

TURCK

Your Global Automation Partner

excom I/O System Integration in Centum VP via PROFIBUS

Integration Manual

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1 About this manual

The instructions set out how to integrate the excom system into the Centum VP control system from Yokogawa via PROFIBUS in the event of system redundancy.

Read this manual and the applicable documents carefully before the integration. This will prevent the risk of personal injury and damage to property. Keep this manual safe during the service life of the product. If the product is passed on, hand over this manual as well.

The manual describes the possibilities for GSD-based integration from the installation right through to the handling of the I/O data and the associated diagnostics. Other applications of the excom system are described in addition to the general integration:

- Set up system redundancy
- Set parameters
- Load parameters to the device

Keep these instructions safe during the service life of the product. If the product is passed on, pass on these instructions as well.

1.1 Target groups

These instructions are written for specifically trained personnel and must be read carefully by anyone entrusted with the installation, commissioning, operation, maintenance, disassembly or disposal of the device.

1.2 Explanation of symbols used

The following symbols are used in these instructions:



DANGER

DANGER indicates a dangerous situation with high risk of death or severe injury if not avoided.



WARNING

WARNING indicates a dangerous situation with medium risk of death or severe injury if not avoided.



CAUTION

CAUTION indicates a dangerous situation of medium risk which may result in minor or moderate injury if not avoided.



NOTICE

NOTICE indicates a situation which may lead to property damage if not avoided.



NOTE

NOTE indicates tips, recommendations and useful information on specific actions and facts. The notes simplify your work and help you to avoid additional work.



CALL TO ACTION

This symbol denotes actions that the user must carry out.



RESULTS OF ACTION

This symbol denotes relevant results of actions.

1.3 Other documents

Besides this document the following material can be found on the Internet at www.turck.com:

- Data sheet
- Quick Start Guides
- excom manuals
- Approvals

1.4 Feedback about these instructions

We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to techdoc@turck.com.

2 Notes on the system

2.1 System identification

This manual applies to the Turck I/O system excom.

2.2 Turck service

Turck supports you in your projects – from the initial analysis right through to the commissioning of your application. The Turck product database at www.turck.com offers you several software tools for programming, configuring or commissioning, as well as data sheets and CAD files in many export formats.

The contact data for Turck branches is provided at [▶ 54].

3 For your safety

The product is designed according to state of the art technology. Residual hazards, however, still exist. Observe the following safety instructions and warnings in order to prevent danger to persons and property. Turck accepts no liability for damage caused by failure to observe these safety instructions.

3.1 Intended use

The excom I/O system can be integrated on a GSD basis via PROFIBUS into the Centum VP control system from Yokogawa.

The device must only be used as described in these instructions. Any other use is not in accordance with the intended use. Turck accepts no liability for any resulting damage.

3.2 General safety instructions

- The device must only be fitted, installed, operated, parameterized and maintained by trained and qualified personnel.
- Only use the device in compliance with the applicable national and international regulations, standards and laws.
- The device meets the EMC requirements for the industrial areas. When used in residential areas, take measures to prevent radio frequency interference.
- Only combine devices for which the technical data is suitable for joint use.
- Faulty repairs can lead to the device failing and to accidents leading to property damage and personal injury. Do not interfere with or modify the system components. These devices are not intended for repair. Take defective devices out of operation and send them to Turck for fault analysis. Observe our return acceptance conditions when returning the device to Turck.

3.3 Notes on Ex protection

- Only use the device in Ex areas when installed in the appropriate protective housing.
- Observe national and international regulations for explosion protection.
- When using the device in Ex areas, the user must have knowledge of explosion protection (IEC/EN 60079-14 etc.).
- Only use the device within the permissible operating and ambient conditions (see certification data and Ex approval specifications).
- Cables and terminals with intrinsically safe circuits must be indicated — use light blue for color-coding. Separate cables and terminals from non-intrinsically safe circuits or isolate accordingly (IEC/EN 60079-14).
- Complete certification of intrinsic safety.
- Never connect equipment to intrinsically safe circuits if this equipment was previously used once in non-intrinsically safe circuits.
- Please follow the instructions for use for the built-in equipment.

4 Integrating the excom system with Centum VP

4.1 Requirements

Hardware used

This example uses the following hardware:

Yokogawa hardware

- 2 × PROFIBUS module APL121

Turck hardware

- MT08-N module rack
- 2 × Gateway GDP-N/FW2.3
- DM80-N digital I/O module
- DO40-N digital output module
- AIH40-N analog input module
- AOH40-N analog output module
- PROFIBUS cable

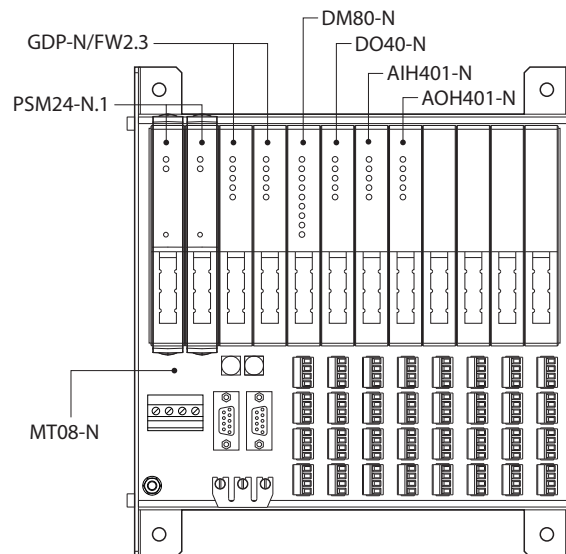


Fig. 1: Example setup of the excom station

Software used

This example uses the following software:

Yokogawa software

- CENTUM VP R6
- SYCON.net

Turck software

- GSD file V2.0.4
- Gateway firmware V2.3.3.0

4.2 Installing the GSD file

The GSD file for the excom system is available as a zip file for download from www.turck.com.

- ▶ Unpack the zip file.

Proceed as follows to install the GSD file:

- ▶ Opening **Centum VP**.
- ▶ In the **All Folders** project tree, select the node that has an FCS (Field Control Station) and the two PROFIBUS modules ALP121.
- ▶ Double-click the **NODE1** node.
- ▶ In the **Opened Folder** main window: **NODE1** double-click the **3ALP121** PROFIBUS module.

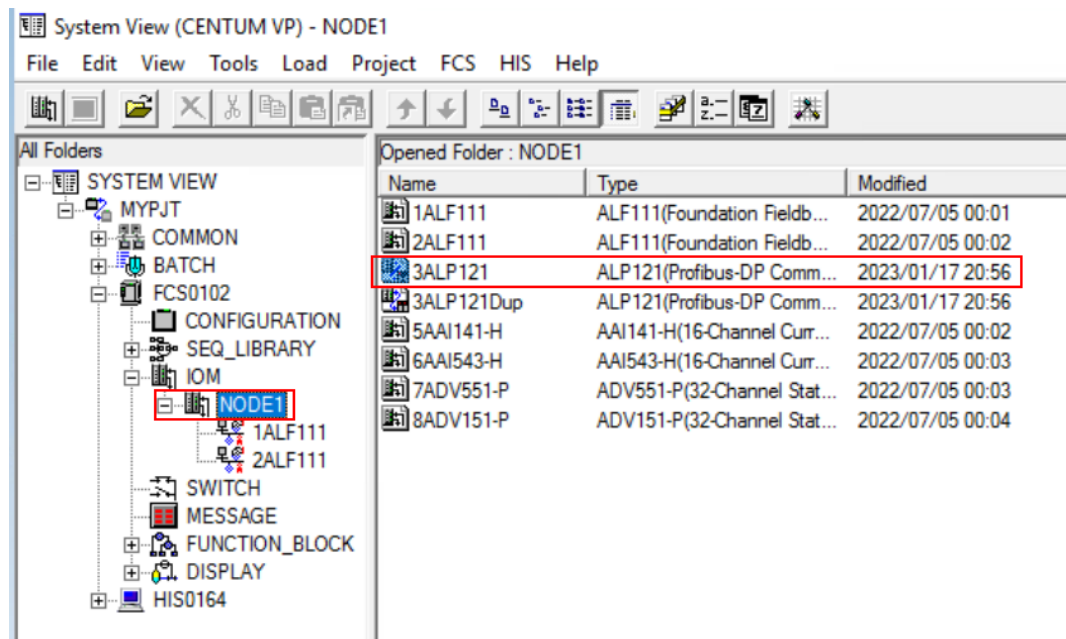


Fig. 2: Open the project

- ⇒ The **Start Builder** window opens.

- ▶ Select the **PROFIBUS-DP Configurator**.
- ▶ Click **OK**.

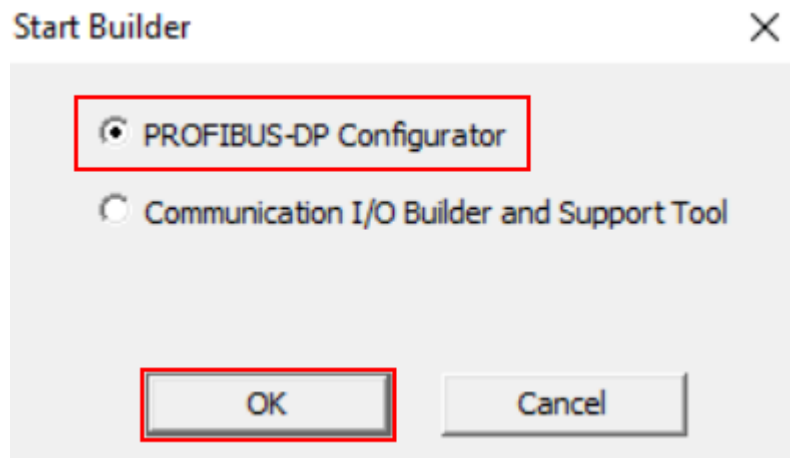


Fig. 3: Start Builder

- ⇒ The **SYCON.net** software opens.
- ▶ Select **Network** → **Import Device Descriptions...** from the top menu bar.

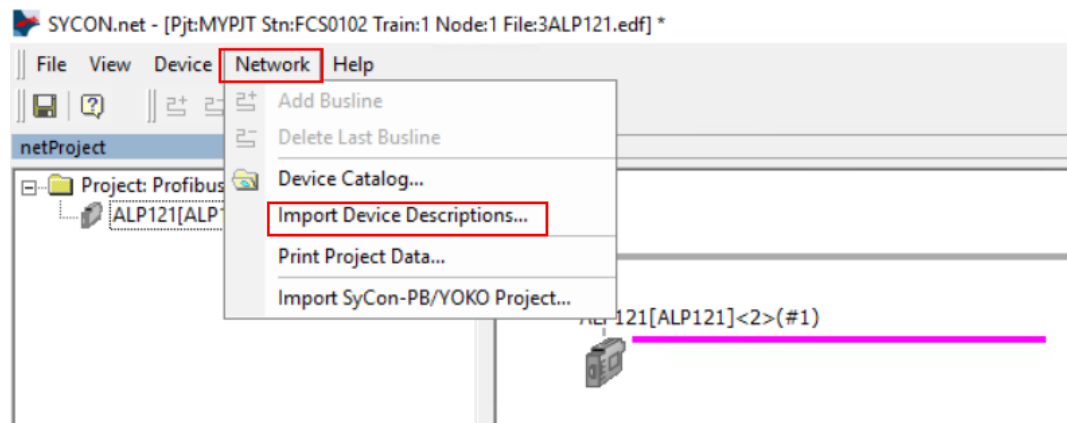


Fig. 4: Select Import Device Descriptions...

- ⇒ A window opens in which the GSD file can be selected.

- ▶ Select the GSD file.
- ▶ Click Open.

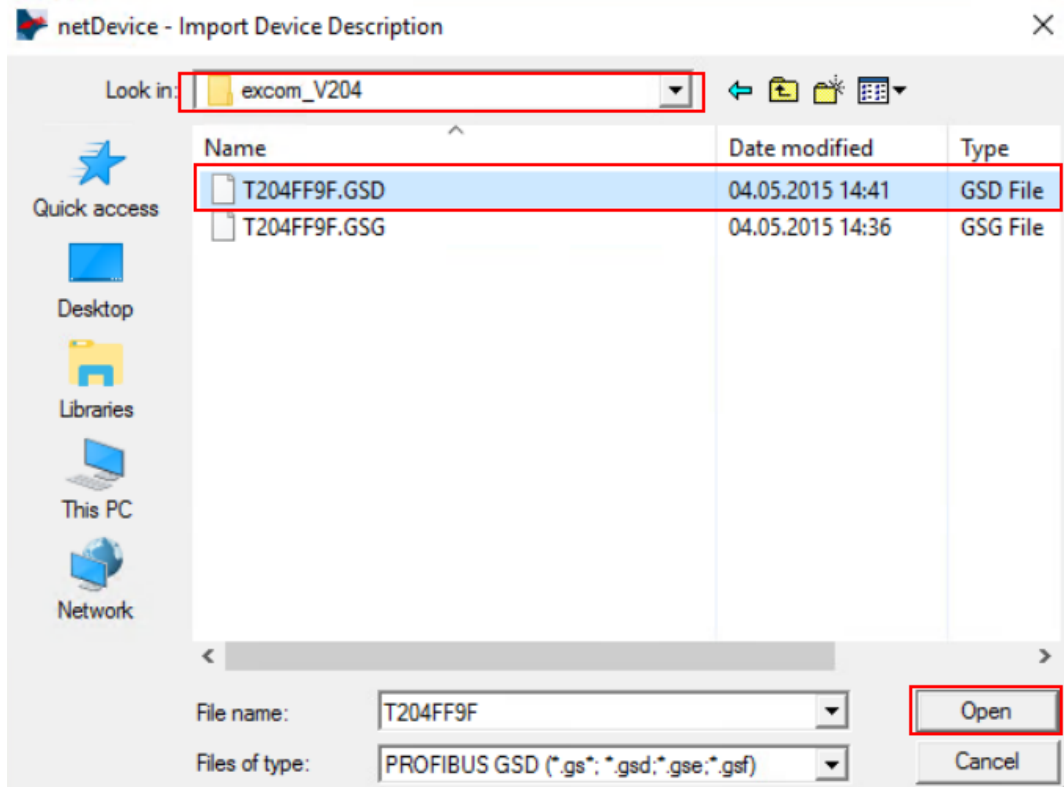


Fig. 5: Select the GSD file

- ⇒ A query window for selecting the graphical representation opens. The graphical display enables a distinction to be made between devices created in the configurator.
- ▶ Click Yes to import the corresponding graphic file in bitmap format.

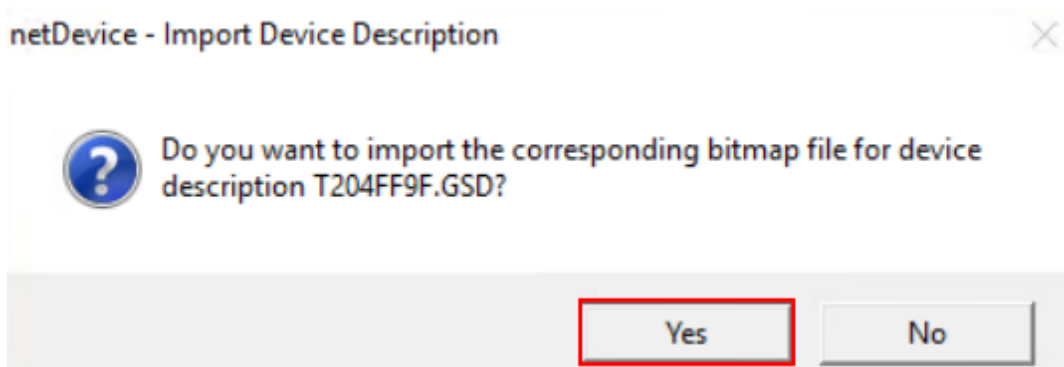


Fig. 6: Import a bitmap file

- ⇒ A selection window for the bitmap file opens.

- ▶ At the bottom of the window, select the file type **Bitmap (*.dib;*.bmp)** from the drop-down menu.
- ▶ Select the desired bitmap file.
- ▶ Click **Open**.

