TURCK

Your Global Automation Partner

excom I/O System Integration in Siemens PCS7 via PROFINET

Integration Manual

Contents

1 About this manual

The instructions describe the integration of the excom system into Siemens PCS7 via PROFINET.

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 the GSDML-based integration, from the installation of the GSDML 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:

- Setting up redundancy
- Changing parameters during operation
- Changing configurations during operation

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 [▶ 51].

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 system is integrated into Siemens PCS7 based on GSDML via PROFINET. In this example integration, system redundancy is implemented with two Siemens controllers.

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 into Siemens PCS7

4.1 Requirements

Hardware used

This example uses the following hardware:

Siemens hardware

- 2 × module rack UR2-H
- 2 × power supply PS407 10A
- 2 × controller CPU 410-5H
- 2 × gateway CP443-1

Turck hardware

- MT08-N module rack
- GEN-N gateway
- DM80-N digital I/O module
- DO40-N digital output module
- AIH40-N analog input module
- AOH40-N analog output module
- Ethernet cable

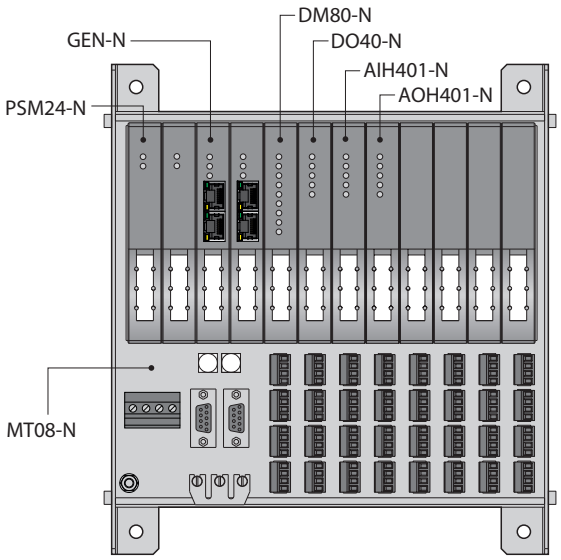


Fig. 1: Example setup of the excom station

Software used

This example uses the following software:

Siemens software

- Simatic Manager 9.0

Turck software

- GSDML file V2.3
- Gateway firmware V1.5.0.0

Requirements

- The programming software has been opened.
- A new project has been created.
- The controller has been added to the project.

4.2 Setting the IP address and PROFINET name

Requirements

- All the required modules must be fitted.
- The screw for the power supply must have been tightened.
- The gateway must be connected to a PC.
- The Turck Service Tool must have been installed on the PC.

The gateway is operational automatically once the power supply is switched on. The status LED on the module flashes green and the status LED on the gateway flashes red.

The device is factory set to IP address 192.168.1.254. A PROFINET device name has not yet been assigned. The IP address can be set via the Turck Service Tool or the SIMATIC Manager. The following example shows how to set the IP address and PROFINET name via the Turck Service Tool. The Turck Service Tool can be downloaded free of charge at www.turck.com.

NOTE
The devices are identified using the PROFINET name.
▶ Assign individual PROFINET names.

NOTE
The PC and the gateway must be located in the same IP network.

▶ Connect the device to a PC via the Ethernet interface.
▶ Launch the Turck Service Tool.
▶ Click **Search** or press **F5**.
⇨ The Turck Service Tool displays the connected devices.

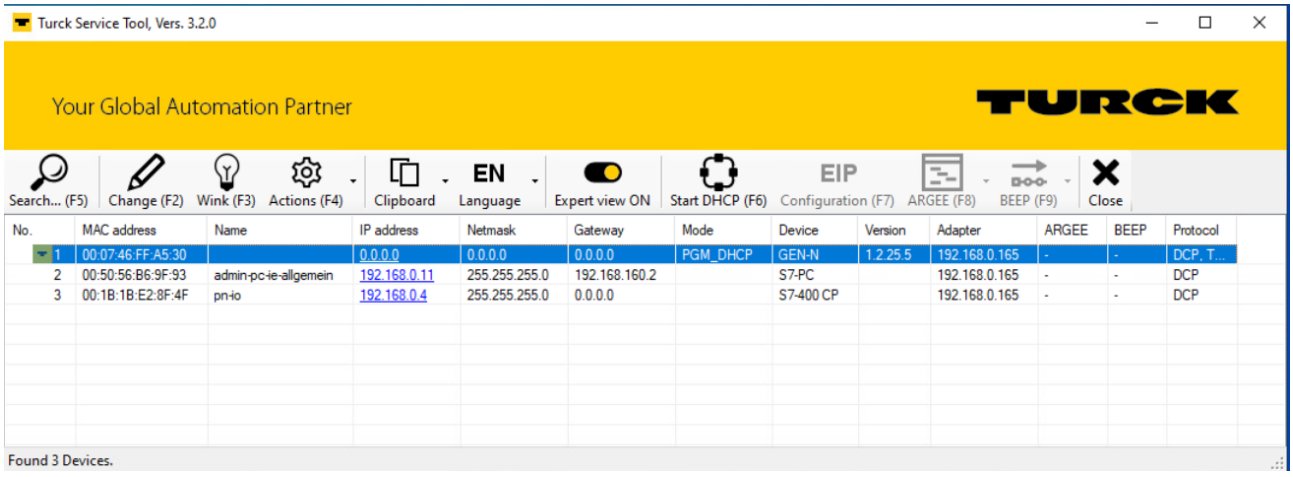


Fig. 2: Turck Service Tool

- Click the gateway (example: GEN-N).
- Click **Change** or press **F2**.
- Set the IP address, device name and, if necessary, the network mask and gateway.
- Accept the changes by clicking **Set in device**.

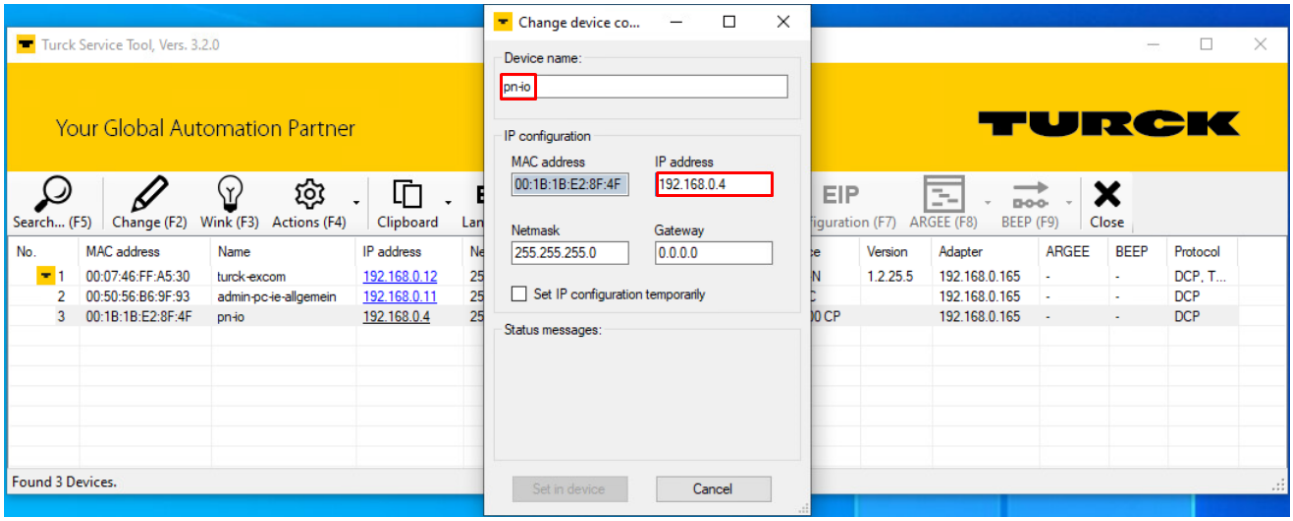


Fig. 3: Set the IP address

Switching to the web server

The device is factory set to IP address 192.168.1.254. To open the web server via a web browser, enter 192.168.1.254 in the address bar of the web browser. This procedure is used to provide an overview.

Alternatively, double-click on the IP address in the Turck Service Tool.

A login is required in order to edit settings via the web server. The default password is “password”.

NOTE
To ensure greater security, Turck recommends changing the password after the first login.

- ▶ Enter the password in the Login field on the home page of the web server.
- ▶ Click **Login**.

The PROFINET name of the device can also be set in the web server.

- ▶ Set the PROFINET name in the gateway under **Parameter** → **Device name**.

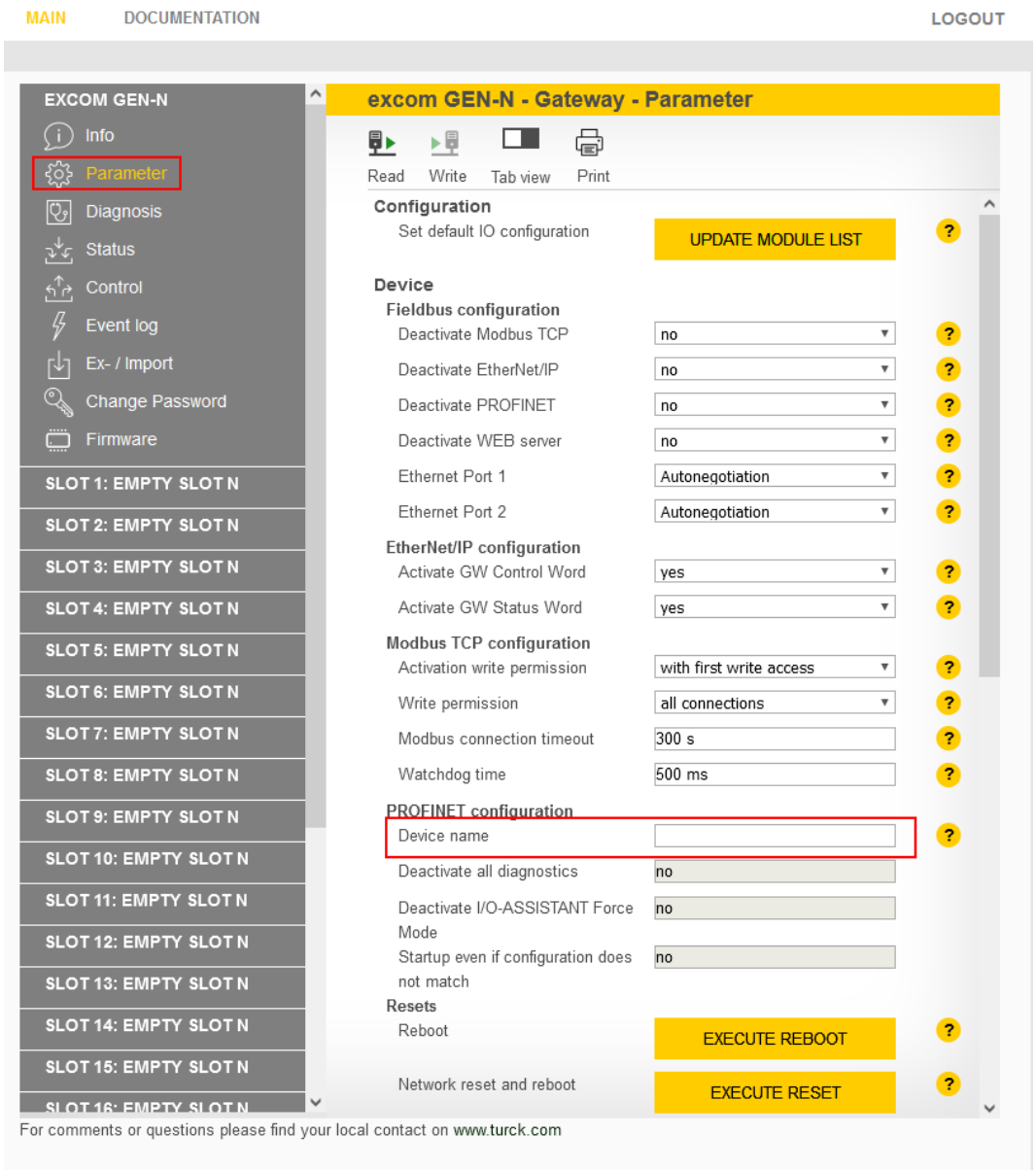


Fig. 4: Set the PROFINET name in the web server

4.3 Installing a GSDML file

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

- Unzip the zip file.

Proceed as follows to install the GSDML file:

- **SIMATIC MANAGER**: Open the project.
- To open the **HW Config** hardware manager: Double-click **Hardware**.

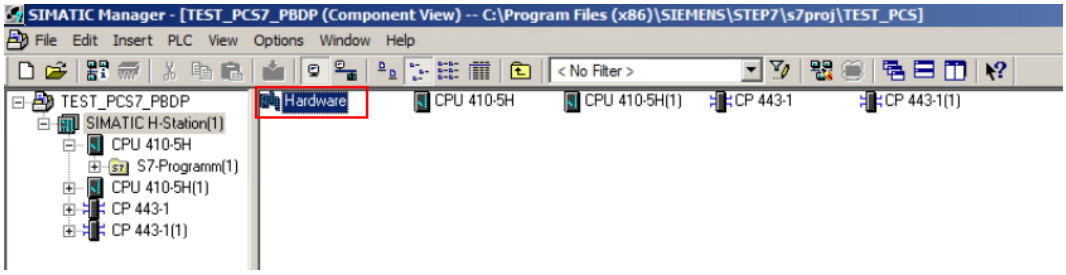


Fig. 5: Open the hardware manager

- In the top menu bar, click **Options** → **Install GSD File…**.

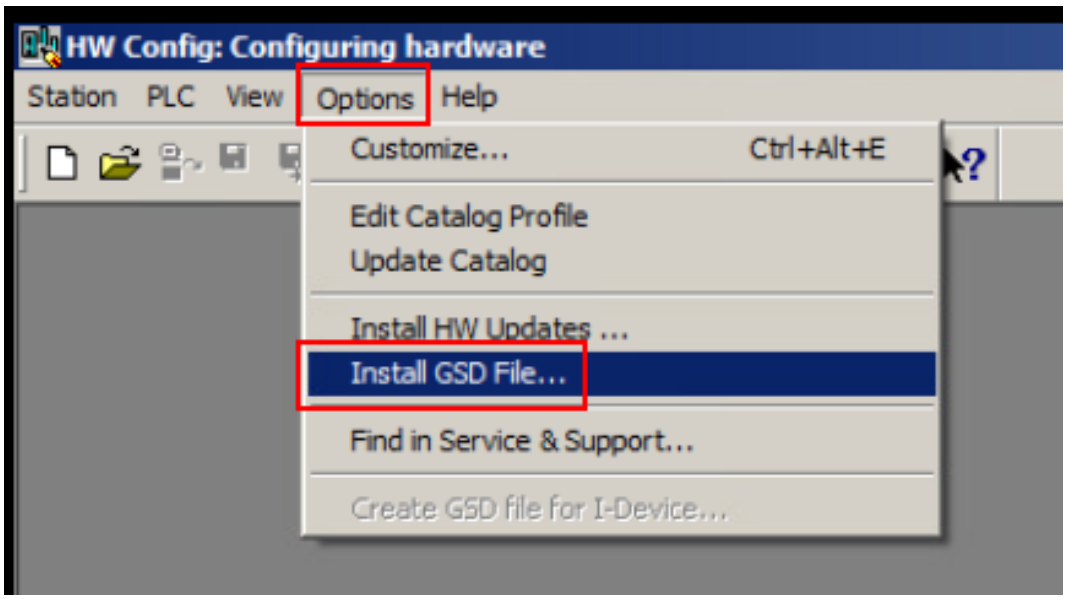


Fig. 6: Select Install GSD File…

⇨ The **Install GSD File…** window opens.

- ▶ Browse the PC for the unzipped GSDML file and select the file.
- ▶ Click **Install**.

