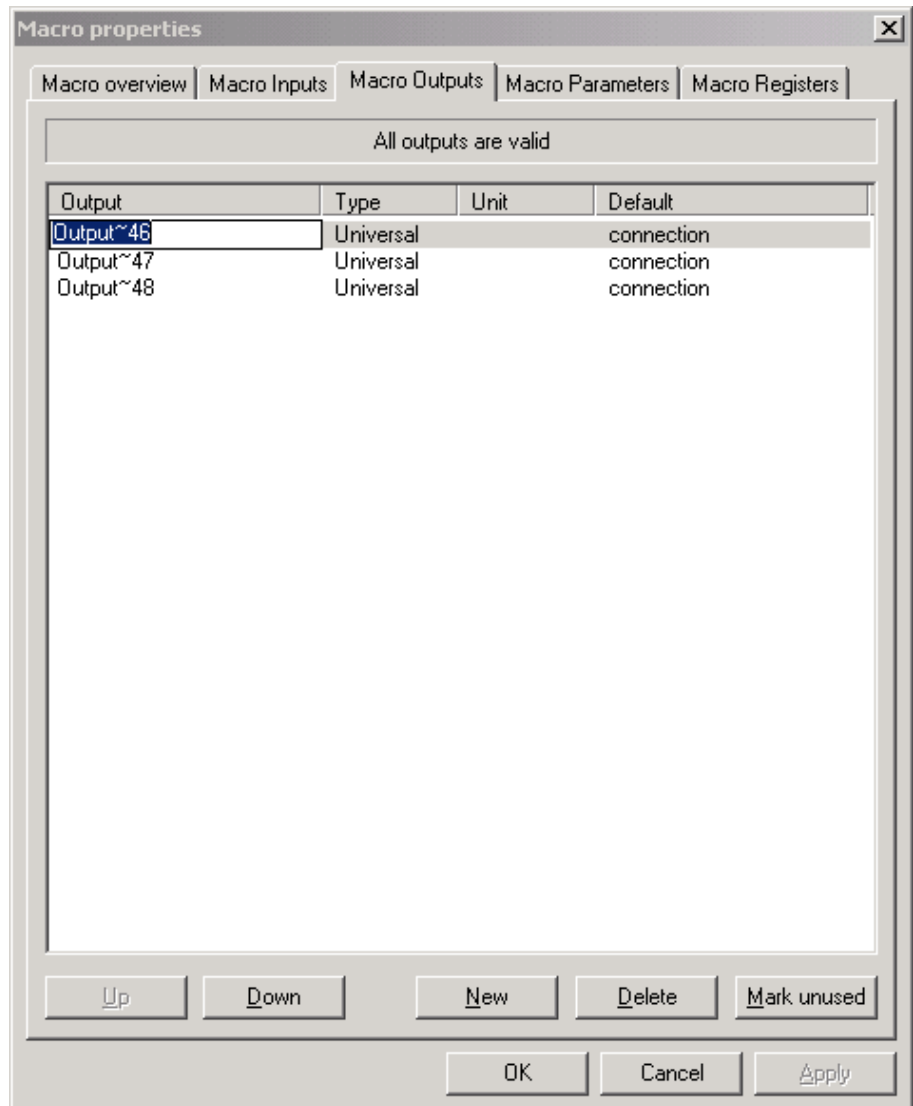
- **Input**
Name of the input(s). Click twice into the row of the desired input to change its name.
- **Type**
Type of the input(s). Click twice into the row of the desired input to get the choice between the three input types (analog, binary, universal, or datapoint).
- **Unit**
Unit of the value (e.g. liters, volt, minutes, ...).

Meaning of the buttons:

- **Up**
Use this button to place the selected input one step up.
- **Down**
Use this button to place the selected input one step down.
- **New**
Use this button to create a new input of the macro.

- **Delete**
The selected input will be removed. Pay attention, only unused inputs can be removed and no undo is possible.
- **Mark unused**
All entries are selected (to delete them).

8. The available outputs are displayed in the tab **Macro Outputs**. Select the tab.



9. Click twice into the rows of the table to set up the properties of the output datapoints of the macro:

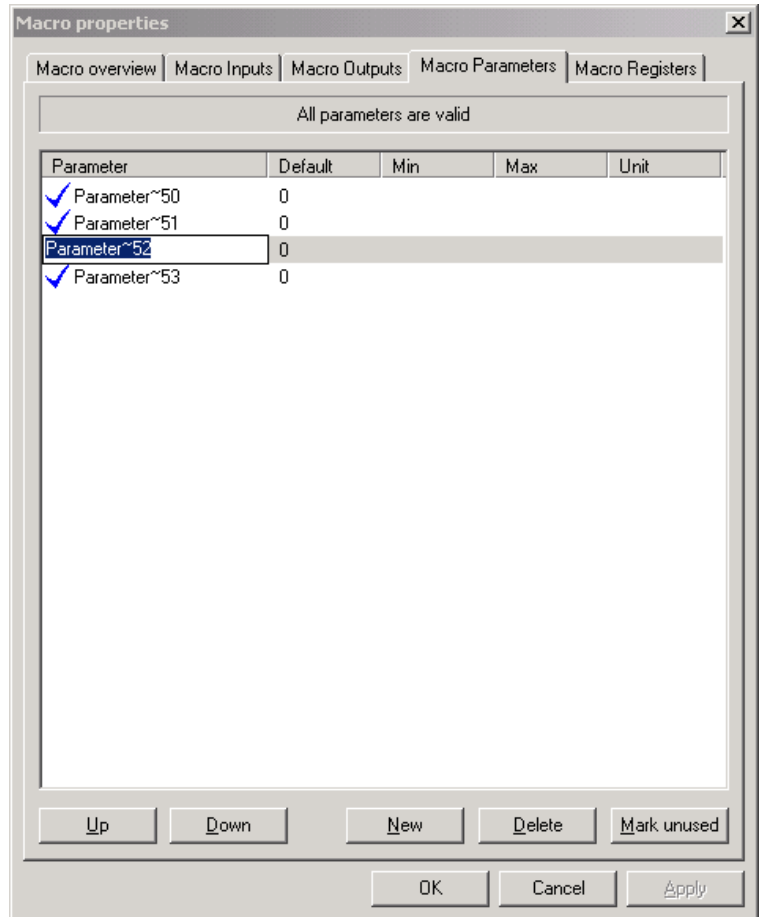
Denotation of the columns:

- **Output**
Name of the output(s). Click twice into the row of the desired output to change its name.
- **Type**
Type of the output(s). Click twice into the row of the desired output to get the choice between the three output types (analog, binary or universal).
- **Unit**
Unit of the value (e.g. liters, volt, minutes, ...).

Meaning of the buttons:

- **Up**
Use this button to place the selected output one step up.

- **Down**
Use this button to place the selected output one step down.
 - **New**
Use this button to create a new output of the macro.
 - **Delete**
The selected output will be removed. Pay attention, only unused outputs can be removed and no undo is possible.
 - **Mark unused**
All entries are selected (to delete them).
10. The available parameters are displayed in the tab **Macro Parameters**. Select the tab.



11. Click twice into the rows of the table to set up the properties of the parameters of the macro:

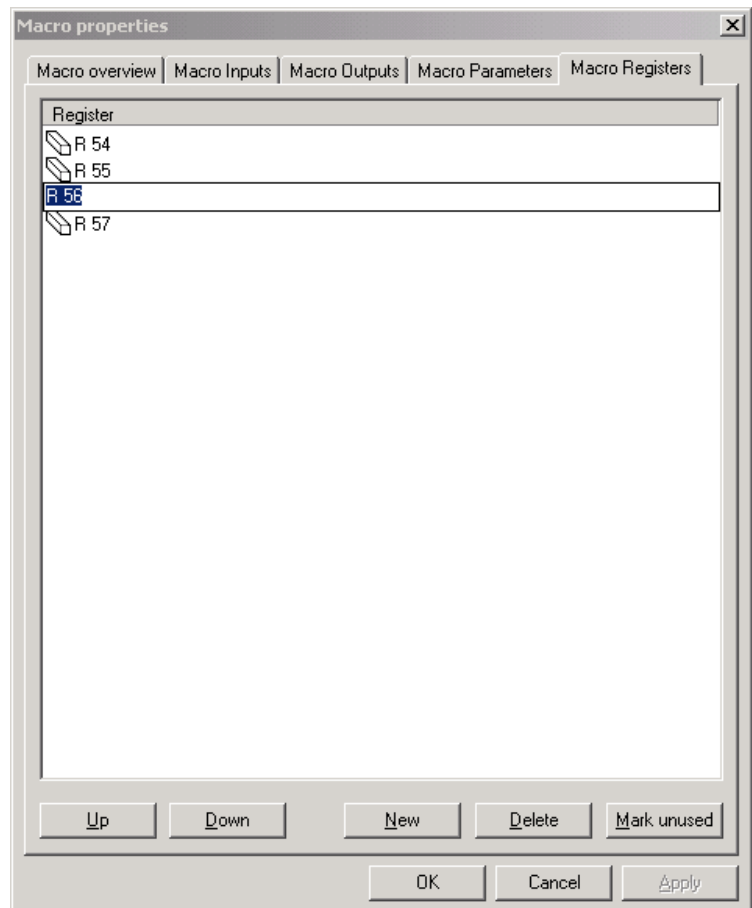
Meaning of the columns:

- **Parameter**
Name of the parameter(s). Click twice into the row of the desired parameter to change its name.
- **Default**
Default value of the parameter(s).
- **Min**
Minimum value of the parameter(s).
- **Max**
Maximum value of the parameter(s).
- **Unit**
Unit of the value (e.g. liters, volt, minutes, ...).

Denotation of the buttons:

- **Up**
Use this button to place the selected parameter one step up.
- **Down**
Use this button to place the selected parameter one step down.
- **New**
Use this button to create a new parameter of the macro.
- **Delete**
The selected parameter will be removed. Pay attention, only unused parameters can be removed and no undo is possible.
- **Mark unused**
All entries become selected (to delete them).

12. The available registers are displayed in the tab **Macro Registers**. Select the tab.



13. Click twice into the rows of the table to set up the properties of the registers of the macro:

Denotation of the columns:

Meaning of the columns:

- **Register**
Name of the register(s). Click twice into the row of the desired register to change its name.

Denotation of the buttons:

- **Up**
Use this button to place the selected register one step up.
- **Down**
Use this button to place the selected register one step down.
- **New**
Use this button to create a new register of the macro.

- **Delete**
The selected register will be removed. Pay attention, only unused registers can be removed and no undo is possible.
- **Mark unused**
All entries become selected (to delete them).

14. Click the button **OK** to leave the window with saving the settings. Click the button **Cancel** to leave the window without saving the settings. Click the button **Apply** to save the settings, or click on any other tab to edit further properties of the macro.

RESULT: The Macro window of the macro opens if you click on button **OK** or **Cancel**.

15. To leave the macro-view and return to the control loop-view, click the right mouse button.

RESULT: The context menu of the macro opens.

16. Click on **Open parent macro**.

RESULT: The Macro window changes from macro- to control loop-view or the macro above. (An indefinite number of macro levels is possible).

Double-click on any other element to change the view to it.

Create and Edit Macro Logic

Prerequisites

1. The user is logged in.
2. A project is open.
3. The opened project has at least one controller, one plant, one loop and one macro.

Procedure

1. Expand the tree view of the control loop of the plant, the macro is assigned to.
2. Double-click on one of the icons of the control loops, the macro is assigned to.

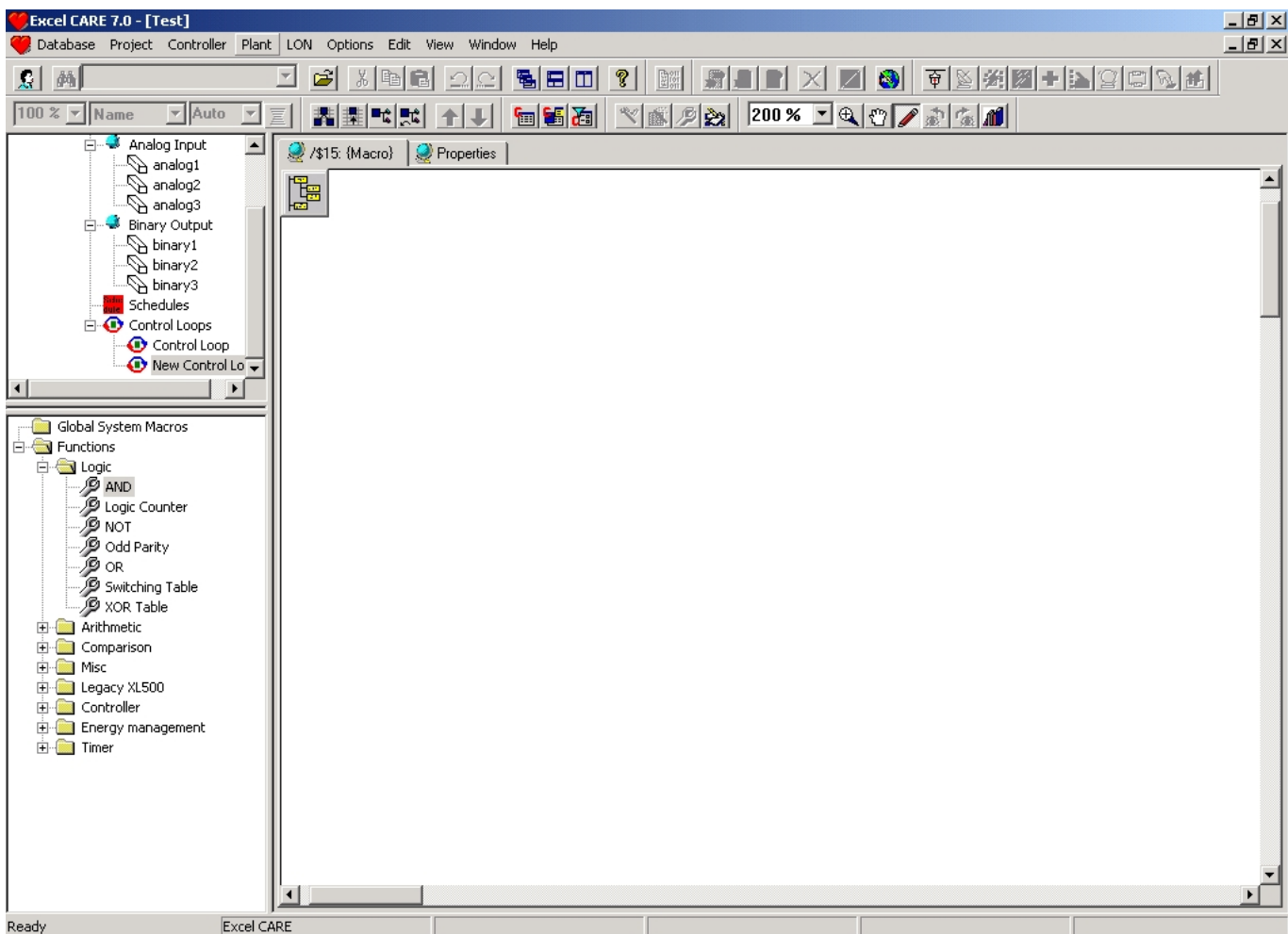
RESULT: The Macro window of the control loop opens in the right pane.
The icon of the macro is displayed in this Macro window.

3. Right-click on the macros icon in the right pane.

RESULT: The context menu of the macro opens.

4. Click on **Open macro in editor**.

RESULT: The Macro window changes from control loop-view to macro-view.

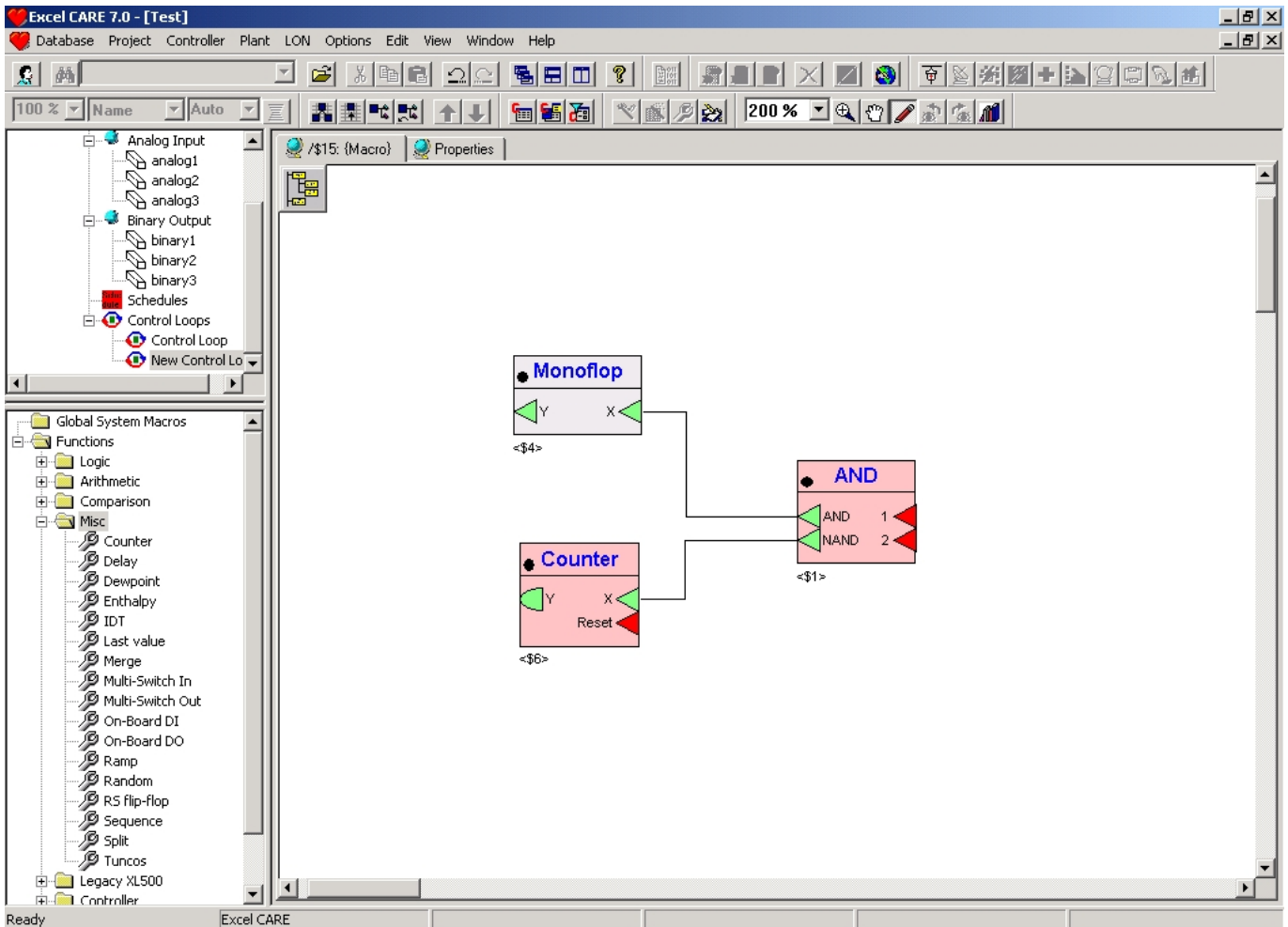


NOTE: The always displayed Properties tab does not change to macro-view.
Here the properties of the control loop are displayed.

5. Define the content of the macro as desired (similar to the creation of a loop logic). Assign functions or hardware/software points to the macro by using drag & drop:

6. Click once on the icon and hold the left mouse-button pressed.
7. Move the cursor into the Macro window. The cursor changes to a “No Parking”-sign if it is moved in areas, you cannot drop the component into.
8. Release the left mouse button.

RESULT: The function or component is displayed in the Macro window.



Denotation of the colours:

- **red**
The setup of the icon is incomplete. All inputs must have a value, e.g. by connecting it to an output or by defining it as a constant.
- **blue**
The icon is selected.
- **none colored (light grey)**
The setup of the icon is accomplished, no errors expected.

For setting up a connection between input and output, see step 8.

9. Apply the described procedure written above with all components and functions you want to combine in this macro.
 - All icons in the Macro window can be moved via drag & drop.
 - You can use the windows known short keys, e.g. “Ctrl + A” for selecting all elements in an active window.
 - To enter the menu Plant, make sure, the Macro window is still selected: Click once with the left mouse button in the Macro window.

RESULT: The following button and drop-down list in the taskbar (from left to the right) are activated:

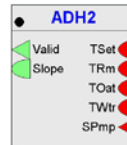


- Zoom per %: Display and change the numerous zoom factor of the whole view, centered by the displayed window.
- Zoom +: Use this button(s) to zoom in a selected area.
- Move all: The cursor changes to a hand and you can move the view of the Macro window.
- Select and edit: The cursor changes to standard and you can select elements in the Macro window, draw connections between outputs and inputs and insert text into the Macro window.
- Last view: The view reverts prior to the last change.
- Next view: The last undo of the view is reverted.

The elements in the Macro window are displayed in the following manner:
Hardware/software point, in most cases a real input or output of the controller.



Function, indicated by the separated header and input and output ports. The name of the function is displayed in this header.



Analog port, it is possible to connect analog and binary ports. The input port translates the input signal into his own format (analog or binary) information may be lost. If you set up a connection between analog and binary ports, an error message informs you about a data mismatch.



The binary port has two values: TRUE (1) or FALSE (0).



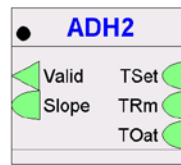
Any port, this port is not predefined as an analog or binary input. The type of data depends on further processing.



The black point in the header indicates the side of the output ports.



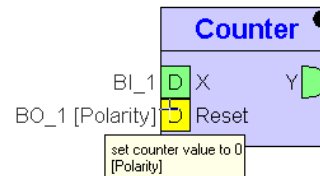
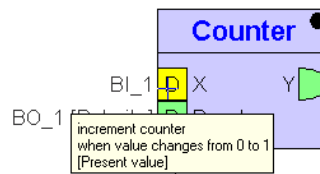
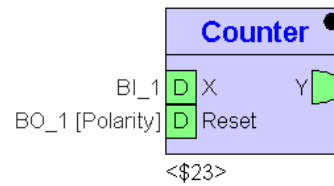
A line under the ports indicates hidden (invisible) ports. You can make them visible using the Properties window of these ports.



Input ports are red coloured, if they are not connected. The color green indicates the accurate connection of the port.



The configuration of inputs is indicated as follows:
 If an input port is configured as datapoint attribute, the default datapoint property "Present Value" is displayed in the tooltip of the port. If any other property is selected as datapoint attribute, e.g. Polarity, this is shown in the tooltip and additionally in brackets at the port.



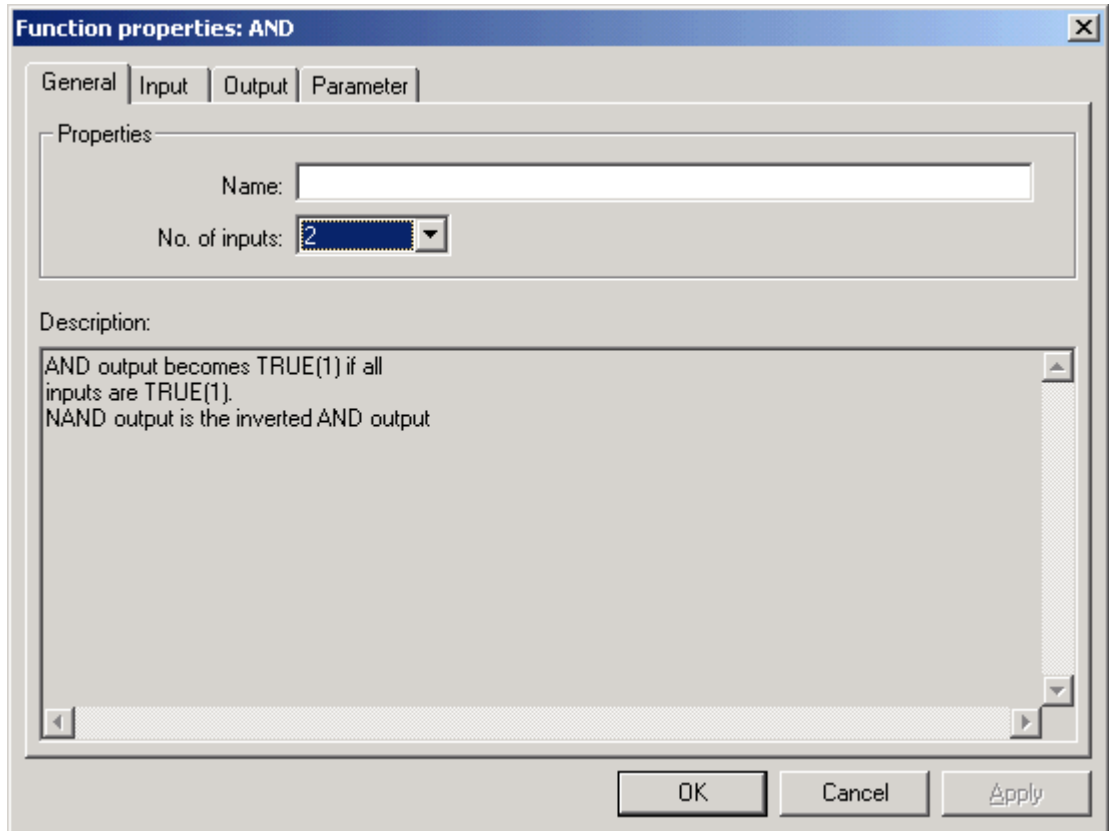
10. Setup the properties of the functions and hardware/software points as follows:

- Right-click on the element you want to setup.

RESULT: The context menu of the element opens.

- Click on **Properties**.

RESULT: The Function properties:<name> dialog box of the element opens.



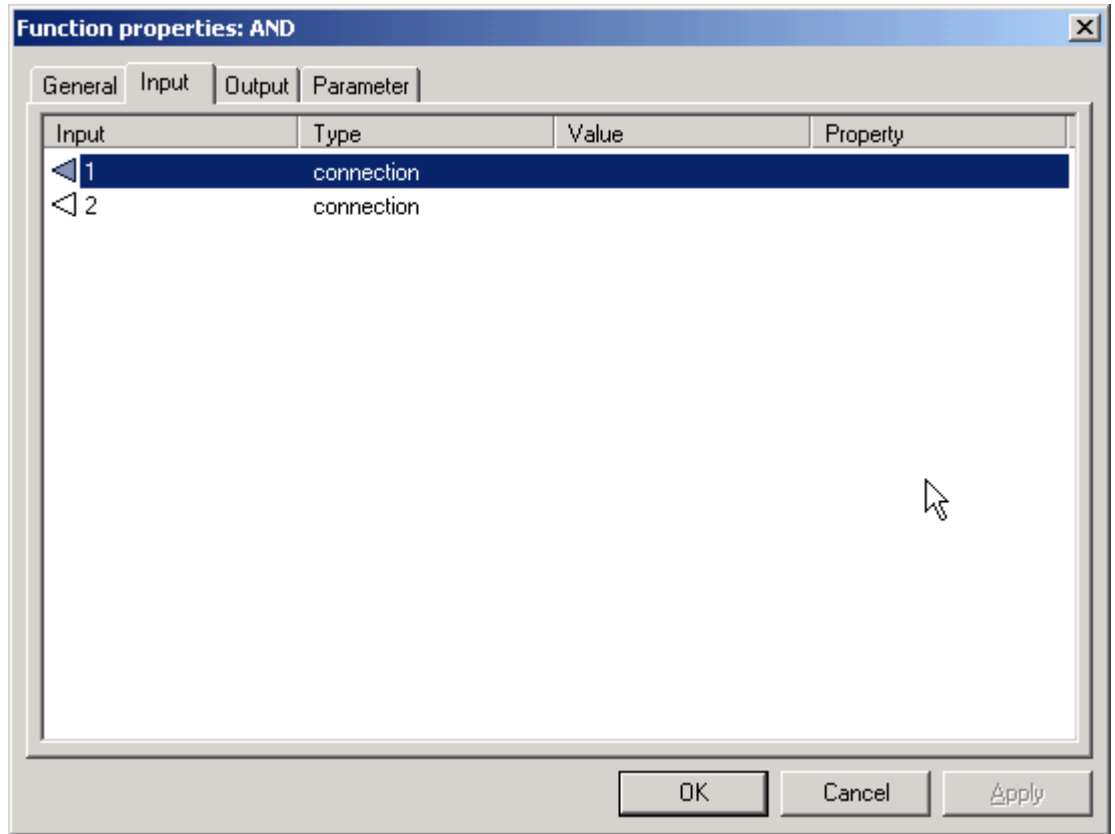
In tab **General** are the following input fields:

- **Name**
Alias of this element. The alias can consist up to 32 characters and/or digits. This alias will be displayed on the tab Internal Parameter of the parent macros (only if the alias-element includes parameters).
- **No. of inputs**
Number of input (in some cases output) connections of the element.

You have to apply changes of the input/output count before you can see the changed number in the input/output tab.

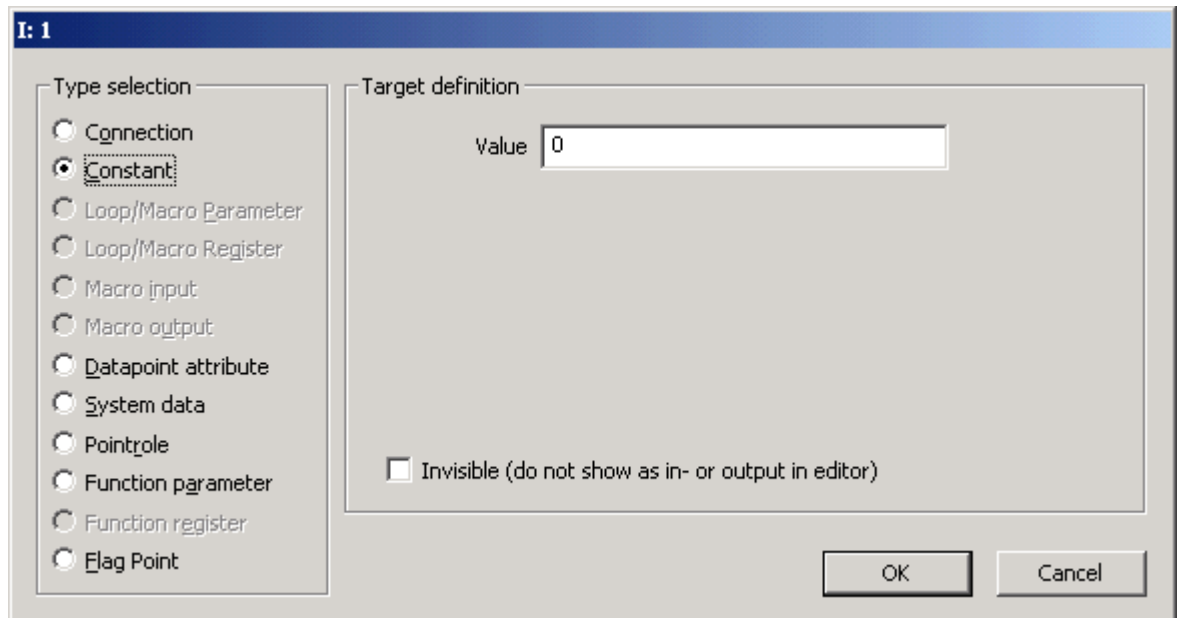
An Input must be always filled with a value. The value could be e.g. a connection (to the output of another element), a data point, or system data. It is possible to hide an input/output if it is not a connection.

The available input connections are displayed in the tab **Input**. Select the tab,



Select the properties of the input by double-clicking on the rows of the table.

RESULT: The configuration dialog box for selecting type and target for the input opens.



- Connection

The input is defined as a connection to one output of another element of this loop. This input will be displayed in the Macro window.

- Constant

The input is set to this value. It is possible to hide this input in the Macro window.

- Loop/Macro Parameter

A parameter can be used by all functions and macros of the loop/macro without being connected. So it is possible to simplify the displayed connections. The input turns to this value. It is possible to hide this input in the Macro window.

- Macro input

The input is the value of a macro's input. It is possible to hide this input in the Macro window.

- Macro output

The input is the value of a macro's output. In this case, the output of the macro is used as a data point.

- System data

The input becomes the value of the system function, such as 'clock'. The following system values are stored:

- Alarm status LED

reads the value of the red alarm LED

0 = Off (no alarm)

1 = license status error

2 = USB error (connected USB device draws more than 500 mA)

4 = panel bus error (e.g. I/O module missing)

8 = LON bus error (e.g. I/O module missing)

16 = sensor error on universal input which is used by the application (e.g. sensor short, break)

combinations of values are possible (e.g. 4+8=12: panel bus error and LON bus error at the same time)

Application LED

reads and writes the status of the application LED

0 = Off

1 = On: permanently

2 = On: continuously blinking (on-off)

3 = On: 2 times continuously blinking (2 x (on-off), pause ..)

4 = On: 3 times continuously blinking (3 x (on-off), pause ..)

5 = On: 4 times continuously blinking (4 x (on-off), pause ..)

6 = On: 5 times continuously blinking (5 x (on-off), pause ..)

- Cycle Time

reads the set current cycle time of the application part in sec

- Day and month

actual date (=100*month+day)

- Day of week

actual day of the week (monday(1)...saturday(7))

- Hours and minutes

actual time (=100*hours+minutes)

- Minutes since midnight

number of minutes after midnight

- Startup flag

indicates, if the system has been restarted

- Year

actual year

- Function parameter

The input is the value of a parameter of one function/macro included in this control loop. Only functions with parameters are listed. If a function has no (alias) name, an identifier ('\$' followed by a unique number) is assigned. This identifier is also displayed below the symbol as long as no name is set.

It is possible to hide this input in the Macro window.

- Function register

The output sets the hidden stored value of one function/macro included in this macro. If a function has no (alias) name, an identifier ('\$' followed by a unique number) is assigned. This identifier is displayed below the symbol as long as no name is

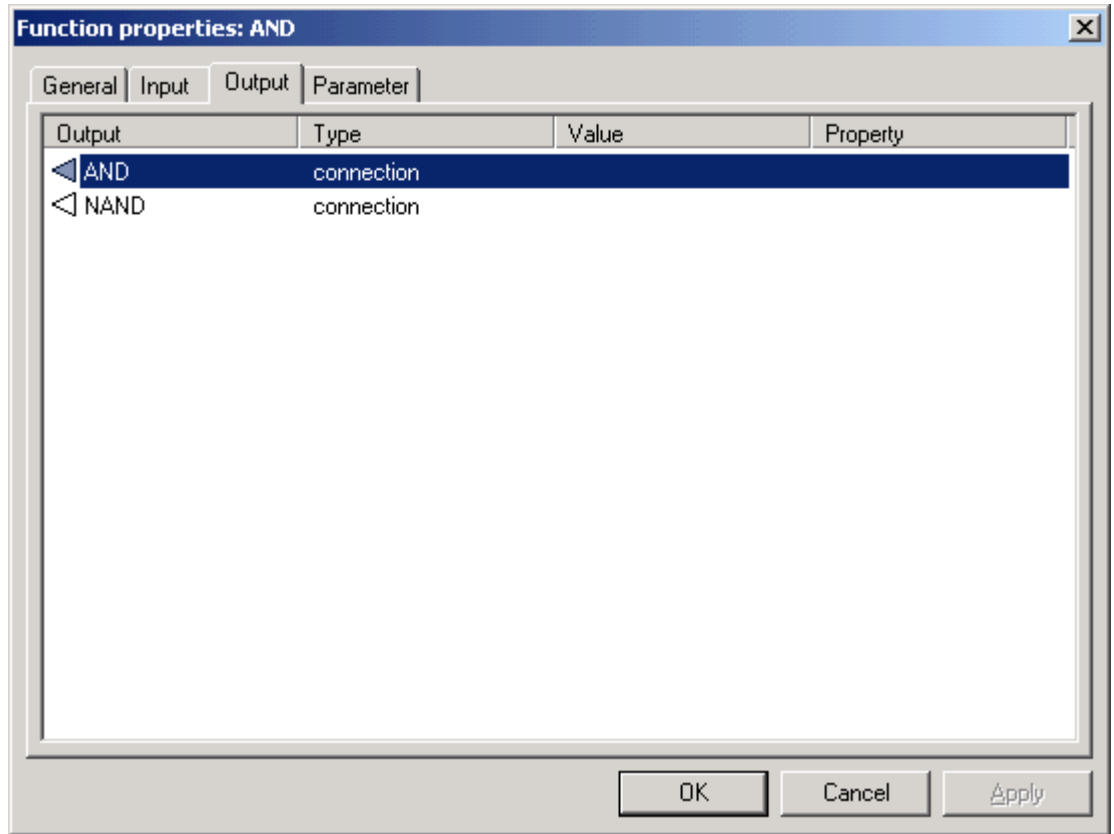
set.

It is possible to hide this output in the Macro window. It is possible to hide this input in the Macro window.

- Invisible (do not show as in - or output in editor)

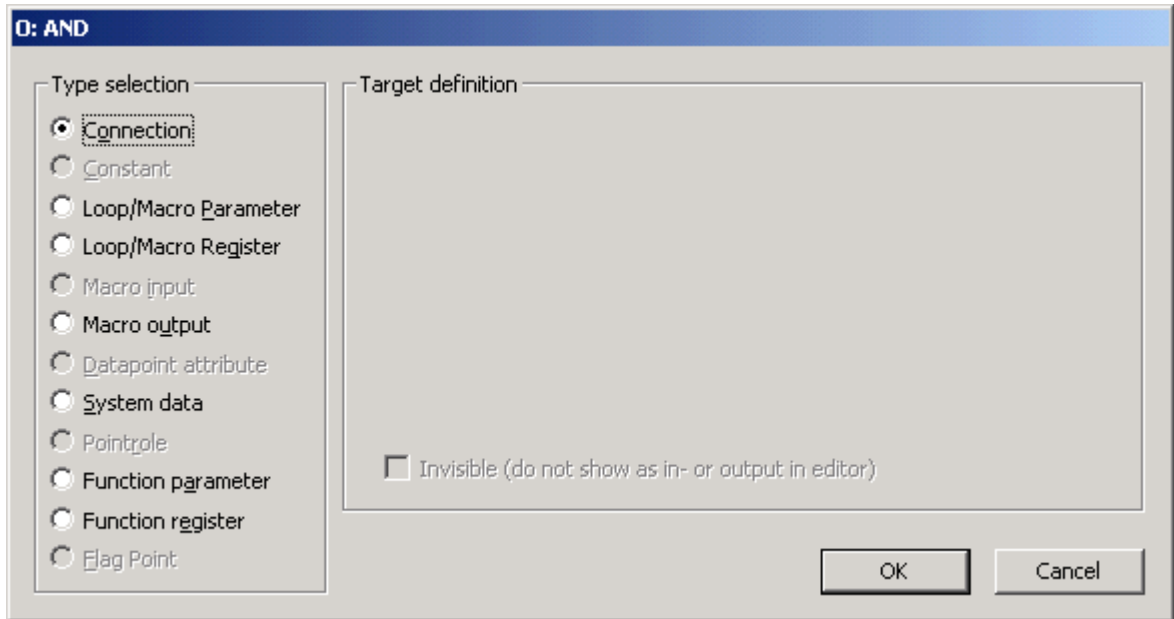
Hides the input or output of the control icon for all types other than "Connection". A line at the bottom of the icon indicates invisible ports.

Note: Datapoint attributes, Point roles and Flags are not available within macros. The available output connections are displayed in the tab **Output**. Select the tab.



Double-click into the rows of the table.

RESULT: The configuration dialog box for selecting type and target for the output opens.



- Connection

The output is defined as a connection to one or more inputs of another element of this loop. This output will be displayed in the Macro window.

- Constant

The output sets up this value. It is possible to hide this output in the Macro window.

- Loop/Macro Parameter

A parameter can be used by all functions and macros of this loop/macro without being connected. So it is possible to simplify the displayed connections. The output sets this value. It is possible to hide this output in the Macro window.

- Macro output

The input is the value of a macro's output. In this case, the output of the macro is used as a data point.

- System data

The output sets a Startup flag or the application LED:

Application LED

reads and writes the status of the application LED

0 = Off

1 = On: permanently

2 = On: continuously blinking (on-off)

3 = On: 2 times continuously blinking (2 x (on-off), pause ..)

4 = On: 3 times continuously blinking (3 x (on-off), pause ..)

5 = On: 4 times continuously blinking (4 x (on-off), pause ..)

6 = On: 5 times continuously blinking (5 x (on-off), pause ..)

- Startup flag

indicates, if the system has been restarted

- M-Bus trigger

allows the controller reading M-Bus records at a particular time (trigger) defined in the time program. This secures the synchronization of M-Bus records reading process independant of controller operation status.

It is possible to hide this output in the Macro window.

- Function parameter

The output sets the value of a parameter of one function/macro included in this control loop. Only functions with parameters are listed. If a function has no (alias) name, an identifier ('\$' followed by a unique number) is assigned. This identifier is also

displayed below the symbol as long as no name is set.
It is possible to hide this output in the Macro window.

- Function register

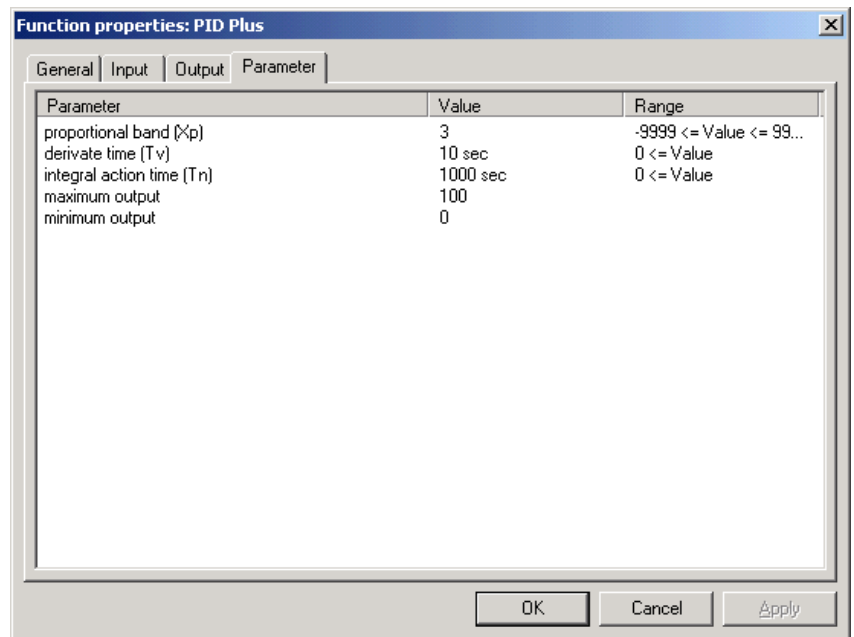
The output sets the hidden stored values (default the previous values of input, output and parameters) of an input, output or parameter of one function/macro included in this macro. It is possible to hide this output in the Macro window. Only functions with parameters are listed. If a function has no (alias) name, an identifier ('\$' followed by a unique number) is assigned. This identifier is also displayed below the symbol as long as no name is set.

- Invisible (do not show as in - or output in editor)

Hides the input or output of the control icon for all types other than "Connection". A line at the bottom of the icon indicates invisible ports.

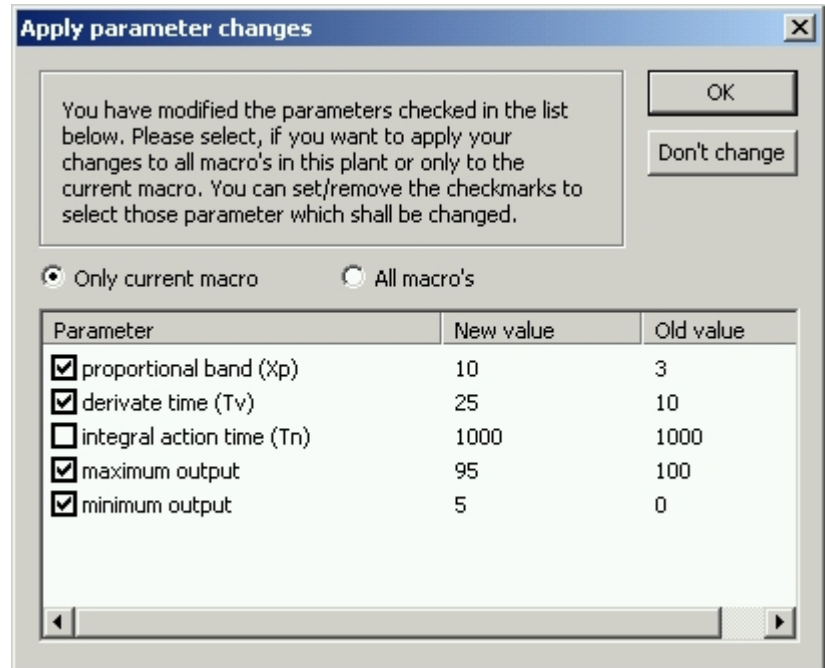
NOTE: Datapoint attributes, Point roles and Flags are not available within macros.

For some elements it is possible to set up **Parameters** in the so named tab. Select the tab.



Parameter update

If you change the parameter of an icon in a macro, the dialog "Apply parameter changes" opens.



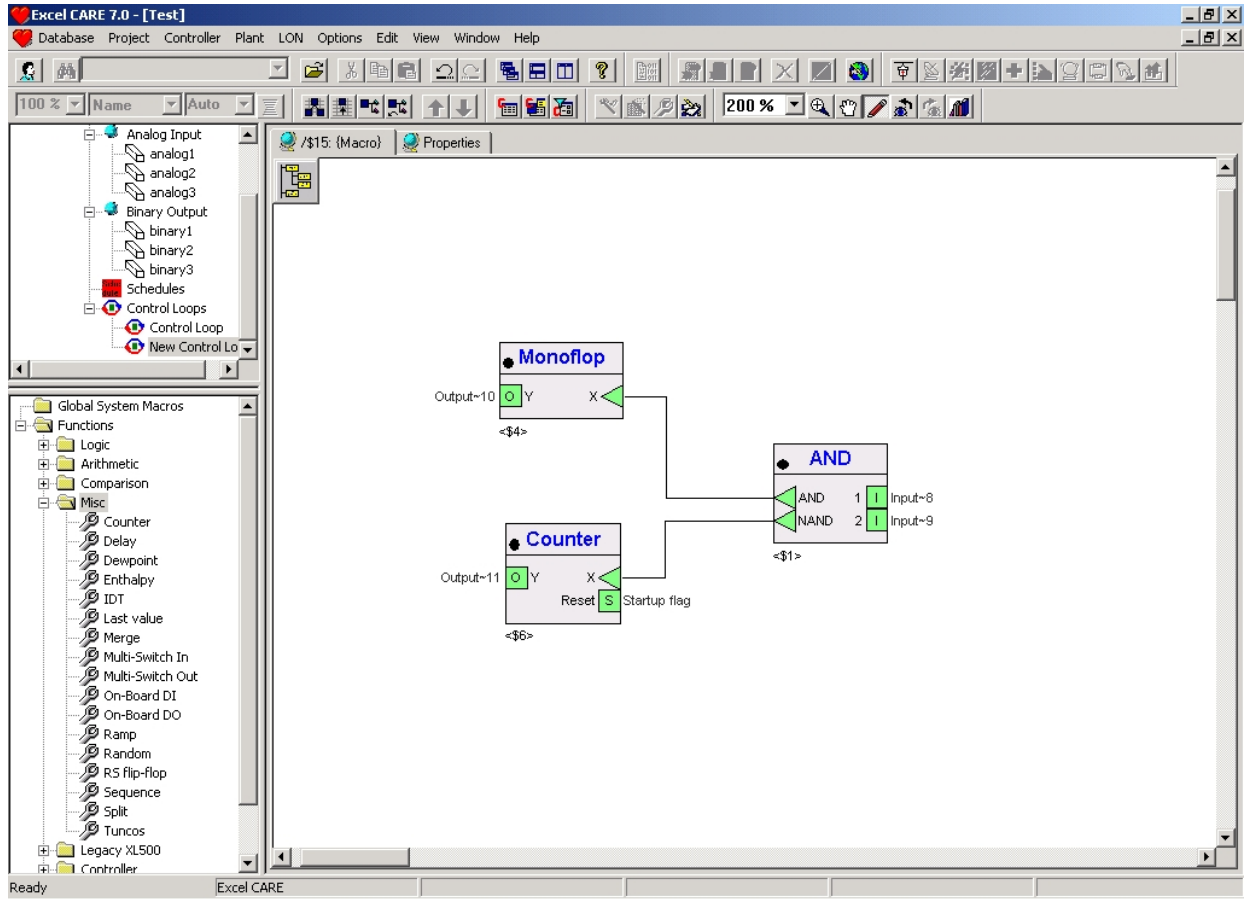
You can select in the check boxes for which parameter the change should apply. The option "Only current macro" applies your changes only to the current macro. The option "All macros" applies the changes to all calls of this macro. With the button "OK" you confirm the made changes. With the button "Don't change" your changes are deleted.

11. Now connect the input and output ports:

- Click once on the first port, you want to connect.
- Move the cursor to the second port and click on it.
- A line will connect the two ports (only in case they are corresponding). One output port can be connected to many input ports. But one input port can be connected to only one output port.
- Customize the connecting line. While creating you can click the left mouse button into free space and the line becomes a corner there. Clicking the right mouse button removes the last corner and cancels line editing when the start point will be removed. Hitting the Space bar toggles the routing direction.
- After creating you can click the right mouse button at the line and the context menu to split (adding one corner) and to delete segments displays. After selecting the line via clicking on it, each single segment (between two corners), except the first and last one, can be moved by clicking on them.

12. Make sure, you have connected all inputs and outputs. Unconnected points are red coloured; all points have to be coloured green.

NOTE: Please note the definition of the macros inputs and outputs. As they are not displayed they easily could be left undefined.



13. To leave the macro-view and return to the control loop-view, click the right mouse button.

RESULT: The context menu of the macro displays.

14. Click on **Open parent macro**.

RESULT: The Macro window changes from macro- to control loop-view.

Double-click on any other element to change the view of it.

Use Pre-configured Macros

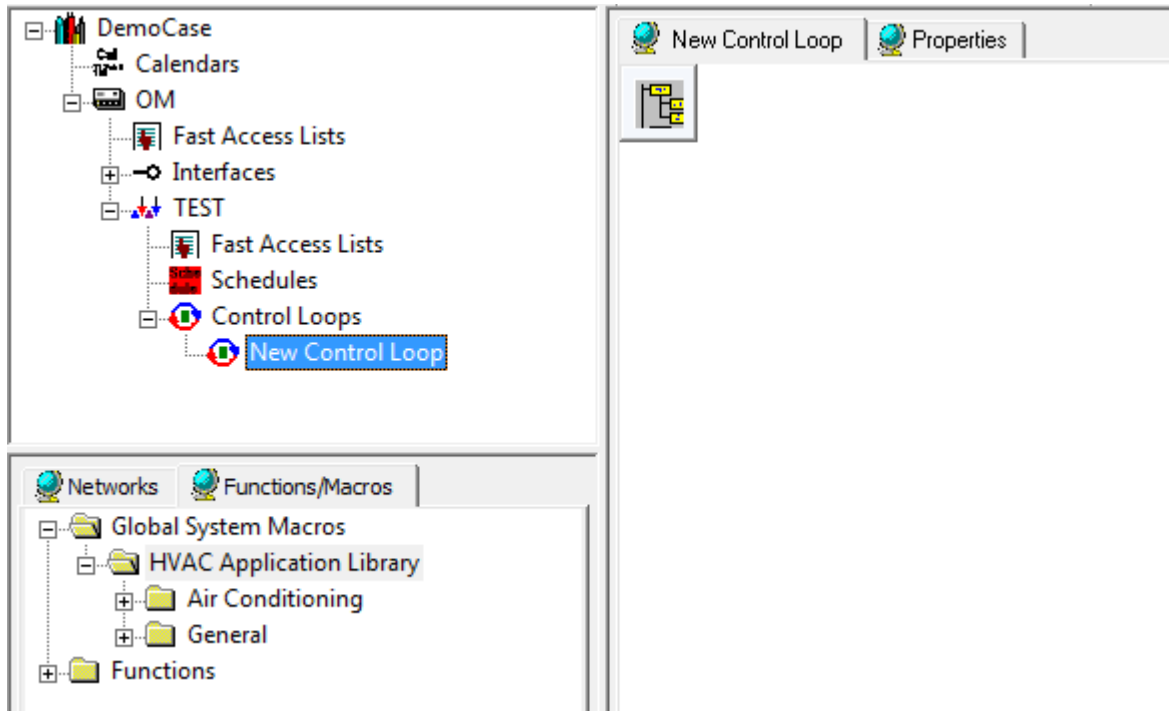
CARE provides pre-configured macros in an HVAC Application Library. These macros can be used for general purpose (e.g. startup and exercise) or for specific air conditioning applications.

By default, the HVAC application library macros are protected against editing. If you want to edit a macro it can be converted to an editable variant. For protected macros, Honeywell offers technical support but for converted macros, Honeywell does not offer support.

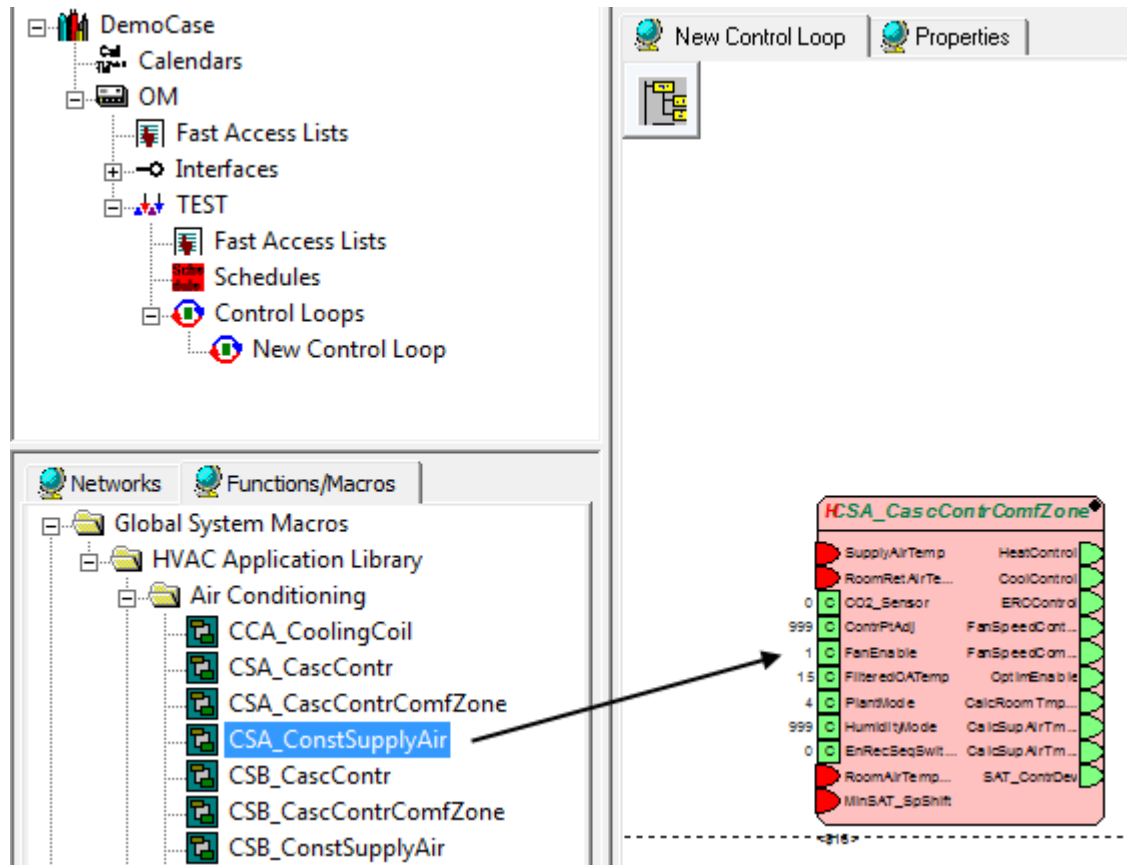
- Prerequisites**
1. The user is logged in.
 2. A project is open.
 3. The open project has at least one controller and one plant and one control loop.

- Procedure**
1. Expand the tree view of the plant.
 2. Double-click on the icon of the control loop you want to edit.

RESULT: The Macro window of the control loop opens in the right pane.



3. In the Functions/Macros view (down left from the macro window) expand the Global System Macros folder and navigate to the folder, Air Conditioning and/or General folder, that contains the pre-configured macro(s) you want to use.
4. Select the macro and drag&drop it to the Macro window.



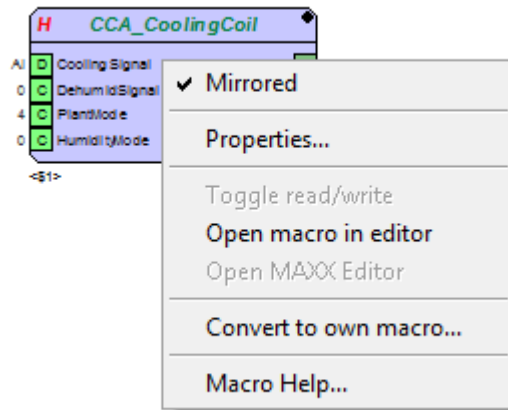
NOTE: You can also add pre-configured macros from the Global Macro Library (see "Open Global Macro Library") section.

5. Connect datapoints to the macro inputs and/or outputs.
6. If desired, edit macro properties in the same way as described in the "Edit Macro Properties" section.
7. If you want to edit the inherent macro logic functions, the macro must be converted to its editable variant. Please note that for such edited macros, no support is provided by Honeywell.
8. To convert a protected macro into its editable variant, please refer to the "Convert Protected Macro to Editable Macro" section.

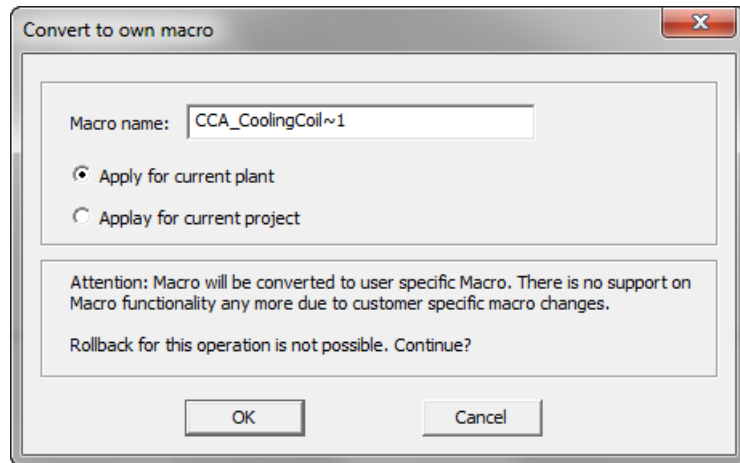
Convert Protected Macro into Editable Macro

By default, the HVAC application library macros are protected against editing. If you want to edit a macro, it can be converted to an editable variant. For protected macros, Honeywell offers technical support but for converted macros, Honeywell does not offer support.

- Procedure**
1. In the Macro Window, right-click the Macro and then click **Convert to own macro...** in the context menu.



RESULT: The Convert to own macro dialog box displays.



2. In **Macro name**, change the name if desired.
3. Keep the **Apply for current plant** option if you want to apply the conversion to all macros of this type in the current plant.
or, select **Apply for current project** if you want to apply the conversion to all macros of this type in the current project.

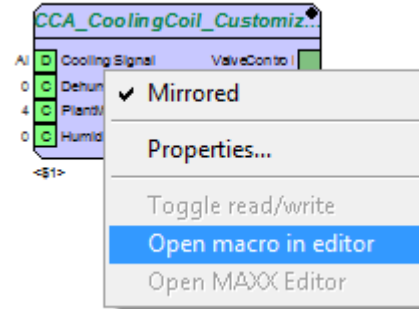
NOTE: Converted macros cannot be reverted and Honeywell does not provide support for converted and changed macros.

4. Click **OK** button.

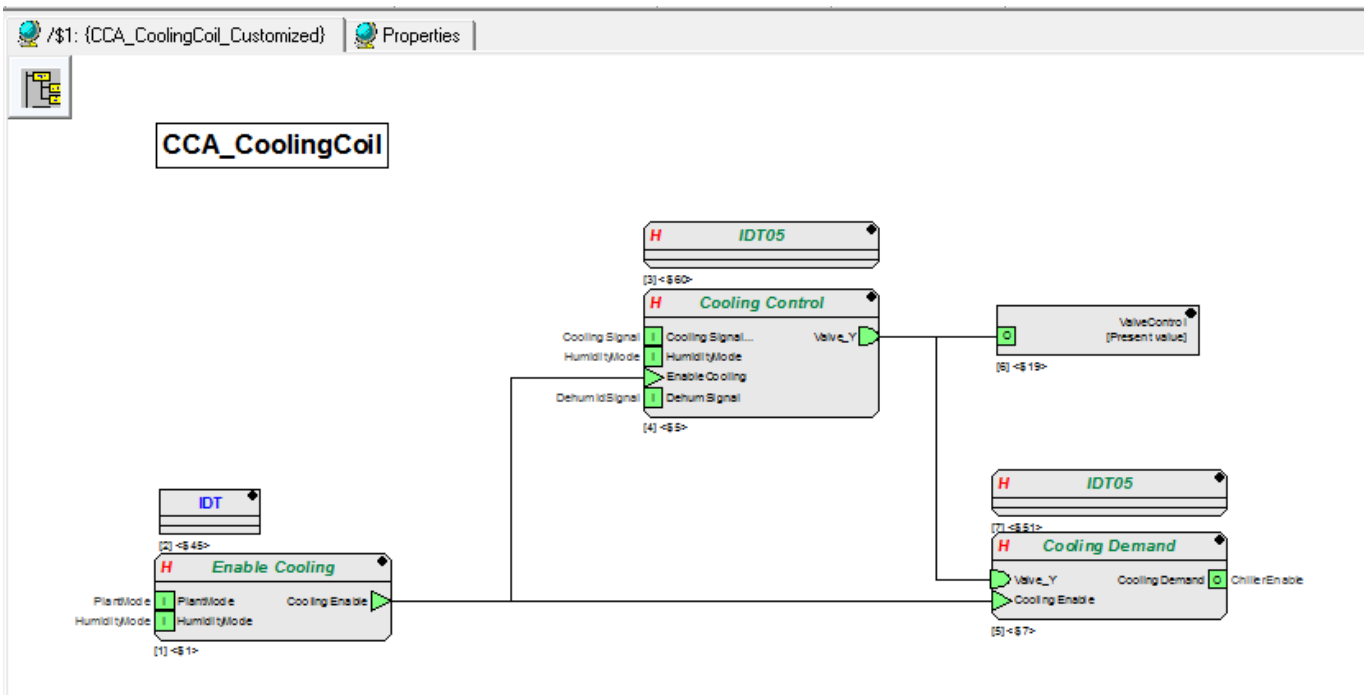
- Click **OK** button.

RESULT: The macro can now be edited.

- To do so, right-click the macro, and then click **Open macro in editor** in the context menu.



RESULT: The macro logic is displayed. This can show functions and/or further protected macros.



- Continue by editing the macro logic as desired, e.g. by changing macro properties, converting macros, and/or editing functions.

Delete Macro

Procedure

Macros will be automatically removed, if they are no longer used in any control loop.

Or, you can delete a macro manually as follows:

- In the control loop pane, select the macro, and then press the **DELETE** key on the keyboard.

Flags

Purpose Flags are independent memory addresses defined for one plant. Each element (hardware/software point, function or macro) of any control loop of this plant is able to setup the value of such a flag with an output or setup the value of an own input with the value of such a flag. So it is possible to transmit data between the control loops of one plant without using a hardware/software point.

NOTE: It is not possible to use flags if the element is included in a macro.

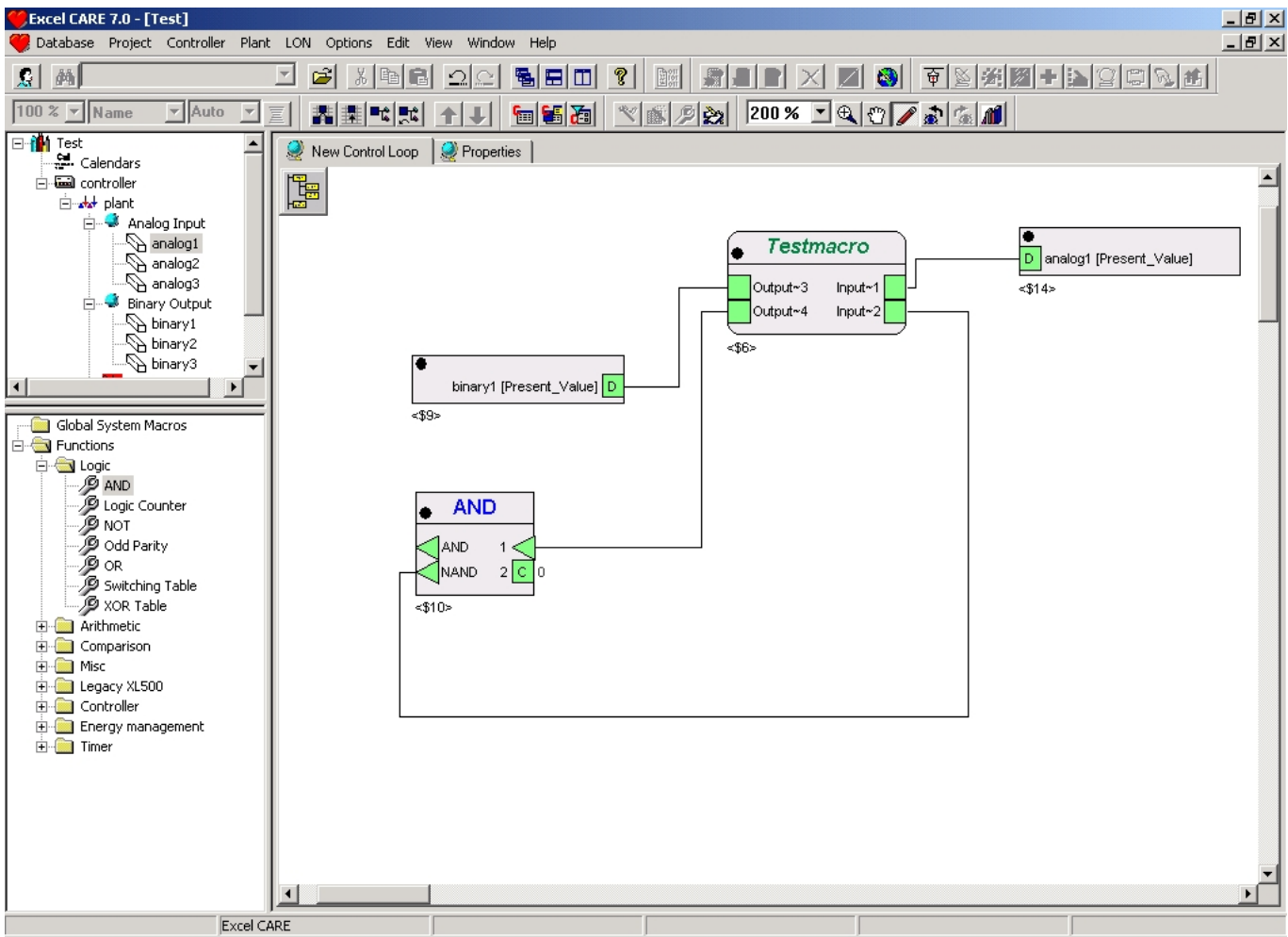
Create and Edit Flags

Purpose Use Flags for easy data transfer between elements (hardware/software point, function or macro) of a single control loop.

- Prerequisites**
1. The user is logged in.
 2. A project is open.
 3. The opened project has at least one controller, one plant and one control loop.

- Procedure**
1. Expand the tree view of the control loops of the plant, the control loop is assigned to.
 2. Double-click on the icon of the control loop you want to setup Flags for.

RESULT: The Macro window of the control loop opens in the right pane.



3. Click once into the free space of the Macro window.

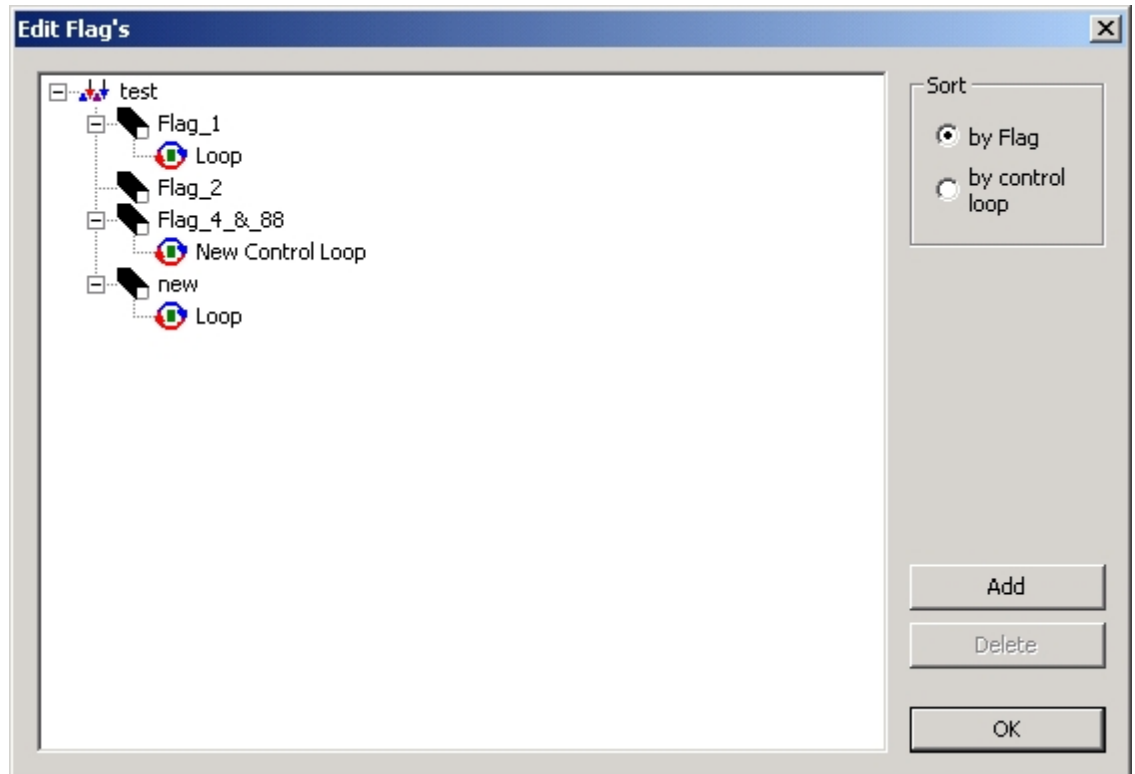
RESULT: The Macro window of the control loop is selected.

4. Click menu item Plant > Control Editor, > Flags...

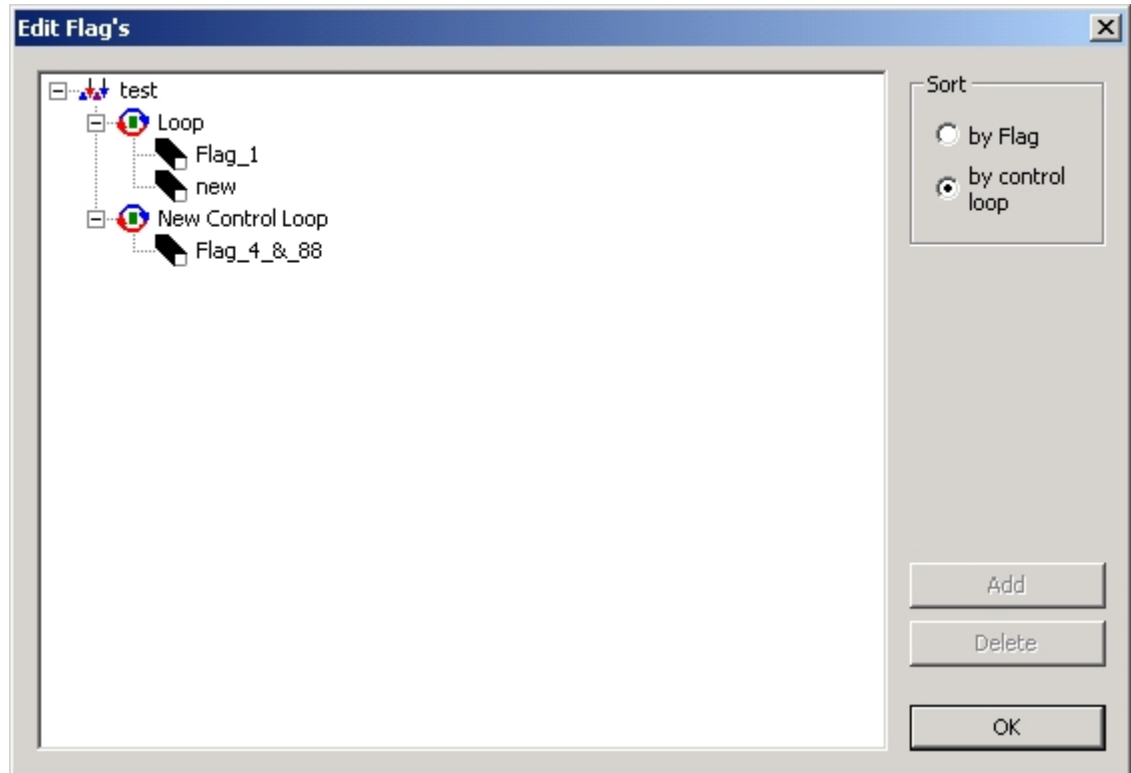
RESULT: The Edit Flag's dialog box opens.

5. Sort flags by clicking on the radio buttons, by Flag or by control loop, on the right.

RESULT: If sorted by flag, all Flags and the control loops, which include these flags, are displayed.



RESULT: If sorted by control loop, all control loops with their connected flags are displayed.

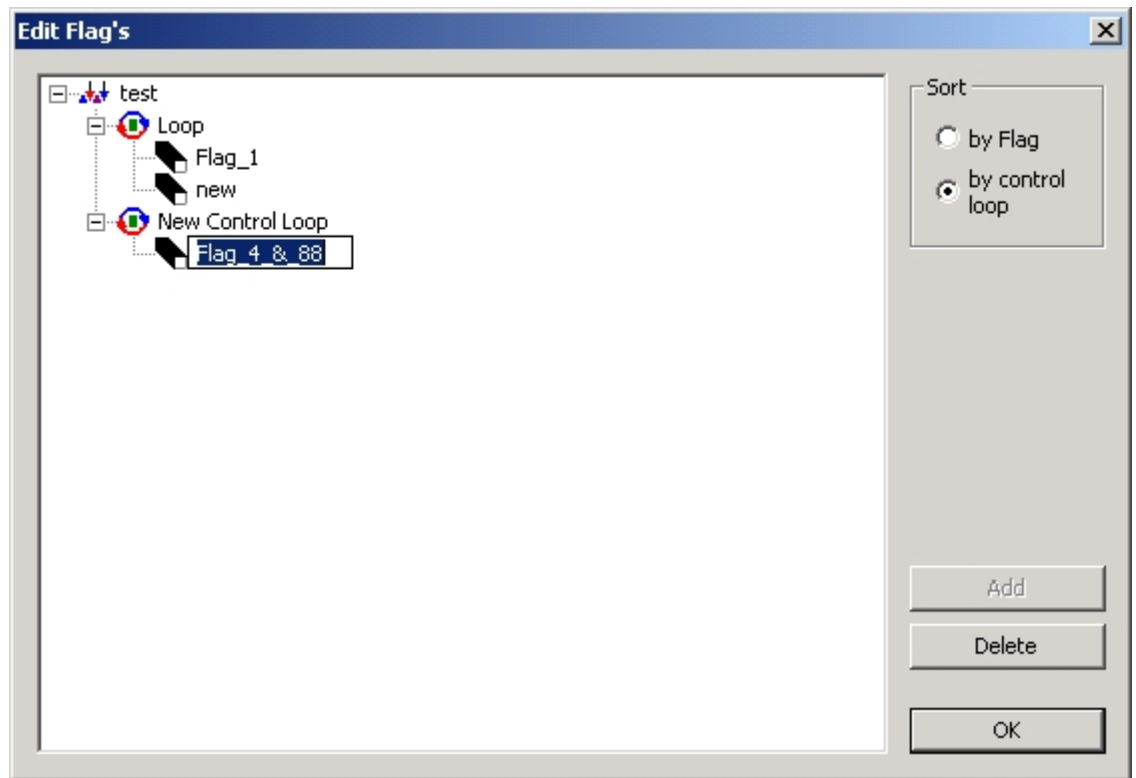


Denotation of the buttons:

- **Add**
Click on Add to create a new flag.
It is not possible to create Flags if the view of the Flags is sorted "by control loop".
The name of the flag must consist of at least one letter. For the name of the flag do not use special characters like ", /, ?, * and blank.
- **Delete**
Click on Delete to remove the selected flag.
Only unused (not assigned to a control loop) flags can be removed.
- **OK**
Click on OK to leave the window.

Click twice on the name of a flag to rename it.

RESULT: The name becomes highlighted and changeable.



Global Macro Library

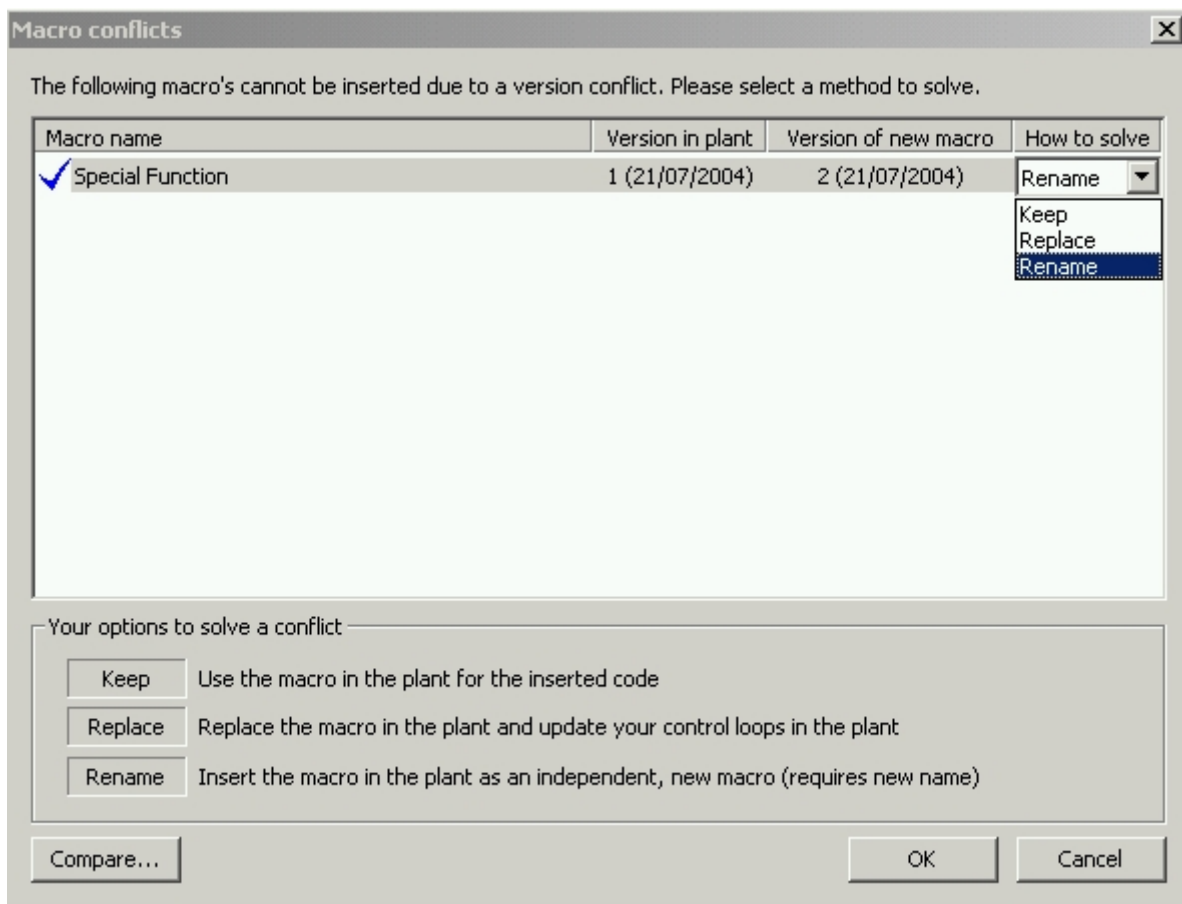
Purpose The Global Macro Library provides macros that can be used globally in any projects. Global macros can be used independently from any project or control loop.

Macros can be transferred between projects via drag&drop from/to the macro window in the project and the macro library.

In addition, you can update a global macro used in projects with changes done to this macro in the macro library.

Macro Conflict

Whenever the contents or properties of a macro are changed, the version and the date of the macro are modified. This may lead to a conflict. The conflict arises when you drop a macro in an editor where the same macro with a different version or date is already in use. The dialog macro conflict opens.




More than one macro may be shown in the dialog, because of the macro dependencies.

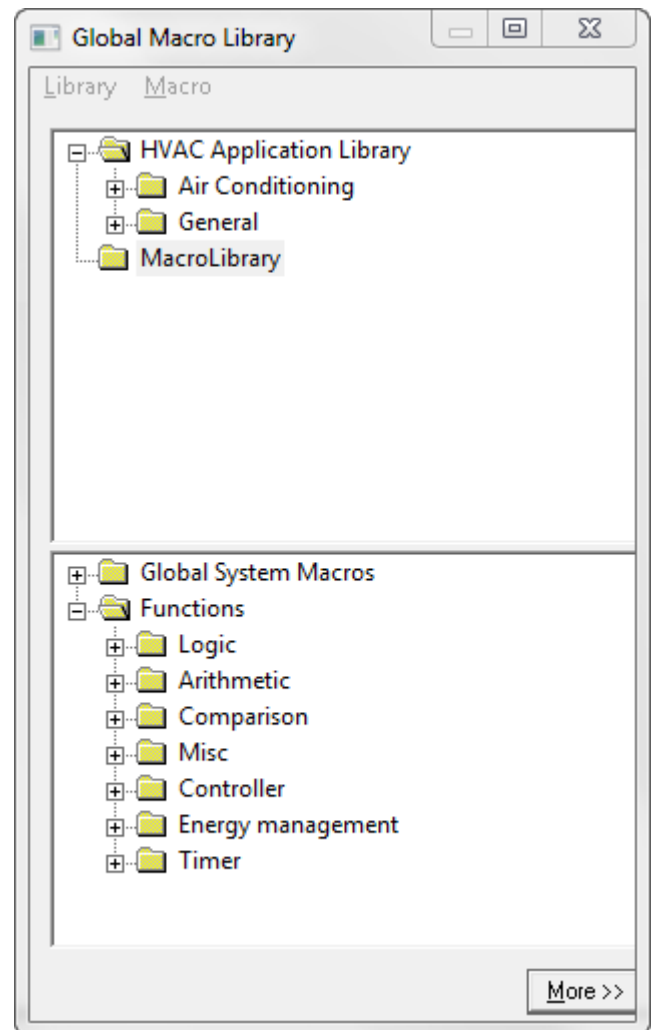
You have three options to resolve the conflict as described in the dialog. Double-click on one of the listed conflicts to mark it. Select your solution in the drop-down list "How to solve". As long as not all macro conflicts are resolved, the button "OK" stays inactive.

Double-click on one of the listed conflicts and then on the button "Compare" to see the differences between the conflicting macros.

Open Global Macro Library

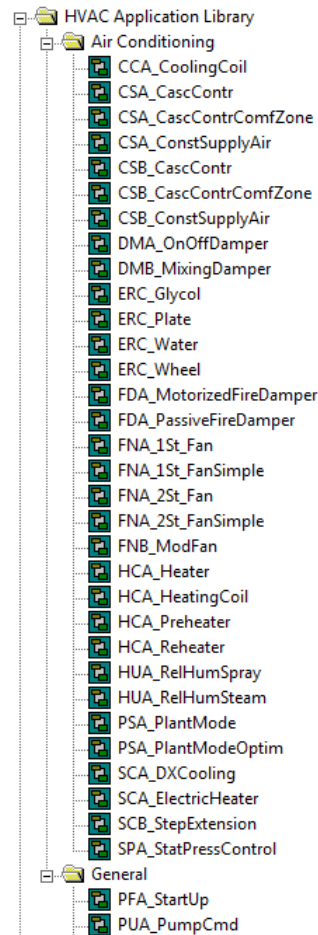
- Procedure** 1. Click menu item Database > Macro Library... , or click on button 

RESULT: The Global Macro Library window opens.



The Global Macro Library window provides the following:

In the upper area, you will see the HVAC Application Library providing pre-configured macros for general purpose and specific air conditioning macros.



By default, an empty folder named 'MacroLibrary' is available.

In the Global Macro Library window, you can do the following:

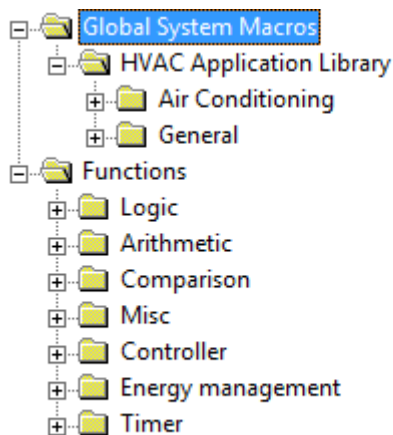
- Arrange libraries, folders and macros in a hierarchical tree structure by applying the following:
 - Create, delete and rename global macro libraries respectively folders
 - Create, copy and delete macros

In addition, you can do the following:

- Edit and update macros
- Create, import and export libraries

In the lower area, the HVAC application library is also provided as global system macros. In addition, control functions are available.

In this area, you cannot edit items or execute commands as in the upper area. But, you can add system macros and functions to the control loop pane via drag&drop.



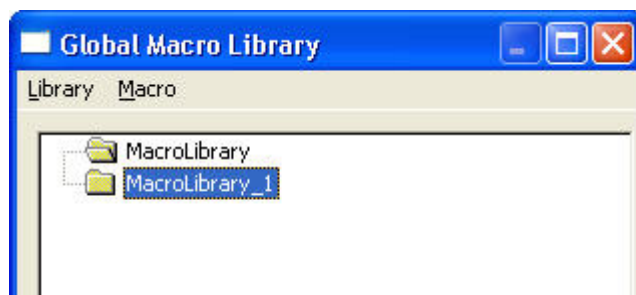
Create Global Macro Library

NOTE: Libraries will always be created on the highest tree level. Folders can be created on any level lower than the library level.

By default, there is an empty library provided named 'MacroLibrary'.

- Procedure** 1. In the Library menu, click Create Library.

RESULT: The new library is created on the level of the default library and is named MacroLibrary_1. Further libraries will be named MacroLibrary_2, MacroLibrary_3, etc. The name of the library can be changed by renaming (see "Rename Folder" section).



2. Add folder(s) to the library and macros as desired and as described in the following sections.

Rename Global Macro Library

See "Rename Folder" section.

Delete Global Macro Library

See "Delete Folder" section.

Create Folder

- Procedure** 1. Click on the library folder or any other folder where the new folder should be created. In the Library menu, click Create Folder.

2. Or, right-click on the library folder or any other folder where the new folder should be created. In the context menu, click Create Folder.
3. In the Create new folder dialog box, enter the name, and then click OK.

RESULT: The new folder is created below the selected folder.

Rename Folder


- Procedure**
1. Click on the folder that you want to rename. In the Library menu, click Rename.
 2. Or, right-click on the folder that you want to rename. In the context menu, click Rename Folder.
 3. In the Rename folder dialog box, change the name, and then click OK.
-

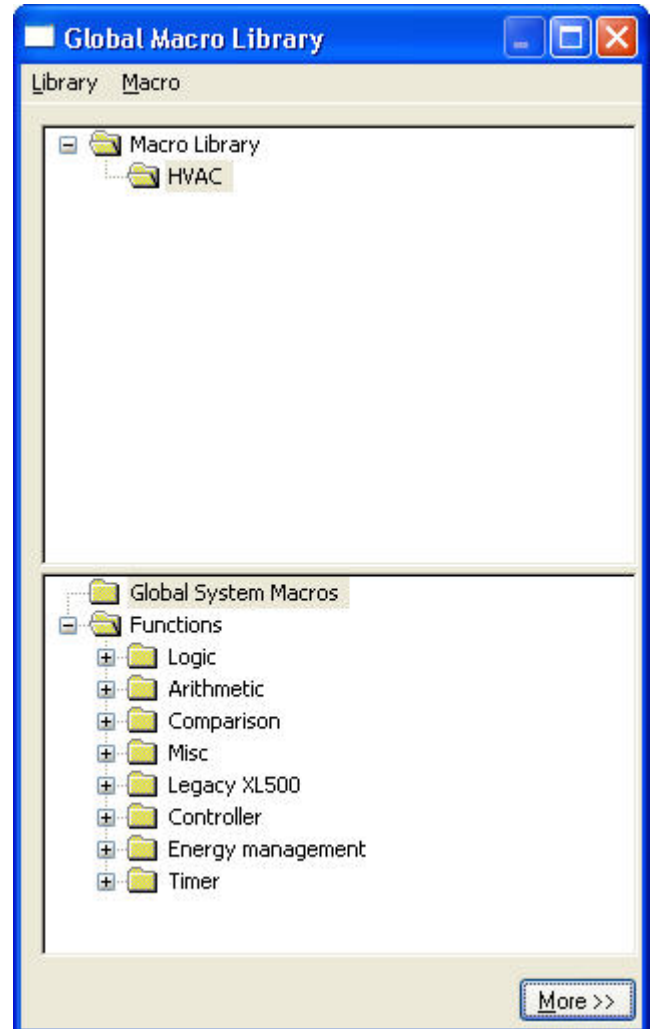
Delete Folder

- Procedure**
1. Click on the folder that you want to delete. In the Library menu, click Delete.
 2. Or, right-click on the folder that you want to delete. In the context menu, click Delete folder. The selected folder and all macros in this folder

NOTE: Other than handling of macros in the control loops view, unused and used macros will be deleted. The used ones are available in the control loop, but no longer stored in the macro library.

Create Global Macro

- Prerequisites**
1. The user is logged in. A library and/or additional folders are created for good navigation.
- Procedure**
1. Select the functions, and then click menu item Database > Macro Library... , or click on button .
- RESULT:** The Global Macro Library window opens.



2. In the Macro menu, select Create, or right-click on the Macro Library folder in the tree (or each other folder).
3. In the context menu, click Create.

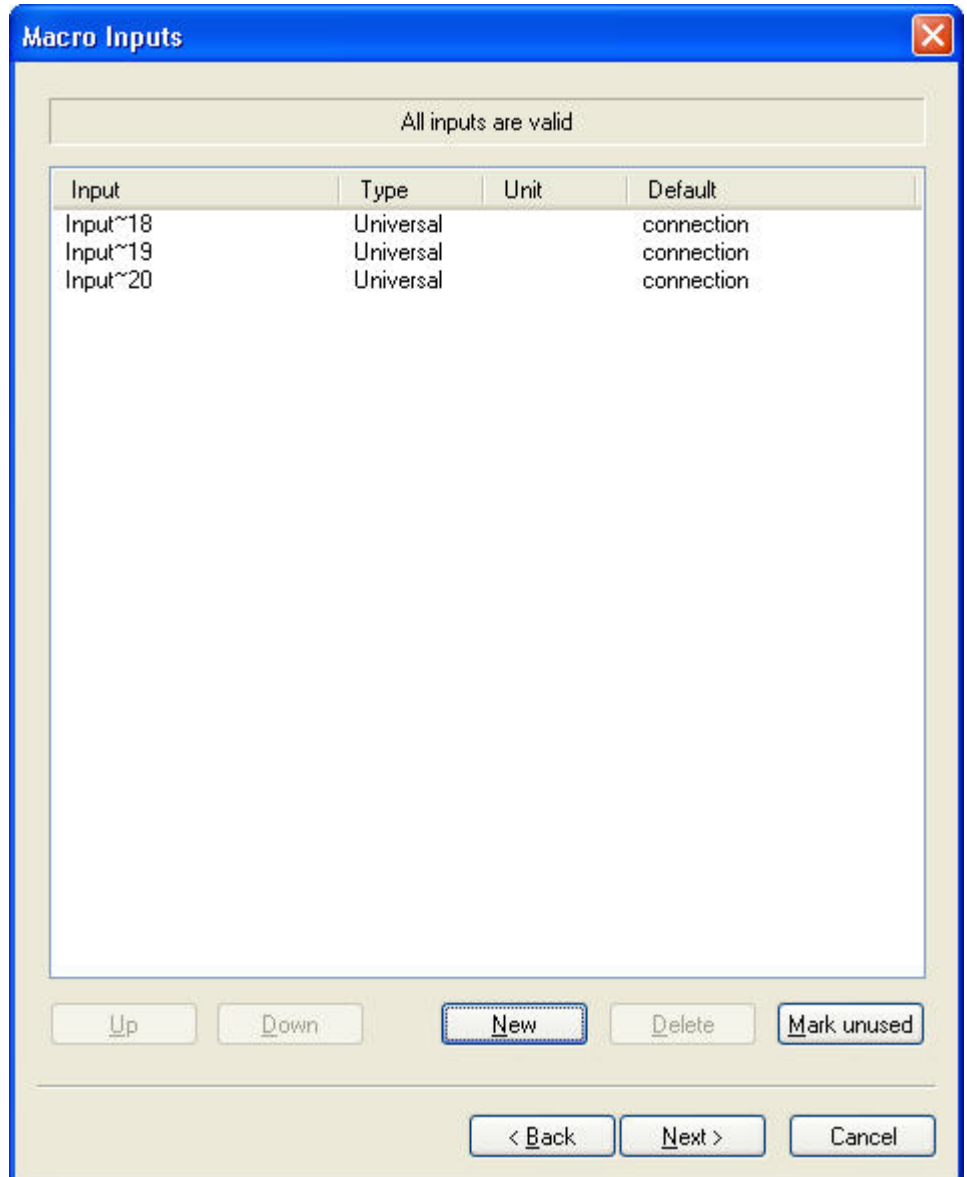
RESULT: The Macro overview dialog box of the macro opens.

Fill in the fields according to your requirements:

- **Please enter a name:**
Unique name of the macro.
- **Description**
Description of the macro, e.g. what's the function of it or which special input/output or parameters are used in this macro.
- **Tooltip**
Descriptive information that will be displayed in the yellow tooltip which displays when moving the cursor over the macro icon.
- **System macro**
Select the checkbox if the macro should be included in the folder "Global System Macros". The macros of this folder can be used for all control loops of the database. Only authorized users can access System macros.
- **Version info (read only, managed automatically)**
Information about the macro

4. Click **Next**.

RESULT: The Macro Inputs dialog box of the macro opens.



5. Click twice into the desired fields of the table to set up the properties of the input datapoints of the macro:

Denotation of the columns:

- **Input**
Name of the input(s). Double-click into the row of the desired input to change its name.
- **Type**
Type of the input(s). Double-click into the row of the input to choose between the three input types (analog, binary, universal, or datapoint).
- **Unit**
Property dialog box of the connections unit of the value (e.g. liters, volt, minutes, ...).

- **Default**

In the default column you can select the type of connection, which will be used when you drop the macro from the Global Library into your editor. If the type pointrole is used, and exactly one datapoint is found with the same pointrole, it is automatically replaced. Otherwise the pointrole type stays the same and should be changed manually.

For default types only one of the following options can be selected:

- Connection
- Constant
- System Data
- Pointrole
- Flagpoint

All options other than "Connection" may be invisible too.

Denotation of the buttons:

- **Up**

Use this button to place the selected input one step up.

- **Down**

Use this button to place the selected input one step down.

- **New**

Use this button to create a new input of the macro.

- **Delete**

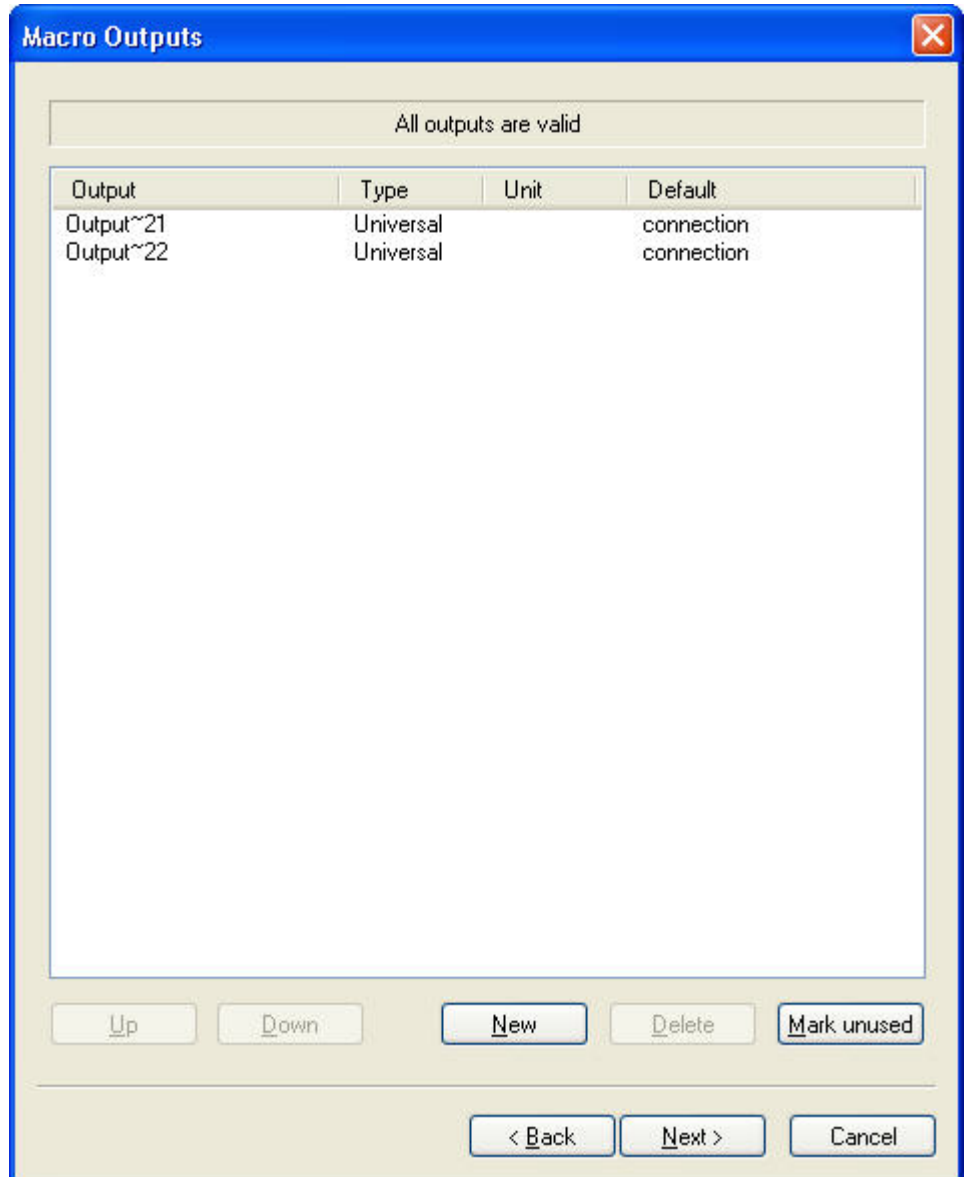
The selected input will be removed. Please note, only unused inputs can be removed and no undo is possible.

- **Mark unused**

All entries not used by the control strategy of the macro are selected (to delete them).

6. Click Next.

RESULT: The Macro Outputs dialog box of the macro opens.



7. Click twice into the rows of the table to set up the properties of the output datapoints of the macro:

Denotation of the columns:

- **Input**
Name of the output(s). Double-click into the row of the desired output to change this name.
- **Type**
Type of the output(s). Double-click into the row of the desired output to choose between the three output types (analog, binary, universal, or datapoint).
- **Unit**
Unit of the value (e.g. liters, volt, minutes, ...).
- **Default**
In the default column you can select the type of connection, which will be used when you drop the macro from the Global Library into your editor. If the type pointrole is used, and exactly one datapoint is found with the same pointrole, it is automatically replaced. Otherwise the pointrole type stays the same and should be changed manually.
For default types only one of the following options can be selected:
 - Connection
 - Constant

- System Data
- Pointrole
- Flagpoint

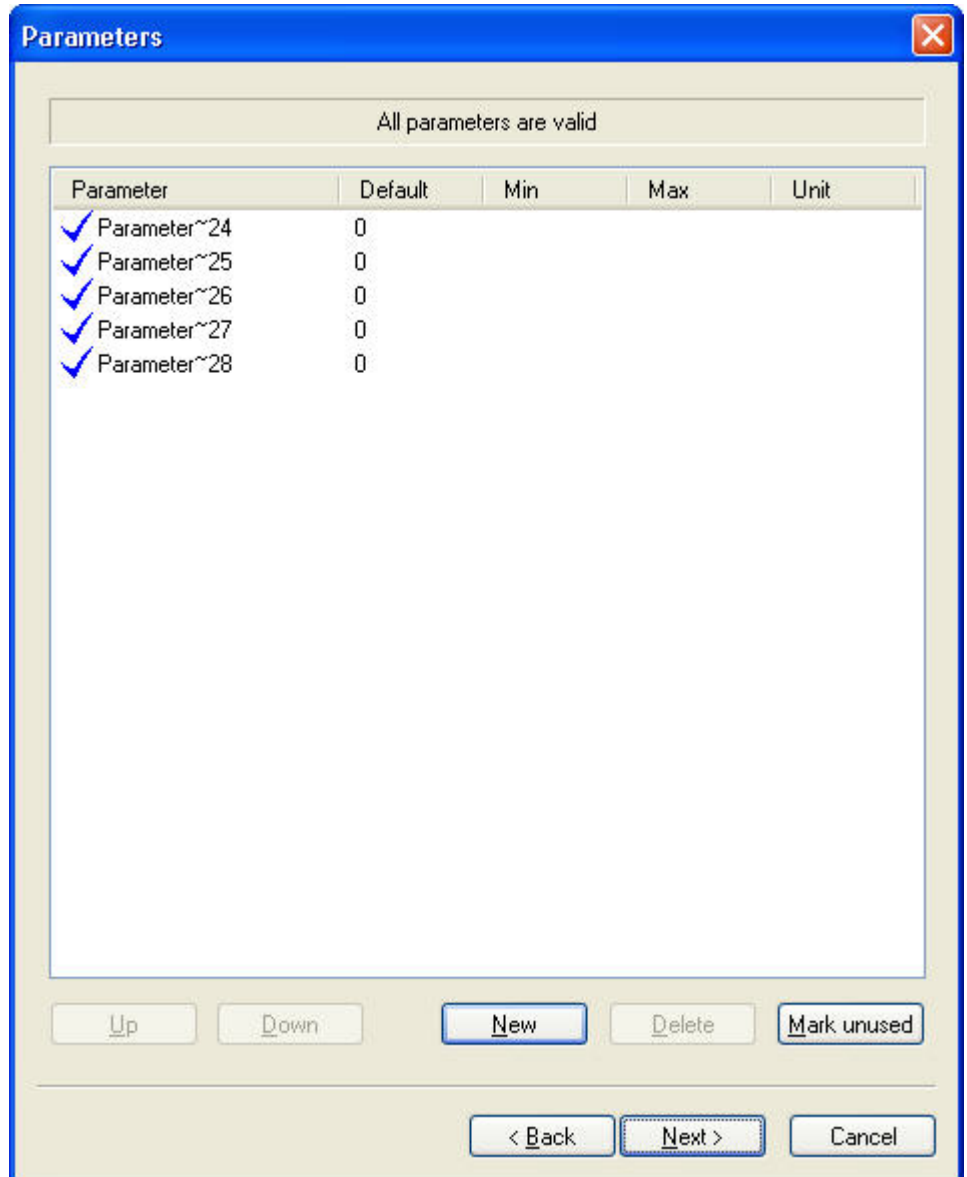
All options other than connection may be invisible too.

Denotation of the buttons:

- **Up**
Use this button to place the selected output one step up.
- **Down**
Use this button to place the selected output one step down.
- **New**
Use this button to create a new output of the macro.
- **Delete**
The selected output will be removed. Please note, only unused outputs can be removed and an undo is not possible.
- **Mark unused**
All entries not used by the control strategy of the macro are selected (to delete them).

8. Click the button **Next**.

RESULT: The Macro Parameters dialog box of the macro opens.



9. Click twice into the desired fields of the table to set up the properties of the parameters of the macro:

Meaning of the columns:

- **Parameter**
Name of the parameter(s). Double-click into the row of the desired parameter to change its name.
- **Default**
Default value of the parameter(s).
- **Min**
Minimum value of the parameter(s).
- **Max**
Maximum value of the parameter(s).
- **Unit**
Unit of the value (e.g. liters, volt, minutes, ...).

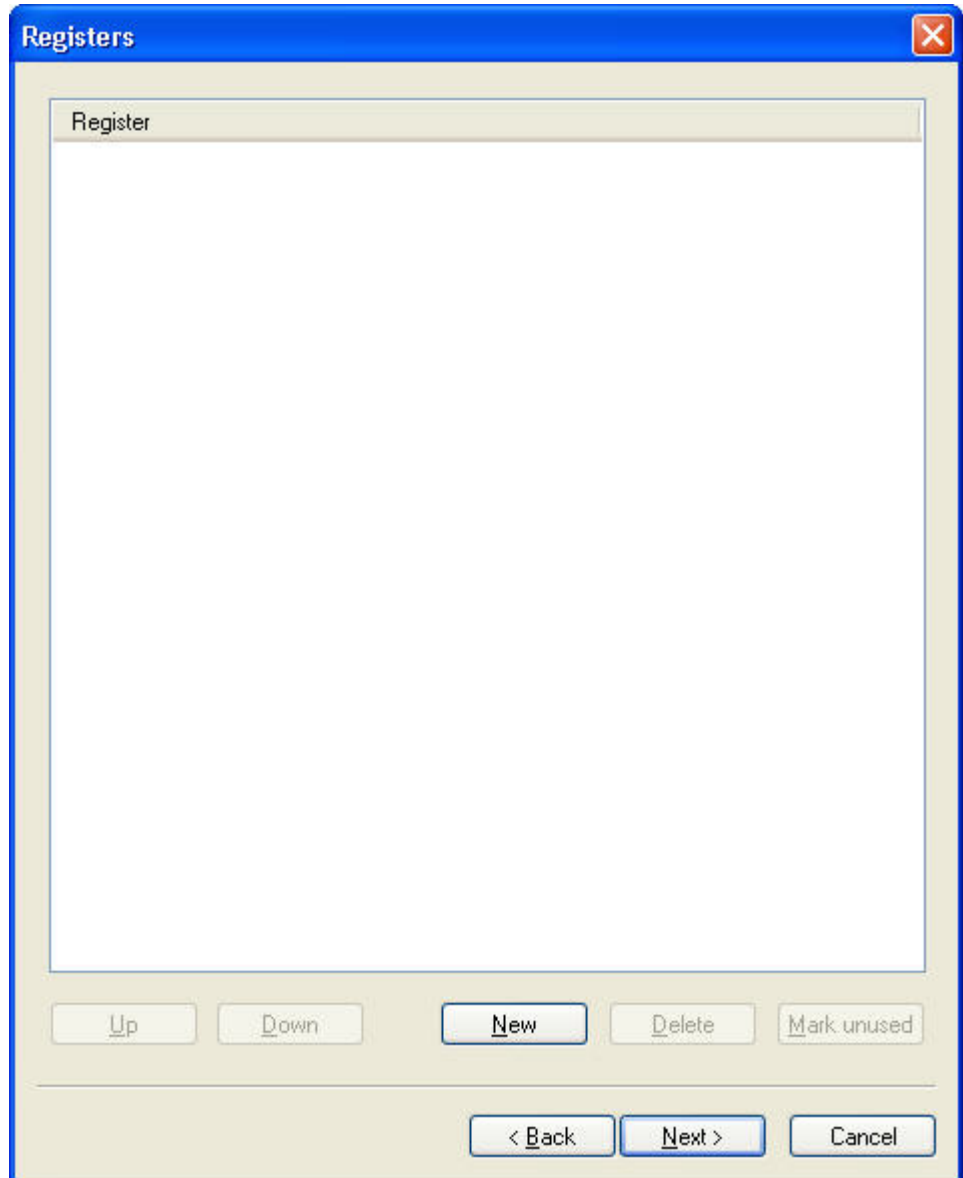
Denotation of the buttons:

- **Up**
Use this button to place the selected parameter one step up.
- **Down**
Use this button to place the selected parameter one step down.

- **New**
Use this button to create a new parameter of the macro.
- **Delete**
The selected parameter will be removed. Please note, only unused parameters can be removed and an undo is not possible.
- **Mark unused**
All entries not used by the control strategy of the macro are selected (to delete them).

10. Click the button **Next**.

RESULT: The Macro Registers dialog box of the macro opens.



11. Click twice into the desired fields of the table to set up the properties of the registers of the macro:

Meaning of the columns:

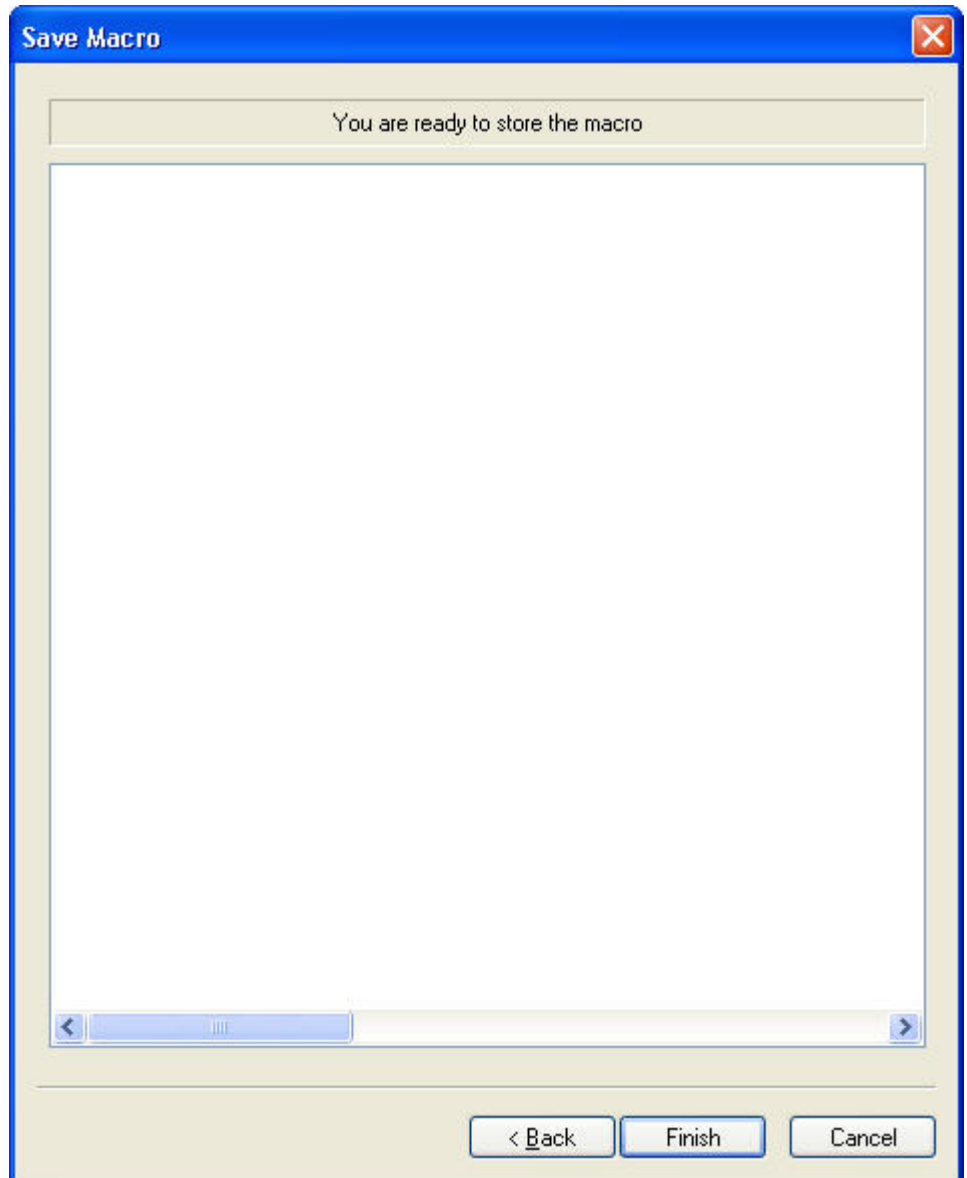
- **Register**
Name of the register(s). Click twice into the row of the desired register to change its name.

Denotation of the buttons:

- **Up**
Use this button to place the selected register one step up.
- **Down**
Use this button to place the selected register one step down.
- **New**
Use this button to create a new register of the macro.
- **Delete**
The selected register will be removed. Please note, only unused register can be removed and an undo is not possible.
- **Mark unused**
All entries not used by the control strategy of the macro are selected (to delete them).

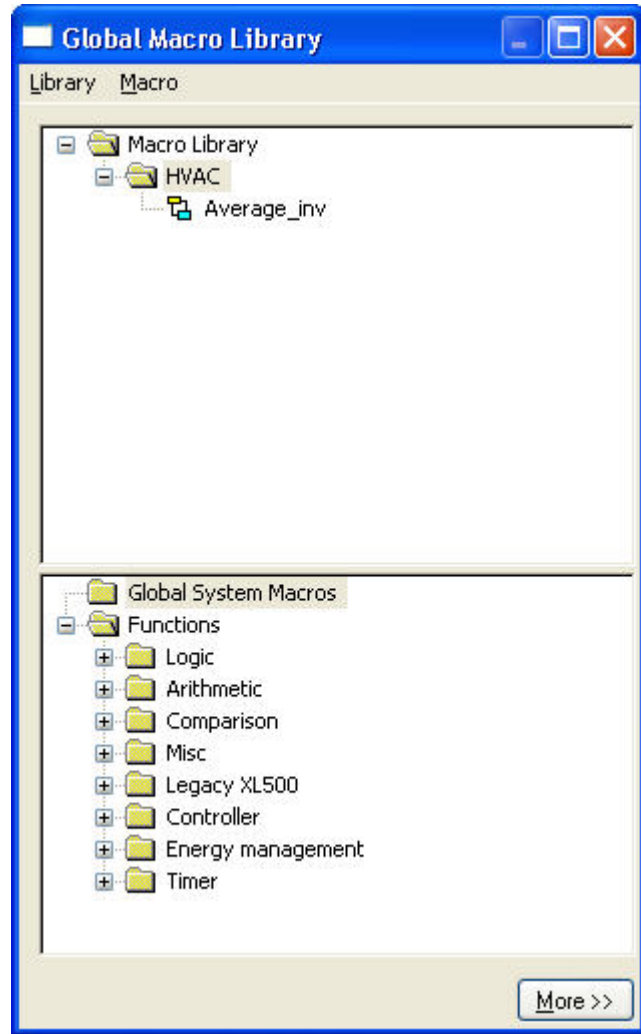
12. Click the button **Next**.

RESULT: The Save Macro dialog box of the macro opens.

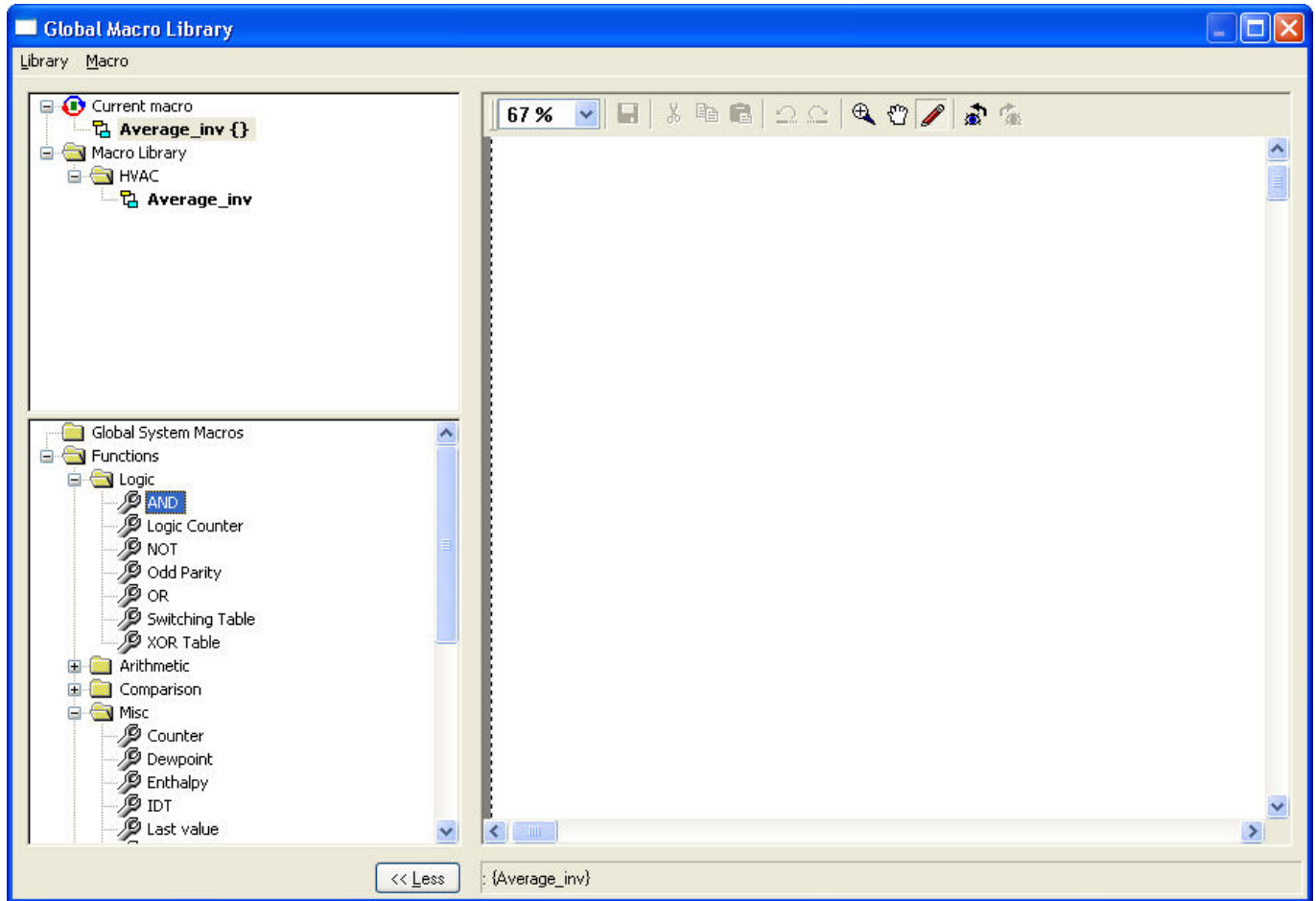


13. Click **Finish**.

RESULT: The macro is added to the Global macro Library window.



14. Continue with creating the macro logic by clicking **More>>**, and then adding and linking the functions.




15. From now on, the macro is stored in the global macro library and can be transferred into any project, database and is available for any control loop.

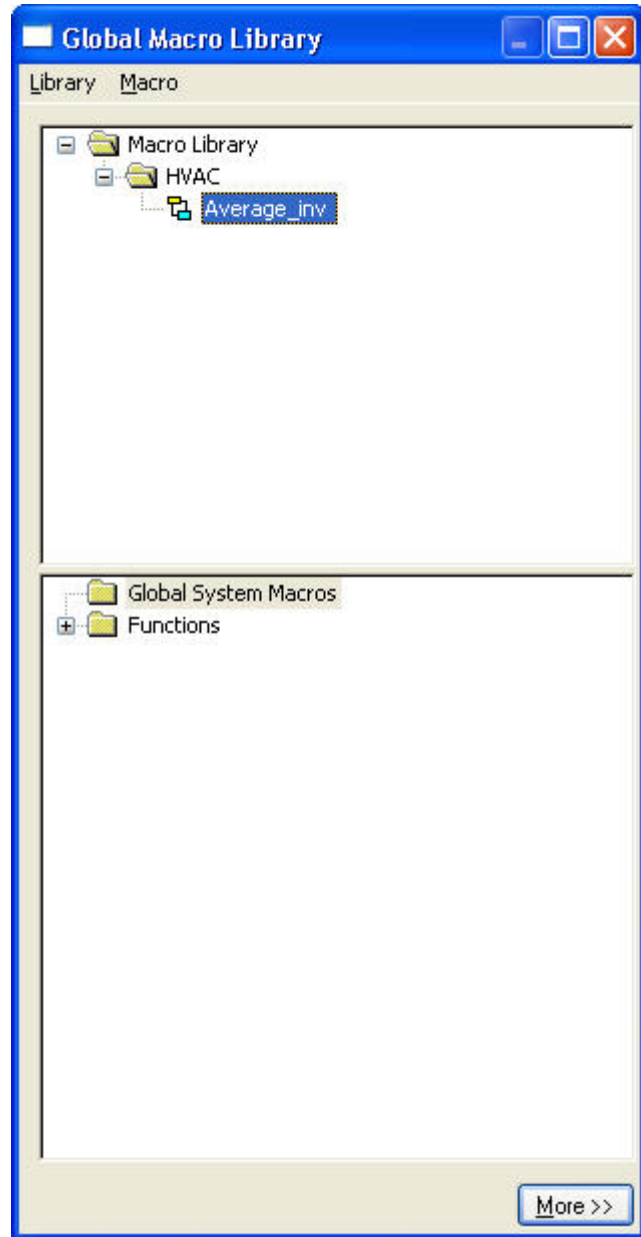
Create Global Macro Logic

Several macros have the attribute System Macro. To see if your macro is defined as a System Macro, open the Macro properties dialog and check if the option "System Macro" is active. System Macros cannot be edited, deleted or moved within the Global Macro Library. A special license is required to create System Macros.

Prerequisites 1. The user is logged in.

Procedure 1. Click menu item Database > Macro Library..., or click on button .

RESULT: The Global Macro Library window opens.



2. Expand the tree view of the folder, the macro is assigned to.

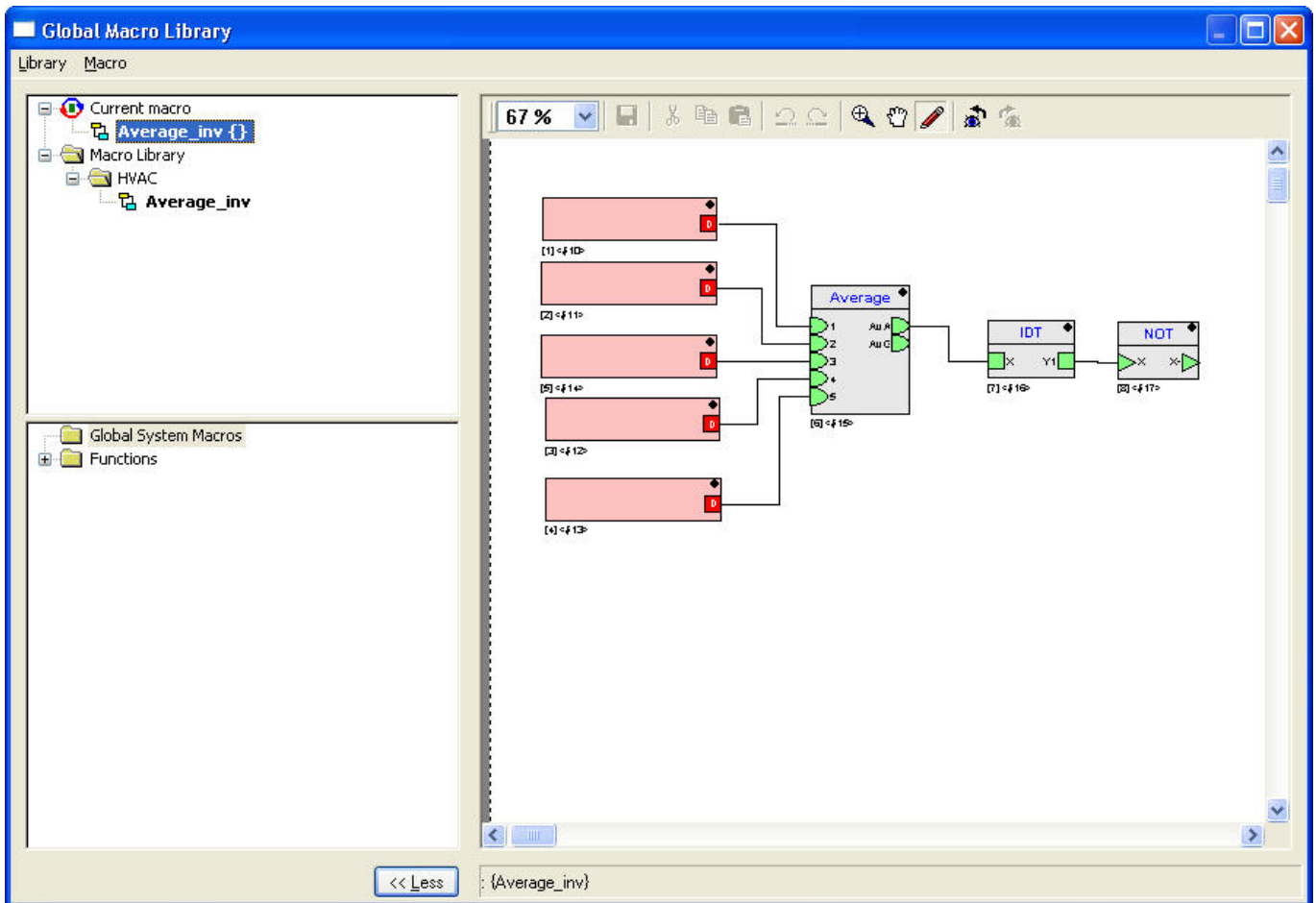
3. Click **More>>**.

RESULT: The Macro window of the folder opens in the right pane.

4. Double-click on the macro.

RESULT: The logic of the macro opens in the Macro window.

NOTE: The editor pane will be displayed automatically if not already visible.



5. Define the content of the macro and connect the input and output ports as described in the previous sections.
6. Make sure, you have connected all inputs and outputs. Unconnected points are red coloured; all points have to be coloured green.

NOTE: Please note the definition of the macro's inputs and outputs. As they are not displayed they easily could be left undefined.

The button "More >>" changed to "<< Less". Use the Save key in the toolbar to save the changes. Leave the edit mode by clicking on "<< Less" or double-clicking another macro to apply changes. Otherwise old settings are copied when you use drag & drop.

Add a Macro of a Control Loop to the Global Macro Library

Prerequisites

1. The user is logged in.
2. A project is open.
3. The opened project has at least one controller, one plant, one loop and one macro.

Procedure

1. Expand the tree view of the control loop of the plant, the macro is assigned to.
2. Double-click on one of the icons of the control loops, the macro is assigned to.

RESULT: The Macro window of the control loop opens in the right pane. The icon of the macro is displayed in this Macro window.

3. Open the Global Macro library:
 - a. Click menu item Database,

- b. Then submenu item Macro Library... ,
- c. Or click on button:



RESULT: The Global Macro Library window opens.

4. Transfer the desired macro to the Global Macro Library, by using the window function drag & drop:
 - a. Move the mouse cursor above the sensitive field in the upper left corner of the macro window:

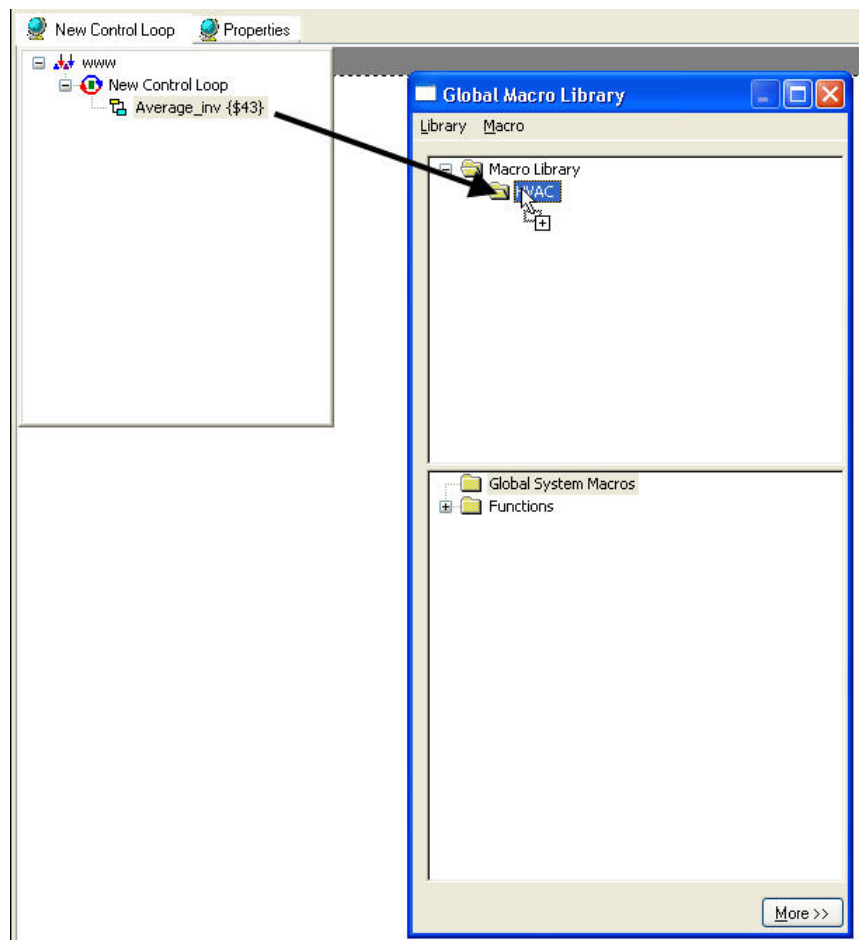


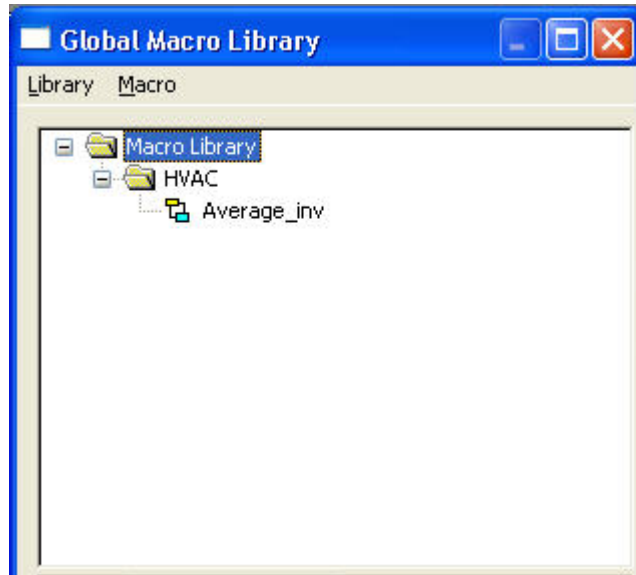
RESULT: The view expands by the macros in the loop.

- b. Click once on the desired macro and hold the left mouse-button pressed.
- c. Move the cursor into the Global Macro Library window. The cursor changes to a "No Parking"-sign if it is moved in areas, you cannot drop the macro into.
- d. Release the left mouse button.

Drag & drop is only **possible** between folders. The library must not contain any system macros, except you have the proper license,

RESULT: The macro is dropped into the Global Macro Library.






Edit Global Macro Properties

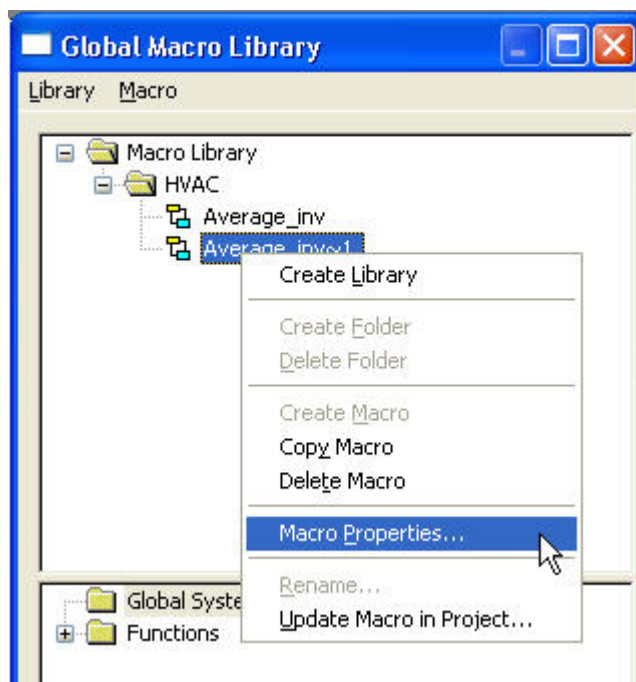
Prerequisites

1. The user is logged in.
2. There must be at least one global macro.

Procedure

1. Click menu item Database > Macro Library... , or click on button .

RESULT: The Global Macro Library window opens.



2. Right-click the macro.
3. In the context menu, click **Macro Properties**.

RESULT: The Macro properties dialog box displays.


4. Change properties as desired. For detailed descriptions of the properties, please refer to the “Create Global Macro” section.

Copy Global Macro

Prerequisites

1. The user is logged in.
2. There must be at least one global macro.

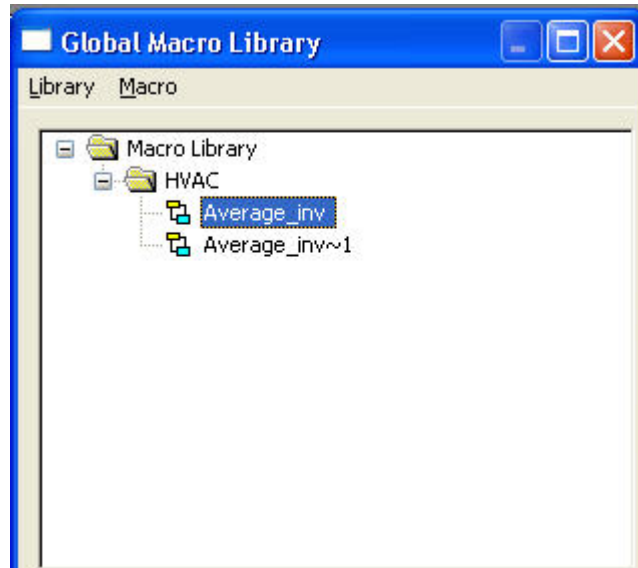
Procedure

1. Click menu item Database > Macro Library... , or click on button .

RESULT: The Global Macro Library window opens.

2. Right-click the macro you want to copy.
3. In the context menu, click Copy Macro.
4. Confirm the message box by clicking OK.

RESULT: The selected macro will be copied.



5. Change the name of the macro if desired as described in the “Edit Macro Properties” section.


Update Global Macro in Project

Global macros used in projects can be updated if the original macro in the global macro library is changed.

Prerequisites

1. The user is logged in.
2. There must be at least one global macro.

Procedure

1. Click menu item Database > Macro Library... , or click on button .

RESULT: The Global Macro Library window opens.

2. Right-click the macro you want to update.
3. In the context menu, click **Update Macro in Project**.


RESULT: The Select Target Project dialog box displays. The macro will be updated in the selected project.

4. From the Target Project drop-down listbox, select the target project, and then click OK.

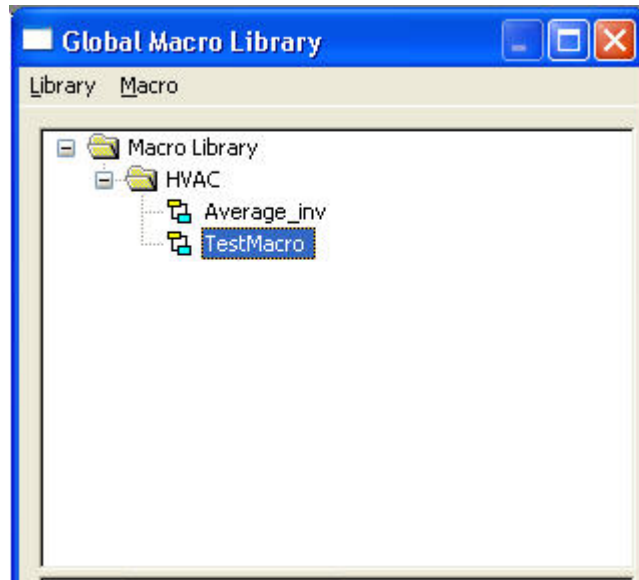
RESULT: The macro will be updated in the selected project.

Delete Global Macro

- Prerequisites**
1. The user is logged in.
 2. There must be at least one global macro.

- Procedure**
1. Click menu item Database > Macro Library... , or click on button .

RESULT: The Global Macro Library window opens.



2. Right-click the macro you want to delete.
3. In the context menu, click Delete Macro.
4. Confirm the message box by clicking OK.

RESULT: The selected macro will be removed.

NOTE: Other than the handling of macros in the control loops view, unused and used macros will be deleted. The used ones are available in the control loop, but no longer stored in the macro library.

Dataexchange between Controllers and 3rd Party Devices / Working with Reference Datapoints

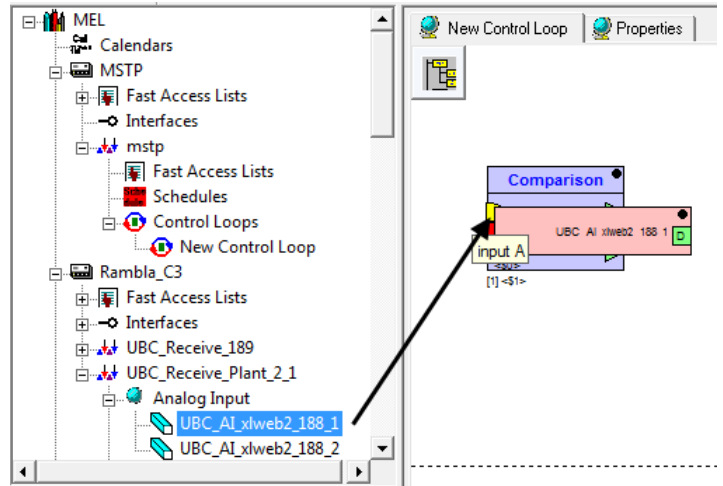
On the BACnet bus, dataexchange can occur between BACnet controllers and/ or a BACnet controller and 3rd party devices by using reference datapoints.

Reference datapoints will be mapped to any other physical or software (value) datapoint type and read or write the value of the assigned datapoint.

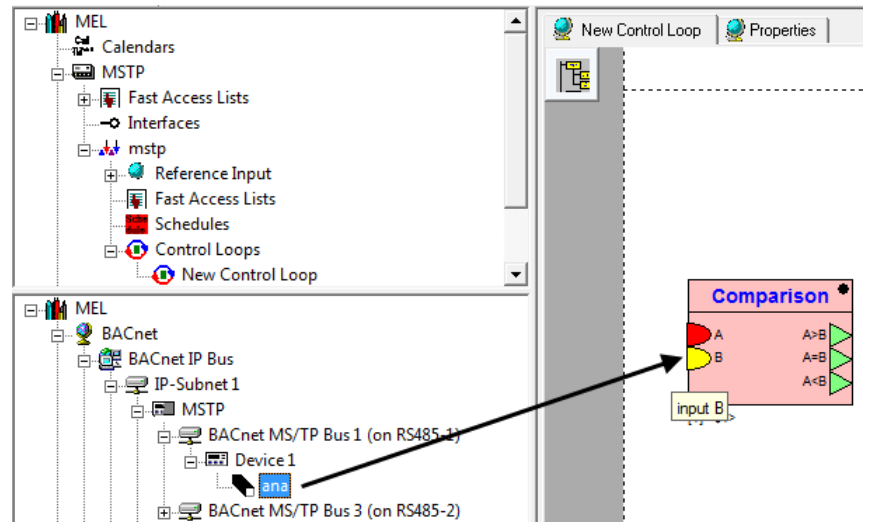
The mapping can be performed either

- on the *Properties* tab of the reference datapoint (see reference datapoint properties description in the "BACnet Points" section), or
- in the control loop by connecting datapoints of the controller or BACnet objects of a 3rd party device to inputs or outputs of a control icon

- Procedure**
1. Display the control icon of the control loop.
 2. For assigning hardware points of the controller, expand the project tree and navigate to the plant that includes the input, output or value datapoint you want to map to a reference point.

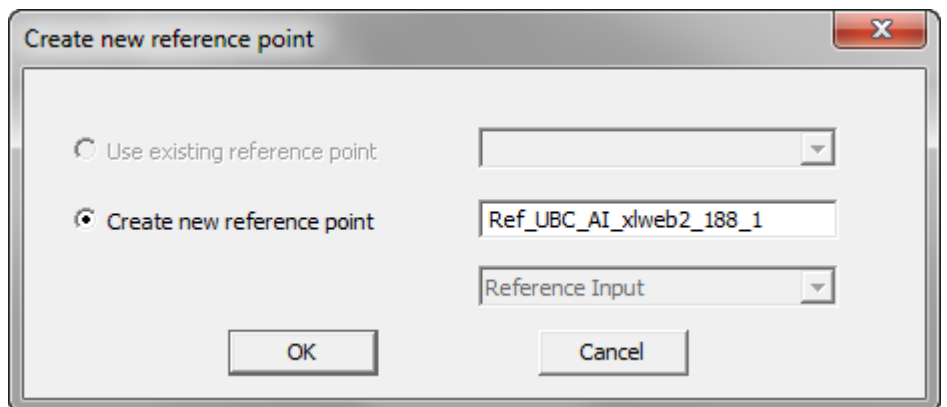


3. Or, for assigning a BACnet object of a 3rd party device, expand the network tree and navigate to the device that includes the BACnet object, you want to map to a reference point.



4. In the corresponding tree, select the datapoint or BACnet object, and then drag&drop it to the input or output of the control icon.

RESULT: The *Create new reference point* dialog box displays. The name of the new reference point which will be mapped to the datapoint is displayed. It's name reads according to the terminology as follows: Ref_<datapoint name> or Ref_<BACnet object name>

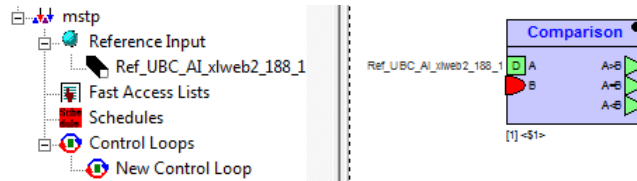


5. Click OK.

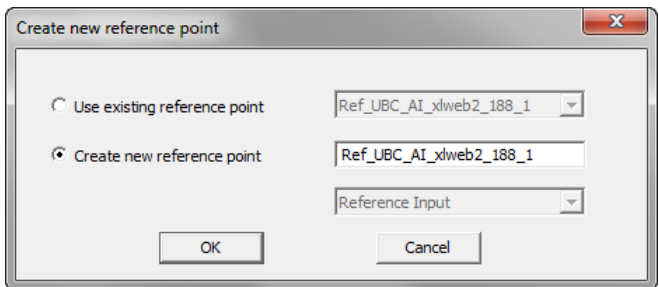
RESULT:

The reference point is created and mapped to the referencing datapoint or BACnet object.

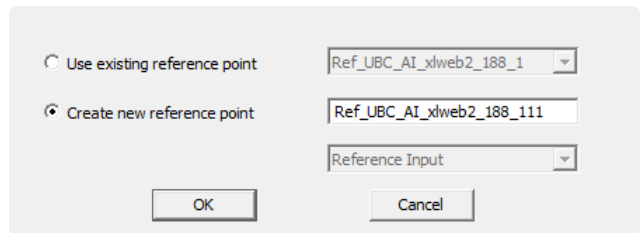
The name of the reference point or BACnet object is shown at the input or output of the control icon. In the tree, the reference point or reference BACnet object is added to corresponding folder (Reference Input or Reference Output). The folder location depends on whether the datapoint or BACnet object has been connected to an input or to an output of the control icon. It is not dependent on the datapoint or BACnet object type (input, output) that has been connected.



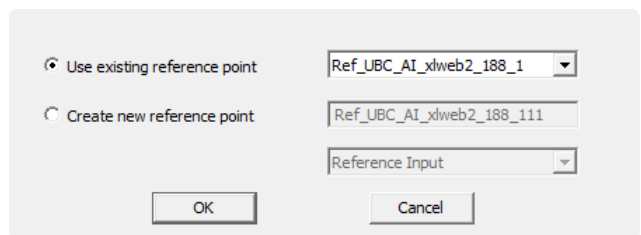
NOTE: If the datapoint or BACnet object that should be mapped to the control icon is already mapped to a reference point or BACnet object, the predefined name must be changed or the reference must be kept by mapping the datapoint to the existing reference point or the BACnet object to the existing BAC net object.



Example 1: Referenced datapoint will be mapped to new reference point with changed name



Example 2: Referenced datapoint will be mapped to existing reference point with same name as before



Find Referenced Datapoint / BACnet Object

Purpose Displaying the referenced datapoint / BACnet object of a reference input or output datapoint.

NOTE: In the following the procedure of finding a referenced datapoint is described. The same procedure can be applied for finding a referenced BACnet object.

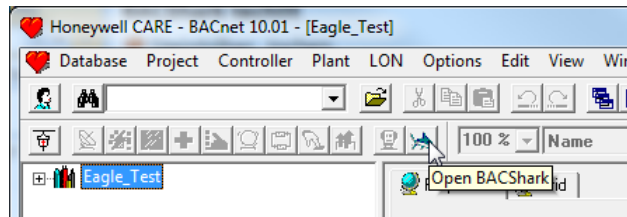
- Procedure**
1. A referenced datapoint can be found in the project tree as follows:
 - a. Expand the tree and navigate to the plant that includes the reference datapoint.
 - b. In the tree, right-click the reference point, and then select **Goto Reference** in the context menu.

Import Datapoint Information from 3rd Party BACnet Device into Eagle Controller

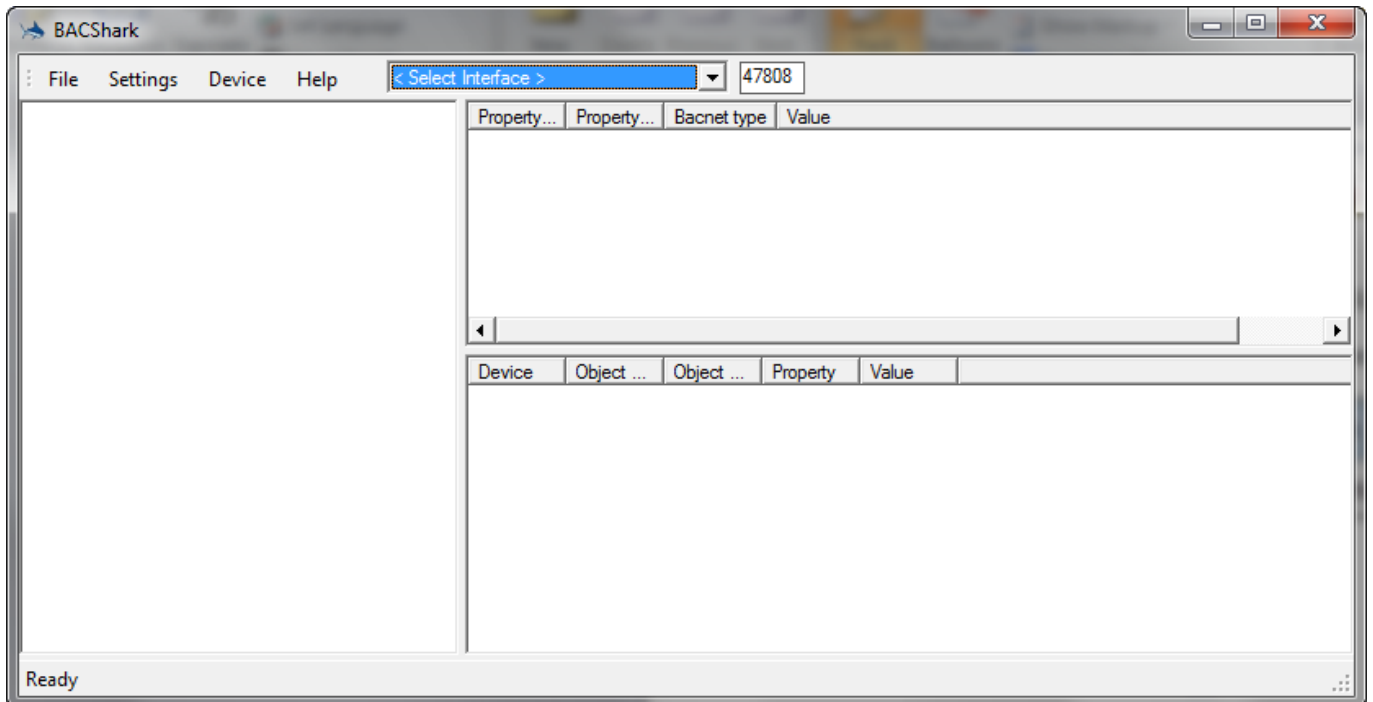
Purpose Import datapoint information from 3rd Party BACnet Device into Eagle Controller for using it in the control strategy.

Prerequisites CARE PC must be connected to the BACnet network via IP network interface. Scanning a BACnet IP network via USB connection is not possible.

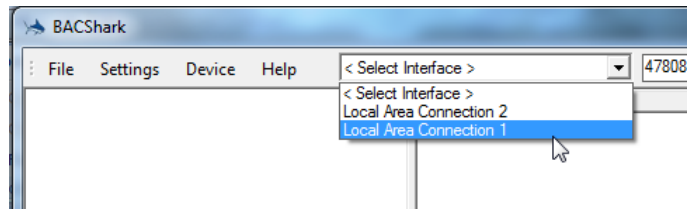
- Procedure**
1. Click on **BACShark** program icon in the CARE toolbar.



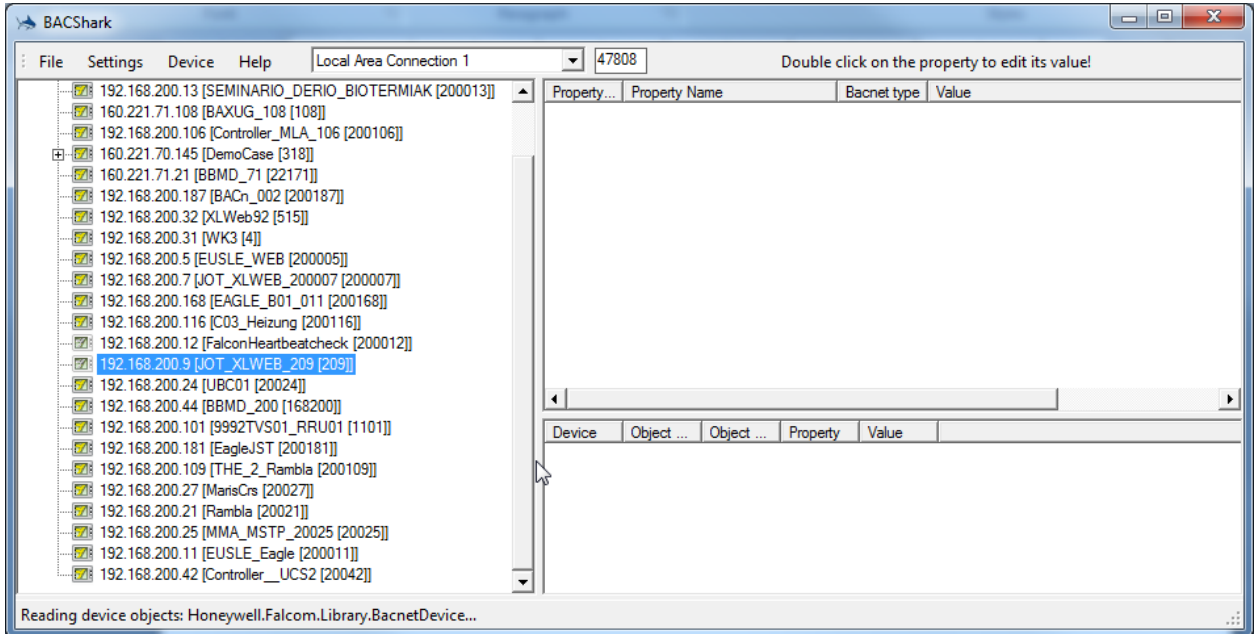
RESULT: BACShark is invoked.



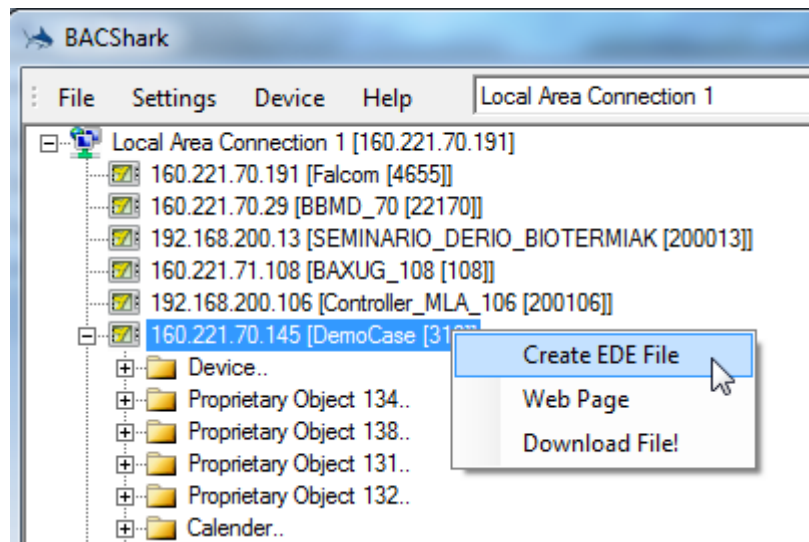
- In the BACShark menu bar, select the ethernet network interface.



RESULT: BACShark is scanning the network and displays all available BACnet devices in the left pane.

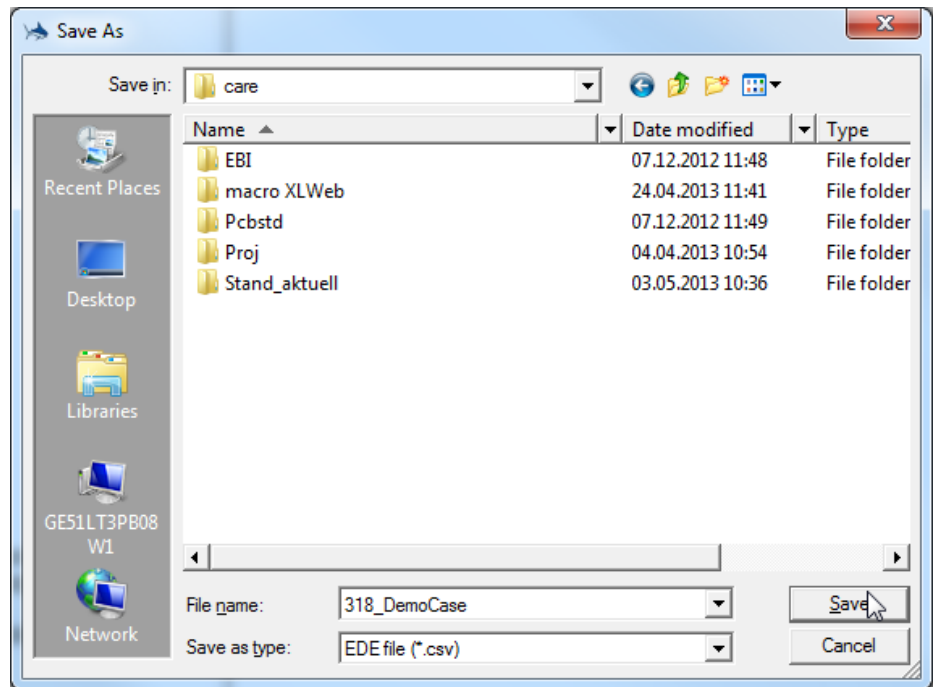


- Expand the tree and browse to the BACnet 3rd party device of which information you want to import into the Eagle controller of your CARE project.



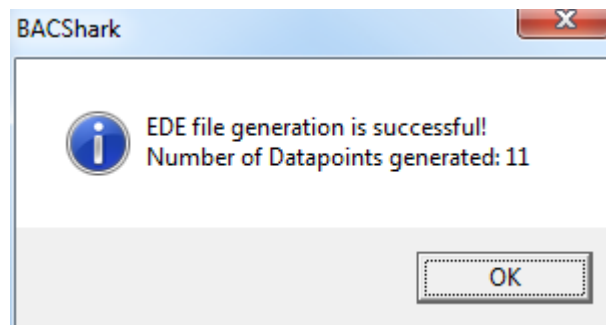
- Right-click the BACnet 3rd party device, and then click **Create EDE File** in the context menu.

RESULT: The Save As dialog box displays.

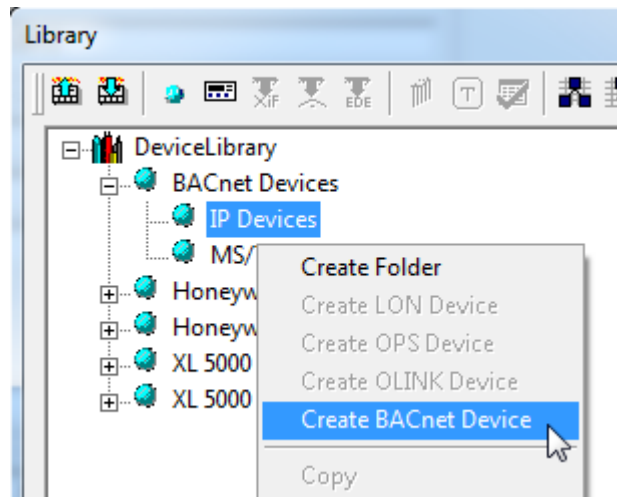


5. In **File name** enter a file name for the *.EDE* file, and then click **Save**.

RESULT: The *.EDE* file will be created and saved to the selected folder. The following message box finally displays.

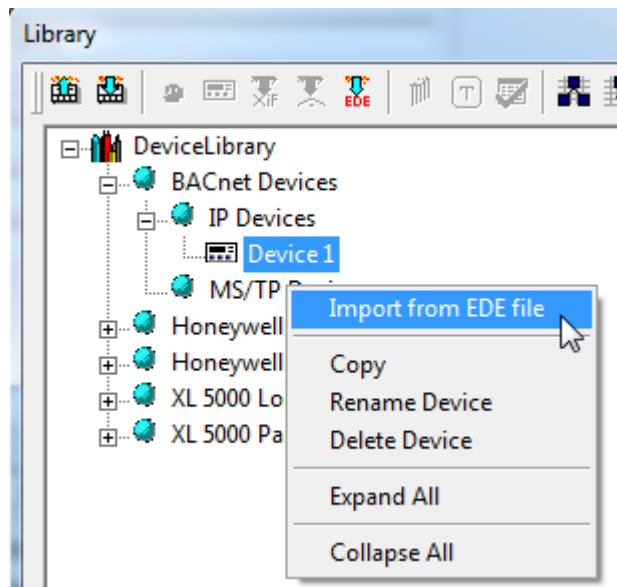


6. Click OK, and then close BACShark.
7. Open the CARE project.
8. Open the Device Library.
9. In the Device Library, expand the *BACnet Devices* folder.



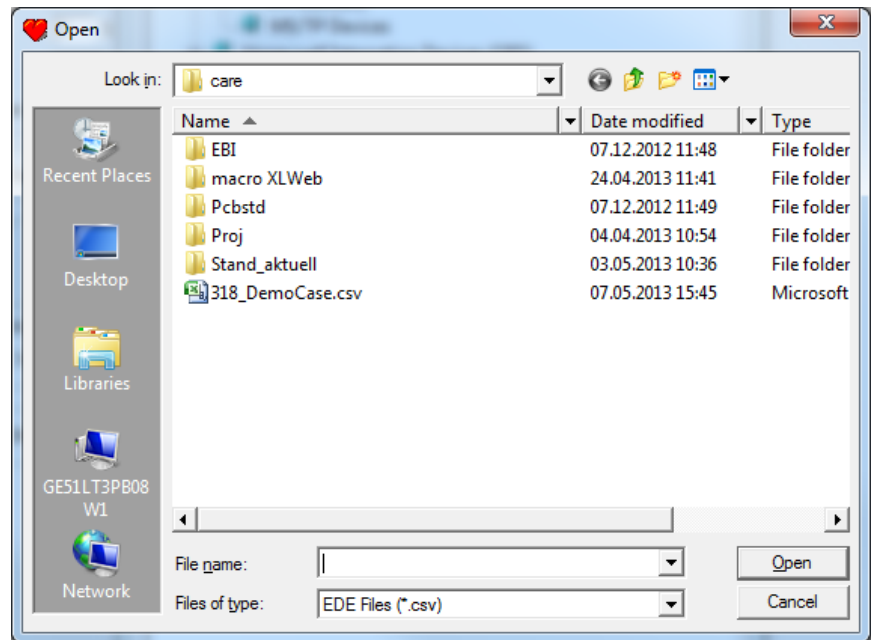
10. Right-click the *IP Devices* folder, and then click **Create BACnet Device** in the context menu.

RESULT: A blank device is added to the *IP Devices* folder.



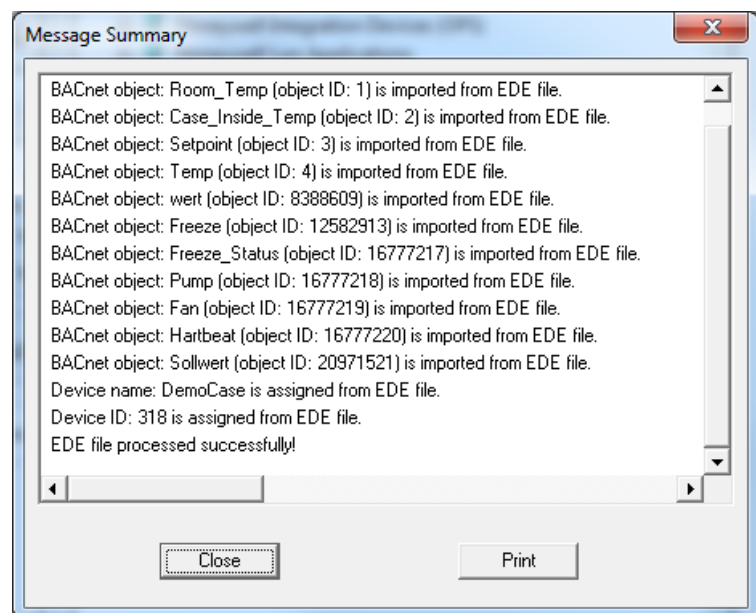
11. Right-click the device, and then click **Import from EDE file** in the context menu.

RESULT: The *Open* dialog box displays.

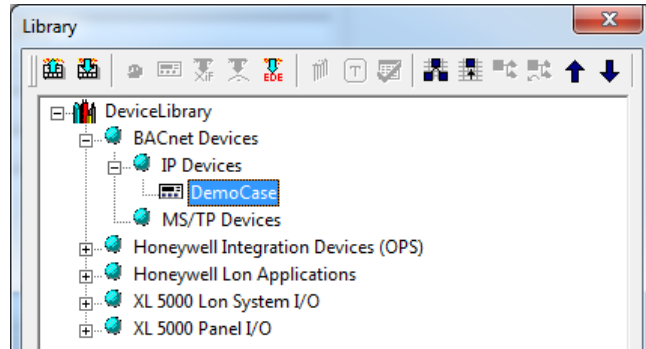


12. Locate the *.EDE* file, select it, and then click **Open**.

RESULT: The *Message Summary* dialog box displays. In this, the imported information of the BACnet device is listed. The successful import of the *.EDE* file is indicated at the end of the summary.

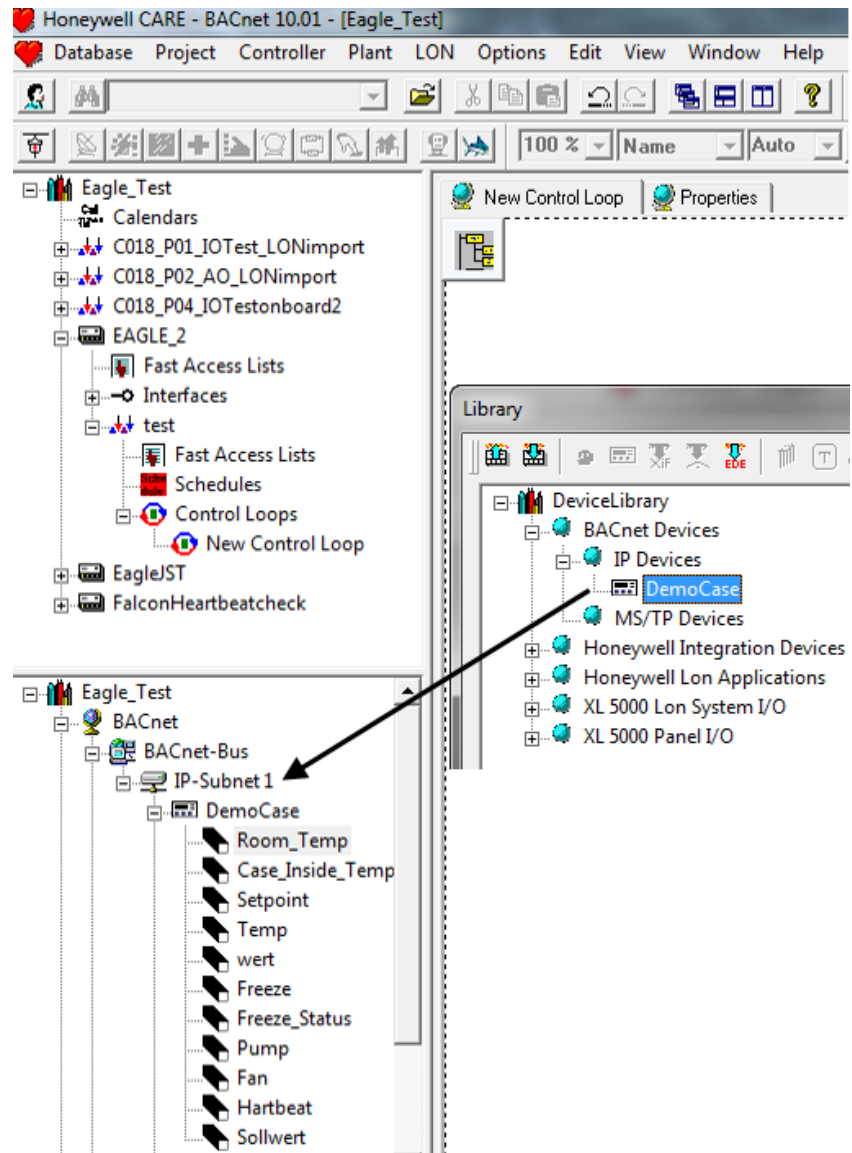


In the Device Library the BACnet device is named accordingly.



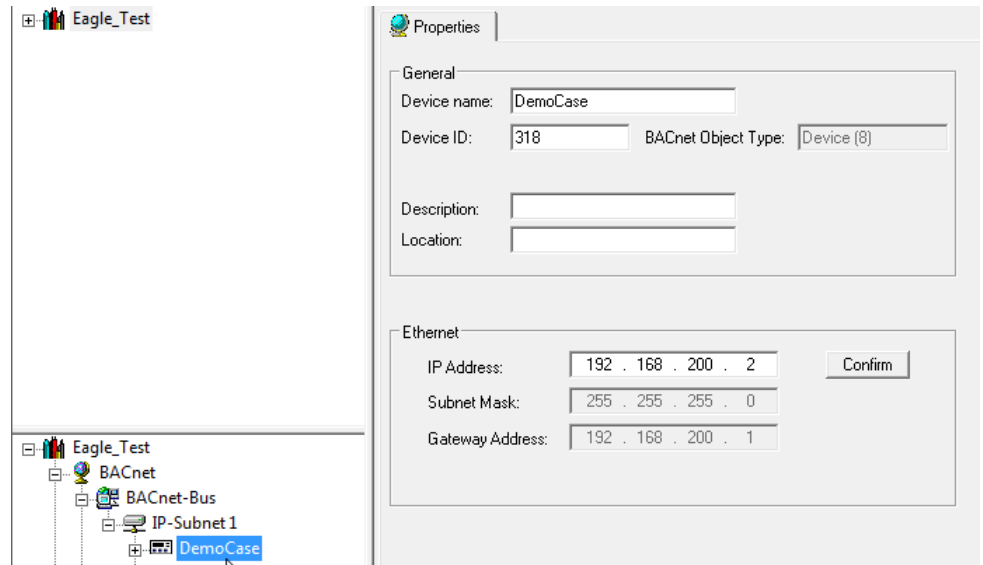
The device information can now be used in the control strategy using reference point functionality.

13. From the device library, add the imported 3rd party BACnet device to the BACnet IP subnet via drag&drop.



14. Open the control loop, and then drag&drop the BACnet object(s) of the BACnet 3rd party device from the network tree to the control loop pane as described in the "Data exchange between Controllers and 3rd Party Devices / Working with Reference Datapoints" section.

15. For IP devices, check the device ID and IP address and change them according to your requirements if necessary.



16. For MS/TP devices, check the device ID and MAC address and change them according to your requirements if necessary.



Read and Use Status Flags from Remote Devices

Purpose Read status flags from a point of a remote device using the reference input in order to use the status flag information in the application of the controller. The following status flags can be read:

- in alarm
- in fault
- out of service
- overridden

The status flag information is coded as a BitString with 4 bits (0..3) in a proprietary property. The property can be read via BACnet and in DDC programs.

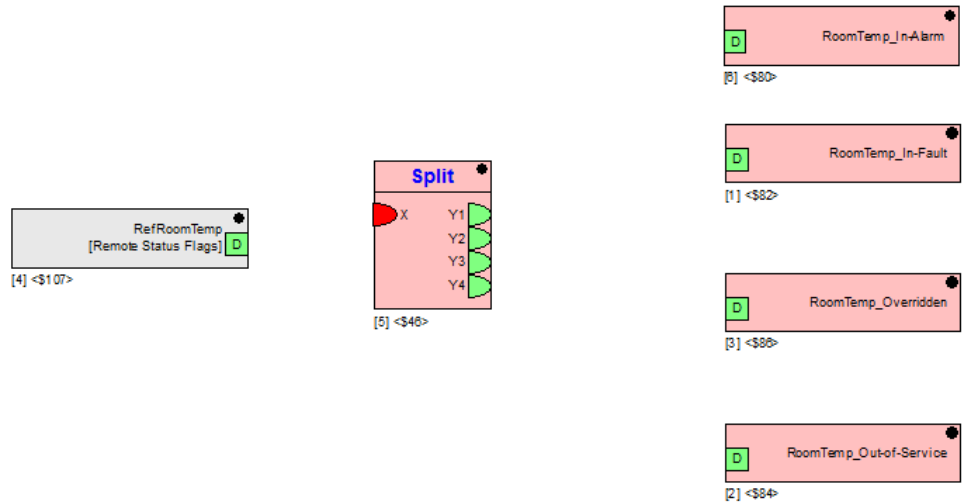
Prerequisites

Use an existing reference input point or create a new reference input point in the controller which reads the status flags of the point in the remote device. In the controller, add the remote point to the reference input point and create 4 binary value points, each for reading one status flag value.

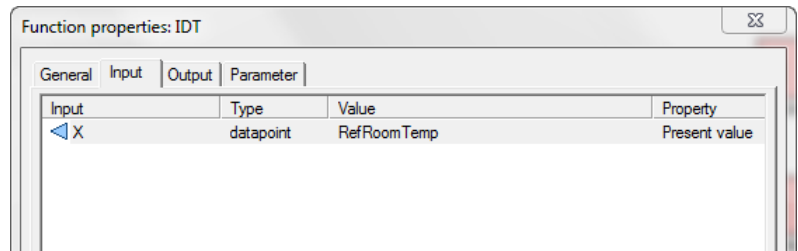
The following procedure describes an example on how to read and use status flag information by using the reference input, the Split function and 4 binary value points for using the status flag values in the application.

Procedure

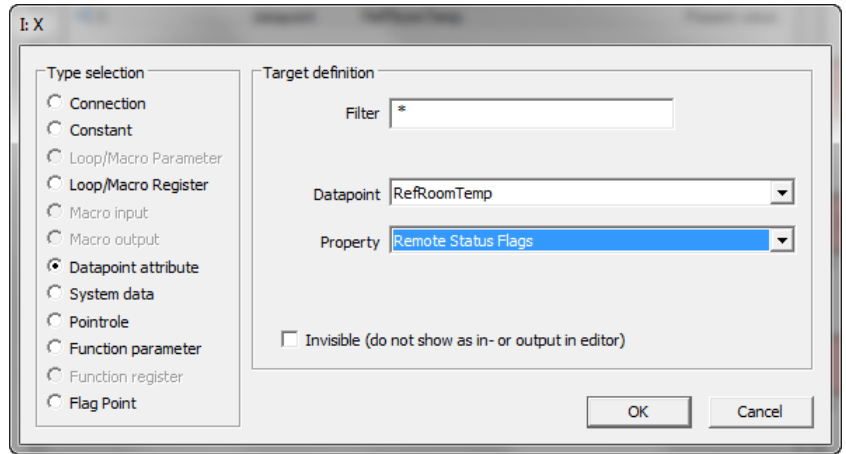
1. Add the reference input point, the Split function and the four binary value points to the control loop pane.



2. Double-click the reference input point and select the *Input* tab in the *Function properties* dialog box.

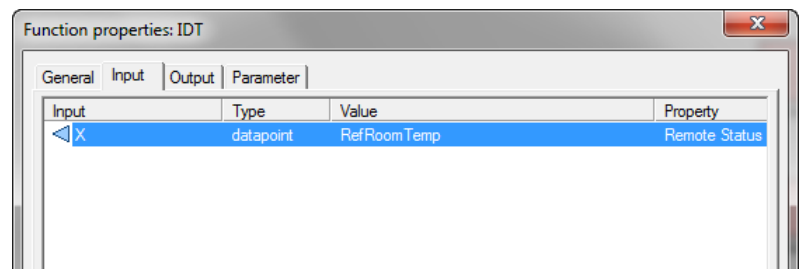


3. Double-click the reference input point.
4. In the *Input* dialog box, select the 'Remote Status Flags' property from the **Property** drop-down listbox.



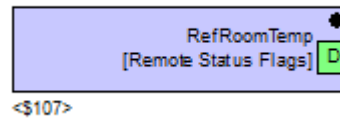
5. Click OK.

RESULT: The *Function properties* dialog box redisplay

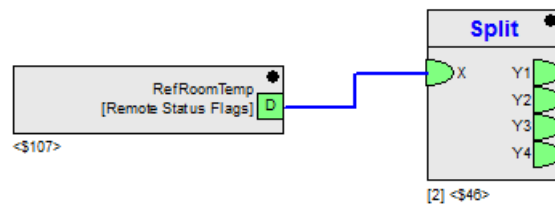


6. Click OK.

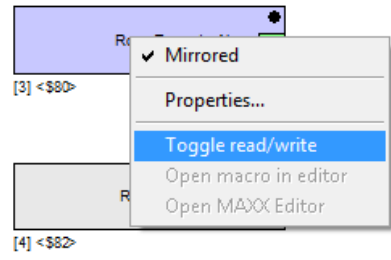
RESULT: The reference input indicates the [Remote Status Flags] property selection.



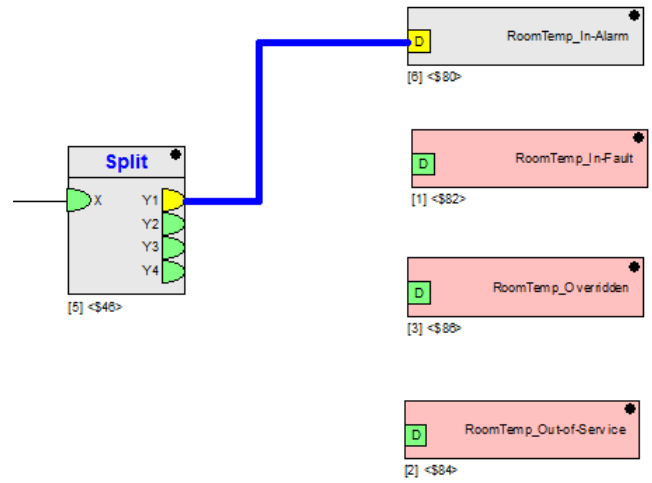
7. Connect the reference input point with the input of the Split function. Make sure that the Split function has at least four outputs Y1..Y4. For detailed description on the Split function, please refer to the Control Icons User Guide, EN2Z-0940GE51.



8. **Toggle read/write** for each of the binary value points.



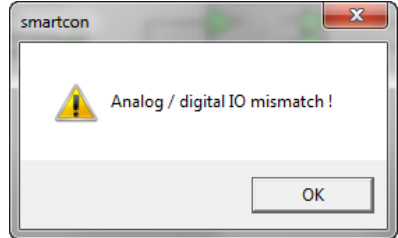
9. Connect the outputs (Y1..Y4) of the Split function to the binary value points.