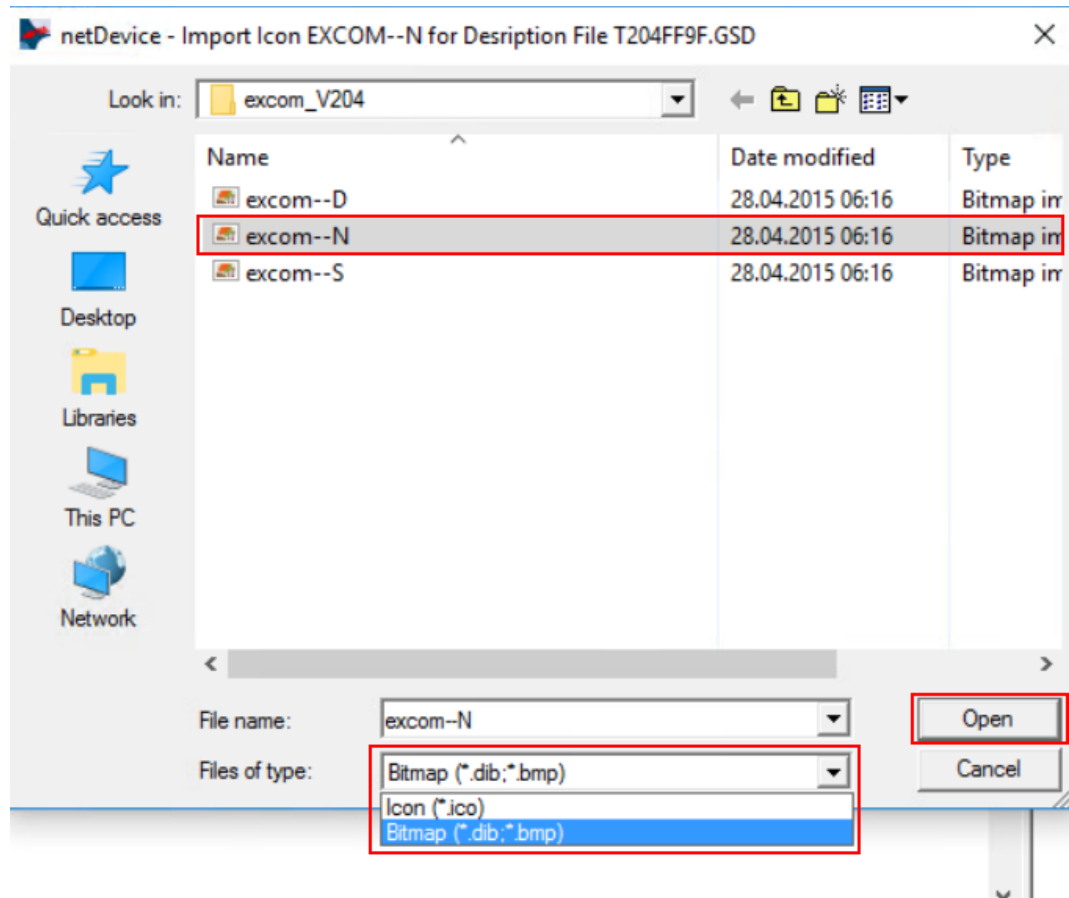


Fig. 7: Select the bitmap file

- ⇒ After the import is successfully completed, a query window opens. The device catalog must be reloaded.

- ▶ Click Yes.

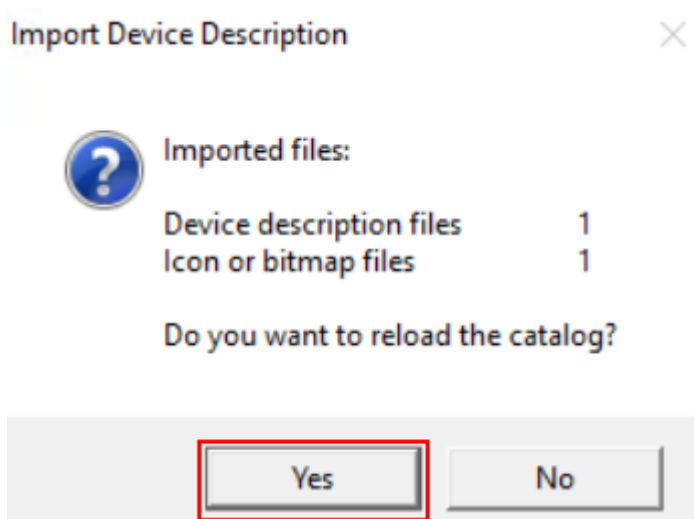


Fig. 8: Load the device catalog

4.3 Creating an excom station and excom modules

The excom station and excom modules must be added to the PROFIBUS configuration. To do this, the GSD file must be installed.

- ▶ In the right side bar, select the GSD file **excom(2.0.4)** and drag and drop it to the PROFIBUS line in the project window.

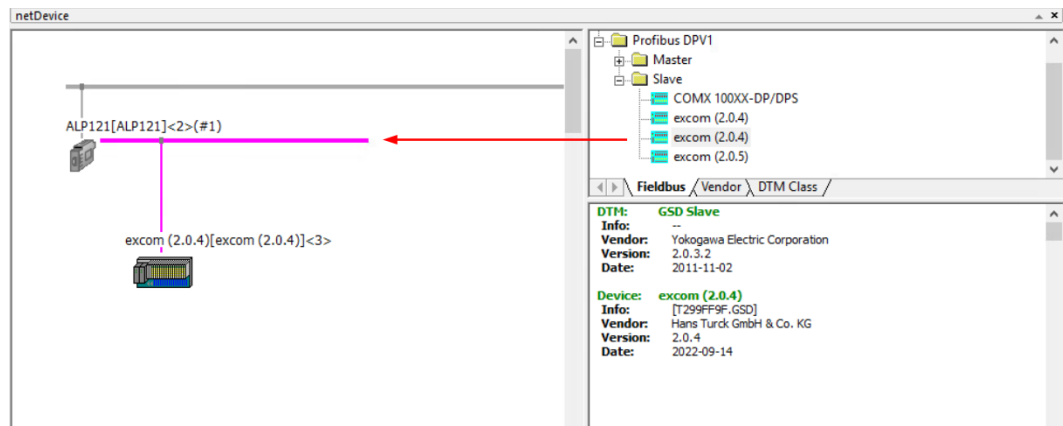


Fig. 9: Add the device by drag and drop

- ▶ To open the excom station configuration, double-click the **excom(2.0.4)** device.
- ▶ Alternatively: Right-click on the **excom(2.0.4)** device and click **Configuration...** in the context menu.

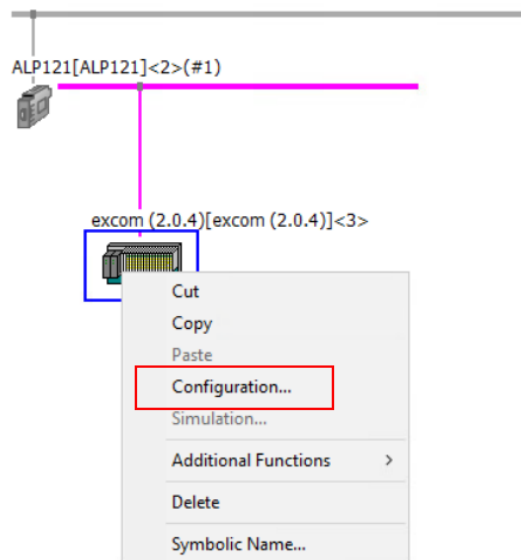


Fig. 10: Click Configuration...

- ⇒ The configuration window opens.

The excom modules must be selected from left to right according to their arrangement on the module rack. The GDP... gateway only needs to be selected once in the case of redundancy.

- ▶ Under the **Navigation Area** click → **Modules**.
- ▶ In the **Available Modules** window, select the excom modules and add them to the configuration using **Append**. The slot numbering is displayed automatically.

In this example, the following excom modules are selected:

- Gateway **GDP C**
- **DM80** digital input module
- **DO40**. digital output module
- **AIH40 1H** analog input module
- **AOH40** analog output module

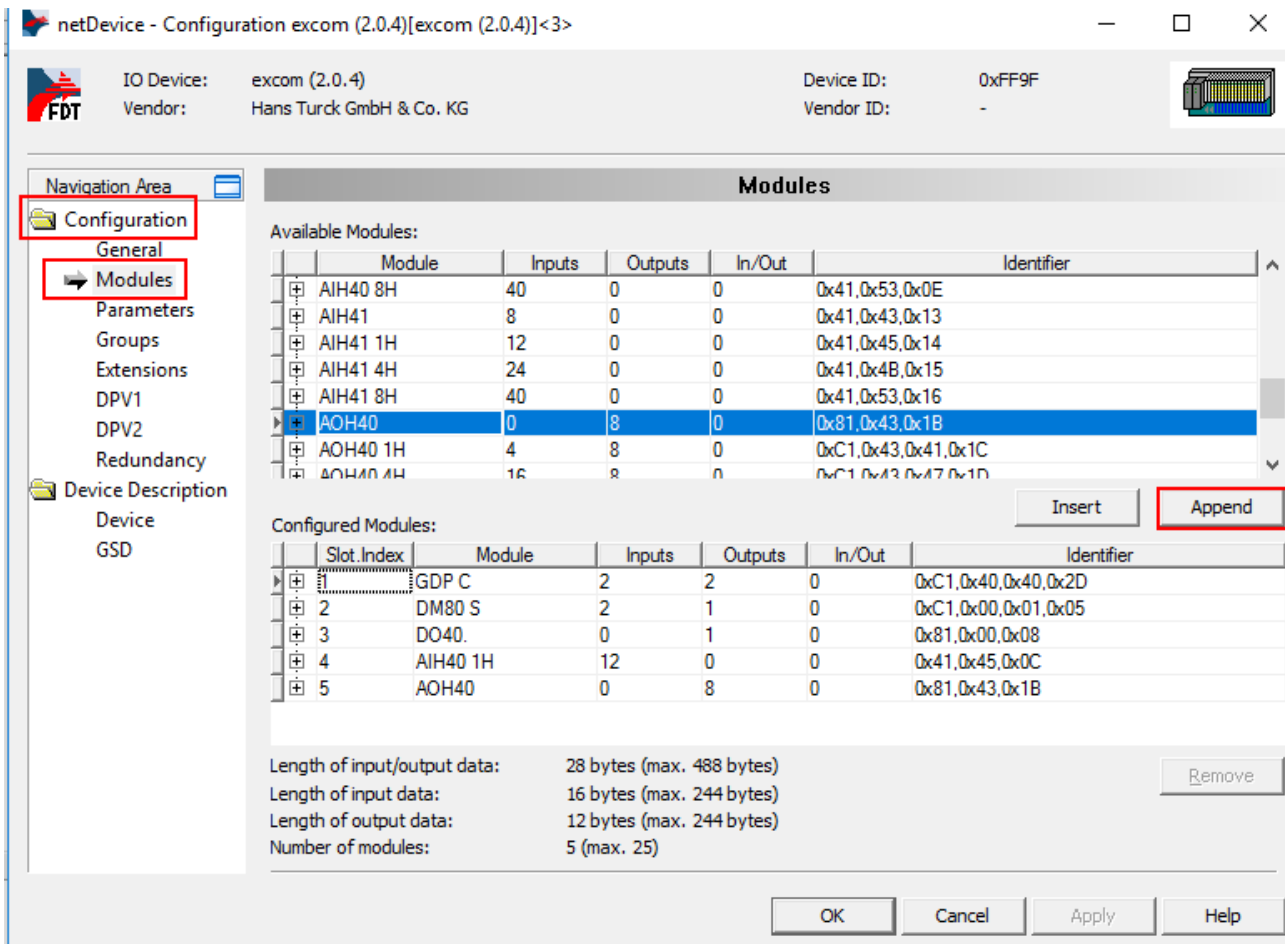


Fig. 11: Configuration window

4.4 Parameterizing excom modules

The gateway or modules can be parameterized in the configuration window. The configuration window can be opened in the project window by double-clicking, or in the context menu of the excom station.

- ▶ In the **Navigation Area**, under **Configuration** click → **Parameters**.
- ▶ Select the desired excom module from the **Module:** drop-down menu.
- ▶ Under **Value**, double-click or tap the space bar to select the displayed value. A drop-down menu opens.
- ▶ In the drop-down menu, set the desired parameter value.

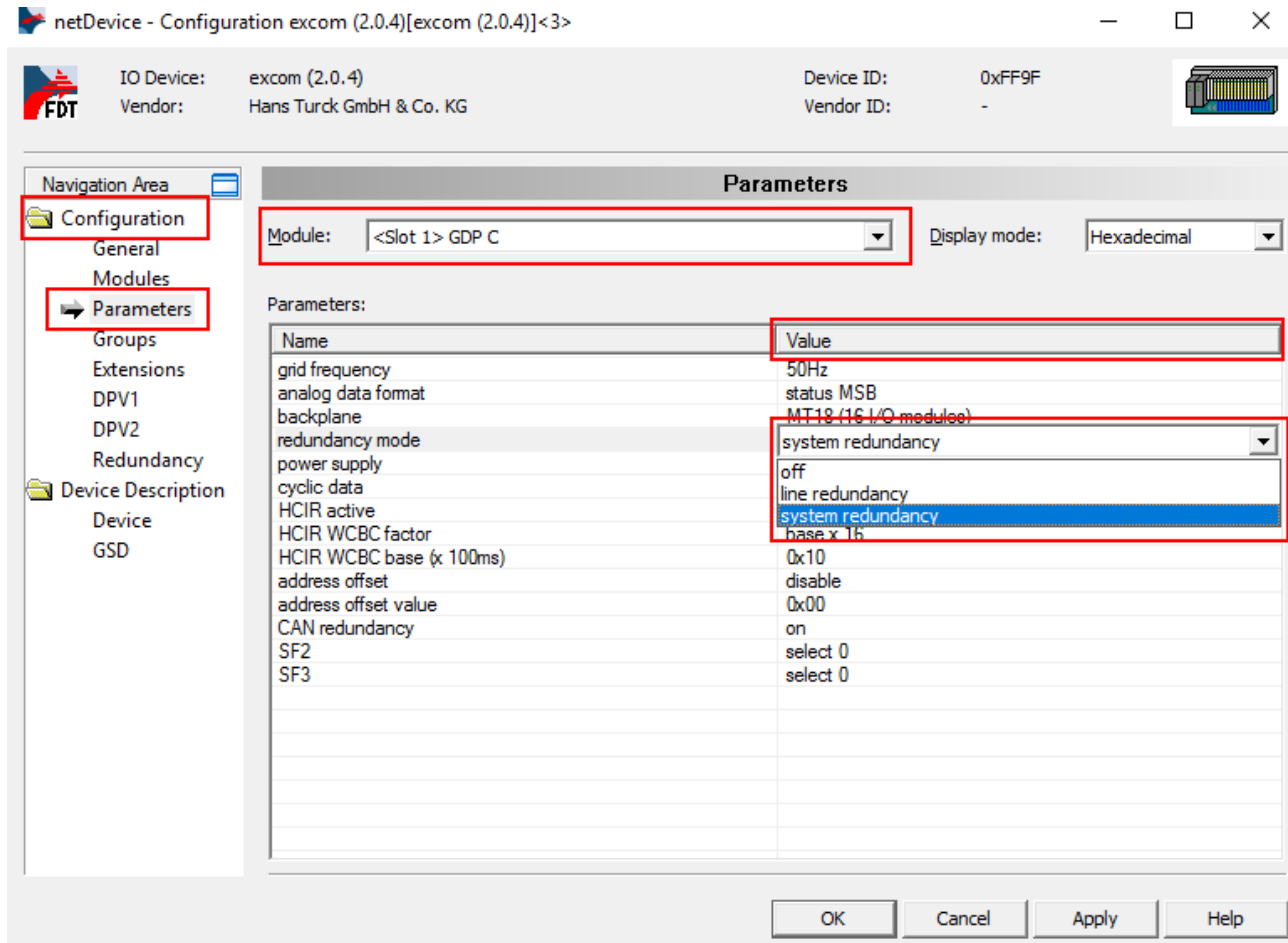


Fig. 12: Set parameters (GDP C example)

4.4.1 Example: GDP C

In the following example, the GDP... gateway is parameterized.

- ▶ Select **Module** → **GDP C** from the drop-down menu.
- ▶ Set the parameter values for each channel under **Value**.