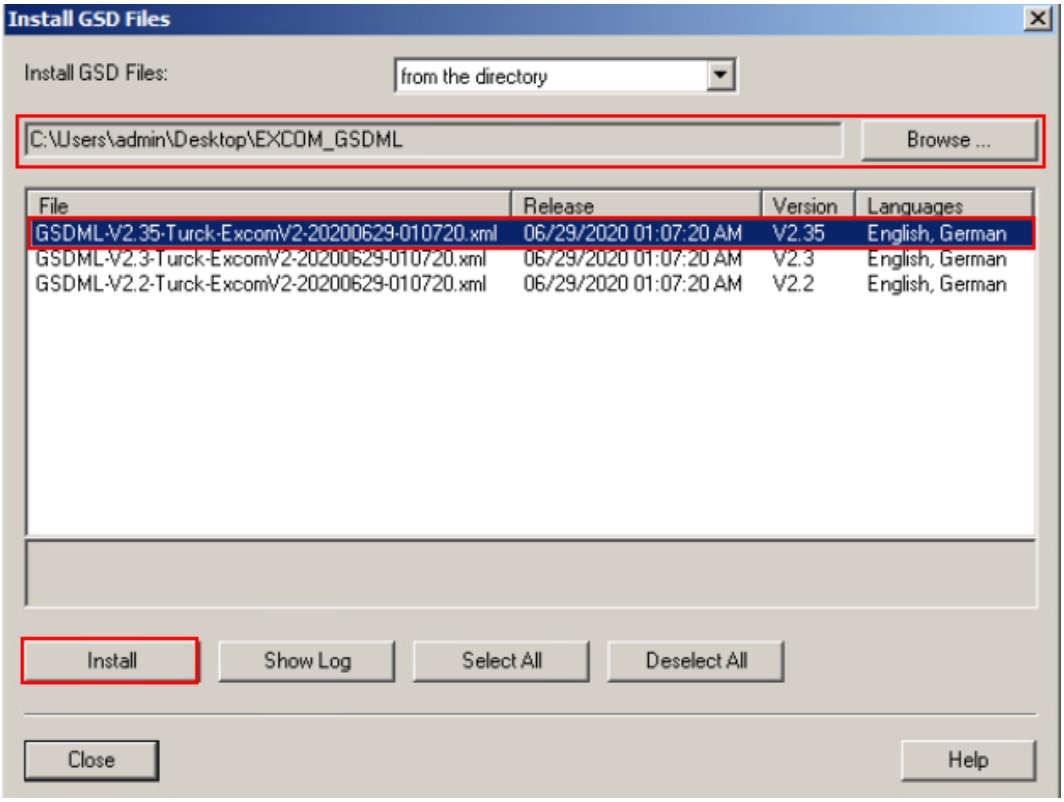


Fig. 7: Install the GSD file

⇨ The GSDML file is added to the hardware library.

4.4 Creating a new PROFINET network

If a project does not yet exist, one must be created. To do this, a PROFINET network must first be created.

- Open the **HW Config** Hardware Manager.

To create two new PROFINET branches, proceed as follows:

- Double-click the PROFINET-enabled interface in the CPU hardware (here: **PN-IO-X8**).
- In the Properties window of the interface, under **General** , click **Properties…**.

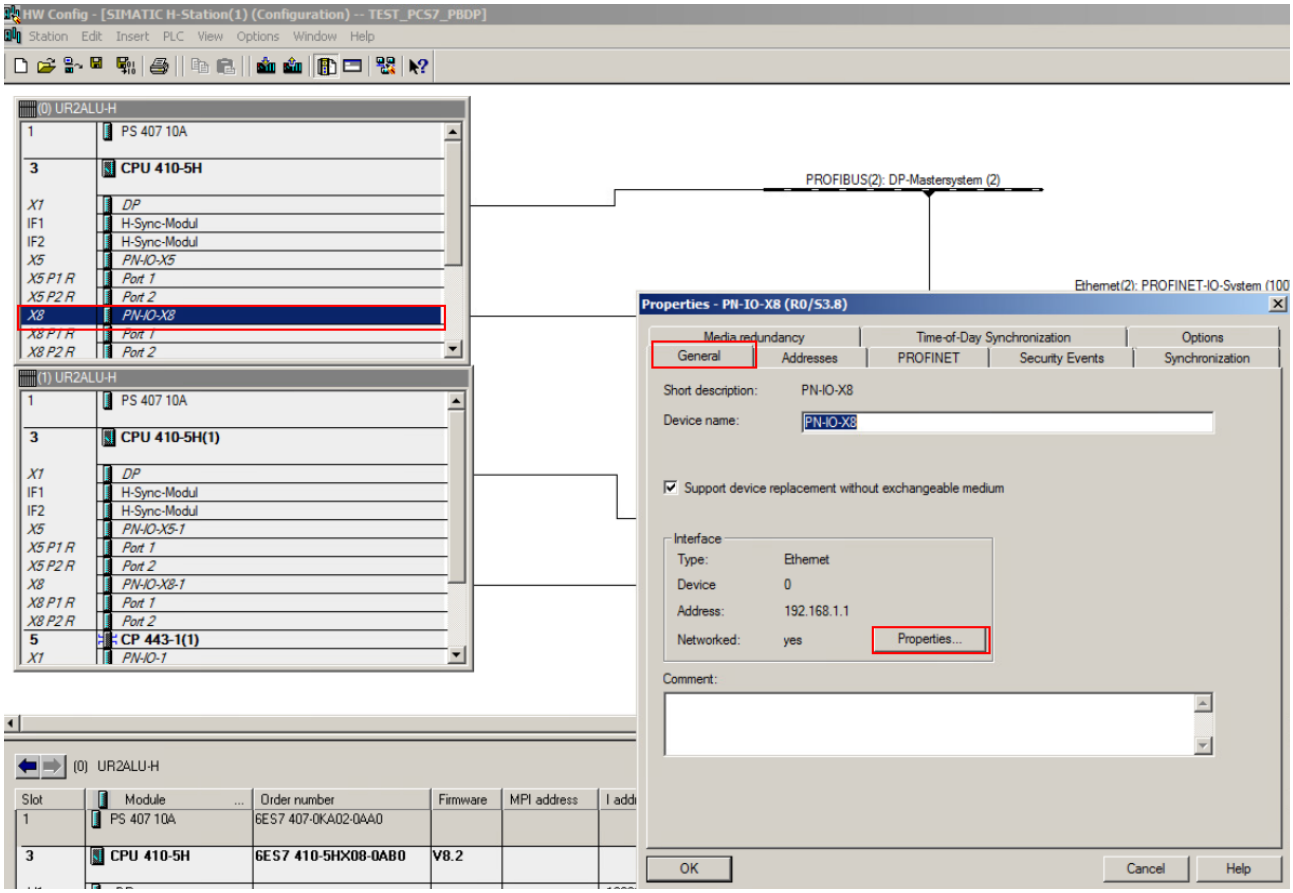


Fig. 8: Open the properties

- ▶ Click the **Parameters** tab.
- ▶ Click **New…**.

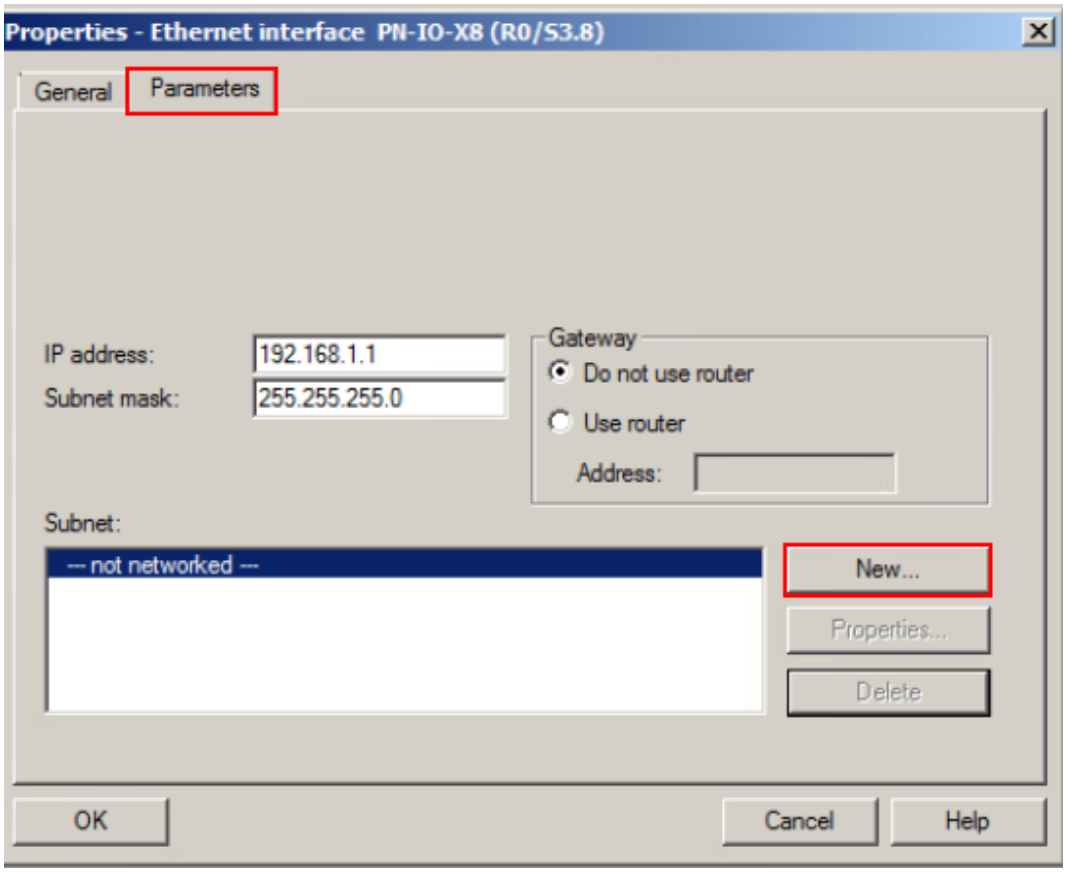


Fig. 9: Click New…

⇨ The **Properties - New subnet Industrial Ethernet** window opens.

The IP address of the interface is assigned when the hardware is created and can subsequently be amended.

- Assign network names.
- Click **OK**.

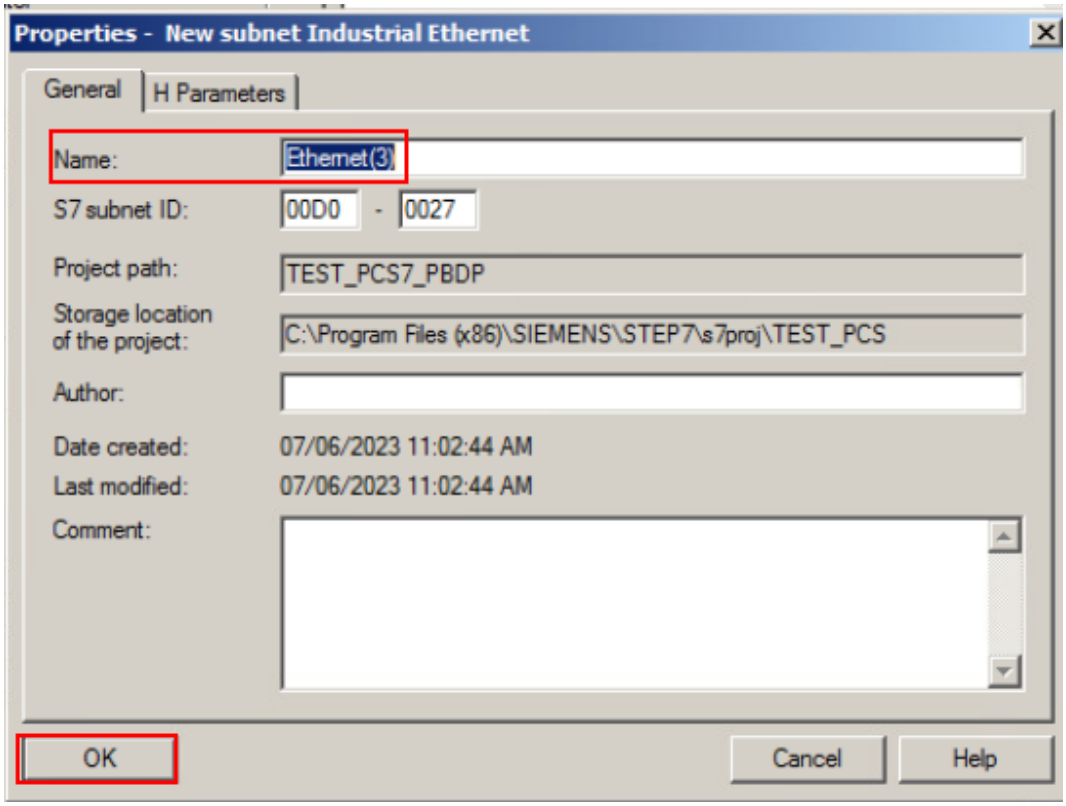


Fig. 10: Assign network names

4.5 Adding the device to the PROFINET network

Proceed as follows to add a device to the PROFINET network. When redundant controllers are used, devices are automatically connected to both PROFINET networks.

- Open the **HW Config** Hardware Manager.
- In the right-hand side bar under **PROFINET IO** → **Additional Field Devices** → **I/O** → **Turck** → **EXCOM**, select the corresponding device (here: GEN-3G).
- Drag and drop the device onto the PROFINET branch.

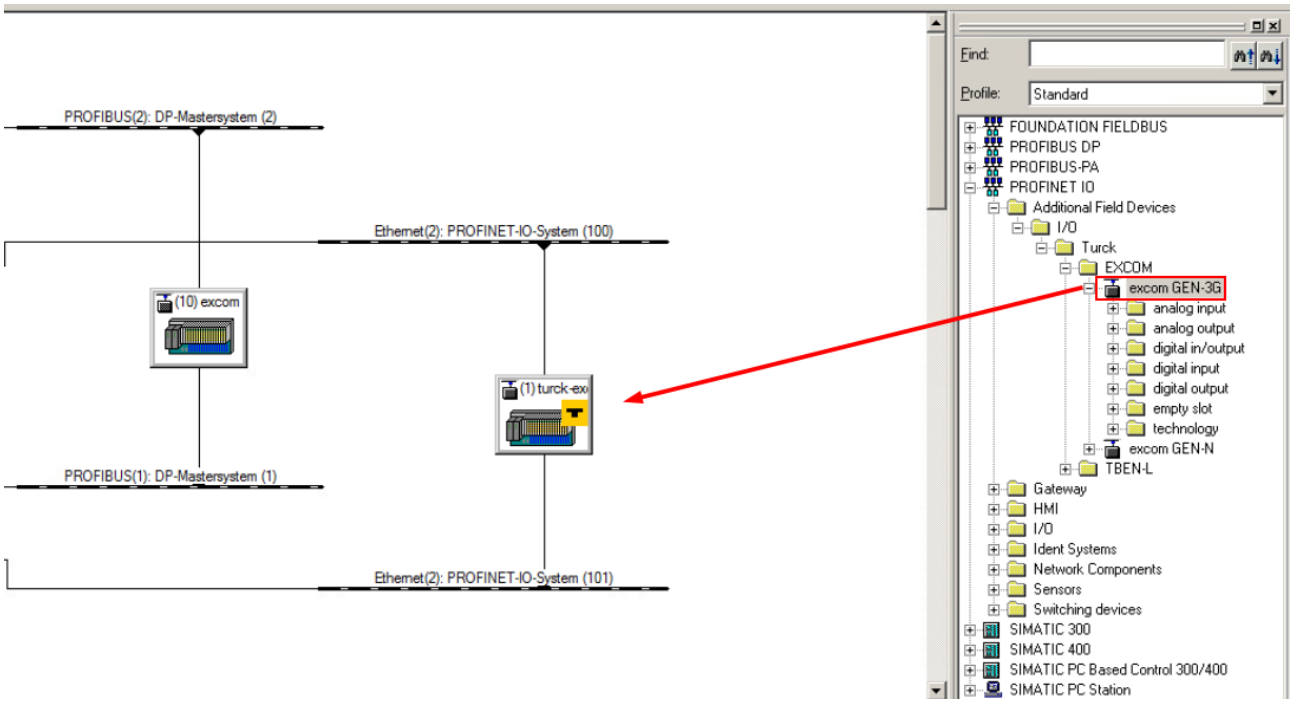


Fig. 11: Drag and drop the device onto the PROFINET branch

- Right-click the device.
- Click **Object Properties…** in the context menu.