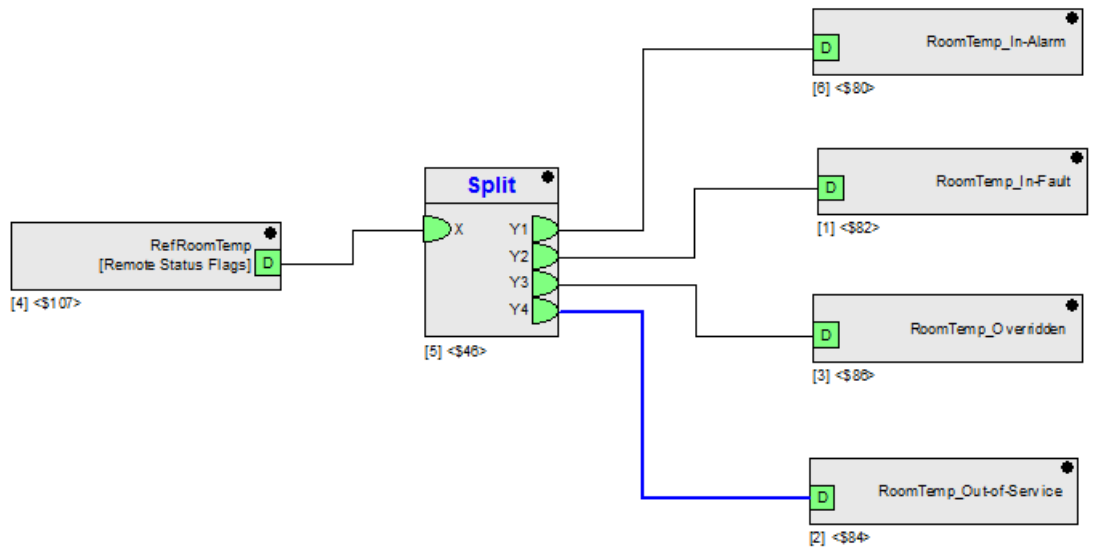


The transmission of the status flag value (4Bitstring) via input X is as follows:

- Y1: bit 0 (1 = in alarm)
- Y2: bit 1 (2 = in fault)
- Y3: bit 2 (4 = overridden)
- Y4: bit 3 (8 = out of service)

10. Confirm the message box always displayed by clicking OK.





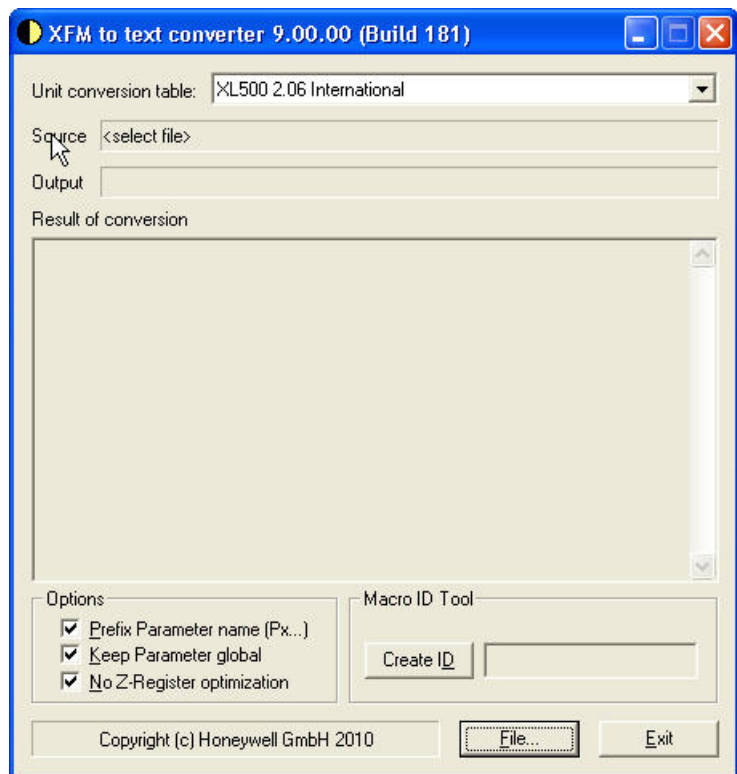
Import Text Macro (XFM)

XMFs can be reused in the FALCON or EAGLE controller by importing them into the Global Macro Library. Note, that this function is restricted to users that have administrator rights. Before importing an XFM in CARE, it must be converted into a text file by using the XFM to Text Converter.

Procedure

1. In the CARE folder, navigate to the folder 'csd2txt' and double-click on *csd2txt.exe*.

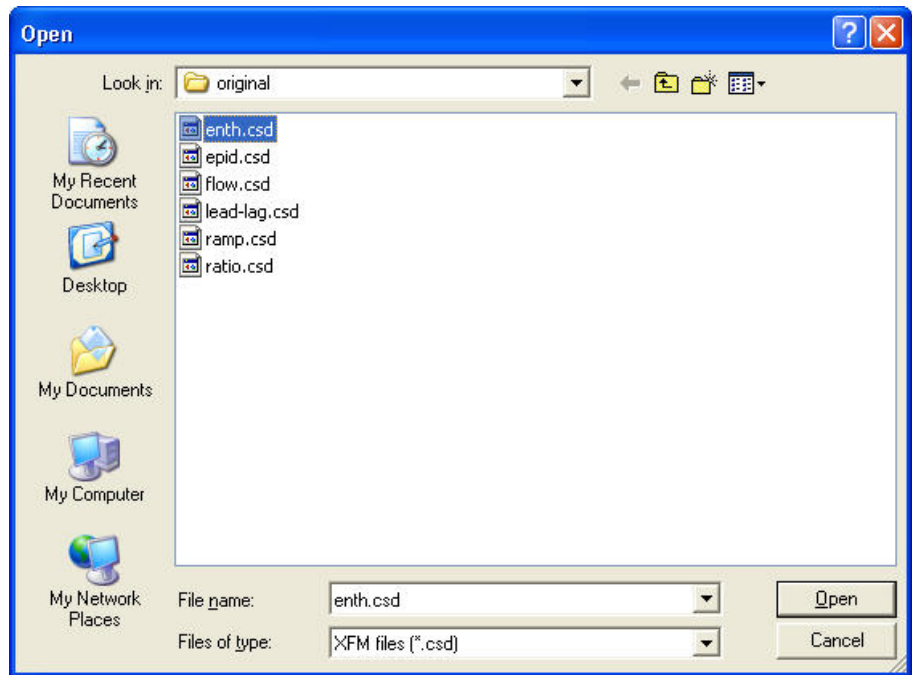
RESULT: The XFM to text convert dialog box displays.



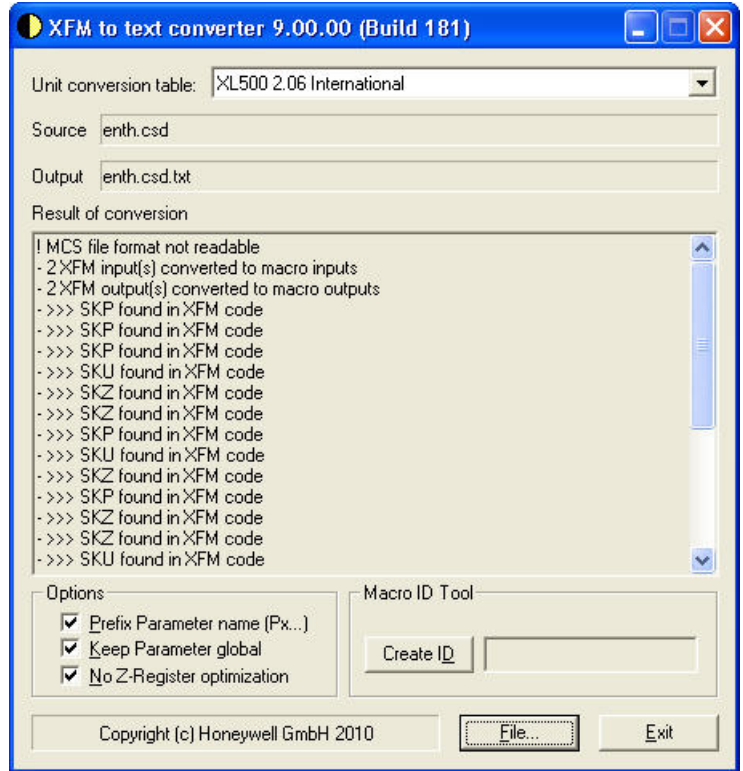
2. From the **Unit Conversion table** drop-down listbox, select the unit conversion table. The list shows all table names which were found in the UNITCONV.INI. It


may be necessary to create or change this table in the UNITCONV.INI file before starting the application

3. Check **Prefix Parameter name (Px...)** if a prefix "Px" should be added to all parameters in the text file, with 'x' replaced by the parameter index.
4. Check **Keep Parameter global** if all XFM parameter will be kept as global macro parameters, even if they would become local function parameters.
5. Click the **Create ID** button if you want to create a new macro id, which will be shown in the text field right to the button.
6. Click **File...** button, select the XFM (*csd* file) you want to convert to a *txt* file in the *Open* dialog box and click the **OK** button. It is recommended to have the RACL Editor source file of the selected XFM (same name, but extension *MCS*) stored in the same directory. Then the XFM to text converter is able to read the statement comments from the source file and add them to the text output.

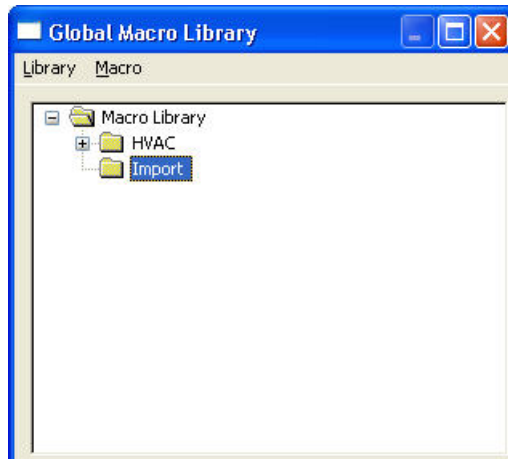


RESULT: In the XFM to text converter dialog box, the selected *csd* file name is displayed in the **Source** field. In the **Output** field, the converted *txt* file name is displayed. The result of the conversion is displayed under **Result of conversion**.



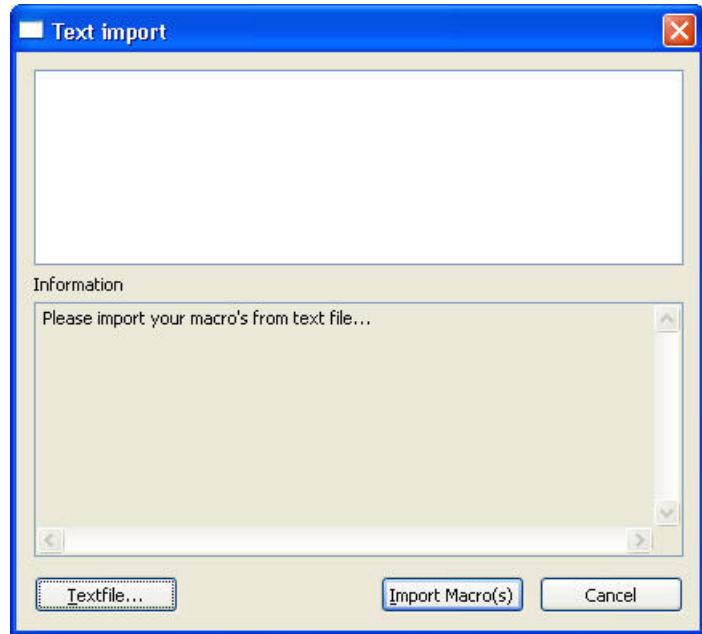
7. Check the conversion result for errors. If successful, the created text file would be saved in the same directory where the XFM was loaded from, with the same name but an additional extension *TXT*, for example, the XFM "AHCSA02A.CSD" will be saved to "AHCSA02A.CSD.txt".
8. Click the **Exit** button.
9. Start CARE and open the project.
10. Open the control loop.
11. Open the Global Macro Library by clicking the Global Macro Library icon .

RESULT: The *Global Macro Library* window displays.

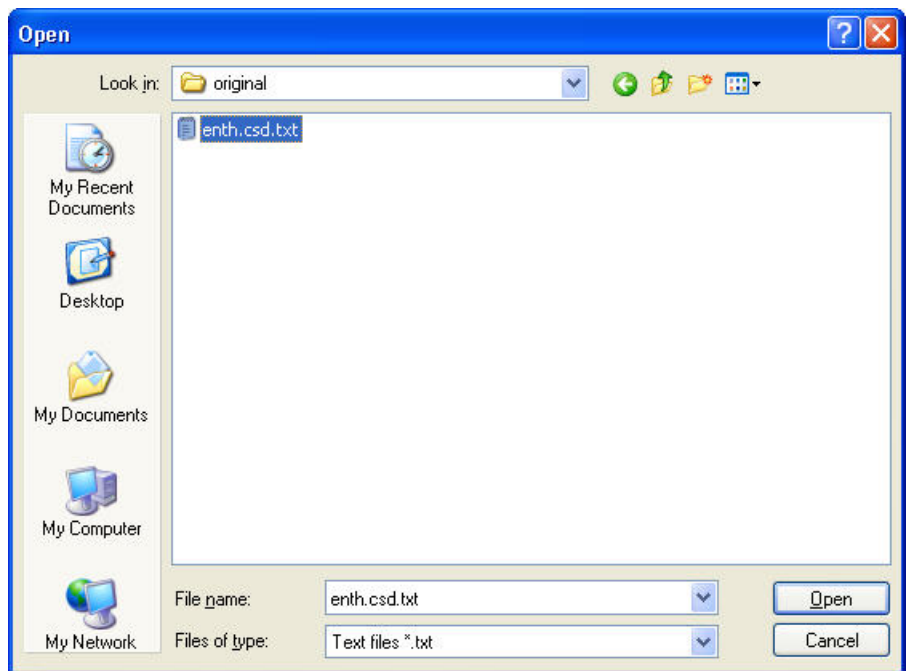


12. In the upper area, click on a folder to which the macro should be imported.
13. Click right mouse button and click on **Import Text Macro** in the context menu.

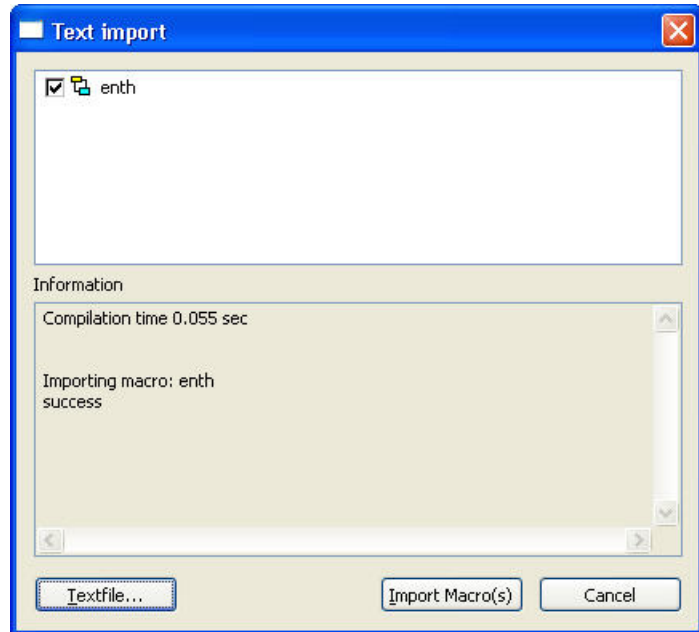
RESULT: The *Text import* dialog box displays.



14. Click **Textfile...** button, select the XFM (csd file) you want to import in the *Open* dialog box and click the **OK** button.



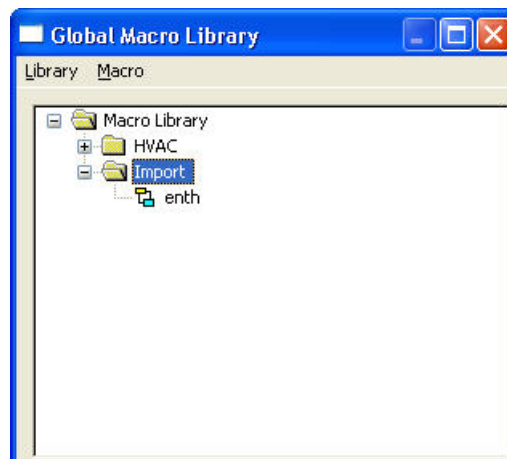
RESULT: After the file has been read short information of the read procedure is displayed and in the upper area are all macros are listed that could be read from the file.



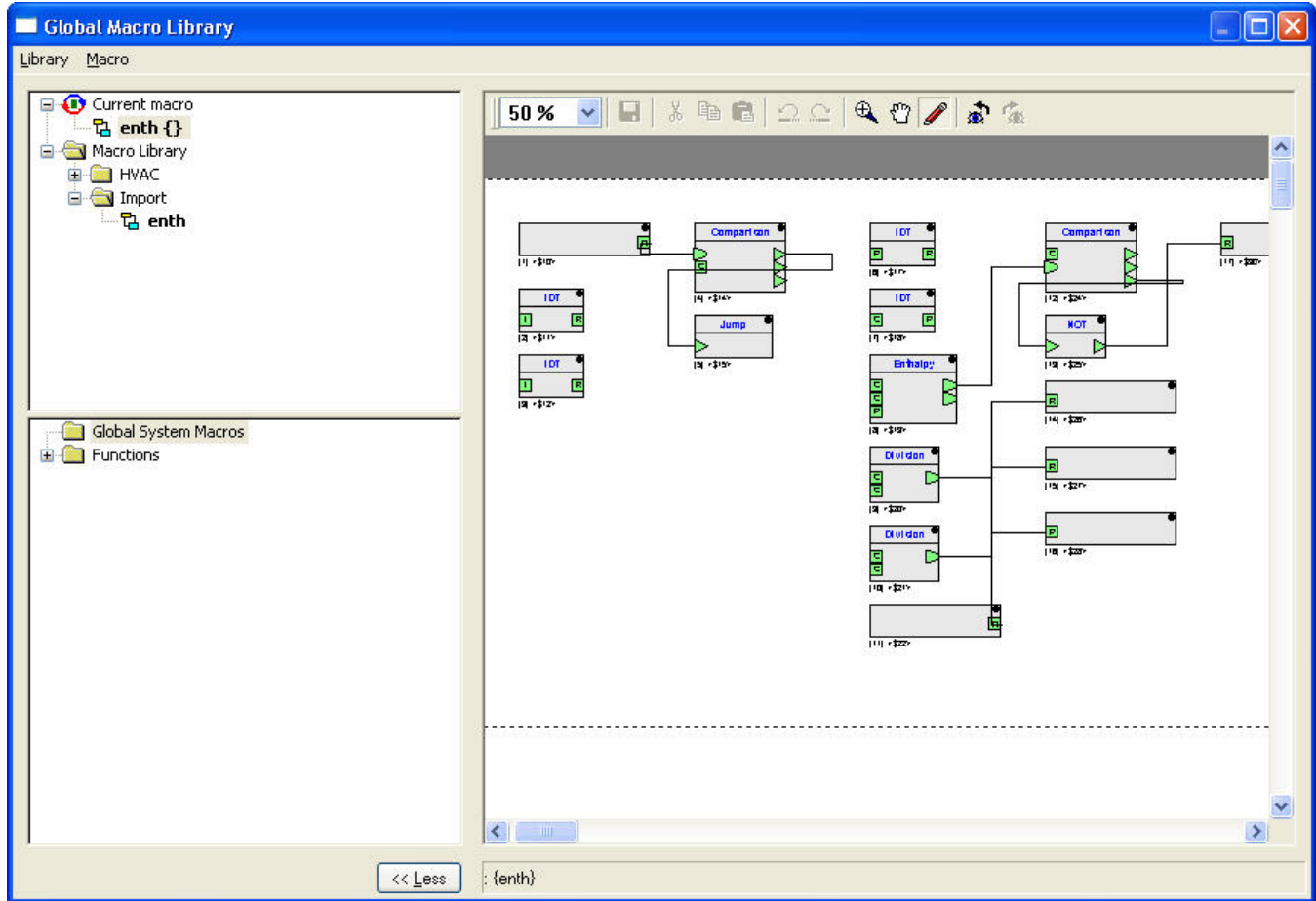
If multiple macros have been imported (see next graphic), the tree structure represents the macro dependencies.

15. Check the macros you want to import. Some macros may be checked automatically if they were needed for other macros you want to import. All macros you want to import must not already exist in the selected macro library. Otherwise an error message will occur and the import fails. If there are errors in the text file, the information text will display a brief description of the error and where it was found in the text.
16. If the text import has been executed properly, click the **Import Macro(s)** button.

RESULT: The macro (XFM) is imported and displayed in the tree in the *Global Macro Library* window.



17. Click the More>> button and double-click on the macro icon in the upper tree for viewing the macro logic on the right pane.



18. If desired, edit the macro logic on the right pane.
19. Click the **Exit** button.

Loop Objects

Purpose A loop object provides the PID control function and allows access of parameters in control loops and control macros via BACnet. The loop object can only be used in one and the same controller.

The loop object has the following BACnet properties which are described in detail in the "Create Loop Object" section:

Values

- Controlled Variable (X)
- Setpoint (W)
- Manipulated Variable (Y)

Parameters

- Proportional Constant (Xp)
- Integral Constant (Tn)
- Derivative Constant (Tv)
- Bias
- Maximum Output
- Minimum Output

Miscellaneous

- Action (direct, reverse)
- Priority of writing
- Speed class
- COV
- Object type
- Object ID
- Instance number
- Descriptor
- Alarm text
- Access Rights
- Alarming
- Event Enrollments

Functional Modes The Loop Object can be set into 2 different functional modes:

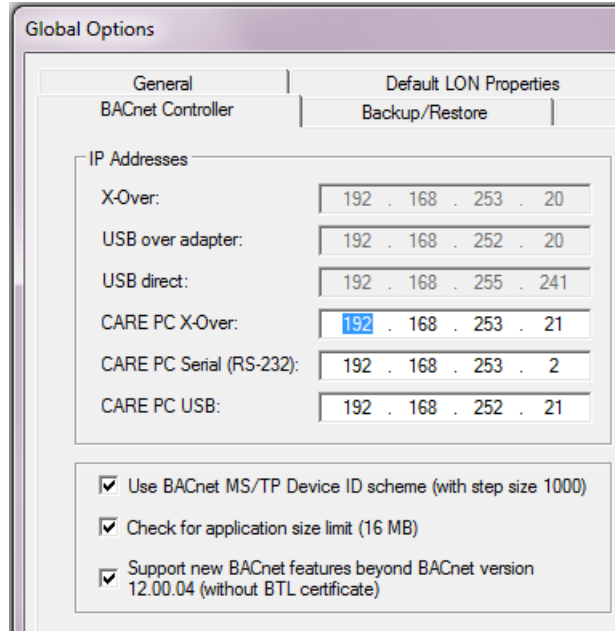
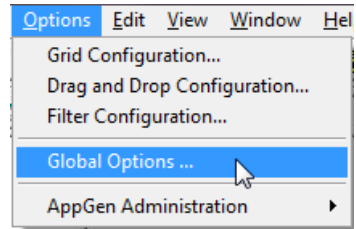
1. as PID controller executing its intrinsic PID function. In this case the BACnet client / HTML Web Interface has only access to the loop object and not to parameters in control loops / macros (applies to CARE 10.05.00 and higher)
2. as interface which works as a shell for accessing parameters in control loops and macros by a BACnet client / HTML Web Interface without executing the PID function (available in CARE 10.08.00 and higher)

In the following, only the main Interface function of the loop object allowing the access of control loop / macro parameters by the BACnet client / HTML Web Interface will be described.

For a general description of the PID control function, please refer to the Control Icons User Guide EN2B-0184GE51. For descriptions of BACnet terms, please refer to standard BACnet documentation (e.g. the BACnet ANSI / ASHRAE Standard).

Create Loop Object

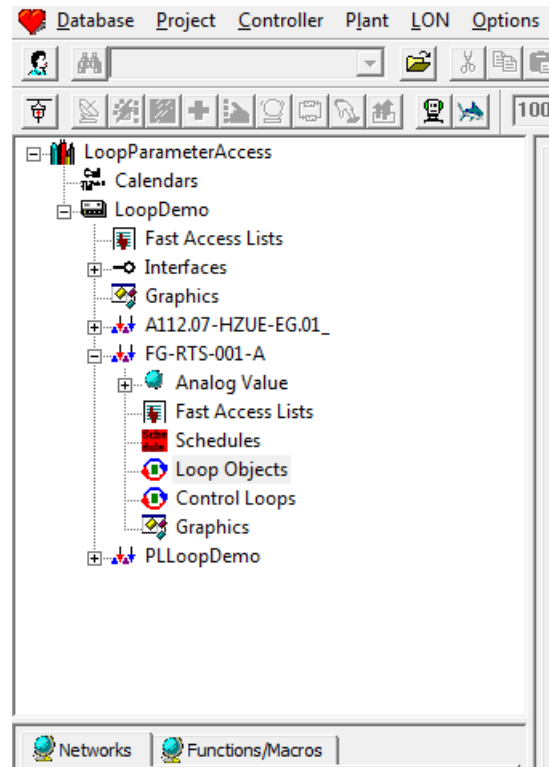
Prerequisites The Loop Object must be available in the control loop by enabling the "Support new BACnet features ..." option on the *BACnet* tab in the **Global Options** dialog.



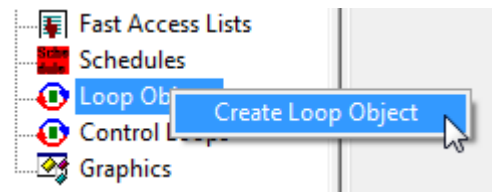
(...continued on next page)

General Procedure

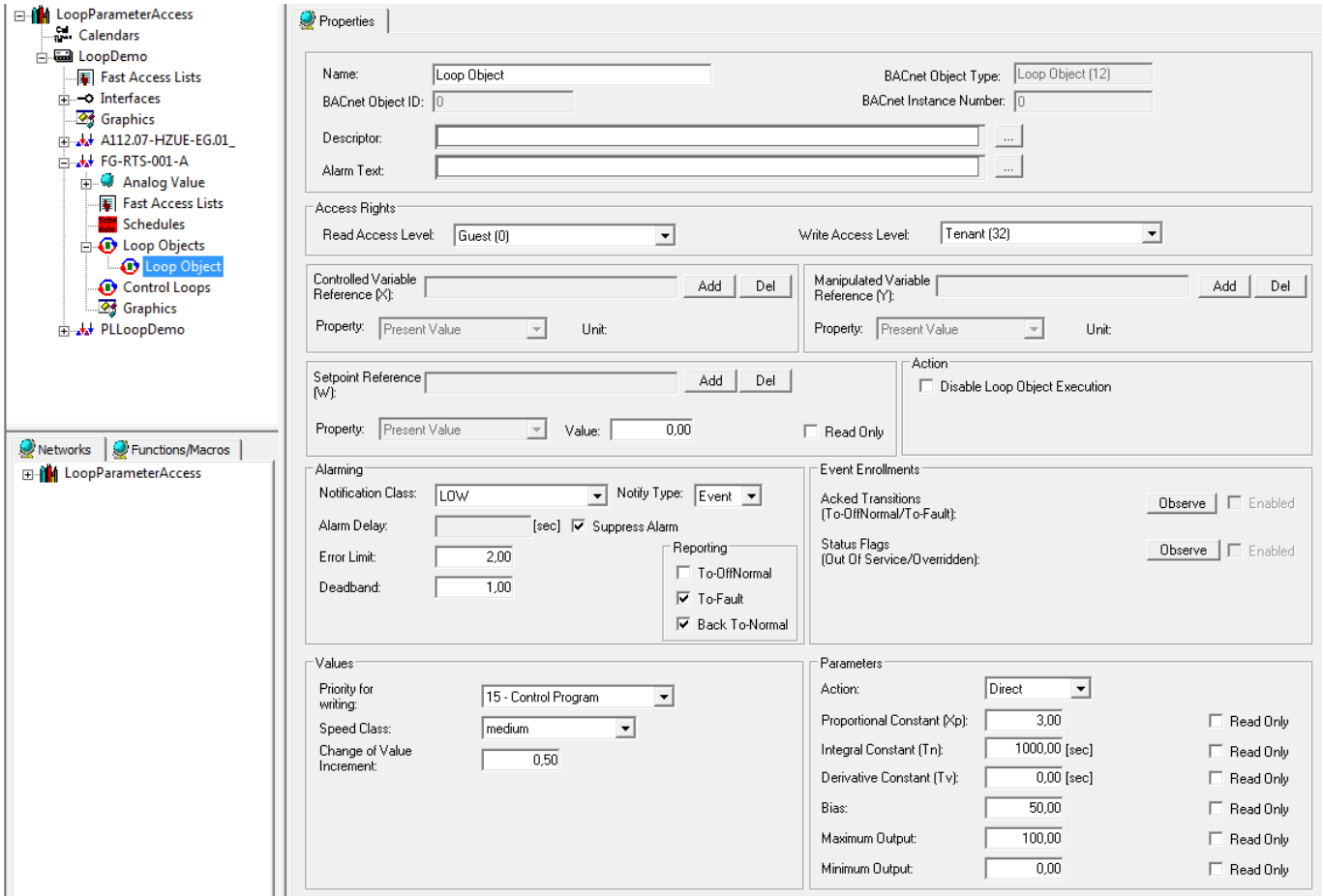
1. This procedure describes the general steps and possible settings when creating a loop object. For applying the loop object with its preferred function as interface for parameter access, particular settings are necessary which are also described in detail in the "BACnet Parameter Access via Loop Object" section.
2. Expand the project in the tree view and browse to the Loop Objects folder.



3. Right-click the *Loop Objects* folder, and then click **Create Loop Object**.



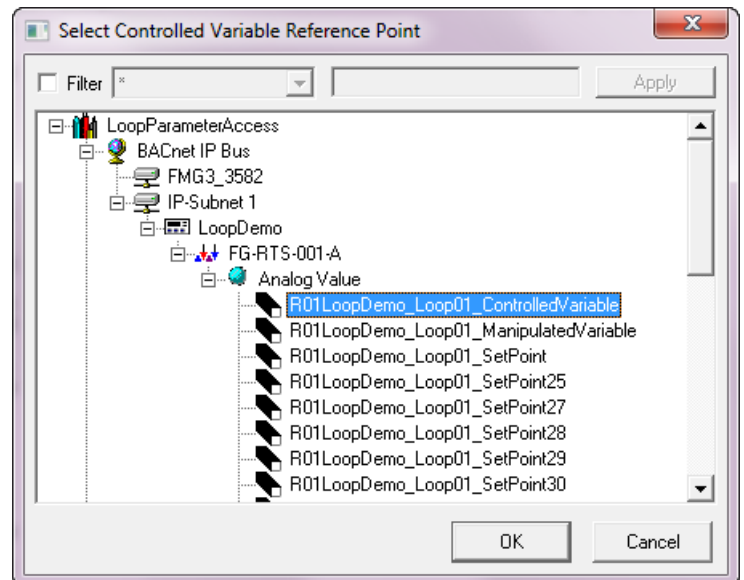
RESULT: The loop object is created and its properties are displayed on the Properties tab on the right.



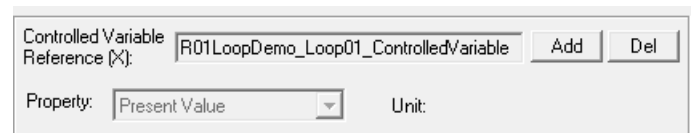
4. Enter/select loop object properties by doing any of the following:

- a. In **Name**, enter a name.
- b. In **Descriptor**, select a descriptor by clicking the dotted button on the right. This invokes the Miscellaneous Text Editor. Please refer to the Miscellaneous Text Editor chapter for details on how to add and change descriptors.
- c. In **Alarm Text**, select a set of alarm texts by clicking the dotted button on the right. This invokes the Miscellaneous Text Editor. Please refer to the Miscellaneous Text Editor chapter for details on how to add and change alarm texts.
- d. In **Read Access Level** select the access rights for reading values of the loop object in the Web Interface.
- e. In **Write Access Level**, select the access rights for writing values to the loop object in the Web Interface.

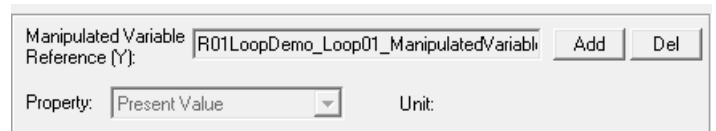
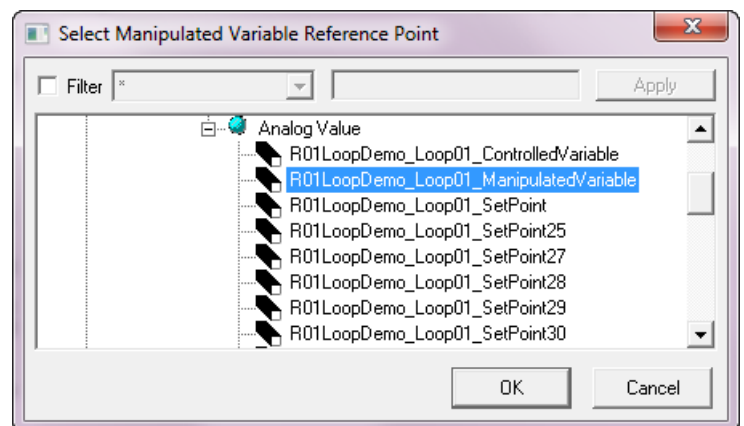
All users having a user level equal or higher than the assigned read access respectively write access level of the loop object will have this access right enabled in the Web Interface, all others will not (for further details, please refer to the User Access Manager section).
- f. In **Controlled Variable Reference (X)**, assign the controlled input datapoint by clicking the **Add** button, then selecting the point in the *Select Controlled Variable Reference* dialog box, and then clicking **OK**.



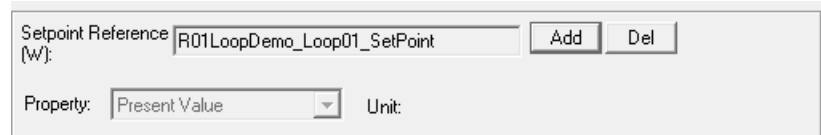
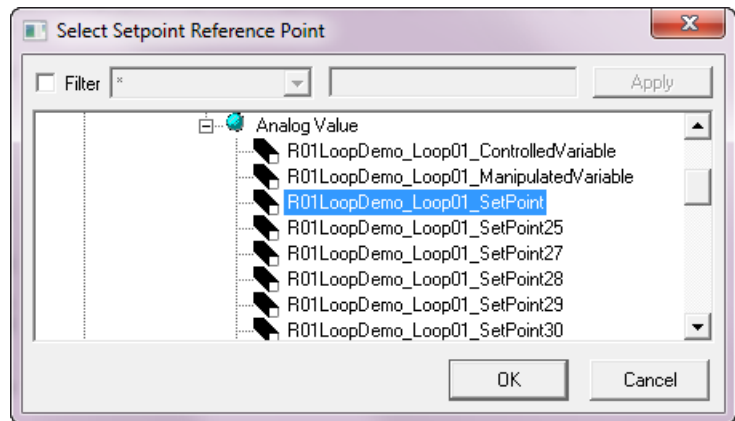
The assigned input point is displayed in the **Controlled Variable Reference (X)** field.



- g. In **Manipulated Variable Reference (Y)**, assign the manipulated output datapoint in the same way as described for the Controlled Variable Reference (X).



- h. If you want to undo an assignment, click the **Del** button to remove the datapoint.
- i. In **Setpoint Reference (W)**, assign the input datapoint for the setpoint in the same way as described for the Controlled Variable Reference (X). Or, enter a value in the **Value** field alternatively. If you want to read and also write to the setpoint via BACnet, leave its **Read Only** flag unchecked. If you want to read and write to the setpoint via control loop (RACL) but not to write to it via BACnet, check its **Read Only** flag (not available if a datapoint was assigned via **Add** button).



j. Check the **Disable Loop Object Execution** checkbox if you want to enable the usage of the loop object as interface for parameter access in control loops and macros, or leave the checkbox unchecked if you want to use the intrinsic PID function of the loop object.

k. In **Notification Class**, enable alarming for the datapoint by selecting a notification class with a given priority. By default the following notification classes with descending priority can be selected:

- Urgent
- High
- Low
- Journal

Each recipient which is assigned to this notification class will receive the datapoint alarm triggered by the selected notification. But, alarms will only be generated for enabled transitions (To-Normal, To-OffNormal, and/or To-Fault) of a recipient. Each enabled transition will be propagated with the selected notification. (For further details please refer to the Notification Class Manager section).

This connection has not to be mixed up with the transitions selected under Reporting (see Reporting description below).

l. In **Notify Type**, select the notify type.

m. Check **Suppress Alarm** if alarms should not be generated. Or, uncheck **Suppress Alarm** if alarms should be generated. In case of the generation of alarms setting an alarm delay time is recommended in order to avoid alarms in case of overshoots.

n. In **Alarm Delay**, enter an alarm delay (only enabled if Suppress Alarm is disabled). In **Error Limit**, enter the absolute value for the difference between the controlled variable value and the setpoint (error) that must be exceeded before a 'To Offnormal' event is generated. Please consider the input of an alarm delay.

p. In **Deadband**, define the value of the deadband in order to set off an alarm of event type 'To-Normal'. For this, the present value must, for at least the defined alarm delay (time), remain within the range:

Low limit plus deadband and high limit minus deadband.

q. Under **Reporting**, check which transition type (To-OffNormal, To Fault and/or Back To-Normal) will be tracked by timestamping.

- r. Under **Event Enrollments**, define which events should be observed by clicking the corresponding **Observe** button.

Acked Transitions

Allows observing the acknowledgement behavior of a user for To-Off-Normal and To-Fault transition events of the datapoint. CARE checks whether a transition event has been acknowledged or not. If a transition event has not been acknowledged within a definable delay time, an alarm based on an event enrollment (event enrollment alarm) is sent to a supervisory recipient, for example EBI.

To enable observing status flag conditions, click the **Observe** button to display the *Event Enrollment – AckedTransitions* dialog box

The screenshot shows the 'Event Enrollment - Acked Transitions' dialog box with the following fields and values:

- Name:** EE_Loop Object.AckedTransitions
- Description:** (Empty)
- Event Type:** Change Of BitString
- Event Parameters:**
 - Bit Mask:** To-OffNormal To-Fault Back To-Normal
 - List Of Values:** (Empty table)
 - Alarm Delay:** 1800 Seconds
- Notify Type:** Event
- Notification Class:** LOW
- Reporting:** To-OffNormal To-Fault Back To-Normal
- BACnet Object ID:** 0 = 0h = 0/0

In the *Event Enrollment – Acked Transitions* dialog box, do the following:

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note the event type of the event enrollment object is 'change of bitstring`.
4. Under **Event Parameters**, select the transition event(s) that should be checked for acknowledgement. The **List of Values** shows the possible logical values (checked=true, unchecked=false, CARE verifies with negative logic for the false condition) resulting from the comparison of the selected transition event(s) and the underlying bitstring mask. An event enrollment alarm will be sent, if the transition event will **not** be acknowledged within the delay time.
5. In the **Alarm Delay** field, enter an alarm delay in sec. The event enrollment alarm will be sent if the transition event has **not** been acknowledged within the delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent after an unacknowledged transition.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if the acknowledgement is missing within the alarm delay;

Back-To-Normal = event notification is sent if the acknowledgement is sent after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.

Status Flags

Allows observing status flags conditions. To enable observing status flag conditions, click the **Observe** button to display the *Event Enrollment – Status Flags* dialog box.

Event Enrollment - Status Flags

Name:

Description:

Event Type:

Event Parameters

Bit Mask	In-Alarm	Fault	Overridden	Out-Of-Service
List Of Values	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TRUE = Datapoint is in checked Status
 FALSE = Datapoint is not in checked Status
 - = don't care

Alarm Delay: Seconds

Notify Type:

Notification Class:

Reporting

To-OffNormal
 To-Fault
 Back To-Normal

BACnet Object ID:

OK Cancel

In the *Event Enrollment – Status Flags* dialog box, do the following (next page):

1. In the **Name** field, change the default name if desired.
2. In the **Description** field, enter a meaningful description if desired.
3. In the **Event Type** field, note that the event type of the event enrollment object is 'change of state'.
4. Under **Status Flags**, select the flags of which conditions should be observed. The **List of Values** shows the possible logical values (checked=true, unchecked=false) resulting from the comparison of the selected status flags and the underlying bitstring mask.
5. In the **Alarm Delay** field, enter an alarm delay in sec. An event enrollment alarm will be sent for each status flag that is enabled (checked) within the alarm delay time.
6. From the **Notify Type** drop-down listbox, select the notify type.
7. From the **Notification Class** drop-down listbox, select the notification class that defines the supervisory recipient to which the event enrollment alarm is sent.
8. Under **Reporting**, check the transition event(s) that should cause an event notification to the supervisory recipient.

NOTE:

These settings refer to the event enrollment itself not to the intrinsic reporting properties of the datapoint:

To-Off-Normal = event notification is sent if a status flag is enabled within the alarm delay;

To-Normal = event notification is sent if a status flag is disabled after the alarm delay has been expired.

If you do not check at least one transition event and one event parameter, the observation is not enabled.

9. After entering the values, click OK. On the *Properties* tab of the datapoint, the **Enabled** check box is checked.
- s. In **Priority for Writing**, select the priority.
 - t. In **Speed Class**, select the speed class. The speed class defines how often the loop will be automatically executed by the controller. The time slice of the speed class is defined in the property sheet of the controller (see "Set Execution Speed Categories" sections).
 - u. In **Change of Value Increment**, enter the COV value.
 - v. In **Action**, select the acting (direct or reverse) that the controller should perform. The output of a direct-acting controller goes lower as the sensed value becomes smaller. The output of a reverse-acting controller goes higher as the sensed value becomes smaller.
 - w. In **Proportional Constant (Xp)**, enter the value for the proportional band.
 - x. In **Integral Constant (Tn)**, enter the value for the integral action time.
 - y. In **Derivative Constant (Tv)**, enter the value for the derivative time.
 - z. In **Bias**, enter an offset value if desired.
 - aa. In **Maximum Output**, enter the maximum value.
 - bb. In **Minimum Output**, enter the minimum value.
 - cc. If you want to read and also write to a parameter via BACnet, leave its **Read Only** flag unchecked. If you want to read and write to a parameter via control loop (RACL) but not to write via BACnet, check its **Read Only** flag.

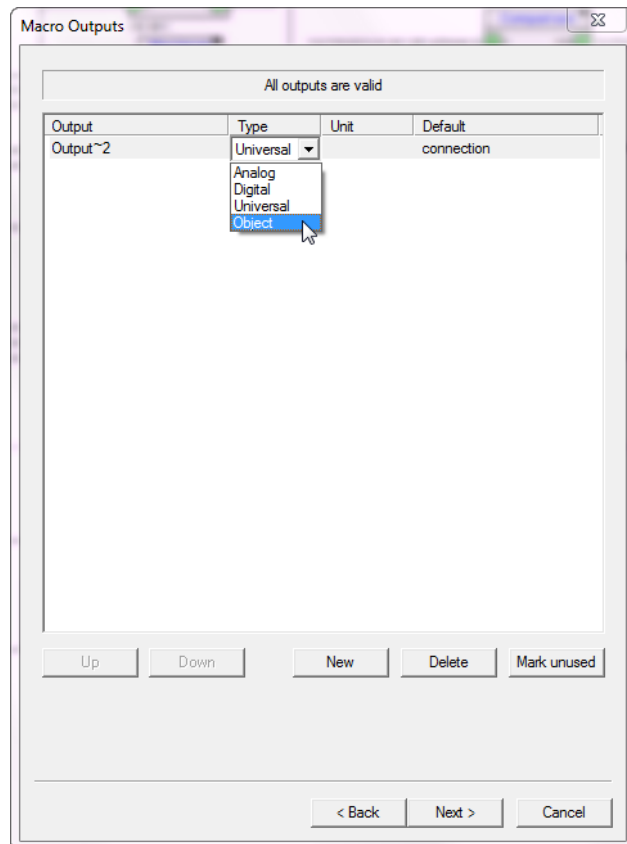
BACnet Parameter Access via Loop Object

Prerequisites Before applying the procedures described in the following sections, please get familiar with the basics of control loop engineering by reading the previous sections in the CARE user guide:

- Control Loops
- Macros

Macro Input and Output Types When creating a new macro (see "Create Macro" section), you add inputs, outputs, control parameters, and registers to the empty macro. The inputs and outputs can be configured by assigning one of the following connection types:

- analog
- digital
- universal
- object

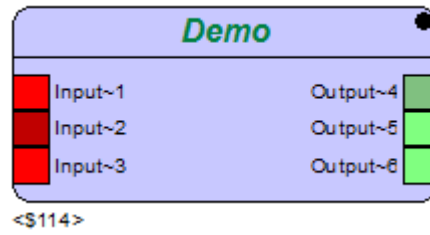


These distinctions will be used to avoid input - output mismatches when assembling the macro and connecting it to other logical components.

The "analog", "digital", and "universal" types allow writing and reading values only.

The "object" type allows writing and reading all properties of the loop object or of a datapoint connected to the input or output. Hence, the "object" type allows accessing multiple parameters through one connection. The accessed parameters are defined in the macro.

Object inputs and outputs at the icon are indicated by darker green and red color than all the other input and output types.



Functional Modes

The Loop Object can be set into 2 different functional modes:

3. as PID controller executing its intrinsic PID function. In this case the BACnet client / HTML Web Interface has only access to the loop object and not to parameters in control loops / macros (applies to CARE 10.05.00 and higher)
4. as interface which works as a shell for accessing parameters in control loops and macros by a BACnet client / HTML Web Interface without executing the PID function (available in CARE 10.08.00 and higher)

The following figures show the 2 different functional modes:

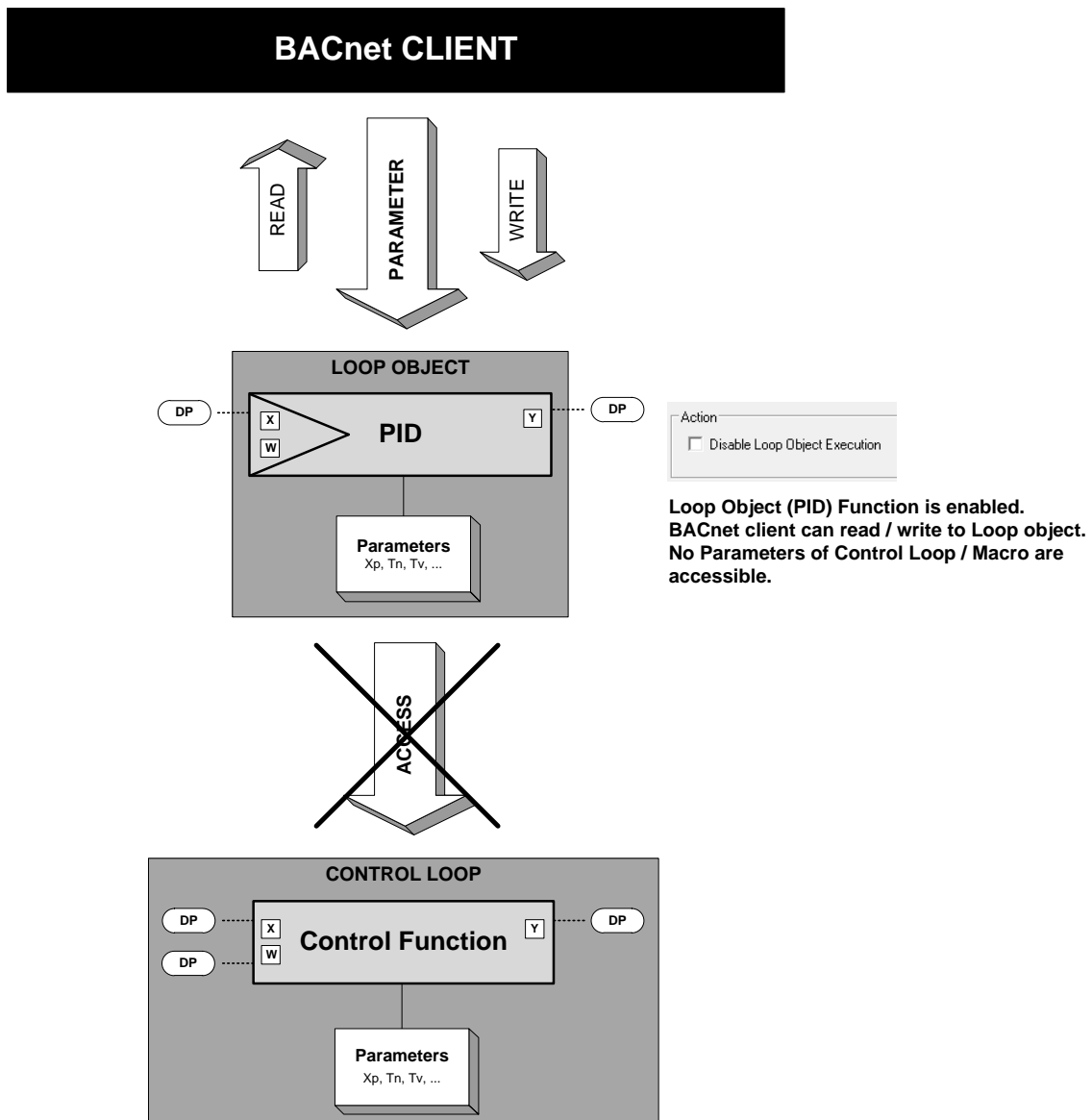


Fig. 1. Intrinsic PID Function of Loop Object

In order to use the loop object as Interface, the intrinsic PID function must be disabled on the *Properties* pane by checking the **Disable Loop Object Execution** option (see Fig. 2).

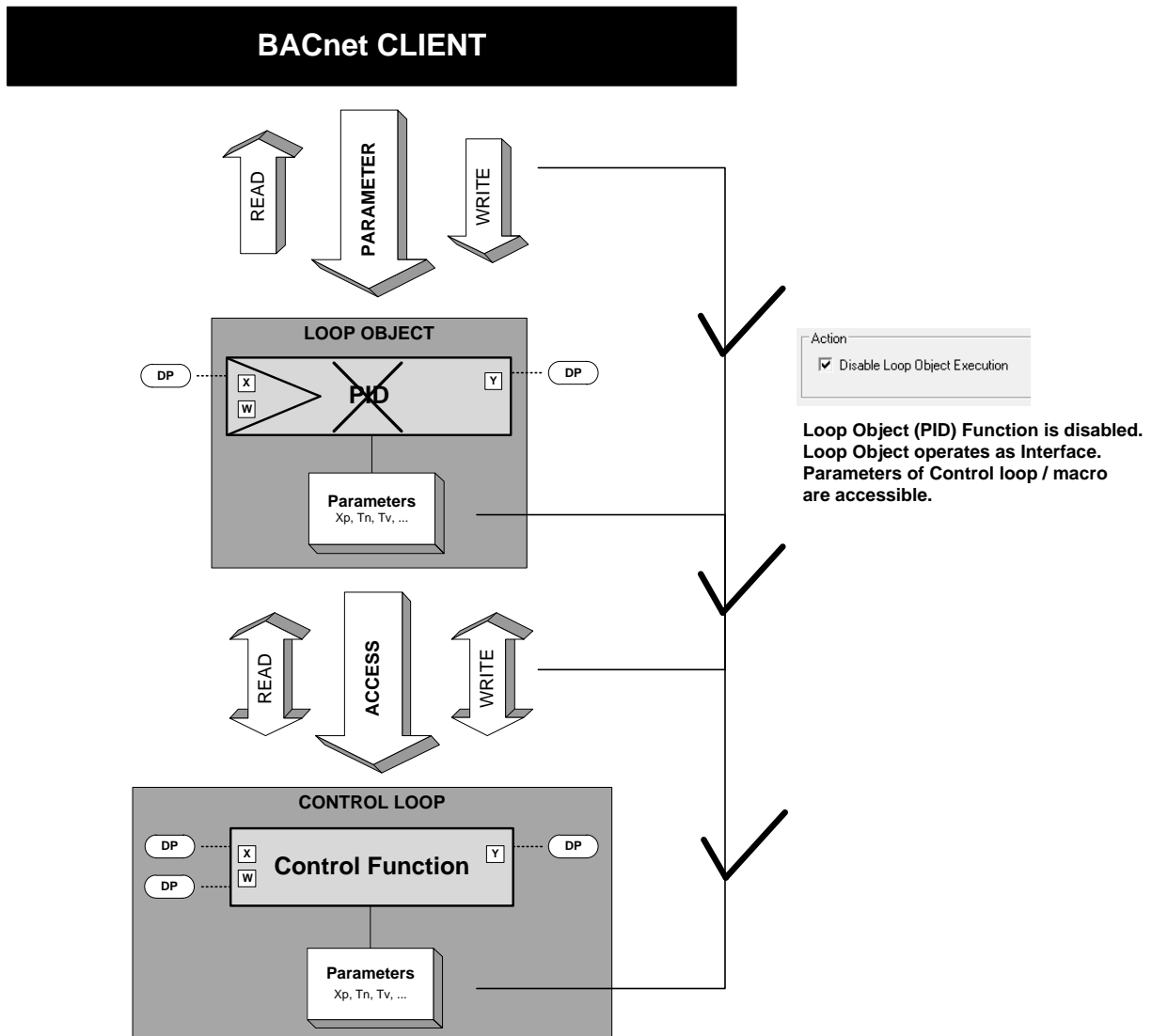


Fig. 2. Parameter Access via Loop Object Interface

In the following sections, the main Interface function of the loop object will be described.

Parameter Access in Control Loops and Macros

Basic Steps

In order to access parameters of a control loop or macro, the following steps must be executed in the loop object and in the control loop or macro respectively.

Loop Object

- Disable Loop Object Execution (mandatory)
- Check read only flags for parameters and setpoint (optional and dependant on requirements / scenario)

Control Loop / Macro

- Configure control variable reference X and manipulated variable reference Y by assigning datapoints (mandatory)
- Configure setpoint reference W by assigning datapoint or entering value (mandatory)
- Map parameters of control loop/macro to parameters of loop object.

- Assigning object identifiers and units of datapoints to loop object variables (X, Y)

The individual steps for control loops and macros are described in detail in the "Parameter Access in Control Loops" and "Parameter Access in Macros" sections.

Parameter Access in Control Loops

Purpose To access parameters in control functions, e.g. PID Plus of control loops by using the loop object as interface.

Main Rules The following steps are required for a successful access of control loop parameters using the loop object.

Loop Object Settings

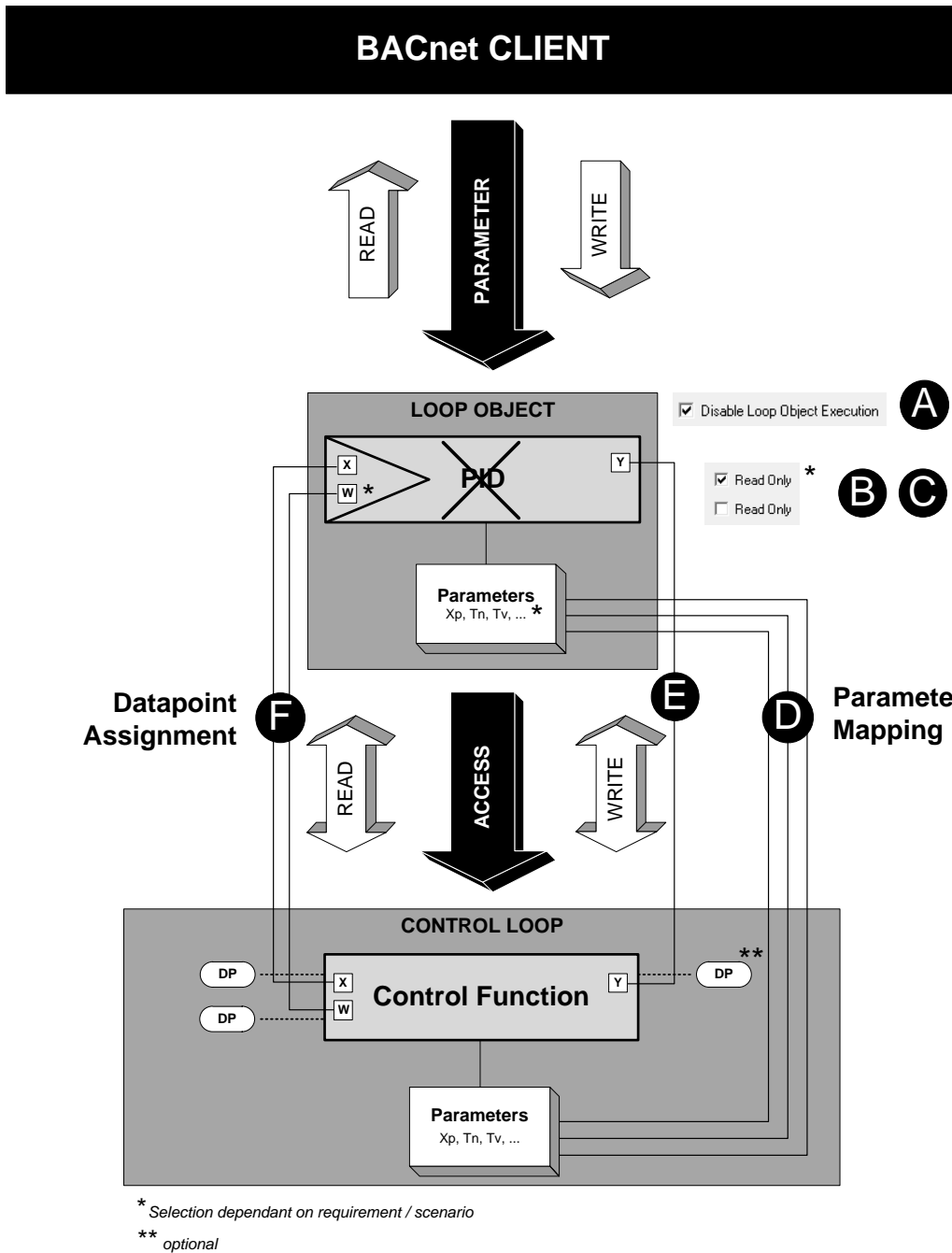
- **Disable Loop Object Execution (A)**
Enable this loop object property.
- **Writeable Parameters via BACnet (B)**
Define the parameters Xp, Tn, and Tv to be writeable via BACnet (see also C below)
- **Read-Only Parameters (C)**
Define the parameters that should be read only and not writeable via BACnet. Except the parameters Xp, Tn, and Tv, all parameters should be writeable via control loop and read-only via BACnet. Some of them can also be set to constant values.

Control Loop Engineering Steps

- **Parameter Mapping (D)**
All parameters which should be accessible in the control loop must be assigned to their counterparts in the loop object. Depending on the home position, the direction is either read or write (see figure 3).
- **Datapoint Assignment (E)**
According to BACnet guidelines, the X, Y reference variables must be configured. This is done by using object IDs of the application datapoints (reference mappings).
- **Setpoint Reference W Configuration (F)**
According to BACnet guidelines, the Setpoint W must be configured. This is done by writing the setpoint from the application datapoint to the loop object setpoint parameter.

Steps A through C must be established in the loop object, steps D through F must be established in the control loop. Both kind of procedures are described in the following.

Schematic Overview First, please refer to the figure on the next page which gives a schematic overview of the actions A through F of the engineering process



* Selection dependant on requirement / scenario
 ** optional

Fig. 3. Schematic Overview of Parameter Access in Control Loop via Loop Object Interface

The following sections describe in detail the steps A through C in the loop object and D through F in the control loop using a PID Plus control function as an example.

The PID Plus control function is the counterpart of the intrinsic PID loop object function.

Read and Write Directions

When mapping parameters between the loop object and the control function (D), the parameter values can be written either from the loop object to the control loop or vice versa (see next figure).

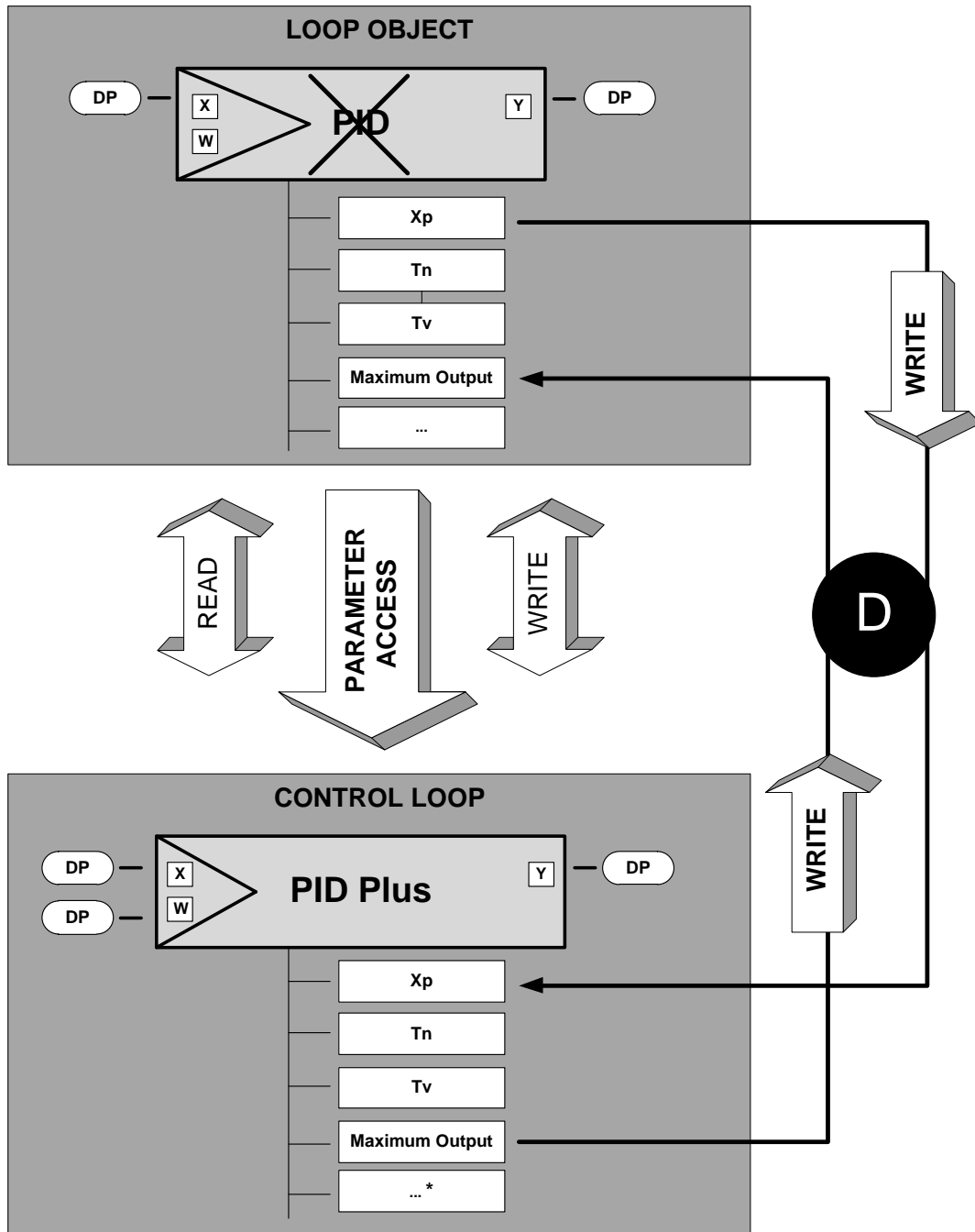


Fig. 4. Read and Write Directions of Mapped Parameters in Loop Object and Control Loop

Loop Object Settings

This section describes the actions A through C to be done in the loop object for the PID Plus example.

- Procedure** 1. Click the Loop Object in the tree to display the *Properties* tab on the right.

The screenshot displays the CARE software interface. On the left, a tree view shows the project structure, with 'Loop Object' selected under 'Loop Objects'. The main area shows the 'Properties' pane for the selected object. The 'Properties' pane is divided into several sections:

- Name:** Loop Object
- BACnet Object Type:** Loop Object (12)
- BACnet Object ID:** 50331658
- BACnet Instance Number:** 10
- Descriptor:** (empty)
- Alarm Text:** (empty)
- Access Rights:** Read Access Level: Guest (0), Write Access Level: Tenant (32)
- Controlled Variable Reference (X):** R02ai_pl2_2ai_pl2_2
- Manipulated Variable Reference (Y):** R02ao_pl2_4ao_pl2_4
- Property:** Present Value, Unit: V
- Property:** Present Value, Unit: %
- Setpoint Reference (W):** Value: 30.00 [V]
- Action:** Disable Loop Object Execution
- Alarming:** Notification Class: LDW, Notify Type: Event, Alarm Delay: (empty) [sec], Error Limit: 2.00 [V], Deadband: 1.00 [V], Reporting: To-OffNormal, To-Fault, Back To-Normal
- Event Enrollments:** Acked Transitions (To-OffNormal/To-Fault): Observe, Enabled; Status Flags (Out Of Service/Overridden): Observe, Enabled
- Parameters:** Action: Direct, Proportional Constant (Xp): 3.00, Integral Constant (Tn): 1000.00 [sec], Derivative Constant (Tv): 0.00 [sec], Bias: 50.00 [%], Maximum Output: 100.00 [%], Minimum Output: 0.00 [%]
- Values:** Priority for writing: 15 - Control Program, Speed Class: medium, Change of Value Increment: 0.50 [%]

- On the *Properties* pane on the right, do the following:
 - For step A, check the **Disable Loop Object Execution** checkbox. This results in disabling the PID function of the loop object and enables the usage of the loop object as interface.
 - For step B, leave the **Read Only** parameters unchecked for **Proportional Constant (Xp)**, **Integral Constant (Tn)** and **Derivative Constant (Tv)**. This results in writing these parameters by the BACnet client / HTML Web Interface.
 - For step C, check the **Read Only** options for the parameters **Bias**, **Maximum Input** and **Maximum Output**. This results in reading and writing these parameters via the control function (in this case PID Plus) but only reading these parameters via BACnet. Parameters such as Bias can also be set to constant values. Constant values cannot be overwritten by the control loop, BACnet client / HTML Web Interface, or HTML Web Interface.
 - Leave or check the **Read Only** option for **Setpoint Reference (W)**. For the PID Plus example used in this scenario, this setting is freely selectable.
 - From the **Action** drop-down listbox, select 'Direct' or 'Reverse'. This setting is not relevant for the parameter access behavior.

The screenshot shows a configuration window for a control loop. It is divided into several sections:

- Setpoint Reference (W):** Includes an input field for the setpoint, 'Add' and 'Del' buttons, a 'Property' dropdown set to 'Present Value', and a 'Value' field set to '0,00'. There is also a 'Read Only' checkbox.
- Action:** A checkbox for 'Disable Loop Object Execution' is checked.
- Alarming:** Contains 'Notification Class' (LOW), 'Notify Type' (Event), 'Alarm Delay' (sec), 'Error Limit' (2,00), 'Deadband' (1,00), and 'Suppress Alarm' (checked). A 'Reporting' section has checkboxes for 'To-OffNormal', 'To-Fault' (checked), and 'Back To-Normal' (checked).
- Event Enrollments:** Includes 'Acked Transitions (To-OffNormal/To-Fault):' and 'Status Flags (Out Of Service/Overridden):', each with an 'Observe' button and an 'Enabled' checkbox.
- Values:** Includes 'Priority for writing:' (15 - Control Program), 'Speed Class:' (medium), and 'Change of Value Increment:' (0,50).
- Parameters:** Includes 'Action:' (Direct), 'Proportional Constant (Kp):' (3,00), 'Integral Constant (Tn):' (1000,00 [sec]), 'Derivative Constant (Tv):' (0,00 [sec]), 'Bias:' (50,00), 'Maximum Output:' (100,00), and 'Minimum Output:' (0,00). Each parameter has a 'Read Only' checkbox.

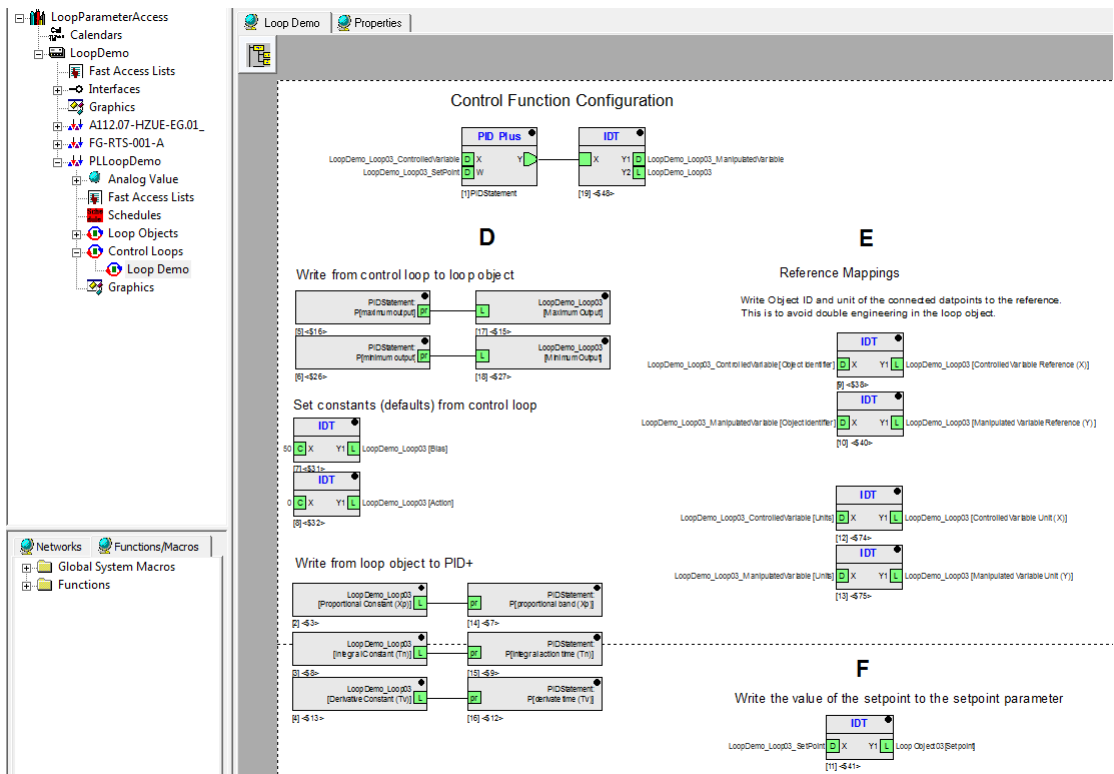
See also the "Basic Steps" section for the general description of the loop object

Control Loop Engineering Steps

This section describes the steps D through F to be done in the control loop for the PID Plus example.

Procedure

1. Click the control loop in the tree to display the control loop on the right pane.



2. Perform the actions D through F which are described in the following:

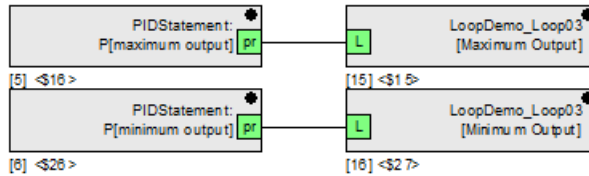
Parameter Mapping (D)

In area D (see next figure), the parameter mappings are shown. Parameters can be either written from the control loop (PID Plus control function) to the loop object or vice versa. Read-only-parameters such as bias or maximum input and maximum output are written from the control loop (PID Plus control function) to the loop object.

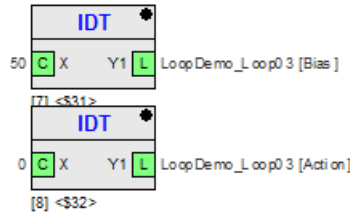
The writeable parameters Xp, Tn, and Tv are written from the loop object to the control loop (PID Plus control function).

D

Write from control loop to loop object



Set constants (defaults) from control loop



Write from loop object to PID+

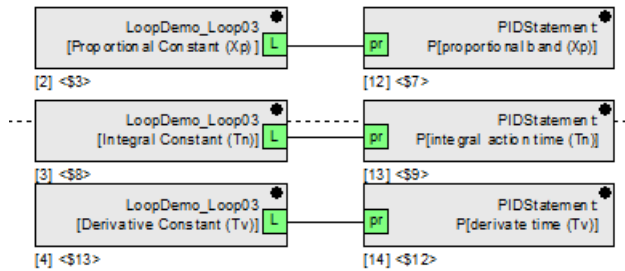


Fig. 5. Parameter Mapping in Control Loop

Datapoint Assignment (E)

In area E (see next figure), the controlled variable X and manipulated variable Y are configured by mapping the Object IDs of the corresponding application datapoints at the inputs to the reference variables of the loop object at the outputs.

E

Reference Mappings

Write Object ID and unit of the conneced datapoints to the reference.
This is to avoid double engineering in the loop object.

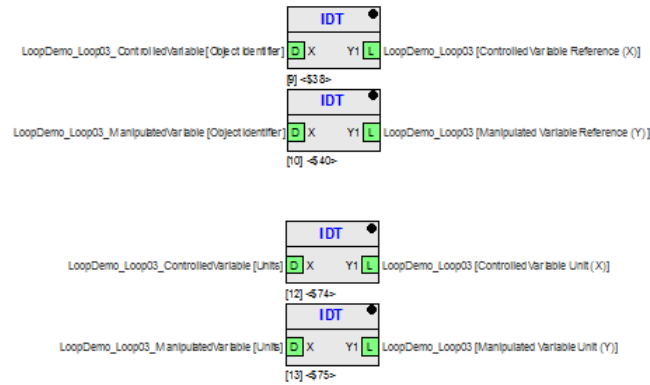


Fig. 6. Datapoint Assignment via Reference Mappings

Setpoint Reference W Configuration (F)

In area F, the setpoint W is configured by mapping the present value of the application datapoint at the input to the setpoint reference W of the loop object at the output.

F

Write the value of the setpoint to the setpoint parameter

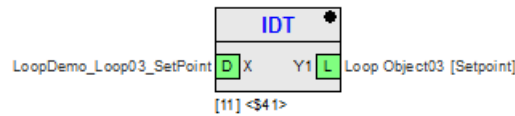


Fig. 7. Setpoint Configuration

Parameter Access in Macros

Purpose To access the control parameters of macros that can include multiple control functions (e.g. EPID) by using the loop object as interface.

Main Rules A macro can have multiple inputs and outputs, control parameters and registers. The loop object is designed to allow access to the control parameters of the parent macro but not to the parameters of its build-in functions. The parameters of the build-in functions are connected to the inputs, outputs and control parameters according to the control logic programmed by the developer.

Read - Write Behavior of Macro Inputs and Macro Outputs

Via object input, parameters can be read, and via object output, parameters can be read and written. At least one output must be configured as 'Object' type (see "Parameter Access in Control Loops and Macros" section).

As a prerequisite, the loop object must be allocated to the object output. This assures that the control parameters can be read and written by the BACnet client / HTML Web Interface. The object output can be seen as a tunnel providing the macro control parameter values transmission. Based on the usage of the loop object output, the macro control parameters and the loop object parameters must be assigned to each other according to the requirements of the logic (Macro -Loop Object - Properties Assignment). This is done on macro level.

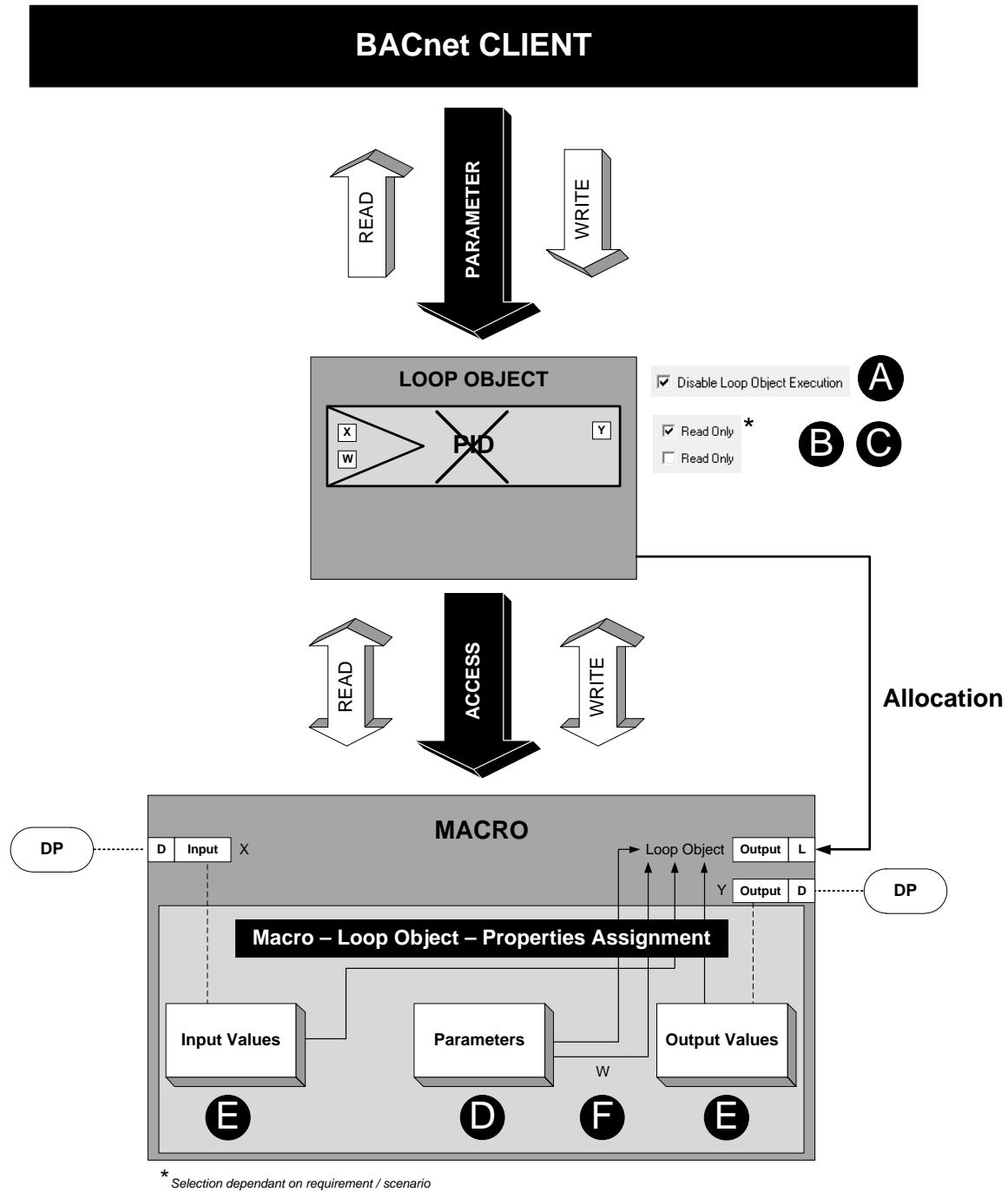


Fig. 8. Schematic Overview of Parameter Access in Macro via Loop Object Interface

Configure Macro Output

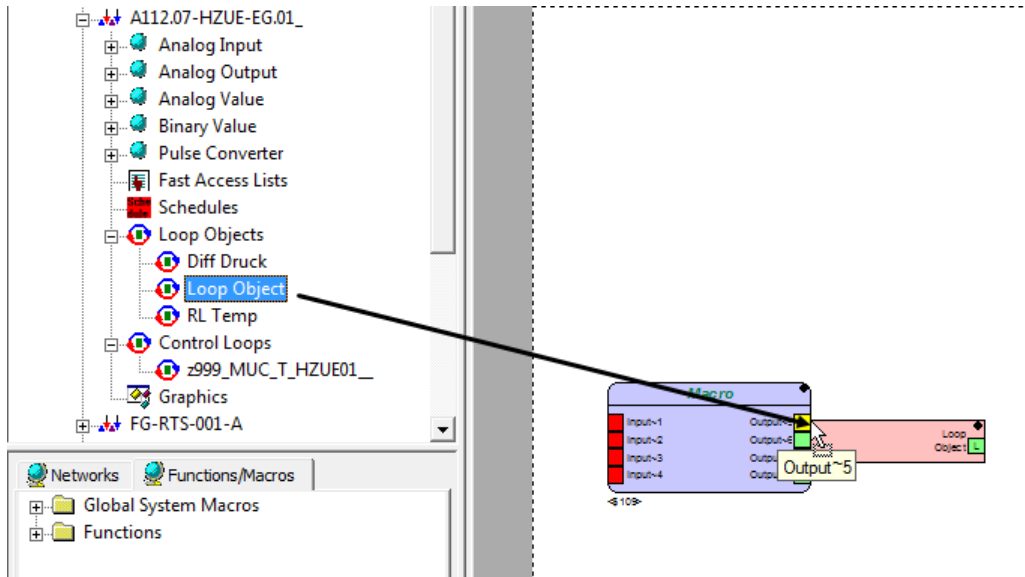
Configure at least one output of the macro as object type as described in the "BACnet Parameter Access via Loop Object" section.

Loop Object Settings

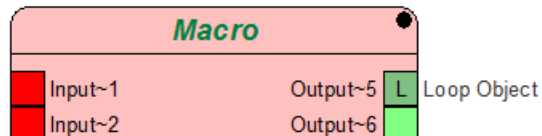
Configure the loop object (indicated by A, B, and C in the previous figure) in the same way as for the control loop access described in the "Loop Object Settings" section, p. 1058.

Allocate Loop Object to Macro

Procedure 1. Drag&drop the loop object onto the macro object output.



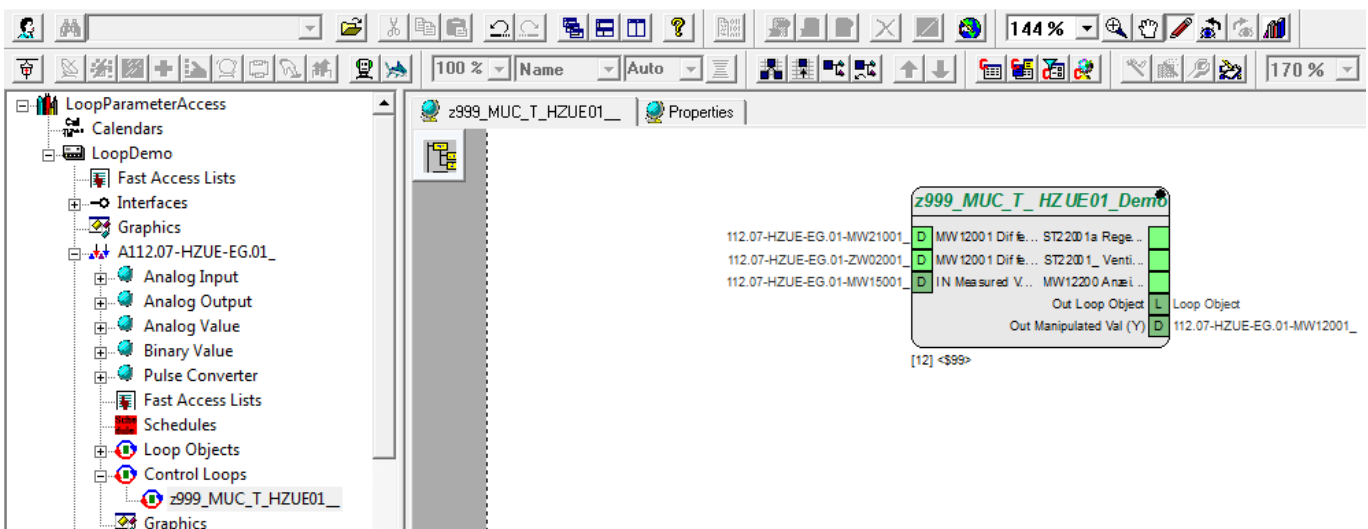
RESULT: The loop object is allocated to the object output indicated by the L in the output symbol and the Loop Object name at the macro output.



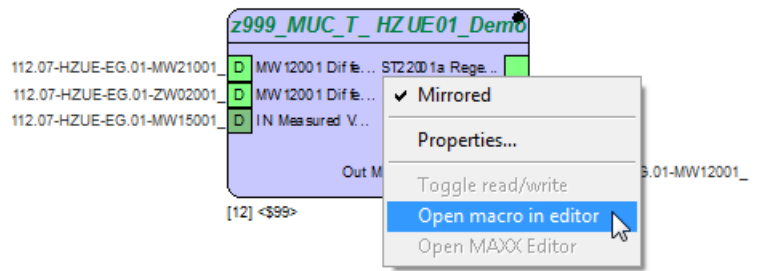
Macro Engineering Steps

This section describes the steps D through F to be done in the macro in order to make the control parameters available to the loop object (BACnet client / HTML Web Interface).

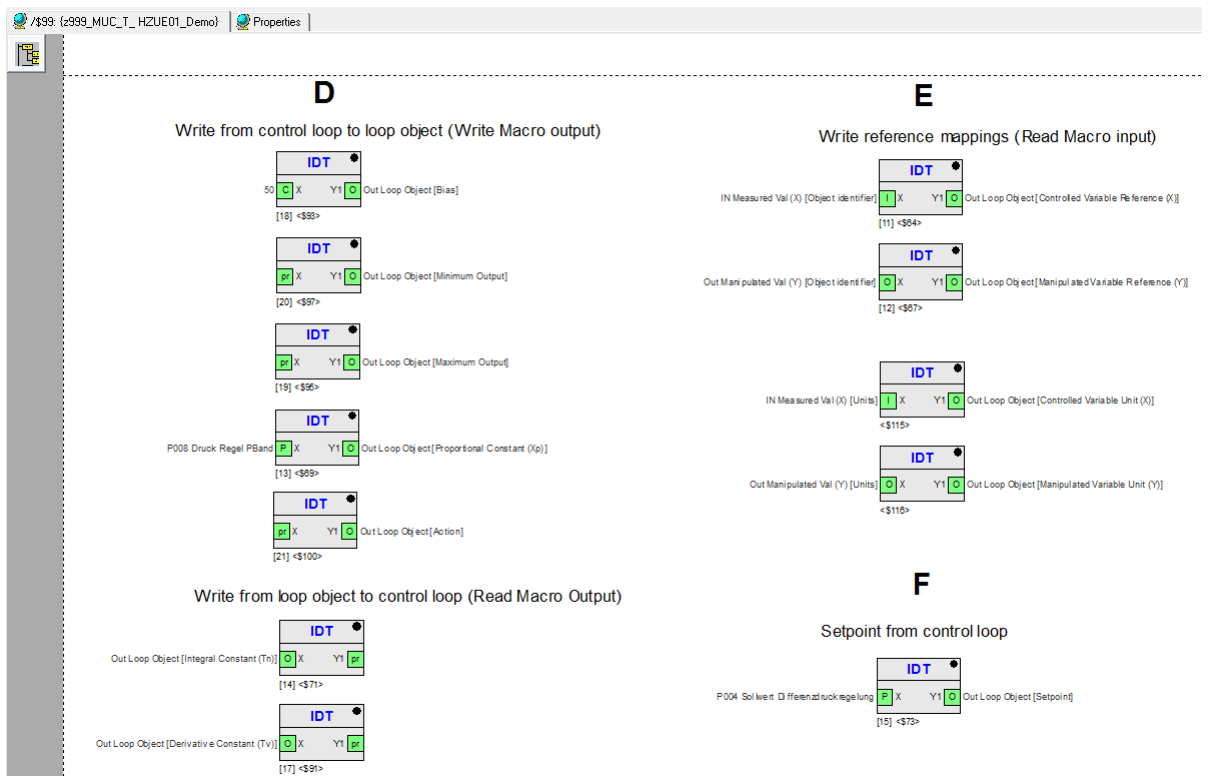
Procedure 1. Click the control loop in the tree to display the macro on the right pane.



2. Right-click the macro and then click on **Open macro in editor**.



RESULT: The macro functions are displayed. For allowing access to the control parameters of the parent macro, the build-in macro logic can and should be left unchanged. Only particular steps including the assignments to the loop object output must be done which are shown as an example in the following figure.



3. Perform the steps D through F which are described as an example in the following:

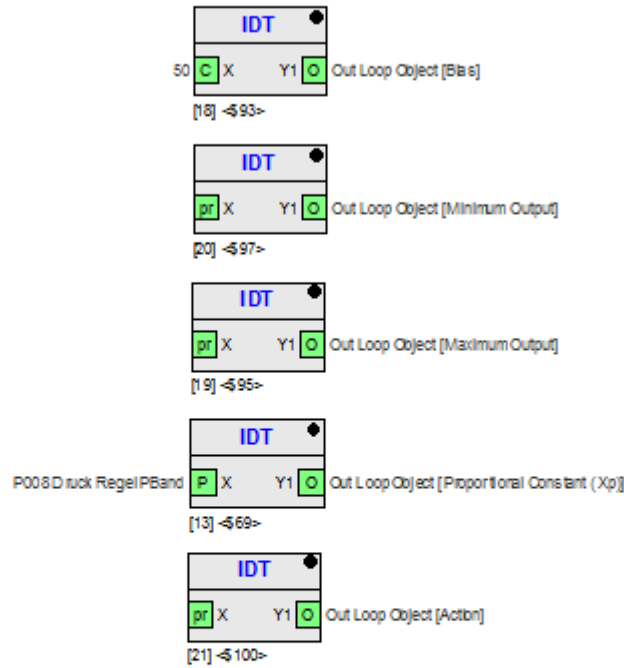
Parameter Mapping (D)

In area D (see next figure), the parameter mappings are shown. Parameters can be either written from the control loop to the loop object or vice versa. Read-only-parameters such as bias or maximum input and maximum output are written from the control loop (PID Plus control function) to the loop object.

The writable parameters Xp, Tn, and Tv are written from the loop object to the control loop (PID Plus control function).

D

Write from control loop to loop object



Write from loop object to control loop

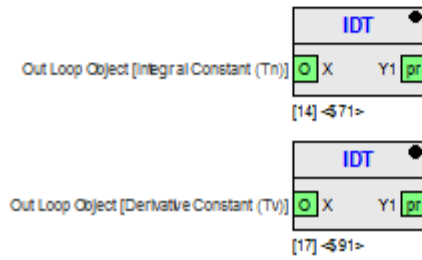


Fig. 10. Parameter Mapping in Macros

Datapoint Assignment (E)

In area E, the controlled variable X and manipulated variable Y are configured by mapping the Object IDs of the corresponding application datapoints at the inputs to the reference variables of the loop object at the outputs.

E

Write reference mappings (Read Macro input)

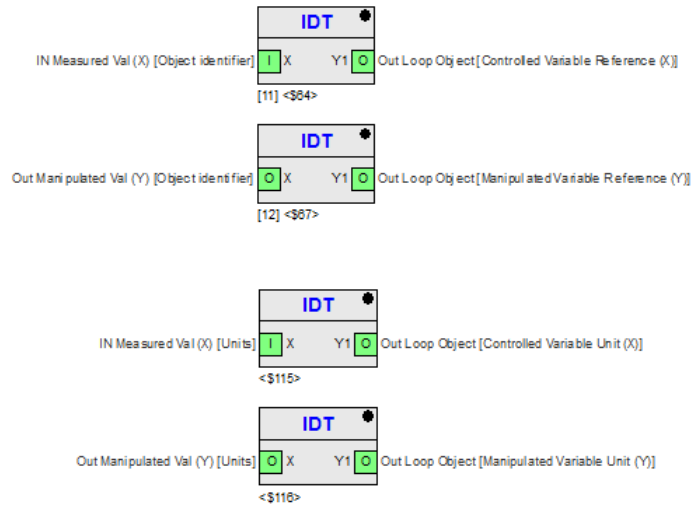


Fig. 11. Datapoint Assignment via Reference Mappings

Setpoint Reference W Configuration (F)

In area F, the setpoint W is configured by mapping the control parameter of the parent macro at the input to the setpoint at the output.

F

Setpoint from control loop

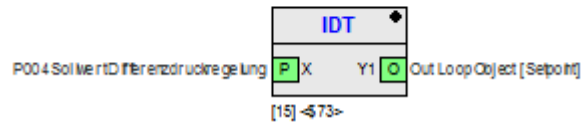


Fig. 12. Setpoint Configuration

Graphics Editor

The Graphics Editor is a graphic tool for the development of graphic pages that can be used for navigation and display when operating the BACnet controller via Web Interface.

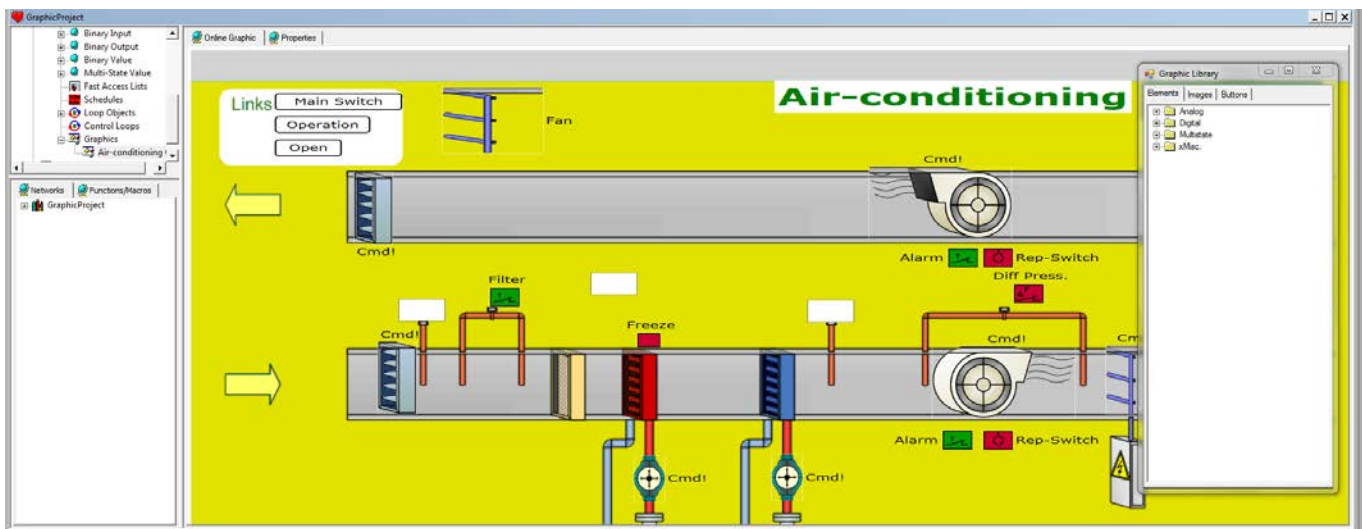
The Graphic Editor provides built-in static and dynamic graphic symbols (elements and images) which allow you to create interactive plant graphics in which you can display and change values. Plant graphics typically show the application, including boilers, heat pumps, water pipes, etc. and attached dynamic display fields which will show the actual datapoint or setting values in the Web Interface.

Plant graphics can be enhanced with “animated” graphic elements. Pages on different hierarchical levels can be linked using linking hotspots. “Real” images can be used as background image for getting a more picturesque style. The Graphic Editor supports:

- creation of plant graphics
- creation of background images
- graphic symbols library containing static images and dynamic elements
- creation of user-defined graphic symbols
- creation of text blocks
- copy and paste of graphic symbols including databindings
- binding of datapoints to HVAC and custom graphic symbols
- linking of buttons to schedules, calendars, trends and graphic pages (web pages)
- window function for historic trends
- gif, jpg, and png graphic formats
- import and export of graphic binding definitions in xml format

Via common CARE functions, the following is provided:

- download of the graphic pages including bindings into the controller
- backup and restore of the graphic pages
- Copy graphics including bindings via plant copy function



Background Knowledge

This section describes the file and folder structures and how CARE handles the files during project and graphic creation in the background. This includes:

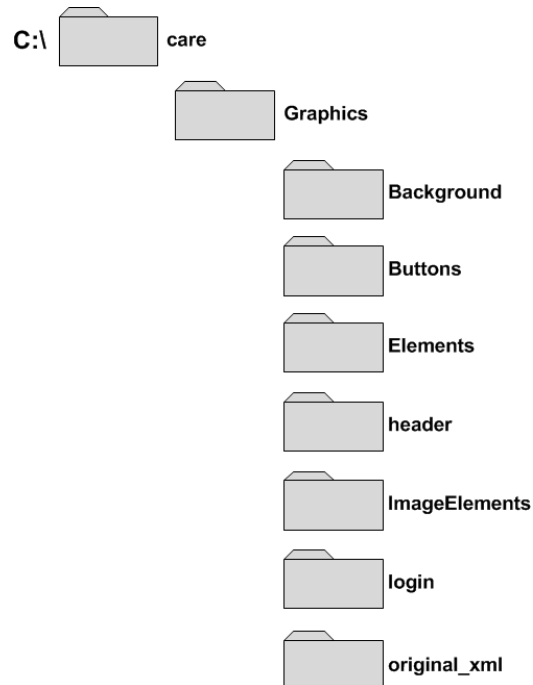
- graphic files
- logos
- xml files

- language files its modification

You can skip this section and start with the "Preparation Notes" section if you do not need to know any information about file management in the background.

File and Folder Structures **Graphics Folder**

With CARE 10.05.00 and higher, a common project-wide Graphics folder will be installed by default.



The Graphics folder contains the following sub folders with an original file set which will be shared among all projects:

Background

background images (GIFs)

Elements

dynamic graphic symbols to be used for binding to datapoints and its relevant XML files that define the function of the elements.

header*

dummy file. Allows adding a header logo for the web interface

ImageElements

static graphic symbols to be used for drawing a plant schematic

login*

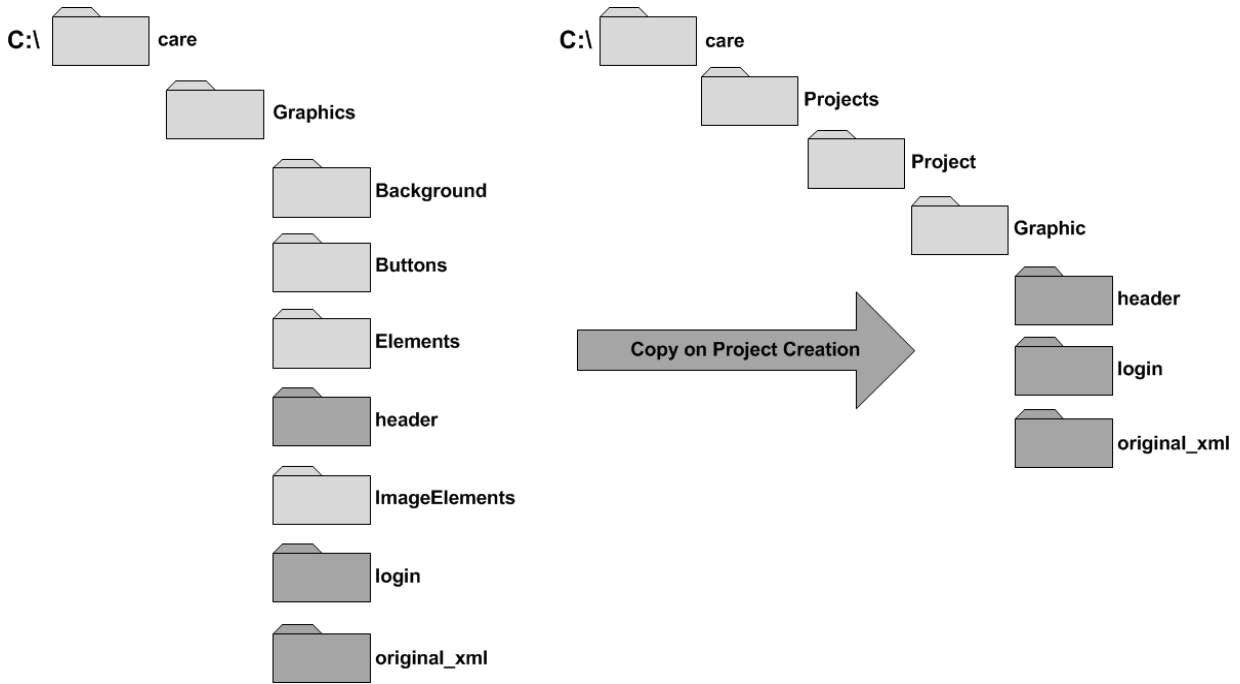
dummy file. Allows adding a login logo for the web interface

original_xml*

country-specific files containing the names (lookup) for elements and buttons

*When creating a graphic, the following folders with its files are copied from the default *Graphics* folder to the individual project folder:

- header
- login
- original_xml



Logos Handling

By default, CARE provides dummy header and login logos in the folders

- header
- login

of the common project-wide Graphics folder before project creation and as copies in the individual project folder.

If you want to use customized header and login logos it is recommended to set the GIF files to the following size:

- headerlogo.gif
360 x 30 pixels
path in web server: usr/local/web/standard/header
- loginlogo.gif
257 x 120 pixels,
path in web server: usr/local/web/standard/login

If the project has not been created yet, copy the custom logo files to the common Graphics folder.

If the project has already been created, copy the custom logo files to the individual project folder.

For details on the CARE folder structure, please refer to the previous "File and Folder Structures" section.

To complete the logo handling successfully, please select the controller and the plant that contains the start graphic (first graphic) in the project and select the logos on the Properties tab under Logos.



NOTE: For the use of this function browser, controller firmware 3.04.01 or higher is required

Languages and Folders

By default, CARE provides a localized language dictionary per country where the customized texts are stored in a list.

According to the country code, the customized texts are stored in the file:

graphic_10xx.xml

The following country-specific files are provided:

- *graphic_1030* = Danish
- *graphic_1031* = German
- *graphic_1033* = English - United States
- *graphic_1034* = Spanish (Intern.)
- *graphic_1035* = Finnish
- *graphic_1036* = French (France)
- *graphic_1040* = Italian
- *graphic_1043* = Dutch
- *graphic_1044* = Norwegian
- *graphic_1049* = Russian
- *graphic_1053* = Swedish
- *graphic_2057* = English - United Kingdom

All these files are provided as original file set in the following folder:

CARE\Graphics

When the project is created, the country-specific xml files will be copied from the original folder:

CARE\Graphics

to the project-specific folder:

CARE\project\graphic

Modifications of Dictionaries

Modifications of buttons and commands or the creation of new buttons and commands in a particular language are always stored in all country-specific XML files in the project subfolder.

To display the buttons and commands in the desired language in CARE and in the web interface, you must select the corresponding language for the user in the User Administration (typically for the SytemAdmin user).

Preparation Notes**Graphic Resolution – Scaling factor**

A graphic can be adjusted for different graphic resolutions. This is possible when creating the graphic initially or later at any time.

The following resolutions and scaling factors are available:

- 800 x 600 scaling factor = 1
- 1024 x 768 scaling factor = 1,28
- 1152 x 864 scaling factor = 1,44
- 1280 x 960 scaling factor = 1,6
- 1600 x 1200 scaling factor = 2
- 1920 x 1440 scaling factor = 2,4

Options for Graphic Size Definition

By default, the size when creating the graphic is 1020 x 645 which corresponds to the resolution of 800 x 600.

You can adjust the graphic size in the following two ways:

5. Select a different resolution/scaling factor (see above list)

or,

6. Create a background graphic that will fit to the available space in the web interface on the customer PC. Do this as follows:

- c. Measure the available space and subtract 30 pixels from X- and Y-coordinate

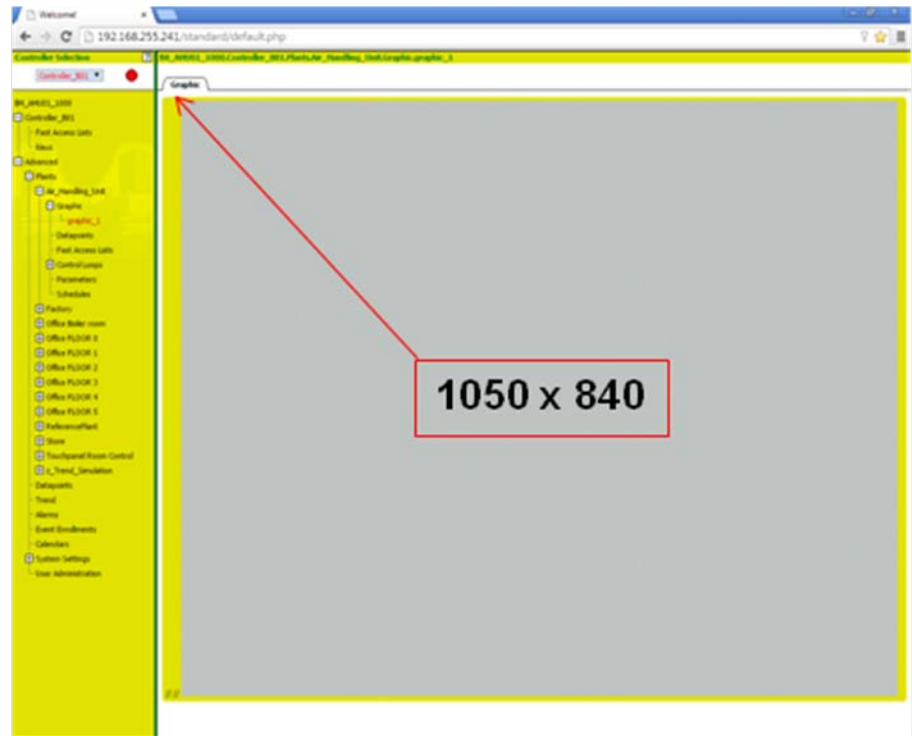
Example:

Measured = 1050 x 840

Size of background image = 1020 x 810

- d. Save the image under:

C:\Care_10_04xx\Graphics\Background



Logos Files

Prepare you GIF files for logos if required according to the description under **Logos Handling** in the previous "Basic Knowledge" section.

Graphic Components

A graphic is composed of the following parts:

- background image
- graphic page

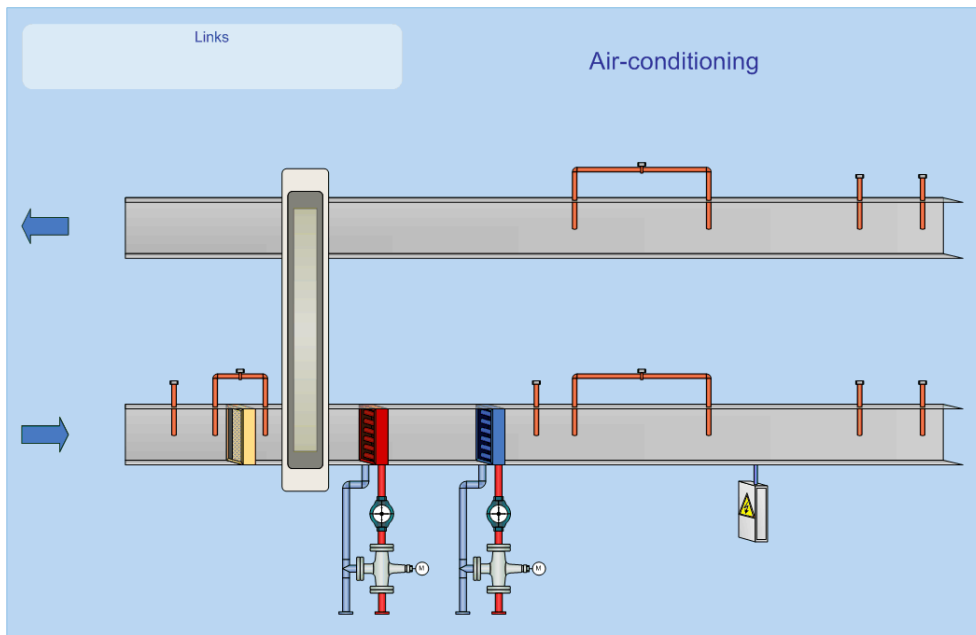
Background Image

The background image can be a blank uni-colored background or any kind of created plant schematic. Background images can be created by using any graphic tool, e.g. Viso, or by creating the image in CARE using the static Images provided from the Graphic library.

Blank uni- colored background image



Plant schematic draw as background image



Graphic Page The graphic page is created by adding static images, dynamic elements, linking buttons and text blocks to the background image.

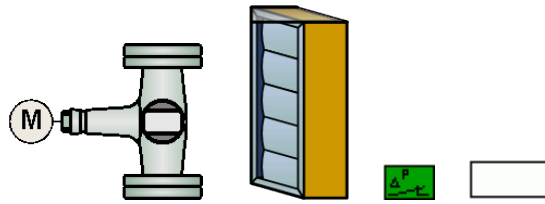
Static images

Static images are images and symbols which cannot be bound to datapoints, e.g. ducts, dampers, fans etc. Static images can also be used to build a background graphic.



Dynamic elements

Dynamic elements are images and symbols that can and must be linked to datapoints such as valves, fans, dampers, switches and value fields. These kind of symbols are used for the display of the changing values in the web browser

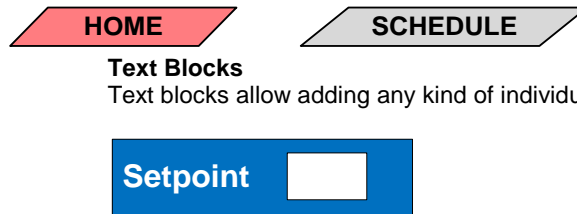


NOTE: Static images and dynamic elements can be of the same category. For example, there a static and dynamic fans, boilers, valves etc.

Links

can be **created** and added to graphic pages for referencing to:

- other graphic pages
- external graphic pages
- trends
- schedules
- calendars



Text Blocks

Text blocks allow adding any kind of individual descriptions.

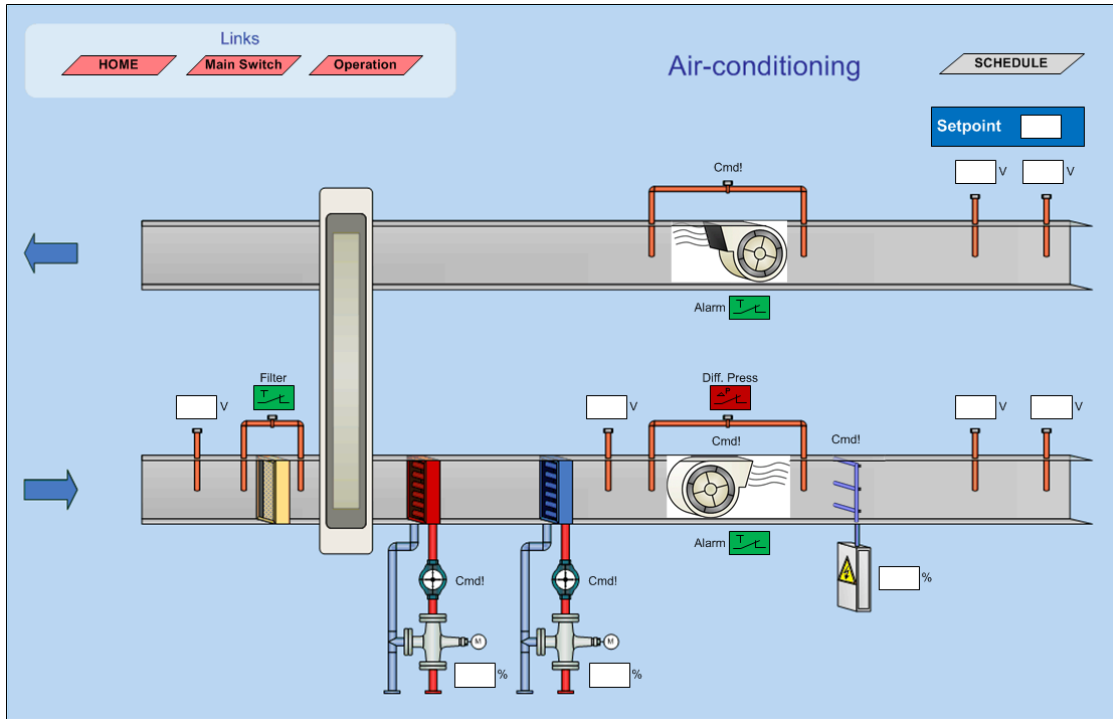
Databinding

For displaying current and updated datapoint values in the online graphic in the web interface, each dynamic element must be bound to a datapoint .

Graphic Example

The following figure shows an example of a graphic consisting of the plant schematic in the background and the graphic consisting of elements, buttons and text blocks in front.

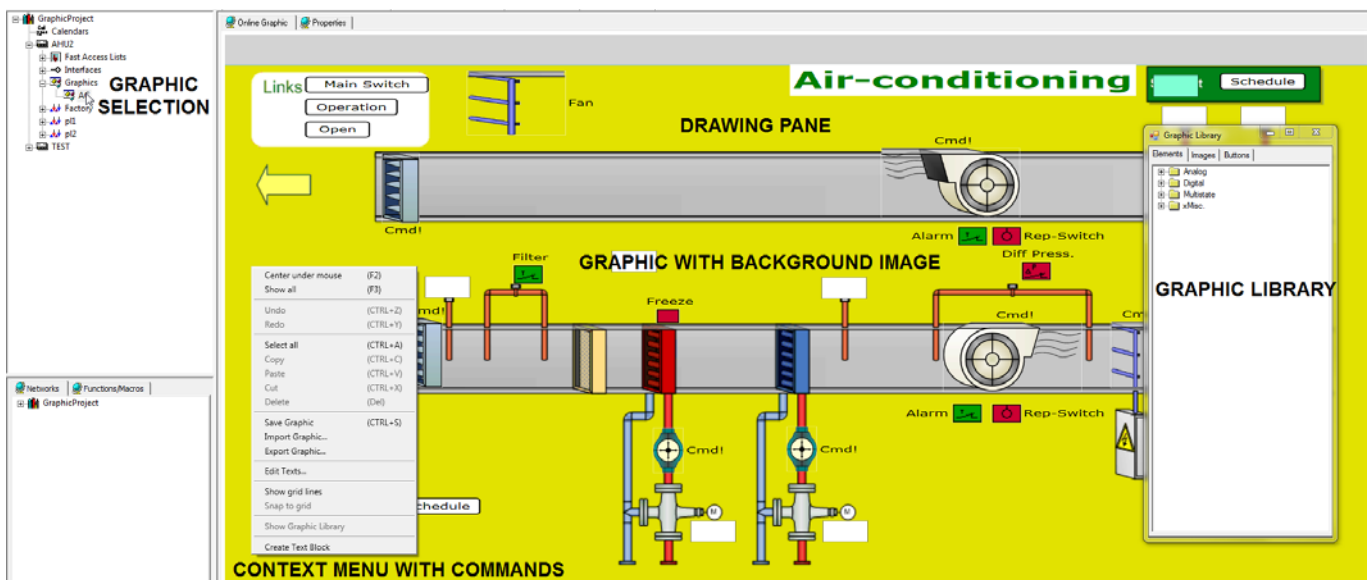
NOTE: Databindings of dynamic elements are not visible in the graphic. To display databindings, double-click the dynamic element to open the Properties dialog box.



The Workspace Environment

The workspace environment for creating graphics includes the following components:

- graphic page selection in the logical plant tree
- drawing pane
- context menu commands
- graphic library



Graphic Page and Drawing Pane

When selecting the graphic in the logical plant tree, the drawing pane on the right provides the area for drawing the graphic by adding static images, dynamic

elements, and linking buttons from the graphic library and applying commands via context menu, e.g. creating text blocks.

Context Menu Commands

When right-clicking in the drawing pane, the following commands are available in a context menu:

Center under mouse	(F2)
Show all	(F3)
Undo	(CTRL+Z)
Redo	(CTRL+Y)
Select all	(CTRL+A)
Copy	(CTRL+C)
Paste	(CTRL+V)
Cut	(CTRL+X)
Delete	(Del)
Save Graphic	(CTRL+S)
Import Graphic...	
Export Graphic...	
Edit Texts...	
Show grid lines	
Snap to grid	
Show Graphic Library	
Create Text Block	

- **Center under mouse (F2)**
Displays the area around the mouse-cursor in the middle. E.g. If the mouse cursor is on the left side, the view will be moved to the right side.
- **Show all (F3)**
Zooms out to display the whole window so all used items of the graphic are visible.
- **Undo (CTRL+Z)**
Reverts the latest action
- **Redo (CTRL+Y)**
Repeats the latest action
- **Select all (CTRL+A)**
Selects all items
- **Copy (CTRL+C)**
Copies the selected item(s)
- **Paste (CTRL+V)**
Pastes the selected item(s)
- **Cut (CTRL+X)**
Removes the selected item(s)
- **Delete (Del)**
Deletes the selected item(s)
- **Save Graphic (CTRL+S)**
Saves the graphic

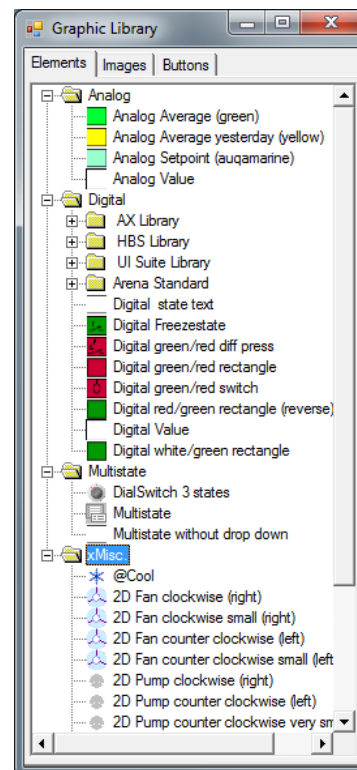
- Import Graphic...
Imports a graphic from ...
- Export Graphic...
Exports a graphic to ...
- Edit Texts...
Opens a multi-language dictionary Editor, to which you can add new texts.
- Show grid lines
Displays grid lines
- Snap to grid
Adjusts selected items to the grid
- Show Graphic Library
Displays the graphic library
- Create Text Block
Inserts descriptive text at the cursor location

Graphic Library

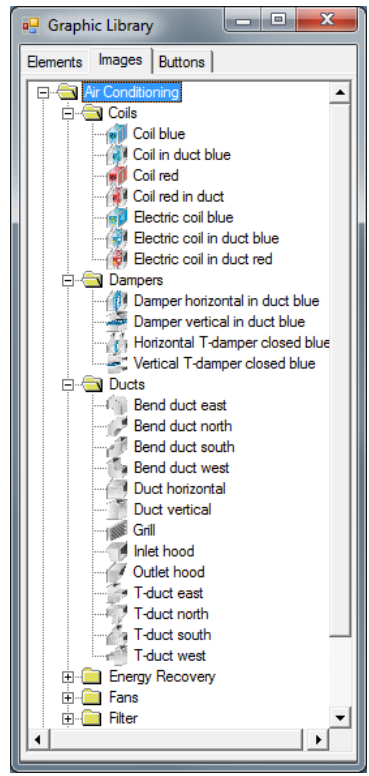
The graphic library provides default graphic symbols, such as:

- dynamic elements such as analog and digital symbols and animated equipment (e.g. fans)
- static images such as ducts, fans, coils etc.
- commands for creating linking buttons

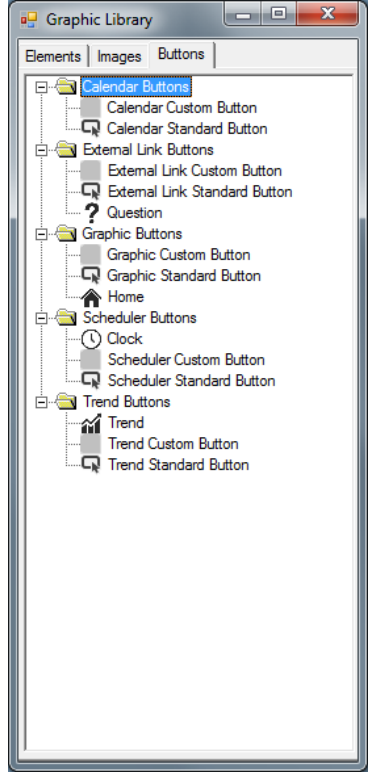
The graphic symbols will be added to the drawing space by simple drag&drop.
New graphic symbols (dynamic elements, static images) can be created by adding default or new graphic symbols and modifying their properties after the addition.



Dynamic Elements in Graphic Library



Static Images in Graphic Library



Linking Button Commands in Graphic Library

Basic Working Techniques for Selection, Adjustment and Editing

Selecting Items

A selected item is indicated by changing the color of its outer frame to blue.

Selecting Single Items

In the drawing pane, do the following:

- with left mouse button, click on the item

Selecting Particular Multiple Items

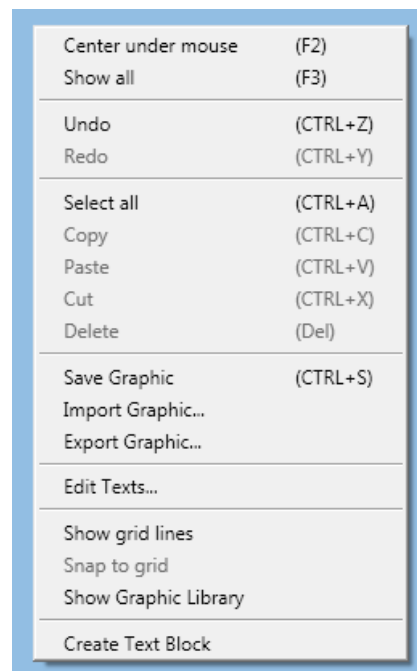
In the drawing pane, do any of the following:

press CTRL or SHIFT key and simultaneously click with left mouse button on the items

Selecting All Items

In the drawing pane, do any of the following:

- Press left mouse button and with left mouse button pressed, draw a frame around all items
- right-click and then click **Select all** in the context menu
- press CTRL+A keys



- Center under mouse (F2)
Displays the area around the mouse-cursor in the middle. E.g. if the mouse cursor is on the left side, the view will be moved to the right side.
- Show all (F3)
Zooms out to display the whole window so that all used items of the graphic are visible.
- Undo (CTRL+Z)
Reverts the latest action
- Redo (CTRL+Y)
Repeats the latest action

- Select all (CTRL+A)
Selects all items
- Copy (CTRL+C)
Copies the selected item(s)
- Paste (CTRL+V)
Pastes the selected item(s)
- Cut (CTRL+X)
Removes the selected item(s)
- Delete (Del)
Deletes the selected item(s)
- Show grid lines
Displays grid lines
- Snap to grid
Adjusts selected items to the grid

Zoom

Press SHIFT or CTRL key and with the key pressed, turn the mouse wheel forward to zoom in, or turn the mouse wheel backward to zoom out.

Copy and Paste Items

Purpose Remove unnecessary items from the graphic. Items can be:

- dynamic elements
- static images
- linking buttons
- text blocks
- other

- Procedure**
1. In the drawing pane, select the item(s) you want to copy.
 2. Press CTRL+C keys, or right-click and then click **Copy** in the context menu.
 3. In the current graphic or in another graphic selected, press CTRL+V keys, or right-click and then click **Paste** in the context menu.

Cut and Paste Items

Purpose Remove unnecessary items from the graphic. Items can be:

- dynamic elements
- static images
- linking buttons
- text blocks
- other

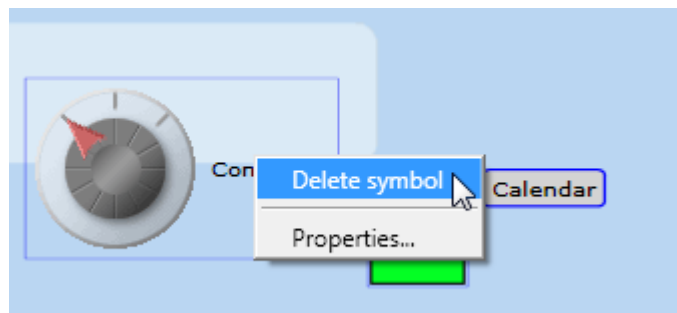
- Procedure**
1. In the drawing pane, select the item(s) you want to cut.
 2. Press CTRL+X keys, or right-click and then click **Cut** in the context menu.
 3. In another graphic selected, press CTRL+V keys, or right-click and then click **Paste** in the context menu.

Delete Items

- Purpose** Remove unnecessary items from the graphic. Items can be:
- dynamic elements
 - static images
 - linking buttons
 - text blocks
 - other
- Procedure**
1. In the drawing pane, select the item you want to delete by clicking or by drawing a frame around. Multi-selection using left mouse button and pressing CTRL or SHIFT key is possible or by drawing the frame around multiple items.
 2. Or, to select all items, right-click and then click **Select all** in the context menu, or press CTRL+A keys.



3. Right-click and then click **Delete Symbol** in the context menu, or press DELETE key.



Undo / Redo Actions

Undo Action

To revert the latest action, do the following:

1. Press CTRL+Z keys, or right-click and then click **Undo (CTRL+Z)** in the context menu

Redo Action

To repeat the latest action, do the following:

1. Press CTRL+Y keys, or right-click and then click **Redo (CTRL+Y)** in the context menu

Adjust Graphic

Center Items

You can adjust selected items into the center of the drawing pane based on the mouse cursor position.

2. Select item(s)

3. Press F2 key or right-click and then click **Center under mouse (F2)** in the context menu

Example: If the mouse cursor is on the left side, the view will be moved to the right side

Show All Items

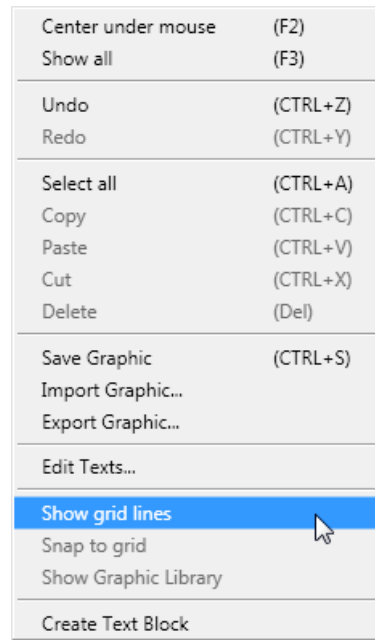
You can show all used items of the graphic as follows:

1. Press F3 key or right-click and then click **Show all (F3)** in the context menu

Show Grid Lines – Snap to Grid

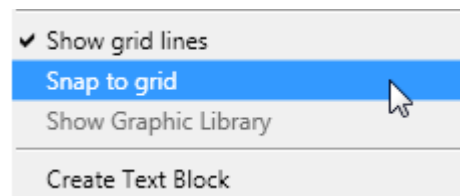
Purpose Show grid lines and adjusting graphic symbols

Procedure 1. Right-click in the drawing pane, and then click **Show Grid Lines** in the context menu.



RESULT: The grid lines are displayed. You can now better position graphic symbols when moving them in the drawing pane or dragging&dropping them from within the graphic library.

2. To adjust all graphic symbols to the grid, right-click in the drawing pane, and click **Snap to Grid** in the context menu.



RESULT: All graphic symbols not adjusted to the grid yet will now be adjusted to the grid.

Show Graphic Library

Purpose Show graphic library if it has been closed by accident or explicitly.

- Procedure**
1. Right-click in the drawing pane, and click **Show Graphic Library** in the context menu.



RESULT: The graphic library is displayed.

Basic Steps in Creating a Graphic

Creating a graphic includes the following basic steps:

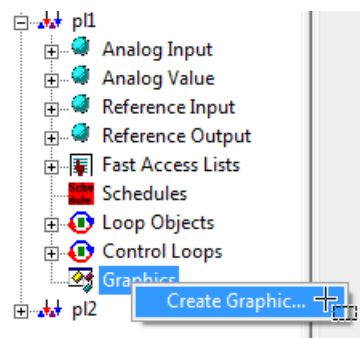
- a. Create new graphic including the setting of graphic properties (graphic ID, resolution, background image)
- b. Add elements, images and buttons from graphic library
- c. Set properties for elements and buttons
- d. Add text blocks

Create New Graphic

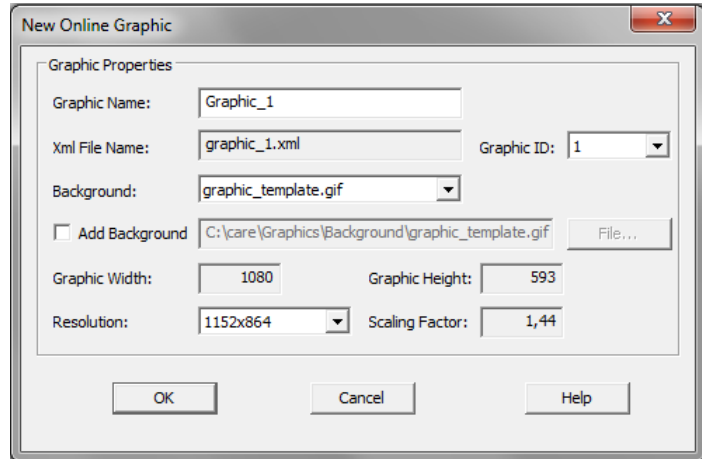
- Procedure**
1. In CARE, expand the project folder and navigate to the plant for the creation of graphics on plant level.

Or, expand the project folder and navigate to the controller for the creation of one single start graphic on controller level (see "Start Graphic and Plant Graphics").

2. Right-click the *Graphics* folder, and then click **New Graphic...** in the context menu



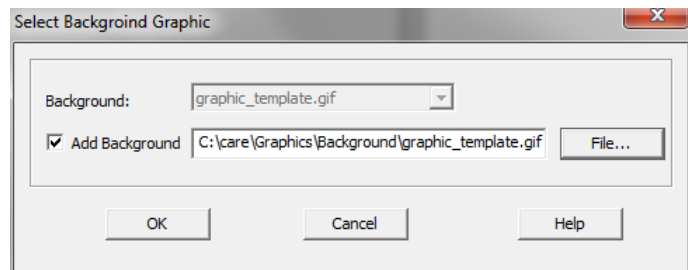
RESULT: The New Online Graphic dialog box displays.



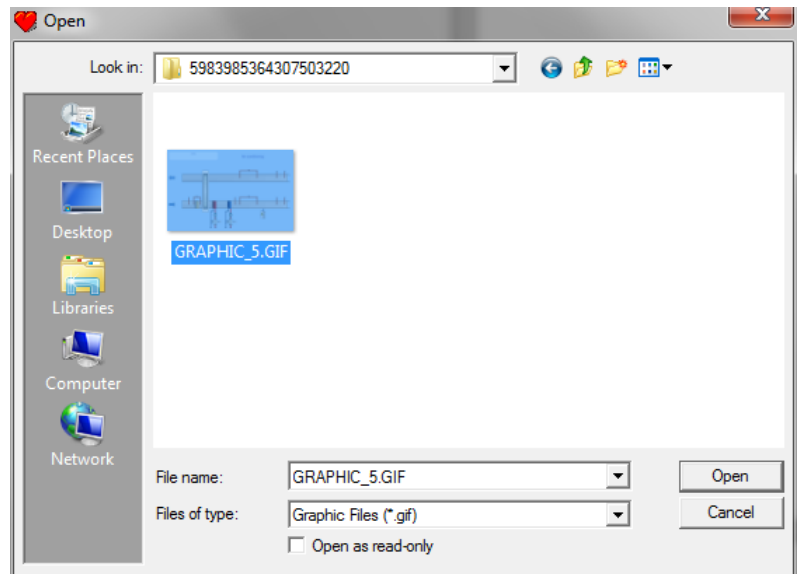
3. In **Graphic Name**, enter a name. By default the name is `Graphic_<consecutive number>`.

In Xml File Name, the created graphic file is shown. It is named according to the default graphic name. To each Xml file a graphic ID is assigned according to the consecutive number of the default graphic name. The graphic ID is used by the software for interlinking multiple graphic pages properly.

4. To change the default Graphic ID, select another ID from the **Graphic ID** drop-down listbox.
5. From the **Background** drop-down listbox, select the background image to be used by default for this graphic and for each newly created graphic.
6. To add a particular background to the current graphic file this time only, check **Add Background** check box and click **File...** button.



7. In the Select Background Graphic dialog box, click the **File...** button.
8. In the Open dialog box, select the file, and then click the **Open** button.

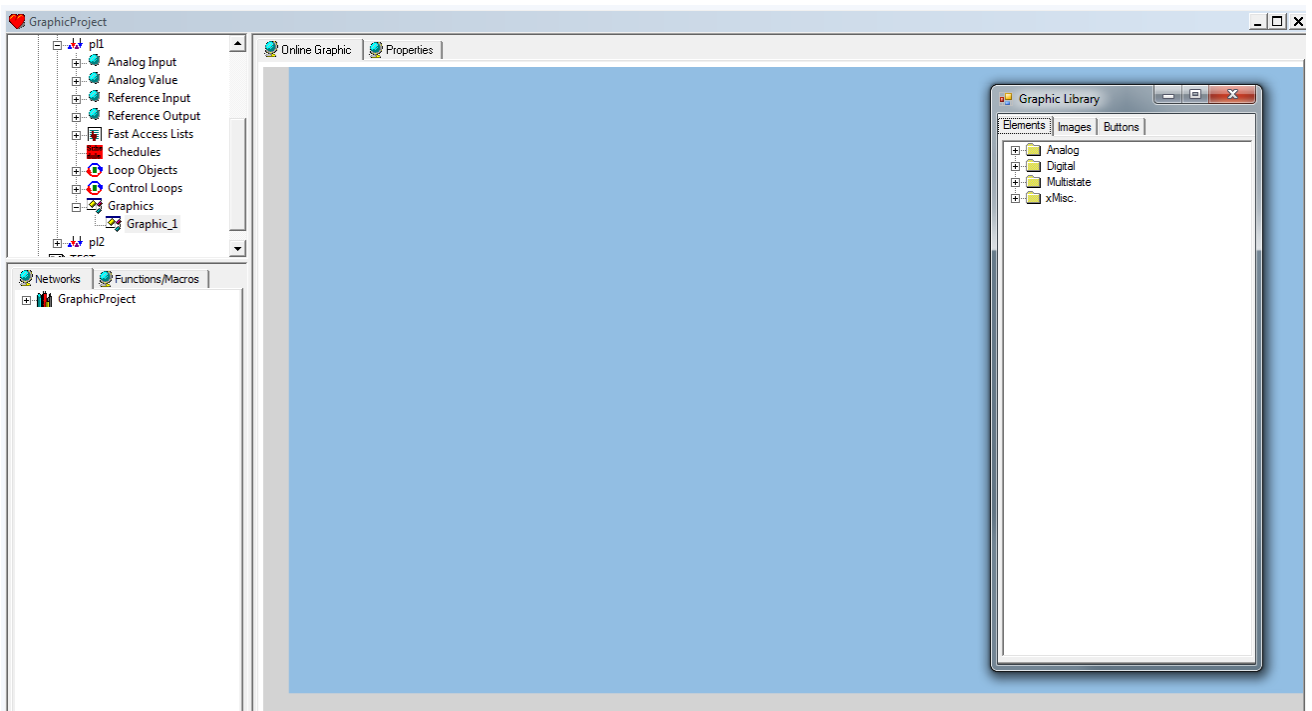


RESULT: The path of the image is added to the field. The width and height of the selected and enabled graphic is displayed in the **Graphic Width** and **Graphic Height** fields.

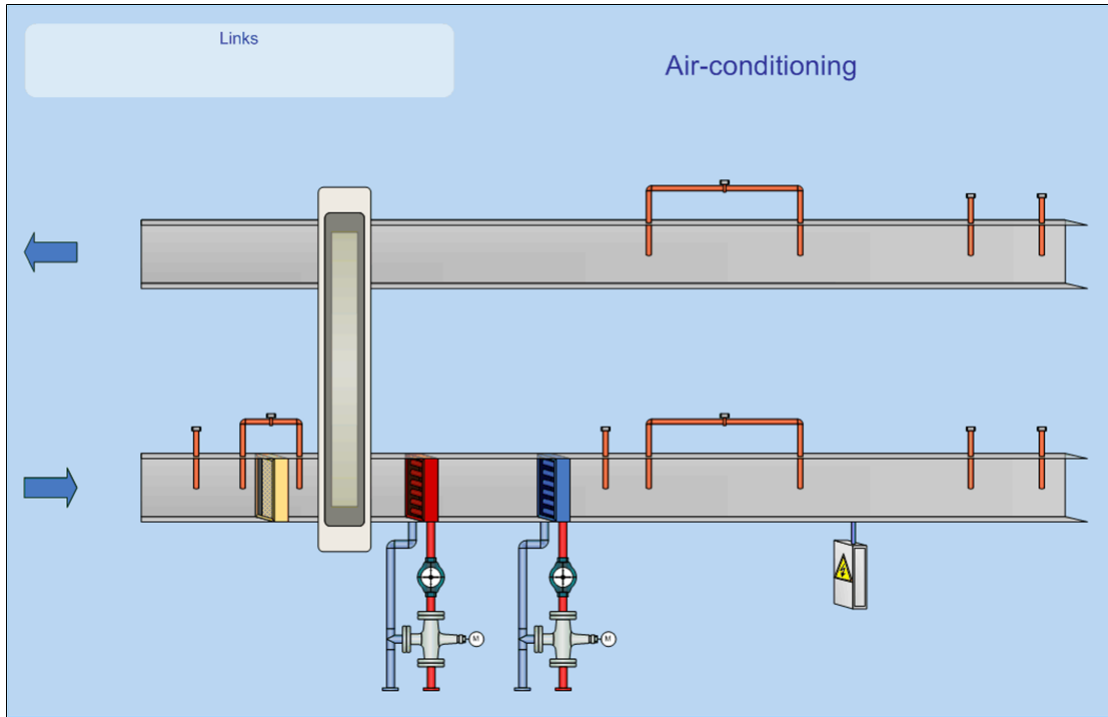
9. From the **Resolution** drop-down listbox, select the resolution. Depending on the resolution the scaling factor is updated in the **Scaling Factor** field.

10. Click **OK**.

RESULT: An "empty" graphics page is created and displayed on the *Online Graphic* tab. On the *Properties* tab, you can change properties if desired at any time.



Empty Graphic with Template Graphic as Background



Empty Graphic with Plant Schematic as Background

- Continue with adding dynamic elements, static images and buttons to the graphic as described in the "Add Elements, Images, and Buttons from Graphic Library to Drawing Pane" section.

Start Graphic and Plant Graphics

A basic application scenario is the following:

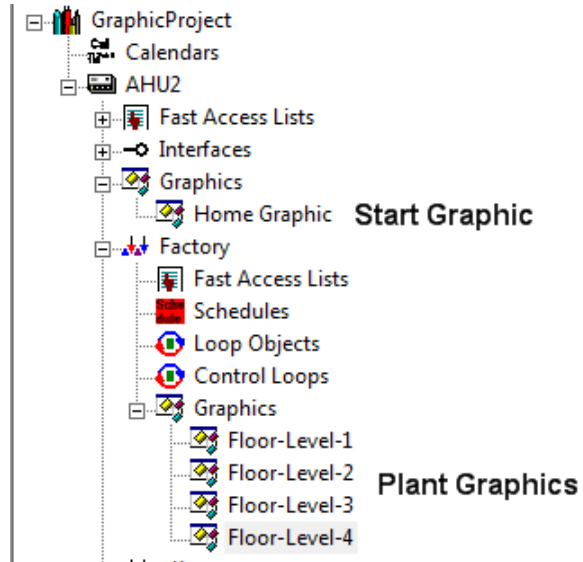
Start graphic

On controller level, one start graphic is created. Then graphic links will be added which link to plant graphics. The start graphic can also contain links to datapoints. The start graphic will be loaded after login to the web interface.

NOTE: If you create graphics, the creation of a start graphic is mandatory.

Plant Graphics

On plant level, multiple graphics can be created to which the start graphic links. The start graphic can also contain graphic links and links to datapoints.



Logos Selection for Start Page

In case a start graphic on controller level is used, you can select a header and/or login logo which will be displayed on the start page in the web interface.

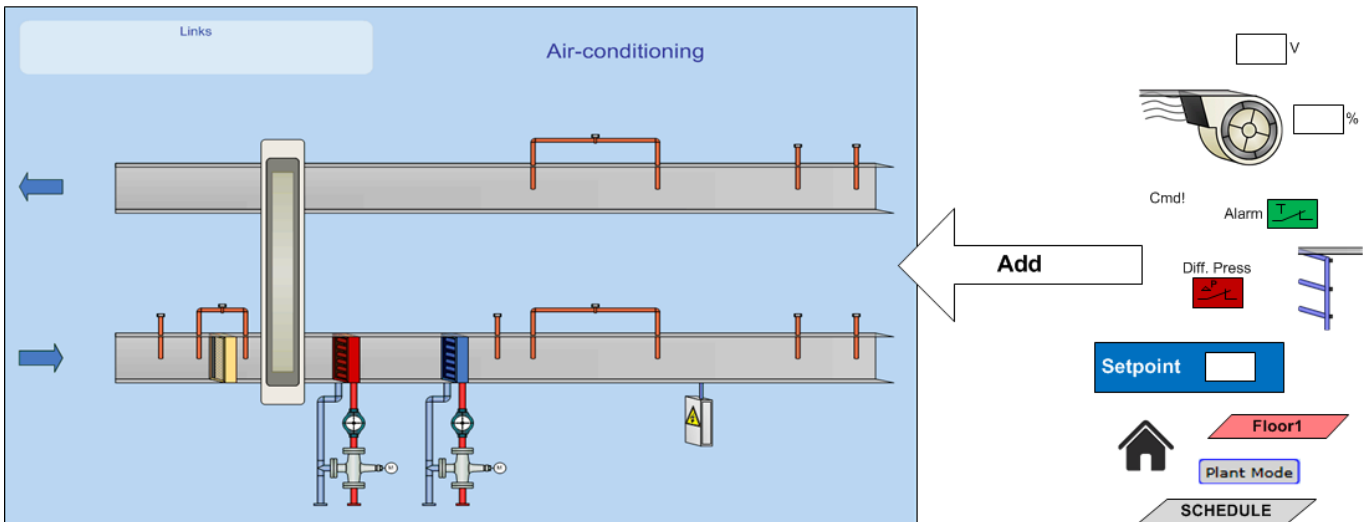
Logos

Login Logo:

Header Logo:

For details on the logos handling, please refer to the "Basic Knowledge" section.

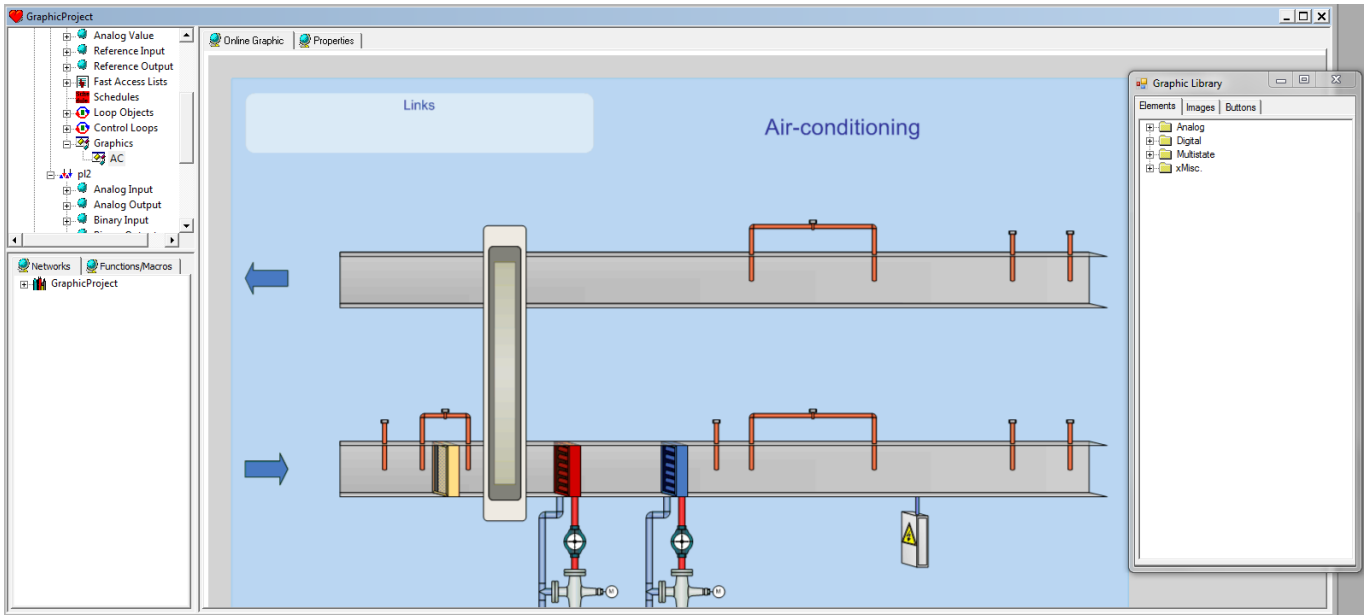
Add Elements, Images, and Buttons from Graphic Library to Drawing Pane



Procedure

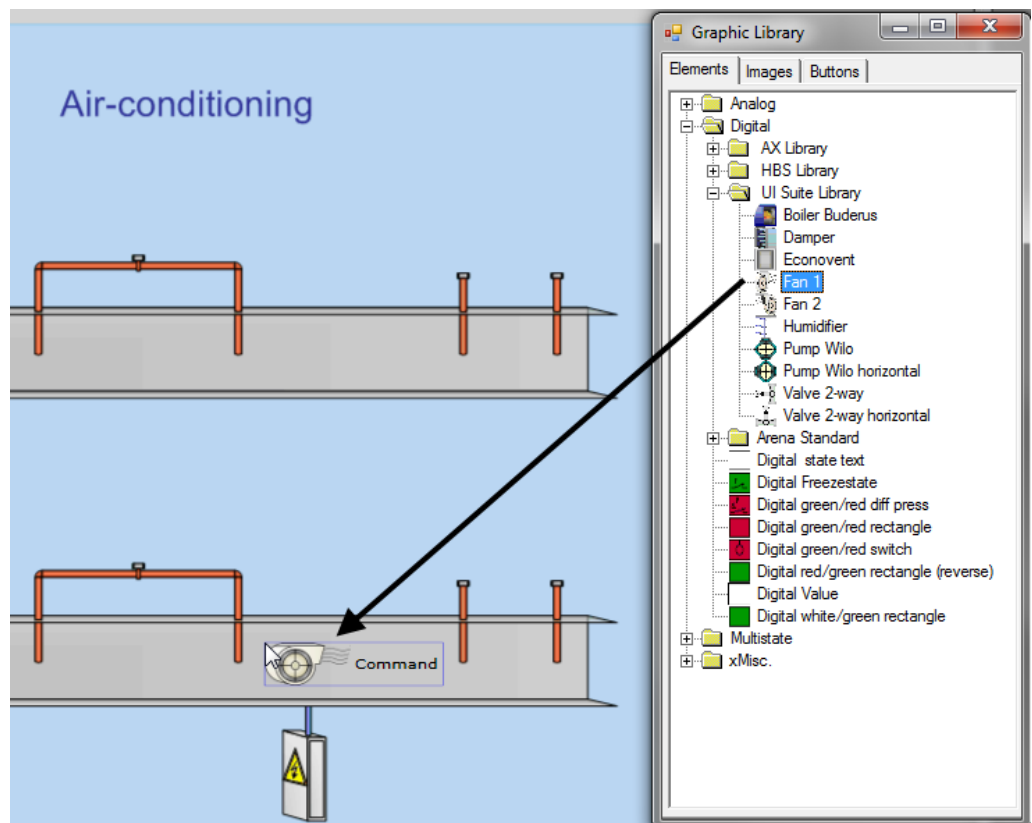
1. Navigate to the plant, or to the controller.
2. In the *Graphics* folder, click the graphic.

RESULT: The online graphic and the graphic library displays on the right pane.



3. In the *Graphic library* do any of the following:

- a. Select the Elements, Images, or Buttons tab.
- b. Expand the corresponding tree.
- c. Select the graphic symbol, drag it to the drawing pane and drop it at the desired place.

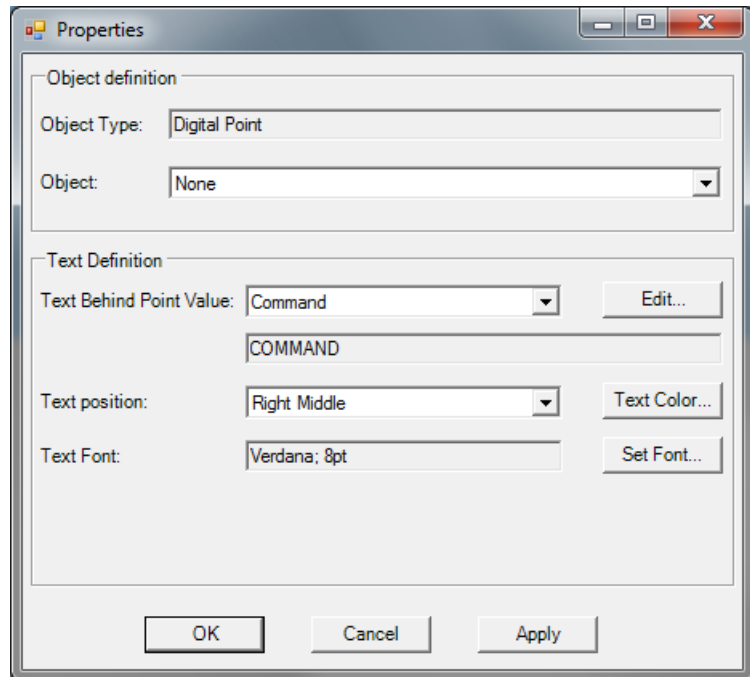


4. Continue with setting properties for dynamic elements and buttons as described in the "Set Properties for Elements and Buttons" section

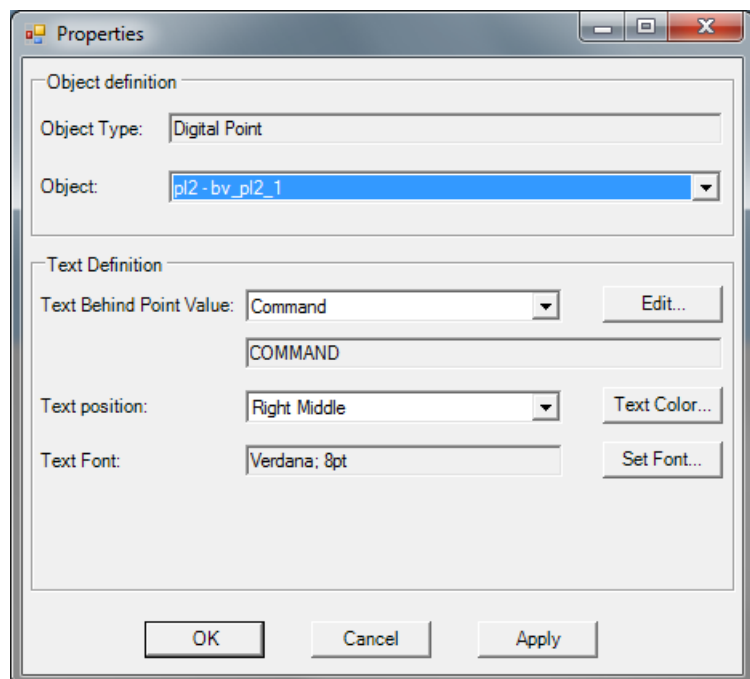
Set Properties for Elements and Buttons

- Procedure** 1. On the drawing pane, double-click the dynamic element.

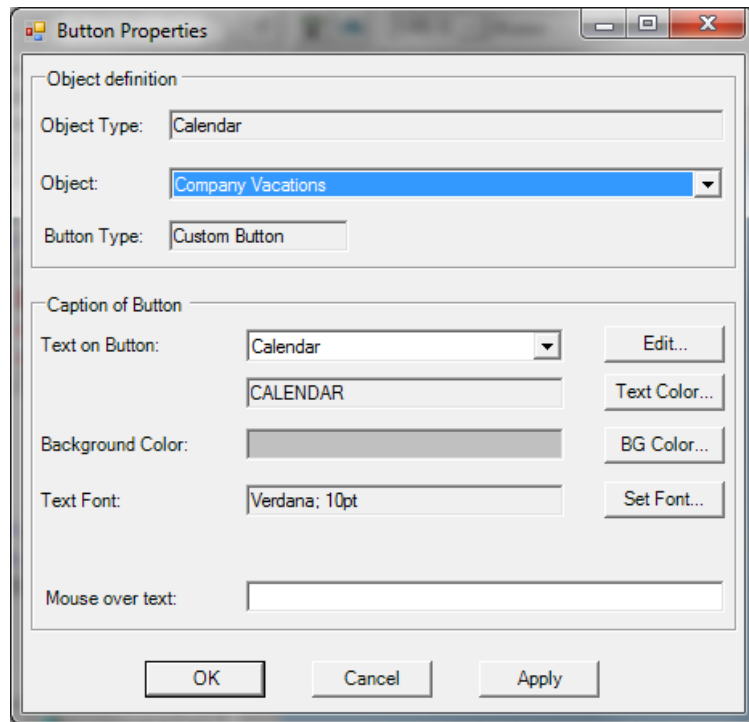
RESULT: The Properties dialog box displays.



Dynamic Element Properties



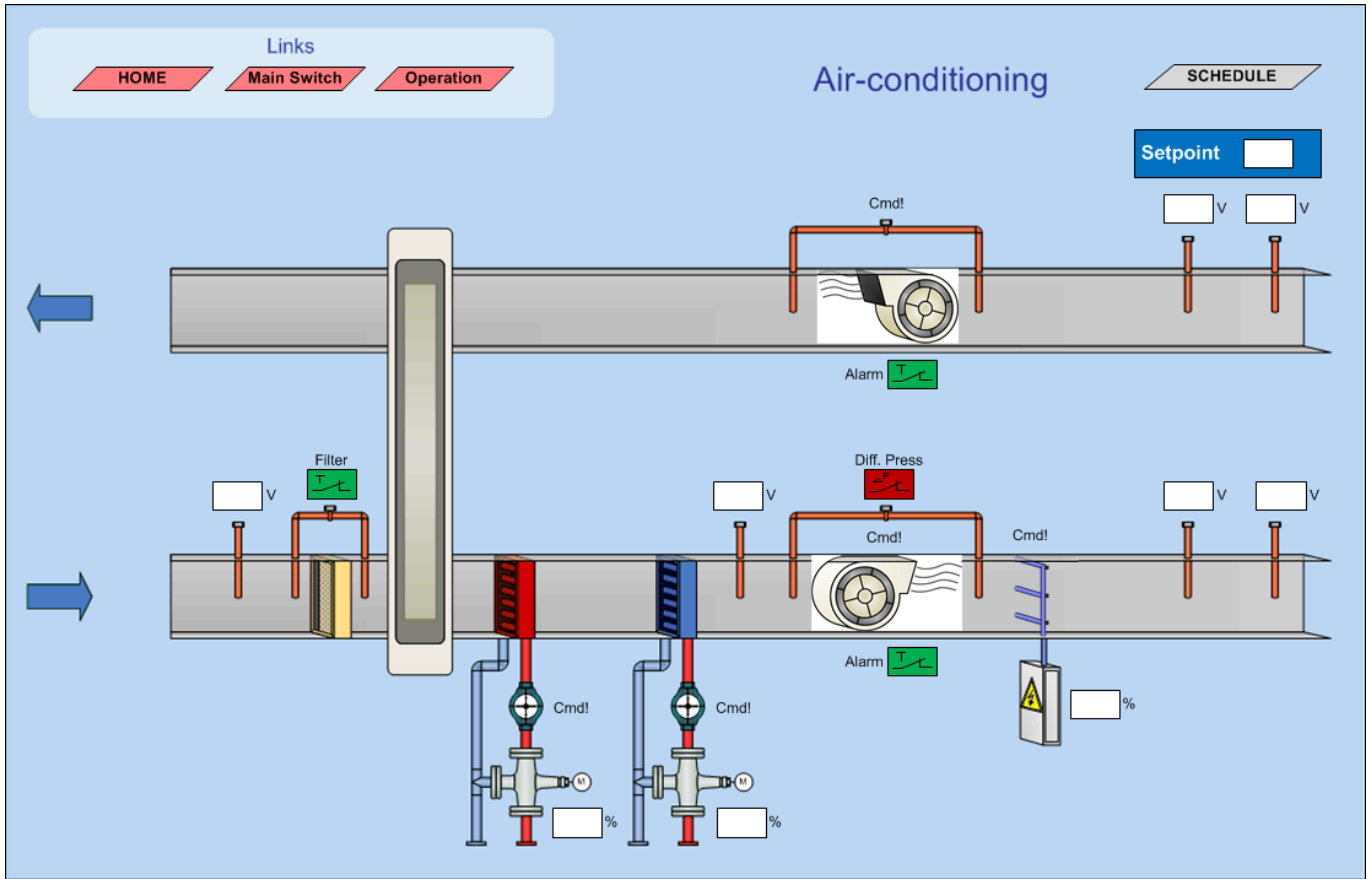
Dynamic Element Properties (e.g. digital point) with databinding object



Button Properties (e.g. Calendar) with referencing object

2. In the **Object Type** field, the object type to which the element or button can be bound, is displayed.
3. From the **Object** drop-down listbox, select the datapoint (for dynamic element), or the reference (for button).
4. For a dynamic element, select the text that indicates the function of the element from the **Text Behind Point Value** drop-down listbox,.
5. From the **Text on Button** drop-down listbox, select the text to be displayed on the button (not applicable to individual symbol button type).
6. To edit text in the language dictionary, click the **Edit...** button (see "Edit Text" section for details)
7. For a dynamic element, select the position of the text in relation to the element from the **Text Position** drop-down listbox,.
8. If you want to format the text other than the default settings, click the **Text color...** button and/or **Set Font...** buttons and define the desired settings.
9. For a button, click the **BG Color...** button and define the desired setting If you want to change the background color.
10. In **Mouse over text**, enter a text that will be displayed in a tooltip when hovering the mouse over the button.
11. Click the **Apply** button to view the result in the drawing pane. If your settings fulfill your requirements, click the **OK** button to close the *Properties* dialog box.
12. Continue by adding text blocks as described in the "Create Text Block" section.

RESULT: The graphic is completed.



Completed Online Graphic

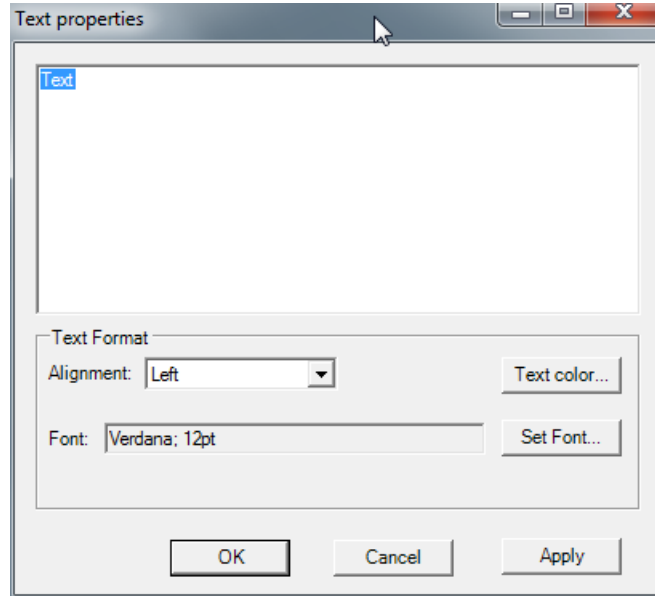
Create Text Block

Purpose Inserts descriptive text at the cursor location

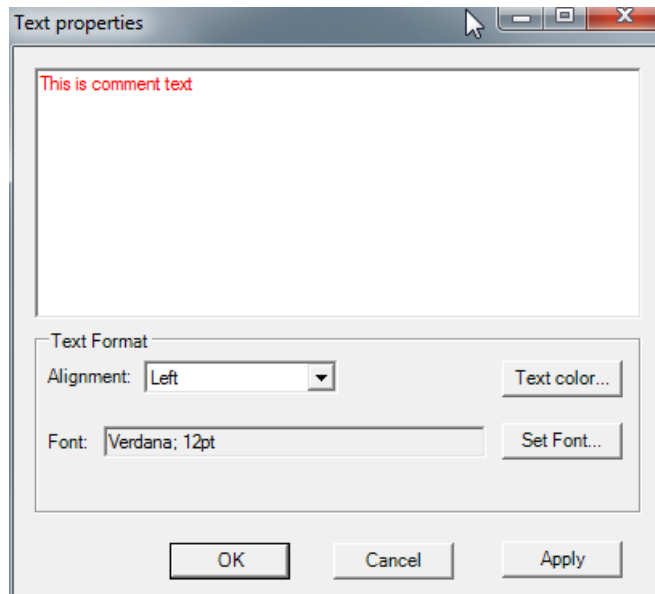
Procedure 1. Right-click in the drawing pane, and click **Create Text Block** in the context menu.

Center under mouse	(F2)
Show all	(F3)
Undo	(CTRL+Z)
Redo	(CTRL+Y)
Select all	(CTRL+A)
Copy	(CTRL+C)
Paste	(CTRL+V)
Cut	(CTRL+X)
Delete	(Del)
Save Graphic	(CTRL+S)
Import Graphic...	
Export Graphic...	
Edit Texts...	
Show grid lines	
Snap to grid	
Show Graphic Library	
Create Text Block	

RESULT: The Text properties dialog box displays.



2. Enter the text.
3. From the **Alignment** drop-down listbox, select the alignment for the text.
4. If you want to format the text other than the default settings, click the **Text color...** and/or **Set Font...** buttons and define the desired settings.



5. Click the **Apply** button to view the result in the drawing pane. If your settings fulfill your requirements, click the **OK** button to close the dialog box.

This is comment text

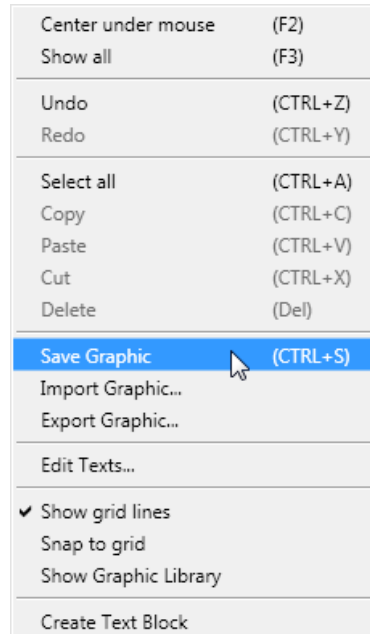
Save Graphic

Purpose To save the changes in the selected graphic.

A graphic will be automatically saved each time you leave the page.

You can explicitly save the graphic as follows:

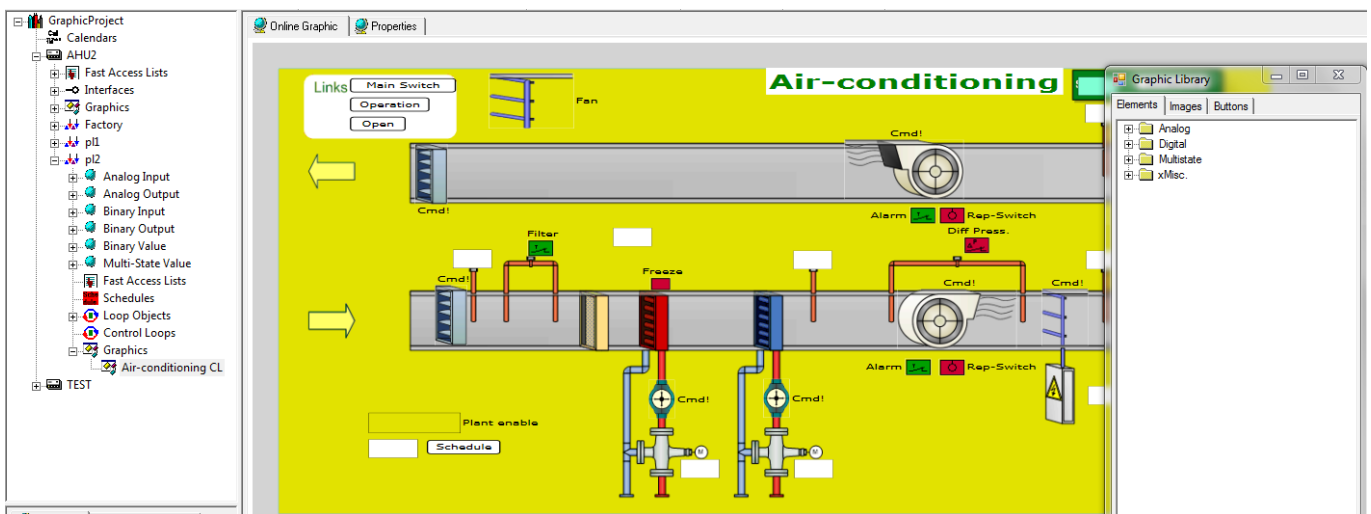
- Procedure**
1. Right-click in the drawing pane, and click **Save Graphic** in the context menu, or press CTRL+S keys.



Change Graphic Properties

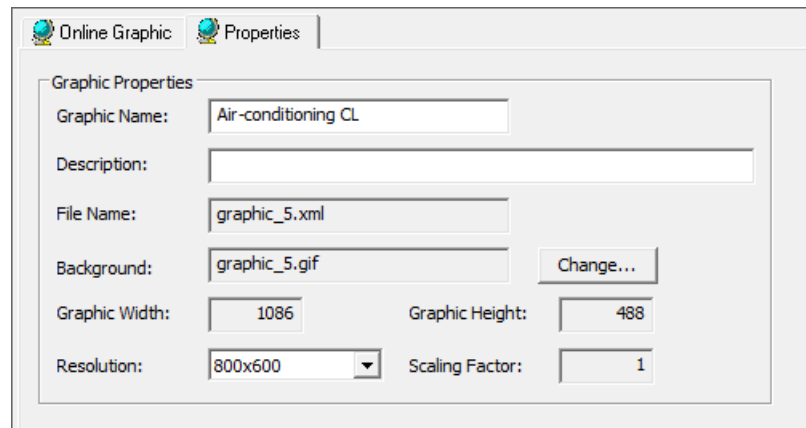
- Procedure**
1. In CARE, expand the project folder and navigate to the plant or controller that contains the graphic.
 2. In the *Graphics* folder, click the graphic .

RESULT: On the right, the graphic is displayed on the Online Graphic tab.



3. Select the *Properties* tab .
The following properties can be changed:

- graphic name
- description
- background image
- resolution of background image



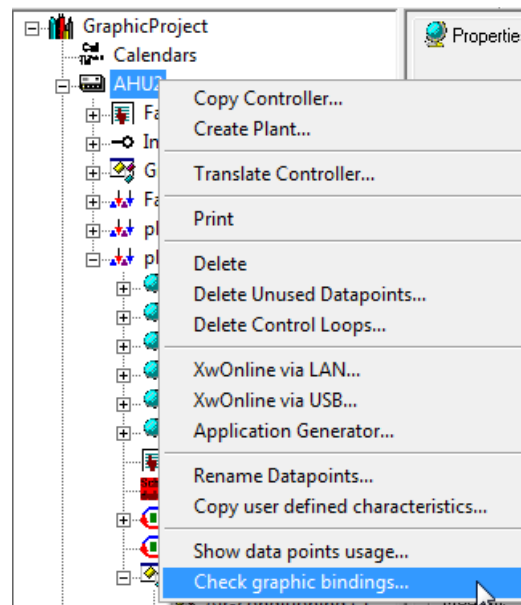
4. Change desired properties. For descriptions of the properties, please refer to the previous steps in the "Create New Graphic" section.

Download Graphic

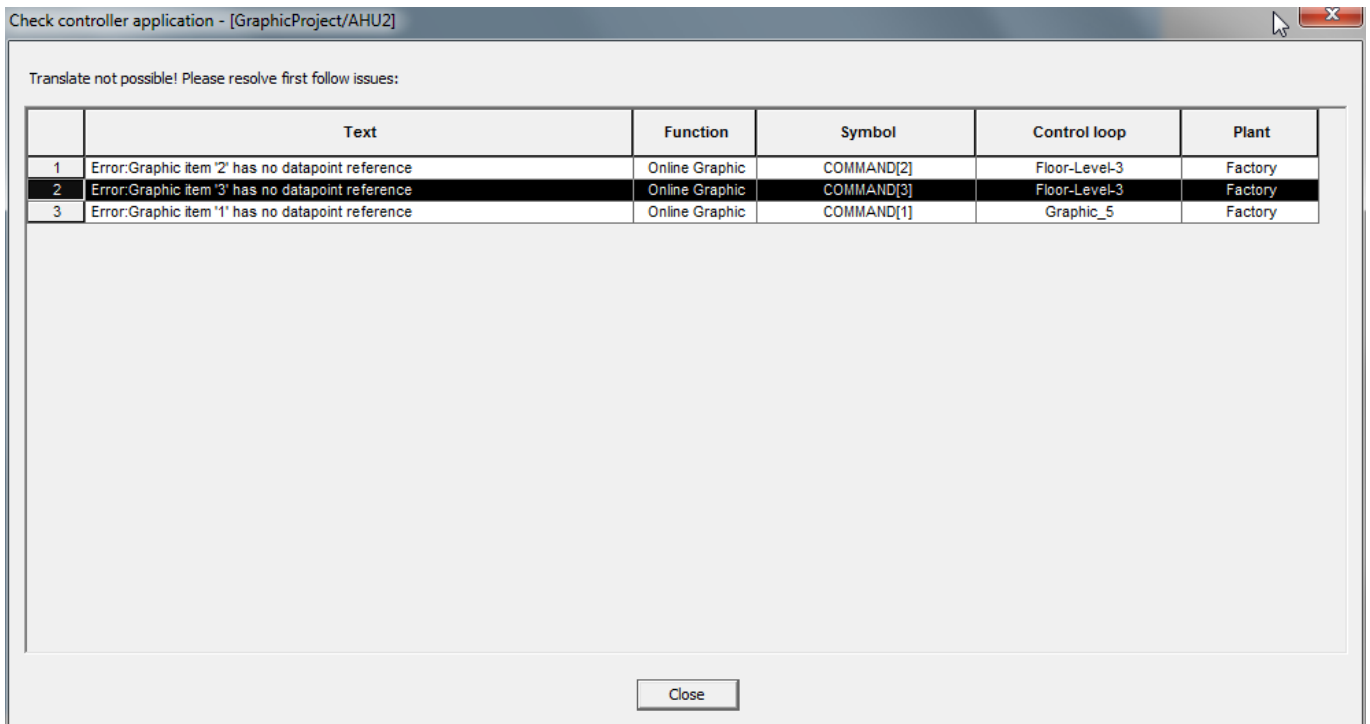
Purpose Download graphics into the controller.

Prerequisites In order to download the graphic successfully, the databindings and button links must be correct, i.e. every dynamic element must have a datapoint assigned and every linking button must reference to a target. CARE interrupts the controller translation if any databindings or referencing links are missing. In addition, the application containing the assigned datapoints and referenced targets of the graphic must be downloaded in the controller prior to the graphic download.

- a. Test if the databindings are correct by right-clicking the controller, and clicking **Check graphic bindings** in the context menu.



- b. If there are missing databindings or links, solve the error by double-clicking the number in the protocol and correcting the error in the graphic .



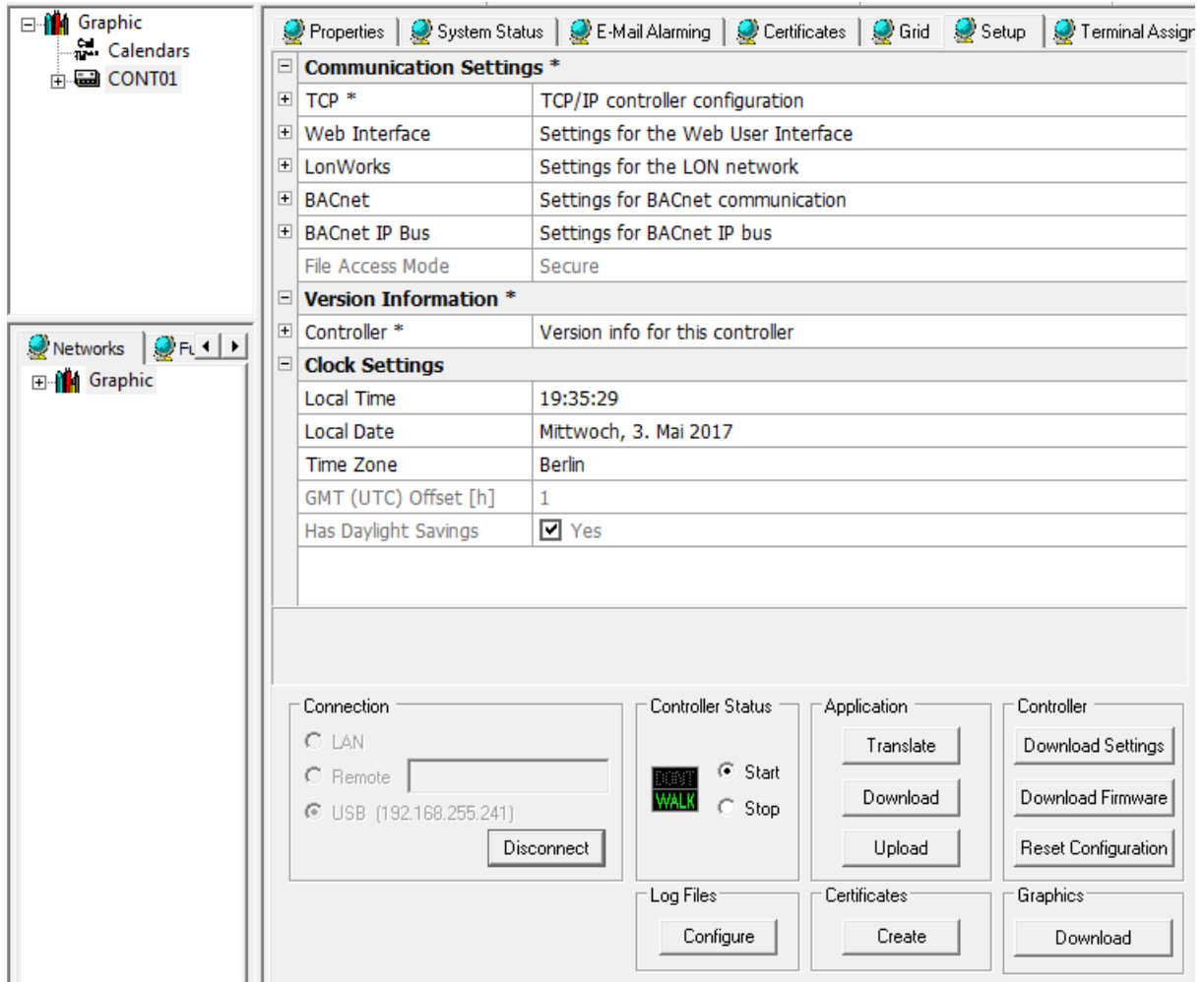
- c. Close the dialog box and re-translate the controller.
 d. Download the application into the controller

NOTE: An application download will not update a graphic in the controller.

Procedure

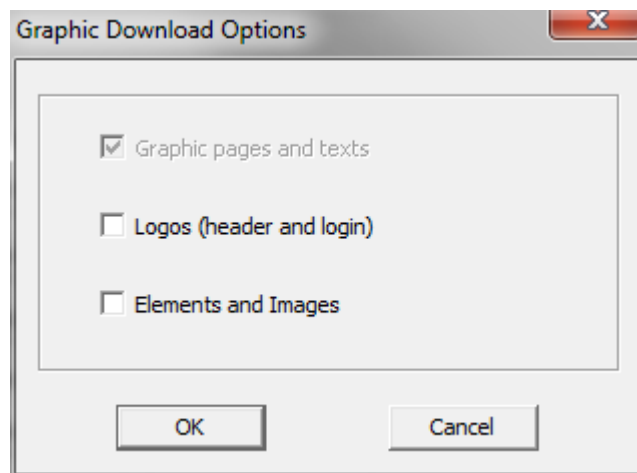
1. In the logical plant tree, click the controller, and then select the *Setup* tab.
2. Connect to the controller by selecting any of the Connection options (LAN, Remote, or USB) and then clicking **Connect**.

RESULT: CARE is connecting to the controller.



3. Under Graphics, click Download.

RESULT: The Graphic Download Options dialog box displays.

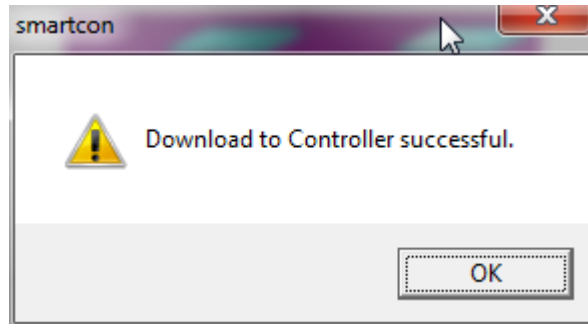


By default, the graphic pages (XML files, background image, all standard elements and images and texts are checked and will be downloaded automatically. If the graphic contains user-defined elements, images or logos, these options must be selected explicitly (see next steps).

4. Check **Logos (header and login)** if you want to download logos the first time or when logos had been changed.
5. Check **Elements and Images** if you have created any own elements and images you want to download and if this is your first download.
6. Click **OK**.

RESULT: CARE is downloading the files into the controller.

If the download was successful, a message box displays.



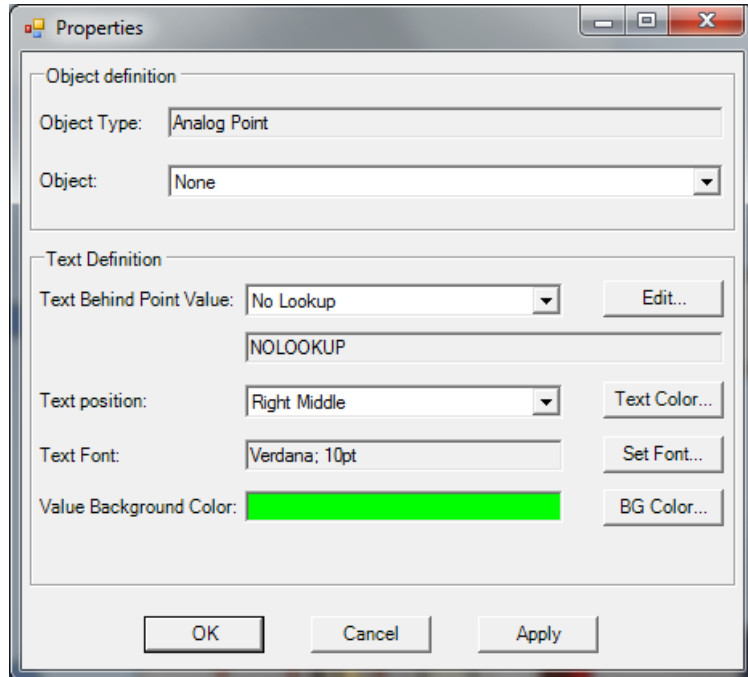
7. Click **OK**.
8. Login to the controller via web browser and check databindings and positions of elements

Possible errors are:

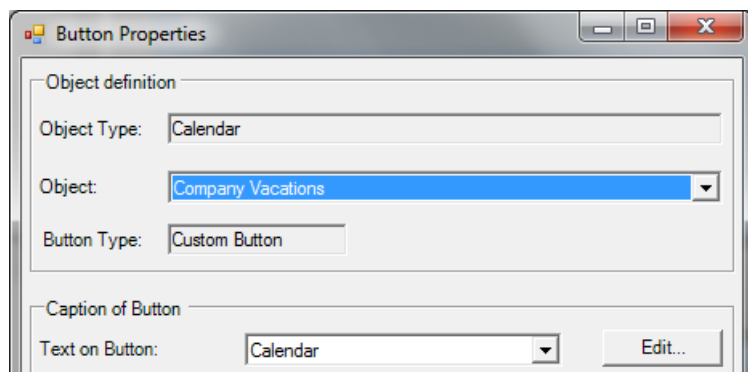
- Names are missing on buttons (will not be checked during translate)
- Wrong- / missing datapoint bindings despite the translate check:
 - Elements without databinding have a red frame
 - Elements with databinding have a blue frame

View / Change Databinding or Links

- Purpose** View or change the databinding of a dynamic element or the link of a button.
- Procedure**
1. On the drawing pane, double-click the dynamic element or the linking button.
- RESULT: The Properties dialog box displays.