Parameter overview — AIH40

Parameter name	Value	Meaning
Mains frequency	50 Hz 60 Hz	Select a filter: To suppress possible overlays due to mains disturbances in analog signals, either a 50-Hz filter or a 60-Hz filter can be selected.
Analog data format	MSB status LSB status No status	Set the status bit position: The status bit of an analog input channel can be mapped into the process input data of the channel and the position (MSB or LSB) can be determined. <ul style="list-style-type: none"> ■ Status MSB: Status bit at bit position 2¹⁵ ■ Status LSB: Status bit at bit position 2⁰ ■ No status: Measured value without status bit
Module racks	MT08 MT16 MT24	Select the module rack used: <ul style="list-style-type: none"> ■ MT08 (8 I/O modules) ■ MT16 (16 I/O modules) ■ MT24 (24 I/O modules)
Redundancy mode	Off Line redundancy System redundancy	Select the type of redundancy: <ul style="list-style-type: none"> ■ Gateway without redundancy function ■ Line redundancy ■ System redundancy
Power supply unit	Simple Redundant	Select diagnostics Simple: Both power supplies supply the excom station with voltage; status information about the redundant supply is not output. Redundant: Both power supplies supply the excom station with voltage and status information about the redundant supply is output.
HCIR active	Off On	Enable online configuration This bit must be set by the PROFIBUS master before the HCIR sequence starts. During the HCIR sequence, the outputs retain their last valid value. After the HCIR sequence is completed, the outputs are set to the current status of the process values.
HCIR WCBC factor	Basis × 1 Basis × 16	Select the factor for generating the max. holding time of the outputs between old and new configuration
HCIR WCBC basis (× 100 ms)	0...63 (default: 5)	Define the basis of the changeover time
Address offset	Off On	Activate or deactivate address offsets for line redundancy
Offset value	0...124 (default: 0)	Select address offsets for generating a virtual address for the redundant gateway (default value: 0, must be at least 1)
CAN redundancy	Off On	Activate or deactivate internal communication redundancy (gateway module communication)
SF2/SF3		Reserved

Parameter name	Value	Meaning
The following parameter applies only to the gateway configuration with the suffix "C" (cyclic data) or "YO" (control data for Yokogawa redundancy) for ALP111.		
Cyclic data		The default value of this parameter is "0" and must not be changed.

4.4.2 Example: DM80

The DM80 digital module is parameterized in the following example.

- ▶ Select **Module** → **DM80** from the drop-down menu.
- ▶ Set the parameter values for each channel under **Value**.

DM80: Parameter overview

The parameters are set in pairs for the particular two channels (1/2, 3/4, 5/6, 7/8).

Parameter name	Value	Meaning
Short circuit monitoring	On Off	Activate or deactivate the short circuit monitoring in pairs The output signal can only be monitored when activating the output.
Wire-break monitoring	On Off	Activate or deactivate the wire-break monitoring in pairs The output signal can only be monitored when activating the output.
Substitute value strategy	Min. value Max. value Last valid value	Set substitute value per channel: minimum (0), maximum (1) or last valid value (0 or 1)
Effective direction	Input Output	Set channels as input or output Input: The channels of the module are switched in groups as inputs (1/2, 3/4, 5/6, 7/8). The DM80-N S and DM80-N S8I variants provide a status. Output: The channels of the module are switched as outputs in groups (1/2, 3/4, 5/6, 7/8). The DM80-N S variant on the other hand also provides a status for the outputs.
Polarity	Normal Inverted	Activate or deactivate signal inversion
Debouncing	Off 10 ms 20 ms 50 ms	Set the additional input signal loss
Channel 1...8	Active Inactive	Activate or deactivate channel 1...8 If a channel is not used, it can be switched off to prevent unwanted fault signals.

4.4.3 Example: DO40

The DO40 digital module is parameterized in the following example. The parameters are presented individually for each channel.

- ▶ Select **Module** → **DO40** from the drop-down menu.
- ▶ Set the parameter values for each channel under **Value**.

DO40: Parameter overview

Parameter name	Value	Meaning
Short circuit monitoring	On Off	Activate or deactivate short-circuit monitoring channel-by-channel The output signal can only be monitored when activating the output.
Wire-break monitoring	On Off	Activate or deactivate wire-break monitoring channel-by-channel The output signal can only be monitored when activating the output.
Substitute value strategy	Min. value Max. value Last valid value	Set substitute value per channel: minimum (0), maximum (1) or last valid value (0 or 1)
Polarity	Normal Inverted	Activate or deactivate signal inversion

4.4.4 Example: AIH40

The AIH40 analog module is parameterized in the following example.

- ▶ Select **Module** → **AIH40 1H** from the drop-down menu.
- ▶ Set the parameter values for each channel under **Value**.

AIH40: Parameter overview

The default parameter values are shown in the following table in **bold** type. The module can be configured with 1, 4 or 8 HART values. You will find more information in the excom manual.

Parameter name	Value	Meaning
Short circuit monitoring	On Off	Activate or deactivate short-circuit monitoring
Wire-break monitoring	On Off	Activate or deactivate wire-break monitoring
Substitute value strategy	Min. value Max. value Last valid value	Set a substitute value per channel: minimum, maximum or the last valid value
HART status/measuring range	Off/0...20 mA	Off/0...20 mA: Dead zero without HART status request; diagnostics for wire break and measuring range undershoot not possible
	Off/4...20 mA	Off/4...20 mA: Live zero without HART status request; diagnostics for wire break and measuring range undershoot active
	On/4...20 mA	On/4...20 mA: Live zero with HART status request; diagnostics for measuring range undershoot and overshoot as well as wire break and short circuit monitoring active
Filter (PT1)	Off 0.1 s 2.6 s 29.2 s	Set the software filter to generate an average value

4.4.5 Example: AOH40

The AOH40 analog module is parameterized in the following example.

- ▶ Select **Module** → **AOH40** from the drop-down menu.
- ▶ Set the parameter values for each channel under **Value**.

Parameter overview — AOH40

The default parameter values are shown in the following table in **bold** type. The module can be configured with 1, 4 or 8 HART values. You will find more information in the excom manual.

Parameter name	Value	Meaning
Short circuit monitoring	On Off	Activate or deactivate short-circuit monitoring
Wire-break monitoring	On Off	Activate or deactivate wire-break monitoring
Substitute value strategy	Min. value Max. value Last valid value	Set a substitute value per channel: minimum, maximum or the last valid value
HART status/measuring range	Off/0...20 mA Off/4...20 mA On/4...20 mA	Define HART status / measuring range Off/0...20 mA: Dead zero without HART status request and wire break inactive Off/4...20 mA: Live zero without HART status request and wire break active On/4...20 mA: Live zero with HART status request (HART diagnostics active) and wire break active

4.5 Configuring the PROFIBUS module ALP121

- ▶ To open the configuration of the PROFIBUS module ALP121, double-click the **ALP121[ALP121]<2>(#1)** device.
- ▶ Alternatively: Right-click on the **ALP121[ALP121]<2>(#1)** device click **Configuration...** in the context menu.

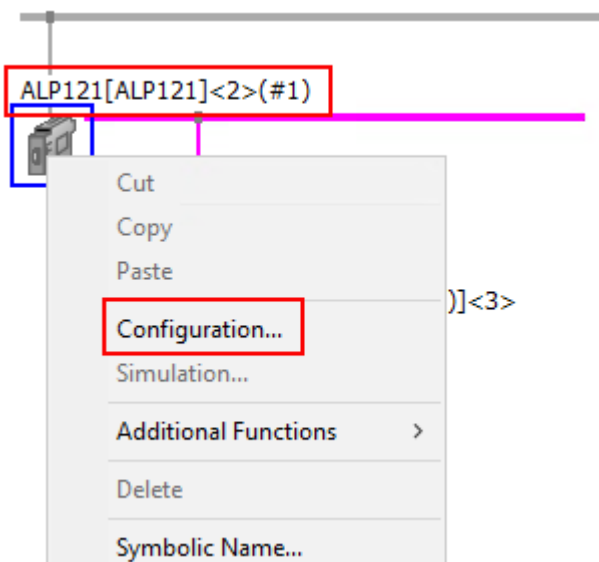


Fig. 13: Context menu (PROFIBUS module ALP12)

⇒ The configuration window opens.

- ▶ In the **Navigation Area** left sidebar, under **Configuration** select → **Bus Parameters**.
- ▶ Make the desired PROFIBUS settings.
- ▶ If parameters are marked with a yellow exclamation point icon: Click **Adjust**.
- ⇒ If **Adjust** has been clicked: The settings for the parameters **Target Rotation Time**, **Watchdog Control Time** and **Data Control Time** are adjusted automatically.

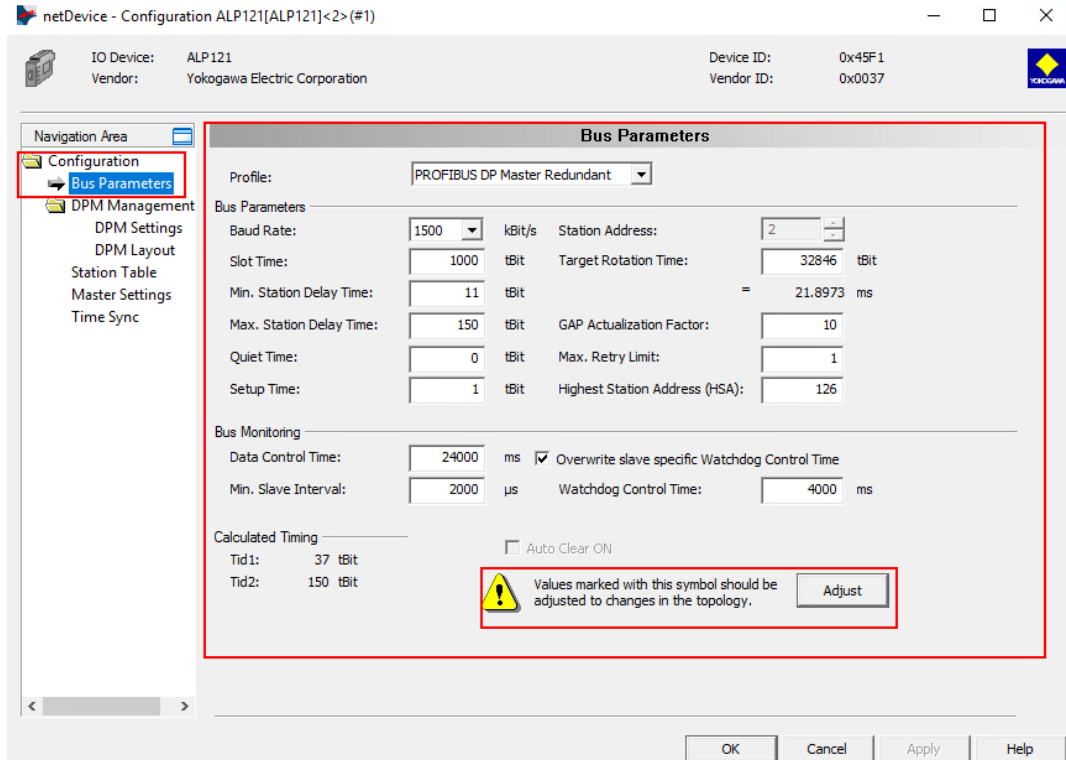


Fig. 14: Configuration window

Setting the PROFIBUS address

To set the PROFIBUS address, proceed as follows:

- ▶ In the **Navigation Area**, under **DPM Management** select → **Station Table**.
- ▶ Under **Station Ad...**, select the PROFIBUS address by clicking in the window in the drop-down menu.

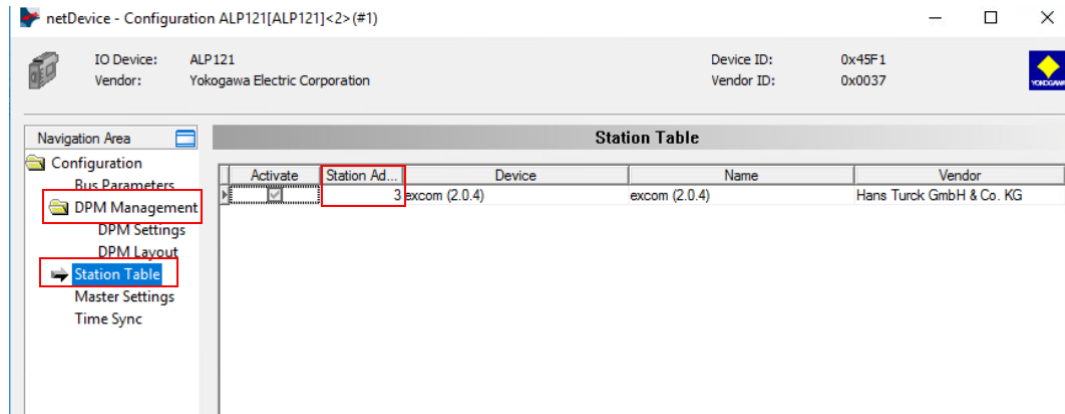


Fig. 15: Set the client station address

If **Activate** is not checked, the device configurations can be set before commissioning.

Define input and output signals

- ▶ In the **Navigation Area**, under **DPM Management** select → **DPM Layout**.
- ▶ In the drop-down menu select **Inputs** or **Outputs**.
- ▶ Select the desired settings.

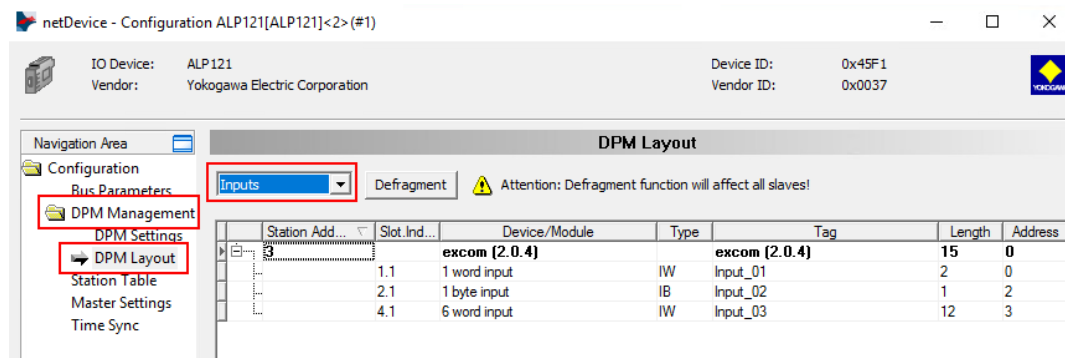


Fig. 16: Define input and output signals

Save the PROFIBUS module configuration

- ▶ Click on the Save icon in the upper-left corner.

4.6 Set system redundancy and HCIR

4.6.1 System redundancy for ALP121

System redundancy can be established for Centum VP with two PROFIBUS modules ALP121.

In system redundancy, two independent fieldbus masters are connected to a single excom station. The two gateways of the excom station are set into cyclic data exchange via the two independent fieldbus masters. The redundant gateways must be configured and parameterized identically via the two fieldbus masters.

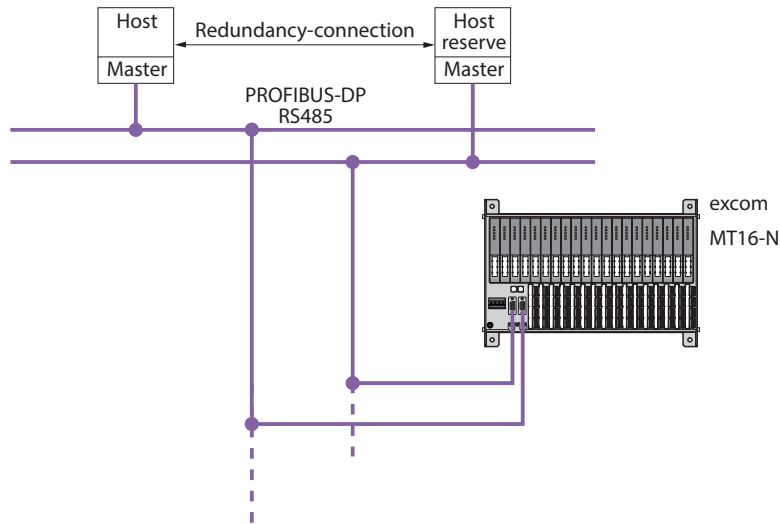


Fig. 17: System redundancy

Set system redundancy

If not already done, set the system redundancy in the gateway:

- ▶ In the Gateway configuration window, under **Navigation Area** click → **Configuration** → **Parameters**.
- ▶ Set the **redundancy mode** parameter to **system redundancy**.