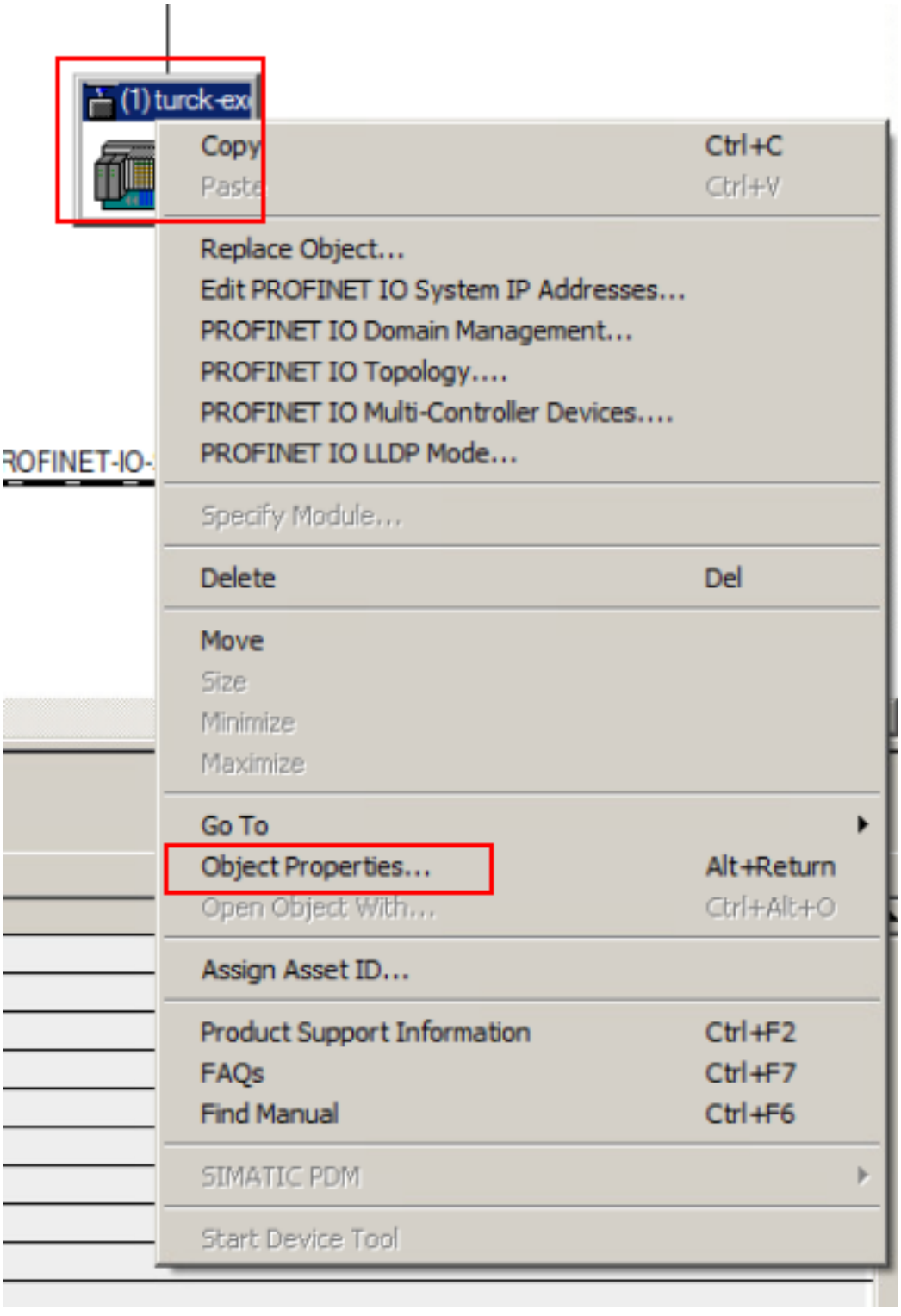


Fig. 12: Click Object Properties…

With PROFINET, the IP address is assigned within a network using a unique device name.

- Enter the stored device name (here the device name of the GEN…) in the Properties window under **General** → **Device name**.

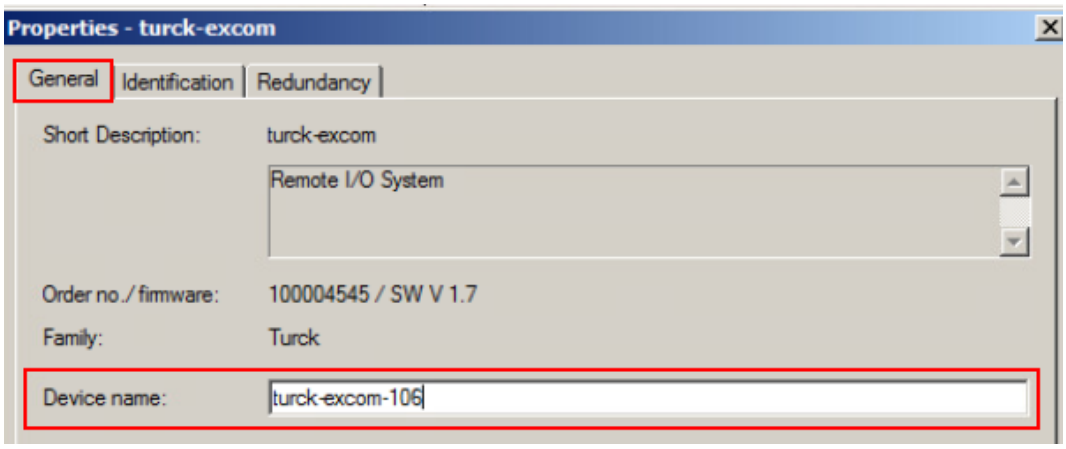


Fig. 13: Enter the device name

- In the Properties window under **General** → **Node in PROFINET IO system**, click **Ethernet…**.
- Set the desired network parameters.
- Click **OK**.

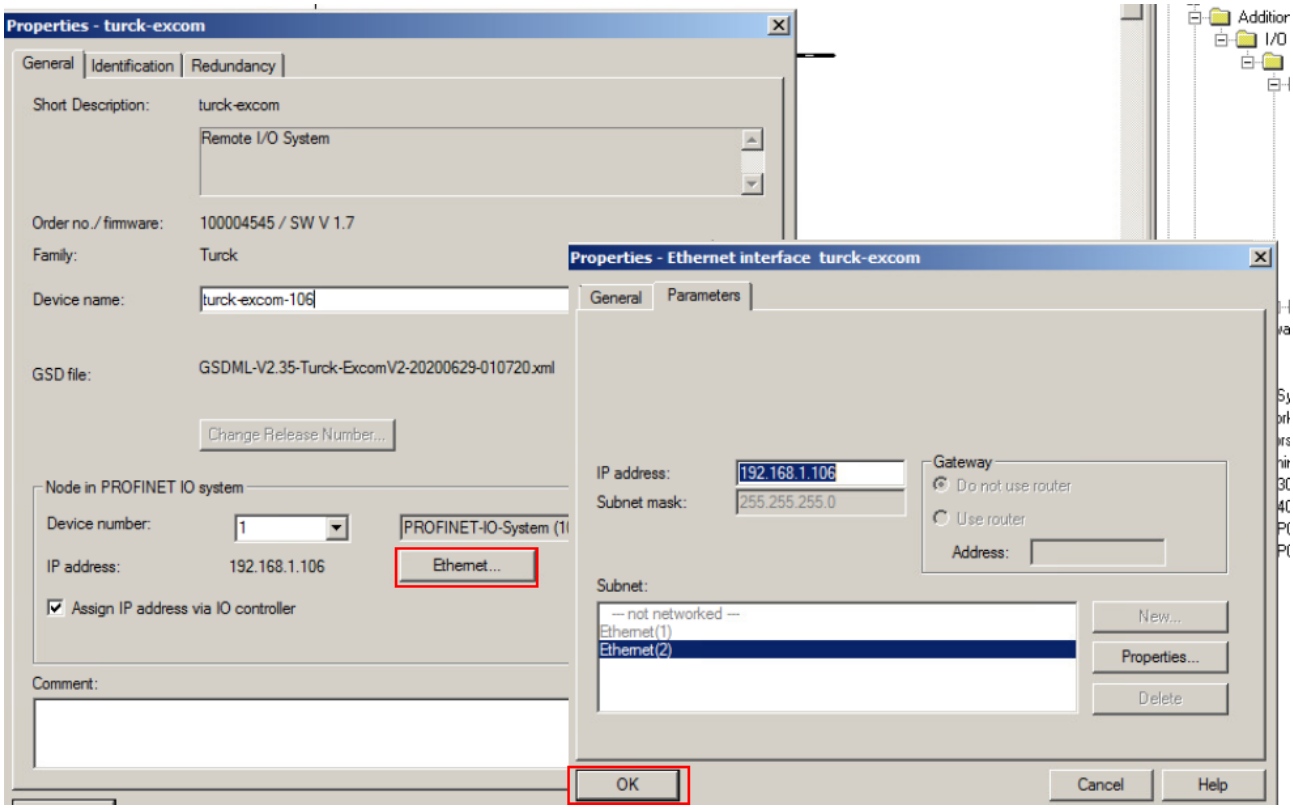


Fig. 14: Set the network parameters

Adding I/O Modules

- ▶ Select the corresponding I/O modules in the right-hand side bar under **PROFINET IO → Additional Field Devices → I/O → Turck → EXCOM → excom GEN….**

  ⇨ The configuration window opens.

- ▶ Add the device to the configuration using drag and drop.

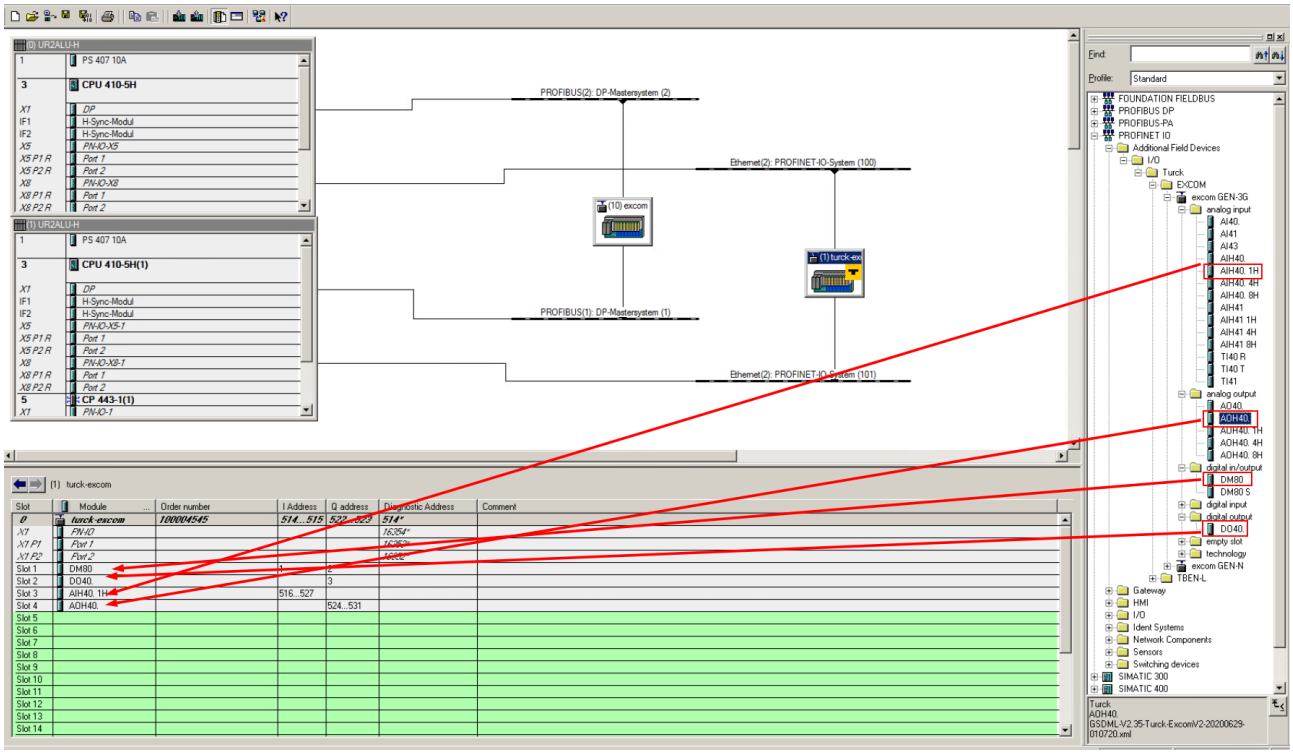


Fig. 15: Add the I/O module using drag and drop

4.6 Parameterizing excom modules

Proceed as follows to parameterize the excom modules:

- Right-click the selected excom module in the **HW Config** hardware manager.
- Click **Object Properties…**.
- Alternatively, double-click the excom module.

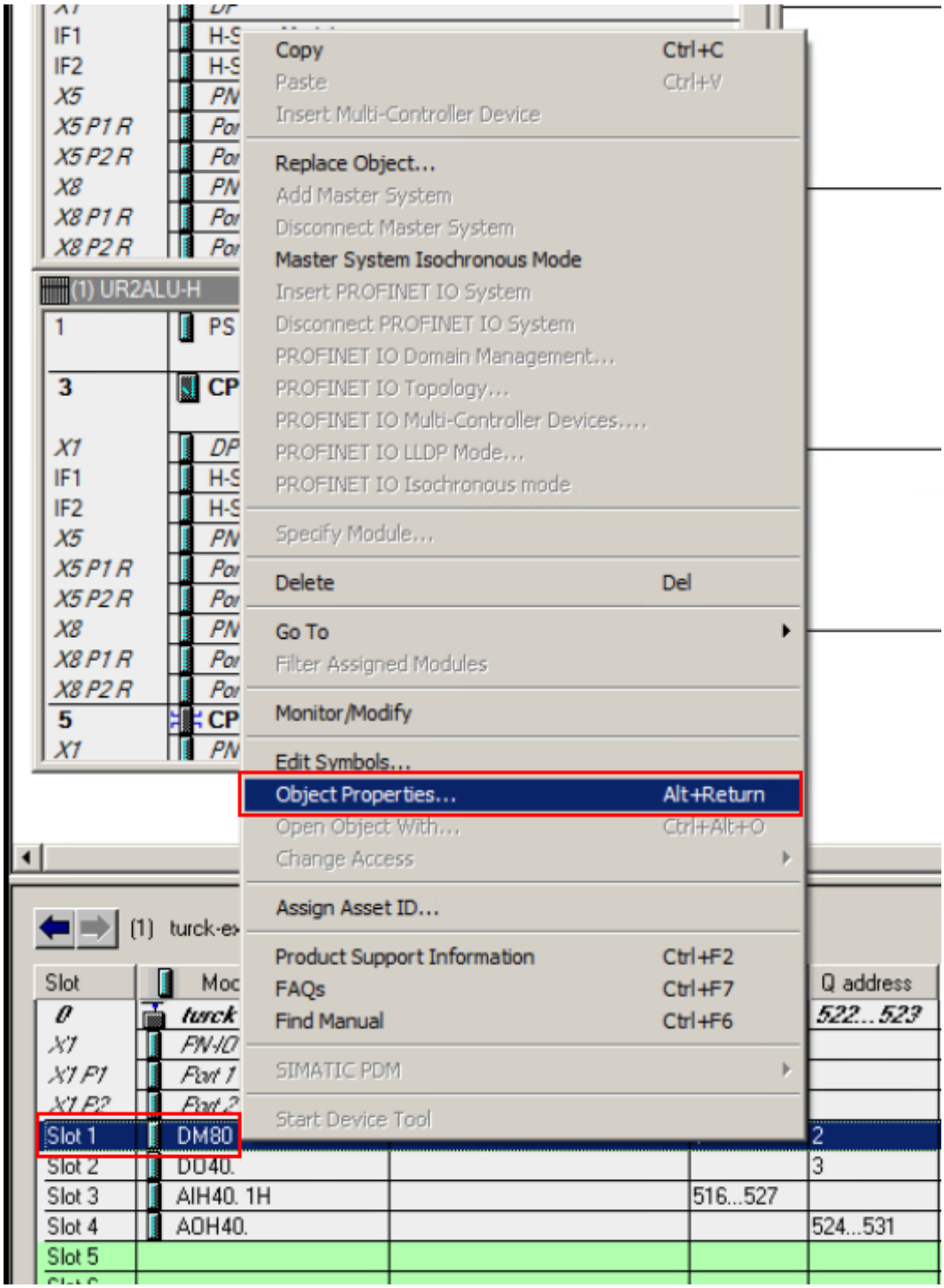


Fig. 16: Open the Properties window

- In the Properties window, select the **Parameters** tab.
- In the right-hand column, set the desired parameters using the drop-down menu.