Example: Dynamic Element Properties



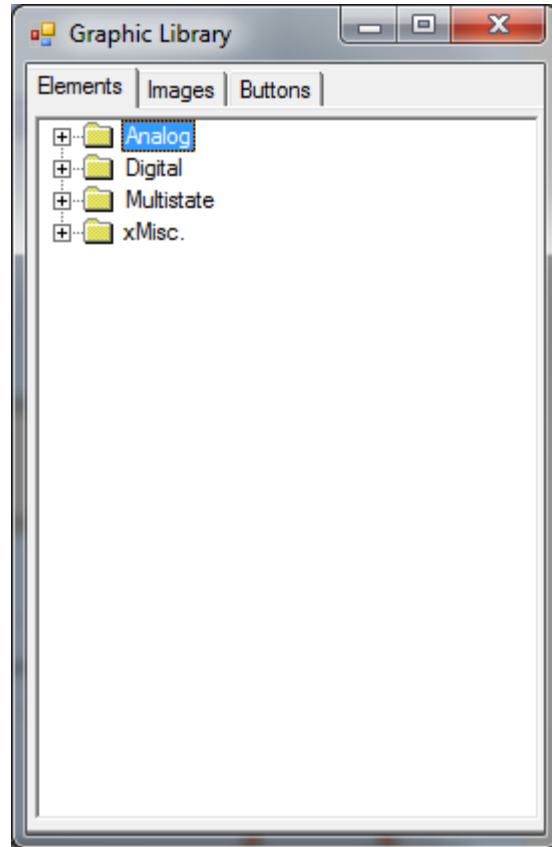
Example: Linking Button Properties (Calendar)

2. For dynamic elements, select the datapoint to be assigned from the **Object** drop-down listbox .
3. For buttons, select the link (calendar, schedule, graphic page, external graphic page, and trend) from the **Object** drop-down listbox .
4. Click the **OK** button to close the *Properties* dialog box.

The Graphic Library

Purpose For composing a graphic or a background image, the graphic library provides the following graphic symbol types:

- default dynamic elements (e.g. analog and digital symbols and animated equipment) that must be bound to datapoints
- static images (e.g. ducts, fans, coils etc.) without binding behavior
- buttons that must be linked to a target



Graphic Composition

The graphic symbols will be added to the drawing space by simple drag&drop.

Creation of New Elements and Images

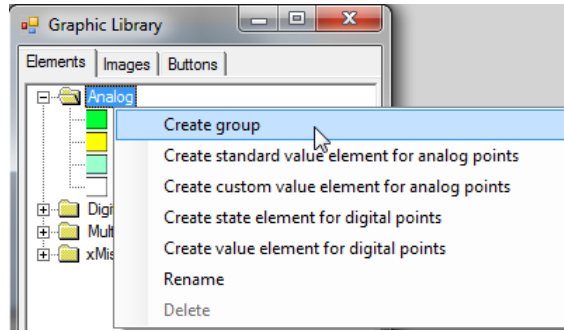
New dynamic elements can be created and new static images can be added by using default or new graphic symbols and modifying their properties.

For the creation of new elements and the addition of new images, the graphic library provides the following functions:

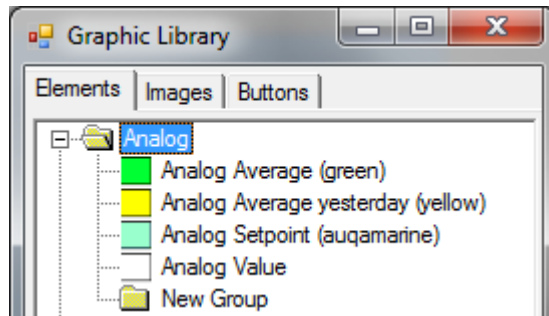
- Creating groups and renaming (sub folders) for structuring the library tree
- Creating custom element for analog points
- Creating standard element for analog points
- Creating state element (with image) for digital points
- Creating value element (without image) for digital points
- Adding image element(s)
- Editing elements and images
- Deleting elements, images and groups

Create and Rename Group

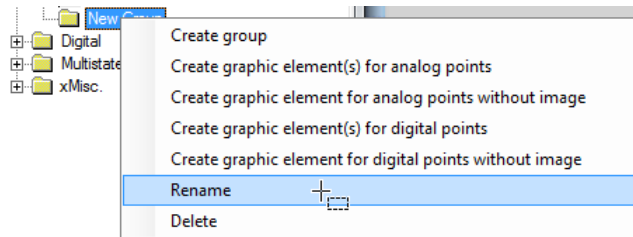
- Purpose** Provides structuring the pre-defined library tree by adding new groups. This is done by adding new sub folders which can named as group.
- Procedure**
1. In the Graphic library dialog, right-click the group (folder) to which you want to add a new group (sub folder), and then click **Create group** in the context menu.



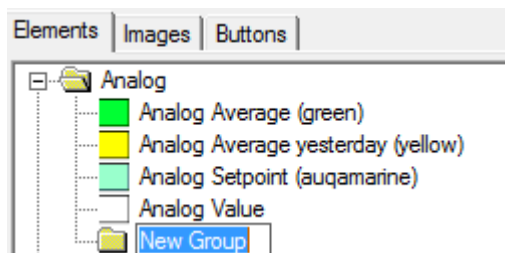
RESULT: The group is added as sub folder to the selected folder and is named New Group.



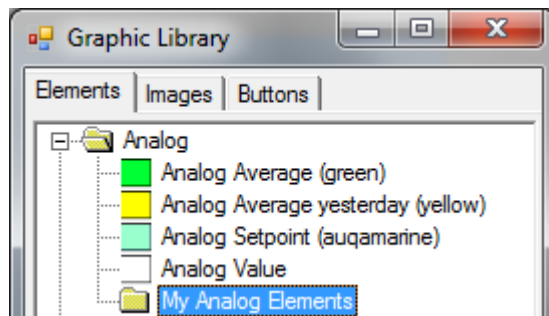
2. Rename the New Group sub folder by right-clicking the sub folder.



3. Then clicking **Rename** in the context menu.



4. And then changing the name of the highlighted entry.



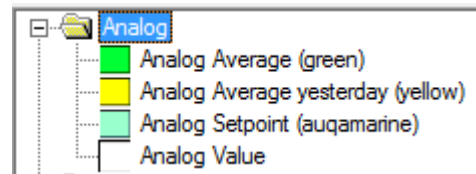
Add Dynamic Elements to Graphic

By default, there is a fixed set of dynamic elements available:

- Elements with background image
- Per type one element without a background image

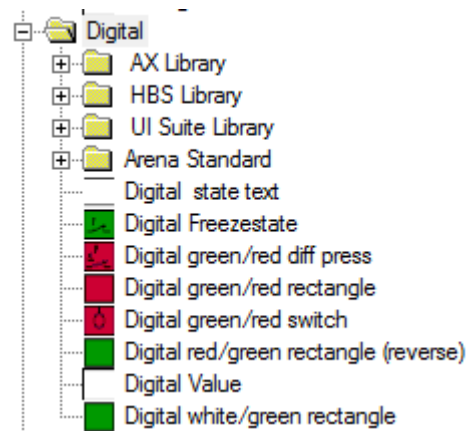
Analog

- Only elements are available to display the value
- Default setting: engineering unit will be displayed



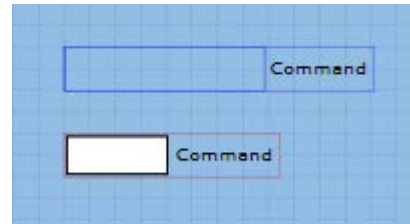
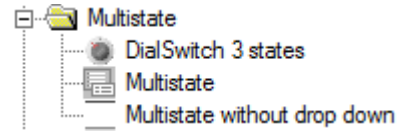
Digital

- Display State Text
- Color change on state change
- Display animated gif's



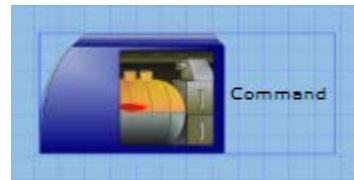
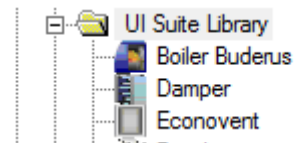
Multistate

Multistate with (default) or without drop-down listbox



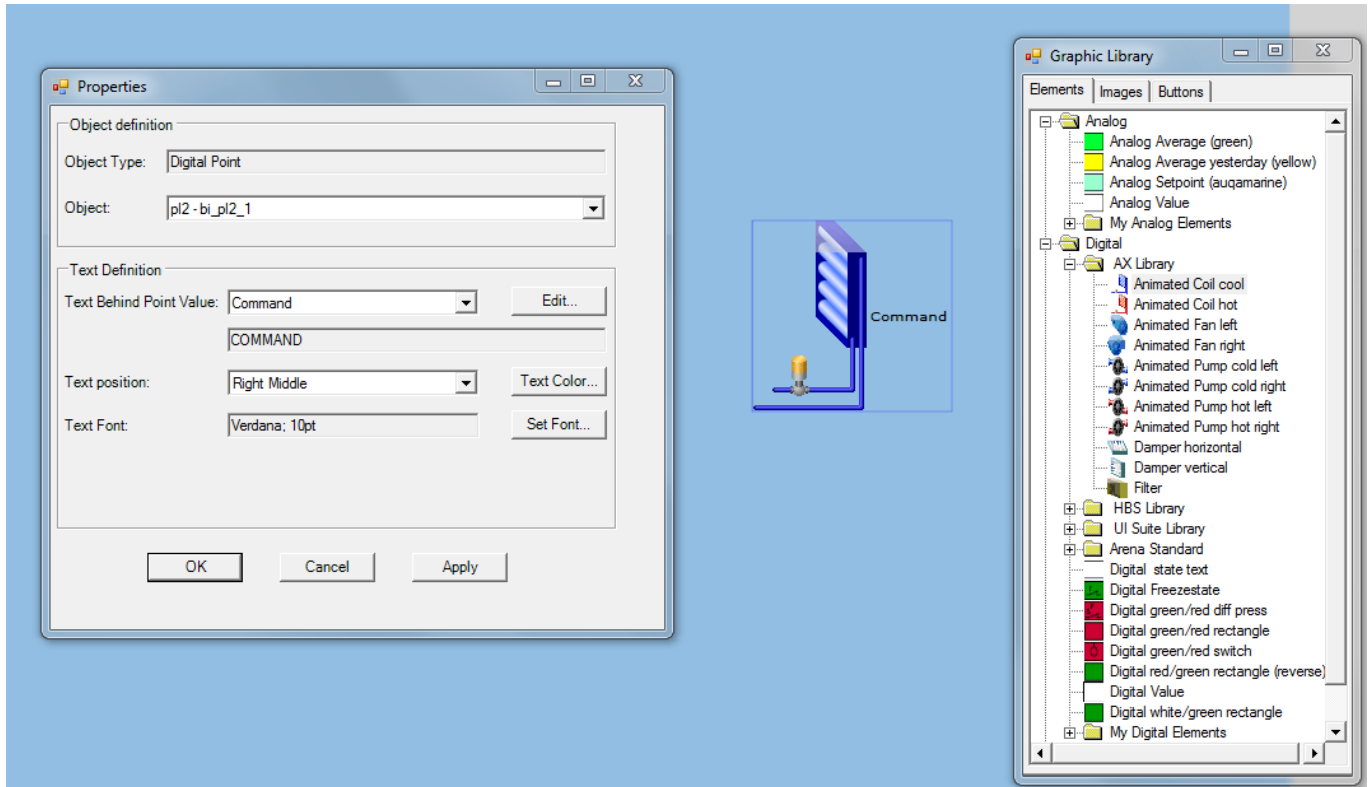
Value-Dependant

In addition there are elements from different libraries where the graphic does change depending on the datapoint value, e.g. Boiler Buderus:



Procedure

1. If not already opened, open the graphic library by right-clicking in the drawing pane, and then clicking **Show Graphic Library** in the context menu.
2. In the Graphic Library, select the Elements tab.
3. Expand the tree, select the element and drag&drop it to the drawing pane.
4. Double-click the element and define the properties in the Properties dialog box.
5. From the Object drop-down listbox, select the datapoint to be assigned.
6. Set further properties as desired.

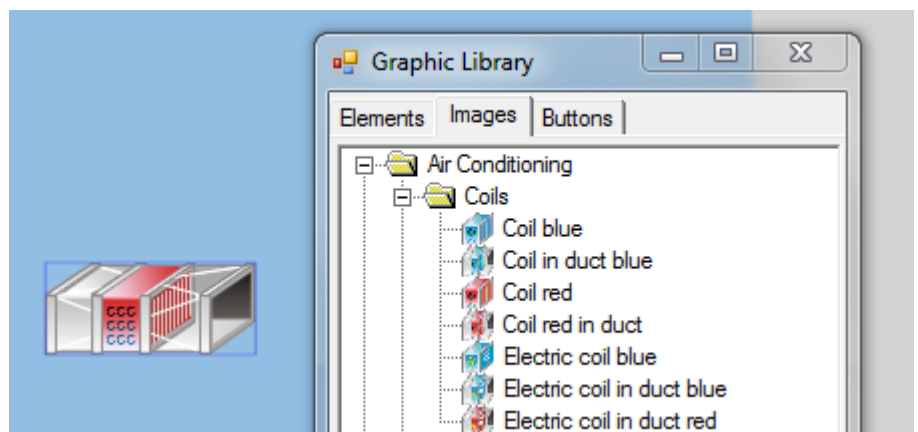


Add Static Image Elements to Graphic

By default, there is a fixed set of static images available. You can create an individual group first and add your custom images to it.

Procedure

1. If not already opened, open the graphic library by right-clicking in the drawing pane, and then clicking **Show Graphic Library** in the context menu.
2. In the Graphic Library, select the Images tab.
3. Expand the tree, select the image and drag&drop it to the drawing pane.



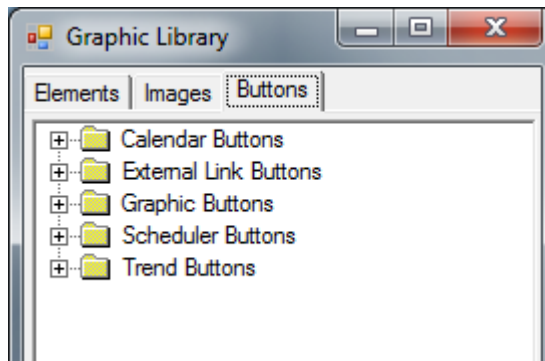
Create Buttons

Linking via buttons provides the following functionalities:

- graphic navigation via hotspots between multiple graphic pages of the same project or another project

- graphic display of an external web page
- displaying a single time program
- showing a calendar
- showing a trend display Group and an active trend

Linking buttons are provided in the graphic library. They are arranged in the following 5 groups.

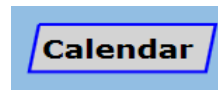


Each button group, except the Calendar button group, provides 3 different types of button:

- Graphic Custom Button
can be customized by changing text color, background color and font and can be resized, round rectangular shape

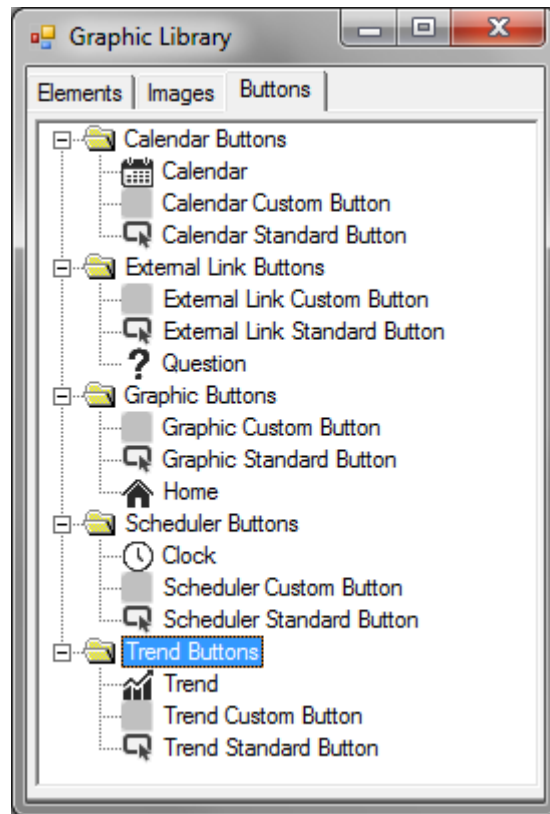


- Graphic Standard Button
cannot be customized and resized, trapezoid-rectanglar shape



- Individual Symbol Button
pre-defined non-changeable symbol, can be resized, individual button, group-dependant shape





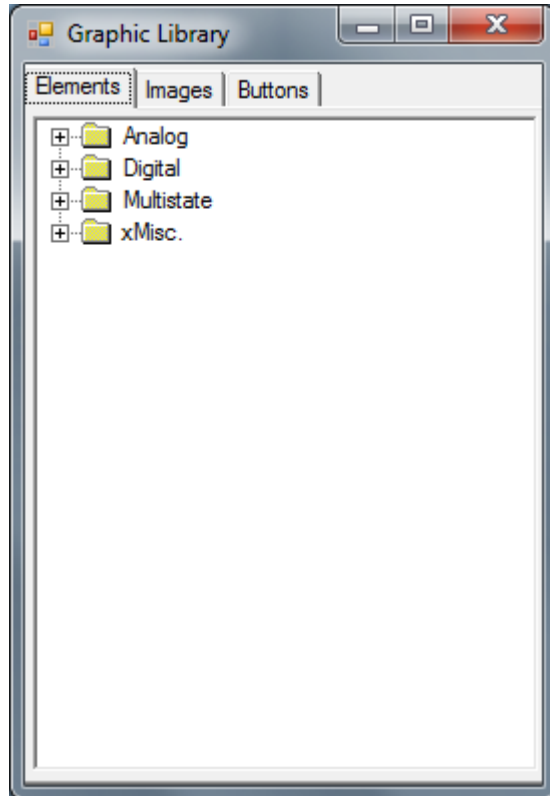
In the following general procedure, the creation of a custom and a standard graphic button is described as an example. The creation of other linking buttons can be performed in the same way.

General Procedure

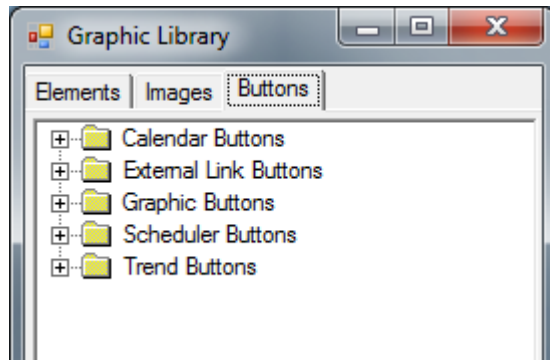
1. If not already opened, open the graphic library by right-clicking in the drawing pane, and then clicking **Show Graphic Library** in the context menu.



RESULT: The Graphic Library displays.



2. In the Graphic Library, select the Buttons tab.

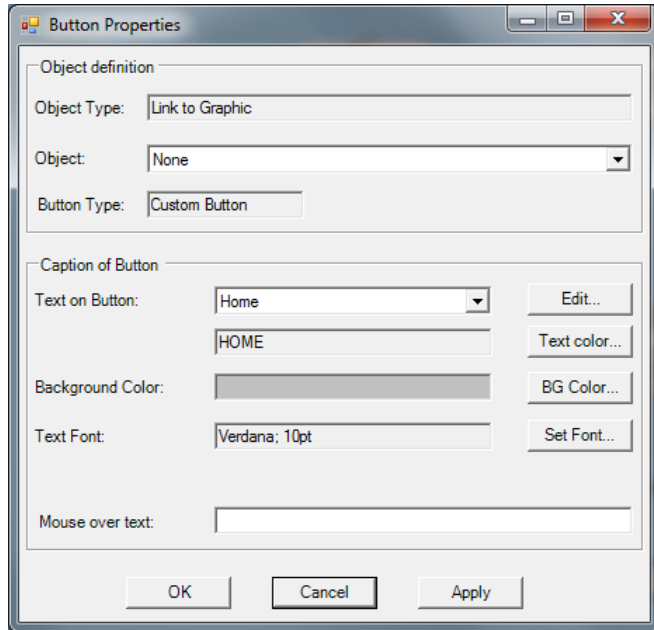


3. Expand the Buttons group from which you want to create a linking button, e.g. the Graphic Buttons group.

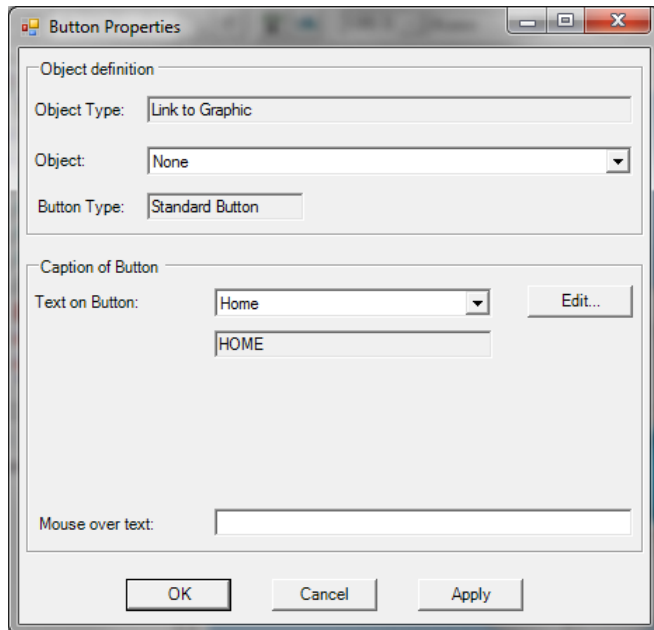
4. Select the button type and drag&drop it to the drawing pane.



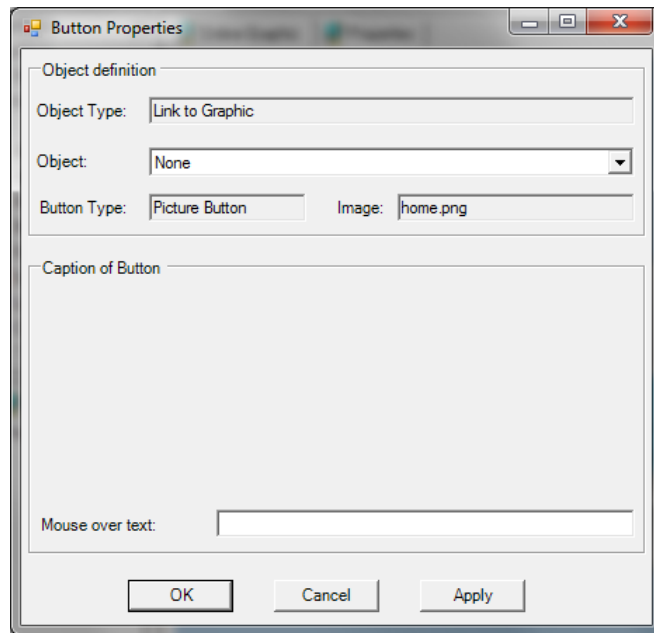
RESULT: The Button Properties dialog box displays.



Button Properties of Custom Button



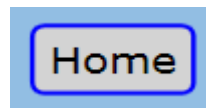
Button Properties of Standard Button



Button Properties of Individual Symbol Button

5. From the **Object** drop-down listbox, select the graphic page to which the button should refer.
 6. From the **Text on Button** drop-down listbox, select the text to be displayed on the button (not applicable to individual symbol button type).
 7. If you want to format the text other than the default settings, click the **Text color...** button and/or **Set Font...** button and define the desired settings (only applicable to custom button type).
 8. If you want to change the background color, click the **BG Color...** button and define the desired setting (only applicable to custom button type).
- NOTE: The web browser adds automatic style options to the custom button. If the background color is set, these style options will not work anymore.
9. In Mouse over text, enter a text that will be displayed in a tooltip when hovering the mouse over the button.
 10. Click **Apply** button to view the result in the drawing pane. If the result fulfills your requirement, click **OK** button to close the dialog box.

RESULT: The button is added to the drawing pane.

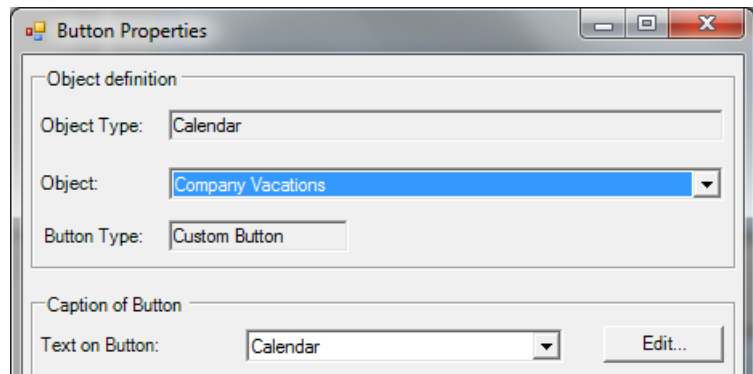


11. If desired, resize the button using the mouse.

Button Command Functions Overview

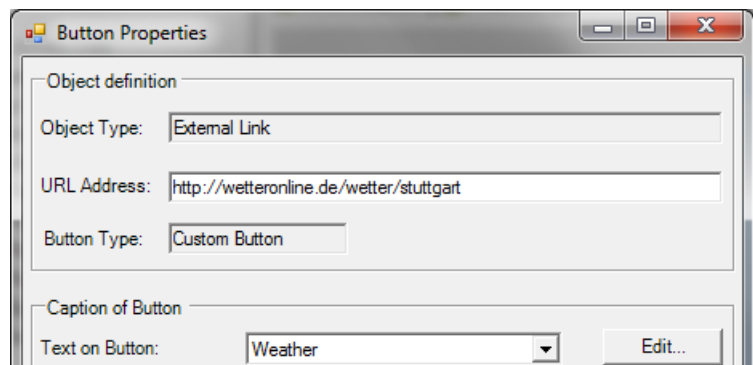
The following screenshots show the main difference in the Custom Button type dialogs as example for the different functions of the linking buttons:

- Create Calendar Button
Creates a button that links to a calendar.



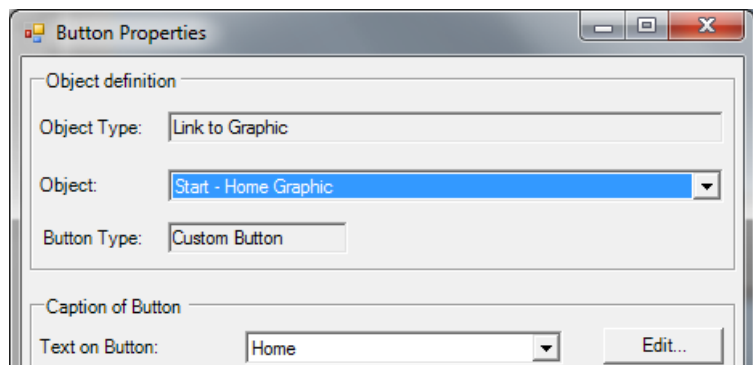
Create the button in the same way as described in the General Procedure.

- Create External Link Button
Creates a button that links to a graphic page of.



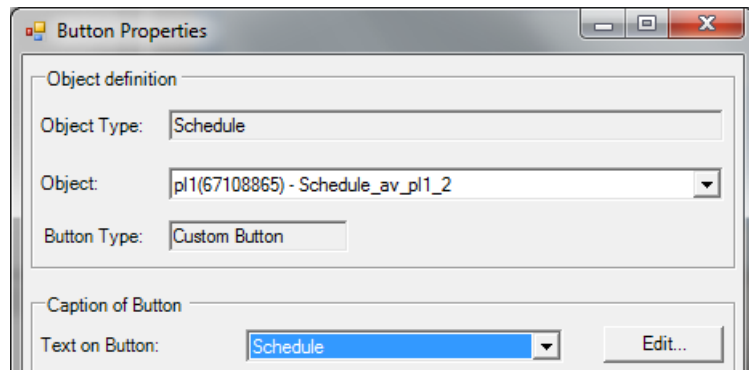
Create the button in the same way as described in the General Procedure.

- Create Graphic Button
Creates a button for navigation via hotspots between multiple graphic pages of the same project or different projects



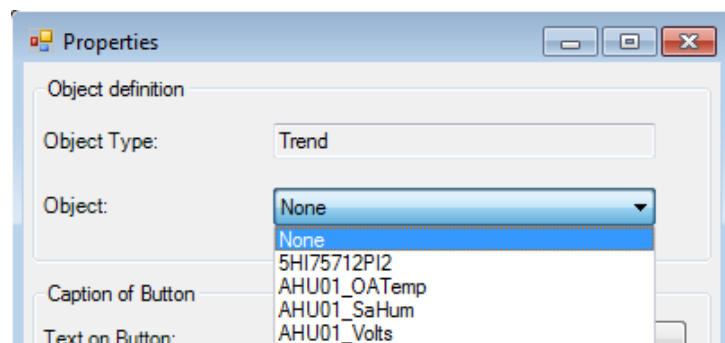
Create the button as described in the General Procedure.

- Create Schedules Button
Creates a button that links to a specific time program. This allows operating a time program/time program overview directly from the graphic.



Create the button in the same way as described in the General Procedure.

- Create Trend Button
Creates a button that links to a trend display Group and displays the corresponding active trend.



Create the button in the same way as described in the General Procedure.

Create New Dynamic Element in Graphic Library

Purpose In the graphic library, new dynamic elements are created by using:

- default elements
- new graphic symbols drawn by your own
- graphic symbols received from another source

and then

- modifying their properties.

Analog dynamic elements can either display the value in a:

- rectangular field (Standard value)
- plain graphic created by the user (Custom value)

Digital dynamic elements can either display the value in a:

- rectangular field (Value)
- multi-part switchable graphic created by the user (State)

Create Standard Value Element for Analog Point

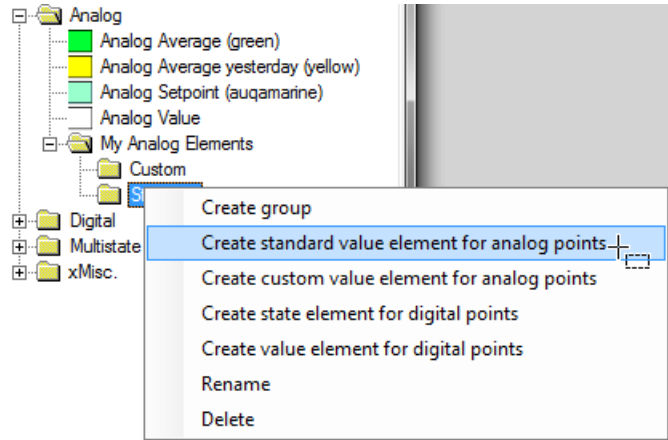
Purpose Create a dynamic element in the library that will display the analog value in a standard rectangular field.

Recommendation

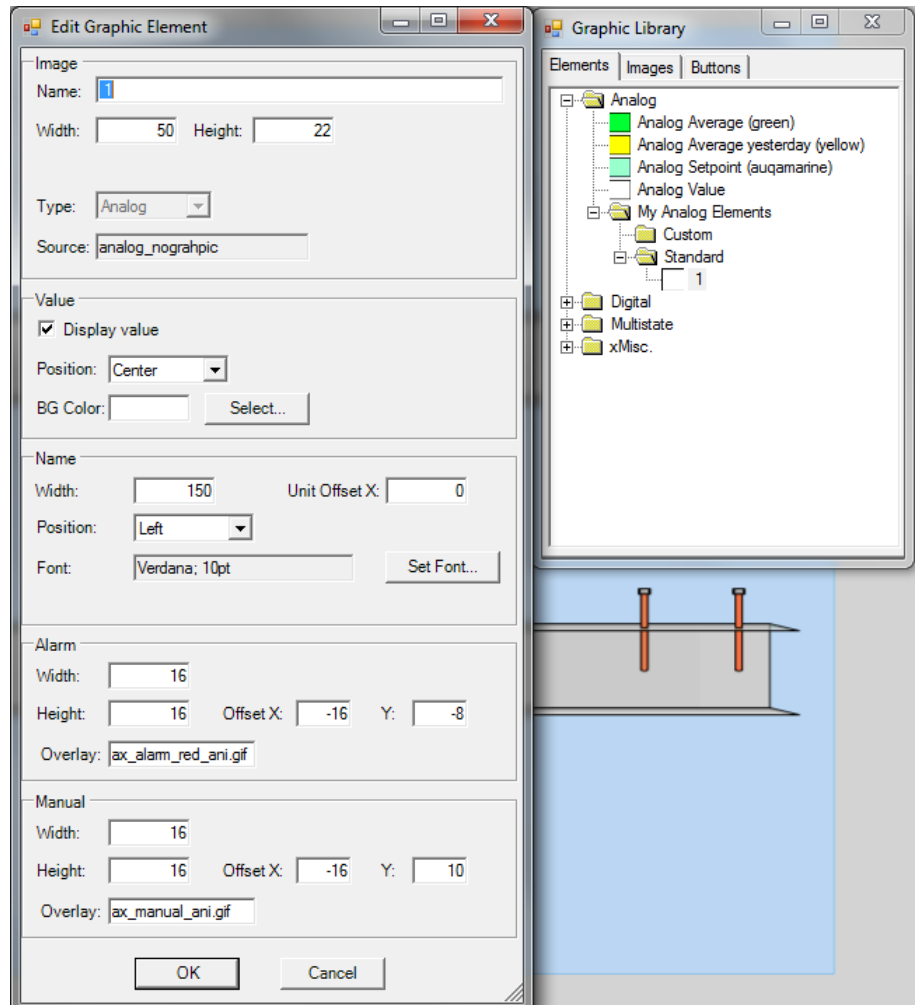
Before creating the new elements, create new groups for the new elements. In this case, you can better distinguish between standard and custom elements (see "Create and Rename Group" section for details).

Procedure

1. In the Graphic Library, right-click the group (folder) in which you want to create the standard value element, and then click **Create standard value element for analog points** in the context menu.



RESULT: In the library tree, a pre-defined rectangular field is added and simultaneously the Edit Graphic Element displays.



2. In the Edit Graphic Element dialog box, set the properties for the standard value element as follows:

Image**Name**

Defaults to a number.

Width, Height

Size of original GIF file.

Type

Analog

Source

analog_nographic which means a rectangular field without a graphic for the display of analog values

Value**Display value**

Displays value and engineering unit

Position

Position related to a graphic element

BG Color

Background color of text. Click **Select...** button to select a color.

Name**Width**

Text length

Unit Offset X

Position related to a graphic element

Font

Font, font style and size. Click **Set Font...** button to define font settings.

Alarm**Width**

Width of alarm GIF in graphic

Height

Height of alarm GIF in graphic

Offset X, Y

Position related to image size

Overlay

File name that is displayed as tooltip when hovering over the alarm symbol. If there should be no overlay, the field must be empty.

Manual**Width**

Width of manual symbol GIF in graphic

Height

Height of manual symbol GIF in graphic

Offset X, Y

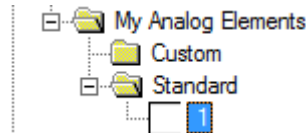
Position related to image size

Overlay

File name that is displayed as tooltip when hovering over the manual symbol icon. If there should be no overlay, the field must be empty.

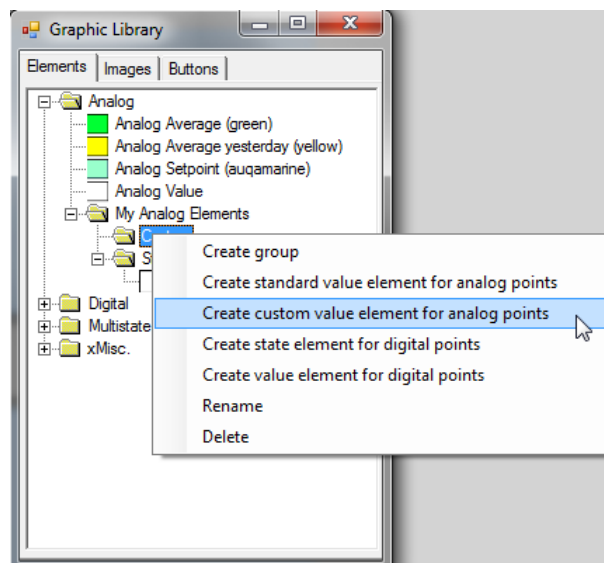
3. Click **OK** button to save settings.

RESULT: The dialog box closes and the defined standard value element is added to the library tree.

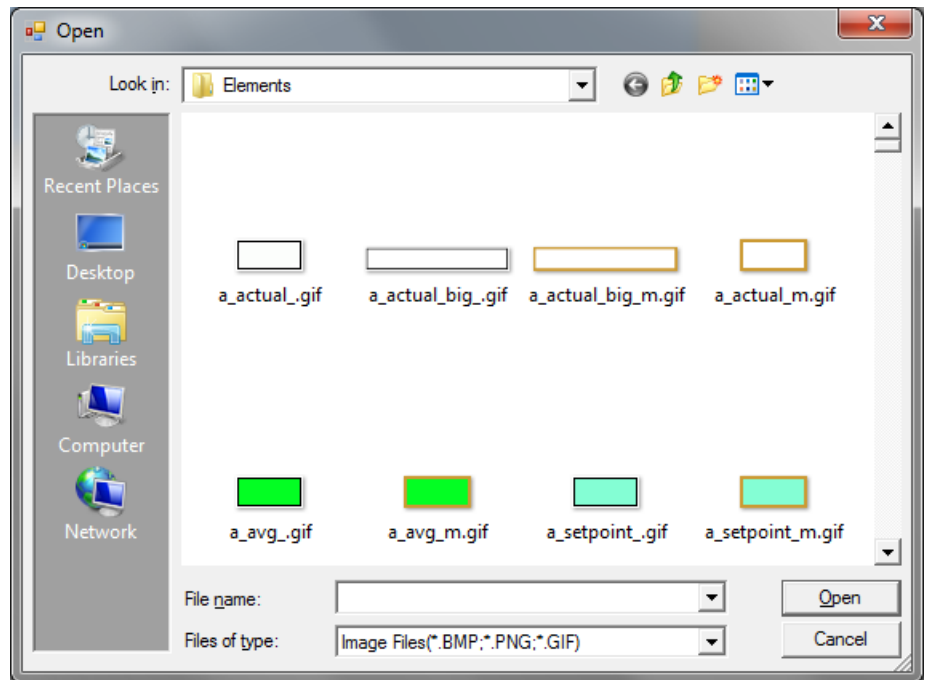


Create Custom Value Element for Analog Point

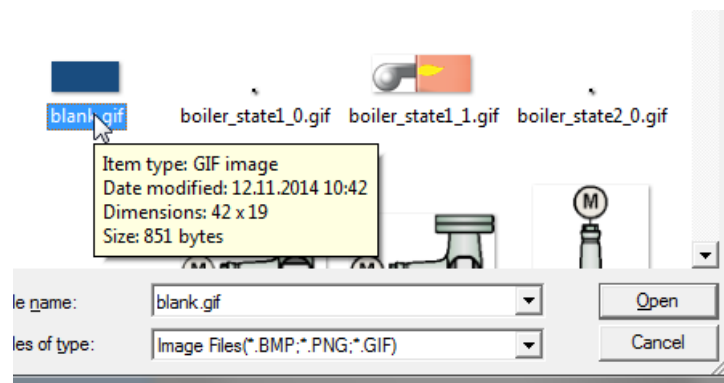
- | | |
|-----------------------|--|
| Purpose | Create a dynamic element in the library that will display the analog value in a customized graphic. The source graphic can be picked from the default set of the graphic library or created by your own. |
| Recommendation | Before creating the new elements, create new groups for the new elements. In this case, you can better distinguish between standard and custom elements (see "Create and Rename Group" section for details). |
| Procedure | <ol style="list-style-type: none"> 1. In the Graphic Library, right-click the group (folder) in which you want to create the custom value element, and then click Create custom value element for analog points in the context menu. |



RESULT: The Open dialog box displays showing the default elements of the library.

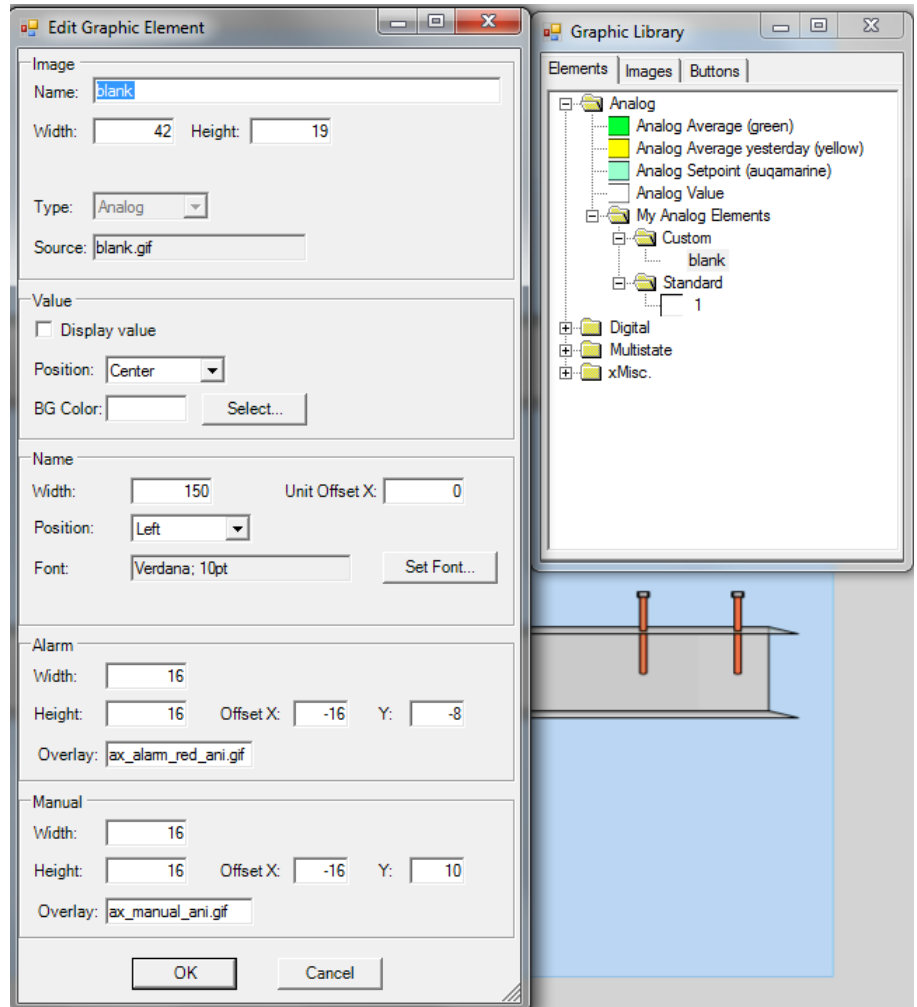


2. Select the element you want to use in this folder, or browse to the folder where you have saved your own images.



3. Click **Open** button.

RESULT: In the library tree, the pre-defined element is added and simultaneously the Edit Graphic Element displays.



4. In the Edit Graphic Element dialog box, set the properties for the custom value as follows:

Image

Name

Defaults name.

Width, Height

Size of original GIF file.

Type

Analog

Source

name of the GIF file

Value

Display value

Displays value and engineering unit

Position

Position related to a graphic element

BG Color

Background color of text. Click **Select...** button to select a color.

Name**Width**

Text length

Unit Offset X

Position related to a graphic element

FontFont, font style and size. Click **Set Font...** button to define font settings.**Alarm****Width**

Width of alarm GIF in graphic

Height

Height of alarm GIF in graphic

Offset X, Y

Position related to image size

Overlay

File name that is displayed as tooltip when hovering over the alarm symbol. If there should be no overlay, the field must be empty.

Manual**Width**

Width of manual symbol GIF in graphic

Height

Height of manual symbol GIF in graphic

Offset X, Y

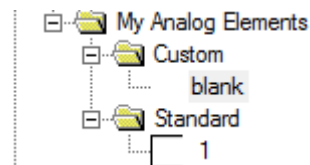
Position related to image size

Overlay

File name that is displayed as tooltip when hovering over the manual symbol icon. If there should be no overlay, the field must be empty.

5. Click **OK** button to save settings.

RESULT: The dialog box closes and the defined custom value element is added to the library tree.



Create Value Element for Digital Point
Purpose

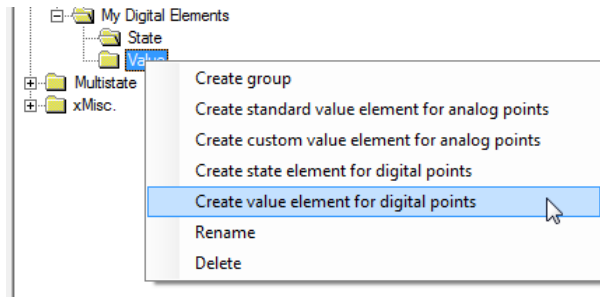
Create a dynamic element in the library that will display the digital value in a rectangular field.

Recommendation

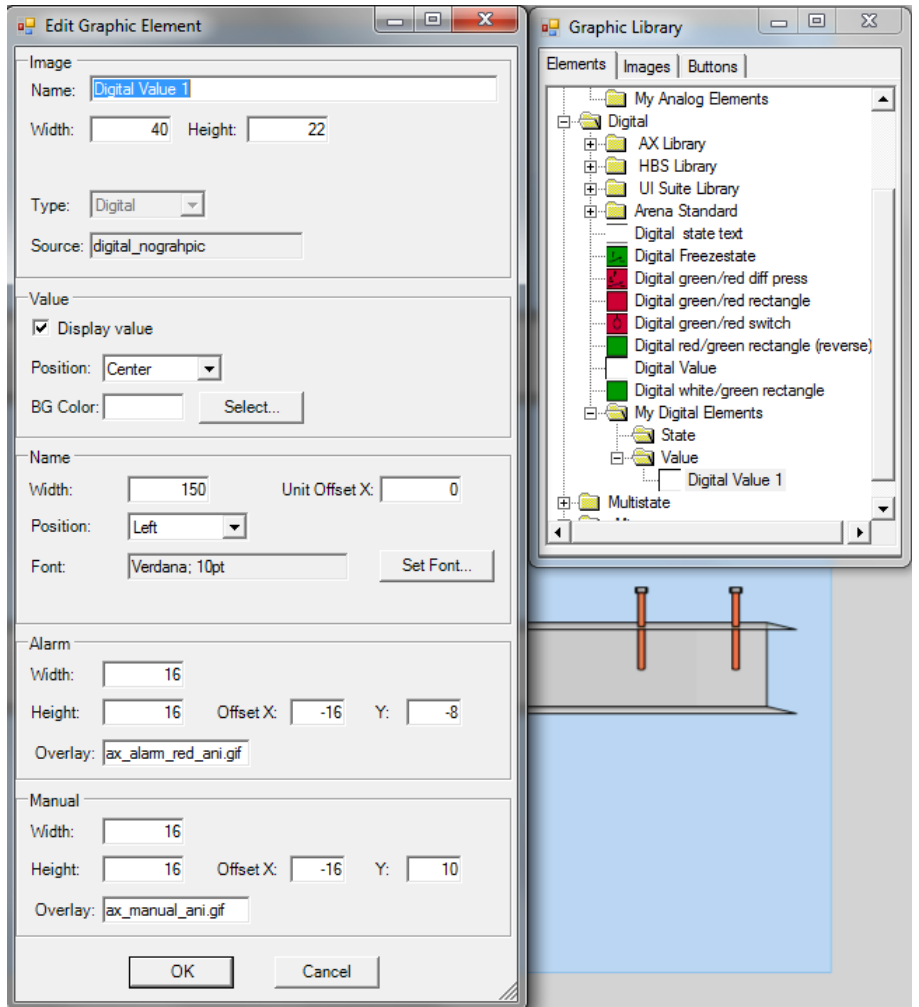
Before creating the new elements, create new groups for the new elements. In this case, you can better distinguish between value and state elements (see "Create and Rename Group" section for details).

Procedure

1. In the Graphic Library, right-click the group (folder) in which you want to create the value element, and then click **Create value element for digital points** in the context menu.



RESULT: In the library tree, a pre-defined rectangular field is added and simultaneously the Edit Graphic Element displays.



2. In the Edit Graphic Element dialog box, set the properties for the standard value element as follows:

Image

Name
Default name

Width, Height
Size of original GIF file.

Type

Digital

Source

digital_nographic which means a rectangular field without a graphic for the display of digital values

Value**Display value**

Displays value and engineering unit

Position

Position related to a graphic element

BG ColorBackground color of text. Click **Select...** button to select a color.**Name****Width**

Text length

Unit Offset X

Position related to a graphic element

FontFont, font style and size. Click **Set Font...** button to define font settings.**Alarm****Width**

Width of alarm GIF in graphic

Height

Height of alarm GIF in graphic

Offset X, Y

Position related to image size

Overlay

File name that is displayed as tooltip when hovering over the alarm symbol. If there should be no overlay, the field must be empty.

Manual**Width**

Width of manual symbol GIF in graphic

Height

Height of manual symbol GIF in graphic

Offset X, Y

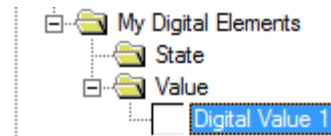
Position related to image size

Overlay

File name that is displayed as tooltip when hovering over the manual symbol icon. If there should be no overlay, the field must be empty.

3. Click **OK** button to save settings.

RESULT: The dialog box closes and the defined value element is added to the library tree.



Create State Element for Digital Point

Purpose Create a dynamic element in the library that will display the digital values in a multi-part switchable graphic. The source graphics can be picked from the default set of the graphic library or created by your own.

Example: Creation of a multistate graphic element that displays the point states graphically.

Prerequisites For multipart switchable default elements, CARE provides pre-defined appropriate graphics. These files are named according to the following conventions:

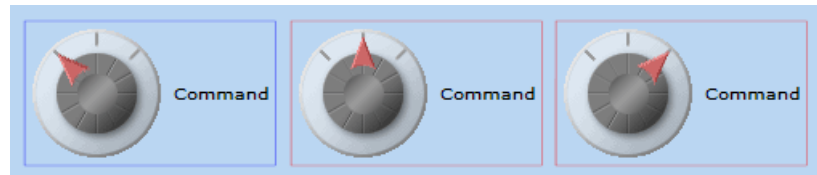
<filename>_0.gif = displays element on point state 0

<filename>_1.gif = displays element on point state 1

<filename>_2.gif = displays element on point state 2

If you want to create your own graphics, you must follow these naming conventions by saving the graphic files accordingly.

Default Multistate Element displaying 3 Point States

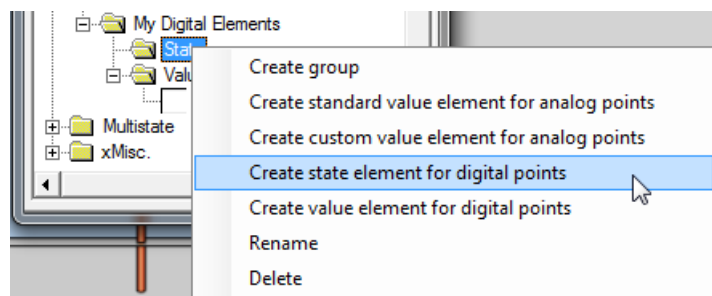


NOTE: When creating the new state element as described in the following procedure, you do not need to use one element for each state, instead you have to use and define only one element from the library. The controller automatically knows which element to display depending on the point state.

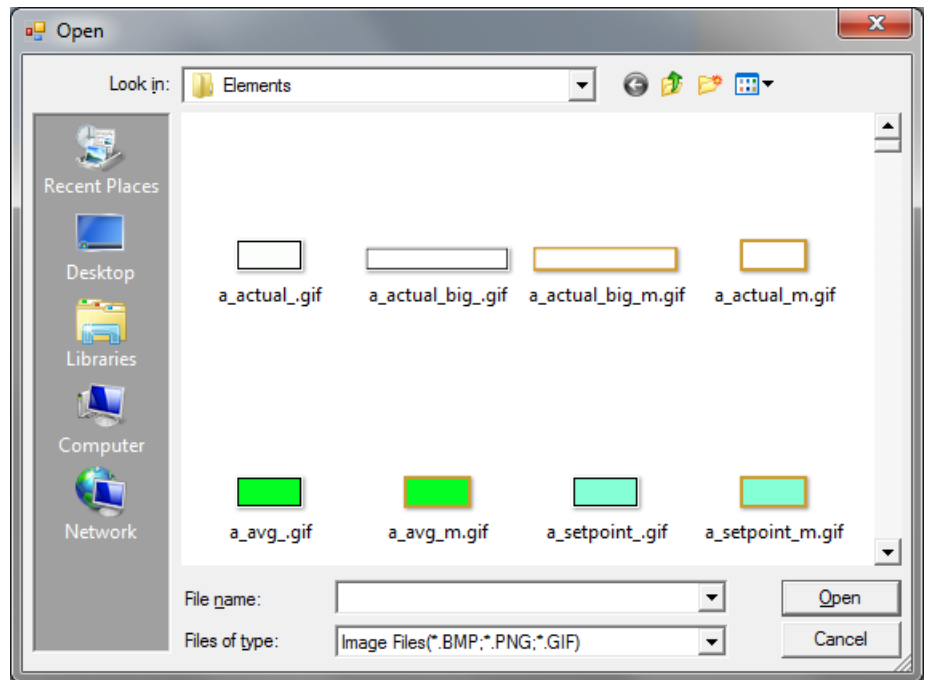
Recommendation Before creating the new elements, create new groups for the new elements. In this case, you can better distinguish between standard and custom elements (see "Create and Rename Group" section for details).

Procedure

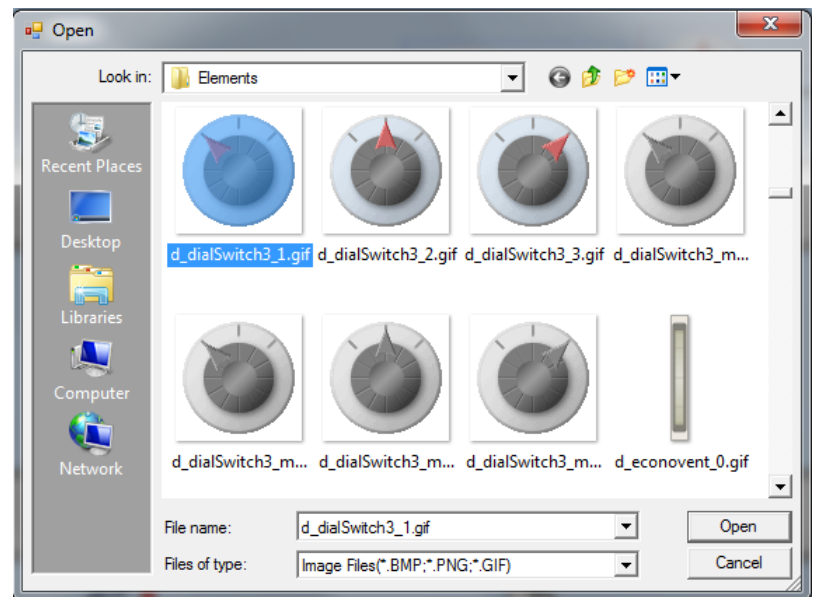
1. In the Graphic Library, right-click the group (folder) in which you want to create the state element, and then click **Create state element for digital points** in the context menu.



RESULT: The Open dialog box displays showing the default elements of the library.

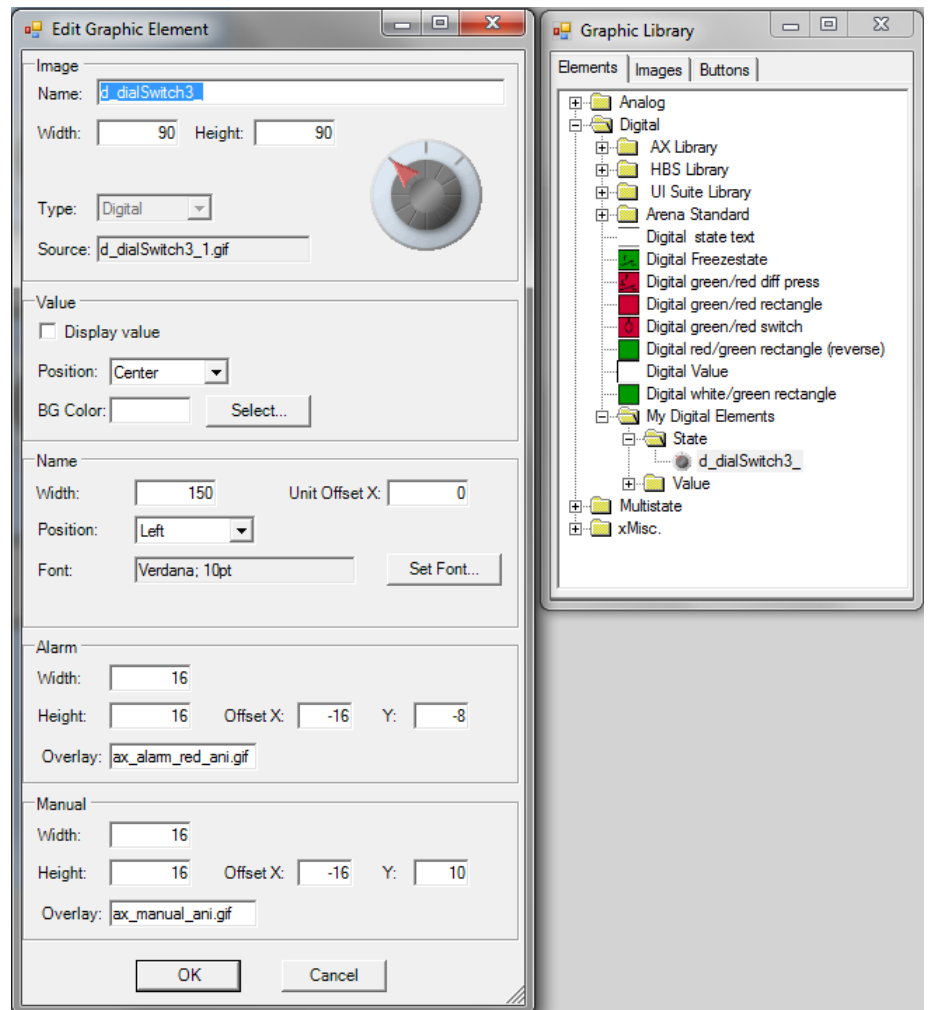


2. Select the element you want to use in this folder, or browse to the folder where you have saved your own images, and select it there.



3. Click **Open** button.

RESULT: In the library tree, the pre-defined element is added and simultaneously the Edit Graphic Element displays.



4. In the Edit Graphic Element dialog box, set the properties for the custom value as follows:

Image

Name

Default name.

Width, Height

Size of original GIF file.

Type

Analog

Source

Name of the GIF file

Value

Display value

Displays value and engineering unit

Position

Position related to a graphic element

BG Color

Background color of text. Click **Select...** button to select a color.

Name**Width**

Text length

Unit Offset X

Position related to a graphic element

FontFont, font style and size. Click **Set Font...** button to define font settings.**Alarm****Width**

Width of alarm GIF in graphic

Height

Height of alarm GIF in graphic

Offset X, Y

Position related to image size

Overlay

File name that is displayed as tooltip when hovering over the alarm symbol. If there should be no overlay, the field must be empty.

Manual**Width**

Width of manual symbol GIF in graphic

Height

Height of manual symbol GIF in graphic

Offset X, Y

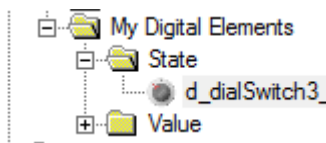
Position related to image size

Overlay

File name that is displayed as tooltip when hovering over the manual symbol icon. If there should be no overlay, the field must be empty.

5. Click **OK** button to save settings.

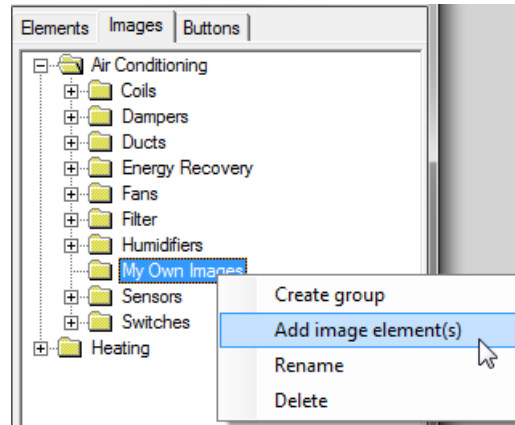
RESULT: The dialog box closes and the defined state element is added to the library tree.



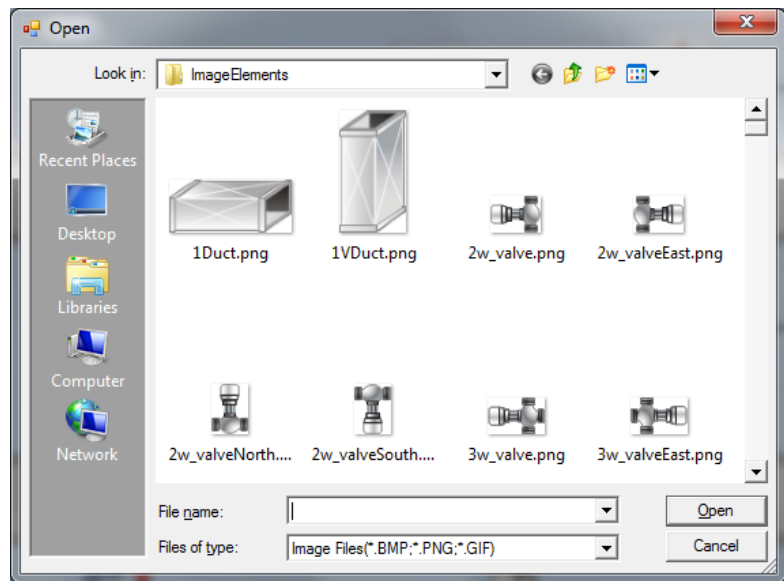
6. In the graphic, assign a digital datapoint to the element.

Add New Static Image(s) to Graphic Library

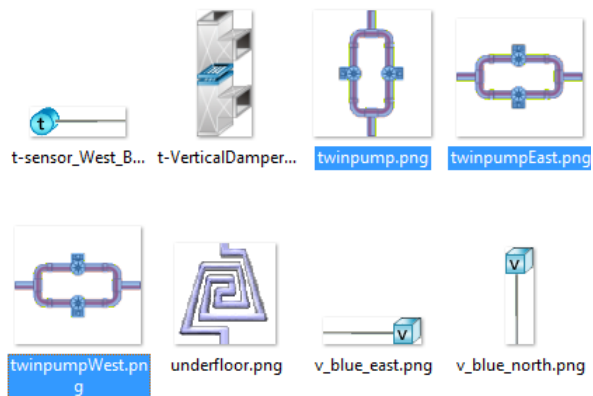
Purpose	New user-defined static images can be added to the graphic library.
Recommendation	Before adding the new images to the library, create new groups for the new images. In this case, you can better distinguish between default images provided by CARE and your own images (see "Create and Rename Group" section for details). Copy the new images to the C:\Care\Graphics\ImageElements folder.
Procedure	<ol style="list-style-type: none"> 1. In the Graphic Library, right-click the group (folder) to which you want to add the static images, and then click Add image element(s) in the context menu.



RESULT: The Open dialog box displays.

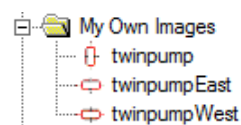


2. Select the image element(s). Multiselection using the CTRL or SHIFT key and mouse button simultaneously is possible.



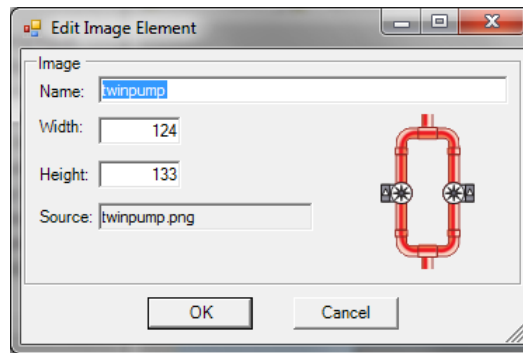
3. Click the **Open** button.

RESULT: The image element(s) are added to the group.



- To modify the properties of the image element, double-click it in the library tree.

RESULT: The Edit Image Element dialog box displays..



- Change Name, Width or Height as desired, and then click **OK**.

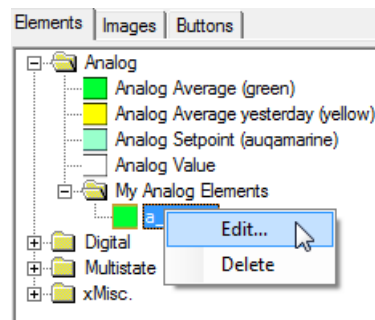
Edit Elements, Images, and Buttons in Graphic Library

Purpose The following graphic symbols can be edited in the graphic library:

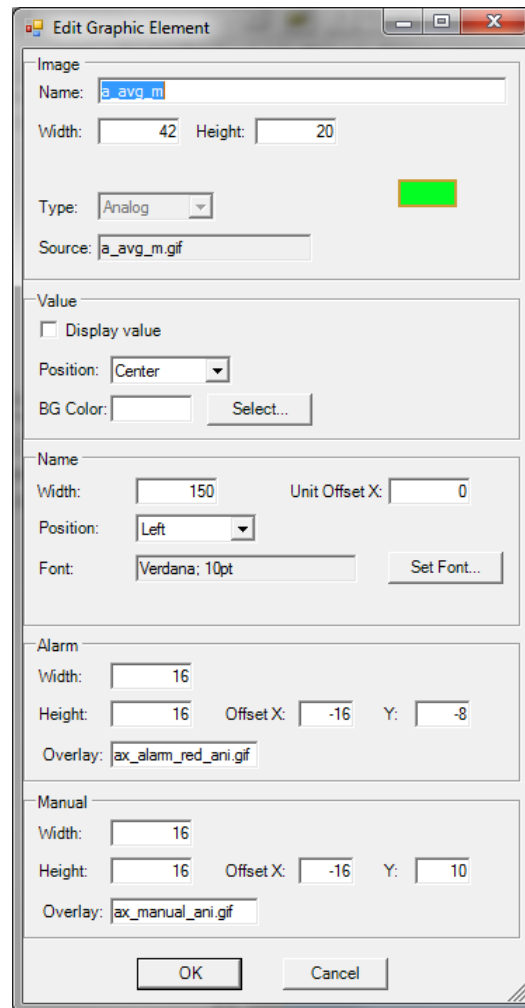
- Elements
- Images
- Custom Buttons and
- Individual Symbol Buttons

NOTE: The original properties of dynamic elements, static images and buttons can only be edited in the graphic library but not in the graphic in the drawing pane. In the graphic of the drawing pane, you can modify properties such as the databinding and text definition of dynamic elements and buttons (see " Show / Modify Properties of Elements and Buttons" section).

- Procedure**
- In the graphic library, right-click the item you want to edit, and then click **Edit** in the context menu, or double-click the item.



RESULT: The corresponding Edit... dialog box displays.



Graphic Element Edit dialog box

2. Modify the properties as desired and described in the sections:

- Create Standard Value Element for Analog Point
- Create Custom Value Element for Analog Point
- Create Value Element for Digital Point
- Create State Element for Digital Point

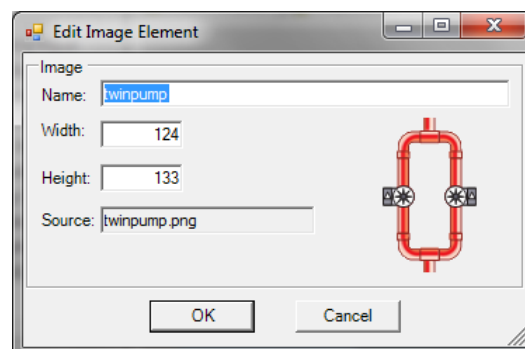
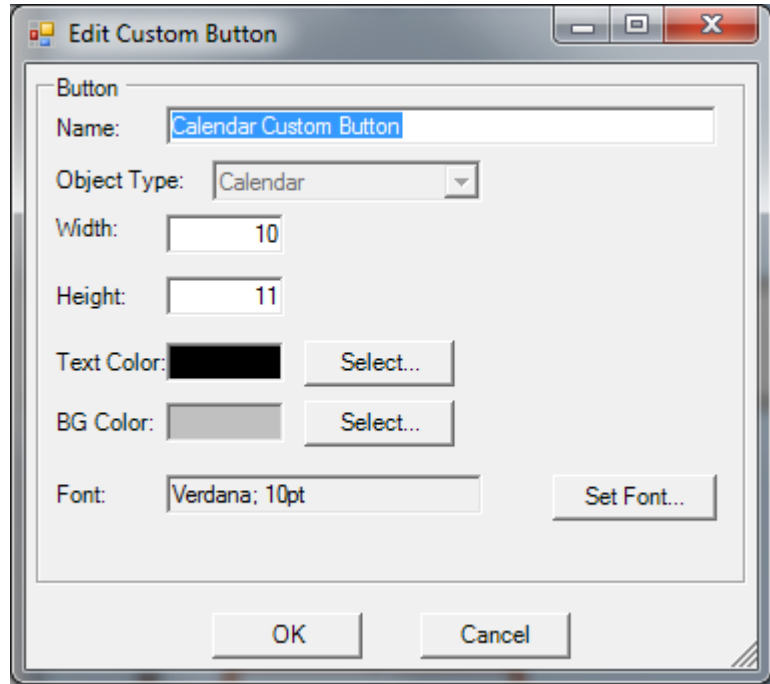


Image Element Edit dialog box

3. Modify the properties as desired and described in the section:

- Add Image Element(s) to Graphic Library



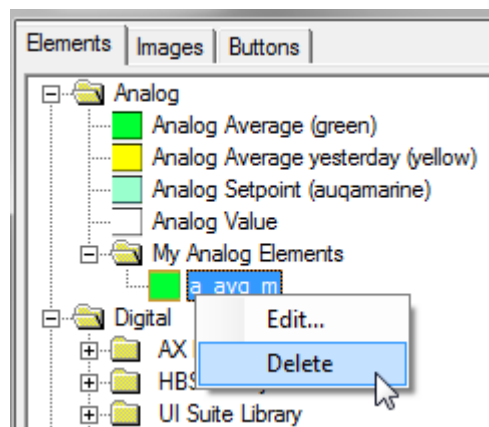
Custom Button Edit dialog box

4. Modify the properties as desired and described in the section:
 - Create Linking Buttons
5. Click OK to save settings.

Delete Items in the Graphic Library

Purpose Delete items (elements, images, groups, and buttons) in the graphic library.

- Procedure**
1. Select the Elements, Images, or Buttons tab.
 2. Right-click the item you want to delete.
 3. In the context menu, click **Delete**.



Example: Element Deletion

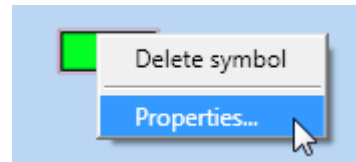
RESULT: The selected item is deleted.

Show / Modify Properties of Elements and Buttons

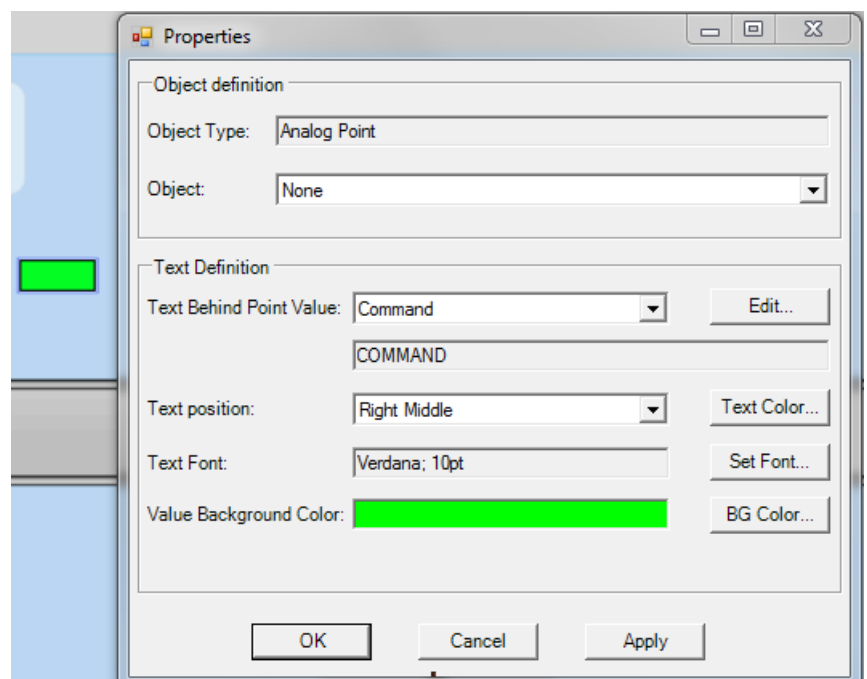
Purpose In the graphic in the drawing pane you can modify properties such as the databinding and text definition of dynamic elements and buttons.

NOTE: The original properties (template) of dynamic elements or buttons can only be edited in the graphic library but not in the graphic in the drawing pane (see "Edit Elements, Images, and Buttons in Graphic Library" section).

Procedure 1. Right-click the dynamic element or button in the graphic, and then click **Properties** in the context menu, or double-click it.



RESULT: The Properties dialog box displays.



2. Modify the properties as desired and described in the "Set Properties for Elements and Buttons" and "Create Linking Buttons" sections.

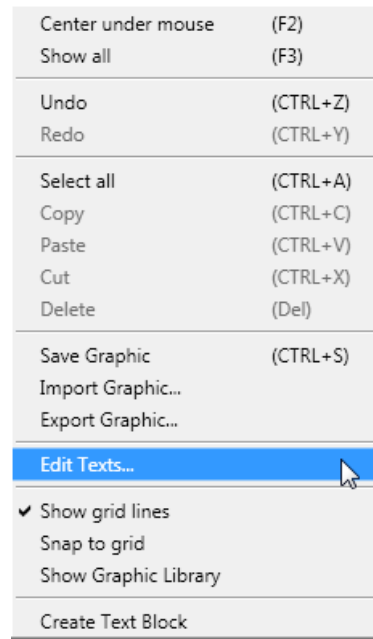
Edit Texts

Texts of buttons and commands are stored in a country-specific language dictionary. All language dictionaries are based on a common set of reference terms called 'Lookup'. Each language dictionary is composed of language pair entries using the common lookup.

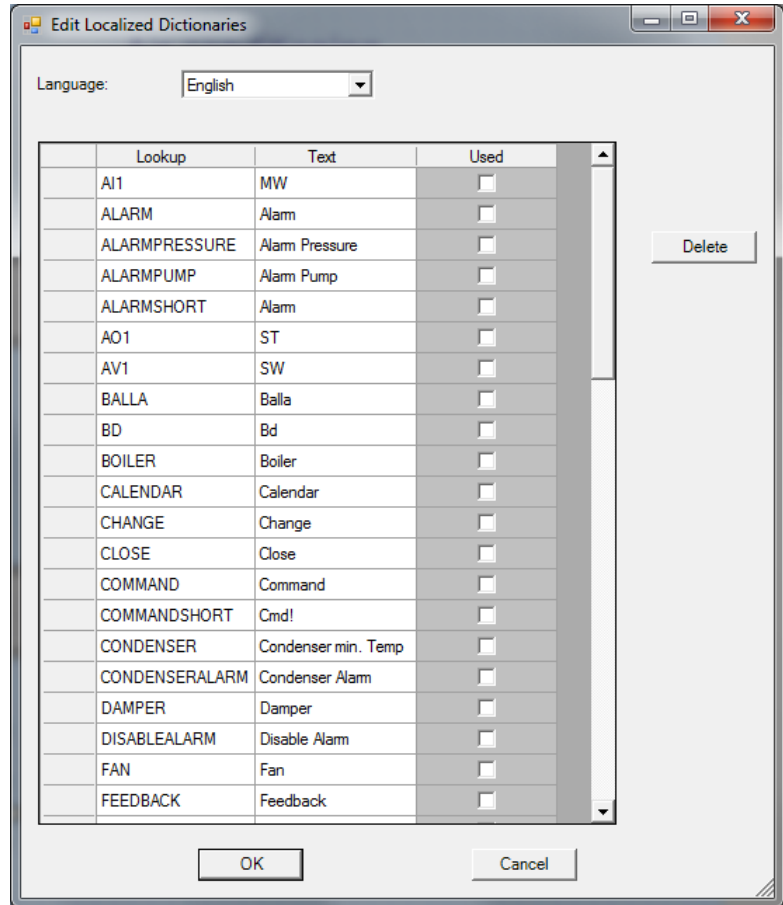
Modifications of texts or the creation of new texts in a particular language are always stored in all language dictionaries.

NOTE: To provide the selection of the texts in the desired language in CARE, you must select the corresponding language for the user in the User Administration.

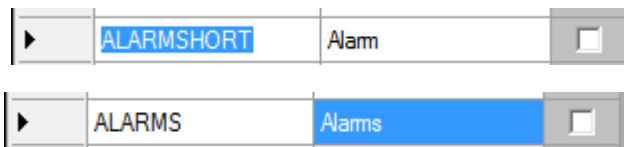
- Procedure**
1. Right-click in the graphic in the drawing pane, and then select **Edit Texts...** in the context menu.



RESULT: The Edit Localized Dictionaries dialog box is displayed. In the Language drop-down listobox, the dictionary can be selected. In the Lookup and Text columns, the language pair of the selected language is displayed. The Used column shows whether the text is already used in the graphic (checked) or not (unchecked).



- From the Language drop-down listbox, select the dictionary you want to modify.
- To change an entry, click twice in the field(s), then delete the text or characters, and then enter the new text.

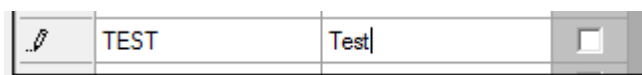


NOTE: For lookups no space or special characters are allowed.

- To add a new language pair, scroll to the end of the list till the blank row with the asterisk is displayed.



- Click once in the field(s), and then enter the new text.



- To delete an entry, click on the first column with the arrow.



NOTE: Texts that are used in the current graphic are checked as used in the **Used** column. When deleting an unused text in the current graphic that may be used in another graphic, it does not work anymore in the other graphic where it was used.

7. Click the **Delete** button.

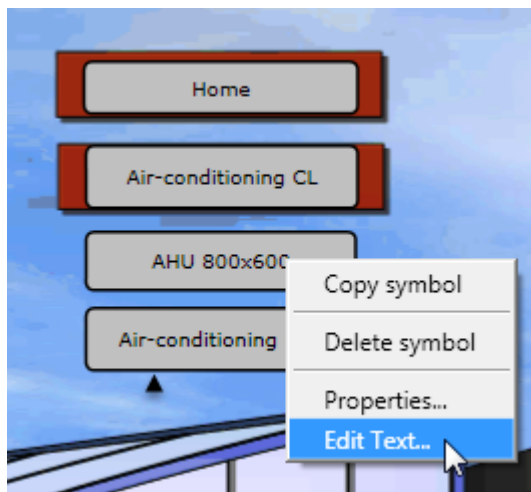
RESULT: The selected language pair is deleted from the dictionary. All modifications of texts done in this particular dictionary are stored in all other country-specific dictionaries (XML files).

8. Click **OK** button so save settings.

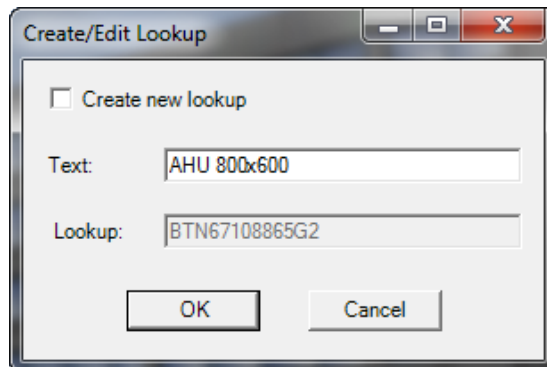
Fast Editing of Lookup Names

Purpose For each individual symbol, an existing lookup name can be edited or a new lookup name can be created. The edited and new lookup name will automatically added to the Localized Dictionaries.

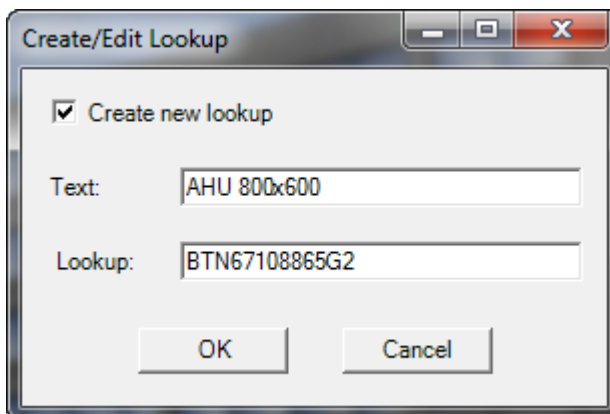
Procedure 1. Right-click the symbol and in the context menu, select **Edit Text**.



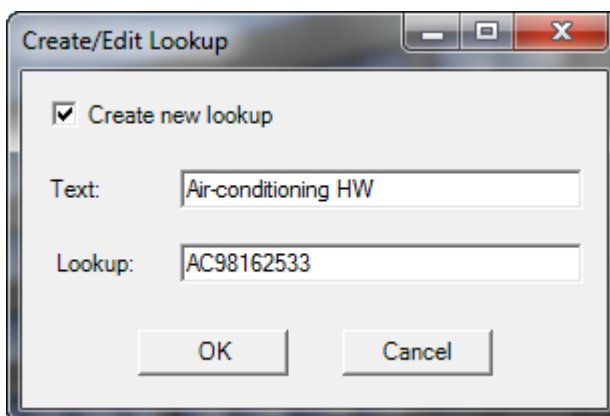
2. In the *Create/Edit Loop* dialog box, change the text if you want to change an existing lookup.



3. Or, check the **Create new lookup** checkbox if you want to create a new lookup.



4. Enter the new text in **Text** and the lookup name (string) in **Lookup**.



In the *Edit ocalized Dictionaries* dialog box, an edited lookup is updated and a new look up is added for reuse.

Copy Graphic

Graphics can be copied in the following ways:

- Copy graphic between plants of the same controller or another controller
- Import graphic
- Copy plant
- Copy controller

Graphic Description and Databindings

Besides general data such as size etc, for each graphic the content and function of the included elements and images is described in the corresponding XML file. This includes the definition of the bindings between dynamic elements and datapoints (databindings). The databinding between an element and a datapoint is established via the BACnet object ID of the datapoint. The BACnet object ID is used for displaying the datapoint value.

For a successful copy process the databindings must be kept.

Graphics can be copied either by context menu commands, keyboard shortcuts usage or drag&drop.

Copy Graphic Between Plants of Same or Other Controller

Scenario 1 Copying between same or different plant of same controller

Method 1

Usage of context menu commands or keyboard shortcuts.

When using the context menu commands or the corresponding keyboard shortcuts, the process copies the elements and images only. The background image must be assigned separately. This method allows copying a graphic within the same plant and different plants of the controller.

- Procedure**
1. In the same or different plant, create a new graphic.
 2. Set the same resolution as in the source graphic and assign the background image.
 3. Open the source graphic.
 4. Select all elements by right-clicking in the drawing pane and selecting **Select all** in the context menu, or by pressing CTRL+A keys.
 5. Copy the selected elements by right-clicking in the drawing pane and selecting **Copy** in the context menu, or by pressing CTRL+C keys.
 6. Select the new graphic, and paste the copied elements by right-clicking in the drawing pane and selecting **Paste** in the context menu, or by pressing CTRL+V keys.
 7. Reposition all elements as required.

- Procedure**
1. In the drawing pane, select the item you want to delete by clicking or by drawing a frame around. Multi-selection using left mouse button and pressing CTRL or SHIFT key is possible or by drawing the frame around multiple items.
 2. Or, to select all items, right-click and then click **Select all** in the context menu, or press CTRL+A keys.

Method 2

Via Drag&Drop.

When copying via drag&drop, the complete graphic including the background image is copied. A

- Procedure**
1. In the source plant, select the graphic in the Graphics folder.
 2. Drag&drop it to the Graphics folder in the different target plant.

Bindings Result As long as the target graphic is inside the same controller, the data bindings will remain.

Scenario 2 From plant in one controller to plant in another controller

The copy steps are done in the same way using method 1 or 2 as when copying graphics within the same controller (see previous procedures). But the binding result is different.

Bindings Result When copying a graphic from a plant in one controller to a plant in another controller, the bindings will be lost.

Copy Graphic via Copy Plant

The plant copy function copies:

- Datapoints
- Control loop
- Fast access list
- Graphics

Bindings Result When copying a plant, the datapoints can be renamed and the bindings will remain.

Copy Graphic via Copy Controller

Bindings Result When copying a graphic via controller copy, the datapoints can be renamed and the bindings will remain.

Copy Graphic via Graphic Import / Export

Purpose To copy a graphic from one project / application(source) to another project / application (target).

Please refer to the "Import / Export" Graphic section.

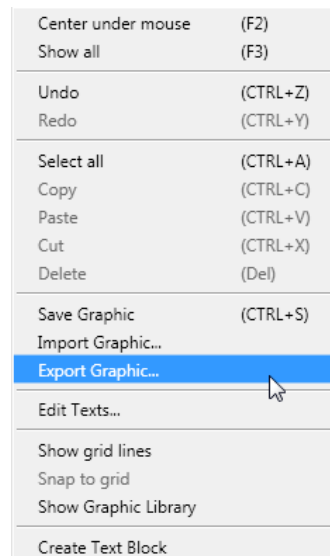
Import / Export Graphic

Purpose To copy a graphic from one project / application(source) to another project / application (target).
For a successful import of a graphic with its bindings, the target CARE application and the source XML files must match. Normally, an XML file from a CARE application A (source) does not fit to an XML file of a CARE application B (target).

If the XML file from the CARE application A should be used for the CARE application B, all bindings need to be checked and re-assigned.

NOTE: When exporting and importing a graphic, the background image will not be exported and imported respectively.

- Procedure**
1. Open the source application and select the graphic.
 2. Right-click in the drawing pane and click **Export Graphic** in the context menu.



3. In the Open dialog box, navigate to the target folder, enter a name for the XML file, and then click the **Open** button.
4. Open the target application and create a new graphic.
5. Right-click in the drawing pane and click **Import Graphic** in the context menu.

Center under mouse	(F2)
Show all	(F3)
Undo	(CTRL+Z)
Redo	(CTRL+Y)
Select all	(CTRL+A)
Copy	(CTRL+C)
Paste	(CTRL+V)
Cut	(CTRL+X)
Delete	(Del)
Save Graphic	(CTRL+S)
Import Graphic...	
Export Graphic...	
Edit Texts...	
Show grid lines	
Snap to grid	
Show Graphic Library	
Create Text Block	

6. In the Open dialog box, navigate to the target folder of the source application, select the XML file, and then click the **Open** button.
7. Re-assign the bindings between elements and datapoints.

Project Backup and Restore

When backing up a project, the following graphic parts are saved in the backed up project:

- background image
- logos
- lookup texts

Standard elements, images and buttons are not backed up since they are available in CARE by default.

If you have created own elements and images, they will not be backed up.

When restoring a project, the following graphic parts will be included in the restored project:

- background image
- logos
- lookup texts

Because own elements and images are not backed up, they cannot be restored and must be added to the restored project manually.

Schedules and Calendars

Purpose To create time sequences for controller operation of devices. For example, set HVAC start and stop times.

Overview

Schedules Schedules are assigned to plants and implement these command programs. Each plant of a controller can have multiple schedules assigned and each schedule can command devices of other controllers.

On a weekly basis, each schedule specifies a datapoint or a list of multiple datapoints. Each datapoint includes switchpoints to command the present value of the datapoint (switched properties). The week program defines the normal daily activity of the system by specifying which switchpoints are to be commanded each day of the week. The week program applies to a definable time period. There is only one week program per schedule.

Besides the week program, specific programs called exceptions can be created. Exceptions have higher priority than the week program and will overwrite the week program for a definable time period. Exceptions can have one of the following time periods:

- Specific Date
e.g. Christmas Eve or 5.5., the whole of May, or the whole year of 2004
- Date Range
e.g. Summer holidays from 29.7-7.9.2004
- Recurring Event
e.g. every last Friday of every month
- Calendar Reference
A project-wide calendar provides dates, e.g. regional holidays and public/religious festivals or any other particular date. The time period can be a specific date, a date range or a recurring event.

Calendars Via exceptions which reference to a project-wide calendar, CARE provides global scheduling because calendar dates are executed in each controller of the project which references to the calendar. Changes in multiple particular controller schedules can be quickly made by simply changing the referenced calendar.

The schedule-calendar reference provides specific scheduling of a plant by parallel access to the project-wide calendar data.

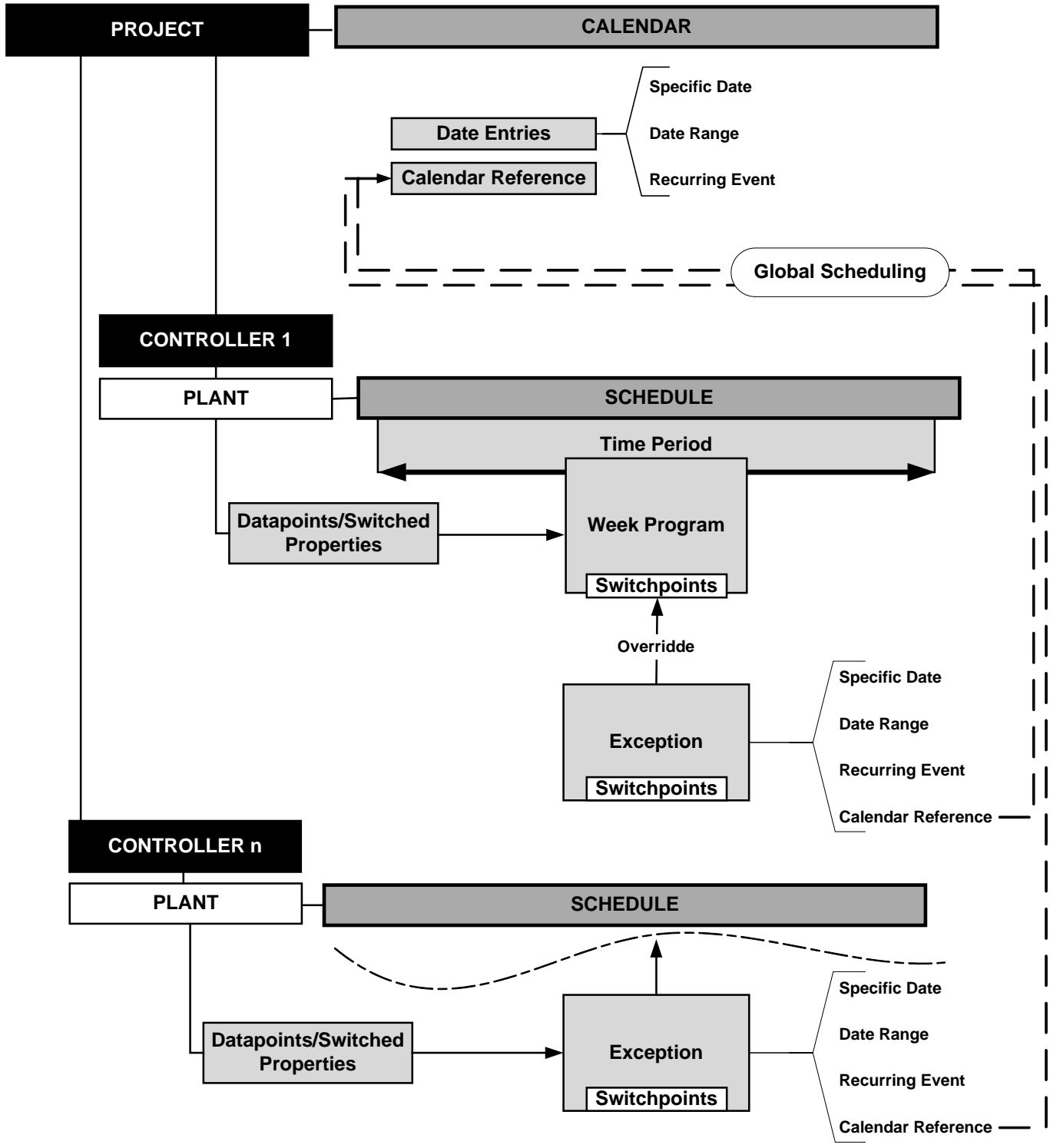


Fig. P1: Calendars and Schedules Overview

Schedules

In general, an application program includes multiple schedules, each having one datapoint (input and value datapoints only) assigned. In certain cases, a schedule can have multiple datapoints assigned (Enhanced Assignment). Each datapoint includes switchpoints (time and value) which command the present value of the datapoint (switched properties). In addition, each schedule has a schedule default value which is valid at 00:00 (midnight), or when the switchpoint is NULL. The switchpoints are part of the regular week program or of exceptions. Each schedule writes the value of the switchpoint or the schedule default into the priority array along with a definable priority for writing (1..16). Finally, the priority array delivers the present value of the datapoint according to the array's prioritization mechanism. Both, the switchpoint value and the schedule default value can be a real value (i.e. any value except NULL) or NULL. For each schedule a priority for writing (into the priority array) must be defined.

NOTE: For schedules, it is recommended to assign priorities for writing in the range of 10 through 16. It is strongly recommended **not** to assign the same priority for writing to different schedules that command the same property.

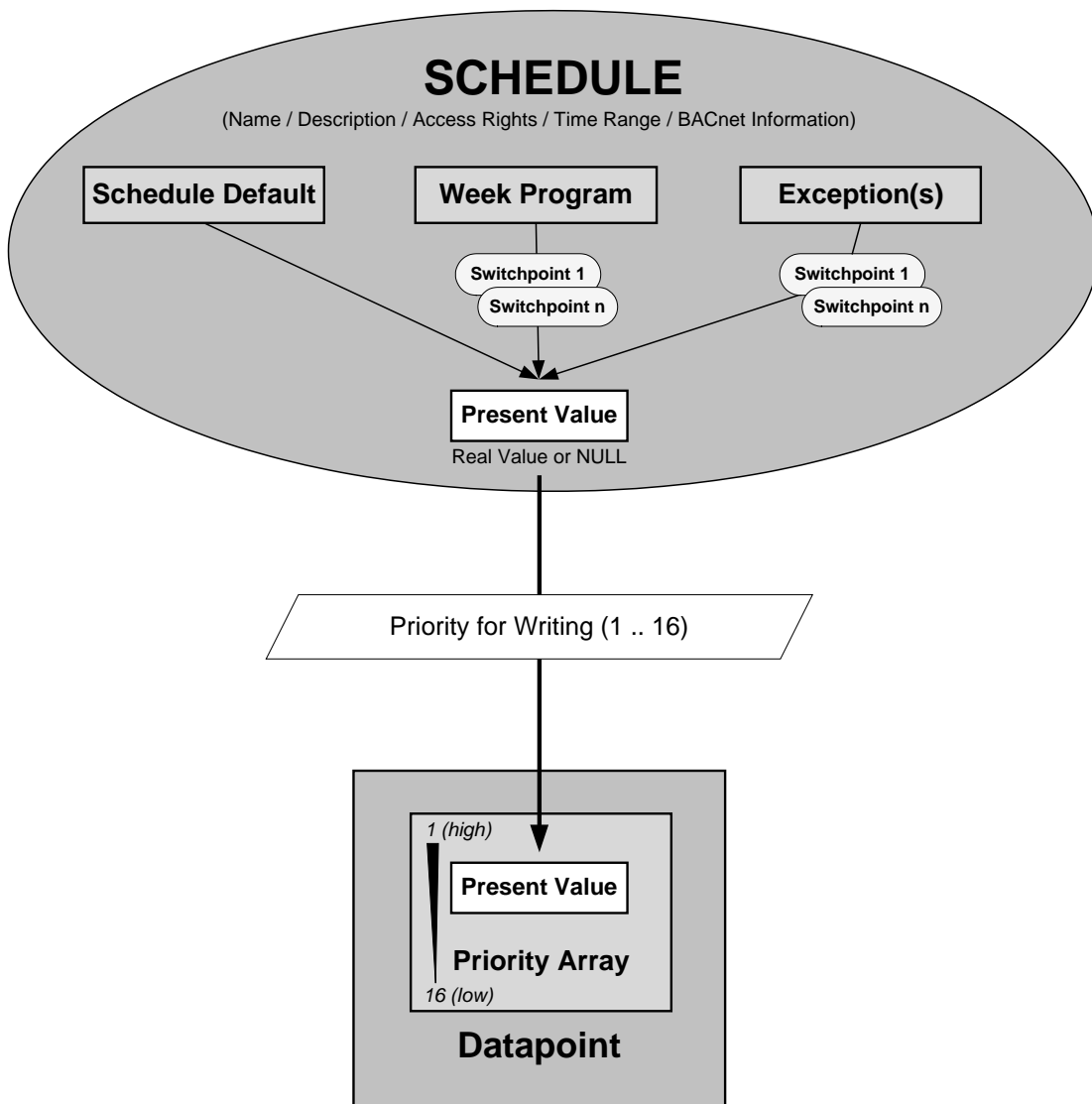


Fig. P2: Present Value Generation Mechanism of Datapoint

Excursus: Present Value / Priority Array The present value is controlled by a command prioritization mechanism which is based upon a fixed number of priorities that are assigned to command – issuing

entities (BACnet tasks, schedules, control strategy, manual operator inputs, etc.). Each of these entities writes to the present value with its assigned priority level. The number of priorities is arranged in a priority array (list) of descending priority (1..16). The priority array can include max. 16 values and will be continuously updated by written values caused by the command-issuing entities.

The present value is determined in the associated priority array of the datapoint by scanning the priority entries downwards from priority 1 through 16. The entry with the highest priority showing a real value dominates all other entries with lower priorities and is always written to the present value. Blank entries (NULL, indicated by dash in the Excel HTML Interface) are ignored. If the priority array is empty (all entries are blank) then the relinquish default value becomes valid and is written to the present value. The relinquish default value cannot be set to NULL and allows starting up a control system with a defined status/value.

Priority Array Example:

	Priority Level	Value
1	Manual Life Safety	-
2		-
3		-
4		-
5	Critical Equipment Control	19,5 °C
6	Minimum On Off	
7		
8	Manual Operator	21,0 °C
9		-
10		-
11		-
12		-
13		-
14		-
15	Control Program	-
16		-
	Relinquish Default	20,0 °C

In the example, Critical Equipment Control has the highest priority and is written to the present value. Note that Manual Life Safety has a higher priority but no value (blank, NULL). Writing NULL to the present value results in a relinquish operation in the priority array and "deletes" the entry at the corresponding position. As soon as the priorities 5 and 8 are relinquished e.g. via BACnet service, the relinquish default of 20,0°C will be valid for the present value.

Prioritization within Schedule(s)

The present value of a datapoint is controlled by the writing priorities of all the command issuing entities (BACnet tasks, control strategy, schedules etc.). In addition, within schedules there is also a prioritization mechanism for evaluating the present value before passing it into the priority array.

The following schedule items can be involved in the evaluation of the present value (descending priority):

1. Manual value operation
2. Exceptions
3. Week program
4. Schedule default

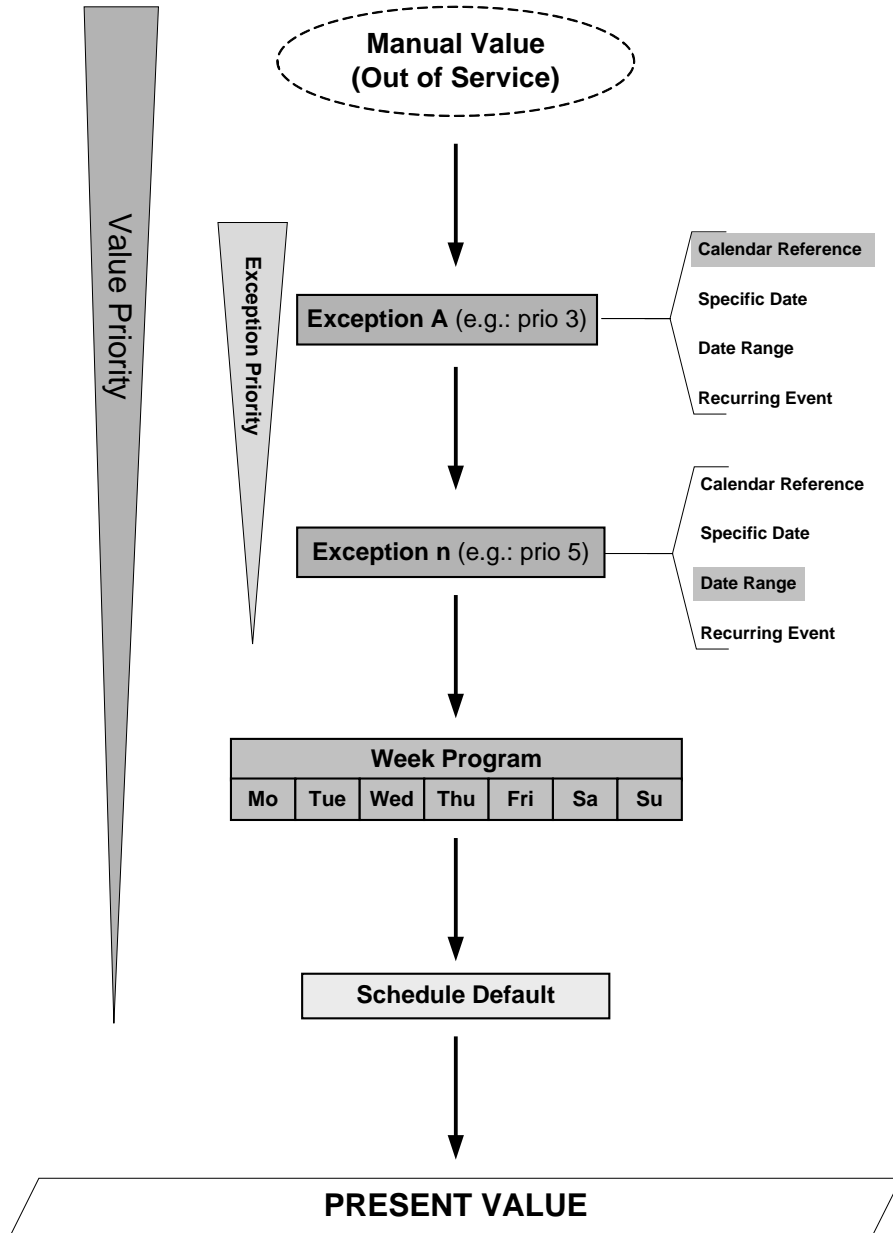


Fig. P3: Present Value Evaluation Mechanism within Schedule

The above graphic shows the following:

Manual value operation

Putting the schedule in manual operation (out of service) has the highest writing priority level (possible in the EAGE Web Interface or via BACnet).

Exceptions

Exceptions associated with a schedule have the second writing priority level. Exceptions must also be prioritized by exception priority assignment.

NOTES: The exception priority should not be mixed up with the writing for priority of the schedule itself.

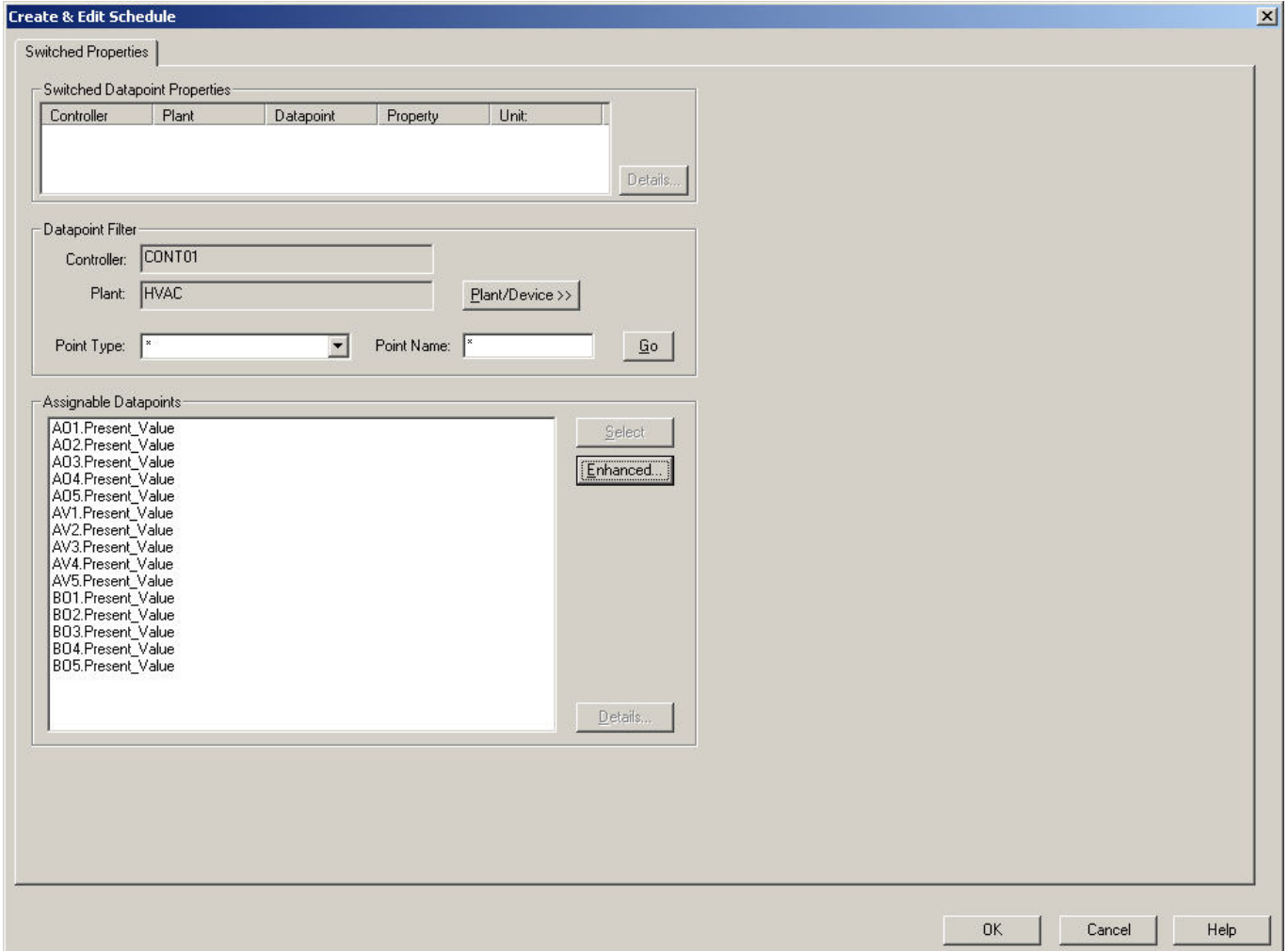
It is strongly recommended **not** to assign the same priority to different exceptions.

If multiple exceptions are defined within a schedule, the active exceptions are executed according to their priority. That is, only the active exception with the

Create New Schedule

Procedure 1. On the Properties tab, click the **New** button.

RESULT: The Create & Edit Schedule dialog box displays.



On the Switched Properties tab, the switched properties will be selected.

Datapoints can be switched in two ways:

Standard

Just a single datapoint with its present value property can be switched. By default, a datapoint has the present value property assigned.

Enhanced

Multiple datapoints and/or other properties than the present value can be switched.

Under Datapoint Filter, a filter for listing certain datapoints to be switched can be defined. You can select datapoints from different plants of the same controller (controller name displayed in the Controller field) or from a different controller (switching remote datapoints). To do so, click the **Plant/Device>>** button, and then select the datapoint from the plant/controller in the Select plant/data point dialog box.

The filtered datapoints will be listed below in the Assignable Datapoints list. By default, all datapoints of the originator plant are available in the list. Once selected, the datapoint will be inserted in the Properties field under Switched

Properties. Under Eng. Unit / State text, its engineering unit respectively the state text is displayed.

By clicking the corresponding **Details** button, the datapoint's details can be viewed/edited, either of the filtered datapoint/property or the selected datapoint/switched property.

Select Datapoints/Switched Properties

- To filter certain datapoints, do one of the following:

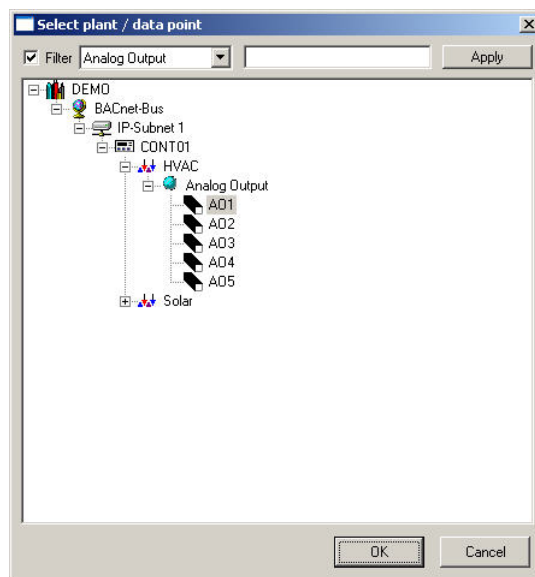
From the Point Type drop-down list box, select the point type to be filtered.

NOTE: Inputs cannot be switched.

and/or

In the Point Name field, enter a search text to display specific datapoint names. Wildcards can be used. By default, all datapoints will be displayed as indicated by an asterisk (*). A blank field is interpreted as *. The filter function is not case sensitive.

If you want select datapoints from another plant or controller, click the **Plant/Device>>** button. In the *Select plant/data point* dialog box, select the datapoint from the plant or controller in the *Select plant/data point* dialog box. You can filter for datapoints to be selected by clicking the Filter check box, and then selecting the datapoint type from the drop-down listbox or entering a search text to display specific datapoint names. Wildcards can be used. By default all datapoints will be displayed as indicated by an asterisk (*). A blank field is interpreted as *. The filter function is not case sensitive. In the *Select plant/data point* dialog box, click the Apply button to display the found datapoints.



NOTES: By selecting datapoints of another controller you can switch those datapoints in that controller remotely.

Inputs cannot be switched.

- Click the **Go** button to apply the filter. All datapoints matching the filter criteria will be displayed under Assignable Datapoints.
- Select the datapoint you want to be switched and click the **Select** button.

RESULT: The datapoint will be inserted in the **Properties** field under **Switched Properties**.

Switched Properties | Details | Week | Exceptions

Switched Datapoint Properties

Controller	Plant	Datapoint	Property	Unit
CONT01	HVAC	A03	Present_Value	

Details...

Datapoint Filter

Controller: CONT01

Plant: HVAC Plant/Device >>

Point Type: * Go

Point Name: *

Assignable Datapoints

- A01.Present_Value
- A02.Present_Value
- A03.Present_Value**
- A04.Present_Value
- A05.Present_Value
- AV1.Present_Value
- AV2.Present_Value
- AV3.Present_Value
- AV4.Present_Value
- AV5.Present_Value
- B01.Present_Value
- B02.Present_Value
- B03.Present_Value
- B04.Present_Value
- B05.Present_Value

Select

Enhanced...

Details...

- To edit details of a datapoint that is selected in the list, click the **Details** button.

NOTE: By using the **Select** button, only one datapoint can be switched (Standard Mode). To switch multiple datapoints and/or other properties than the present value, click the **Enhanced** button (Enhanced Mode).

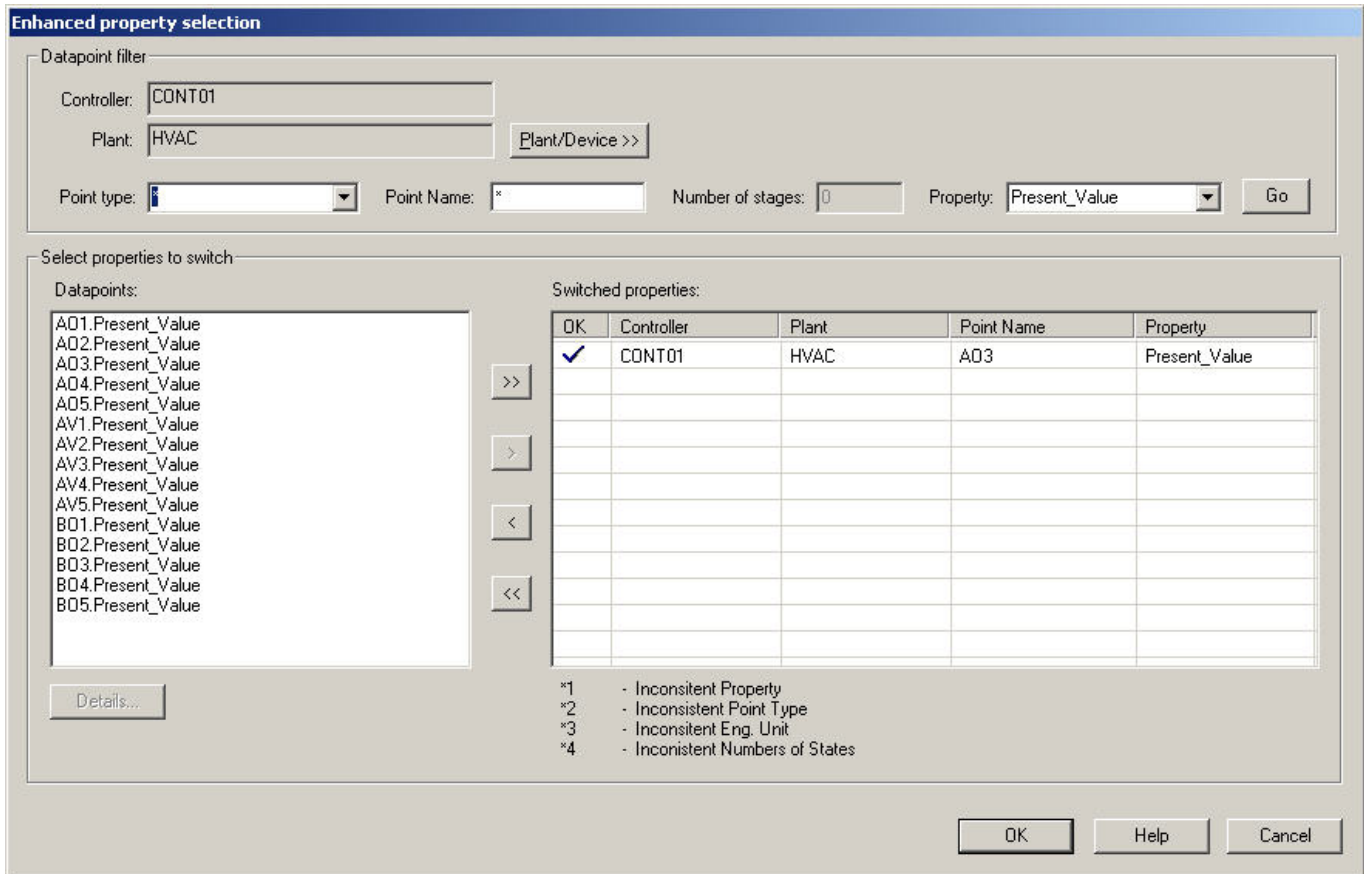
- If you want to use the Enhanced mode, continue with step 8.

or

- If you want to proceed with creating the schedule, continue with step 16.

- Click the **Enhanced** button.

RESULT: The Enhanced property selection dialog box displays.



9. To filter certain datapoints, do one of the following:

If you want select datapoints from another plant or controller, click the **Plant/Device>>** button. In the *Select plant/data point* dialog box, select the datapoint from the plant or controller in the *Select plant/data point* dialog box. You can filter for datapoints to be selected by clicking the Filter check box, and then selecting the datapoint type from the drop-down listbox or entering a search text to display specific datapoint names. Wildcards can be used. By default all datapoints will be displayed as indicated by an asterisk (*). A blank field is interpreted as *. The filter function is not case sensitive. In the *Select plant/data point* dialog box, click the Apply button to display the found datapoints.

NOTES: By selecting datapoints of another controller you can switch those datapoints in that controller remotely.

Inputs cannot be switched.

On the Switched Properties tab, select the point type to be filtered from the Point Type drop-down list box.

If multi-state points (MO, MV) have been selected from the Point Type drop-down list box, enter the number of stages in the Number of Stages field.

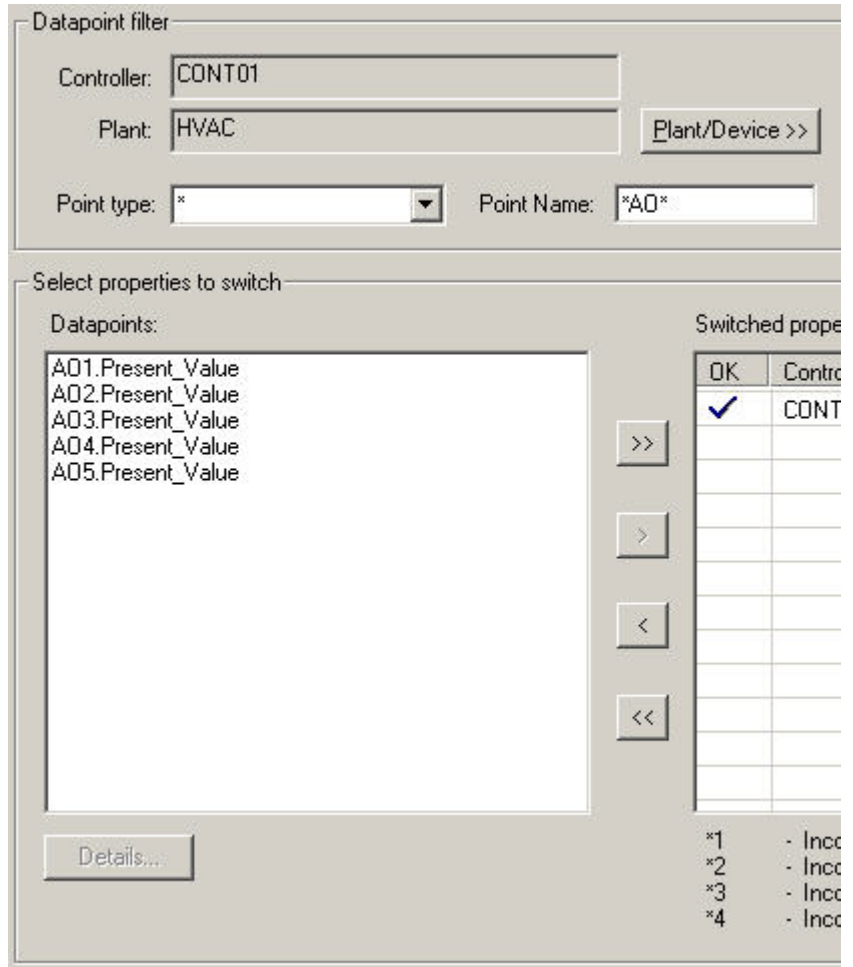
and/or

In the Point Name field, enter a search text to display specific datapoint names. Wildcards can be used. By default all datapoints will be displayed as indicated by an asterisk (*). A blank field is interpreted as *. The filter function is not case sensitive.

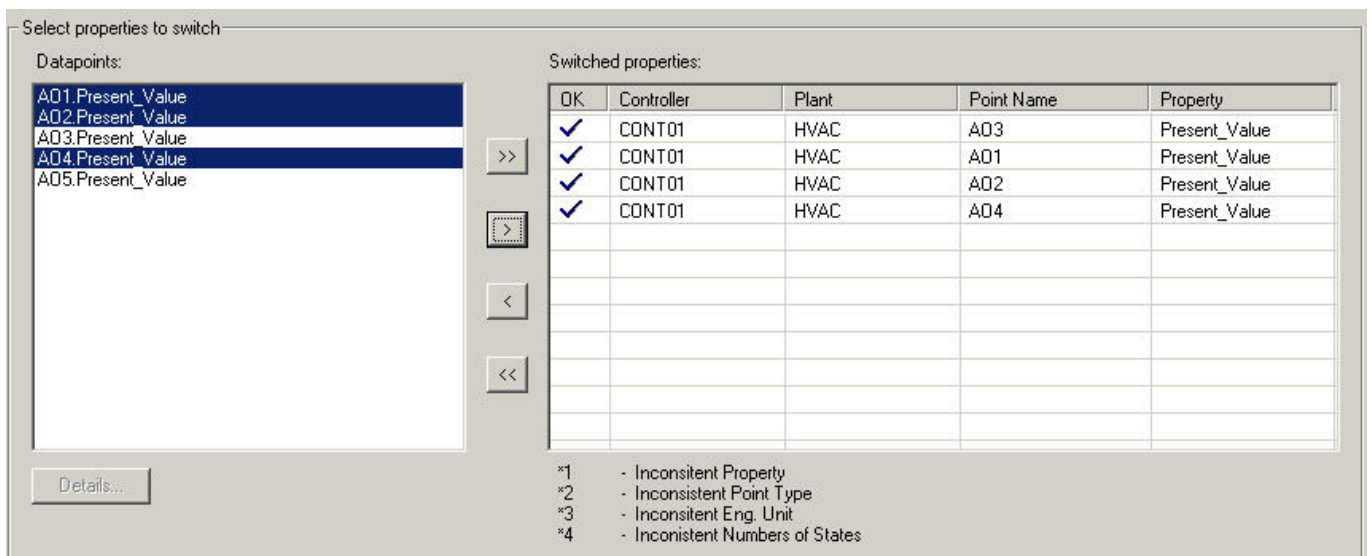
and/or

From the Property drop-down list box, select the property of the datapoints to be searched for.

- Click the **Go** button to apply the filter. All datapoints/properties matching the filter criteria will be displayed in the Datapoints list under Select Properties to Switch. Datapoints/properties can be put into switching status and vice versa by moving them between the Datapoints and the Switched Properties list.



- To move datapoints/properties between the two lists, that is, to make them to be switched or not, do one of the following:



To move certain datapoints/properties:

highlight the datapoints/properties to be moved in the Datapoints list respectively in the Switched Properties list. Multiselection by using the CTRL, respectively the SHIFT key is possible.

Click the **Single Arrow** button with desired direction.

Or,

To move all datapoints in one step:

Click the **Double Arrow** button with desired direction.

NOTE:

Software performs consistency checking for datapoint type, property and engineering unit for the datapoints that have been selected and moved into the switching status.

Consistency checking assures that the same schedule does not switch datapoints:

- of different types, e.g. AO and BO
- with different properties, e.g. present value and low alarm limit
- of which engineering unit does not correspond to the property to be switched

If one of these items do not match, the inconsistency is indicated in red with the corresponding comment number in the OK column of the point name.

Switched properties:

OK	Controller	Plant	Point Name	Property
✓	CONT01	HVAC	A03	Present_Value
✓	CONT01	HVAC	A01	Present_Value
✓	CONT01	HVAC	A02	Present_Value
✓	CONT01	HVAC	A04	Present_Value
✓	CONT01	HVAC	A05	Present_Value
*2	CONT01	HVAC	AV1	Present_Value
*2	CONT01	HVAC	AV2	Present_Value
*2	CONT01	HVAC	AV3	Present_Value
*2	CONT01	HVAC	AV4	Present_Value
*2	CONT01	HVAC	AV5	Present_Value
*2	CONT01	HVAC	BO1	Present_Value
*2	CONT01	HVAC	BO2	Present_Value

*1 - Inconsistent Property
 *2 - Inconsistent Point Type
 *3 - Inconsistent Eng. Unit
 *4 - Inconsistent Numbers of States

In addition, a warning displays in case you want to continue by clicking the **OK** button.



12. Confirm the message by clicking the **OK** button.

13. Remove inconsistent properties from the Switched Properties list (see step 14).
14. Click the **OK** button in the Enhanced Property Selection dialog box.

RESULT: In the Create & Edit Schedule, the properties will be inserted in the Properties list under Switched Properties. The Details, Week and Exceptions tabs are now available for completing the schedule.

Switched Properties | Details | Week | Exceptions

Switched Datapoint Properties

Controller	Plant	Datapoint	Property	Unit
CONT01	HVAC	A03	Present_Value	
CONT01	HVAC	A01	Present_Value	

Datapoint Filter

Controller: CONT01

Plant: HVAC Plant/Device >>

Point Type: * Go

Point Name: *

- Define Details** 15. Click the Details tab.

Switched Properties | **Details** | Week | Exceptions

Schedule Name:

Description:

Valid from:

Valid until:

Priority for writing:

Access Rights

Read Access Level:

Write Access Level:

BACnet Object Information

Object Type:

Object ID:

Instance ID:

Schedule default

Value:

NULL

Here you can enter the following details of the schedule:

- Name
- Description
- Valid period
- Priority for writing
- Access rights
- BACnet Object Information
- Schedule default

16. In the Schedule Name field, enter the name for the schedule.
17. In the Description field, enter an additional description if desired.
18. The valid period for the schedule will be defined by selecting the start and end date under Valid from and Valid until. By default, the schedule is valid one year from the current date on.

To define the valid period of the schedule, do the following:

Click the Valid From checkbox and select the start date from the drop-down list box.

NOTE: If the checkbox is unchecked, no start date can be selected. This means that the schedule is valid on any date up to and including the end date.

Click the Valid Until checkbox and select the end date from the drop-down list box.

NOTE: If the checkbox is unchecked, no end date can be selected. This means that the schedule is valid on any date from the start date on.

NOTE: If both checkboxes are disabled, the schedule is always valid.

19. From the Priority for Writing drop-down list box, select the priority between 9 and 16 (lowest). The priority defines which priority the schedule will have in the BACnet priority array.

20. From the Read Access level drop-down list box, select the user level that should have read access for the schedule.

Schedules will only be displayed in the EAGLEWeb Interface if the read access level of the user is equal to or higher than the read access level of the schedule.

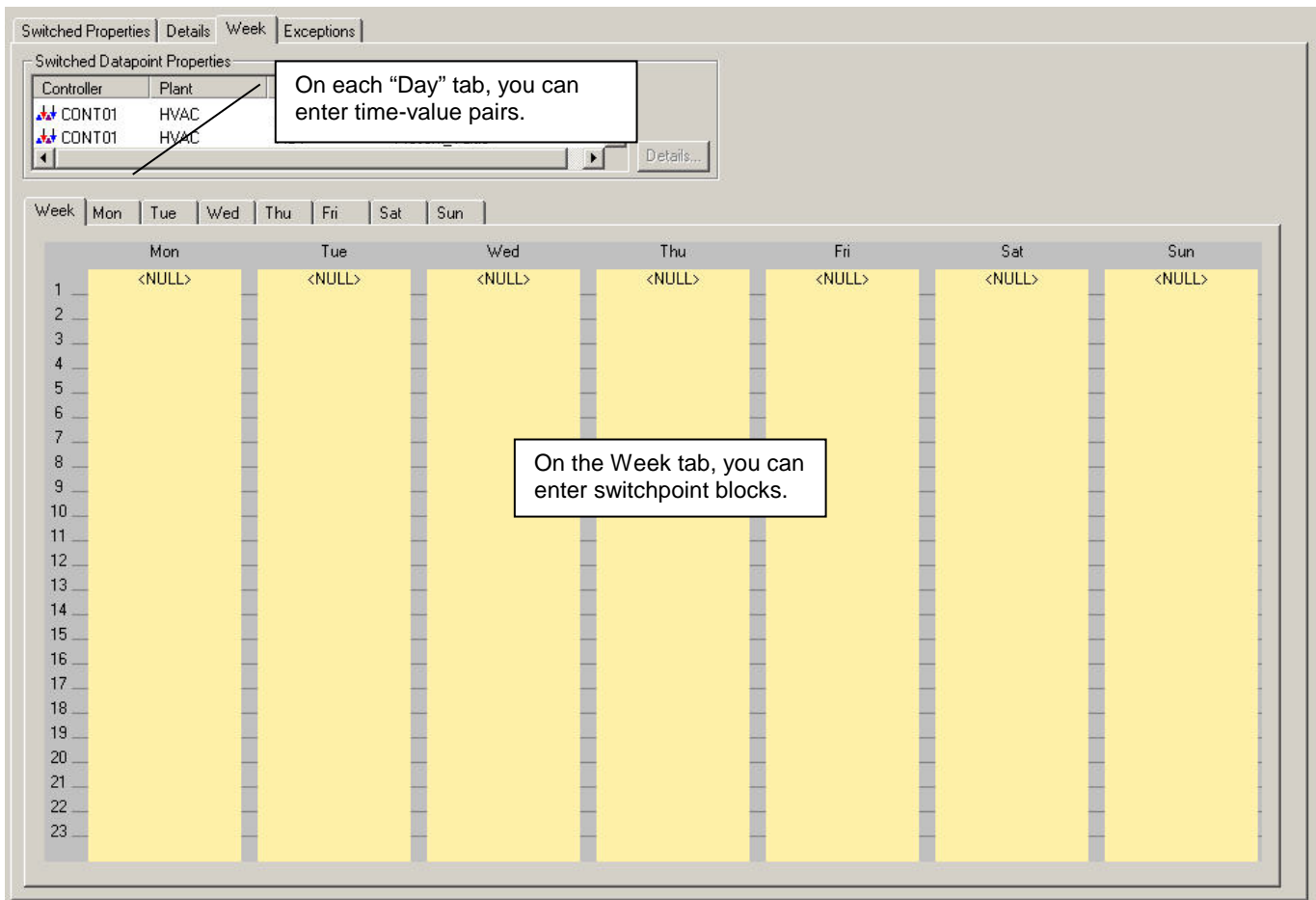
21. From the Write Access level drop-down list box, select the user level that should have write access for the schedule.

Creating, editing, deleting and copying of schedules in the EAGLE Web Interface is only possible if the user's write access level is equal or higher than the write access level of the schedule.

22. In the **Schedule Default Value** field, you must enter a schedule default value. The schedule default value is used at 00.00 (twelve midnight) as present value of all switched properties when no other value is in effect. The schedule default value can be NULL or any value, for example, 'value in %' for analog outputs, or 'running' for digital outputs. The NULL value removes the current value entry of the switched properties from the priority array. Then the next lower value in the priority array becomes the present value of the switched properties.

Enter the value in the **Schedule Default Value** field, or check the **NULL** checkbox.

- Create Week Program**
23. Proceed the creation of the schedule by clicking the Week tab.



RESULT: On the Week tab, you create the weekly program that should be performed during the schedule period (see Details tab).

In the main area of the Week tab, an empty one-week time period is displayed twice: one Week tab including all days and one separate tab for each day

In the Properties list under Switched Properties, the switched properties are displayed. The corresponding engineering unit / state text of the selected property is shown on the right under Eng. Unit / State Text.

To view/edit a datapoint's details selected in the list, click the **Details** button.

The week program will be created by defining switchpoints. Switchpoints are time-value pairs per day that determine the time when the schedule sets a certain value. There are two ways to create switchpoints:

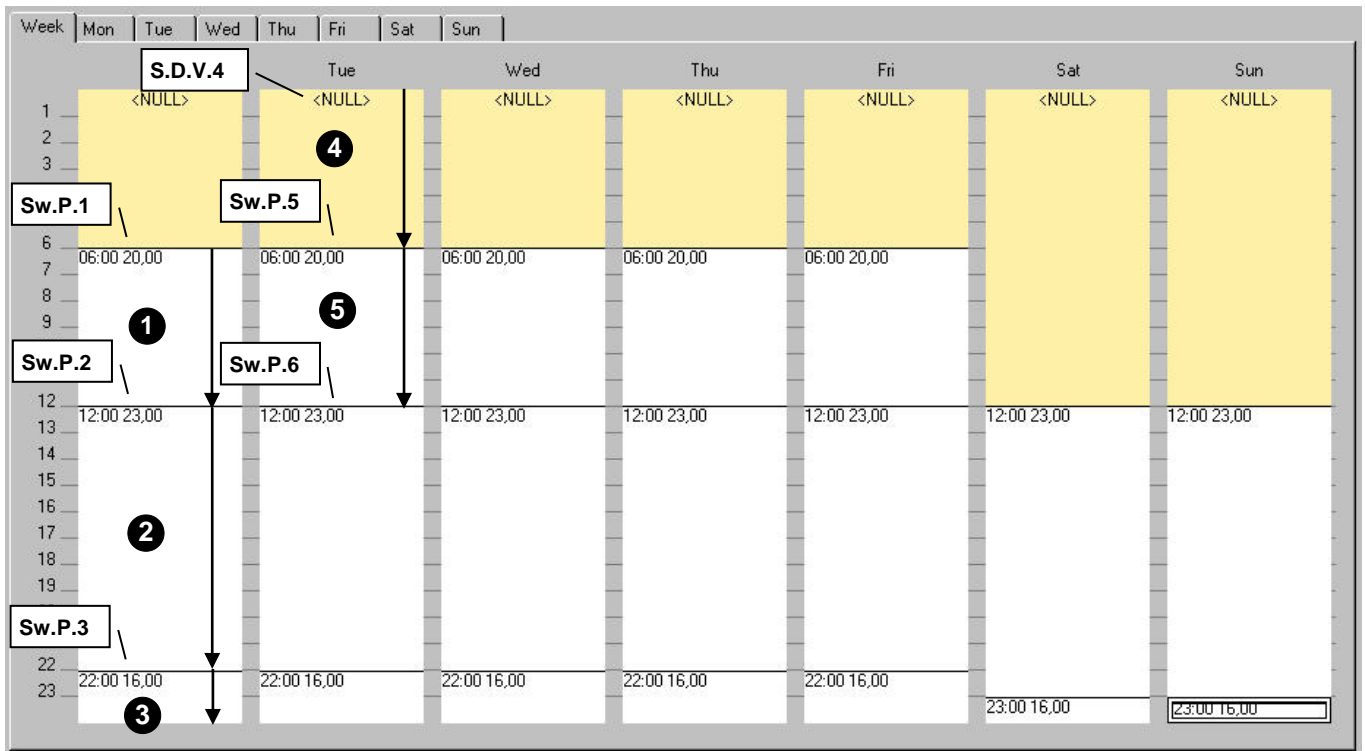
- by entering the time-value pairs in a table
- by creating switchpoint blocks graphically

RESULT: The switchpoints are shown in the daily time scale with start time and value. The end time of a switchpoint is determined by the starttime of the consecutive switchpoint. The period between two switchpoints is called a switchpoint block, that is, a week is normally divided into consecutive switchpoint blocks. Each switchpoint block has its special value which changes with the start time of the next switchpoint. A switchpoint block is valid, at the longest, until 00.00 (twelve midnight) when the schedule default value becomes valid. The schedule default value is then

valid until the next switchpoint. The schedule default value can be deleted by defining a switchpoint at 00.00.

Example (see next figure):

Switchpoint block ① is defined by switchpoint 1 (Sw.P.1) starting on Monday 06.00 and ending on Monday 12.00 with a value of 20.00. Switchpoint block ② is defined by switchpoint 2 (Sw.P.2) starting on Monday 12.00 and ending on Monday 22.00 with a value of 23.00. Switchpoint block ③ is defined by switchpoint 3 (Sw.P.3) starting on Monday 22.00 and ending on Monday 22.59 with a value of 16.00. At 00:00 the schedule default value, in this case NULL, becomes valid. Switchpoint block ④ is defined by "switchpoint4" (S.D.V.4 = schedule default value) starting at 00:00 and ending on Tuesday 6.00 with the actual value of the priority array (EAGLE Web Interface). Switchpoint block ⑤ is defined by switchpoint 5 (Sw.P.5) starting on Tuesday 06.00 and ending on Tuesday 12.00 with a value of 20.00.



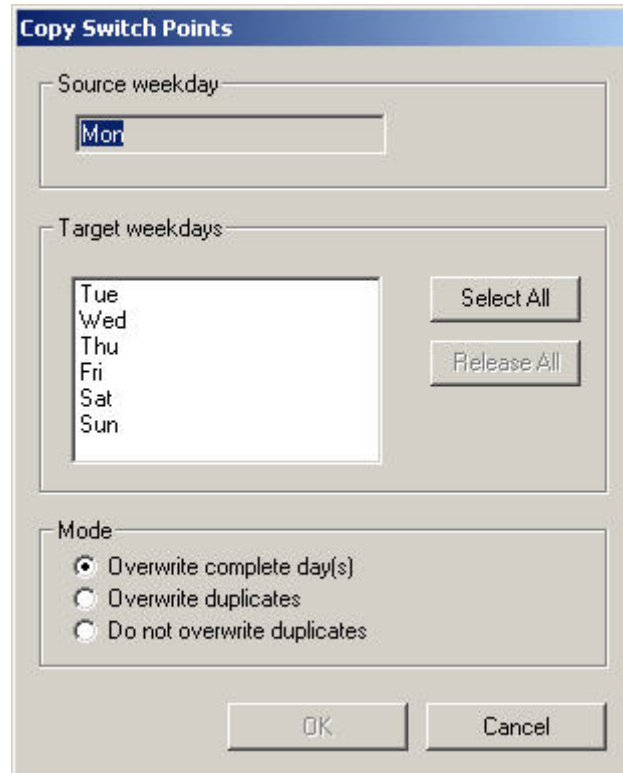
Define Switchpoints in Table 24. Click on the Mon tab, for example.

25. Click the **New** button.
26. Enter the time in the Time cell and press the ENTER key.
27. Enter the value in the Value cell and press the ENTER key.
28. If desired, enter further time-value pairs as described in steps 23 - 27.

Time	Value
23:00	23,00
06:00	14,00

To copy the switchpoint of this day to one or multiple other day(s), click the **Copy day to** button.

RESULT: The Copy Switch Points dialog box displays.



Under Source weekday, the currently selected day is displayed.

29. Under Target weekdays, click on the day(s) you want the source day to be copied to. Click the **Select All** button to select all target weekdays. Click on single days to deselect them, or click the **Release All** button to deselect all target weekdays.
30. Under Mode, define the copy mode by selecting the desired option under:

Overwrite complete day(s)

All switchpoints (time-value pairs) of the target days will be deleted and overwritten with the source day's switchpoints.

Overwrite duplicates

Switchpoints of the target day(s) which are at the same time (duplicates) as the source switchpoint will be overwritten with the source switchpoint values. New switchpoints of the source day will be copied to the target days.

Do not overwrite duplicates

Switchpoints of the target day(s) which are at the same time as the source switchpoint will not be overwritten with the source switchpoint values. New switchpoints of the source day will be copied to the target days.

31. Click the **OK** button and click on the Week tab.
32. On the Week tab, move cursor to the day and time where you want to insert the switchpoint.
33. Click right mouse button and click on **New** in the context menu.

RESULT: The Create/Edit Switchpoint dialog box displays.

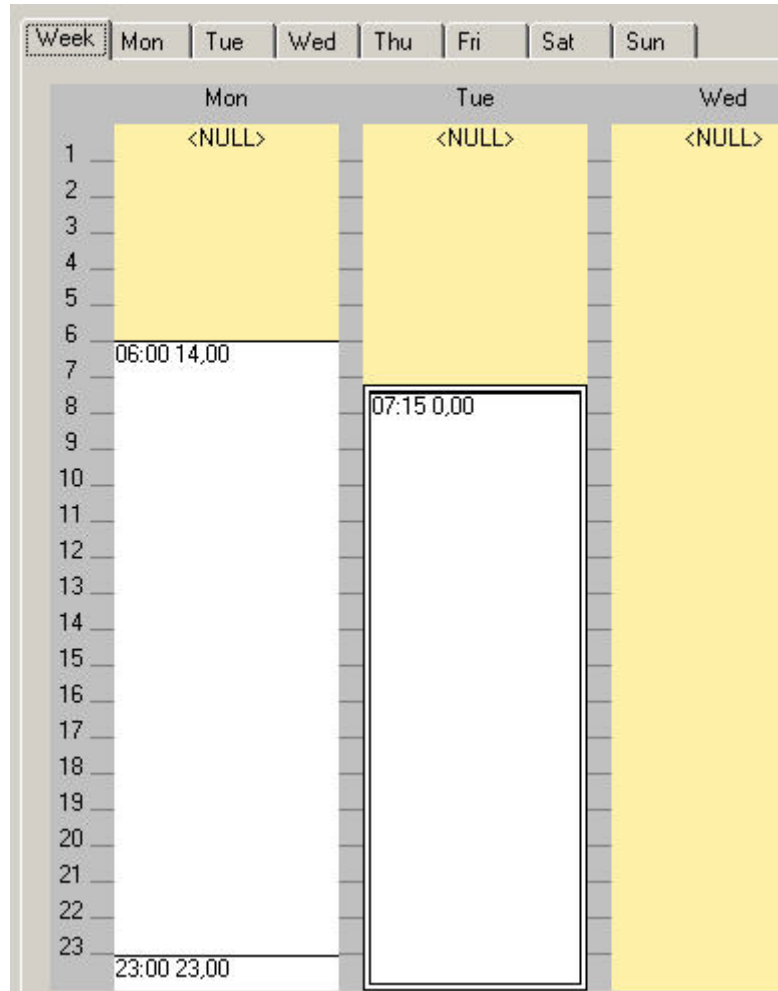
Define Switchpoints Graphically

The screenshot shows a dialog box titled "Create & Edit Switchpoint". It has the following fields and controls:

- From:** Two input boxes containing the values "7" and "15".
- Value:** An input box containing "0,00" and a checkbox labeled "NULL" which is currently unchecked.
- To:** Two input boxes containing the values "6" and "0".
- next Sw.Point:** A checkbox which is checked.
- Buttons:** "OK" and "Cancel" buttons at the bottom.

34. In the **From** field, enter the start value for the switchpoint.
34. In the upper **Value** field, enter the start value for the switchpoint.
35. Check the NULL check box if you want to remove the current value at the start switching time from the priority array (EAGLE Web Interface).
36. By default, the start value will be valid until the consecutive switchpoint as indicated by the checked **next Sw.Point** checkbox (displayed in the disabled **To** field). If you want to create a switchpoint prior to the next switchpoint, uncheck the **next Sw. Point** check box and enter the time into the **To** field. Note that the end time can only be set for the same day, at 23.59 p.m. at the longest. In the lower **Value** field, enter the value for the switchpoint, which starts at the time entered in the **To** field.
37. Check the NULL check box if you want to remove the current value at the end switching time from the priority array (EAGLE Web Interface).
38. Click the **OK** button.

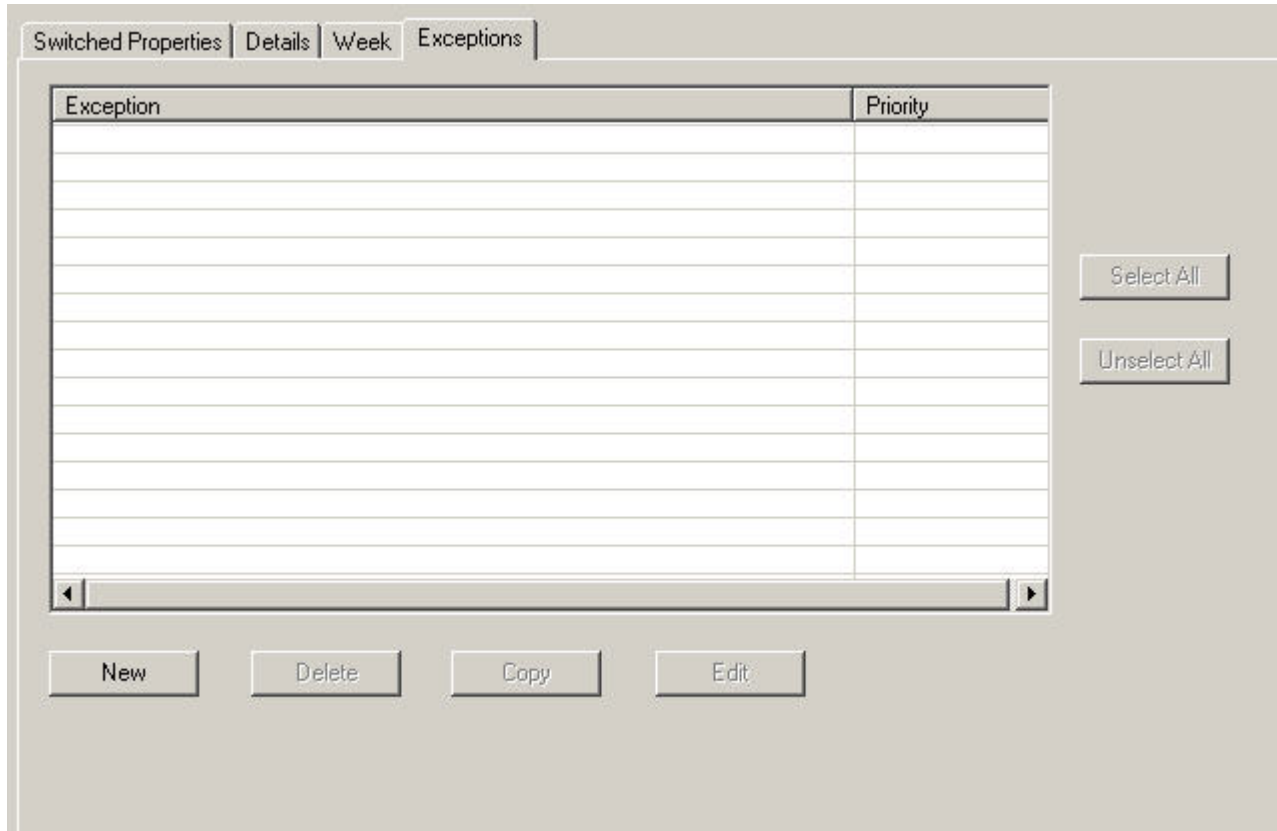
RESULT: The new switchpoint is added to the Week tab.



39. Continue by doing one the following:

- Copy switchpoint(s), (see Copy Switchpoints Graphically section)
- Edit switchpoint (see Edit Switchpoint Graphically section)
- Delete switchpoint (see Delete Switchpoint Graphically section)
- Proceed with the creation of an Exception (see step 40)

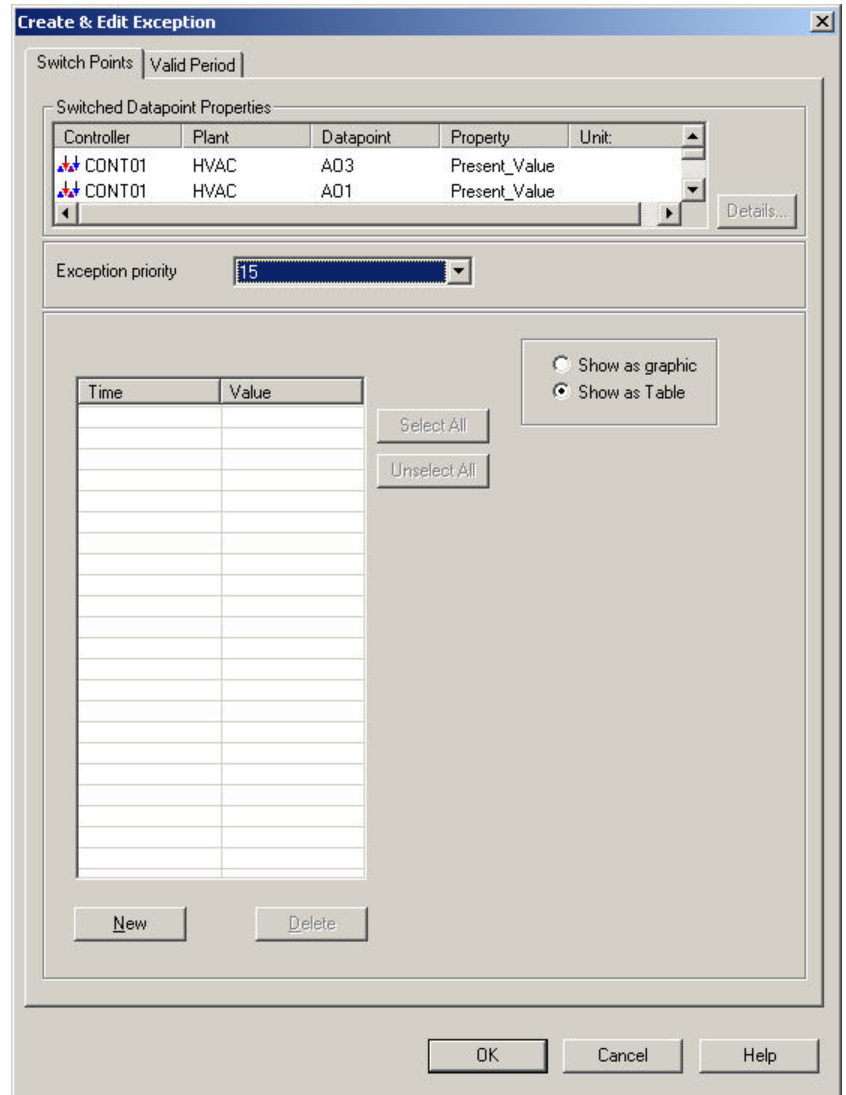
Create Exception 40. Click the Exceptions tab.



An exception is a special daily switching program that differs from the weekly program. Any exception has a higher priority than the weekly program. Exceptions themselves can be prioritized to define the processing sequence in case exceptions have overlapping time periods. If the current date enters the valid period of the exception, the exception overwrites the daily program of that day. Exceptions can be executed on particular dates, date ranges, as a recurrent event or on predefined calendar dates.

41. Click the **New** button.

RESULT: The Create & Edit Exception dialog box displays. On the Switched Properties tab, the switchpoints that will be switched by the exception are displayed. The engineering unit/state text of a selected switched property is shown on the right. To edit details of a switched property that is selected in the list, click the **Details** button.



42. From the **Exception Priority** drop-down list box, select the priority. The priority defines the processing sequence in case exceptions have overlapping validity ranges. Priorities are from 1 (highest) to 16 (lowest).

Switchpoints can be created in a table or graphically. By default, the table option **Show as Table** is enabled.

43. To create a new switchpoint in a table, click the **New** button.
44. Enter the time in the Time cell and press the ENTER key.
45. Enter the value in the Value cell and press the ENTER key.
46. If desired, enter further time-value pairs as described in steps 43-45.

To delete a switchpoint, select the switchpoint in the table and click the **Delete** button.

Switched Datapoint Properties

Controller	Plant	Datapoint	Property	Unit
CONT01	HVAC	A03	Present_Value	
CONT01	HVAC	A01	Present_Value	

Validity type

Specific Date
 Date Range
 Recurring Event
 Calendar Reference

Date

Name:

Specific Date: 11/20/2008

odd month (!)
 last day of month (#)
 even month (=)
 every day (*)
 every month (*)
 every year (*)

49. Under Validity Type, select one of the following options by clicking the corresponding radio button:

Specific Date

Time period is one specific date (day, month, year) is to be defined, e.g. Christmas Eve or 5.5., the whole of May, or the whole year of 2004 (see step 8 for completion).

Date Range

Time period is a date range is to be defined, e.g. Summer holidays from 29.7-7.9.2004 (see step 10 for completion).

Recurring Event

Time period is a recurring event is to be defined, e.g. every last Friday of every month (see step 12 for completion)

Calendar Reference

A project-wide calendar can be selected that provides the specific dates, that is, the exception will be valid for all calendar entries of the referenced calendar

50. In the Name field, enter a name for the exception.

51. If Specific Date has been selected:

Validity type

Specific Date Date Range Recurring Event Calendar Reference

Date

Name:

Specific Date:

last day of month (#) even month (=)

every day (*) every month (*) every year (*)

From the Specific Date drop-down list box, select the specific date, e.g. 5.5.2004. If the chosen date should be on a regular basis, for example, every day, month or year, etc., check the corresponding check box from:

- last day of month (#)
- every day (x)
- odd month (!)
- even month (=)
- every month (*)
- every year (*)

A selected regular option is indicated by a special character as shown above in brackets (#, x, !=, *) in the selected specific date, for example, 5.*.2004, if the **every month** option has been checked. In this case the specific date is valid on every fifth of every month as indicated by the asterisk.

Combinations of the options are possible.

52. Click the **OK** button to save specific date.

53. If Date Range has been selected:

Validity type

Specific Date Date Range Recurring Event Calendar Reference

Date

Name:

Date Range from:

Date Range to:

Check the checkboxes at **Date Range from** and **Date Range to** and select start and end date from the drop-down list boxes.

NOTE:

If the **Date Range from** checkbox is unchecked, the drop-down listbox is disabled. This means, that the date range will be any date up to and including the end date.

If the checkbox **Date Range to** is unchecked, the drop-down listbox is disabled. This means, that the date range will be on any date from the start date on.

If both drop-down listboxes are disabled, the date range will be all the time.

- 54. Click the **OK** button to save the date range.
- 55. If Recurring Event has been selected:

Validity type

Specific Date
 Date Range
 Recurring Event
 Calendar Reference

Date

Name:

Recurring on:

From the Recurring on drop-down list boxes, select the date options that define the recurring event.

- 56. Click the **OK** button to save the recurring event.
- 57. If Calendar Reference has been selected:

Referenced calendar

Calendar entries:

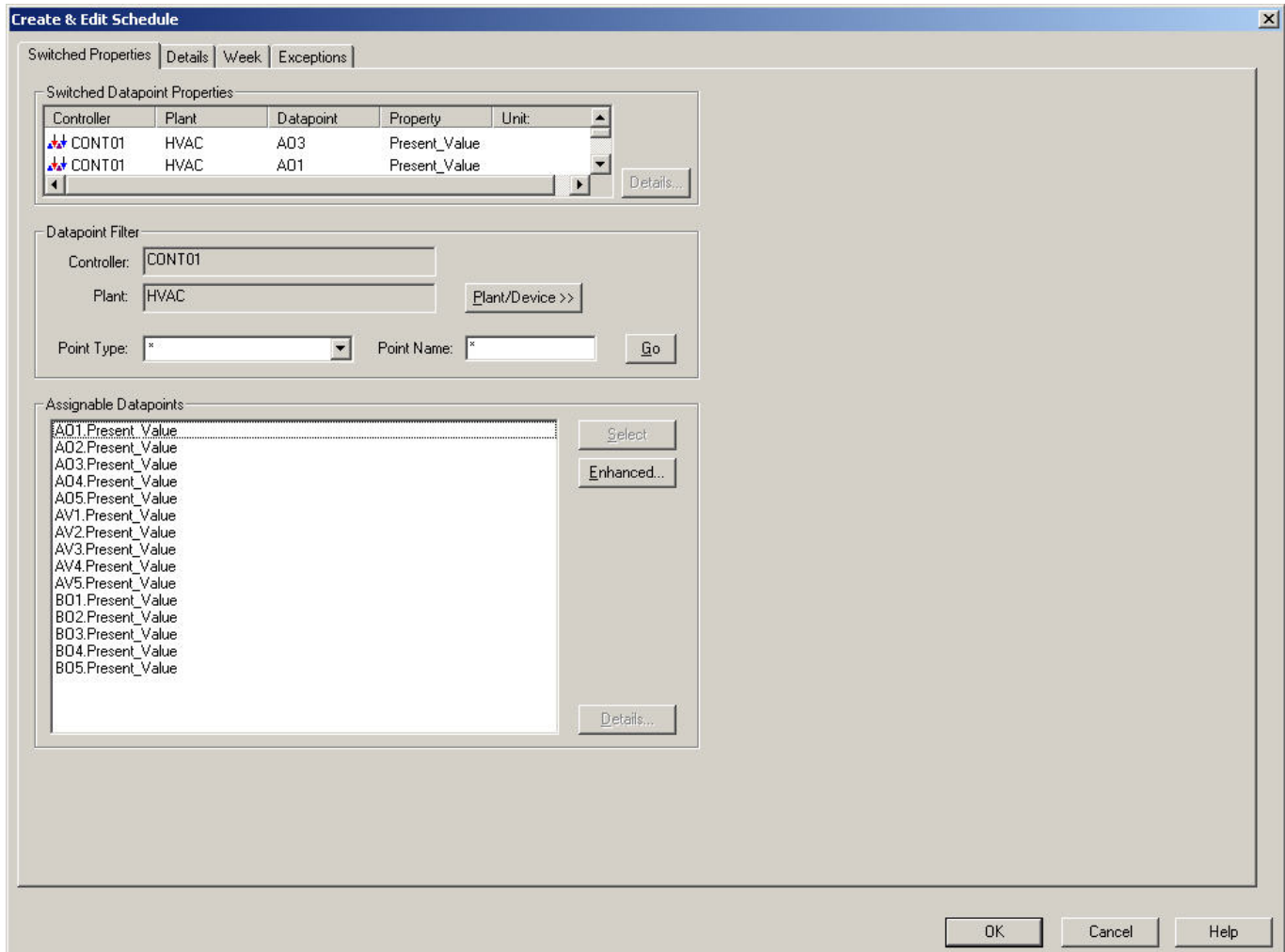
Name	Date
Specific date	*/#/2008

Under Referenced calendar, select the calendar from the drop-down list box.

RESULT: Under Calendar Entries, the entries of the selected calendar are shown by name and date.

- 58. If desired, click **Show References** button to view existing schedules which reference to the selected calendar.
- 59. If desired, create additional entries by clicking the **New Entry** button.

RESULT: The New & Edit Calendar Entry dialog box displays.



Copy Switchpoint(s) Graphically

When copying a switchpoint, only the switchpoint itself defined by its time and value is copied, not the complete switchpoint block which extends to the next switchpoint. This means, for copying all switchpoints of a day, the switchpoint block of the last switchpoint that extends to the next day, must be selected.

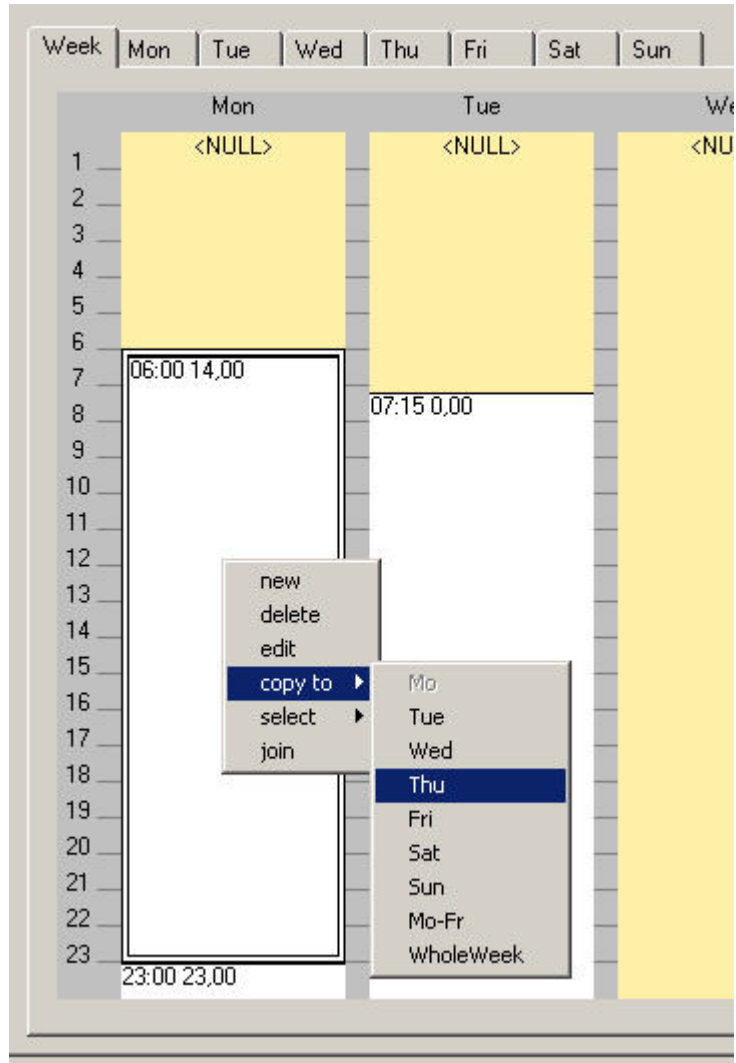
Procedures

Copy Single Switchpoint

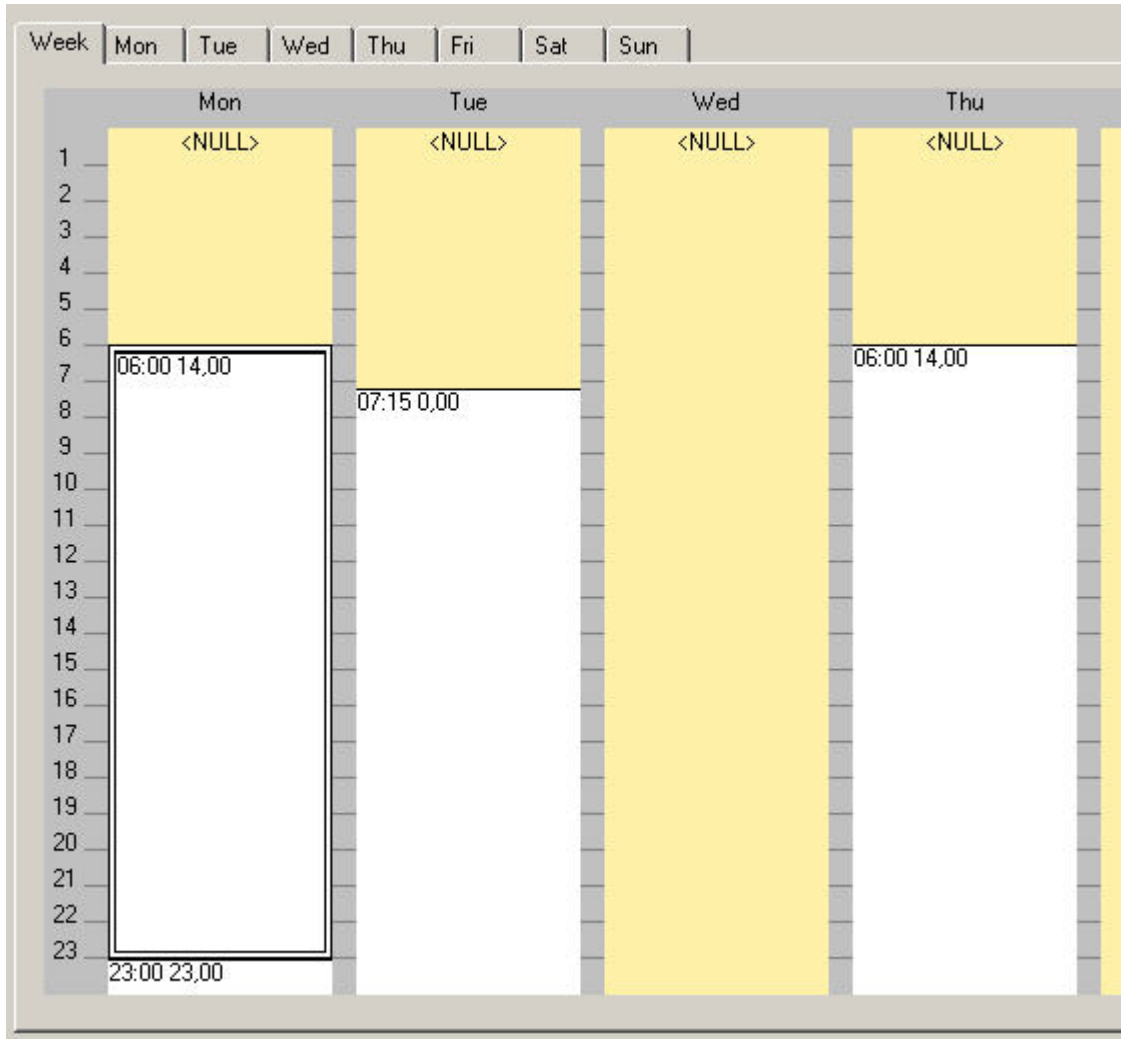
1. On the week tab, click on the switchpoint.

RESULT: The switchpoint block is marked with a double-lined rectangle.

2. Click right mouse button and with left mouse button, select **Copy to**, then click on the destination, day or whole week.



RESULT: The switchpoint is copied to the destination, in this case the switchpoint at 6.00 is copied to Tuesday. The copied switchpoint value is valid until the next switchpoint. Existing switchpoints of that day will be kept (see "Copy all Switchpoints of a Day" section).



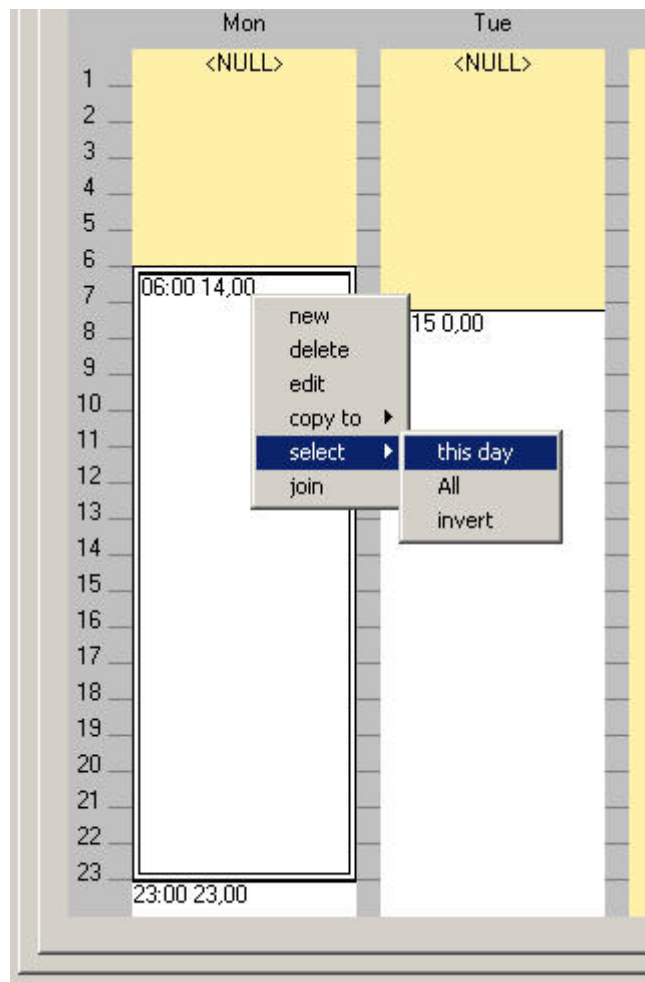
Copy All Switchpoints of a Day

IMPORTANT

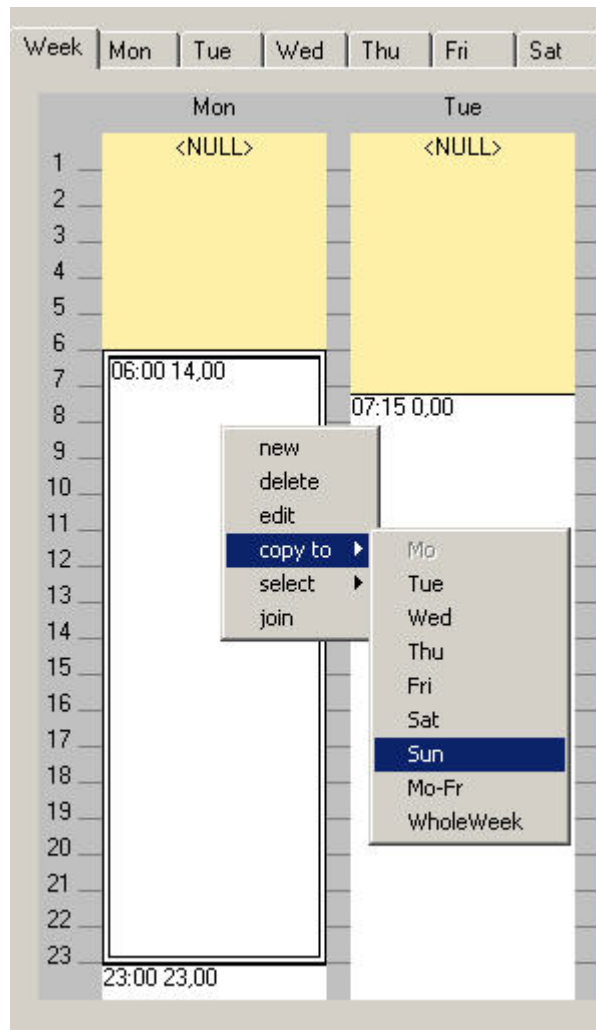
When copying all switchpoints of a day, all switchpoints of the target day(s), to which the switchpoints are copied, will be deleted.

1. On the week tab, click on the first switchpoint of the day.

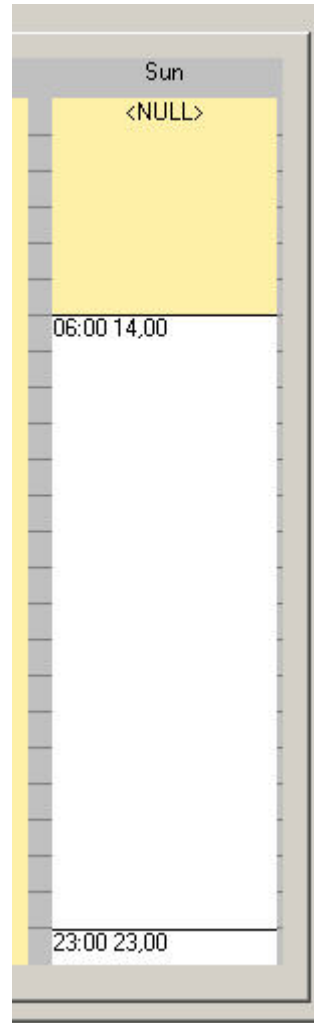
RESULT: The switchpoint block is marked with a double-lined rectangle.



2. Click right mouse button and with left mouse button, select **select**, then click on **this day** in the context menu.
3. Move cursor over the marked switchpoints, click right mouse button and with left mouse button select **Copy to**, then click on the destination, day or whole week.



RESULT: All switchpoints of the day are copied to the destination are copied.



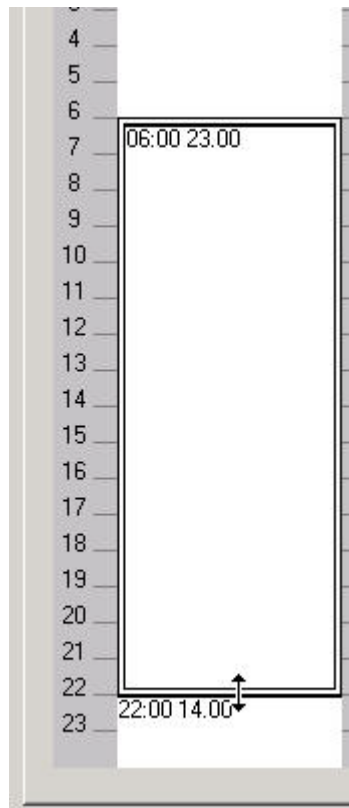
Edit Switchpoint Graphically

The time period of a switchpoint block can be reduced or prolonged by moving the start and end points (start and end time) up or down. In addition, the complete switchpoint block can be moved up or down so that the start and end time will be modified by the same time range.

Procedures

Change Start Or End Time

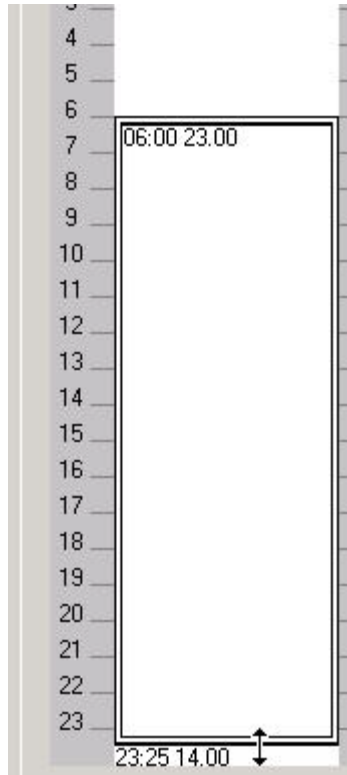
1. On the Week tab, click on the switchpoint.



2. Move cursor over the desired start time respectively end time until a double arrow displays.
3. Move cursor up or down to the new position.

NOTE: Software allows change steps with the constant time interval of 5 minutes only.

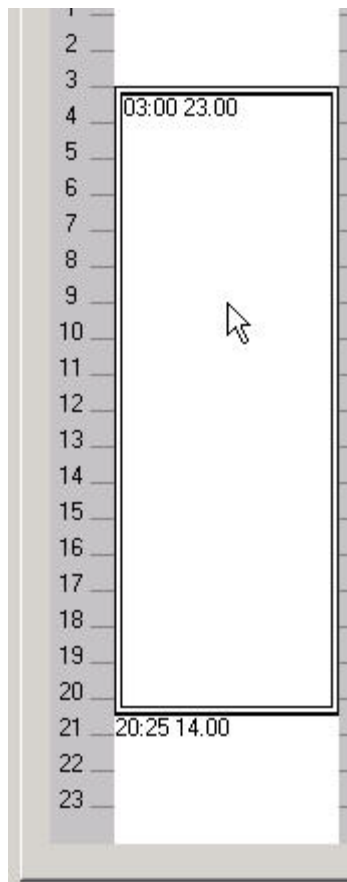
RESULT: The adjacent switchpoint blocks will be moved and changed accordingly. In this case, the switchpoint block of the switchpoint starting at 6.00 has been prolonged from 22.00 to 23.25. This results in the reduction of the time period of the adjacent switchpoint block which previously started at 22.00.



Change Start And End Time

1. On the Week tab, click on the switchpoint (block) and, by keeping the mouse button pressed, move the switchpoint block to the desired position.

NOTE: Software allows change steps with the constant time interval of 5 minutes only.



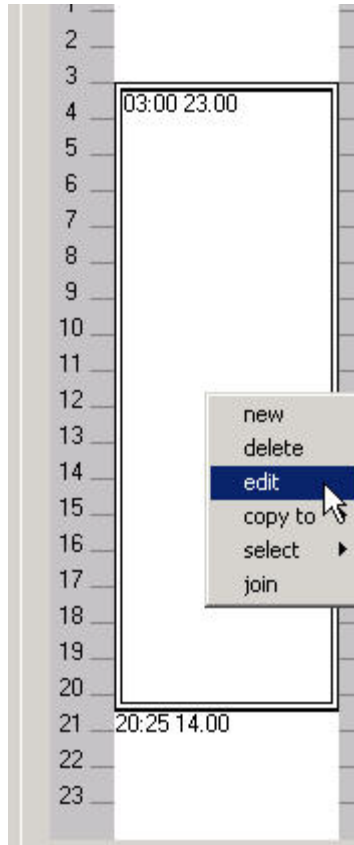
2. Release the mouse button.

RESULT: The complete switchpoint block has been moved and both, the start and end time have been changed. The adjacent switchpoint blocks will be moved and changed accordingly.

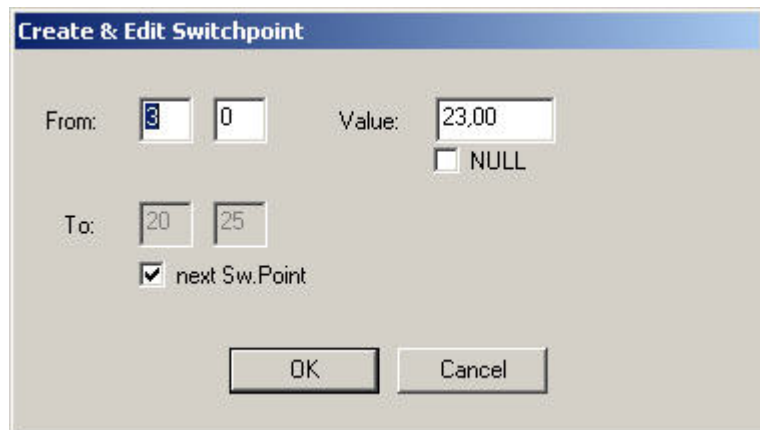
Change Switchpoint Value

1. On the Week tab, click on the switchpoint you want to edit.
2. Click right mouse button, and with left mouse button, click on **Edit** in the context menu.

Or, double-click on the switchpoint.



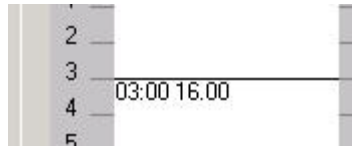
RESULT: The New/Edit Switchpoint dialog box displays.



2. In the Value field, enter the new value.

3. If desired, change the start and end time of the switchpoint block in the From and/or To fields.
4. Click the **OK** button.

RESULT: The updated value will be displayed on the Week tab.