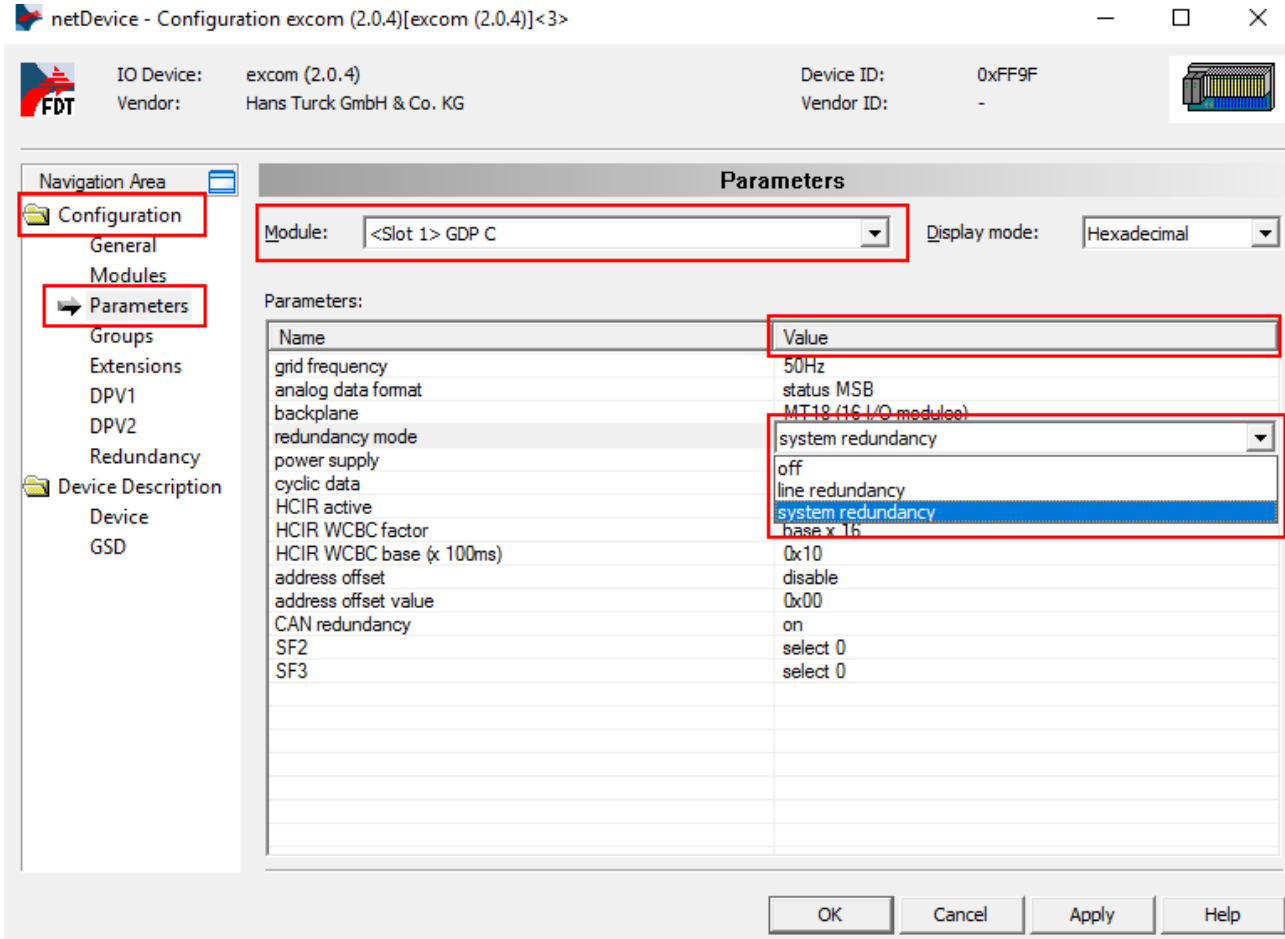


Fig. 18: Set system redundancy (GDP C example)

To activate system redundancy in the control system, proceed as follows:

- ▶ In **Centum VP**, select the node in the **All Folders** left sidebar.
- ▶ Open the **NODE1** node.
- ▶ Right-click **3ALP121**.
- ▶ Click **Properties...**

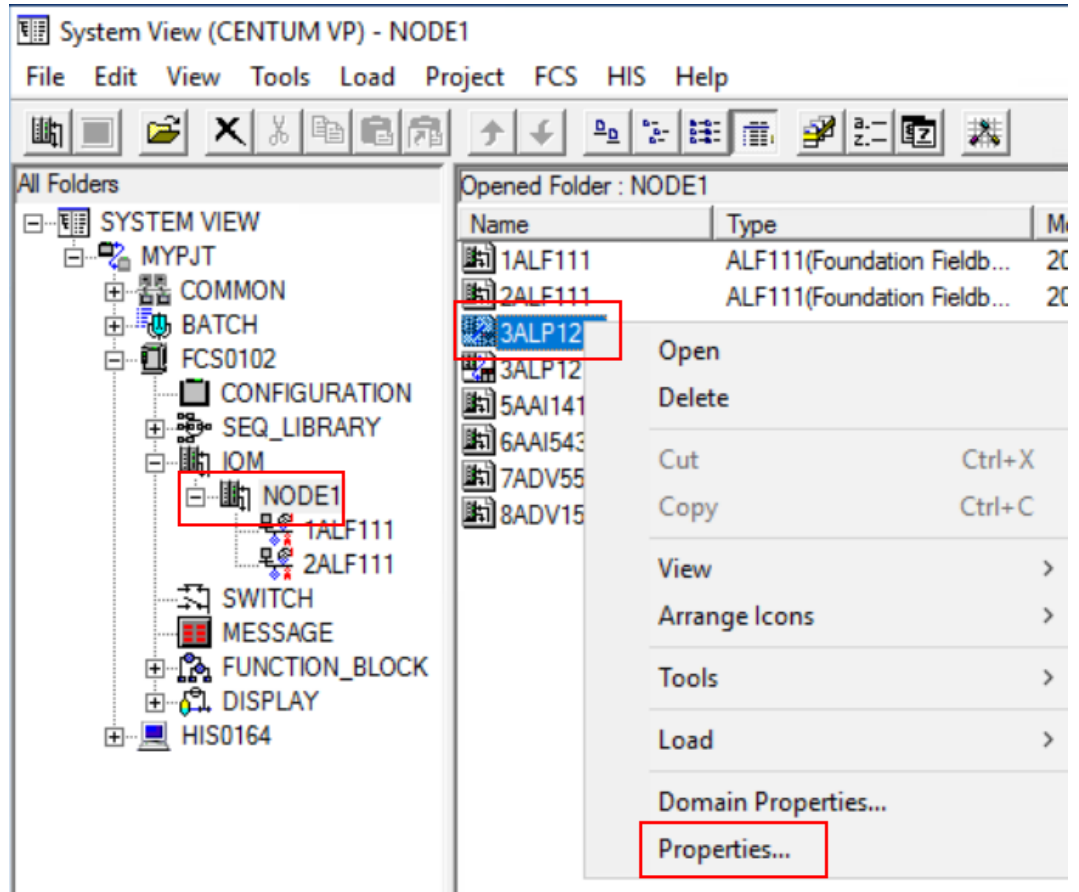


Fig. 19: Open the 3ALP121 context menu

- ▶ Select the **Type and Position** tab.
- ▶ Check whether **Duplicate Next Card** is checked.

The screenshot shows a software interface for configuring an IOM card. The 'Properties' dialog box has two tabs: 'Type and Position' (which is selected and highlighted with a red box) and 'Set Details'. Under 'IOM Type', the 'Category' is 'Profibus-DP Communication' and the 'Type' is 'ALP121(Profibus-DP Communication)'. Under 'Installation Position', the 'Slot' is '3'. The 'Duplicate Next Card' checkbox is checked and highlighted with a red box. Under 'Output Type', 'Output in a lump' is selected. The 'High Speed Read' checkbox is unchecked. There is an 'IOM Comment' text field at the bottom.

Fig. 20: Check system redundancy

- ▶ Select the **Set Details** tab.
- ▶ Under **Type of Redundancy**, select → **Network Redundancy**.

Properties

The screenshot shows the 'Set Details' configuration window for a Profibus-DP Communication module. The 'Type and Position' tab is active. The 'IOM Category' is 'Profibus-DP Communication', 'IOM Type' is 'ALP121(Profibus-DP Communication)', and 'Slot' is '3'. The 'Type of Redundancy' section has 'Network Redundancy' selected. The 'Perform Fallback' section has 'Perform Fallback' checked and 'All points maintain Current value' selected. The 'Action when module/channel fail detected' section has 'Set all corresponding module output data to OOP' checked. There are also spinners for 'Head of Slot numbers of Slave Device in Message' and 'Prefixed slave device channel number in alarm message', both set to 1. A 'Command(L)' field is at the bottom.

Fig. 21: Select the redundancy type

View the status of the system redundancy

The status of the system redundancy can be viewed. Redundancy may be activated or not activated.

- ▶ In the left sidebar, select **Navigation Area** → **Configuration** → **Redundancy**.
- ▶ Check whether **Activate Redundancy Mode** is checked.
- ▶ If system redundancy is not activated: Check **Activate Redundancy Mode**.

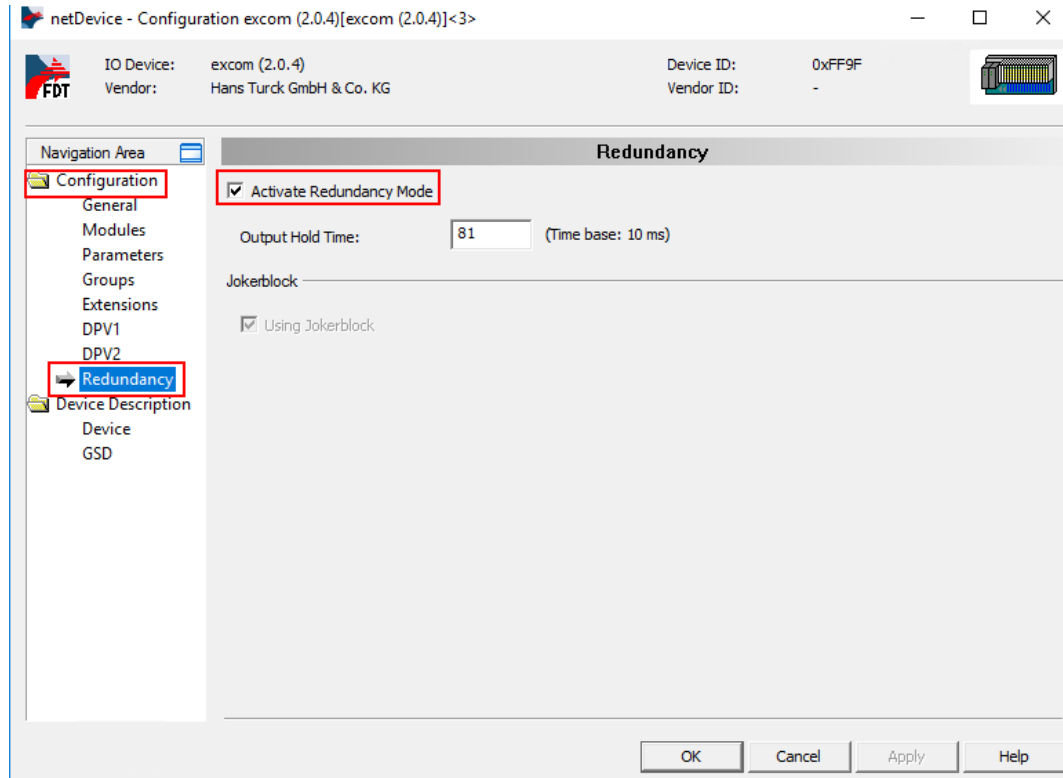


Fig. 22: System redundancy active

4.6.2 HCIR in Centum VP

Yokogawa does not support direct Hot Configuration in Run (HCIR). In the excom gateway, the HCIR parameter can be switched on and the hold time window can be set.

The HCIR function allows the user to extend the configuration of the I/O modules during operation or to change parameters of the module channels. The PROFIBUS communication of the excom station is stopped during the HCIR sequence. The hold time of the outputs results from the set parameters of the HCIR-WCBC basis and the HCIR-WCBC factor (see Parameterizing excom modules). All outputs will be frozen for the pre-defined period. Diagnostics are not discontinued during the HCIR sequence.

If the new configuration does not take place within the specified holding time, the outputs change to the predefined substitute value. The outputs also change to the predefined substitute value if communication is interrupted during the changeover and the watchdog runs. Centum VP issues a fault signal during this time that the node is not reachable. The message must be suppressed during the loading process of the new configuration or subsequently ignored. After a successful configuration change, the data is transferred to cyclic bus communication in accordance with the new configuration and the PROFIBUS node continues to operate normally.

As an example, the default values of the HCIR-WCBC factor and the HCIR-WCBC basis result in the maximum hold time:

$$1 \times (5 \times 100 \text{ ms}) = 500 \text{ ms}$$

4.7 Configure I/O signals

- ▶ In the **All Folders** project tree, select the **NODE1** node in which the PROFIBUS modules ALP121 are created.
- ▶ Double-click the **3ALP121** PROFIBUS module.
- ⇒ The **Start Builder** window opens
- ▶ Select **Communication I/O Builder and Support Tool**.
- ▶ Click **OK**.

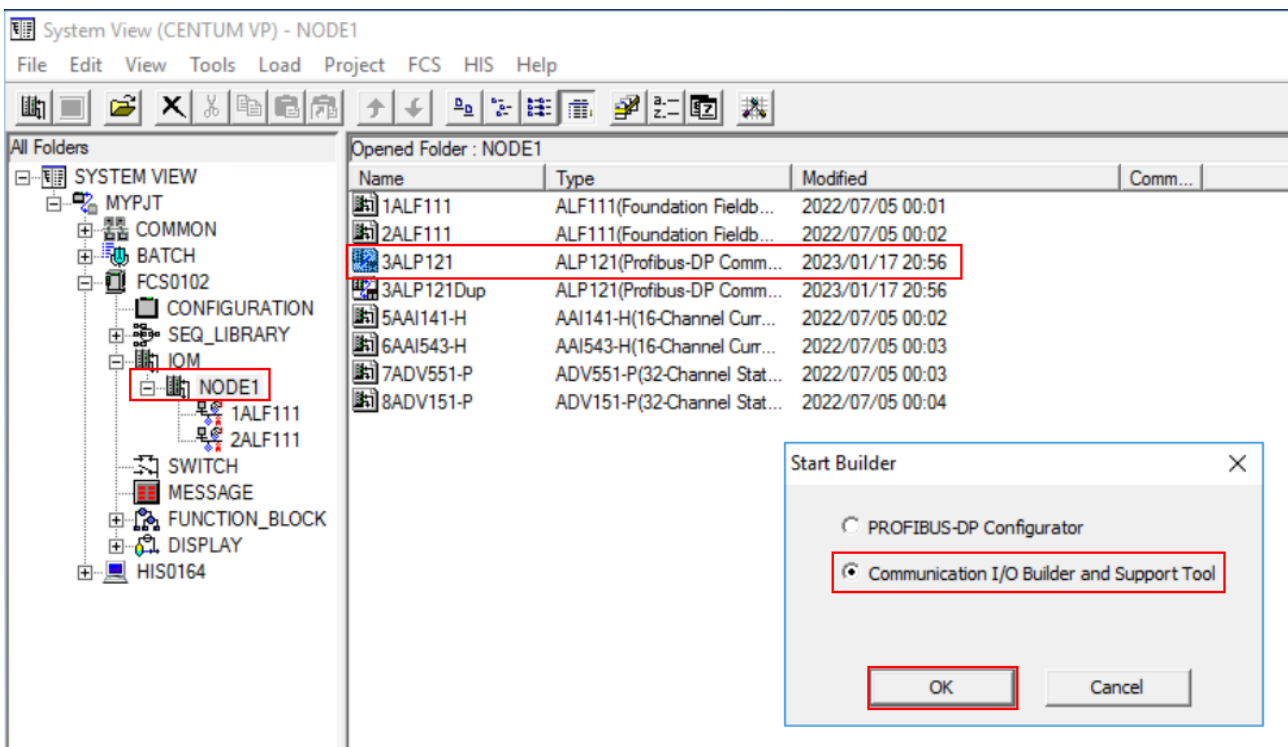


Fig. 23: Open Start Builder

- ⇒ The **Communication I/O Support Tool** window with the configured excom modules opens.