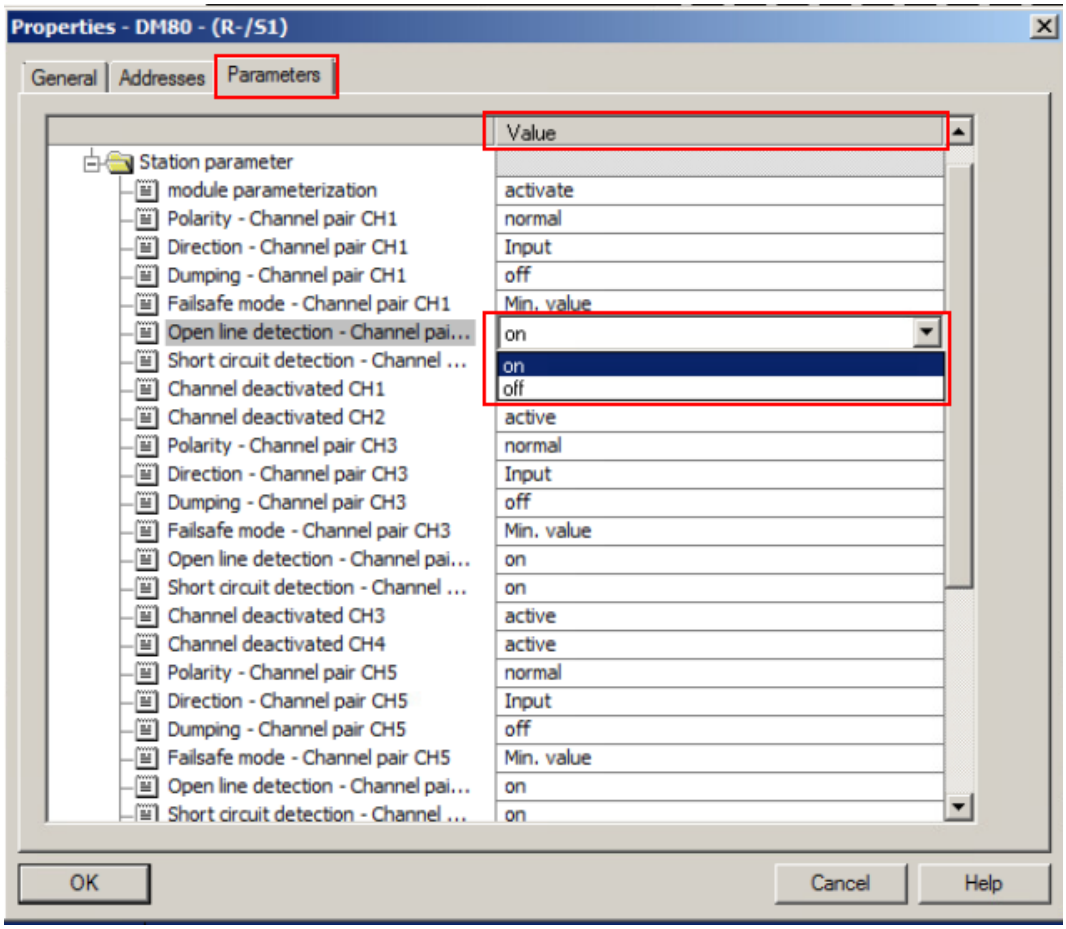


Fig. 17: Set parameters

4.6.1 Example: GEN…

- In the Properties window, select the **Parameters** tab.
- In the right-hand column, set the desired parameters using the drop-down menu.

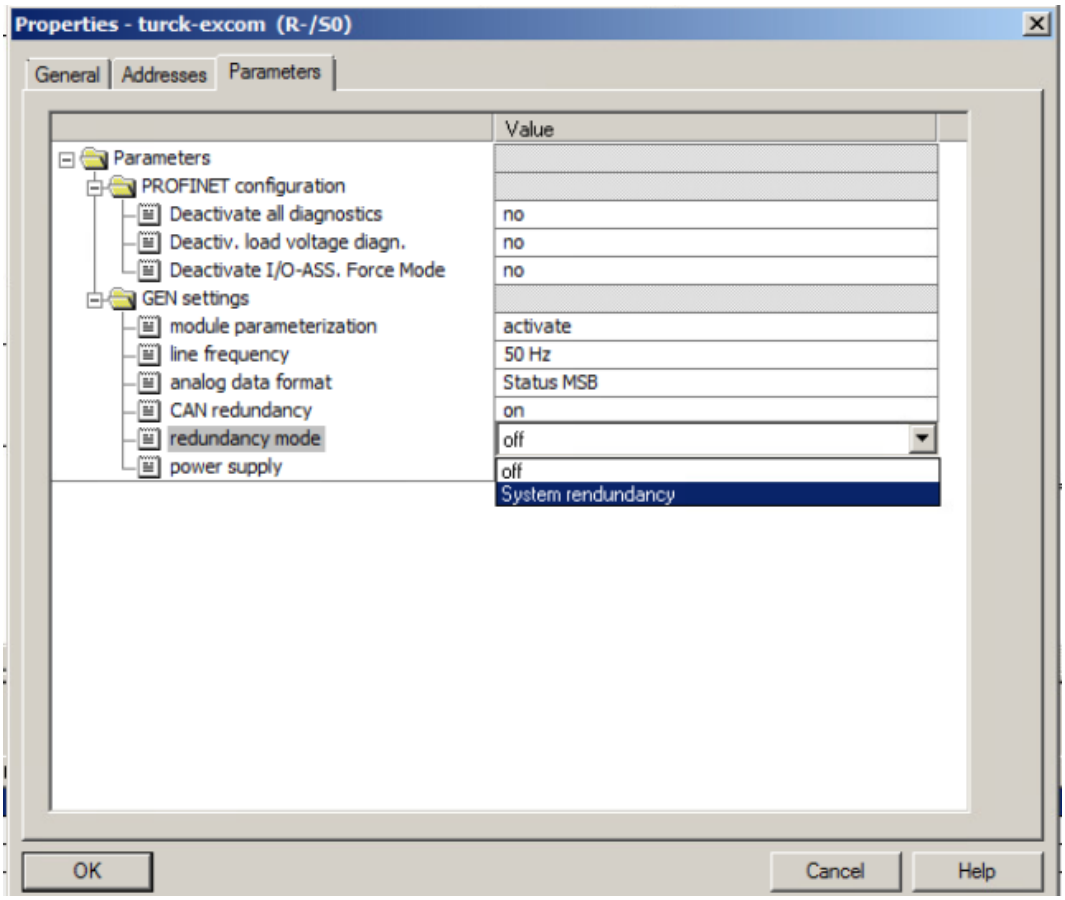


Fig. 18: Set the GEN… parameters

GEN…: Parameter overview

Parameter name	Value	Meaning
Grid	**50 Hz** 60 Hz	Choose filter: Either a 50 Hz filter or a 60 Hz filter can be selected in order to suppress superimposed power supply interference with analog signals.
Analog data format	**Status MSB** Status LSB No status	Define 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 defined. ■ Status MSB: Status bit at bit position 2^{15} ■ Status LSB: Status bit at 2^{0} ■ No status: Measured value without status bit
Redundancy mode	**Off** Line redundancy System redundancy	Select redundancy type: ■ Gateway without redundancy function ■ Line redundancy ■ System redundancy
Power supply module	**Single** Redundant	Select diagnostics Simple: Both power supply modules feed the excom station with voltage, however, status information on the redundant supply is not output. Redundant: Both power supply modules feed the excom station with voltage and station information on the redundant supply.
CAN redundancy	Off **On**	Activate or deactivate internal communication redundancy (gateway module communication)

4.6.2 Example: AIH40 1H

- In the Properties window, select the **Parameters** tab.
- In the right-hand column, set the desired parameters using the drop-down menu.

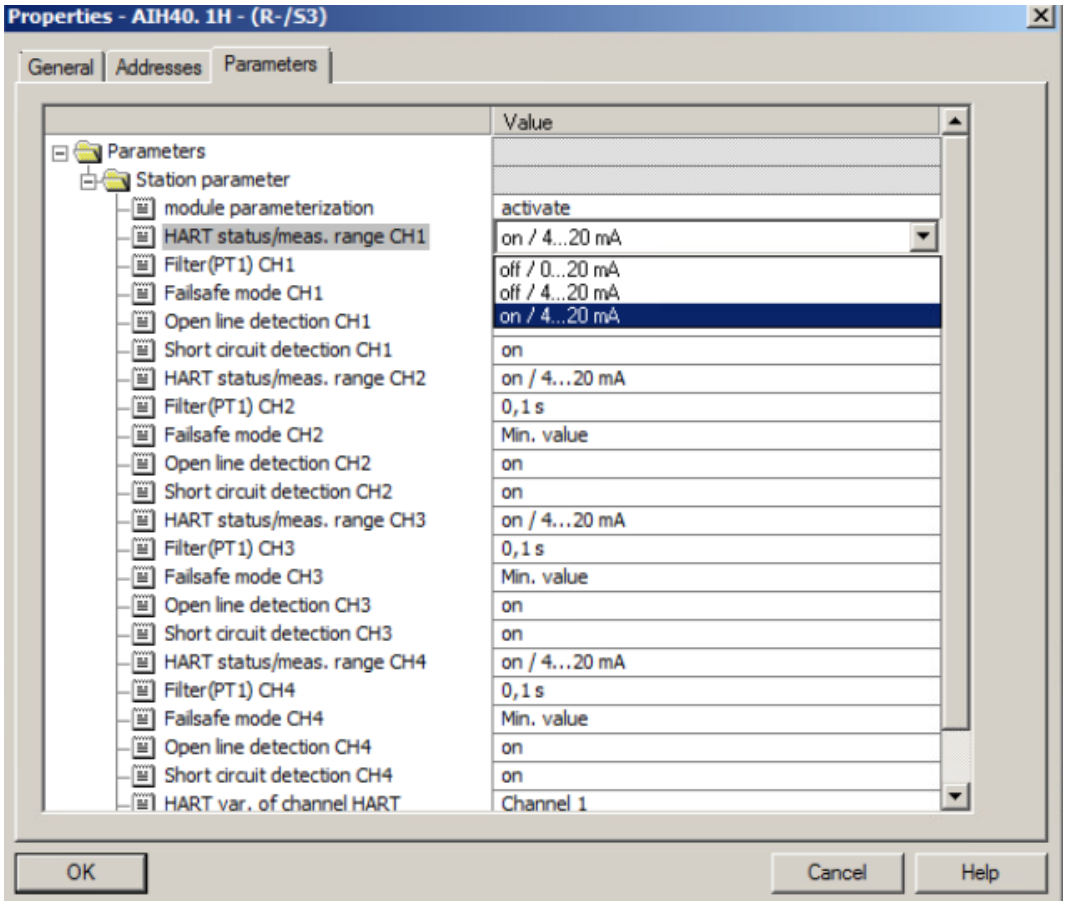


Fig. 19: Set the AIH40-1H parameters

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/4…20 mA **On/4…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: Live zero without HART status request; diagnostics for wire break and measuring range undershoot active 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

4.6.3 Example: DM80

- In the Properties window, select the **Parameters** tab.
- In the right-hand column, set the desired parameters using the drop-down menu.

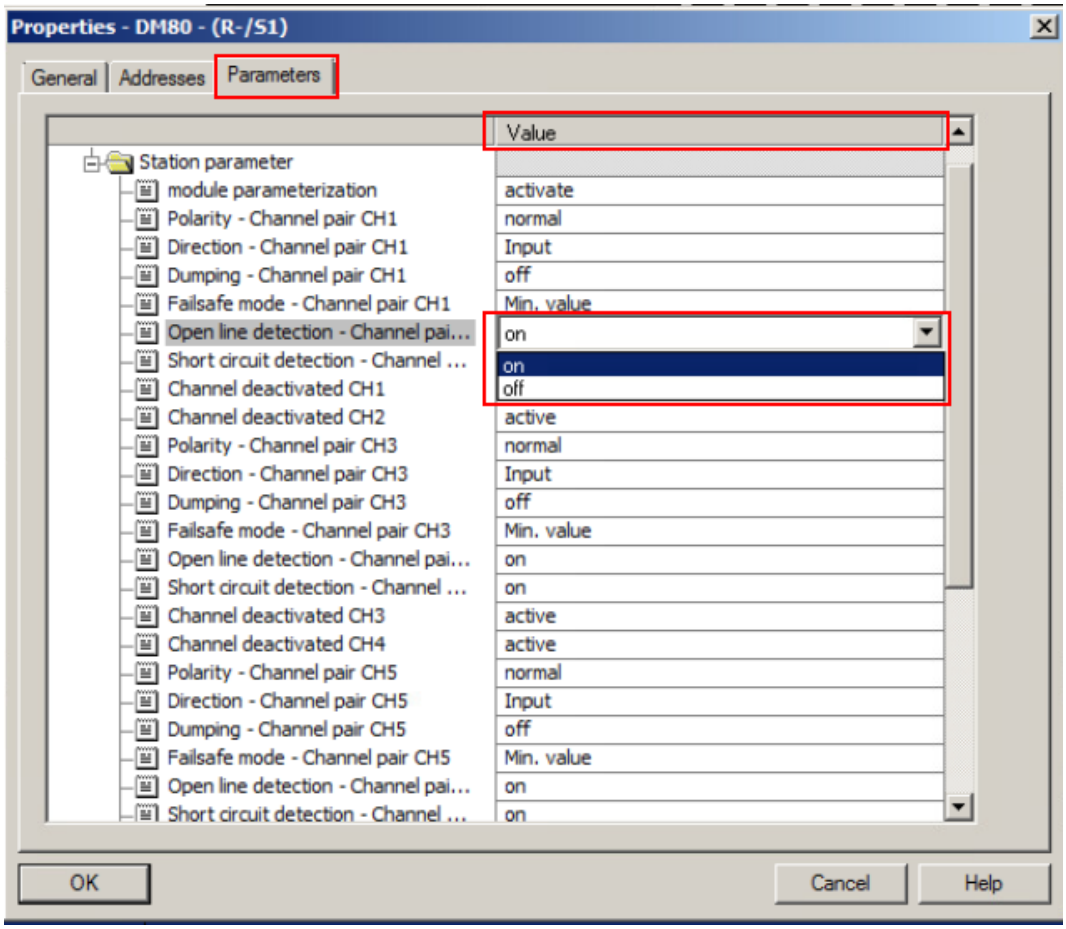


Fig. 20: Set the DM80 parameters

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.

4.6.4 Example: DO40

- In the Properties window, select the **Parameters** tab.
- In the right-hand column, set the desired parameters using the drop-down menu.

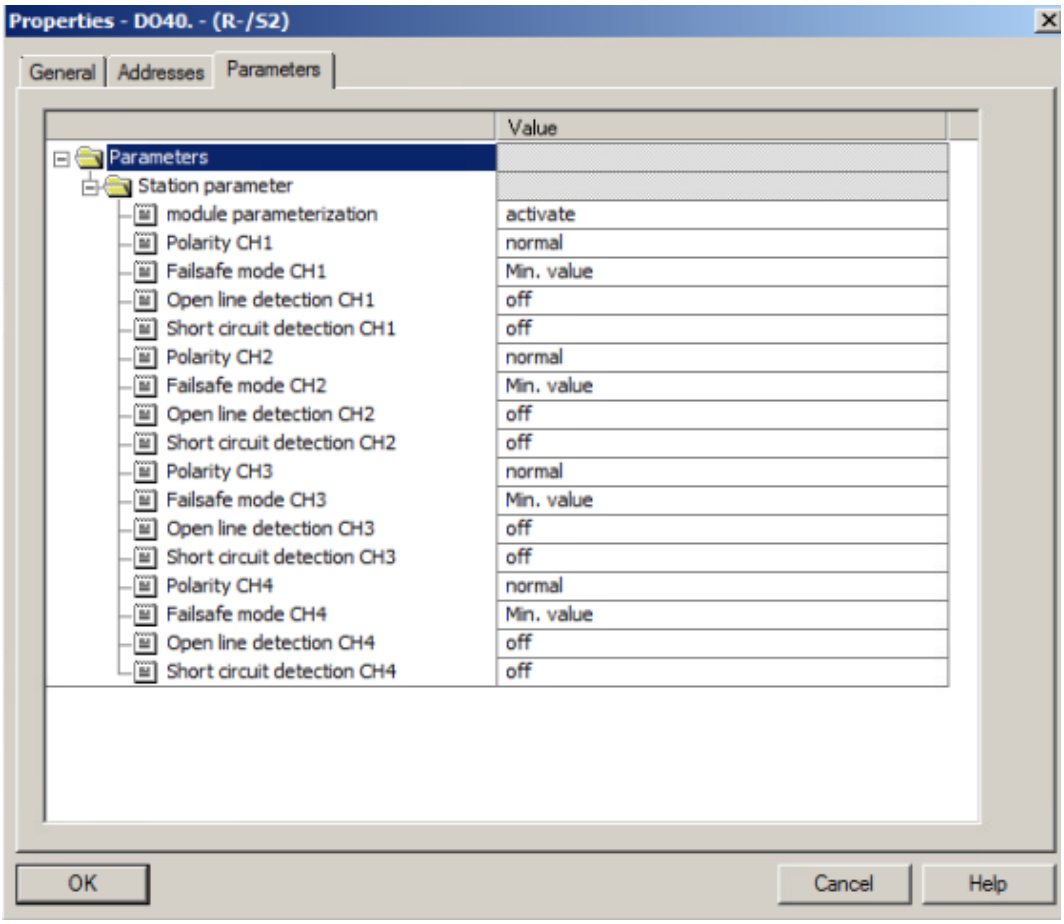


Fig. 21: Set the DO40 parameters

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

4.6.5 Example: AOH40

- In the Properties window, select the **Parameters** tab.
- In the right-hand column, set the desired parameters using the drop-down menu.