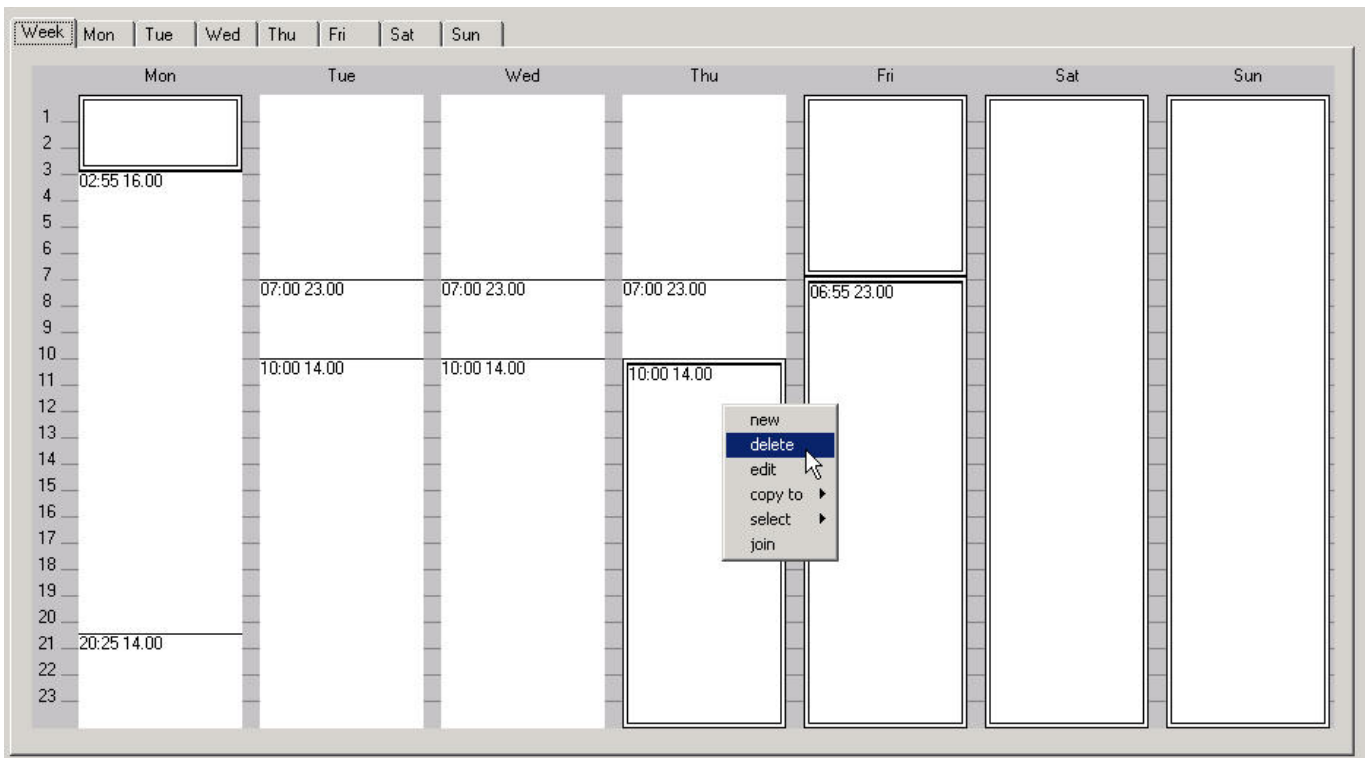
Procedures

Delete Switchpoint(s) Graphically

Delete Multiple Switchpoints

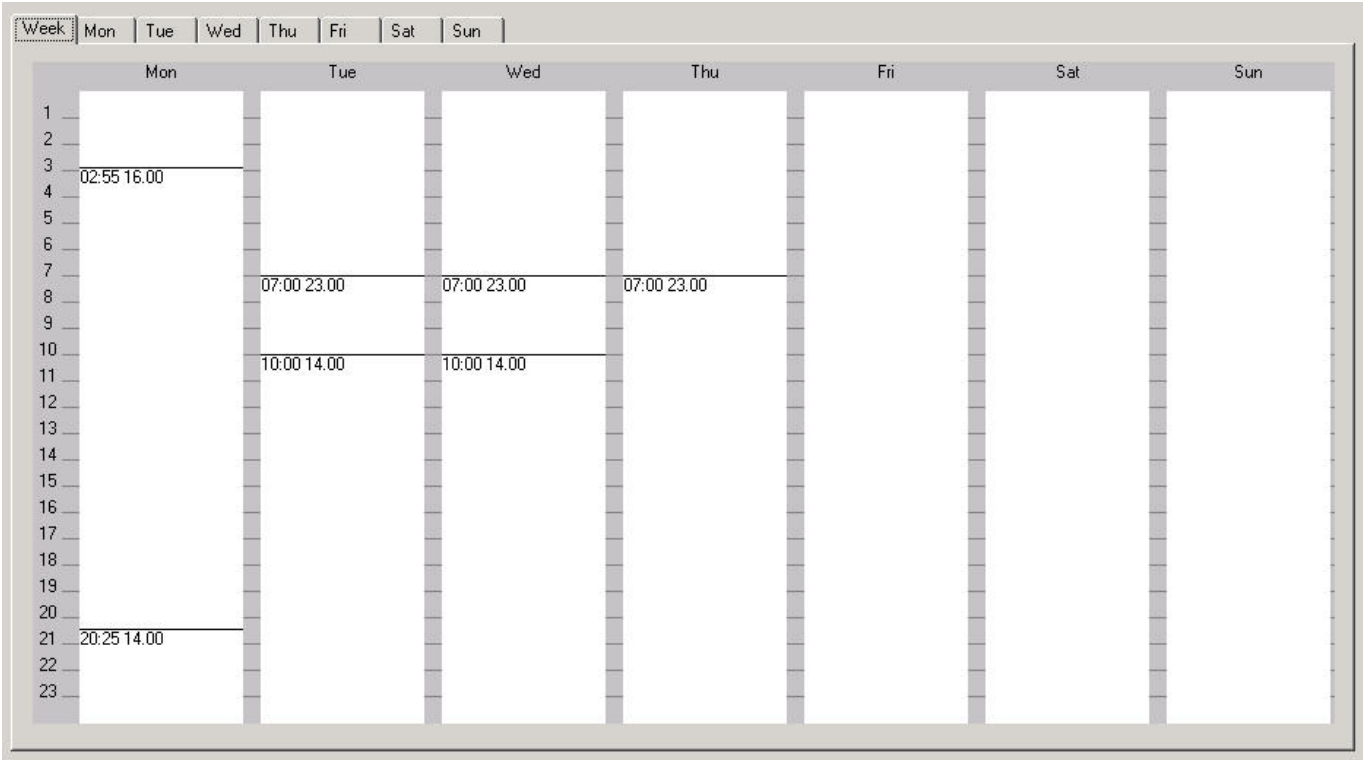
1. On the Week tab, click on the switchpoint. To select multiple switchpoints, use the CTRL key simultaneously.

RESULT: The switchpoint blocks are marked with a double-lined rectangle.



2. Click right mouse button and with left mouse button click on **Delete** in the context menu.

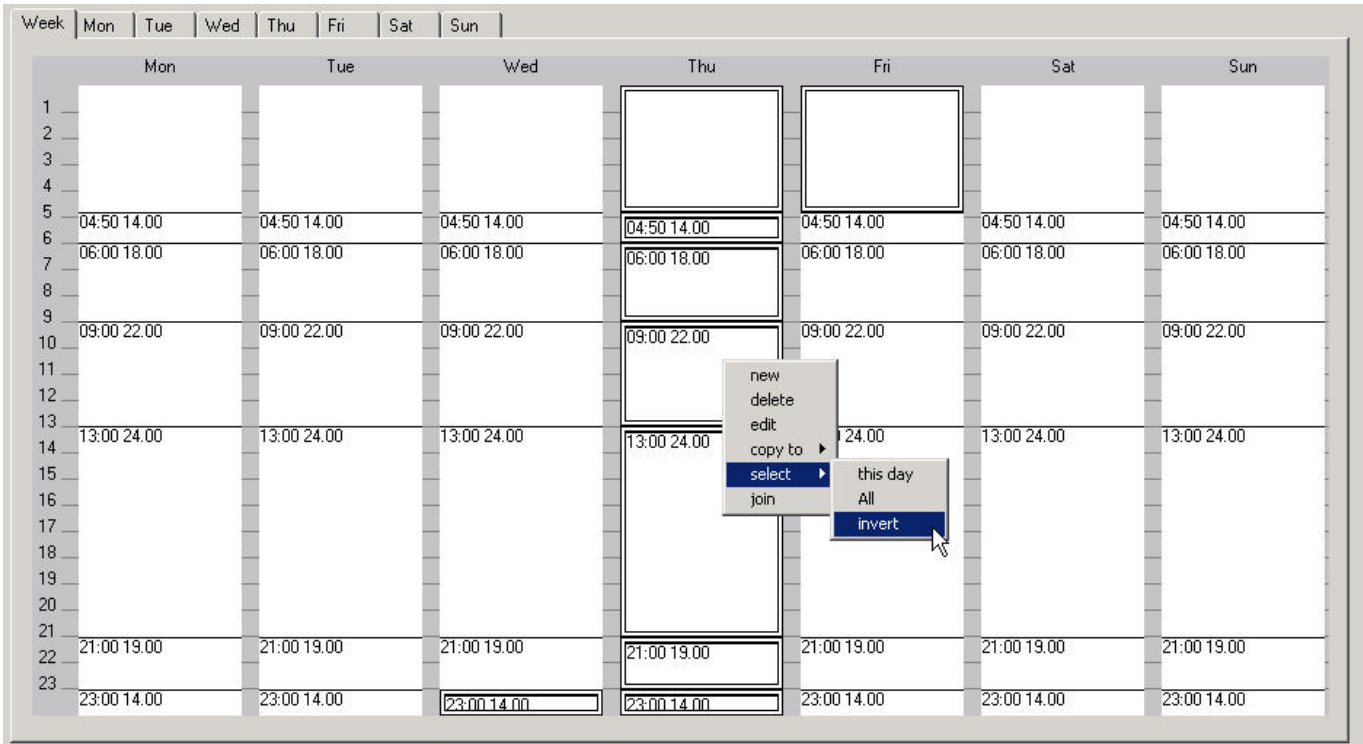
RESULT: The switchpoints are deleted.



Delete All Switchpoints by Keeping Few Switchpoints

1. On the Week tab, multi-select the switchpoints you want to keep by pressing CTRL key and left mouse button concurrently.

RESULT: The switchpoint blocks are marked with a double-lined rectangle.



2. Click right mouse button and click **Invert** in the context menu.

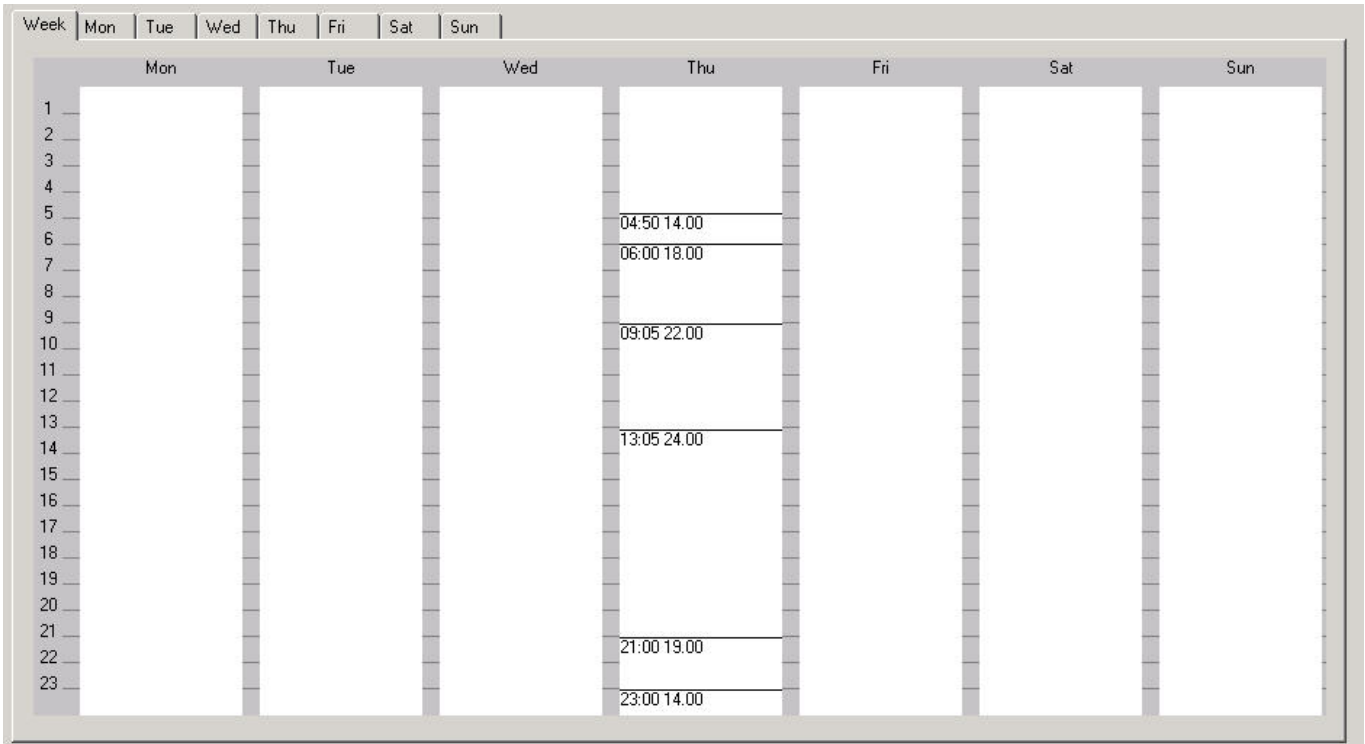
Week	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1							
2							
3							
4							
5							
6	04:50 14.00	04:50 14.00	04:50 14.00	04:50 14.00	04:50 14.00	04:50 14.00	04:50 14.00
7	06:00 18.00	06:00 18.00	06:00 18.00	06:00 18.00	06:00 18.00	06:00 18.00	06:00 18.00
8							
9							
10	09:00 22.00	09:00 22.00	09:00 22.00	09:00 22.00	09:00 22.00	09:00 22.00	09:00 22.00
11							
12							
13							
14	13:00 24.00	13:00 24.00	13:00 24.00	13:00 24.00	13:00 24.00	13:00 24.00	13:00 24.00
15							
16							
17							
18							
19							
20							
21	21:00 19.00	21:00 19.00	21:00 19.00	21:00 19.00	21:00 19.00	21:00 19.00	21:00 19.00
22							
23	23:00 14.00	23:00 14.00	23:00 14.00	23:00 14.00	23:00 14.00	23:00 14.00	23:00 14.00

RESULT: All the other switchpoint blocks are now marked with a double-lined rectangle.

3. Click right mouse button and click **Delete** in the context menu.

Week	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1							
2							
3							
4							
5							
6	04:50 14.00	04:50 14.00	04:50 14.00	04:50 14.00	04:50 14.00	04:50 14.00	04:50 14.00
7	06:00 18.00	06:00 18.00	06:00 18.00	06:00 18.00	06:00 18.00	06:00 18.00	06:00 18.00
8							
9							
10	09:00 22.00	09:00 22.00	09:00 22.00	09:05 22.00	09:00 22.00	09:00 22.00	09:00 22.00
11							
12							
13							
14	13:00 24.00	13:00 24.00	13:00 24.00	13:05 24.00	13:00 24.00	13:00 24.00	13:00 24.00
15							
16							
17							
18							
19							
20							
21	21:00 19.00	21:00 19.00	21:00 19.00	21:00 19.00	21:00 19.00	21:00 19.00	21:00 19.00
22							
23	23:00 14.00	23:00 14.00	23:00 14.00	23:00 14.00	23:00 14.00	23:00 14.00	23:00 14.00

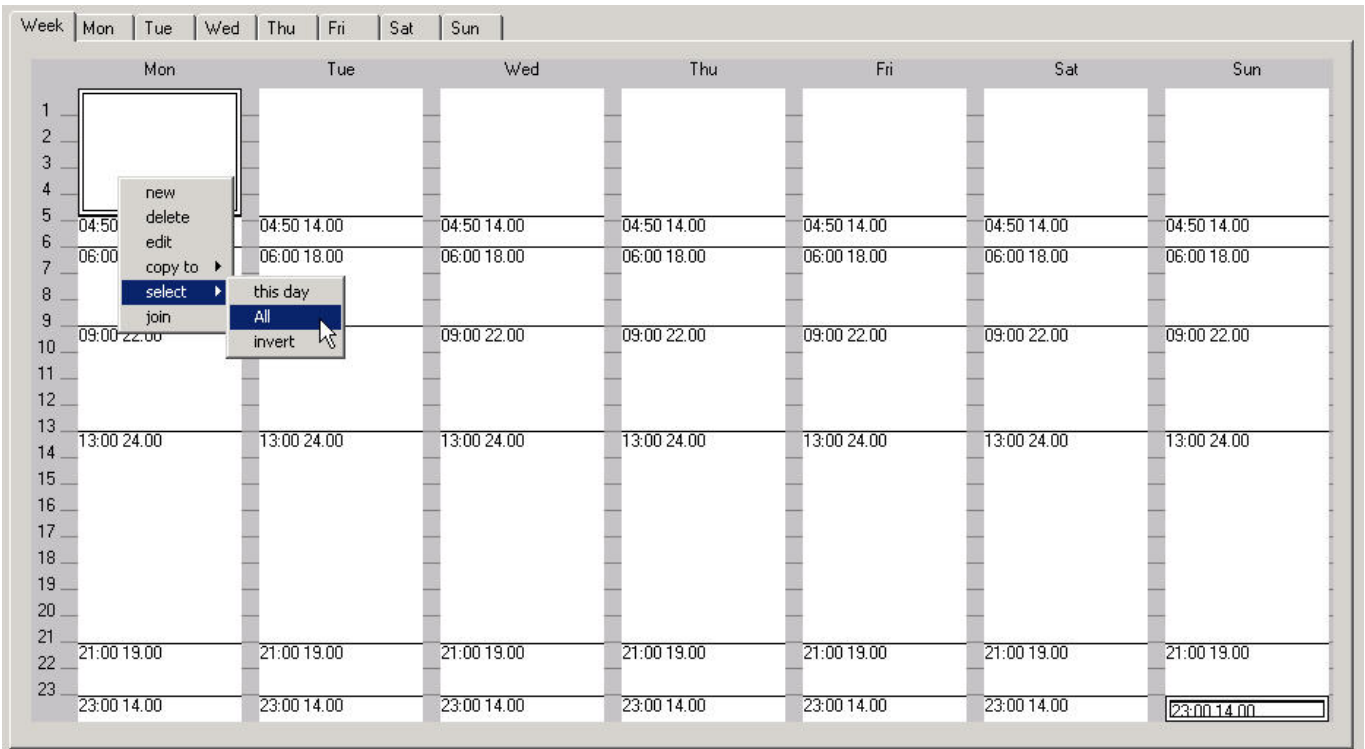
RESULT: The marked switchpoint blocks are deleted. In this case all switchpoints originally selected on Thursday have been kept.



Delete All Switchpoints

1. On the Week tab, click right mouse button and with left mouse button, select **Select**, then click on **All** in the context menu.

RESULT: All switchpoints are marked with a double-lined rectangle.



2. Click right mouse button and with left mouse button, click on **Delete** in the context menu.

Week	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1							
2							
3							
4							
5							
6	04:50 14.00	05:00 14.00	04:50 14.00	04:50 14.00	04:50 14.00	04:50 14.00	04:50 14.00
7	06:00 18.00	06:00 18.00	06:00 18.00	06:00 18.00	06:00 18.00	06:00 18.00	06:00 18.00
8							
9							
10	09:00 22.00	09:00 22.00	09:00 22.00	09:00 22.00	09:00 22.00	09:00 22.00	09:00 22.00
11							
12							
13							
14	13:00 24.00	13:00 24.00	13:00 24.00	13:00 24.00	13:00 24.00	13:00 24.00	13:00 24.00
15							
16							
17							
18							
19							
20							
21							
22	21:00 19.00	21:00 19.00	21:00 19.00	21:00 19.00	21:00 19.00	21:00 19.00	21:00 19.00
23	23:00 14.00	23:00 14.00	23:00 14.00	23:00 14.00	23:00 14.00	23:00 14.00	23:00 14.00

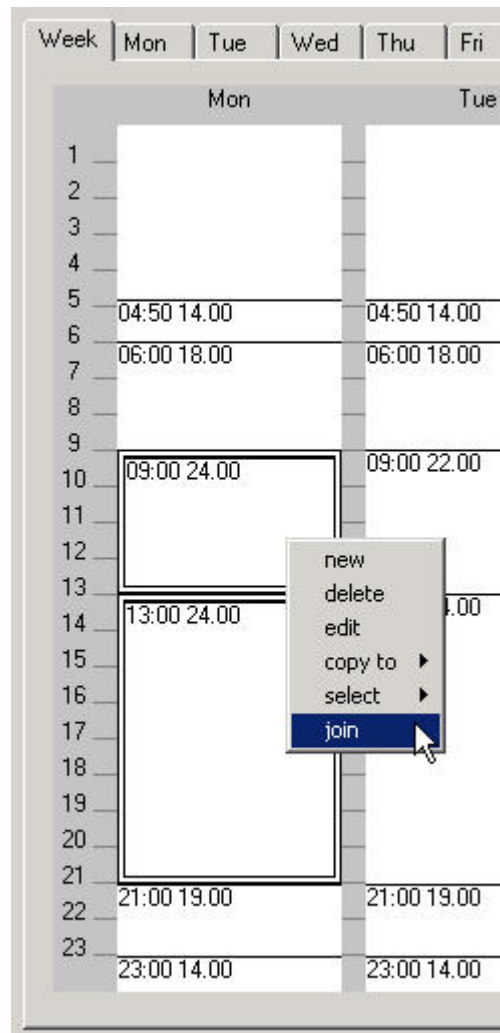
RESULT: All switchpoints are deleted.

Join Switchpoints

Multiple consecutive switchpoints which have the same value can be joined to one switchpoint (block).

Procedure

1. On the Week tab, multi-select the switchpoints you want to join.



2. Click right mouse button and with left mouse button, click on **Join** in the context menu.

RESULT: The selected switchpoints will be joined to one switchpoint (block).

Week	Mon	Tue	Wed
	Mon		
1			
2			
3			
4			
5	04:50 14.00		
6	06:00 18.00		
7			
8			
9			
10	09:00 24.00		
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22	21:00 19.00		
23	23:00 14.00		

Delete Switchpoint in the Table

Procedure 1. Click on the day's tab.

RESULT: The selected switchpoints are listed with their time and values.

Create & Edit Calendar

Calendar Properties

Name:

Description:

Access Rights

Read Access Level:

Write Access Level:

BACnet Object Information

Object Type: Instance ID:

Object ID:

List of Dates

Name	Date

Select all

Unselect all

New

Delete

Edit

OK Cancel Help

2. Under **Calendar Properties**, enter the **Name** and a **Description** in the fields of the same name.
3. Under Access Rights, define the **Read Access Level** and **Write Access Level** by selecting it from the corresponding drop-down list box. For detailed information on access rights, please refer to the User Access Manager section.
4. Under List of Dates, enter the calendar date entries the calendar should include by clicking the **New** button.

RESULT: The New & Edit Calendar Entry dialog box displays.

The screenshot shows a dialog box titled "New & Edit Calendar Entry". It has a "Validity type" section with three radio buttons: "Specific Date" (selected), "Date Range", and "Recurring Event". Below this is a "Date" section with a "Name:" text box, a "Specific Date" dropdown menu showing "18.11.2003", and three checkboxes: "every day", "every month", and "every year". At the bottom are "OK", "Cancel", and "Help" buttons.

5. Under Validity Type, select one of the following options by clicking the corresponding radio button:

Specific Date

Time period is one specific date (day, month, year) is to be defined, e.g. Christmas Eve or 5.5., the whole of May, or the whole year of 2004 (see step 8 for completion).

Date Range

Time period is a date range is to be defined, e.g. Summer holidays from 29.7-7.9.2004 (see step 10 for completion).

Recurring Event

Time period is a recurring event is to be defined, e.g. every last Friday of every month (see step 12 for completion)

6. Under Date, enter a name for the calendar entry.
7. If Specific Date has been selected, select the specific date, e.g. 5.5.2004. from the Specific Date drop-down list box. If the chosen date should be valid every day, check the **every day** checkbox. In this case, the specific date includes every day of May in 2004 indicated by an asterisk, *.5.2004. If the chosen date should be valid every month, check the **every month** checkbox. In this case, the specific date is on every fifth of every month indicated by an asterisk, 5.*.2004. If the chosen date should be valid every year, check the **every year** checkbox. In this case, the fifth of May every year will be the specific date indicated by an asterisk, 5.5.*. Combinations of the three options are possible, e.g. assuming the 5.5.2004 sample, the selection of the **every day** of **every year** options determines the valid date to *5*, that is every May of every year.
8. Click the **OK** button to save the specific date.

New & Edit Calendar Entry

Validity type

Specific Date Date Range Recurring Event

Date

Name:

Specific Date: every day
 every month
 every year

OK Cancel Help

9. If Specific Date has been selected:

Check the checkboxes at **Date Range from** and **Date Range to** and select start and end date from the drop-down list boxes.

NOTE:

If the **Date Range from** checkbox is unchecked, the drop-down listbox is disabled. This means, that the date range will be any date up to and including the end date.

If the checkbox **Date Range to** is unchecked, the drop-down listbox is disabled. This means, that the date range will be on any date from the start date on.

If both drop-down listboxes are disabled, the date range will be all the time.

New & Edit Calendar Entry

Validity type

Specific Date Date Range Recurring Event

Date

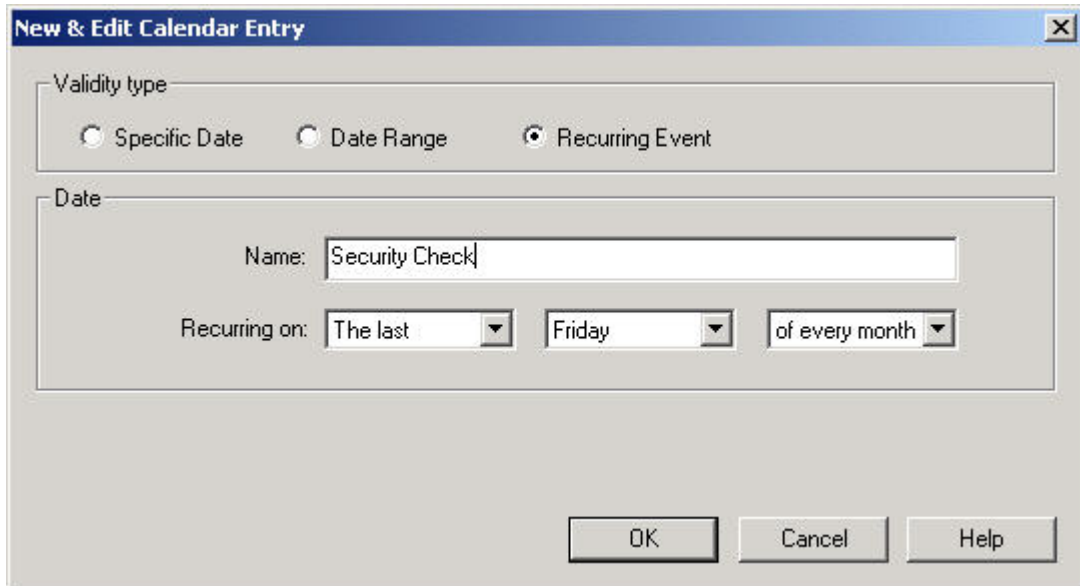
Name:

Date Range from: every day
 Date Range to: every month
 every year

OK Cancel Help

10. Click the **OK** button to save the date range.

11. If Recurring Event has been selected, select the date options from the Recurring on drop-down list boxes.



New & Edit Calendar Entry

Validity type

Specific Date
 Date Range
 Recurring Event

Date

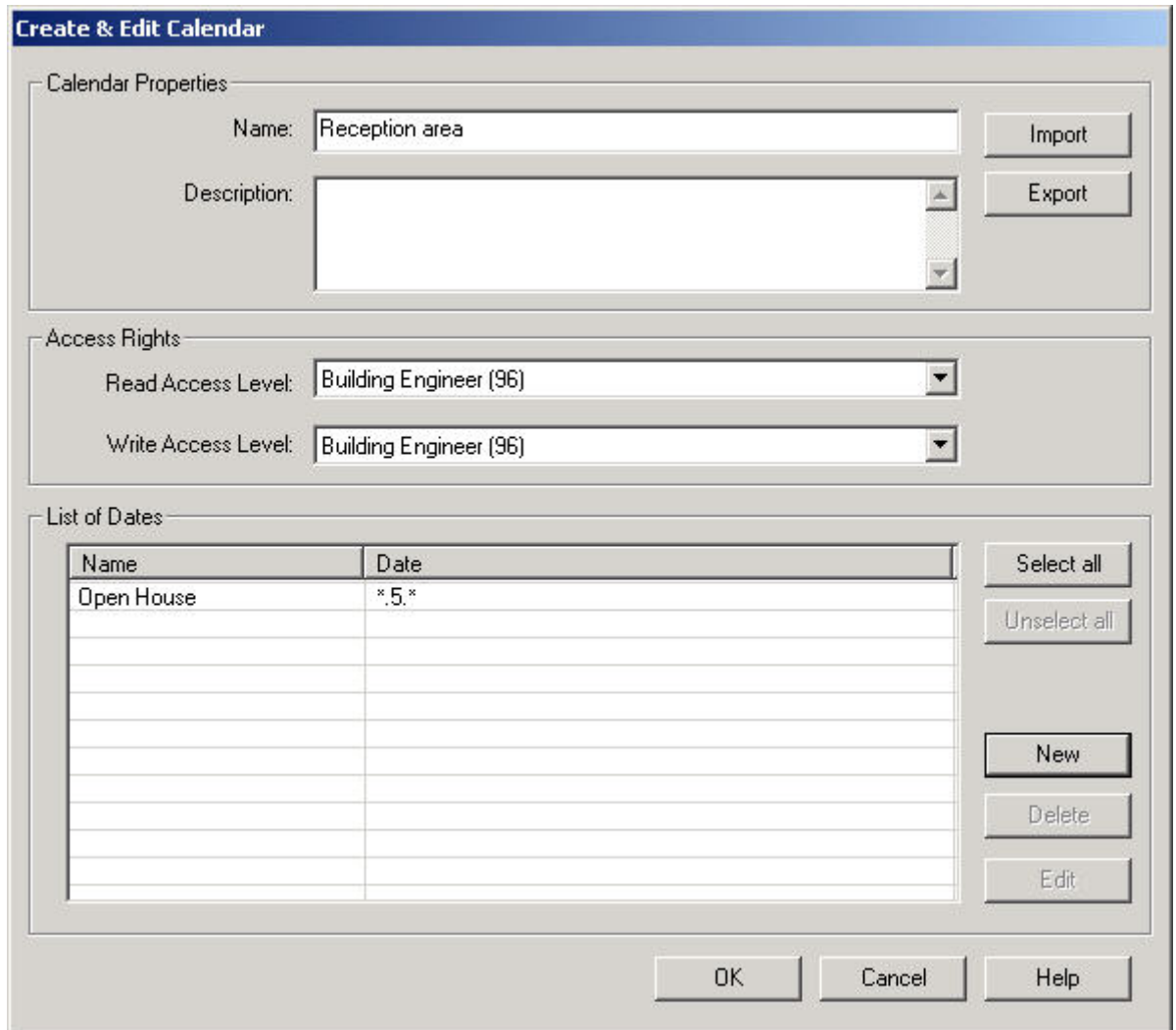
Name:

Recurring on:

OK Cancel Help

12. Click the **OK** button to save the recurring event.

RESULT: The Create & Edit Calendar dialog box redisplay.



Create & Edit Calendar

Calendar Properties

Name:

Description:

Import Export

Access Rights

Read Access Level:

Write Access Level:

List of Dates

Name	Date
Open House	*.5.*

Select all Unselect all

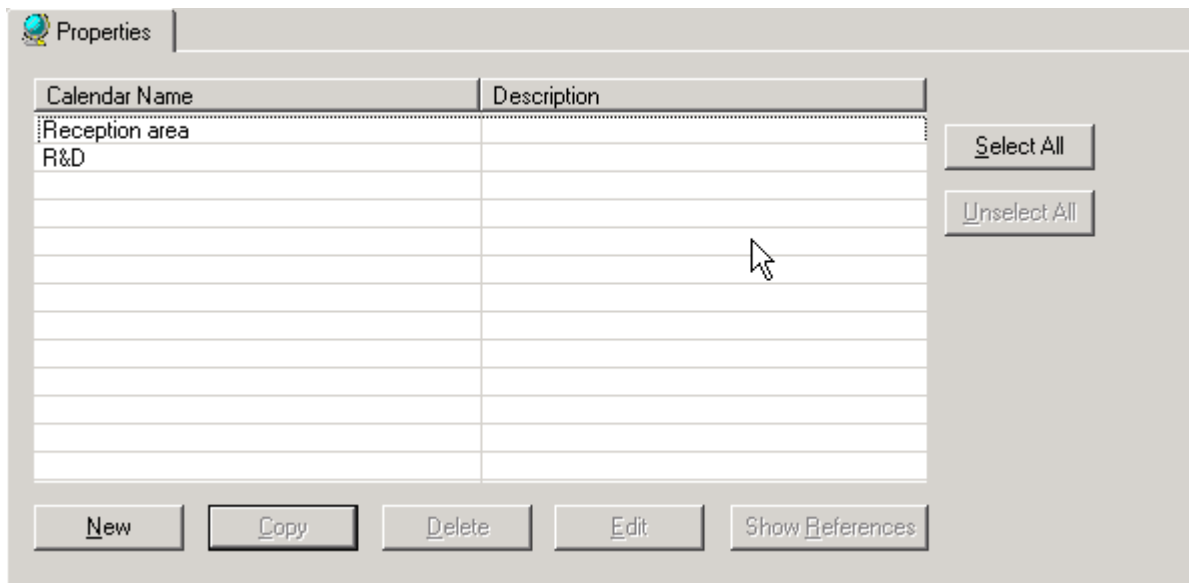
New Delete Edit

OK Cancel Help

13. If desired, continue with the creation of further calendar entries.

15. Click the **OK** button to save settings.

RESULT: The Calendars Properties tab redisplay listing the newly created calendar.



Edit Calendar

- Procedure**
1. On the Properties tab, select the calendar to be edited in the list and click the **Edit** button.

RESULT: The Create&Edit Calendar dialog box displays.

Create & Edit Calendar

Calendar Properties

Name:

Description:

Access Rights

Read Access Level:

Write Access Level:

BACnet Object Information

Object Type: Instance ID:

Object ID:

List of Dates

Name	Date
Specific date	7.12.2004

Select all

Unselect all

New

Delete

Edit

OK Cancel Help

2. Edit the calendar by doing one of the following:

Under **Calendar Properties**, change the **Name** and the **Description** in the fields of the same name.

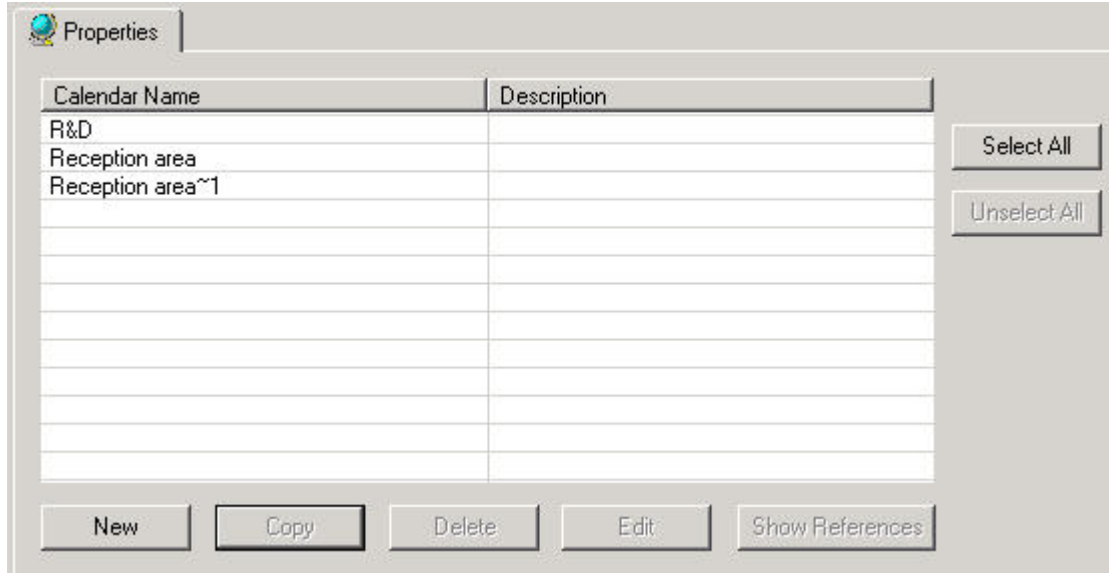
Under Access Rights, redefine the **Read Access Level** and **Write Access Level** by selecting it from the corresponding drop-down list box. For detailed information on access rights, please refer to the User Access Manager section.

Under List of Dates, add additional calendar date entries by clicking the **New** button. Or edit entries by selecting the entry and clicking the **Edit** button (see Create New Calendar section). Or, delete a calendar entry by selecting it and clicking the **Delete** button. For selection/deselection, the **Select all/Unselect all** button, for multiselection, simultaneously clicking the mouse and the CTRL or SHIFT key can be used.

Copy Calendar

- Procedure** 1. On the Properties tab, select the calendar to be copied in the list and click the **Copy** button.

RESULT: The calendar will be copied. The new calendar name is indicated by the ~ symbol and a consecutive number, e.g. Reception ~1.

**Delete Calendar**

- Procedure** 1. On the Properties tab, select the calendar to be deleted from the list and click the **Delete** button.

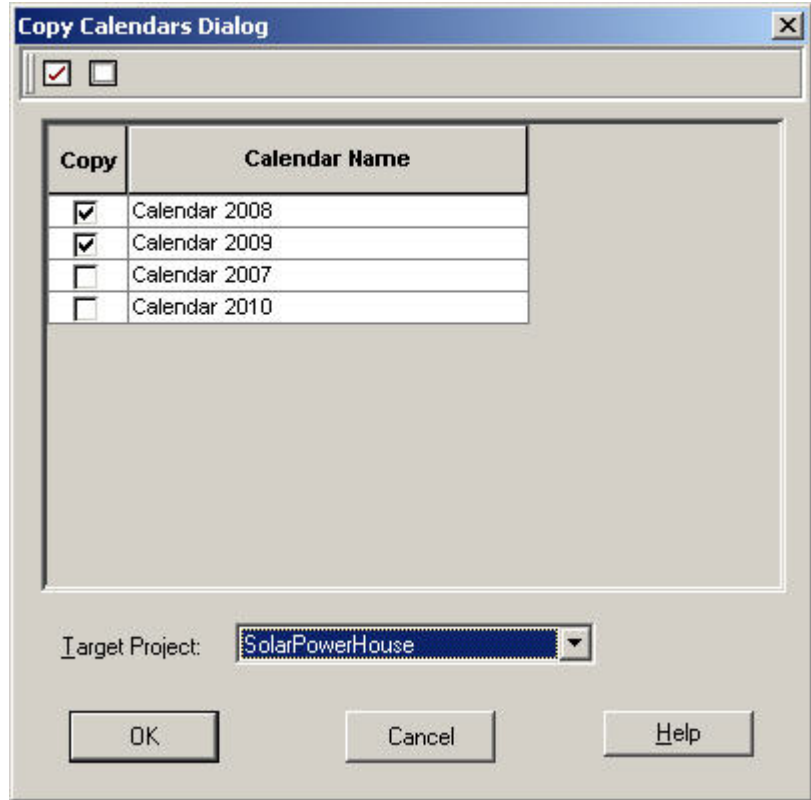
RESULT: The calendar will be deleted.

Show References

Purpose To view all schedules of any controllers that refer to the selected calendar.

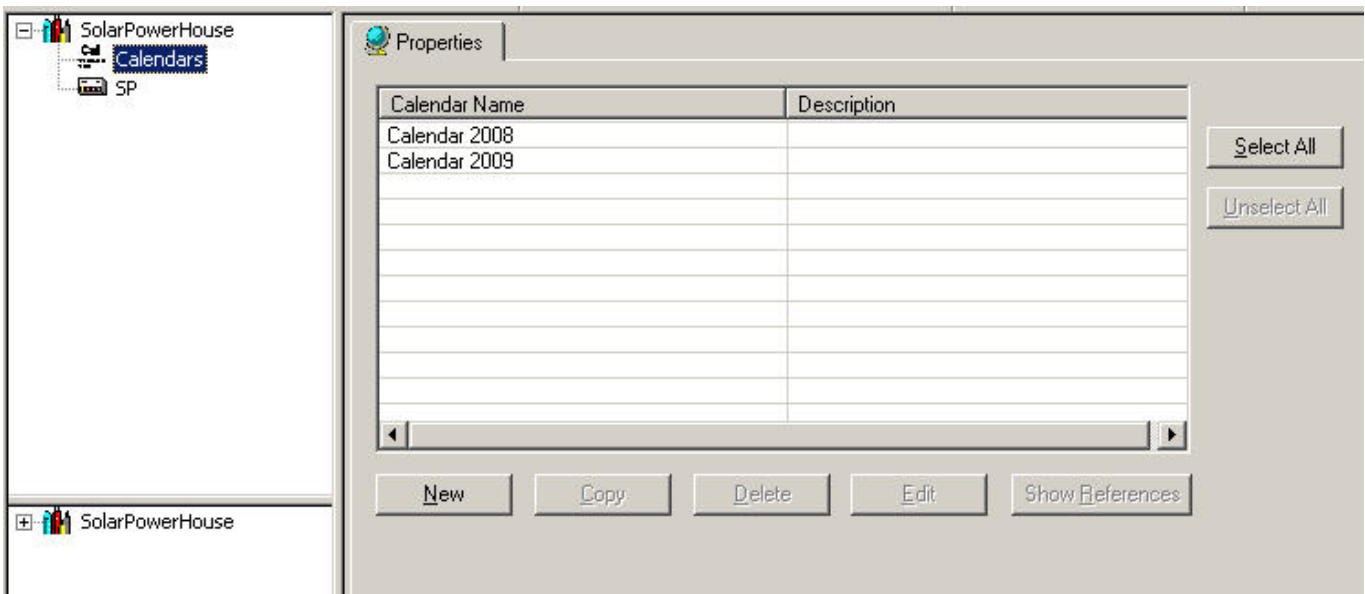
- Procedure** 1. On the Properties tab, highlight the calendar and click the **Show References** button.

RESULT: The *Calendar References* dialog box displays listing all controllers with their referencing schedule (object).



3. Uncheck the calendars you do not want to copy. Re-check calendars you want to copy. You can check all calendars by clicking the check icon on the top and you can uncheck all users by clicking the blank icon on the top.
4. From the Target Project drop-down listbox, select the project to which you want to copy the calendars.
5. Click the **OK** button.

RESULT: The Copy Calendars dialog box is closed. The selected calendars are copied to the target project and can be displayed and edited on the Calendars Properties tab.



LONWORKS ENGINEERING

LONWORKS NETWORK ENGINEERING

Before engineering a LonWorks network, it is strongly recommended to get familiar with LonWorks technology by reading the Excel 50/500 LonWorks Mechanisms Interface Description, form number EN0B-0270 and the relevant Echelon documentation.

Prerequisites

The controller, the plant and the datapoints have been created in the logical plant tree (see the CARE ENVIRONMENT, BASIC STEPS, CONTROLLERS DEFINITION AND MANAGEMENT, PLANTS DEFINITION AND MANAGEMENT and EDITORS chapters).

A LON application running on a LonWorks network is to be engineered in the network tree in interaction with the logical plant tree. LonWorks network engineering may include the following tasks:

- Model physical LonWorks structure by defining a channel structure
- Creation of routers
- Configuration of the network components, e.g. transceiver type for LON-channels, LON network interface, etc., routers
- Logical arrangement of controllers and LON devices
- Editing of the controller network interface by
 - Creating and deleting LON objects
 - Creating and deleting input and output NVs of standard and structured type
 - Creating and Mapping NVs to datapoints
 - Building and assigning value conversion tables
- Assignment of LON devices (Binding)
- Onnet network tuning

Excel 800/500/50 Controller Network Interface

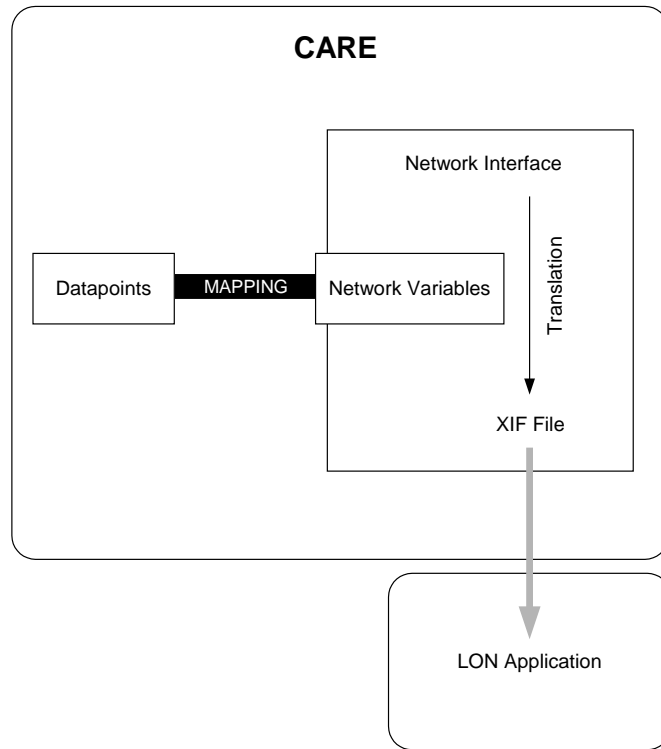
CARE provides all necessary functions to enable a CARE application running on a LonWorks network. The following sections shortly describe the interaction and relation between the "datapoint world of CARE" and the "network variables world of LON".

The network interface provides the information needed for installation and binding. The network interface is composed of the following key elements:

- Node object
- Generic LonMark objects
- Application specific LonMark objects such as sensor, actuator, or controller object
- Network variables
- Configuration parameters

CARE provides the network interface by creating the XIF file (External Interface file) for each controller (device) of the CARE project. The XIF file is automatically generated along with the application translation.

The "interface" between the CARE application and the network interface is implemented via mapping functionality between datapoints and NVs. Mapping can be created manually or automatically within CARE.



Changes on the Controller Network Interface/CARE Application

When using CARE Versions **lower 4.00.00** respectively controller OS versions **lower 2.06**, changes on the controller network interface should be done as little as possible, since it affects the bindings. This means as soon as

- NVs are deleted or added
- Objects are deleted or added
- NVs have been moved between objects
- NV types have been changed
- Input NV has been changed into output NV and vice versa
- NV name has been changed
- Changing the mapping of datapoints to NVs
- NV self documentation has been changed
- Flags have been changed
- Value conversion tables have been added or changed

the network interface (XIF file) will be changed.

IMPORTANT

When using OS 2.04 and downloading an application of which network interface was changed, the bindings will be eliminated and have to be re-done with a separate LON tool. When using OS 2.06 bindings will be kept when changing the network interface and therefore no bindings must be re-done.

NOTE: The program ID will be kept even if the network interface was changed. Then, the LON device template with the program ID must be deleted in the LON tool.

The most actions mentioned above are exclusively applicable in the logical LON-bus part of the network tree. Any changes done in the logical plant tree will not affect the network interface. Thus, the following actions will **not** affect the network interface:

- Changing datapoint names
- Changing time programs
- Changing the datapoint description
- Adding/Deleting or Editing C-Bus datapoints
- Changing control strategies and switching tables

IMPORTANT

*As long as a network interface remains the same, for **OS 2.04** LON applications can be downloaded without elimination of the bindings.*

Using a LNS tool additionally

If a LON network interface has to be changed – because the LON application needs to be changed – when using a LNS tool, the following steps need to be taken:

1. Delete the LON device (controller) in LonMaker®
This means that all bindings will be deleted and gone.
2. Delete the LON template in LonMaker®
Download the changed application into the controller
3. Install a new LON device (controller) in LonMaker® by getting the information from the controller or the XIF file.
4. Re-do all bindings!

If a LON device like a controller has been deleted in LonMaker®, then the controller will restore the LON bindings after 3 minutes automatically, if no new or changed bindings will be done in LonMaker®.

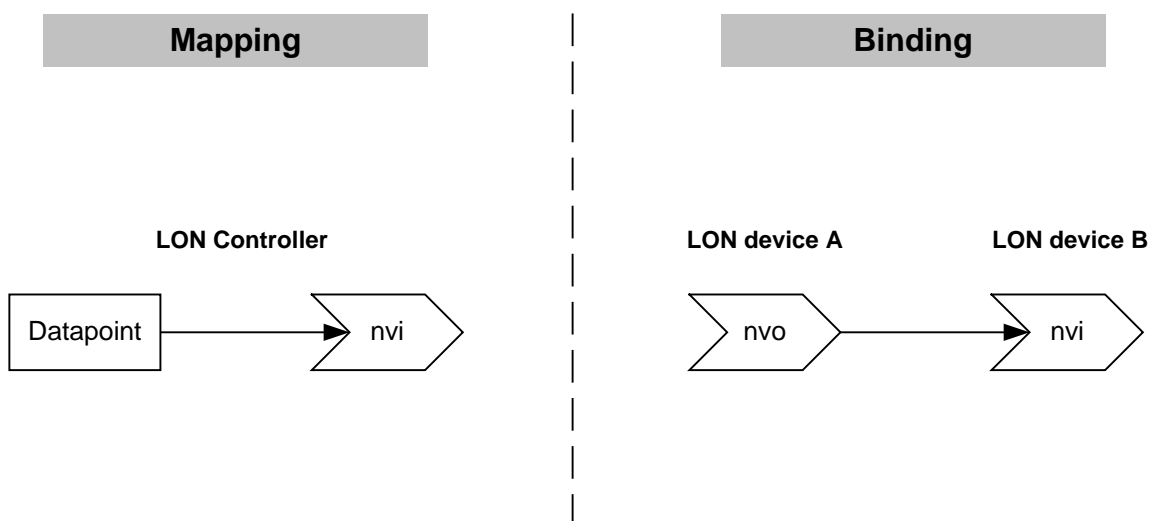
When using **OS 2.06** in CARE the following steps need to be taken in case of necessary interface changes:

1. Translate the controller
2. Download the controller
3. Commission the controller
4. Synchronize with LNS (only when using additional LNS tools)

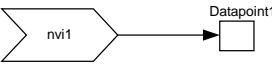
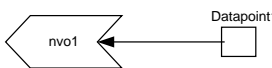
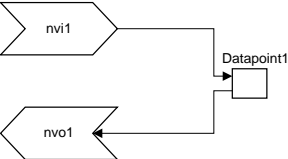
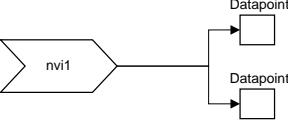
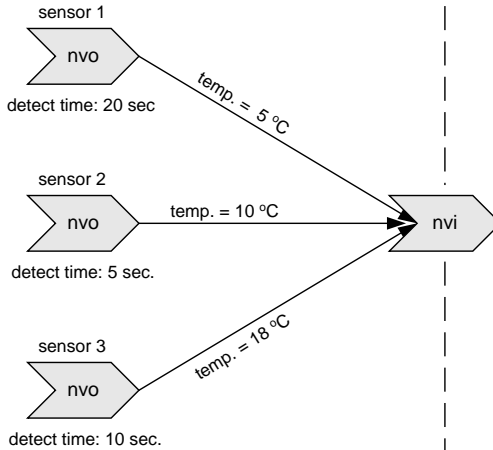
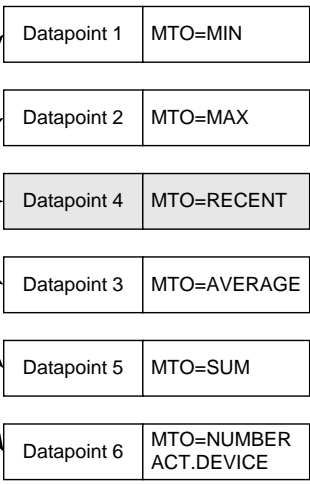
Mapping and Binding

Mapping is the process of assigning a LON network variable (NV) to an Excel 50/500/800 datapoint. Mapping allows the use of LonWorks network information in Excel 800, 500 and 50 datapoints. Mapping has not to be mixed up with Binding.

Binding is defined as the process of interconnecting NVs (devices) on a LonWorks network. This is a standard functionality provided by LON tools and CARE.



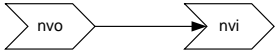
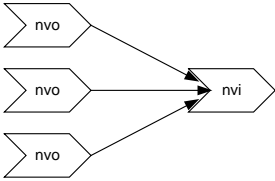
Mapping Types Within CARE the following mapping types are possible:

Mapping Types	
	<p>Software points can be of any type (input and output). Hardware points must be of the same type. Input NVs can also be mapped to multiple datapoints (see Many-to-one mapping).</p>
	<p>Software points can be of any type (input and output). Hardware points must be of the same type. Output NVs can only be mapped to one datapoint.</p>
	<p>Allows to map a maximum of one input NV and one output NV to the same software point.</p>
	<p>For input NVs there are 2 different binding types on the LON part: One-To-One (1-1): The value of the input NV corresponds to the value of one bound output NV Many-To-One (n-1): The value of the input NV corresponds to a mathematical function (recent, min, max, average, sum, or number of devices) of all bound output NVs.</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; background-color: #e0e0e0;"> Binding via LON tool </div> <div style="border-left: 1px dashed black; width: 1px; height: 100%;"></div> <div style="border: 1px solid black; padding: 5px; background-color: #e0e0e0;"> Mapping via CARE </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%; text-align: center;"> <p>LON Devices</p>  </div> <div style="width: 45%; text-align: center;"> <p>LON Controller</p>  </div> </div> <div style="text-align: right; margin-top: 10px; background-color: #e0e0e0; padding: 2px;"> MTO: Many-To-One </div> <p>On the CARE part, an input NV can be mapped to multiple datapoints. For each</p>

Mapping Types	
	<p>mapping one mathematical function out of all possible functions can be applied. However, for all mappings, the same value conversion table is used.</p> <p>The available functions are:</p> <p>None: Default Recent: Latest updated value of all bound output NVs is used Min: Minimum value of all bound NVs is used Max: Maximum value of all bound output NVs is used Average: Arithmetic average of all bound output NVs is calculated Sum: The sum of all incoming values is calculated Number of active devices: The number of active devices that deliver values via their bindings.</p>

The following point types cannot be mapped:

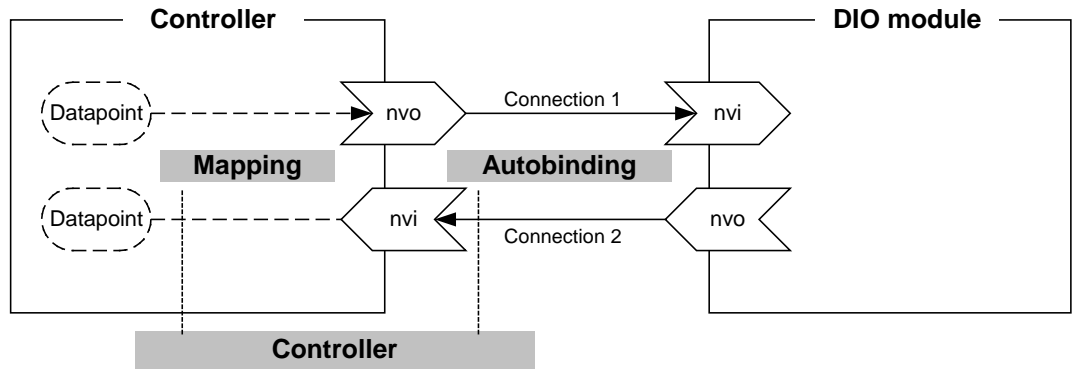
- FF Flex DO_Feedback_DI
- FM Flex Multistage
- FP Flex Pulse2
- GA Global Analog
- GD2 Global Digital 2state
- GDn Global Digital Nstate
- TO Totalizer

Binding Types	
Via LON tool the following two types of binding are possible:	
	<p>One-To-One (OTO): One nvo is connected to one nvi.</p> <p>The value of the input NV corresponds to the value of the bound output NV. This is the Standard binding type.</p>
	<p>Many-To-One (MTO): Multiple output NVs are bound to one input NV and vice versa.</p> <p>This results in the choice to analyze different mathematical calculations of the bound output NVs for the nvi. The value of the input NV corresponds to the chosen mathematical function (in, max, average, sum, recent, number of devices) of all bound output NVs. The results can be transferred to up to many datapoints via point mapping done in CARE.</p>

Regarding the use of distributed I/O modules and additional LON devices with Excel 800, 500 and Smart controllers on a LonWorks network, the following binding mechanisms are possible:

Controller Autobinding

When using an Excel 800, 500 or Smart controller with its distributed I/O modules residing on one physical LON-bus, the controller generates the NVs for the application itself and assigns them to the respective datapoints. After this, the controller also performs the binding of the NVs automatically (Autobinding). Mapping and Autobinding are proprietary to Honeywell. Due to this controller capability, no mapping needs to be done in CARE and no LON tool for manual binding is necessary.



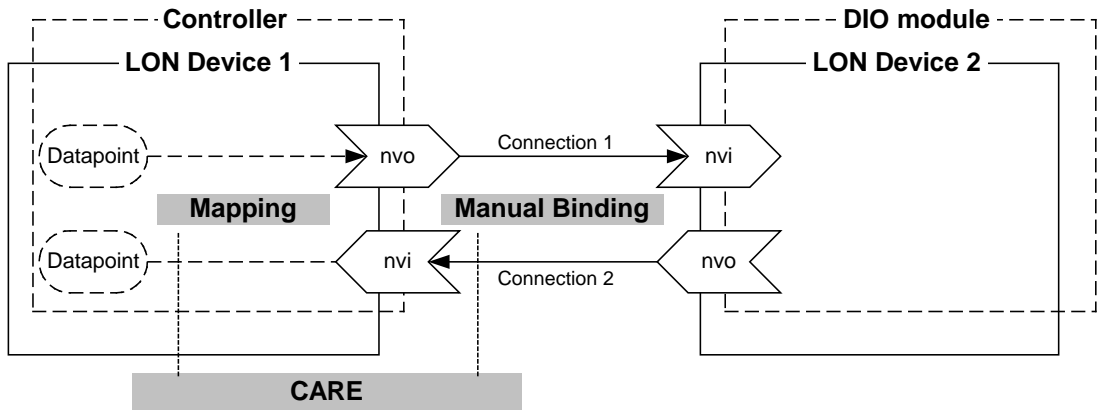
Manual Binding

There are several cases in which it is necessary to manually bind the NVs of the Distributed I/O modules to their respective controller(s).

Autobinding can be used to bind the NVs of a maximum of 16 Distributed I/O modules per controller, only. If the application requires more than 16 Distributed I/O modules per controller, you must use CARE to allocate those additional NVs requiring mapping with data points and bind the NVs of the additional modules to the controller.

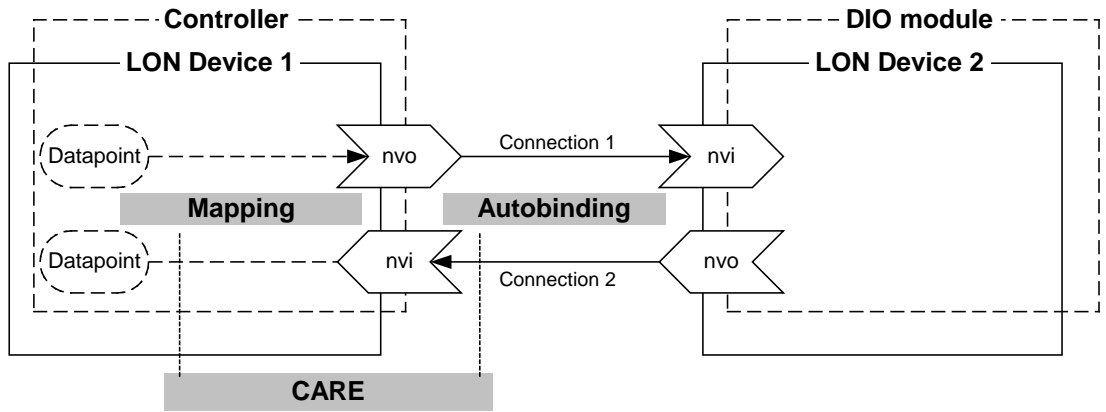
When the NVs of other devices on the LON bus (other than the host Excel 50/500/800 controller) require binding to Distributed I/O modules, autobinding cannot be used.

A LON tool (e.g. CARE) is required to bind all of the Distributed I/O modules' NVs.



CARE Autobinding

In an Open LON configuration, CARE provides the integration of additional Honeywell LON devices other than DIO modules such as the M7410G actuator with LON capabilities and/or 3rd party LON devices. In this case, the DIO modules are not assigned to the controller by autobinding. Instead, all datapoints are boardless as a rule and each DIO module must be assigned to the controller by connecting datapoints of the controller to NVs of the LON device (CARE Autobinding). CARE creates the mapped NVs for the datapoints automatically during the Binding procedure. In addition, matching LON devices can be bound to each other by interconnecting their corresponding NVs.



Design and Configure Network

Purpose To structure the C-bus and LonWorks network according to conditions in the building.

This includes:

- Set global settings (Default LON Properties).
- Creation of a skeletal structure consisting of Default and subsystems
- Physical and logical arrangement of controllers and LON devices in these systems
- Configuration of the network components, e.g. transceiver type for LON-channels, LON network interface, etc.

For information on the BACnet-Bus network structure, please refer to the "BACnet Network Structure" section.

Set Default LON Properties

To set default LON properties, please refer to the "Set Global CARE Options" section.

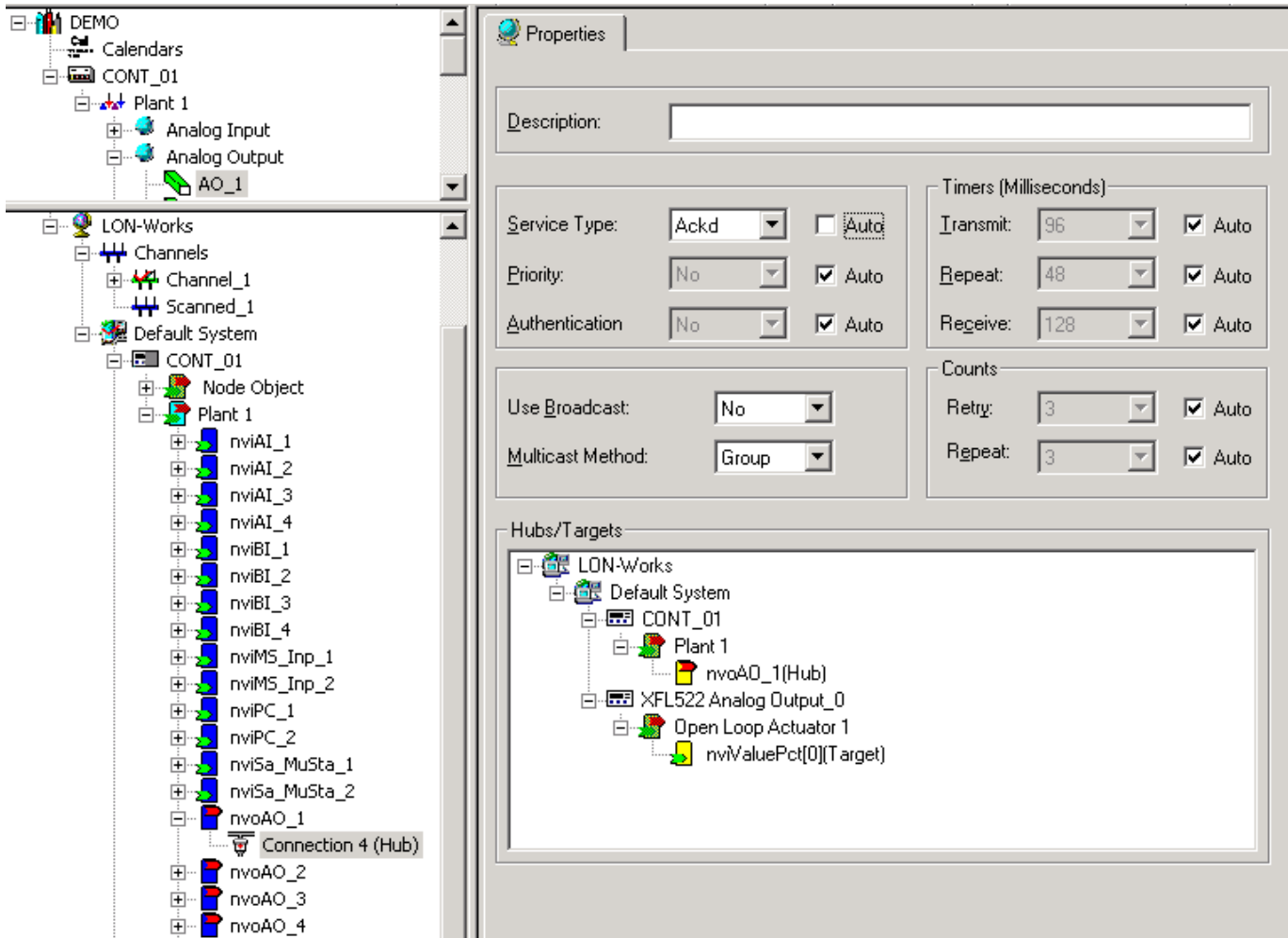
Change Service Type for BACnet Datapoints

Applies to analog, binary and multi-state output point types of the Excel Web controller.

In order to make sure that the Reliability property for the present value works properly, the service type of the point must be set to Acknowledged (Ackd). With acknowledged service, controller - I/O module disconnections are indicated by the relevant reliability 'No Sensor' or 'No Output'.

NOTE: If a large number of outputs (e.g. all outputs of multiple I/O modules) are set to acknowledged service, the performance on the LON bus may drastically decrease.

- Procedure**
1. Expand the LON-bus part of the network tree and navigate to the output point in the plant.

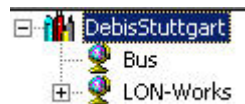


2. Click on the connection.
3. On the Properties tab on the right, uncheck Auto at Service type and select Ackd from the drop-down listbox.

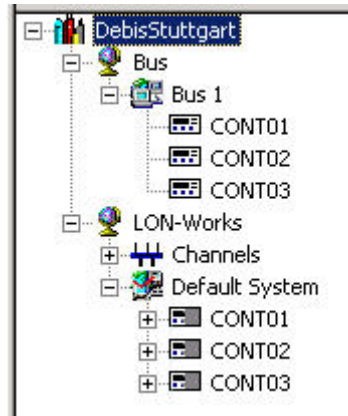
The Default Network Structure

NOTE: For information on the BACnet-Bus network structure, please refer to the "BACnet Network Structure" section.

By default, the network tree shows the two basic bus types, Bus and LON-Works.



Each bus is sub-divided by default to allow an arrangement of the network components according to the physical conditions in the building.



The Bus folder contains the Bus 1 subfolder by default. Further created subfolders will be numbered continuously. The subfolders represent the physical C-Bus network structure of the project and contain the C-bus controllers, which control that segment of the building.



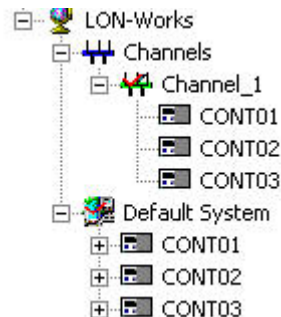
NOTE: The subfolder names are examples and freely editable. For example, the default Bus 1 subfolder can be named into Area1 or Block A.

The LON-Works folder represents the network interface of the LON-Bus and is subdivided by default into a physical part, called Channels and a logical part, called Default System.



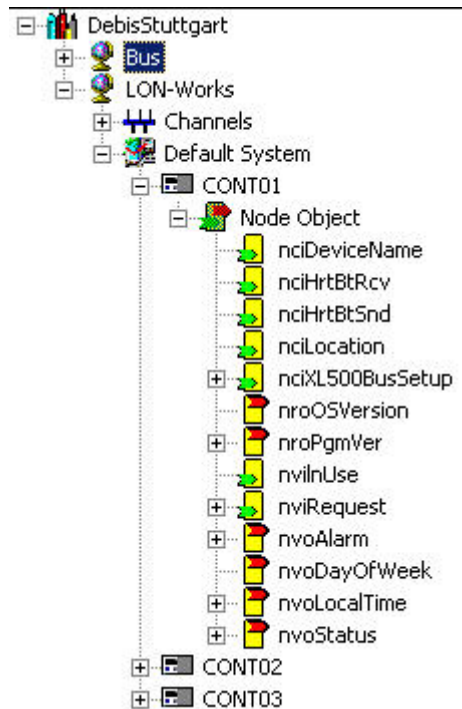
The Channels folder contains the Channel_1 subfolder by default. Additional channels can be created and their names are freely editable.

A channel arranged in the Channels folder, represents the physical medium, for example twisted-pair cable, and lists all LON devices attached to this cable. Controllers can be shifted between channels to model the physical conditions in the building.



The Default System as the top-level system of the logical LON-Bus part provides all software functions necessary to work on LON devices, LON objects, NVs etc. It might contain the following components:

- Subsystems (to be created below the Default System)
- LON devices
- LON objects
- NVs (network variables)
- SCPTs (standard configuration property types)



NOTE: The Default System and subsystems can have further subsystems. Names as "Default System" and "Subsystem" are examples and freely editable.

Create C-Bus Subsystems

NOTE: For information on the BACnet-Bus network structure, please refer to the "BACnet Network Structure" section.

- Procedure**
1. With left mouse key, select the physical Bus folder in the network tree.
 2. Click right mouse key and with left mouse key, click Create Bus in the context menu.



RESULT: The new subsystem folder will be added below the Bus folder, in this case called Bus 2. On the Properties tab on the right pane, the following properties can be defined:

(Sub)System Name
Edit the name, if desired.

C-Bus, C-bus baud rate
If the controllers communicate via physical C-Bus, click the C-Bus radio button and select the C-bus baud rate from the drop-down listbox.

LON-Bus, Bus ID
If the controllers communicate via Building Management Functionality over LON (explicit messaging), click the LON-Bus radio button and select a bus ID from the drop-down listbox. The C-Bus architecture allows max. 30 controllers per physical C-Bus. Hence, a subsystem can include 30 controllers at maximum. For the 31th C-Bus controller a new subsystem must be created.

Remote Host Name
In case you want to download an application remotely, enter the host name or the IP address.

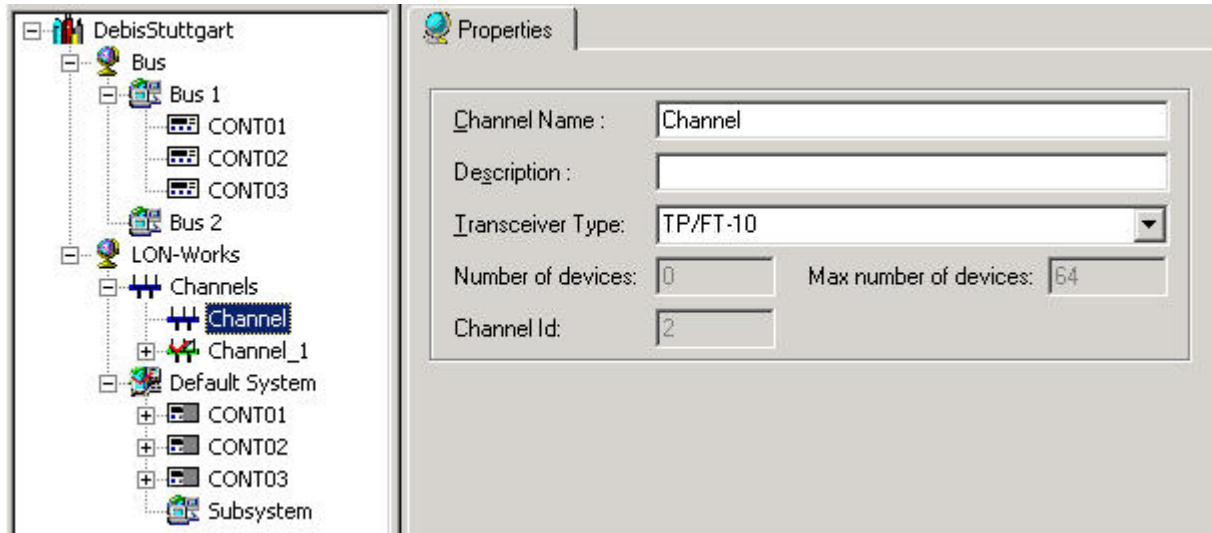
Remote Bus ID
For remote application download, enter the Cbus ID.
To view  the Cbus ID, open the Windows Control Panel and double-click the CBUS  icon on the remote PC (see "Download Application Remotely" section)

3. To position controllers in Bus subsystems, please refer to the Create and Place Controller in the Network tree section.

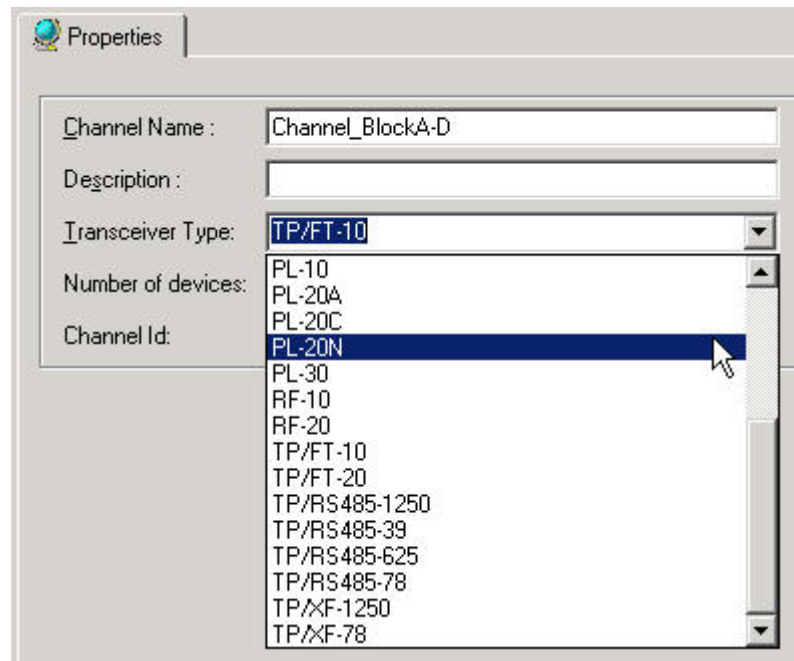
Create Channel

- Procedure**
1. With left mouse key, click on the Channels folder.
 2. Click right mouse key and with left mouse key, click Create Channel in the context menu.

RESULT: The new folder will be added to the Channels folder.



3. On the Properties tab on the right pane, edit the name in the Channel Name field and select the transceiver from the Transceiver Type drop-down listbox.



4. To position controllers in channels, please refer to the Create and Place Controller in the Network tree section.

Connect Channels via Router

IMPORTANT

If two channels are used, they must be connected via router.

Procedure

1. With left mouse key, click on the channel you want to connect via router, respectively on the Default System or a subsystem folder.
2. Click right mouse key and with left mouse key, click Create Router in the context menu.

RESULT: The New Router dialog box displays.

New Router

Router Name :

Router Type :

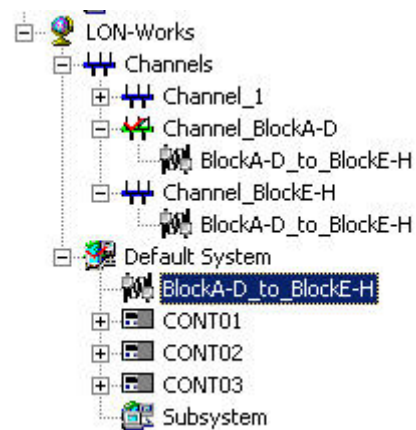
Near Side Channel :

Far Side Channel :

OK Cancel Help

3. Enter the name in the Router Name field and select the Near Side and the Far Side for the router in the corresponding Channel drop-down listboxes.

RESULT: The router is assigned to the Default System, respectively subsystem folder and it appears in each channel.



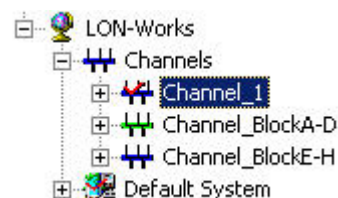
4. In the network tree, click on the router to display router properties on the right pane.

- On the Properties tab, enter description and values for Node Selfdoc String, Ping Interval, Individual Program ID, Location String in ASCII code and the neuron Ids for the Near Side and the Far Side. For detailed descriptions on the items, please refer to relevant Echelon documentation.

Set Default Channel

Purpose To define the default channel where a created controller will be inserted and where a device will be inserted out of the device library when dragging it on the Terminal Assignment tab. The presetting for the channel is "Channel_01". Note that only one single channel can be the default channel. The default channel can also be used as network interface channel (see Set Network Interface Channel section).

- Procedure**
- In the LON-bus part of the network tree, right-click on the Channel and click on Default channel in the context menu.



RESULT: The defined default channel gets a red checkmark . Next time, when creating a controller or dragging a LON device onto the Terminal Assignment tab, it will be inserted into the defined default channel.

Set Network Interface Channel

IMPORTANT

This function is of high importance when using multiple channels, which are connected via routers. Make sure to connect physically to that channel which has been set as the network interface channel in CARE.

Purpose To define the channel via which the CARE PC should connect to the LonWorks network. Note that only one single channel can be the interface channel. The network interface channel can also be used as default channel (see Set Default Channel section).

Procedure 1. In the LON-bus part of the network tree, right-click on the Channel and click on NI Channel in the context menu.



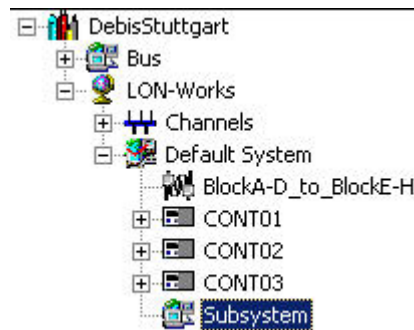
RESULT: The selected channel gets green and is now the interface channel via which CARE connects to the LonWorks network when going Onnet.

Create LON-Bus Subsystems

Purpose To arrange the network components according to the physical conditions in the building.

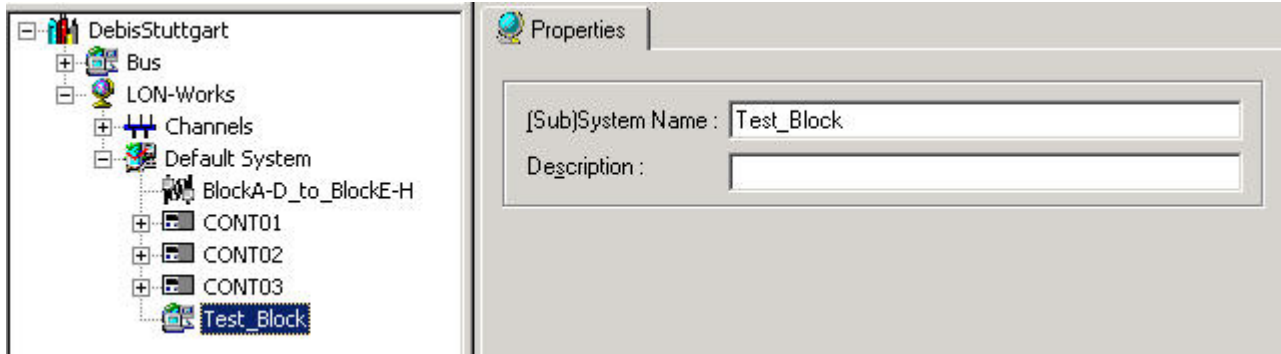
Procedure 1. With left mouse key, select the Default System folder or an existing subsystem folder where you want to create another subsystem for.
2. Click right mouse key and with left mouse key, click Create Subsystem in the context menu.

RESULT: The new subsystem folder will be added to the logical LON-Bus part of the network tree.



3. On the Properties tab on the right pane, edit the name in the (Sub)System Name field, if desired, and click on the created subsystem folder in the logical LON-Bus network tree.

RESULT: The newly named subsystem folder displays.



NOTE: Top-level systems as the Default System and subsystems can have further subsystems.

4. If desired, continue creating further subsystems on the same or lower level by repeating step 1 ff. with the appropriate selected folder you want to create the subsystem for.

Create and Place Controller in the Network tree

When creating a controller, the C-Bus subsystem and the LON-Bus subsystem, where the controller should be placed, can be pre-defined.

Set C-Bus Default

Purpose To define the C-Bus where a created controller should be inserted by default. The presetting for the default system is "Bus 1".

- Procedure**
1. When creating the new controller by menu item Controller and submenu item New, select the default Bus system in the Bus name drop-down listbox.

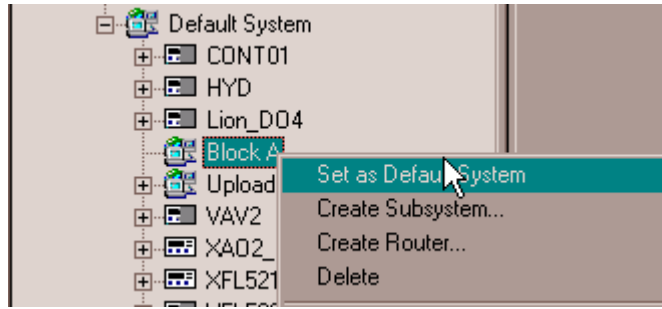


NOTE: After creation of the controller, it can also be moved between different subsystems by Drag&Drop.

Set LON-bus Default System

Purpose To define the LON-bus system where a created controller should be inserted by default. The presetting for the default system is "Default System".

- Procedure**
1. In the LON-bus part of the network tree, right-click on the subsystem folder, in this case Block A, and click on Set as Default System in the context menu.



RESULT: When creating a controller next time, it will be inserted into the folder, defined as default system. The LON-bus default system is indicated by a checkmark.

NOTE: After creation of the controller, it can also be moved between different subsystems by Drag&Drop.

Move Controllers in the Network Tree by Drag&Drop

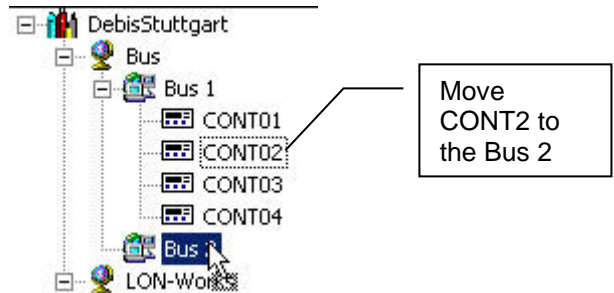
IMPORTANT

*Do not move controllers, which are already bound to other devices. First, move the controller and then do the binding.
When moving controllers between different channels, the channels must be connected via routers.*

In the C-Bus part of the network tree, controllers can be moved between different subsystem folders.

In the logical LON-Bus part of the network tree, controller devices can be moved between the top-level system and/or subsystem folders.

- Procedure**
1. In the source folder, select controller (controller device), drag it to the desired target folder and drop it.



Example 1: Move C-Bus Controller between Bus Subsystems

Configure Channel

Purpose Configuration of the physical part(s) of the LON-Bus includes the naming, description (optional) and the definition of the transceiver type.

Procedure Refer to the Create Channel section.

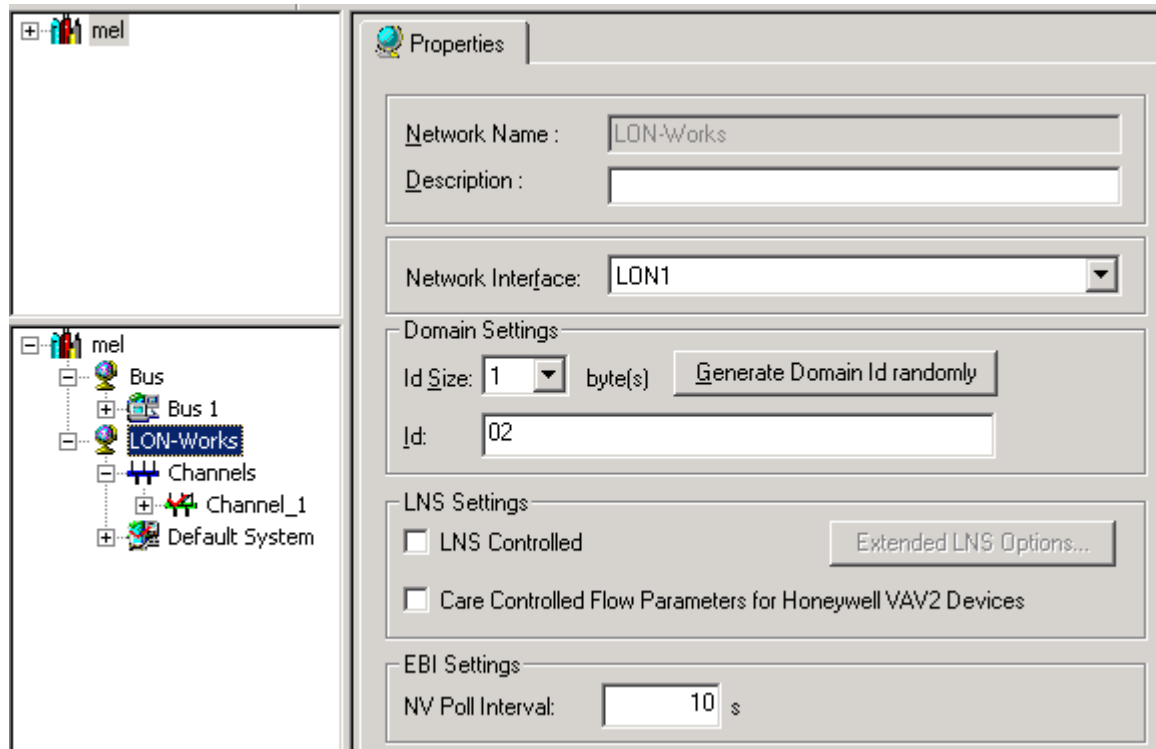
Configure LON-Bus

Purpose Configuring the LON-Bus includes the definition of the:

- network interface type

- domain settings
- LNS settings
- EBI settings.

Procedure 1. In the network tree, click on the LON-Works folder.



2. On the Properties tab on the right pane, select the network interface from the Network Interface drop-down list box.
3. In the Id Size field, set the Id size in bytes format and enter the domain Id into the ID field. If you want to get a randomly generated domain ID, click the Generate Domain ID randomly button. In this case the Id Size previously selected must be higher than 0.
4. Check the LNS Controlled checkbox if you want to enable the LNS Controlled mode which allows the incremental updating of the LNS database with changed information done in CARE. For detailed information on this topic and on the Extended LNS Options button, please refer to the "CARE and LNS" section.
5. Check the **CARE Controlled Flow Parameters for Honeywell VAV2 Devices checkbox** if want to update the LNS database with the current CARE values of the flow parameters 'duct area', 'flow setpoint minimum' and 'flow setpoint maximum'.
6. In the NV Poll Interval, enter the interval in seconds in which all NVs will be polled by the EBI LON point server. For each NV, the poll interval can also be set individually (see "EBI Settings" section).

Configure Lon Interface

CARE supports LON IP Interfaces for the use of IP852 and LonSock Remote Server. Both IP852 and LonSock Remote Server are based on LonSock2 which is the basis for CARE, COACH and ARENA software. CARE allows the administration of LON IP Interfaces by new creation, selection and deletion.


IP852

Allows the direct and remote diagnostic of networks based on IP852 standard. Ideally a router is used as network interface and the mandatory configuration server (CS) service is running in the router.

LonSock Remote Server

Allows remote access to PCs and the Excel Web controller with a shared network interface on which the RNI server is running.

Procedure

1. Click menu item **Lon**, then submenu item **Lon Interface Configuration**, or click  in the configuration toolbar.

RESULT: The *Lon Interface Configuration* dialog box is displayed.

2. To create a new interface, click on desired type, IP-852 or Lon Sock Remote Server in the tree.
3. Click the **New** button,

RESULT: If an IP852 interface is selected, the properties as described in step 4 et seq. are displayed on the right pane for entering the appropriate information.

If a LonSock Remote Server interface is selected, the properties as described in step 8 et seq. are displayed on the right pane for entering the appropriate information.

4. Enter an Interface Name.
5. Enter the Configuration Server Address and Port number (if necessary).
6. Select the Local IP Address and enter the Port number (if necessary).
7. Click **Apply** button, then click **Exit** button.
8. Enter an Interface Name.
9. Enter the LonSock Remote Host Address and Port number (if necessary).
10. Select the Remote Host Address Interface. This interface must be available on the Host PC and the RNI server must be running (shared network interface).
11. Click **Apply** button, then click **Exit** button.

Reset Second Domain

Purpose

To set the second domain to zero for controllers that use two domains such as:

- Excel Web
- Excel 50/500/800 Smart (CentralLine CARE only)

For successful remote commissioning of Excel Web projects created with CARE versions lower than 8.03.00, you must reset the second domain to zero before starting the commissioning.

Procedure

1. Right-click the LonWorks folder in the network tree, and then click Reset Second Domain in the context menu.

RESULT: The second domain is set to zero.

Network Topologies for Excel 800, 500 and Smart Controllers

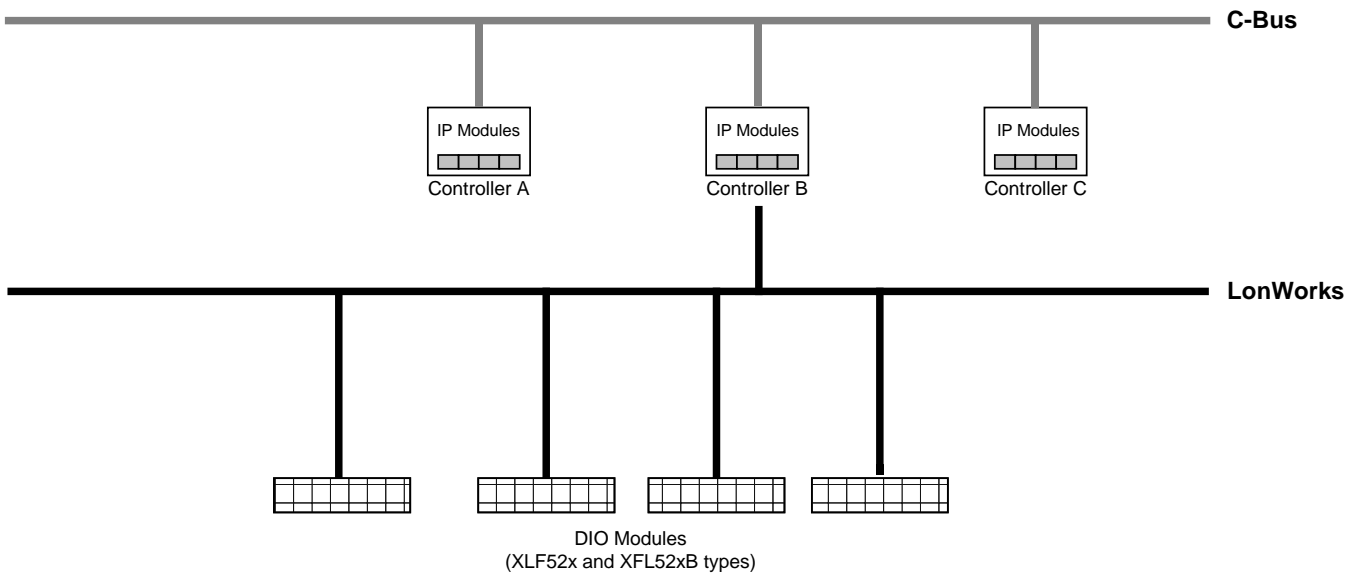
Regarding the use of distributed I/O modules and additional LON devices with Excel 800, 500 and Smart controllers on a LonWorks network, several topologies dependent on the used OS are possible:

Local OS 2.0/2.01 - 2.04

A "Local" topology allows the attachment of just one Excel 500 or Smart controller to its (max. 16) DIO modules on a single LonWorks network. No other devices co-exist on that bus. The DIO modules are assigned to their host Excel 500 or Smart controller automatically, and autobinding is performed. Both, the XFL52x and XFL52xB module types can be used.

NOTE: For OS 2.0/2.1 and OS 2.03, the topology of the LonWorks network is always "Local" although it cannot be selected explicitly when creating a new controller.

Local Topology (OS 2.0/2.01 to 2.04)

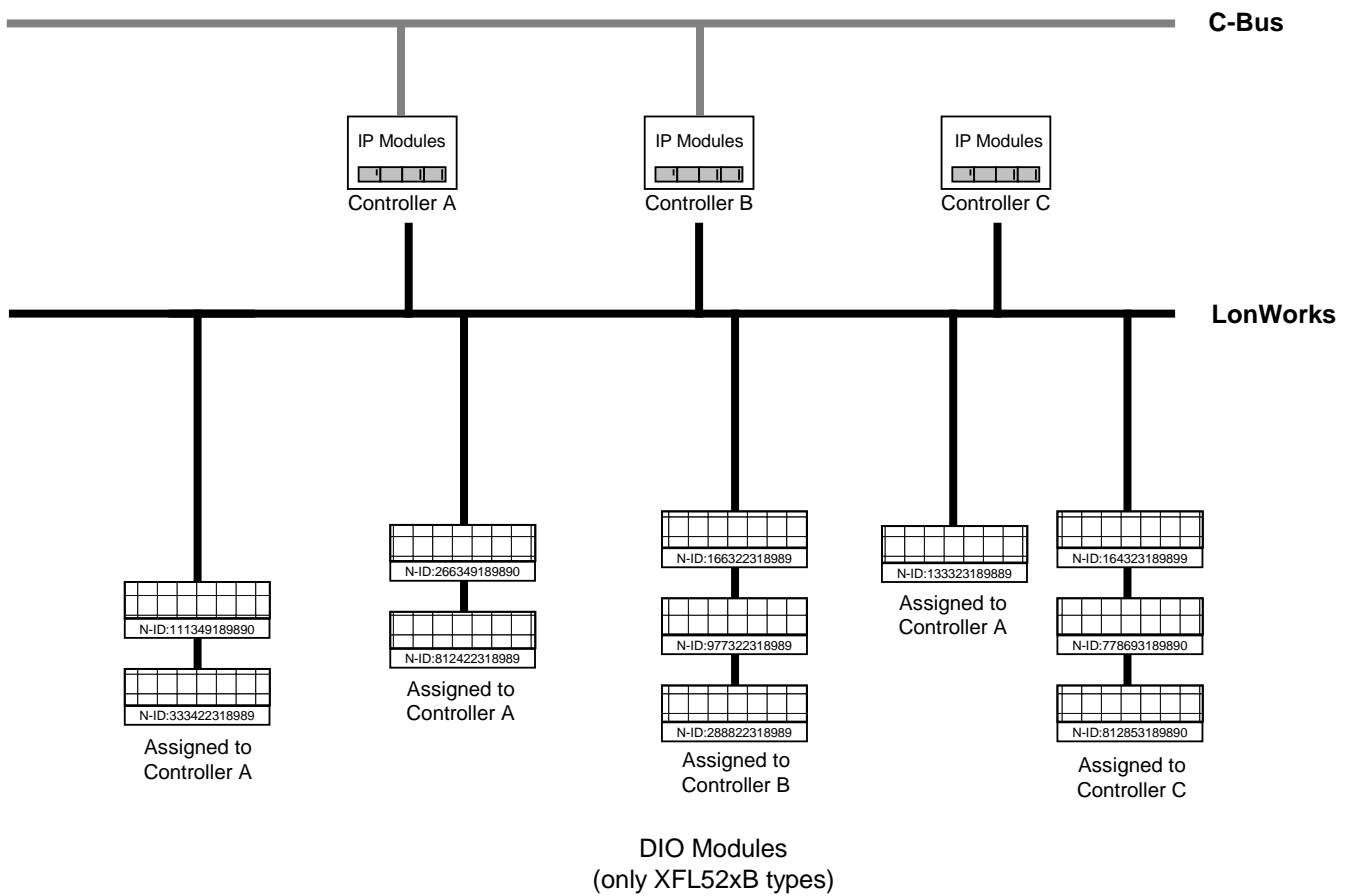


Shared OS 2.04

A "Shared" topology allows the attachment of multiple Excel 500 and Smart controllers to their DIO modules on a single LonWorks network. But, multiple controllers cannot process datapoints on the same DIO module. The Shared topology does not allow the integration of additional 3rd party or other Honeywell LON devices. Autobinding may still be used for the NVs of a maximum of 16 Distributed I/O modules assigned exclusively to the host Excel 500 or Smart controller.

NOTE: It is recommended that you use CARE for assigning the DIO modules to their dedicated Excel 500 or Smart controller by entering the DIO modules' Neuron IDs. The alternative is to assign them using the MMI. Only the XFL52xB module types can be used.

Shared Topology (OS 2.04)



Open LON

OS 2.04

When using OS 2.04, an "Open LON" topology refers to an *interoperable* LONWORKS system in which CARE will be used to generate a LONMARK-compliant network interface file capable of providing NVs which can be bound to other devices (which may include other Excel 500 controllers with their own DIO modules, Excel 50 or Excel 10 controllers, or third-party devices). The NVs of the DIO modules exceeding 16 must be bound manually using a LON tool (an LNS-based tool capable of using Honeywell plug-ins is recommended). For OS 2.04, the "Open LON" operating mode is combined with the "Shared" operating mode to allow multiple controllers with DIO modules and further Open LON devices on a single LonWorks bus (see next section).

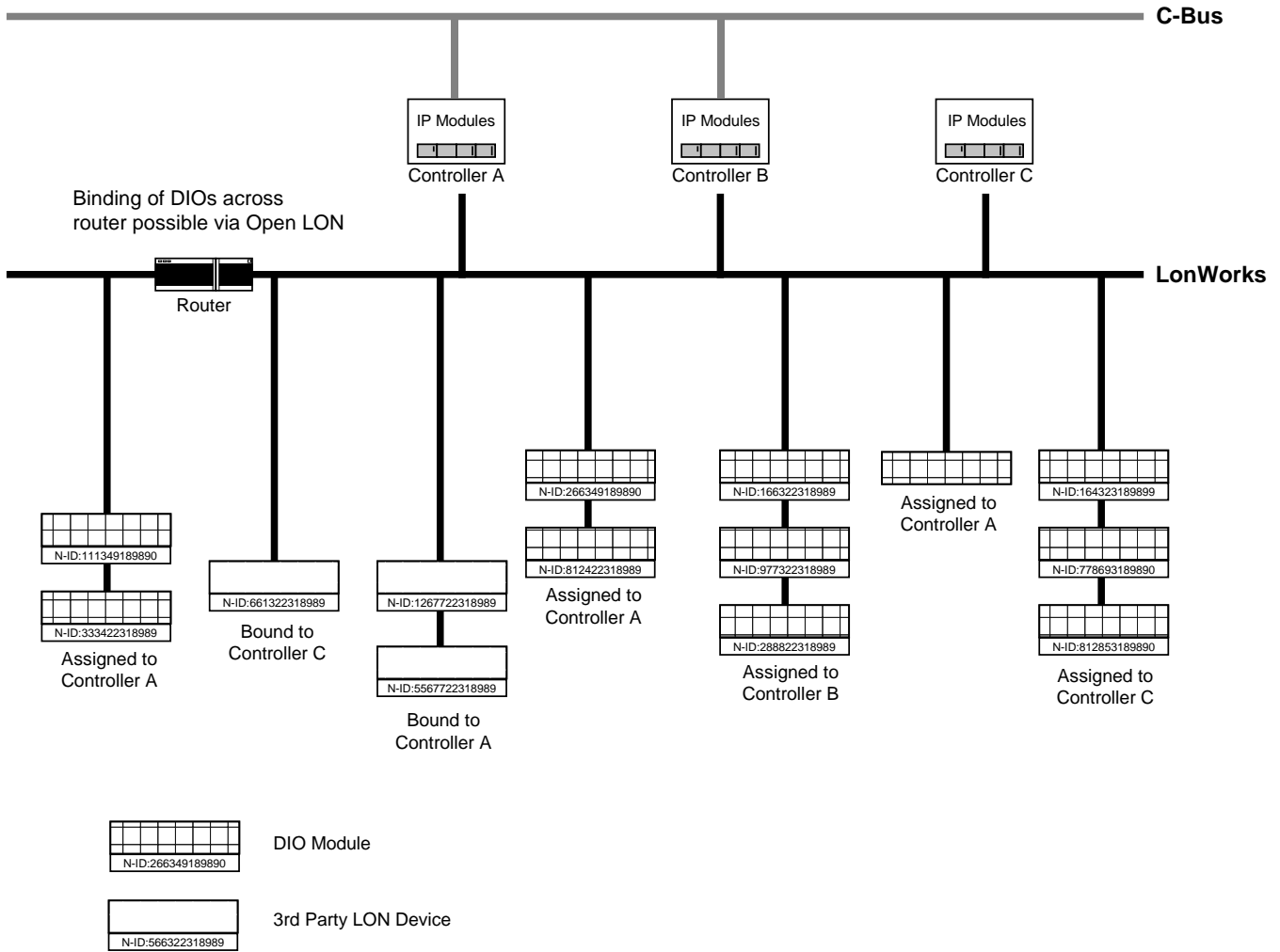
Shared/Open LON

OS 2.04

When using OS 2.04, the "Shared" and the "Open" operating modes can be in effect simultaneously for the integration of additional 3rd party or other Honeywell LON devices. In this case, autobinding is performed for the NVs of a maximum of 16 DIO modules, while the data points of additional DIO modules must be manually mapped with shared NVs and the NVs of the additional DIO modules must be bound manually using an LNS-based tool (Manual Binding).

NOTE: To avoid using a separate software tool for the Binding procedure, it is recommended to integrate Open LON devices by using OS 2.06, since CARE can be used for creating the bindings (CARE Autobinding).

Shared/Open LON Topology (OS 2.04)



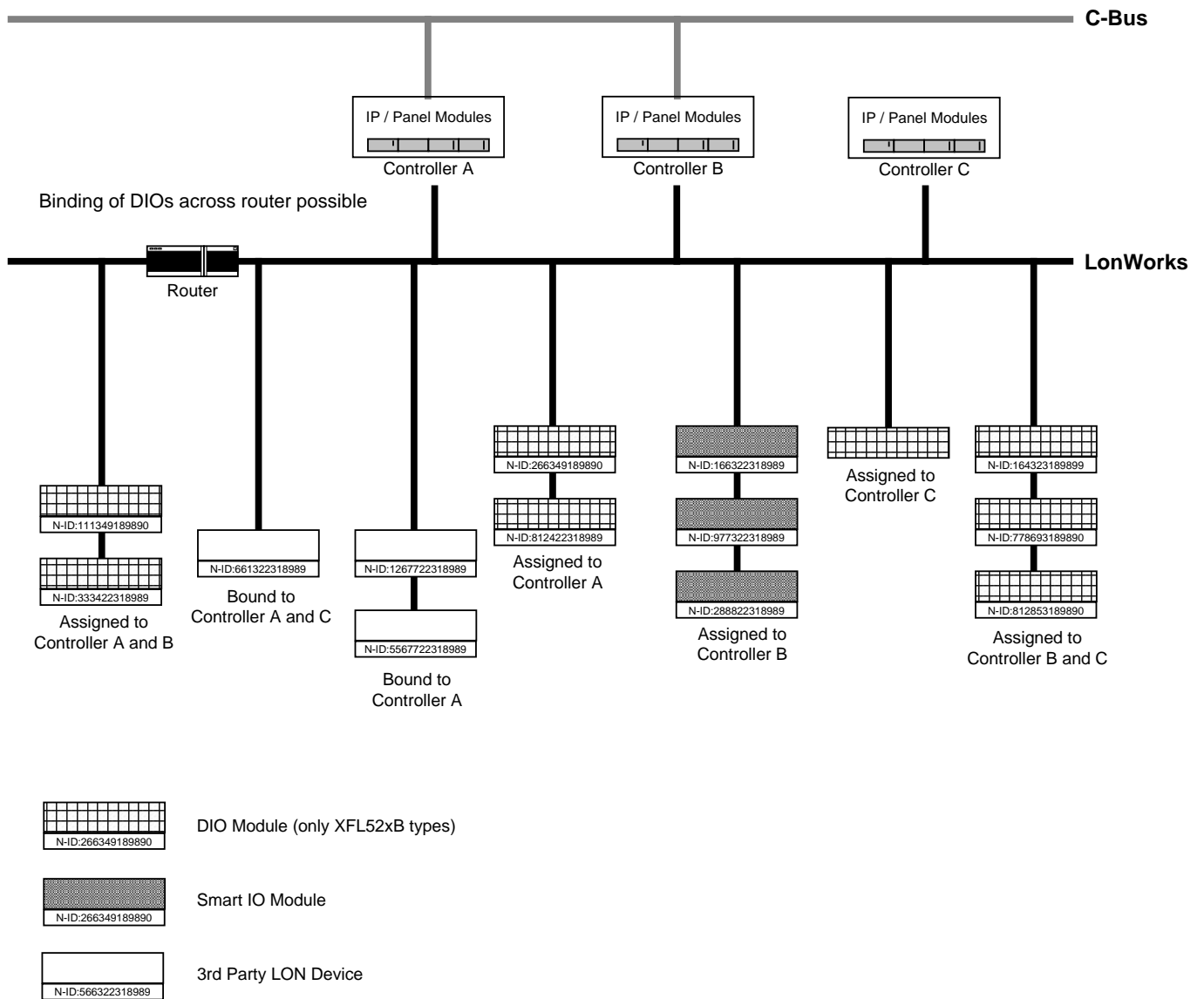
Open LON OS 2.06/3.0

When using OS 2.06 or 3.0, an "Open LON" topology allows an interoperable LONWORKS system in which CARE will be used to generate a LONMARK-compliant network interface file for each device, capable of providing NVs which can be bound to other devices. These devices may include Excel 800, 500 controllers with their DIO modules or Smart I/O modules, Excel 50 or Excel 10 controllers, and additional 3rd party or other Honeywell LON devices such as the Honeywell actuator with LON capabilities. Multiple controllers can process one and the same datapoint/NV on a DIO, Smart I/O module or any other LON device.

The bindings will be done in CARE (CARE Autobinding). For the integration of Honeywell or 3rd party LON devices no separate binding tool such as LonMaker is necessary. The DIO modules will be handled as any other LON device, that is, they must be bound to the controller. Controller Autobinding no longer takes place.

NOTES: For OS 2.06 and 3.0 the DIO modules must be assigned to their Excel 500/800 controller by entering the Neuron ID in CARE. A later assignment via MMI is not possible.

Open LON Topology (OS 2.06 / 3.0)



Excel 500/Smart Controller with DIO Modules on Local Topology

NOTE: Applies to OS 2.0/2.02 - 2.04.

Binding

When using an Excel 500 or Smart controller with its distributed I/O modules in Local topology, the controller performs the Mapping and Autobinding. Due to this controller capability, no mapping needs to be done in CARE and no separate LON tool for binding is necessary.

Physical Assignment

For proper physical assignment of the DIO modules to the single controller, the module address in CARE must match the hex switch setting.

NOTE: NVs generated by the controller cannot be edited within CARE and are not visible in any LON tool.

Excel 500/Smart Controllers with DIO Modules on Shared/Open LON Topology (OS 2.04)

NOTE: Applies to OS 2.04.

Binding As in Local topology, the controllers perform Autobinding. To physically assign the corresponding DIO modules to their dedicated controllers, the following steps have to be done:

Physical Assignment

- Enter Module address according to hex switch setting.
- Enter Neuron ID in TAF (optional). The Neuron ID can also be selected via XI 581/2 later.

Excel 500, 50, 10, Smart Controllers with DIO Modules and other Honeywell / 3rd party LON devices on Shared/Open LON Topology (OS 2.04)

NOTE: Applies to OS 2.04.

Binding To integrate additional LON devices other than distributed I/O modules, the following steps have to be done:

1. In CARE, create LON network interface that fits to the desired Honeywell LON device and 3rd party LON device, respectively, by mapping CARE datapoints to NVs.
2. With a LON tool, e.g. CARE, bind the mapped NVs to the corresponding NVs of the Honeywell and 3rd party LON device, respectively (Manual Binding)

IMPORTANT

When using OS 2.04, the Integration of additional LON devices is only possible in the Shared/Open LON topology.

Excel 800, 500, 50, 10, Smart Controllers with DIO Modules and other Honeywell / 3rd party LON devices on Shared/Open LON Topology (2.06/3.0)

NOTE: This applies to OS 2.06 and 3.0 only.

Logical Assignment

If the system is set to the Open LON topology, CARE 7.03.00 provides the integration of additional Honeywell LON devices other than DIO modules such as the M7410G actuator with LON capabilities and/or 3rd party LON devices. When using Open LON, the DIO modules will be handled as any other LON device. They must be imported from a device library. That is, when using OS 2.06 or 3.0, the DIO modules are not assigned to the controller by controller autobinding. Instead, all datapoints are boardless as a rule and each DIO module must be assigned to the controller by connecting datapoints of the controller to NVs of the LON device (CARE Autobinding). CARE creates the mapped NVs for the datapoints automatically. In addition, matching LON devices can be bound to each other by interconnecting their corresponding NVs.

To bind a LON device to an appropriate Excel controller (Excel 800, 500, 50, 10, Smart) or to another LON device, the following steps have to be done on the Terminal Assignment tab:

1. Import the LON device from the device library.
2. Enter the neuron ID (later assignment via MMI not possible).
3. Depending on the LON device (1) (Excel controller, e.g. DIO module, 3rd party LON device), which the imported LON device should be

connected to, connect the controller datapoints, respectively the NVs of the other LON device (1) with the matching NVs of the imported LON device (2).

Excel 50 on Shared/Open LON Topology

NOTE: Applies to OS 2.04.

The Excel 50 freely programmable controller can be used only in Shared/Open LON Topology. CARE sets this automatically.

Which Target I/O Hardware do you prefer first?

From the CARE point of view, the following table shows the possible Controller - OS – Target I/O hardware combinations for Excel 800, 500 and 50 controllers with LON capabilities:

OS	Possible Target I/O	Controller			
		Excel 800	Excel 500	Excel Smart	Excel 50
2.0/2.01, 2.03	IP (XF5..)	-	x	-	x
	Distributed I/O (XFL5..)	-	x	x	-
	Open LON *	-	-	-	-
2.04	IP (XF5..)	-	x	-	x
	Distributed I/O (XFL5..)	-	x	x	-
	Open LON *	-	x	x	x
2.06	IP (XF5..)	-	x	-	x
	Distributed I/O (XFL5..)	-	x	-	-
	Open LON *	-	x	x	x
3.0	Panel I/O (XF8..)	x	-	-	-
	Distributed I/O (XFL8..)	x	-	-	-
	Open LON *	x	-	-	-

* no physical hardware

As the table shows, the respective controllers can work with a unique hardware configuration of just the same module type or, depending on controller type, with up to three different target hardware types:

- IP modules (Standard) of type XF5.. or Panel I/O modules of type XF8..
- Distributed I/O (DIO) modules of type XFL5.. or XFL8..
- Open LON (boardless points)

CARE Process

Regarding the hardware configuration, the following basic steps in CARE have a decisive influence:

Define controller

Includes the definition of the system architecture in principle, Shared / Open LON or Local.

Define plant

Includes the definition of the preferred target I/O hardware configuration for the plant, IP/Panel I/O, Distributed I/O or Open LON (see IMPORTANT hint).

Attach plant to controller

When attaching the plant(s) to the controller, CARE assigns the hardware points to the corresponding modules as defined for the plant(s) by the target I/O hardware

selection (Preferred Target Hardware in New Plant dialog box). This results in a unique hardware configuration if all plants have the same target I/Os or in a mixed hardware configuration if the plants have different target I/Os.

NOTE: The preferred target I/O hardware configuration selected first can be changed afterwards at any time, either for the plants separately (Plant Properties tab) or in a single step for the complete controller, which affects all plants (Modify Target I/O Hardware on the Controller Properties tab).

IMPORTANT

Note, that setting the preferred target I/O hardware means just a pre-definition of the target hardware. The final configuration needs to be done on the Terminal Assignment Tab.

The following table summarizes the selection of the target I/O hardware and the corresponding assignment on the Terminal Assignment tab.

OS	Physical Target I/O	Preferred Target I/O Modify Target I/O Hardware	Assignment in TAF
2.0/201, 2.03	IP (XF5..)	Standard I/O (IP)	All Points are assigned to IP modules
	Distributed I/O (XFL5..)	Distributed I/O	All Points are assigned to distributed I/O modules
2.04	IP (XF5..)	Standard I/O (IP)	All Points are assigned to IP modules
	Distributed I/O (XFL5..)	Distributed I/O	All Points are assigned to distributed I/O modules
2.06	IP (XF5..)	Standard I/O (IP)	All Points are assigned to IP modules
	Distributed I/O (XFL5..)	Open LON	All* Points are boardless and must be bound manually to distributed I/O modules
	3 rd party LON devices and/or other Honeywell LON devices	Open LON	All* Points are boardless and must be bound manually to NVs of the appropriate LON device
3.0	Panel I/O (XF8..)	Panel I/O	All Points are assigned to Panel I/O modules
	Distributed I/O (XFL8..)	Distributed I/O	All Points are assigned to distributed I/O modules
	3 rd party LON devices and/or other Honeywell LON devices	Open LON	All* Points are boardless and must be bound manually to NVs of the appropriate LON device

Restrictions* Point types which are not supported by Open LON will be assigned to distributed I/O or Standard I/O modules.

Point types not supported by Open LON:

DO	Pulsed Digital Output
FF	Flex DO_Feedback_DI
FM	Flex Multistage
FP	Flex Pulse2
GA	Global Analog
GD2	Global Digital 2state
GDn	Global Digital Nstate
PT	Pseudo Totalizer
TO	Totalizer

Mapping Scenarios for OS 2.04

Assumption	<p>To create a LonWorks network interface for integration of additional LON devices, the following will be assumed:</p> <ul style="list-style-type: none"> • OS 2.04 or higher had been selected • LON topology was set to Shared/Open LON <p>Then, NVs can be mapped to:</p> <ul style="list-style-type: none"> • Physical hardware points (standard I/O or Distributed I/O) • Boardless datapoints (Open LON) • Software points
Using Standard I/O	<p>If a datapoint had been mapped to an NV and standard I/O hardware has been selected as target I/O hardware, this datapoint will have a double assignment, to the IP-bus connection via hardware module and to the LonWorks network connection via NV. For value processing of these kinds of mapped datapoints, please refer to the Data Priority of NVs and Datapoints section.</p>
Using Distributed I/O	<p>If a datapoint had been mapped to an NV and distributed I/O hardware has been selected as target I/O hardware, this datapoint will have a double assignment, to the LonWorks network connection via hardware module and to the LonWorks network connection via NV. For value processing of these kinds of mapped datapoints, please refer to the Data Priority of NVs and Datapoints section.</p>
Using Open LON	<p>For integration of additional LON devices, Open LON is recommended as preferred target hardware. This results in creation of boardless points (see restrictions), which do not belong to any board.</p> <p>Boardless points will have the same behavior as normal hardware points, e.g. Alarming etc.</p> <p>For value processing of mapped datapoints, please refer to the Data Priority of NVs and Datapoints section.</p>
Software Points	<p>Software points can also be mapped to datapoints, but these points are not visible on the Terminal Assignment tab.</p>
Manual Mapping of Distributed I/O Modules	<p>On a Shared/Open LON architecture, distributed I/O modules can be bound to the Excel 500 or Smart controller like any other LON devices.</p> <p>IMPORTANT</p> <p><i>NVs generated by CARE take precedence over NVs generated by the controller during Autobinding. That is, if DIO modules are bound to the controller via Manual Mapping and Binding, Autobinding does not take place.</i></p>

Routers and Repeaters Use

Autobinding will be performed in the Local as well as in the Shared/Open LON architecture. For both topologies, routers restrict autobinding, since DIO modules have to reside within the same router segment as its dedicated controller.

In contrast to routers, autobinding across repeaters is possible.

Routers can be used in a Shared / Open LON topology, if distributed I/Os were manually mapped in CARE and manually bound via LON tool.

Define/Modify Target I/O Hardware Configuration

Purpose Define/Modify I/O hardware module type for Excel 500, Smart and Excel 50 controllers. For the Excel 500 controller, target I/O hardware can be changed for OS Versions 2.0 and higher. For the Excel 800 controller, target I/O hardware can be changed for OS Versions 3.0 and higher. For the Excel 50 and Excel Smart controllers, hardware can be changed only, if OS 2.04 or higher is applied. The target I/O hardware configuration can be changed according to the following table.

Module Type	Excel 500/800	Excel Smart	Excel 50
IP I/O / Panel I/O**	X	-	X
DIO	X	X	-
Open LON* (boardless)	X	X	X

* no physical hardware.

** Panel I/O modules are not applicable to Excel Smart and Excel 50 controllers.

The table shows that for Excel 800/500, the target hardware can be changed from any type to any type, whereas for Excel Smart, only a change from DIO modules to Open LON and vice versa, and for Excel 50 a change from IP I/Os to Open LON and vice versa is possible.

This provides the creation of unique as well as mixed hardware configurations for the controllers. Creating a **unique hardware configuration** means that all plants will be assigned to the same I/O module type, IP/Panel I/O, Distributed I/O, or Open LON. Creating a **mixed hardware configuration** means that IP/Panel I/O modules, Distributed I/O modules, and/or boardless points will reside on the same controller.

NOTE: The preferred target I/O hardware configuration selected first can be changed afterwards at any time, either for the plants separately (Plant Properties tab) or in a single step for the complete controller, which affects all plants (Modify Target I/O Hardware on Controller Properties tab).

IMPORTANT

Note that setting the preferred target I/O hardware means just a pre-definition of the target hardware. The final configuration need to be done on the Terminal Assignment tab.

Restrictions

Certain point types are not supported by Open LON. When using OS 2.04, non-supported types will be put on IP (Excel 500, 50) or distributed I/O modules (Excel 500, Smart), even if Open LON was selected. When using OS 2.06 or 3.0, non-supported types will be indicated in red in the logical plant tree and must be put manually on IP boards or panel I/O boards.

Point types not supported by Open LON:

DO	Pulsed Digital Output
FF	Flex DO_Feedback_DI
FM	Flex Multistage
FP	Flex Pulse2
GA	Global Analog
GD2	Global Digital 2state
GDn	Global Digital Nstate
PT	Pseudo Totalizer
TO	Totalizer

When Distributed I/O was selected for an Excel 500/800 controller and the application contains a point type, which is not supported by distributed I/O modules, these points will be put on standard/panel I/O modules.

IMPORTANT

*When an Excel 500/800 controller is full, that is, the maximum number of modules has been reached, a change in the **plant** target I/O hardware will not be able to create any different module type. Therefore the actual hardware will not change, even if the setting for the plant is changed on the Plant Properties tab. In this case you have to do manual changes via the*

*terminal assignment or set the Controller to the other target I/O hardware that will affect **all** plants.*

Attachment When attaching a plant, CARE assigns all hardware points of the plant to the target I/O hardware that is selected for the plant. The target hardware can be changed for attached as well as for unattached plants.

Define Unique Target I/O Hardware Configuration

Purpose Define unique target I/O hardware modules (Standard I/O / Panel I/O or Distributed I/O, or Open LON) for Excel 500/800, Smart, or 50 controllers.

Procedures This can to be done by selecting the **same** target hardware (Standard I/O / Panel I/O or Distributed I/O, or Open LON) for **any** plants when defining the plants.

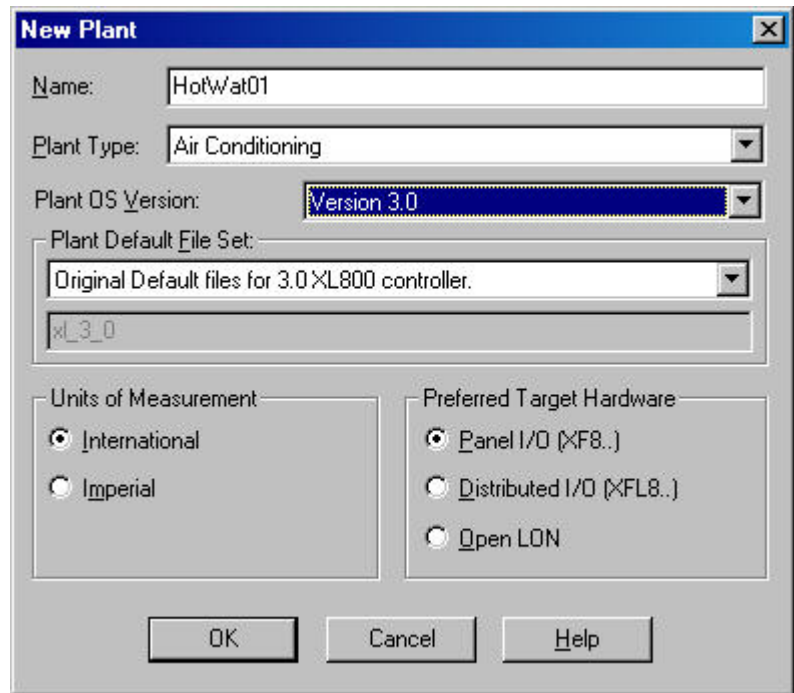
or

by setting the target hardware for a controller to Standard I/O / Panel I/O or Distributed I/O, or Open LON. In this case, the controller has plants with each of two or three module types already attached (see Modify Target I/O Hardware for a Complete Controller section). This affects **all** plants attached to the controller.

Define Plants with Unique Target I/Os1. In the logical plant tree, click on the controller.

2. Click menu item Plant, then drop-down item New.

RESULT: The New Plant dialog box displays.



3. Enter plant name and select plant type.

4. Select OS version. If Distributed I/O modules are used for Excel 500, select OS 2.0 - 2.04. If Open LON is used, select OS 2.06 or higher.

5. Select units of measurement.

6. Under Preferred Target Hardware, select desired hardware by clicking the corresponding radio button:

Standard I/O (XF5..)

(applicable to Excel 500 and 50 with OS 2.0 - 2.06).
Hardware Points of this plant will be assigned to XF5.. modules (IP bus).

Panel I/O (XF8..)
(applicable to Excel 800, OS 3.00 only)
Hardware points of this plant will be assigned to XF8.. modules (panel bus).

Distributed I/O (XF5..)
(applicable to Excel 500 and Smart with OS 2.0 - 2.04).
Hardware Points of this plant will be assigned to XF5.. modules. (LonWorks-bus).

Distributed I/O (XF8..)
(applicable to Excel 800, OS 3.00 only).
Hardware Points of this plant will be assigned to XF8.. modules (LonWorks-bus).

Open LON
Hardware points of this plant will be boardless, that is, unassigned (applicable to Excel 800 OS 3.0, Excel 500, Smart, 50 with OS 2.06 and higher, and Excel 10)

7. Click OK.
8. Select the same target I/O hardware for all other plants you want to define and attach the plants.

RESULT: All hardware points of the plants are assigned to the appropriate hardware modules of the same kind of target hardware.
The points will be attached to existing modules of the selected target hardware first. New modules will be created until the maximum number of I/O modules is reached. If not all points can be attached, the max. number of hardware points has been exceeded.

Restrictions

Certain point types are not supported by Open LON. When using OS 2.04, non-supported types will be put on IP (Excel 500, 50) or distributed I/O modules (Excel 500, Smart), even if Open LON was selected. When using OS 2.06 or 3.0, non-supported types will be indicated in red in the logical plant tree and must be put manually on IP boards.

Point types not supported by Open LON:

DO	Pulsed Digital Output
FF	Flex DO_Feedback_DI
FM	Flex Multistage
FP	Flex Pulse2
GA	Global Analog
GD2	Global Digital 2state
GDn	Global Digital Nstate
PT	Pseudo Totalizer
TO	Totalizer

When Distributed I/O was selected for an Excel 500 / 800 controller and the application contains a point type, which is not supported by distributed I/O modules, these points will be put on standard I/O / Panel I/O modules.

Modify Target I/O Hardware for a Complete Controller

1. In the logical plant tree, click on controller.
2. On the right pane, select the Properties tab.

3. Upgrade the controller, if not already done, by changing the Controller OS Version to Version 2.0 or higher. If the controller is already upgraded, continue with step 4.

Conditions for Changing Target I/O Hardware

For Excel 50 and Excel Smart, OS version have to be 2.04.

For Excel 500, OS version have to be higher than 2.0. For change to Open LON, the OS have to be 2.06 or higher.

4. When using OS 2.04 for Distributed I/O modules select topology Shared/Open LON or Local, by clicking desired radio button.
5. Under Modify Target I/O Hardware click the desired button:

Standard I/O (XF5..)

(applicable to Excel 500 and 50 with OS 2.0 - 2.06).

Hardware points of this plant will be assigned to XF5.. modules (IP bus).

Panel I/O (XF8..)

(applicable to Excel 800, OS 3.00 only)

Hardware points of this plant will be assigned to XF8.. modules (panel bus).

Distributed I/O (XF5..)

(applicable to Excel 500 and Smart with OS 2.0 - 2.04).

Hardware points of this plant will be assigned to XF5.. modules. (LonWorks-bus).

Distributed I/O (XF8..)

(applicable to Excel 800, OS3.00 only).

Hardware points of this plant will be assigned to XF8.. modules (LonWorks-bus).

Open LON

Hardware points of this plant will be boardless, that is, unassigned (applicable to Excel 800 OS 3.0, Excel 500, Smart, 50 with OS 2.06 and higher, and Excel 10).

RESULT: All plants will be automatically detached and the plant automatically reattached to the selected target hardware. All datapoint attributes remain unchanged except the technical address.

Restrictions

Certain point types are not supported by Open LON. When using OS 2.04, non-supported types will be put on IP (Excel 500, 50) or distributed I/O modules (Excel 500, Smart), even if Open LON was selected. When using OS 2.06 or 3.0, non-supported types will be indicated in red in the logical plant tree and must be put manually on IP boards or panel I/O boards.

Point types not supported by Open LON:

DO	Pulsed Digital Output
FF	Flex DO_Feedback_DI
FM	Flex Multistage
FP	Flex Pulse2
GA	Global Analog
GD2	Global Digital 2state
GDn	Global Digital Nstate
PT	Pseudo Totalizer
TO	Totalizer

When Distributed I/O was selected for an Excel 800/500 controller and the application contains a point type, which is not supported by distributed I/O modules, these points will be put on standard I/O / panel I/O modules.

Define Mixed Target Hardware Configuration

Purpose

Define mixed target I/O hardware configuration (Standard I/O / Panel I/O and/or Distributed I/O, and/or Open LON) for Excel 800, 500, Smart, or 50 controllers. Possible configurations depend on controller type and OS version.

Procedures

This can to be done by selecting **different** target hardware (Standard I/O / Panel I/O, Distributed I/O, or Open LON) for plants when defining the plants

or

by modifying the target hardware of plants already defined and attached

or

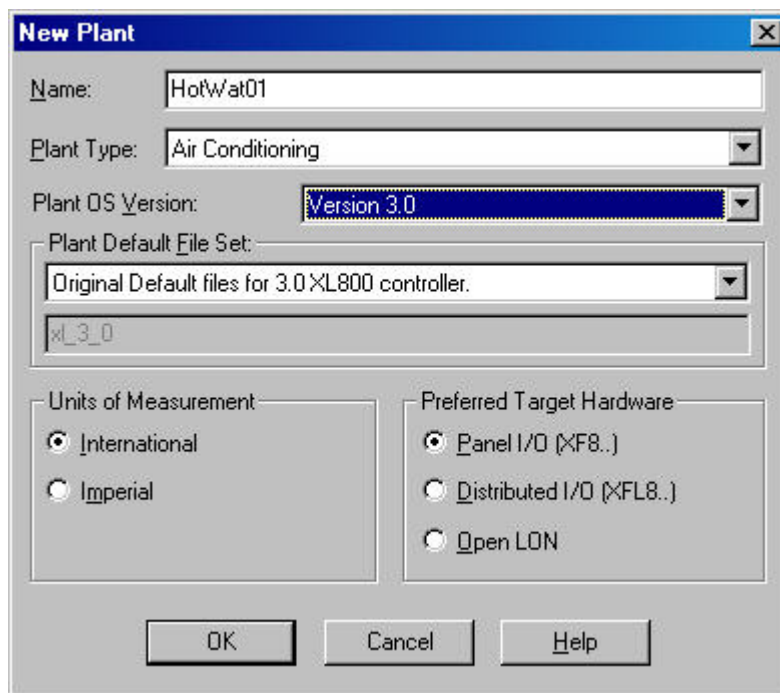
by modifying modules to a different type and/or swapping points between different module types by using the terminal assignment function (see TERMINAL ASSIGNMENT chapter).

Define Plants with Different Target I/Os1.

In the logical plant tree, click on controller, you want to create the plant for.

2. Click menu item Plant, then drop-down item New.

RESULT: The New Plant dialog box displays.



3. Enter the plant name and select plant type.
4. Select OS version. If Distributed I/O modules are used, select OS 2.0 - 2.04. If Open LON is used, select OS 2.06 or higher.
5. Select units of measurement.
6. Under Preferred Target I/O select desired target I/O hardware by clicking the corresponding radio button:

Standard I/O (XF5..)
 (applicable to Excel 500 and 50 with OS 2.0 - 2.06).
 Hardware Points of this plant will be assigned to XF5.. modules (IP bus).

Panel I/O (XF8..)
 (applicable to Excel 800, OS 3.00 only)
 Hardware points of this plant will be assigned to XF8.. modules (panel bus).

Distributed I/O (XF5..)
 (applicable to Excel 500 and Smart with OS 2.0 - 2.04).
 Hardware Points of this plant will be assigned to XF5.. modules. (LonWorks-bus).

Distributed I/O (XF8..)
 (applicable to Excel 800, OS 3.00 only).
 Hardware Points of this plant will be assigned to XF8.. modules (LonWorks-bus).

Open LON
 Hardware points of this plant will be boardless, that is, unassigned (applicable to Excel 800 OS 3.0, Excel 500, Smart, 50 with OS 2.06 and higher, and Excel 10)

7. Click OK.
8. For further plant(s), select different target I/O hardware and attach the plants.

RESULT: The hardware points of the plants will be assigned to existing hardware modules of the selected target hardware. New modules will be created until the maximum number of I/O modules is reached. If this limit is reached, remaining points

will be attached to eventually existing free terminals on modules of the different hardware type.

If all points can still not be attached, the max. numbers of hardware modules and points respectively have been exceeded. In this case, reduce the number of hardware points to the maximum number of available hardware points for the particular hardware modules.

Restrictions Certain point types are not supported by Open LON. When using OS 2.04, non-supported types will be put on IP (Excel 500, 50) or distributed I/O modules (Excel 500, Smart), even if Open LON was selected. When using OS 2.06 or 3.0, non-supported types will be indicated in red in the logical plant tree and must be put manually on IP boards or panel I/O boards.

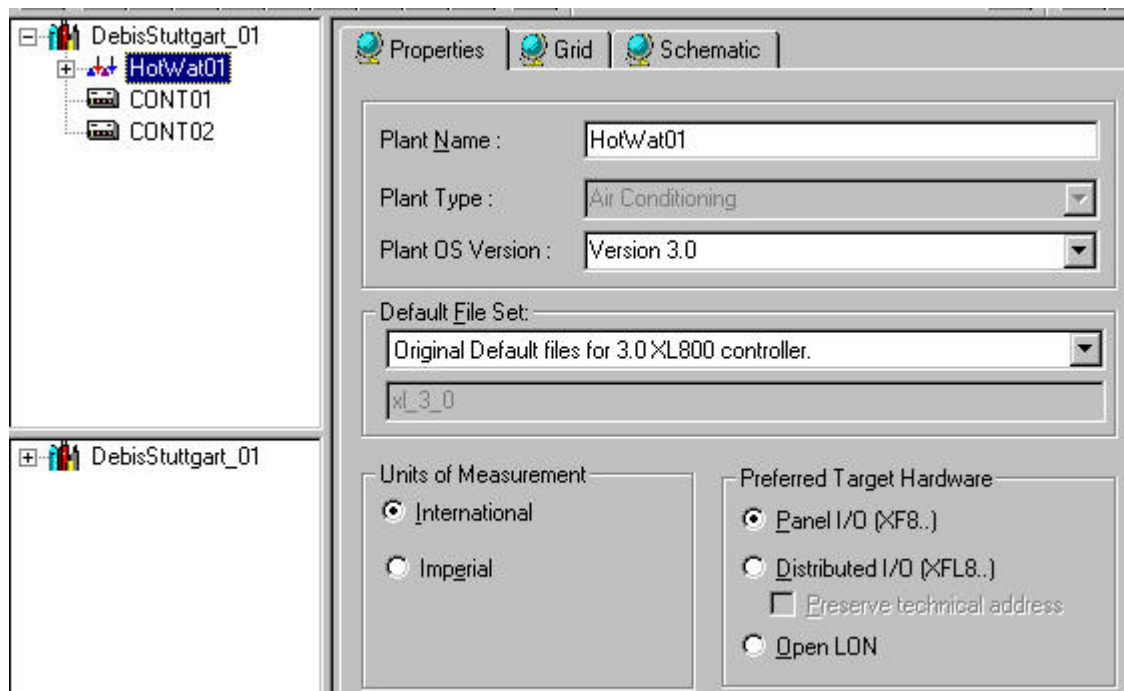
Point types not supported by Open LON:

DO	Pulsed Digital Output
FF	Flex DO_Feedback_DI
FM	Flex Multistage
FP	Flex Pulse2
GA	Global Analog
GD2	Global Digital 2state
GDn	Global Digital Nstate
PT	Pseudo Totalizer
TO	Totalizer

When Distributed I/O was selected for an Excel 500/800 controller and the application contains a point type, which is not supported by distributed I/O / Panel I/O modules, these points will be put on standard I/O modules / panel I/O modules.

Modify Target I/O Hardware for a Plant

1. In the logical plant tree, click on the plant.
2. Click on the Properties tab on the right.



3. Under Preferred Target Hardware select desired target hardware:

Standard I/O (XF5..)

(applicable to Excel 500 and 50 with OS 2.0 - 2.06).

Hardware points of this plant will be assigned to XF5.. modules (IP bus).

Panel I/O (XF8..) (applicable to Excel 800, OS 3.00 only)
Hardware points of this plant will be assigned to XF8.. modules (panel bus).

Distributed I/O (XF5..) (applicable to Excel 500 and Smart with OS 2.0 - 2.04).
Hardware points of this plant will be assigned to XF5.. modules. (LonWorks-bus).

Distributed I/O (XF8..) (applicable to Excel 800, OS 3.00 only).
Hardware points of this plant will be assigned to XF8.. modules (LonWorks-bus).

Preserve technical address refers to modification of the target hardware via the standard I/O and distributed I/O radio buttons, if point changes in the TAF have already been made before (only applies to Excel 500 controller OS Versions 2.0 and higher).

Enabling this checkbox when changing the target hardware results in the following:

Points that are already assigned to that target hardware type, which will be changed to, preserve their technical address on the corresponding module.

Disabling this checkbox when changing the target hardware results in the following:

Points that are already assigned to that target hardware type, which will be changed to, may lead to a change of the technical address on the corresponding module. The Attach process optimizes for best use of modules.

5. Click **OK** to confirm.

RESULT: An attached plant will be automatically detached and the plant automatically attached to the selected target hardware.

Restrictions

Certain point types are not supported by Open LON. When using OS 2.04, non-supported types will be put on IP (Excel 500, 50) or distributed I/O modules (Excel 500, Smart), even if Open LON was selected. When using OS 2.06 or 3.0, non-supported types will be indicated in red in the logical plant tree and must be put manually on IP boards or Panel I/O boards.

Point types not supported by Open LON:

DO	Pulsed Digital Output
FF	Flex DO_Feedback_DI
FM	Flex Multistage
FP	Flex Pulse2
GA	Global Analog
GD2	Global Digital 2state
GDn	Global Digital Nstate
PT	Pseudo Totalizer
TO	Totalizer

When Distributed I/O was selected for an Excel 500/800 controller and the application contains a point type, which is not supported by distributed I/O modules, these points will be put on standard I/O modules / Panel I/O modules.

IMPORTANT

*When an Excel 500/800 controller is full, that is, the maximum number of modules has been reached, a change in the **plant** target I/O hardware will not be able to create any different module type. Therefore the actual hardware will not change, even if the setting for the plant is changed on the Plant Properties tab. In this case you have to do manual changes via the terminal assignment or set the Controller to the other target I/O hardware that will affect **all** plants.*

Data Priority of NVs and Datapoints

This section describes the priority between the network variables and the datapoints in the application. A valid network input value always has priority over the value from a sensor or switch wired directly to the controller or the values from the internal control algorithm or Time Program.

When a network input variable is not bound and its value is INVALID, then the value is ignored and the value from the local sensor/switch, the control algorithm, or the Time Program is written to the datapoint.

When a network input variable is not bound and has valid data, then the data is written to the mapped datapoint. The datapoint will then work in the Manual mode, and values from the internal algorithm, Time Program, or local sensor/switch are ignored.

When a network input variable is bound and its value is INVALID, then the value is ignored and the value from the local sensor/switch, the control algorithm, or the Time Program is written to the datapoint.

When a network input variable is bound and has valid data, then the data is written to the mapped datapoint. The datapoint will then work in Auto mode, and values from the internal algorithm, Time Program, or local sensor/switch are ignored.

When a network input variable is bound and reports NO RESPONSE (sending device or communication failure), then the latest value from the network is written to the mapped datapoint. The datapoint will then work in Auto mode, and values from the internal algorithm, Time Program, or local sensor/switch are ignored.

Enter Program ID

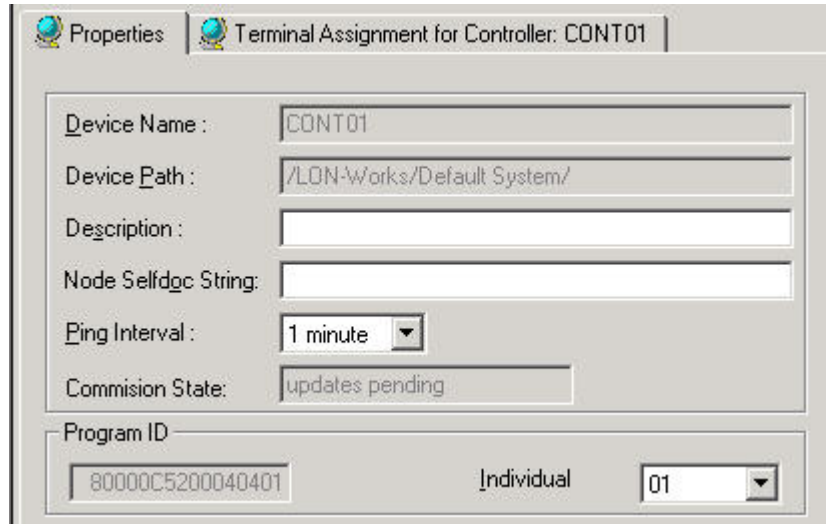
Purpose The program ID is provided in the XIF file and is used by a network management tool to identify the type of device (network interface). The program ID is a unique ID for one special type of device. The same device type can be used multiple times within one project; the program ID will then be the same for every device. When using different devices having different network interfaces in one or more projects, the program ID has to be different.

The program ID consists of two parts. One part is calculated due to controller type related data. The second part consists of an offset you can enter for the project, and the controller number that is freely editable.

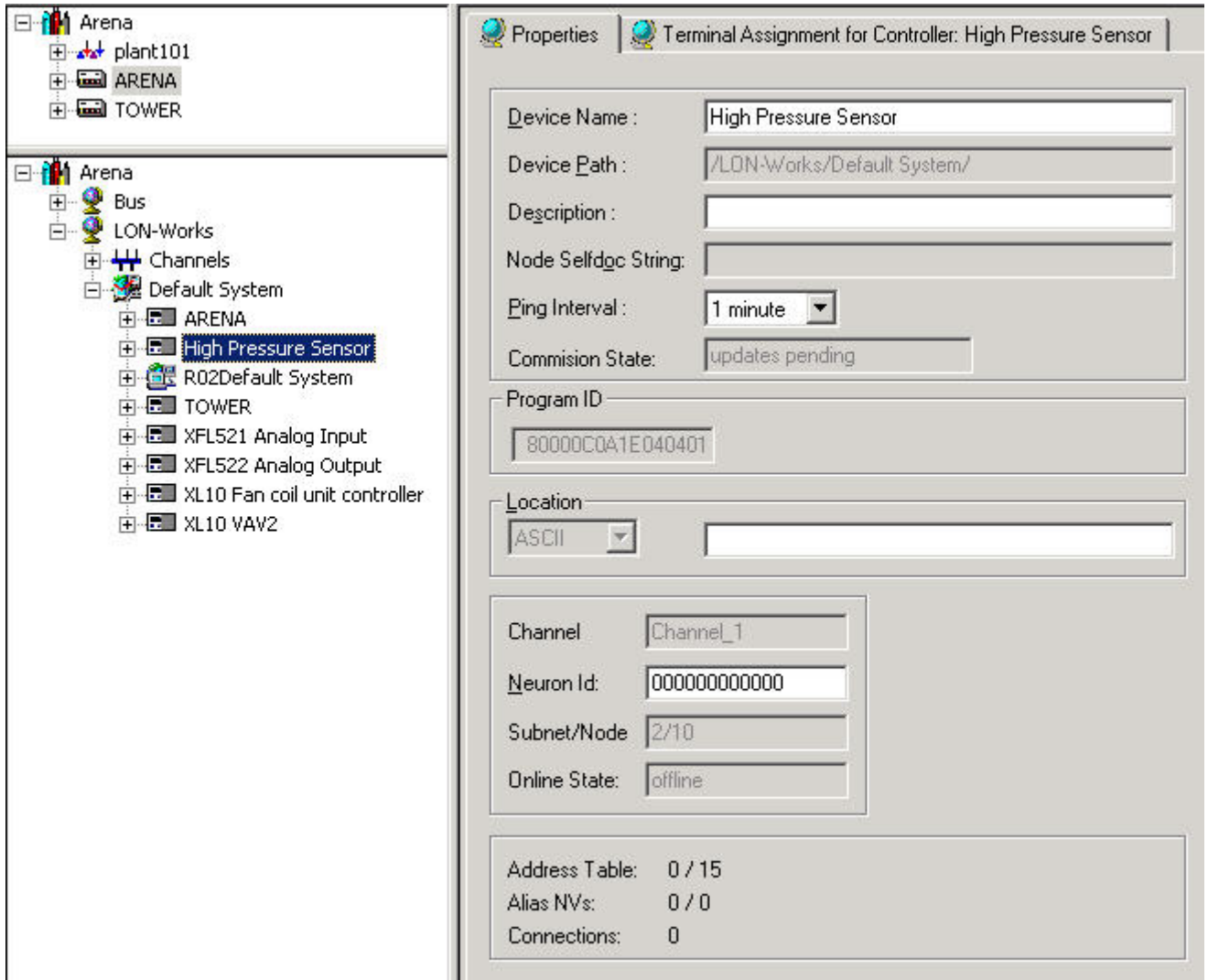
Procedure

1. Enter project Offset as described in the Enter Project Offset section.
2. In the logical LON-bus part of the tree, click on the controller.

RESULT: On the Properties tab on the right, the calculated part of the program ID is displayed in the Program ID field.



- By default the controller number is taken over and displayed in the Individual drop-down listbox at the right. Select desired value (optional).



Assign LON devices (Binding)

The assignment of LON devices will be performed on the Terminal Assignment tab by interaction between the logical plant tree and the logical LON-bus part of the network tree.

Click on Terminal Assignment tab to display assigned

From logical plant tree, these two CARE datapoints are connected (bound) by Drag&Drop to

These two LON devices are assigned to CONT01

In logical LON bus part of network tree, double-click on (controller) device (CONT01), to display assigned devices

The assignment of LON devices includes two main steps:

1. Add LON device to the network
2. Connect CARE datapoints, respectively NVs to NVs (Binding)

Add LON Device to the Network

To add LON devices to the network, they will be imported out of a device library. In this device library you can:

- Create new devices
- Import devices via XIF file or Online
- Copy devices
- Rename devices
- Delete devices

Procedure

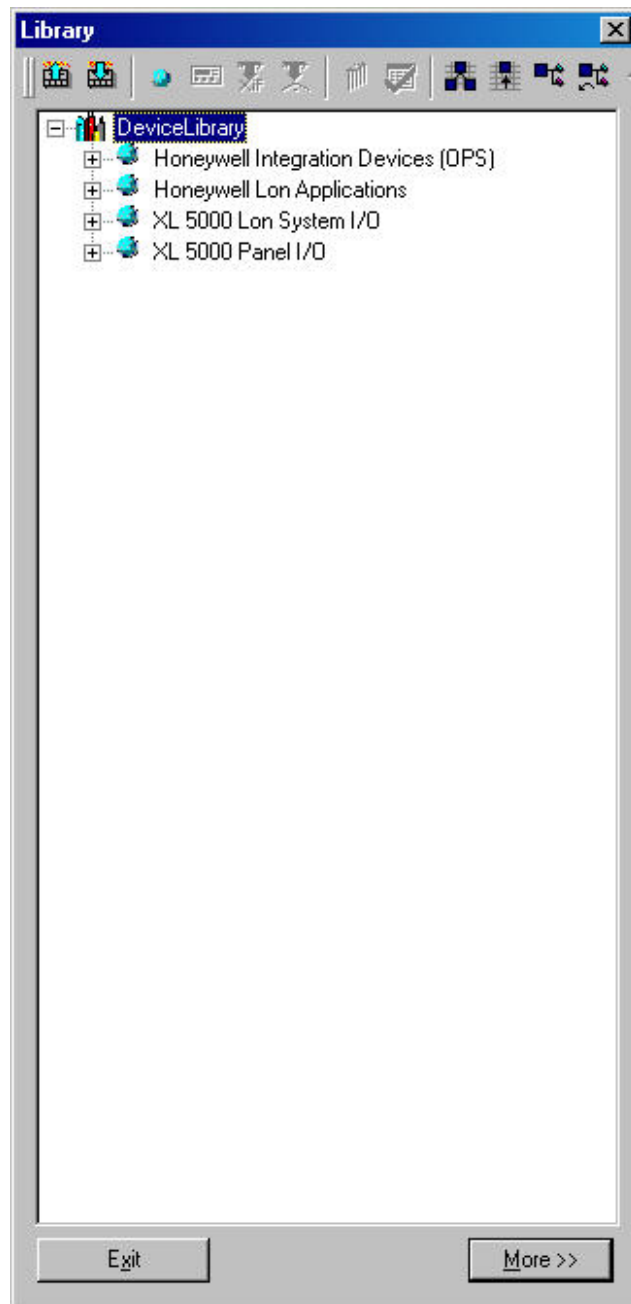
1. In the logical LON-Bus part of the network tree, double-click on the LON device, e.g. controller device, you want to assign a LON device to.



RESULT: The controller is highlighted in yellow.

2. On the right pane, select the Terminal Assignment tab.
3. On the Terminal Assignment pane, click right mouse key, then click Device Library in the context menu.

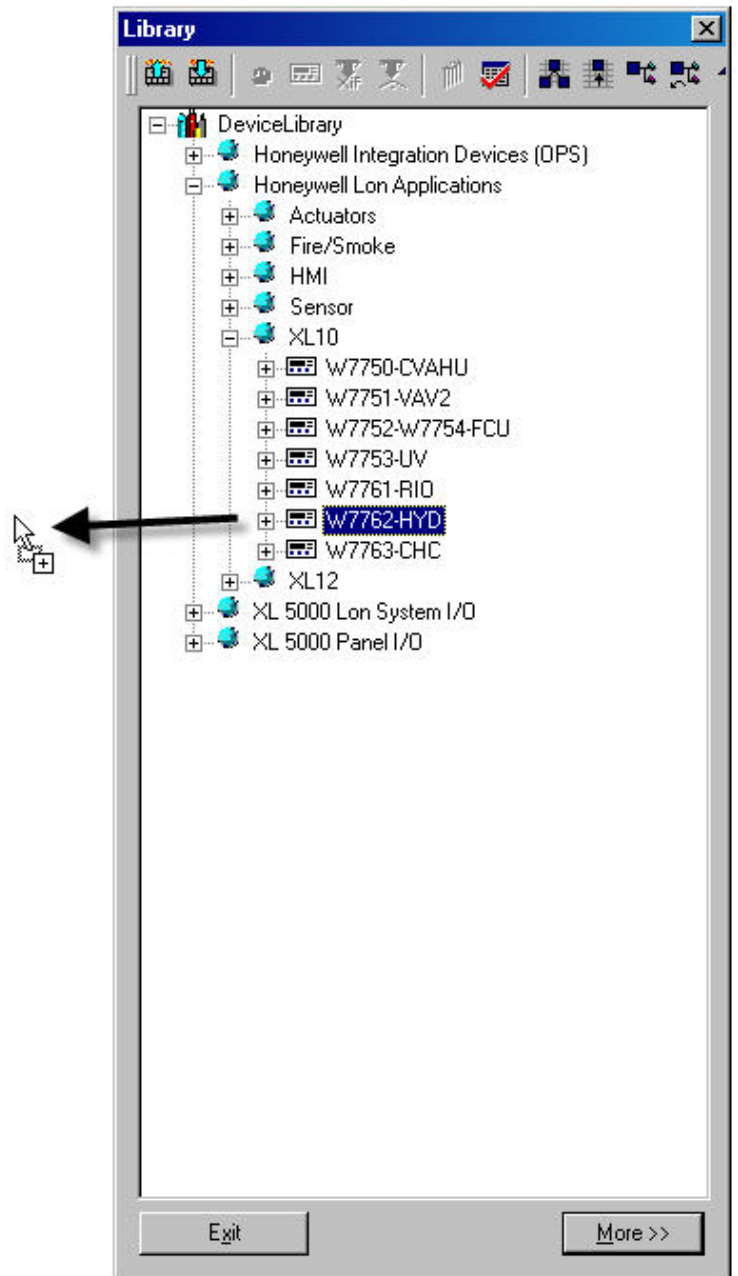
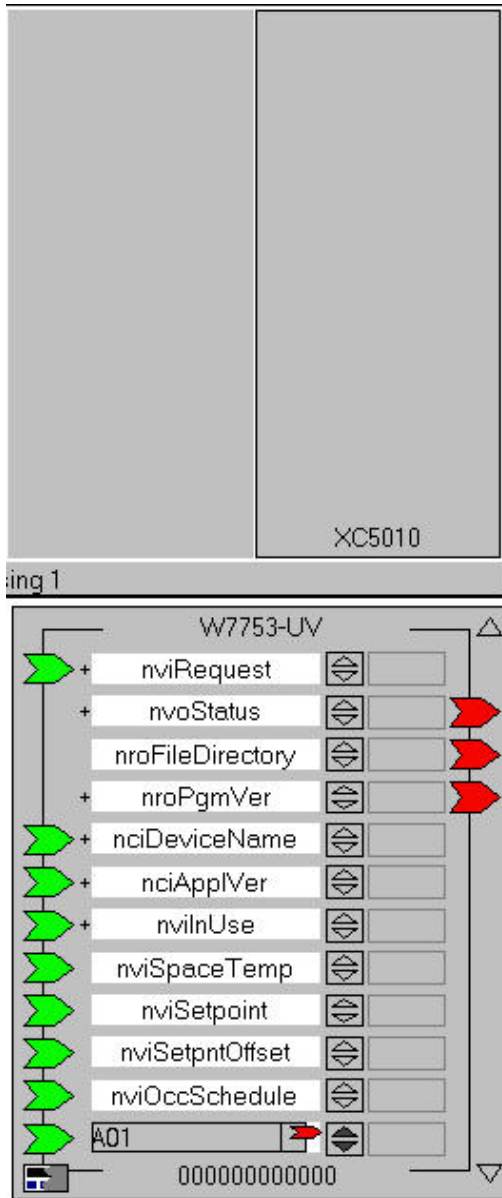
RESULT: The Library dialog box displays.



4. Open the Device Library tree, to display the available devices.

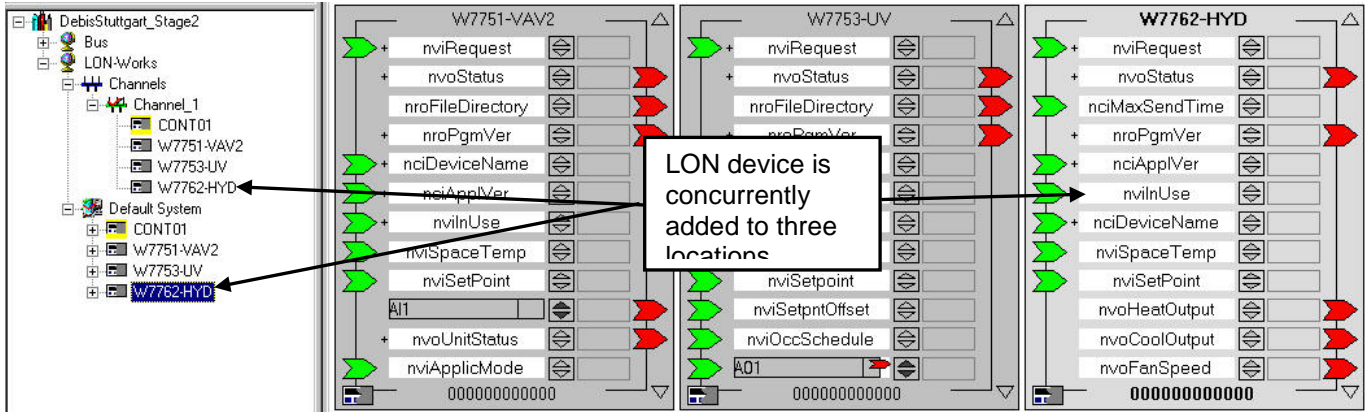
NOTE: Creating, deleting and renaming folders can structure the tree.

5. Select the device in the DeviceLibrary tree, drag it to a blank spot on the Terminal Assignment tab and drop it there.



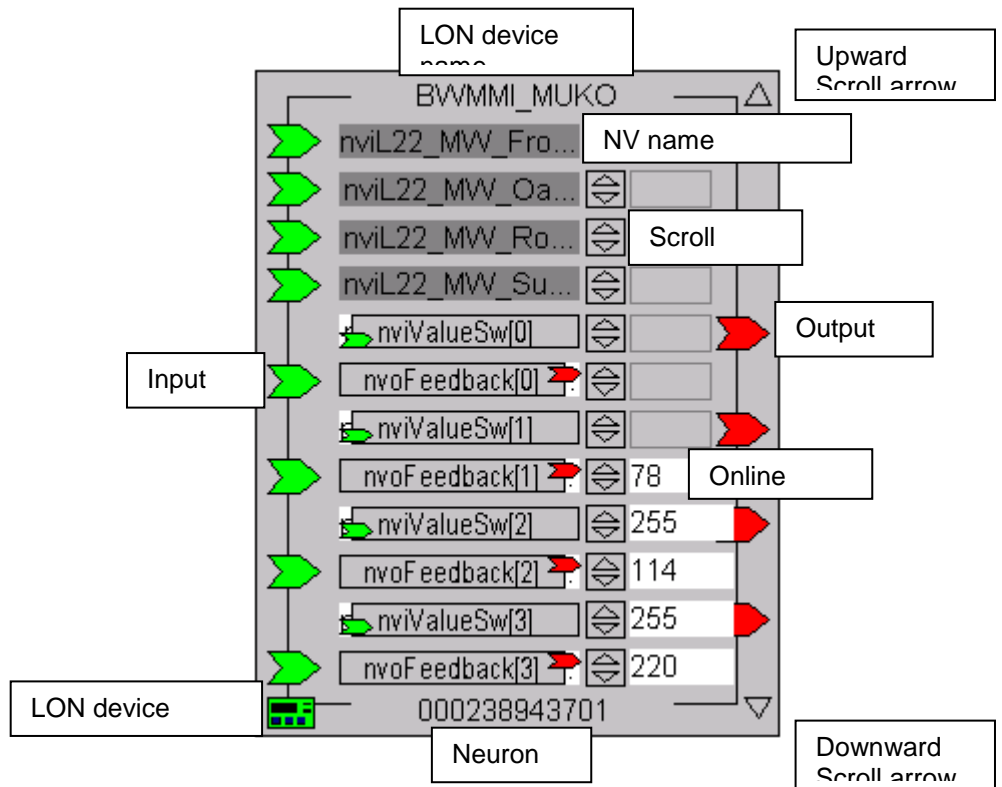
RESULT: The LON device is concurrently added to three locations:

- to the terminal assignment tab
- to the channel where the selected LON device resides
- in the logical LON-Bus part of the network tree, to the folder where the selected LON device resides



6. To assign the device, continue by interconnecting the devices as described under the Connect CARE Datapoints/NVs to NVs section.

On the top of the LON device the name is displayed. The terminals display the NV name. Input-NVs are indicated on the left as green arrows, Output-NVs are indicated on the right as red arrows. Upward- and downward scroll arrows on the right top and at the bottom allow to scroll through all available NVs of the device. Scrolling is also possible when dragging a datapoint/NV onto a terminal by positioning the datapoint/NV over the upward or downward scroll arrow. Right to the terminal a combined upward-downward arrow allows to display bound NV/datapoint names. Right to the upward-downward arrow, a field allows displaying the current online value of the NV. A tool tip displays the engineering unit when moving the cursor over the field. When setting the terminal online, the field is white. When setting the terminal offline, the field is gray. A plus symbol at an NV indicates components of a structured NV. In the middle at the bottom, the neuron ID is displayed. On the left at the bottom the color of the LON device status icon indicates the current status of the device (white = unknown-not initialized, green = application is running, red = not available-application stopped). Fully-colored means that the current status in CARE and the device status is the same. Half-colored means "Updates pending". Certain devices such as distributed I/O modules and Smart I/O modules can be displayed in two different modes (see Show LON device as Open LON section).



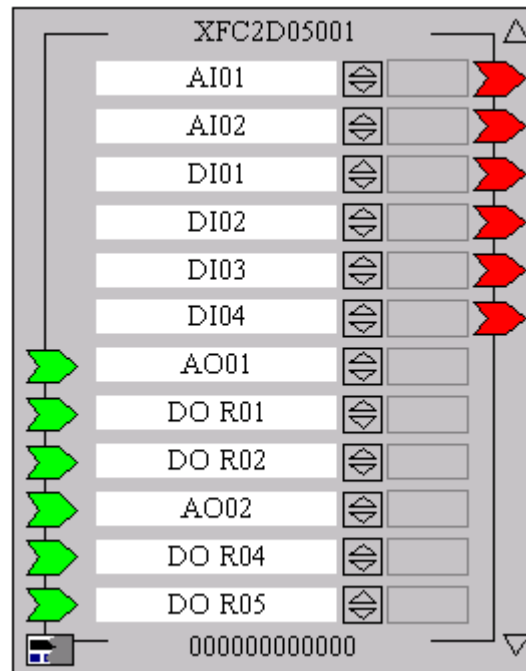
To display assigned devices for one particular device, please refer to the Display Connected Devices section.

Show LON Device as Open LON

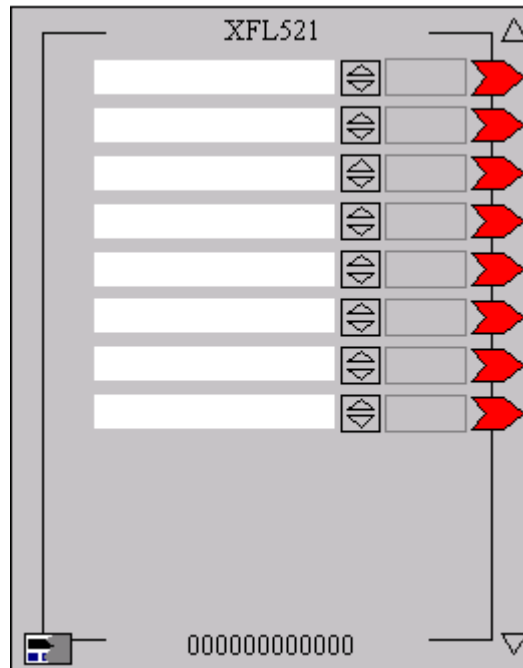
Some devices such as Smart I/O modules or distributed I/O modules can be displayed in two different modes, as:

- Standard mode
- Open LON mode

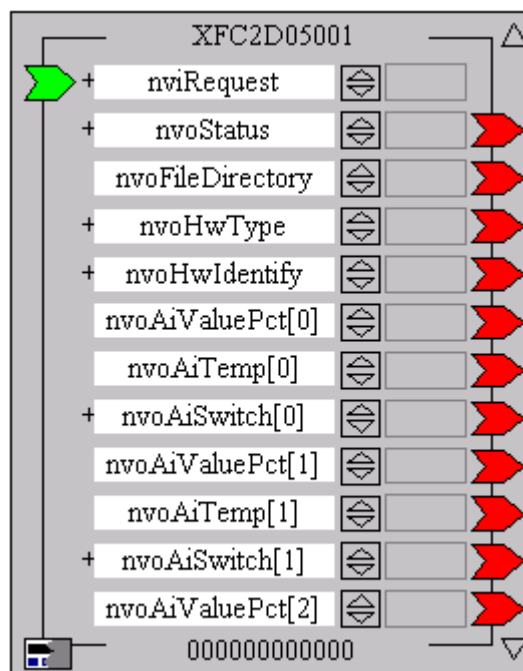
A Smart I/O module such as XFC2D05001 shows the terminals in standard mode as follows:



A distributed I/O module such as XFL 521 of B-type shows the terminals in standard mode as follows:



As Open LON, the NVs residing on the device terminals are shown:



IMPORTANT

When connecting CARE datapoints to a distributed I/O or Smart I/O module in the standard mode, that is no NVs are shown, CARE automatically creates the proper connections through the CARE Autobinding mechanism. Hence, the standard mode is recommended for the binding of distributed I/O or Smart I/O modules to an Excel 500 controller. Do not display distributed I/O or Smart I/O modules as Open LON when binding them to an Excel 500 controller. The Open LON display mode is recommended if NVs from Open LON devices should be connected to a distributed I/O or Smart I/O module.

- Procedure**
1. To toggle between the Standard and the Open LON mode, do the following:

2. Move cursor over the device.
3. Click right mouse key and with left mouse key, click on Show as Open LON to check/uncheck the option.

RESULT: The device is displayed in Open LON mode (Show as Open LON checked), respectively standard mode (Show as Open LON unchecked).

Connect CARE Datapoints/NVs to NVs

Assigning LON devices to others will be done by connecting the appropriate NVs of the two devices. If one LON device is an Excel 50 or 500 or 800 controller, assignment will simply be done by connecting the CARE datapoints to the appropriate NVs of the LON device (CARE Autobinding). When connecting datapoints to NVs, CARE internally creates the corresponding NVs of the same name (Mapping). In case of the assignment of two LON devices, the NVs of the corresponding devices will be directly connected. In case the output and input NV resides on the same device, a turnaround binding will be executed.

Procedure

1. Make sure that the LON device to which you want assign another device or on which you want to create a turnaround binding, has been selected by double-clicking in the network tree (highlighted in yellow) and the Terminal Assignment tab has been selected on the right pane.

RESULT: On the terminal assignment tab, already assigned LON devices are displayed (see Add LON device to the Network section).

2. If the LON device you want to assign is not available, add desired device to the network by Drag&Drop of the LON device from either the logical LON-Bus part of the network tree or the device library (see Add LON device to the Network section). In case of turnaround binding creation, it is the same device.
3. In the logical plant tree, click on the datapoint.

Or, if the datapoint is also assigned to a module, click on the terminal on the terminal assignment tab on the right.

Or, when assigning two Open LON devices to each other, click on the NV in the logical LON-Bus part of the network tree, you want to connect to the LON device displayed on the terminal assignment tab.

Or, when creating a turnaround binding on one and the same device, click on the NV in the logical LON-Bus part of the network tree.

4. Drag it to the desired terminal on the LON device and drop it.

RESULT: When moving the datapoint/NV over the LON device, CARE shows any NV type in green that matches to the datapoint/NV. In the status line at the bottom, the corresponding NV name, NV type and the LON object, which the NV belongs to, is displayed.

Terminal Assignment for Controller: CONT01

Module No. 1	Module No. 3
1	1 ClqVlv
2 MaTemp	2 HtgVlv
3	3 AOS
4 Cool1	4 MaDmpr
5 Cool2	5
6 Cool3	6
7 Cool4	7
8 Cool5	8

Housing 1

+ nvoStatus	
+ nciMaxSendTime	
+ nroPgmVer	
+ nciAppVer	
+ nviInUse	
+ nciDeviceName	
MaDmpr	
nviSetPoint	
MaTemp	
nvoCoolOutput	
+ nvoFanSpeed	

ILAS_V1

nciDefaultOutput	
nciDIconfig	
+ nciDirRev	
nciRunTime	
nciMaxRcvTime	
nviActPos	
nvoActPosFb	
ClqVlv	
+ nvoDISwitch	

Properties Terminal Assignment for Controller: CONT01

Debis_Berlin_Stage1

- CONT01
 - AHU1
 - Analog Input
 - Cool1
 - Cool2
 - Cool3
 - Cool4
 - Cool5
 - DaTemp
 - DuctStatic
 - MaTemp
 - Analog Output
 - Digital Input
 - Digital Output
 - Pseudo Analog
 - Pseudo Digital 2 Stage

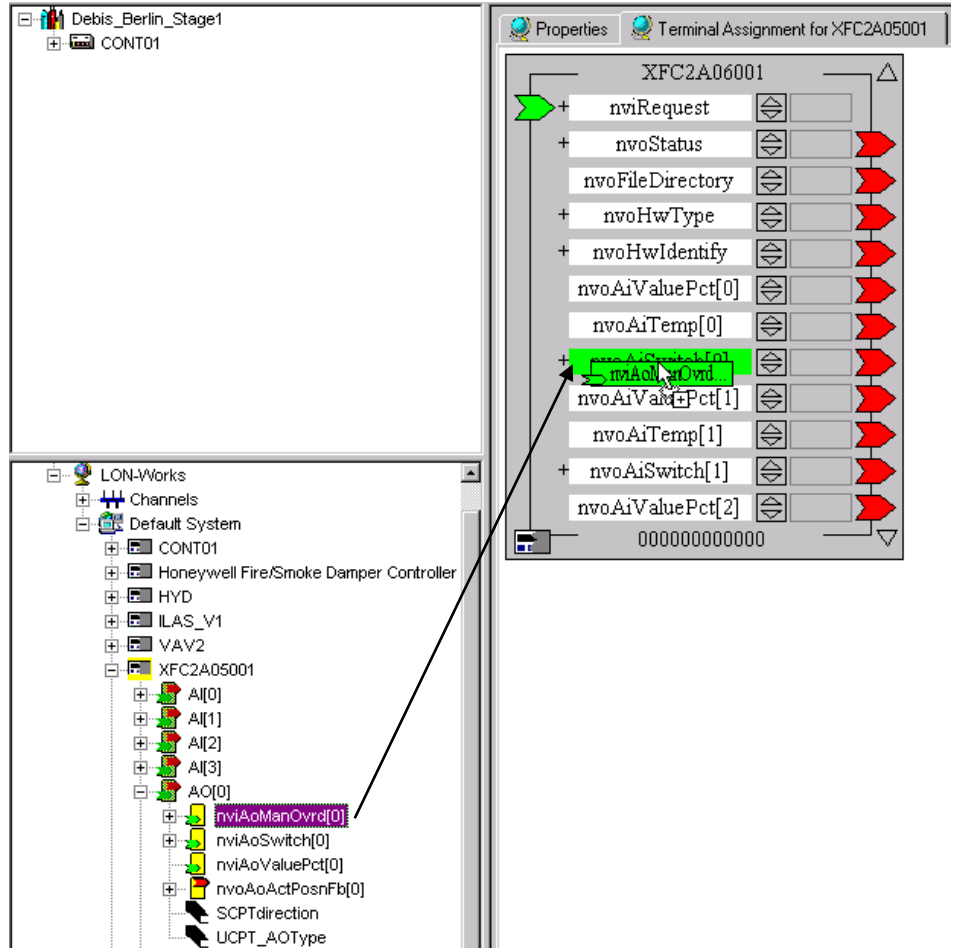
Debis_Berlin_Stage1

- Bus
- LON-Works
 - Channels
 - Default System
 - CONT01
 - Honeywell Fire/Smoke Damper
 - HYD
 - ILAS_V1
 - Uploaded Devices
 - VAV2
 - X402 2_01

In logical LON bus part of network tree, double-click on destination device (CONT01), to display assigned source

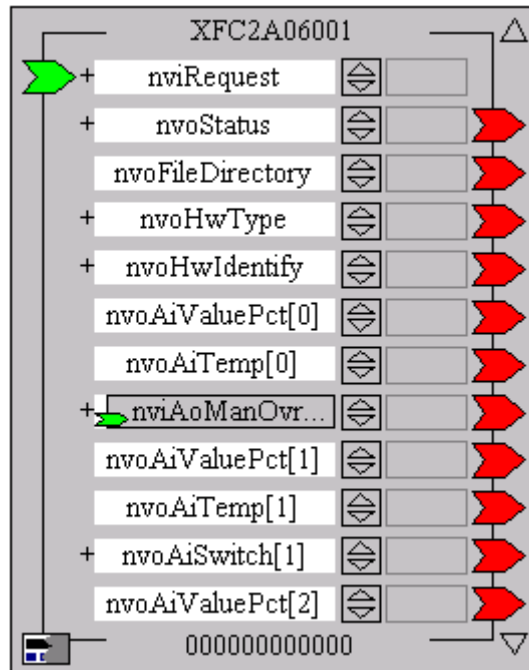
Datapoint "MaTemp" can be dragged from both locations

Example 2: Connection of CARE Datapoint to NV of an Open LON Device (Excel 500 to Excel 10 Hydronic controller)



Example 3: Connection of NVs of two Open LON Devices

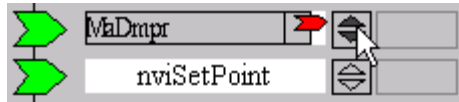
RESULT: The connection is indicated as follows:



When a CARE datapoint was connected, CARE automatically creates a NV of the same name, in the

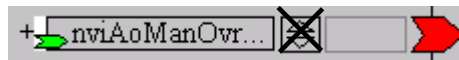
previous case (see figure, respectively Example 2) nvoMaTemp for the datapoint MaTemp. On the device in the terminal assignment tab, the connected datapoint with the newly created NV name is shown as "terminal" covering the NV where the datapoint has been dropped. A small green, respectively red arrow indicates the NV type, input or output NV.

You can toggle between the display of the datapoint name and the corresponding NV name, for example, MaDmpr ↔ nvoMaDmpr by clicking the dark upward-downward arrows right at the terminal.

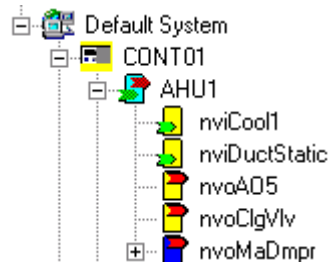


If multiple datapoints or NVs have been dropped onto the same terminal, you can scroll with the dark upward-downward arrows and all of them will be displayed with their datapoint name and NV name.

If (only) two NVs are mapped to a each other, see figure, respectively Example 3, toggling is not possible.



In the LON-Bus part of the network tree, any bound NV is indicated by its blue background, which previously was yellow in the unbound state.



For a connection between two NVs, in the status line at the bottom, the NV name and NV type of the moved NV (left side), the NV name, NV type and the LON object where the NV has been dropped (right side), is displayed.



Example 4: Status display of two connected NVs

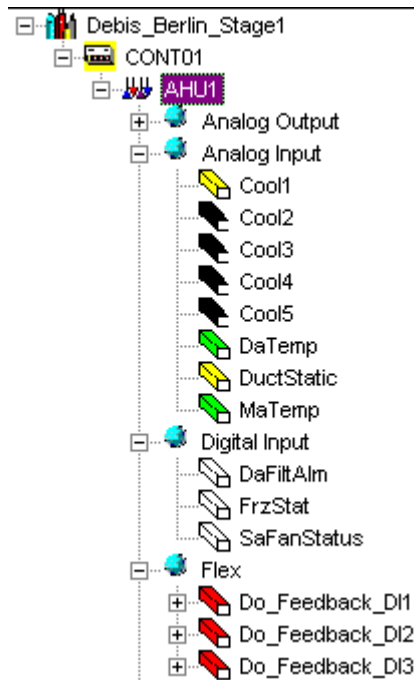
For a connection between CARE datapoint and NV, in the status line at the bottom, the datapoint type and subtype (left side), the NV name, NV type and the LON object, where the datapoint has been dropped (right side) is displayed.



Example 5: Status display of connected CARE Datapoint and NV

Datapoint Display Depending on their status/type, datapoints are displayed in different colors in the logical plant tree:

Point Status/Type	Color
On board	black
Boardless	white
On board and mapped	yellow
Boardless and mapped	yellow
On board, mapped and bound	green
Boardless, mapped and bound	green
Boardless Flexpoint	red



NV and LON Object Display

Depending on their status, NVs and LON objects are displayed in different colors in the LON-bus part of the network tree:

Tree Item	Status	Color
NV	Unbound	Yellow background with green left-handed arrow (inputs) and red right-handed arrow (outputs)
	Bound	Dark blue background with green left-handed arrow (inputs) and red right-handed arrow (outputs)
LON Object	No bound NVs included	Green background with green left-handed arrow and red right-handed arrow
	At least one bound NV included	Bright blue background with green left-handed arrow and red right-handed arrow

NOTE: How connections are displayed in the logical LON part of the network tree, please refer to the Show Connections of Devices section.

What Kind of NV Types can be bound together?

The following describes the different ways of binding mechanisms for Excel 800, 500, 50 and Smart controllers depending on the provided network variables types of the used devices.

Autobinding can only be applied to a certain number of standard network variable types (SNVTs) and user-defined network variable types (UNVTs). This is a subset of the total number of NV types supported by CARE.

Autobinding of unstructured SNVTs and UNVTs supported by the controller

Standard network variable types (SNVTs) that are supported by Excel 800, 500, 50 or Smart controller can only be bound together if they are of the same type.

Example: An output NV of type SNVT_temp can only be bound to an input NV of type SNVT_temp and vice versa. CARE considers this automatically when binding a CARE datapoint to a NV of another LON device (autobinding).

Autobinding of structured SNVTs and UNVTs supported by the controller

Mainly for autobindings to Excel 10 controllers, CARE provides a couple of special structured UNVTs. All those NV types are indicated by '80000' at the beginning of their name, for example, 80000C5007030403_nvoAlarmStatus_XL500.

For the Excel 800, 500, 50 and Smart controller, CARE provides some special adapted variants of structured LonMark SNVTs that the controller can use either for autobinding or manual binding. All those SNVTs are indicated by the suffix '_XL500', for example, SNVT_switch_XL500 or SNVT_switch_struct_XL500.

Compact structured SNVTs

For autobinding the structured SNVTs are of type 'compact' and consist of multiple components, for example the NVT_switch_XL500 consists of the two components value and state. Structured compact SNVTs are indicated by the suffix '_XL500'.

Compact '_XL500' SNVTs are designed for autobinding between one datapoint and one NV without the necessity of mapping each component to one separate datapoint.

When applying a compact '_XL500' SNVT, the controller automatically calculates the proper result out of the components according to the implemented controller algorithm.

Mappable structured SNVTs

In comparison to the structured compact SNVTs to be used for autobinding, CARE provides structured SNVTs for manual binding. In this case, each component of the SNVT can be mapped to a separate datapoint. Structured SNVTs to be used for manual binding are indicated by the suffix '_struct_XL500', for example SNVT_tod_event_struct_XL500. Structured SNVTs with mappable components can be used in case the automatic algorithm of the controller should be evaded and specific engineering should be applied.

For all above mentioned structured SNVTs and UNVTs, CARE automatically assigns the appropriate structured NV type to a datapoint when the datapoint is connected to corresponding structured NV respectively component.

Manual binding of structured UNVTs or SNVTs supported by the controller

For the Excel 800, 500, 50 and Smart controller, CARE provides some special adapted variants of structured LonMark SNVTs that the Excel 800, 500, 50 and Smart controller can use for manual binding.

For detailed description, please refer to the "Autobinding of structured SNVTs and UNVTs supported by the controller" section.

**Manual Binding of
unstructured SNVTs
and UNVTs not supported
by the controller**

If non-supported unstructured SNVTs or UNVTs from another LON device should be bound to the Excel 800, 500, 50 or Smart controller, user-defined network variable types (UNVTs) must be applied for the controller in CARE.

NOTE: The CARE autobinding mechanism is not possible.

The following UNVTs are provided by CARE:

- UNVT_byte
- UNVT_ubyte
- UNVT_word
- UNVT_uword
- UNVT_long
- UNVT_ulong
- UNVT_float

The UNVTs consist of 1, 2 or 4 bytes and are signed or unsigned (u). The scale factor for all CARE UNVTs is as follows: a = 1, b = 0, c = 0.

IMPORTANT

In order to bind an UNVT to a non-supported SNVT or UNVT, they must have the same byte size (contact device manufacturer for detailed information of NV structure). The type definition such as integer, floating (including the algebraic sign) and the scale factor is not checked for plausibility. Hence, you should consider the scale factors and the type definitions of the SNVT and the UNVT in order to get a proper result.

Example: An input NV of type SNVT_volt_kilo can be bound to an output UNVT of type UNVT_word. Both have a byte size of 2, both are signed, but the scale factor is as follows: a = 1, b = -1, c = 0.

**Manual binding of
structured UNVTs or SNVTs
not supported by the controller**

If non-supported structured SNVTs or UNVTs from another LON device should be bound to the Excel 800, 500, 50 or Smart controller, user-defined network variable types (UNVTs) must be applied in CARE for the controller.

To bind non-supported structured SNVTs or UNVTs from another LON device, CARE provides a set of structured UNVTs that consist of 1 to 31 components.

Each component is of type UNVT_ubyte (u=unsigned) with the byte size = 1.

The structured UNVTs are named as follows:

- UNVT_struct1_XL500
- UNVT_struct2_XL500
- ..
- ...
- UNVT_struct31_XL500

The binding is done as follows:

1. Check the byte size of the non-supported structured NV, you want the Excel 800, 500, 50 or Smart controller NV bind to.
2. For the controller, create a structured NV of type UNVT_struct"xx"_XL500 of the same byte size.

3. Connect the structured NV (nvi or nvo icon in the LON-bus part of the network tree) to the NV on the device terminal.
4. Manually map a datapoint to each component of the created structured NV. This provides the further processing of the values by assigning switching tables or mathematical functions via the Switching Logic feature of CARE.

IMPORTANT

Before mapping the components to datapoints, you should know the type definition structure (see LonMark SNVT master list respectively get the UNVT structure definition from the device manufacturer).

Note, that the type definition structure of the NV as it is displayed on the device on the terminal assignment tab is decisive regarding the byte-byte assignment, not the alphanumeric components' sequence displayed in the LON-bus part of the network tree.

*In order to bind a self-defined structured UNVT to a non-supported structured UNVT or SNVT, they must have the same byte size. The type definition such as integer, floating (including the algebraic sign) and the scale factor is not checked for plausibility. Hence, you should consider the scale factors and the type definitions of the **components** to be connected in order to get a proper result.*

Manual Binding of Structured UNVTs or SNVTs with bit field components

To bind CARE datapoints to structured UNVTs or SNVTs that contain bit fields, in general the same procedure as for the manual binding of structured UNVTs or SNVTs has to be applied. In addition, you must consider to arrange the bit fields in byte groups. Bit fields can be further processed via switching tables and/or XMFs and can be used for controlling the status of bound LON devices via Excel 50/500/800 Controller time programs.

How to Control the Status of a bound LON Device via an Excel 800/500/50 Controller Time Program?

The status of a LON device bound to an Excel 50, 500, or 800 controller, for example, the occupied/unoccupied status of an Excel 10 controller, can be controlled by the time program of the Excel 800, 500 or Excel 50 controller.