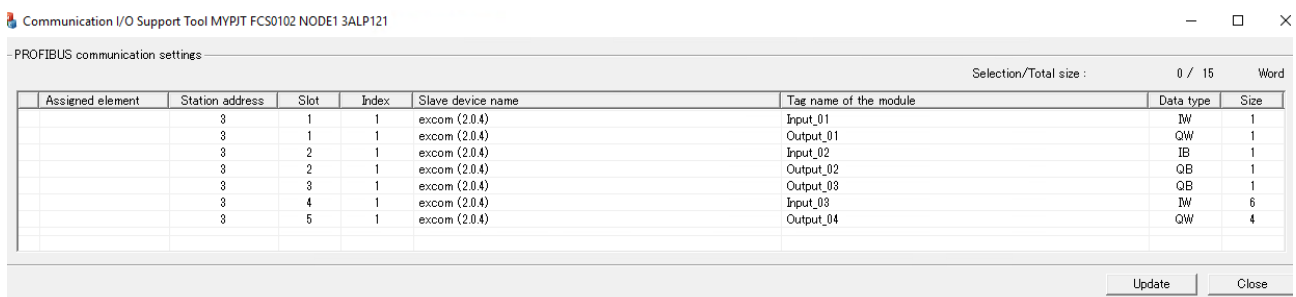


Fig. 24: Communication I/O Tool

- ▶ Close the **Communication I/O Support Tool** window.
- ▶ In the **Communication I/O Builder** window, configure the I/O signals.

Element	Buffer	Program Name	Size	Port	Reverse	Scan	Service Comment	Label
\$WW0004	50	*	*	*	*	*		
\$WW0005	*	*		1	1 Bits	Normal	excom Station 3 - Input_01	%%DM80_IN
\$WW0006	*	*		*	*	*		
\$WW0007	*	*		1	1 Bits	Normal	excom Station 3 - Output_02	%%DM80_OUT
\$WW0008	*	*		*	*	*		
\$WW0009	*	*		1	1 Bits	Normal	excom Station 3 - Output_03	%%DO40
\$WW0010	*	*		*	*	*		
\$WW0011	*	*		6	1 No	Normal	excom Station 3 - Input_03	%%AIH40_1
\$WW0012	*	*		*	*	*		%%AIH40_2
\$WW0013	*	*		*	*	*		
\$WW0014	*	*		*	*	*		
\$WW0015	*	*		*	*	*		
\$WW0016	*	*		*	*	*		
\$WW0017	*	*		8	1 No	Normal	excom Station 3 - Output_04	%%AOH40_1
\$WW0018	*	*		*	*	*		

Fig. 25: Configure I/O signals

- ▶ Load the configuration to the controller via **File** → **Download**.

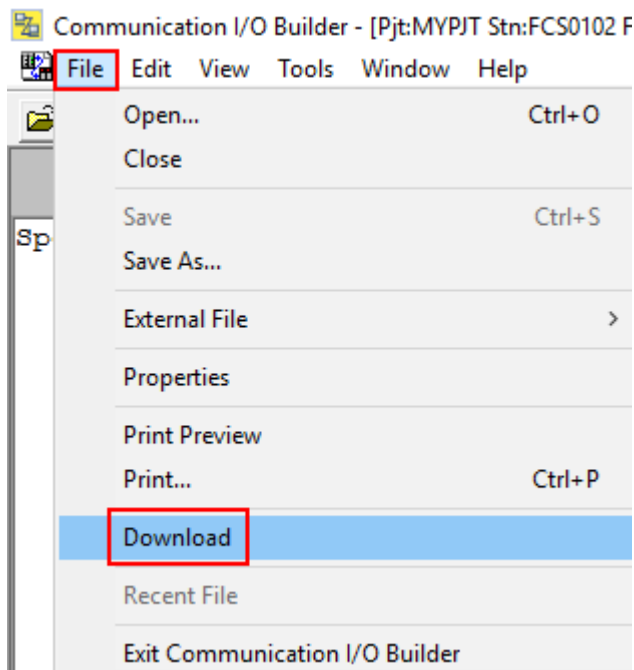


Fig. 26: Load the configuration to the controller

- ▶ Alternatively: Close the window and confirm the query window with **Yes**.

Configure I/O signals in Excel

The I/O signals can also be configured via Excel instead of configuring the I/O signals in the Communication I/O Builder.

- ▶ Under **File** → **External File**, export the I/O signal configuration table as a csv file.
- ▶ Configure I/O signals in the csv file.
- ▶ Under **File** → **External File**, import the I/O signal configuration table as a csv file.

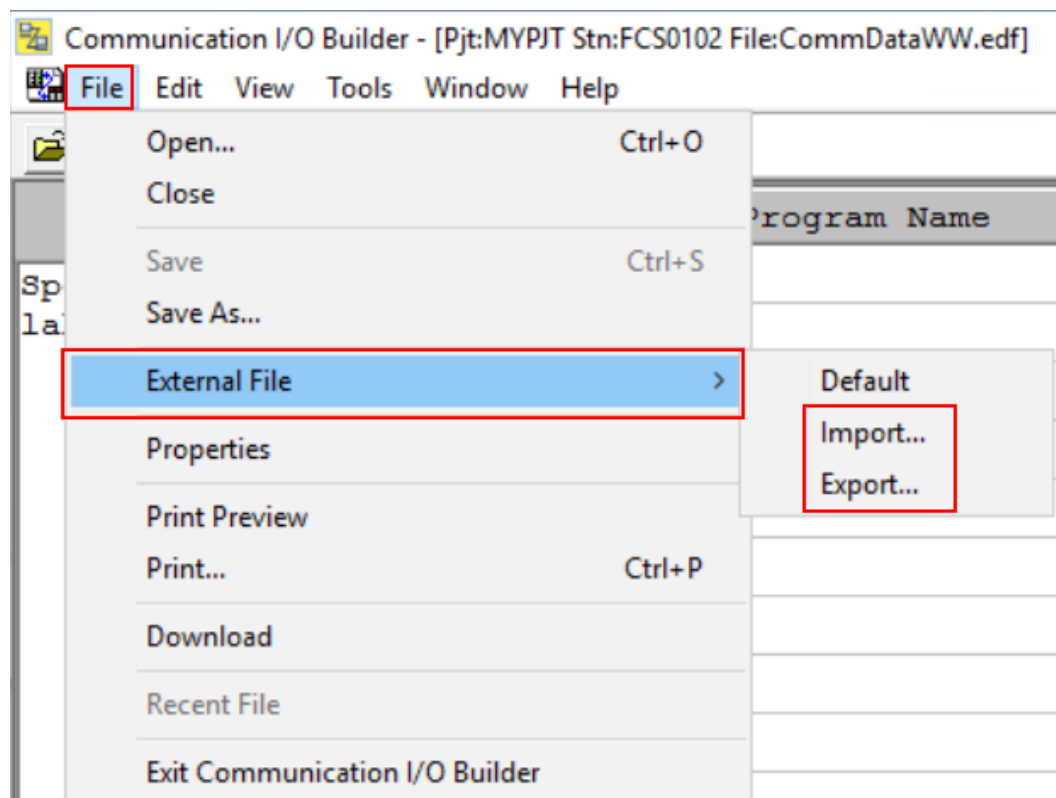


Fig. 27: Export and import I/O signals as a csv file

Load the I/O signal configuration to the PROFIBUS module

Once the I/O signals have been configured, the configuration can be loaded into the PROFIBUS module ALP121.

- ▶ Select the node in the **All Folders** project tree.
- ▶ Open the **NODE1** node.
- ▶ Right-click the **3ALP121** PROFIBUS module.
- ▶ In the **Tools** context menu click → **PROFIBUS-DP** → **Download PROFIBUS communication settings...**

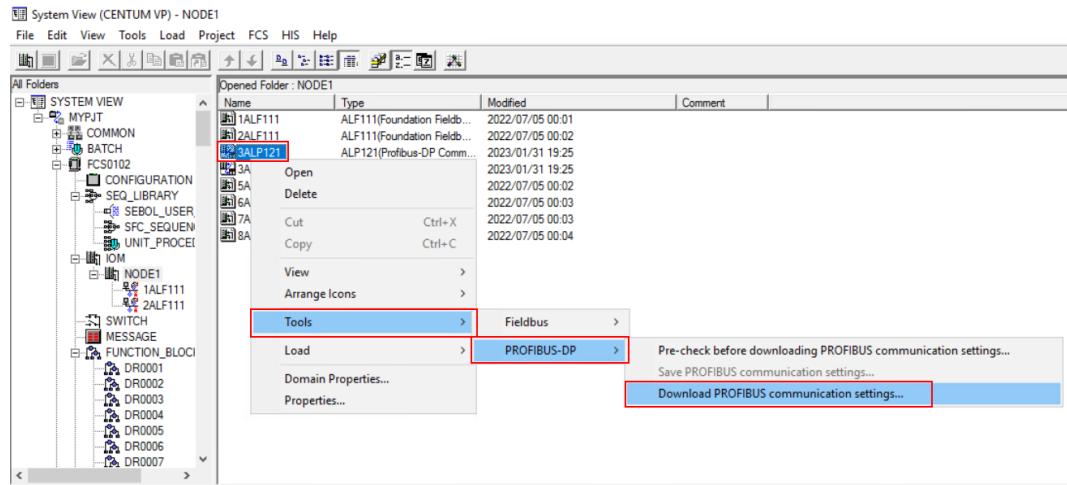


Fig. 28: Load the I/O signal configuration to the PROFIBUS module

- ⇒ The **Downloading confirmation dialog** query window opens.
- ▶ Confirm the query **Download to FCS?** with **OK**.

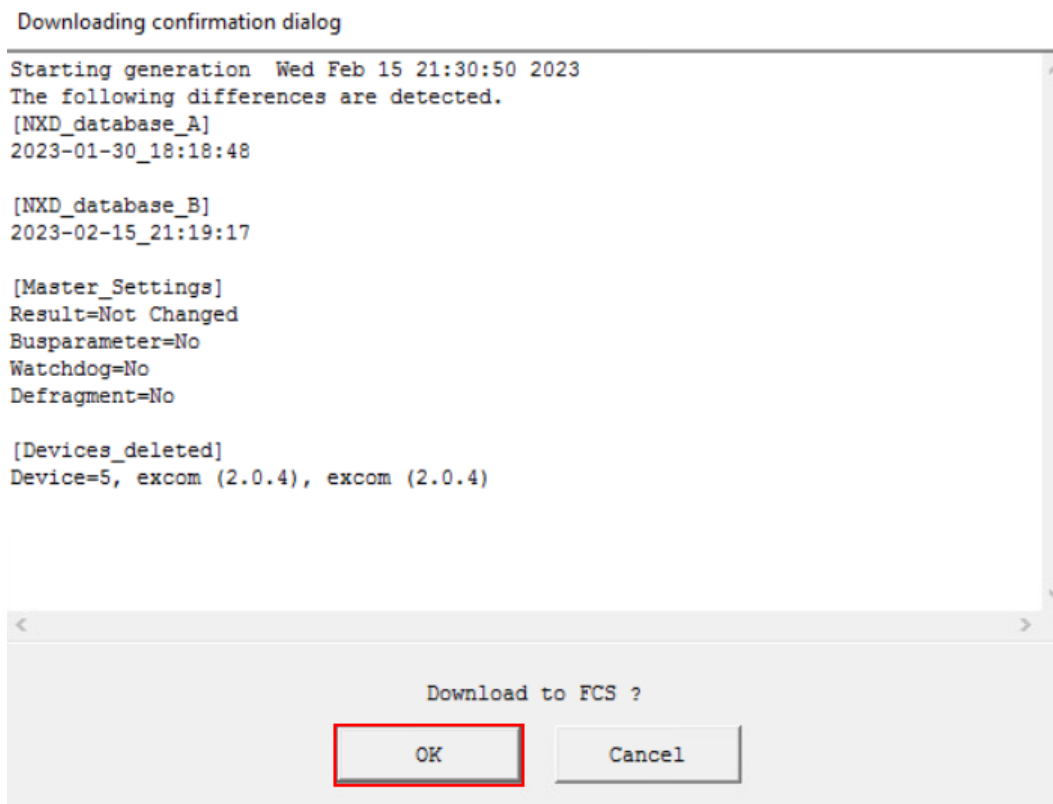


Fig. 29: Downloading confirmation dialog

- ⇒ The configuration is loaded to the PROFIBUS module.

Settings channels

The %WB Tag Number Definition Call(W) is used to assign specific element names for the digital signals of the individual channels of the modules. The element name is required for later programming. In addition, settings can be made for the buttons (display blocks) in the HIS (Human Interface Station), e.g. the color of the buttons. The element name is composed of %WB followed by the position of the signal assignment and the bit position of the signal. An example element name is %WB000501. The specification 0005 is derived from the position of the signal and the 01 for the bit position in a byte or word.

In the %WB Tag Number Definition Call(W) context menu the module channels are assigned to the signals from the Communication I/O Builder:

- ▶ Select → Tools in the Communication I/O Builder.
- ▶ Select %WB Tag Number Definition Call(W) in the context menu.

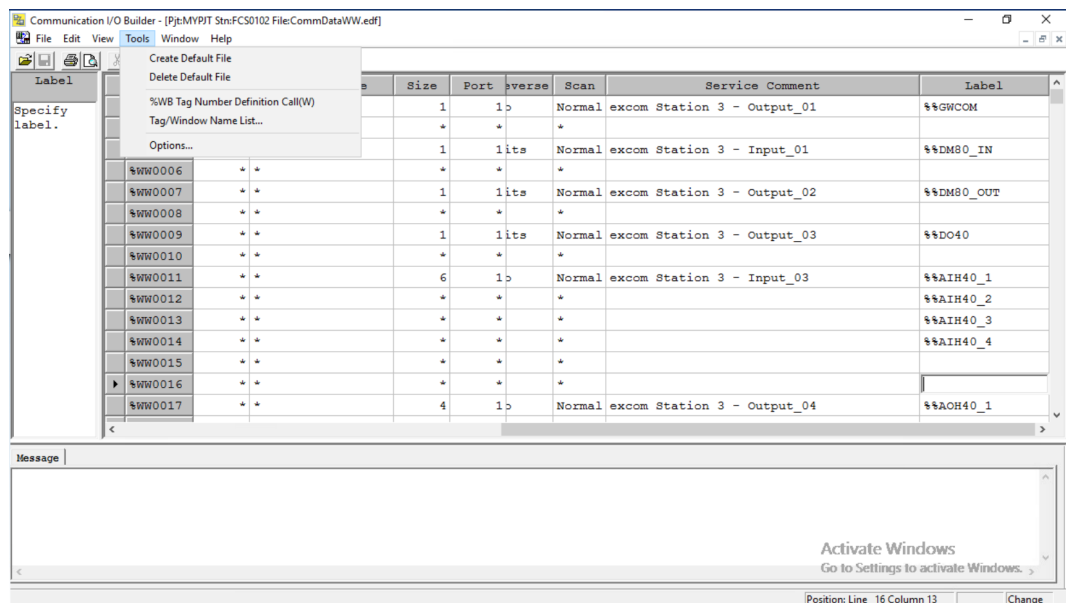


Fig. 30: Select the %WB Tag Number Definition Call(W) view

- ▶ Set the tag names and buttons.

Element	No.	Element	Tag Name	Tag Comment	Switch Position	Label	Btn1	Btn2	Lvl	Tag M
	0001				ON,,OFF,ON	Direct	Red	Red	4	General
	0002				ON,,OFF,ON	Direct	Red	Red	4	General
	0003				ON,,OFF,ON	Direct	Red	Red	4	General
	0004				ON,,OFF,ON	Direct	Red	Red	4	General
	0005	%WB000501	DM80_CH1_IN		ON,,OFF,ON	Direct	Red	Green	4	General
	0006	%WB000502	DM80_CH2_IN		ON,,OFF,ON	Direct	Red	Green	4	General
	0007	%WB000503	DM80_CH3_IN		ON,,OFF,ON	Direct	Red	Green	4	General
	0008	%WB000504	DM80_CH4_IN		ON,,OFF,ON	Direct	Red	Green	4	General
	0009	%WB000505	DM80_CH5_IN		ON,,OFF,ON	Direct	Red	Green	4	General
	0010	%WB000506	DM80_CH6_IN		ON,,OFF,ON	Direct	Red	Green	4	General
	0011	%WB000507	DM80_CH7_IN		ON,,OFF,ON	Direct	Red	Green	4	General
	0012	%WB000508	DM80_CH8_IN		ON,,OFF,ON	Direct	Red	Green	4	General
	0013	%WB000901	DO401_CH1		ON,,OFF,ON	Direct	Red	Green	4	General
	0014	%WB000902	DO401_CH2		ON,,OFF,ON	Direct	Red	Green	4	General
	0015	%WB000903	DO401_CH3		ON,,OFF,ON	Direct	Red	Green	4	General
	0016	%WB000904	DO401_CH4		ON,,OFF,ON	Direct	Red	Green	4	General
	0017	%WB001101	AIH40_CH1		RUN,,STOP,RUN	Direct	Red	Yellow	4	General

Fig. 31: Tag names and buttons are set

- ▶ Download channel allocation via **File** → **Download**.