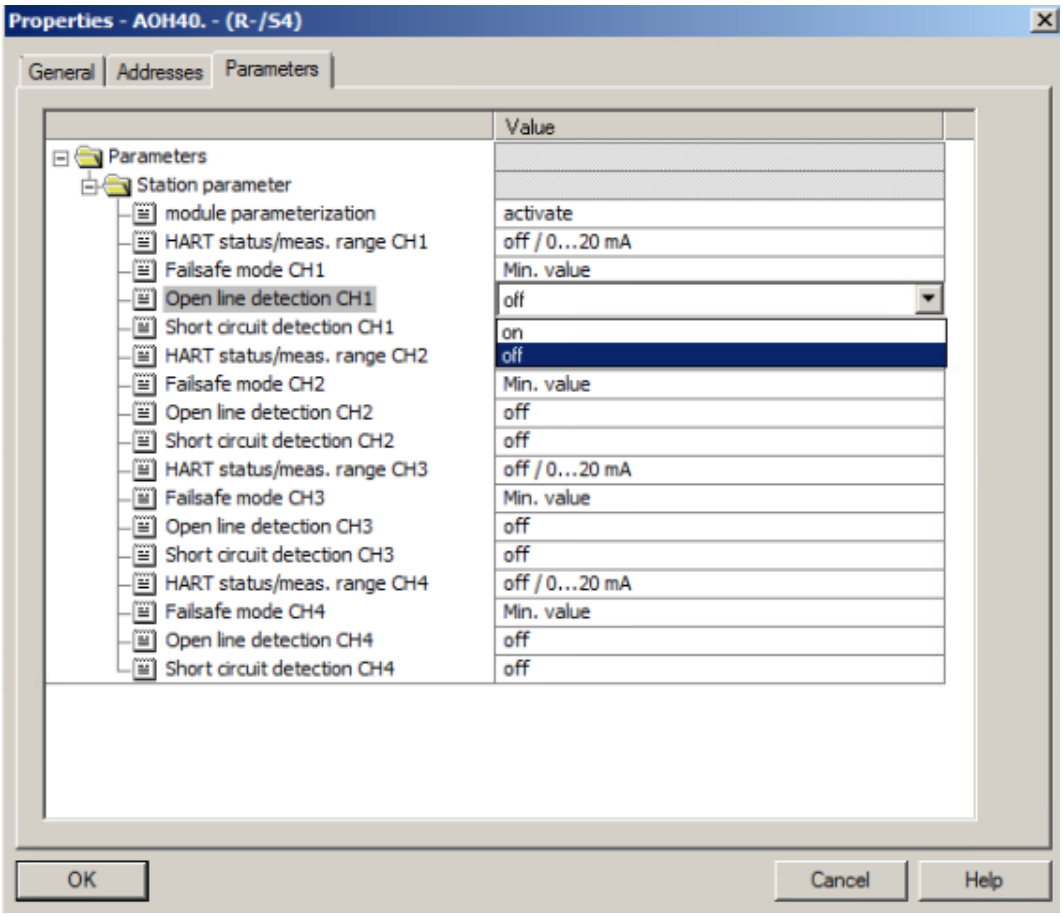


Fig. 22: Set the AOH40 parameters

AOH40: 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. Further information on this is provided in the excom manual for the non-Ex area.

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 monitoring inactive Off/4…20 mA: Live zero without HART status request and wire-break monitoring active On/4…20 mA: Live zero with HART status request (HART diagnostics active) and wire-break monitoring active

4.7 Loading the new hardware configuration into the CPU

To download the new hardware configuration to the CPU, proceed as follows:

- Click the Download to Module icon in the menu bar of the **HW Config** hardware manager.

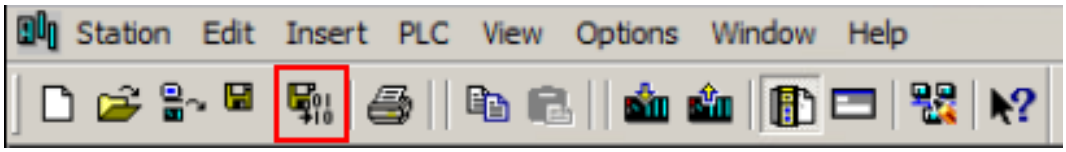


Fig. 23: Click the save-and-compile icon

- Download the virtual CPU to the CPU using the Download to Module icon.

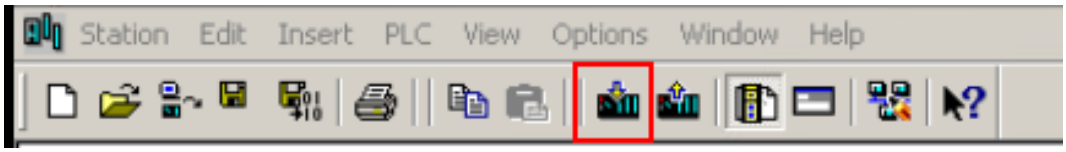


Fig. 24: Download to the CPU

⇨ The **Download to Module** window opens.

In the window, you can select whether the station configuration is to be reloaded in RUN mode or whether the CPU is to be stopped for configuration. System redundancy is required for station configuration in RUN mode. If the station configuration is reloaded in RUN mode, CPU-1 is first stopped and loaded. As soon as CPU-1 is set back to RUN mode, CPU-2 is stopped and loaded. Once CPU-2 is returned to RUN mode, redundancy is restored.

- In the **Download to Module** window, select the status for the station configuration (here: RUN).
- Click **OK**.

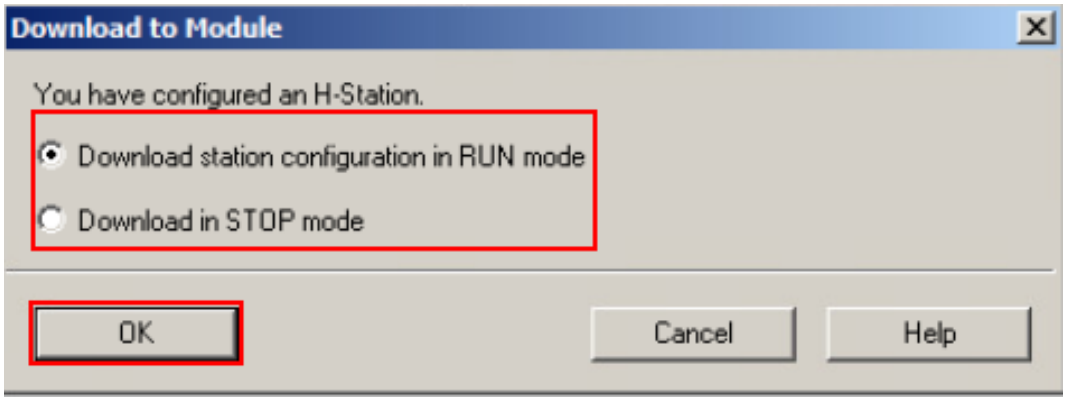


Fig. 25: Select Download to Module

- ▶ Select the CPU to be reloaded first.
- ▶ Click **Next**.

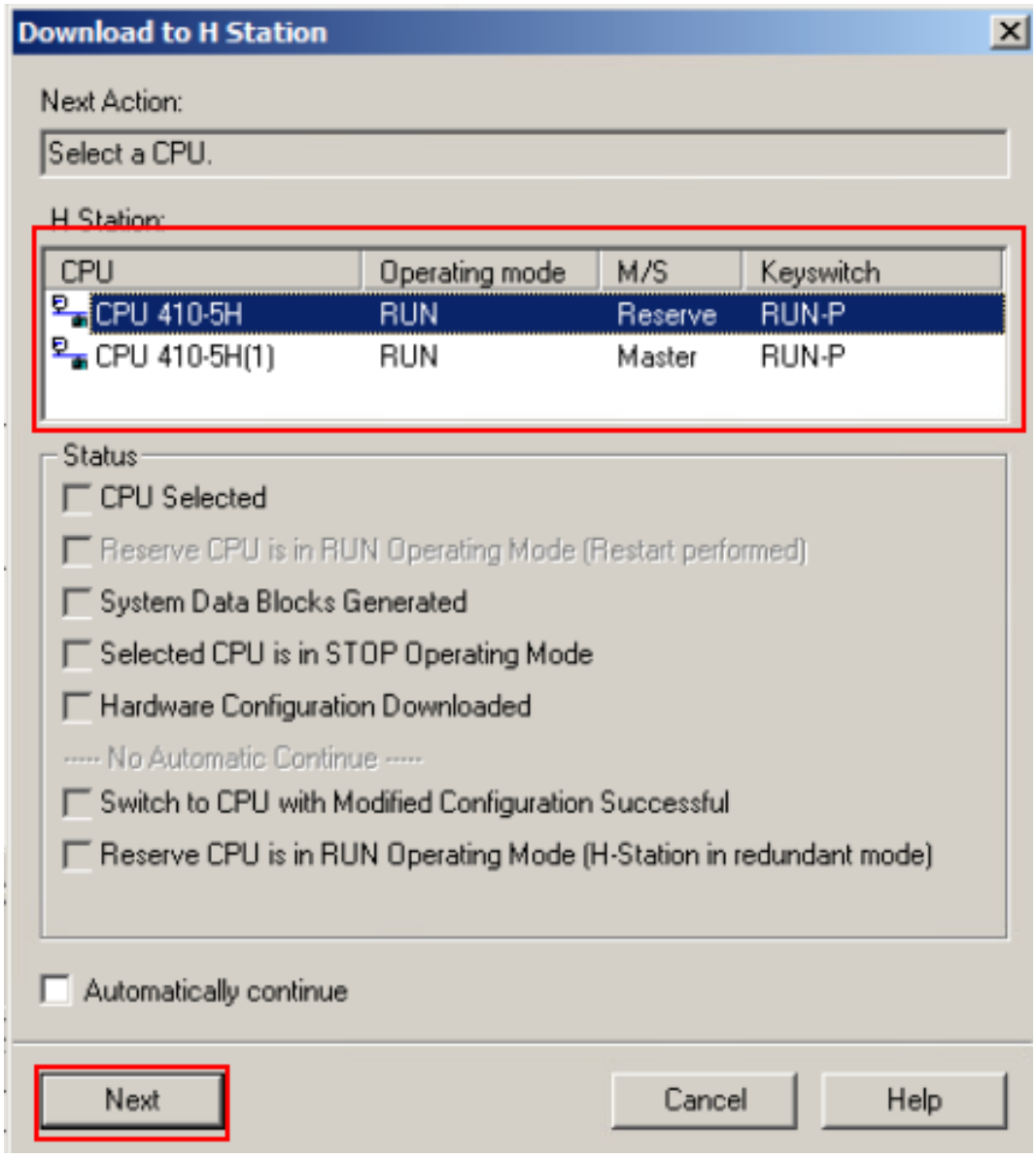


Fig. 26: Select CPU in redundant systems

⇨ The new hardware configuration is first loaded into the reserve CPU.

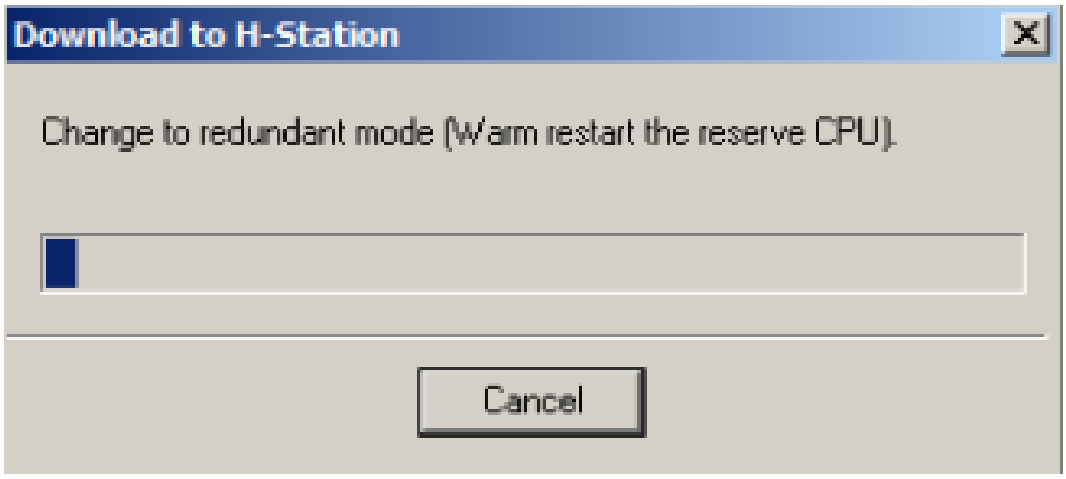


Fig. 27: The hardware configuration is loaded into the reserve CPU

⇨ The new hardware configuration is loaded into the second CPU.

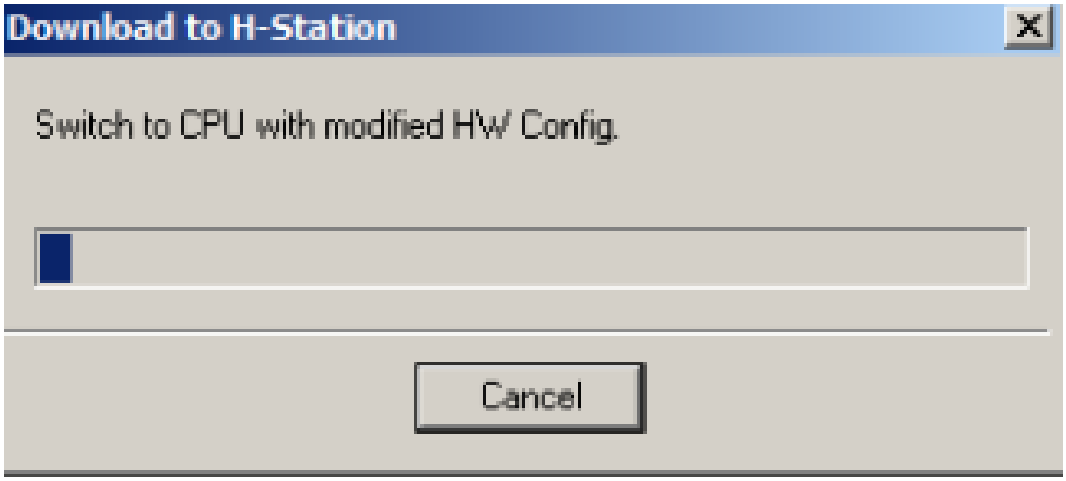


Fig. 28: Switch to second CPU

4.8 Defining I/O signals

To ensure clear assignment of the devices during programming, the I/O signals can be defined via the symbol table. Information about the address range of the I/O signals is available in the hardware manager.

- Open **HW Config**.
- In the menu bar, click **Options** → **Symbol Table**.