This is to be done by mapping the relevant datapoints of the Excel controller and the NVs of the LON device to each other whereby the datapoint must be a switchpoint of the Excel controller's time program

One of the following connections must be applied:

Point Type in Time program of Excel 50/500/800 Controller	NV Type in LON Device
1 Digital Multistage point	SNVT_tod_event_XL500
1 Digital Multistage Point	SNVT_tod_event_struct_XL500
1 Digital Multistage Point	- Current_state datafield: to be mapped on a datapoint that contains current state
1 Pseudo Analog Point	- Next_state datafield: to be mapped on a datapoint that contains next state
	- Time_to_next_state datafield: to be mapped to a datapoint which is switched by the controller's time program

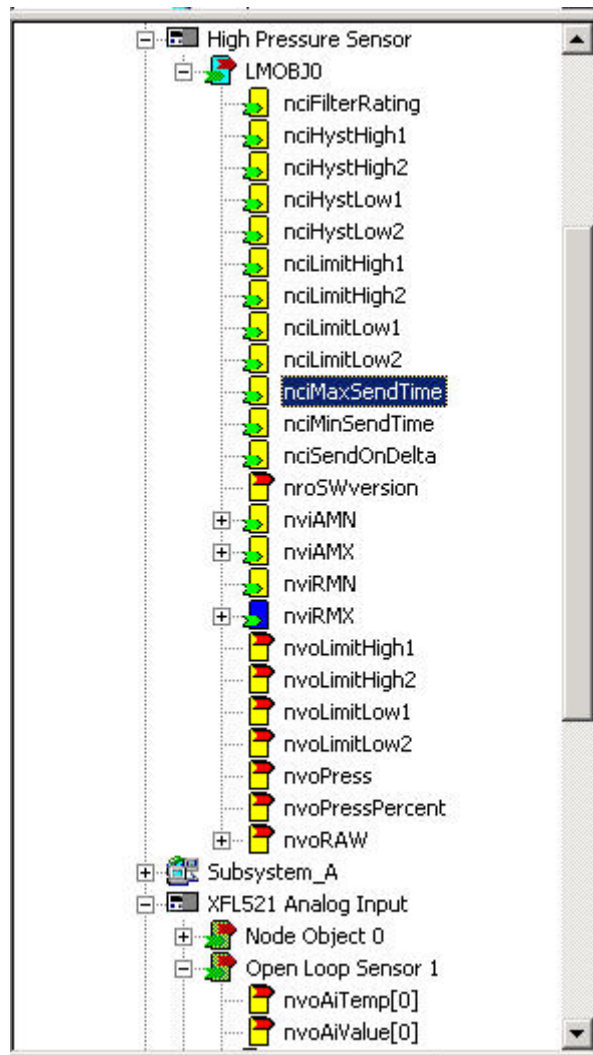
Create Turnaround Binding

Purpose To create a turnaround binding, that is, to bind an input NV to an output NV or vice versa of the same device. For the procedure, please refer to the Connect CARE Datapoints/NVs to NVs section and connect the two NVs on the same device.

Create Multiple Bindings

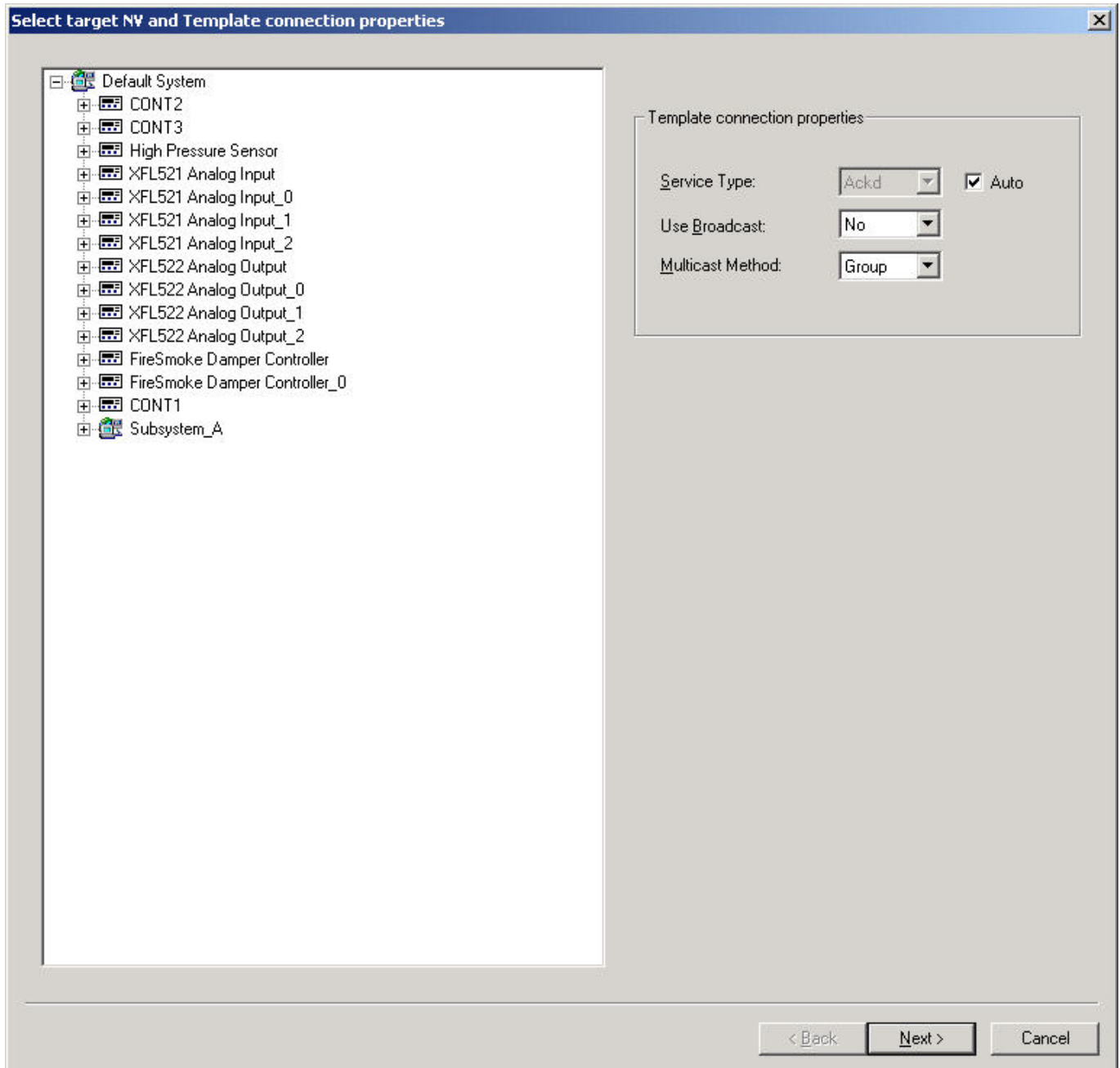
Purpose To create multiple bindings between one particular NV of a source device and NVs of the same type in multiple target devices.

Procedure 1. In the network tree, navigate to the source device and select the NV you want to create the multiple bindings for.

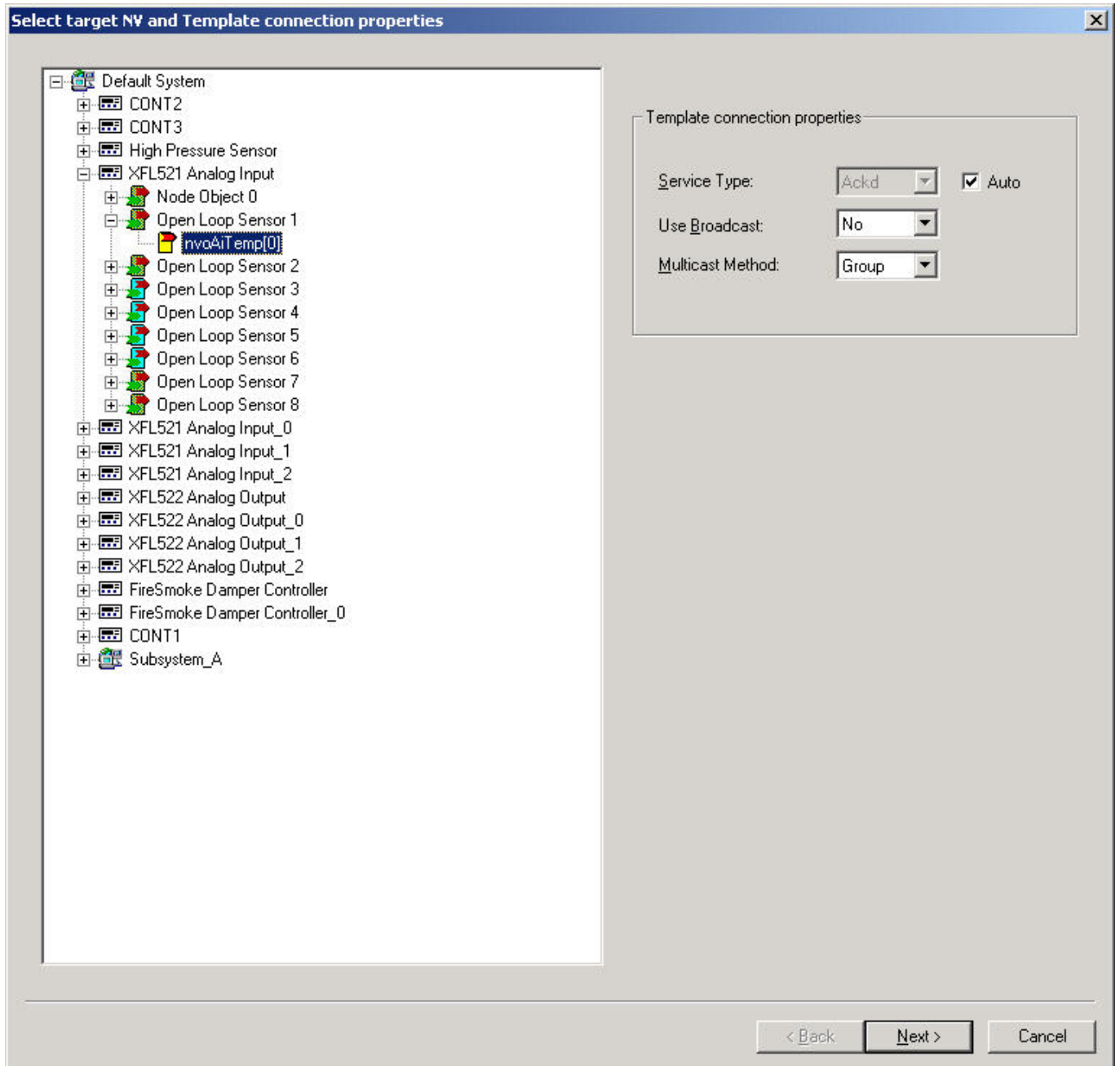


2. Click right mouse button and with left mouse button, click on Multiple Binding in the context menu.

RESULT: The Select target NV and template connection properties dialogbox displays.

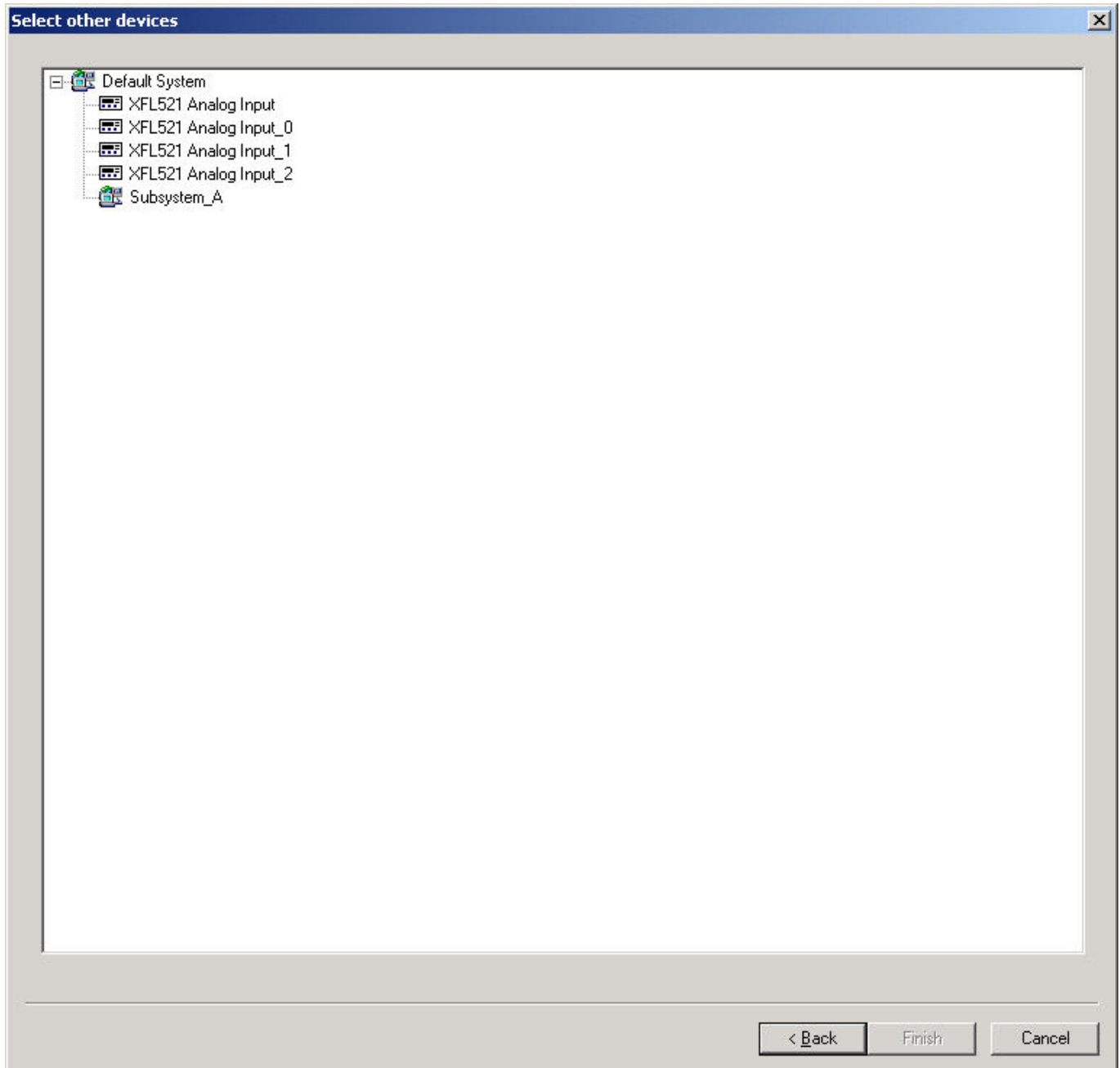


3. Expand the tree and navigate to the target NV. Non-compatible devices respectively NVs cannot be selected as target.



4. To alter the default NV connection properties, change the Template connection properties on the right. Refer to the relevant Echelon documentation for details on these settings.
5. Click the **Next** button.

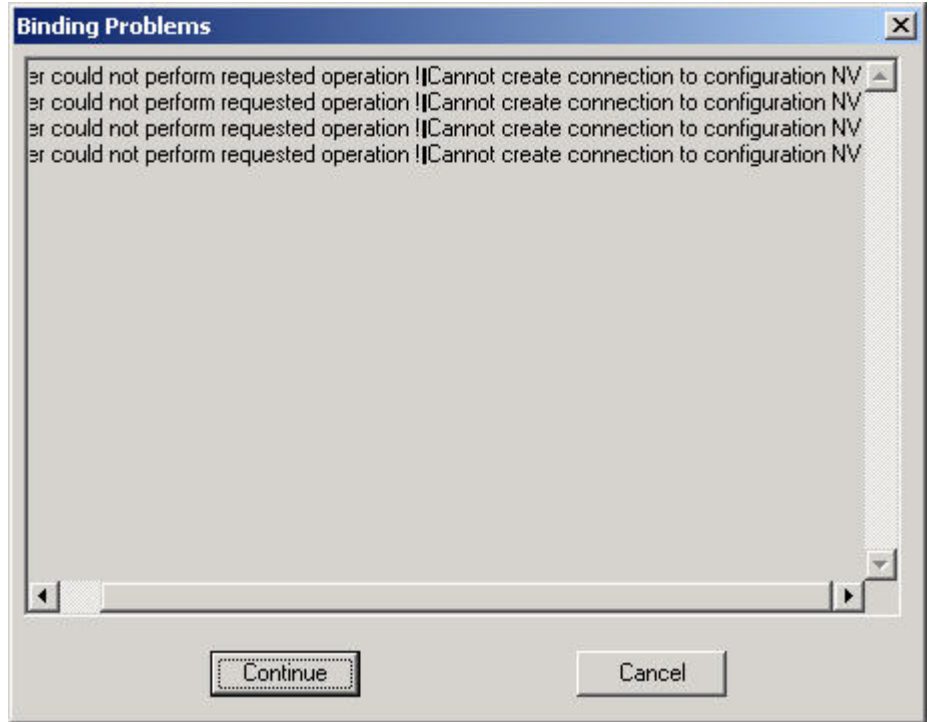
RESULT: All compatible target devices are displayed.



6. Select devices by clicking on them. Use CTRL key for multi-selection.

7. Click the **Finish** button.

RESULT: In case the bindings cannot be created properly the Binding problems dialogbox displays.



- 8. Click the **Continue** button, if you want CARE to create the bindings anyway.

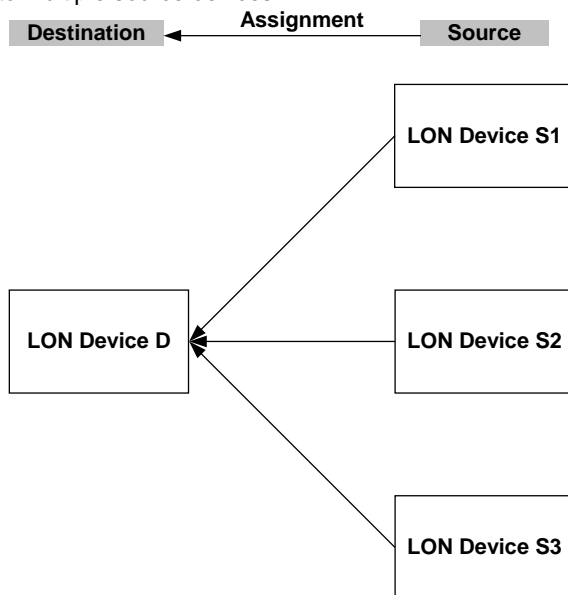
RESULT: In case there were binding problems, CARE will perform all steps that are possible in creating multiple bindings.

- 9. Click the **Cancel** button, if you want CARE to cancel the multiple binding procedure.

Multiple Bindings (Group Binding) may cause problems during LNS Synchronize. Please notice the *Default LON Properties* tab description in the Set Global CARE Options section for more information.

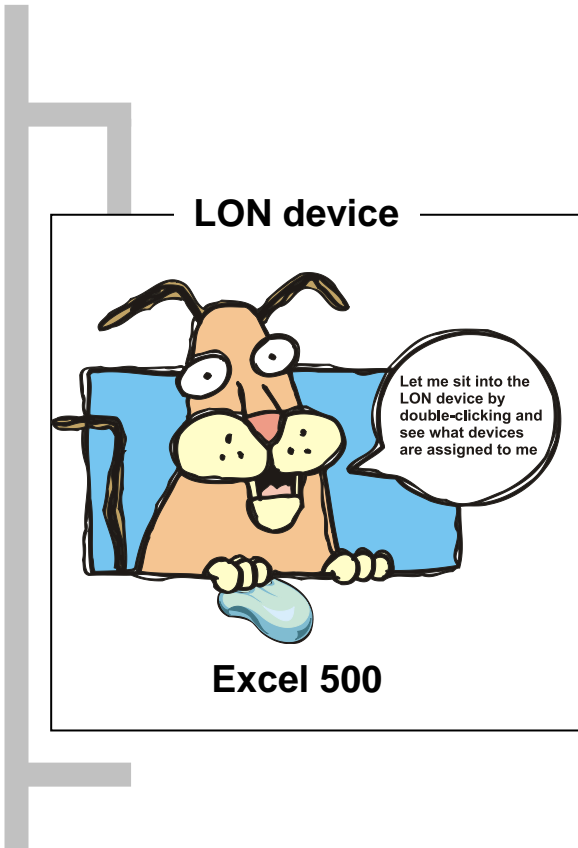
Display Connected Devices

When interconnecting LON devices, you will select a destination device to which you can assign up to multiple source devices.

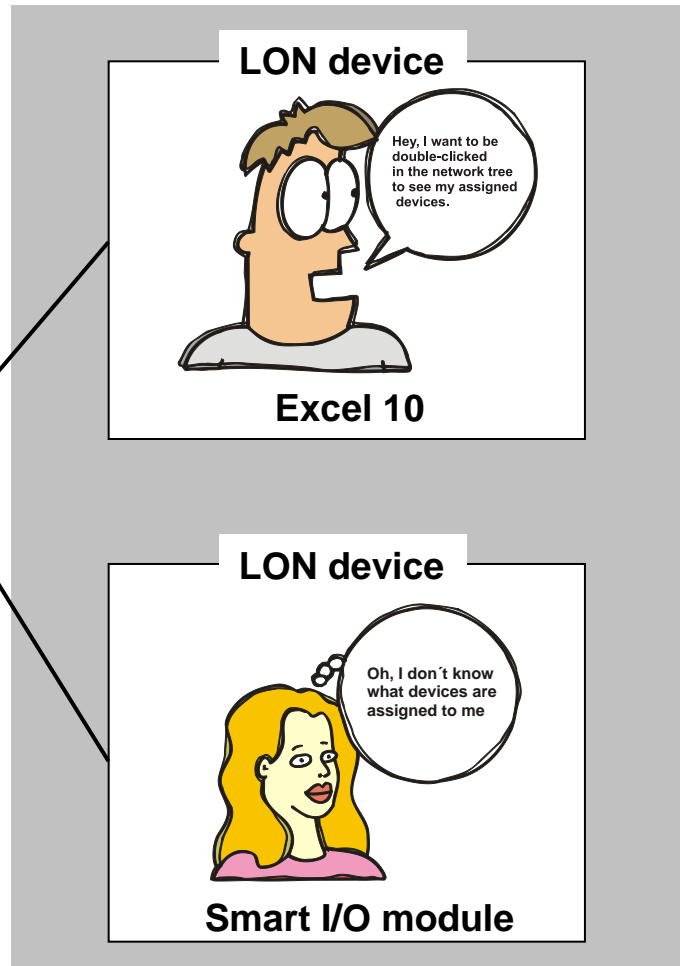


Idea To display all assigned devices of one particular device, either destination or source device, imagine you are sitting in the LON device selected by **double-click** in the logical LON-Bus part of the network tree. Imagine you are looking outside. You will then see all connected devices on the terminal assignment tab.

Network Tree



Terminal Assignment Tab



Click on Terminal Assignment tab to display

Module No. 1	Module No. 3
1	1 ClqVlv
2 MaTemp	2 HtgVlv
3	3 A05
4 Cool1	4 MaDmpr
5 Cool2	5
6 Cool3	6
7 Cool4	7
8 Cool5	8

Housing 1

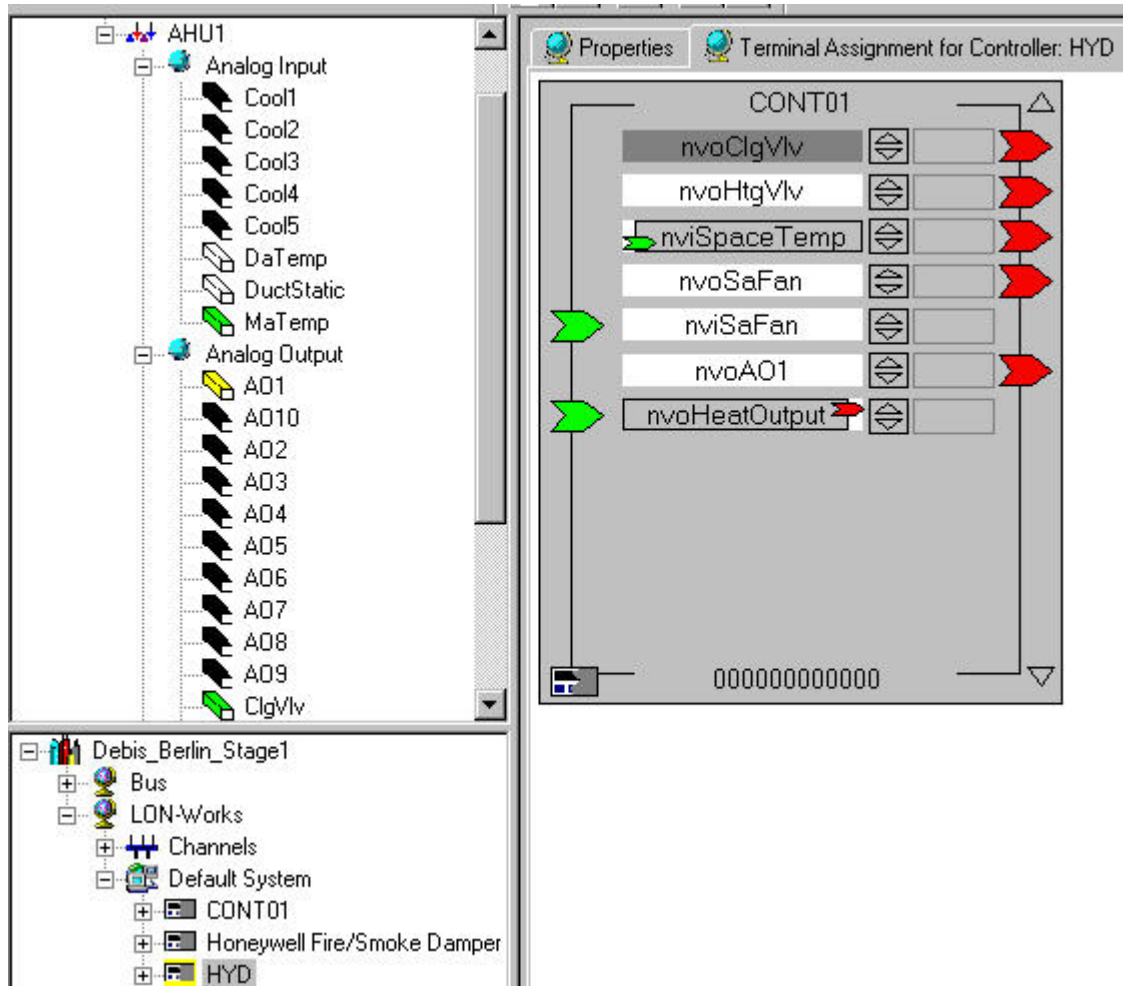
HYD ILAS_V1

These two source devices are assigned to

nciMaxSendTime nciDirRev
 nroPgmVer nciRunTime
 nciAppVer nciMaxRcvTime
 nviInUse nviActPos
 nciDeviceName nvoActPosFb
 MaDmpr ClqVlv
 nviSetPoint nvoDISwitch
 MaTemp
 nvoCoolOutput
 nvoFanSpeed

Example 6: Display of assigned devices

If a device is connected to multiple devices, the connected datapoints/NVs are shown in dark gray. In the following example, the controller CONT1 is connected to the Hydronic controller currently selected in the network tree. This is indicated by the nvoHeatOutput terminal. In addition CONT1 is connected to another device, which is indicated by the dark gray nviDaTemp terminal.



Example 7: Display of a multiple connected device

Permanent and Temporary Display of Devices

The assignment of LON devices includes two main steps:

1. Add LON device to the network
2. Connect CARE datapoints, respectively NVs to NVs (Binding)

When adding the device to the network in step 1, the device is **permanently** inserted and displayed into the **network tree**, but **temporarily** added and displayed on the **terminal assignment tab**.

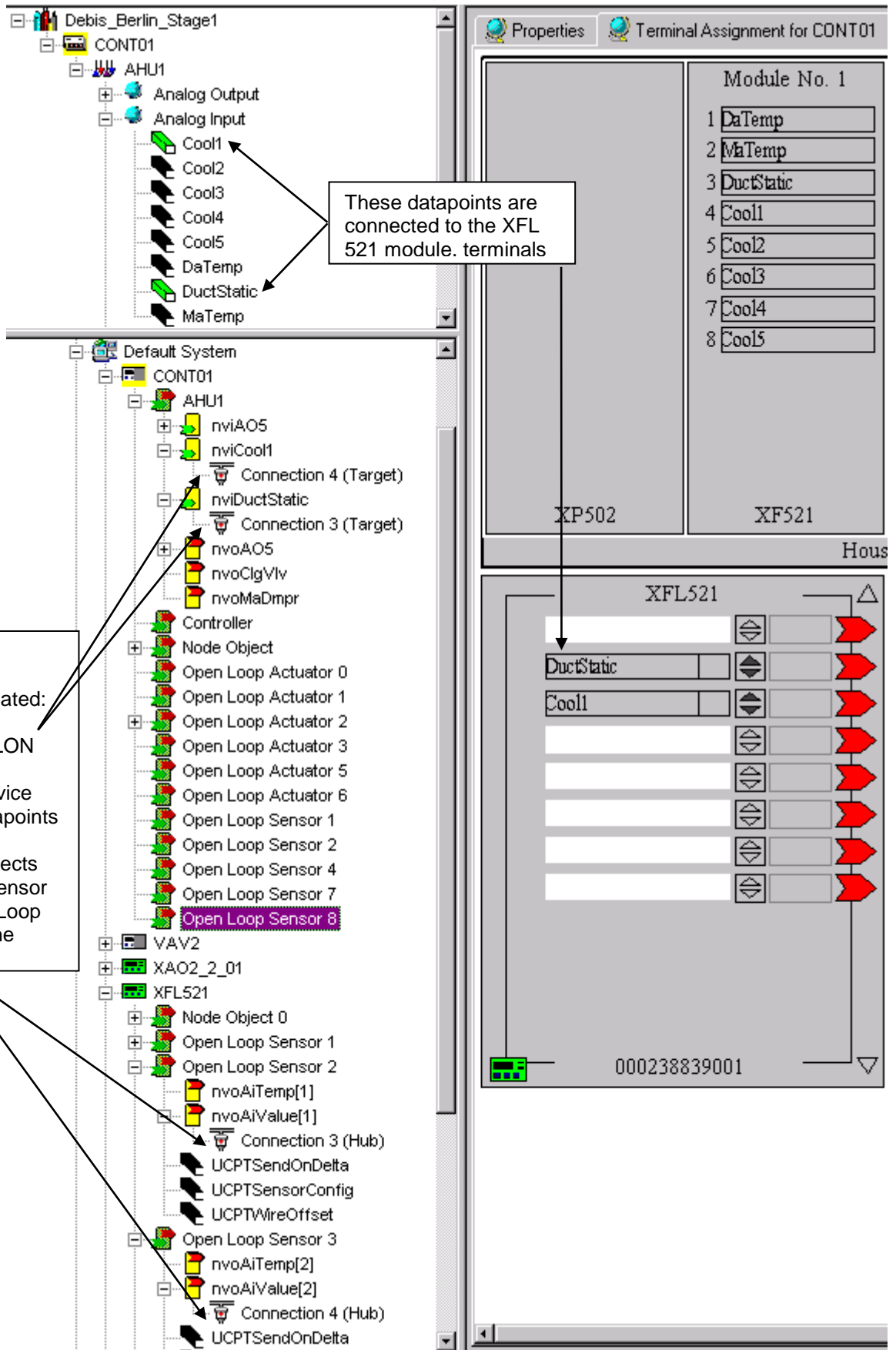
IMPORTANT

*If the destination device in the network tree will be de-selected, **before** the source device has been bound in step 2, the temporary device will be removed from the terminal assignment tab. The temporary source device on the terminal assignment tab will only be displayed permanently after step 2 has been done.*

Once the device has been imported from the device library, it is still available in the network tree. Do not import the device twice from the device library. Instead, drag&drop it from the network tree to the terminal assignment tab.

Show Connections of Devices

See next page.



For each binding done between datapoint to NV or NV to NV, the connection is indicated in the logical LON-bus part of the network tree.

By double-clicking on the connection on the Properties tab on the right pane, the connection structure (hub-target) is displayed graphically. For example, the following Hubs/Targets field for the Connection 4 (Target) shows:

- Controller CONT01 is bound to XFL521
- via the nviCool1 (Target) belonging to the AHU1 LON object and the nvoAiValue(2)(Hub) belonging to the Open Loop Sensor 3 LON object

The reverse way is also possible:

In the connection structure you can double-click on an NV to display the corresponding hub/target of the assigned device in the logical LON-bus part of the network tree.

NOTE: If you would like to configure connection properties, it is strongly recommended to get familiar with the relevant Echelon documentation.

Configure Connection

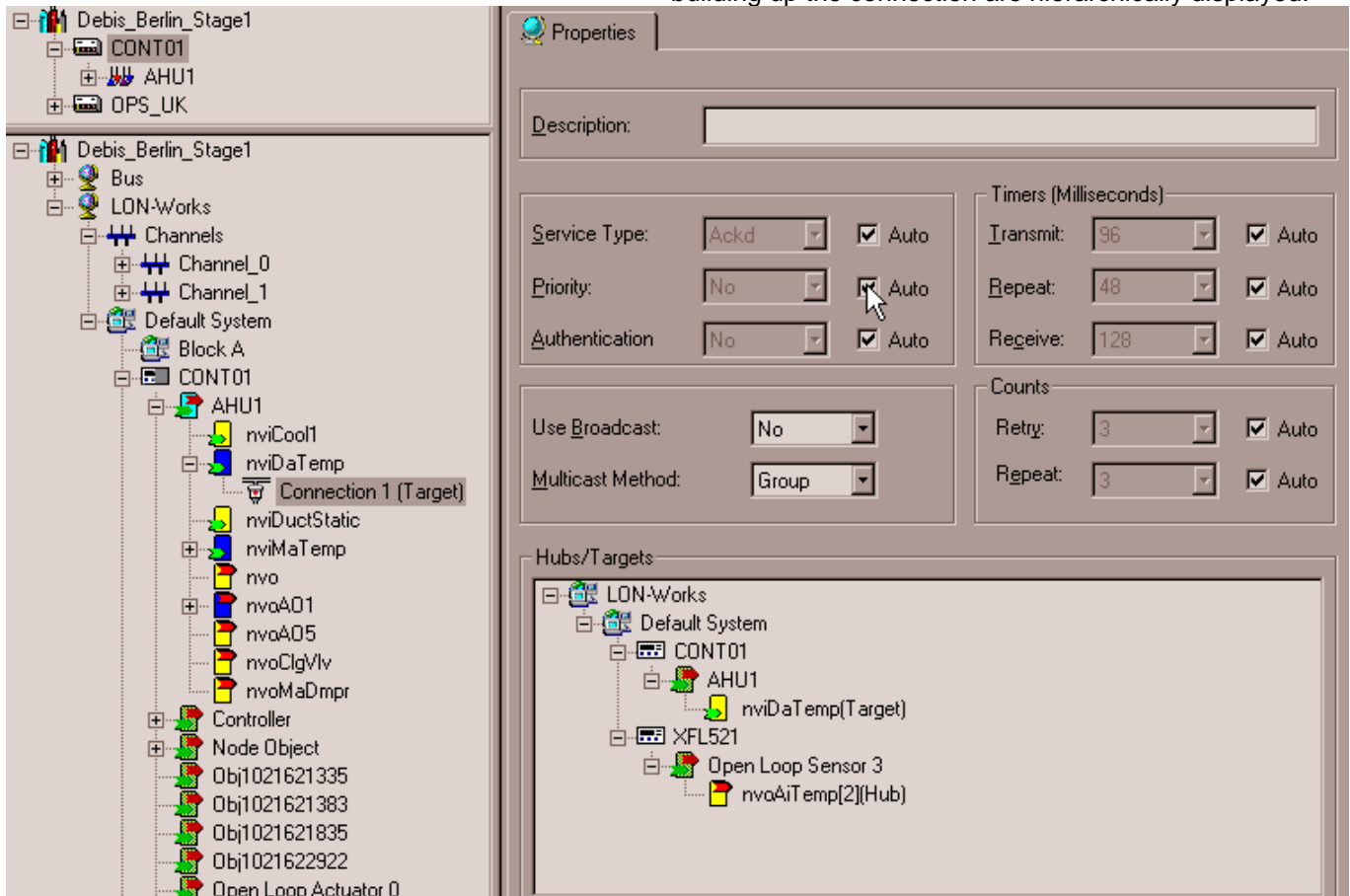
Purpose To define settings for a connection between 2 NVs.

NOTE: If you would like to configure connection properties, it is strongly recommended to get familiar with the relevant Echelon documentation.

Procedure 1. In the LON-bus part of the network tree, click on the connection.

RESULT: On the right pane, the connection properties are displayed. Settings include, for example, the service type, broadcast-multicast mode, timers and counts. Below

under Hubs/Targets the devices, LON objects and NVs building up the connection are hierarchically displayed.



2. Select desired options from the corresponding drop-down listboxes. If the Auto checkbox is checked for an option, CARE will use the value resulting from the actual peripheral conditions of the NVs building up the connection.

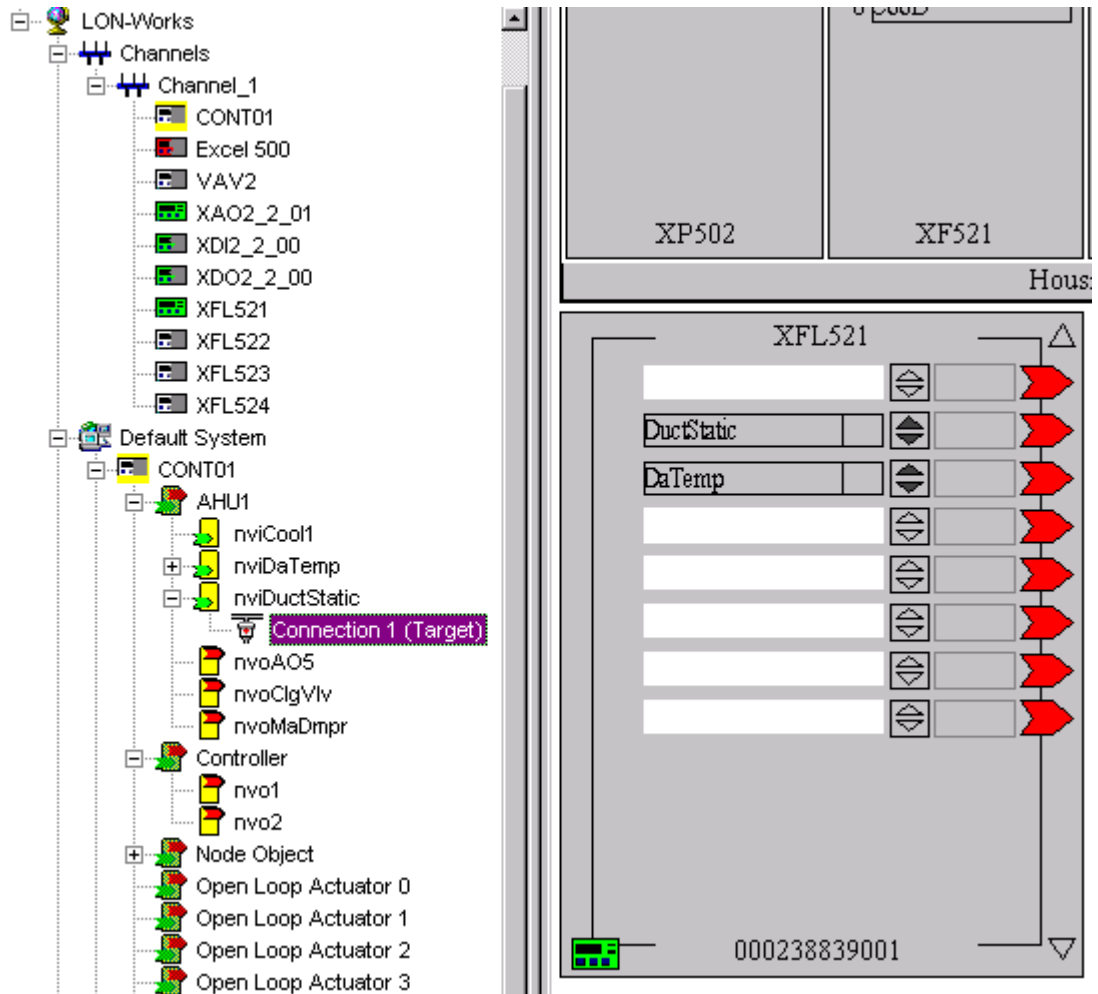
NOTE: It is strongly recommended not to change the AUTO settings without having advanced knowledge of relevant Echelon technology. For detailed information, please refer to the relevant Echelon documentation.

Delete Connection / Remove Binding

Deleting a connection removes the binding between two NVs.

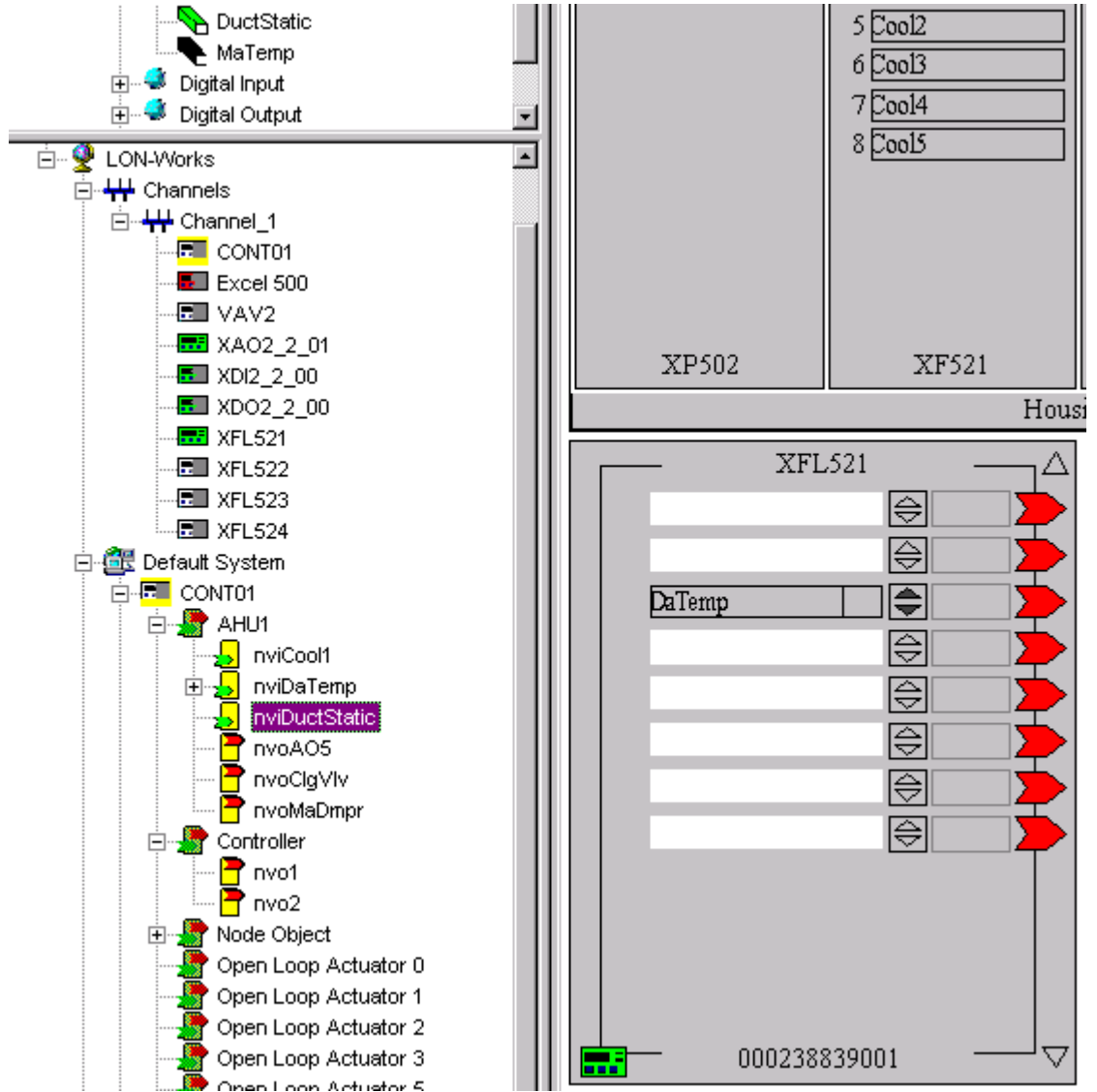
Procedure

1. In the logical LON-bus part of the network tree, double-click on the destination device to display assigned devices on the terminal assignment tab on the right pane.
2. With right mouse key click on the connection in the logical LON-bus part of the network tree.



3. With left mouse key, click Delete in the context menu.

RESULT: The connection is deleted in the tree and the datapoint and the NV is removed from the terminal on the device. Note, that the mapping between NV and datapoint still remains as the NV is displayed in the tree, in this case the nviDuctStatic. In the logical plant tree, the datapoint is displayed in yellow indicating that is already mapped.

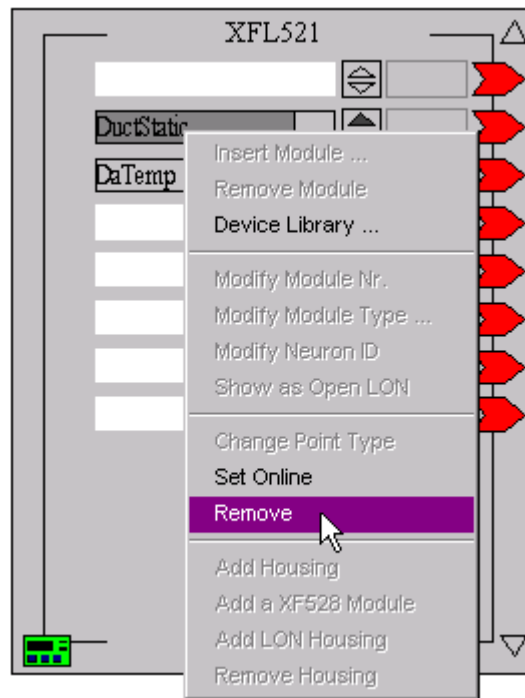


Remove Datapoint / NV from Terminal

In comparison to the deletion of a connection where the mapping between a NV and a datapoint is kept, the binding and mapping is deleted when removing a datapoint/NV from a device terminal.

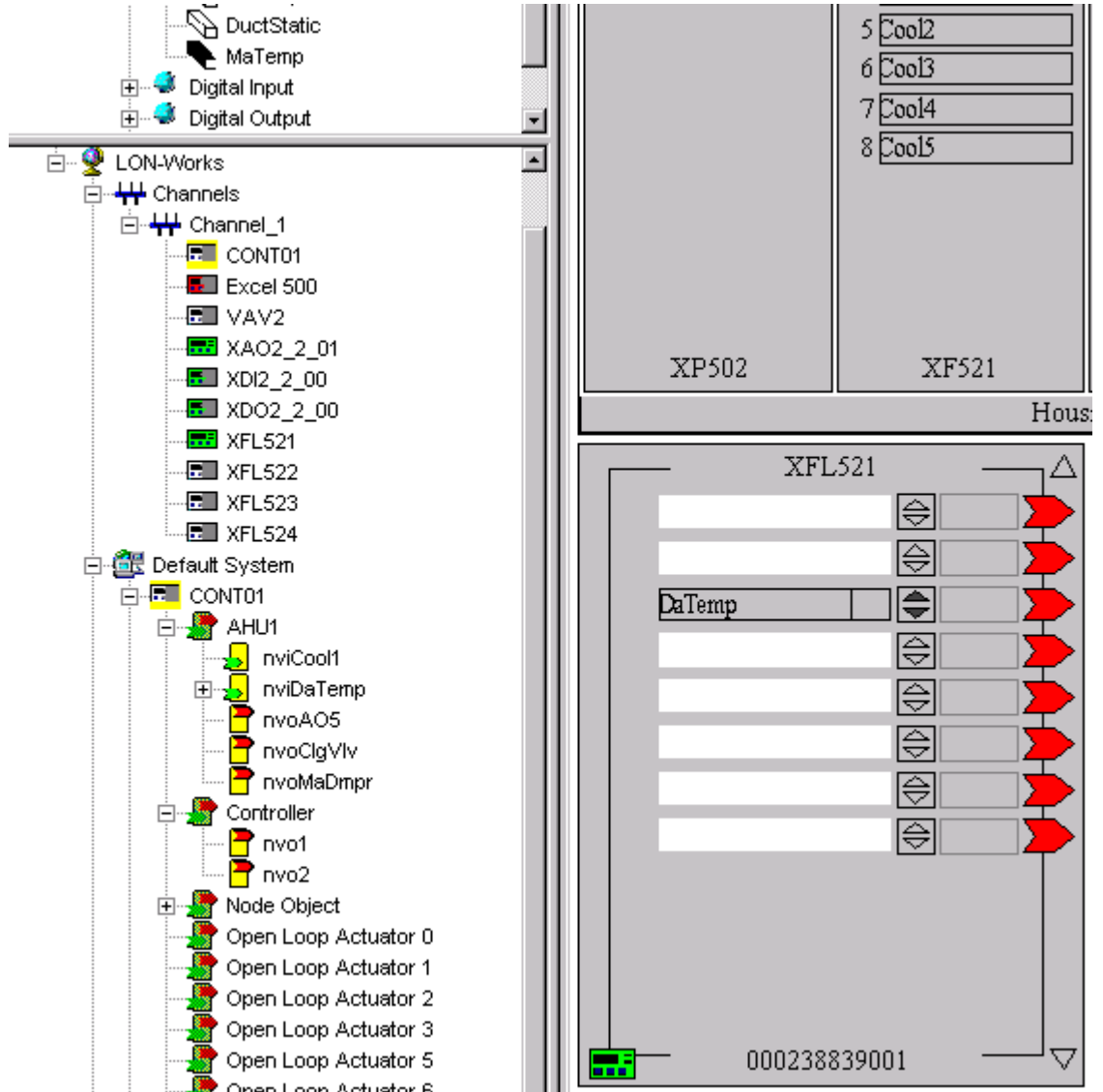
Procedure

1. In the logical LON-bus part of the network tree, double-click on the destination device to display assigned devices on the terminal assignment tab on the right pane.
2. With right mouse key, click on the terminal of which datapoint/NV you want to remove.



3. With left mouse key, click Remove in the context menu or press DELETE key on the keyboard.

RESULT: The datapoint/NV is removed from the terminal on the device and the connection and the NV itself is deleted in the tree. Note, that the binding is removed and the mapping between NV and datapoint too indicated by the white display of the datapoint in the logical plant tree.



Indicate bound Datapoint on LON Device / Show Bound LON Device of Datapoint

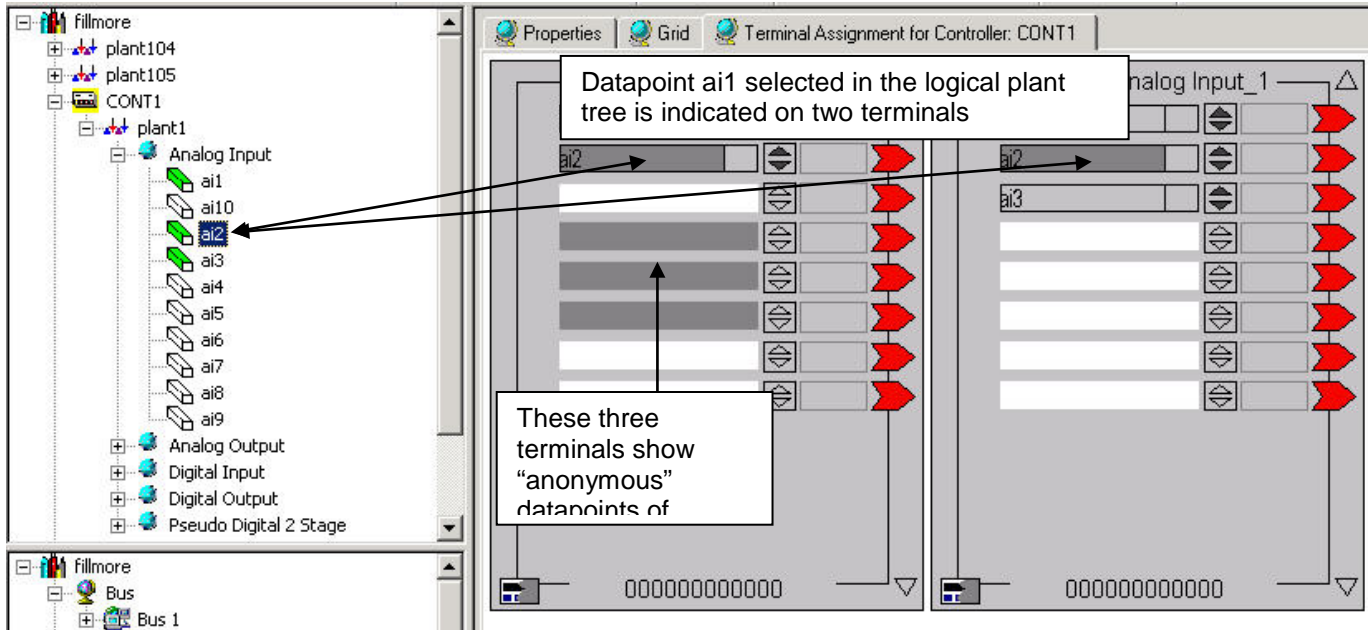
Datapoints which are bound to a LON device are automatically indicated on the LON device in dark gray when the datapoint is selected in the logical plant tree.

Hence, all bound LON devices can automatically be seen by simply selecting the datapoint.

Procedure

1. In the logical plant tree, click on the bound datapoint of which bound LON devices you want to see.

RESULT: On the terminal assignment tab, the bound datapoint is indicated in dark gray on the corresponding terminal. Terminals which have bound datapoints to another LON controller are indicated "anonymously" without the datapoint name by a dark gray bar.



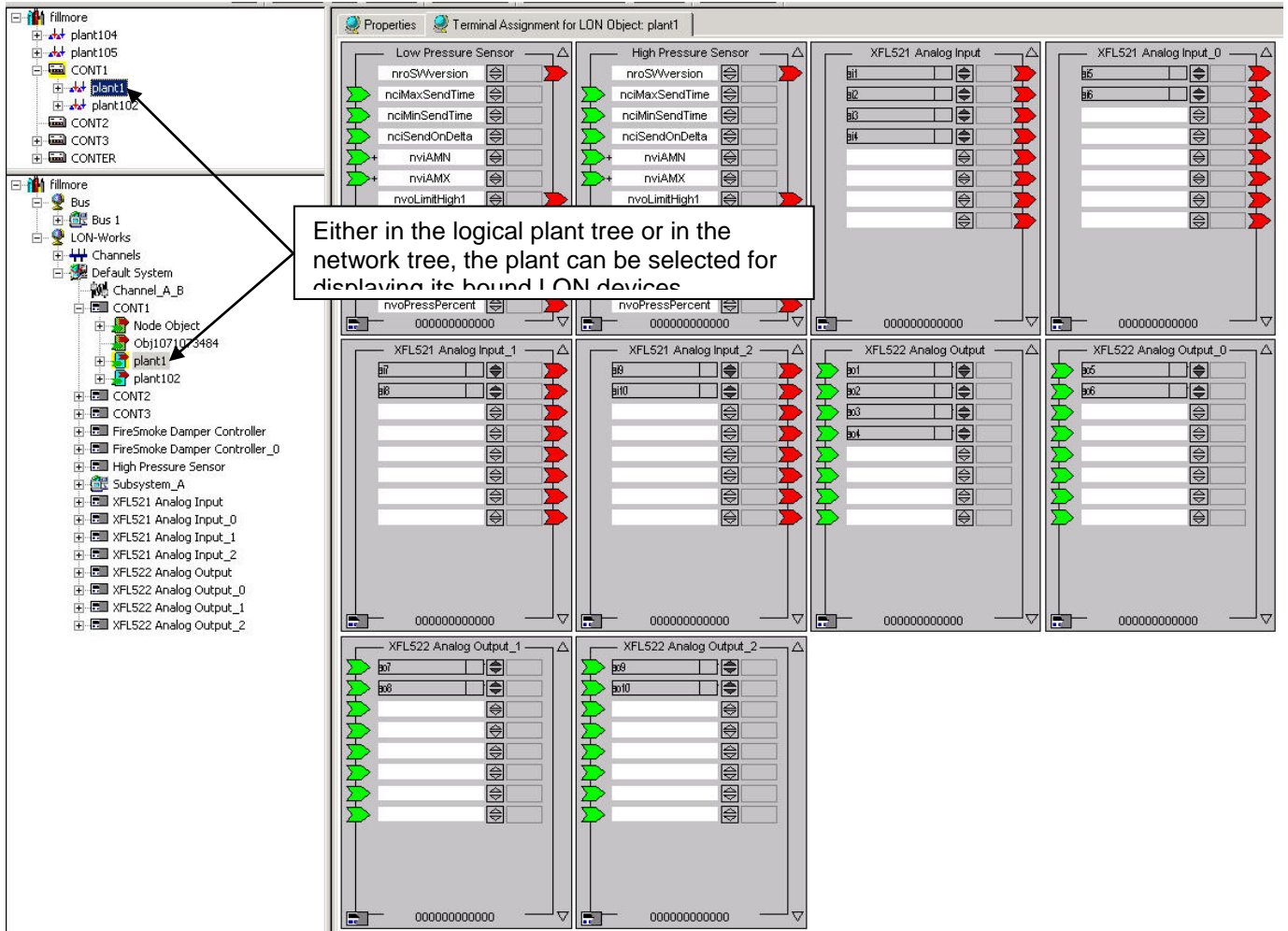
View Bound LON Devices on Plant Level

Purpose To view all bound LON devices of a plant. LON devices of a plant can be displayed in two ways, either in the logical plant tree or in the network tree on LON object level


Procedure 1. In the logical plant tree, click on the plant and select the Terminal Assignment tab.

Or, navigate to the corresponding LON object of the plant in the network tree and double-click on it.


RESULT: All bound LON devices are displayed.



View Bound LON Devices on LON Object Level

Purpose To view on LON object level which other LON device is bound to the LON device. When viewing assigned LON devices of a particular device in the network tree by double-clicking on its device icon  all LON devices bound to it are displayed on the terminal assignment tab. When double-clicking on a particular LON object of a device, only the corresponding LON LON, which is connected to that LON object, is displayed on the terminal assignment tab.

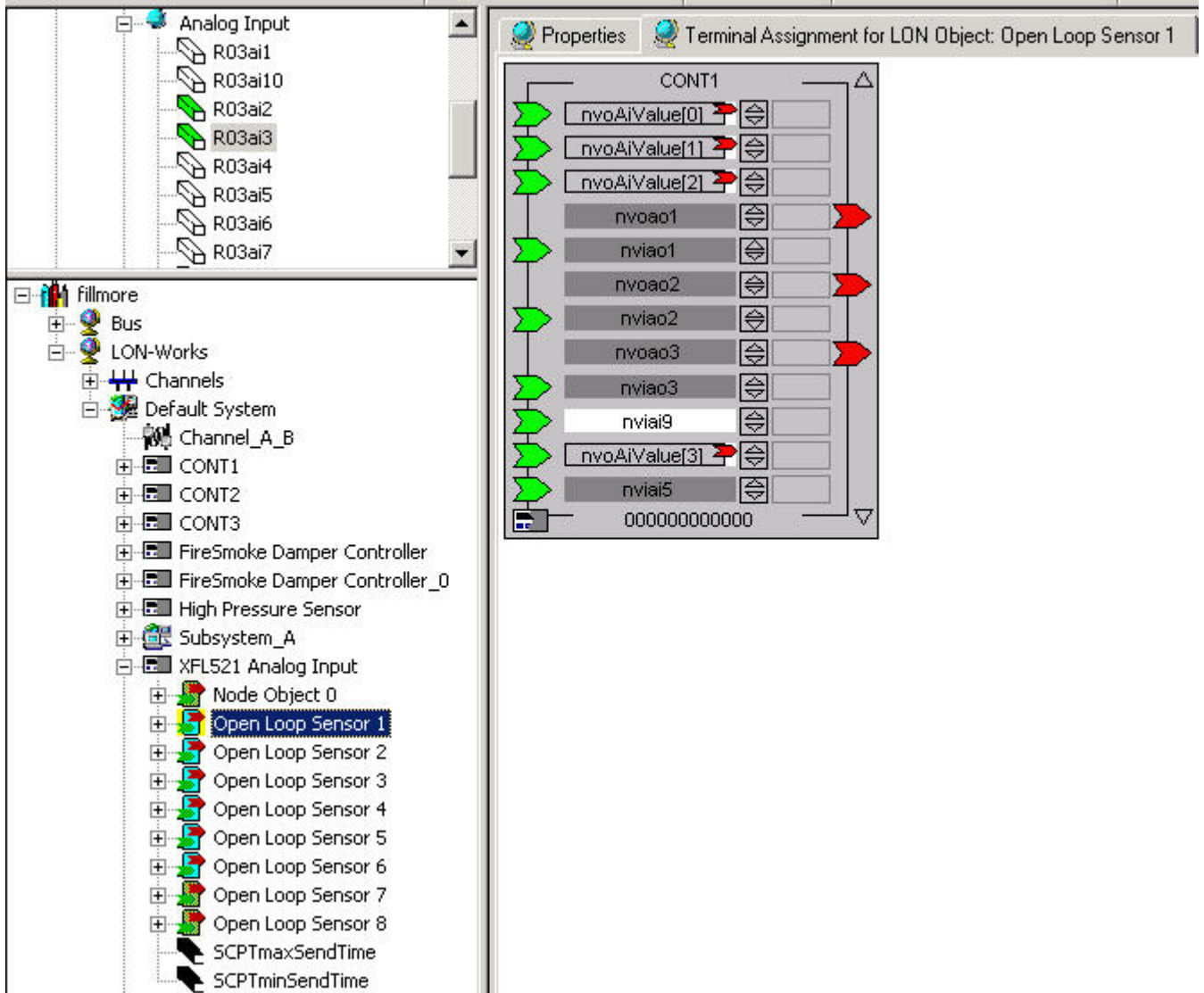
Example: An XFL521 Analog input module is assigned to two controllers, Cont1 and Cont3. Compare the displays as described in the following procedure.

Procedure 1. Double-click on the LON device  in the network tree and select the Terminal assignment tab.

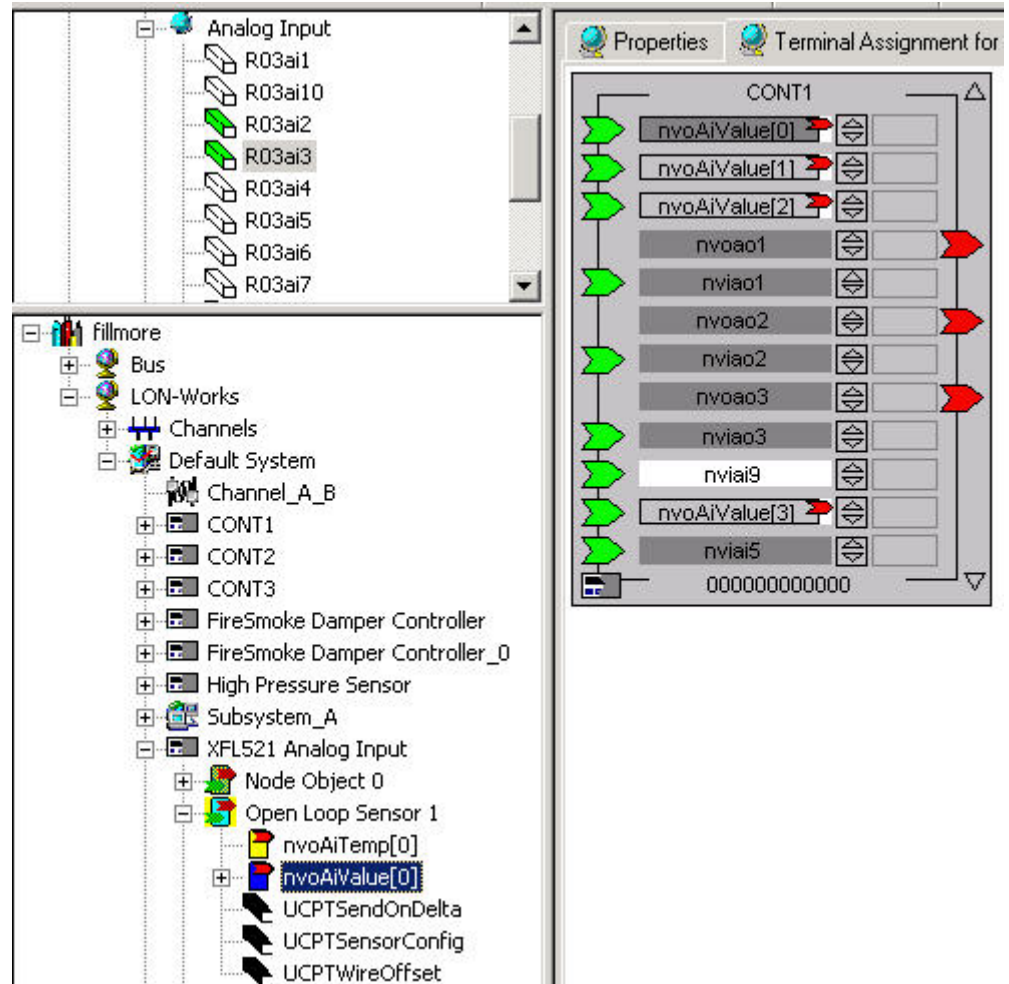
RESULT: Both controllers, Cont1 and Cont3, which are bound to the XFL521 Analog input module, are displayed.

- In the network tree, double-click on the Open Loop Sensor 1 LON object of the LON device.

RESULT: In this case, only CONT1 is shown on the terminal assignment tab, that is CONT1 is bound via the Open Loop Sensor 1 object to the XFL521 Analog input module.



3. To view details on which NV is used for the connection, open the Open Loop Sensor 1 object by clicking on the plus symbol.



RESULT: The used NV, in this case nvoAiValue(0) is indicated in dark blue.

4. Click on the nvoAiValue(0) NV.

RESULT: On the terminal assignment tab the corresponding terminal highlighted in dark grey.

5. In this example the CONT1 is additionally bound via the Open Loop Sensor 2, 3 and 4 objects. CONT3 is bound via the Open Loop Sensor 5 and 6 objects. To view details about those bindings repeat steps 2 to 4.

Copy LON Devices

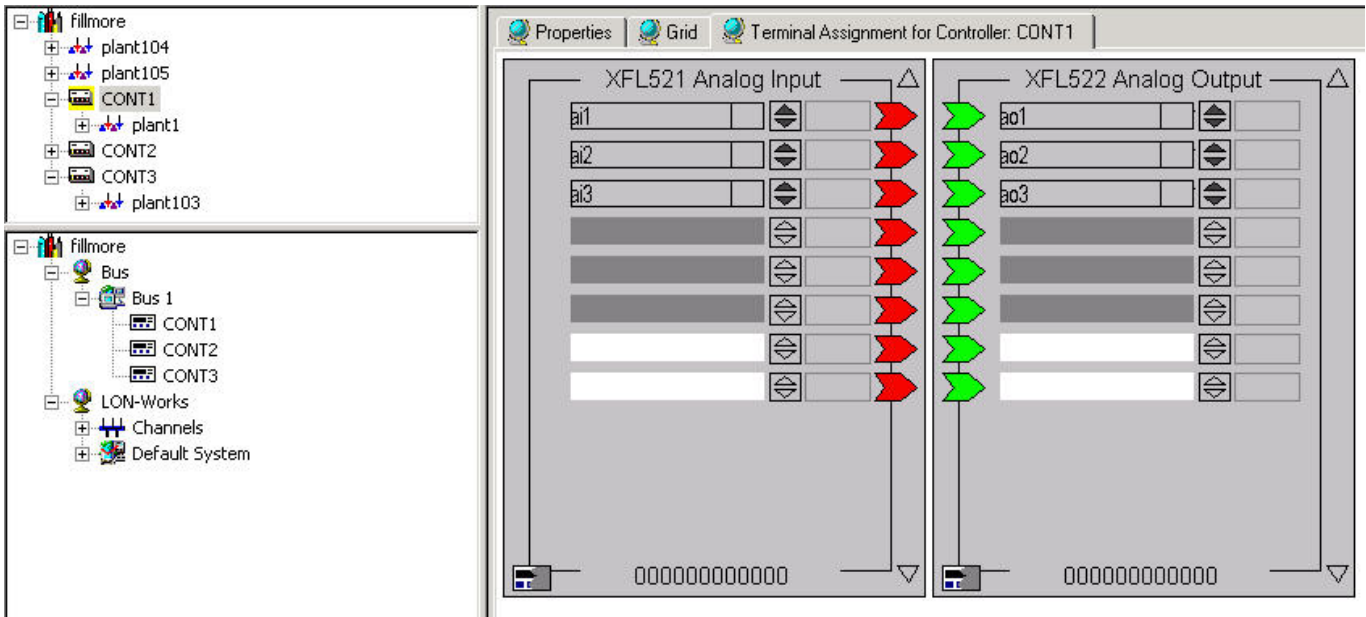
Purpose To copy a LON device (Honeywell LON device or 3rd party LON device) including its bindings to a LON controller.

NOTE: LON devices can only be copied in the same terminal assignment view, that is, LON devices cannot be copied between different LON controllers. LON controllers cannot be copied in the TAT. To copy LON controllers, please refer to the Copy Controller section under CONTROLLERS DEFINITION, ATTACHMENT, AND MANAGEMENT.

- Procedure**
1. On the Terminal Assignment tab, display the device you want to copy by double-clicking on the bound LON controller in the logical plant tree or in the network tree.

- On the right pane, select the Terminal Assignment tab.

RESULT: All bound LON devices are displayed.

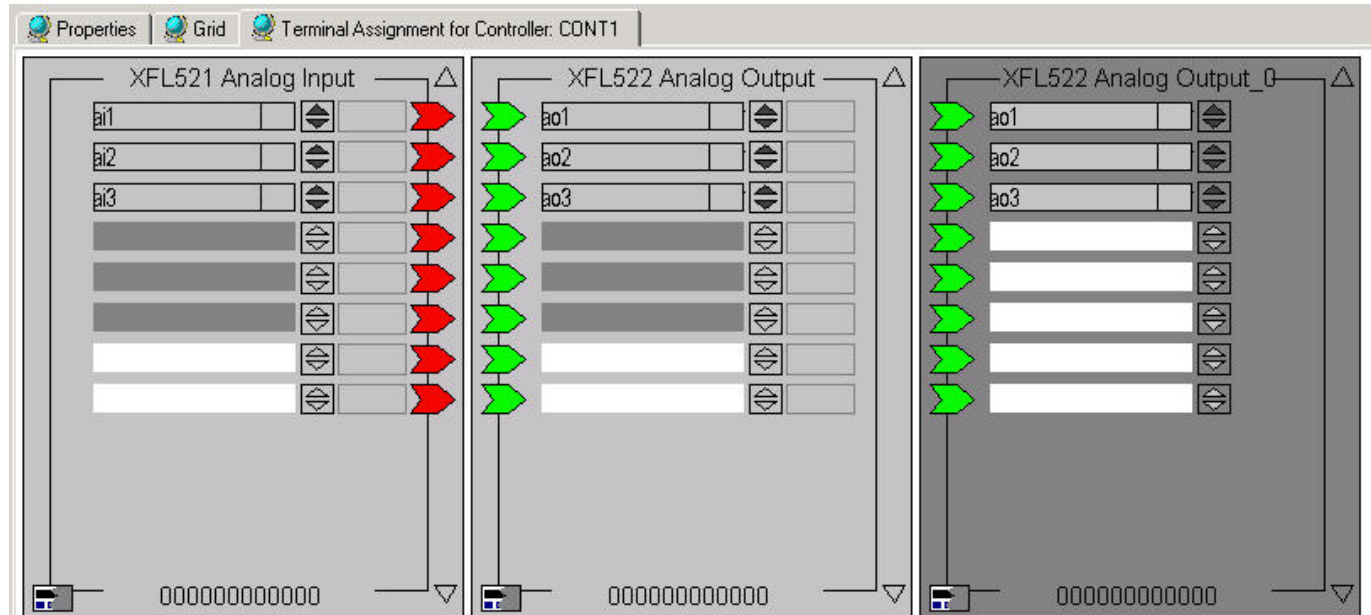


- Click on the LON device you want to copy.

RESULT: The device is marked in dark-gray.

- Click right mouse button and with left mouse button click on **Copy** in the context menu or press CTRL+C keys.
- On any position in the terminal assignment tab, click right mouse button and with left mouse button click on **Paste** in the context menu or press CTRL+V keys.

RESULT: The LON device is copied and placed in the terminal assignment tab. Every copied device is consecutively numbered as _0, _1, _2 etc. In the network tree, the copied device is added to the same LON channel respectively to the same system/subsystem. The bindings of the copied device are copied as multicast to the existing NVs of the source device and they have the same binding properties as the source bindings.

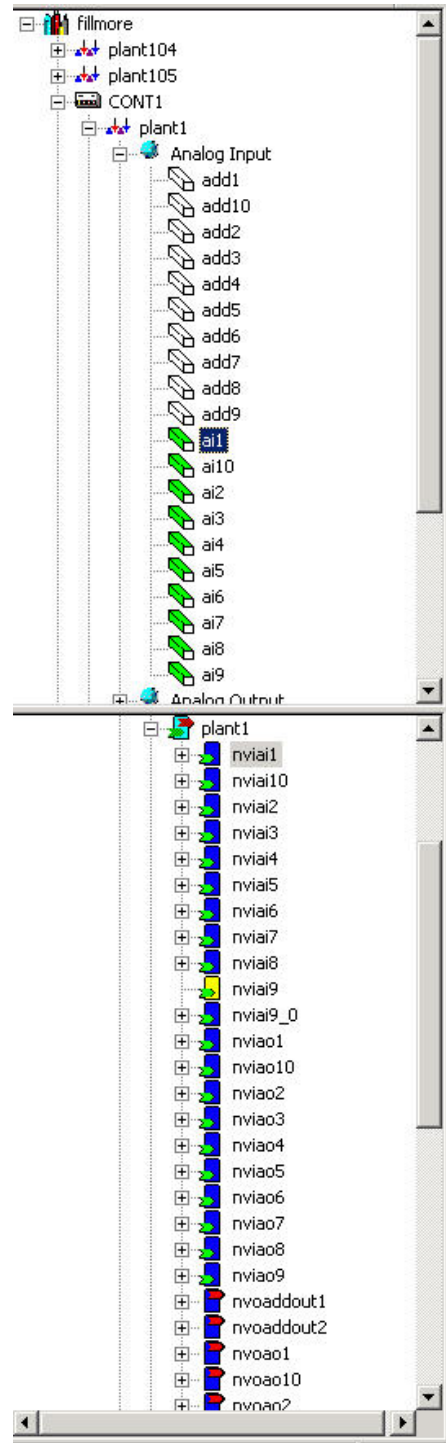


Show associated NV of Bound Datapoint

Purpose To show the associated NV of a bound datapoint.

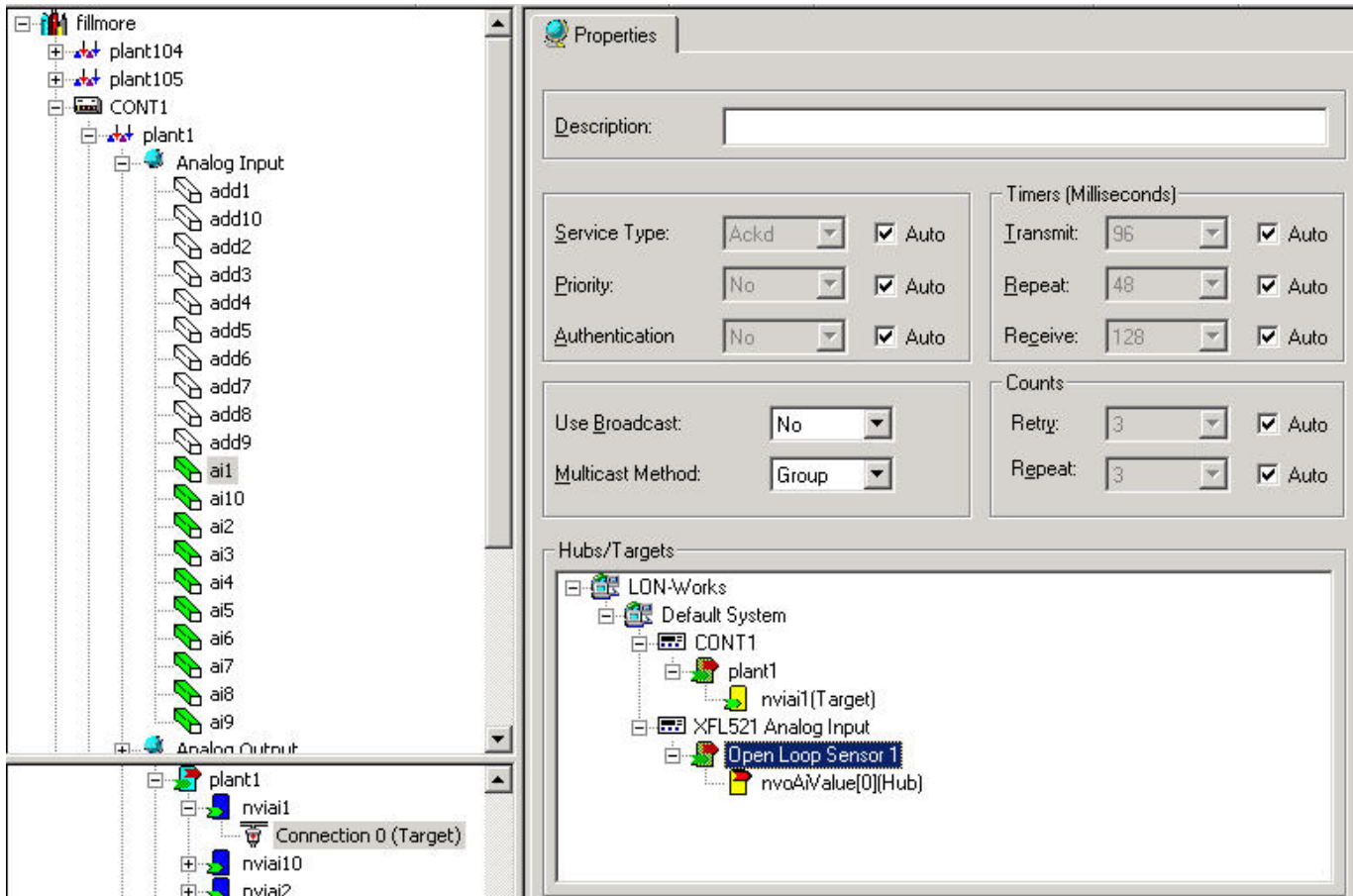
- Procedure**
1. In the logical plant tree, click on the datapoint.
 2. Click right mouse button and with left mouse button click Go to NV in the context menu.

RESULT: The network tree will be expanded and the associated NV will be marked.



3. Click on the plus symbol at the associated NV and click on the connection icon.
4. On the right pane, select the Properties tab.

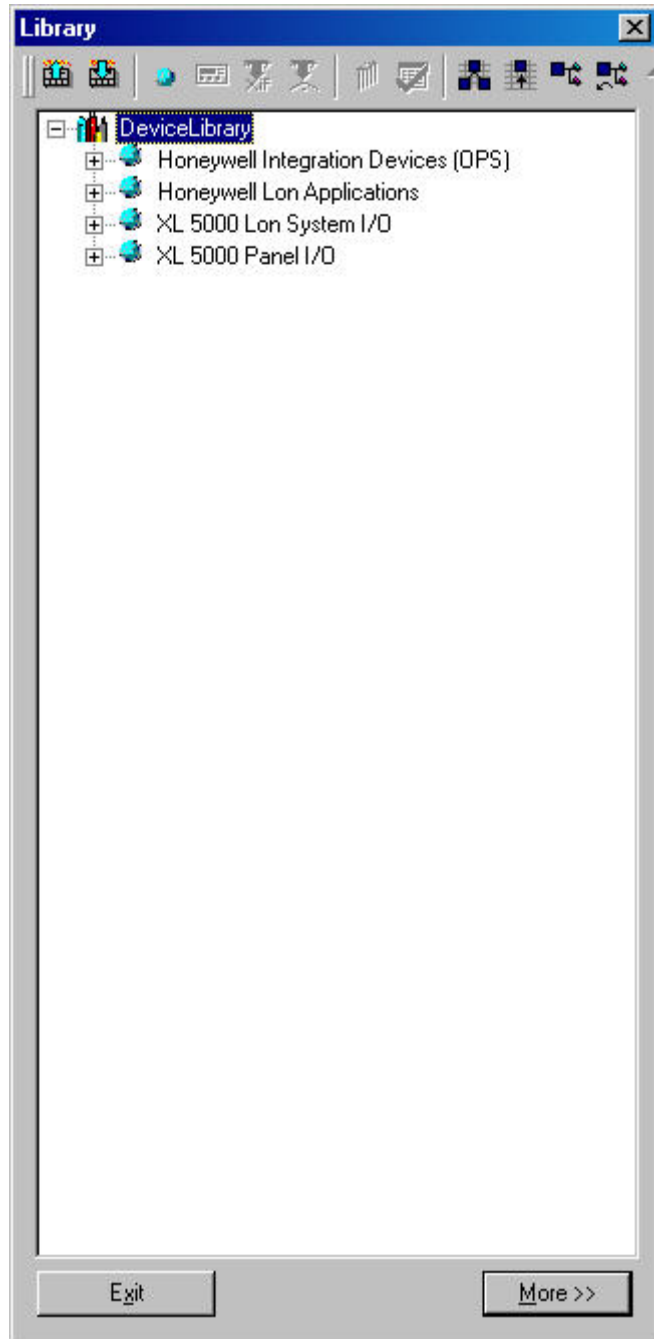
RESULT: Under Hub/Target you can view the corresponding destination NVs that has caused the binding.



The Device Library


The device library stores LON devices for adding them to the network tree, respectively to the terminal assignment tab. By default, it includes all currently available Honeywell LON devices. 3rd party LON devices can be imported via XIF file into the library additionally. In addition, OLink and OPS devices can be created. In addition, devices can be copied from the network tree to the device library.

The device library dialog window looks as follows:



The devices are arranged in a hierarchical tree. The icons in the device library tree have the following meaning:

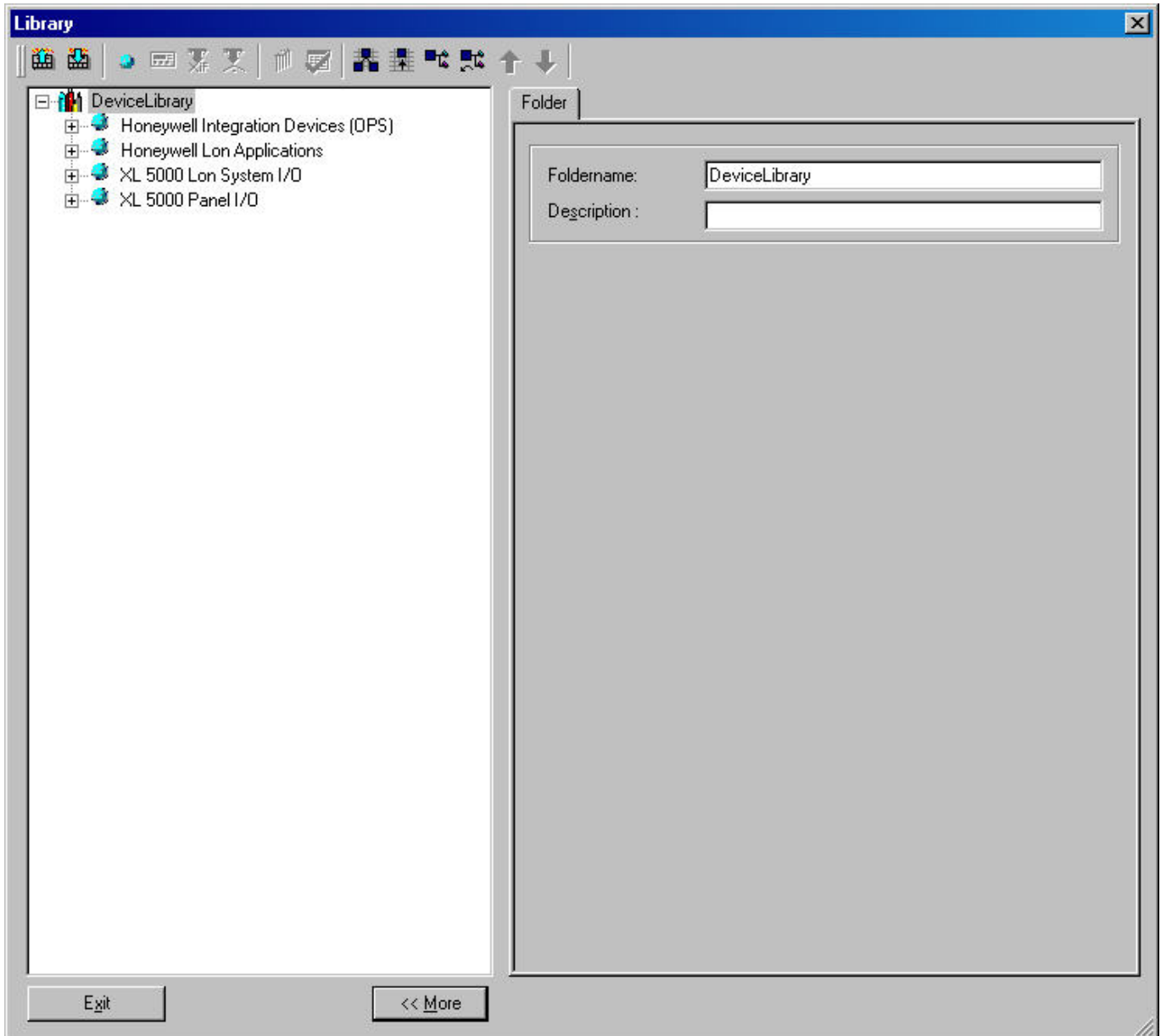
 = Device library

 = Folder

 = LON Device

As any hierarchical tree, the device library tree can be structured by creating, deleting, copying and renaming folders and LON devices.

Click the More button to display details for the selected tree item, in this case for the XFL521 Analog Input.



The device library provides the following functions:

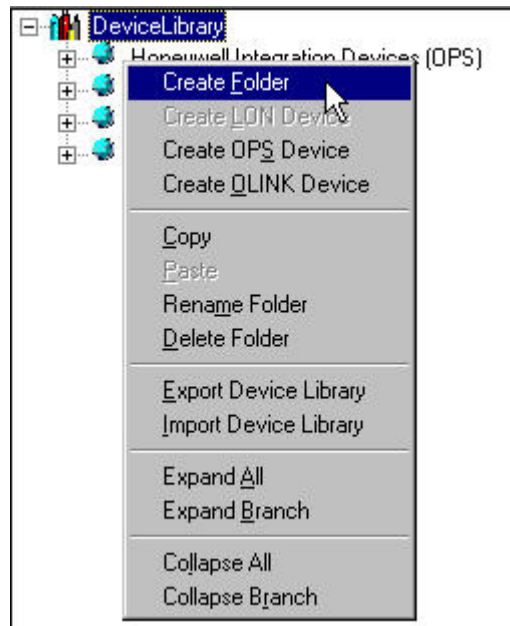
- Create LON devices by importing data from XIF files or Online
- Create OPS devices by using the OPS Template Editor
- Import LON objects from XIF files or Online
- Edit devices
- Assign value conversion tables to devices
- Rename devices
- Copy devices
- Delete devices
- Export and import device library
- Set Values for NVs, SCPTs/UCPTs and NCIs (see Set Values for NVs, SCPTs/UCPTs and NCIs section)

Structure Device Library Tree

The device library tree can be structured by creating, deleting, copying and renaming folders and LON devices.

Create Folder

- Procedure**
1. In the tree, right-click on the device library icon or an existing folder, where the new folder should be created.



2. In the context menu, click on Create Folder.

RESULT: The new folder named NewFolder is created.



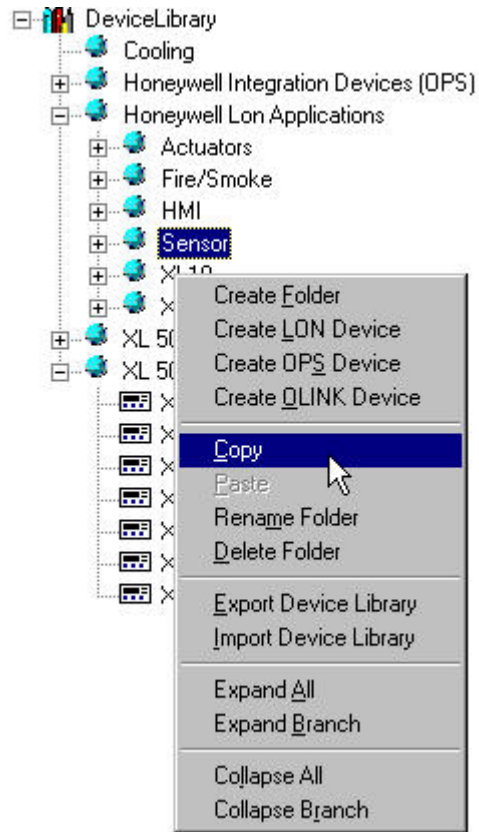
3. To name the folder individually, rename the flashing name in the tree. Or, on the bottom of the Device Library window, click the More button and rename the folder in the Folder Name field on the right pane. Add a description, if desired.

Rename Folder

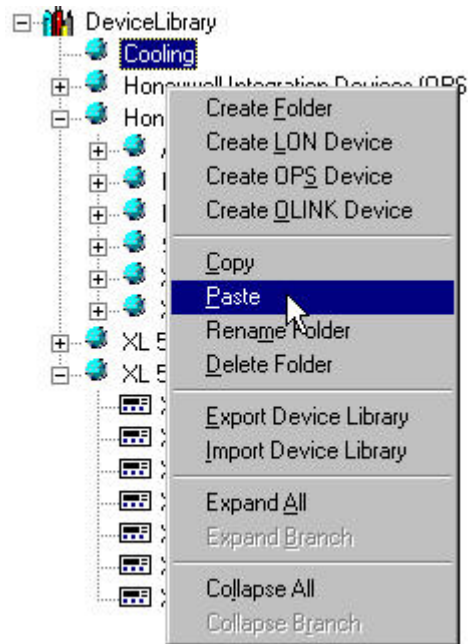
Refer to step 3 of the Create Folder section.

Copy Folder

- Procedure**
1. In the tree, right-click on the folder, you want to copy and click Copy in the context menu.



2. In the tree, right-click on target folder you want to copy the selected folder to and click on Paste in the context menu.



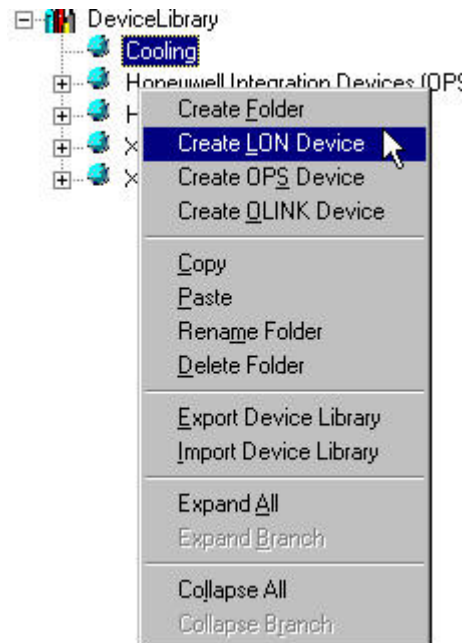
RESULT: The folder is copied.

Delete Folder

- Procedure**
1. In the tree, right-click on the folder, you want to delete and click Delete in the context menu.

Create LON Device

- Procedure**
1. Click on the **More** button on the bottom of the Device Library window.



2. In the tree, right-click on the folder, in which you want to create the LON device and click on Create LON device in the context menu.

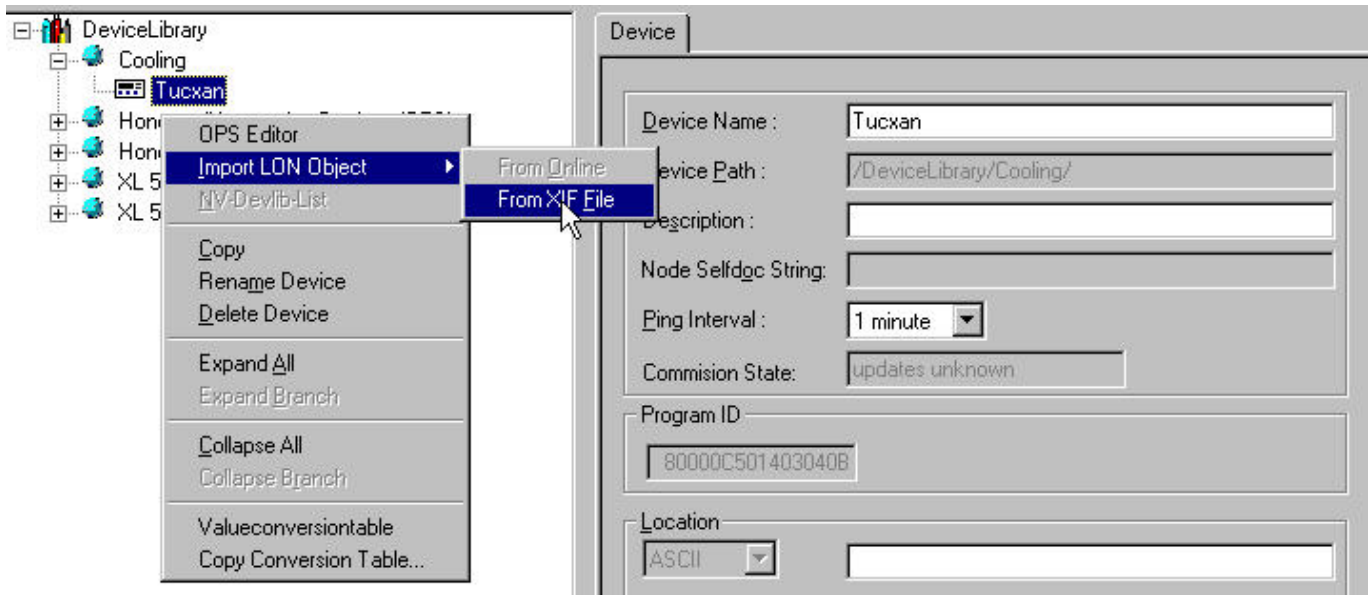
RESULT: The LON device is inserted into the tree.



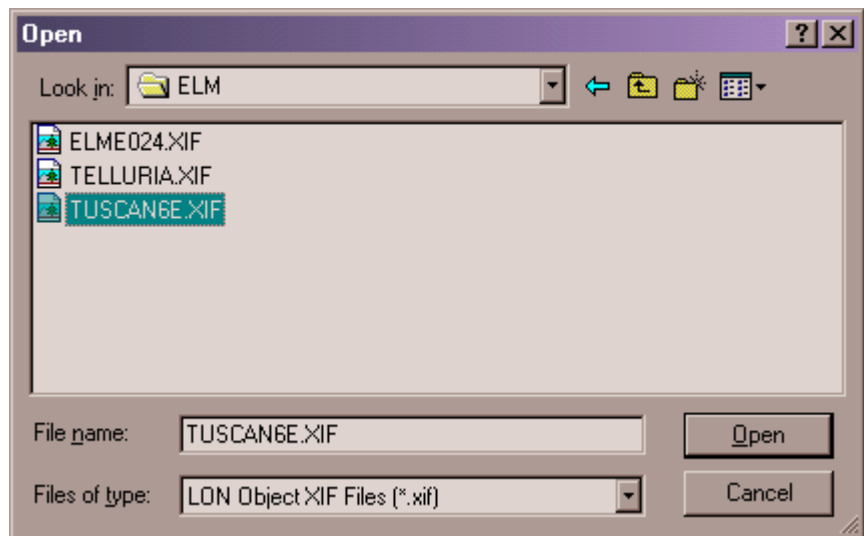
3. Issue a name and enter a description if desired on the right pane.
4. Select the ping interval from the Ping Intervals drop-down listbox. The ping interval determines how often a device is pinged by the LNS Server to ensure it is still operating and in communication with the network. Set the ping interval based on the expected attachment of the device to the network. If you expect that the device will never move on the network, select Never. Set the interval to 15 minutes for a device you expect will move rarely, to 2 minutes for a device you expect will move fairly often, and to 1 minute for a device you expect will move very often. The default ping interval is 1 Minute.
5. Enter the location string in ASCII format into the Location field, if desired.
6. Check the Keep Device Configuration checkbox if you want to keep the configuration parameters of the device when applying one of the following functions: plug-in offline or online, commissioning or synchronizing with LNS. Setting this option prevents unintentional overwriting of the current configuration of the physical device. The above functions are not available until the parameters have been uploaded from the device. When setting this option, each device of this type will have the "Keep Device Configuration" automatically checked when it will be added to the network tree, respectively to the terminal

assignment tab (for further information, please refer to the Keep Device Configuration section).

7. Right-click on the device icon in the tree.
8. Click on Import LON object and from XIF file if the XIF file is available. Or, click on From Online, if you want to import the information online directly from the device connected to the LonWorks network.

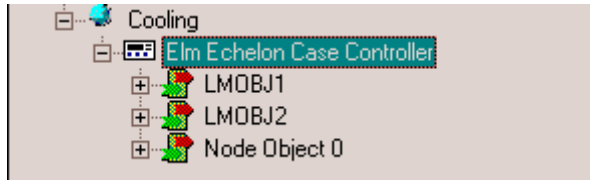


RESULT: If the “From XIF file” option has been selected, the Open dialog box is displayed.

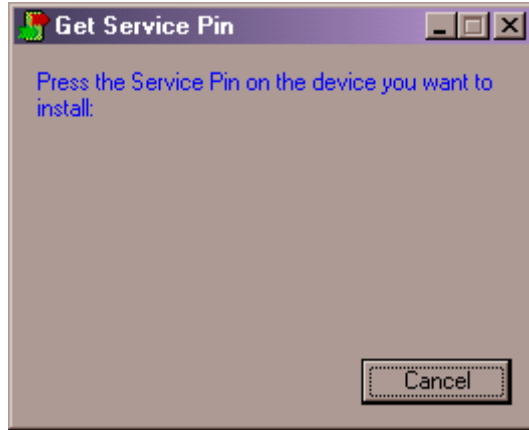


9. Browse to the folder where the XIF file has been saved, select the XIF file and click the Open button.

RESULT: The corresponding LON objects are imported and displayed in the tree. The LON device name is re-named by the name saved in the XIF file, in this case Elm Echelon Case Controller.



RESULT: If the "From Online" option has been selected, the Get Service Pin dialog box is displayed.



10. Press the service pin on the hardware.

RESULT: The corresponding LON objects are imported and displayed in the tree. The LON device name is re-named by the name saved in the XIF file, in this case Elm Echelon Case Controller.

IMPORTANT

The 'From Online' option should only be used if the device's XIF file is not available and/or the CARE database is not to be synchronized with LNS.

Create OLink Template

The device library provides the creation of OLink templates for multiple use of OLink hardware configurations. Templates can be created by step-by-step procedure or automatically by importing the vendor network interface via *opt* file.

IMPORTANT


Changes on an OLink template done in the device library are not reflected in a template already assigned to a controller. After the template has been assigned to the controller, it cannot be unassigned and replaced by another template.

Creating an OLink template, includes the following steps:

- Create OLink controller (device)
- Create OLink subsystem controller
- Create OLink point(s)

Procedures

Create OLink device

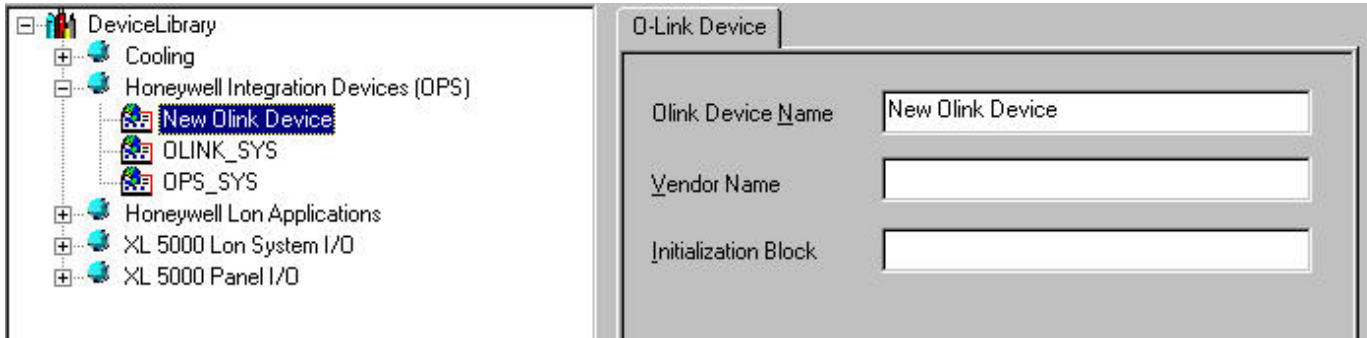
1. On the CARE toolbar, click on the Device Library icon 

RESULT: The *Library* dialog window displays.

2. At the bottom, click on the **More >>** button to activate the itemized display for items selected in the tree.

- Right-click on the folder, in which you want to create the OLink device (template), in this case, the default folder *Honeywell Integration Devices (OPS)* and click on **Create OLink device** in the context menu.

RESULT: The OLink device is inserted into the tree.



- Enter basic information on the *OLink Device* tab on the right as follows:

OLink Device Name
Name of device

Vendor Name
Name of vendor of which subsystem is to be connected to the C-Bus

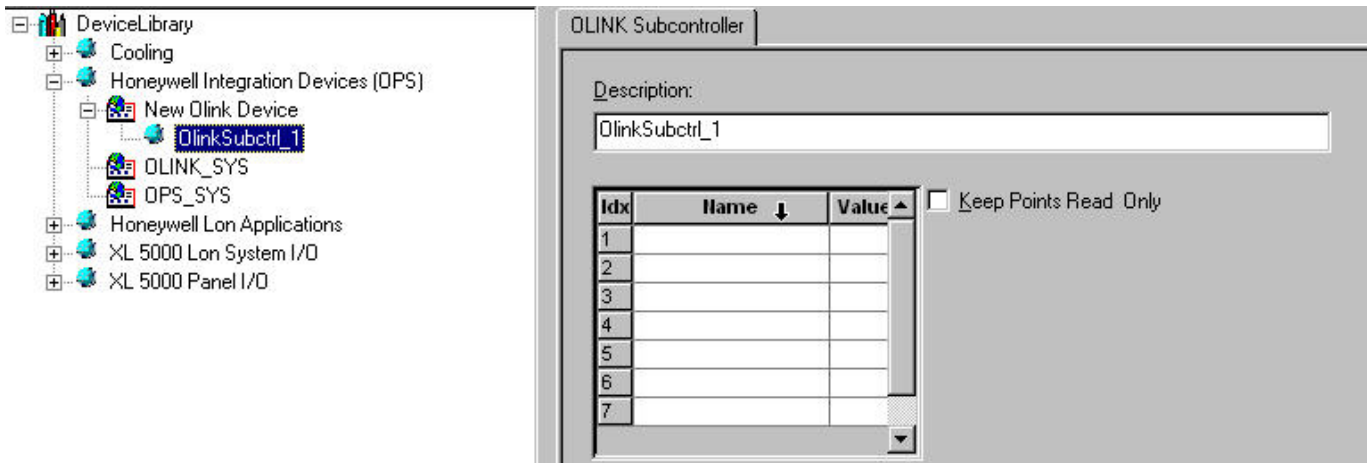
Initialization Block
Communication and setup parameters

- Continue by creating OLink subsystem controller(s) as described in the following steps.

Create OLink Subsystem Controller

- In the network tree, click on the OLink device.
- Click right mouse key and with left mouse key, click on **Create OLink Subsystem Controller** in the context menu

RESULT: The OLink subsystem controller is assigned to the OLink controller in the tree.



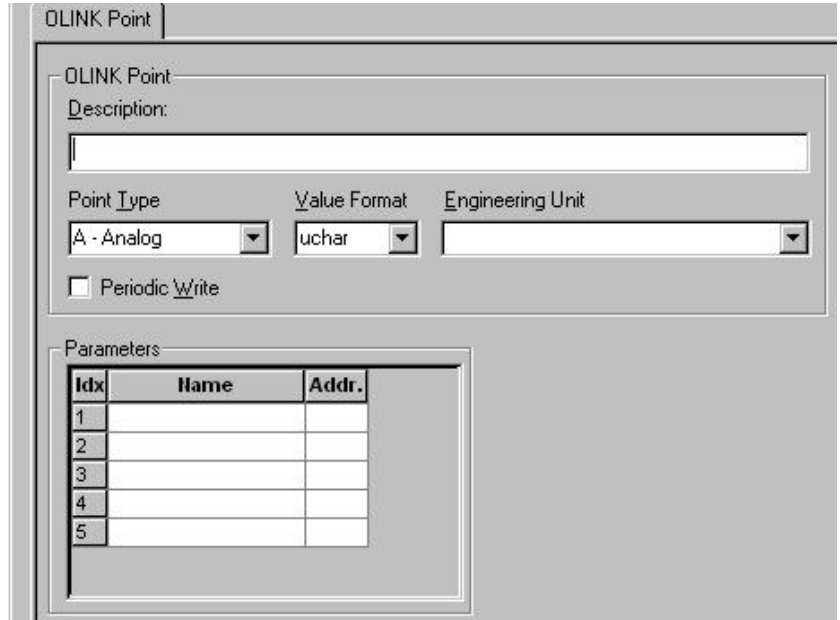
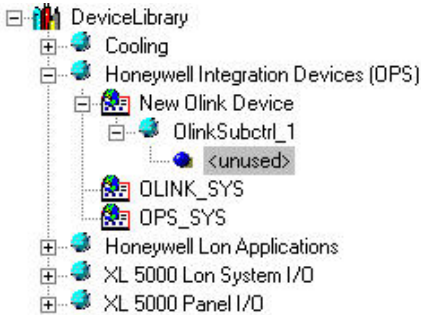
- On the *OLink Subcontroller* tab on the right, enter a name in the **Description** field.

- In the list below, enter names and values for the OLink interface in the **Value** and **Name** fields. Therefore you need the VNI description from the vendor, which typically includes the list of points which are to be mapped to the C-bus, the engineering units, etc.

10. Check the **Keep Points Read Only** checkbox, if desired. In this case, point values cannot be overwritten.
11. Continue by creating OLink points as described in the following steps.
12. In the tree, click on the OLink subsystem controller.
13. Click right mouse key and with left mouse key, click on **Create OLink Point** in the context menu

Create OLink Point

RESULT: The OLink point is assigned to the OLink subsystem controller in the tree.



14. On the *OLink Point* tab on the right, define settings as follows:

Description
Enter a point name

Point Type
Select point type from drop-down list box

Value Format
Select value format from drop-down list box

Engineering Unit
Select engineering unit from drop-down list box, if desired. For more information on how to create engineering units for an OLink controller, refer to the "Define OLink Engineering Units" section.

Periodic Write
Check the checkbox, if you want the value to be written periodically

Parameters
Enter names and values for the OLink interface in the **Name** and **Value** fields. Therefore you need the VNI description from the vendor which typically includes the list of points which are to be mapped to the C-bus, the engineering units, etc.

15. To save the template, click **Exit** button at the bottom of the *Device Library* window.

- Procedure**
1. In the tree, right-click on the folder, in which you want to create the OPS (Open Point Server) device and click on Create device in the context menu.

RESULT: The LON device is inserted into the tree.



2. In the Toolbar, click on the *OPS Editor* icon to invoke the OPS Template Editor.



For detailed description on how to edit the OPS device in the OPS Template Editor, please refer to the OPS Editor section.

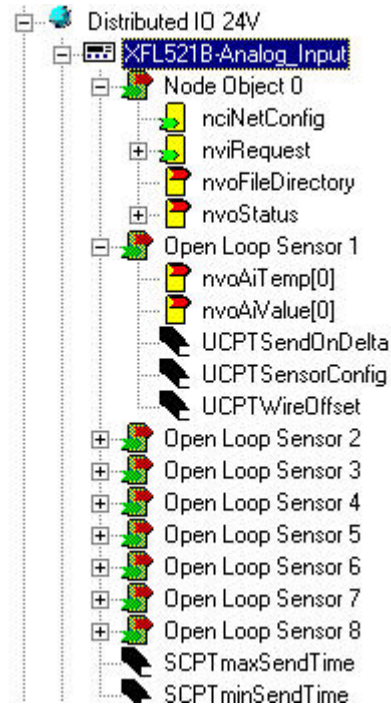
3. When finished creating the OPS data, click **OK** button to close the OPS Template Editor.

Configure NV List Display

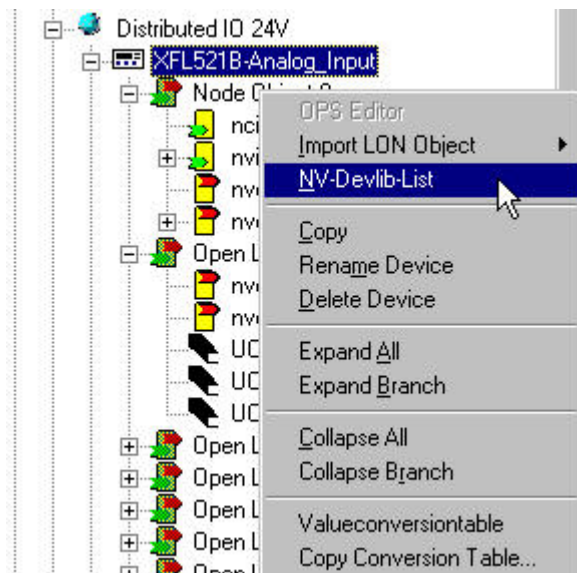
Purpose To define which NVs should be displayed for a LON device in the device library tree.

NOTE: The same functionality is available for a particular device displayed on the terminal assignment tab.

- Procedure**
1. In the tree, double-click on the LON device to display its LON objects.
 2. Double-click on the LON object(s) whose NVs you want to display.



3. Right-click on the LON device and click on NV-Devlib-List in the context menu.



RESULT: The NV-Devlib-List dialog box displays. For all NVs of the selected LON device, the following is shown:

NV name
e.g. nviRequest

LON object
LON object which the NV belongs to, e.g. Node object

NV Type
SNVT_object_request

I/O
Type of NV, input or output

CARE Visual

Whether the NV should be displayed on the Terminal Assignment Tab in CARE or not, that is, whether the NV should be displayed for the LON device in the device library tree and the LON network tree or not. Check/uncheck the corresponding checkbox(es) for the desired result. To select/deselect all NVs, highlight the column and click the



icon.


Central Usage (for future use)

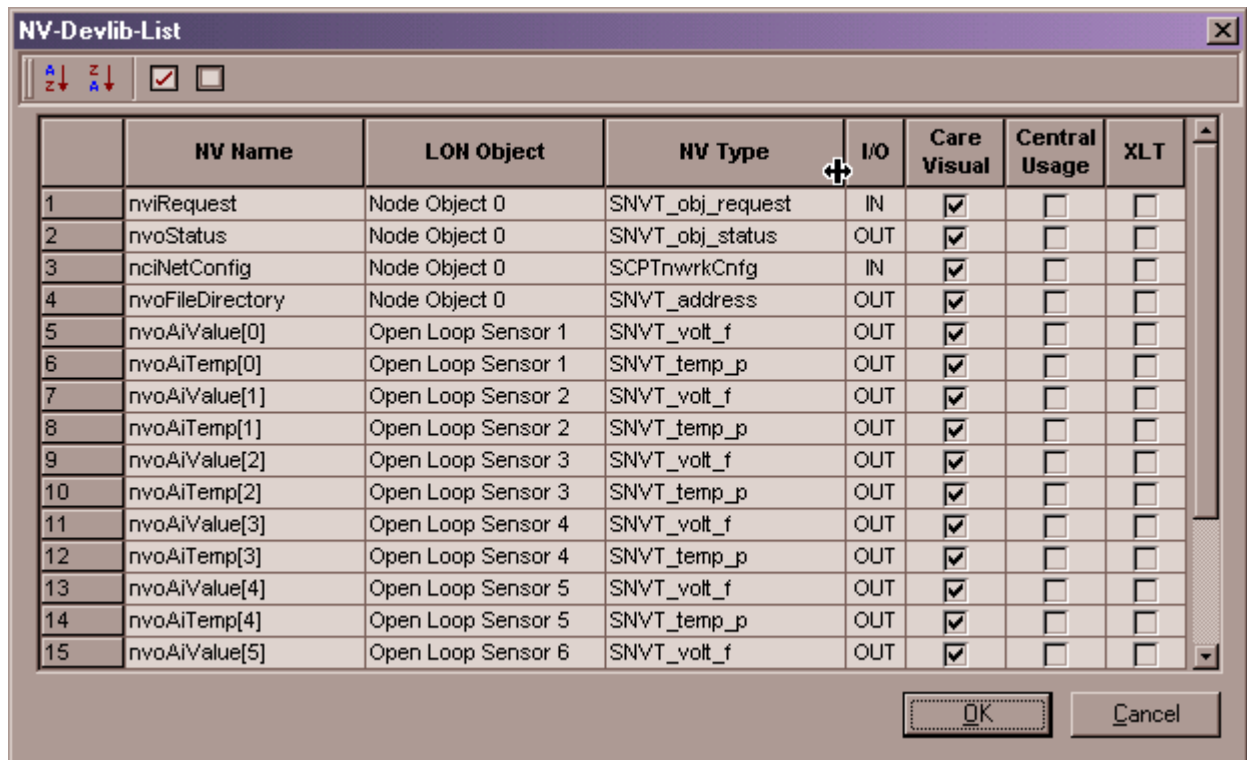
Whether the NV should be used on a central, such as XBS or not. Check/uncheck the corresponding checkbox(es) for the desired result.

XLT (for future use)

Whether the NV should be used for the Excel toolkit or not. Check/uncheck the corresponding checkbox(es) for the desired result.

To select/deselect all NVs of a column, highlight the corresponding column and click the / icon.

To sort a column ascending/descending, highlight the corresponding column and click the  icon.



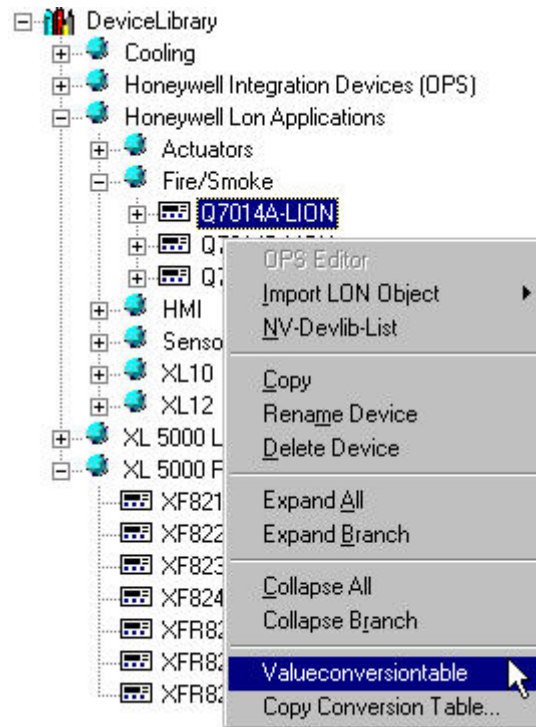
4. Confirm your settings by clicking OK.

Assign Value Conversion Table

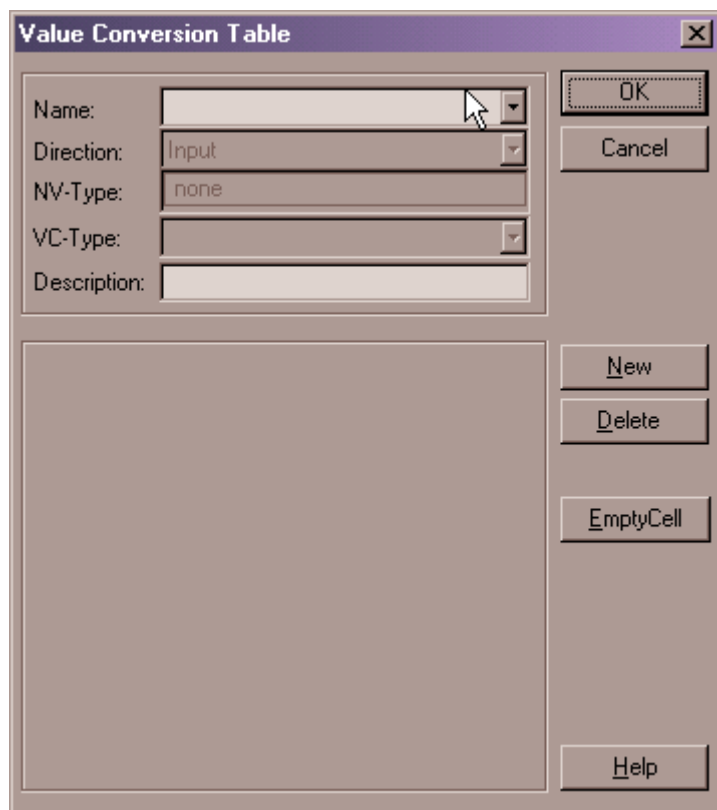
Purpose

To assign a value conversion table to a LON device. This can be applied especially to the Excel 500 - Smart I/O autobinding. When binding a Smart I/O module that has value conversion table assigned, for example, to an Excel 500 controller, the value conversion table will be used automatically by the Excel 500 controller.

- Procedure**
1. In the tree, right-click on the LON device and click on ValueConversionTable in the context menu.



RESULT: The Value Conversion Table dialog box displays.



For detailed description on how to build a value conversion table, please refer to the Build Conversion Table section.

Rename LON Device

- Procedure**
1. In the tree, right-click on the LON device and click on Rename Device in the context menu. Rename the flashing name in the tree.

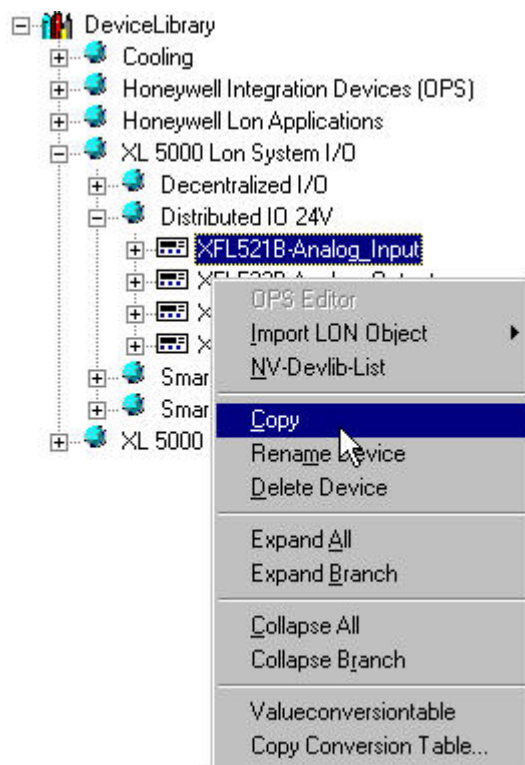
Or, on the bottom of the Device Library window, click the More button and rename the folder in the Folder Name field on the right pane. Add a description, if desired.

Copy LON Device

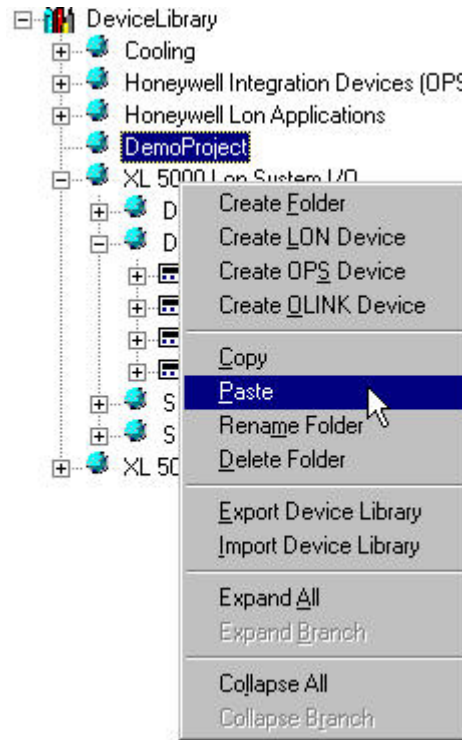
A LON device can be copied within the device library with its default configuration or by dragging&dropping it from within the LON-bus part of the network tree. In this case individually configured devices, either by plug-in or by CPs change, can be added to the device library for re-use (see Import device library and Export device library sections).

Copy Default LON Device within Device Library

- Procedure**
1. In the tree, right-click on the LON device, you want to copy and click Copy in the context menu.



2. In the tree, right-click on target folder to which you want to copy the selected device and click on Paste in the context menu.

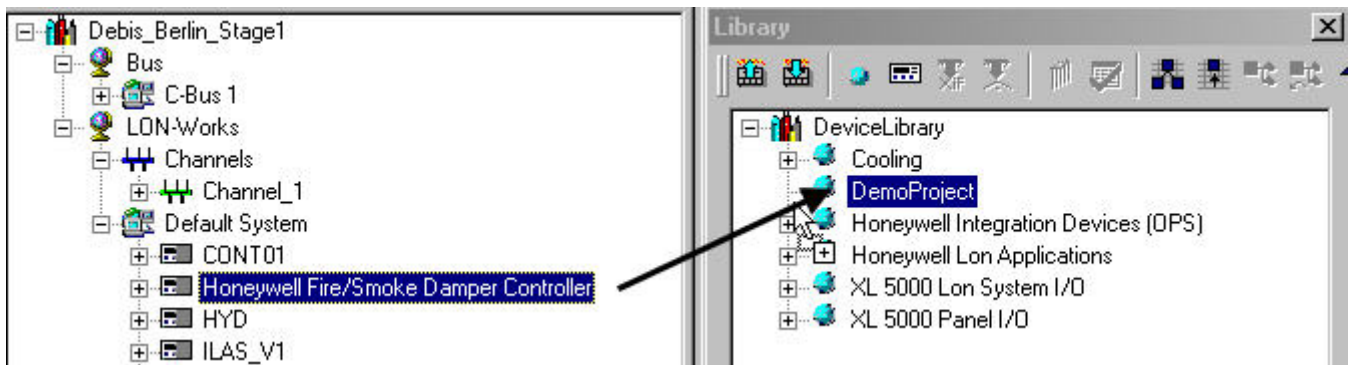


RESULT: The device is copied.

Copy Configured Device into Device Library

Purpose To copy individually configured device from within the logical LON-bus part of the network tree to the device library.

- Procedure**
1. In the logical LON-bus part of the network tree, configure device via plug-in or by editing CPs directly.
 2. Open the device library and browse to the target folder you want to copy the LON device to.
 3. In the logical LON-bus part of the network tree, click on the device.
 4. Drag it to the device library and drop it to the target folder.




RESULT: In the above example, the Honeywell Fire/Smoke Damper Controller is copied to the Customized folder.

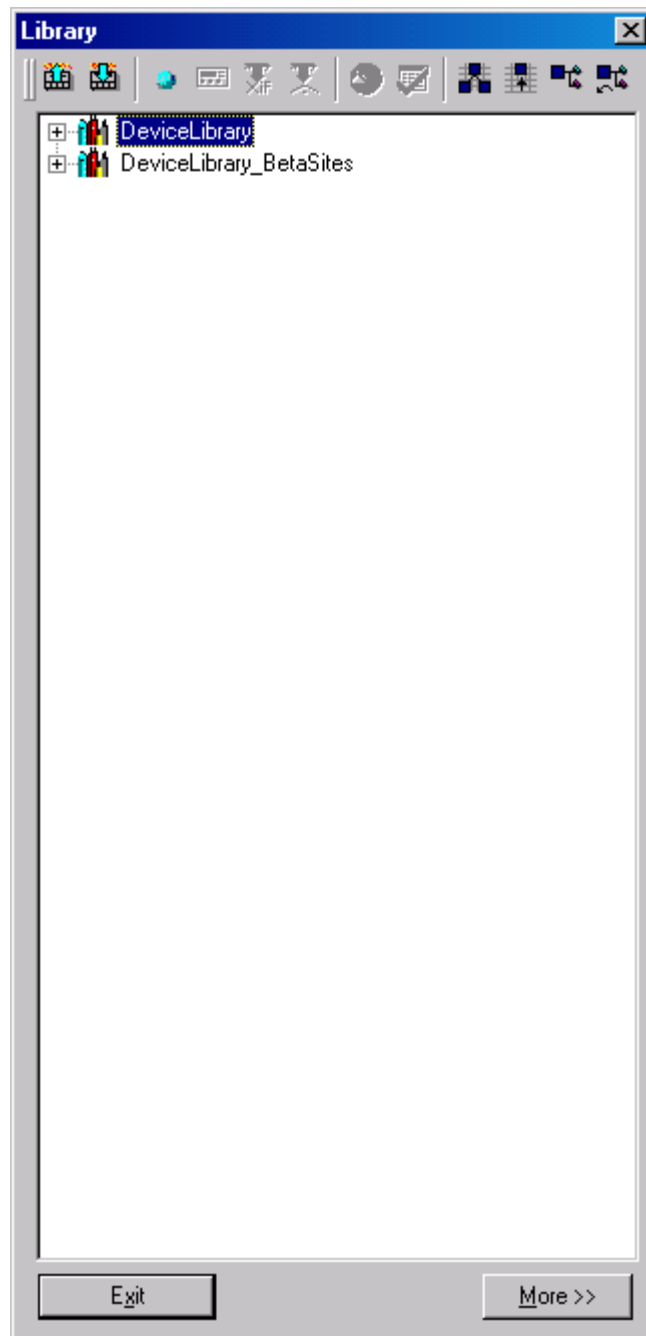
Delete LON Device

- Procedure**
1. In the tree, right-click on the LON device, you want to delete and click Delete in the context menu.

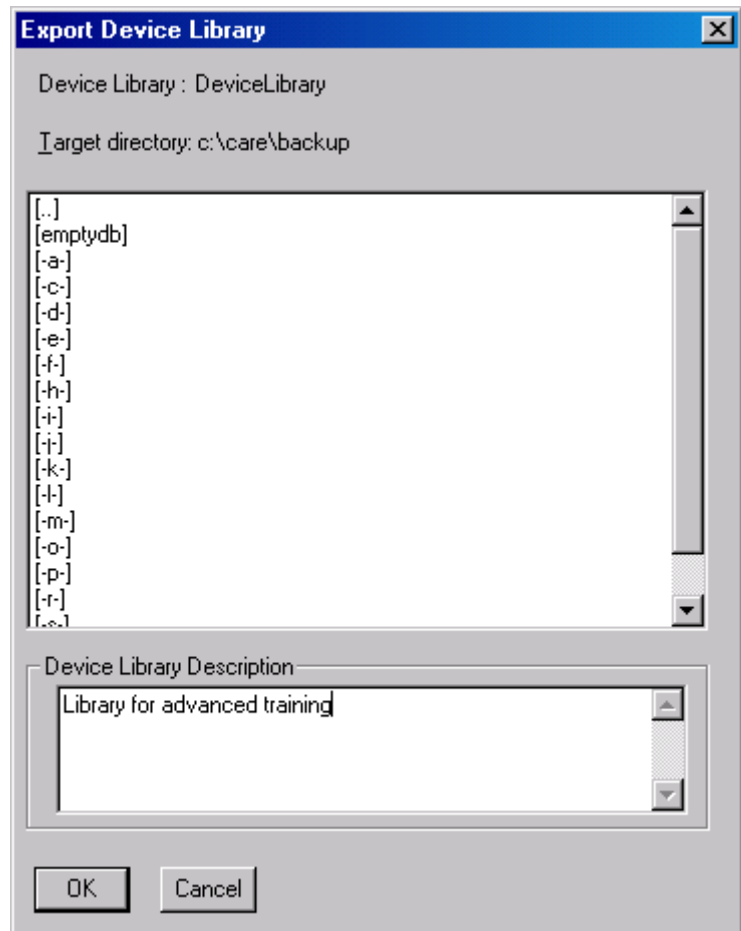
Export Device Library

Purpose To backup a device library for repeatedly or multiple use, for example, on a laptop PC.

- Procedure**
1. In the device library window, select the device library in the tree and click on the Export Device Library icon 

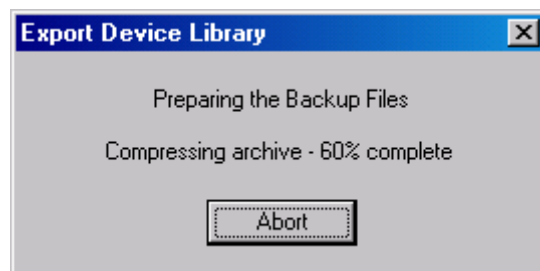


RESULT: The Export Device Library dialog box displays.

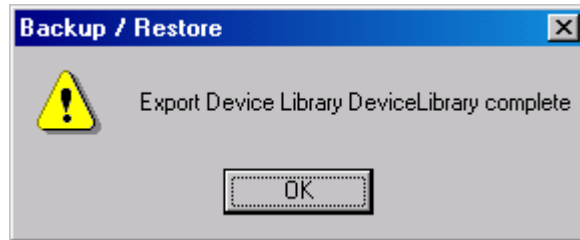


2. Under Target directory, select the target directory where the device library should be saved.
3. Under Device Library Description, enter a description, if desired.
4. Click OK.

RESULT: The Export is starting as the following dialog box displays.



5. Confirm the Export by clicking OK in the Backup / Restore dialog box.



Import Device Library

Purpose To restore a backed-up device library. Copies can be created by importing the library multiple times and saving it under different target library names.

Procedure 1. In the device library window, click on the Import Device Library icon



RESULT: The Import Device Library dialog box displays. The device library is saved with its name as it is shown as top-level folder in the device library tree, in this case DeviceLibrary.

2. Under Source directory, browse to the directory where the device library had been saved.

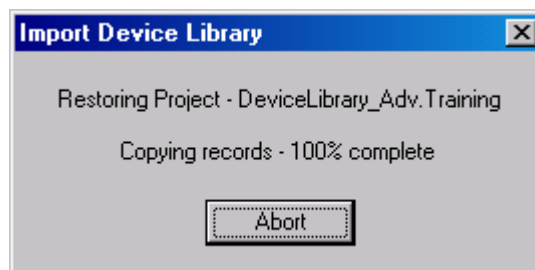
3. In the Device Library's list below, click on the library you want to import.

4. In the Target Device Library Name field, enter a new name for the library.

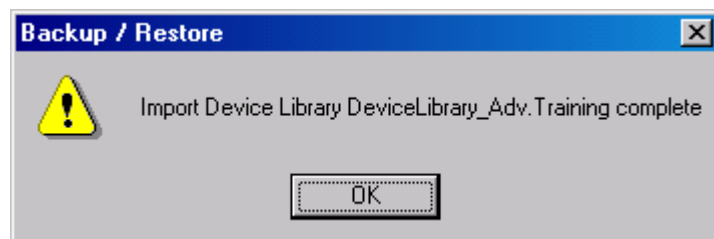
NOTE: The same source library can be imported multiple times (copy) by saving it under different target names.

5. Click the Import button.

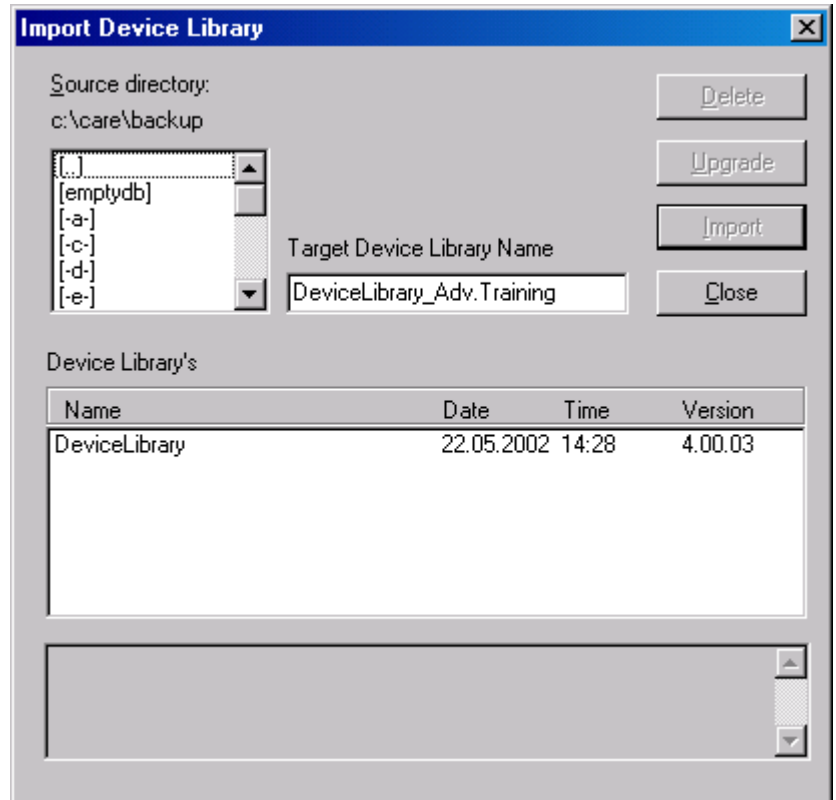
RESULT: The Import is starting as the following dialog box displays.



6. Confirm the Import by clicking OK in the Backup / Restore dialog box.

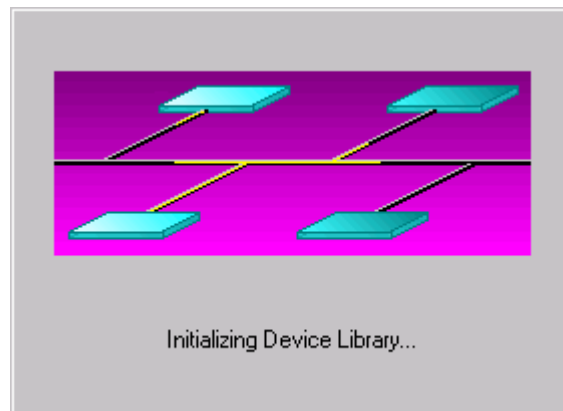


RESULT: The Import Device Library dialog box re-displays.

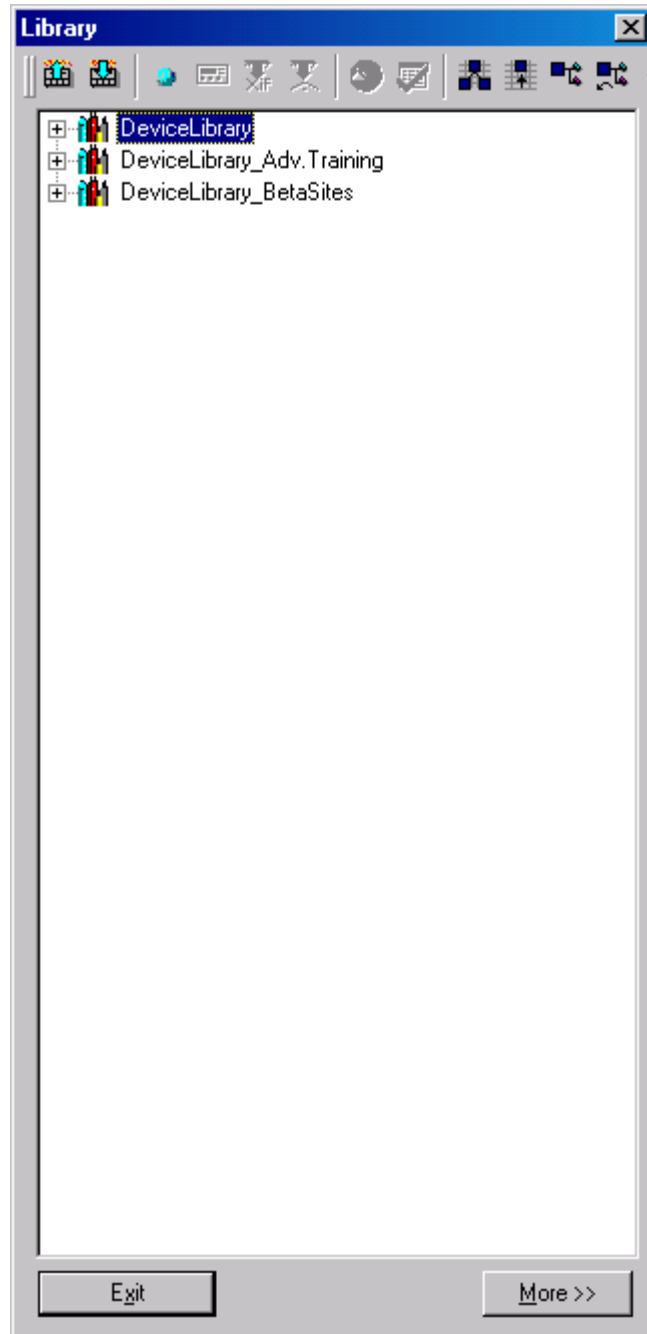


7. Click the Close button.

RESULT: The Device Library will be initialized.



RESULT: Finally the device library is added to the tree in the Device Library window.



Import Single LON Device into the Device Library

Purpose To import a single LON device into the device library.

- Procedure**
1. Import the source device library that contains the LON device you want to import (see Import Device Library section).
 2. Open the copied source device library tree and copy the particular device to the target device library (see Copy LON device section).
 3. Delete the source device library (see Delete Folder section).

Troubleshooting on Errors during Import into the Device Library If the device library import has any errors importing a 3rd party device, the object server log will capture the errors if the TRACE=1 is added under the object server header in the CARE.INI file.

Copy LON Device Settings

Copy NV Settings

Purpose To copy the NV settings of a single device to one or multiple other devices of the same type. You can set the display of NVs on the device in the terminal assignment tab. In addition, the online availability of NVs can be defined when you are Onnet with CARE.

- Procedure**
1. In the logical LON-bus part of the network tree, click on the LON device of which NV settings you want to copy.
 2. Click right mouse button and with left mouse button click on **Copy NV Settings** in the context menu.

RESULT: The Select NVs dialog box displays showing the following properties for all NVs:

Select NVs

Copy	Care Visual	Online	NV Name	LON Object	NV Type	I/O
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nviRequest	Node Object 0	SNVT_obj_request	IN
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoStatus	Node Object 0	SNVT_obj_status	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nciNetConfig	Node Object 0	SCPTnwrkCrfg	IN
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoFileDirectory	Node Object 0	SNVT_address	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiValue[0]	Open Loop Sensor 1	SNVT_volt_f	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiTemp[0]	Open Loop Sensor 1	SNVT_temp_p	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiValue[1]	Open Loop Sensor 2	SNVT_volt_f	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiTemp[1]	Open Loop Sensor 2	SNVT_temp_p	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiValue[2]	Open Loop Sensor 3	SNVT_volt_f	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiTemp[2]	Open Loop Sensor 3	SNVT_temp_p	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiValue[3]	Open Loop Sensor 4	SNVT_volt_f	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiTemp[3]	Open Loop Sensor 4	SNVT_temp_p	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiValue[4]	Open Loop Sensor 5	SNVT_volt_f	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiTemp[4]	Open Loop Sensor 5	SNVT_temp_p	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiValue[5]	Open Loop Sensor 6	SNVT_volt_f	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiTemp[5]	Open Loop Sensor 6	SNVT_temp_p	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiValue[6]	Open Loop Sensor 7	SNVT_volt_f	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiTemp[6]	Open Loop Sensor 7	SNVT_temp_p	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiValue[7]	Open Loop Sensor 8	SNVT_volt_f	OUT
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	nvoAiTemp[7]	Open Loop Sensor 8	SNVT_temp_p	OUT

< Back Next > Cancel

CARE Visual

Whether the NV should be displayed in CARE on the Terminal Assignment Tab. Check/uncheck the corresponding NVs for the desired result.

Online

Whether the current value of the NV should be displayed in the Online field on the device.

NV name

e.g. nviRequest

LON object

LON object which the NV belongs to, e.g. Node object

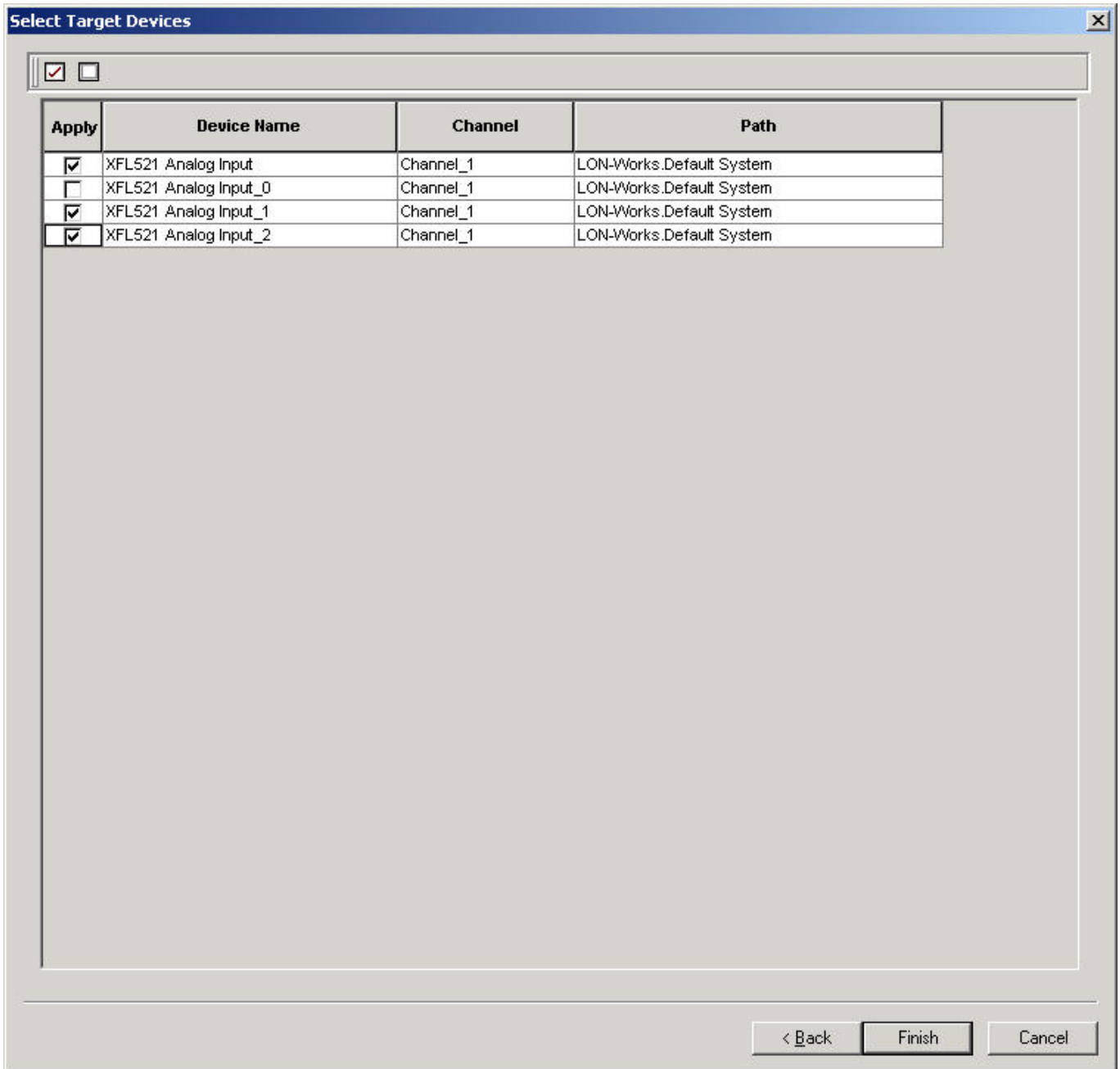
NV Type

SNVT_object_request

I/O
 Type of NV, input or output

3. In the Copy column by default all NVs are checked for copying. To uncheck a selected NV, click the check bar. To uncheck all NVs, click the icon at the top. To check all NVs, click the icon at the top.
4. Click the **Next** button.

RESULT: The Select Target Devices dialog box displays all devices which are of the same type as the source device. For each device, the channel and the path is shown, that is where the target device resides in the physical and logical structure in the network tree.



5. In the Apply column, check the devices to which the NV settings should be copied. To check all devices, click the icon at the top. To uncheck all devices, click the icon at the top.
6. Click the **Finish** button.

RESULT: The Select Target Devices dialog box closes and the NV settings were copied to the selected target devices.

Copy CPs and NCIs

Purpose To copy the configuration values of a device to one or multiple other devices of the same type. Hence, LON device configuration via Plug-In must to be done only once. Configuration values can be CPs (standard and user defined configuration parameter types) and NCIs (network variables using the config class keyword for configuration).

NOTE CPs and NCIs of Excel 500/800 controllers as well as extension records cannot be copied.

- Procedure**
1. In the logical LON-bus part of the network tree, click on the LON device of which CPs and NCIs you want to copy.
 2. Click right mouse button and with left mouse button click on **Copy CPs/NCIs** in the context menu.

RESULT: The Select CPs/NCIs dialog box displays showing the following properties:

Select CPs/NCIs

Copy	CP Name	Lon Object	NV Type	Type	Value
<input checked="" type="checkbox"/>	UCPTSensorConfig	Open Loop Actuator 1	80000C050303040F_UCPT_1	CP	0 - 10V Output
<input checked="" type="checkbox"/>	UCPTdriveTimeClose	Open Loop Actuator 1	80000C050303040F_UCPT_2	CP	90
<input checked="" type="checkbox"/>	UCPTdriveTimeOpen	Open Loop Actuator 1	80000C050303040F_UCPT_3	CP	90
<input checked="" type="checkbox"/>	SCPTdelayTime	Open Loop Actuator 1	SCPTdelayTime	CP	5
<input checked="" type="checkbox"/>	SCPTminDeltaLevel	Open Loop Actuator 1	SCPTminDeltaLevel	CP	1
<input checked="" type="checkbox"/>	UCPTsyncMin	Open Loop Actuator 1	80000C050303040F_UCPT_4	CP	2
<input checked="" type="checkbox"/>	UCPTsyncMax	Open Loop Actuator 1	80000C050303040F_UCPT_5	CP	98
<input checked="" type="checkbox"/>	UCPTsyncCharge	Open Loop Actuator 1	80000C050303040F_UCPT_6	CP	100
<input checked="" type="checkbox"/>	UCPTSensorConfig	Open Loop Actuator 2	80000C050303040F_UCPT_1	CP	0 - 10V Output
<input checked="" type="checkbox"/>	UCPTdriveTimeClose	Open Loop Actuator 2	80000C050303040F_UCPT_2	CP	90
<input checked="" type="checkbox"/>	UCPTdriveTimeOpen	Open Loop Actuator 2	80000C050303040F_UCPT_3	CP	90
<input checked="" type="checkbox"/>	SCPTdelayTime	Open Loop Actuator 2	SCPTdelayTime	CP	5
<input checked="" type="checkbox"/>	UCPTSensorConfig	Open Loop Actuator 3	80000C050303040F_UCPT_1	CP	0 - 10V Output
<input checked="" type="checkbox"/>	UCPTdriveTimeClose	Open Loop Actuator 3	80000C050303040F_UCPT_2	CP	90
<input checked="" type="checkbox"/>	UCPTdriveTimeOpen	Open Loop Actuator 3	80000C050303040F_UCPT_3	CP	90
<input checked="" type="checkbox"/>	SCPTdelayTime	Open Loop Actuator 3	SCPTdelayTime	CP	5
<input checked="" type="checkbox"/>	UCPTSensorConfig	Open Loop Actuator 4	80000C050303040F_UCPT_1	CP	0 - 10V Output
<input checked="" type="checkbox"/>	UCPTdriveTimeClose	Open Loop Actuator 4	80000C050303040F_UCPT_2	CP	90
<input checked="" type="checkbox"/>	UCPTdriveTimeOpen	Open Loop Actuator 4	80000C050303040F_UCPT_3	CP	90
<input checked="" type="checkbox"/>	SCPTdelayTime	Open Loop Actuator 4	SCPTdelayTime	CP	5
<input checked="" type="checkbox"/>	UCPTSensorConfig	Open Loop Actuator 5	80000C050303040F_UCPT_1	CP	0 - 10V Output
<input checked="" type="checkbox"/>	UCPTdriveTimeClose	Open Loop Actuator 5	80000C050303040F_UCPT_2	CP	90
<input checked="" type="checkbox"/>	UCPTdriveTimeOpen	Open Loop Actuator 5	80000C050303040F_UCPT_3	CP	90
<input checked="" type="checkbox"/>	SCPTdelayTime	Open Loop Actuator 5	SCPTdelayTime	CP	5
<input checked="" type="checkbox"/>	UCPTSensorConfig	Open Loop Actuator 6	80000C050303040F_UCPT_1	CP	0 - 10V Output
<input checked="" type="checkbox"/>	UCPTdriveTimeClose	Open Loop Actuator 6	80000C050303040F_UCPT_2	CP	90
<input checked="" type="checkbox"/>	UCPTdriveTimeOpen	Open Loop Actuator 6	80000C050303040F_UCPT_3	CP	90
<input checked="" type="checkbox"/>	SCPTdelayTime	Open Loop Actuator 6	SCPTdelayTime	CP	5
<input checked="" type="checkbox"/>	UCPTSensorConfig	Open Loop Actuator 7	80000C050303040F_UCPT_1	CP	0 - 10V Output
<input checked="" type="checkbox"/>	UCPTdriveTimeClose	Open Loop Actuator 7	80000C050303040F_UCPT_2	CP	90
<input checked="" type="checkbox"/>	UCPTdriveTimeOpen	Open Loop Actuator 7	80000C050303040F_UCPT_3	CP	90
<input checked="" type="checkbox"/>	SCPTdelayTime	Open Loop Actuator 7	SCPTdelayTime	CP	5

< Back Next > Cancel

CP name

Name of configuration parameter/NCI, e.g. SCPTdelayTime

LON object

LON object which the CP/NCI belongs to, e.g. Open Loop Actuator 1

NV Type

NV type which the CP/NCI belongs to, e.g. SCPTdelayTime

Type

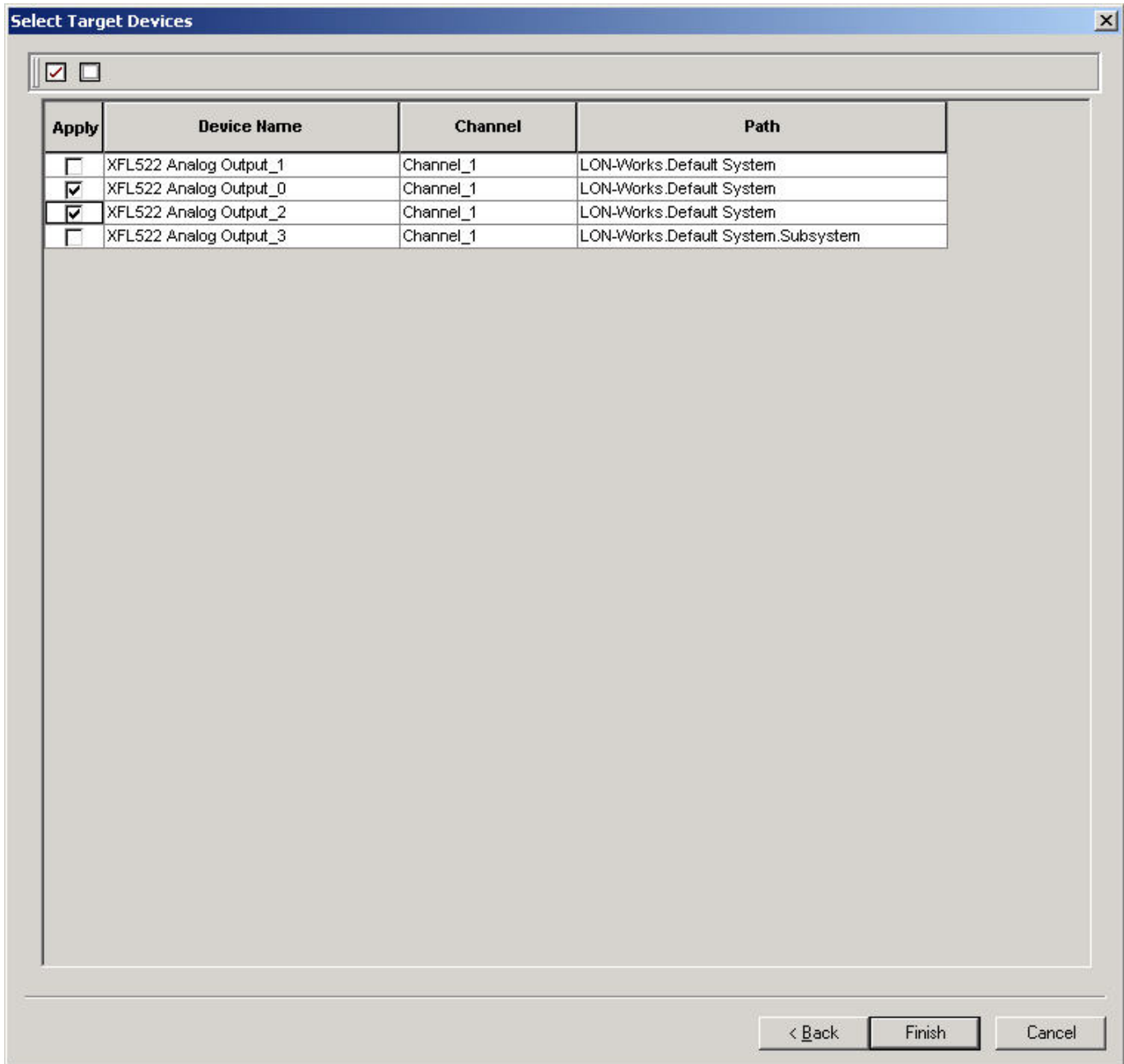
CP type, e.g. CP

Value

CP value. 0-10V Output

3. In the Copy column by default all CPs/NCIs are checked for copying. To uncheck a selected CPs/NCI, click the check bar. To uncheck all CPs/NCIs, click the icon at the top. To check all CPs/NCIs, click the icon at the top.
4. Click the **Next** button.

RESULT: The Select Target Devices dialog box displays all devices which are of the same type as the source device. For each device, the channel and the path is shown, that is where the target device resides in the physical and logical structure in the network tree.



5. In the Apply column, check the devices to which the CPs/NVIs should be copied. To check all devices, click the icon at the top. To uncheck all devices, click the icon at the top.
6. Click the **Finish** button.

RESULT: The Select Target Devices dialog box closes and the CPs/NCIs were copied to the selected target devices.

Edit Excel 500/800 Controller Network Interface Manually

The following main functions will change the network interface of an Excel 500/800 Controller:

- Creating and Mapping NVs to datapoints
- Creating and deleting LON objects
- Creating and deleting input and output NVs of standard and structured type
- Move NVs between LON objects
- Building and Assigning value conversion tables

Refer to the "Changes on the Controller Network Interface/CARE Application" for actions to be performed if the network interface has been changed.

Create and Manually Map NV to Datapoint

Purpose NVs can simply be created and mapped to a datapoint by assigning LON attributes to the datapoint. LON attributes are:

- LON point type (input, output, input&output, manual mapping)
- NV type (SNVT_temp_P, UNVT_byte, Boolean etc.)

Procedure 1. In the logical plant tree, click on the datapoint, you want to create a NV for and to be mapped to it.

RESULT: On the right, the datapoint attributes are displayed in itemized display.

- From the Lon Point drop-down listbox, select where the datapoint should be mapped to:

IMPORTANT


Note that the length of the user address of the datapoint should not exceed 18 characters when creating Lon points, since the length for NV names when using LNS tools is restricted to 21 characters. NVs names longer than 21 characters will abort the translation of the application and must be reworked.

The value is set to 21 by default in the CARE.INI file and can be changed if longer names are desired for exclusive use in CARE.

- NV-Input
Datapoint is mapped to an input NV with the prefix nvi at the datapoint name, e.g. nviMW_OaTemp.
- NV-Output
Datapoint is mapped to an output NV with the prefix nvo at the datapoint name, e.g. nvoMW_OaTemp.
- NV-Input & Output
Datapoint is mapped to both an input NV and an output NV. Two NVs will be created with its corresponding prefixes, e.g. nviMW_OaTemp and nvoMW_OaTemp.
- Manual Mapping
Pre-Definition. Datapoint can be mapped to an input NV created. Select Manual mapping if you want to consider this datapoint for many to one mapping or if you want to map it to another NV.

NOTE: No NV will be created.

4. From the NV-Type drop-down listbox(es), select NV-Type.

RESULT: The created NV with its assigned type is created and added to the plant object in the logical LON-Bus part (Default System folder) of the network tree. The NV can also be displayed and edited directly by clicking on the dotted button  right to the Output drop-down listbox. This dialog provides working on a single Lon point/NV in more detail whereas in the network tree all created NVs can be displayed in an overall view.

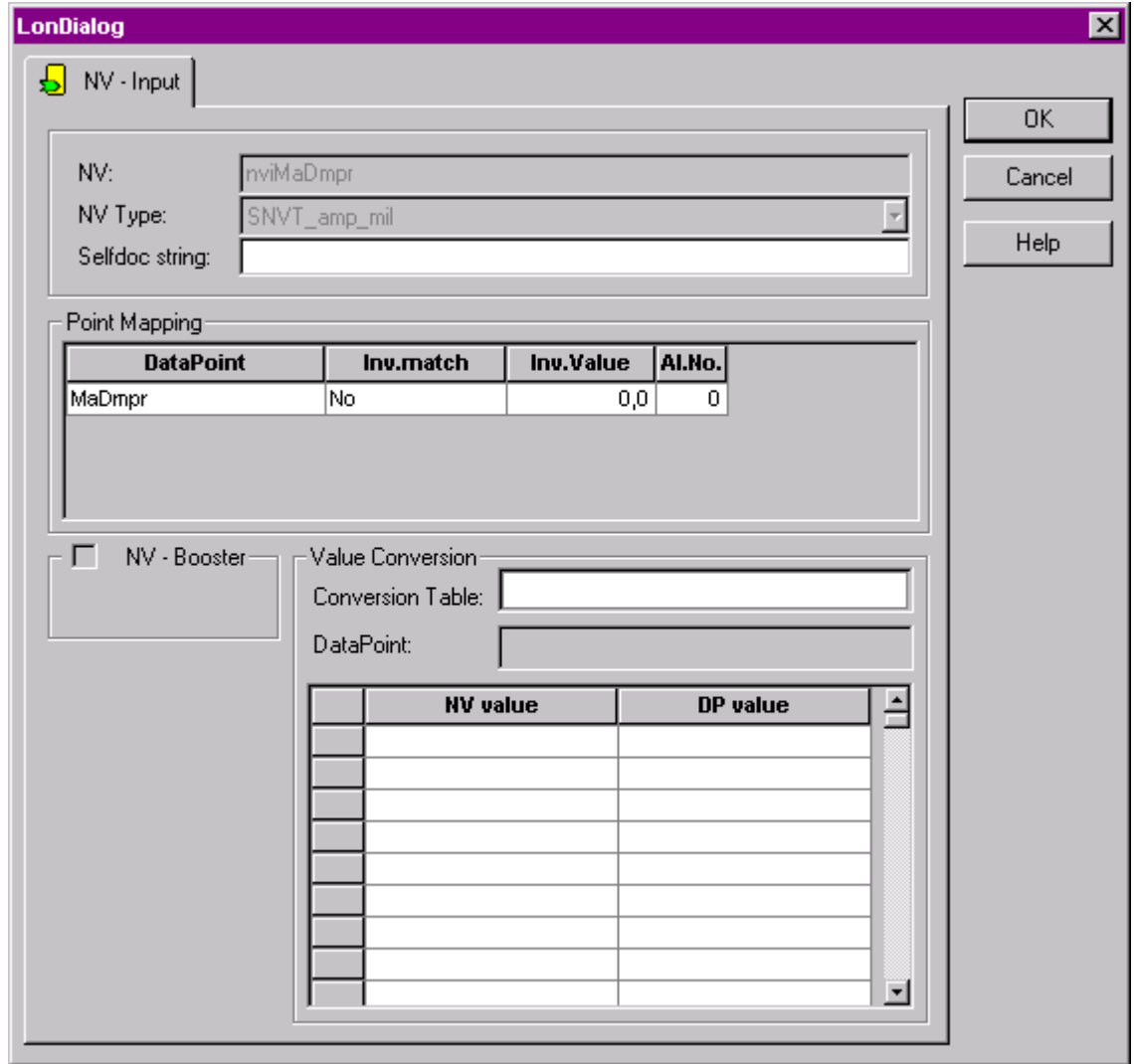
The screenshot displays the Lon Dialog interface. On the left, there are two network tree views. The top tree shows a hierarchy: Debis_Berlin_Stage1 > CONT01 > AHU1 > Analog Output > MaDmpr. The MaDmpr node is highlighted in yellow. A callout box points to it with the text: "Datapoint 'MaDmpr' is indicated in yellow as mapped". The bottom tree shows a different hierarchy: Debis_Berlin_Stage1 > LON-Works > Channels > Default System > CONT01 > AHU1 > nviMaDmpr. The nviMaDmpr node is highlighted in purple. A callout box points to it with the text: "NV 'nviMaDmpr' is created and mapped to datapoint".

The main Properties pane on the right is titled "Properties" and shows the configuration for the selected NV. Under "Input NV", the "NV:" field contains "nviMaDmpr" and the "SNVT_amp_mil" field contains "SNVT_amp_mil". Below this is a "Point Mapping" table:

DataPoint	Inv.match	Inv.Value	AI.No.
MaDmpr	No	0,0	0

A callout box points to the table with the text: "This pane shows the NV properties for nviMaDmpr (selected in network tree)". Below the table is an "NV - Booster" checkbox (unchecked) and a "Value" section containing a "Conversion Table:" field and a "DataPoint:" field. At the bottom is a table with two columns: "NV value" and "DP value".

Lon Dialog accessible by selecting created NV in logical LON-bus part of network tree



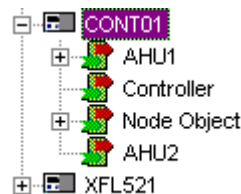
Lon Dialog invoked by clicking dotted button  for displaying/editing one single Lon point/NV

Regarding a single Lon point/NV, the functionality is slightly different for both dialogs.

Create LON Object

Purpose LON objects can be used for hierarchical structuring of the controller network interface. The following two LON objects are created automatically and will be displayed in the logical LON-bus part.

- Node Object
- Controller (no NVs by default)




When creating new LON objects, they will be assigned to the LON device (controller icon). Hierarchically they are positioned below the LON device. The node object includes pre-defined network variables and provides the “communication” between the objects belonging to a LON device (node).

When creating NVs for a datapoint in the logical plant tree, a LON object with the plant name, which the LON point belongs to, is automatically created.

Any object can be deleted, except the node object.

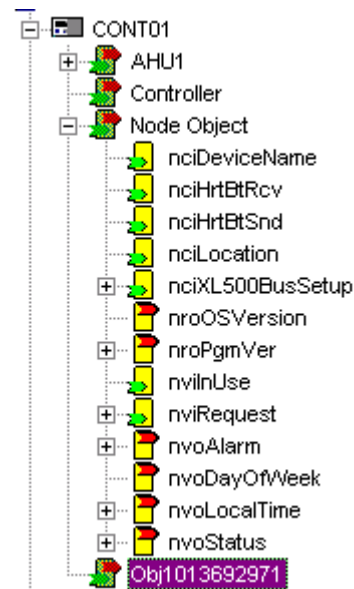
Procedure

1. In the logical LON-bus part of the network tree, click on the controller symbol , which you want, assign the new LON object to.
2. Click menu item Controller, then submenu item LON and Create LON-object.

Or, click Create LON object icon .

Or, click right mouse key and with left mouse key click on Create LON-object in the context menu.

RESULT: The LON object is created as pre-defined name in the tree.

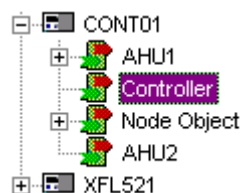


3. On the right pane, enter desired name for the LON object in the LonObjectName field.
4. Enter a description if desired in the Description field.


Create/Edit Input - / Output NV

Procedure

1. In the logical LON-bus part of the network tree, click on a LON object or NV, but not the Node object.




2. To create an Input Network Variable (NV-IN), click menu item Controller, then submenu item LON and Create NV-IN.

Or, click Create NV-IN icon .

Or, click right mouse key and with left mouse key click on Create NV-IN in the context menu.

3. To create an Output Network Variable (NV-OUT), click menu item Controller, then submenu item LON and Create NV-OUT.

Or, click Create NV-OUT icon .

Or, click right mouse key and with left mouse key click on Create NV-OUT in the context menu.

RESULT: Below the controller object in the tree, the NVs are created with its respective prefix nvi or nvo. On the Properties tab on the right pane, the newly created NV can be edited as follows:

- Enter name
- Define NV type
- Enter Selfdoc string
- Map datapoint(s) to the NV
- Define max. bindings for the NV
- Assign value conversion table

Example:

The node has the following five LonMark Objects defined within it: one node object (type 0); and four closed loop sensor objects (type 2). Suppose that the developer plans to include additional installation information about the node, in this case "Installation Text". The entry would be the following:

&3.2@0,2,2,2,2;Installation Text

IMPORTANT

In this field only text to be defined as additional textual information after the semicolon can be entered.

Map Datapoint

- Under Point Mapping you can assign (map) one to several points to the NV, if desired.

NOTE: Only points, which were set to Manual Mapping in the logical plant tree, are selectable from the drop-down listbox. Several points can only be mapped if the NV-Booster check box is checked and the max. bindings are set (refer to Many-to-One Mapping/NV-Booster® section).

DataPoint	Inv.match	Inv.Value	Al.No.	Man.t.One
MVV_DischarTemp	No	0	0	Min
ST_KL_DistrAir	No	0,0	0	Recent
SM_Frostwatch	No	MALFUNCTION	0	Average

In the first row of the **Datapoint** column, select the datapoint you want to map to the NV from the drop-down list.

In the **Inv.match** column, select whether the mapped datapoint should be checked for invalidity (Yes) or not (No).

Checking for Invalid match makes sure that in case an invalid information comes from an NV or datapoint, the controller will still work with a "defined value". The invalidity check works as follows:

Input NVs

In the **Inv.match** field, select Yes. Enter a datapoint value into the **Inv.Value** field in case the Input NV gets invalid (FF). The controller checks the Input NV value for invalidity. If the Input NV value is invalid, the datapoint will take the set datapoint value.

Example

An Input NV of type "unsigned byte" is mapped to a datapoint. Invalid match is set to Yes and the datapoint value is set to 5. As soon as the Input NV value becomes invalid (e.g. because the mapping is broken) the datapoint value will be 5.

Output NVs

In the **Inv.match** field select an operator. Enter a comparison value into the **Inv.Value** field. The controller compares the datapoint value with the comparison value, using the comparison operator. If the comparison result is TRUE, than the Output NV will take the invalid value (FF).

Possible operators for invalid match are: Exact, Lower, Greater, Lower or Greater, Lower or Equal, Greater or Equal, Auto.

NOTE: For the Auto operator, the output NV always sends Invalid.

Example

A Output NV of type unsigned byte is mapped to a datapoint. Invalid match is set to 'Lower'. The comparison value is set to 5. As soon as the datapoint's value drops below 5, the Output NV's value will become invalid.

In the **Inv.Value** column, enter the value that should be used for Invalid Match checking of the mapped datapoint.

In the **AI.No.**, enter the alarm number (5 - 23, or none) for the datapoint. Applies to AI, PA and DI points only.

In the **Many.t.One** column select one the following options to be applied for the mapped datapoint:

Recent

Latest updated value of the bound output NVs is taken into the data Pont

Min

Minimum value of the bound output NVs is taken into the datapoint

Max

Maximum value of the bound output NVs is taken into the datapoint

Average

Average value of the bound output NVs is taken into the datapoint

Sum

Sum value of the bound output NVs is taken into the datapoint

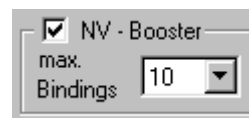
Number Active Devices

Number Active Devices of the bound output NVs is taken into the datapoint

If desired, map further datapoint(s), starting with the Datapoint column.

Set max. Bindings (NV-Booster ®)

8. Check NV-Booster checkbox if you want to display/set the max. bindings the input NV can get via LON tool. This selection is for pre-setting memory in the controller (see Many-to-One Mapping/NV-Booster). From the drop-down listbox select desired number.



Set Heartbeat for NV

9. Check/uncheck Heartbeat checkbox if you want the controller to cyclically check if the heartbeat activation is still alive/or not.

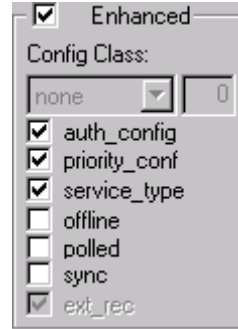
The heartbeat can be activated or deactivated for every single NV.

If heartbeat is checked for an input NV, this NV is to be checked according to nciHrtBtRcv, and all mapped NVs are sent in this way by default. If the controller does not receive an update within the specified interval, it will try to poll the output NV from the source device. In this way, the heartbeat mechanism also works for devices without periodic updates. If the polling also fails, the data point mapped with this NV is set to NO RESPONSE and the invalid value (if specified) is adopted. Additionally, if alarming has been enabled for the data point, a NO RESPONSE alarm will be issued. If the value of nciHrtBtRcv is changed using a LONWORKS network management tool, and if the application is saved to Flash memory, the value is saved as well.

If heartbeat is checked for an output NV, this NV is to be sent periodically, and all mapped NVs are sent in this way by default. If the value of nciHrtBtSnd is changed using a LONWORKS network management tool, and if the application is saved to Flash memory, the value is saved as well.

For all mapped input NVs and output NVs, heartbeat defaults to checked.

- Set Flags for NV**
10. Check Enhanced checkbox if you want to display/edit one of the following flags for the NV:



auth_config

Defines whether the authentication of the NV may be modified by a LONWORKS network management tool (checked) or not (unchecked). Defaults to checked.

priority conf

Defines whether the priority of the NV may be modified by a LONWORKS network management tool (checked) or not (unchecked). Defaults to checked.

service type

Defines whether the service type of the NV may be modified by a LONWORKS network management tool (checked) or not (unchecked). Defaults to checked.

offline

Defines whether a NV can only be changed in Offline mode (checked) or not (unchecked). Defaults to unchecked.

polled

Defines whether the NV can be bound (unchecked) or not (checked). Defaults to unchecked.

sync

Defines whether the NV is synchronous (checked) or not (unchecked). Defaults to unchecked.

ext_rec

Defines whether the NV has an extension record following the node's self-documentation string (checked) or not (unchecked). Defaults to checked and cannot be changed.

11. Check/uncheck desired flags described in step 9.

Assign Value Conversion Table

12. First read the general information about conversion tables in the Build a Conversion Table section.
13. From the Conversion Table drop-down list box, select desired conversion table. The conversion table is displayed.

Input NV

NV:

NV Type:

Selfdoc string:

Point Mapping

DataPoint	Inv.match	Inv.Value	Al.No.	Man.t.One
SM_Smokedetect	No	MALFUNCTION	0	Recent
MW_OaTemp	No	0	0	Average
MW_SupplyTemp	No	0	0	Recent
MW_RoomTemp	No	0	0	Recent

NV - Booster

max. Bindings:

Enhanced

Value Conversion

Conversion Table:

DataPoint:

	NV value	DP value
<	2,00000	10,00000
>=	2,00000	15,00000
>=	15,00000	20,00000
>=	18,00000	25,00000
>=	24,00000	3,00000
>=	30,00000	35,00000
>=		
>=		
>=		

NOTE: In the list, only conversion tables of the same NV type as selected in the NV Type field above, are selectable.

The conversion table is applied to all points displayed in the Point Mapping list. When selecting a special datapoint, the datapoint values of the conversion table change depending on the datapoint type. When selecting no datapoint, the conversion table is displayed with its "original values" as they were entered when building the table. Refer to the Build Conversion Table section for detailed information.

Select Input - / Output NV of structured type

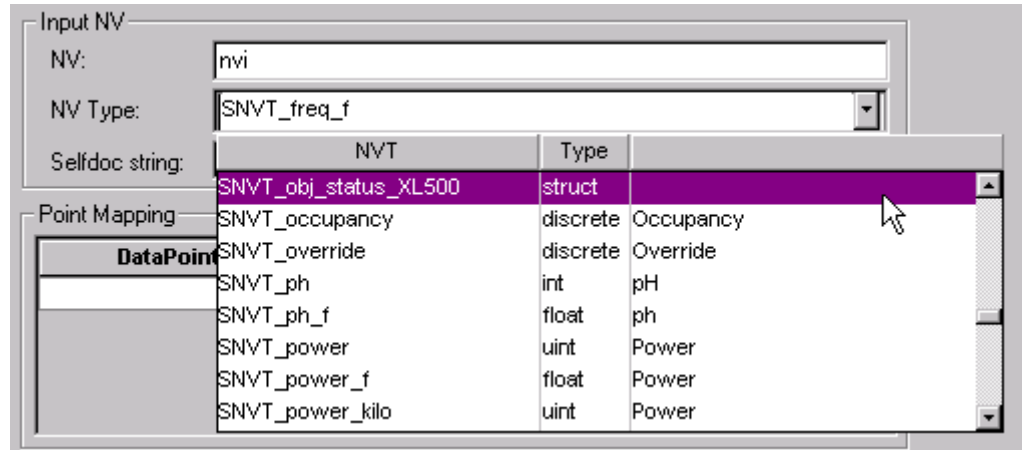
Structured NV types consist of components with pre-assigned NV types, then called component types, which cannot be edited. Pre-defined Structured input and output NV types are delivered with CARE. The user cannot create Structured input and output NV types by herself/himself. To each component a single datapoint can be mapped. In the logical plant tree, for this mapped datapoint, the NV-type, not the component type of the structured NV is displayed.

IMPORTANT

Note, that once a structured NV type was selected for the NV, it cannot be reverted to a NV type of other type, e.g. to float or integer etc.

Procedure

1. In the logical LON-bus part of the network tree, click on the NV.
2. From the NV Type drop-down list on the right, select structured NV type.



RESULT: A message is displayed asking if you really want to use only the structured NV type.

3. Confirm by clicking OK for creating the structured NV type.

RESULT: In the tree, the components are displayed below the NV. On the right, point mapping can be done. To each component one single datapoint, which has previously been set to "Manual Mapping" in the logical plant tree, can be mapped. Many-to-One mapping is not possible. As the figure shows, Invalid match checking and Alarm No functions can be applied.

The screenshot displays the configuration interface for a LONWORKS network. On the left, a logical plant tree is shown, with the following structure:

- Debis_Berlin_Stage1
 - CONT01
 - AHU1
 - Analog Output
 - Analog Input
 - Cool1
 - Cool2
 - Cool3
 - Cool4
 - Cool5
 - DaTemp
 - DuctStatic
 - MaTemp
- Bus
- LON-Works
- Channels
- Default System
 - CONT01
 - AHU1
 - AHU2
 - Controller
 - nviObjStatus_XL500
 - object_id
 - reserved2
 - status_byte0
 - status_byte1
 - status_byte2
 - Node Object
 - XFL521

The Properties tab on the right is configured as follows:

- Input NV:**
 - NV: nviObjStatus_XL500
 - NV Type: SNVT_obj_status_XL500
 - Selfdoc string:
- Structured Type Component:**
 - Component: object_id
 - Component Type: UNVT_uword
- Point Mapping:**

DataPoint	Inv.match	Inv.Value	AI.No.
none			
MaTemp			
- Enhanced:**

NV value	DP value

A callout box points to the 'MaTemp' entry in the Point Mapping table with the text: "Select component 'object_id' of structured NV 'nviObjStatus_XL500' and map datapoint 'MaTemp' to it".

When selecting the mapped datapoint in the logical plant tree, the NV-type, not the component type of the structured NV is displayed on the Properties tab.

For the datapoint "MaTemp" the mapped NV "SNVT_obj_status_XL500" is displayed even if the component "object_id" was previously selected

NOTE: For structured NVs, a conversion table cannot be applied.

Many-to-One Mapping/NV-Booster®

Honeywell's NV-Booster allows binding all of the output NVs to a single input NV with a many-to-one binding (for details refer to Mapping and Binding section). The controller keeps a background copy of the input NV for each of the different controller output NVs bound to it for performing the mathematical functions. For pre-setting the memory of the controller, it has to be defined how many bindings at max. the controller should allow.

The input NV can be mapped to multiple datapoints. For each mapped datapoint one of the following mathematical functions can be applied.

- | | |
|---------------------------|--|
| Recent: | Latest updated value of all bound output NVs is used |
| Min: | Minimum value of all bound NVs is used |
| Max: | Maximum value of all bound output NVs is used |
| Average: | Arithmetic average of all bound output NVs is calculated |
| Sum: | The sum of all incoming values is calculated |
| Number of active devices: | The number of active devices that deliver values via their bindings. |

- Procedure**
1. In the logical LON-bus part of the network tree, select input NV.
 2. On the right, check NV-Booster checkbox, and select max. Bindings from the drop-down listbox.
 3. In the Datapoint column, select datapoint you want to map the input NV to.
 4. In the Man.t.One column, select mathematical function, which should be applied.

Point Mapping

DataPoint	Inv.match	Inv.Value	Al.No.	Man.t.One
MWV_OaTemp	No	0	0	Min
BM_But_Climate	No	OFF	0	Recent
ST_KL_Mixer	No	0,0	0	Max
ST_KL_SupplAir	No	0,0	0	Sum

NV - Booster
max. Bindings: 10
 Enhanced

Value Conversion
Conversion Table: none
DataPoint: ST_KL_SupplAir

Arrange NVs

Purpose By default the LON device comes with the node and the controller object. When creating the network interface by mapping NVs to datapoints, newly created NVs are automatically assigned to the respective controller object. If desired, NVs can be grouped and allocated to self-defined objects. This function allows to structure the LON device according to your needs. It is only applicable when working in the logical LON-bus part of the network tree.


- Procedure**
1. Create LON object(s), if not already done.
 2. Move existing NVs to the desired object(s) per drag&drop. When creating new NVs, select the object that the NVs should be allocated to.

NOTE: Even if NVs are grouped in certain self-defined objects, all NVs belong to one controller.

Delete NV/LON Object

NOTE The network interface should be changed as little as possible. Therefore deleting NVs should be as few as possible. NVs can only be deleted in the logical LON-bus part of the network tree. When removing the LON attribute or changing the NV type in the Datapoint Editor view, a NV will not be

deleted. NVs from the Node object can be deleted on no account (refer to Changes on the Network Interface/CARE Application section).

- Procedure**
1. In the logical LON-bus part of the network tree, click on the NV/LON object you want to delete.
 2. Click menu item Controller, then submenu item Lon and Delete LON-object/NV.
Or, click Delete icon .

RESULT: The NV/LON object is deleted from the tree.


NOTE: The Node and the controller objects cannot be deleted.