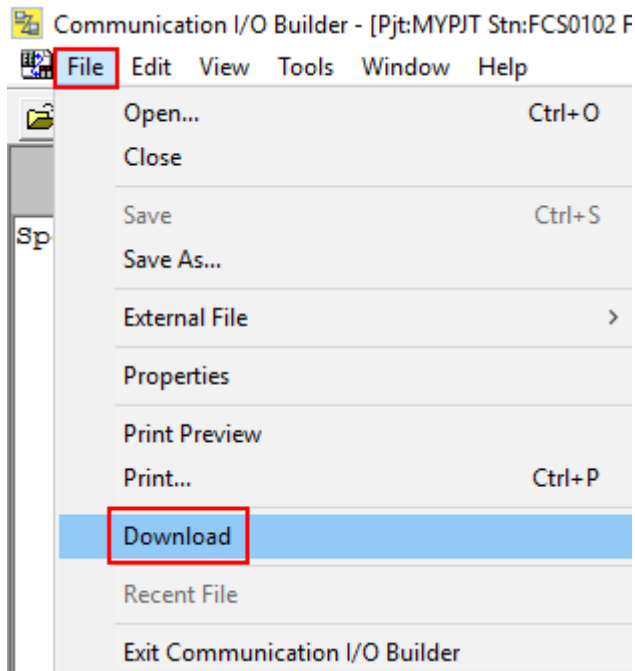


Fig. 32: Download channel allocation

- ▶ Close the **Communication I/O Support Tool** window.

The configured I/O signals must be loaded to the PROFIBUS module ALP121:

- ▶ In the **All Folders** project tree, select the **MYPJT** project.
- ▶ Click **Load** in the top bar.
- ▶ In the context menu, click **Download Project Common Section**.

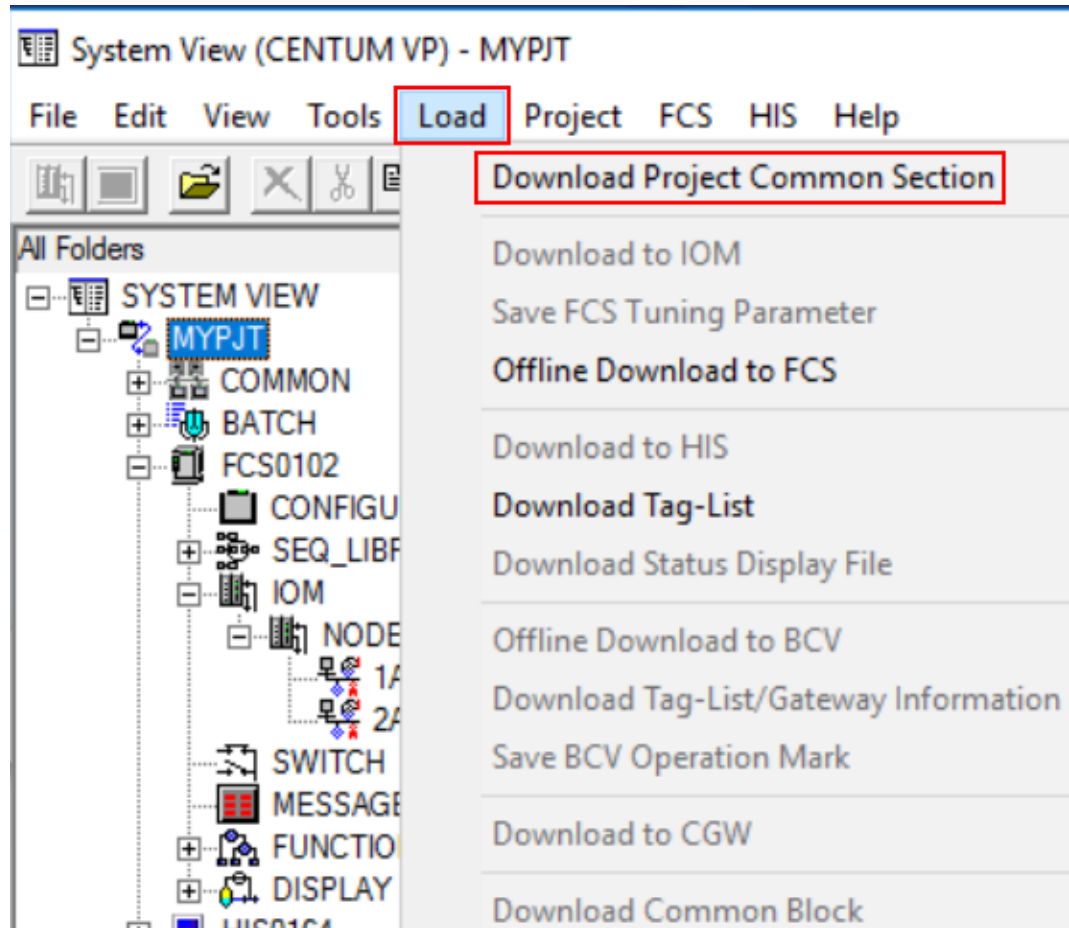


Fig. 33: Download Project Common Section

⇒ A query window opens.

Perform the subsequent download only if a new project has been created.

- ▶ Confirm the query window with **OK**.

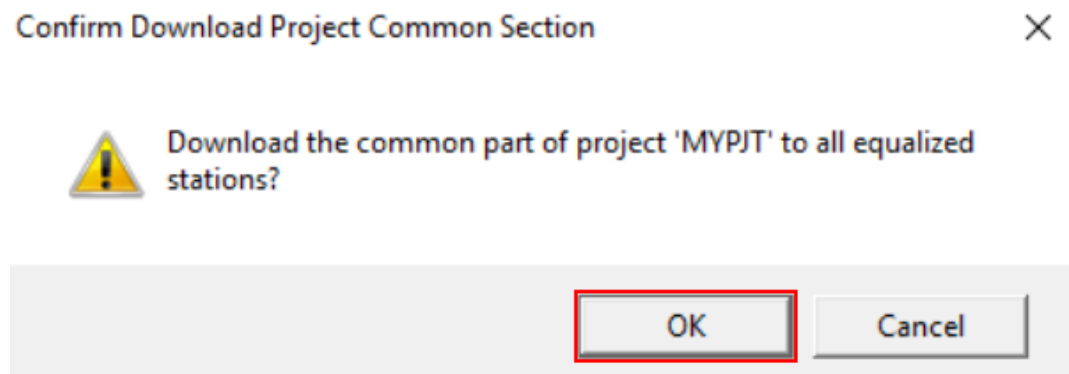


Fig. 34: Confirm Download Project Common Section

⇒ Another query window opens.

- ▶ Decide whether to download the domain properties.
- ▶ Confirm the query window with **Yes** or **No**.

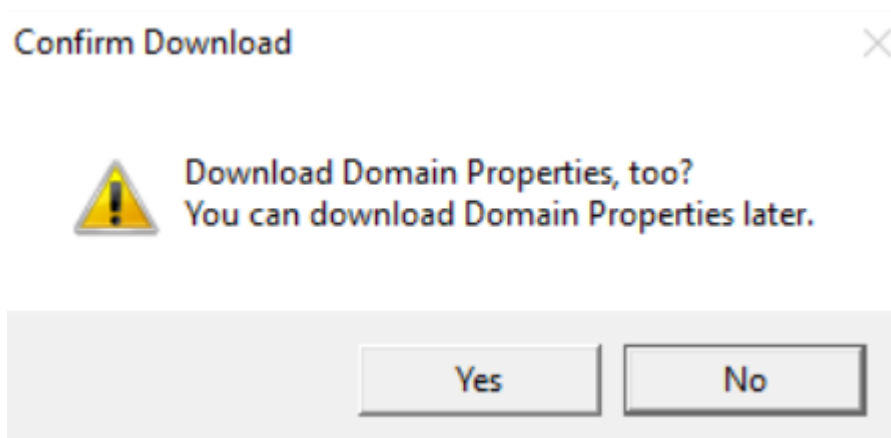


Fig. 35: Download domain properties

- ⇒ The project download is complete.

For a newly created project or controller as well as basic changes in the program, an offline download must be carried out in the FCS (controller). The controller is taken offline and re-loaded.

- ▶ In the **All Folders** project tree, select FCS FCS0102.
- ▶ Click **Load** in the top bar.
- ▶ Click **Offline Download to FCS** in the context menu.

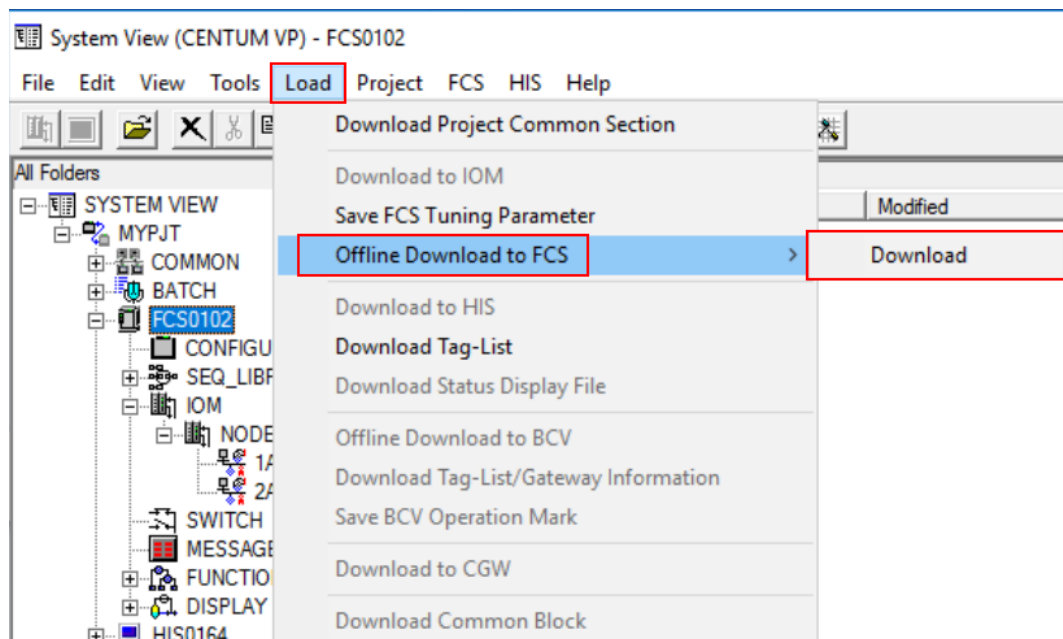


Fig. 36: Offline Download to FCS

- ⇒ A query window opens.

- ▶ Confirm the query window with **OK**.

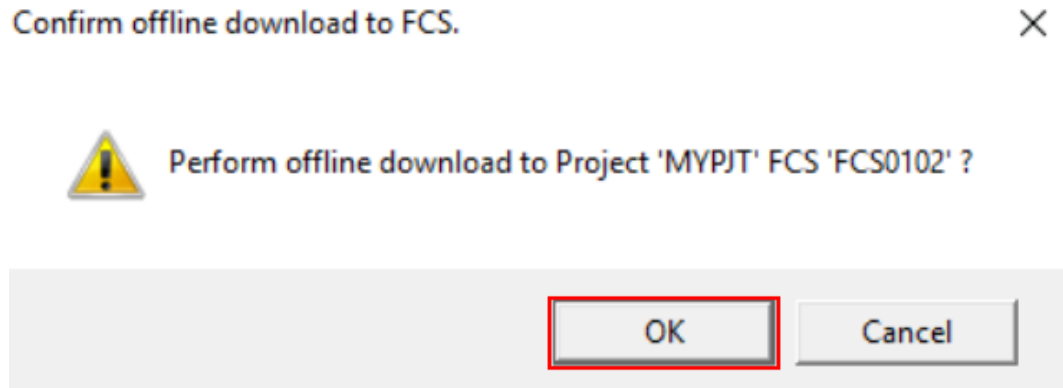


Fig. 37: Confirm offline download to FCS.

- ⇒ Another query window opens.
- ▶ Confirm the query window with **Yes**.

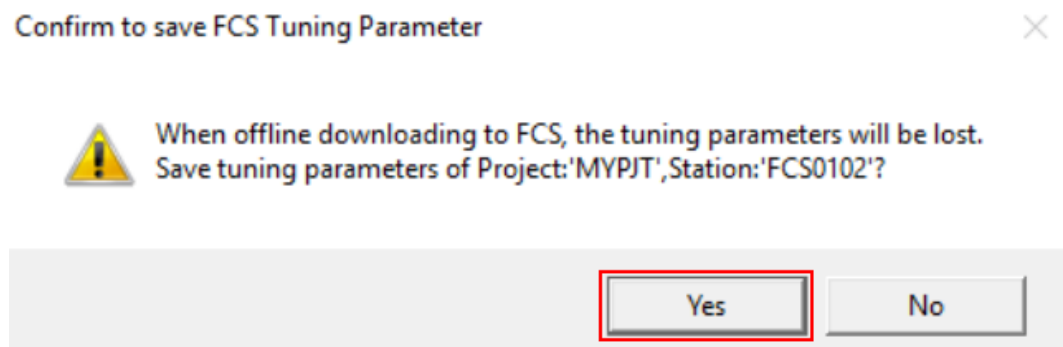


Fig. 38: Confirm to save FCS Tuning Parameter

- ⇒ The offline download of the project is complete.

4.8 Set I/O signals in Control Drawing

- ▶ Select the function block in the **All Folders** project tree.
- ▶ Open the function block **FUNCTION_BLOCK**.
- ▶ Right-click **DR0001**.
- ▶ Click **Open**.

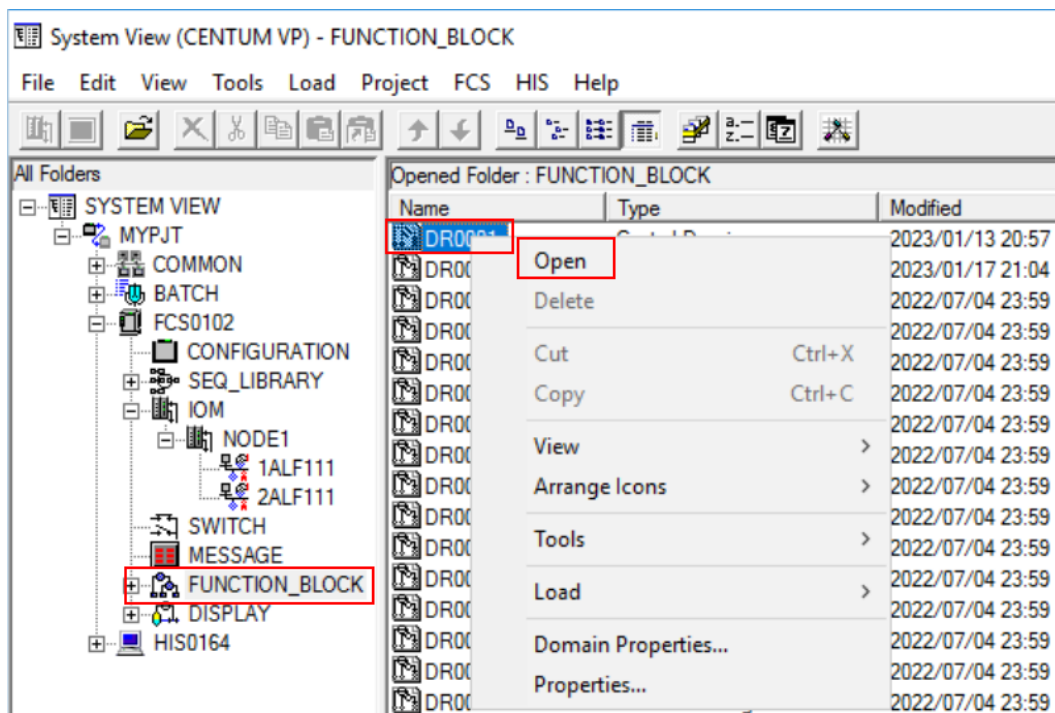


Fig. 39: Open the function block

- ⇒ The **Control Drawing Builder** opens.

Set the function block

Function blocks can be added in the **Control Drawing Builder**.

- ▶ Add function block: Right-click in the main window. In the context menu click **Insert** → **Function Block...**
- ▶ Alternatively: Click the function block icon in the navigation bar.