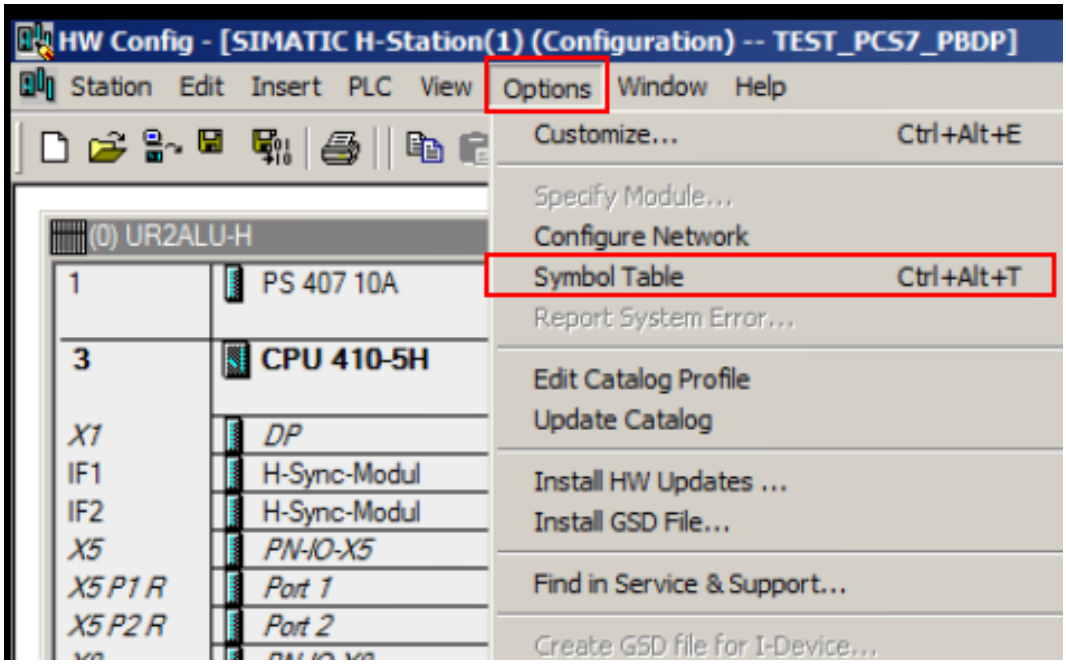
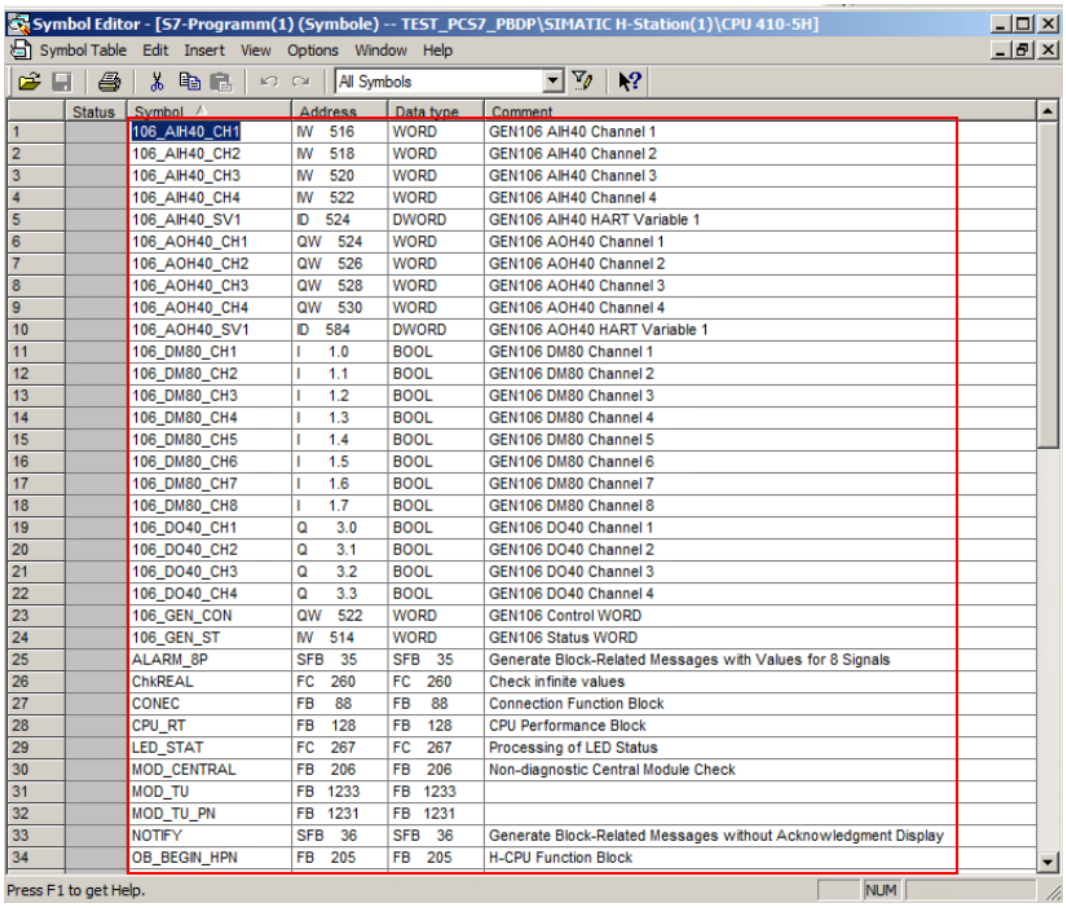


Fig. 29: Open the symbol table

⇨ The **Symbol Editor** opens.

- The symbol, address, data type and a comment can be set for the I/O signals from within the **Symbol Editor**.



	Status	Symbol	Address	Data type	Comment
1		106_AIH40_CH1	IW 516	WORD	GEN106 AIH40 Channel 1
2		106_AIH40_CH2	IW 518	WORD	GEN106 AIH40 Channel 2
3		106_AIH40_CH3	IW 520	WORD	GEN106 AIH40 Channel 3
4		106_AIH40_CH4	IW 522	WORD	GEN106 AIH40 Channel 4
5		106_AIH40_SV1	ID 524	DWORD	GEN106 AIH40 HART Variable 1
6		106_AOH40_CH1	QW 524	WORD	GEN106 AOH40 Channel 1
7		106_AOH40_CH2	QW 526	WORD	GEN106 AOH40 Channel 2
8		106_AOH40_CH3	QW 528	WORD	GEN106 AOH40 Channel 3
9		106_AOH40_CH4	QW 530	WORD	GEN106 AOH40 Channel 4
10		106_AOH40_SV1	ID 584	DWORD	GEN106 AOH40 HART Variable 1
11		106_DM80_CH1	I 1.0	BOOL	GEN106 DM80 Channel 1
12		106_DM80_CH2	I 1.1	BOOL	GEN106 DM80 Channel 2
13		106_DM80_CH3	I 1.2	BOOL	GEN106 DM80 Channel 3
14		106_DM80_CH4	I 1.3	BOOL	GEN106 DM80 Channel 4
15		106_DM80_CH5	I 1.4	BOOL	GEN106 DM80 Channel 5
16		106_DM80_CH6	I 1.5	BOOL	GEN106 DM80 Channel 6
17		106_DM80_CH7	I 1.6	BOOL	GEN106 DM80 Channel 7
18		106_DM80_CH8	I 1.7	BOOL	GEN106 DM80 Channel 8
19		106_DO40_CH1	Q 3.0	BOOL	GEN106 DO40 Channel 1
20		106_DO40_CH2	Q 3.1	BOOL	GEN106 DO40 Channel 2
21		106_DO40_CH3	Q 3.2	BOOL	GEN106 DO40 Channel 3
22		106_DO40_CH4	Q 3.3	BOOL	GEN106 DO40 Channel 4
23		106_GEN_CON	QW 522	WORD	GEN106 Control WORD
24		106_GEN_ST	IW 514	WORD	GEN106 Status WORD
25		ALARM_8P	SFB 35	SFB 35	Generate Block-Related Messages with Values for 8 Signals
26		ChkREAL	FC 260	FC 260	Check infinite values
27		CONEC	FB 88	FB 88	Connection Function Block
28		CPU_RT	FB 128	FB 128	CPU Performance Block
29		LED_STAT	FC 267	FC 267	Processing of LED Status
30		MOD_CENTRAL	FB 206	FB 206	Non-diagnostic Central Module Check
31		MOD_TU	FB 1233	FB 1233	
32		MOD_TU_PN	FB 1231	FB 1231	
33		NOTIFY	SFB 36	SFB 36	Generate Block-Related Messages without Acknowledgment Display
34		OB_BEGIN_HPN	FB 205	FB 205	H-CPU Function Block

Fig. 30: Set I/O signals

4.9 Performing online diagnostics

To open a node's online diagnostics, proceed as follows:

- Click the online icon.

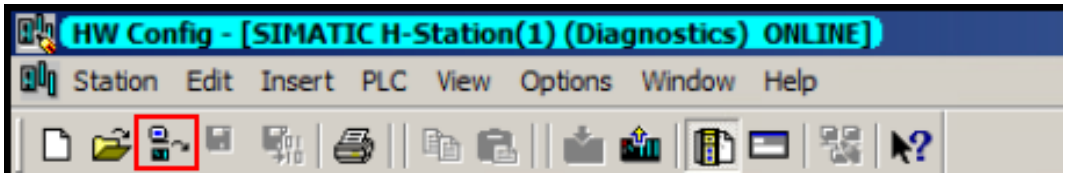


Fig. 31: Click the online icon

- Double-click the node.
- Alternatively: Right-click on the node and select **Module Information…** from the context menu.

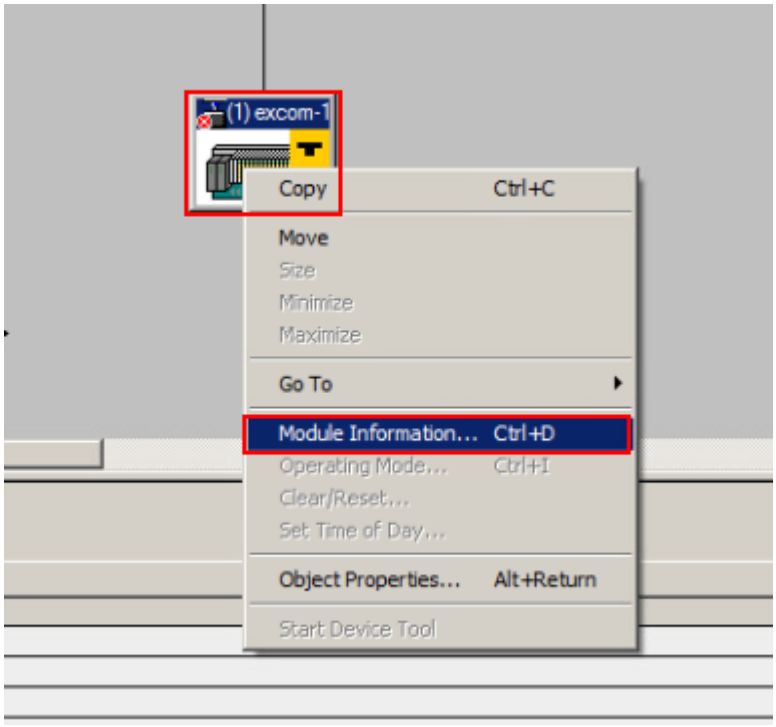


Fig. 32: Open online diagnostics

⇨ The **Module Information** window opens.

In the **General** tab, the **Status:** area displays any errors.

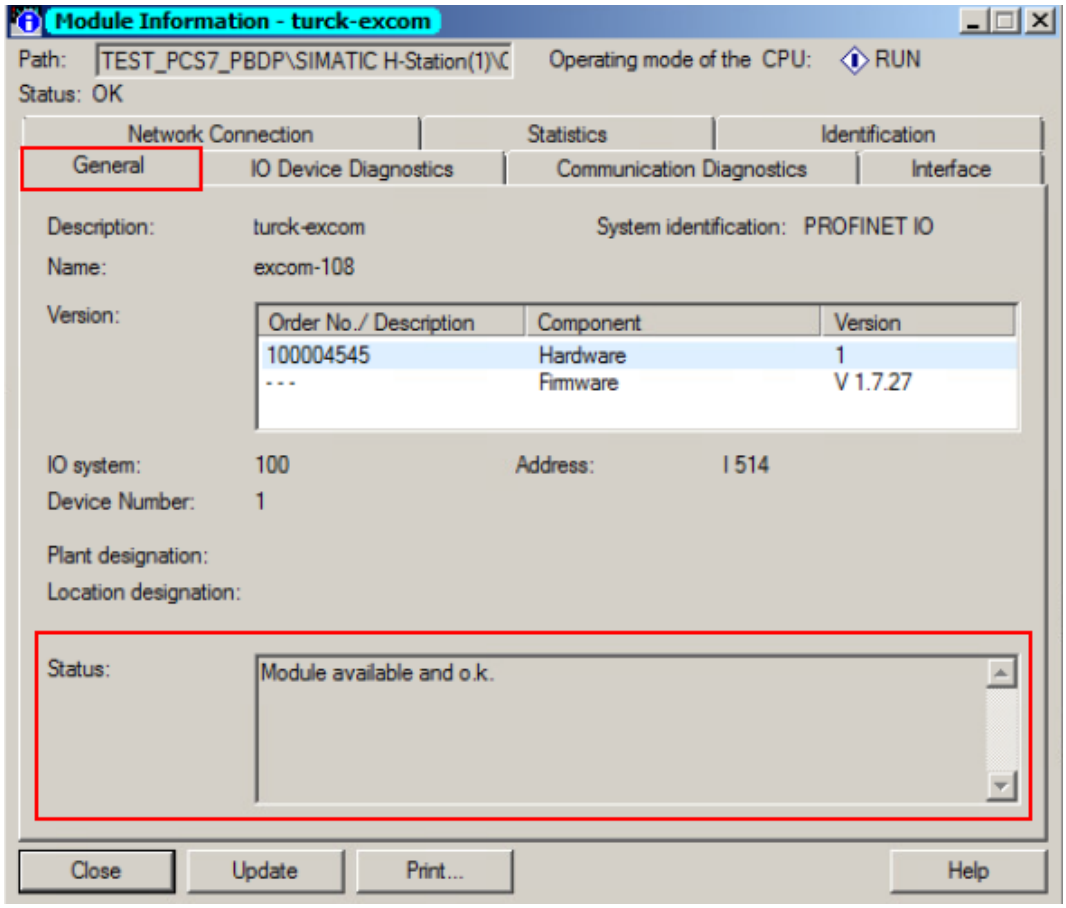


Fig. 33: Errors are displayed under Status

- ▶ To display all active diagnostics, click the **IO Device Diagnostics** tab.
- ▶ The errors can be output in hexadecimal format, to do so click **Hex Format…**.
- ⇨ The active diagnostics are displayed under **Channel-specific Diagnostics**.

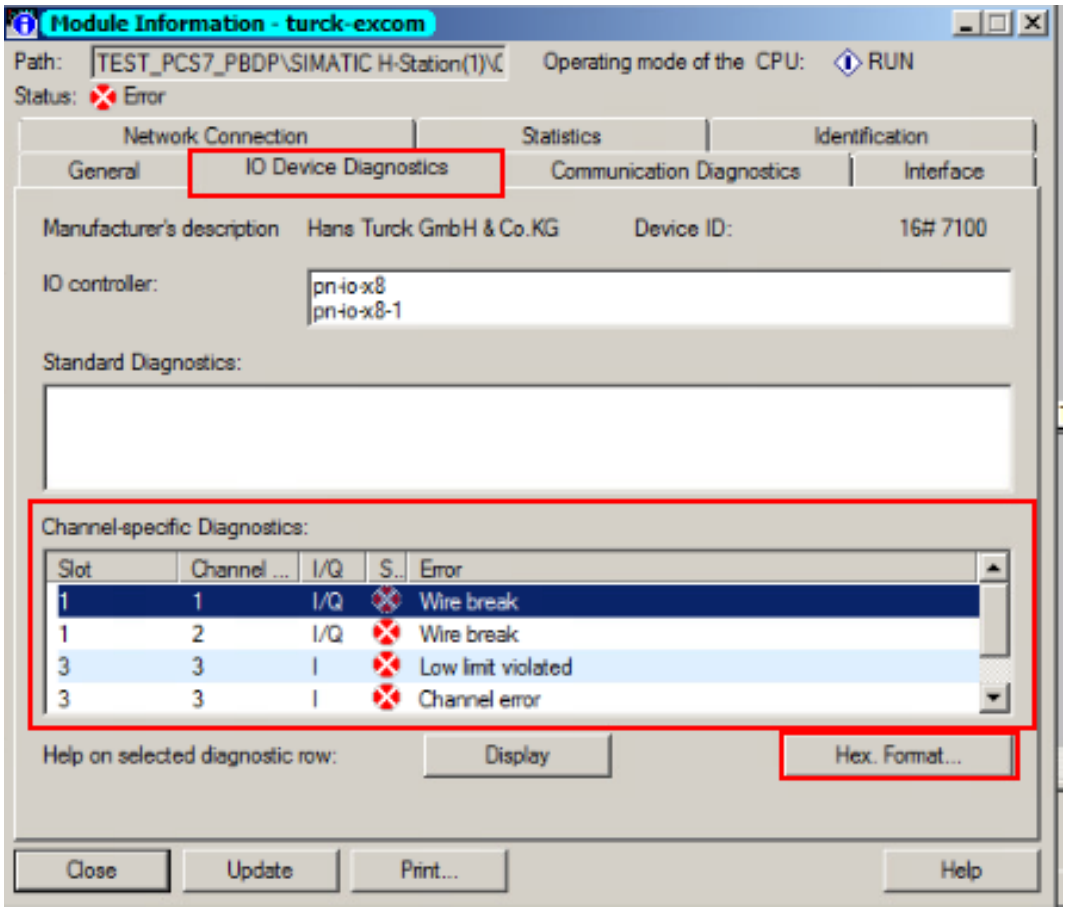


Fig. 34: Channel-specific Diagnostics

4.10 Using function blocks

Function blocks are available for simplified programming of the excom system in PCS7. The function modules are developed and distributed by Codewerk. The function blocks are used under "Pläne" in the Simatic Manager.