Build Conversion Table

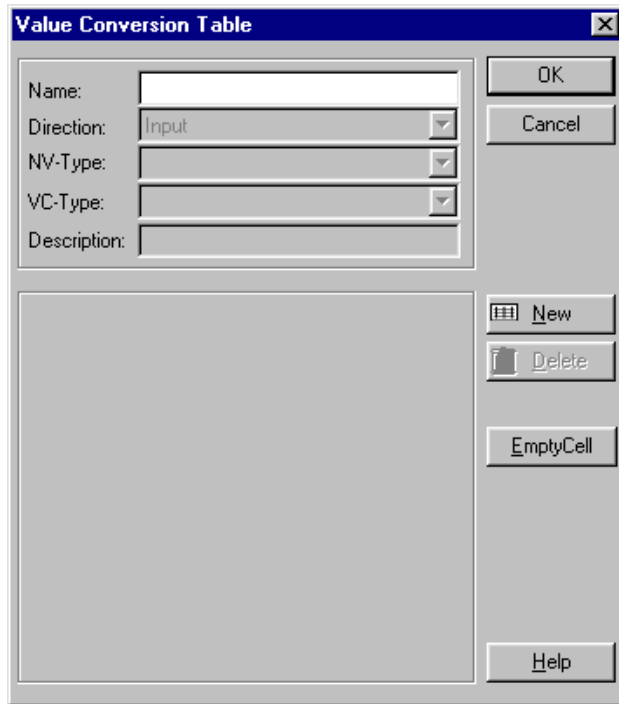
Purpose When mapping datapoints to NVs a conversion between NV and datapoint values can be done. Therefore two conversion table types are known, the discrete and the linear characteristic conversion tables. It can be used for both, input and output NVs. But, value conversions are direction sensitive: Value conversions for input NVs cannot be used for output NVs and vice versa. In addition the NV type, e.g. SNVT_hvac_mode must match. For a single NV max. one conversion table, characteristic or discrete, can be used. A conversion table either for input NVs or output NVs is always applied to the whole controller – in other words, each controller needs its own conversion tables.
By default pre-defined conversion tables are shipped with CARE. In addition own conversion tables can be created.

The following conversions are possible:

NV	Datapoint
Analog	Discrete
Discrete	Discrete

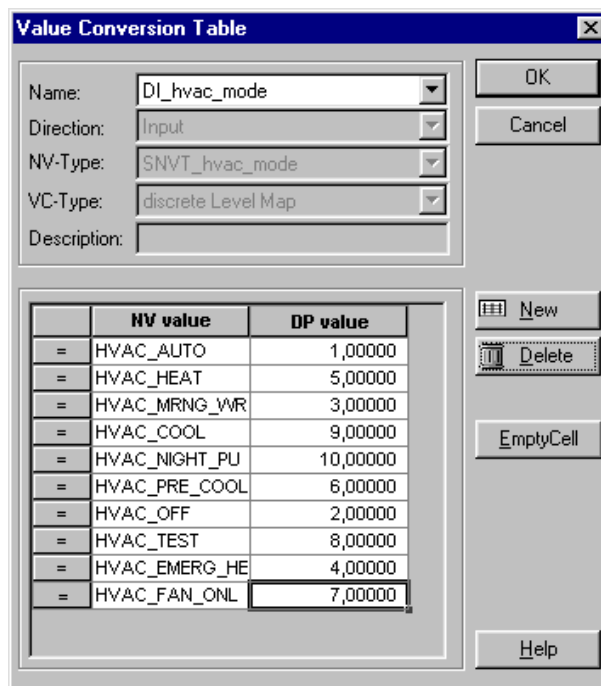
- Procedure**
1. In the logical LON-bus part of the network tree, click on the controller.
 2. Click menu item Controller, then submenu item Lon and Value Conversion Table.
Or, click Conversion tables icon .

RESULT: The Value Conversion Table dialog box displays.



3. To build a new conversion table, click the **New** button and enter a name into the Name field.
4. From the Direction drop-down listbox, select whether the conversion direction is from NV to datapoint, then select Input, or from datapoint to NV, then select Output.
5. From the NV-Type drop-down listbox, select the NV type.
6. From the VC-Type (value conversion type) drop-down listbox, select type. It can be of analog or discrete type.

RESULT: When a discrete NV type was selected and the direction is Input, the Value Conversion Table dialog box displays as follows:



The NV value column displays the discrete LON states. In the DP value column, you can enter the corresponding values the datapoint should have. The conversion is characterized by the = operator which means that each discrete state of the NV corresponds to a defined discrete state indicated by its number of the mapped datapoint.

- To discard a value, select cell and empty the cell by pressing the EmptyCell button.

IMPORTANT

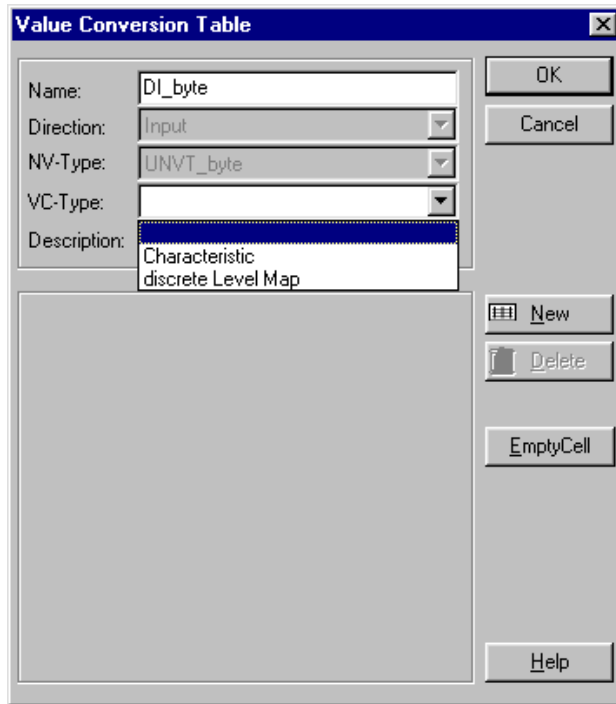
Depending on the datapoint type that is mapped to the NV, the conversion table values of the datapoint are processed differently for the mapped point. The following tables give examples how the entered values will be processed by CARE:

Discrete NV mapped to digital datapoint

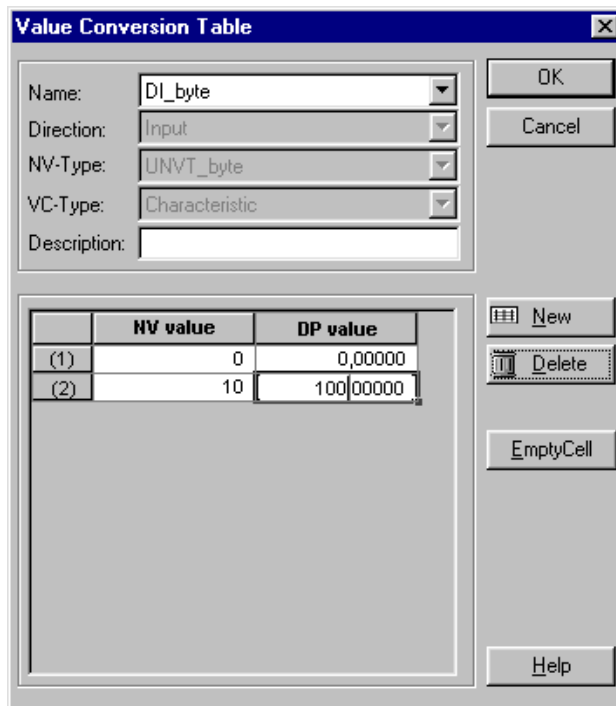
Operator	NV value	Entered datapoint (DP) value	Processed value in mapped datapoint
=	HVAC_AUTO	1	ON
=	HVAC_HEAT	5	OPERATION
=	HVAC_MRNG_WR	3	MALFUNCTION
=	HVAC_COOL	9	PRESENT
=	HVAC_NIGHT_PU	10	OPERATING
=	HVAC_PRE_COOL	6	OPEN
=	HVAC_OFF	2	OFF
=	HVAC_TEST	8	STAGE N
=	HVAC_EMERG_HE	4	ALARM
=	HVAC_FAN_COIL	7	CLOSED

When building a conversion table using a discrete NV type the corresponding datapoint values are assigned by entering the state numbers into the DP column. If there is no DP value assigned, the NV value will be deleted later when the NV is mapped to the datapoint. If a value greater than the max. states number is entered, e.g. 12 for the above example, this number is displayed in the Value Conversion field.

RESULT: When an analog NV type was selected and the direction is Input, the Value Conversion Table dialog box displays as follows:



For analog NV types, e.g. UNVT_byte, a Characteristic or discrete Level Map can be selected. When using a characteristic the Value Conversion Table dialog box displays as follows:



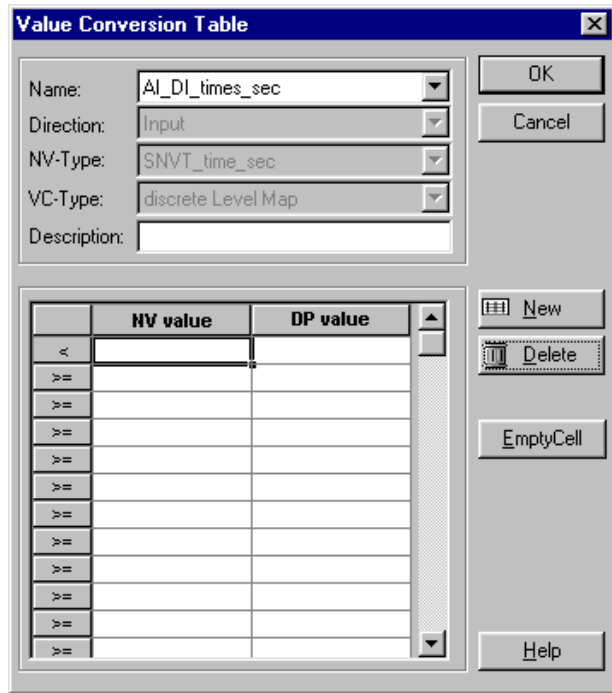
Analog NV with characteristic mapped to analog datapoint

NV value	Entered datapoint (DP) value
0	0
10	100

When the NV is mapped to an analog datapoint, the entered values for the datapoint will be processed depending on the engineering unit as follows:

If the engineering unit has no digits after the colon, the values will be rounded and the digits entered after the colon are cut. If the engineering unit has digits after the colon the digits are considered as they were entered.

When using a discrete Level Map, the Value Conversion Table dialog box displays as follows (next page):



When building a conversion table using an analog NV type and converting it via discrete level map the corresponding datapoint values are assigned by entering the state numbers into the DP column. If there is no DP value assigned, the NV value will be deleted later when the NV is mapped to the datapoint.

IMPORTANT

Note that the operator for the NV values is >=

Analog NV mapped to digital datapoint with discrete level map

Operator	NV value	Entered datapoint (DP) value	Processed value in mapped datapoint
<	-40	1	Sensor Break
>=	-40	2	Heating OFF
>=	30	3	Heating ON
>=	110	4	Malfunction

8. When finishing the conversion table, click **OK** to confirm.

Copy Conversion Table

Purpose To copy a conversion table from one LON device to one or multiple other LON devices. A conversion table can be assigned to each kind of LON device but only an Excel 500/800 controller is able to analyze the data. For detailed information on conversion table creation and usage, please refer to the Build Conversion Table section. The Copy function for Conversion tables is also available in the device library.

- Procedure**
1. In the logical LON-bus part of the network tree, click on the LON device of which conversion table you want to copy.
 2. Click right mouse button and with left mouse button click on **Copy Value Conversion Table** in the context menu.

RESULT: The Select Conversion Table dialog box displays showing the following conversion table properties column wise:

Name

Name of the conversion table

Direction

IN (input) = value conversion table was created for inputs, or OUT (output) = value conversion table was created for outputs,

NV Type

e. g. SNVT_hvac_mode

VC Type

Type of the value conversion table, discrete or linear characteristic

Description

Additional information about the value conversion table.

Select Conversion Table

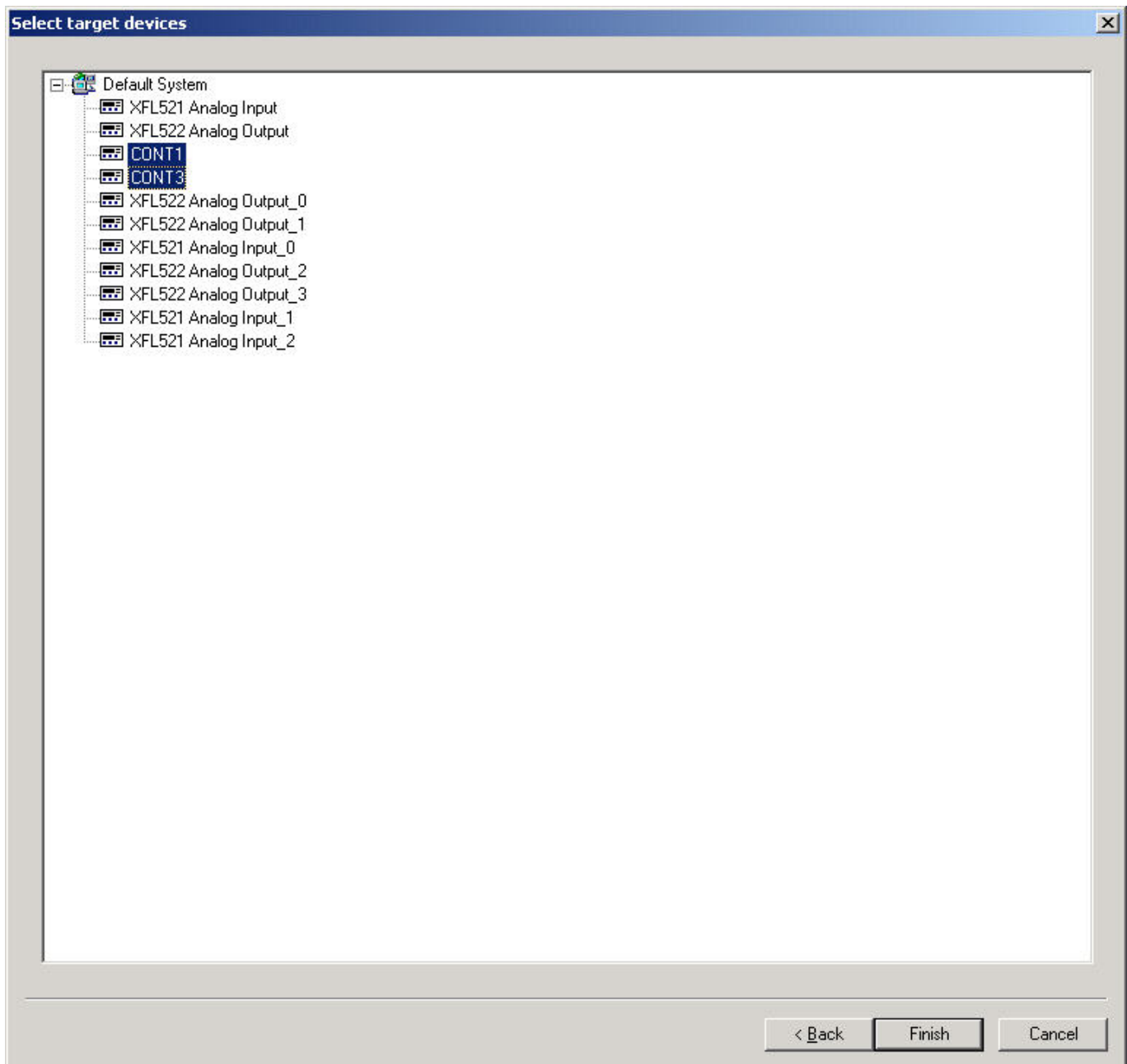
Copy	Name	Direction	NV-Type	VC-Type	Description
<input checked="" type="checkbox"/>	DI_HVAC Mode	IN	SNVT_hvac_mode	Discrete Level Map Digital	test

< Back Next > Cancel

In the Copy column by default all conversion tables are checked for copying. To uncheck a selected conversion table, click the check bar. To uncheck all conversion tables, click the icon at the top. To check all conversion tables, click the icon at the top.

3. Click the **Next** button.

RESULT: The Select Target Devices dialog box displays all devices of the project as they are arranged in the system. A hierarchical tree structure can be expanded to view all devices.



4. Click on the device to which the conversion table should be copied. Multiselection is possible by concurrent usage of the STRG key.

5. Click the **Finish** button.

RESULT: The Select Target Devices dialog box closes and the conversion table was copied to the selected target devices.

Onnet Tuning

Prerequisites To perform onnet tuning you must have installed the corresponding PC-LON-interface (SLTA 10, PCLTA-10 FT-10, PCLTA-20 PCI 20, LonDongle) and drivers from Echelon on the PC and the connection between PC and the LonWorks network via COM1 or COM2 must be established (see Echelon documentation).

To perform onnet tuning you have to go onnet. When being onnet you can do one of the following procedures:

- Commissioning/Decommissioning devices
- Addressing Devices
- Setting certain devices online/offline
- Resetting devices
- Winking devices
- Testing devices
- Replacing Devices
- Configuration and monitoring of devices via Plug-Ins (offline and online)
- Get online values of NVs
- Set values for NVs, SCPTs, UCPTs and NCIs
- Modify configuration parameters
- Synchronize with LNS
- Downloading Firmware

IMPORTANT

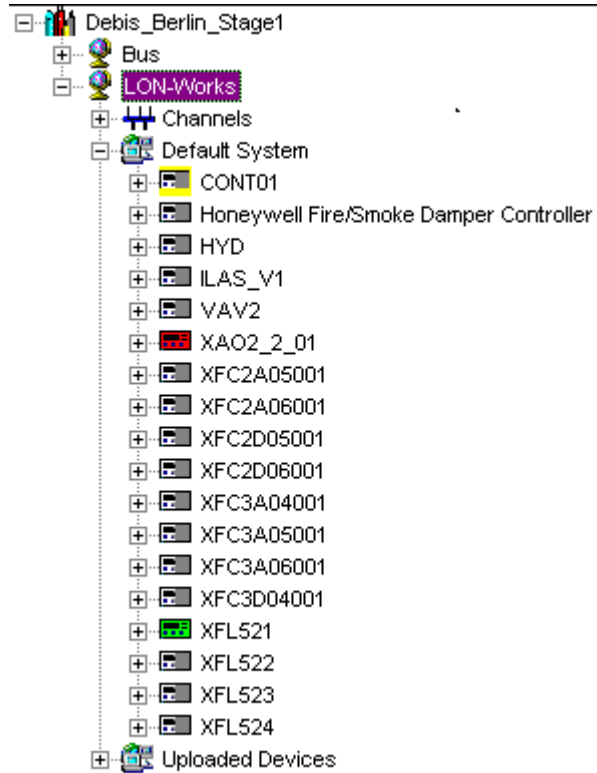
Certain functions are restricted respectively workarounds have to be applied if a Synchronization with LNS is to be considered and a LNS tool is used in parallel for the LonWorks network engineering. For detailed information, please refer to the Synchronize with LNS section.

Go Onnet

Going onnet is the first step before any onnet tuning procedure can be done.

- Procedure**
1. With left mouse key, click on the LonWorks folder in the logical LON-bus part of the network tree.
 2. Click right mouse key and with left mouse key click Onnet in the context menu.

RESULT: You are now onnet. CARE is checking the current state of all devices in the network tree. Depending on the current state, devices are displayed in different colors (see Status of Devices section). The status may not instantly be visible since it is updated in the background.

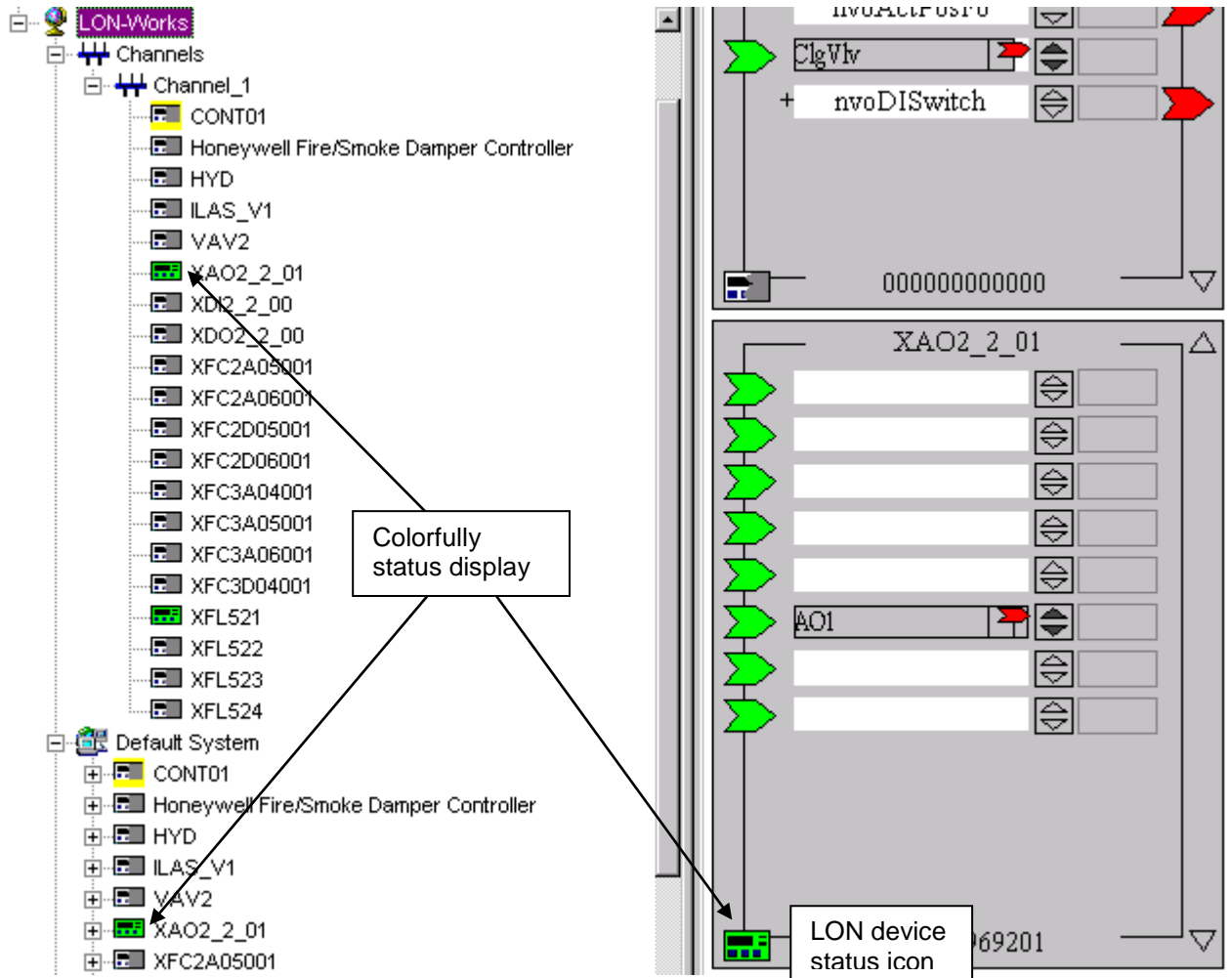


Status of Devices

Prerequisites To view the status of devices, you have to be onnet (see Go Onnet section).

The status of a device is indicated three times:

- In the channel folder of the network tree
- In the logical LON-bus part of the network tree
- On the device located on the terminal assignment tab

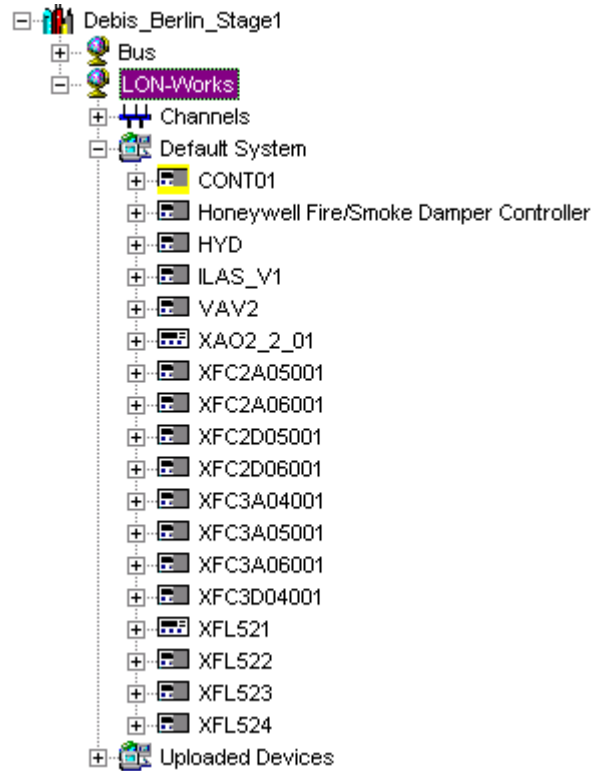


The states can be described via the following table:

Status of Device		
Color	Half-colored (Different status of CARE and device, Updates pending)	Fully-colored (Same status between CARE and device)
White	Unknown, not initialized	
Green	Application is running	
Red	Not available (damaged), applicationless	

Go Offnet

- To work offline, you have to go offnet in CARE.
- Procedure**
1. With left mouse key, click on the LonWorks folder in the logical LON-bus part of the network tree.
 2. Click right mouse key and with left mouse key click Offnet in the context menu.
- RESULT:** You are now offnet. All devices in the network tree are displayed in fully or half-white depending on their status.



Address Device

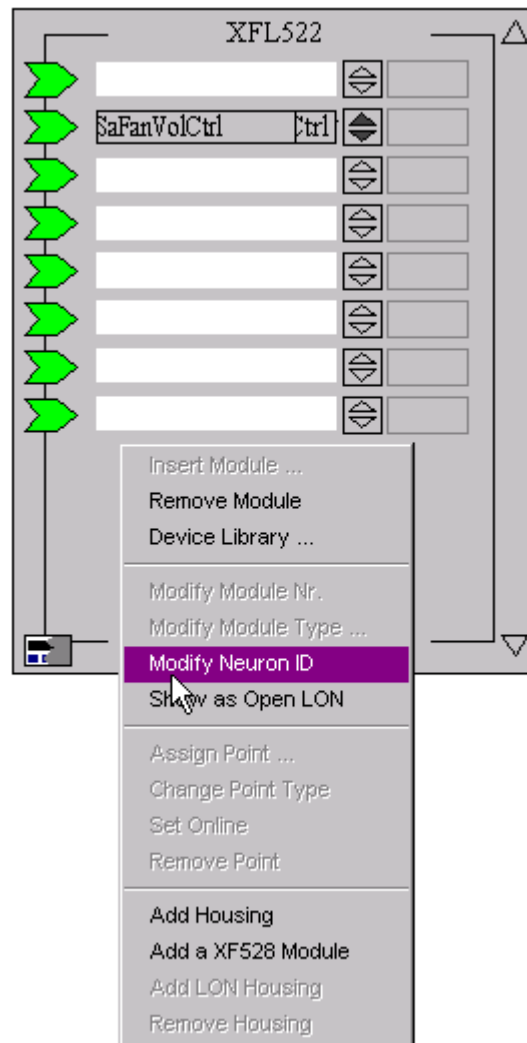
Prerequisites You have to be onnet (see Go Onnet section).

Addressing is the first step of the commission procedure. Addressing can be done by

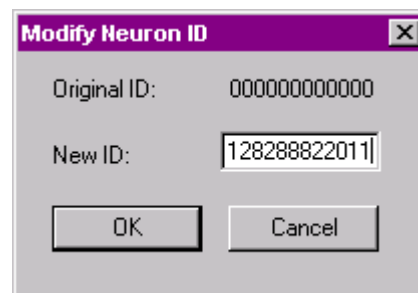
- Entering the neuron ID on the device
- Get the neuron ID by pressing the service pin
- Uploading devices by scanning the network

Enter Neuron ID on Device

- Procedure**
1. With right mouse key, click on the device on the terminal assignment tab.
 2. With left mouse key, click on Modify Neuron ID in the context menu.

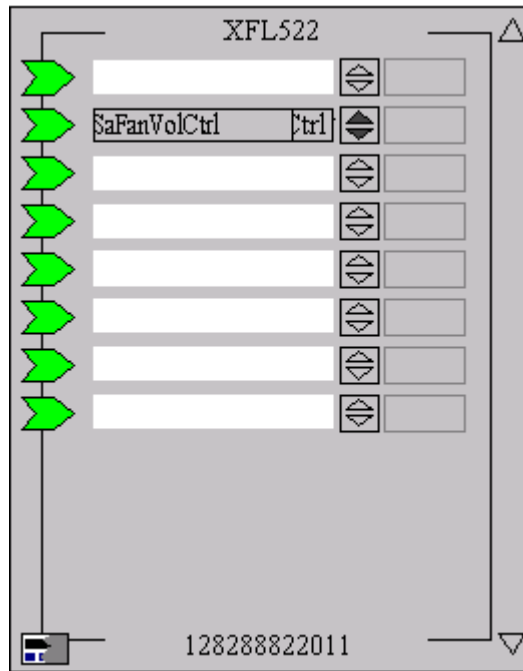


RESULT: The Modify Neuron ID dialog box displays.



3. Enter the neuron ID for the device and confirm by clicking OK.

RESULT: The neuron ID is assigned to the device and displayed on the bottom of the device.

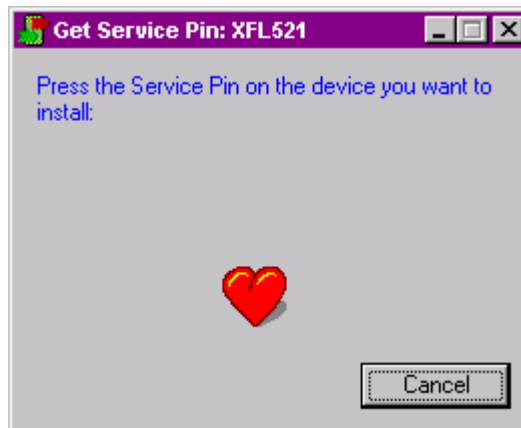


Get Neuron ID by Pressing Service PIN

If the neuron ID is not known, it can be get by pressing the service pin at the device.

- Procedure**
1. In the logical LON-bus part of the network tree, click on the device.
 2. Click right mouse key and with left mouse key, click on Get Service Pin in the context menu.

RESULT: The Get Service Pin:<name of device> dialog box is displayed.



3. Press the service pin at the device.

RESULT: The dialog box is closed. The neuron ID is assigned to the device and displayed on the bottom of the device.

Scan Network

With this function CARE automatically uploads all devices to the network tree residing on the current domain that is set on the LonWorks folder properties tab. For

example, these can be devices from another project. The current states and configurations of the uploaded devices are indicated by the appropriate color (see Status of Devices section).

Procedure

1. In the network tree, click on the LON-Works folder.
2. Click right mouse key and with left mouse key, click on Scan Lon-Network.

RESULT: The network is scanned and devices are uploaded and add to the network tree. When scanning the network the first time, an Uploaded Devices folder is created and the uploaded devices will be put in there. All devices show a half-colored status that means that they need to be addressed and/or commissioned.

Already uploaded devices will not be uploaded twice during further scanning.

They can be moved to other folders in the logical LON-bus part of the network tree.

**Commission Device(s)**

It is possible to commission a single device or all devices of a system (top level system such as the Default System or subsystem) or the complete LonWorks network.

When commissioning all devices of a system or the network, only those devices will be commissioned which **network interface, configuration or bindings** had been changed in CARE since the latest commissioning, that is, the current state of the device is different to the current state in CARE.

NOTE: When performing onnet binding changes (hotbinding) on devices other than Excel 50/500/800 controllers, the devices are instantly commissioned. When performing offnet binding changes on devices other than Excel 50/500/800 controllers, you must go onnet again and commission, respectively recommission the corresponding devices again. Excel 50/500/800 controllers need to be commissioned, respectively recommissioned again in any case.

Prerequisites

Devices must be addressed (see Address Device section) and you have to be onnet (see Go Onnet section).

Procedures**A) Commission all devices of the network**

1. With left mouse key, click on the LonWorks folder in the logical LON-bus part of the network tree.
2. Click right mouse key and with left mouse key click Commission in the context menu.

RESULT: For any device, which is not addressed yet, the Get Service Pin dialog box displays asking you to press the service pin. Press the service pin and Click OK. After all devices have been addressed, they will be commissioned. Commissioned devices are indicated by the fully colored green display of the devices in the network tree as well as on the device status icon on the devices.

B) Commission all devices of a system (top level or subsystem)

1. With left mouse key, click on the system folder (top level = Default System or another individually named subsystem folder) in the logical LON-bus part of the network tree.

2. Click right mouse key and with left mouse key click Commission in the context menu.

RESULT: For any device, which is not addressed yet, the Get Service Pin dialog box displays asking you to press the service pin. Press the service pin and Click OK. After all devices have been addressed, they will be commissioned. Commissioned devices are indicated by the fully colored green display of the devices in the network tree as well as on the device status icon on the devices.

C) Commission single device

1. With left mouse key, click on the device in the logical LON-bus part of the network tree.
2. Click right mouse key and with left mouse key, click Commission in the context menu.

RESULT: If the device which is not addressed yet, the Get Service Pin dialog box displays asking you to press the service pin. Press the service pin. After the device has been addressed, it will be commissioned. The commissioned devices are indicated by the fully colored green display of the device in the network tree as well as on the device status icon on the device.

Recommission All Devices

It is possible to recommission devices of a system (top level system such as the default System or subsystem) or the complete LonWorks network.

When recommissioning all devices of a system or the network, all devices will be commissioned despite of their current states. That means, that even those devices will be commissioned of which network interface, bindings or configuration had **not** been changed since the latest commissioning.

NOTE: When performing onnet binding changes (hotbinding) on devices other than Excel 50/500/800 controllers, the devices are instantly commissioned. When performing offnet binding changes on devices other than Excel 50/500 controllers, you must go onnet again and commission, respectively recommission the corresponding devices again. Excel 50/500/800 controllers need to be commissioned, respectively recommissioned again in any case.

Prerequisites Devices must be addressed (see Address Device section) and you have to be onnet (see Go Onnet section).

Procedures A) Recommission all devices of the network

1. With left mouse key, click on the LonWorks folder in the logical LON-bus part of the network tree.
2. Click right mouse key and with left mouse key click Recommission All in the context menu.

RESULT: For any device, which is not addressed yet, the Get Service Pin dialog box displays asking you to press the service pin. Press the service pin and Click OK. After all devices have been addressed, they will be recommissioned. Recommissioned devices are indicated by the fully colored green display of the devices in the network tree as well as on the device status icon on the devices.

B) Recommission all devices of a system (top level or subsystem)

1. With left mouse key, click on the system folder (top level = Default System or another individually named subsystem folder) in the logical LON-bus part of the network tree.

2. Click right mouse key and with left mouse key click Recommission All in the context menu.

RESULT: For any device, which is not addressed yet, the Get Service Pin dialog box displays asking you to press the service pin. Press the service pin and Click OK. After all devices have been addressed, they will be recommissioned. Recommissioned devices are indicated by the fully colored green display of the devices in the network tree as well as on the device status icon on the devices.

Decommission Device	Single devices can be decommissioned which results in an unconfigured "virgin" device. NOTE: Routers have not to be decommissioned.
Prerequisites	The device must be commissioned (see Commission Device(s) section) and you have to be onnet (see Go Onnet section).
Procedure	<ol style="list-style-type: none"> 1. With left mouse key, click on the device in the logical LON-bus part of the network tree. 2. Click right mouse key and with left mouse key click Decommission in the context menu. <p>RESULT: The device is decommissioned indicated by a half-colored white display.</p>

Set Device(s) Offline/Online

Devices can be set online/offline. Setting devices offline means that the device is switched into a kind of "Standby mode". In this mode, the communication between the application and the neuron chip of the device is interrupted and the device sends no data on the bus. Setting devices offline is helpful, for example, in order to avoid interfering bus traffic when testing particular sections/devices of the network. You can set all devices or a certain device offline/online.

Prerequisites	Devices must be addressed (see Address Device section) and you have to be onnet (see Go Onnet section).
Procedures	<p>A) Set all devices offline/online</p> <ol style="list-style-type: none"> 1. With left mouse key, click on the top level (e.g. Default System) folder of the logical LON-bus part in the network tree. 2. Click right mouse key and with left mouse key, <ul style="list-style-type: none"> click Set devices offline in the context menu, if you want to set all devices offline, respectively click Set devices online in the context menu. if you want to set all devices online. <p>RESULT: All devices are set offline, respectively online. Each device set offline, is displayed in fully or half-white color. Each device set online, is displayed in its original color (see Status of Devices section).</p> <p>B) Set single device offline/online</p> <ol style="list-style-type: none"> 1. With left mouse key, click on the device in the logical LON-bus part of the network tree. 2. Click right mouse key and with left mouse key, <ul style="list-style-type: none"> click Set device offline in the context menu, if you want to set the device offline,

respectively

click Set device online in the context menu. if you want to set the device online.

RESULT: The device is set offline, respectively online. A device set offline, is displayed in fully or half-white color. A device set online, is displayed in its original color (see Status of Devices section).

Reset Device(s)

Resetting a device means an application restart in the device.

Prerequisites Devices must be commissioned (see Commission Device(s) section) and you have to be onnet (see Go Onnet section).

Procedures **A) Reset all devices**

1. With left mouse key, click on the LonWorks folder or on the top level (e.g. Default System) folder of the logical LON-bus part in the network tree.
2. Click right mouse key and with left mouse key, click Reset in the context menu.

RESULT: The application in each device will be restarted.

B) Reset single device

1. With left mouse key, click on the device in the logical LON-bus part of the network tree.
2. Click right mouse key and with left mouse key, click Reset in the context menu.

RESULT: The application in the node will be restarted.

Wink Device(s)

NOTE: The device must support the wink command feature.

Prerequisites Devices must be commissioned (see Commission Device(s) section) and you have to be onnet (see Go Onnet section).

Procedures **A) Send Wink to all devices**

1. With left mouse key, click on the LonWorks folder or on the top level (e.g. Default System) folder of the logical LON-bus part in the network tree.
2. Click right mouse key and with left mouse key, click Wink in the context menu.

RESULT: A Wink command has been sent to the selected devices.

B) Send Wink to single device

1. With left mouse key, click on the device in the logical LON-bus part of the network tree.
2. Click right mouse key and with left mouse key, click Wink in the context menu.

RESULT: A wink command has been sent to the selected device.

x

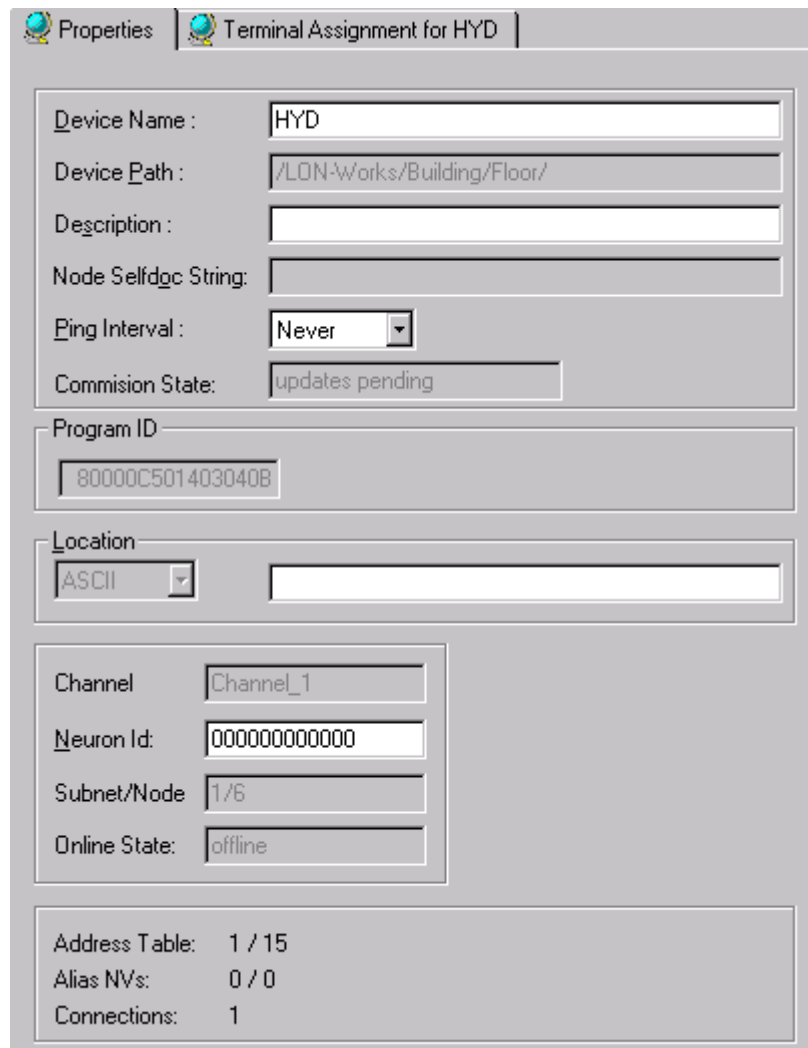
Test Device(s)

Prerequisites Devices must be commissioned (see Commission Device(s) section) and you have to be onnet (see Go Onnet section).

Procedures **A) Test all devices**

1. With left mouse key, click on the LonWorks folder or on the top level (e.g. Default System) folder of the logical LON-bus part in the network tree.
2. Click right mouse key and with left mouse key, click Test in the context menu.

RESULT: The commission and online state for all devices will be checked and updated. View state changes on the Properties tab of the corresponding devices and note eventual color changes of the devices in the logical LON-bus part of the network tree.



The screenshot displays the 'Terminal Assignment for HYD' dialog box. It contains the following fields and values:

- Device Name: HYD
- Device Path: /LON-Works/Building/Floor/
- Description: (empty)
- Node Selfdoc String: (empty)
- Ping Interval: Never
- Commission State: updates pending
- Program ID: 80000C501403040B
- Location: ASCII
- Channel: Channel_1
- Neuron Id: 000000000000
- Subnet/Node: 1/6
- Online State: offline
- Address Table: 1 / 15
- Alias NVs: 0 / 0
- Connections: 1

B) Test a single device

1. With left mouse key, click on the device in the logical LON-bus part of the network tree.
2. Click right mouse key and with left mouse key, click Test in the context menu.

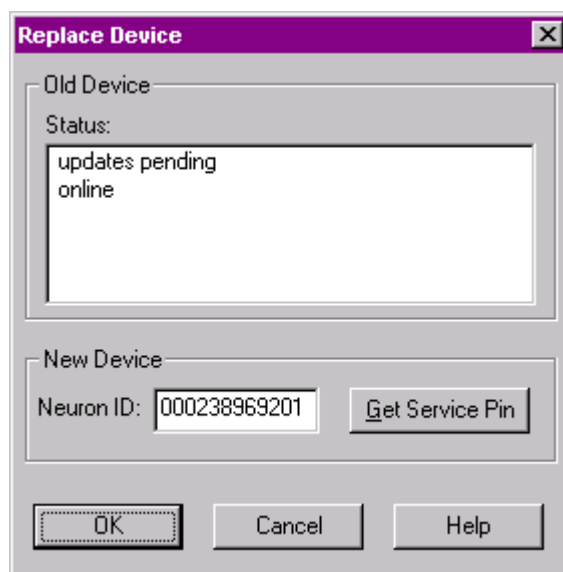
RESULT: The commission and online state for the device will be checked and updated. View state changes on the Properties tab of the corresponding device and note eventual color changes of the device in the logical LON-bus part of the network tree.

Replace Device

Prerequisites In case a device has been replaced physically, it must be replaced in CARE too. Devices must match each other, that is, their program IDs must correspond. Devices must be addressed (see Address Device section) and you have to be onnet (see Go Onnet section).

- Procedure**
1. In the logical LON-bus part of the network tree, click on the device, you want to replace.
 2. Click right mouse key and with left mouse key, click Replace Device.

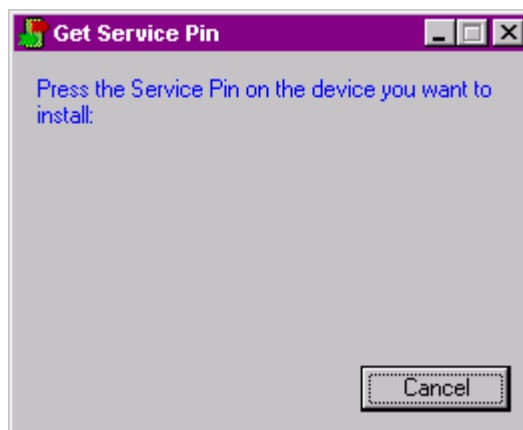
RESULT: The Replace Device dialog box is displayed.



In the Status field, the current status and in the Neuron ID field, the neuron ID of the device to be replaced is displayed. The device will be decommissioned.

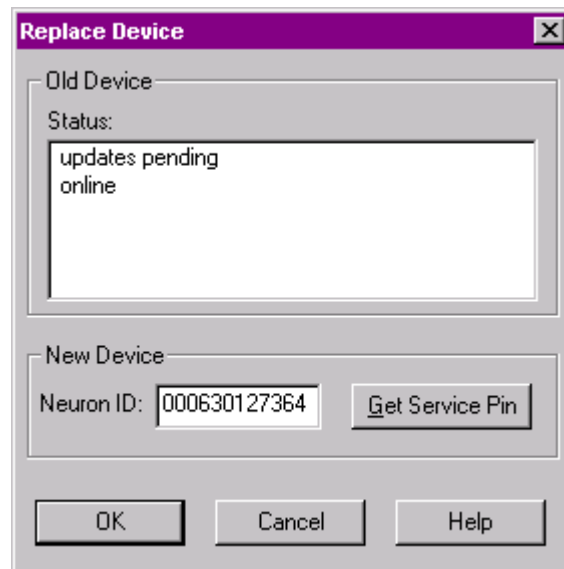
3. Click the Get Service Pin button.

RESULT: The Get Service is displayed.



- At the new device, press the service pin button.

RESULT: The neuron ID of the new device is displayed in the Neuron ID field.



- Click OK to finish the replacement.

Upload Parameters

It is possible to upload the current configuration parameters into CARE from:

- all devices of the complete LonWorks network
- all devices of a system (top level system such as the Default System or subsystem)
- a single device

If CARE is in LNS controlled mode, the parameters will be uploaded from the device via LNS database.

Prerequisites Devices must be addressed (see Address Device section) and you have to be onnet (see Go Onnet section).

Procedures **A) Upload parameters from all devices of the complete network**

- With left mouse key, click on the LonWorks folder in the logical LON-bus part of the network tree.
- Click right mouse key and with left mouse key click Upload Parameters in the context menu.

RESULT The current parameters from all devices of the complete network will be uploaded into CARE.

B) Upload parameters from all devices of a system (top level or subsystem)

- With left mouse key, click on the system folder (top level = Default System or another individually named subsystem folder) in the logical LON-bus part of the network tree.
- Click right mouse key and with left mouse key click Upload Parameters in the context menu.

RESULT: The current parameters from all devices residing in the selected system will be uploaded into CARE.

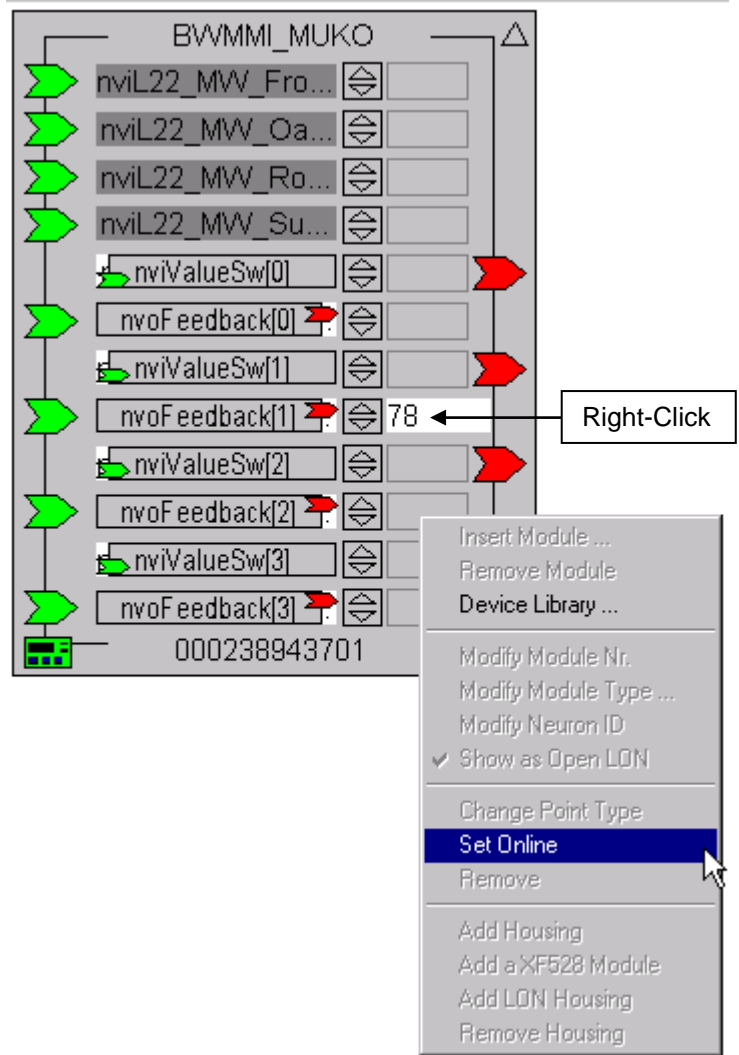
C) Upload parameters from a single device

1. With left mouse key, click on the device in the logical LON-bus part of the network tree.
2. Click right mouse key and with left mouse key, click Upload Parameters in the context menu.

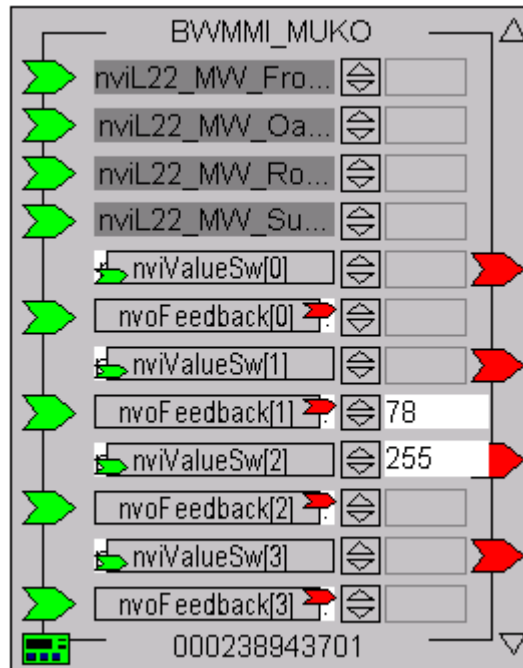
RESULT: The current parameters from the selected device will be uploaded into CARE.

Get Online Value of NV

Purpose	To get the current value of a bound NV from the LON-bus.
Prerequisites	Devices must be addressed (see Address Device section) and you have to be onnet (see Go Onnet section).
Procedure	<ol style="list-style-type: none">1. In the LON-Bus part of the network tree, double-click on the LON device.2. On the right pane, click on the terminal assignment tab to display the device.3. Right-click on the field of the NV (terminal) and click on Set Online in the context menu.
NOTE	When moving the cursor over the field, a tool tip displays the corresponding engineering unit.



RESULT: The field gets white and the current value of the NV is displayed.



NOTE: When being Offnet (see Go Offnet section) and setting the NV online, the field gets grayed and the latest value displayed will be reloaded.

Set NV Offline

- Purpose** To hide current value of a bound NV.
- Prerequisites** NV (terminal) must be in online mode.
- Procedure**
1. Right-click on the field of the NV (terminal) and click on the checked "Set Online" command in the context menu.
- RESULT: The field gets grayed and no value is displayed.

Set Values for NVs, SCPTs/UCPTs and NCIs

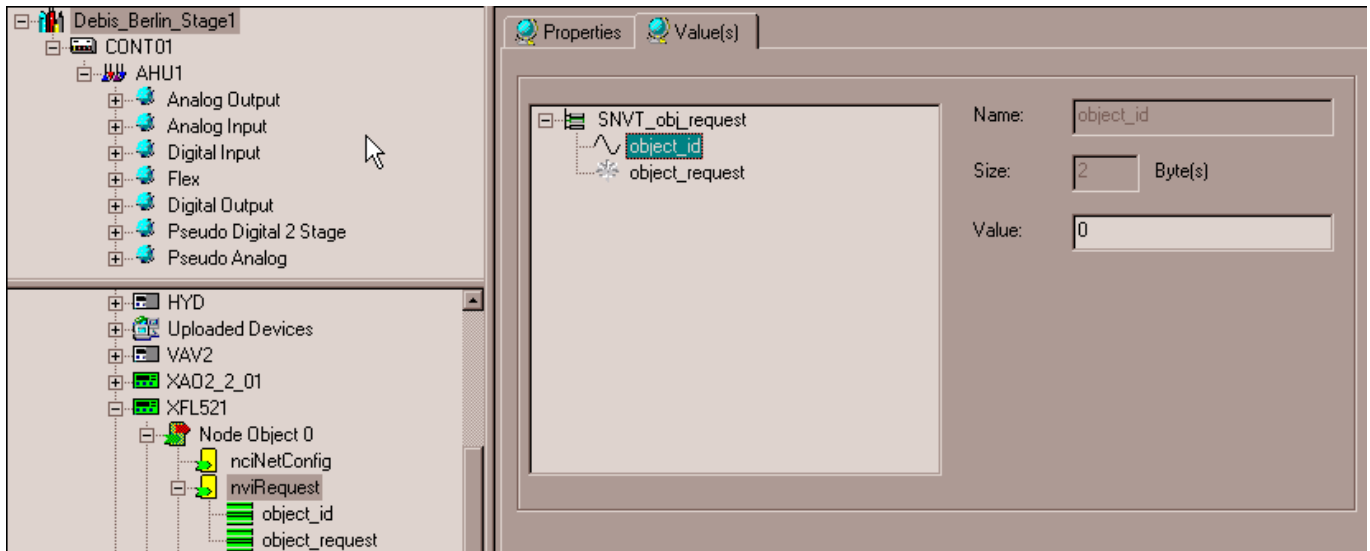
CARE allows to enter values for Input NVs (network variables), SCPTs (standard configuration parameter types) and NCIs (network variables using the config class keyword for configuration). Values can be entered online or offline as the following table shows:

	Input NVs	NCIs	SCPTs
Online	+	+	+
Offline	-	+	+

Set Value for NV

- Prerequisites** Device must be commissioned (see Commission Device(s) section) and you have to be onnet (see Go Onnet section), respectively the device must be online.
- Procedure**
1. In the LON-bus part of the network tree, click on the input NV.
 2. On the right pane, click on the Value(s) tab.
 3. In case the NV is structured and has components, select the component in the Value(s) tree.

4. In the Value field, enter the value.



RESULT: The value is written into the device.

Set Value for SCPT

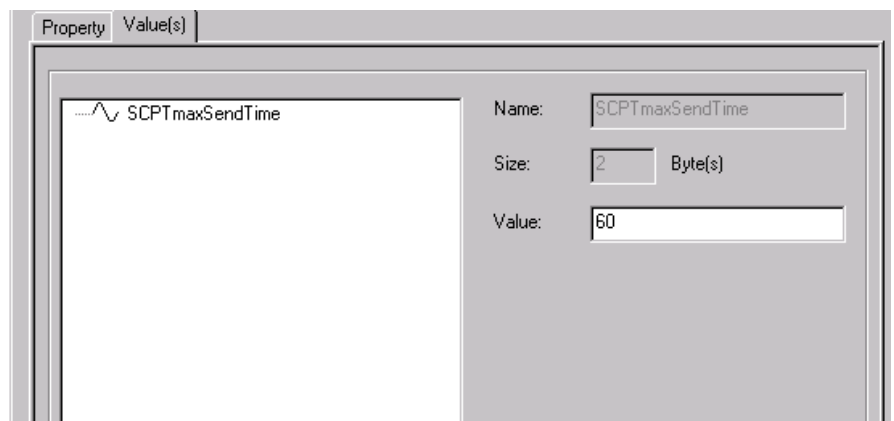
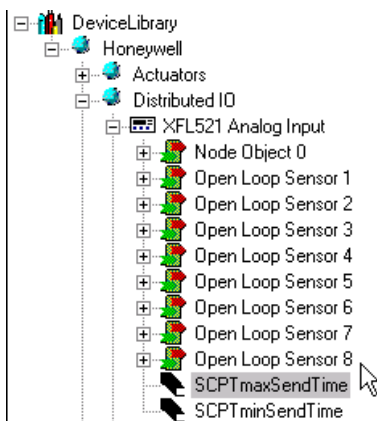
For SCPTs values can be set online or offline mode and either in the device library or in the LON-bus part of the network tree. Values that had been set in offline mode will be issued as soon as the device has been set online.

Prerequisites

In case you want to set the value online, the device must be commissioned (see Commission Device(s) section) and you have to be onnet (see Go Onnet section).

Procedure

1. In the LON-bus part of the network tree, respectively in the device library tree, click on the SCPT.
2. On the right pane, click on the Value(s) tab and enter the value into the Value field.



Example 8: Value input in LON-bus part of network tree

RESULT: The value is written into the device as soon as the device is online.

Set Value for NCI

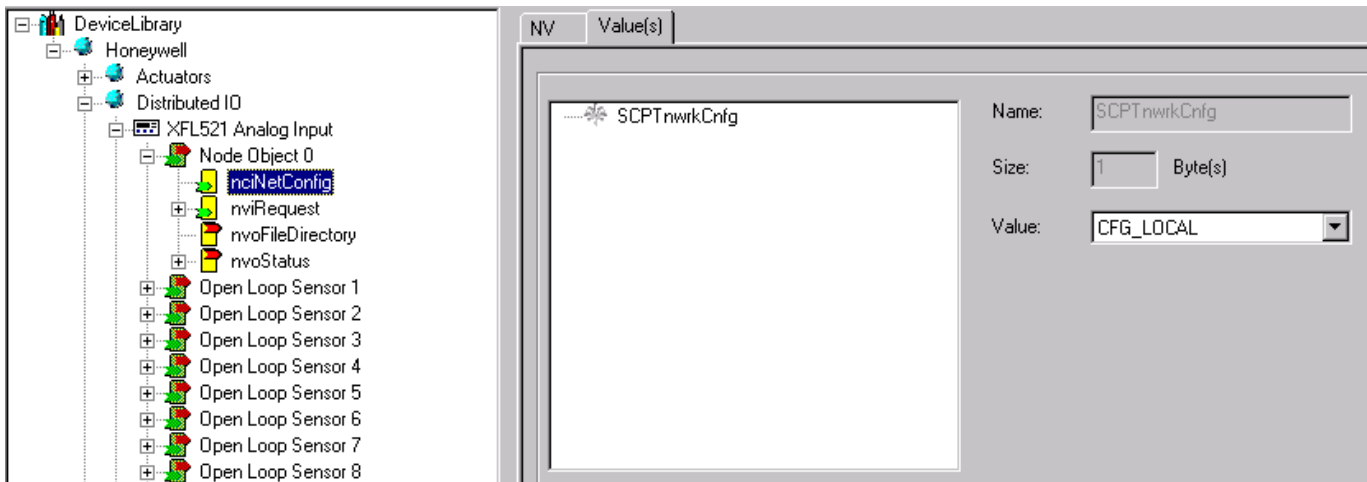
For NCIs values can be set in online or offline mode and either in the device library or in the LON-bus part of the network tree. Values that had been set in offline mode will be issued as soon as the device has been set online.

Prerequisites

In case you want to set the value online, the device must be commissioned (see Commission Device(s) section) and you have to be onnet (see Go Onnet section).

Procedure

1. In the LON-bus part of the network tree, respectively in the device library tree, click on the NCI.
2. On the right pane, click on the Value(s) tab and enter the value into the Value field, respectively select the value from the drop-down listbox.



Example 9: Value input in device library tree

RESULT: The value is written into the device as soon as the device is online.

Integrate Third Party Devices

Main Steps

The integration of third party devices includes the following main steps:

1. Import the XIF file into the device library (see Add LON Device to the Network section)
2. Add the device to the **NI** channel in the network tree (see Add LON Device to the Network and Set Network Interface Channel sections)
3. Install the plug-in for the device
4. Go onnet and start the plug-in (see Plug-In Online Functions in CARE Controlled Mode section)

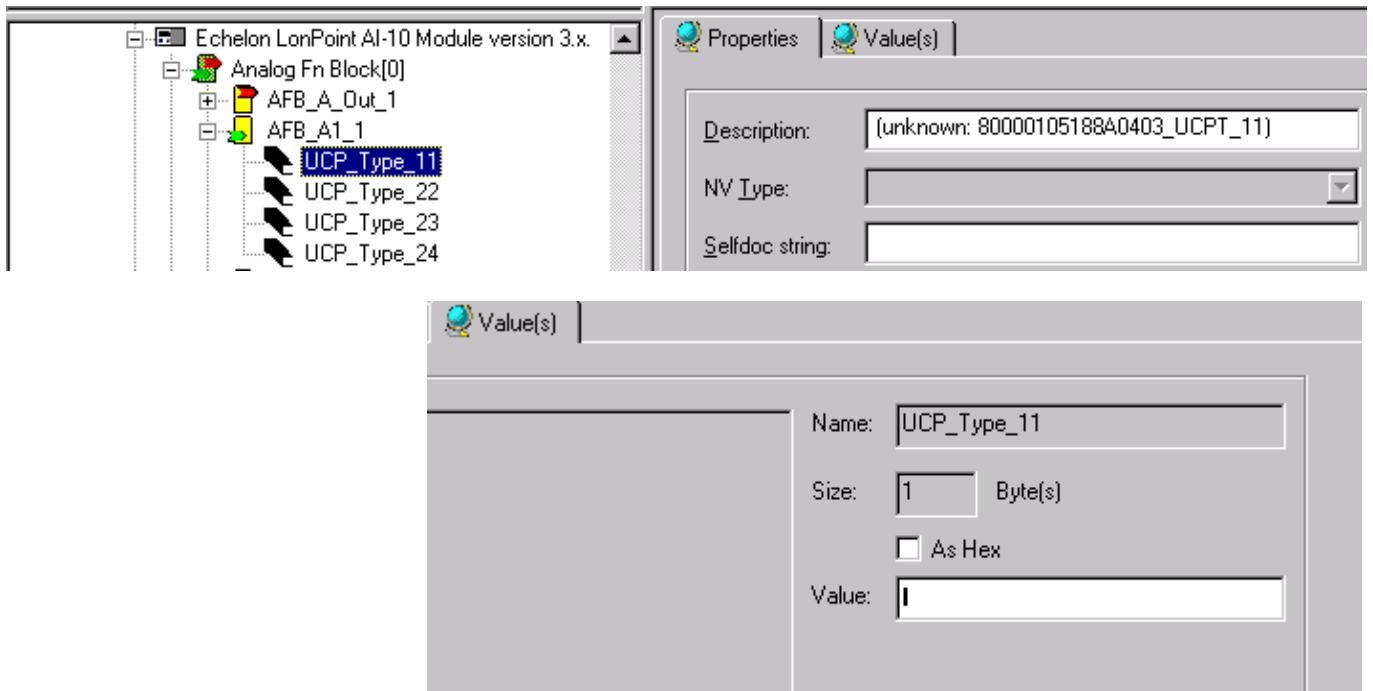
Troubleshooting on Errors during Import into the Device Library

If the device library import has any errors importing a 3rd party device, the object server log will capture the errors if the TRACE=1 is added under the object server header in the CARE.INI file.

Troubleshooting on unknown CPs

When starting the plug-in (step 4), some unknown CPs may not be identified and displayed properly. Those CPs will be listed in a log file which is displayed when invoking the plug-in. The unknown status can also be viewed as Description on the Properties tab by clicking on the device in the network tree.

Example: Description and value of an unknown CP



If unknown CPs were detected, please check whether they should be used in your application or not.

If the CPs will not be used at all, you can ignore the message and no further actions have to be done.

If you want to use unknown CPs, it is recommended to send the drf file set to the Honeywell Technical Assistant Center (TAC) in Schönaich.

TAC will check the drf file set and update the NVT_list.ltc file with proper CP information for the corresponding device.

1. After receiving the updated NVT_list.ltc file, do the following:
2. Copy the updated NVT_list.ltc file to the CARE folder.

RESULT: The current NVT_list.ltc file will be overwritten.

NOTE: The current NVT_list.ltc file version can be viewed in the NV Type List Version field of the Default LON Properties dialog box (see "Set Global Options" section).

3. Backup the database by clicking menu item Database, then submenu item Backup.
4. Restore the database by clicking menu item Database, then submenu item Restore.

RESULT: From now on, CARE will use the updated NVT_list.ltc file.

IMPORTANT

Before you continue to work with the new and proper CP information (updated NVT_list.ltc file), delete the corresponding device in the device library and in the network tree. Then add the device to the device library and to the network tree again.

CARE and LNS

In large installations with several different crafts e.g. HVAC, security or light, LNS is used as common standard. CARE supports LNS by providing the transfer of binding and configuration information of a LonWorks network from CARE to LNS via the Synchronize with LNS mechanism.

Synchronize with LNS

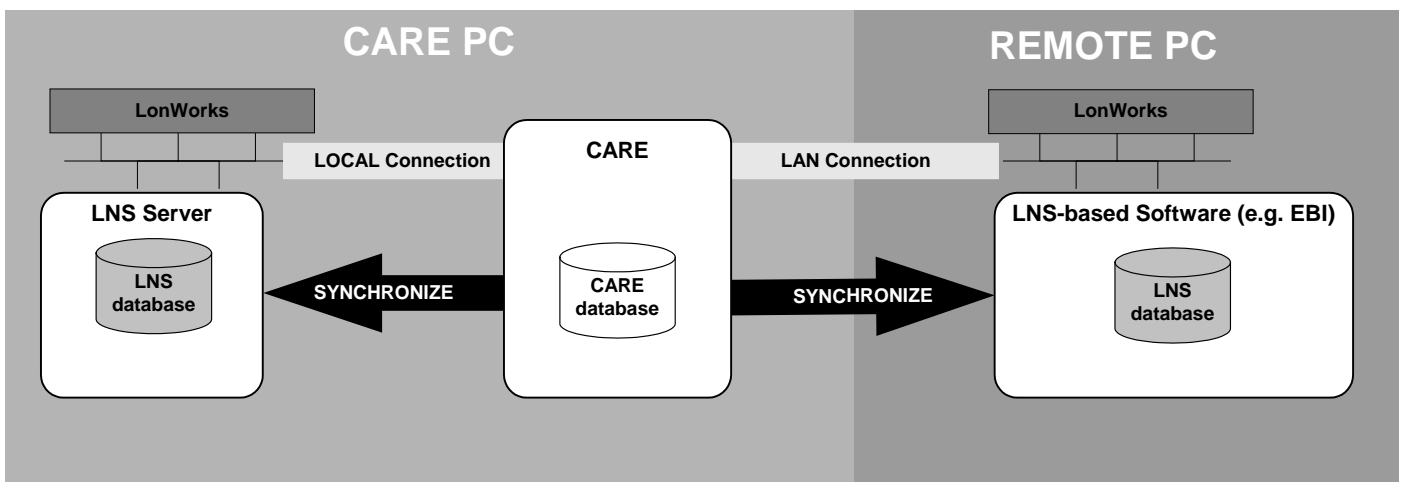
Purpose The Synchronize with LNS mechanism (LNS Controlled mode) allows the incremental updating of the LNS database with changed information done in CARE.

The communication between CARE and the LNS database can be in the following ways:

- Remote mode via LAN: CARE and LNS-based software including the LNS database are on different PCs.
- Local mode: CARE and the LNS database is on the same PC.

In LNS controlled mode, CARE has no longer commissioning control on the **remote** network. Instead the LNS-based software controls and commissions the network.

Synchronization in LNS Controlled Mode



The most common way is the remote mode with two different PCs, one client PC with CARE running (CARE PC) and another host PC (Remote PC) with an LNS-based application such as EBI, SymmetrE or LonMaker running on it. The PCs communicate via LAN remotely.

To setup a proper working system, the following requirements must be fulfilled:

Assumptions and Prerequisites

Remote Mode

CARE PC

Fully licensed CARE 8.xx.xx and LNS 3.23 turbo must be installed. CARE must be running.

Remote PC

LNS 3.23 turbo and Remote Sync Server (RSS) must be installed. Normally these two software applications come with EBI and SymmetrE.

On the remote PC Make sure that sufficient LNS credits are available for the LON devices included in the CARE project (see LNS Credits Handling section).

Ask the I.T administrator for the remote PC address, host name or IP address, and port number and note it down.

IMPORTANT

By default, for LNS, ports 2540 and 2541, for RSS port 3500 will be used. These ports must be opened in the PC firewall to ensure proper remote operation.

Local Mode

Fully licensed CARE 8.xx.xx and LNS 3.23 turbo must be installed. CARE must be running.

On the CARE PC, make sure that sufficient LNS credits are available for the LON devices included in the CARE project (see LNS Credits Handling section).

IMPORTANT


For all LON devices which are not included in the CARE device library by default, you must provide the corresponding XIF files for LNS synchronization.

Multiple Bindings (Group Binding) and Address Table Entries Allocation

Group Binding may cause problems during Synchronize. Please notice the *Default LON Properties* tab description in the Set Global CARE Options section for more information.

Procedures

Remote PC (LAN Mode)

1. Start Windows control panel and double-click on the Remote Sync Server icon  in the control panel.

RESULT: The Remote Sync Server Configuration dialog box displays.

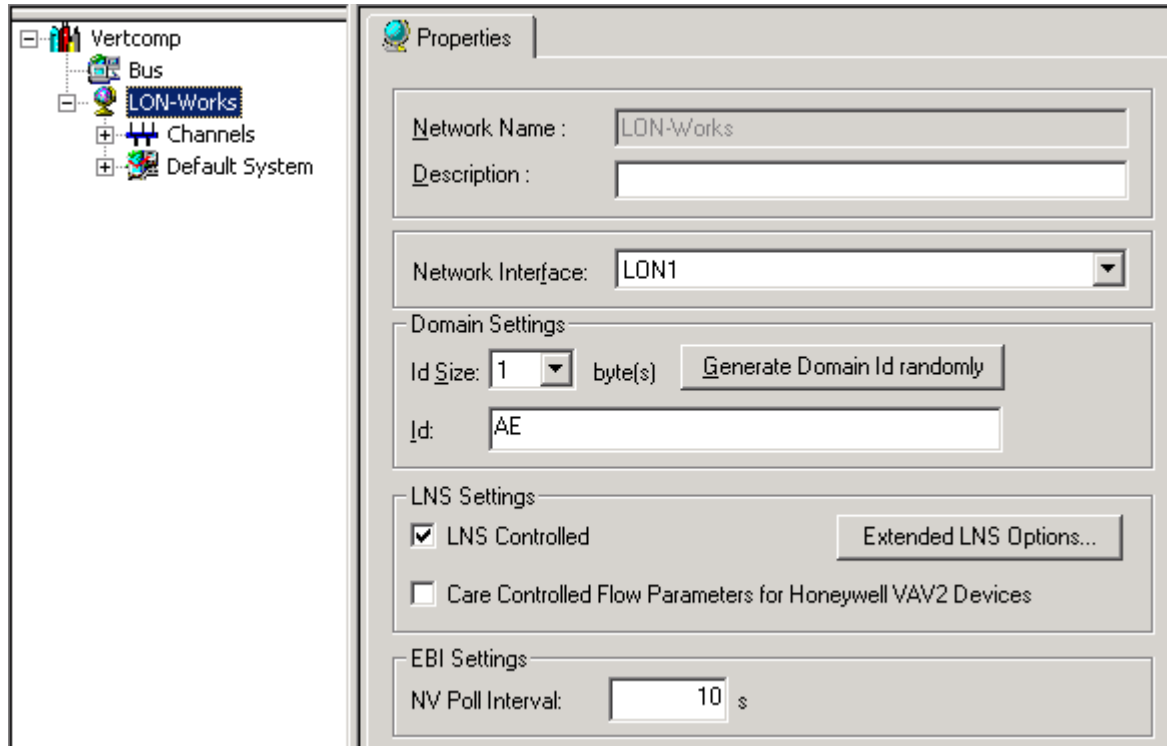
2. In the New Password field, enter the password.
3. In the Confirm New Password field, enter the same password.
4. In the Port Number field, keep the default port number 3500.

IMPORTANT

Make sure that the server port number displayed by default, has been enabled by the I.T. administrator. If the I.T. administrator has enabled another port, enter the provided port number.

5. Note down the password, the port number, and the server address (IP or host name) for later use on the CARE PC.
6. Under Remote Sync Server, click the Start radio button if the service is stopped.
7. Click the **Close** button.

CARE PC (Local Mode and LAN Mode) 1. In the physical LON bus part of the network tree, click on LonWorks.



2. On the Properties tab on the right, set the following settings:

Check the **LNS Controlled** checkbox. In LNS controlled mode, CARE has no longer commissioning control. Instead LNS controls and commissions the network.

Check the **CARE Controlled Flow Parameters for Honeywell VAV2 Devices** checkbox if want to update the LNS database with the current CARE values of the flow parameters 'duct area', 'flow setpoint minimum' and 'flow setpoint maximum'.

In the NV Poll Interval, enter the interval in s by which all NVs will be polled by the EBI LON point server. For each NV, the poll interval can also be set individually (see "EBI Settings" section).

3. Click the Extended LNS Options button.

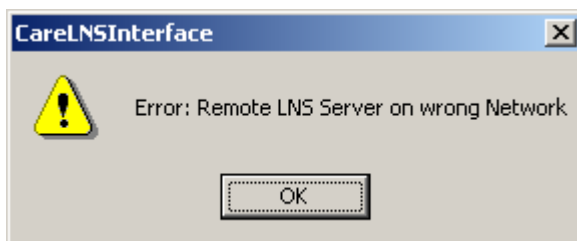
RESULT: The LNS Options dialog box displays.

4. Under Connection, click the LAN radio button, if CARE and the LNS-based software including the LNS database are on different PCs. Or, click on the Local radio button, if CARE and the LNS database is on the same PC.
5. From the LNS Network Name drop-down listbox, select the LNS network name. It is defaulted to the same name as the project.
6. To create a LNS network other than the default, click the New button.

RESULT: The New LNS Network dialog box displays.

IMPORTANT FOR LAN CONNECTION

During testing it may be typically that multiple networks have been opened on the remote PC. Because LNS does not allow having multiple remote LAN connections, the following message displays if the networks are different:



*To resolve the conflict, manually shut down all LNS databases on the remote PC and make sure that only **one single** network and the **same** network is opened on the remote PC as on the CARE PC. Having one and the same network on the CARE and the remote PC is presumed for an error-free running in normal operation mode (see also CARE and EBI Upgrades section).*

7. Enter a name in the Network Name field.
8. Click the OK button.
9. From the Local LNS NI drop-down listbox, select the network interface that LNS should use for connection to the LON network.
10. From the LNS NI Channel drop-down listbox, select the NI (network interface) channel that LNS should use for connection to the LON network (locally or remotely). The NI channel is the segment of a LON network where CARE/LNS is physically connected to.

Note that the network interface channel on the CARE and Remote PC can be different. Often EBI on the remote PC may be connected to the backbone and CARE PC is connected to another channel.

11. Under Domain Settings, set the Id size in bytes format the Id Size field and enter the domain Id into the ID field. If you want to get a randomly generated domain ID, click the Generate Domain ID randomly button. In this case the Id Size previously selected must be higher than 0. It is recommended to use a different domain as in the CARE project.
12. Under CARE Remote Configuration, enter the host name or IP address of the remote PC into the Hostname / IP field.
13. In the Port Number field, enter the same port number as defined in RSS application (see steps 1 to 6 of the Remote PC Procedure) on the remote PC.
14. In the Password field, enter the same password as defined in RSS application (see steps 1 to 6 of the Remote PC Procedure) on the remote PC.
15. Click the Load Remote NI (network interface) button, to enable the selection of the remote LNS NI from the drop-down listbox. By clicking the Load Remote NI button CARE automatically checks the communication between the CARE PC and the Remote PC. In case the communication works properly, the network interface of the remote PC can be selected from the Remote LNS NI drop-down listbox. In the Status line, the current status and errors that may occurred are displayed.

LNS Options

LNS Network Configuration

Connection

Local

LAN

LNS Network Name: Demo [New]

Local LNS NI: No Connection

LNS NI Channel: Channel_1

Domain Settings

Id Size: 1 [Generate Random Id]

Id: C0

CARERemote Configuration

Hostname / IP: []

Port Number: 3500

Password: []

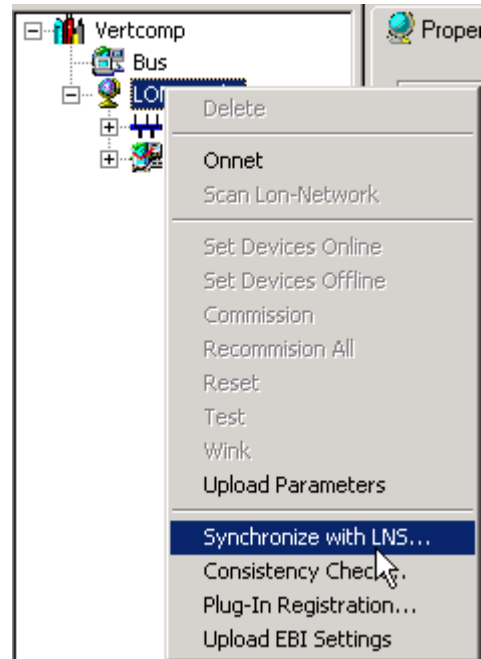
Remote LNS NI: LON1 [Load Remote NI]





Help Apply OK Cancel

16. Click the OK button.

RESULT: The settings are saved. Whenever starting the synchronize process from now on, CARE will use the settings defined here.

17. Click the Synchronize with LNS icon  on the toolbar.
Or, click on the LON-Works folder in the network tree, the click right mouse button and with left mouse button click on Synchronize with LNS in the context menu.



RESULT: The LNS Network Synchronization dialog box displays. On the top the network status is displayed by connection type (LAN, Local) and the network name. The  /  plug icon status indicates whether the network interface of the remote PC is physically connected to the network  or not  respectively whether it is working properly or not.

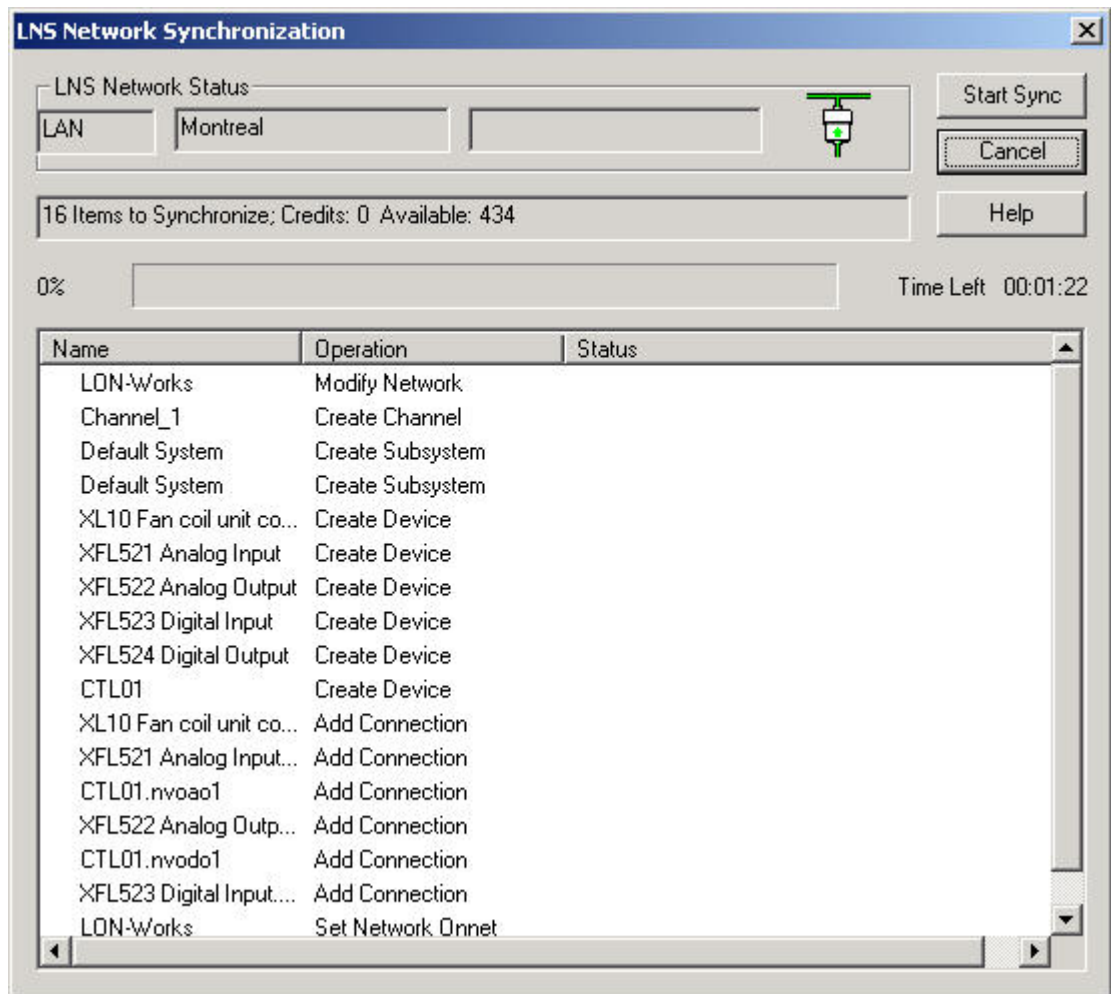
In the second line, the number of inconsistent database items to be synchronized, and the number of credits needed for synchronization as well as the number of available credits are listed (see LNS Credits Handling section).

In the third line on the right, the estimated time to execute the synchronize process is shown.

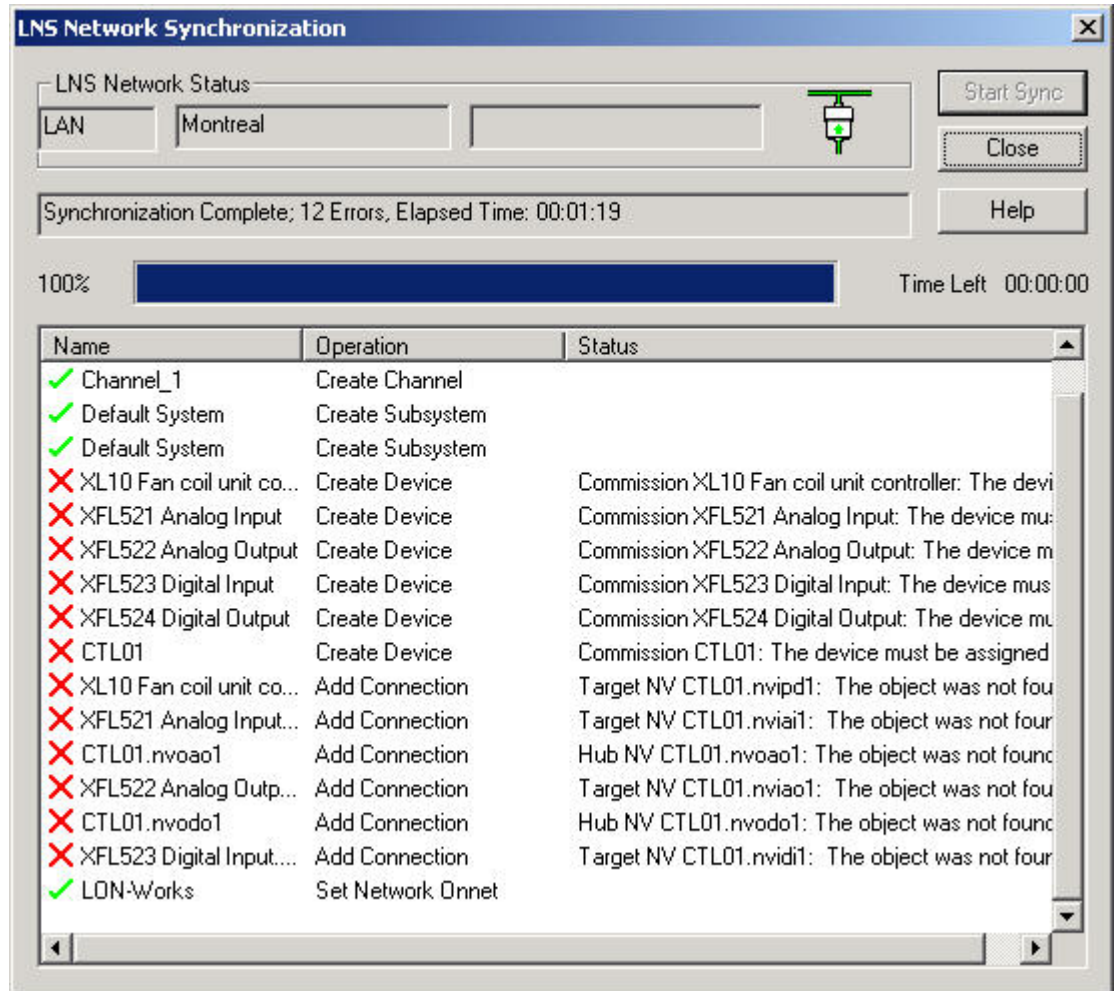
IMPORTANT

CARE cannot consider manipulations of the LNS database done with 3rd party LNS-based software. To get those kind of changes reported, please use the Consistency Check function (see Consistency Check section).

In the list, the name of the inconsistent database items and the corresponding operation to be executed are listed.

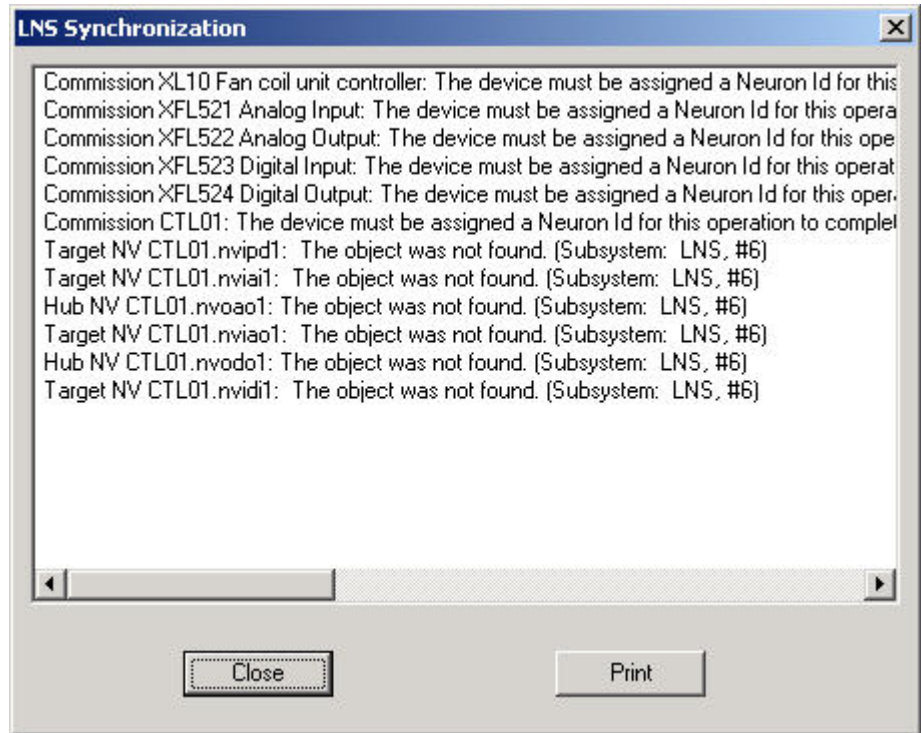


18. To start Synchronizing, click the Start Sync button.



RESULT: The inconsistent items will be synchronized. Successful execution of an operation is indicated by a green checkmark. Abortive execution is indicated by a red cross and the status/reason is described in the Status column. Successfully modified devices are automatically set to online. Changes made in EBI during synchronization are not written to the devices until the synchronization has been finished.

Abortive execution messages are displayed in parallel in the LNS Synchronization dialog box.



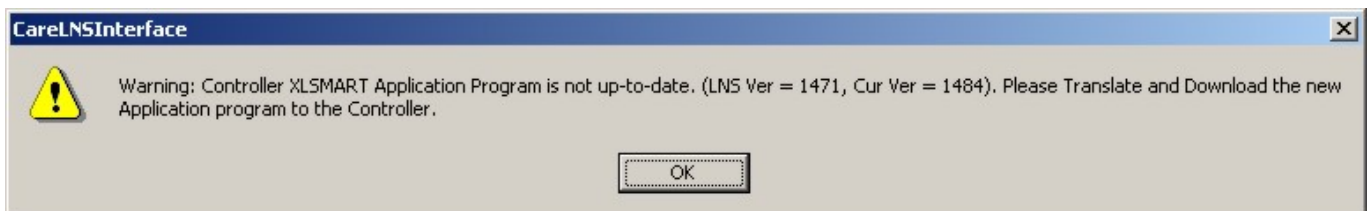
19. To print the status messages, click the Print button, then click the Close button.

20. To perform a successful synchronization, solve the problems as described in the status messages and synchronize again.

RESULT: A successful synchronization is indicated by an empty items list and the message "LNS is synchronized" in the LNS Network Synchronization dialog box.

Controller Application Verification Note

When starting Synchronization, CARE verifies whether the currently running applications in the controllers are consistent with the applications to be used for synchronization. In case of application inconsistencies, the following message box displays.



Click the OK button. To make the applications consistent, translate the controller and download the application into the controller.

In case LNS cannot read the controller version due to communication problems or an uncommissioned network, the following message box displays.



Click the OK button. Connect the controller to the network. Download the correct application into the controller and commission the network.

Available Functions and Restrictions When CARE is in the Synchronized mode by checking the LNS controlled option on the LON-Works Properties tab, you cannot apply any of the following onnet functions:

- LON network scanning
- Set device offline/online
- Commission device/network
- Recommission complete network
- Decommission device
- Replace device
- Test device
- Upload Parameters directly into CARE

In synchronized mode, the following CARE functions are still available when being onnet:

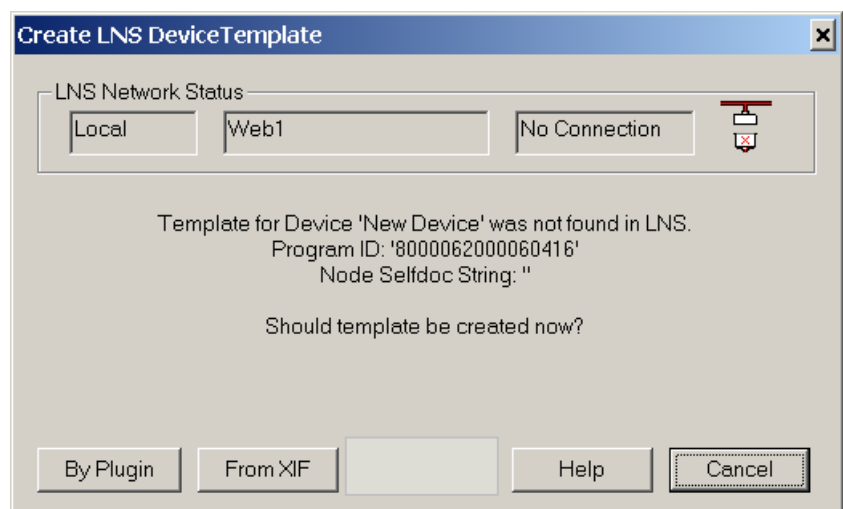
- Get service pin
- Reset device
- Wink device
- Monitor NV values (in NI Channel only)

Create LNS Device Template

For proper LNS synchronization, the LNS database must include all device templates of the LON devices included in the project. A template will be created during Plug-In registration or by importing the information from the XIF file. For all currently available Honeywell Plug-Ins/LON devices, CARE provides an "empty" template database that includes the corresponding device templates. Hence, during LNS Synchronization, separate Plug-In registration or importing XIF file information is not necessary.

Device templates of 3rd party devices are not saved in the template database. During the first LNS synchronization of the project, those device templates will be registered in a separate step per device in any case. After the first synchronization, all created device templates, Honeywell device templates and 3rd party device templates are saved with the project.

During Synchronization for any device type, which no device template has been created for in the LNS database, the Create LNS Device Template dialog box displays. The device template can be created either by the Plug-In registration or importing XIF file information.



Create Template by Plug-In Registration 1. Click the By Plug-In button, if you want to create the device template by registering the plug-in.

RESULT: The Plug-In Registration dialog box displays.

2. In the "Not Registered" list, select desired plug-in(s) and click Add button.

RESULT: The plug-in is added to the "To Be Registered" list.

3. Click Register button.

RESULT: The registration process starts and creates the device template.

4. Confirm message boxes, which might be generated and displayed by the plug-in.

NOTE: A plug-in, which is already registered as listed under the "Already Registered" list, can be reregistered in case it does not work properly. To reregister a plug-in, select it in the "Already Registered" list, add it to the "To Be Reregistered" list by clicking the Add button and click Register button.

Create Template from XIF File

1. Click the From XIF button, if you want to create the device template by using XIF file information.

RESULT: The Open XIF File dialog box displays.

2. Browse to folder where the XIF file is saved.

3. Select the XIF file in the list and click Open button.

RESULT: The device template is created by using XIF file information.

Resynchronize Complete LNS Network

Purpose	To synchronize the complete LNS network not only inconsistent LON information.
Local	Delete the LNS project on the CARE PC and synchronize again (see Delete LNS Projects section).
Remote	Delete LNS project manually on the Remote PC and synchronize again.

Consistency Check

Purpose To verify whether the CARE database and the LNS database are consistent or not. Especially to check if the LNS database has been modified with another LNS-based application (e.g. LonMaker) which causes manual re-engineering to be done in CARE.

CARE compares the following items:

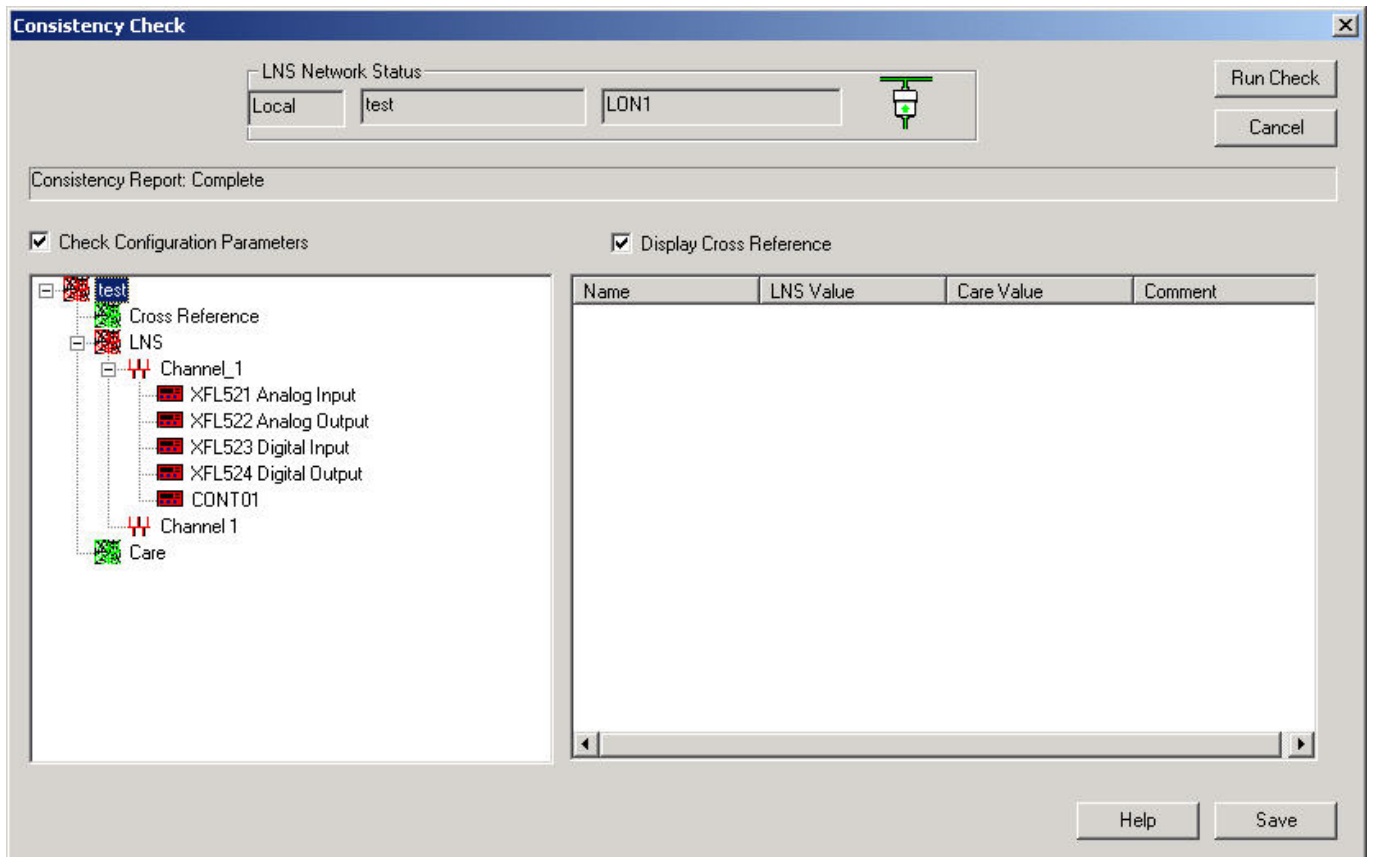
- CARE and LNS database versions
- Channel, subsystem definitions
- Devices and device interfaces
- Parameters
- Bindings
- Additional or other items in LNS database than in CARE database





NOTE: It is recommended to perform a consistency check after a synchronization and not before, in order to minimize the detectable inconsistencies.

In some cases it may need a resynchronization of the project to get consistent. But a consistency check may take the same amount of time or more than a resynchronization of the project. Changes of device statuses (e.g. from online to offline), NV values (except CPs and NCIs) are not considered to be relevant.

- Procedure** 1. In the toolbar, click the Consistency Check icon .

RESULT: The Consistency Check dialog box displays.



On the top the network status is displayed by connection type (LAN, Local) and the network name. The  /  plug icon status indicates whether the network interface of the remote PC is physically connected to the network  or not  respectively whether it is working properly or not.

2. Click the Check Configuration Parameters checkbox, if you want to check the configuration parameters in addition. Note, that this takes additional time.

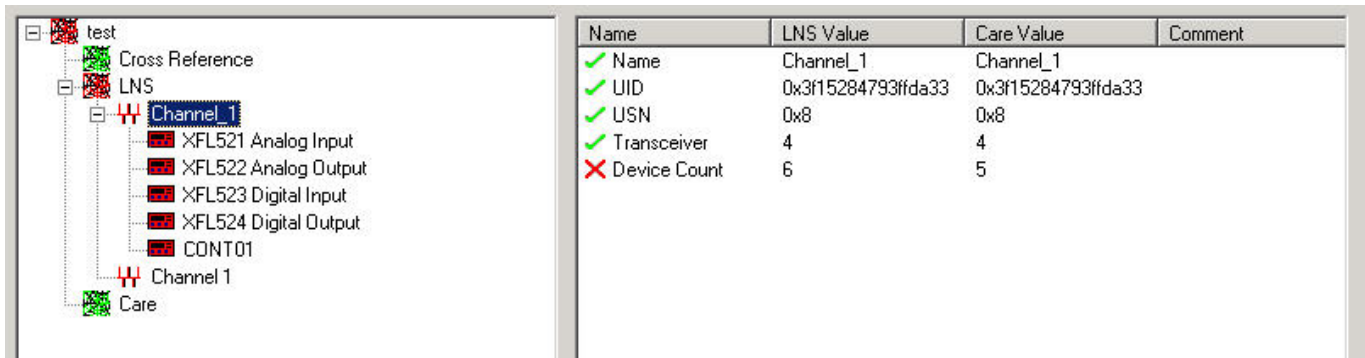
NOTE: The Click the Display Cross Reference option is for internal use only.

3. Click the Run Check button.

RESULT: Status of analyzing is displayed in the Status field above the lists areas. On the left list area, the analyzed network is displayed as hierarchical structure. If all items of the network are consistent the components are displayed in green. If at least one item is not inconsistent, the network name icon is displayed in red.

On the right list area, by default the analyzed items of the highest tree level, that is, the network, are displayed by Name, LNS Value, CARE Value and Comment. Consistent items are indicated by a green checkmark, inconsistent items are displayed by a red cross and a corresponding comment.

To display analyzed items of lower network components, select the corresponding component in the tree on the left.



Name	LNS Value	Care Value	Comment
✓ Name	Channel_1	Channel_1	
✓ UID	0x3f15284793ffda33	0x3f15284793ffda33	
✓ USN	0x8	0x8	
✓ Transceiver	4	4	
✗ Device Count	6	5	

When consistency check is finished, the message “End of Report” is displayed in the Status field above the report list.

4. Click the Save button and save the report as csv. file.
5. Print the report and resolve the conflicts described in the report either by manual operation in CARE or by LNS-based software usage on the LNS database.
6. Click the Cancel button to close the Consistency Check dialog box.

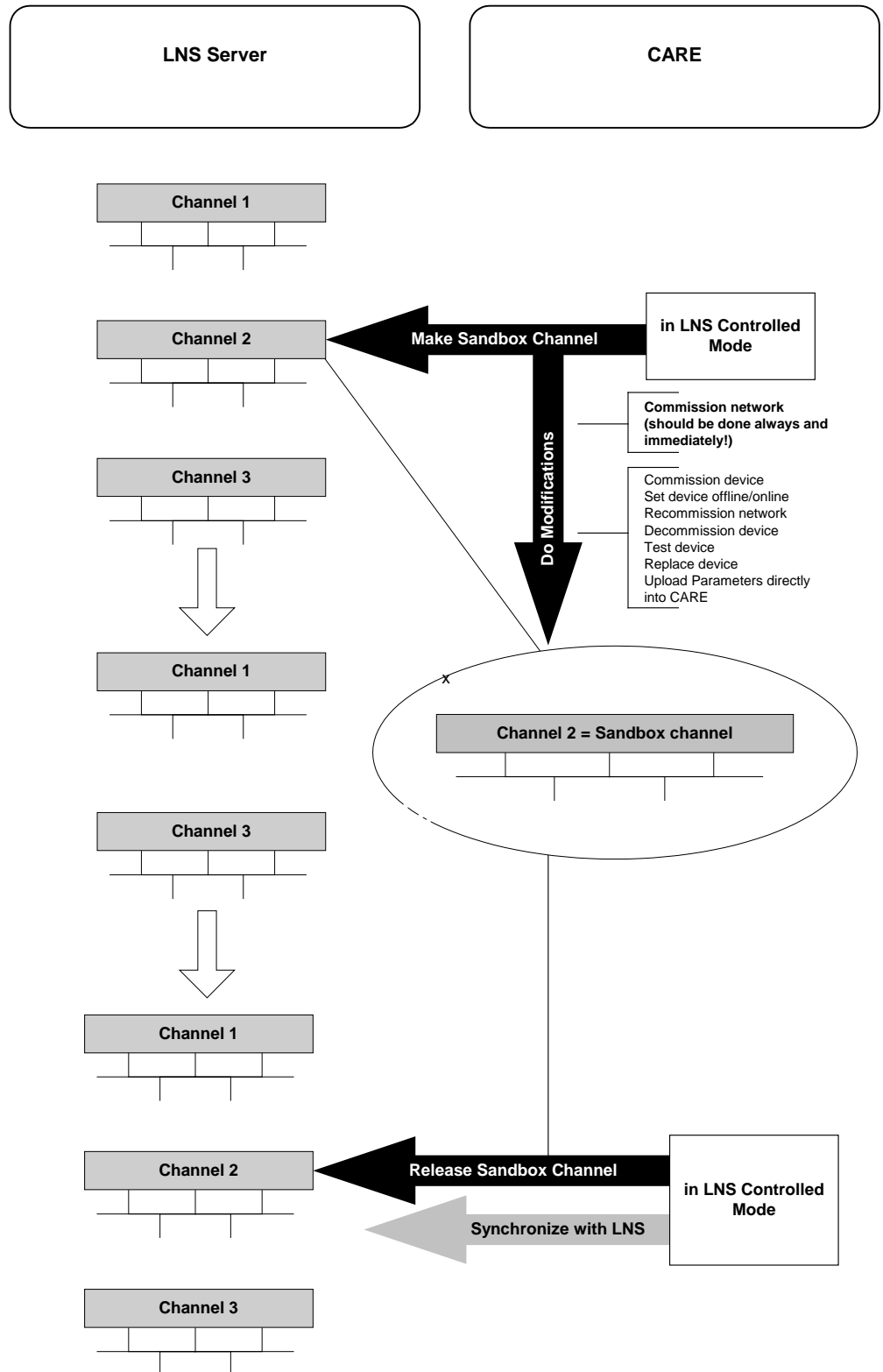
Apply “Sandbox” Channel

Purpose To control one particular channel while LNS has control over the complete network. This may necessary for testing purposes and starting up in case of major structural changes of the network. Although the network is LNS controlled, for the sandbox channel, all CARE Onnet functions can be applied as follows:

- Set device offline/online
- Commission network/device
- Recommission network
- Decommission device
- Test device
- Replace device
- Upload Parameters directly into CARE

IMPORTANT

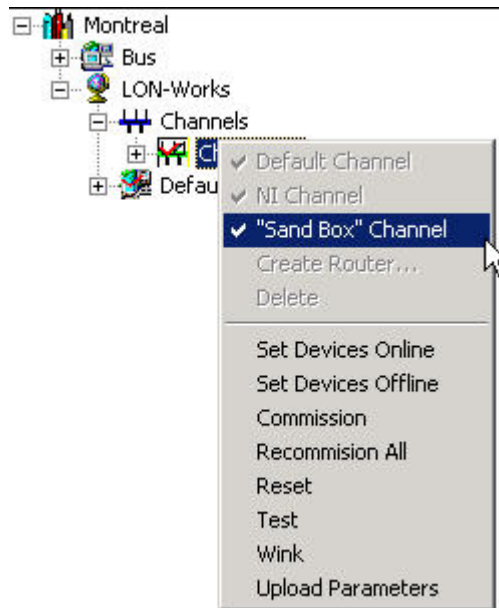
When setting the channel to sandbox, the devices in the channel will be automatically decommissioned. Henc, after setting the channel to sandbox, it is strongly recommended to commission the “ownerless” devices immediately in order to restore normal control functionality.



Restrictions Plug-ins functionality is restricted to the offline start of a plug-in. Only one channel can be defined as sandbox channel. Devices of other channels cannot be reached via routers and therefore bindings between devices of different channels will not work. Routers cannot be modified or commissioned. This will be done during the following Synchronize process.

Domain Settings It is recommended to use different domain settings as LNS.

- Procedure**
1. In the physical part of the LON-Works bus, click on the channel you want to make the sandbox channel.
 2. With right mouse button, click on the channel you want to make the sandbox channel and with left mouse button click on "Sandbox" Channel in the context menu.



3. Click right mouse button and with left mouse button click on Onnet.

RESULT: The following functions are now enabled for working on the channel's devices:

- Set device offline/online
- Commission network/device
- Recommission network
- Recommission device
- Test device
- Replace device
- Upload Parameters

The sandbox channel is automatically defined as NI channel.

4. Select the channel and commission the channel by selecting Commission in the context menu.
5. Make the changes to the channel's devices and do the testing and startup.
6. Release the channel to the normal state by disabling the "Sandbox" Channel option in the context menu.
7. Synchronize the CARE database with the LNS database as described in the Procedures of the Synchronize with LNS section.

Upload Parameters from LNS Database

Purpose To upload parameters directly modified in the devices by usage of e.g. a handheld calibration tool or EBI. CARE allows uploading of the complete set of parameters such as CPs, NCIs including related extension records.

Uploading can be done for a single device, all devices of a subsystem, a channel or the LNS database.

NOTE: Uploading parameters of a complete subsystem or network may lead to a very high busload. Hence, it is strongly recommended to upload parameters only from changed devices.

For procedure please refer to the Upload Parameters section.

LON Device Monitoring

When the LNS tool/workstation is already running, you can go Onnet with CARE and perform the following action:

- Monitor online values in the terminal assignment tool

NOTE: This works only for the NI Channel and when using the same domain ID as LNS.

EBI Settings

For the communication with the EBI, general settings which apply to all NVs and individual settings which apply to particular NVs, can be selected.

The settings are as follows:

Settings for All NVs

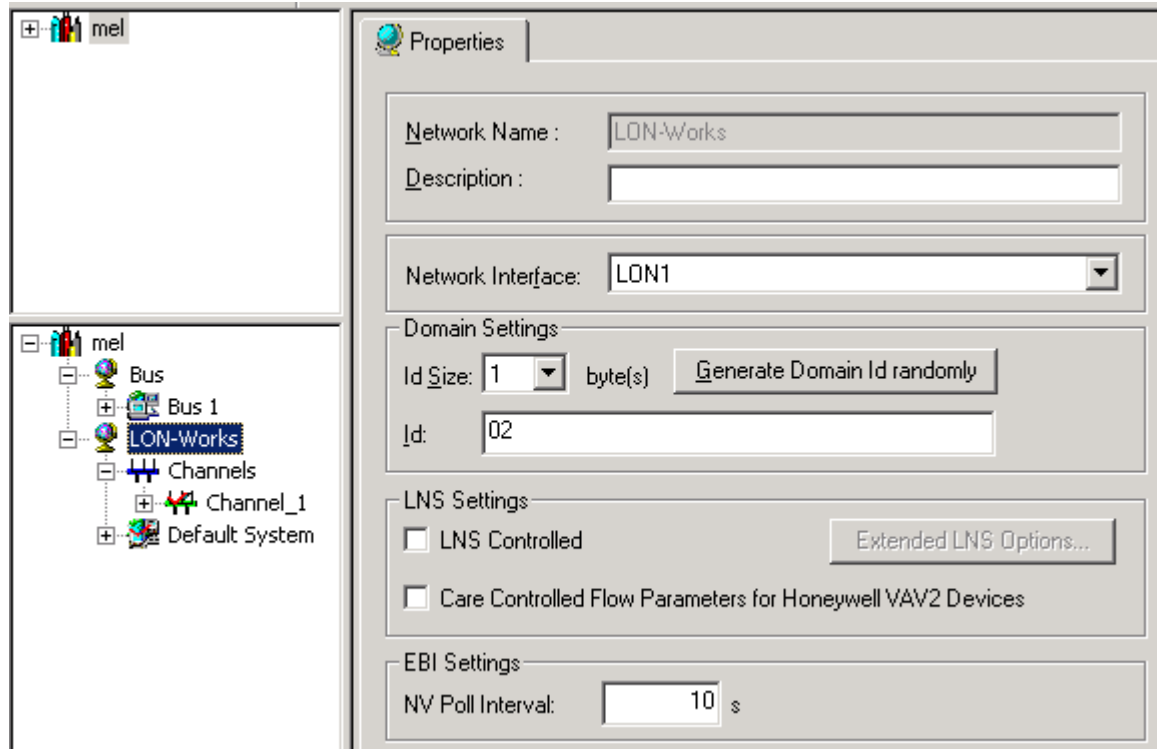
- NV Poll Interval
Defines the NV Poll Interval in s in which all NVs will be polled by the EBI LON point server.

Settings for Particular NVs

- NV Poll Interval
Defines the NV Poll Interval in s by which a NVs will be polled by the EBI LON point server.
- Report by Exception
For a particular NV, LNS uses a report by exception message transfer as opposed to a polling mechanism to the LNS client. In this case the LonWorks Point Server is the LNS client. It is recommend that this bit is always set and perhaps this option should not even be shown.
- Use Bound Updates
Binds the respective network variable to the host network interface (host binding).

Select NV Poll Intervall for all NVs Procedure

1. In the network tree, click on the LON-Works folder.



2. On the Properties tab on the right pane, enter the interval in the NV Poll Interval field.

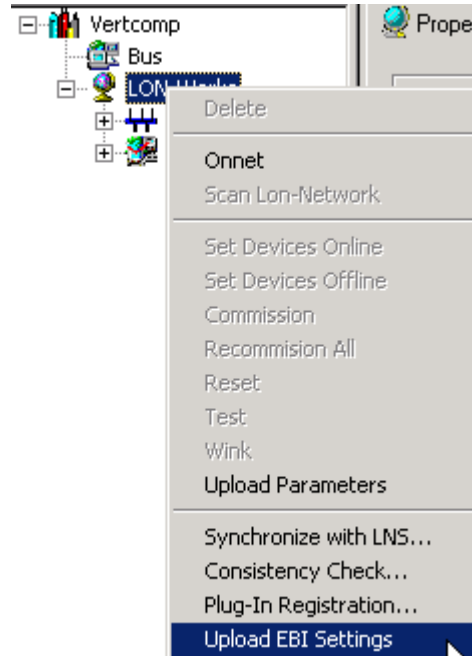
Select Settings for Particular NV Procedure

1. Expand the network tree, navigate to the NV and select it.

Upload EBI Settings

To avoid problems when upgrading CARE and/or EBI, it is highly recommended to upload the EBI settings into CARE before doing the upgrade (see also "CARE and EBI Upgrades" section).

- Procedure**
1. In the logical LON-bus part of the network tree, right-click on the LonWorks folder and click on Upload EBI Settings in the context menu.



RESULT: The parameters NV Poll Interval, Report by Exception and Use Bound Updates will be uploaded.

LNS Plug-Ins

CARE provides access to Honeywell LNS-based Plug-Ins in order to configure, calibrate and/or monitor the corresponding LON devices.

LNS Plug-Ins will be installed with their own setup program and can then be executed from within CARE for the selected device.

LNS Plug-Ins can be invoked locally on the CARE PC and remotely on a PC connected via LAN. For details, please refer to the Synchronize with LNS section.

Honeywell Plug-Ins can be downloaded from "<http://www.honeywell.de/plugin>".





Plug-In Registration

To use a Plug-In it must be registered first in the LNS database. *Inter alia* the registration process creates the necessary device template for the corresponding LON device. For Honeywell Plug-Ins/LON devices, CARE provides an "empty" template database that includes all current device templates.

NOTE: Registration depends on the LNS network status, which indicates the connection mode, local or remote. For both connection modes, local and remote, a plug-in must be registered separately one-time.

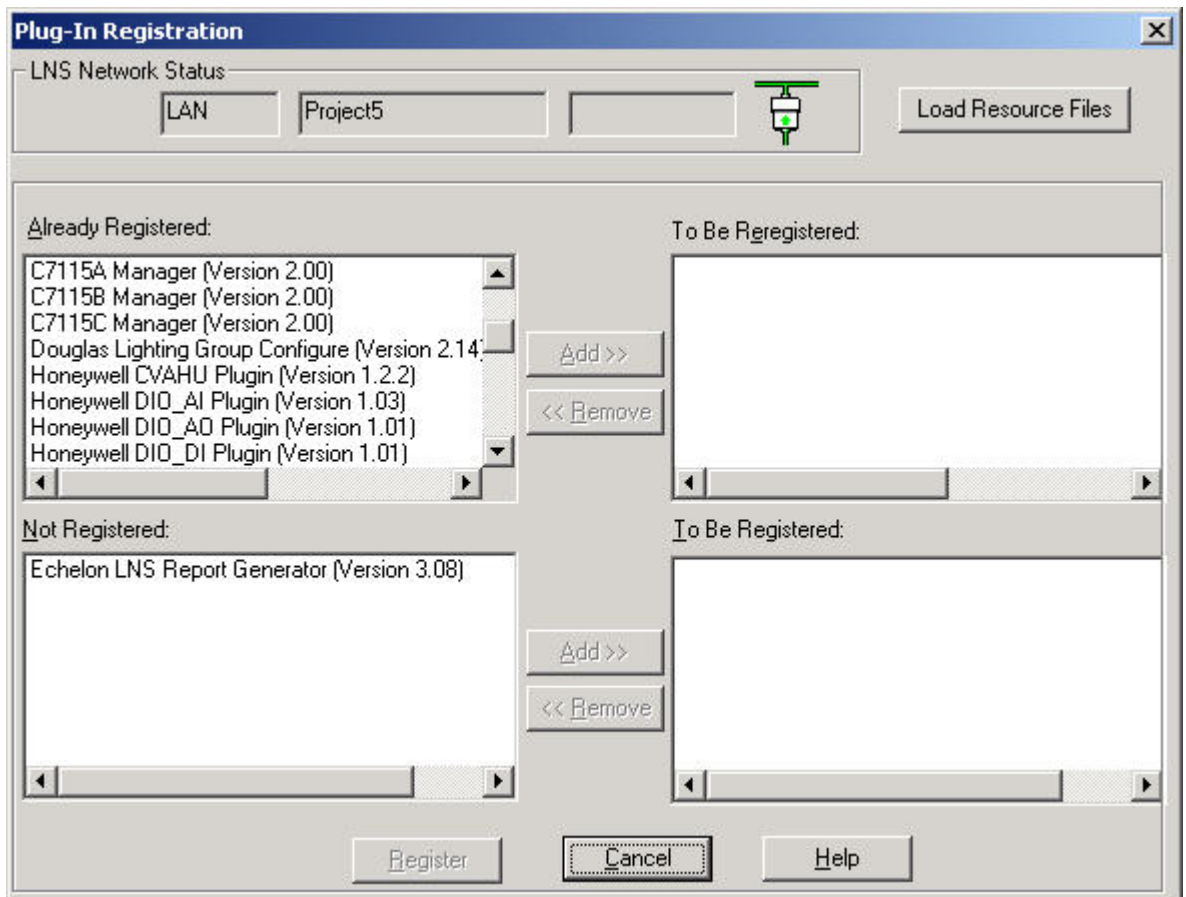
- Procedure**
1. In the logical LON-bus part of the network tree, right-click on the LonWorks folder and click on Plug-In Registration in the context menu.

RESULT: The Plug-In Registration dialog box displays.

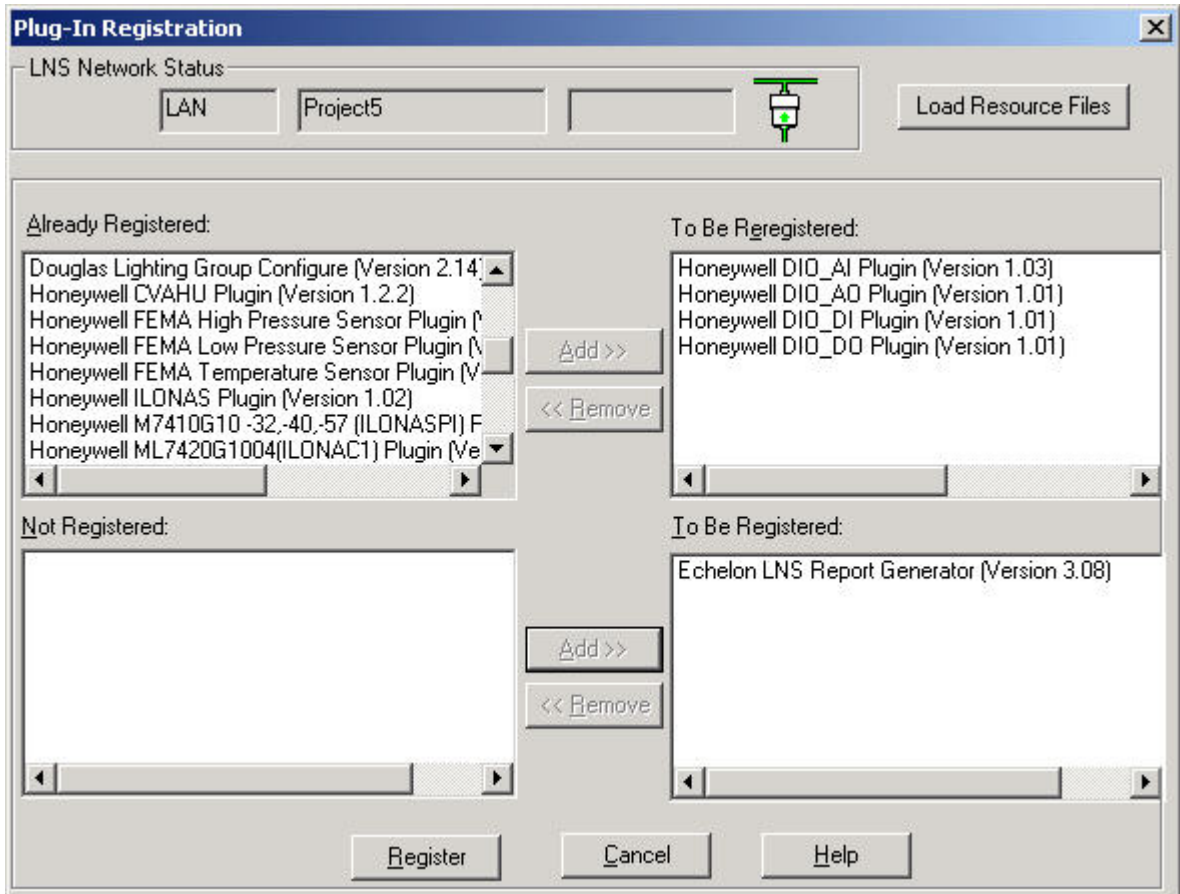
On the top the network status is displayed by connection type (LAN, Local) and the network name. The  /  plug icon status indicates whether the network interface is physically connected to the network  or not  respectively whether it is working properly or not.

Note that if CARE is not in LNS controlled mode, the connection type is always local.

In the upper left, the Already Registered list shows all plug-ins which have been already registered. In case of plug-in updates they can be re-registered. In the lower left, the Not registered list shows all plug-ins which have not been registered yet.



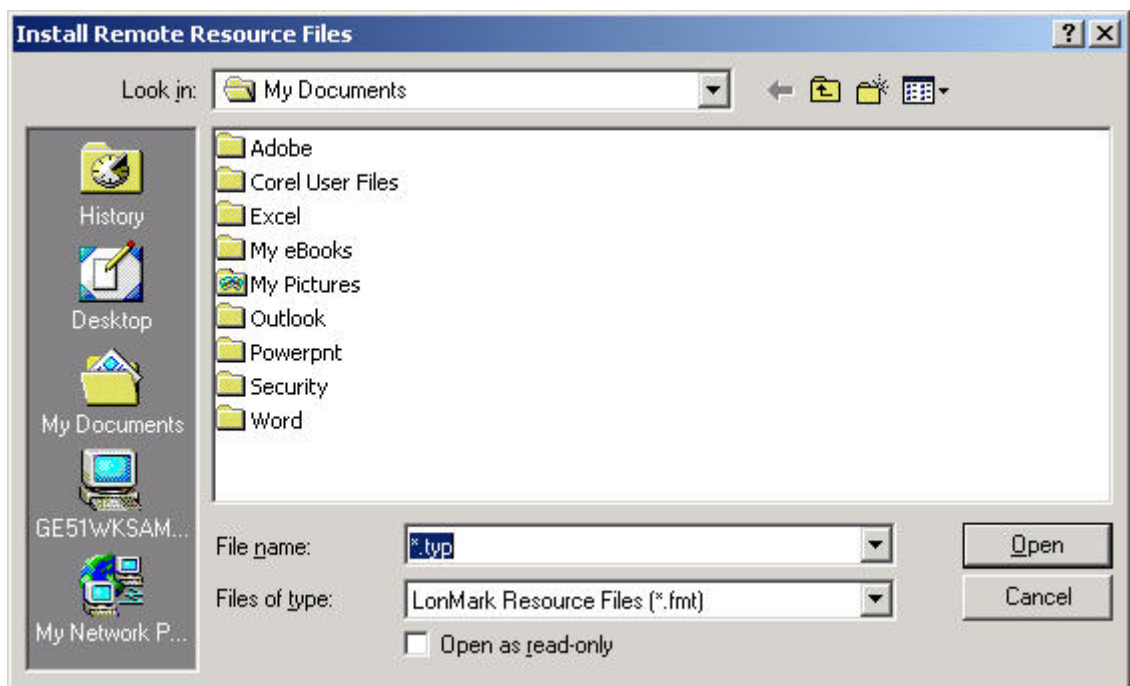
2. In the corresponding list(s), select the plug-ins to be registered and click the Add button(s).



- If remote operation of the plug-in is required, click the Load Resource Files button.

NOTE: Loading resource files is only possible via LAN connection mode not via LON.

RESULT: The Install Remote Resource Files displays.



4. Browse to the folder where the resource files are located and select the file.
5. Click the Open button.
6. Click the Register button.

RESULT: The registration process starts and creates the device templates for the plug-ins. If the resource files have been loaded, they will be installed on the remote PC.

7. During the registration process, confirm message boxes, which might be generated and displayed by the plug-in.

Plug-In Functions

Plug-ins provide configuration, calibration and monitoring functions dependent on the device the plug-in is designed for. The kind of access to the various plug-In functions such as depends on the LNS Controlled option setting.

LNS Controlled Mode

In LNS Controlled mode, the full functionality as designed for the plug-in is available while LNS is running.

CARE Controlled Mode

In CARE Controlled Mode, LNS Plug-In functions are restricted. While LNS is running by the parallel use of a LNS tool, proper operation is only possible for

- Configuration
- Calibration

While LNS is running,

- Monitoring
does not work properly because the device will be operated standalone without any bindings. Hence, if a LNS tool is used in parallel for the LonWorks network engineering, it is not allowed to go Onnet with CARE and monitor devices via Plug-In Online if the LNS tool is already running.

In CARE Controlled Mode plug-in functions can be executed in offline and/online mode as follows:

- Configuration (offline or online)
- Calibration (online)
- Monitoring (Test and Diagnostic, online)

As the list shows, configuration can be done offline as well online, whereas calibration and monitoring can only be done online.

Normally, configuration will be the first step, then the device can be calibrated and/or monitored.

Depending on the mode, offline or online, the interaction between CARE (database), LNS database, Plug-In and LON device will be different for the procedures (see "Plug-In Offline Functions in CARE Controlled Mode (Configuration)" and "Plug-In Online Functions in CARE Controlled Mode (Configuration, Calibration, Monitoring)" sections.

Prerequisites

The plug-in must be installed and registered on the CARE PC. For remote plug-in operation on a PC connected via LAN, the device templates and the *DRF* files must be installed on the remote PC. This will be done remotely during registering the plug-in on the CARE PC (see Plug-In Registration section).

Re-registering is also possible in the same way.

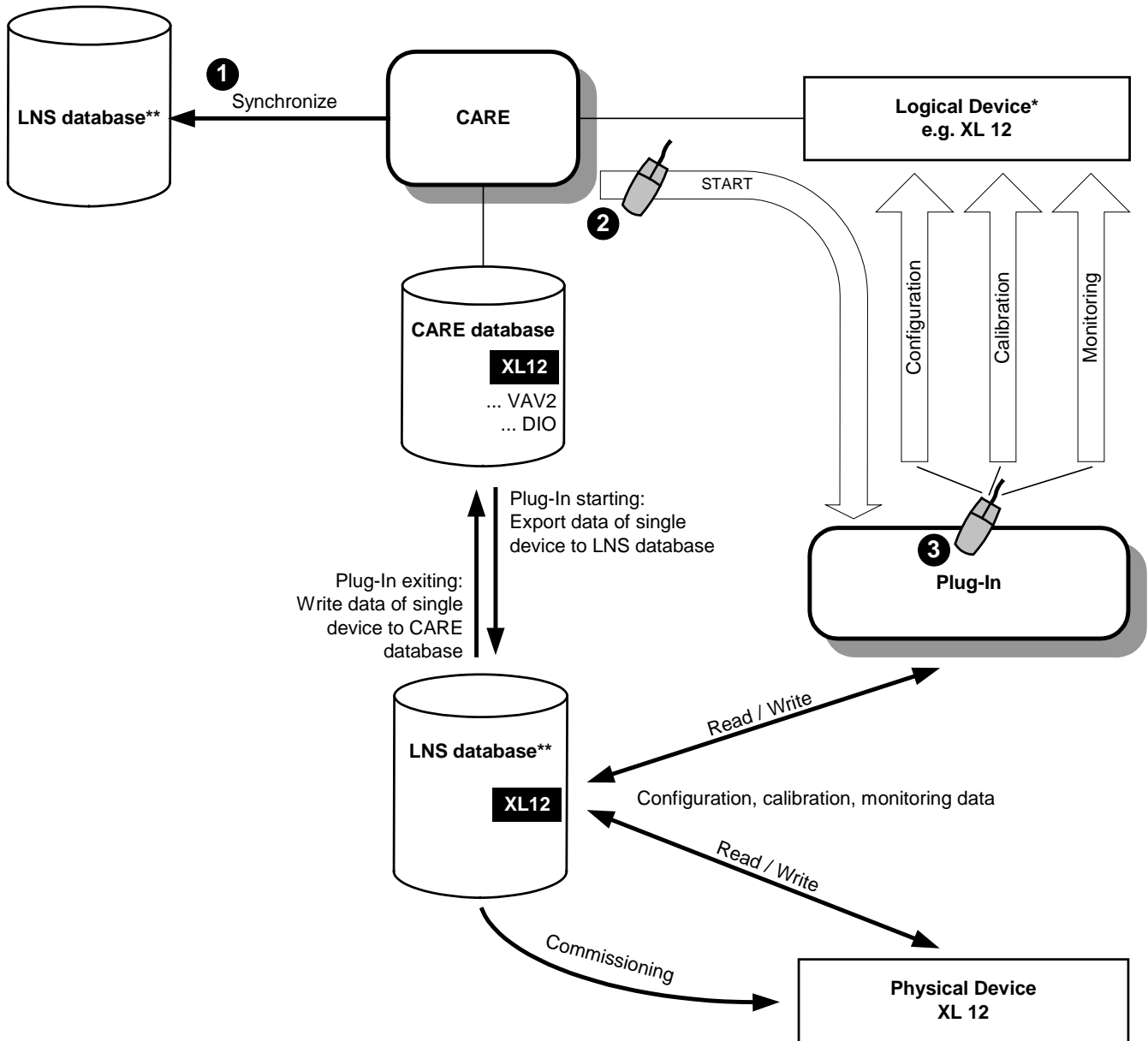
Plug-In Functions in LNS Controlled Mode

In LNS Controlled mode, the full functionality (calibration, configuration and monitoring) of the plug-in is available while LNS is running (offline or online).

NOTE: It is recommended to perform a Synchronize with LNS before launching the Plug-in.

The CARE process when working in LNS controlled mode is as follows:

Plug-In in LNS Controlled Mode



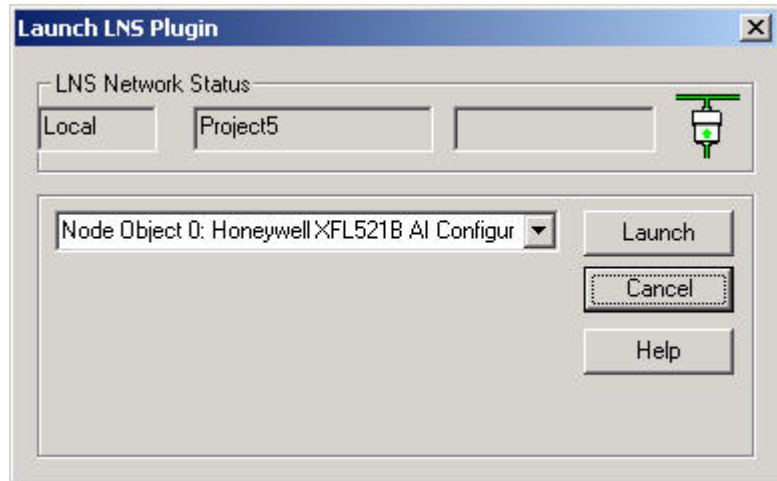
* Device in network tree

** One and the same LNS database

Prerequisites see Prerequisites in Plug-In Functions section.

- Procedure**
1. If not already done, install the LNS software and the Plug-In.
 2. Set CARE into LNS controlled mode and Synchronize with LNS as described in the Synchronize with LNS section.
 3. In the logical LON-bus part of the network tree, click on the device, of which plug-in you want to start.
 4. Click right mouse key and with left mouse key, click Plug-Ins.

RESULT: The Launch LNS Plugin dialog box displays.



5. Select desired option, in this case, under Configure, Monitor, and Honeywell project settings.

NOTE: The Honeywell project settings allow defining global settings such as engineering unit, fail detect time, etc., for example, for each XL 10 controller type. Those global settings are saved in the LNS project and not in the CARE database. Hence, when changing such a global setting via plug-in, the changed value is not taken over after the plug-in has been closed.

6. Click the **Launch** button.

RESULT: The plug-in is started. The physical device is commissioned.

7. In the Plug-In, define the settings

RESULT: The data are saved to the physical device and to the logical device respectively to the LNS and to the CARE database.

8. Exit the Plug-In.

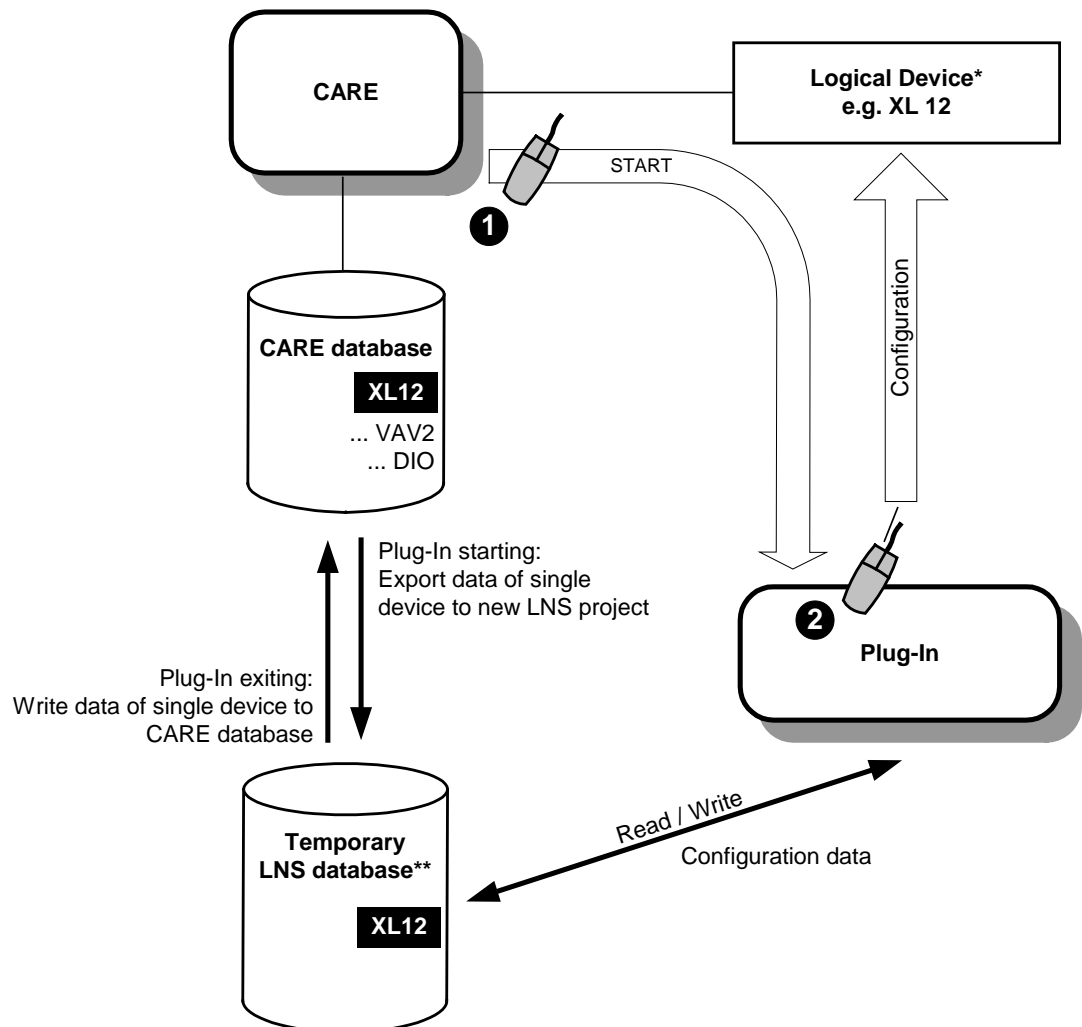
Plug-In Offline Functions in CARE Controlled Mode (Configuration)

Configuring a device means to define device-specific settings, for example "the time to open / time to close a valve" in an air handling unit. The configuration can be done offline or online and is saved in the LNS, respectively in the CARE database. When the logical device (logical device=device in network tree) has been configured offline, the configuration data must then be saved to the physical device by commissioning in a second step.

When the logical device has been configured online, the configuration data is automatically saved to the physical device.

The CARE process when working offline on a Plug-In is as follows:

Plug-In Offline in CARE-Controlled Mode



* Device in network tree

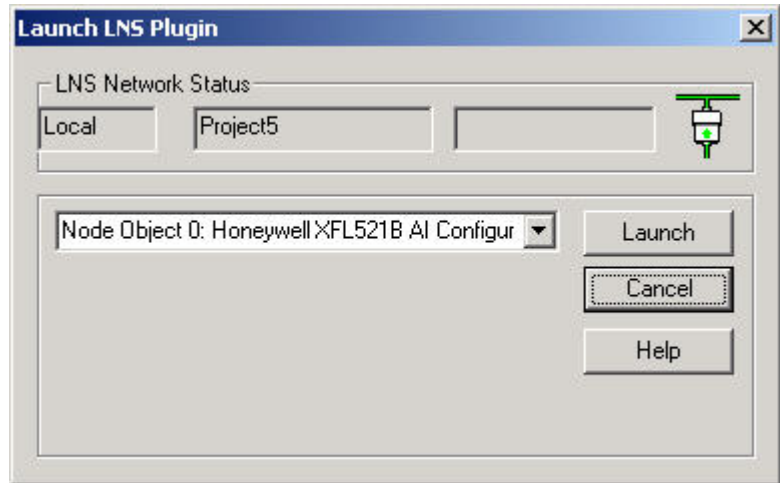
** Not the LNS database used for Synchronize

Prerequisites see Prerequisites in Plug-In Functions section.

NOTE: If DIO/Smart I/O Plugins are used, the point attributes will not be updated.

- Procedure**
1. If not already done, install the LNS software and the Plug-In.
 2. In the logical LON-bus part of the network tree, click on the device, you want to configure.
 3. Click right mouse key and with left mouse key, click Plug-Ins Offline.

RESULT: The Launch LNS Plugin dialog box displays.



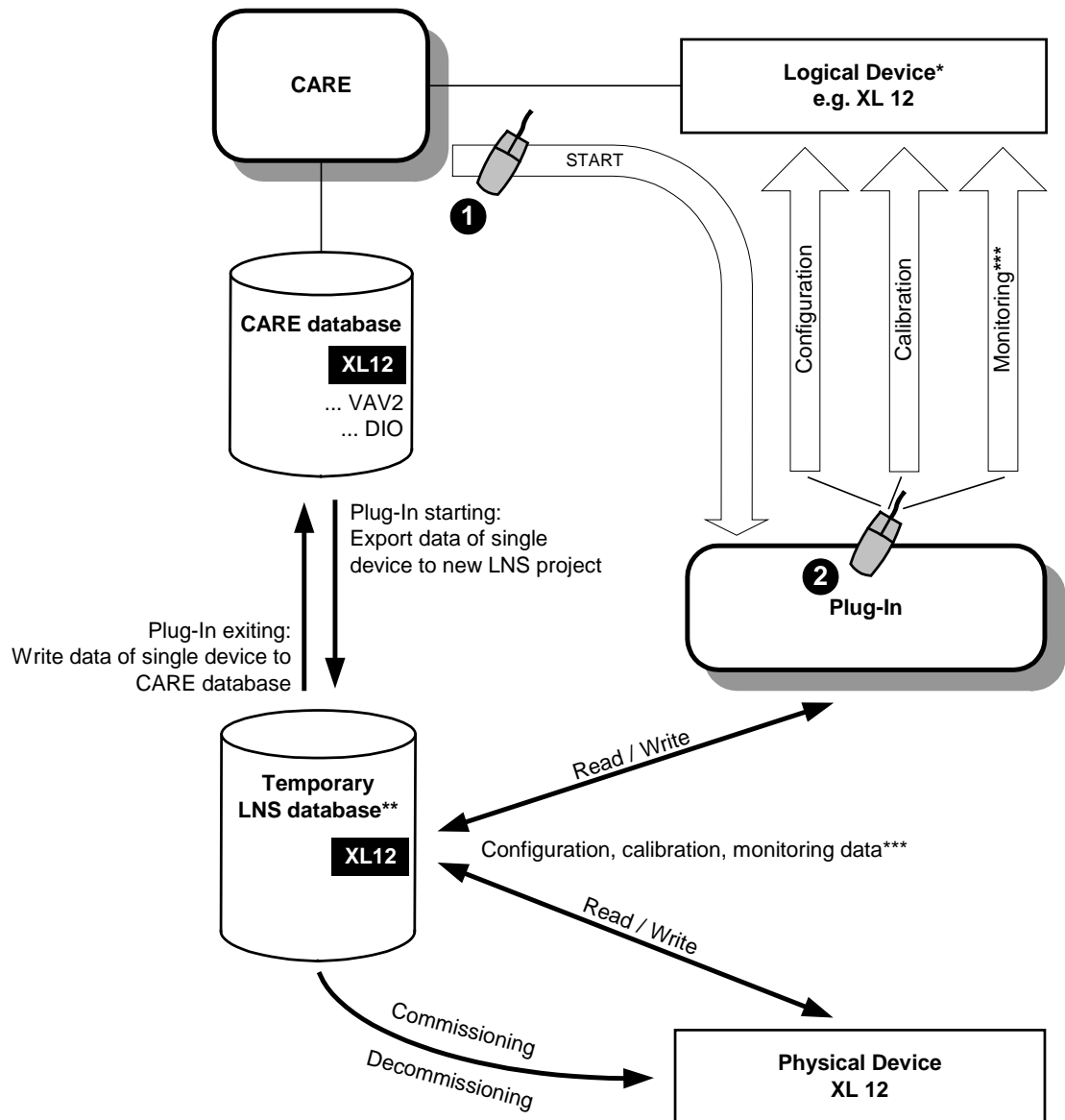
4. Select the Configure option.
5. Click **Launch** button.
RESULT: The plug-in is started.
6. Configure the device.
RESULT: The configuration data are saved to the logical device respectively to the LNS and to the CARE database.
7. Exit the Plug-In.
8. To save the configuration data in the device, commission the device as described in the "Commission Device(s)" section.

Plug-In Online Functions in CARE Controlled Mode (Configuration, Calibration, Monitoring)

Plug-In online operation can properly be used for calibration and configuration only. The monitoring does not work properly because the device will be operated standalone without any bindings.

The CARE process when working online on a Plug-In is as follows:

Plug-In Online in CARE-Controlled Mode



* Device in network tree

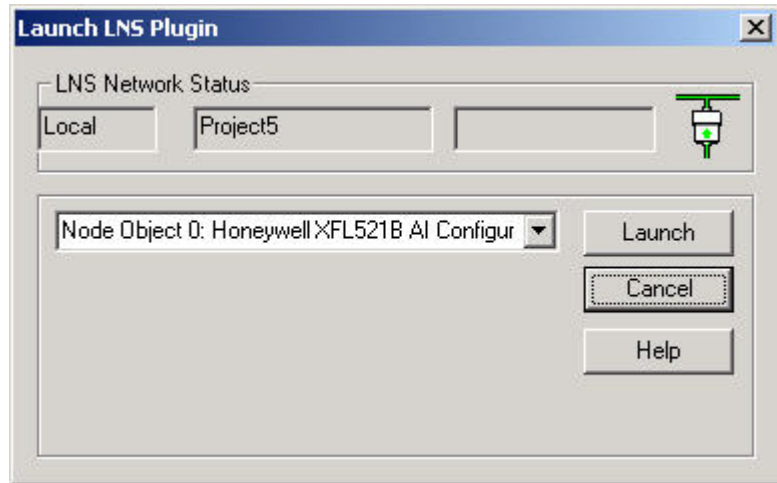
** Not the LNS database used for Synchronize

*** Proper Monitoring not possible due to standalone status of commissioned device

Prerequisites see Prerequisites in Plug-In Functions section.

- Procedure**
1. If not already done, install the LNS software and the Plug-In.
 2. In the logical LON-bus part of the network tree, click on the device, you want to monitor.
 3. Click right mouse key and with left mouse key, click Plug-Ins Online.

RESULT: The LNS Plugin dialog box displays.



4. Select desired option, in this case, under Configure, Monitor, and Honeywell project settings.

NOTE: The Honeywell project settings allow defining global settings such as engineering unit, fail detect time, etc., for example, for each XL 10 controller type. Those global settings are saved in the LNS project and not in the CARE database. Hence, when changing such a global setting via plug-in, the changed value is not taken over after the plug-in has been closed.

5. Click the **Launch** button.

RESULT: The plug-in is started. The physical device is commissioned.

6. In the Plug-In, define the settings

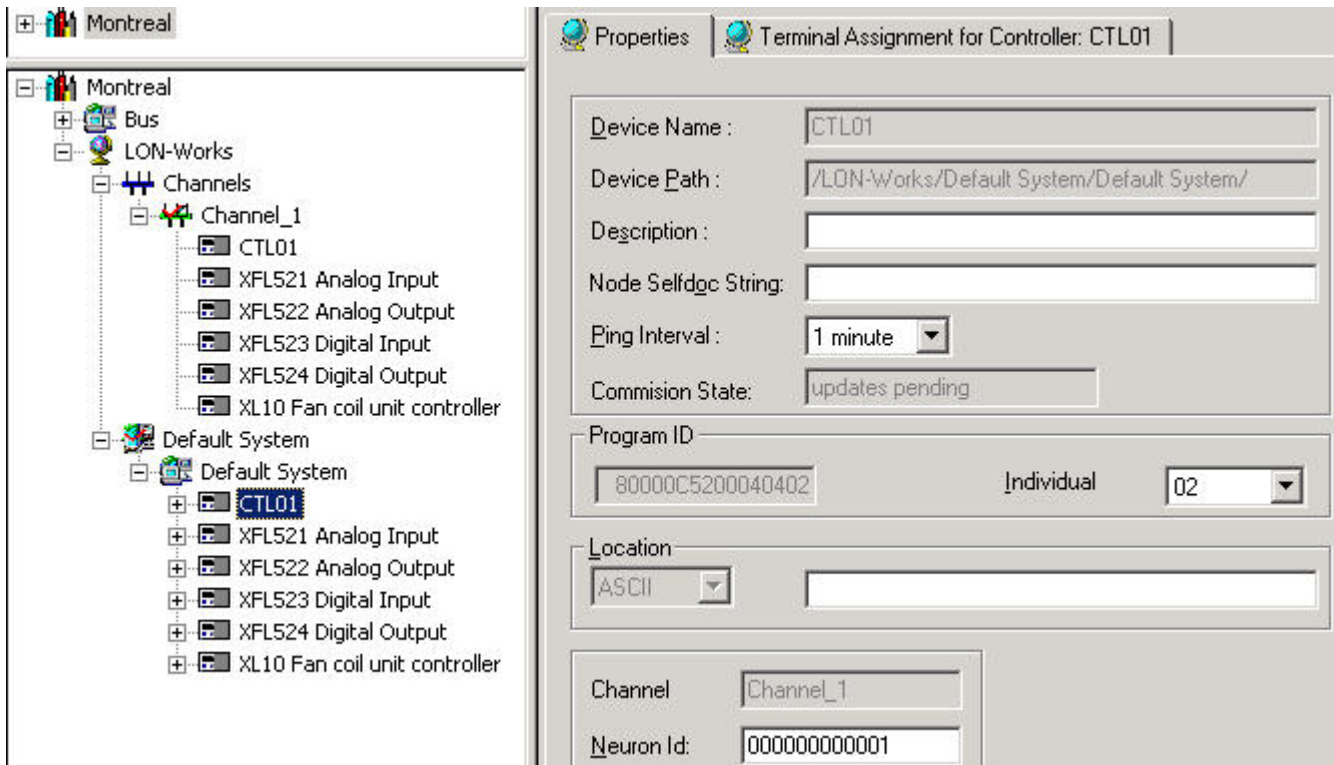
RESULT: The data are saved to the physical device and to the logical device respectively to the LNS and to the CARE database.

7. Exit the Plug-In.

RESULT: The device is decommissioned.

Replace Device in LNS Controlled Mode

Devices can be replaced in the LNS database without using any additional credits. A device can be replaced by simply changing the neuron ID on the Properties tab of the device.



During the next synchronization, LNS replaces the device by commissioning the new device and decommissioning the old device.

Restore CARE Projects

When restoring a project created with an older CARE version than 5, the default status of the project regarding LNS is "not yet synchronized".

When restoring an old CARE project which has been changed and synchronized in the meanwhile, it may result in the need to start again. That is, the LNS project must be deleted in CARE respectively on the Remote PC and the restored project must be synchronized.

When back upping a project, LNS extensions will be included, but LNS related files such as XIF; DRF and LNS database files will not.

Delete LNS Project(s)

Whenever synchronizing the LNS database with the CARE database, the CARE project is stored as LNS project for usage within the LNS-based tool.

In case the CARE project name is changed and the corresponding LonWorks network is synchronized again, the old LNS project can be deleted to save disk space.

Depending on the LNS controlled mode (Local or LAN), that is, whether CARE and the LNS server reside on the same PC or on different PCs, LNS projects are to be deleted in different ways.

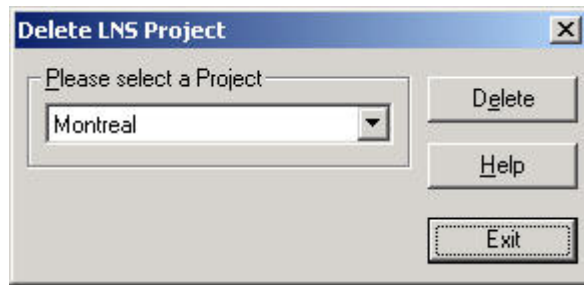
See also "LNS Credits Handling" section.

Procedure (Local LNS Server)

1. Click menu item Database, then submenu item Delete LNS Project(s).


RESULT: The Delete LNS Project dialog box displays.

2. Select the project from the Please select a Project drop-down listbox.

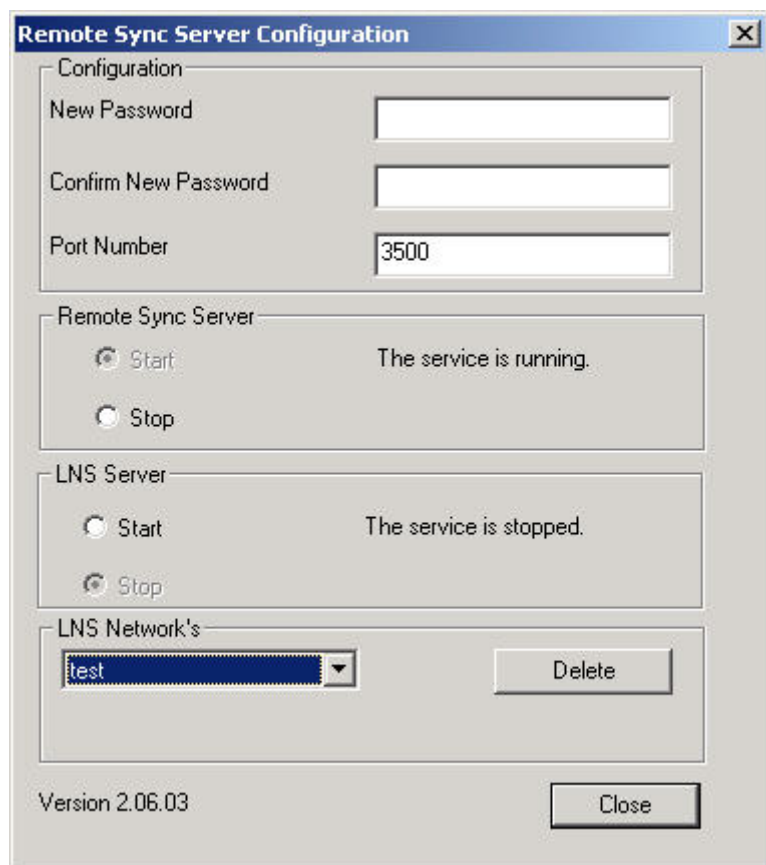


3. Click the Delete button.

Procedure (Remote LNS Server)

1. Start Windows control panel and double-click on the Remote Sync Server icon  in the control panel.

RESULT: The Remote Sync Server Configuration dialog box displays.



2. Under Remote Sync Server, click the Stop radio button.
3. Under LNS Server, click the Stop radio button.
4. From the LNS Network's drop-down listbox, select the network (project) you want to delete and click the **Delete** button.
5. Click the **Close** button.

LNS Credits Handling

IMPORTANT

By default CARE provides one credit necessary for the Plug-Ins Online function. Hence, make sure that least one credit is always available in the LNS database. Also make sure, that the job specific number of credits has been ordered before starting the Synchronize with LNS function.

The credits count will be affected when applying one of the following functions:

Synchronization with LNS

In case devices have been added, for each device one credit will be subtracted from the credits count available. In case devices have been deleted, for each device one credit will be returned. The credits will be count on the PC where the LNS database is installed.

Delete LNS Project

When deleting an LNS project, the credits that have been subtracted during LNS Synchronization will be returned.

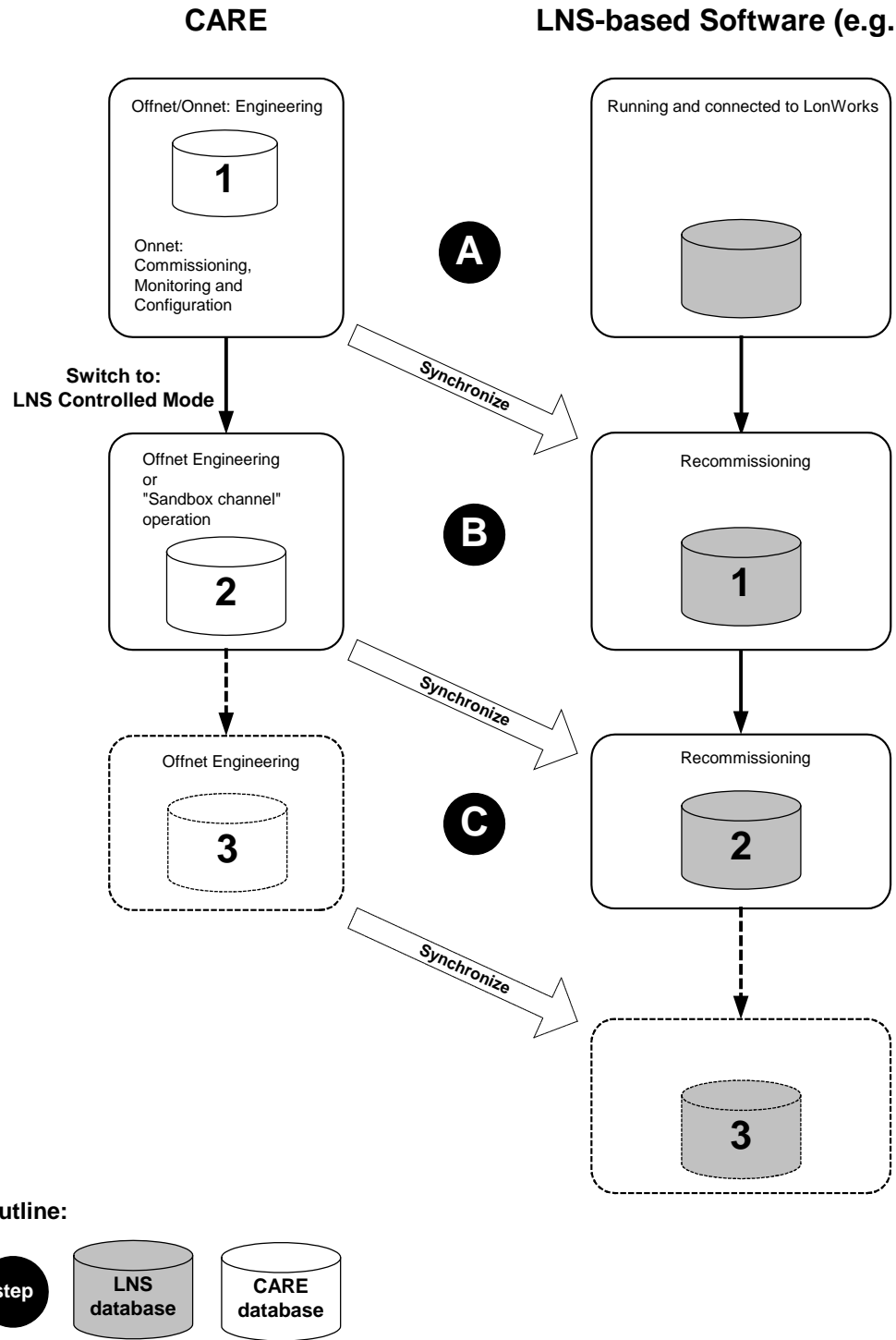
Plug-In Online

When working Online with a LNS Plug-In, one credit will be issued during commissioning and returned after decommissioning (temporary issue).

Incremental LonWorks Engineering

Workflow

Incremental engineering means that CARE will be used in combination with a LNS-based software such as EBI whereas CARE is running in LNS controlled mode in which the LNS-based software is controlling the LonWorks network. The following diagram describes the engineering workflow during incremental engineering:



- A. The initial engineering is done with CARE in Offnet mode respectively in Onnet mode. Usually in Offnet mode, you structure the LON network and do the bindings. Then you go Onnet, commission and configure the devices/LON network. To bring the LNS database into the actual state, you switch CARE into LNS Controlled mode. Then you synchronize the LNS network/database with the CARE network/database. The LNS-based software gets Online and recommissions the complete network. All LON devices are displayed on the workstation.
- B. As it is typical for incremental project engineering, you may add and configure some new components, such as LON devices, channels, and/or routers in CARE. This can be done offnet or onnet. In order to apply the full set of CARE

onnet functions, the respective channel can be separated as a “sandbox” channel, even if the LNS-based software is running and controlling the network.

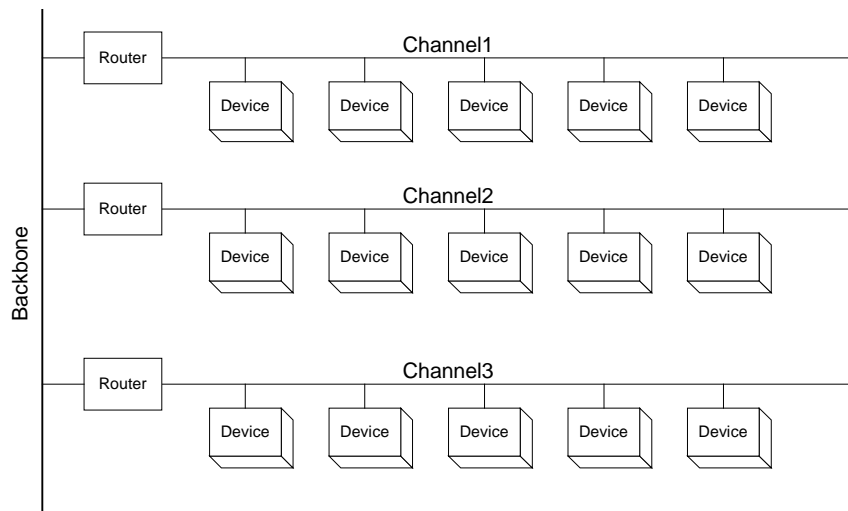
After completing the changes and still in LNS controlled mode, you synchronize the LNS network with the CARE network again. The LNS database will be updated with changed information done in CARE.

C. Repetition of step B, and so forth.

Architectures

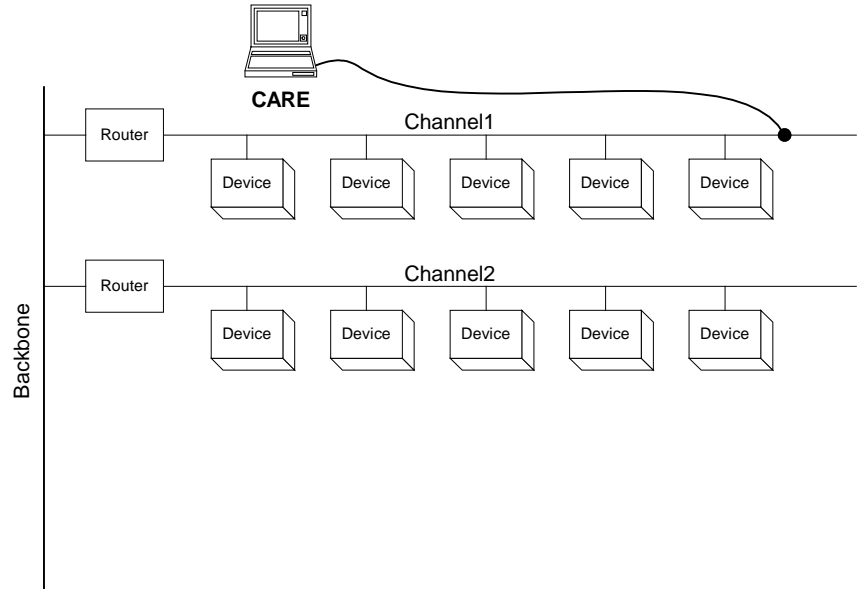
For big jobs it is possible to startup the plant incrementally. In this case, some precautions need to be taken as described in the following sections.

Example Architecture

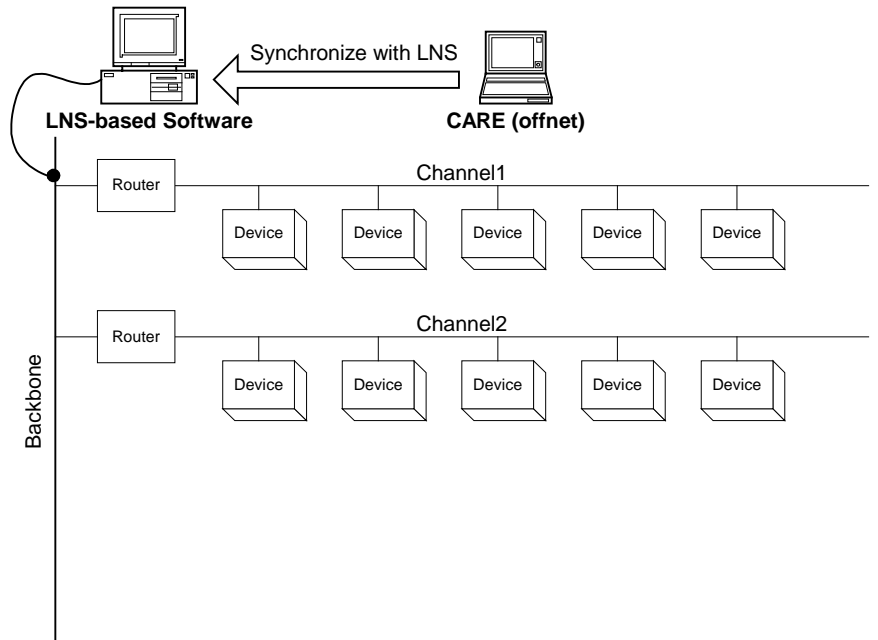


Initial Engineering

- Procedure**
1. Connect the CARE PC to any channel of the LON network and set this channel to the network interface channel (NI channel).
 2. Do complete network startup with CARE using the complete CARE onnet functions.

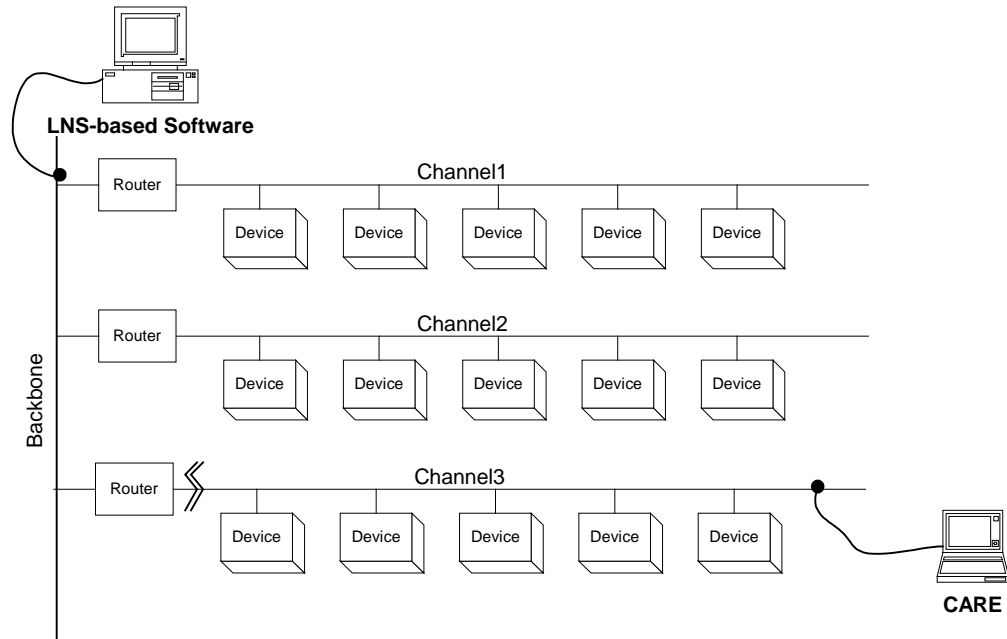


3. Disconnect CARE from the LON network by setting it Offnet.
4. Connect the PC with the LNS-based software, e.g. EBI, physically to the backbone and open the LNS network.
5. In CARE (Extended LNS Options), make the backbone channel to the LNS NI channel.
6. Synchronize the LNS network with the CARE network.



Adding a Channel

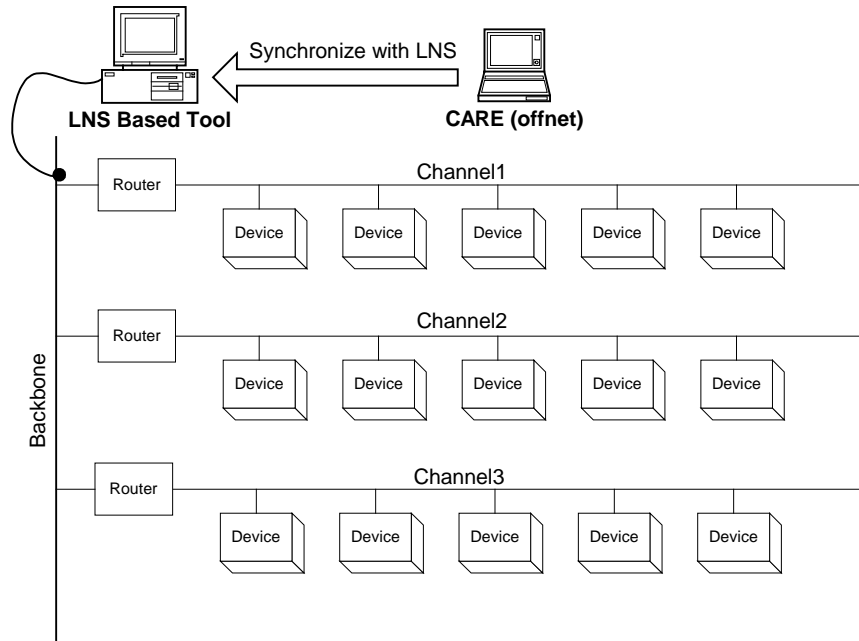
If a new channel should be added, it must be engineered offnet with CARE.



1. Engineer the new channel in CARE.
2. Connect CARE PC physically to the new channel.
3. In CARE, make the new channel to the "sandbox" channel.
4. Do the complete startup of this channel with full onnet functionality of CARE.

NOTE: Bindings between new channel(s) and existing channels that had been synchronized will not work during this start-up.

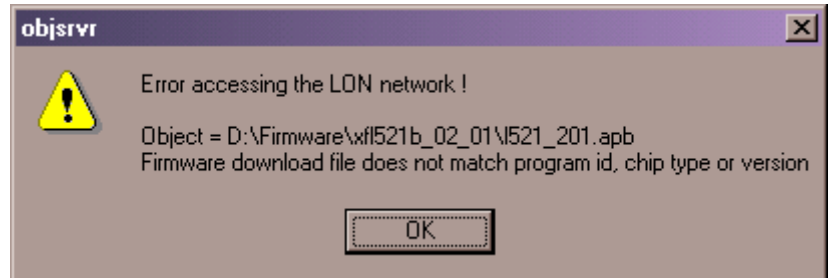
5. Disconnect the CARE PC from the LON network by setting it offnet.
6. Release the sandbox channel.
7. Synchronize the LNS network with the CARE network.
8. Integrate the new channel into the LNS-based software.



Download Firmware

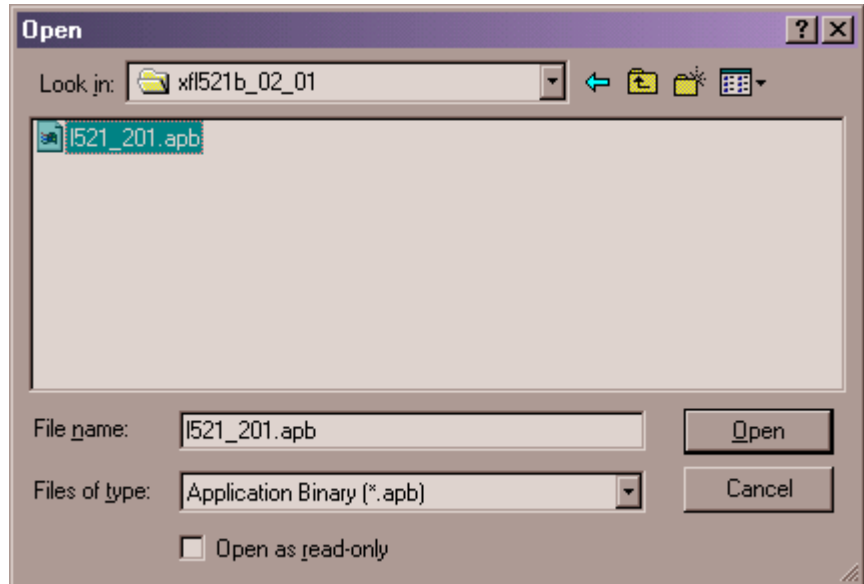
Prerequisites The device must be commissioned (see Commission Device(s) section) and you have to be onnet (see Go Onnet section).

NOTE: Only .APB files can be downloaded and downloading is only possible, if the existing program ID, the chip version and the firmware version match the application file to be downloaded. If not, error messages occur, for example:



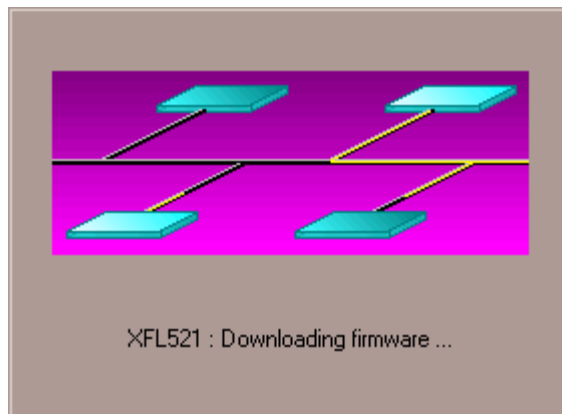
- Procedure**
1. In the tree, click on the device, you want to download an application to.
 2. Click right mouse key, and with left mouse key click on Firmware Download.

RESULT: The Open dialog box displays.



3. Browse to folder and select desired application file.
4. Click Open button.

RESULT: CARE starts downloading firmware.



The process window disappears when download is finished and the device gets white-colored in the network tree.

Download Application Remotely (Excel Online Remote)

Purpose To download and start an application remotely. In addition, status information and values can be viewed. The application will be downloaded from the CARE PC to the Remote PC (EBI, SymmetrE) which is connected to the controller.


Prerequisites To enable the remote download function (Excel Online Remote), the following prerequisites must be fulfilled:

- The application must be translated and loaded into the controller
- LAN connection between CARE PC and Remote PC must be working
- Remote PC must have access to the controller via e.g. XPC500, BNA, LON, etc.
- Server on Remote PC must be running
- Excel 500 point server service (C-Bus driver service) must be running on the Remote PC. In general, the service is running as soon as EBI has been started. For information on the Cbus address, see Procedure.

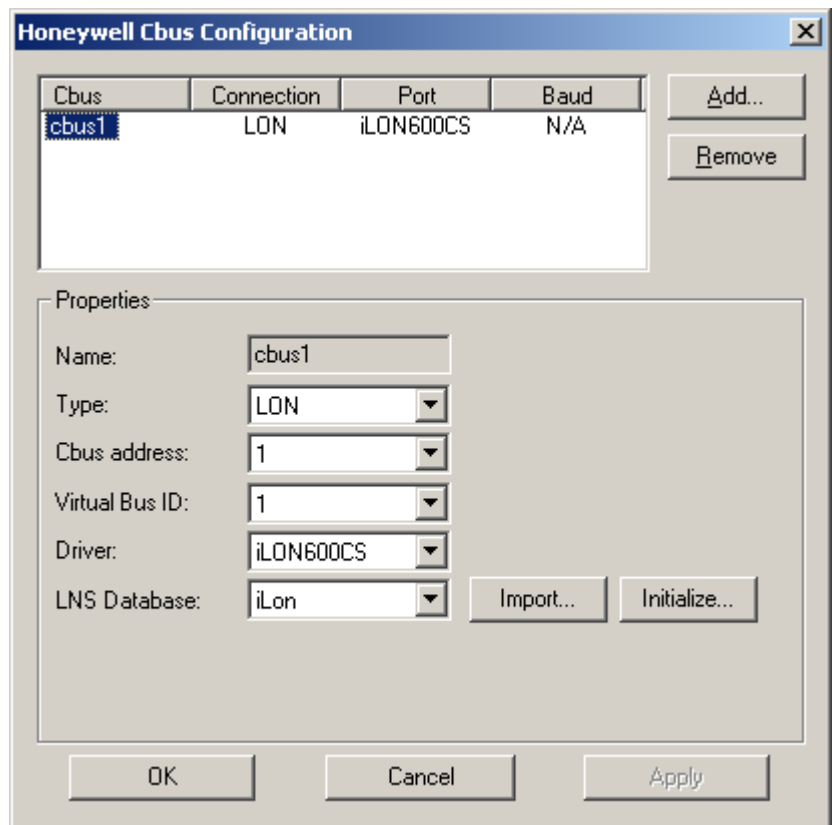
Access Principle of Excel Online Remote

After the LAN connection between CARE PC and remote PC is established, a service of the Remote PC is used to access the XL500 controller. Starting Excel Online Remote is independent on the connection (interface) type (XPC500, BNA, LON, etc.). As soon as the controller and datapoint online changes can be seen on the Remote PC, Excel Online Remote can be started.

Procedure (Remote PC)

1. In the Windows Control Panel, double-click the CBUS  icon.

RESULT: The Honeywell Cbus Configuration dialog box displays.

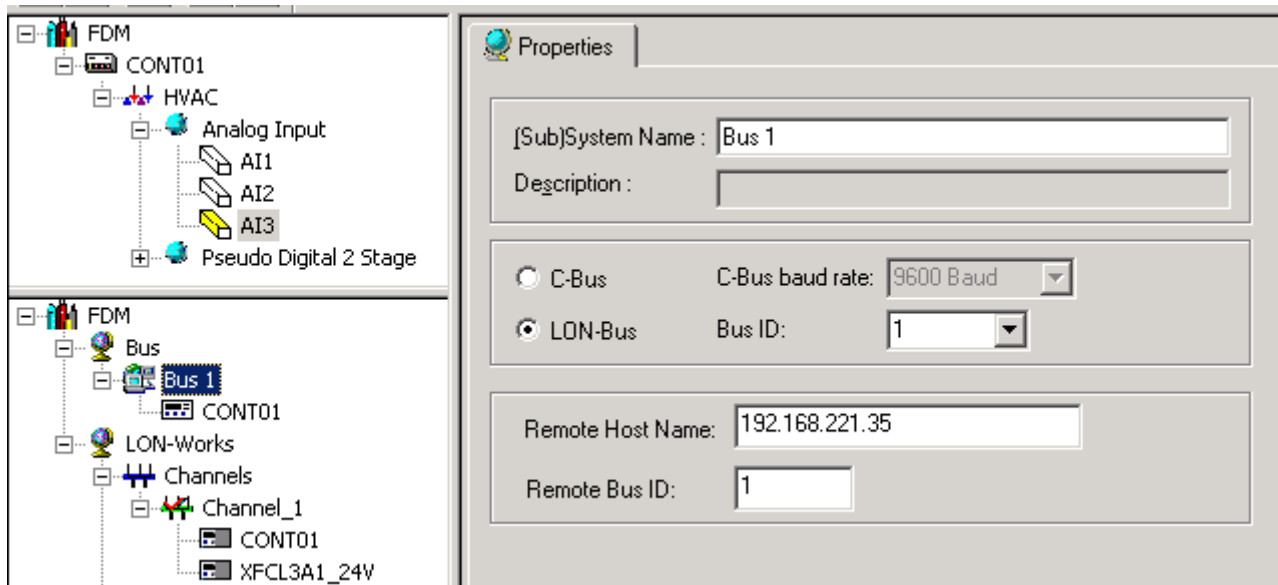


2. To create a connection, click the **Add** button. A connection is inserted named cbus1 in the Cbus column. When adding further connections, the names are consecutively numbered as cbus2, cbus3, etc. The Cbus

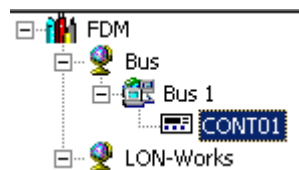
entry represents the remote Cbus ID, e.g. for cbus1 the remote bus ID is 1, and so on. This remote bus ID is needed in CARE for providing a proper remote download.


3. Click on the entry in the Cbus column and select the connection from the Type drop-down listbox, e.g. LON.
4. If a LON connection is selected, click the Initialize button to initialize the LNS database.
5. Click the **OK** button.

Procedure (CARE PC) 6. Expand the network tree, and click on the subsystem of the C-bus network, which includes the controller.



7. On the Properties tab on the right, select the connection, C-Bus or LON-bus.
8. In the Remote Host Name field, enter the host name or the IP address of the remote PC.
9. In the Remote Bus ID field, enter the remote bus ID (see Step 2).
10. Translate the controller if not already done.
11. Translate the controller if not already done.
12. In the physical LON bus part of the network tree, click on the controller.



13. In the CARE toolbar, click the  icon.

RESULT: Excel Online Remote is started.

14. Download the controller as described in the **ONLINE SERVICE AND COMMISSIONING** section.

Restrictions

MMI Emulation and all related functions do not work. Alarms are received but the alarm buffer cannot be uploaded. Firmware cannot be downloaded.

Keep Device Configuration

Purpose To avoid impermissible or unintentional overwritings of actual device configurations, the configuration of each device can optionally be kept. The actual configuration of the device cannot be overwritten as long as the parameters have not been uploaded from the device.

After the parameters have been uploaded, the configuration can be overwritten by usage of one of the following functions:

- Plug-In online or offline
- Commissioning
- Synchronization with LNS.