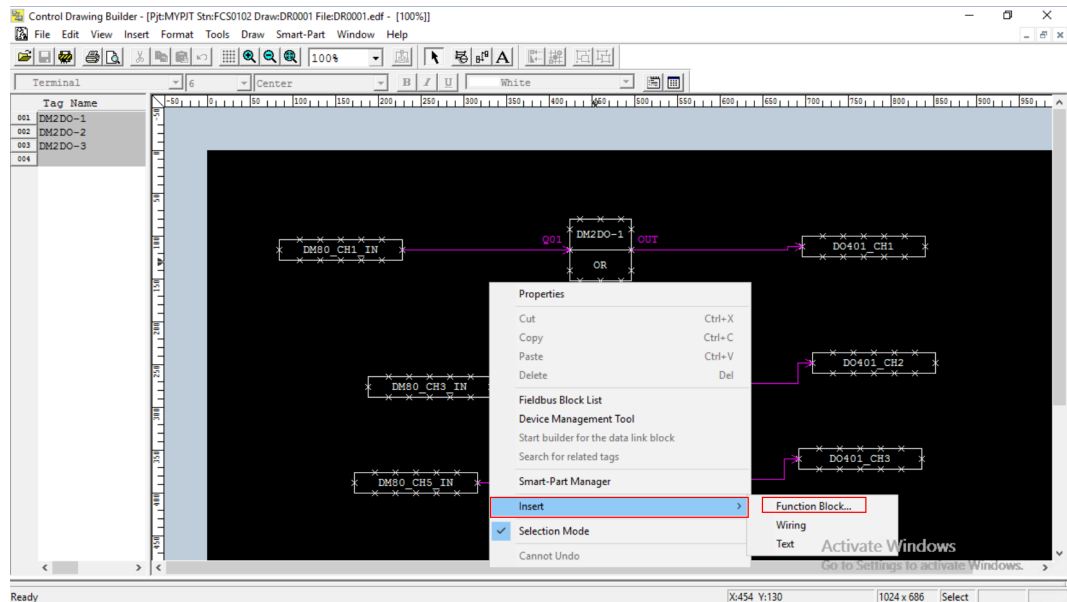


Fig. 40: Add a function block in the Control Drawing Builder

⇒ The **Select Function Block** window opens.

In the following example, the **Logic Operation Blocks** function block is set with an OR function:

- ▶ In the project tree, select **Logic Operation Blocks**.
- ▶ Select **OR**.
- ▶ Click **OK**.

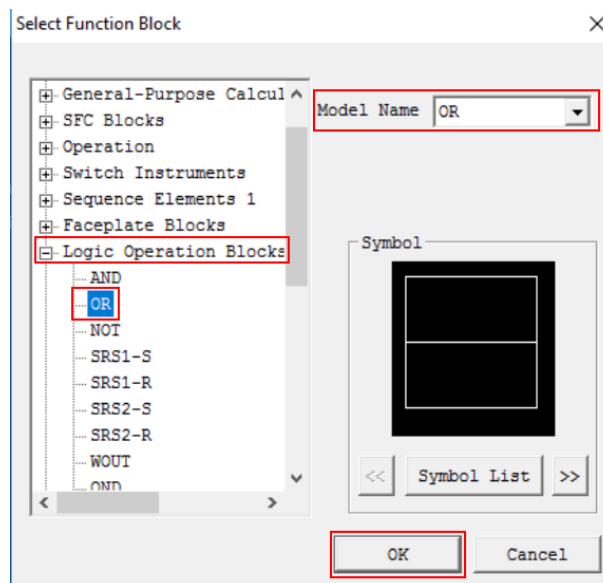


Fig. 41: Select the function block

Once the function block is added, it can be set in the **Function Block**.

- ▶ If the Select Function Block window is not yet closed: Close the window.
- ▶ Double-click the function block.

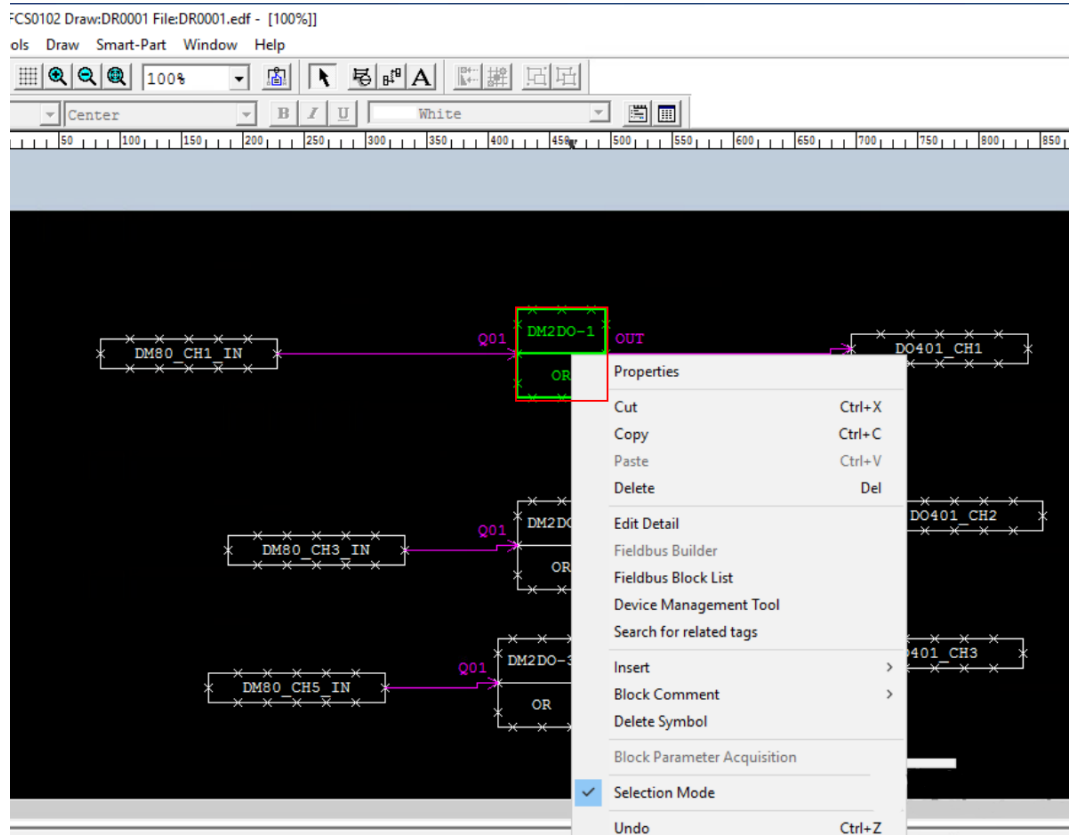


Fig. 42: Set the function block

- ▶ In the open **Function Block** window, select the **Function Block** tab.
- ▶ Select the desired settings.

Function Block

Common | **Function Block** |

Tag Name

Model Name OR

Tag Comment

Scale Low limit value

High limit value

Engineering unit symbol

Input Signal Conversion

Totalizer Time Unit

Tag Mark

Alarm Level

Lvl

Upper Equipment Name

Symbol

<< >>

OK Cancel Apply

Fig. 43: Set the function block

Connect function blocks

To interconnect signals and create program sequences or step sequences, connect the function blocks.

- ▶ Click on the wiring icon in the top bar.

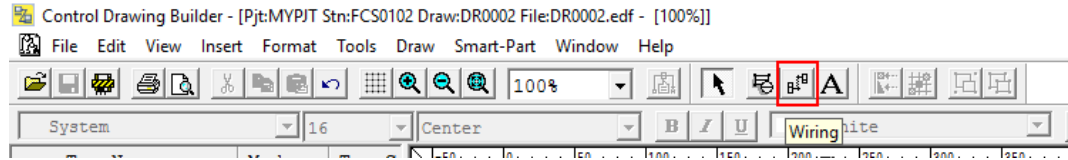


Fig. 44: Wiring icon

- ▶ Select the start point at the start block and connect it to the target block by double-clicking.

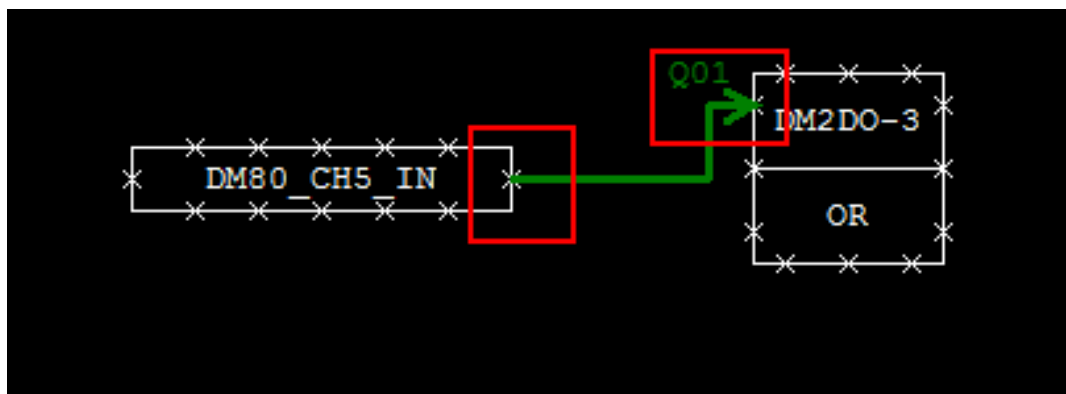


Fig. 45: Connect the function block

Set digital input and output signals

The **Link Block** → **PIO** function block must be set for each digital input and output signal.

- ▶ In the project tree, select **Link Block**.
- ▶ Select **PIO**.
- ▶ Click **OK**.

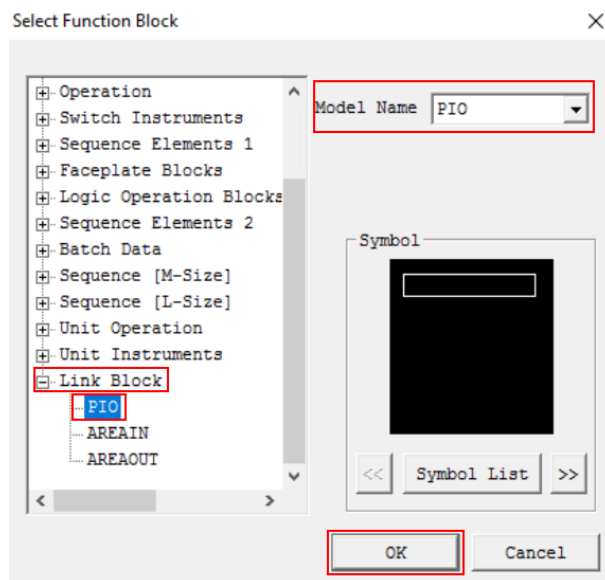


Fig. 46: Select the function block

⇒ The window closes.

- ▶ Double-click the function block.
- ▶ Alternatively: Right-click on the function block and click **Properties...** in the context menu.
- ▶ In the open window, select the **Link Block** tab.
- ▶ Under **Connection Information**, set the destination or source signal.

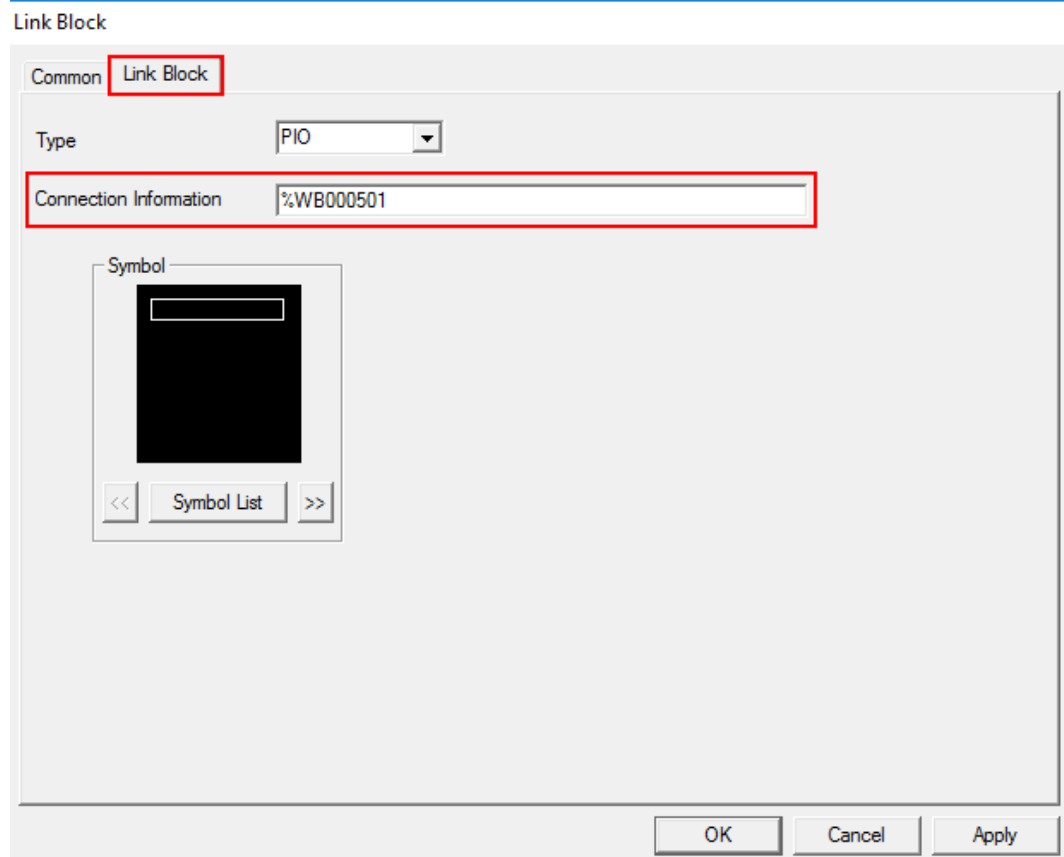


Fig. 47: Set the link block

Set analog input and output signals

The **Input Indicators** → **PVI** function block must be set for each analog input and output signal.

- ▶ In the project tree, select **Input Indicators**.
- ▶ Select **PVI**.
- ▶ Click **OK**.

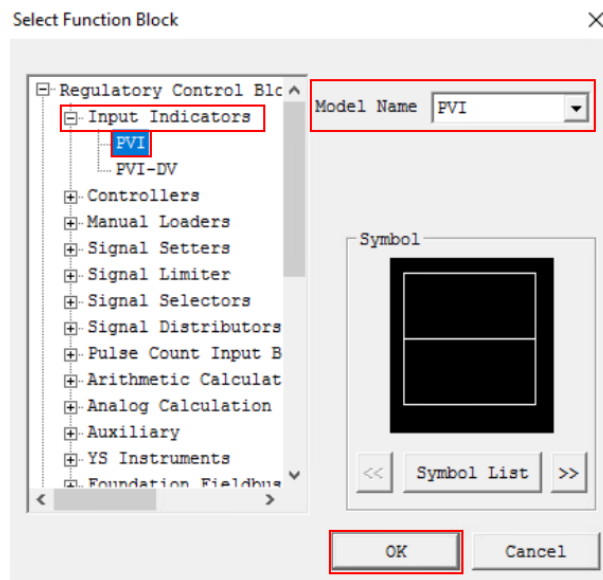


Fig. 48: Select the function block

- ⇒ The function block is set.
- ▶ Right-click on the function block (here: **AI2AO PVI**).
- ▶ Select **Edit Detail** in the context menu.

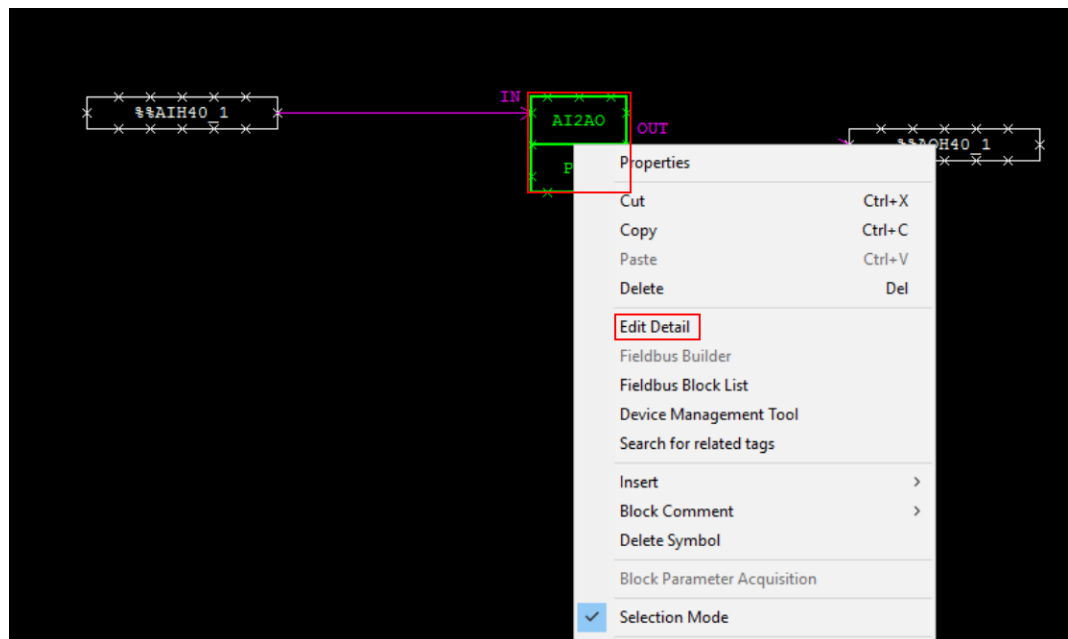


Fig. 49: Set the function block

- ▶ Click the **Show/Hide Detailed Setting Items** icon in the navigation bar.
- ⇒ The tabs **Tag**, **Input**, **Alarm**, **Output**, **Connections** and **Others** appear next to the **Basic** tab.