- Click **S7-Programm(1)** → **Pläne** in the project tree.

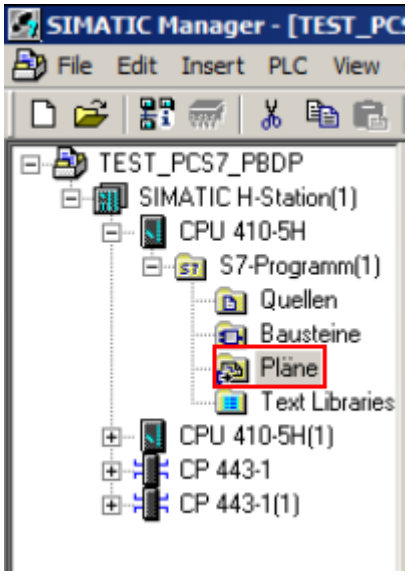


Fig. 35: "Pläne" in the project tree

- To open a plan: Double-click the plan.
- To create a new plan: Right-click in the main window and select a plan under **Insert New Object** in the context menu.

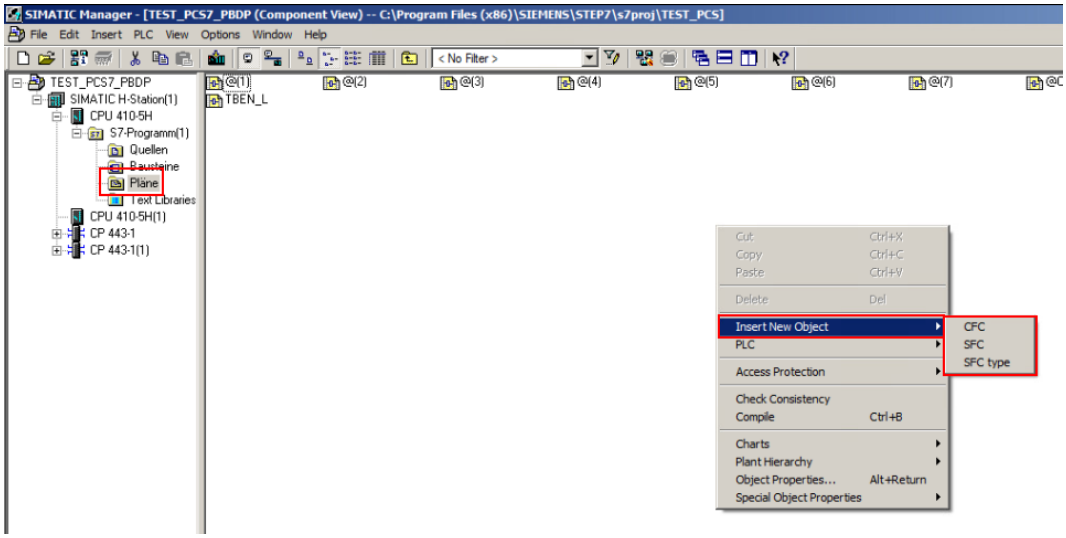


Fig. 36: Open or create a plan

- Double-click the free field in the plan to link I/O signals.

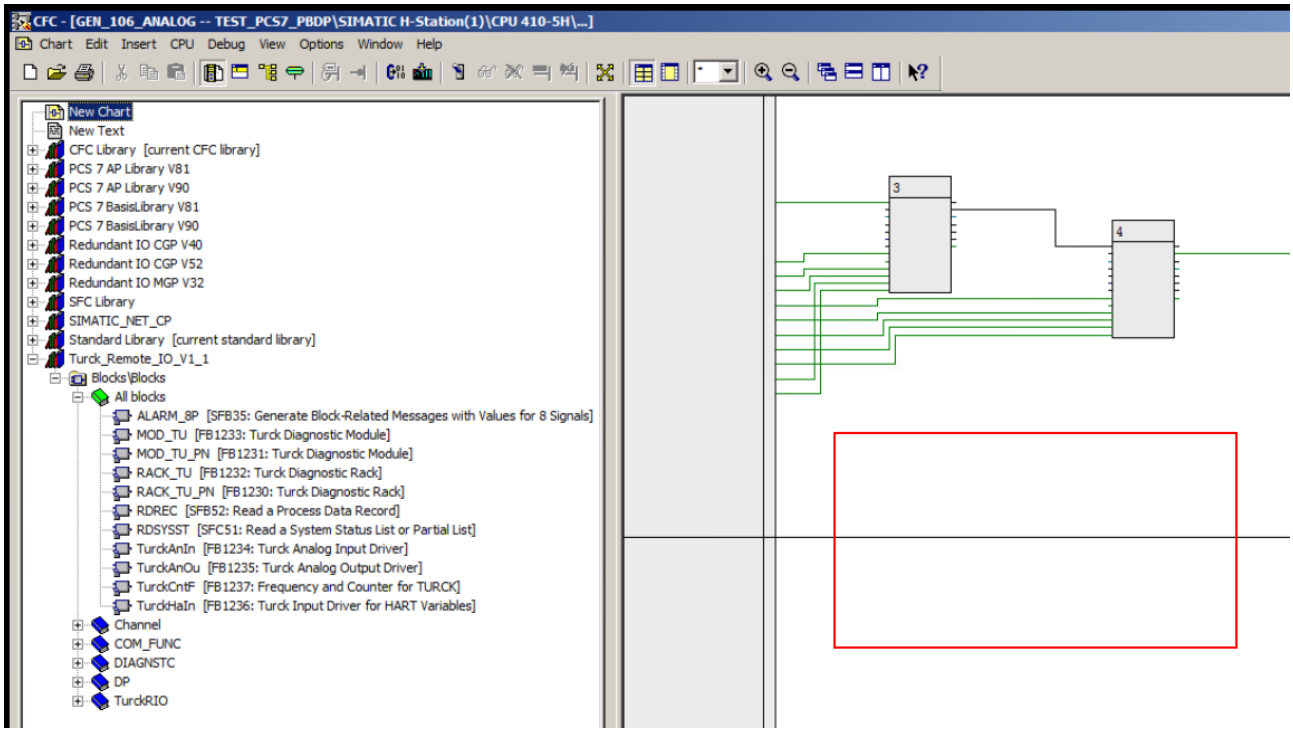


Fig. 37: Select the free field

- Select the **Libraries** tab at the bottom.
- Expand the **Turck_Remote_IO_V1_x** library.
- Select the desired function block in the library and drag and drop it into the free field.

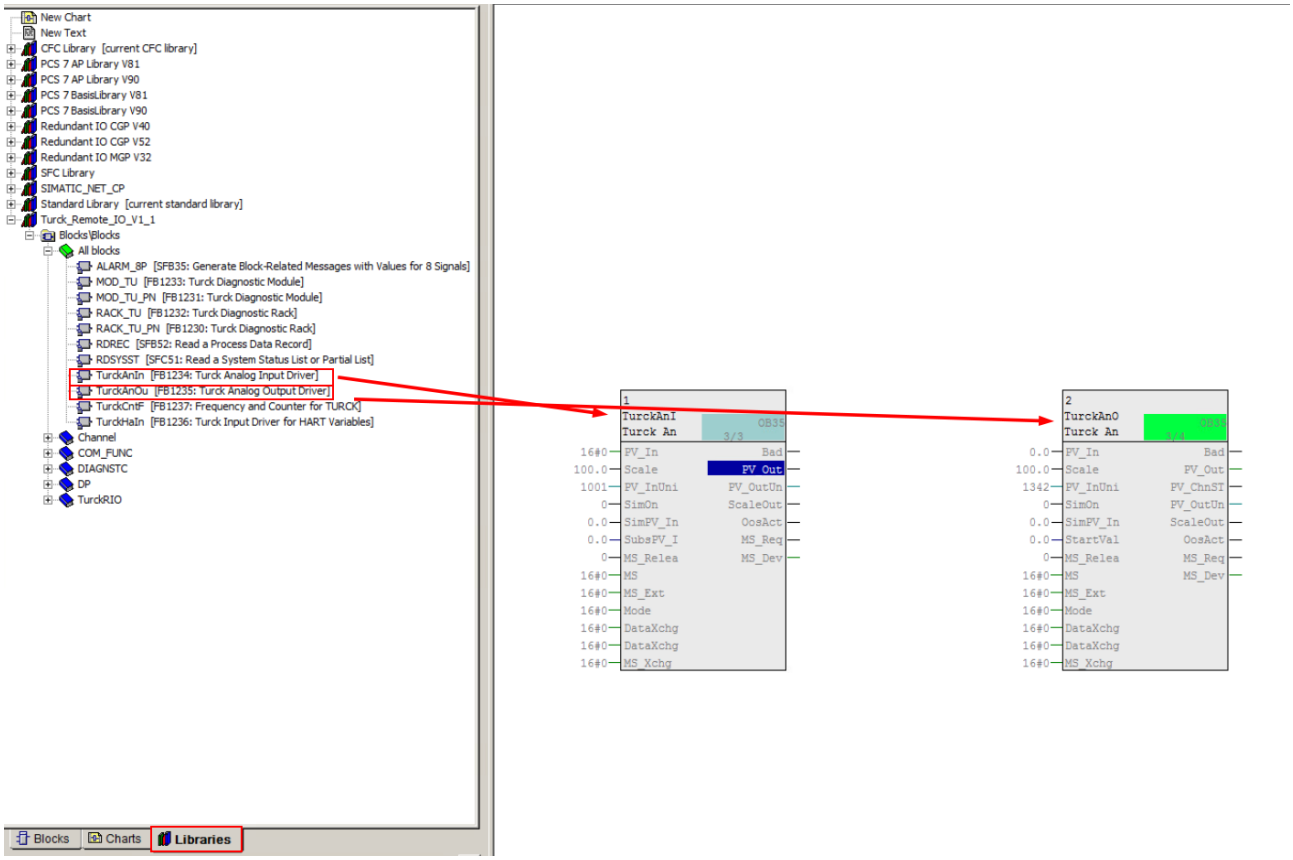


Fig. 38: Drag function blocks into the free field

- Two function blocks can be linked by dragging and dropping at the corresponding connection point.

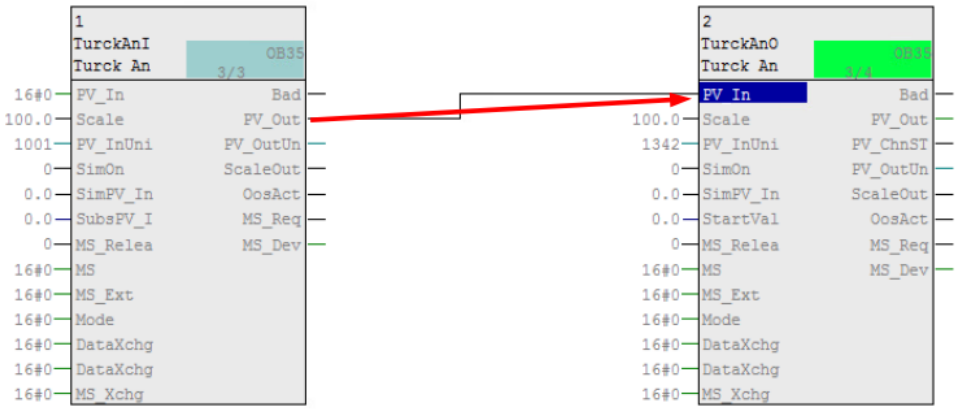


Fig. 39: Link function blocks

To connect a signal with the input connection, for example, proceed as follows:

- Right-click on the input connection.
- Click **Interconnection to Address…** in the context menu.

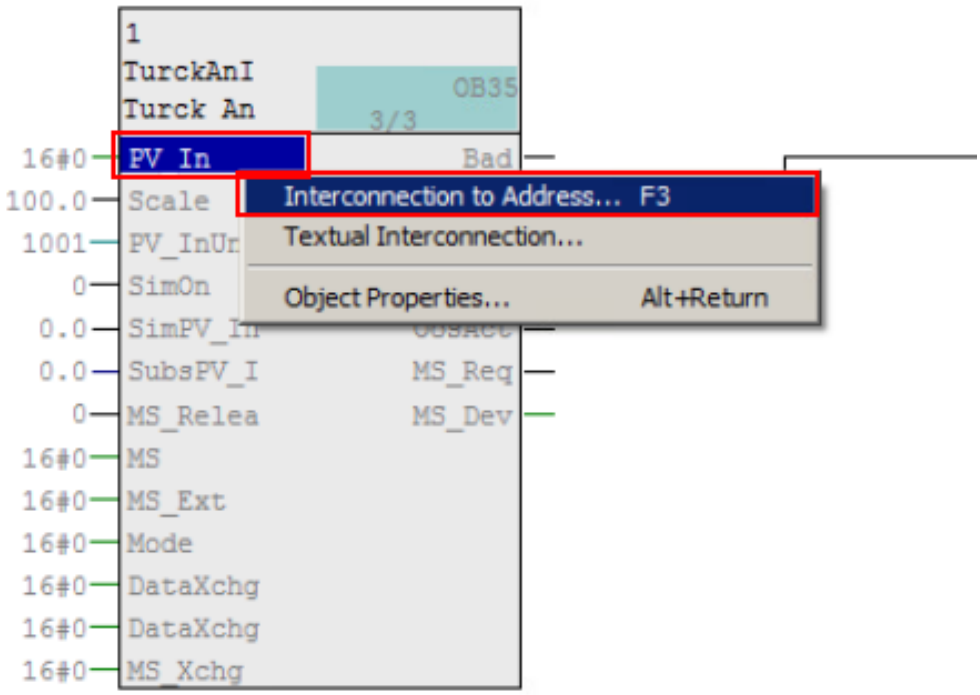
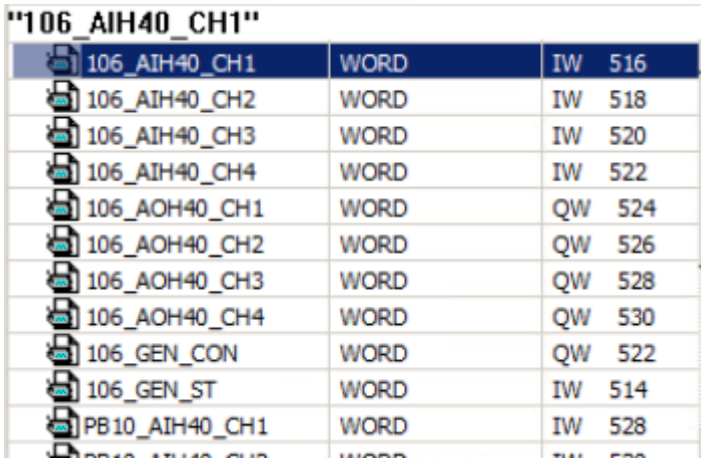


Fig. 40: Click Interconnection to Address…

- Select the signal from the symbol table.



"106_AIH40_CH1"

106_AIH40_CH1	WORD	IW 516
106_AIH40_CH2	WORD	IW 518
106_AIH40_CH3	WORD	IW 520
106_AIH40_CH4	WORD	IW 522
106_AOH40_CH1	WORD	QW 524
106_AOH40_CH2	WORD	QW 526
106_AOH40_CH3	WORD	QW 528
106_AOH40_CH4	WORD	QW 530
106_GEN_CON	WORD	QW 522
106_GEN_ST	WORD	IW 514
PB10_AIH40_CH1	WORD	IW 528

Fig. 41: Select signals from the symbol table

⇨ The signals are entered at the connection point of the function block.

4.11 Downloading function blocks to the CPU

Before the set programming is loaded into the CPU, the programming must be compiled.

- ▶ Click the compile icon in the top menu bar.

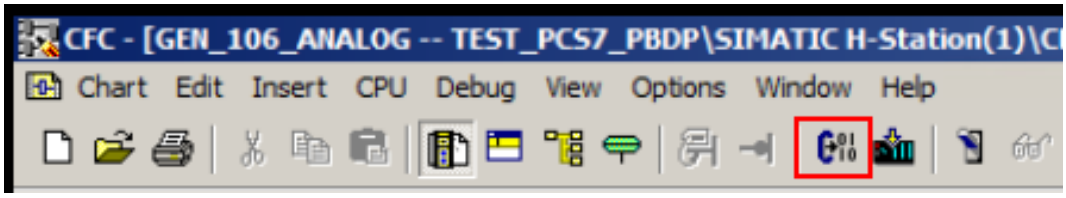


Fig. 42: Click the compile icon

- ⇨ The **Compile program** window opens.

Depending on the scope of the changes, either the entire program or just the changes can be compiled.

- ▶ Select the scope.
- ▶ Click **OK**.