The Keep Device Configuration property can be assigned to the LON device in the network tree as well as in the device library. When setting the property for a device in the device library, each imported device out of the library will have it automatically checked as it was added to the network tree/terminal assignment tab.

IMPORTANT

When upgrading a project created with a CARE version lower than 5.0, CARE automatically sets the property of any device to not "Keep Device Configuration" and assumes that the parameters are already uploaded. If the upgraded project includes physically pre-configured devices such VAV 2 it is strongly recommended to check the property of the device(s) to "Keep Device Configuration", or to upload the parameters prior to using any of the above-mentioned functions in order to change a device's configuration.

Plug-In Online and Plug-In Offline Behavior

In case the Keep Device Configuration property is checked for a single device, the plug-in cannot be invoked from within the device as long as the parameters have not been uploaded.

Commissioning Behavior

In case the Keep Device Configuration property is checked for a single device, commissioning cannot be done for a single device as long as the parameters have not been uploaded. Unexported devices will be shown in a list.

Synchronize to LNS Behavior

In case the Keep Device Configuration property is checked for a single device, Synchronize with LNS is possible but the corresponding device will not be exported/synchronized as long as the parameters have not been uploaded. A system/subsystem can be commissioned whereas only the devices which have the Keep Device Configuration property not assigned will be commissioned and the uncommissioned devices will be shown in a list.

Procedure


1. In the logical LON part of the network tree, click on the device.
2. On the Properties pane on the right, check the Keep Device Configuration checkbox.

The screenshot displays the LONWORKS configuration tool. On the left is a tree view of the project structure for 'Montreal', showing a hierarchy from Bus to LON-Works, Channels, Default System, and finally the selected device 'XFL521 Analog Input'. The right pane shows the configuration details for this device, including its name, path, description, node string, ping interval, commission state, program ID, location, channel, neuron ID, subnet/node, and online state. Summary statistics and a 'Keep Device Configurator' checkbox are also visible.

Field	Value
Device Name	XFL521 Analog Input
Device Path	/LON-Works/Default System/Default System/
Description	
Node Selfdoc String	XAI2_2_02
Ping Interval	1 minute
Commission State	updates pending
Program ID	80000C050103040E
Location	ASCII
Channel	Channel_1
Neuron Id	000000000002
Subnet/Node	1/3
Online State	offline
Address Table	1 / 15
Alias NVs	0 / 0
Connections	1
Keep Device Configurator	<input checked="" type="checkbox"/>

For the procedure in the Device Library please refer to the Create LON Device section under Device Library.

Excel Web Remote LON Commissioning

- Prerequisites** For commissioning Excel Web projects created with CARE version lower than 8.03.00, the old project must be upgraded and restored, the second domain must be reset and the application in the controller must be running.
- Procedure**
1. Perform prerequisites mentioned above.
 2. Click menu item **Lon**, then submenu item **Lon Interface Configuration**, or click  in the configuration toolbar.

RESULT: The *Lon Interface Configuration* dialog box is displayed.
 3. To create a new interface, click on **Lon Sock Remote Server** in the tree.
 4. Click the **New** button.

RESULT: The properties for entering the appropriate information are displayed on the right pane.
 5. In **Interface Name**, enter an interface name.
 6. In **LonSock Remote Host Address**, enter the IP address of the Excel Web controller
 7. In **Port**, enter the port number 3830 if not displayed.
 8. In **Remote Host Address Interface**, select `/dev/lon`.
 9. Click **Apply** button
 10. Confirm the message box by clicking **OK** button, and then click **Exit** button.
 11. Confirm the message box by clicking **OK** button, and then click **Exit** button.
 12. Select the Lon interface on the **Properties** pane of the LonWorks node.
 13. Expand the LON-bus part of the network tree and commission the Excel Web controller.
 14. Commission the LON devices connected to the commissioned Excel Web controller.

ONLINE SERVICE AND COMMISSIONING

ONLINE SERVICE AND COMMISSIONING

Overview

XL Online provides the following commissioning and service functions online:

- Changing datapoint values
- Viewing datapoints in a watch list
- Setting parameters
- Monitoring z and x/y registers
- Set RACL cycle time
- Start/stop application
- Editing time programs
- Set system clock
- Saving and erasing application in the Flash EPROM
- Point trending
- Up-/downloading controller application
- Changing controller number and viewing bus configuration
- Downloading firmware
- Download Application Remotely
- Viewing alarms
- Repair *PRA* file

Getting started

To perform online commissioning and service functions, the following steps have to be done before:


- Physically connect to the controller
- Get the controller files on digital media (CD, floppy disk) and/or translate the controller in CARE (only if a download is necessary)

Physically Connect to Controller

Purpose	Physically connect controller to Personal Computer (PC).
Requirements	The PC must be within 49 ft. (15m) of the controller. At greater distances (up to 3281 ft. [1000m]), you must add a line driver. Use a XW585 Connection Cable.
Procedure	<ol style="list-style-type: none"> 1. Insert plug on the XW585 connection cable into the socket on the front of the controller computer module. 2. Insert the other plug on the XW585 connection cable to the serial interface socket on the back of the PC (COM 1 or COM 2). 3. Power on the PC. 4. Start XL Online as described in the "Start XL Online" section.

Start XL Online

Start separately

- Procedure**
1. If XL Online has been ordered and registered separately, click on XL Online icon  in the Windows **Start** menu.

RESULT: If XL Online has not been registered yet, the *Registration* dialog box displays.
 2. Register XL Online as described in the "Registering the first Time" section.

RESULT: The *XL Online* main window displays. Software tries to connect to the port according to the settings defined in the *XL Online Options* dialog box (see "Port Settings" section).

If no controller is connected to the port or software cannot connect to the controller due to wrong port settings, the XI 581/2 MMI is gray and the status message "No connection" is displayed.


If the connection is completed, the MMI is displayed in blue. If no text is displayed, click on another tab or click the ESC button on the MMI emulation.
 3. Continue with step 3 of the "Start from within CARE procedure".

Start from within CARE

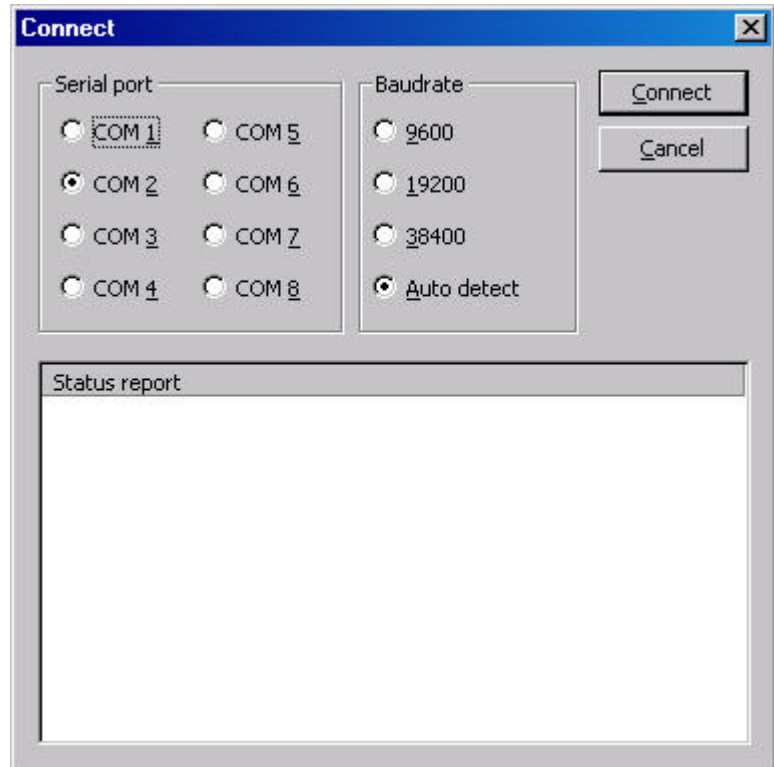
- Procedure**
1. If XL Online has been registered within a CARE license, select the controller in the logical plant tree in CARE.
 2. Click menu item **Controller**, then submenu items **Tools** and **XL Online**.

RESULT: The *XL Online* main window displays. Software tries to connect to the port according to the settings defined in the *XL Online Options* dialog box (see "Port Settings" section).

If no controller is connected to the port or software cannot connect to the controller due to wrong port settings, the XI 581/2 MMI is gray and the status message 'No connection' is displayed.

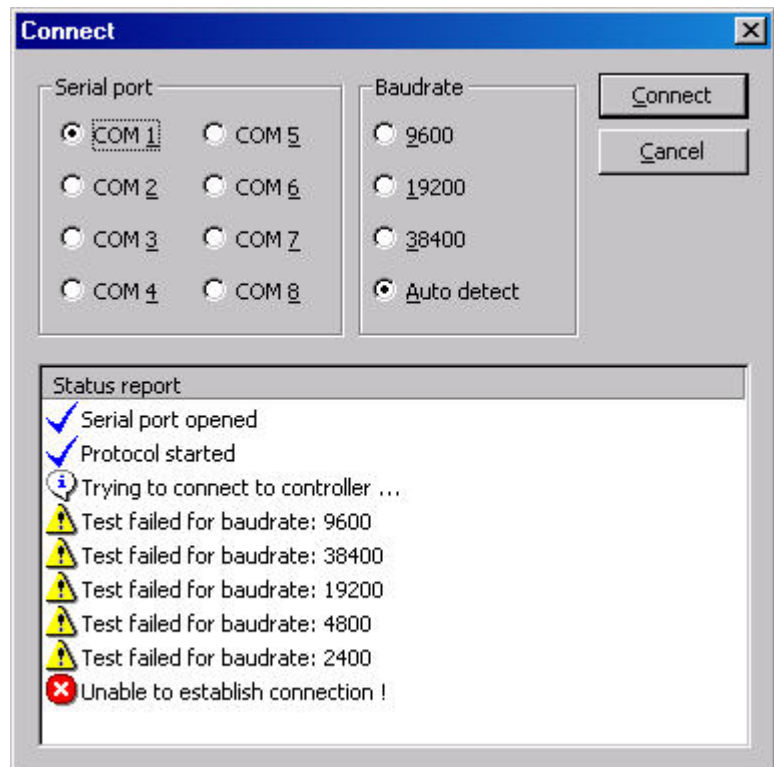
If the connection is completed, the MMI is displayed in blue. If no text is displayed, click on another tab and back or click the ESC button on the MMI emulation.
 3. If 'no connection' is displayed in the status line, connect the controller to the port as follows:
 4. Click menu item **File**, then submenu item **Connection**.
Or, click on the *Change serial port settings* icon  on the button bar.

RESULT: The *Connect* dialog box displays.

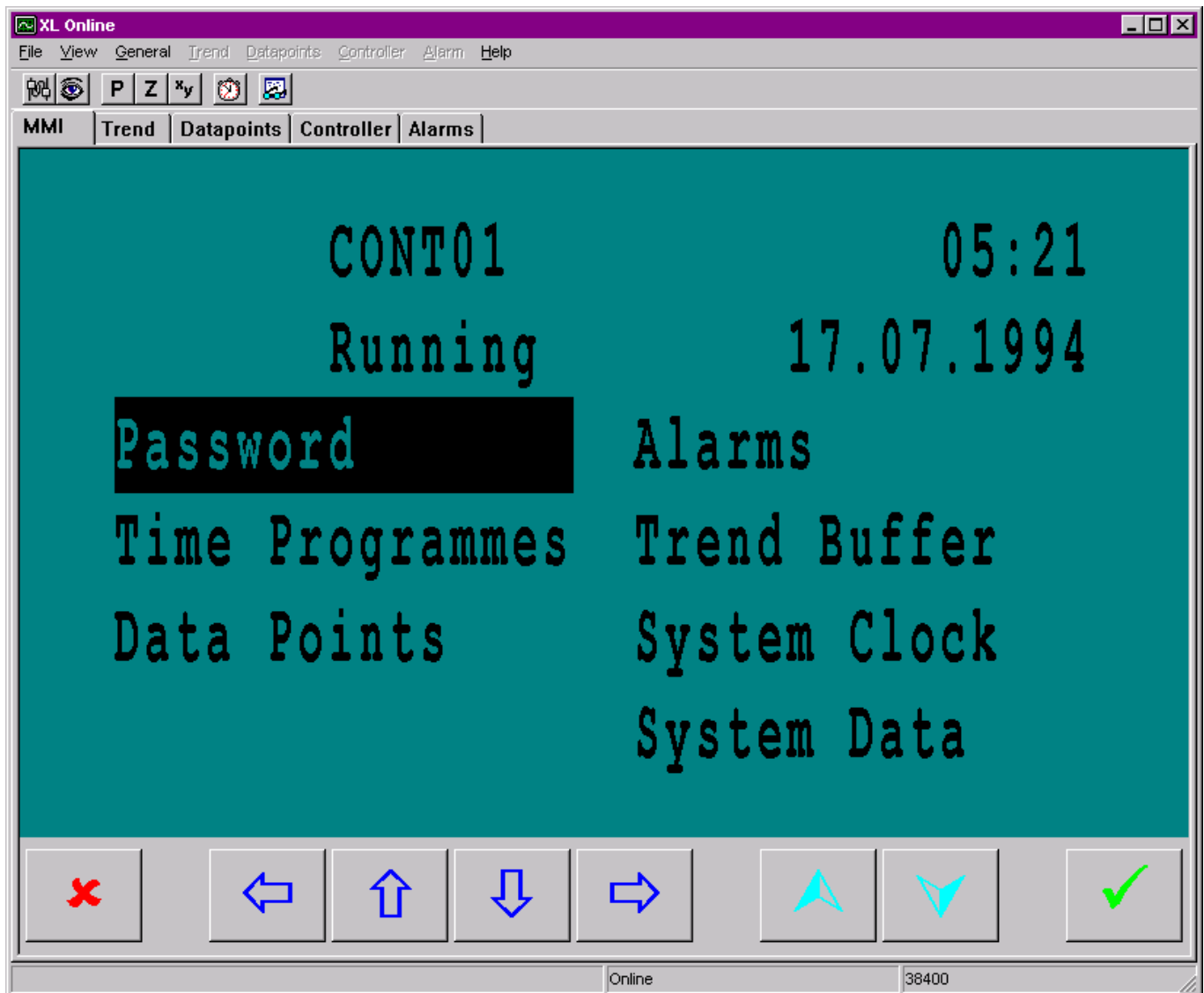


5. Select the **serial port** and the **baud rate** by clicking the corresponding radio buttons. Select **Auto detect**, if you do not know the baud rate (default setting).
6. Click the **Connect** button.

RESULT: If the connection could not be completed, the following status report is displayed.



RESULT: If the connection could be completed, the MMI is displayed in blue. If no text is displayed, click on another tab and back or click the ESC button on the MMI emulation.



7. Click the *Controller* tab.

RESULT: Controller status information is listed.

The screenshot shows the 'XL Online' software window with the 'Controller' tab selected. The main area displays a table of controller details. At the bottom, the status is 'Online' and the value is '38400'.

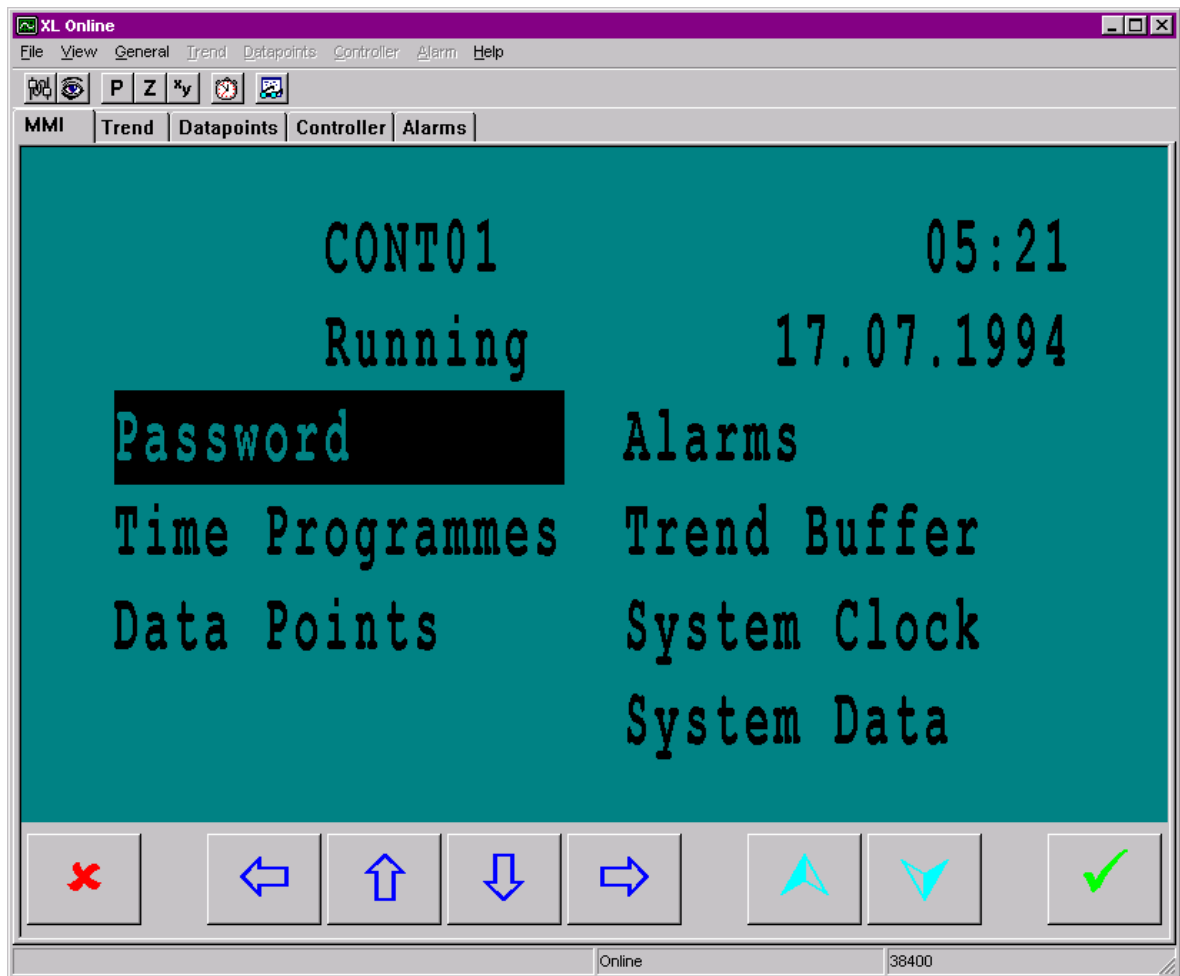
Description	Value
Controller name	CONT01
Program name	CONT01
Controller no.	22
Device type	XL500 - Version 2.04.94
Download time	16. July 94 - 13:54:01
Country code	Germany
--- Application status ---	
Application status	Running
AppPart: Common value	Running
AppPart: Field ID	Running
AppPart: Timeprogram	Running
AppPart: RACL	Running
AppPart: ASPECD	Running
Logon status	Inactive
--- Application parts ---	
RACL application (ral)	3.1 - 192 Bytes
RACL Parameter (rap)	3.1 - 496 Bytes
RACL Z-Register (raz)	3.1 - 16 Bytes
RACL T-Register (rat)	3.1 - 16 Bytes
ASPECD (adl)	3.1 - 20320 Bytes
Time program (zpg)	3.2 - 4416 Bytes
Datapoint description (ipl)	3.1 - 3632 Bytes
Descriptors (klx)	3.1 - 592 Bytes
Alarm text (alk)	3.1 - 2240 Bytes
State text (zsx)	3.1 - 464 Bytes
Engineering units (phx)	3.1 - 1024 Bytes
Characteristics (kdx)	3.1 - 512 Bytes
Configuration (kfx)	3.1 - 144 Bytes
Project (pra)	3.1 - 112 Bytes
NV Mapping table (ymp)	3.1 - 176 Bytes
NV Conversion (ycv)	3.1 - 48 Bytes
NV Configuration (ynv)	3.1 - 1504 Bytes

Online 38400

8. Check the information.

The XL Online Main Window

The main window is designed as follows:



Tabs The main functions are provided on the following tabs:

MMI

Allows changing values in the controller via XI581/82 emulation

Trend

Allows trending datapoints

Datapoints

Allows changing datapoint attributes, writing them to the controller, and invoking a watch list for certain datapoints.

Controller

Displays controller information. Allows printing the controller information in HTML format. Allows up-/downloading a controller application, downloading firmware, changing the controller number, and viewing bus configuration.

Alarms

Displays critical and non-critical alarms

When selecting a tab, the corresponding menu is enabled in the menu bar providing the appropriate submenu items:

Menus**File**

Provides submenu items to:

- Connect to the controller including port and baud rate selection and detection
- Set default options for XL Online
- Repair PRA file
- Print controller information in HTML format
- Exit XL Online

View

Provides submenu items to:

- Enable/disable the bars display
- Select tabs
- Invoke watch list

General

Provides submenu items to:

- Set parameters, z and x/y register, RACL cycle time, system clock
- Start/stop the application in the controller
- Edit time programs
- Save and erase application in the Flash EPROM

Trend

Provides submenu items to:

- Perform trend sessions
- View and export records

Datapoints

Provides submenu items to:

- Write value changes to the controller
- Add points to a watch list
- Select/deselect points in manual mode

Controller

Provides submenu items to:

- Display controller information
- Up-/download controller
- Download firmware
- Change controller number and view bus configuration

Alarms

- Clear alarms

Help

- Invoke Online-Help
- Register XL Online
- Display About information

Button Bar















Depending on the current tab selection, the button bar provides the following functions:



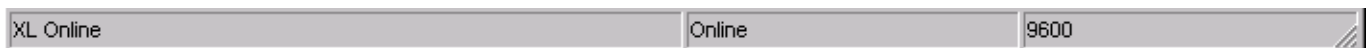
Connect to the controller and change serial port settings for an online session.



Detect baud rate of current serial port

-  Show/hide parameter dialog box
-  Show/hide z-register dialog box
-  Show/hide x/y-register dialog box
-  Open time program editor
-  Show/hide datapoint watch list
-  Show/hide line info window
-  Open new trend data file
-  Open existing trend data file
-  Select datapoints for trend recording
-  Start/stop trend recording
-  Reload datapoint list/Refresh controller info
-  Add selected datapoints to watch list
-  Upload controller application
-  Download controller application

Status Line Displays port, current status, e.g. Online, baud rate = 9600 etc., or the current trend file.



Exit XL Online

Procedure 1. Click menu item **File** then submenu item **Exit**, or click on default Windows *Close* icon at the top right corner.

RESULT: XL Online is closed.

Procedures

Define Default Settings

For the following default settings can be defined:

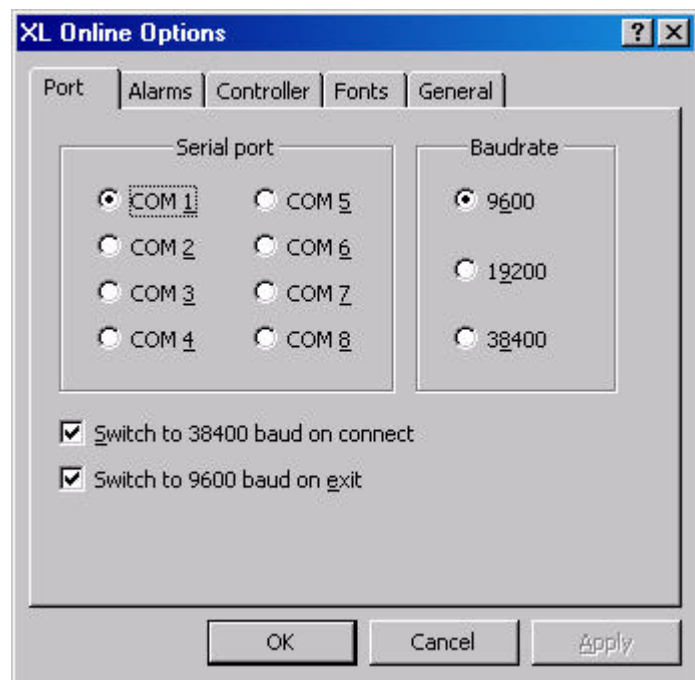
- Port
- Alarms
- Controller
- Font
- General

Port Settings

Purpose Define default settings for the port and baud rate XL Online should use when starting it. After the start, XL Online searches automatically for the port and the baud rate defined in this dialog box. If the port configuration matches, the MMI displays. If the port configuration is different, the MMI remains gray and displays the status 'No connection' in the status line.

Procedure 1. Click menu item **File**, then submenu item **Options**.

RESULT: The *XL Online Options* dialog box is displayed.



2. Under **Serial port** and **Baudrate**, select desired port respectively baud rate which software should use as default connection settings.
3. To increase the download/upload speed after the connection has been completed, check the **Switch to 38400 baud on connect** check box, to increase the baud rate to 38400 baud.

NOTE: For an automatic baud rate switch, the controller OS must be 2.04 or higher.

4. Check the **Switch to 9600 baud on exit** check box, to reset the baud rate to 9600 baud when XL Online is closed.

NOTE: If the controller supports a baud rate of 38400 baud , it is recommended to check both, the Switch to 38400 baud on connect and the Switch to 9600 baud on exit option.

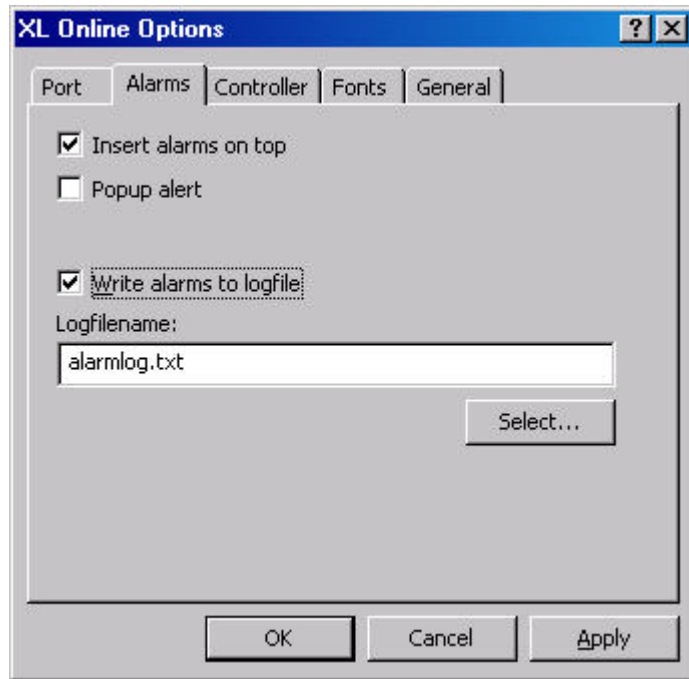
5. Click **OK** button to confirm settings.

Alarm Settings

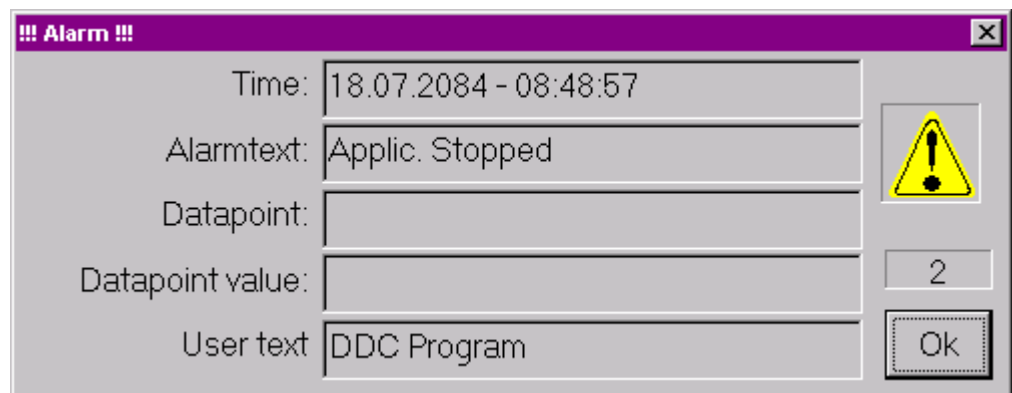
Purpose Define default settings for the alarm display.

- Procedure** 1. Click menu item **File**, then submenu item **Options**.

RESULT: The *XL Online Options* dialog box is displayed.



2. Click the *Alarms* tab.
3. To let the alarms be inserted at the top of the list on the *Alarm* tab, check the *Insert alarms on top* check box.
4. To let an additional popup alert display, check the **Popup alert** checkbox on the *Alarm* tab. The following popup alert will then display when new alarms arrive.



5. To let the alarms be saved into a log file, check the **Write alarms to log file** check box. The alarms will be saved into a *.TXT* file. The name of the file can

be changed in the **Log file name** field and an existing file can be used by clicking the **Select** button and selecting it. New alarms will be added continuously to the end of the log file.

- Click **OK** to confirm settings.

Controller Upload-/Download Settings

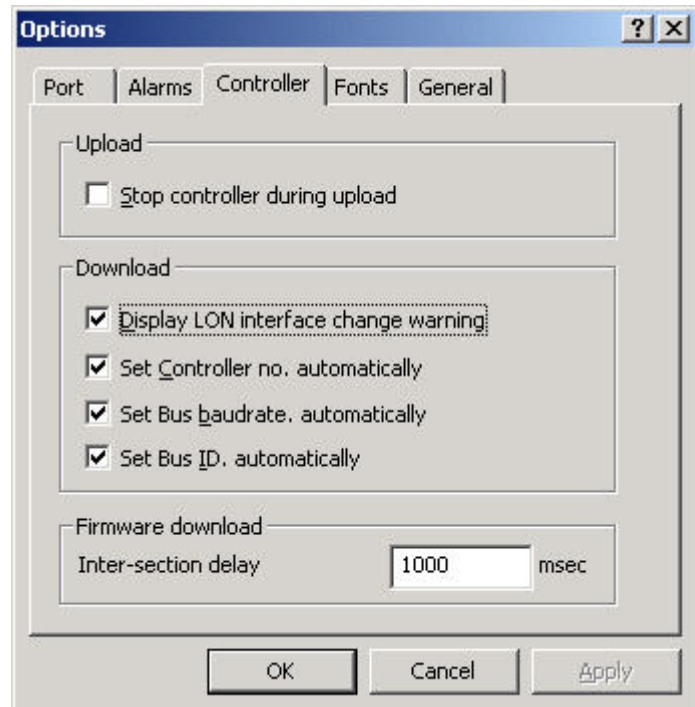
Purpose Set whether the controller should be stopped or not when uploading the application.

Set whether the settings of the controller number, bus baud rate and bus ID issued during engineering in CARE should be used when downloading an application. For detailed information on these items, please refer to the "LonWorks Network Engineering" section in the CARE User Guide EN2B-0182 (Europe) / 74-5587 (U.S) and the LonWorks Mechanisms Interface Description EN0B-0270.

In addition, the option whether a warning should be displayed or not when an application with a changed LON interface will be downloaded, can be set.

Procedure 1. Click menu item **File**, then submenu item **Options**.

RESULT: The *XL Online Options* dialog box is displayed.



- Click the *Controller* tab.
- Check one of the following options:

Stop controller during upload

Defines whether the application should be stopped during upload or not.

Display LON interface change warning

Defines whether warning messages are to be displayed or not in case a changed LON network interface will be downloaded.

Enabling the option is recommended when using controller OS lower than 2.06 and bindings might be deleted. Disabling the option is recommended when using controller OS 2.06 where any bindings will be kept even if the LON interface has been changed.

Set Controller no. automatically

Defines whether the controller number set in CARE should be used or not when downloading the application.

Set Bus baudrate automatically

Defines whether the C-bus baud rate set in CARE should be used or not when downloading the application.

Set Bus ID automatically

Defines whether the LON ID set in CARE should be used or not when downloading the application.

Inter-section delay

Defines a delay while burning the sections of the FLASH EPROM. Default is 1000 msec. The range is between 0 and 9999 msec. The time should be increased if the firmware download repeatedly stops on one and the same section.

7. Click **OK** button to confirm settings.

For further instructions, refer to the "What kind of application to download?" section.

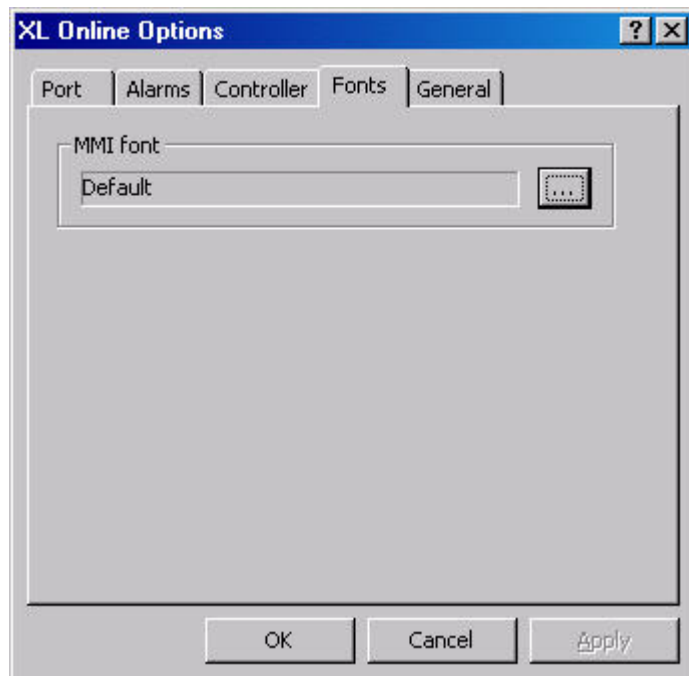
Font Settings


Purpose Define default settings for the MMI font display. Font modification can be used, for example, to match country specific (e.g. Japanese or Cyrillic) controller operating sequences with the MMI display and/or in case a notebook is used.

By default, XL Online uses a bold true type font with fixed width, indicated by 'Default' in the **MMI** field. Note, that 'Default' cannot be re-selected after another font had been selected. To get a font similar to the default font, it is recommended to select the 'Courier new' font as it is described in the procedure.

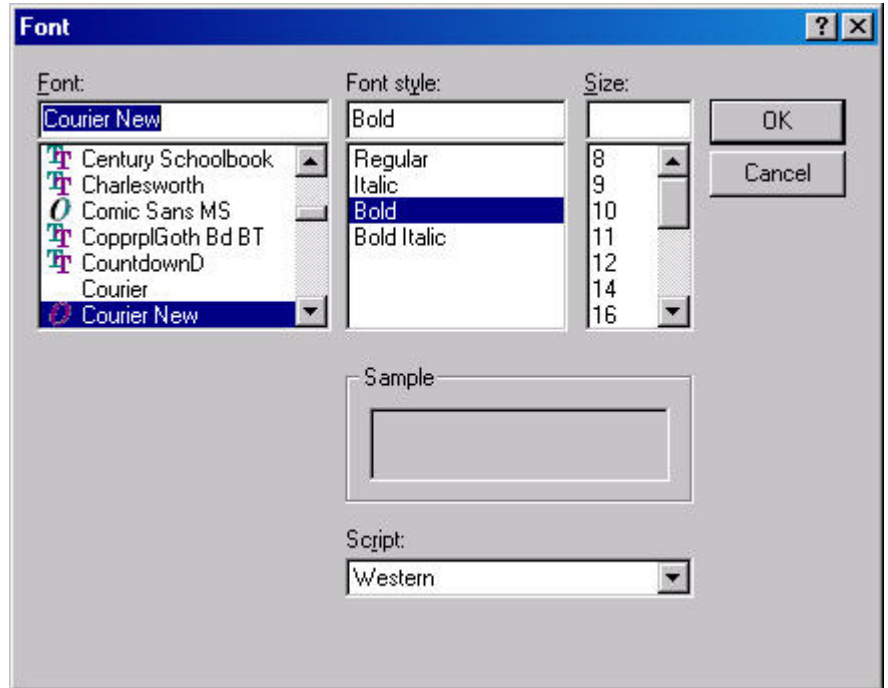
- Procedure**
1. Click menu item **File**, then submenu item **Options**.

RESULT: The *XL Online Options* dialog box is displayed.



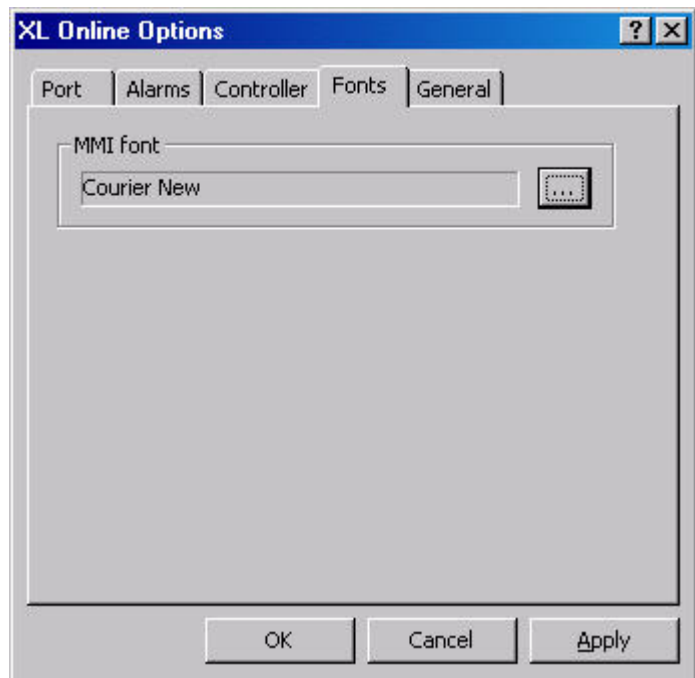
2. Click the *Fonts* tab.
3. To select another font than the "default font", click the  button.

RESULT: The *Font* dialog box is displayed.



4. Select the desired font (the font size is not relevant) and click **OK** button.

RESULT: The font is displayed in the **MMI** field on the *Fonts* tab.



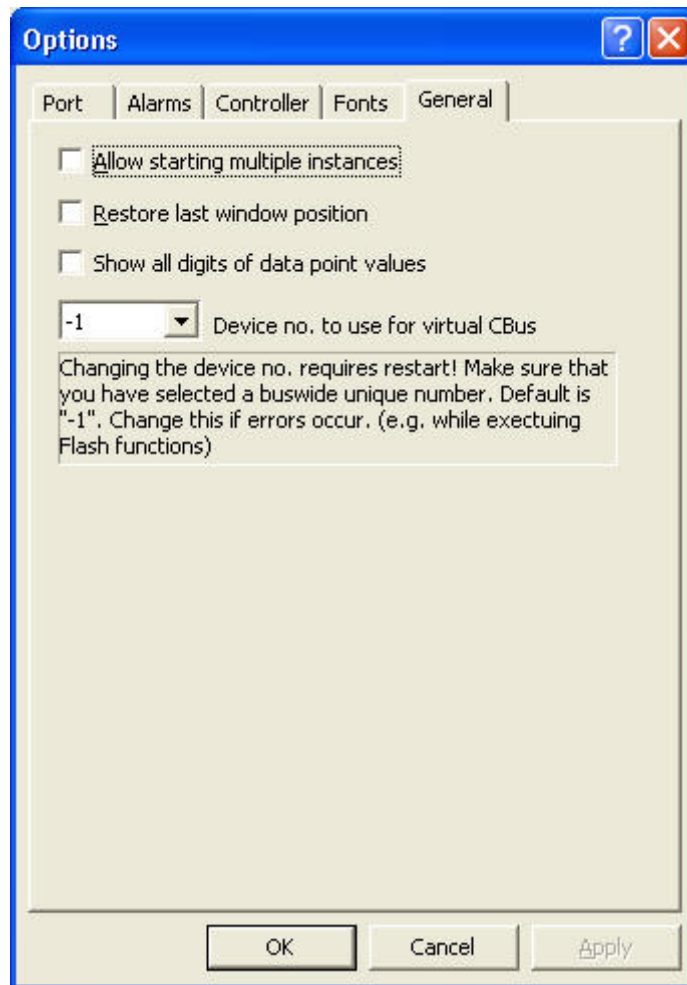
5. Click **OK** button to confirm settings.

General XL Online Settings

Purpose Define general settings for XL Online.

- Procedure** 1. Click menu item **File**, then submenu item **Options**.

RESULT: The *XL Online Options* dialog box is displayed.



2. Click the *General* tab.
3. Select options under:

Allow starting multiple instances

Defines whether XL Online can be opened in multiple instances or not. Multiple instances of XL Online can be used for example, to communicate with multiple controllers at the same time or to compare an old trend with a currently running trend.

Restore last window position

Defines whether XL Online should be opened with the last window position and size on the desktop. When unchecked, XL Online opens with the default position and size.

Device no. to use for virtual CBus


Defines the buswide free device (controller) no. that must be used when connecting XL Online to a virtual C-Bus system. The default setting -1 must be used if all device numbers have already been allocated. Any other number known to be free on the C-Bus, can also be used. Note that when connecting using the default device no. -1, flash functions may not work properly. In this case, use another free buswide device no. If the device no. has been changed, restart XL Online.

4. Confirm settings by clicking **OK** button.

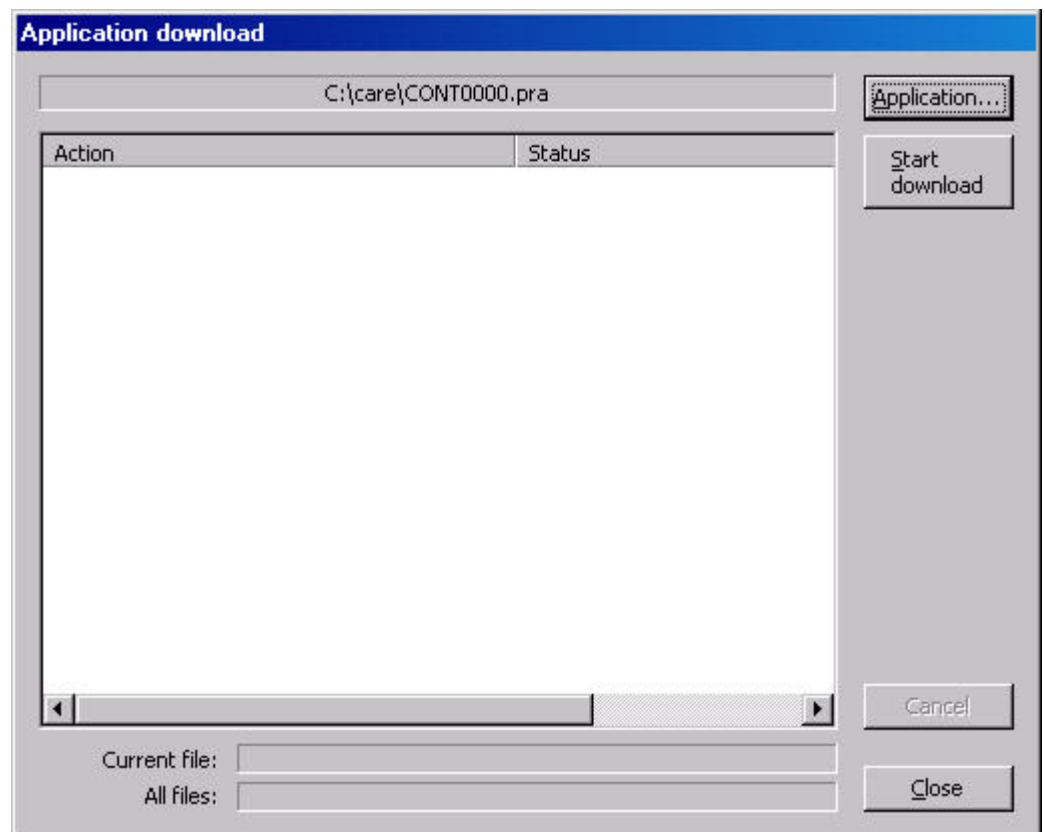
Download Controller

Purpose Copy translated files to a controller (step 2 of commissioning procedure).

NOTE: Make sure that the controller number in CARE and in the MMI is the same. If they are different, set them equal either in CARE or in the MMI or by **Set controller no.** command (see "Set Controller Number" section). For operating instructions of the MMI refer to the XI581/2 Operator Terminal Manual.

- Procedure**
1. Physically connect to controller as described in the "Connect to Controller" section.
 2. Start XL Online as described under the "Start XL Online section".
 3. Click menu item **Controller**, then submenu item **Download** or,
click on *Download to Controller* icon  on the toolbar.

RESULT: The *Application download* dialog box displays.

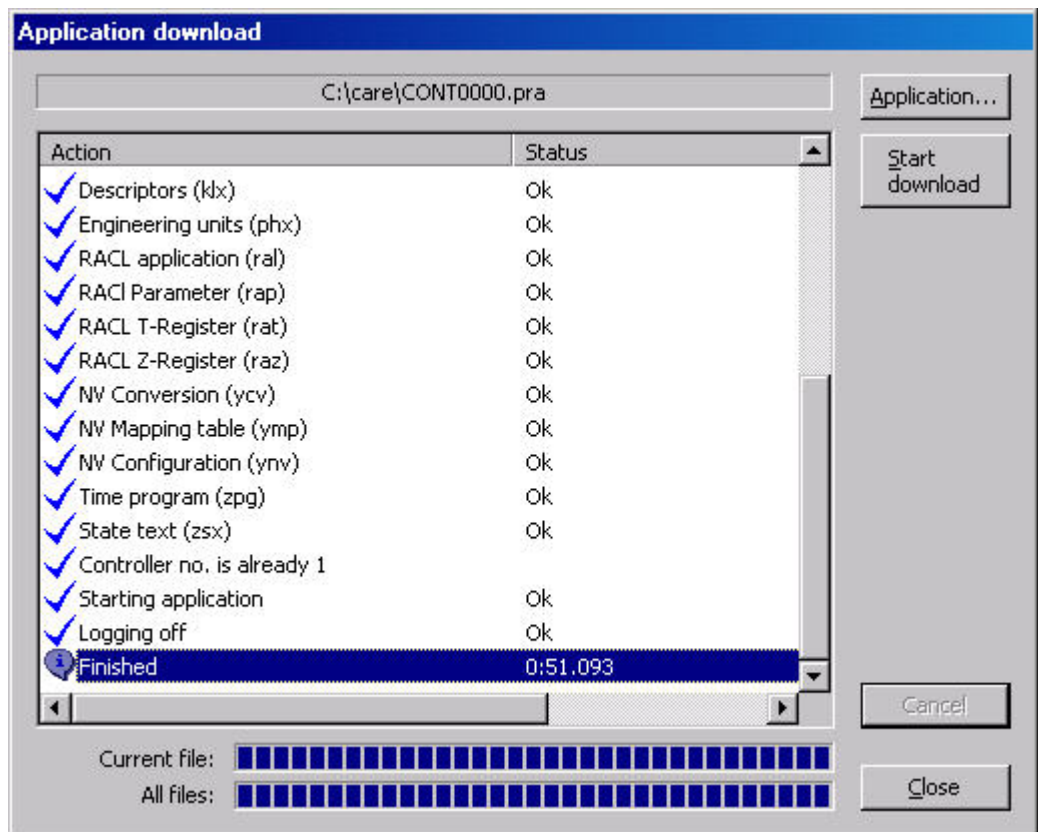
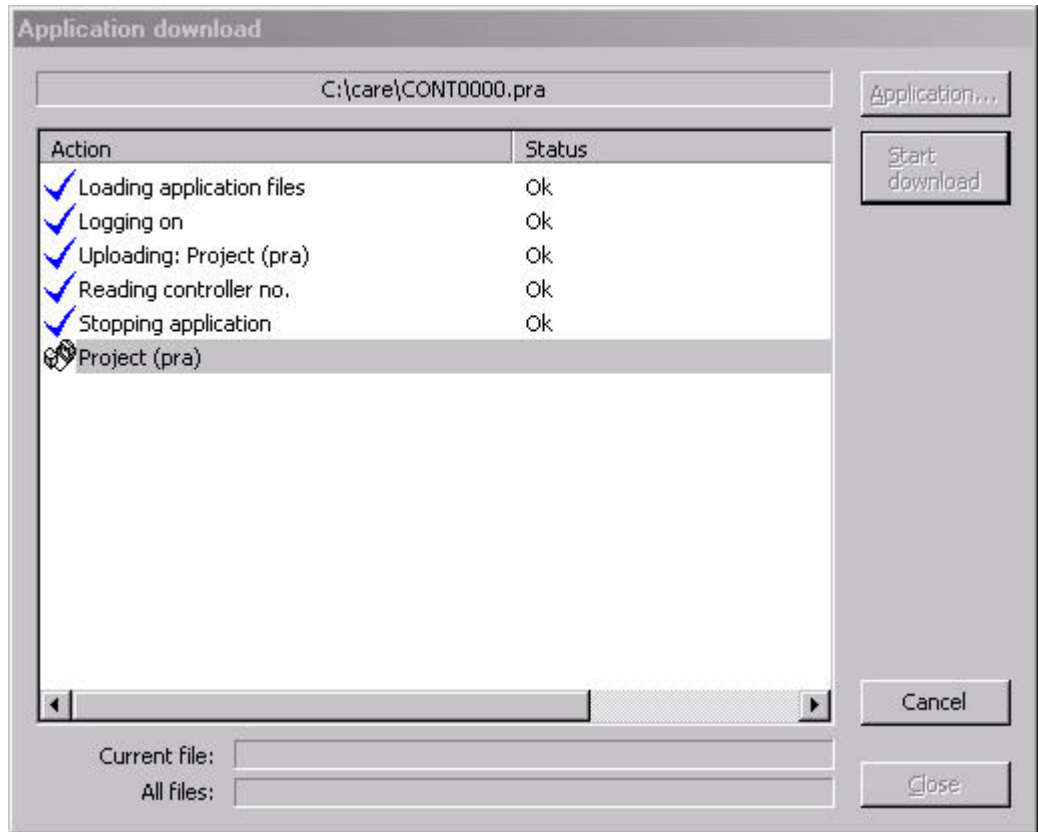


RESULT: At the top, the path of the previously downloaded application is displayed.

4. If you want to download a new application, click **Application** button and select the desired application (.PRA file).
5. Click **Start download** button if you want to download the previously downloaded application or the new application.

RESULT: Depending on the kind of application you want to download, different messages can appear (see "What kind of Application to Download" section).

The download starts. Action and status messages will be listed while the download proceeds.



6. Click the **Close** button when the download is finished.

RESULT: Eventually alarms are generated as indicated by the flashing *Alarm* icon on the *Alarms* tab.

7. Click the *Alarms* tab, check the messages and perform appropriate troubleshooting procedures if necessary.

What Kind of Application to Download?

When using controller OS 2.06 for binding LON devices, the bindings will be kept when downloading an application with a changed LON network interface.

When using controller OS lower than 2.06 in combination with a separate LON tool for creating the bindings, different messages will occur when downloading a changed interface. In XL Online, it is possible to enable/disable the display of the corresponding warning messages generally.

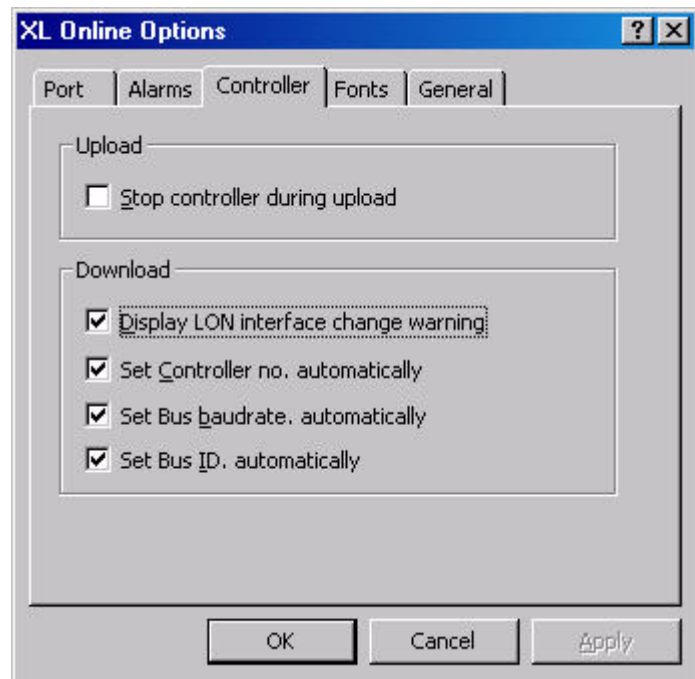
Enable/Disable LON Interface Change Warning

In XL Online, click menu item **File**, then submenu item **Options** to open the *XL Online Options* dialog box.

Click *Controller* tab.

Check the **Display LON interface change warning** check box if you want to get the warning messages in case a changed LON network interface will be downloaded. Enabling the option is recommended when using controller OS lower than 2.06 and bindings might be deleted.

Uncheck the **Display LON interface change warning** check box if warning messages should not be displayed when downloading a changed LON network interface. Disabling the option is recommended when using controller OS 2.06 where any bindings will be kept even if the LON interface has been changed.



LON Interface Change Warning Enabled As CARE allows the creation of LON applications, it has to be considered, whether the application you want to download is a LON application having a LON network interface or whether it is a "normal" application without a LON network interface. CARE allows the partial download of a LON application, where changes had been made to the CARE application itself, with keeping an unchanged LON network interface.

IMPORTANT

It is of high importance to know what kind of application you want to download and what kind of application is currently running in the controller, since CARE allows the choice of keeping or eliminating the bindings.

Although CARE compares the controller application and the application to be downloaded regarding the LON network interface, you should also know, whether the LON network interface and/or the CARE application had been changed or not.

The following table summarizes the different possibilities when downloading "normal" applications and LON applications:

Download of Normal Application without LON Network Interface	
Controller	CARE
No application in controller	Download without response
Normal application in controller	Download without response
LON application in controller	Download with response asking: <i>The LON interface of this application has changed. If you download now, your existing bindings will get lost.</i> When confirming with OK , the bindings will get lost and need to be re-done with a LON tool. The (modified) CARE application will be downloaded. When canceling the download, the bindings will be kept and the CARE application will not be downloaded.
Download of LON Application	
Controller	CARE
No application in controller	Download without response
Normal application in controller	Download without response
LON application in controller	Download with response. Message depends on, whether the network interface was changed or not. If Network interface had been changed: <i>The LON interface of this application has changed. If you download now, your existing bindings will get lost.</i> When confirming with OK , the bindings will get lost. The (modified) CARE application will be downloaded. When canceling the download the bindings will be kept. The CARE application will not be downloaded. If LON interface had not been changed: <i>Do you want to keep existing NV bindings. If you select NO, then all bindings will get lost.</i> When confirming with OK , the bindings will be kept. The (modified) CARE application will be downloaded (partial download). When confirming with NO , the bindings will get lost and need to be re-done with a LON tool. The (modified) CARE application will be downloaded. When canceling the download the bindings will be kept. The CARE application will not be downloaded.

Upload Controller

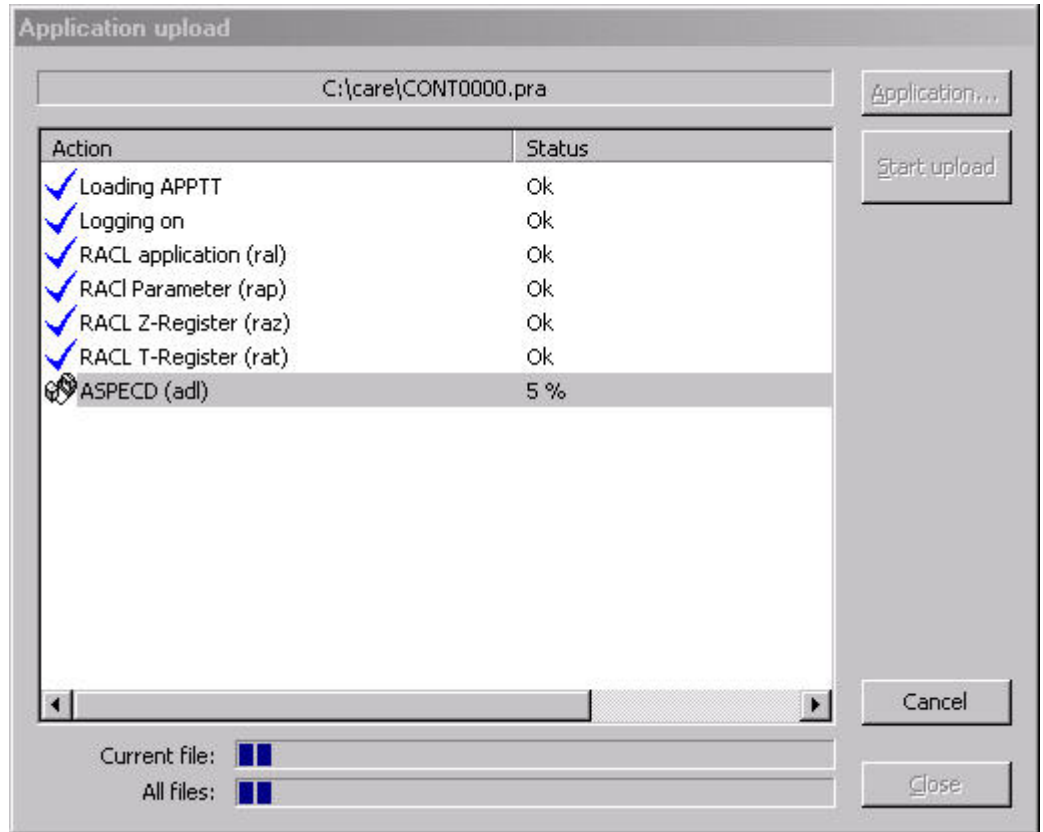
Check **Upload** setting in the *XL Online Options* dialog box (see "Controller Upload-/Download Settings" section).

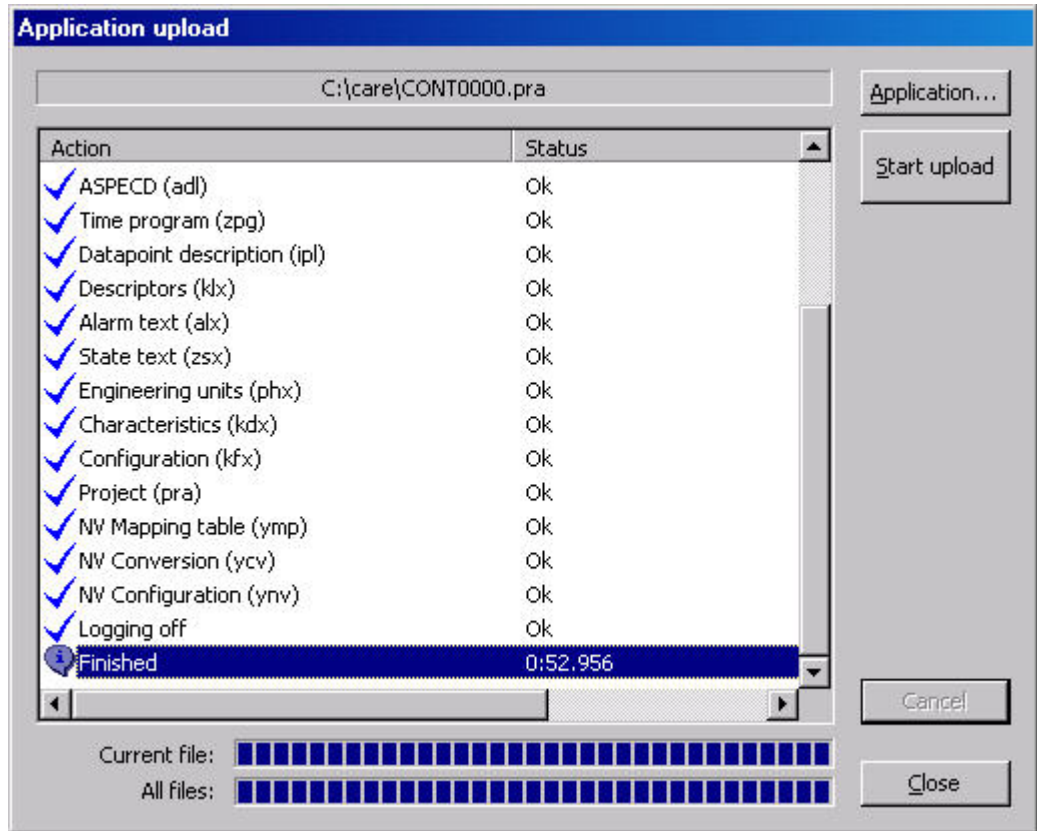
1. If not already connected to the controller, follow steps 1 to 10 of the Download Controller procedure.
2. Click menu item **Controller**, then submenu item **Upload**

or,

click on *Upload from Controller* icon  on the toolbar.

RESULT: The upload starts. Action and status messages will be listed while the upload proceeds.






3. Click the **Close** button to finish the Upload.

Detect Baud rate

Purpose Scan for baud rate of the port where the controller is connected. This function can be used if the connection to the controller is completed after XL Online has been started, but the baud rate does not match.

Procedure 1. Click menu item **File**, then submenu item **Detect Baudrate**.

or,
click on *Detect baudrate for current serial port* icon  on the toolbar.

RESULT: Software scans for baud rates and autodetects the baud rate that matches to the baud rate of the controller.

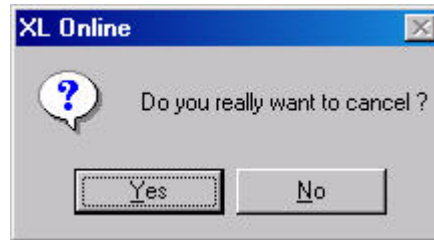
NOTE: While detecting the baud rate, the 'Wait cursor' symbol appears and no actions are possible.

Cancel Up- / Download

Purpose To correctly finish the up- or download, if for example, the communication was interrupted during the process or, if you want to definitely cancel the up- or download.

Procedure 1. In the *Download application* or *Upload application* dialog box, click the *Cancel* button.

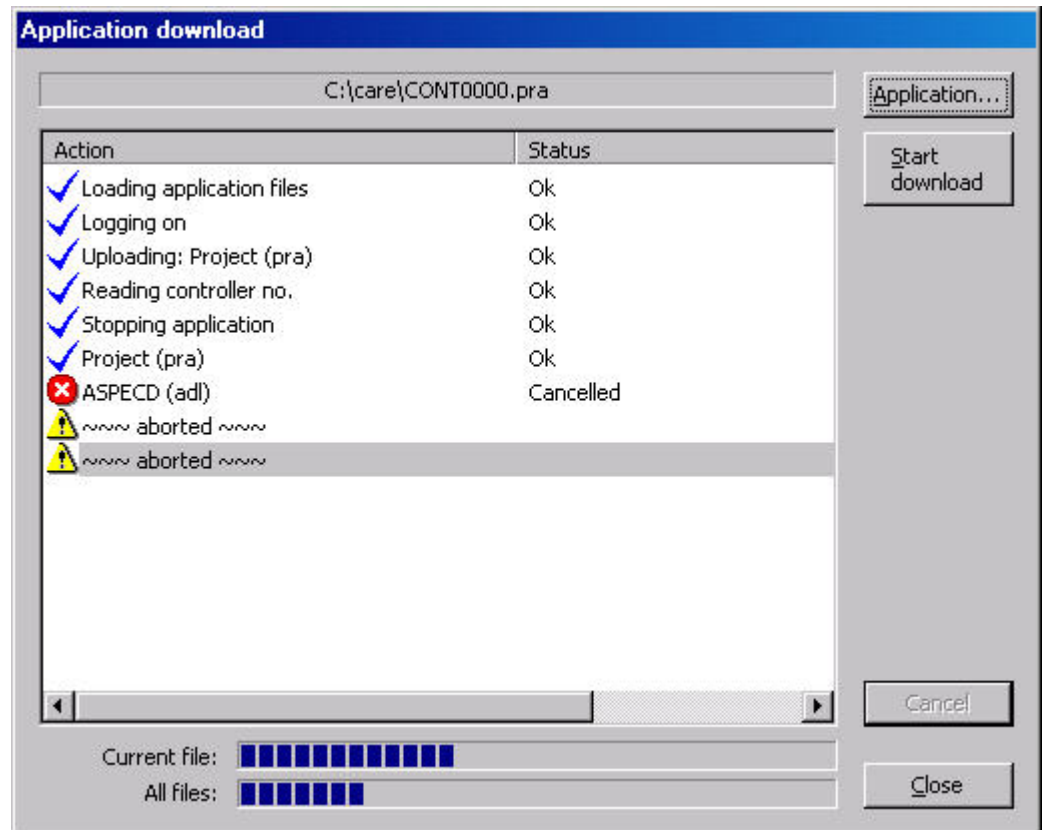
RESULT: A message is displayed asking, if you really want to cancel the up- or download.



RESULT: The current up- or download process is cancelled.

2. Click **Yes** button to cancel.

RESULT: The current up- or download process is cancelled.

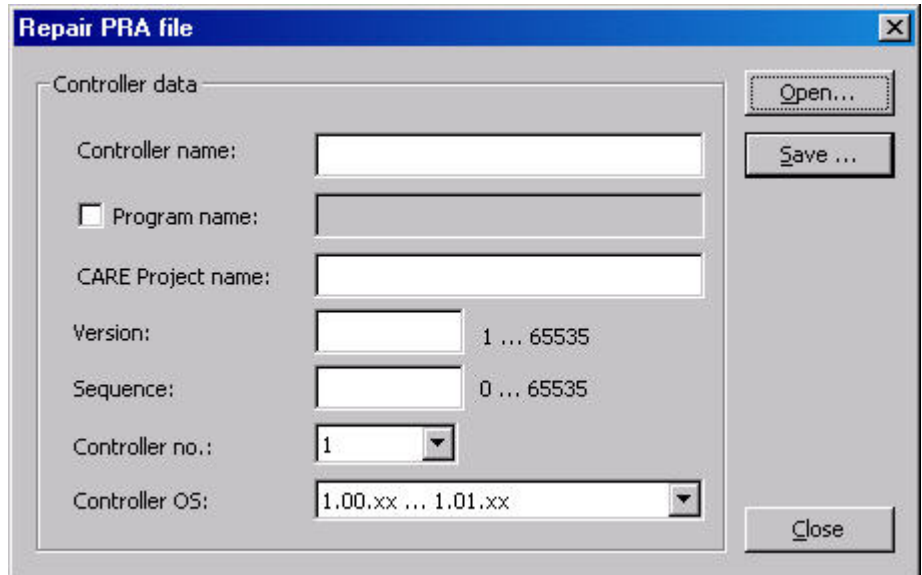


Repair PRA File

Purpose To repair a corrupted *PRA* file. The repaired *PRA* file can then be used for proper download.

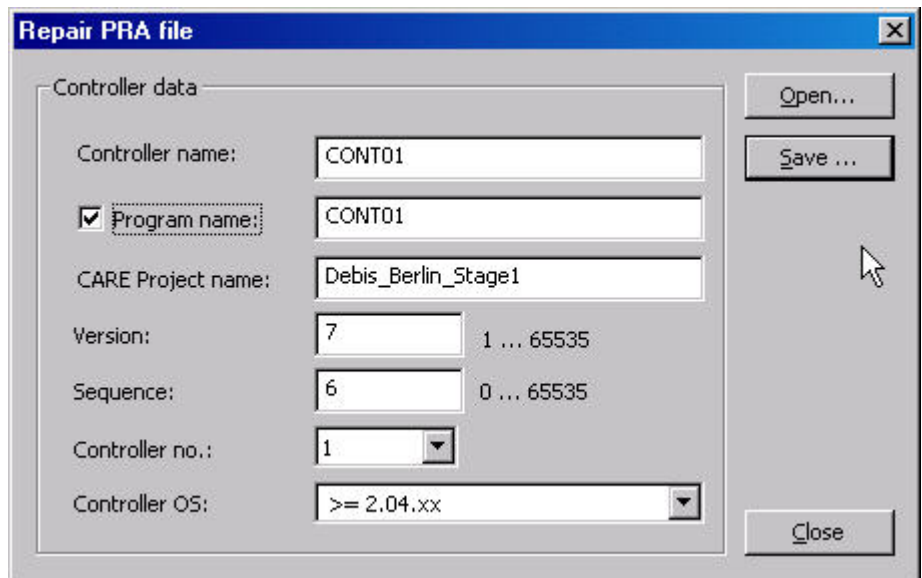
- Procedure**
1. Click menu item **File**, then submenu items **Support** and **Repair PRA file**.

RESULT: The *Repair PRA file* dialog box displays.



- Open the corrupted *PRA* file by clicking the **Open** button and selecting it in the *Open* dialog box.

RESULT: The *PRA file* data is displayed.



IMPORTANT

Check the data and make sure that they are correct by entering/selecting the appropriate settings.

- Normally controller and program name are the same. To change the program name use check **Program name** checkbox and change program name.
- The **Sequence** value is typically '0'.
- For all controller OS's lower than 2.04, select '1.00.xx ... 1.01.xx' from the **Controller OS** drop-down listbox.
- Save the *PRA* file by clicking the **Save** button and saving it in the *Save as* dialog box.

RESULT: The *PRA file* is repaired.

- Click **Close** button.

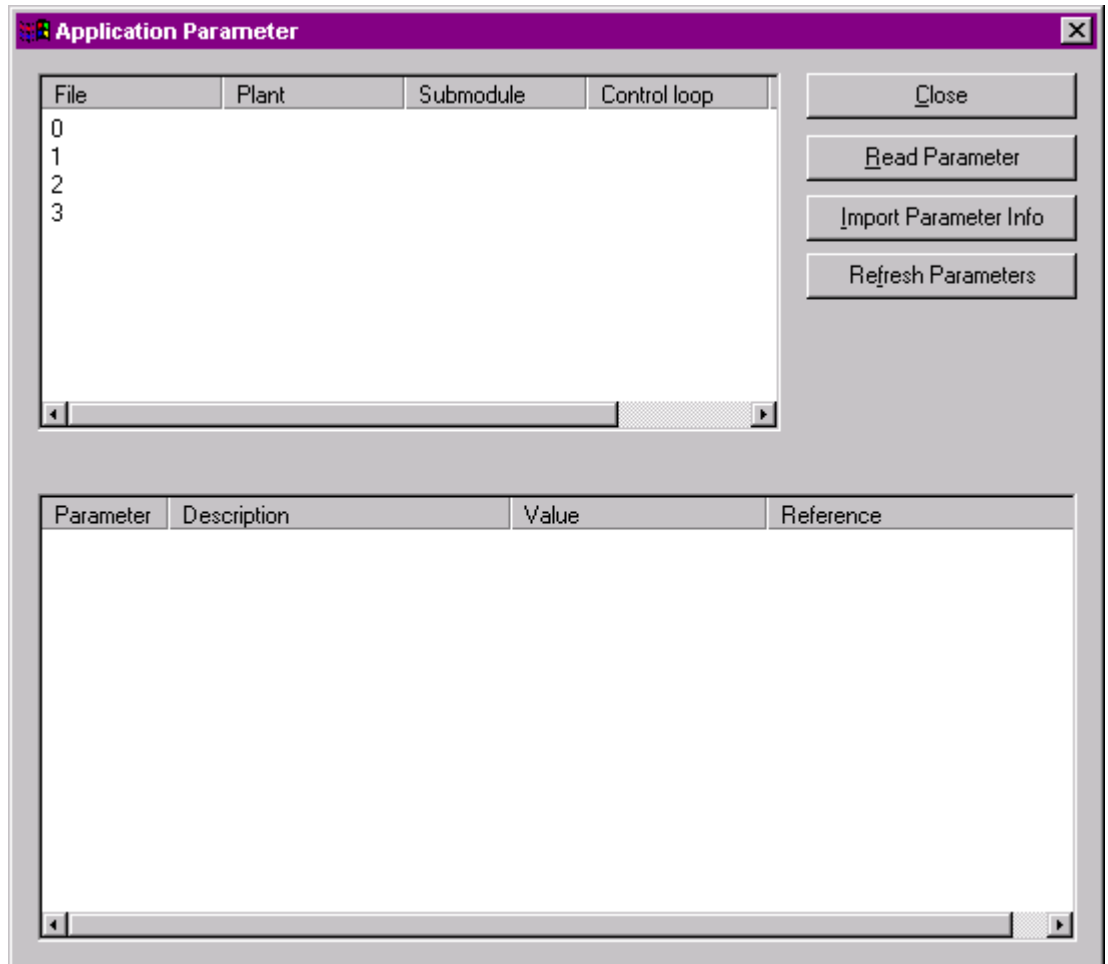
View/Change Application Parameters

Purpose To view and/or change parameters of the controller parameter file (.RAP).

Procedure 1. Click menu item **General**, then submenu items **Application** and **Parameter**.

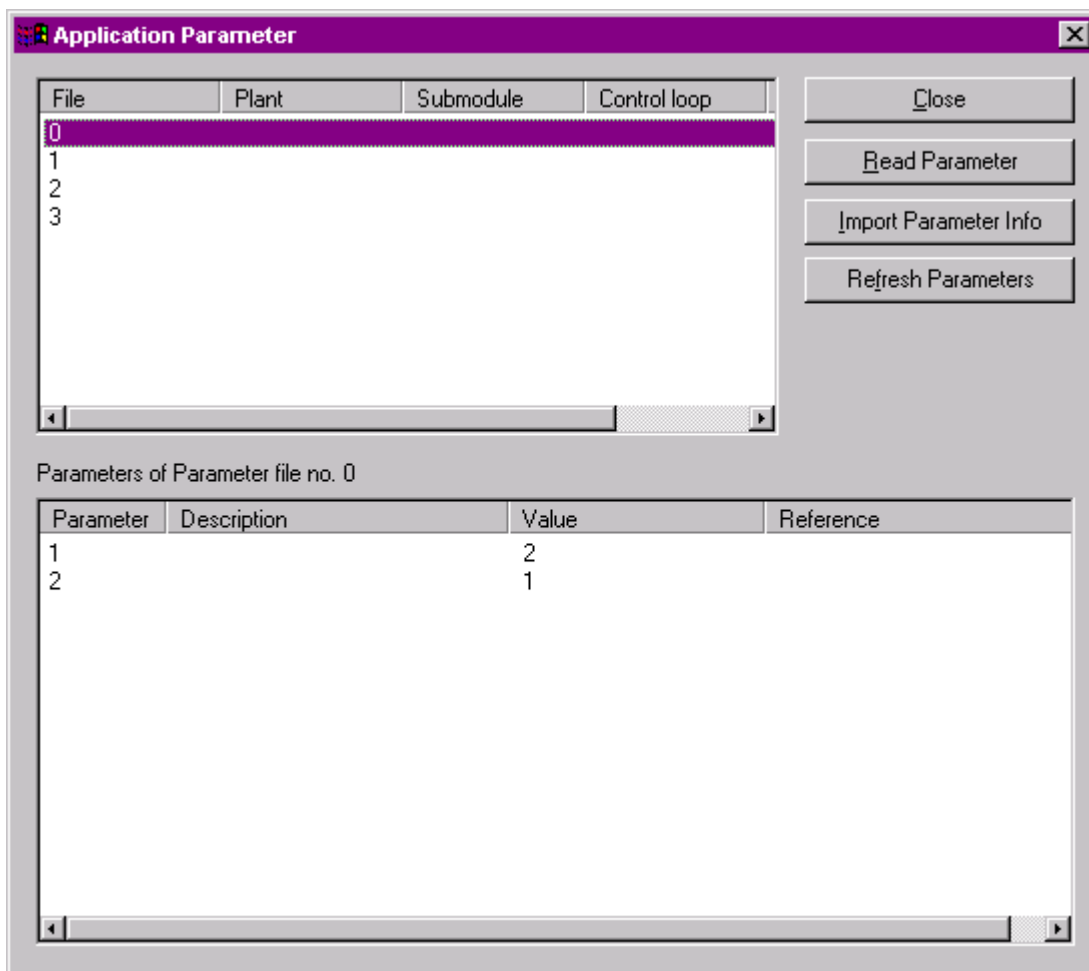
Or, click the **Show/hide parameter dialog** button .

RESULT: The *Application Parameter* dialog box displays and software is checking the parameter files (may take a few seconds). Finally in the list at the top, the used parameter files are displayed.



2. To display the parameters for a parameter file, select the file in the top list and click the **Read Parameter** button, or double-click on the file in the top list.

RESULT: In the list at the bottom, the parameters for the parameter file are displayed.

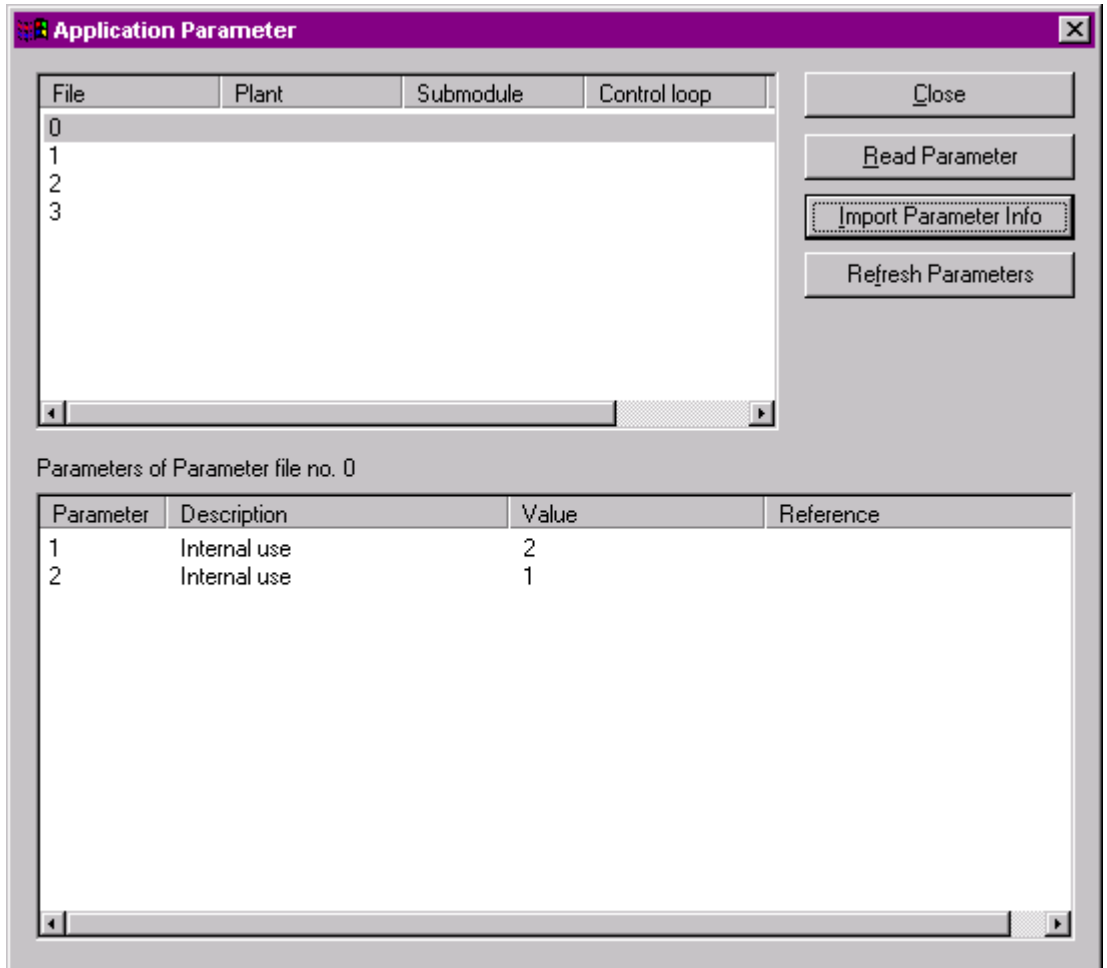


- To display the descriptions for the displayed parameters, click the **Import Parameter Info** button.

RESULT: The descriptions are displayed in the **Description** column in the list at the bottom.

IMPORTANT

There is no consistency check for the matching text file. Selecting a wrong text file results in wrong display.

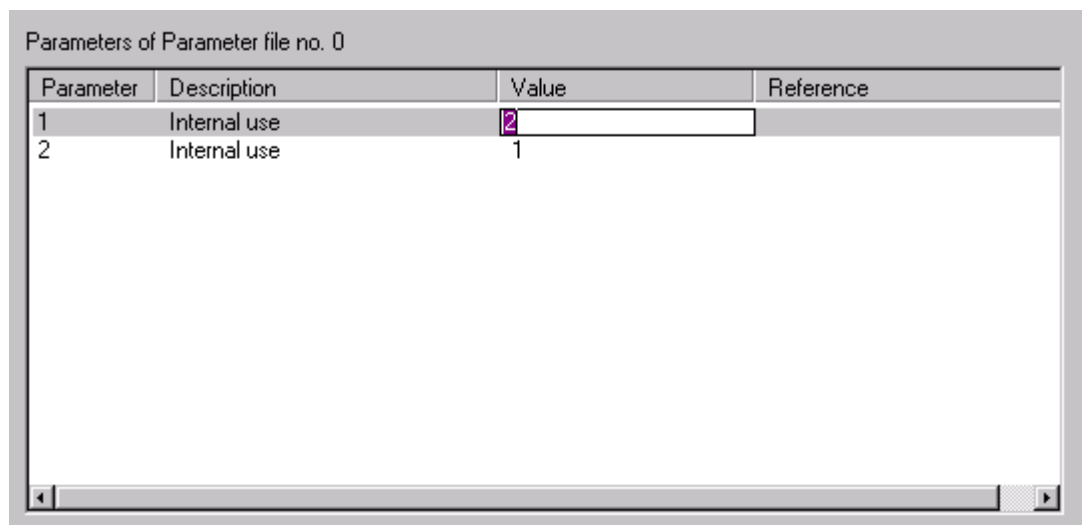


- To view updated values generated during a RACL cycle, click the **Refresh Parameters** button.

RESULT: The current parameter values will be displayed.

- To change a parameter value, select the parameter in the list at the bottom.

- Click the **Value** column, change the value and press ENTER key.



RESULT: The changed value has been written to the selected parameter file.


Parameters of Parameter file no. 0

Parameter	Description	Value	Reference
1	Internal use	6	
2	Internal use	1	

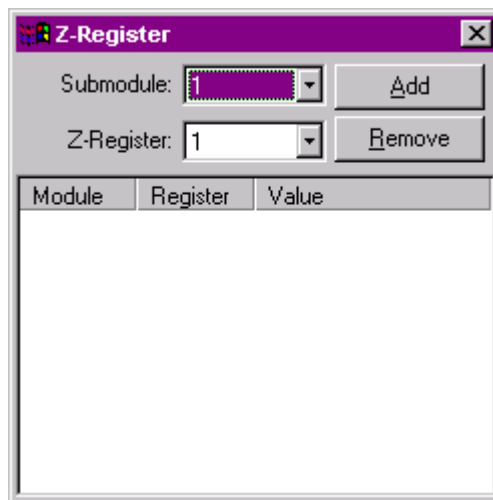
Monitor Z-Registers

Purpose Display of a selected z-register value as it changes in the controller and change the value of a z-register. Z-registers can be accessed in general, from special flag points, and from XFMs. When debugging XFMs, open the relevant application with the RACL Editor in parallel. With the procedure described in this section you can select and monitor any existing z-register.

Procedure 1. Click menu item **General**, then submenu item **Z-register**.

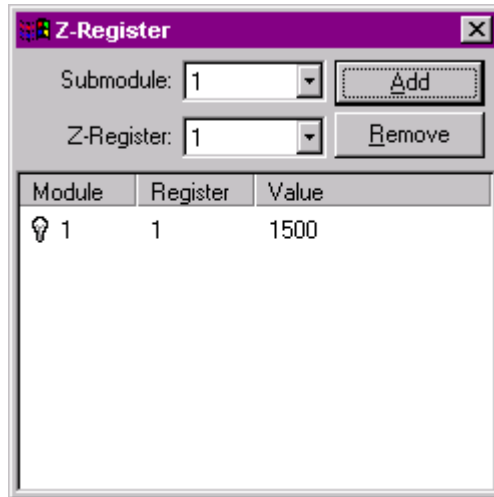
Or, click the **Show/hide z-register dialog** button .

RESULT: The *Z-Register* dialog box displays. The dialog box can be displayed permanently while performing other functions in XL Online.



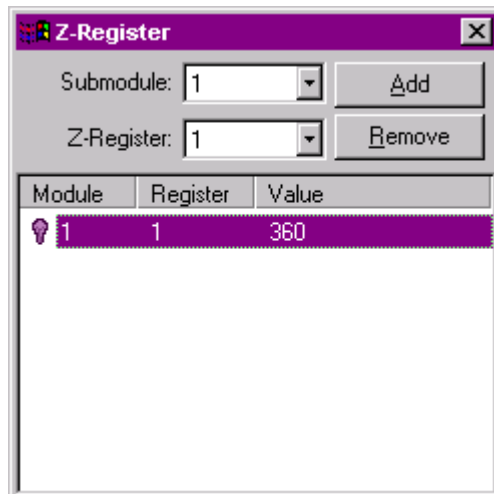
2. To monitor a z-register, select the submodule and the z-register (index number) in the fields of the same name and click the **Add** button. Max. 10 z-registers can be monitored concurrently and displayed in the dialog box.

RESULT: The z-register is added to the list. Software polls the z-register and displays updated values.



3. To check z-register functions, select the z-register in the list.
4. Click the **Value** column, enter the value and press ENTER key.

RESULT: The value is written to the z-register. Software polls the z-register and displays updated values. Note value changes



5. To remove a z-register, select the z-register in the list and click the **Remove** button.
6. To end monitoring, close the dialog box.

NOTE: A changed z-register may be overwritten immediately by the application.

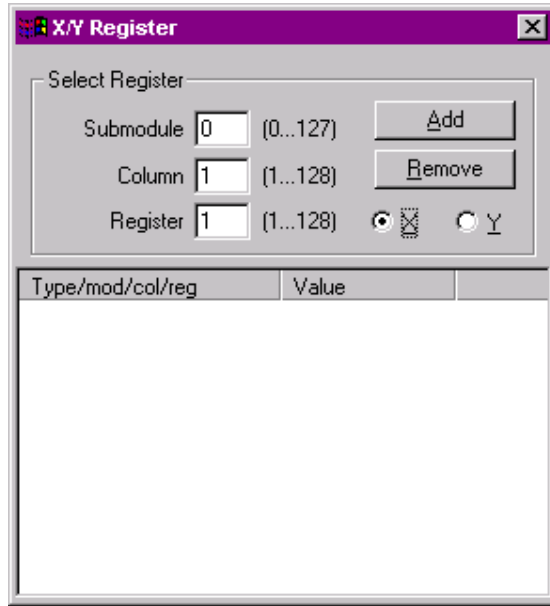
Monitor X/Y-Registers

Purpose Display of a selected x/y register value as it changes in the controller and change the value of an x/y register. X/Y registers can be accessed in general, from special flag points, and from XFMs. When debugging XFMs, open the relevant application with the RACL Editor in parallel. With the procedure described in this section you can select and monitor any existing x/y register.

NOTE: For this you must know the submodule, the column and the index number from the x/y register you want to monitor.

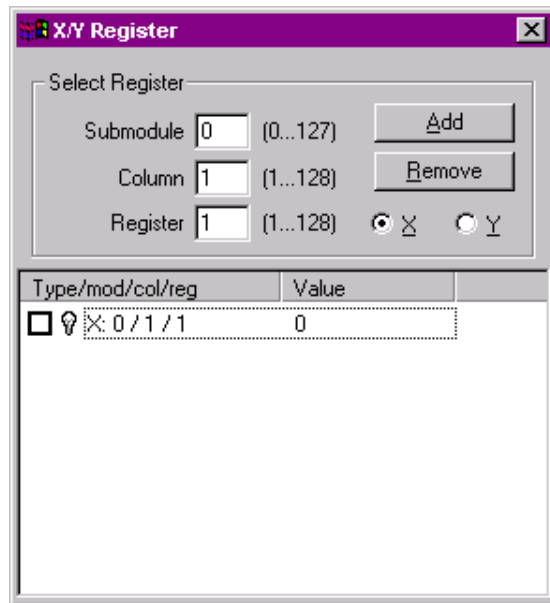
- Procedure**
1. Click menu item **General**, then submenu item **X/Y register**.
Or, click the **Show/hide x/y register** dialog button **Z**.

RESULT: The *X/Y Register* dialog box displays. The dialog box can be displayed permanently while performing other functions in XL Online.



2. Click **X** or **Y** radio button dependent on which registers, x or y registers you want to monitor.
3. Enter the submodule, column and register (index number) for the register in the fields of the same name and click the **Add** button. Max. 10 x and 10 y registers can be monitored concurrently and displayed in the dialog box.

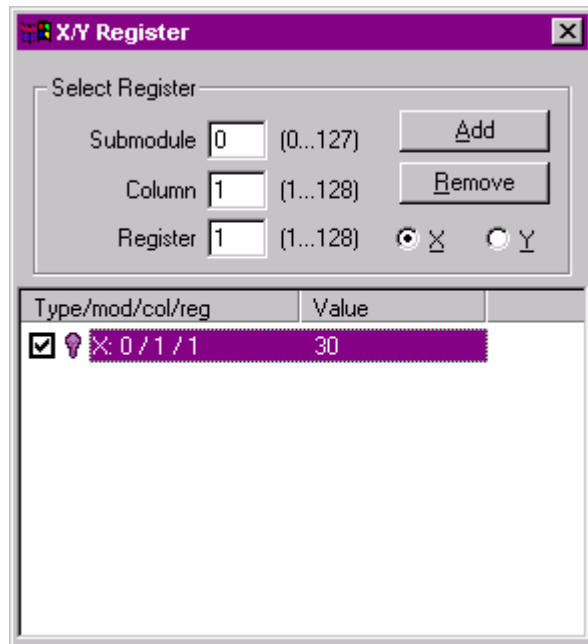
RESULT: The x/y register is added to the list. Software polls the x/y register and displays updated values.



4. To check x/y register functions, check the check box in the line.

- Click the **Value** column, enter the value and press ENTER key.

RESULT: The value is written to the x/y register. Software polls the x/y register and displays updated values. Note value changes.



IMPORTANT

As long as the register is checked, the setting is permanent and the controller cannot overwrite the value, even if XL Online is closed.

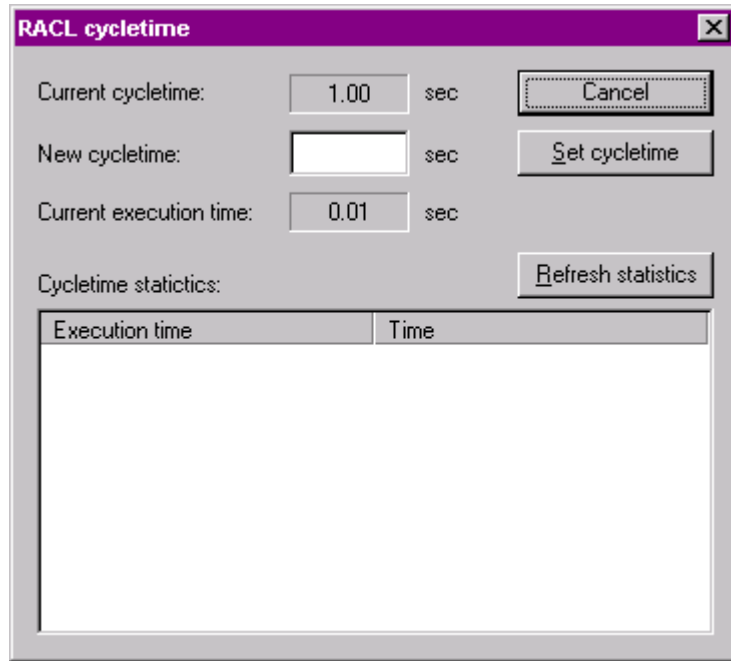
- To remove an x/y register, select the x/y register in the list and click the **Remove** button.
- To end monitoring, close the dialog box.

Set RACL Cycle time

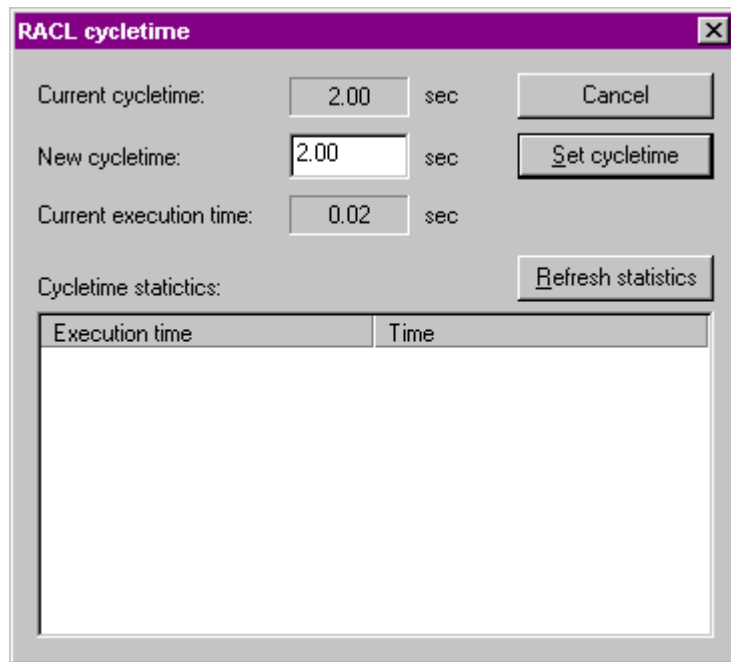
Procedure

- Click menu item **General**, then submenu items **Application** and **RACL Cyclotime**.

RESULT: The *RACL cyclotime* dialog box displays.

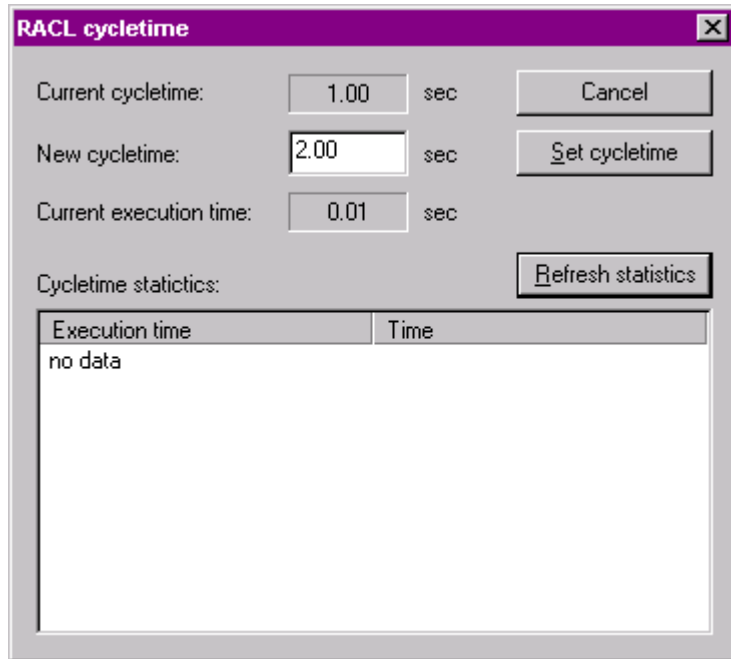


- To change the current cycle time, enter desired value in the **New cyclotime** field and click **Set cyclotime** button.



- To view the last ten RACL cycles that have been taken longer than the set cycle time, click the **Refresh statistics** button

RESULT: If the case, the last ten RACL cycles are displayed with execution time (duration) and start time in the **Cyclotime statistics** list.



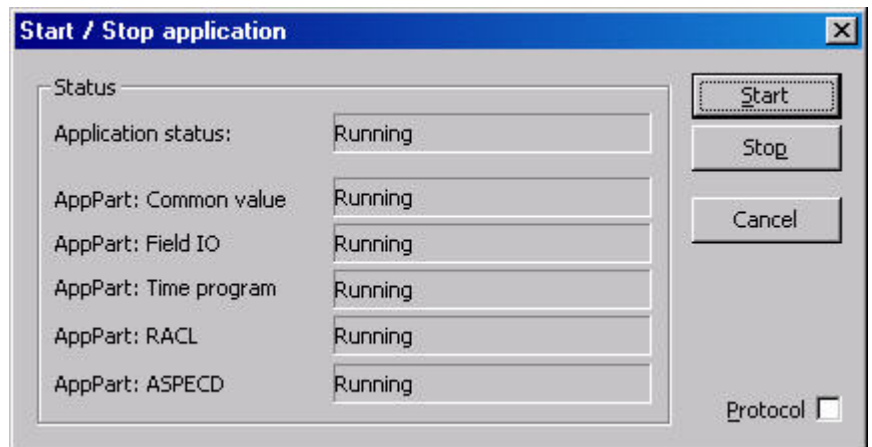
NOTE: For controller OS 2.0 and higher, the cycle time is automatically adapted to the execution time, that is a set value may then be changed.

Start / Stop Application

Purpose To start or stop the application running in the controller.

Procedure 1. Click menu item **General**, then submenu items **Application** and **Start /Stop**.

RESULT: The *Start / Stop application* dialog box displays. The current status of the application parts are displayed.



2. To start a stopped application, click the **Start** button.

3. To stop a running application, click the **Stop** button.

RESULT: The application is stopped.

4. When stopping and starting the application, note alarms that may occur on the *Alarms* tab and in the popup alert (if enabled in the *XL Online Options* dialog box).

5. Check **Protocol** check box if you want to save the start/stop changes continuously in a log file called *StartStop.log* (saved in the current directory, normally the CARE root directory).



NOTE: The data will only be saved to the log file as long as the *Start / Stop Application* dialog box is opened.

View/Modify Time Programs

Purpose Display and modify time sequences for controller operation. For example, set HVAC start and stop times. Time Programs implement these command schedules. A controller can have a maximum of 20 Time Programs. Each Time Program specifies a list of points to command and a *Weekly Program*. This Weekly Program defines the normal daily activity of the system by specifying which Daily Programs a controller should use for each day of the week (Sunday through Saturday). The Weekly Program applies for each week of the year. There is only one Weekly Program per Time Program. Daily Programs list points and point actions and times for the controller to implement. Operators assign Daily programs to Weekly programs or as date override to provide for automatic operations on scheduled dates. Yearly Programs define time periods with special daily programs. Yearly programs are suited to consider specific local conditions, for example, regional vacation and public /religious festivals. Yearly programs can be defined for more than one year.

Example:

Controller 1
 Time Program 1
Point Assignments
 hvac_ctrl
 min_hvac

<i>Weekly Program</i>	<i>Daily Program Name</i>
Monday	normal_daily
Tuesday	normal_daily
Wednesday	normal_daily
Thursday	normal_daily
Friday	normal_daily
Saturday	Weekend
Sunday	Weekend

Where the **normal_daily** Daily Program includes the following items (time, user address, command):

06:00	hvac_ctrl	on
18:00	hvac_ctrl	off

And the **Weekend** Daily Program includes the following items (time, user address, command):

12:01	min_hvac	on
23:59	min_hvac	off

Today (Point) Overrides

You can assign different commands and times to selected points within a time program. These changes are "today overrides".

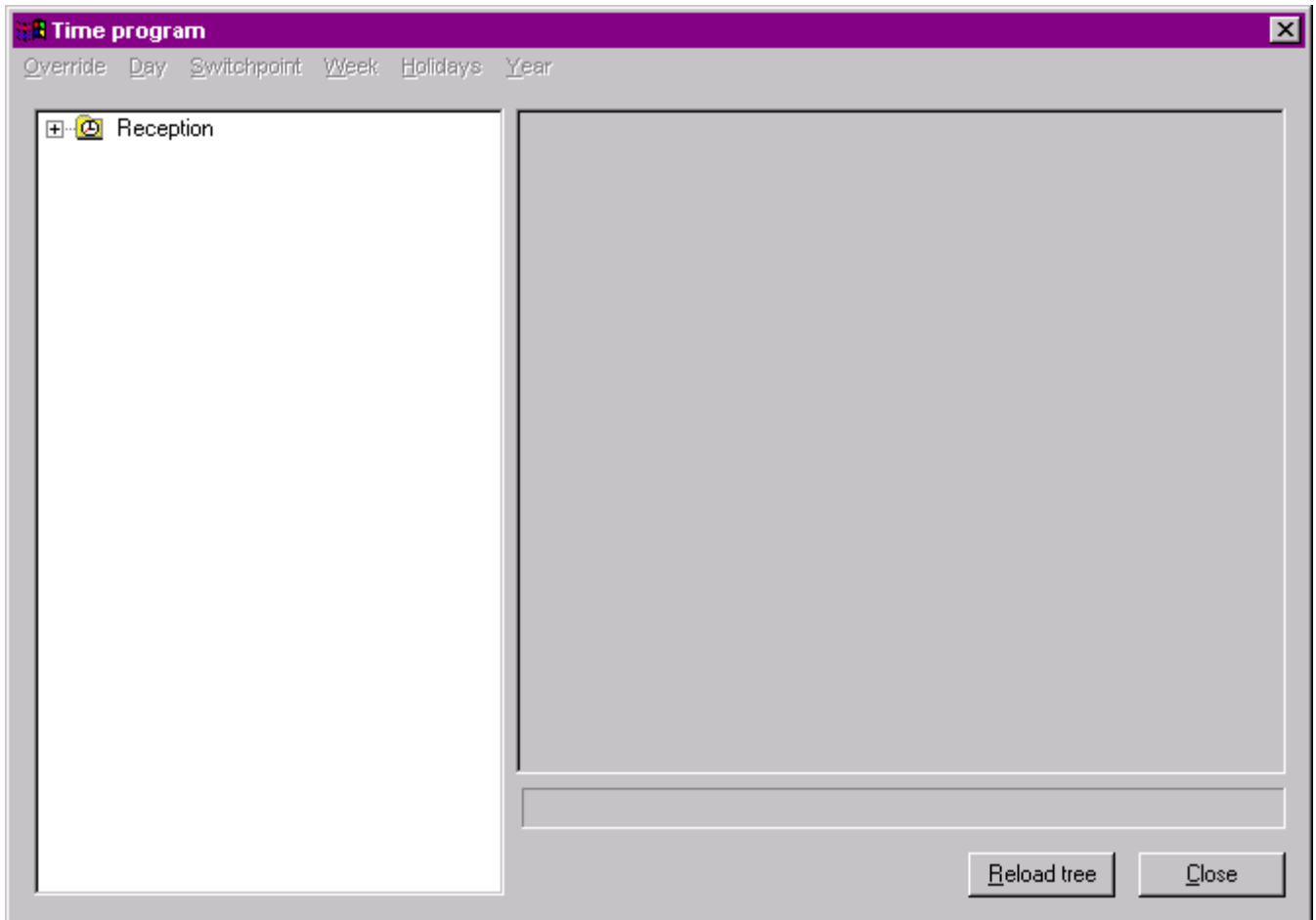
Date Overrides

You can also assign temporary schedules to replace daily schedules when holidays or other events occur that require different times and commands. These schedules are "date overrides".

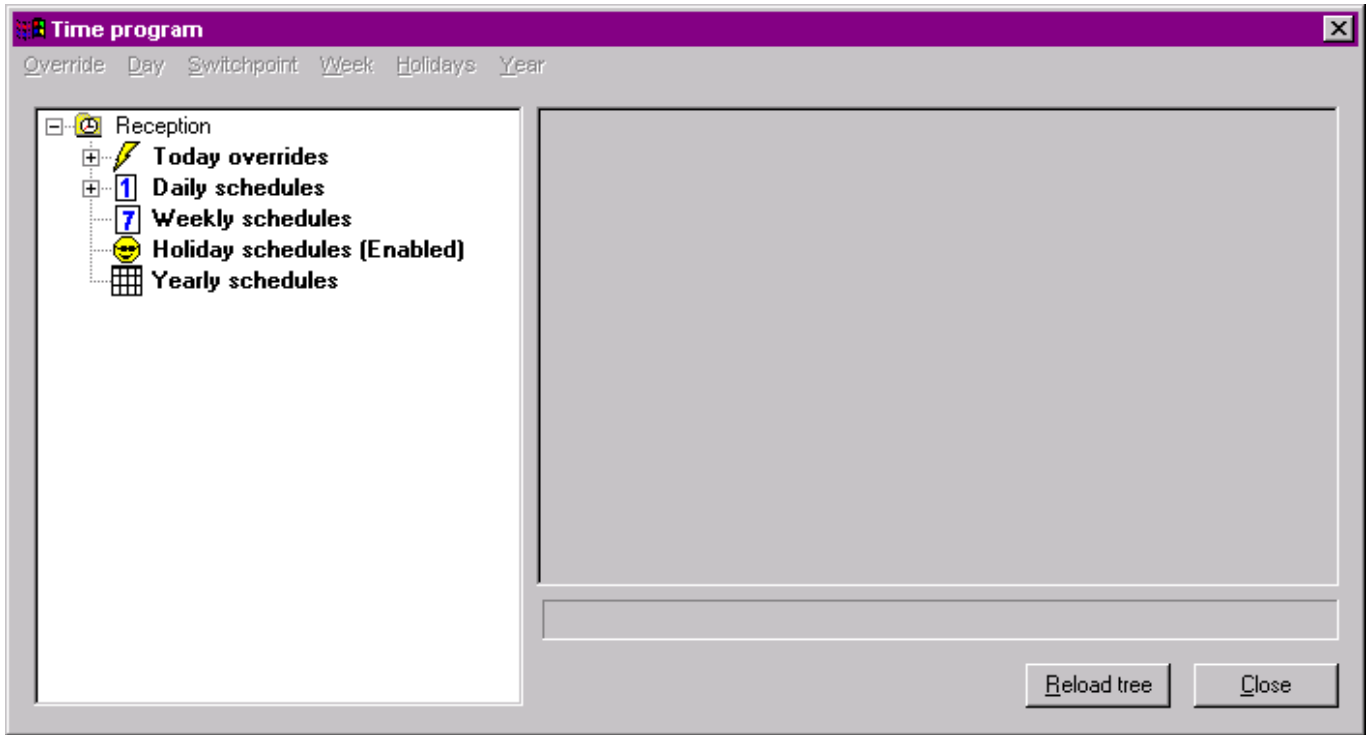
Open Time Program Editor**Procedure**

1. Click menu item **General**, then submenu items **Application** and **Time Program**.

RESULT: The *Time program* main window displays.



2. Open the tree on the left to display the available time programs. In this case the time program 'Reception' is displayed.



Close Time Program Editor

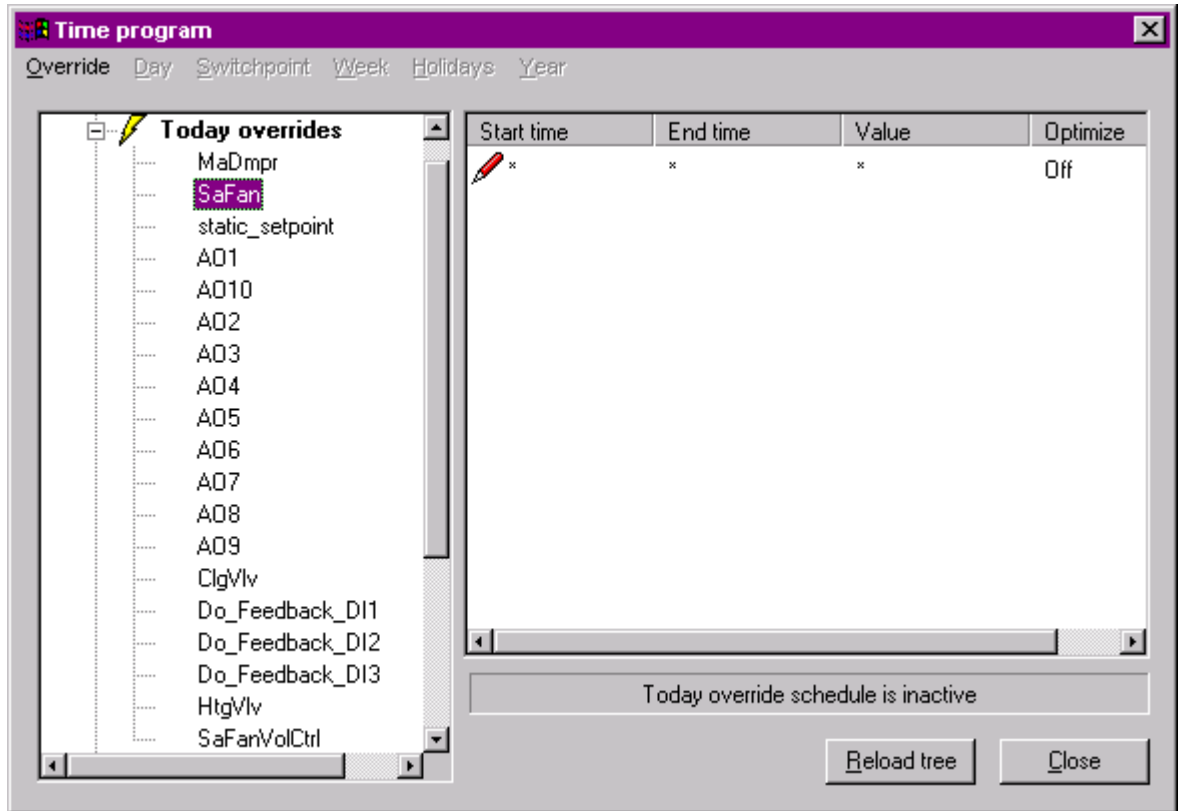
- Procedure**
1. In the *Time program* main window, click the **Close** button.

Override Today Schedule

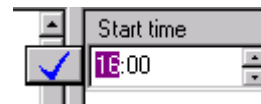
Purpose Override a normal day’s activity for a selected point.

- Procedure**
1. Open the time program editor as described in the "Open Time Program Editor" section.
 2. In the tree, open the *Today overrides* folder and click on the point you want to override.

RESULT: At the bottom, the status message and on the right, a *pencil* icon indicates that the point has currently no override and can be edited for overriding the today schedule.



3. Click in the **Start time** column
Or, click menu item **Override**, then submenu item **Edit Start time**.
4. Enter the time when the override should start (the blue checkmark indicates the editing mode of the field).
5. Press ENTER key.



6. Continue by setting the end time, the value and the optimize status in the corresponding fields in the same manner as described in steps 3 through 5. Use appropriate submenu items in the **Override** menu alternatively.

Start time	End time	Value	Optimize
✓ 16:00	17:00	On (1)	Off

7. If desired, edit further points for overriding the schedule for today.

IMPORTANT

Once a Today schedule override has been set, it cannot be deleted. In case you want to "delete" an override, set the start-end time difference to 1 min.

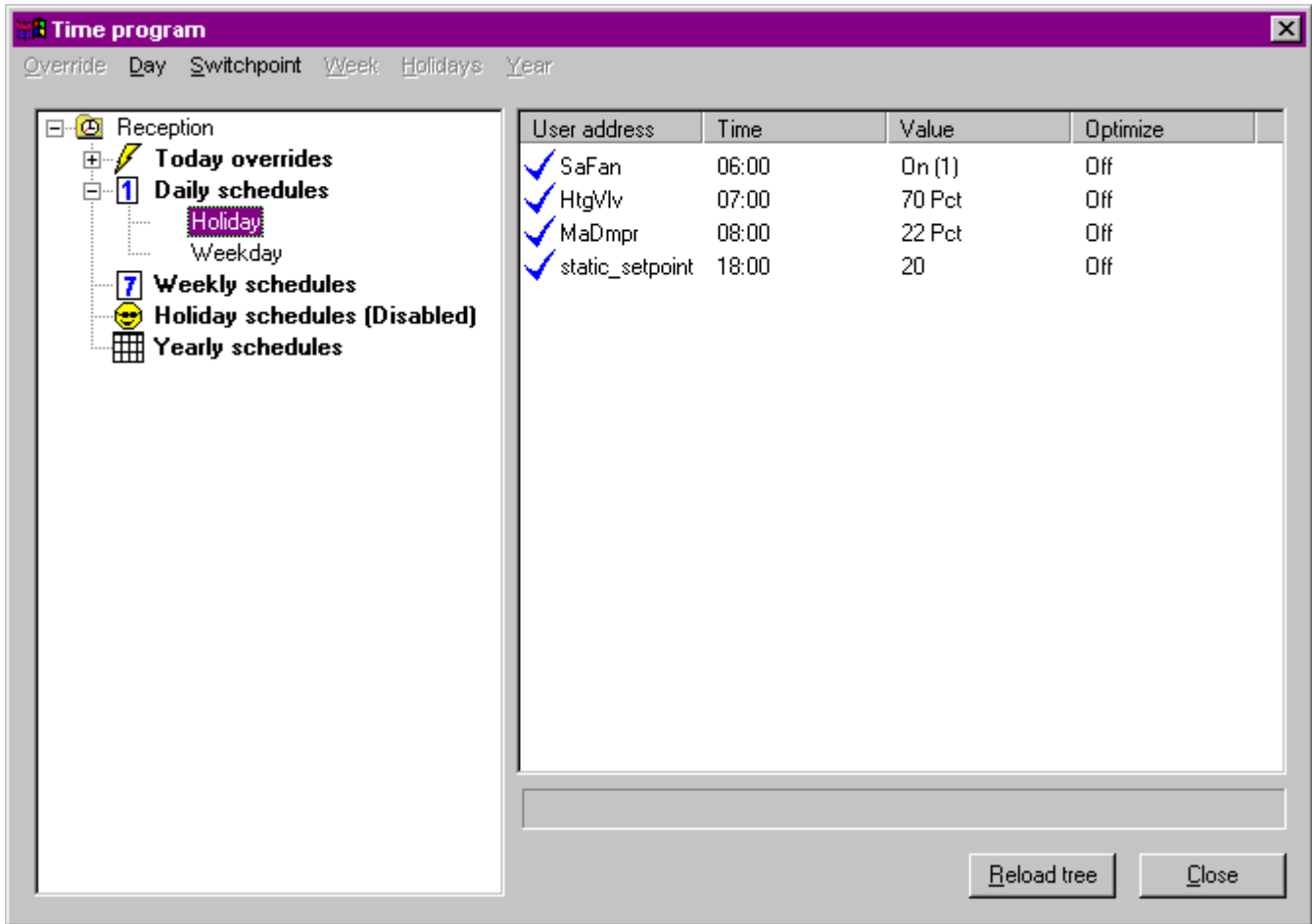
Modify Daily Schedule

Purpose	Edit, create, rename or delete a daily schedule.
Procedures	...

Edit daily schedule

1. Open the time program editor as described in the "Open Time Program Editor" section.
2. In the tree, open the *Daily schedules* folder and click on the daily program you want to modify.

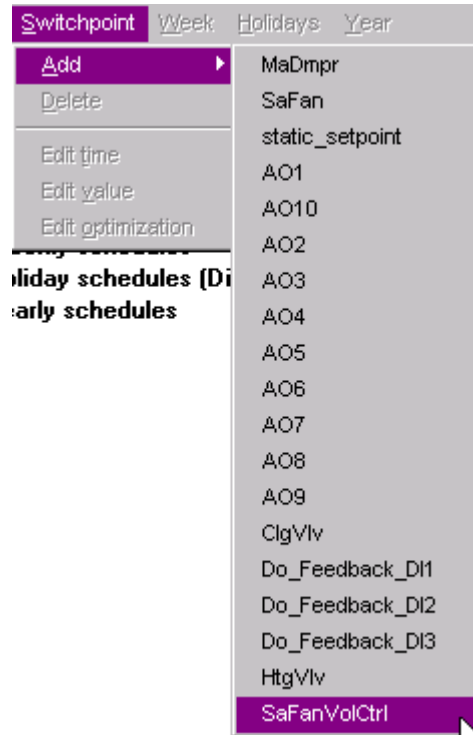
RESULT: On the right, all points assigned to the daily program are displayed.



3. Select the point in the list.
4. Set the time, the value and the optimize status in the corresponding fields in the same manner as described in steps 3 through 5 of the "Override Today Schedule" section.

Add New Point

1. Click daily schedule in the tree.
2. Click menu item **Switchpoint** then submenu item **Add** and select the point.



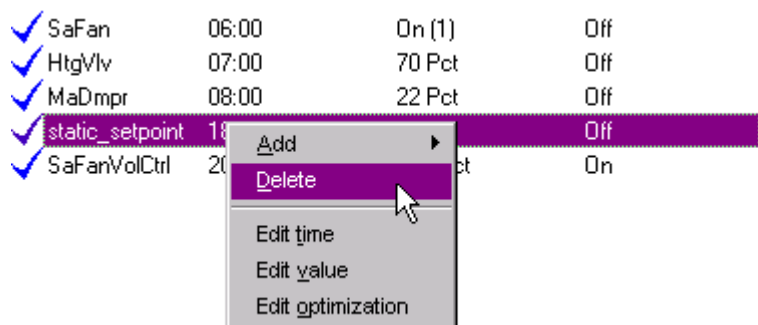
RESULT: The point is added to the list.

User address	Time	Value	Optimize
✓ SaFan	07:00	Off (0)	On
✓ HtgVlv	07:00	70 Pct	Off
✓ MaDmpr	08:00	22 Pct	Off
✓ static_setpoint	18:00	20	Off
✎ SaFanVolCtrl	*	*	On

3. Set the time, the value and the optimize status in the corresponding fields in the same manner as described in steps 3 through 5 of the "Override Today Schedule" section.

Delete Point

1. To delete a point from the daily schedule, select the point in the list.
2. Click right mouse key and with left mouse key click **Delete** in the context menu. Or, click menu item **Switchpoint**, then submenu item **Delete**.



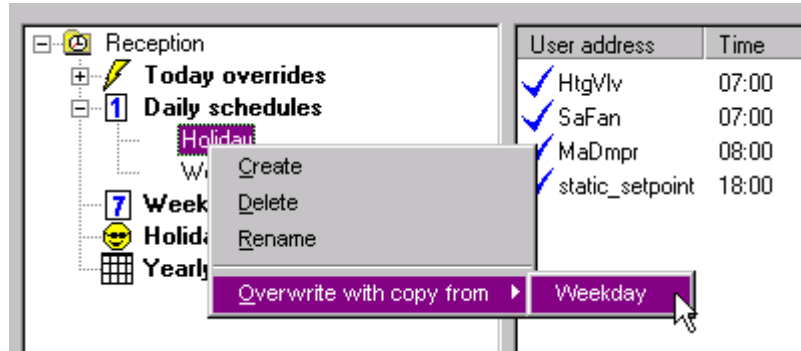
RESULT: The point is deleted from the list.

Overwrite Daily Schedule

All points will be deleted. You can only overwrite a daily schedule that is not used in any weekly, holiday or yearly program. To overwrite a daily schedule with another daily schedule do the following

1. In the tree, click the daily schedule you want to overwrite.
2. Click right mouse key and with left mouse key, click on **Overwrite with copy from** and select the daily schedule, in this case **Weekday** in the context menu.

Or, click menu item **Daily**, then submenu item **Overwrite with copy from** and select the daily schedule.

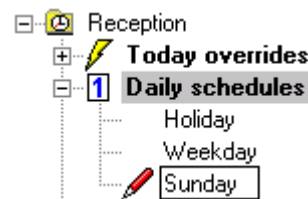


RESULT: The selected daily schedule points will delete the current points.

User address	Time	Value	Optimize
✓ SaFan	06:00	On (1)	Off
✓ HtgVlv	07:00	70 Pct	Off
✓ MaDmpr	08:00	22 Pct	Off
✓ SaFanVolCtrl	20:00	200 Pct	On

Create New Daily Schedule

1. To create a new daily schedule, click on the *Daily schedules* folder in the tree.
2. Click right mouse key and with left mouse key, click on **Create** in the context menu.
Or, click menu item **Day**, then submenu item **Create**.
3. In the folder, enter the name for the new daily schedule, e.g. 'Sunday'.



4. Add points to the new daily schedule by clicking menu **Switchpoint**, then submenu item **Add** and selecting the desired point (see "Edit Daily Schedule" section).

Rename Daily Schedule

1. To rename a daily schedule, click on the schedule in the tree.
2. Click right mouse key and with left mouse key, click on **Rename** in the context menu.
Or, click menu item **Day**, then submenu item **Rename**.
3. Rename the flashing folder name.

Delete Daily Schedule

1. To delete a daily schedule, click on the daily schedule.
2. Click right mouse key and with left mouse key, click on **Delete** in the context menu.
Or, click menu item **Day**, then submenu item **Delete**.

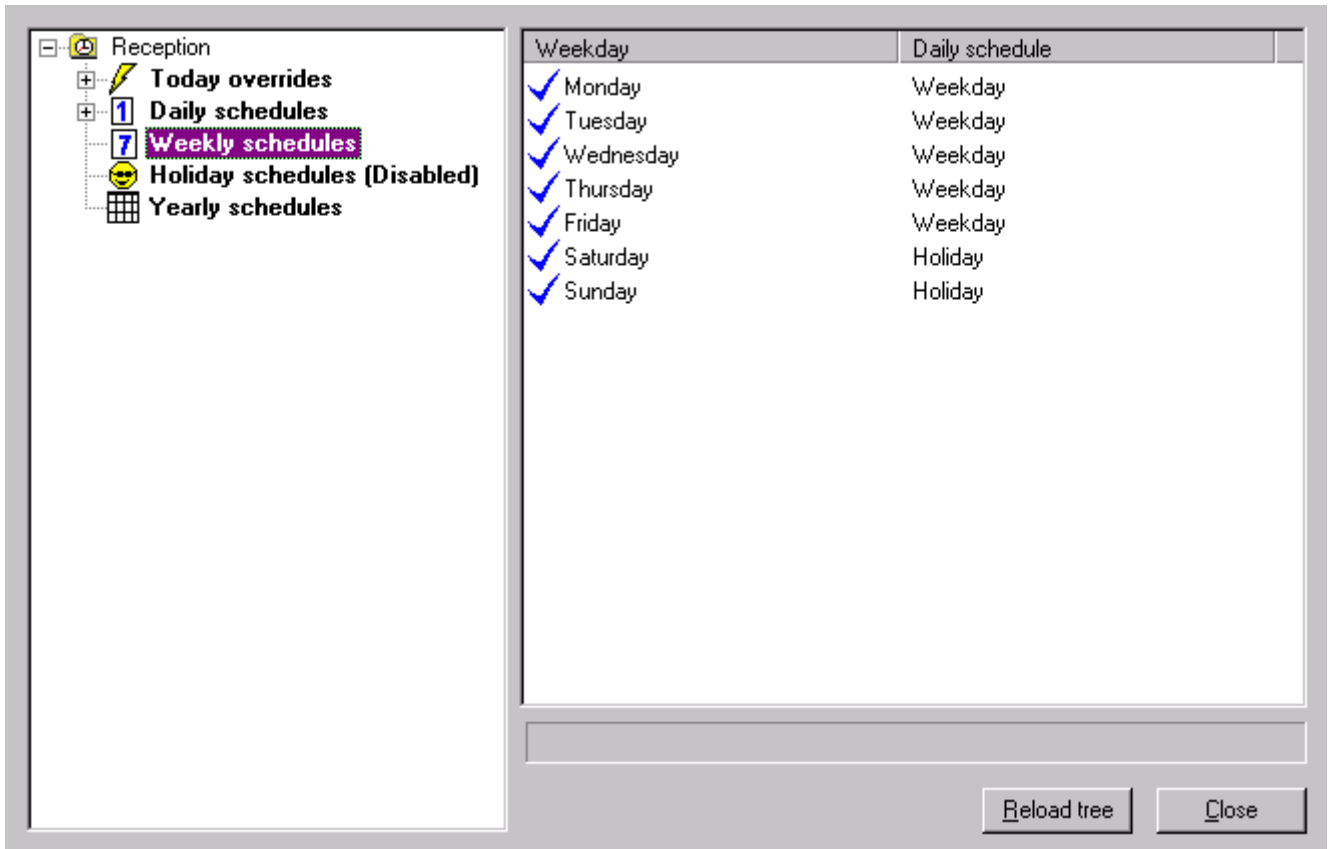
NOTE: You can only delete a daily schedule that is not used in any weekly, holiday or yearly program.

Modify Weekly Schedule

Purpose Define the weekly schedule for a controller by selecting the daily schedules the controller should use each day (Sunday through Saturday) of a normal week.

- Procedure**
1. Open the time program editor as described in the "Open Time Program Editor" section.
 2. In the tree, click on the *Weekly schedules* folder.

RESULT: On the right, the week with its assigned daily schedules is displayed.



3. To assign another daily schedule to a weekday, click on the weekday in the **Daily schedule** column.
4. Select the desired daily schedule and press ENTER key.

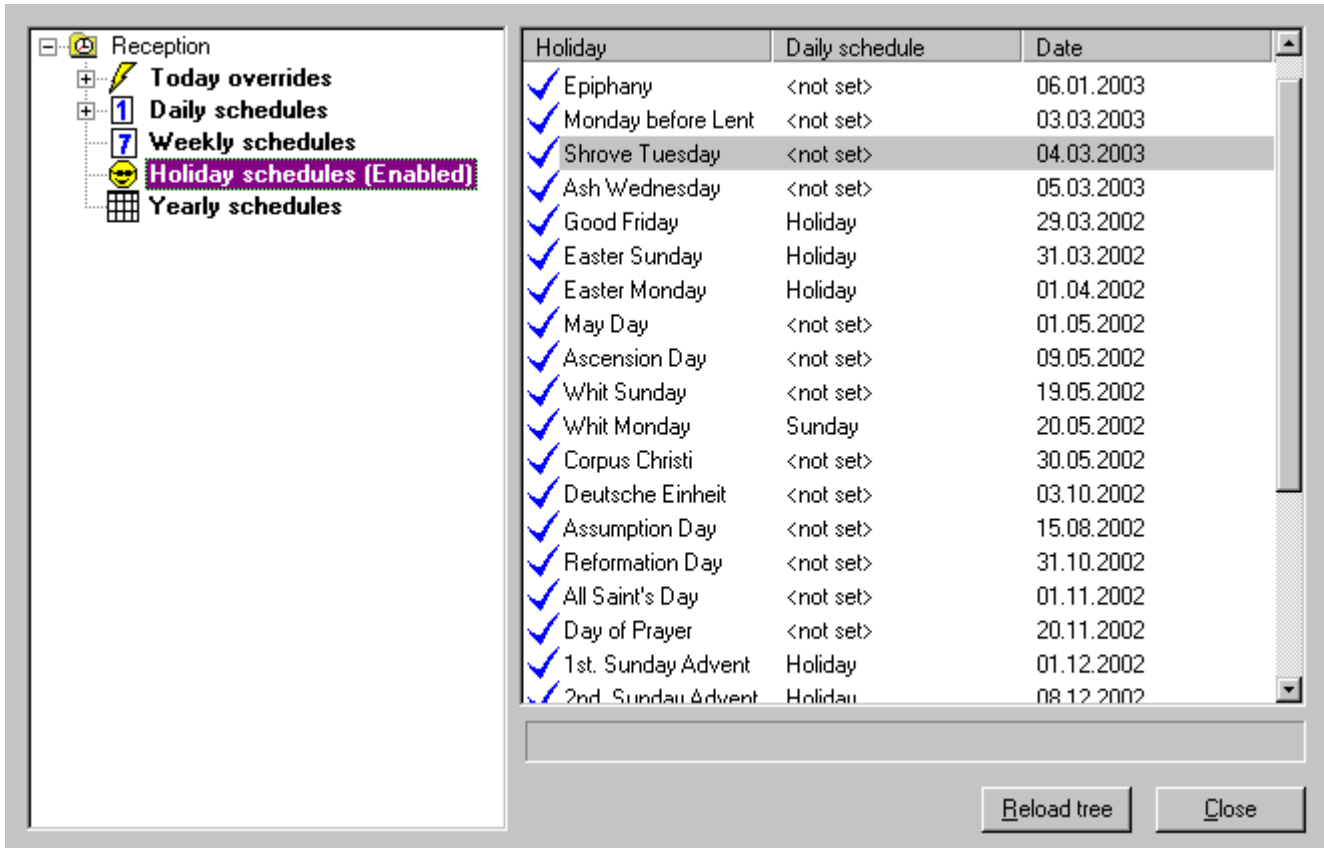
NOTE: It is also possible to remove an assigned daily schedule by selecting <not set>. This means, that on that day no daily schedule is executed.

Modify Holiday Schedules

Purpose Holiday schedules are saved with the application and can be enabled or disabled as a whole since they are country specific. To each holiday a daily schedule can be assigned.

- Procedure**
1. Open the time program editor as described in the "Open Time Program Editor section".
 2. In the tree, click on the *Holiday schedules* folder.

RESULT: On the right, all holidays with its assigned daily schedules are displayed. Note that the blue checkmark appears for the enabled as well as for the disabled mode.



- Enable/Disable Holiday Schedules**
3. Click right mouse key and with left mouse key, click on **Enable**, respectively **Disable**.
- Assign Daily Schedules**
5. To assign another daily schedule to a holiday, click on the holiday in the **Daily schedule** column.
 6. Select the desired daily schedule and press ENTER key.
- NOTE:** It is also possible to remove an assigned daily schedule by selecting <not set>.

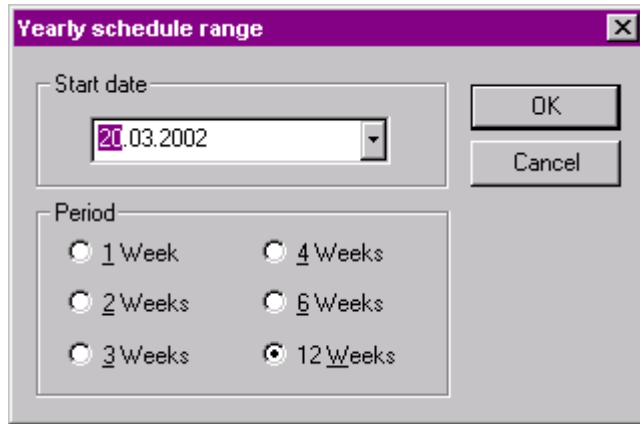
Modify Yearly Schedules

Purpose Setup exception for specific days (period) of the year.

- Procedure**
1. Open the time program editor as described in the "Open Time Program Editor" section.

2. In the tree, click on the *Yearly schedules* folder.
3. Click right mouse key and with left mouse key, click on **Load** in the context menu.
Or, click menu item **Year**, then submenu item **Load**.

RESULT: The *Yearly schedule range* dialog box is displayed.



4. Open calendar by clicking the **Start date** drop-down listbox and define the start date of the range.
5. Under period, define the desired duration by clicking the corresponding radio button.

RESULT: On the right, the current yearly schedule is displayed for the defined period. The weekdays show their assigned daily schedules. For the assigned daily schedule, the following descending priority is used: *yearly schedule* → *holiday schedule* → *weekly schedule*.

That is, by default a weekday has the daily schedules of the week schedule assigned. If a weekday has a holiday schedule assigned, the daily schedule of that holiday is used and the name of the holiday is shown in the source column. Note, that in this case holidays must be enabled. If a weekday is part of a yearly schedule period, the daily schedule defined for that period is used. In the source column 'Yearly schedule' is displayed.

For each weekday the source of the assigned daily schedule is indicated by the following icons and a description in the source column:

Icon	Assigned daily schedule	Source Display
	"according to the weekly schedule"	"No display"
	"according to the holiday schedule"	Name of holiday
	"according to the yearly schedule"	Yearly schedule

IMPORTANT

When changing the daily schedule for a weekday, the weekday gets always part of the yearly schedule as indicated by the source description "yearly schedule" and the icon.

Weekday	Time	Daily schedule	Source
7 Wednesday	20.03.2002	Weekday	
7 Thursday	21.03.2002	Weekday	
7 Friday	22.03.2002	Sunday	
7 Saturday	23.03.2002	Holiday	
7 Sunday	24.03.2002	Sunday	
7 Monday	25.03.2002	Weekday	
7 Tuesday	26.03.2002	Weekday	
7 Wednesday	27.03.2002	Weekday	
7 Thursday	28.03.2002	Weekday	
☺ Friday	29.03.2002	Holiday	Good Friday
7 Saturday	30.03.2002	Holiday	
☺ Sunday	31.03.2002	Holiday	Easter Sunday
☺ Monday	01.04.2002	Holiday	Easter Monday
7 Tuesday	02.04.2002	Weekday	
7 Wednesday	03.04.2002	Weekday	
7 Thursday	04.04.2002	Weekday	
7 Friday	05.04.2002	Sunday	
☐ Saturday	06.04.2002	Sunday	Yearly schedule
7 Sunday	07.04.2002	Sunday	
7 Monday	08.04.2002	Weekday	
7 Tuesday	09.04.2002	Weekday	
7 Wednesday	10.04.2002	Weekday	
7 Thursday	11.04.2002	Weekday	
7 Friday	12.04.2002	Sunday	
☐ Saturday	13.04.2002	Sunday	Yearly schedule
7 Sunday	14.04.2002	Sunday	

6. To assign another daily schedule to a weekday, click on the weekday in the **Daily schedule** column.

7. Select the desired daily schedule and press ENTER key.

NOTE: It is also possible to remove an assigned schedule by selecting <not set>.

RESULT: In this case, for the defined period, on Wednesday 10.04.2002, the daily schedule 'Sunday' will be used.

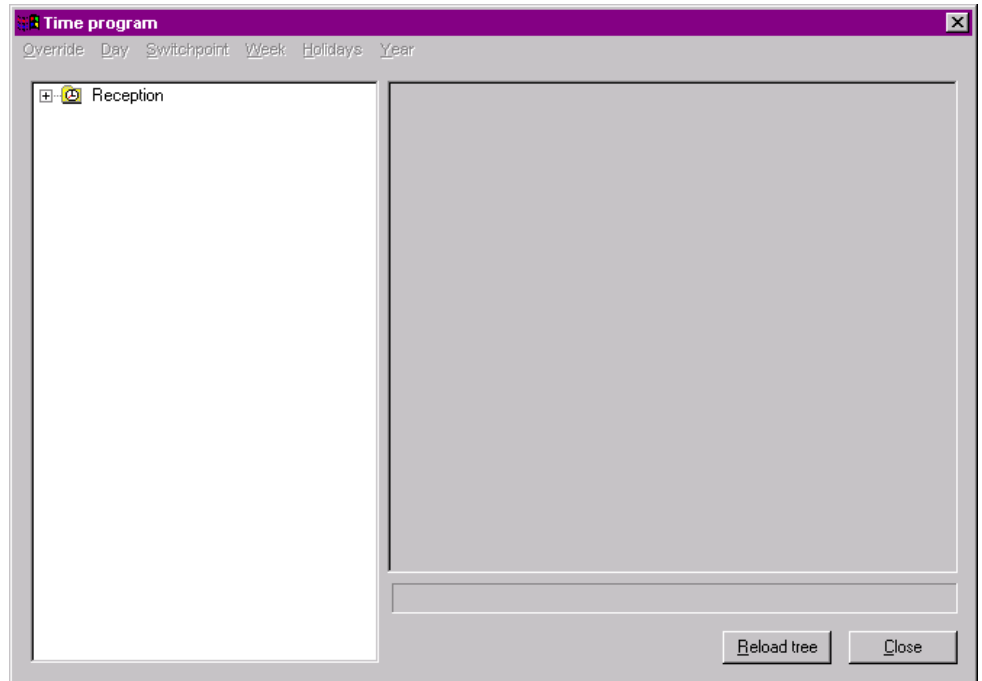
☐ Wednesday	10.04.2002	Sunday	Yearly schedule
7 Thursday	11.04.2002	Weekday	
7 Friday	12.04.2002	Sunday	
☐ Saturday	13.04.2002	Sunday	Yearly schedule
7 Sunday	14.04.2002	Sunday	

Reload Tree

Purpose Load the current schedules from the controller.

Procedure 1. In the *Time program* main window, click the **Reload** button.

RESULT: The tree is collapsed and the current schedules from the controller were loaded.

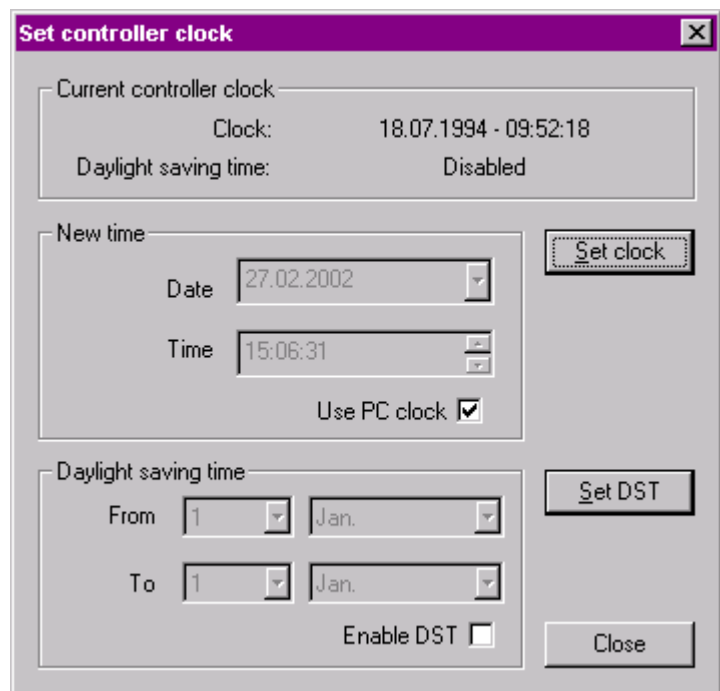


Set System Clock

Purpose To set the controller clock.

Procedure 1. Click menu item **General**, then submenu item **System Clock**.

RESULT: The *Set controller clock* dialog box displays.



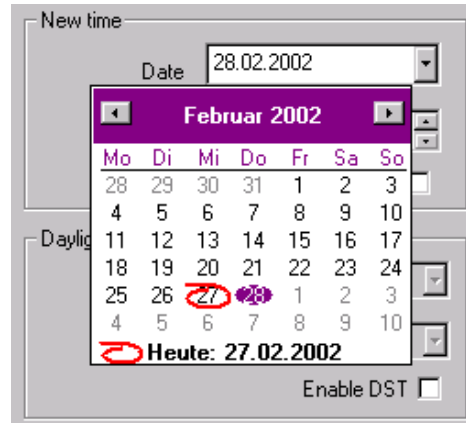
Under *Current controller clock*, the current time in the controller and whether the daylight saving time is enabled or disabled, is displayed.

2. To set a new time do one of the following:

To use the current PC clock as new time, check the **Use PC clock** checkbox (default) and click the **Set clock** button.

RESULT: The controller clock is set to the current PC clock.

To set an individual time, uncheck the **Use PC clock** checkbox. Into the **Date** and **Time** field, enter the desired time (each item part separately).



Or, click on the drop-down arrow at the **Date** field and select data in the calendar (use keyboard arrows to scroll through). Close the calendar by clicking on any location outside the calendar.

Or, use the scroll arrows at the time field to set the time.

Click the **Set clock** button

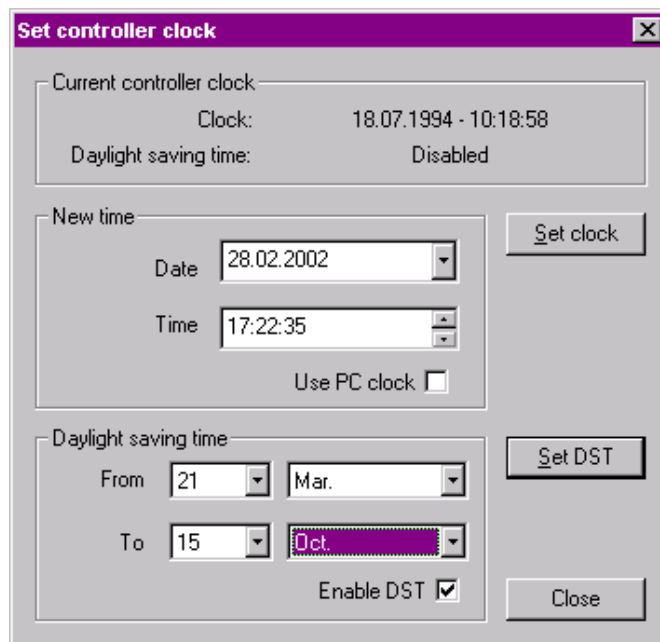
RESULT: The controller clock is set to the new individually set time.

3. To set daylight saving time (DST) do the following:

Check the **Enable DST** checkbox.

Under *Daylight saving time*, set the time in the **From** and **To** fields.

Click the **Set DST** button.

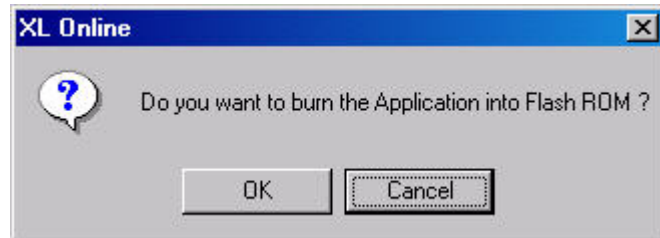


RESULT: The controller uses the set DST.

Save Application in Flash ROM

- Procedure**
1. Click menu item **General**, then submenu items **Flash ROM** and **Save Application**.

RESULT: The following dialog box displays.



2. To save the application in the Flash ROM, click **OK** button.
3. Confirm the following message.

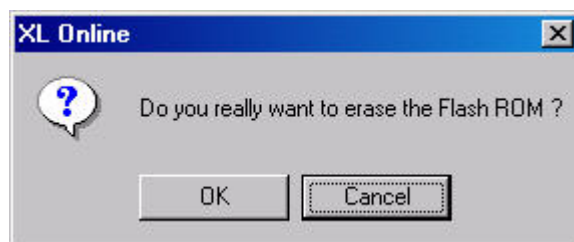


NOTE: Saving an application to the Flash ROM can take up to 30 seconds.

Erase Flash ROM

- Procedure**
1. Click menu item **General**, then submenu item **Flash ROM** and **Erase**.

RESULT: The following dialog box displays.



2. To erase the Flash ROM, click **OK** button.
3. Confirm the following message.



NOTE: Erasing the Flash ROM can take up to two minutes.

Work with MMI

XL Online provides an emulation of the XI581 AH / XI582 AH bus wide operator interface to change basic information programmed into the Excel controller. For detailed description on those functions, please refer to the XI581 AH/ XI582 AH user guide, form EN2B-0126 (European) / 74-3554 (U.S.).


Start MMI

Click on the *MMI* tab in the *XL Online* main window. The *XL Online* main window displays. Software tries to connect to the port according to the settings defined in the *XL Online Options* dialog box (see "Port Settings" section).

Connection and Display Problems

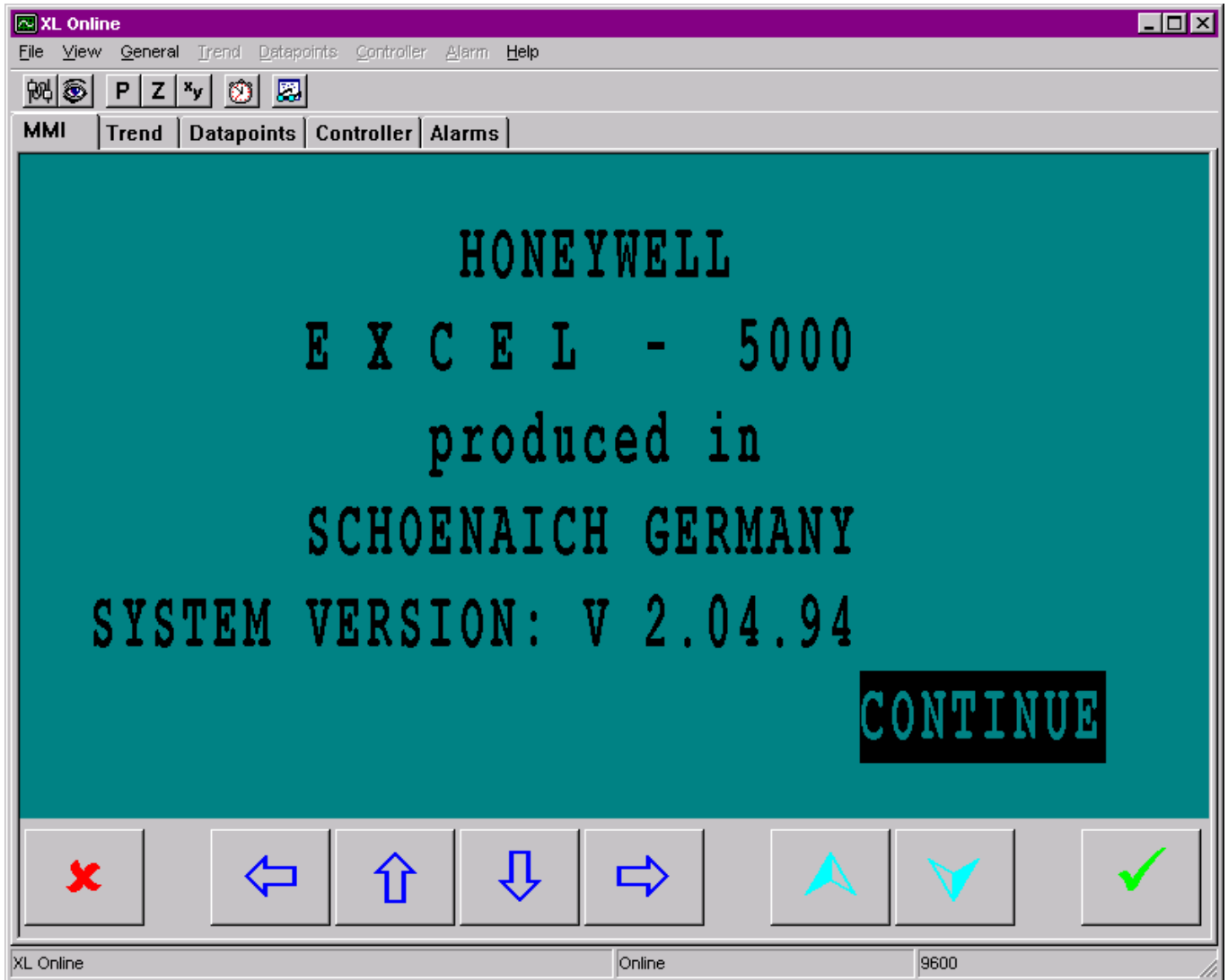
If no controller is connected to the port or software cannot connect to the controller due to wrong port settings, the MMI is gray and the status message No connection is displayed. If a connection is completed and no application is running, the MMI is blue and blank. If an application is running, the MMI is blue and the initial text is shown.

Procedures

1. If the MMI is gray, connect the controller to the port as follows:
2. Click menu item **File**, then submenu item **Connection**.
Or, click on the *Change serial port settings* icon  on the button bar.
3. In the *Connect* dialog box, select the **serial port** and the **baudrate** by clicking the corresponding radio buttons. Select **Auto detect**, if you do not know the baudrate (default setting).
4. Click the **Connect** button.

RESULT: If the connection is completed, the MMI is displayed in blue. If no text is displayed, click on another tab or click the ESC button on the MMI emulation.

5. Make sure that the controller number in CARE and in the MMI is the same. If they are different, set them equal either in CARE or in the MMI or by **Set controller no.** command (see "Set Controller Number and View Bus Configuration" section). For operating instructions of the MMI refer to the XI581/2 Operator Terminal Manual.











Initial Screen

To work with the MMI, the buttons at the bottom must be used. Note that you cannot click on selected items in the screen displays.

Example: To get from the initial screen (see above) to the next screen (Continue item is highlighted) you must click the **Enter** button.

In the following, the operating buttons of the MMI emulation will be explained.

Button	Key	Scroll Description
	Escape, delete, backspace	End the task you are performing and return to a previous display window. If you click this key after you modify a field, but before clicking Enter, √, the XI581/2 erases any new information you input and retains the original information. If you click this key after you modify a field <i>and</i> press Enter, √, the XI581/2 retains the new information you input.
	left arrow	Within a menu or a line of items, the left arrow moves the cursor from one column (or item) to another. Within a data field, the left arrow moves the cursor to the left one digit.
	up arrow	Move the cursor to the previous field, the previous column, or to the previous line in a column.
	down arrow	Move the cursor to the next field, the next column, or to the next line in a column.
	right arrow	Within a menu or a line of items, the right arrow moves the cursor from one column (or item) to another. Within a data field, the right arrow moves the cursor to the right one digit.
	plus	Increase the value of a digit by one (for example, from 2 to 3). You can also use this key to change the condition of a digital point. For example, click this key to flip a digital point from OFF to ON.
	minus	Decrease the value of a digit by one (for example, from 2 to 1). You can also use this key to change the condition of a digital point. For example, click this key to flip a digital point from OFF to ON.
	Enter	Enter and confirm input values or command choices for the controller. When you click this key, it allows modification of the highlighted field. Clicking Enter again stores the value in memory.

Moving Between Columns

To move horizontally between columns in a menu or list, press the down arrow key, τ, until you reach the bottom of the column. When you click the down arrow key again, the cursor automatically jumps to the first item in the next column.¹ If the cursor is on the first item in the first column, clicking the right arrow key, ™, moves the cursor to the first item in the second column. If the cursor is on the last item in the second column, clicking the down arrow key, τ, moves the cursor to the first item in the first column.¹

¹ NOTE: In case not all entries are displayed (e.g. no password entered), this may differ slightly.

Modifying a Field

To change information in a field, first use the arrow keys to move to and highlight the field. Then click, √. After the change is made, the Enter button must be clicked again to confirm the change.

Moving From Field to Field

Once you begin modifying the digits in a field, you can move from digit to digit within that field using the arrow keys. However, to move to a different field, you must click Enter, √, after making your last change to the field. The field is then highlighted. You can then use the arrow keys to move to and highlight the next field you wish to modify.

Point Order in Lists


Points are listed according to hardware type. In other words, all analog points appear first, followed by digital points, and finally totalizer points.

Monitor Points

Load Points

Purpose To upload and view points from the controller

Procedure

1. Click on the *Datapoints* tab.
2. Click menu item **Datapoints** then submenu item **Load points** or click  button.

RESULT: All points except hidden points will be uploaded from the controller and displayed.

User address	Point type
Cool1	Analog input
Cool2	Analog input
Cool3	Analog input
Cool4	Analog input
Cool5	Analog input
DaTemp	Analog input
DuctStatic	Analog input
MaTemp	Analog input
AO1	Analog output
AO10	Analog output
AO2	Analog output
AO3	Analog output
AO4	Analog output
AO5	Analog output
AO6	Analog output
AO7	Analog output
AO8	Analog output
AO9	Analog output
CigVlv	Analog output
HtgVlv	Analog output
MaDmpr	Analog output
SaFanVolCtrl	Analog output
DaFiltAlm	Digital input
FrzStat	Digital input
SaFanStatus	Digital input
SaFan	Digital output
static_setpoint	Pseudo analog
EXECUTING_STOPPED	Pseudo digital
SHUTDOWN	Pseudo digital
STARTUP	Pseudo digital
Do_Feedback_DI1	Flexpoint
Do_Feedback_DI2	Flexpoint
Do_Feedback_DI3	Flexpoint

Apply Filter

You can apply a filter using wildcards (?) and jokers (*) to list certain points according to their user address. The filter is case-sensitive. When composing the search name, the list is instantly updated. By default all points are listed with the joker * in the drop-down list. The user addresses can be sorted ascending or descending by clicking on the **User address** column title.

User address	Point type
Cool1	Analog input
Cool2	Analog input
Cool3	Analog input
Cool4	Analog input
Cool5	Analog input
DaTemp	Analog input
DuctStatic	Analog input
MaTemp	Analog input
A01	Analog output
A010	Analog output
A02	Analog output
A03	Analog output
A04	Analog output
A05	Analog output
A06	Analog output
A07	Analog output
A08	Analog output
A09	Analog output
ClgVlv	Analog output
HtgVlv	Analog output
MaDmpr	Analog output
SaFanVolCtrl	Analog output
DaFiltAlm	Digital input
FrzStat	Digital input
SaFanStatus	Digital input
SaFan	Digital output
static_setpoint	Pseudo analog
EXECUTING_STOPPED	Pseudo digital
SHUTDOWN	Pseudo digital
STARTUP	Pseudo digital
Do_Feedback_DI1	Flexpoint
Do_Feedback_DI2	Flexpoint
Do_Feedback_DI3	Flexpoint

- Procedure**
1. Into the drop-down listbox at the top, enter search name using wildcards and/or jokers.

Example: In the following, all user addresses beginning with 'S' are displayed.

User address	Point type
SaFanVolCtrl	Analog output
SaFanStatus	Digital input
SaFan	Digital output
SHUTDOWN	Pseudo digital
STARTUP	Pseudo digital

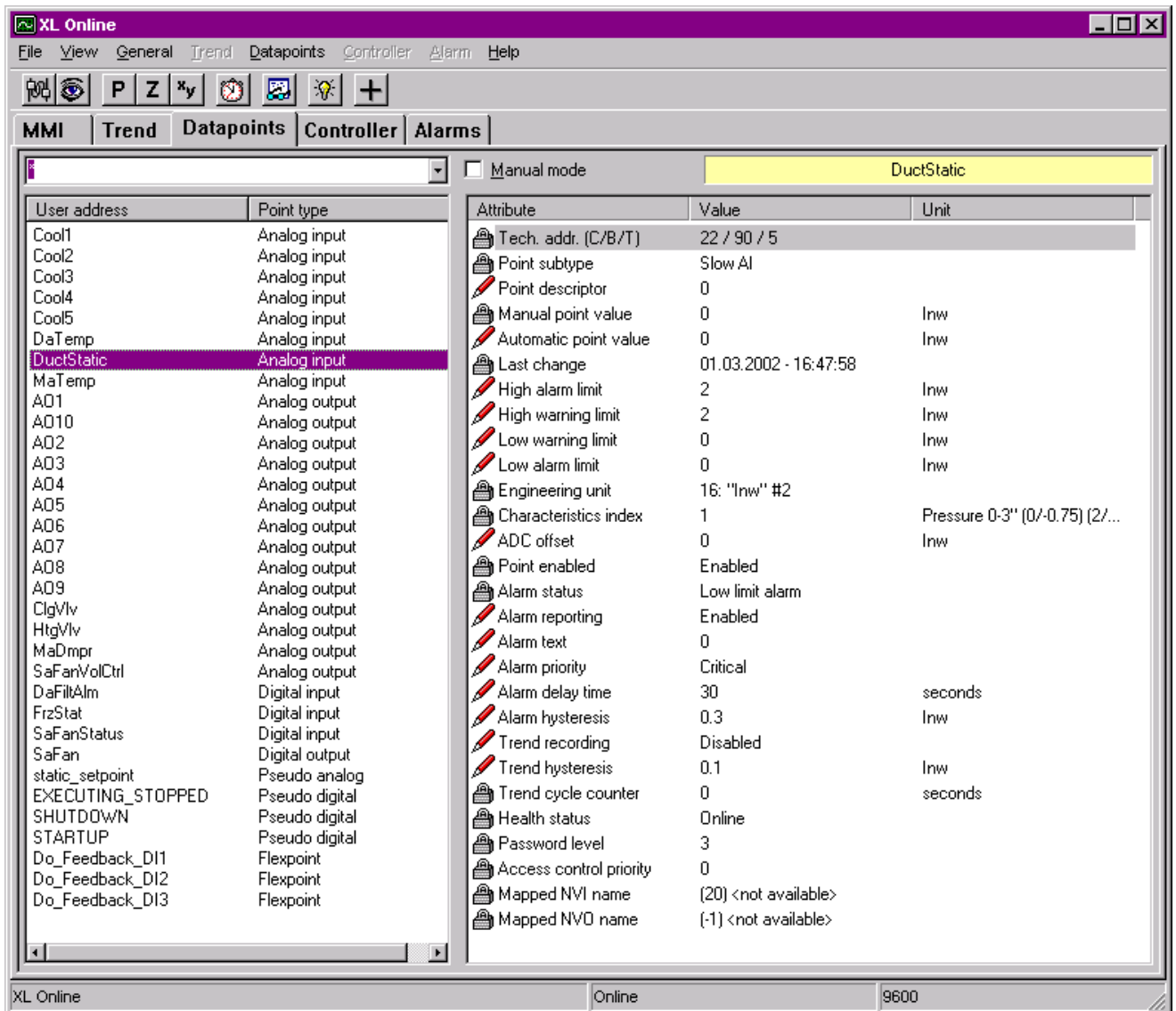
Edit Points

Purpose Edit point values and write them to the controller.

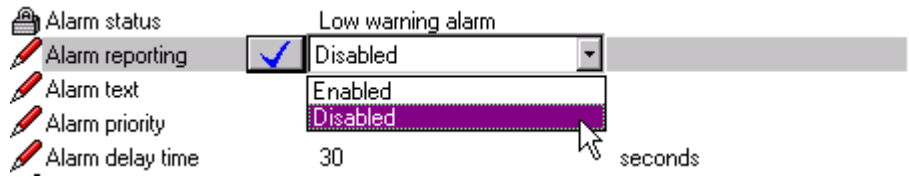
Procedure 1. In the list on the left, click on datapoint.

RESULT: On the right pane, the datapoint’s attributes with value and unit are displayed. The *pencil* icon indicates attributes that can be edited. The *lock* icon indicates read-only attributes. In the yellow field at the top the user address name is displayed.

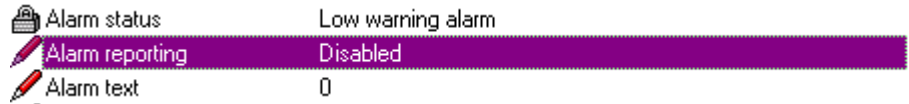
NOTE: The points will not be polled. To refresh point values, double-click on the point in the left list.



2. In the left list, click on the point, you want to edit.
3. On the right pane, click into the **Value** column of the attribute.
4. Enter value and press ENTER key or click button.



RESULT: The value is written to the controller.



5. Note, that alarms that may occur and be displayed on the *Alarms* tab and/or in the *Alarm* popup alert.

Set Points to Manual Mode

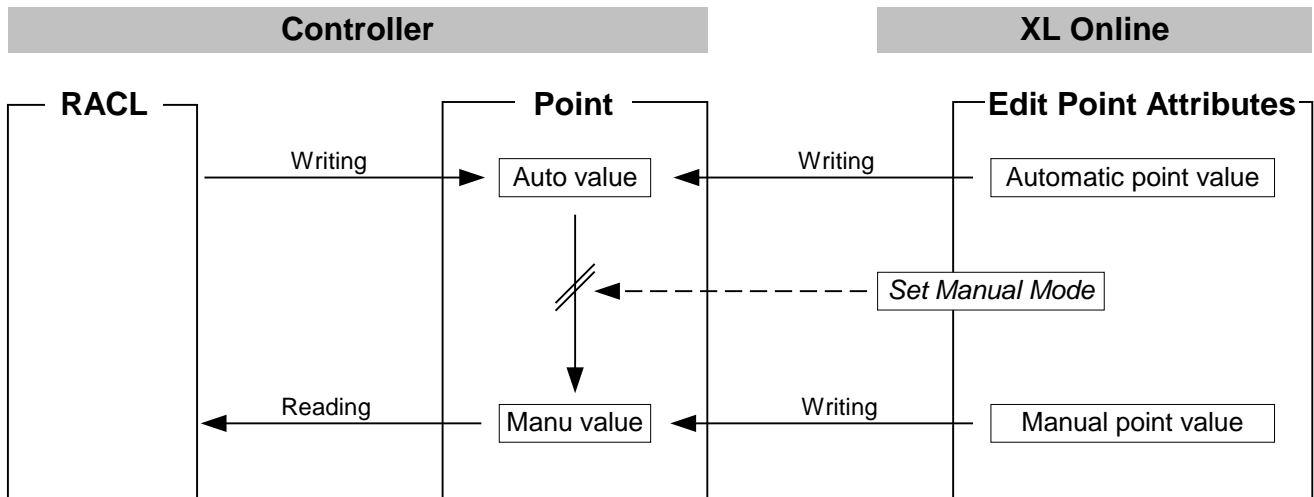
Changing a point value via XL Online is handled by the controller internally as follows:

The changed value is written to the **Auto value** field and by default automatically copied to the **Manu value** field. RACL writes to the **Auto value** field and reads from **Manu value** field. To disable the automatic copy, the manual mode option can be set. In this case RACL always reads the given manual point value, which may differ from the automatic point value.

Examples:

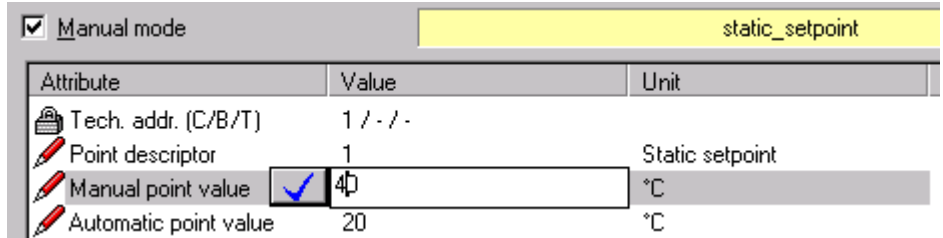
For a pseudopoint, use the automatic point value attribute and write a constant value to the controller, e.g. room temperature = 26 degrees C.

For a digital output, set the manual mode and switch on a pump constantly by setting the manual point value to ON.



To set the manual mode, check the **Manual Mode** checkbox.

To enter a manual value, click into the **Value** field of the **Manual point value** attribute and enter desired value.



Set Point to Manual Mode

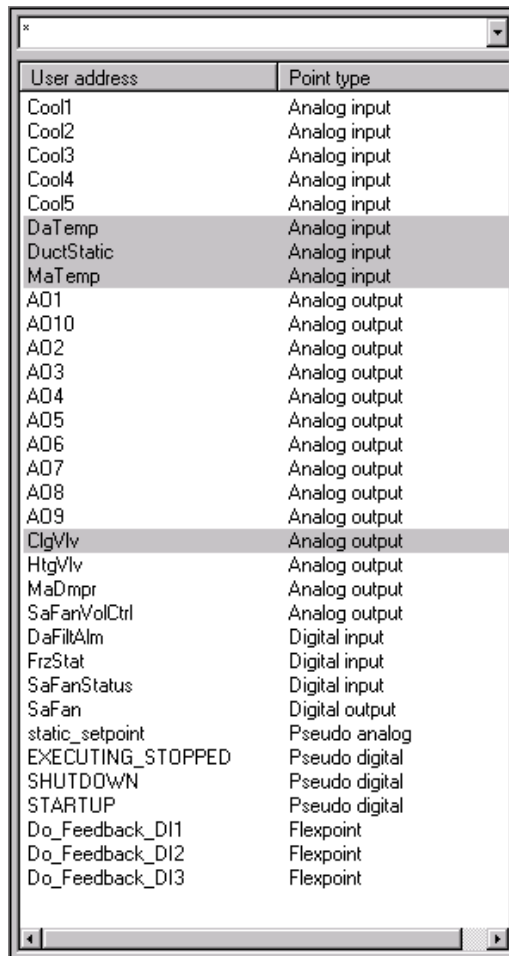
- Procedure**
1. Check **Manual Mode** checkbox to put a point into manual mode.
 2. Note alarms that may occur and be displayed on the *Alarms* tab and/or in the *Alarm* popup alert.

Select Points in Manual Mode

Purpose Highlights all points currently displayed that are in manual mode. Note, in case a filter is applied, points will be searched only in the currently displayed list.

- Procedure**
1. Click menu item **Datapoints**, then submenu item **Select points in manual mode**.


RESULT: Software is scanning and all found points are highlighted in gray in the list.

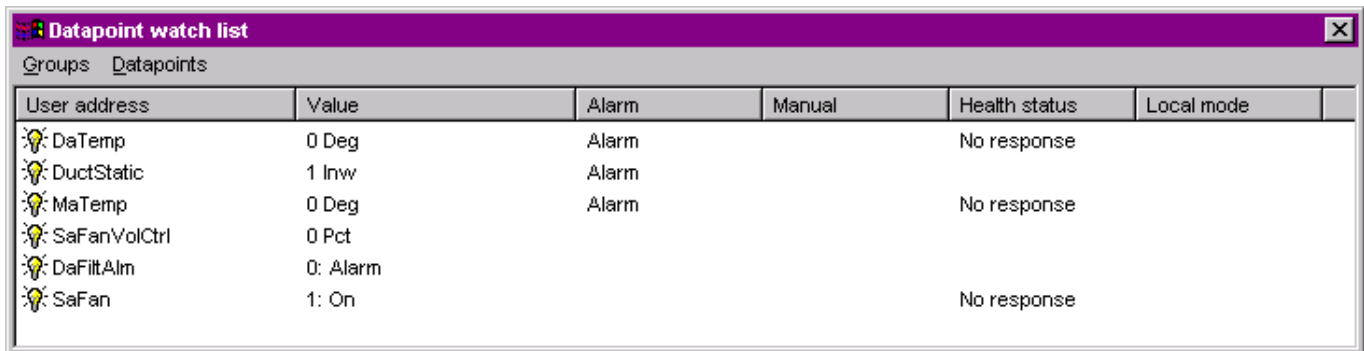


Clear Manual Mode for Selection

- Purpose** Sets all points that are in manual mode into automatic mode.
- Procedure**
1. Click menu item **Datapoints**, then submenu item **Clear manual mode for selection**.
- RESULT: Software is setting automatic mode for all selected points.
2. Note alarms that may occur and be displayed on the *Alarms* tab and/or in the *Alarm* popup alert.

Add Points to Watch list

- Purpose** Add selected points to a watch list. In this watch list certain states for the points will be polled and displayed. Points can be removed from the watch list and new points can be added to the watch list. Multiple points can be added and saved to a group for re-use. This group can also be used for trending.
- Procedure**
1. In the list select points by using left mouse key and STRG key, respectively SHIFT key.
 2. Click menu item **Datapoints**, then submenu item **Add point to watchlist** or click  button.
- RESULT: In the *Datapoint watch list* window selected points are displayed. Max. four points are polled and updated concurrently as indicated by the flashing *yellow light* icon. The following states are continuously updated:
- Value**
Displays the current value of the point.
- Alarm**
Shows whether the point is in alarm or not
- Manual**
Displays whether the point is in manual operation or not
- Health status**
Shows whether the I/O module, the point is assigned to, communicates with the controller or not. 'No response` means that there is no communication.
- Local mode**
Shows whether the point is in manual override or not.



User address	Value	Alarm	Manual	Health status	Local mode
DaTemp	0 Deg	Alarm		No response	
DuctStatic	1 Inw	Alarm			
MaTemp	0 Deg	Alarm		No response	
SaFanVolCtrl	0 Pct				
DaFiltAlm	0: Alarm				
SaFan	1: On			No response	

- Remove Point(s) from Watch list**
1. In the *Datapoint watchlist* window, select points by using left mouse key and STRG key, respectively SHIFT key.
 2. Click menu item **Datapoints**, then submenu item **Remove** or press DEL key.

RESULT: The selected points are removed from the list.

Save Point(s) in Group

1. Click menu item **Groups**, then submenu item **Save as**.
2. In the *Save as* dialog box, save the file.

RESULT: All points are saved in the *.HGF* file and can be re-used later.

Load Point Group

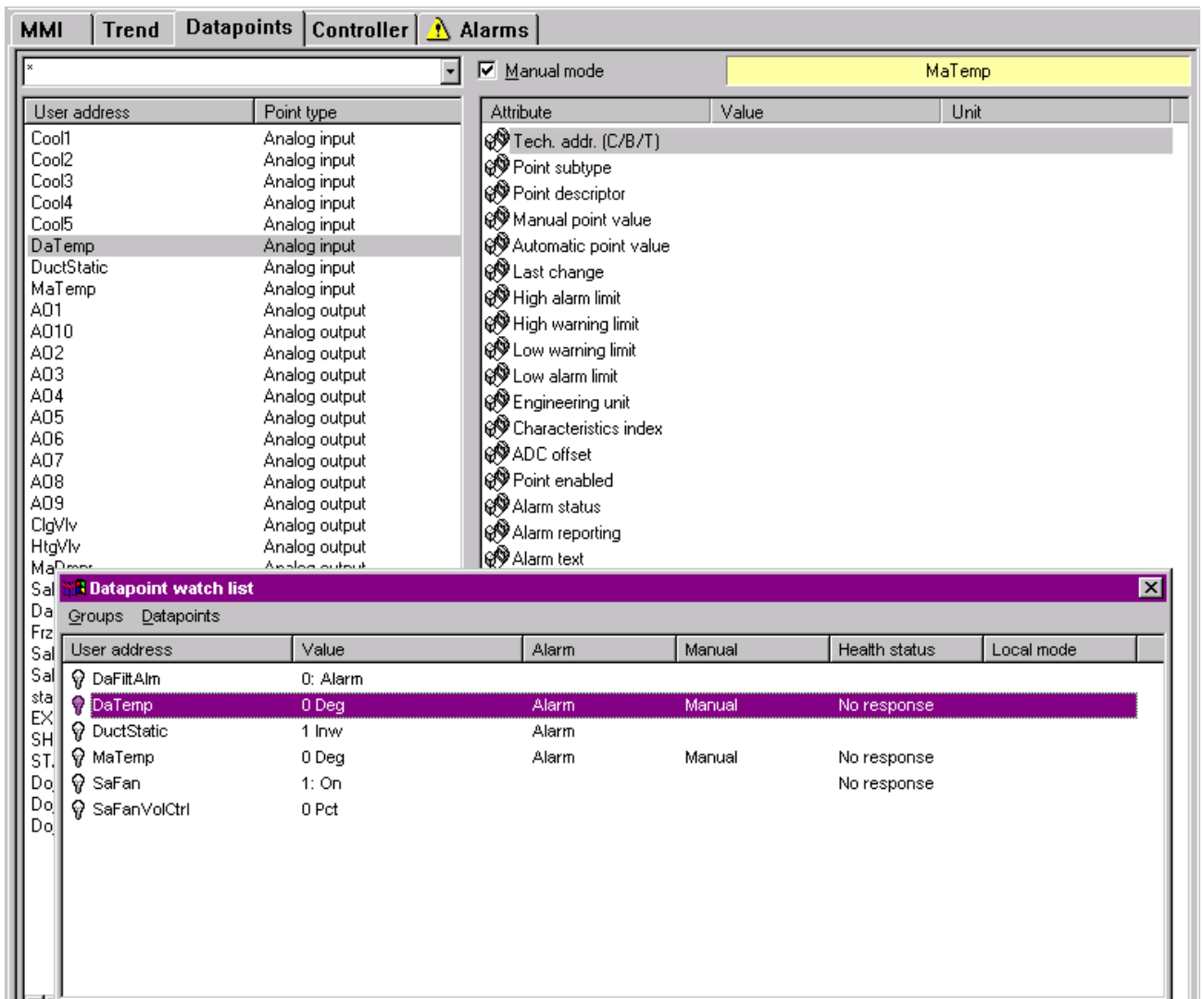
1. Click menu item **Groups**, then submenu item **Load**.
2. In the *Open* dialog box, open the *.HGF* file.

RESULT: The points of the group are displayed in the watch list and will be polled. All previously loaded point will be removed from the list.

Show Attributes for Watched Point on Datapoints tab

1. For a watched point in the *Datapoint watchlist* window, the attributes for the point can be viewed concurrently on the *Datapoints* tab in the *XL Online* main window.
2. In the *Datapoint watchlist* window, double-click on the point.

RESULT: In the following example, the 'DaTemp' datapoint has been double-clicked. On the **Datapoints** tab, the point is highlighted and its attributes are shown.



View Watch list

Procedure 1. Click menu item **View**, then submenu item **Watchlist**.

RESULT: The *Datapoints watchlist* window displays showing the previously watched points. Polling starts. Points not being found in the controller, will be indicated by a green *question mark* icon.

Trend Points

Purpose To graphically record point value changes. Datapoints to be recorded will be defined and saved in an *.HTF* file. For the recorded trend data, time and used datapoints are continuously saved block by block into a history file and can be exported as *.CSV* file to MS Excel.

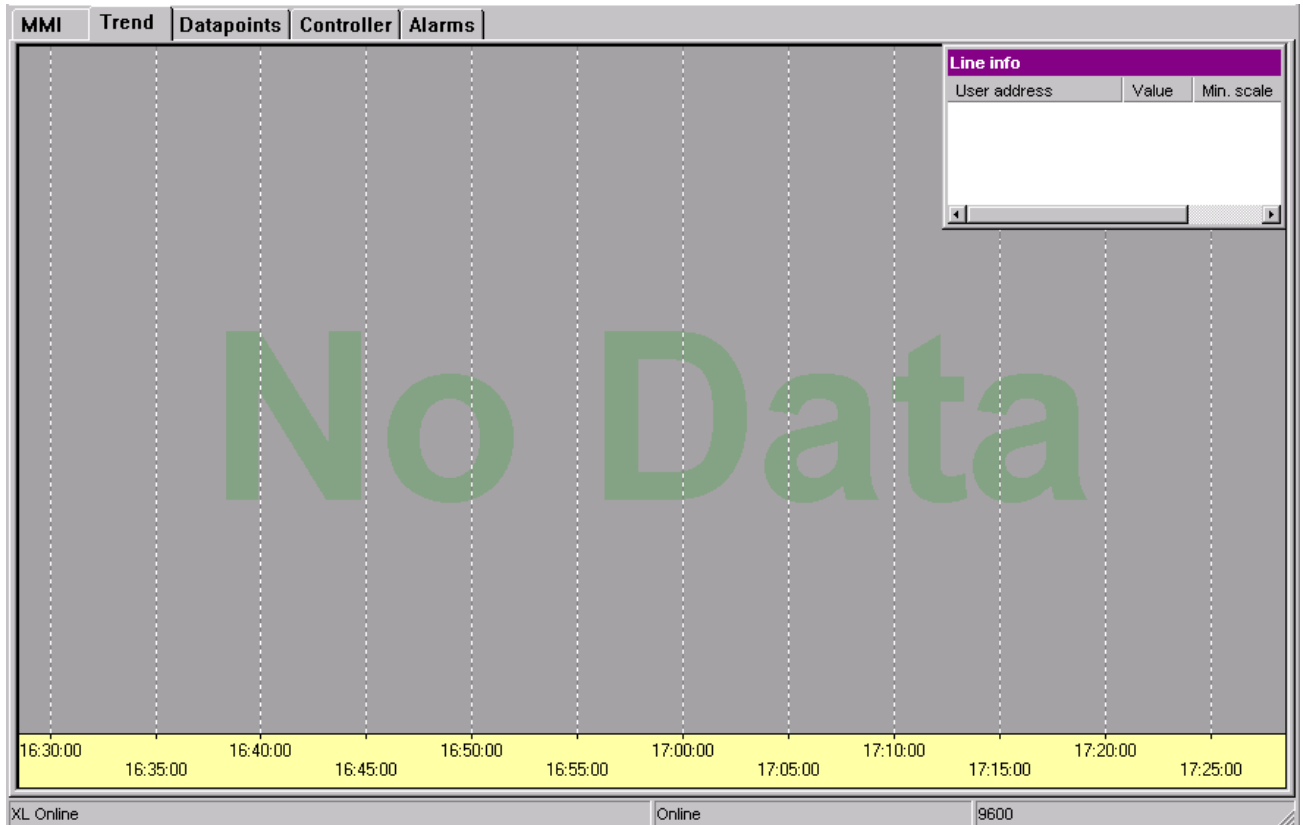
A trending session includes the following steps:

1. Initiate trending by creating a new or open an existing *.HTF* file
2. Select datapoints for recording
3. Start recording
4. Stop recording
5. Close trending

NOTE: Steps 1 to 4 create one block in the history file and can be repeatedly done for different datapoint combinations (*.HTF* files). For one and the same *.HTF* file, it is not possible to continue a stopped recording at the same point (value/time) where it was finished. The new recording starts from scratch. But, every record is saved as block in the history file.

Procedure 1. Click *Trend* tab.

RESULT: The recording pane shows the recording status 'No Data' and the *Line info* is empty.



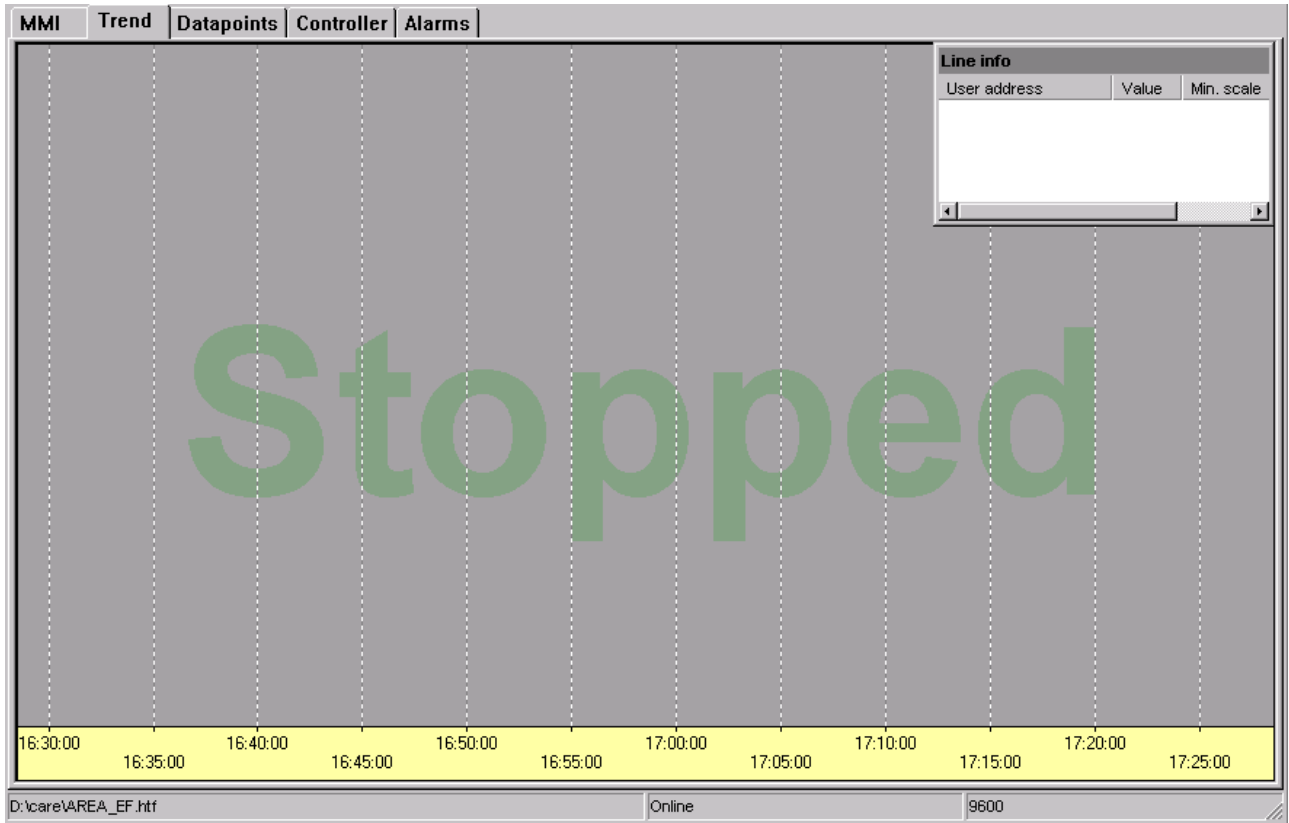
2. If you want to start the session with a new combination of datapoints, click menu item **Trend**, then submenu item **New**.
3. In the Save as dialog box, enter the file name, e.g. AREA_EF and click **Save** button.