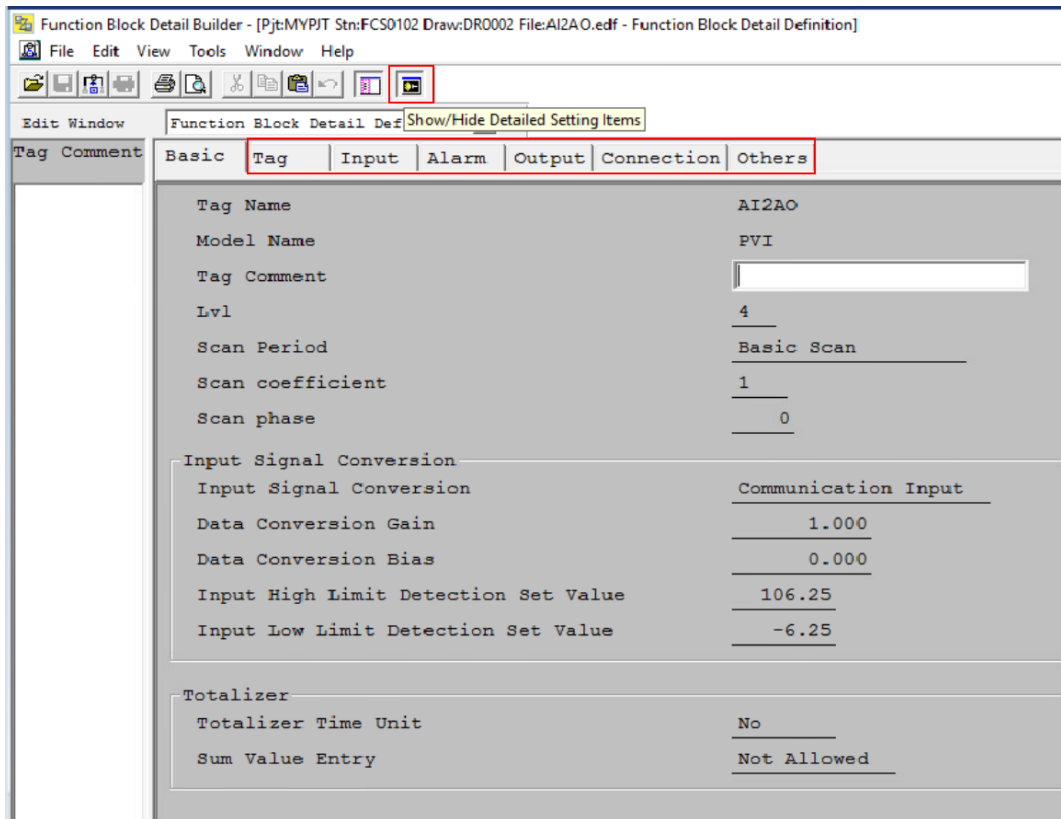


Fig. 50: Show tabs

- ▶ Under the **Basic** tab, open the **Input Signal Conversion** drop-down menu.
- ▶ **SUBSYS** : Select **Communication Input**.

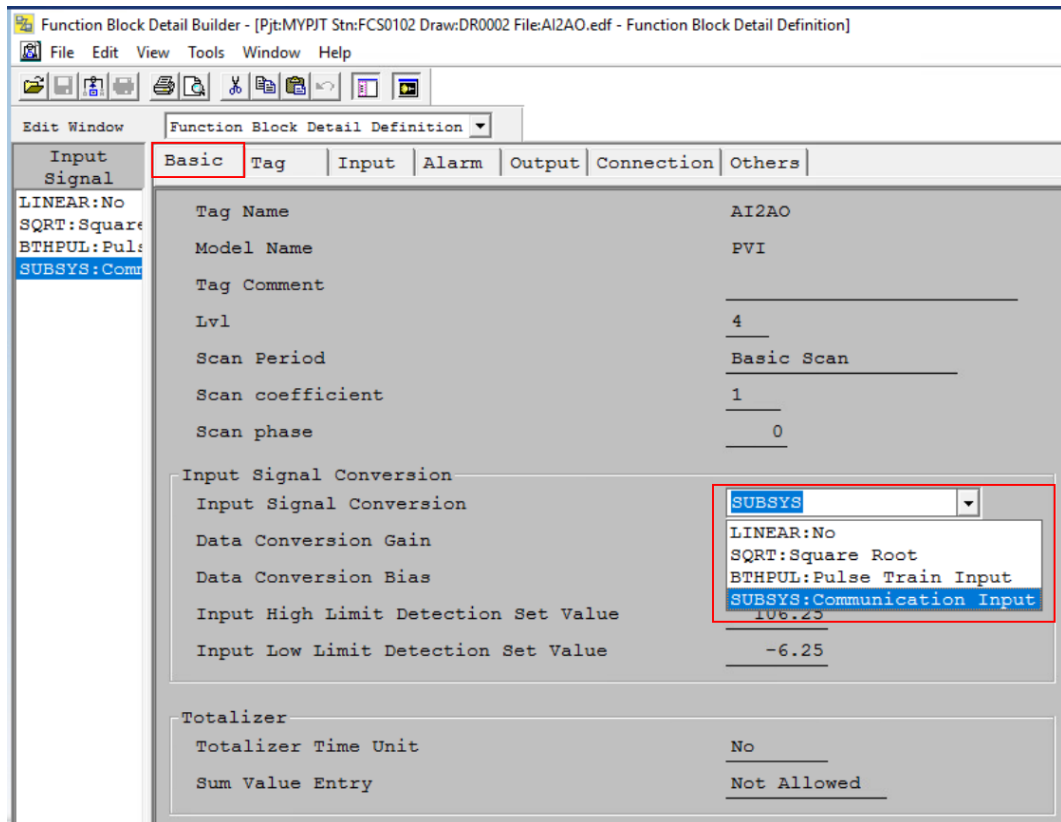


Fig. 51: Set Input Signal Conversion

- ▶ Under the **Input** tab, select the desired settings (here: **High limit value**).

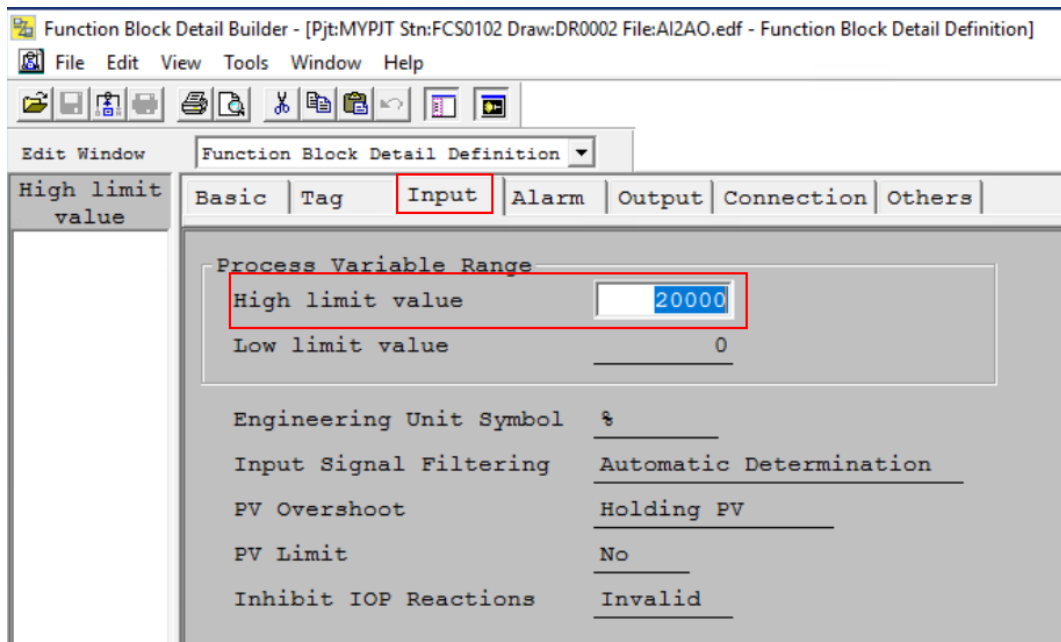


Fig. 52: Set the high limit value

- ▶ Under the **Output** tab, open **Output Signal Conversion** drop-down menu.
- ▶ **SUBSYS** : Select **Communication Output**.
- ▶ The **Data Conversion Gain** and the **Data Conversion Bias**.

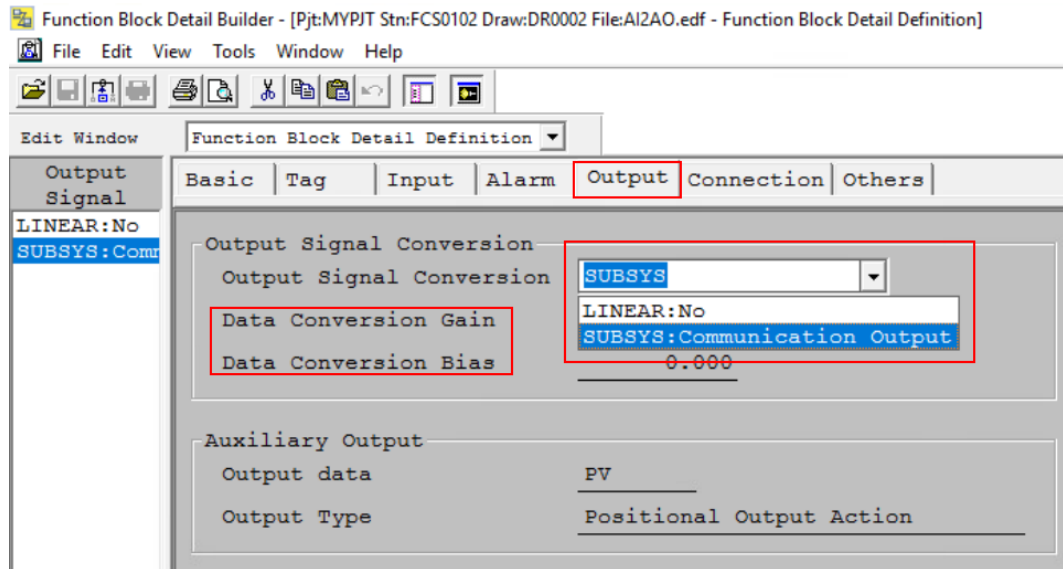


Fig. 53: SUBSYS : Communication Output

Example: Connect the analog input signal to an analog output signal

- ▶ Select the **Connection** tab.
- ▶ Under **Measurement Input (IN)**, use the designation (here: %%AIH40_1) from the **Communication I/O Tool**.

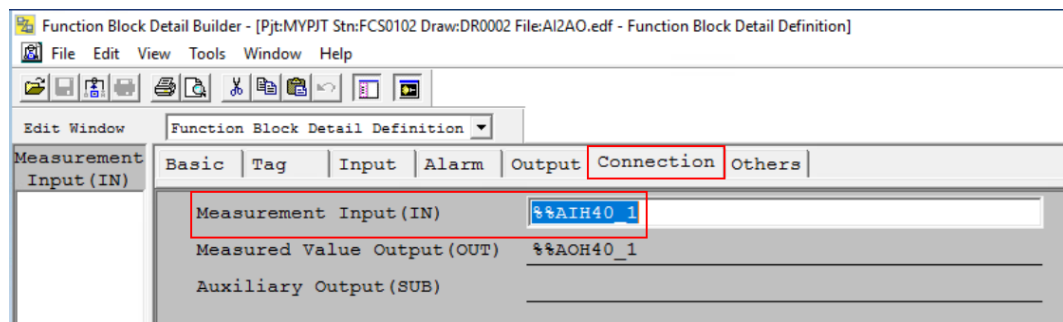


Fig. 54: Measurement Input (IN)

Load the settings to the FCS

Once the settings have been made, the Control Drawing must be loaded to the FCS.

- ▶ In the top navigation bar, click **File** → **Download**.

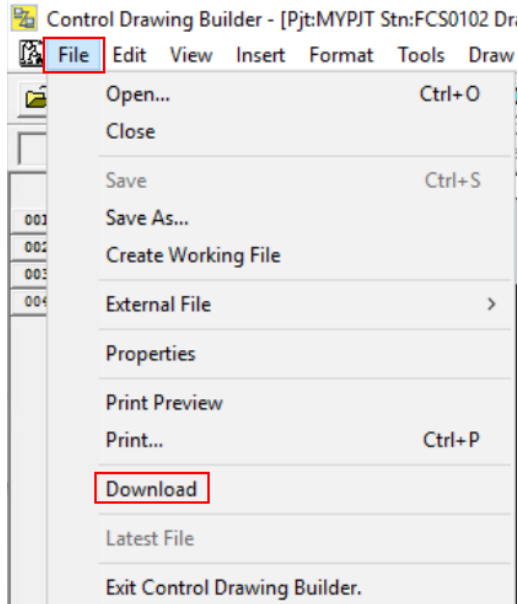


Fig. 55: Load the settings to the FCS

- ▶ Confirm the **Downloading confirmation dialog** query window with **OK**.

Downloading confirmation dialog

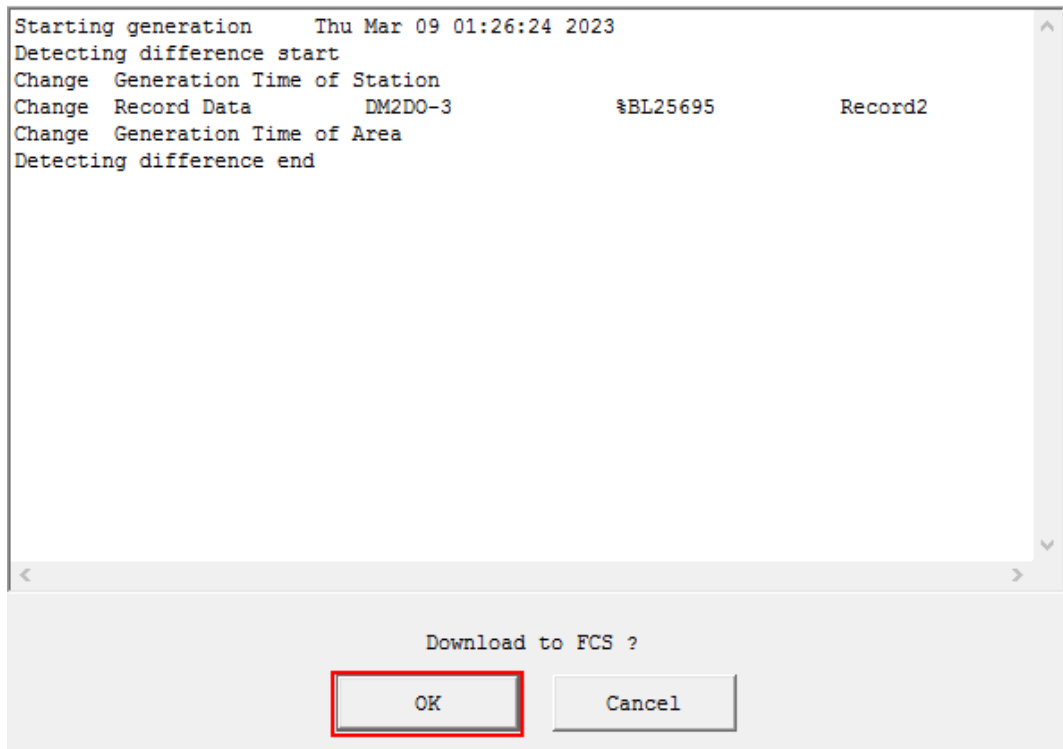


Fig. 56: Query window

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