Or,

If you want to open an already recorded combination of datapoints, click menu item **Trend**, then submenu item **Open**.

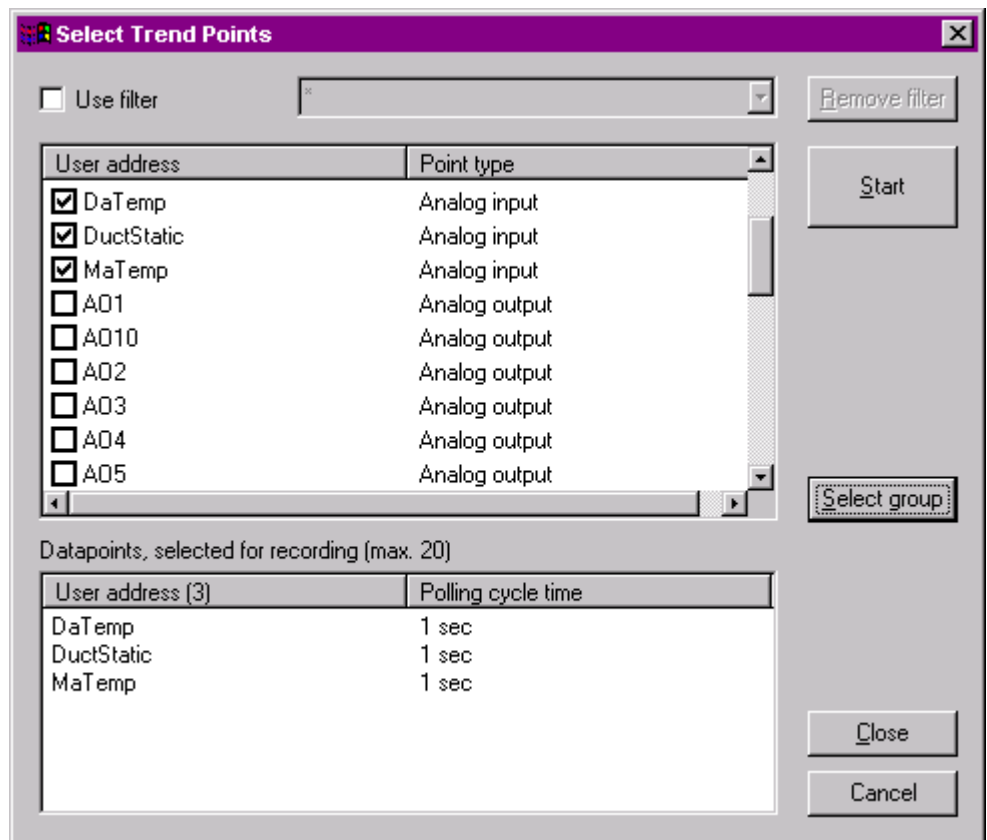
In the Save as dialog box, select the file and click **Save** button.

RESULT: On the pane the recording status 'Stopped' is displayed. The status line shows the *.HTF* file name, in this case *AREA_EF.HTF*.



4. Click menu item **Trend**, then submenu item **Select datapoints**.

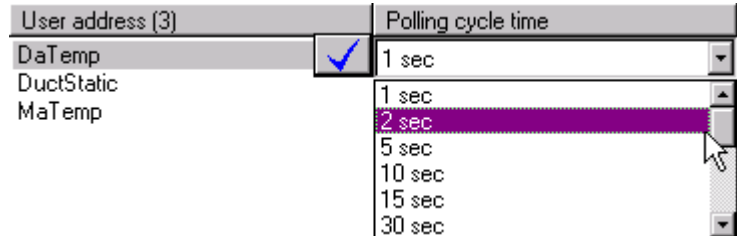
RESULT: The *Select Trend Points* dialog box displays.



5. Select datapoints for recording by checking the corresponding checkboxes. If desired, use a filter by checking the **Use filter** checkbox and entering the filter criteria in the same manner as described under the "Apply Filter section".

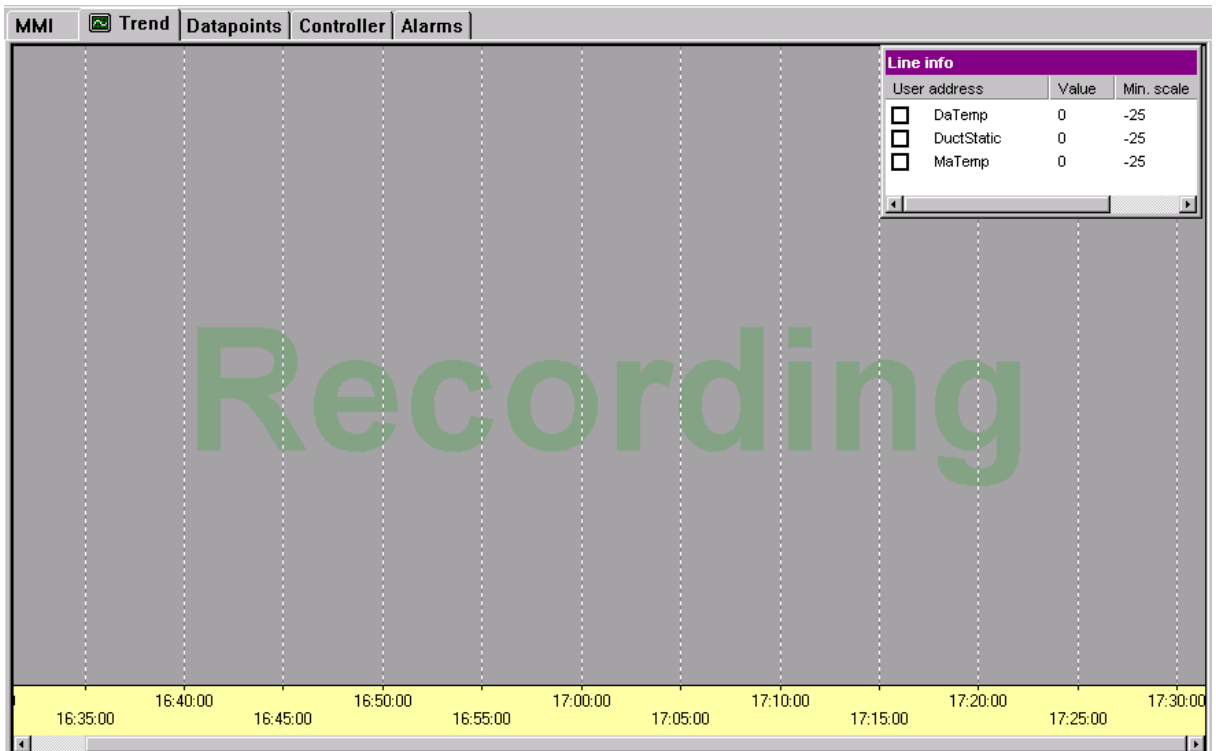
Or, select a point group previously created for the watch list as follows:
 Click the **Select group** button. In the *Open* dialog box, enter the file name, e.g. *myGroup.HGF* and click **Open** button. Note, that if a group is selected datapoints previously checked as described in step 5 will be de-selected.

6. If desired, change the polling cycle time for points as follows:
 Click into the **Polling cycle time** column for the point, select the value and press the ENTER key.



7. Click **Start** button

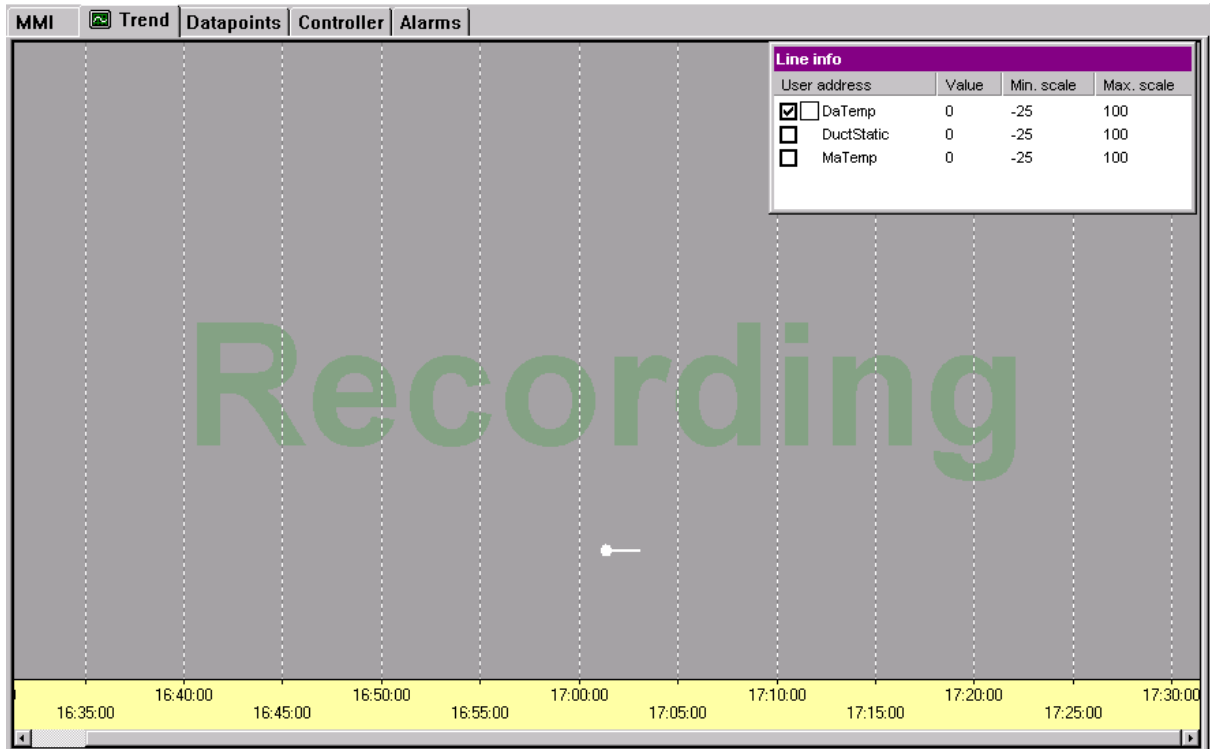
RESULT: The points are copied to the *Line info* window. Software starts trending as indicated by the recording status 'Recording'. The actual record start time is centered in the yellow time scale at the bottom.



8. In the *Line info* window, check the datapoints you want to display by clicking the corresponding checkbox.

RESULT: In the *Line info* window, each point gets a display color by accident and the current values are continuously displayed in the **Value** column. On the recording pane, a colored line graphically displays the point's values. Start and end of the line are enlarged.

NOTE: All points will be recorded, even a point was not selected for graphical display.



9. When recording multiple points, it is recommended to move the recording lines by customizing the scales (see "Customize Scales" section).

10. To stop recording, click menu item **Trend**, then uncheck submenu item **Start / Stop recording** or press button.

NOTE: It is not possible to continue a stopped recording at the same point (value/time) where it was finished. The new recording starts from scratch. But, every record is saved as block in the history file.

11. To directly start a new recording for the same datapoint combination press button.

12. To start a new recording with a different datapoint combination, repeat steps 2 to 10.

13. To end the trend session, click menu item **Trend**, then submenu item **Close**.

Show/Hide Line Info Window

Procedure

1. To view/hide the *Line info* window, check/uncheck the **Show Info** submenu item in the **Trend** menu.

Line info			
User address	Value	Min. scale	Max. scale
<input checked="" type="checkbox"/> DaTemp	0	-25	100
<input checked="" type="checkbox"/> DuctStatic	0	-25	100
<input checked="" type="checkbox"/> MaTemp	0	-25	100

Customize Scales

The horizontal time scale and the vertical value scale can be customized while recording and after the recording has been stopped. In case of multiple point recording, the recording lines can be individually displayed by setting individual scales for the points.

Customize Time Scale

The time scale can be set to three different time ranges and for each range different resolutions can be adjusted.

Set Time Range With right mouse key, click on the gray area of the recording pane.

With left mouse key, click **Time scaling**, and then click desired **time range** in the context menu:

1 hour

Displays 1 hour in the format hh.mm.ss (seconds not used and set to 00)

1 day

Displays 1 day in the format hh.mm.ss (seconds not used and set to 00)

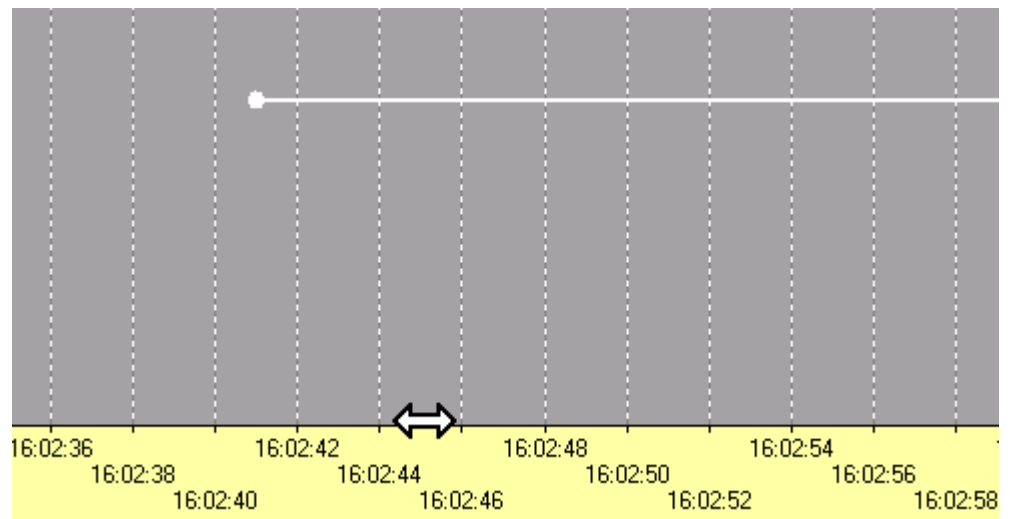
Full range

Displays range covering the first and the last value in the format hh.mm.ss

Center Scale With left mouse key, double-click on the time scale to center the scale around the current PC time.

Move View To move the viewed area to the left or right do the following:
Click on the coordinate axis area till a double arrow appears and move the line to the left or right.

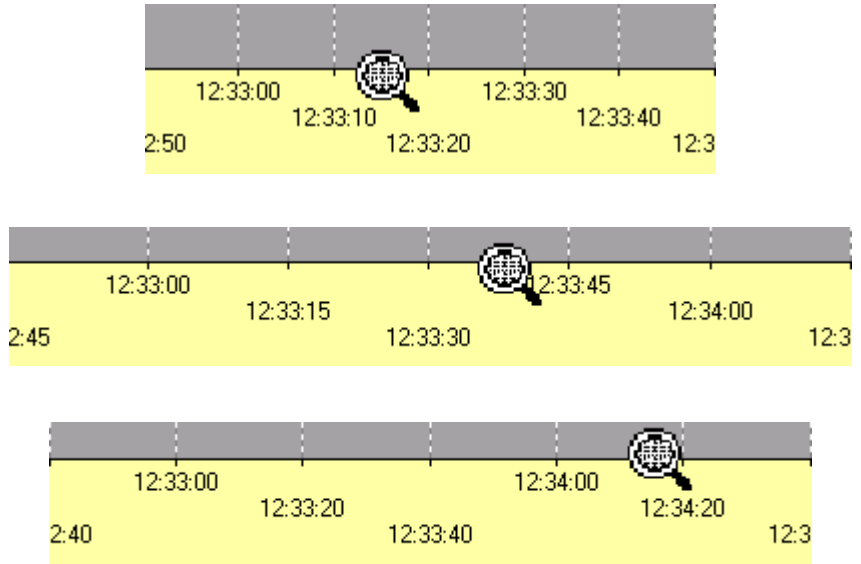
At the desired position, release left mouse key.



Change Resolution To change the resolution, click right mouse key over the time scale till the magnifying glass symbol displays.

With pressed right mouse key, move the magnifying glass symbol horizontally to the left or right and release right mouse key as soon as the desired resolution is shown on the scale. Pressing SHIFT key concurrently speeds up the movement by factor 3.

Examples: Range = full scale, resolution = 10, 15, 20 seconds



Customize Value Scale

When starting a recording session, the value scale is set to default values, which depend on the source of the datapoints (new selected points or a block from a history file). For example, when starting a session from scratch, the minimum scale value is '-25' and the maximum value is '100'. The recording lines start at the shifted origin '0'. The origin can be restored which means that the scale starts with the value '0' at the origin of the coordinate axes.

For each datapoint's recording line, the scale values can be set individually. Scale settings can be copied from one datapoint to another.

Set Min and Max Value

In the *Line info* window, click into the **Min. scale**, respectively **Max. scale** column. Type in value and press ENTER key.

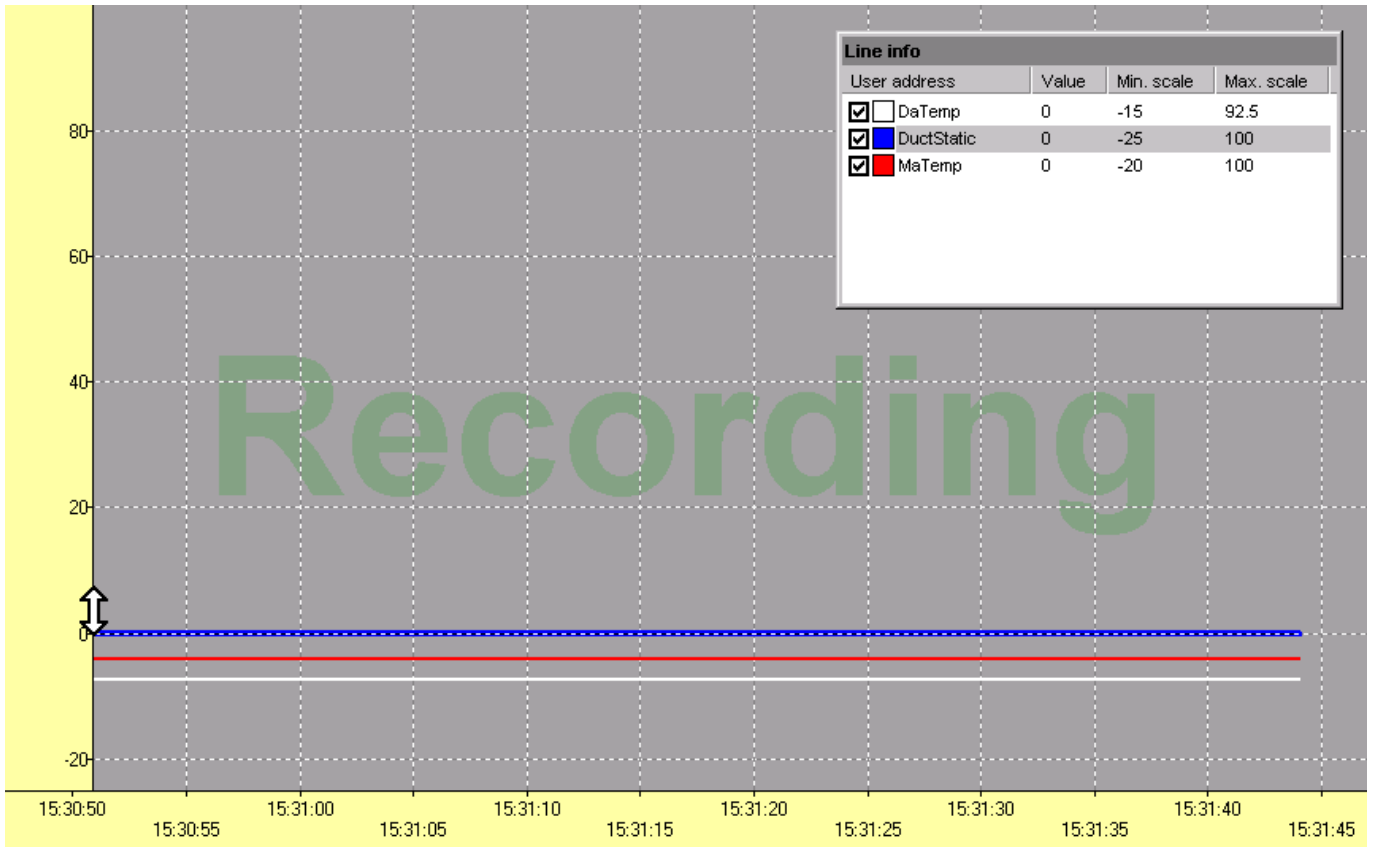
Line info				
User address	Value	Min. scale	Max. scale	
<input checked="" type="checkbox"/> DaTemp	0	-15	92.5	
<input checked="" type="checkbox"/> DuctStatic	0	-25	100	
<input checked="" type="checkbox"/> MaTemp	0	-20	100	

Or, with left mouse key, click on the line.
 On the left, the value scale appears.
 Click on the coordinate axis area till a double arrow appears and move the line up or down.
 At the desired position, release the left mouse key.
 Pressing SHIFT key concurrently speeds up the movement by factor 3.

Or, with left mouse key, click on the line.
 Click right mouse key and with left mouse key, click on **Full scale** in the context menu.
 The scale is set to the range covering all recorded values of this time.

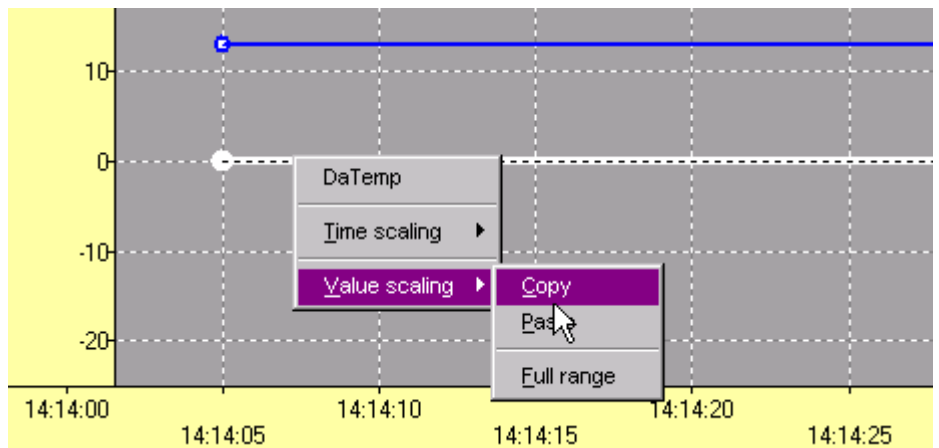
Note the min and max scale value changes in the *Line info* window.

NOTE: If a recording line cannot be clicked on, since it is not visible in the recording pane, select the datapoint in the *Line info* window and set proper scale values for re-display.



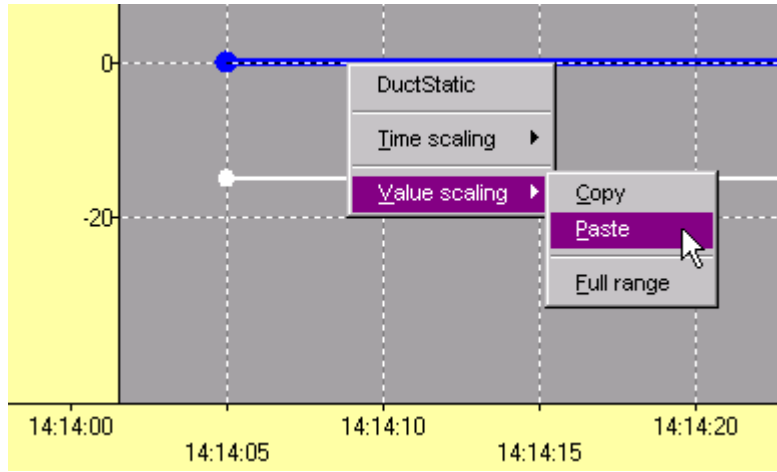
Copy Scale Setting To copy a scale setting from one point to another do the following:

Click on the recording line, in this case the lower one, or select datapoint in the *Line info* window.



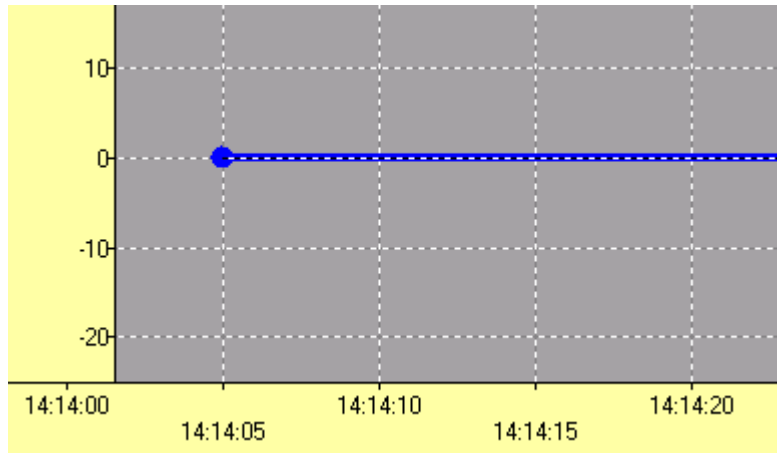
Click right mouse key, and with left mouse key click **Value scaling** and **Copy** in the context menu.

Click on the recording line, in this case the upper one, or select datapoint in the *Line info* window to which you want to copy the scale setting.



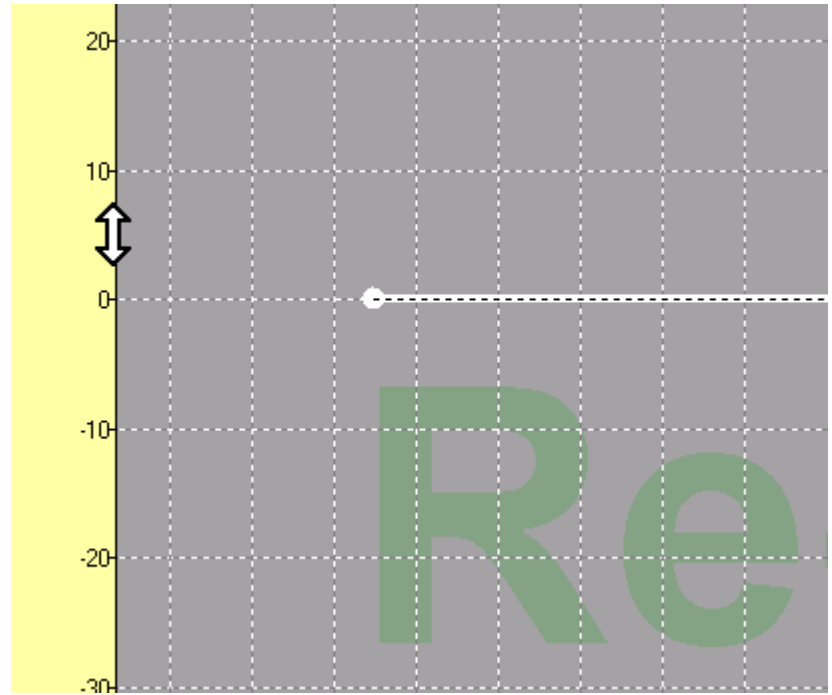
Click right mouse key, and with left mouse key click **Value scaling** and **Paste** in the context menu.

RESULT: The upper line gets the scale settings of the below line which is now covered.



Move baseline To move the baseline of a recording line upwards or downwards do the following:

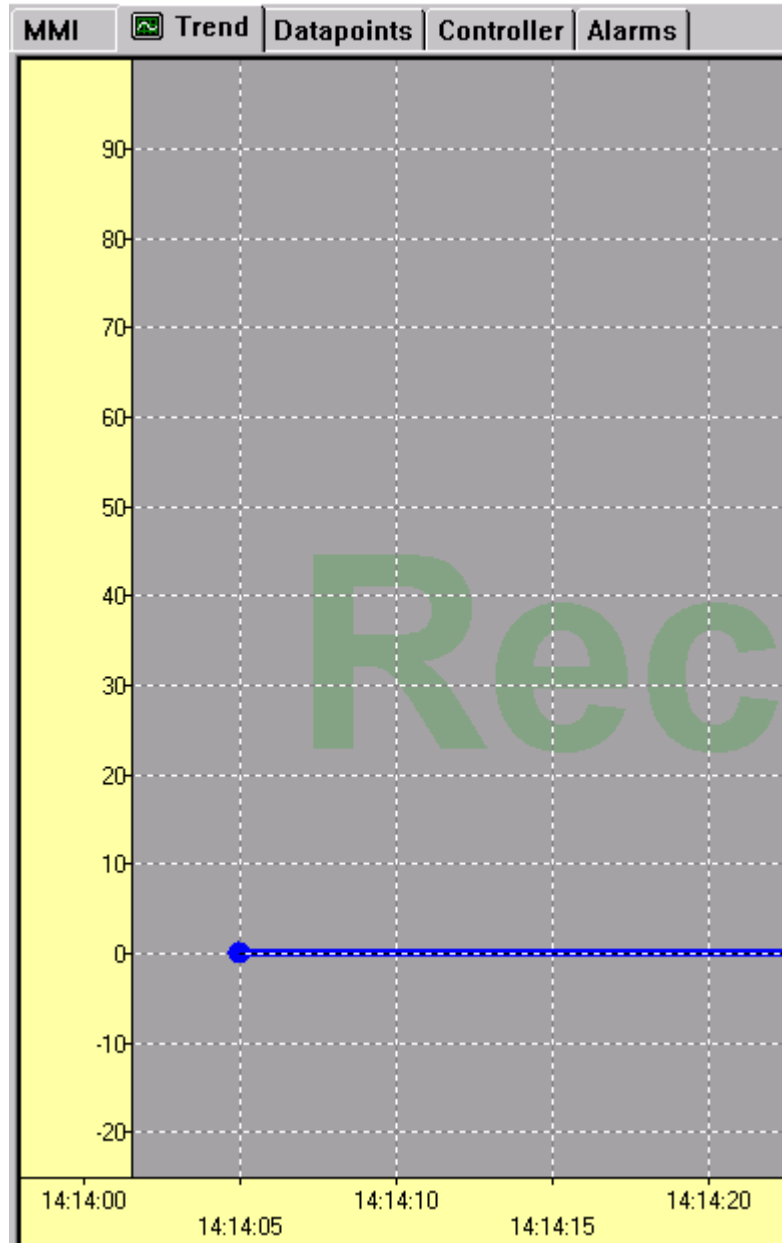
- Click on the recording line.
- On the left, click on the coordinate axis area of the value scale till a double arrow appears and move the line up or down.
- At the desired position, release the left mouse key.
- Pressing SHIFT key concurrently speeds up the movement by factor 3.



Change Resolution Changing the resolution for the value scale can be done in the same manner as described for the Time scale.

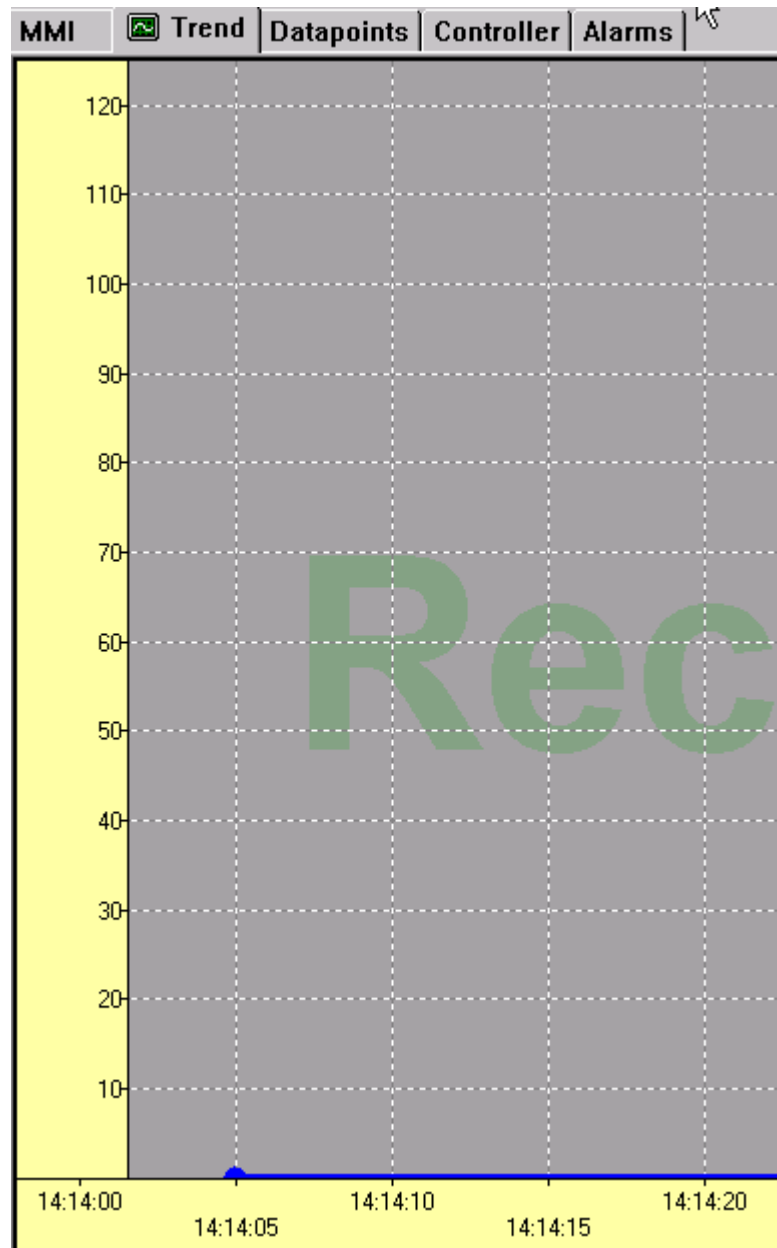
Restore Baseline Click on the recording line.

RESULT: On the left, the value scale displays.



Double-click on the value scale.

RESULT: The baseline is set to the origin, that is, the scale starts with the value '0' at the origin of the coordinate axes.

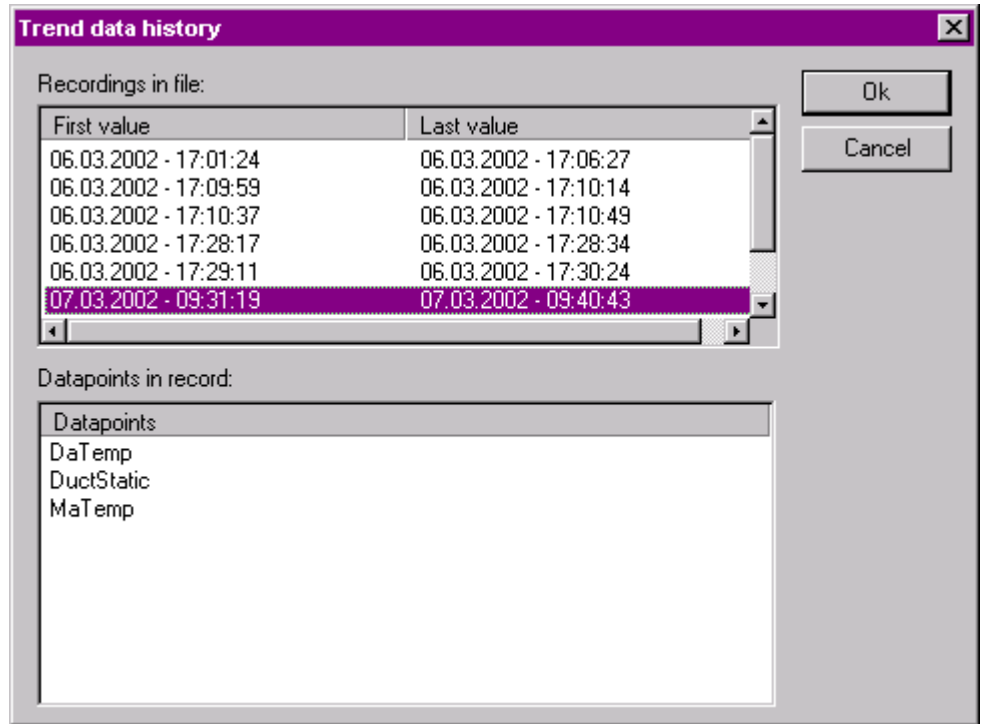


View Record History

- Purpose** To view recording blocks by time and datapoints.
- Procedure**
1. Click menu item **Trend**, then submenu item **History**.

RESULT: The *Trend data history* dialog box displays. The recordings are displayed with start time (**First value**) and end time (**Last value**) in the **Recordings in file** list field.
 2. To view the recorded datapoints of a record, click on the record in the list.

RESULT: In the **Datapoints in record** field, the datapoints, which are recorded in this time frame, are displayed.



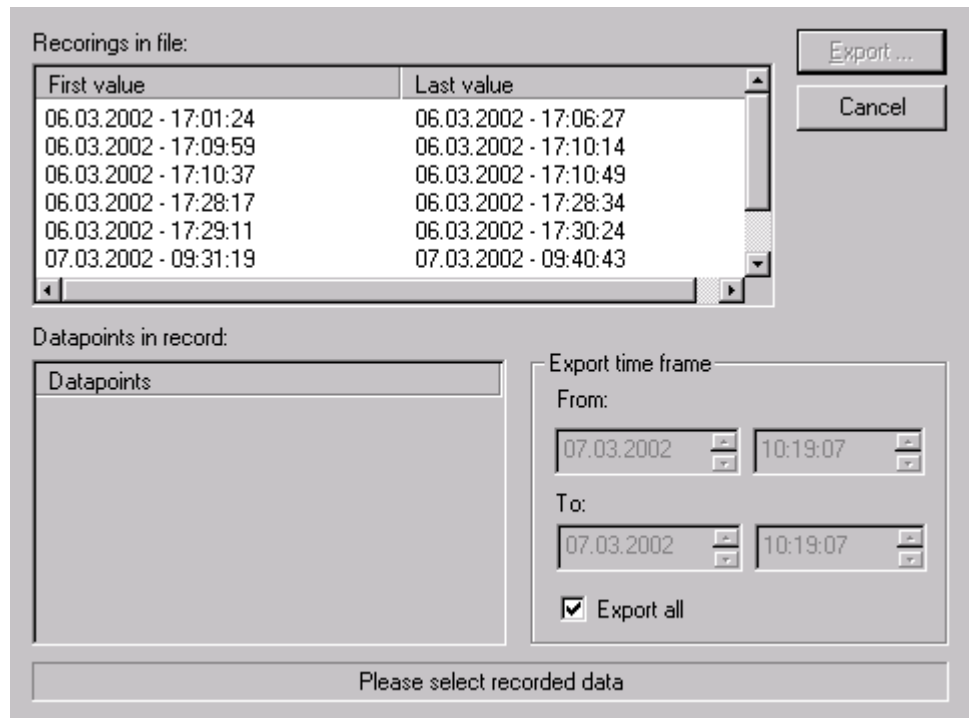
3. Close the *Trend data history* dialog box by clicking **OK** or **Cancel** button.

Export Record Data

Purpose To export records as .CSV file to e.g. MS Excel.

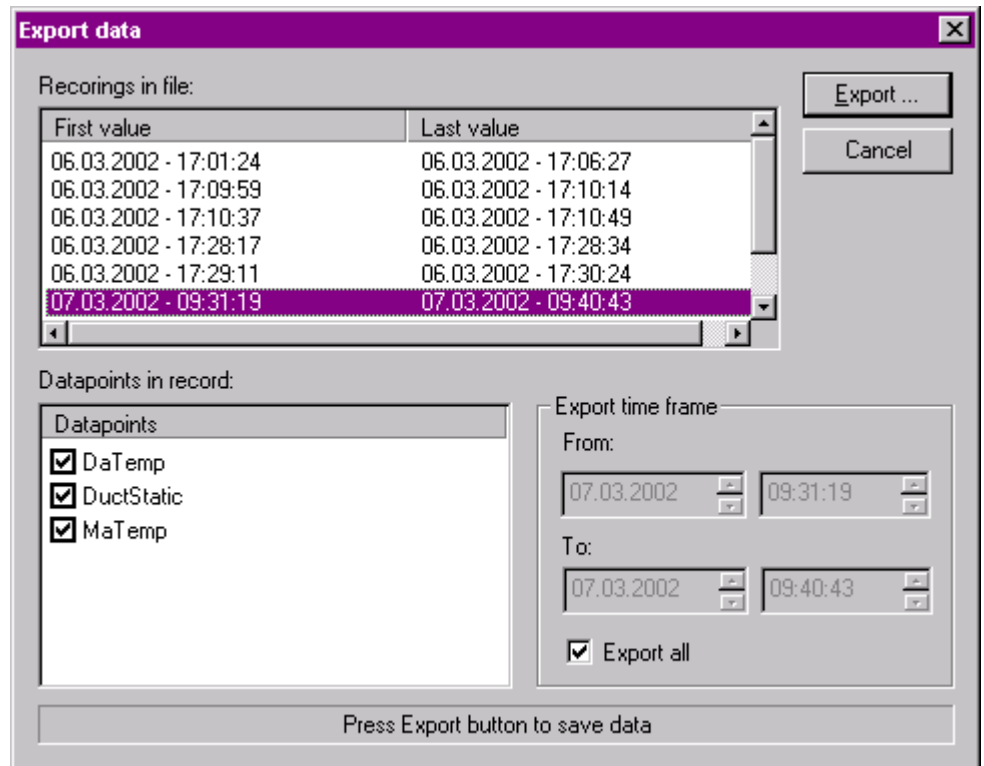
Procedure 1. Click menu item **Trend**, then submenu item **Data Export**.

RESULT: The *Export data* dialog box displays. The recordings are listed with start time (**First value**) and end time (**Last value**) in the **Recordings in file** list field.



- To view the recorded datapoints of a record, click on the record in the list.

RESULT: In the **Datapoints in record** field, the datapoints are displayed.



- If you want to except a datapoint's data from the export, uncheck the point.
- If you want to export not the complete time frame of a record, uncheck the **Export all** checkbox and set the time frame in the **From** and **To** fields on the right.
- Click the **Export** button.
- In the **Save as** dialog box, enter the name for the .CSV file and click the **Save** button.

View Alarms

Purpose View critical and non-critical alarms.

Critical alarms are controller system alarms and alarms that arise for points that have the critical alarm attribute assigned. Non-critical alarms arise for points that have the non-critical alarm attribute assigned.

Datapoint attribute related alarms arise due to limiting value exceeding or undershooting of either the critical or non-critical attribute value.


When controllers report alarms, they report critical alarms first, then any non-critical alarms they may have.

NOTE: Alarms are displayed. They can be cleared but not acknowledged. Alarms can be saved into a printable log file. New alarms will be added continuously to the end of the log file. An alarm history file is not available.

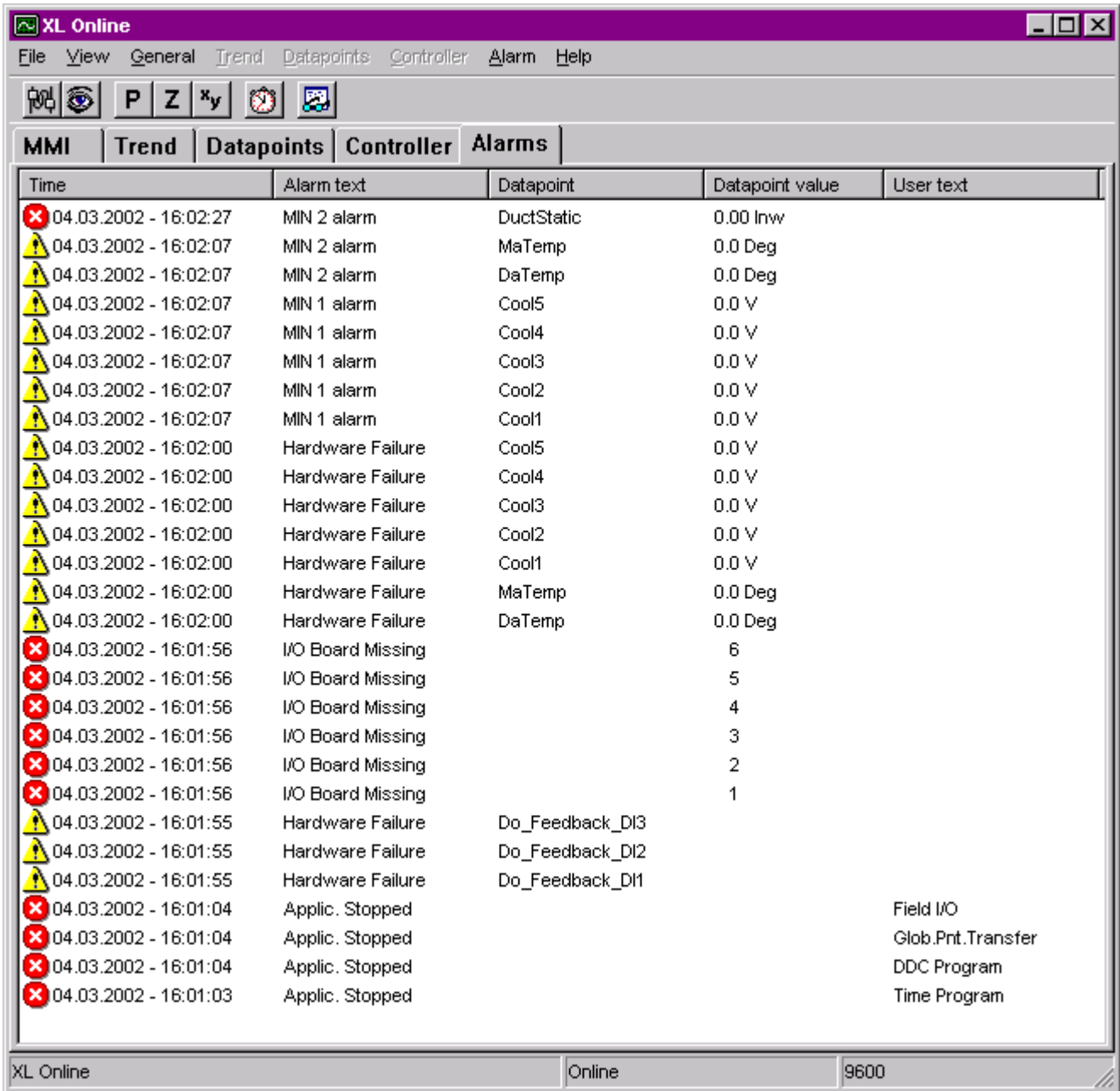
Alarms will be displayed on the *Alarms* tab by default and in an additional popup alert (optional).

Check the general alarm settings (see "Alarms Settings" section) for new alarm insertion, popup alert display and log file creation.



Procedure 1. Click on the *Alarms* tab.

NOTE: The *Alarms* icon  **Alarms** is flashing on the *Alarm* tab as long as the tab has not been selected yet.

RESULT: The alarms are displayed as follows:



Time	Alarm text	Datapoint	Datapoint value	User text
04.03.2002 - 16:02:27	MIN 2 alarm	DuctStatic	0.00 Inw	
04.03.2002 - 16:02:07	MIN 2 alarm	MaTemp	0.0 Deg	
04.03.2002 - 16:02:07	MIN 2 alarm	DaTemp	0.0 Deg	
04.03.2002 - 16:02:07	MIN 1 alarm	Cool5	0.0 V	
04.03.2002 - 16:02:07	MIN 1 alarm	Cool4	0.0 V	
04.03.2002 - 16:02:07	MIN 1 alarm	Cool3	0.0 V	
04.03.2002 - 16:02:07	MIN 1 alarm	Cool2	0.0 V	
04.03.2002 - 16:02:07	MIN 1 alarm	Cool1	0.0 V	
04.03.2002 - 16:02:00	Hardware Failure	Cool5	0.0 V	
04.03.2002 - 16:02:00	Hardware Failure	Cool4	0.0 V	
04.03.2002 - 16:02:00	Hardware Failure	Cool3	0.0 V	
04.03.2002 - 16:02:00	Hardware Failure	Cool2	0.0 V	
04.03.2002 - 16:02:00	Hardware Failure	Cool1	0.0 V	
04.03.2002 - 16:02:00	Hardware Failure	MaTemp	0.0 Deg	
04.03.2002 - 16:02:00	Hardware Failure	DaTemp	0.0 Deg	
04.03.2002 - 16:01:56	I/O Board Missing		6	
04.03.2002 - 16:01:56	I/O Board Missing		5	
04.03.2002 - 16:01:56	I/O Board Missing		4	
04.03.2002 - 16:01:56	I/O Board Missing		3	
04.03.2002 - 16:01:56	I/O Board Missing		2	
04.03.2002 - 16:01:56	I/O Board Missing		1	
04.03.2002 - 16:01:55	Hardware Failure	Do_Feedback_DI3		
04.03.2002 - 16:01:55	Hardware Failure	Do_Feedback_DI2		
04.03.2002 - 16:01:55	Hardware Failure	Do_Feedback_DI1		
04.03.2002 - 16:01:04	Applic. Stopped			Field I/O
04.03.2002 - 16:01:04	Applic. Stopped			Glob.Pnt.Transfer
04.03.2002 - 16:01:04	Applic. Stopped			DDC Program
04.03.2002 - 16:01:03	Applic. Stopped			Time Program

Critical alarms are indicated by the red  icon, non-critical alarms are indicated by the  icon. For each alarm the following information is displayed:

Time
Time when the alarm was generated

Alarm text

System alarm text of the controller

Datapoint

Name of datapoint

Datapoint value

Value of the datapoint when the alarm was generated

User text

Alarm text attribute defined for the datapoint.

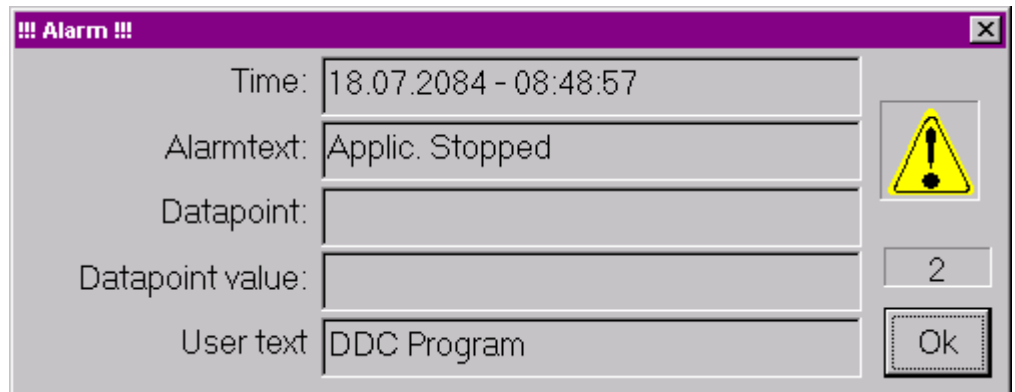
2. To clear the list from certain alarms, select alarms by using STRG and/or SHIFT key and click menu item **Alarm**, then submenu item **Clear selection**.
3. To clear the list completely, click menu item **Alarm**, then submenu item **Clear all**.

View Alarms in Popup Alert

Purpose To display new alarms in an additional popup alert.

Procedure 1. To enable the popup alert display, see "Alarms Settings" section.

RESULT: New alarms will be displayed additionally in a popup alert. Both, critical and non-critical alarms are displayed one after the other with time, alarm text, datapoint name, value and user-defined text.



2. Check and respond to the alarms.
3. To clear an alarm, click the **OK** button.
4. To clear all alarms, close the dialog by clicking the *Close* icon at the top right corner.

NOTE: The yellow icon on the right remains the same for both, critical and non-critical alarms.

View Alarm History Buffer

Purpose To display the alarm messages saved in the alarm history buffer.

Procedure 1. Click menu item **Alarm**, then submenu item **Alarm History Buffer**.

RESULT: At max. the last 99 messages from the alarm history buffer are displayed (use scroll buttons on the left).

The screenshot shows a window titled "Alarm History Buffer [33]" with two tabs: "History Buffer" and "Active Alarms". The "Active Alarms" tab is selected, displaying a table with the following data:

Time	Alarm text	Datapoint	Datapoint value	User text
23.05.2002 - 14:15:45	Power failure			
22.05.2002 - 12:41:02	New appli. loaded			
22.05.2002 - 12:40:42	Applic. Stopped			DDC Program
22.05.2002 - 12:40:42	Applic. Stopped			Glob.Pnt.Transfer
22.05.2002 - 12:40:42	Applic. Stopped			Field I/O
22.05.2002 - 12:40:42	NV Bindings lost			
22.05.2002 - 12:40:40	Applic. Stopped			Time Program
21.05.2002 - 15:59:16	New appli. loaded			

2. To view just the currently active alarms, click **Active Alarms** button.

View Controller Status

Purpose To view controller status information such as:

- Controller name, number, device type
- Application status and parts
- Hardware configuration

Procedure 1. Click on the *Controller* tab in the *XL Online* main window.

The screenshot shows the 'Controller' tab in the XL Online software. The main window displays a table of controller parameters and their values. The 'Controller name' is highlighted in red and is 'CONT01'. Below this, various application status and parts are listed, along with their sizes in bytes. At the bottom, IP Bus hardware configuration is shown, indicating that all four boards are not used.


Description	Value
Controller name	CONT01
Program name	CONT01
Controller no.	22
Device type	XL500 - Version 2.04.94
Download time	04. Mar. 02 - 16:01:53
Country code	Germany
--- Application status ---	
Application status	Running
AppPart: Common value	Running
AppPart: Field IO	Running
AppPart: Timeprogram	Running
AppPart: RAACL	Running
AppPart: ASPECD	Running
Logon status	Inactive
--- Application parts ---	
RAACL application (ral)	4.1 - 192 Bytes
RACL Parameter (rap)	4.1 - 496 Bytes
RACL Z-Register (raz)	4.1 - 16 Bytes
RACL T-Register (rat)	4.1 - 16 Bytes
ASPECD (adl)	4.1 - 20320 Bytes
Time program (zpg)	4.1 - 4448 Bytes
Datapoint description (ipl)	4.1 - 3632 Bytes
Descriptors (klx)	4.1 - 592 Bytes
Alarm text (alk)	4.1 - 2240 Bytes
State text (zss)	4.1 - 464 Bytes
Engineering units (phx)	4.1 - 1024 Bytes
Characteristics (kdx)	4.1 - 512 Bytes
Configuration (kfx)	4.1 - 144 Bytes
Project (pra)	4.1 - 112 Bytes
NV Mapping table (ymp)	4.1 - 176 Bytes
NV Conversion (ycv)	4.1 - 48 Bytes
NV Configuration (ynv)	4.1 - 1504 Bytes
-- IP Bus hardware configuration --	
Board 1	- not used -
Board 2	- not used -
Board 3	- not used -
Board 4	- not used -

At the bottom of the window, the status bar shows 'XL Online', 'Online', and '9600'.

2. Check controller status information.
3. To print the controller status information in HTML format, click menu item **File**, then submenu item **Print**.

NOTE: Under IP Bus hardware configuration only those modules are listed that are physically connected and used by the application.

Refresh Controller Status

- Procedure**
1. To refresh the controller status information on the *Controller* tab, click menu item **Controller**, then submenu item **Refresh Info**, or click the  icon on the button bar or press F5 key.

RESULT: The controller status display on the *Controller tab* is refreshed.

Set Controller Number/View Bus Interface Configuration

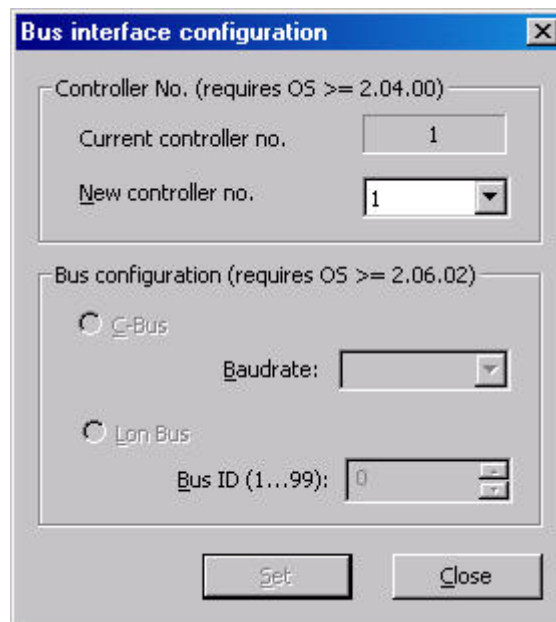
Purpose To set the controller number the same as in the translated application if they are different. To view the bus interface configuration such as bus ID and baudrate.

NOTE: The controller number of EXCEL 5000 controllers can only be changed for OS 2.04 and higher. For controller OS lower 2.04 the MMI emulation must be used. For the OPS controller, the controller number cannot be set.

Bus configuration data are only displayed for OS 2.06.02 and higher

- Procedure**
1. Click menu item **Controller**, then submenu item **Bus configuration**.

RESULT: The *Bus interface configuration* dialog box is displayed.



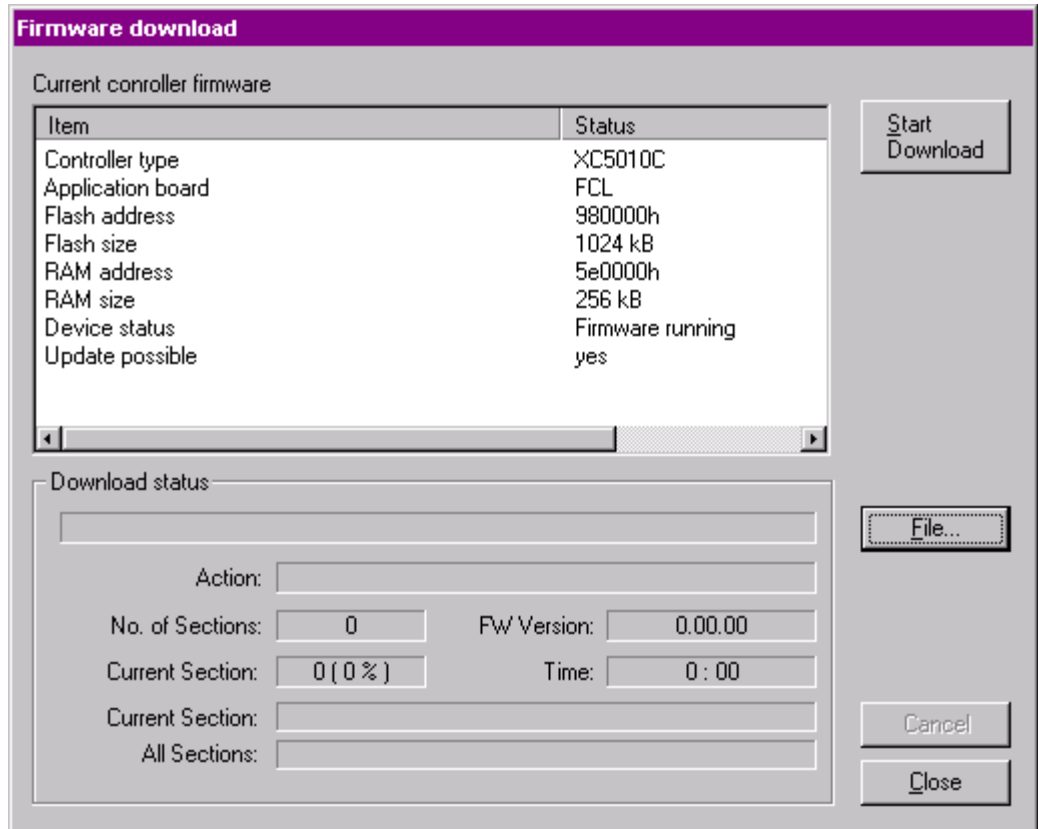
2. From the **New controller no.** drop-down listbox, select the controller number you want to change the controller to.
 3. Click the **Set** and then the **Close** button.
-

Download Firmware

Purpose Download firmware, e.g. in case of firmware updates, into an Excel controller with flash EPROM.

- Procedure**
1. Click menu item **Controller**, then submenu item **Firmware download**.

RESULT: The Firmware download dialog box displays.



RESULT: Under current controller firmware, the status information of the firmware is displayed.

- If you want to download a new firmware, click **File** button and select the desired firmware (.XXC file).

NOTE: xx are the last two digits of the OS Version.

Example: XL500204.02c for OS 2.04.02 of Excel 500 controller

- Click **Start Download** button if you want to download the firmware.

RESULT: The download process is displayed under the **Download status** fields.

- After download is finished, click the **Close** button.

Download Application Remotely

For detailed information please refer to the Download Application Remotely subsection in the LONWORKS NETWORK ENGINEERING section.

APPENDIX

APPENDIX A: CONTROL ICONS

APPENDIX B: ENGINEERING UNITS

APPENDIX C: POINT ATTRIBUTES TABLES

APPENDIX D: PLANT CONTROLLER UPGRADES AND DOWNGRADES

APPENDIX E: CHECK UTILITY

APPENDIX F: ERROR MESSAGES

APPENDIX A: CONTROL ICONS

Purpose	Control icons provide preprogrammed functions and algorithms to implement sequences of control in a plant schematic. Control icon symbols list in the left-hand column of the control strategy window.
Celsius vs. Fahrenheit	<p>Some control icons use metric units, for example, Celsius instead of Fahrenheit for temperatures. If you want to use English units, you must convert any English inputs to metric units before input to a control icon or switching logic. Use the MAT editor to perform the conversion.</p> <p>If the icons in a control loop use consistent engineering units for all inputs and outputs, it is not necessary to perform a conversion.</p>
Control Icon Manual	For a complete description of each control icon as well as application examples, see Excel CARE Control Icons User Guide EN2Z-0940 (Europe).

APPENDIX B: ENGINEERING UNITS

NOTE: This section applies to CARE XL-5000 only.

Purpose This chapter lists engineering units available in the system for points and pseudopoints. There are two types: analog and digital.

Analog

Index Number	Eng. Unit	Decimal Places	Example Dec. Pl.	Description
1		0	x	BLANK
2	° C	0	x	Celsius (no decimal)
3	° C	1	x.x	Celsius (one decimal)
4	° C	2	x.xx	Celsius (two decimal)
5	° C	3	x.xxx	Celsius (three decimal)
6	K	0	x	Kelvin (no decimal)
7	K	1	x.x	Kelvin (one decimal)
8	K	2	x.xx	Kelvin (two decimal)
9	K	3	x.xxx	Kelvin (three decimal)
10	Deg	0	x	degrees Fahrenheit (no decimal)
11	Deg	1	x.x	degrees Fahrenheit (one decimal)
12	Deg	2	x.xx	degrees Fahrenheit (two decimal)
13	Deg	3	x.xxx	degrees Fahrenheit (three decimal)
14	Inw	0	x	inches of water column (no decimal)
15	Inw	1	x.x	inches of water column (one decimal)
16	Inw	2	x.xx	inches of water column (two decimal)
17	Inw	3	x.xxx	inches of water column (three decimal)
18	GPM	0	x	Gallons per minute (no decimal)
19	GPM	1	x.x	Gallons per minute (one decimal)
20	CFM	0	x	Cubic feet per minute (no decimal)
21	CFM	1	x.x	Cubic feet per minute (one decimal)
22	KFM	0	x	1000 cubic feet per minute (no decimal)
23	KFM	1	x.x	1000 cubic feet per minute (one decimal)
24	KFM	2	x.xx	1000 cubic feet per minute (two decimal)
25	FPM	0	x	Feet per minute (no decimal)
26	FPM	1	x.x	Feet per minute (one decimal)
27	Hr	0	x	Hours (no decimal)

28	Hr	1	x.x	Hours (one decimal)
29	Min	0	x	Minutes (no decimal)
30	Min	1	x.x	Minutes (one decimal)
31	Sec	0	x	Seconds (no decimal)

32	Day	0	x	Day (no decimal)
33	Day	1	x.x	Day (one decimal)
34	Cnt	0	x	Count (no decimal)
35	kW	0	x	Kilowatt (no decimal)
36	kW	1	x.x	Kilowatt (one decimal)
37	kW	2	x.xx	Kilowatt (two decimal)
38	kW	3	x.xxx	Kilowatt (three decimal)
39	MW	0	x	Megawatts (no decimal)
40	MW	1	x.x	Megawatts (one decimal)
41	MW	2	x.xx	Megawatts (two decimal)
42	MW	3	x.xxx	Megawatts (three decimal)
43	kWH	0	x	Kilowatt hours (no decimal)
44	kWH	1	x.x	Kilowatt hours (one decimal)
45	kWH	2	x.xx	Kilowatt hours (two decimal)
46	kWH	3	x.xxx	Kilowatt hours (three decimal)
47	MWH	0	x	Megawatts per hour (no decimal)
48	MWH	1	x.x	Megawatts per hour (one decimal)
49	MWH	2	x.xx	Megawatts per hour (two decimal)
50	MWH	3	x.xxx	Megawatts per hour (three decimal)
51	Pos	0	x	Position (no decimal)
52	Pos	1	x.x	Position (one decimal)
53	Pos	2	x.xx	Position (two decimal)
54	Pct	0	x	Percent (no decimal)
55	Pct	1	x.x	Percent (one decimal)
56	Pct	2	x.xx	Percent (two decimal)
57	Val	0	x	Value (no decimal)
58	Tot	0	x	Totalizer (no decimal)
59	PSI	0	x	Pounds per square inch (no decimal)
60	PSI	1	x.x	Pounds per square inch (one decimal)
61	PSI	2	x.xx	Pounds per square inch (two decimal)
62	V	0	x	Volts (no decimal)
63	V	1	x.x	Volts (one decimal)
64	V	2	x.xx	Volts (two decimal)
65	mA	0	x	Milliamperes (no decimal)
66	mA	1	x.x	Milliamperes (one decimal)
67	A	0	x	Amperes (no decimal)
68	A	1	x.x	Amperes (one decimal)
69	A	2	x.xx	Amperes (two decimal)
70	BTU	0	x	British Thermal Unit (no decimal)
71	BTU	1	x.x	British Thermal Unit (one decimal)
72	W	0	x	Watts (no decimal)
73	RH	0	x	Relative humidity (no decimal)
74	RH	1	x.x	Relative humidity (one decimal)
75	Hz	0	x	Hertz (no decimal)

76	WBF	0	x	Wet-bulb fahrenheit (no decimal)
77	WBF	1	x.x	Wet-bulb fahrenheit (one decimal)
78	Ton	0	x	Tons (no decimal)
79	Ton	1	x.x	Tons (one decimal)
80	TnH	0	x	Tons per hour (no decimal)
81	TnH	1	x.x	Tons per hour (one decimal)
82	DPT	0	x	Dew-point temperature (no decimal)
83	BPH	0	x	BTU per hour (no decimal)
84	MBH	0	x	1000 BTU per hour (no decimal)
85	PPH	0	x	Parts per hour (no decimal)
86	m/K	0	x	Meters per Kelvin
87	m/K	1	x.x	Meters per Kelvin
88	%/K	0	x	Percent per Kelvin
89	%/K	1	x.x	Percent per Kelvin
90	gkg	0	x	Gram per kilogram
91	gkg	1	x.x	Gram per kilogram
92	gkg	2	x.xx	Gram per kilogram
93	gkg	3	x.xxx	Gram per kilogram
94	Wm ²	0	x	Watts per square meter
95	h_m	2	x.xx	hours and minutes
96	m_s	2	x.xx	minutes and seconds
97	GWh	0	x	Gigawatthours
98	GWh	1	x.x	Gigawatthours
99	GWh	2	x.xx	Gigawatthours
100	GWh	3	x.xxx	Gigawatthours
101	GW	0	x	Gigawatts
102	GW	1	x.x	Gigawatts
103	GW	2	x.xx	Gigawatts
104	GW	3	x.xxx	Gigawatts
105	W	0	x	Watts
106	W	1	x.x	Watts
107	W	2	x.xx	Watts
108	W	3	x.xxx	Watts
109	J	0	x	Joules
110	J	1	x.x	Joules
111	J	2	x.xx	Joules
112	J	3	x.xxx	Joules
113	KJ	0	x	Kilojoules
114	KJ	1	x.x	Kilojoules
115	KJ	2	x.xx	Kilojoules
116	KJ	3	x.xxx	Kilojoules
117	MJ	0	x	Megajoules
118	MJ	1	x.x	Megajoules
119	MJ	2	x.xx	Megajoules
120	MJ	3	x.xxx	Megajoules
121	GJ	0	x	Gigajoules
122	GJ	1	x.x	Gigajoules
123	GJ	2	x.xx	Gigajoules
124	GJ	3	x.xxx	Gigajoules

125	TJ	0	x	Terajoules
126	TJ	1	x.x	Terajoules
127	TJ	2	x.xx	Terajoules
128	TJ	3	x.xxx	Terajoules
129		0	x	
130	Pa	0	x	Pascals
131	Pa	1	x.x	Pascals
132	Pa	2	x.xx	Pascals
133	Pa	3	x.xxx	Pascals
134	kPa	0	x	KiloPascals
135	kPa	1	x.x	KiloPascals
136	kPa	2	x.xx	KiloPascals
137	kPa	3	x.xxx	KiloPascals
138	bar	0	x	Bar
139	bar	1	x.x	Bar
140	bar	2	x.xx	Bar
141	bar	3	x.xxx	Bar
142	N/m	0	x	Newtons per meter
143	N/m	1	x.x	Newtons per meter
144	N/m	2	x.xx	Newtons per meter
145	N/m	3	x.xxx	Newtons per meter
146	p	0	x	Pound
147	p	1	x.x	Pound
148	p	2	x.xx	Pound
149	p	3	x.xxx	Pound
150	kp	0	x	Kilopound
151	kp	1	x.x	Kilopound
152	kp	2	x.xx	Kilopound
153	kp	3	x.xxx	Kilopound
154	Mp	0	x	Megapound
155	Mp	1	x.x	Megapound
156	Mp	2	x.xx	Megapound
157	Mp	3	x.xxx	Megapound
158	N	1	x.x	Newtons
159	N	2	x.xx	Newtons
160	N	3	x.xxx	Newtons
161	g	0	x	Grams
162	g	1	x.x	Grams
163	g	2	x.xx	Grams
164	g	3	x.xxx	Grams
165	Kg	0	x	Kilograms
166	Kg	1	x.x	Kilograms
167	Kg	2	x.xx	Kilograms
168	Kg	3	x.xxx	Kilograms
169	t	0	x	Metric ton
170	t	1	x.x	Metric ton
171	t	2	x.xx	Metric ton
172	t	3	x.xxx	Metric ton
173	mm	0	x	Millimeters
174	cm	0	x	Centimeters
175	m	1	x.x	Meters
176	m	2	x.xx	Meters
177	m	3	x.xxx	Meters

178	km	0	x	Kilometers
179	km	1	x.x	Kilometers
180	km	2	x.xx	Kilometers
181	km	3	x.xxx	Kilometers
182	m/s	0	x	Meters per second
183	m/s	1	x.x	Meters per second
184	kmh	0	x	Kilometers per hour
185	kmh	1	x.x	Kilometers per hour
186	spG	3	x.xxx	Specific weight
187	Ent	1	x.x	Enthalpy
188	Ent	2	x.xx	Enthalpy
189	Ent	3	x.xxx	Enthalpy
190	SpW	2	x.xx	Specific heat
191	W1z	3	x.xxx	Heat number
192	m ²	3	x.xxx	Square meters
193	m ³	0	x	Cubic meters
194	m ³	1	x.x	Cubic meters
195	m ³ h	0	x	Cubic meters per hour
196	m ³ h	1	x.x	Cubic meters per hour
197	m ³ s	0	x	Cubic meters per second
198	m ³ s	1	x.x	Cubic meters per second
199		0	x	Blank
!200	Hr	0	x	Hours (no decimal)
!201	Min	0	x	Minutes (no decimal)
!202	Sec	0	x	Seconds (no decimal)
!203	Pct	0	x	Percent (no decimal)
!204	K/K	1	x.x	Kelvin per Kelvin
!205	K/K	2	x.xx	Kelvin per Kelvin
!206	K/K	3	x.xxx	Kelvin per Kelvin
!207	kHz	1	x.x	Kilohertz
!208	kHz	2	x.xx	Kilohertz
!209	kHz	3	x.xxx	Kilohertz
210	kVa	1	x.x	Kilo Voltamperes
211	kVa	2	x.xx	Kilo Voltamperes
212	kVa	3	x.xxx	Kilo Voltamperes
213	VA	0	x	Voltamperes
214	VA	1	x.x	Voltamperes
215	VAR	0	x	
216	VAR	1	x.x	
217	kV	0	x	Kilovolts
218	kV	1	x.x	Kilovolts
219		0	x	
220	con	0	x	Constant
221	con	1	x.x	Constant
222	con	2	x.xx	Constant
223	con	3	x.xxx	Constant

224		0	x	
225	I/O	0	x	Input/Output
226	klx	0	x	Kilolux
227	klx	1	x.x	Kilolux
228	k/h	0	x	Kelvin per hour
229	k/h	1	x.x	Kelvin per hour
230	I	0	x	Blank
231	I	1	x.x	Blank
232	I	2	x.xx	Blank
233	I	3	x.xxx	Blank
234	I	0	x	Blank

Index Number	Active Status Text	Passive Status Text
1	Normal	Alarm
2	Night	Day
3	Disable	Enable
4	Heating	Cooling
5	Local	Remote
6	Manual	Auto
7	Unoccupied	Occupied
8	Off	On
9	Open	Close
10	Winter	Summer
11	Slow	Fast
12	Low	High
13	On	Off
14	Alarm	Normal
15	Close	Open
16	Enable	Disable
17	Occupied	Unoccupied
18	on	off
19	on	off
20	on	off

APPENDIX C: POINT ATTRIBUTES TABLES

NOTE: This section applies to CARE XL-5000 only.

Each point in a controller has associated attributes such as user address, technical address, and descriptor. The Data Point Editor described in the Editors chapter of this manual provides dialog boxes that specify attributes (fields and values) for each point type in a controller.

Point attributes in the CARE database may not be available for editing in an off-line editor such as the Excel Building Supervisor (“XBS”) operator terminal or the XI518/XI582 operator terminals. Likewise, some attributes may be in controller files, but not available for import from the controller into the CARE database.

This chapter contains tables for each point type. The tables list point attributes and presents the following information for each:

- **Field description** specifies either the attribute name in the related point editor dialog box or the use of the field in CARE.
- **Field range** specifies the possible values of the field.
- **In CARE Database** specifies whether or not it is stored in CARE databases that are Version 1.5.1 or later. Previous database versions do not necessarily store the same fields.
- Whether or not the attribute is available for **off-line editing**. “Off-line” editing refers to changes made to database values while the controller is not active in the system. In other words, when you are using CARE to change copies of controller files, not the files in the actual controller.
- Whether or not the attribute is available for **on-line editing**. “On-line” editing refers to changes made to controller files while the controller is active. For example, if you are using an XBS operator terminal to change field values in a controller while it is operating.
- Whether or not the attribute can be imported via the **Import Controller** function (menu item Database, dropdown items Import, Controller). Import Controller Files in the File Management chapter describes the import procedure.

This information is useful when you are importing controller files or setting initial values for attributes that can be changed in an on-line editor.

Table Definitions

User address and technical address are attributes that apply to every point. Following are definitions and ranges for each field.

User

Address

Point name (maximum of 18 alphanumeric characters) assigned to a point for operator use in locating and commanding the point. Examples: Room temp floor 1 and Flow temp G/floor. This name and the descriptor further define the point. This name must be unique within a controller.

User addresses must include one non-digit character and cannot include Tabs, double quotes, ?, *, or space characters. All other ASCII characters are allowable (A-Z, 0-9, +, -, _, etc). For example, 12A is a valid user address, but 12 is not.

Technical

Address

Internal six-digit number that defines and locates a point in the system. The number is composed of three pairs representing controller number (0-30), module number (1-

16), and I/O number (1-12). Example: 010310 meaning Controller 1, Module 3, I/O 10.

Analog Input Point Type

Datapoint Editor Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
User Address	18 alphanumeric characters	yes	yes	no	no (create)
Technical Address of point (controller, board, point)	6 digits	yes	yes, with Technical Address dialog box	no	yes (for nonexistent only)
Descriptor (index into table of point descriptors)	0 to 64	yes	yes	XBS	yes
Operator Access Level	1 to 4	yes	yes	no	yes
Write Protect Priority	0 to 3	yes	no	no	yes
Engineering Unit (index into table of analog engineering units)	0 to 235	yes	yes	no	yes
Characteristic (index into table of linearization tables)	0 to 255	yes	yes	no	yes
Alarm Text (index into table of alarm text strings)	0 to 128	yes	yes	XBS	yes
Low Alarm Limit (lower alarm limit)		yes (as float)	yes (as float)	XBS (as float)	yes
Low Warning Limit (lower warning limit)		yes (as float)	yes (as float)	XBS (as float)	yes
High Warning Limit (upper warning limit)		yes (as float)	yes (as float)	XBS (as float)	yes
High Alarm Limit (upper alarm limit)		yes (as float)	yes (as float)	XBS (as float)	yes
Alarm Delay (time in seconds)	0 to 65535	yes	yes	XBS	yes
Suppress Alarm (indicates alarm disabled [1] or enabled [0])	0 or 1	yes	yes	XBS	yes
Alarm Type (indicates critical [1] or non-critical)	0 or 1	yes	yes	XBS	yes
Point Subtype	0 to 255	yes	no	no	yes (for nonexistent only)
Hide Point (indicates, if point is visible=no [0] or hidden=yes [1])	0 or 1	yes	yes	yes	yes
Trend cycle (time in minutes)	0-65535	yes	yes	yes	yes

Other Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
number of technical addresses (future)	0 to 255	yes	no	no	yes
manual point value	0 to 4095	yes (initial value stored as a float)	no	XBS	yes
current point value	0 to 4095	yes	no	no	yes
last modification date		yes	no	no	yes
indicates negative slope for linearization table	0 or 1	yes	no	no	no
indicates manual mode (1)	0 or 1	yes	no	XBS	yes
indicates if point is in alarm (1)	0 or 1	yes	no	no	yes
indicates if trend is enabled (1)	0 or 1	yes	no	581	yes
indicates if point should be refreshed (1)	0 or 1	yes	no	XBS (trending)	no
A/D (sensor) offset* for ai point	-32767 to 32768	yes (as float)	yes	XBS (as float)	yes

No Response (indicates, if communication between controller and DIO module is interrupted, yes [1], no [0])	0 or 1	no	no	no	no
DIO Remote (indicates, if point is in manual override by a DIO module, yes [1], no [0])	0 or 1	no	no	no	no

* A/D offset must be imported with current value because the offset is stored in the controller as a number of counts that is relative to the "current" value.

Analog Output Point Type

Datapoint Editor Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported ?
User Address	18 alphanumeric characters	yes	yes	no	no (create)
Technical Address of point (controller, board, point)	3 digits	yes	yes, with Technical Address dialog box	no	yes (for nonexistent only)
Descriptor (index into table of point descriptors)	0 to 64	yes	yes	XBS	yes
Operator Access Level	1 to 4	yes	yes	no	yes
Write Protect Priority	0 to 3 (1-255)	yes	no	XBS	yes
Engineering Unit (index into table of analog engineering units)	0 to 235	yes	yes	no	yes
Characteristic (index into table of linearization tables)	0 to 255	yes	yes	no	yes
Point Subtype	0 to 255	yes	no	no	yes (for nonexistent only)
Time to Close (in seconds)		yes	yes	XBS	yes
Time to Open (in seconds)		yes	yes	XBS	yes
Suppress Alarm (indicates alarm disabled [1])	0 or 1	yes	yes	XBS	yes
Hide Point (indicates, if point is visible=no [0] or hidden=yes [1])	0 or 1	yes	yes	yes	yes
Trend cycle (time in minutes)	0-65535	yes	yes	yes	yes

Other Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported ?
number of technical addresses	0 to 255	yes	no	no	yes
manual point value	0 to 4095	yes (initial value stored as float)	no	XBS	yes
current point value	0 to 4095	yes	no	no	yes
indicates manual mode (1)	0 or 1	yes	no	XBS	yes
indicates if trend is enabled (1)	0 or 1	yes	no	XI581/XI582	yes
indicates if point should be refreshed (1)	0 or 1	yes	no	XBS (trending)	no
No Response (indicates, if communication between controller and DIO module is interrupted, yes [1], no [0])	0 or 1	no	no	no	no
DIO Remote (indicates, if point is in manual override by a DIO module, yes [1], no [0])	0 or 1	no	no	no	no

Pseudo Analog Point Type

Datapoint Editor Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
User Address	18 alphanumeric characters*	yes	yes	no	no
Descriptor (index into table of point descriptors)	0 to 64	yes	yes	XBS	yes
Operator Access Level	1 to 4	yes	yes	no	yes
Write Protect Priority	0 to 3 (1-255)	yes	no	XBS	yes
Initialization Value (manual point value)		yes (initial value stored as float)	yes	XBS	yes
Engineering Unit (index into table of analog engineering units)	0 to 235	yes	yes	no	yes
Alarm Text (index into table of alarm text strings)	0 to 128	yes	yes	XBS	yes
Low Alarm Limit (lower alarm limit)		yes	yes	XBS	yes
Low Warning Limit (lower warning limit)		yes	yes	XBS	yes
High Warning Limit (upper warning limit)		yes	yes	XBS	yes
High Alarm Limit (upper alarm limit)		yes	yes	XBS	yes
Suppress Alarm (indicates alarm disabled [1])	0 or 1	yes	yes	XBS	yes
Alarm Type (indicates critical [1] or non-critical [0])	0 or 1	yes	yes	XBS	yes
Hide Point (indicates, if point is visible=no [0] or hidden=yes [1])	0 or 1	yes	yes	yes	yes
Trend cycle (time in minutes)	0-65535	yes	yes	yes	yes

Other Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
Technical address of point (controller, board, point)	5 digits	yes	no	no	yes (for nonexistent only)
current point value		yes	no	no	yes
date of last modification		yes	no	no	yes
point subtype	0 to 255	yes	no	no	yes (for nonexistent only)
indicates manual mode (1)	0 or 1	yes	no	XBS	yes
indicates if point in alarm (1)	0 or 1	yes	no	no	yes
indicates if trend is enabled (1)	0 or 1	yes	no	XI581/XI582	yes
indicates if point should be refreshed (1)	0 or 1	yes	no	XBS (trending)	no

Digital Input Point Type

Datapoint Editor Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
User Address	18 alphanumeric characters	yes	yes	no	no (create)
Technical Address of point (controller, board, point)	6 digits	yes	yes, with Technical Address dialog box	no	yes (for nonexistent only)
Descriptor (index into table of point descriptors)	0 to 64	yes	yes	XBS	yes
Operator Access Level	1 to 4	yes	yes	no	yes
Write Protect Priority	0 to 3 (1-255)	yes	no	XBS	yes
Alarm Text (index into table of alarm text strings)	0 to 128	yes	yes	XBS	yes
Engineering Unit (index into table of digital engineering units)	0 to 20	yes	yes	no	yes
Alarm Delay (time in seconds)	0 to 65535	yes	yes	XBS	yes
Service Interval (for runtime hours)	0 to 65535	yes	yes	XBS	yes
Point Subtype	0 to 255	yes	no	no	yes (for nonexistent only)
Suppress Alarm (indicates alarm disabled [1])	0 or 1	yes	yes	XBS	yes
Alarm Type (indicates critical [1] or non-critical)	0 or 1	yes	yes	XBS	yes
Runtime Enabled (indicates if runtime is enabled [1])	0 or 1	yes	yes	XBS	yes
Active State of point (0 or 1)	0 or 1	yes	yes	no	yes
Alarm Status (enable alarm checking upon change of point value)	0 or 1	yes	no	XBS	yes
Hide Point (indicates, if point is visible=no [0] or hidden=yes [1])	0 or 1	yes	yes	yes	yes

Other Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
number of technical addresses (future)	0 to 255	yes	no	no	yes
manual point value	0 to 255	yes (initial value)	no	XBS	yes
current point value	0 to 255	yes	no	no	yes
highest value for n-state point	0 to 255	yes	no	no	yes
runtime in minutes(accumulated)		yes	no	XBS	yes
last modification date		yes	no	no	yes
counter of runtime between service intervals (mins)		yes	no	XBS	yes
cycle count to active state		yes	no	no	yes
indicates manual mode (1)	0 or 1	yes	no	XBS	yes
indicates if point is in alarm (1)	0 or 1	yes	no	no	yes
indicates if trend is enabled (1)	0 or 1	yes	no	XI581/XI582	yes
indicates if point should be refreshed (1)	0 or 1	yes	no	XBS (trending)	no
No Response (indicates, if communication between controller and DIO module is interrupted, yes [1], no [0])	0 or 1	no	no	no	no
DIO Remote (indicates, if point is in manual override by a DIO module, yes [1], no [0])	0 or 1	no	no	no	no

Digital Output Point Type

Datapoint Editor Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
User Address	18 alphanumeric characters	yes	yes	no	no
Technical Address of point (controller, board, point)	6 digits	yes	yes, with Technical Address dialog box	no	yes (for nonexistent only)
Descriptor (index into table of point descriptors)	0 to 64	yes	yes	XBS	yes
Operator Access Level	1 to 4	yes	yes	no	yes
Write Protect Priority	0 to 3 (1-255)	yes	no	XBS	yes
Engineering Unit (index into table of digital engineering units)	0 to 235	yes	yes	no	yes
Service Interval for runtime hours	0 to 65535	yes	yes	XBS	yes
Point Subtype	0 to 255	yes	no	no	yes (for nonexistent only)
Suppress Alarm (indicates alarm disabled [1])	0 or 1	yes	yes	XBS	yes
Alarm Type (indicates critical [1] or non-critical [0])	0 or 1	yes	yes	XBS	yes
Runtime Enabled (indicates if runtime is enabled [1])	0 or 1	yes	yes	XBS	yes
Active State	0 or 1	yes	yes	no	yes
Hide Point (indicates, if point is visible=no [0] or hidden=yes [1])	0 or 1	yes	yes	yes	yes

Other Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
number of tech addr (future)	0 to 255	yes	no	no	yes
manual point value		yes (initial value)	no	XBS	yes
current point value		yes	no	no	yes
highest value for n-state pt	0 to 255	yes	no	no	yes
runtime in minutes		yes	no	XBS	yes
date of last modification		yes	no	no	yes
counter of runtime between service intervals (mins)		yes	no	XBS	yes
cycle count to active state		yes	no	no	yes
indicates manual mode (1)	0 or 1	yes	no	XBS	yes
indicates if trend is enabled (1)	0 or 1	yes	no	XI581/XI582	yes
switching down has an OFF phase (0)	0 or 1	yes	no	no	yes
indicates if point should be refreshed (1)	0 or 1	yes	no	no	no
delay time for OFF phase (secs)	0 to 255	yes	yes	XBS	yes
delay time switching up (secs)	0 to 255	yes	no	no	yes
delay time switching down (secs)	0 to 255	yes	no	no	yes
No Response (indicates, if communication between controller and DIO module is interrupted, yes [1], no [0])	0 or 1	no	no	no	no
DIO Remote (indicates, if point is in manual override by a DIO module, yes [1], no [0])	0 or 1	no	no	no	no

Pseudo Digital Point Type

Datapoint Editor Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
User Address	18 alphanumeric characters	yes	yes	no	no (create)
Descriptor (index into table of point descriptors)	0 to 64	yes	yes	XBS	yes
Operator Access Level	1 to 4	yes	yes	no	yes
Write Protect Priority	0 to 3 (1-255)	yes	no	XBS	yes
Initial value (manual point value)	0 to 255	yes (initial value)	yes	XBS	yes
Engineering Unit (index into table of digital engineering units)	0 to 20	yes	yes	no	yes
Alarm Text (index into table of alarm text strings)	0 to 128	yes	yes	XBS	yes
Service Interval for runtime hours	0 to 65535	yes	yes	XBS	yes
Suppress Alarm (indicates alarm disabled [1])	0 or 1	yes	yes	XBS	yes
Alarm Type (indicates critical [1] or non-critical)	0 or 1	yes	yes	XBS	yes
Runtime Enabled (indicates if runtime is enabled [1])	0 or 1	yes	yes	XBS	yes
Active State of point (0 or 1)	0 or 1	yes	yes	no	yes
Alarm Status (enable alarm checking upon change of point value)	0 or 1	yes	no	XBS	yes
Hide Point (indicates, if point is visible=no [0] or hidden=yes [1])	0 or 1	yes	yes	yes	yes

Other Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
technical address		yes	no	no	yes (for nonexistent only)
current point value	0 to 255	yes	no	no	yes
highest value for n-state point	0 to 255	yes	no	no	yes
runtime in minutes		yes	no	XBS	yes
last modification date		yes	no	no	yes
counter of runtime between service intervals (mins)		yes	no	XBS	yes
cycle count to active state		yes	no	no	yes
point subtype	0 to 255	yes	no	no	yes (for nonexistent only)
indicates manual mode (1)	0 or 1	yes	no	XBS	yes
indicates if point is in alarm (1)	0 or 1	yes	no	no	yes
indicates if trend is enabled (1)	0 or 1	yes	no	XI581/XI582	yes
indicates if point should be refreshed (1)	0 or 1	yes	no	XBS (trending)	no

Totalizer Point Type

Datapoint Editor Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
User Address	18 alphanumeric characters	yes	yes	no	no (create)
Technical Address of point (controller, board, point)	6 digits	yes	yes, with Technical Address dialog box	no	yes (for nonexistent only)
Descriptor (index into table of point descriptors)	0 to 64	yes	yes	XBS	yes
Operator Access Level	1 to 4	yes	yes	no	yes
Write Protect Priority	0 to 3 (1-255)	yes	no	XBS	yes
Engineering Unit (index into table of analog engineering units)	0 to 20	yes	yes	no	yes
Interval Limit to report a message		yes	yes	no	yes
Scaling Factor for number of pulses		yes	yes	XBS	yes
Totalizer type	0 to 255	yes	no	no	yes (for nonexistent only)
Suppress Alarm (indicates alarm disabled [1])	0 or 1	yes	yes	XBS	yes
Alarm Type (indicates critical [1] or non-critical)	0 or 1	yes	yes	XBS	yes
Hide Point (indicates, if point is visible=no [0] or hidden=yes [1])	0 or 1	yes	yes	yes	yes

Other Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
number of technical addresses	0 to 255	yes	no	no	yes
manual point value		yes (initial value)	no	XBS	yes
current point value		yes	no	no	yes
last value of HW counter	0 to 255	yes	no	no	yes
last value of slow HW counter	0 to 255	yes	no	no	yes
last reported refresh value	0 to 255	yes	no	no	yes
interval counter for pulses specified in attrib "interval"		yes	no	no	yes
indicates manual mode (1)	0 or 1	yes	no	XBS	yes
indicates if trend is enabled (1)	0 or 1	yes	no	XI581/XI582	yes
indicates if point should be refreshed (1)	0 or 1	yes	no	no	no
No Response (indicates, if communication between controller and DIO module is interrupted, yes [1], no [0])	0 or 1	no	no	no	no
DIO Remote (indicates, if point is in manual override by a DIO module, yes [1], no [0])	0 or 1	no	no	no	no

Pseudo Totalizer Point Type

Datapoint Editor Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
User Address	18 alphanumeric characters	yes	yes	no	no (create)
Descriptor (index into table of point descriptors)	0 to 64	yes	yes	XBS	yes
Operator Access Level	1 to 4	yes	yes	no	yes
Write Protect Priority	0 to 3 (1-255)	yes	no	no	yes
Engineering Unit (index into table of analog engineering units)	0 to 20	yes	yes	no	yes
Interval Limit to report a message		yes	yes	no	yes
Scaling Factor for number of pulses		yes	yes	XBS	yes
Suppress Alarm (indicates alarm disabled [1])	0 or 1	yes	yes	XBS	yes
Alarm Type (indicates critical [1] or non-critical)	0 or 1	yes	yes	XBS	yes
Hide Point (indicates, if point is visible=no [0] or hidden=yes [1])	0 or 1	yes	yes	yes	yes

Other Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
technical address of point (controller, board, point)	6 digits	yes	no	no	yes (for nonexistent only)
manual point value		yes (initial value)	no	XBS	yes
current point value		yes	no	no	yes
last reported refresh value	0 to 255	yes	no	no	yes
interval counter for pulses specified in attrib "interval"		yes	no	XBS	yes
indicates manual mode (1)	0 or 1	yes	no	XBS	yes
indicates if trend is enabled (1)	0 or 1	yes	no	XI581/XI582	yes
indicates if point should be refreshed (1)	0 or 1	yes	no	XBS (trending)	no

Global Analog and Digital Point Types

Datapoint Editor Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
Point Subtype (input or output)		yes	yes	no	yes (for nonexistent only)
User Address	18 alphanumeric characters	yes	yes	no	no (create)
Technical Address	6 digits	yes	yes	no	yes (for nonexistent only)
Descriptor (index into table of point descriptors)	0 to 64	yes	yes	XBS	yes
Operator Access Level	1 to 4	yes	yes	no	yes
Write Protect Priority	0 to 3 (1-255)	yes	no	XBS	yes
Engineering Unit (index into table of engineering units)	0 to 20 (digital) 0 to 235 (analog)	yes	yes	no	yes
Hide Point (indicates, if point is visible=no [0] or hidden=yes [1])	0 or 1	yes	yes	yes	yes
Trend cycle (time in minutes)	0-65535	yes	yes	yes	yes

Other Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
manual value		yes (initial value)	no	XBS	yes
current point value		yes	no	no	yes
1 if controller is down	0 or 1	yes	no	no	no
indicates manual mode (1)	0 or 1	yes	no	XBS	yes
1 if controller is slave	0 or 1	yes	no	no	yes
active state (for digital points only)	0 or 1	yes	yes	no	yes
indicates if point should be refreshed (1) (for analog pts only)	0 or 1	yes	no	XBS (trending)	no

DO Feedback DI Point Type

Datapoint Editor Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
User Address	18 alphanumeric characters	yes	yes	no	no
Descriptor (index into table of point descriptors)	0 to 64	yes	yes	XBS	yes
Alarm Text (index into table of alarm text strings)	0 to 128	yes	yes	XBS	yes
Engineering Unit (index into table of digital engineering units)	0 to 20	yes	yes	no	yes
Operator Access Level	1 to 4	yes	yes	no	yes
Write Protect Priority	0 to 3 (1-255)	yes	yes	XBS	yes
Cycle Count to active state		yes	no	no	yes
Duration Off phase (secs)	0 to 255	yes	yes	no	yes
Delay Switch Up (secs)	0 to 255	yes	yes	no	yes
Delay Switch Down	0 to 255	yes	yes	no	yes
Feedback Delay (time) for signal	0 to 255	yes	yes	no	yes
Service Interval (user specified maintenance interval in hours)	0 to 65535	yes	yes	XBS	yes
Suppress Alarm (indicates alarm disabled [1])	0 or 1	yes	yes	XBS	yes
Alarm Type (indicates critical [1] or non-critical)	0 or 1	yes	yes	XBS	yes
Runtime Enabled	0 or 1	yes	yes	XBS	yes
Switching Down (OFF phase when value is 1)	0 or 1	yes	yes	no	yes
Hide Point (indicates, if point is visible=no [0] or hidden=yes [1])	0 or 1	yes	yes	yes	yes

Other Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
subtype of assigned points (DO)	0 to 255	yes	no	no	yes (for nonexistent only)
subtype of feedback points (DI)	0 to 255	yes	no	no	yes (for nonexistent only)
manual point value	0 to 255	yes	no	XBS	yes
current point value	0 to 255	yes	no	no	yes
max for manual/current point values	0 to 255	yes	no	no	yes
accumulated runtime (mins)		yes	no	XBS	yes
time within a maintenance interval (time since last service)		yes	no	XBS	yes
last modification date		yes	no	no	yes
indicates manual mode (1)	0 or 1	yes	no	XBS	yes
indicates if point is in alarm (1)	0 or 1	yes	no	no	yes
indicates if trend is enabled (1)	0 or 1	yes	no	XI581/XI582	yes
enable runtime accumulation	0 or 1	yes	yes	XBS	yes
indicates if point should be refreshed (1)	0 or 1	yes	no	no	no
technical address of DO point	6 digits	yes	no	no	yes
technical address of DI point	6 digits	yes	no	no	yes
No Response (indicates, if communication between controller and DIO module is interrupted, yes [1], no [0])	0 or 1	no	no	no	no

DIO Remote (indicates, if point is in manual override by a DIO module, yes [1], no [0])	0 or 1	no	no	no	no
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Pulse 2 Point Type

Datapoint Editor Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
User Address	18 alphanumeric characters	yes	yes	no	no (create)
Descriptor (index into table of point descriptors)	0 to 64	yes	yes	XBS	yes
Engineering unit (index into table of digital engineering units)	0 to 20	yes	yes	no	yes
Operator Access Level	1 to 4	yes	yes	no	yes
Write Protect Priority	0 to 3 (1-255)	yes	yes	XBS	yes
Cycle Count to active state		yes	yes	no	yes
Pulse Duration (secs)	0 to 255	yes	yes	XBS	yes
Service Interval (user-specified maintenance interval in hours)	0 to 65535	yes	yes	XBS	yes
Suppress Alarm (indicates alarm disabled [1])	0 or 1	yes	yes	XBS	yes
Alarm Type (indicates critical [1] or non-critical)	0 or 1	yes	yes	XBS	yes
Runtime Enabled	0 or 1	yes	yes	XBS	yes
Hide Point (indicates, if point is visible=no [0] or hidden=yes [1])	0 or 1	yes	yes	yes	yes

Other Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
point subtype	0 to 255	yes	no	no	yes (for nonexistent only)
technical address of first point		yes	no	no	yes
manual point value	0 to 255	yes	no	XBS	yes
current point value	0 to 255	yes	no	no	yes
accumulated runtime (mins)		yes	no	XBS	yes
time within a maintenance interval (time since last service)		yes	no	XBS	yes
last modification date		yes	no	no	yes
indicates manual mode (1)	0 or 1	yes	no	XBS	yes
indicates if trend is enabled (1)	0 or 1	yes	no	XI581/XI582	yes
indicates if point should be refreshed (1)	0 or 1	yes	no	no	no
No Response (indicates, if communication between controller and DIO module is interrupted, yes [1], no [0]), for OS 2.0 only	0 or 1	no	no	no	no
DIO Remote (indicates, if point is in manual override by a DIO module, yes [1], no [0])	0 or 1	no	no	no	no

Multistage Point Type

Datapoint Editor Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
User Address	18 alphanumeric characters	yes	yes	no	no
Descriptor (index into table of point descriptors)	0 to 64	yes	yes	XBS	yes
Engineering Unit (index into table of digital engineering units)	0 to 20	yes	yes	no	yes
Technical address of first point	6 digits	yes	no	no	yes
Operator Access Level	1 to 4	yes	yes	no	yes
Write Protect Priority	0 to 3 (1-255)	yes	yes	XBS	yes
Cycle Count to active state		yes	no	no	yes
Service Interval (user-specified maintenance interval in hours)	0 to 65535	yes	yes	XBS	yes
Suppress Alarm (indicates alarm disabled [1])	0 or 1	yes	yes	XBS	yes
Alarm Type (indicates critical [1] or non-critical)	0 or 1	yes	yes	XBS	yes
Runtime Enabled	0 or 1	yes	yes	XBS	yes
Active State (1)	0 or 1	yes	yes	no	yes
Hide Point (indicates, if point is visible=no [0] or hidden=yes [1])	0 or 1	yes	yes	yes	yes

Other Attributes

Field Description	Field Range	In CARE Database	Off-line Editing?	On-line Editing?	Imported?
point subtype	0 to 255	yes	no	no	yes (for nonexistent only)
manual point value	0 to 255	yes	no	XBS	yes
current point value	0 to 255	yes	no	no	yes
max value of point	0 to 255	yes	no	no	yes
accumulated runtime (mins)		yes	no	XBS	yes
time within a maintenance interval (time since last service)		yes	no	XBS	yes
last modification date		yes	no	no	yes
indicates manual mode (1)	0 or 1	yes	no	XBS	yes
indicates if trend is enabled (1)	0 or 1	yes	no	XI581/XI582	yes
indicates if point should be refreshed (1)	0 or 1	yes	no	no	no
No Response (indicates, if communication between controller and DIO module is interrupted, yes [1], no [0])	0 or 1	no	no	no	no
DIO Remote (indicates, if point is in manual override by a DIO module, yes [1], no [0])	0 or 1	no	no	no	no

APPENDIX D: PLANT AND CONTROLLER UPGRADES AND DOWNGRADES

NOTE: This section applies to CARE XL-5000 only.

Multiple Operating System Handling

Purpose Multiple Operating System Handling is a feature of CARE allowing to upgrade/downgrade operating system versions for Excel 5000 controllers. CARE supports the operating system versions:

- OS 1.1 (Europe and Latin America only)
- OS 1.2
- OS 1.3/1.4
- OS XLIRC (Europe and Latin America only)
- OS 1.5
- OS 2.0
- OS 2.03
- OS 2.04
- OS 2.06
- OS 3.00

CARE capabilities vary for each version as shown in the following table.

Feature	Ver. 1.1/1.2	Ver. 1.3/1.4/XLIRC	Ver 1.5	Ver 2.0/2.03/2.04/2.06	Ver 3.00
Point descriptors	64	255	255	255	255
Alarm messages	128	255	255	255	255
Analog engineering units	234	234	254	254	254
Digital engineering units	20	127*	127*	127	127
Global digital points	2-state	2-state and multi-state	2-state and multi-state	2-state and multi-state	2-state and multi-state
Global analog update	fixed**	fixed**	programmable	programmable	Programmable
Trend hysteresis	fixed**	fixed**	programmable	programmable	Programmable
Alarm hysteresis	fixed	fixed	programmable	programmable	Programmable
LON points				via point mapping to NVs	via point mapping to NVs
NVs				Excel 50: max. 46	Excel 50: max. 46
				Excel 500: max. 512	Excel 500: max. 512
Hardware points	128				384
Software points of one type	128 (253 + 3 internal if OS > 2.03)				384 – 3 internal
Software points of all types	256				384
Global points	128				384
Maximum number of points: (Hardware-, software, internal- and global points)	384				384

NOTE: *There is a limit of 255 states, therefore, 127 implies that each point has two states (pairs). If a point has more than two states, the total number is reduced.
 **If global value is greater than 20, the change must be at least 1 percent. If the value is less than 20, the change must be at least .2 units.

Upgrading is possible from a current version to any higher version without intermediate steps, for example you can upgrade from OS Version 1.3/1.4 to OS-Version 2.06 without upgrading to OS-Version 1.5 as intermediate step. Analogously the same is valid for downgrading, except Excel 800 OS 3.00. This controller cannot be downgraded. For details on upgrading an Excel 500 controller to an Excel 800 controller, please refer to the Upgrade Excel 500 Controller to Excel 800 Controller section.

Restrictions Upgrading from older OS versions uses all restrictions required for the older OS version. Downgrading to an older OS version will be allowed as long as the application remains within the restrictions of the target OS. If downgrading of a controller is not possible because of controller or plant restrictions, CARE displays the appropriate error message and does not change the OS version.

Procedures Upgrading or downgrading a controller applies to the controller and its **attached** plants only. When replacing its OS all attached plants are upgraded/downgraded automatically.

NOTE: The OS number of one single **attached** plant cannot be changed. The OS number of an unattached plant can be changed. When attaching a plant with a different OS version number as the controller, the OS version number of the plant gets the OS version number of the controller.

Change Controller OS Version

1. In the logical plant tree, click on the controller.
2. On the right pane, click on the Properties tab.

New Controller

Controller Name: CONT02

Bus Name: Bus 1

Controller Number: 2

Controller Type: Excel Smart

Controller OS Version: Version 2.06

Country Code: Version 2.0/2.1
Version 2.03
Version 2.04
Version 2.06

Default File Set: Original Default files for 2.06 XL500 controller & XL50 external MMI.

xl_2_06

Units of Measurement
 International
 Imperial

Power Supply
 XP501
 XP502

Installation Type
 Cabinet Door Installation
 Normal Installation

LON
 Shared / Open LON
 Local

OK Cancel Help

NOTES: All plants attached to the controller will be upgraded/downgraded by upgrading/downgrading the controller.

If downgrading of a controller is not possible because of controller or plant restrictions, CARE displays the appropriate error message and does not change the OS version.

3. Click the down arrow next to Controller OS Version list box and select desired version.
4. If messages occur, follow the instructions and correct the conditions displayed.

Change Plant OS Version

1. In the logical plant tree, click on the **unattached** plant.

NOTE: Attached plants cannot be upgraded/downgraded.

2. On the right pane, click on the Properties tab.

- Click the down arrow next to Plant OS Version list box and select desired version.

The Preserve Technical Address checkbox refers to modification of the target hardware, if point changes in the TAF have already been made before.

Enabling this checkbox results in the following:

Points that are already assigned to that target hardware type, which will be changed to, preserve their technical address on the corresponding module.

Disabling this checkbox results in the following:

Points that are already assigned to that target hardware type, which will be changed to, may not necessarily preserve their technical address on the corresponding module.

- If messages occur, follow the instructions and correct the conditions displayed.

Disposition of Templates

If you enter search templates for a Ver. 1.3 or 1.5 controller and then downgrade the controller to Ver. 1.2, there is no warning message during the downgrade pertaining to the templates. The templates remain in the database in case the controller is upgraded to Ver. 1.3. or 1.5. When the database is translated to the Ver. 1.2 controller with the “hidden” templates, the templates are not translated into the controller files.

Upgrade Excel 500 Controller to Excel 800 Controller

The following steps show the upgrade strategy of Excel 500 to Excel 800 applications:

Procedure

- Detach the plant from the Excel 500 controller.
- Change the plant version to OS 3.0.
RESULT: The time program will be lost.
- Create an Excel 800 controller.

4. Re-attach the plant to the 800 controller.

RESULT: The datapoints will be automatically assigned to panel I/O modules. Open Lon points will be not assigned.

Upgrade Controller to OS 2.04 and higher

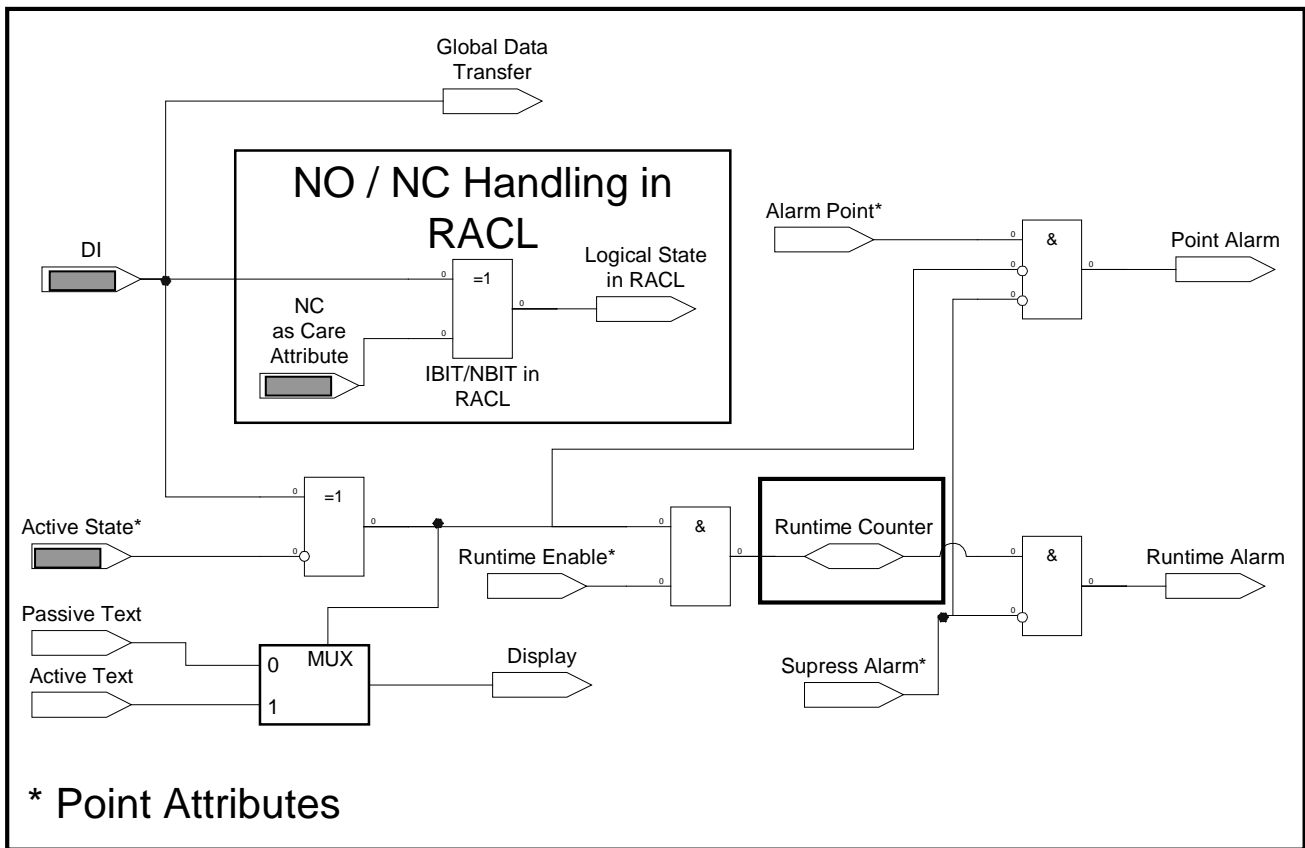
NO/NC Processing

For OS 2.04 and higher the NO/NC* handling is completely reworked. When using previous projects CARE performs an automatic upgrade for datapoints regarding the NO/NC behavior. The upgrade result may show points which have to be reworked either in the control strategy or to be defined as status or alarm point. To understand what to do in the upgrade dialog, the old NO/NC handling (OS version lower than 2.04) and the new NO/NC handling for OS 2.04 and higher will be compared for digital points in the following sections.

*NO/NC means Normally Open/Normally close.

Old NO/NC Mechanism

For OS lower than 2.04 the NO/NC mechanism is as follows:



Have decisive influence on results of logical processing

The logical behavior provides several interactive spots. The following table shows the dependence.

DI Voltage	NO/NC as CARE attribute in schematic	Logical State in Control Strategy (RACL)	Logical state for Global Transfer	Active State	Text Displayed	Alarm	Runtime Enable	Hours run accumulation
<2,5V	NC	1	0	0	Active	RTN		
>5V	NC	0	1	0	Passive	ALM		
<2.5V	NC	1	0	1	Passive	ALM		
>5V	NC	0	1	1	Active	RTN		
<2.5V	NO	0	0	0	Active	RTN		
>5V	NO	1	1	0	Passive	ALM		
<2.5V	NO	0	0	1	Passive	ALM		
>5V	NO	1	1	1	Active	RTN		

Alarm direction: ALM = Alarm, RTN = Alarm Return to Normal

DI Voltage: Terminal logic state (open < 2.5 V = 0, closed > 5 V = 1)

NO/NC as CARE attribute: NO = 0, NC = 1

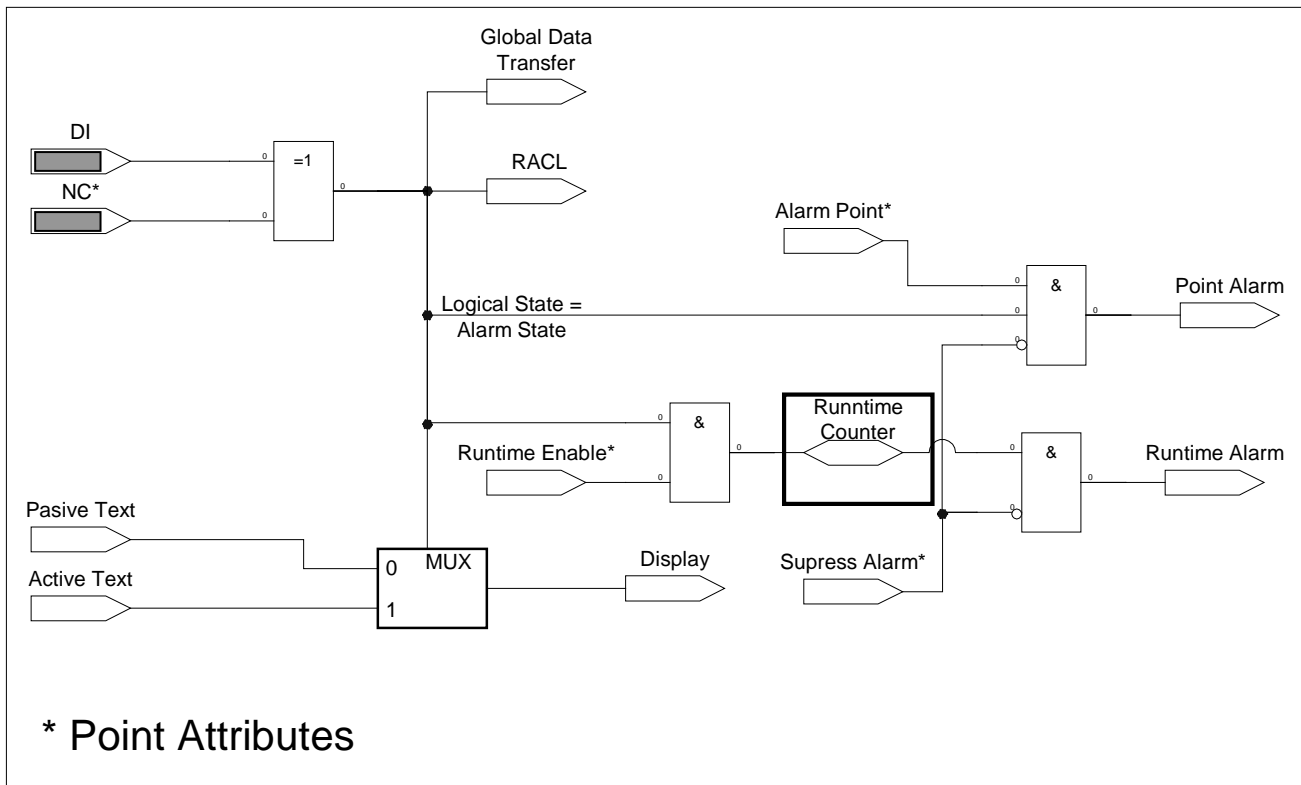
Active State: DI is active at 0 or 1

The results are the following:

- Via Active State attribute it is possible to invert the alarm direction, the corresponding active/passive text pair, and the runtime counter.
- The logical state of global points provided for global data transfer can be different to the logical state in the control strategy (RACL) if NO was chosen for the point. In addition when NC and Active State = 0 or NO and Active State = 1 was chosen, the active-passive text pairs were inverted.
- In general negative logic could lead to problems.

New NO/NC Mechanism

For OS 2.04 and higher the NO/NC mechanism is as follows:



Have decisive influence on results of logical processing

DI Voltage: Terminal logic state (open < 2.5 V = 0, closed > 5 V = 1)
 NO/NC as CARE attribute: NO = 0, NC = 1

Assumption: positive logic and relay contact model

Digital Input NO			Digital Input NC		
Contact position	Voltage at Input	Logical Status	Contact position	Voltage at Input	Logical Status
Open	<2.5V	0	Open	<2.5V	1
Closed	>5V	1	Closed	>5V	0

The new NO/NC handling for OS 2.04 or higher provides the following:

The NO/NC attribute will firstly be set in the schematic as before, but can be changed in the Datapoint Editor offline as well as online via XI 581AH/582AH. The Active State attribute is no longer available. There will be no possibility to invert this logic. Results are shown in the following tables:

Logical state in control strategy	Unit Text displayed	Text Display	Value change	Generated alarm
0	passive	OFF	0->1	Return to normal (RTN)
1	active	ON	1->0	Alarm coming (ALM)

The logical state of a DI point (0 or 1 in control strategy) depends only on the setting of the normally open/normally closed attribute set in the Datapoint Editor. The alarm state, the state for the runtime counter and for the global point transfer follows the logical state in the control strategy.

The hours run are always counted when the control strategy logical state is 1. As outlined above, this depends only on the setting on the NO/NC attribute. Hours run in general are only counted if the Runtime Enabled attribute is set to yes.

DI VOLTAGE	NO/NC as CARE attribute in schematic	Logical state in control strategy	Logical state for Global Transfer	Text Displayed	Alarm	Runtime Enable	Hours run accumulation
<2.5V	NO	0	0	Passive	RTN	Yes	No
>5V	NO	1	1	Active	ALM	Yes	Yes
<2.5V	NC	1	1	Active	ALM	Yes	Yes
>5V	NC	0	0	Passive	RTN	Yes	No
<2.5V	NO	0	0	Passive	RTN	No	No
>5V	NO	1	1	Active	ALM	No	No
<2.5V	NC	1	1	Active	ALM	No	No
>5V	NC	0	0	Passive	RTN	No	No

Alarm direction: ALM = Alarm, RTN = Alarm Return to Normal

Upgrading to OS 2.04 and higher / Status point or Alarm point

When upgrading from a previous OS to OS 2.04 or higher CARE is checking each digital, pseudo digital, and global digital point, whether it can be upgraded without losing the correct logical behavior. To keep the logical behavior means that both the logical value for Data processing and the logical value for Alarming will be the same as before. If this is the case the point will be automatically upgraded.

For some reasons certain points cannot be upgraded automatically. If e.g. the Active State attribute was inverted in the application to be upgraded, points cannot keep both the correct Data processing value and the correct Alarming value. In this case the user has to decide whether the point should be a Status point for which the data processing value of the control strategy will be considered and the alarming will be wrong, or if the point should be an Alarm Point for which the Alarming value will be considered and the data processing will be wrong. This can be done in the NO/NC Upgrade dialog box.

In general status points are set to NO, alarm points are set to NC. Global points have to be reworked completely in the control strategy and/or switching logic and certain pseudopoints need to be corrected regarding the alarming direction in any case.

For each point to be upgraded manually, a description is displayed in the NO/NC Upgrade dialog box, which indicates what to do.

IMPORTANT

The Upgrade to OS 2.04 and higher cannot be done without losing compatibility in some cases

Upgrading is done by the rules listed in the following table:

Attributes				OS < 2.04				OS 2.04		
Point	NO / NC	Contact	Relay	Active	Logical	Alarm	Unit text	Logical	Alarm	Unit text
Types:	Attributes:	position:	On/Off:	State	status ^{*3}		displayed:	status: ^{**1,3}		displayed:
DI	NO	Open (<2.5V)		0	0	RTN	Active	0	RTN	Passive
DI	NO	Closed (>5V)		0	1	ALM	Passive	1	ALM	Active
DI	NO	Open (<2.5V)		1	0	ALM	Passive	0	RTN	Passive
DI	NO	Closed (>5V)		1	1	RTN	Active	1	ALM	Active
DI	NC	Open (<2.5V)		0	1	RTN	Active	1	ALM	Active
DI	NC	Closed (>5V)		0	0	ALM	Passive	0	RTN	Passive
DI	NC	Open (<2.5V)		1	1	ALM	Passive	1	ALM	Active
DI	NC	Closed (>5V)		1	0	RTN	Active	0	RTN	Passive
AI>DI ²	NO	Open (<2.5V)		0	0	RTN	Active	0	RTN	Passive
AI>DI ²	NO	Closed (>5V)		0	1	ALM	Passive	1	ALM	Active
AI>DI ²	NO	Open (<2.5V)		1	0	ALM	Passive	0	RTN	Passive
AI>DI ²	NO	Closed (>5V)		1	1	RTN	Active	1	ALM	Active
AI>DI ²	NC	Open (<2.5V)		0	1	RTN	Active	1	ALM	Active
AI>DI ²	NC	Closed (>5V)		0	0	ALM	Passive	0	RTN	Passive
AI>DI ²	NC	Open (<2.5V)		1	1	ALM	Passive	1	ALM	Active
AI>DI ²	NC	Closed (>5V)		1	0	RTN	Active	0	RTN	Passive
DO	NO		On	1	1		Active	1		Active
DO	NO		Off	1	0		Passive	0		Passive
DO	NC		On	0	0		Active	0		Passive
DO	NC		Off	0	1		Passive	1		Active
PD_2	n/a			0	0	RTN	Active	0	RTN	Passive
PD_2	n/a			0	1	ALM	Passive	1	ALM	Active
PD_2	n/a			1	0	ALM	Passive	0	RTN	Passive
PD_2	n/a			1	1	RTN	Active	1	ALM	Active
PD_n	n/a							X (0,1,2...)		StateX
GD_2	n/a							0	RTN	Passive
GD_2	n/a							1	ALM	Active
GD_n	n/a							X (0,1,2...)		StateX

*1 Runtime follows the Logical status (Logical Status = 1 means runtime logging)

*2 At DI Subtype AI the pull up resistor will be switched off as default for new HW Points only for OS 2.04

*3 State in Control Strategy (RACL)

Procedure

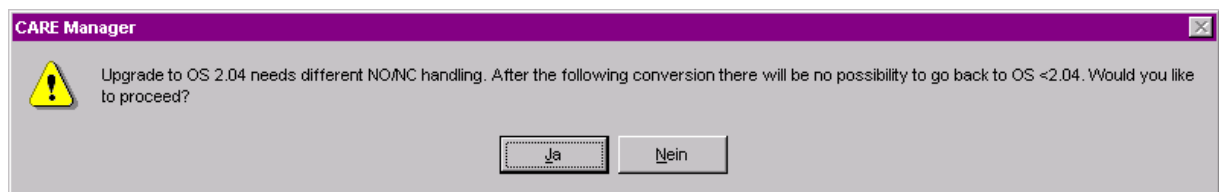
IMPORTANT

Note, that the Upgrade cannot be performed explicitly. The upgrade will be done automatically when upgrading a controller OS lower than 2.04 to 2.04.

Nevertheless after once the upgrade was performed the points that need to be reworked/defined as status or alarm points can be edited in the NO/NC Upgrade dialog box in as many sessions as you like.

1. Open Controller Information dialog box by clicking menu item Controller, then submenu item Information.
2. From the controller OS Version drop-down listbox, select OS 2.04 or higher.
3. Click OK.

RESULT: Observe the following message and click OK if you really want to upgrade to OS 2.04 or higher.

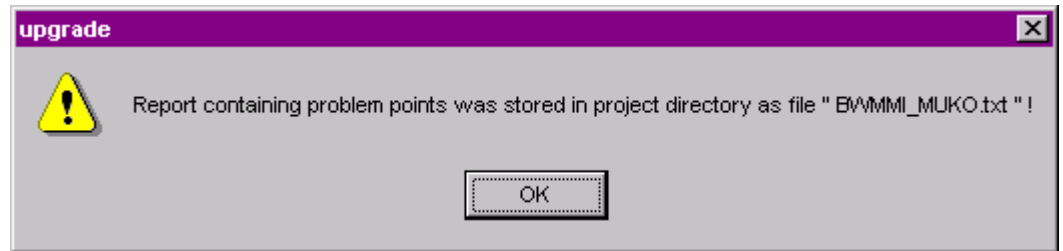


4. Confirm next message box.

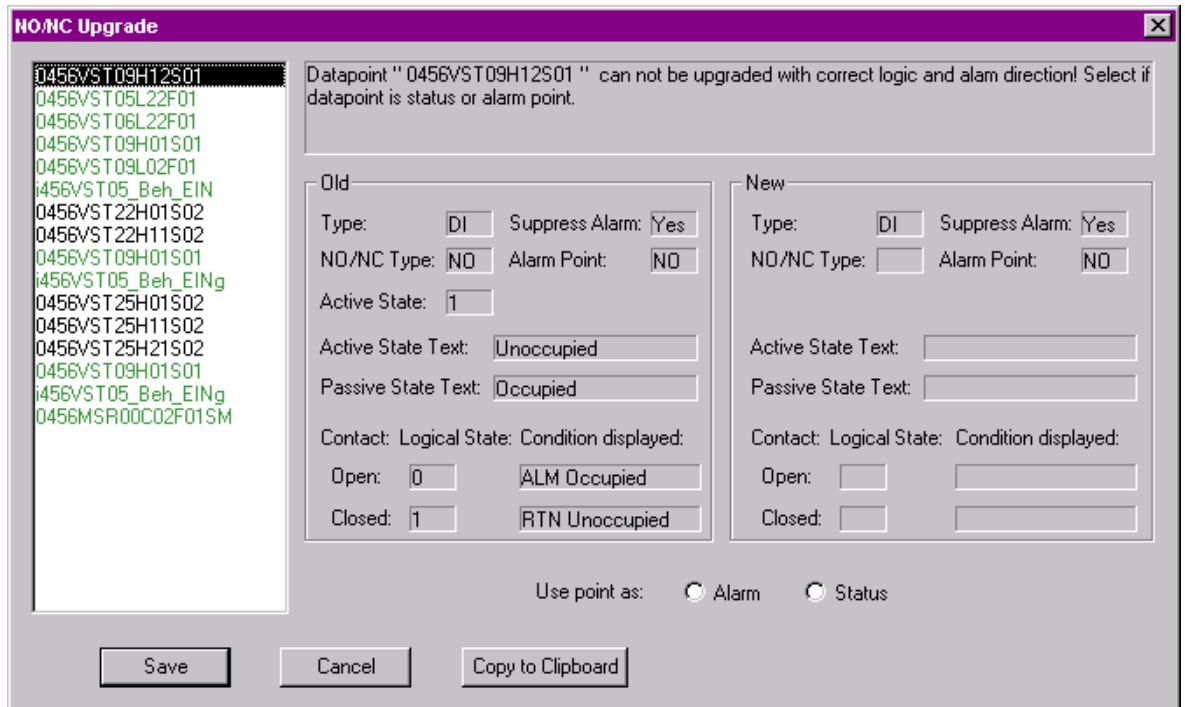


points

5. Confirm next message box. It is recommended to print the problem report.



RESULT: The NO/NC Upgrade dialog box is displayed.



On the left, all points, which were not automatically upgraded are shown. When selecting a point, note the point description on the right. Points, which can be defined as status or alarm point, are displayed in black. Global points and pseudopoints, which have wrong alarm direction, will displayed green when selecting them.

6. Copy the points to the clipboard and paste them into a word processing program. Print out the list. Do this every time before you close the dialog box to keep the result of the points edited.
7. Select a point displayed in black and define if it should be a status point (NO) or an alarm point (NC) by selecting respective radio button. Note the results in the field under New on the right.

RESULT: The point gets green in the list.

8. Continue with next point(s).
9. Before closing the dialog box, copy the points to the clipboard and paste them into a word processing program for printing your result.
10. Click Save button.

RESULT: All points defined as status or alarm point are now upgraded. When opening the NO/NC Upgrade dialog box next time, they will not be displayed anymore. Go for reworking global points and pseudopoints.

Upgrade Controller to OS 2.06 when using Multistage or DO_Feedback_DI Points on DIO

IMPORTANT

When using Multistage DO or DO_Feedback_DI Points (Flex points) that reside on distributed I/O modules, the points must be shifted to IP modules before upgrading the controller to OS 2.06 in order to avoid damage of the controlled equipment. As long as the controller OS is lower than 2.06, for example 2.04, the application need not to be changed even if the controller unit supports OS 2.06.

Controller OS 2.06 usage and functionality in CARE 4 and CARE- XL500 10.08.01

The behavior of the controller OS 2.06 in CARE 4 and CARE-XL500 10.08.01 differ strongly regarding the following functions:

- Sensor Offset
- NO/NC
- Characteristics
- Actuator runtime

The following table shows the relationship between controller hardware OS, controller OS in CARE, and the CARE version.

Controller OS Version (Hardware)	Controller OS Version (CARE)	CARE Version
2.06.00 – 2.06.04	2.06.	Version 4
2.06.00 – 2.06.04 2.06.05	2.06	Version XL500 10.08.01

For the usage of open LON I/O modules (Smart I/O modules and Distributed I/O modules), the hardware controller OS 2.6.05 includes the following enhancements:

- Sensor offset applicable for all characteristic types
- Normally open / Normally Closed attribute active in controller
- Default characteristics enabled and calculated by the controller
- Actuator run time handling optimized for open LON I/O modules

When upgrading a CARE 4 project to a CARE-XL500 10.08.01 project using controller OS 2.06, the CARE version dependent behavior of each of these functions have to be clearly understood as described in the following.

Sensor Offset Handling

The sensor offset compensates value deviations caused, for example, by voltage drop on the cable. The following example shows how the sensor offset is calculated:

Example:

Displayed Original Value	20 K
Entered Sensor Offset Value	- 2 K
Displayed New Value	18 K

CARE 4 and OS 2.06.00 – 2.06.04

- Sensor offset handling is done in the open LON I/O module.
- Sensor offset value entered in the datapoint (Datapoint Editor) is ignored and has to be set via UCPT in the LON-Works part of the network tree, or the module has to be configured via plug-in.
- Sensor offset is supported for PT1000 only.
- Sensor offset is handled differently for Distributed I/O modules and Smart I/O modules:
 For Distributed I/O modules, sensor offset is entered as value in Ohm to be calculated according to the characteristic of the sensor
 For Smart I/O modules, sensor offset is entered as direct value without the need of referring to the characteristic
- Online Sensor offset changes via MMI or Excel Online are ignored

CARE-XL500 7.01.02 and OS 2.06.05 and higher

- Sensor offset handling is done in the controller:
- Sensor offset value entered in the datapoint (Datapoint Editor) will be valid and executed
- Sensor offset is entered as a real value (+ or -) for both module types and other relevant Honeywell devices such as Excel 10
- Sensor offset is applicable to all characteristics (NTC, PT1000, PT100, 0-10 V input) in combination with open LON devices.
- Sensor offset input can still be done as in CARE 4.
- The sensor offset should be done only in one place, either in the datapoint of the controller (Datapoint Editor) or in the UCPT of the open LON module (LON-Works part of the network tree)
- Online sensor offset changes via MMI are ignored but via Excel Online are executed
- Plug-in for configuration is no longer needed

CARE 4 / CARE-XL500 10.08.01 Upgrade and OS 2.06.05 and higher

When upgrading a CARE 4 project in CARE-XL500 10.08.01, sensor offset values set in the open LON I/O module and in the controller will be added.

Example:

Real Value (Sensor)	Sensor Offset 1 (I/O Module)	Sensor Offset 2 (Controller)	Value Display (MMI)
22 K	2 K	2 K	26 K

Work around

Check the sensor offset value of the datapoint and set the value to 0.

CARE 4 / CARE-XL500 10.08.01 Upgrade and OS 2.06.00 - 06.04

When still using OS 2.06.00 - 2.06.04 in an upgraded project in CARE-XL500 10.08.01, the sensor offset handling is the same as in CARE 4.

NO/ NC Attribute Handling

CARE 4 and OS 2.06.00 – 2.06.04

- NO/NC handling is done in the open LON I/O modules
- NO/NC handling of digital Smart I/O and Distributed I/O modules are different via plug-in access in CARE
- Changing NO/NC status in CARE requests new bindings
- Online changes of NO/NC status for digital Smart I/O and Distributed I/O modules can be entered, but are ignored.
- Online changes of NO/NC status for internal digital I/O modules (XF-modules) can be entered and are executed.

CARE-XL500 10.08.01 and OS 2.06.05

- NO/NC handling for digital Smart I/O and Distributed I/O modules is shifted into the controller:
Contact state is converted inside the controller, not in the module

- NO/NC handling for digital Smart I/O and Distributed I/O modules is the same.
- NO/NC status can be edited in the datapoint Attribute 'Point Subtype' (Datapoint Editor)
- When changing NO/NC status, re-binding or module re-configuration is no longer required in CARE
- Online changes of NO/NC status are blocked for digital Smart I/O and Distributed I/O modules. MMI shows *****
- Online changes of NO/NC status for internal digital I/O modules can be entered and are executed

CARE 4 / CARE-XL500 10.08.01 Upgrade and OS 2.06.05 and higher

When upgrading a CARE 4 project in CARE-XL500 10.08.01, take care of the following:
 Check if value conversation tables have been used for Distributed I/O modules. If yes, remove any of them.

Check digital inputs which are configured as NC in the Smart I/O module (in CARE 4, digital inputs of a Smart I/O module are automatically set to NC if a datapoint of subtype NC is bound to the Smart I/O terminal).
 Reset all NC states of the Smart I/O module to NO states with the plug-in.

Characteristics Handling

CARE supports the following characteristic types:

Default Characteristics

Default characteristics are delivered with CARE and they can be edited with the Default Text Editor to meet local requirements. The following shows examples:

	Default Characteristic	Range of Open LON I/O Module
1	Pressure 0-3 "	0 to 11.0 V
3	Pressure ±0.25 "	0 to 11.0 V
4	Pressure 0-5 "	0 to 11.0 V
9	Direct Out 0-100 %	0 to 11.0 V
10	Reverse Out 0-100 %	11.0 to 0 V

Note that the voltage ranges are wider than actual open LON I/O module input to account for possible miscalibration of the module. Modules 1 through 4 and 9 range from 2 to 10 V. Device 10 ranges from 10 to 2 V.

Fixed Characteristics

Fixed characteristics are delivered with CARE, but cannot be edited in the Miscellaneous Text Editor. They can only be selected and assigned to points in the Datapoint Editor, and are available under the IDs 11 through 15 for slow subtype points, and under the IDs 11 through 29 for fast subtype points.

CARE Subtype Index		XL-Online Index	Characteristic	
Slow	Fast		Name	Specification
15	23	253	NTC Type F	-58.0 to 302.0 F Negative temperature coefficient degrees F
11	11	255	NTC	-50.0 to 150.0 C Negative temperature coefficient degrees C

12	12	254	LINEAR_GRAPH	0 to 10 V
13	19	249	PT1000 Type F/I	-58.0 to 302.0 F
14	20	250	PT1000 Type C/I	-50.0 to 150.0 C
	17	247	PT1000 Type F/II	32 to 752.0 F
	18	248	PT1000 Type C/II	0.0 to 400.0 C
	21	251	PT100 Type F	-58.0 to 302.0 F
	22	252	PT100 Type C	-50.0 to 150.0 C
	15	245	PT3000 Type F	-58.0 to 302.0 F
	16	246	PT3000 Type C	-50.0 to 150.0 C
	13	243	BALCO Type F	-58.0 to 302.0 F
	14	244	BALCO Type C	-50.0 to 150.0 C
	24	241	0-10 V	0-10 V
	25	242	2-10V = 0-100 %	2-10V = 0-100 %
	26	237	NI 1000 TK5000 F	-22.0 to 266.0 F Positive temperature coefficient degrees F
	27	238	NI 1000 TK5000	-30.0 to 130.0 C Positive temperature coefficient degrees C
	28	239	NTC-10 F	-22.0 to 212.0 F Negative temperature coefficient degrees F
	29	240	NTC-10	-30.0 to 130.0 C Negative temperature coefficient degrees C

Characteristics can either be calculated in the open LON I/O module or in the controller. Depending on the controller OS and the CARE version, the handling of characteristics is as follows:

CARE 4 and OS 2.06.00 - 2.06.04

- Fixed characteristics such as PT1000 are calculated inside the open LON I/O module.
- Default characteristics such as Pressure 0-3 " cannot be calculated by the open LON I/O module and are ignored by the controller too, although they are selectable in CARE.
- In case a fixed characteristic has been selected, the input NV value delivered by the open LON I/O module is properly displayed as datapoint value.
- In case a default characteristic has been selected, the datapoint in most cases shows a value in the range of 0 - 10 based on the default characteristic input range of 0 - 10 V. To correct that wrong display and assure right input NV-to-datapoint value conversion, a conversion table has to be allocated to the controller.
- Default characteristics can be changed, deleted and newly created ("user-definable default characteristics").

CARE-XL500 10.08.01 and OS 2.06.05 and higher

- Fixed characteristics such as PT1000 are calculated inside the open LON I/O module.
- Default characteristics such as Pressure 0-3 " are enabled in CARE and calculated by the controller.

- In case a fixed characteristic is selected, the NVi value delivered by the open LON I/O module is properly displayed as datapoint value.
- In case a default characteristic is selected, the datapoint value is displayed properly as datapoint value. No additional conversion table is required.
- Default characteristics can be changed, deleted and newly created ("user-definable default characteristics").

Benefit and Limitation of "User-Definable Default Characteristics" in CARE 4 and XL500 10.08.01

Benefit

Allows the creation of non-linear characteristics by definition of up to four reference points.

Limitation

Controller characteristic input allows max. input values of 0-11.

Work around

Add a value conversion table that fits the NV input value to the max. input range of 0 - 11.

Example: Smart I/O module with 0 – 10 V humidity sensor connected

Inputsignal (Sensor)	NVO – Value (I/O Module)	Value Conversion Table (Controller NV)	Characteristic (Datapoint)	Value Display (Datapoint on MMI)									
0 – 10 V	SNVT_lev_percent: 0 – 100 %	<table border="1"> <thead> <tr> <th></th> <th>NV value</th> <th>DP value</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>0</td> <td>0,00000</td> </tr> <tr> <td>(2)</td> <td>100</td> <td>10,00000</td> </tr> </tbody> </table>		NV value	DP value	(1)	0	0,00000	(2)	100	10,00000		0 – 100 %
	NV value	DP value											
(1)	0	0,00000											
(2)	100	10,00000											

CARE 4 / CARE-XL500 10.08.01 Upgrade and OS 2.06.05 and higher

When upgrading a CARE 4 project in CARE-XL500 10.08.01, previously ignored default characteristics become active and are calculated by the controller. If, as in most cases, a conversion table had been assigned additionally, the datapoint shows wrong values.

Workaround

Check if a conversion table is allocated to the controller. If yes, delete it. Check the values (reference points) of the characteristic in order to assure a correct datapoint value display.

Actuator Run Time Handling

The actuator runtime handling is still located in the LON I/O modules but is optimized as the following comparison shows:

CARE 4 and OS 2.06.00 - 2.06.04

- Changing the actuator runtime in CARE deletes existing bindings and requests a re-binding
- Online changes of the actuator runtime for internal I/O modules can be entered and are executed

- Online changes of the actuator runtime for open LON I/O modules can be entered, but are ignored

CARE-XL500 10.08.01 and OS 2.06.05

- Change of the actuator runtime datapoint attribute in CARE is written into the UCPT without deleting the binding
- Online changes of the actuator runtime for internal I/O modules can be entered and are executed
- *Online changes of the actuator runtime for open LON I/O modules are blocked. MMI displays *****

*Also supported for open LON applications using OS 2.06.05 in CARE 4.

OS XLIRC Support

A feature of CARE 3.0.00 is the support of mapping IRC controller configurations on Excel 500 controllers (OS XLIRC), which provides basically the same functionality as Excel OS 1.3 except active bus wide MMI tool functionality (BMMI).

CARE offers the ability to map a defined set of IRC Multicontroller fixed application registers to Excel 5000 system user addresses that are accessible via an XBS central or local user interfaces. If defined, room specific time programs can be downloaded to an IRC Multicontroller.

The new features are added to the CARE *Default Text Editor* and to the *Miscellaneous Text Editor*.

Default Text Editor

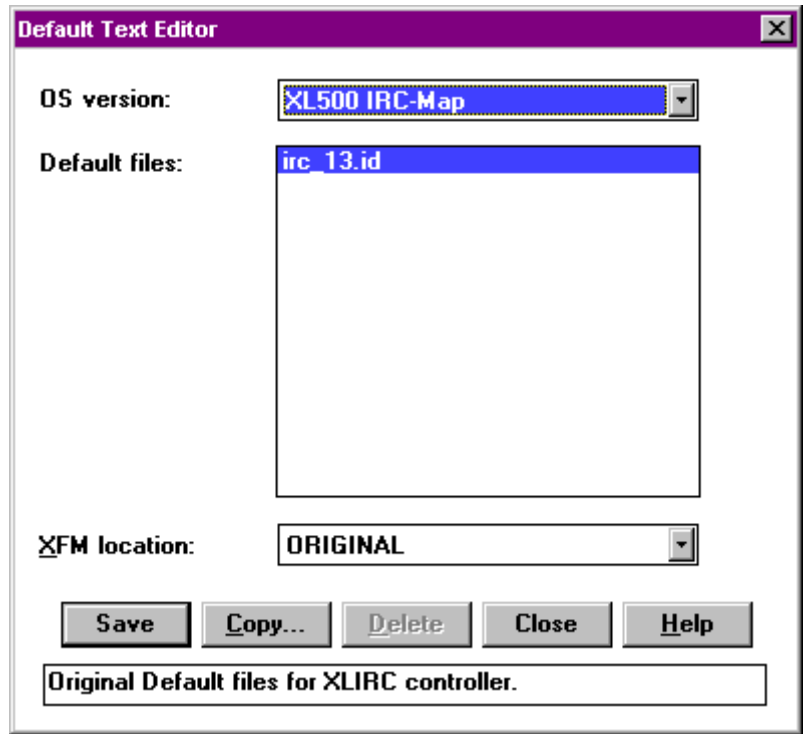
CARE provides sets of default files available for each new controller, which can be edited or created by the *Default (Text) Editor* (DEFT). Creating of new default files is only possible by copying an existing file set and then editing this copy.

This Editor of menu bar item *Database* is enhanced by two additional features for editing *Register Class Names* and the *Engineering Units Mapping Table* in an OS XLIRC default .ADL file.

When the selected default file set has OS version *OS XLIRC*, the new item *OS XLIRC* of DEFT menu bar item *Edit* opens with a sub menu containing the two items *Register Class Names* and *Engineering Units Mapping Table*.

For default text editing refer to Appendix: Default Text Editor.

- | | |
|------------------|--|
| Purpose | Select default file of IRC Multicontroller configuration |
| Procedure | <ol style="list-style-type: none"> 1. Dropdown menu bar item <i>Database</i> and select <i>Default Editor</i>.
CARE opens <i>Default Text Editor</i> box. |



2. Pull down *OS version* window and select *XL500 IRC-Map*.

CARE displays all the default files available for OS version *XL500 IRC-Map* (OS *XLIRC*).

3. Select specific default file, confirm with **Save** and select **Close**.

RESULT: CARE provides with specific IRC multicontroller default file to be edited.

To edit the specific XLIRC features refer to *IRC Register Class Names (DEFT)* or *IRC Engineering Units (DEFT)* to edit other default features refer to the main body of this manual.

Default files can be edited or copied to create a new file, default file set(s) can be deleted.

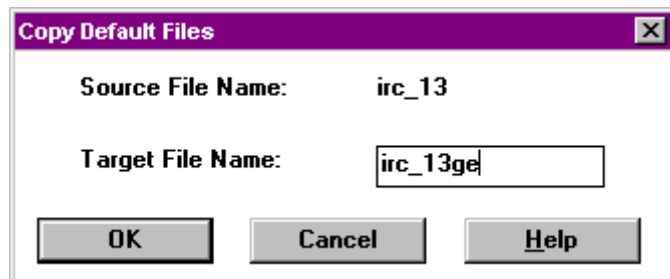
Purpose Create new default file for IRC Multicontroller configuration

- Procedure**
1. Dropdown menu bar item *Database* and select *Default Editor*.

2. Pull down *OS version* window and select *XL500 IRC-Map*.

3. Select specific default file and click **Copy**.

CARE displays the *Copy Default Files* box with the selected file name as Source File Name and the same name for Target File Name.



4. Enter new target file name and confirm with **OK**.

CARE returns to *Default Text Editor* box.

5. Pull down *OS version* window and select *XL500 IRC-Map* again.

CARE displays all the default files including the new file available for OS version *XL500 IRC-Map (OS XLIRC)*.

6. Select new default file in the *Default Text Editor* box, confirm with **Save** and select **Close**.

RESULT: CARE returns to *Default Text Editor* for editing the selected new file.

In order to edit the specific XLIRC features refer to *IRC Register Class Names* or *IRC Engineering Units*, to edit other default features refer to the main body of this manual.

IRC Register Class Names (DEFT)

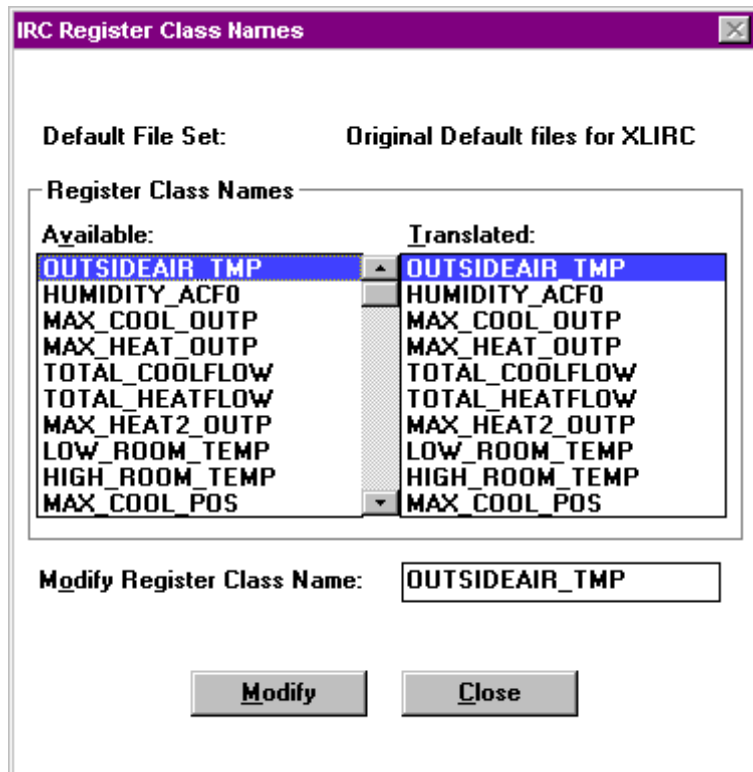
After selecting an IRC multicontroller default file, the class names of the IRC registers can be modified.

Purpose Modify IRC register class name

- Procedure**
1. Pull down menu bar item *Edit* of CARE Default Editor and select *Register Class Names* of item *OS XLIRC*.

NOTE: Item *OS XLIRC* only occurs if default file is of version XLIRC.

CARE Default Editor displays the *IRC Register Class Names* box.



2. Select the register class name to be modified.

CARE Default Editor displays selected register class name in the *Modify Register Class Name* window.

3. Edit register class name and click **Modify** to confirm the modification.
4. Select another register class name to be modified or click **Close** to close the box.

RESULT: The default file contains modified register class names, which are available for each new controller.

NOTE: Opening the *IRC Register Class Names* box at another time, the new IRC register class names occur in the *Register Class Names* windows *Available* and *Translated*.

IRC Engineering Units (DEFT)

After selecting an IRC multicontroller default file, the texts of the IRC engineering units can be mapped to another number.

Purpose Modify mapping of IRC engineering unit

Procedure 1. Pull down menu bar item *Edit* of the CARE Default Editor and select *Engineering Units Mapping Table* of item *OS XLIRC*.

NOTE: Item *OS XLIRC* only occurs if default file is of version *XLIRC*.

CARE Default Editor displays the *Engineering Units Mapping Table* box.

2. Select the IRC engineering unit in the *IRC Engineering Unit* window.

CARE Default Editor marks the selected IRC engineering unit and the CARE engineering unit opposite, and displays the appropriate unit texts.

3. Select a CARE engineering unit of the same type with another number in the *CARE Engineering Unit* window and click **Modify** to confirm the modification.
4. Select another IRC engineering unit to be remapped or click **Close** to close the box.

RESULT: The IRC engineering unit is mapped on another CARE engineering unit.

IRC Register Class Names (MISC)

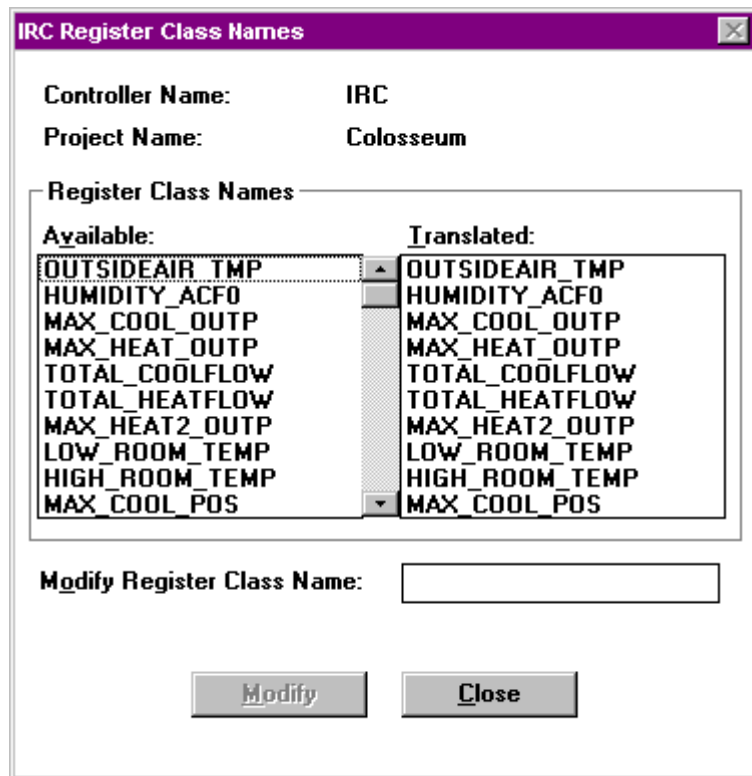
After selecting a current IRC multicontroller, the class names of the IRC registers can be modified.

Purpose Modify IRC register class name

Procedure 1. Pull down menu bar item *Edit* of CARE Miscellaneous Text Editor and select *Register Class Names* of item *OS XLIRC*.

NOTE: Item *OS XLIRC* only occurs when the selected controller is of version *XLIRC*.

CARE Miscellaneous Text Editor displays the *IRC Register Class Names* box for the selected controller.



2. Select the register class name to be modified.

CARE Miscellaneous Text Editor displays selected register class name in the *Modify Register Class Name* window

3. Edit register class name and click **Modify** to confirm the modification.
4. Select another register class name to be modified or click **Close** to close the box.

RESULT: The controller files now contain modified register class names, which are available for the selected controller.

NOTE: Opening the *IRC Register Class Names* box at another time, the new IRC register class names occur in the *Register Class Names* windows *Available* and *Translated*.

IRC Engineering Units (MISC)

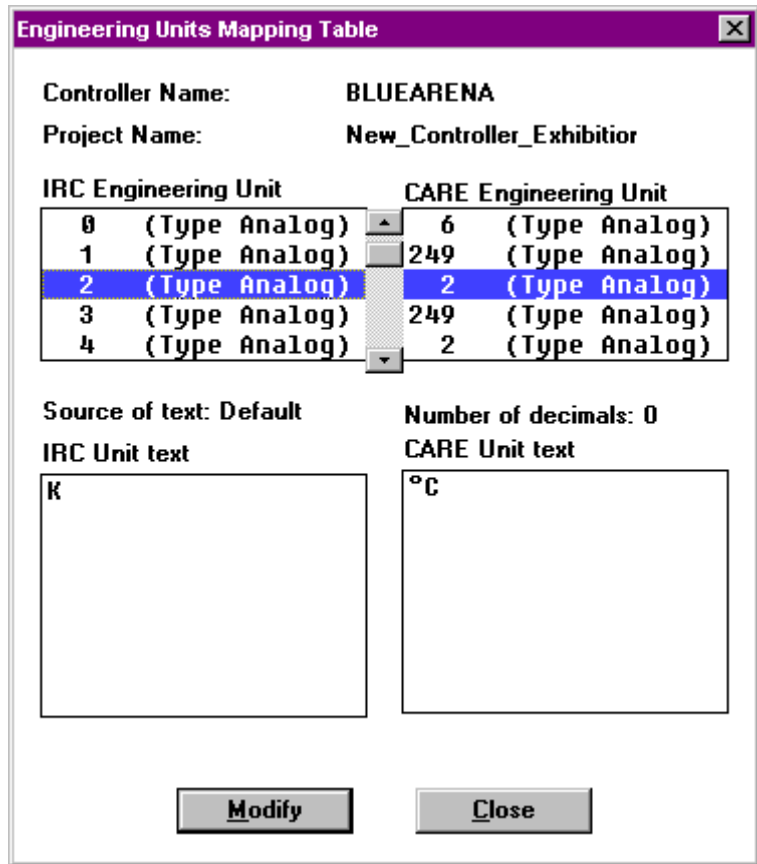
After selecting a current IRC multicontroller, the IRC engineering units can be mapped to another number.

Purpose Modify mapping of IRC engineering unit

- Procedure**
1. Pull down menu bar item *Edit* of the CARE Miscellaneous Text Editor and select *Engineering Units Mapping Table* of item *OS XLIRC*.

NOTE: Item *OS XLIRC* only occurs when the selected controller is of version XLIRC.

CARE Miscellaneous Text Editor displays the *Engineering Units Mapping Table* box.



2. Select the IRC engineering unit in the *IRC Engineering Unit* window.
 CARE Miscellaneous Text Editor marks the selected IRC engineering unit and the CARE engineering unit opposite, and displays the appropriate unit texts.
3. Select a CARE engineering unit of the same type with another number in the *CARE Engineering Unit* window and click **Modify** to confirm the modification.
4. Select another IRC engineering unit to be remapped or click **Close** to close the box.

RESULT: The IRC engineering unit is mapped on another CARE engineering unit.

S 1.1/1.1.30 Support

A feature of CARE 10.08.01 is the support of downgrading controller configurations to OS version 1.1 and creating controllers and plants with OS version 1.1.30.

CARE offers the ability to downgrade controller configurations as long as the engineered controller allows you to do so. If there are controller or plant restrictions, which do not allow to downgrade, CARE displays the appropriate error message and does not change the OS version.

Refer to the introduction of this appendix:

- For all other processes corresponding to downgrading a controller configuration.
- To create controllers and plants with OS version 1.1.30.
- For information about general restrictions for creating and downgrading of controllers and plants with this version.

Special restrictions for plants with this OS version include no support of:

- Flexible Multistage Points
- Flexible DO_Feedback_DI Points
- Flexible Pulse_2 Points
- Fast AI Points
- Fast Analog Input Points
- Pulsed Digital Output Points

NOTE: Unattached plants containing those points cannot be attached to a controller with OS version 1.1.30.

APPENDIX E: CHECK UTILITY

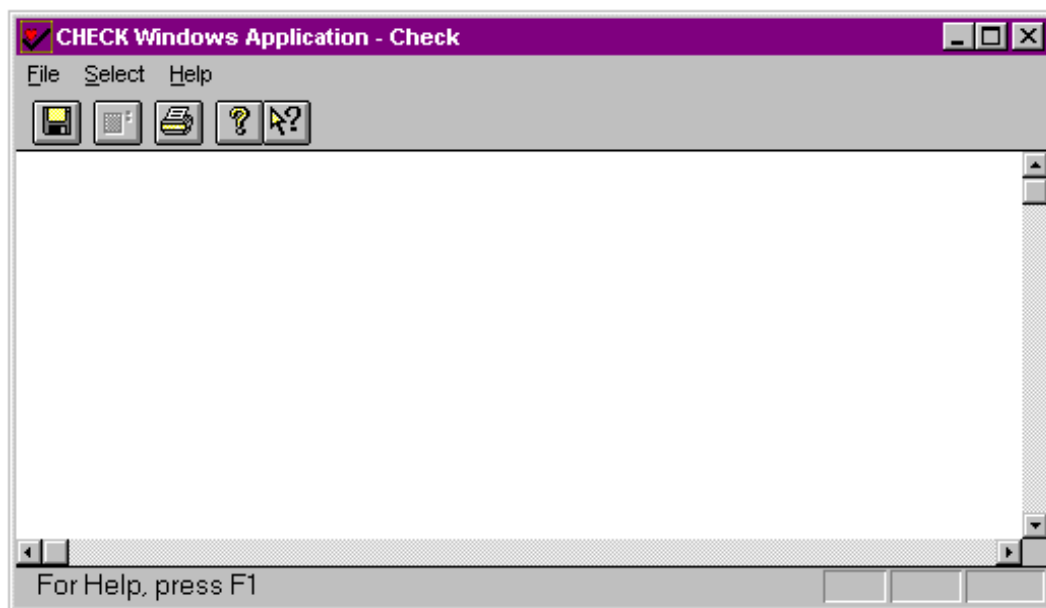
NOTE:

This section applies to CARE XL-5000 only.

Purpose This chapter describes the check utility that looks at multiple selected projects to find non-unique user addresses and controller names.

Procedure 1. Click menu item Project, then submenu item Check User Addresses.

RESULT: The CHECK Windows Application Check window displays.
Example:



The Menu Bar Description note following this procedure describes menu bar and button bar options.

2. Click menu bar item Select, then dropdown item Projects. Or, click the select project button in the button bar (second button from the left).



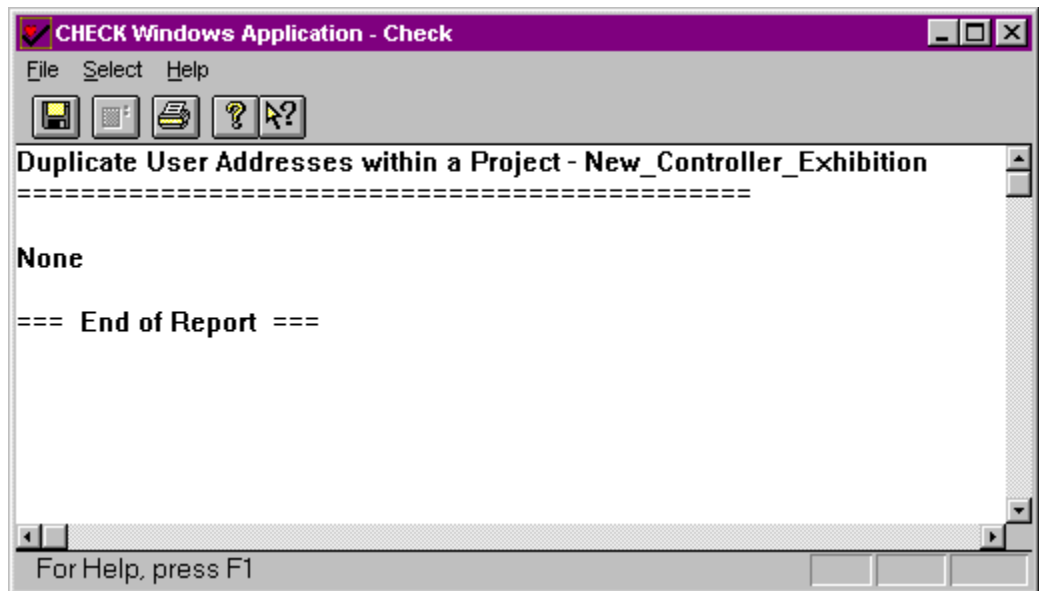
RESULT: The Project Selection dialog box displays with a list of all projects in the CARE database.

3. Click one or more project names to select them to be checked. Click **OK** to begin the check process.

NOTE: After you click **OK**, you cannot return to this selection dialog box and select other projects. You must exit the check utility and restart it to check other projects.

To deselect a project, click it again. To exit without selecting any projects, click **Cancel**.

RESULT: When the check utility is through, the results display in the check window. Example:



The first section of the display lists controller names that were found in more than one project. In this example, the name CPU1 was found in a project named AnothProject and also in a project named TwinTowers.

The next section of the display lists user addresses found in more than one project. In this example, user address MaDmpr was found in both the AnothProject and the TwinTowers project.

The end of the display is labeled with the words COMPARISON COMPLETE.

4. You can print the results, save them to a file, and/or exit the utility.



To print the results, click menu bar item File, then dropdown item Print. Or, click the print button in the button bar (third from the left). The Print dialog box displays so you can select print options.



To save the results to a file, click menu bar item File, then dropdown item Save As. Or, click the save as button in the button bar (first one on the left). The Save As dialog box displays so you can enter a file name and location where software should save the file.

To exit the utility, click menu bar item File, then dropdown item Exit. Or, double-click the Ventilator icon in the upper left-hand corner of the window.

Menu Bar Description

The menu bar contains three items, File, Select, and Help. The button bar contains buttons that provide a shortcut to selecting the menu bar items. The following text describes each menu bar item and shows its associated button, if one exists.

- File The File menu bar item provides the following dropdown items:



- Save As Display the Save As dialog box to specify a file name and location where software should save the check results.



- Print** Display the Print dialog box to select print options (range of pages to print, number of copies, etc) and print the check results. Shortcut keys: **Ctrl P**.
- Print Preview** Display the check results in a preview window as they would appear if printed. The print preview window replaces the check window and allows you to view either one or two pages at a time; move through the document; zoom in and out of pages; and initiate a print.
- Print Setup** Display the Print Setup dialog box to specify a printer and other print options. You can also display this dialog box from the Print dialog box (Print dropdown item).
- Exit** Close the check utility function. You can also double-click the Ventilator icon in the upper left-hand corner of the window to end the check session. Or, use the shortcut keys (**Alt F4**).



- Select** The Select menu bar item provides one dropdown item, Projects. This item displays the Project Selection dialog box that lists all current CARE projects. You use this dialog box to specify which projects you want the check utility to search. See Step C in the previous procedure for more details and a dialog box example.
- Help** The Help menu bar item provides three dropdown items:
- Index** Display the Table of Contents topic in the on-line help file for the check utility. See On-Line Help in the Getting Started chapter of this manual for details on help files.
- Using Help** Display the Table of Contents topic in the on-line help file for the check utility. See On-Line Help in the Getting Started chapter of this manual for details on help files.



- About CHECK** Display the About dialog box to view the version number of the check utility.

Context-Sensitive Help



The button bar provides a context-sensitive button that changes the cursor to a help question mark. Move the help cursor to the area of the window where you want more information and click the mouse button. The help topic related to that area of the window displays.

Troubleshooting

- Incomplete Reports** The following text lists problems that may occur and suggests actions you can take.
- A report may not display in its entirety because software generated more data than can fit in the window buffer. You can view the entire report by printing it or saving the results to a file and then printing or viewing the file. Or, you can run the check utility again but with fewer projects selected. Edit the projects in CARE to remove duplications and run the check utility again.
- Memory Exceeded Message** Software generated more data than can fit in available memory. Run the check utility again but with fewer projects selected. Edit the projects in CARE to remove duplications and run the check utility again.

No Data Base	The check utility executable file (CHECK.EXE) must reside in the same directory as the CARE database. If it is not, copy CHECK.EXE into the same directory as CAREMAN.EXE.
No Projects Found in Data Base	Software found a CARE database, but it does not contain any projects. Verify that the check utility is in the correct directory (CHECK.EXE must be in the same directory as CAREMAN.EXE) and that the correct version of the CARE database is also there.

APPENDIX F: ERROR MESSAGES

NOTE: This section applies to CARE XL-5000 only.

Purpose This chapter lists error messages that can appear during various CARE functions (alphabetically arranged) and a list of error messages that can occur during RACL generation.

General Errors

Message	Description
Alarm Message	An Alarm message dialog box may display after a controller download. The box displays date and time, user address and value/status (if relevant), and an alarm message. This Appendix lists some of the alarm messages that can display.
Communication problems	<p>When you exit CARE, the serial port used for communication with controllers may remain in use and thus be unavailable to other software applications.</p> <p>You can use the Control Panel 386 Enhanced function to issue a warning message whenever two applications attempt to control the same COM port. The 386 Enhanced function dialog box lists available COM ports in the Device Contention box. Select the COM port CARE uses and enable the Always Warn option.</p> <p>When the warning message occurs, reset the serial port. The Windows™ Terminal function can usually release the serial port and make it available for the next application. Start the Terminal function. The Terminal window displays with a menu bar that includes a Settings item. Select Settings, then the Communications dropdown item. When the Communications dialog box displays, select the COM port in question, click OK, and then exit the Terminal function.</p> <p>Try running the new application. If the application will not communicate (for example, no data is available), close the application, reboot the PC, and restart the application.</p>
Controller already exists	While establishing a new controller, you entered the name and number of an existing controller. Change the name and number.
Control loop is incomplete or Control strategy is incomplete	The control loop created is not completely connected. Check out the control loop.
Duplicate math output name. Names must be unique.	If you enter a new formula name in the New Variable Name dialog box and another formula already exists with that name, this message displays. All formula names must be unique within a controller. The New Variable Name dialog box displays from the Math Editor dialog box. See Switching Logic, MATH Rows section for an example of the Math Editor dialog box.
Error establishing data	Internal database error. This error cannot be eliminated.
Hardware point cannot be modified	The physical point type selected cannot be modified.
HW Config. failure	This message may display in an Alarm Message dialog box after a download to a controller. The message means that there are not enough hardware modules or enough of the right type of hardware modules to support the database. For example, there may be digital output points in the database but no digital output modules in the controller.

HW Conf. too large	This message may display in an Alarm Message dialog box after a download to a controller. The message means that the database requires less hardware than the controller physically has. For example, an Excel 500 controller may have two analog input boards, but the database requires only one. This alarm always appears when loading an Excel 80A or 100A controller if the points required are less than or equal to one Excel 500 module. For example, an Excel 100A can have 12 analog inputs but if the database has 8 or less inputs (the size of an XF521 or XF526 board), the alarm displays.
Illegal character in math expression Illegal character in User Address	These messages display after entry of a math formula in the Math Editor dialog box. See Switching Logic, MATH Rows section for an example of the Math Editor dialog box. See Excel CARE Control Icons User Guide 74-5577 (US) / EN2B-0184 (Europe) for rules for formula entry.
Insufficient hard disk capacity to print	The Windows™ print spooler could not establish the spooler file on the PC disk. As a result, the printing operation will take longer. Delete unnecessary files from the PC disk.
Insufficient memory or Insufficient memory space	There is insufficient memory available for the selected function. Divide the action into several steps and repeat.
Insufficient memory to print	The main computer memory is inadequate to print. Increase the main computer memory.
Invalid entry	The entry made in the mathematical editor is incorrect. Correct the mathematical formula.
Invalid password	The password entered is incorrect. Repeat password entry.
Invalid user address	The user address entered is incorrect. Only letters and numbers may be used.
Macro cannot be deleted	The selected macro cannot be deleted.
Macro name already exists	An attempt has been made to overwrite an existing macro. Select another name, one that does not exist, in order to save the macro.
Macro name does not exist	The macro name given does not exist in the database.
Mathematical function could not be saved	The formula in the mathematical editor could not be saved. Try to save again.
Maximum number of hardware points reached in controller or Maximum number of hardware points reached in plant	The maximum number of physical points for a controller has been exceeded. A maximum of 128 different physical points may be specified.
Maximum number of modules exceeded or Maximum number of modules reached in the controller	The maximum number of modules for a controller has been exceeded. One EXCEL 500 Controller can contain a maximum of 16 input/output modules.
Maximum number of PID controllers per plant has been reached or Maximum number of PID controllers exceeded	The maximum number of controllers in the plant have been exceeded. Maximum number of controllers per plant is 20.
Maximum number of software points exceeded	The maximum number of pseudopoints for the controller has been exceeded. A maximum of 256 different pseudopoints may be defined.
Minimum value > maximum value	While entering internal parameters, the lower limit has been set above the upper limit.

Missing double quote	This message can display after entry of a math formula in the Math Editor dialog box. All user addresses in a formula must be surrounded by double quotes. See Switching Logic, MATH Rows section for an example of the Math Editor dialog box. See Excel CARE Control Icons User Guide 74-5577 (US) / EN2B-0184 (Europe) for rules for formula entry.
More than 128 T-registers in module	The maximum number of T-registers (time registers) has been exceeded. Maximum number of T-Registers is 128.
More than 128 X or Y-Registers in module	The maximum number of X-registers or Y-registers has been exceeded. Maximum number of X or Y-registers is 128.
Name/Number/Type conflict	The name or the number of the new controller created already exists.
No controller assignment for project	The selected controller has not been used in the selected project.
No controller in database	CARE cannot find the controller in the database.
No controller in the project	A controller has not been established for this project.
No control loop found	No control loop has been created for the plant selected.
No control loop symbol found	CARE cannot find the control loop icon. Exit from the control strategy. Recall the control strategy again.
No element information	CARE cannot find any information about the elements of the selected segment.
No memory for polynomial	There are too many pivot points. Reduce the number of pivot points.
No more memory available	CARE has exceeded the memory. Increase the memory size of the computer.
No plant for the controller	No plant has been assigned to the selected controller.
No plant in database	CARE cannot find a plant in the database belonging to the project.
No plant type in database or No plant type exists	CARE cannot find a plant type in the database for the plant selected.
No printer found in WIN.INI	No printer has been entered in the WIN.INI file. Please install the printer and then recall the function again.
No software point exists	A pseudopoint has not been created for the plant selected.
No software point has been selected	A pseudopoint box has not been selected on the pseudopoint bar. Select a box on the pseudopoint bar to eliminate the error.
No switching table exists or No switching table found	No switching table has been created for the plant selected.
No text selected	If you click a Copy or Cut button and you have not highlighted any text to copy or cut, this message displays. For example, the Math Editor dialog box has Cut, Copy, and Paste functions that would generate this error. See Switching Logic, MATH Rows section for an example of the Math Editor dialog box.
Now removing controller application files due to changes in database. Please retranslate this controller.	This notice means that the controller has been translated but changes have been made to its files. These changes were made with one of the editors (Miscellaneous Text, Data Point Description, or Time Program). This notice appears when you exit an editor. You should retranslate the controller.
Number of columns > 128 in one module	The maximum number of columns has been exceeded. Maximum number of columns is 128.
Number of parameter registers in Module > 128	The maximum number of parameter registers has been exceeded. Maximum number of parameter registers is 128.
Number of submodules > 127	The maximum number of submodules (subprograms) has been exceeded. Maximum number of submodules is 128.
Number of Z-registers in module > 128	The maximum number of Z-registers (dynamic registers) has been exceeded. Maximum number of Z-registers is 128.

Paste buffer is empty	If you click a Paste button and you have not copied or cut any text, this message displays. For example, the Math Editor dialog box has Cut, Copy, and Paste functions that would generate this error. See Switching Logic, MATH Rows section for an example of the Math Editor dialog box.
Plant already exists	The newly created plant has been given the name of a plant that already exists. Select a new name that does not already exist.
Plant could not be assigned to controller <Controller Name>	The desired controller could not be assigned to the plant. Assign another controller to the plant.
Plant segment cannot be added	The maximum number of plant segments has been reached.
Price data not available	The calculation routine in CARE cannot find the price data. Copy the price data file (CAREKALK.DAT) from the diskette into the CARE directory on your PC disk.
Printer set for portrait format. Do you want landscape format?	If portrait format is preselected, this question displays before printing the plant graphics. Landscape format can then be reset.
Project already exists	An attempt has been made to assign an existing project name to a new project. Please choose another name that does not already exist.
Project <Name> does not exist	The selected project does not exist.
Segment cannot be deleted. It is still connected	The segment to be deleted from the plant is still in use elsewhere in the plant. This segment can only be deleted once it has been removed from all relevant control loops or switching tables.
Several switching tables for user address	This warning may appear during a plant translation. It means that more than one switching table commands the same point. This situation is very common with analog points and sometimes with digital points. It could be a problem if you have inadvertently created two switching tables commanding the same point to do opposite actions. You may want to check your tables.
Software address already exists	A new pseudopoint user address already exists. Please select a new user address.
Software point could not be established	The pseudopoint cannot be generated because an existing user address has been used. Modify the user address.
Switching table not included in macro library	The switching table cannot be included in the macro database. Repeat the save as a macro.
Switching table not saved due to missing user address	The user address for the control device has been omitted from the switching table being loaded as a macro.
This user address already exists or User address already exists in controller. Modify?	Two plants have been assigned to one controller. In both plants, at least one user address is identical so the controller does not know which plant to associate with it. Take care to ensure that identical user addresses are not used when a controller controls more than one plant.
Translate function gray	If the Translate item is gray (unavailable) under the Controller menu, one or more of the control strategies for the current plant may be incomplete.
Unknown point type	CARE does not recognize the selected plant type. Perhaps a blank space has been included in the new name during renaming or copying? Currently, only the heating and air conditioning plant types exist.
WIN.INI error. Change printer	There is an error in the WIN.INI file. Call up the "Change..." function in the printer menu.

RACL Generation Errors

RACL generation errors are usually a result of insufficient memory or wrong data from the database. Suggestions:

- Check the following list of messages.
- Try closing other open applications and/or rebooting the PC.
- For database problems, try retranslating the controller and/or detaching and attaching the controller.

If an internal error displays, the real cause may stem from other software applications in Windows™ or DOS rather than from RACL. Again, rebooting may help.

Message	Description
!!! No control loop found !!!	No control loop has been defined in CARE. This is a warning.
No control loop icon found	An empty control loop has been found. Loading does not make sense.
Insufficient memory	More memory is required.
Memory lock error	A memory block could not be locked. This error should not occur in Windows™ 3.1
Error in data base function	A database function returned an error code.
Nullpointer in parameter list	A local memory handler function in RACLGEN got a null pointer. This error should never occur in a final version.
Invalid parameter list handler	This text is wrong. It should be "Invalid handle in parameter". It says that a memory block handle passed to a RACLGEN memory handler function is null.
Memory reallocate error	Error in memory handler.
Inconsistency in CARE database	The data from the CARE database is not plausible. Possible causes: - an empty input connection in a control loop. - unknown delay type in a switching table
Parameter error in function	This message is no longer in use.
Array overload error	This message is no longer in use.
!!! No switching table found !!!	No switching table has been defined in CARE. This is a warning.
Specified memory size > 64K	A memory block greater than 64 has been requested. Possible causes: --a large application in CARE - wrong database connection information which leads to an open connection in RACL.
Module: more than 128 T-registers More than 128 X or Y-registers in modules Number of module parameter registers > 128 Number of module Z-registers > 128	Too many registers of the specified type required for the application.
Trying to connect outside of a symbol	Attempt to connect two RACL symbols where the requested input/output is above the existing connectors.
Trying to connect two data points without I/O statement	Internal RACL error that should never occur.

Internal memory inconsistent	<p>A plausibility check of RACLGEN's internal database detected an error. Possible causes:</p> <ul style="list-style-type: none"> - any input connection at a MAT symbol. - an undefined input type in the internal RACL chart. - an undefined output type in the internal RACL chart. - attempt to connect two RACL symbols, which do not have the appropriate number of inputs and outputs. - an unknown point type when loading the .IPL file. <p>For example, if you use a Math statement that includes a flag in a control loop that also uses an XFM, software generates incorrect code during plant translation. See the Control Strategy chapter, Pseudopoints and Flags, for details.</p>
Switching table overflow (too many rows, columns or XOR's)	A switching table has too many rows, columns, or XORs.
User address or address type not found	A point name has been referenced that cannot be found in the data read from the .IPL file. In many cases, this error is a result of a reversed notation in a MAT function.
Invalid type for input data point	Attempt to access input in a way that is only allowed for outputs. This error does not normally display. If it does, there may be an error in the database data.
Invalid type for output data point	Attempt to access output in a way that is only allowed for inputs. This error does not normally display. If it does, there may be an error in the database data.
Mathematical function stack underflow	Internal MAT function stack underflow. This error should never occur.
Error interpreting the mathematical function row	Usually, this error means there is wrong data in the database.
Error: Recursion in mathematical function row	Another MAT function is referenced in a MAT function.
Invalid type of CARE symbol conversion	An unknown symbol has been read from a control loop.
Function not supported	This message is no longer in use.
Type of data point used in this location not permitted	The type connected to the symbol must be a point.
No plant for the active controller available	No plant found in the database. This error does not usually occur.
Program stack overflow	Too many recursions have been made to convert a MAT function.
Number of submodules > 127 Number of columns in a module > 128	Excessive number of submodules or columns in a module.
RACL opcode not supported	An internal error in RACLGEN that should not occur.
Too few internal parameter in CARE symbol	Too few parameters for a control loop symbol from the CARE database.
Too few X-registers in symbol	An internal error in RACLGEN that should not occur.
No columns in switching table No rows in switching table XOR tables with only one column or row forbidden Multiple columns with only one row forbidden	Invalid switching table read from the database.
Inputs must be continuously connected	Inputs of a control loop symbol have not been continuously connected.
No more space for message	Message listbox overflow.
Switching table function values buffer overflow	Too many switching tables defined for one point.
The index definitions for standard files missing	This text is wrong. It displays when the directory for the XI584 standard files is not defined in the CARE.INI file.

The index definitions for XI583 missing	This text is wrong. It displays when the directory for the XI584 and CARE.EXE files is not defined in the CARE.INI file.
The standard files name definitions missing	The name for the standard files is missing in the CARE.INI file.
Warning. Application is too big	The sum of all application parts exceeds the maximum defined in RGWRFILE.C. The algorithm is also in RGWRFILE.C
Error opening or reading XL100, XL80 intermediate file Data point description file not found	These messages are no longer in use.
Error opening temporary switching table file Error generating temporary switching table file Error reading temporary switching table file Error writing to temporary switching table file Error deleting temporary switching table file Error writing to temporary control loop file Error reading the temporary control loop file Error deleting the temporary control loop file	RACLGEN creates a temporary file for each switching table and control loop. These messages indicate file I/O errors.
Error generating the loadable T-register file Error generating the loadable Z-register file Error generating the loadable P-register file Error generating the loadable EXCEL code file Error generating the loadable EXCEL code or P-register file Error generating the loadable EXCEL code file	File I/O error in the last pass in RGWRFILE.C
Error copying the XI583 standard files Error opening the project file Error reading the project file	These messages are no longer in use.
Error generating the reference file	The function for writing the reference file is in RGWRFIL1.C, but the error is in RGWRFILE.C based on the return code.
Error whilst loading engineering units	The function for reading engineering units is in RGINIT.C, but the error is in RGWRFILE.C based on the return code.
User address (or value of operand) >127	A plausibility check message in RGWRFILE.C while creating the RACL code file. It always indicates an internal error where the real cause may stem from other software applications in Windows™ or DOS rather than from RACL. Rebooting may help.
Error in submodule file	An error while loading and linking an XFM in RGWRFILE.C.
Error in Input assignment! Error in Output assignment!	An illegal connection between control symbols was found in RGSETSYM.C. The problem is usually wrong data from the database.
Error in internal XFM-Symbol parameters!	An empty file name or wrong version of an XFM was found in the database.
Datapoint for XFM->CSD assignment not found!	An XFM references a point that cannot be found in the point list of RACLGEN, normally the contents of the .IPL file plus CARE flags and mathematical function names.
Different version of XFM symbol and .CSD file!	The version of an XFM in the database and the referenced file does not match.
File is not a .CSD file for Honeywell-CARE!	Illegal file header found in a .CSD file.
Too much datapoints in .CSD File!	The number of points in a .CSD file exceeds 255.
Error in Command Line	Syntax error in run-time command line of RACLGEN.
Illegal project name!	No project name passed via run-time command line.
Illegal target controller name!	No target controller passed via run-time command line.

Error opening data point description (.IPL) Error opening data point text description (.KFX)	Open error in RGPCB_IN.C.
Maximum number of software points exceeded	More than 128 software points found in RGPCB_IN.C.
There was an error accessing the Environment Record There was an error creating the Alarm Text File There was an error creating the Analog Eng Units File There was an error creating the Digital Eng Units File There was an error creating the Point Descriptor File There was an error creating the Time Program File There was an error creating the Characteristics File	Database and file I/O errors in RGMKFILE.C.
Illegal or duplicate datapoint access!	Writing access to one point has been attempted: - from more than one symbol in one or more control loops - from an internal XFM reference and from anywhere outside - from more than one switching table.

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