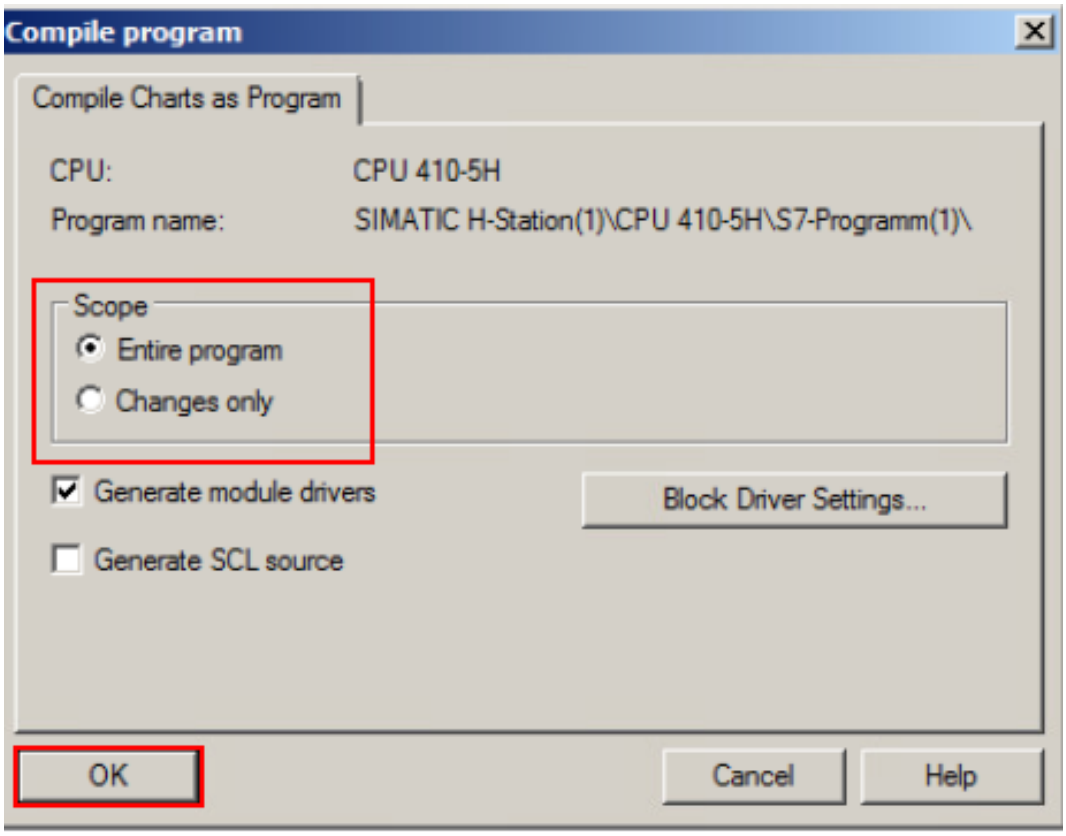


Fig. 43: Compile the program

⇨ The compilation will take place. A log is output after the compilation is completed.

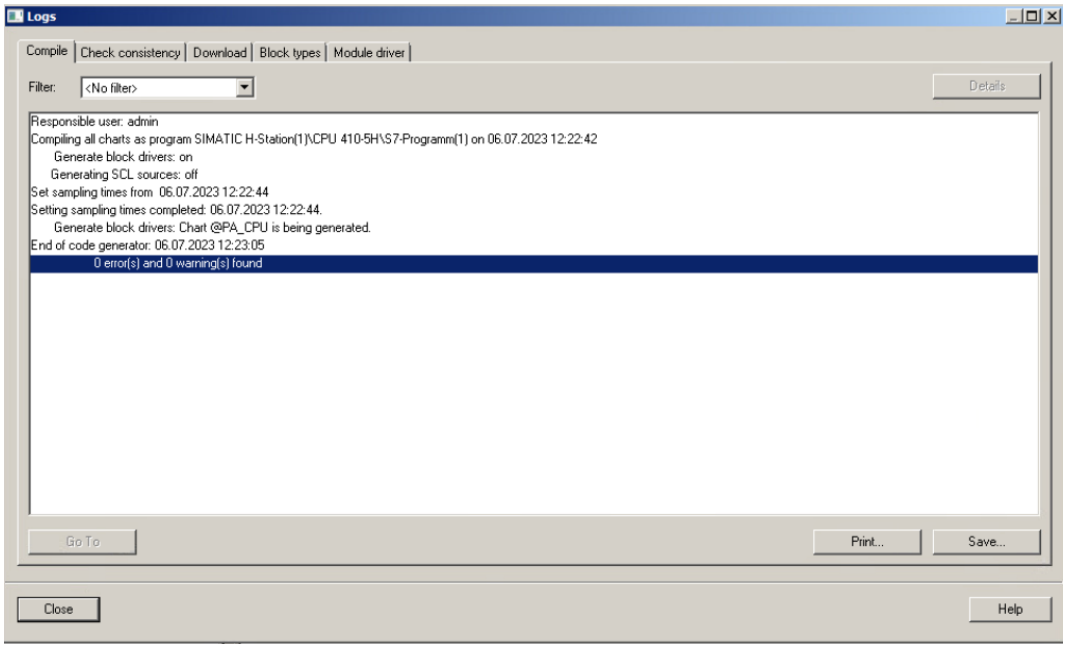


Fig. 44: Log window

⇨ Once the compilation is complete, the function blocks are automatically linked to each other.

The plan can be downloaded to the CPU after the compilation.

▶ Click the download icon in the top menu bar.

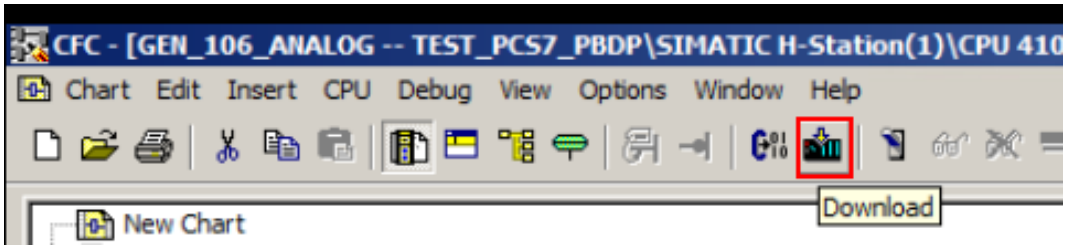


Fig. 45: Click the download icon

⇨ The **Download** window opens.

- Select the download mode — download the entire program or only the changes.
- Click **OK**.

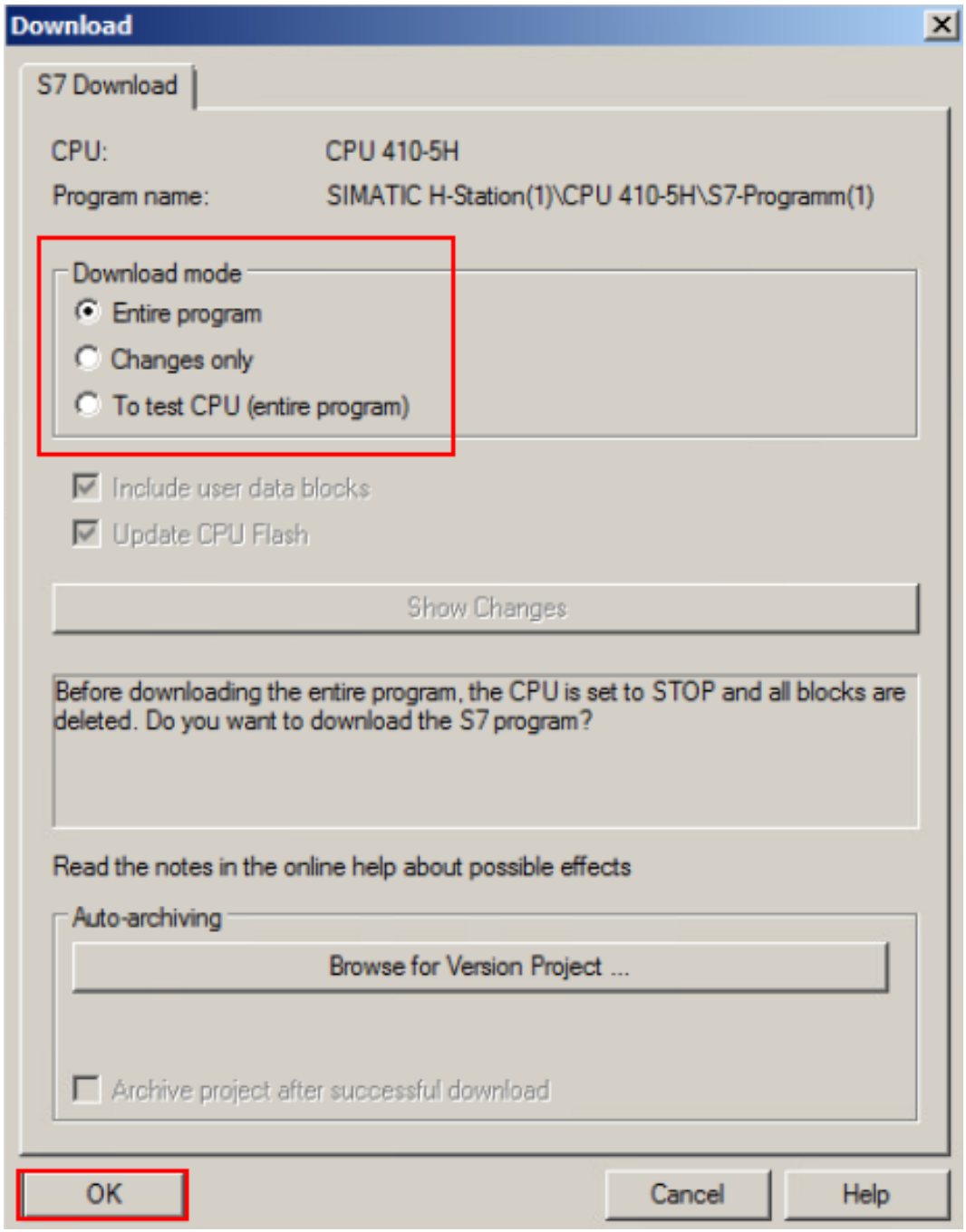


Fig. 46: Select download mode

- Depending on the operating status, select whether the parameters are to be read back. Previously recorded or written parameters are saved.

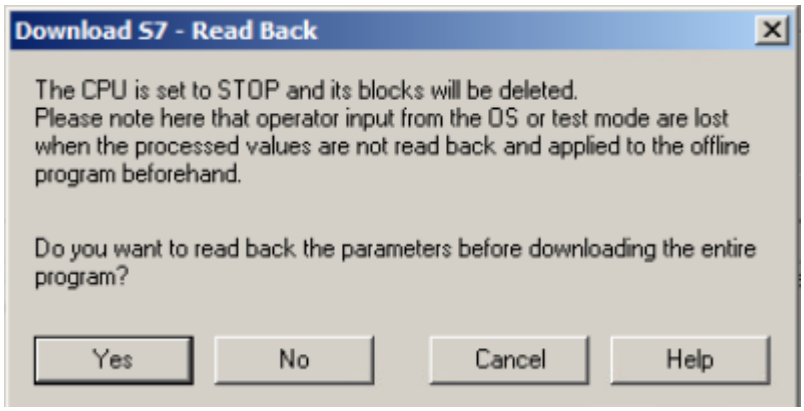


Fig. 47: Read back parameters

- In the query window, select whether the system should be restarted.

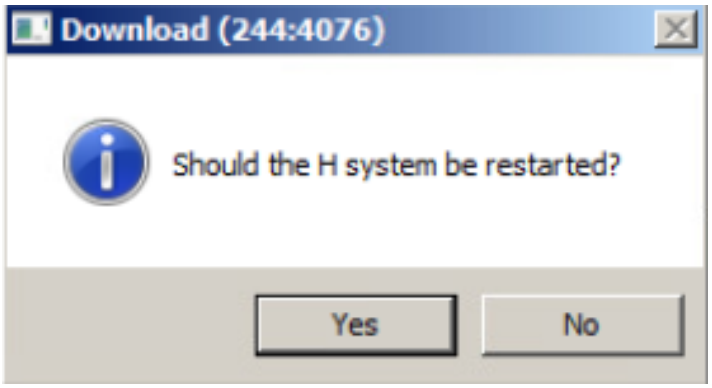


Fig. 48: Restart the system

Starting test mode

To view the plan of the current data for the function block, test mode can be started.

- ▶ Click the test mode icon.

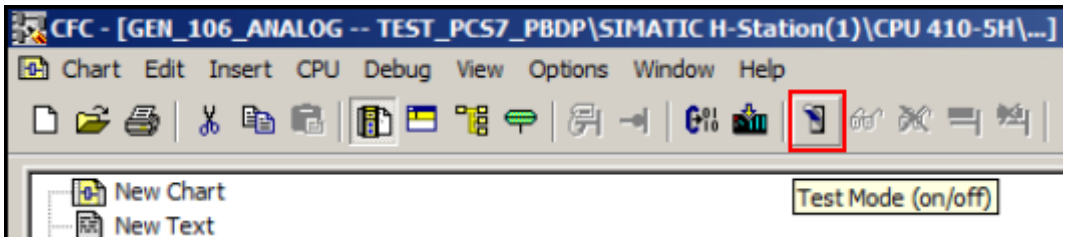


Fig. 49: Click the test mode icon

- ▶ Right-click Establish connection.
- ▶ Click **Add I/O**.

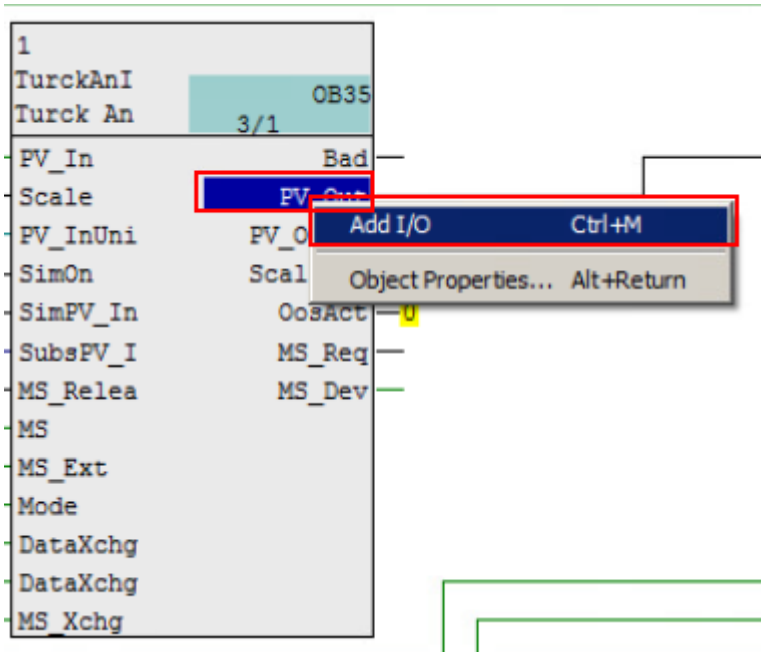


Fig. 50: Add I/O

- ⇨ The measured value of the field device is displayed as a hexadecimal value.

5 Redundancy strategies

5.1 Topology

The general topology of the Turck-specific system redundancy with the Ethernet protocols EtherNet/IP, Modbus TCP and PROFINET is structured as follows:

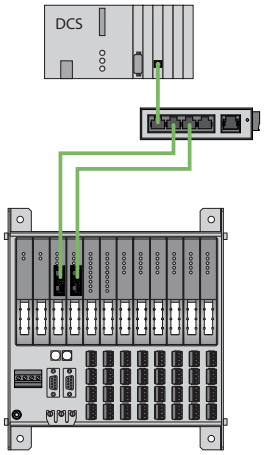


Fig. 51: System redundancy with one master and two gateways

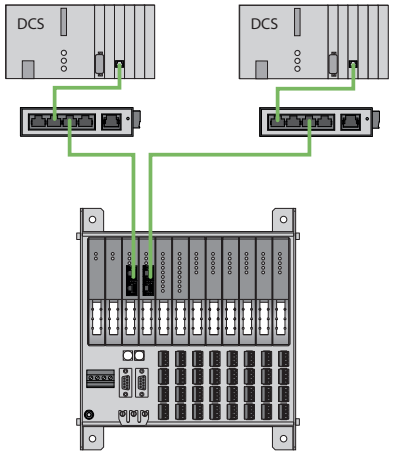


Fig. 52: System redundancy with two masters and two gateways

The system redundancy with one master and two gateways is a Turck-specific, parameterizable redundancy function of the excom system. The two gateways are provided here with separate IP addresses. The separate IP addresses are used to set up independent communication. The gateways communicate the input data and receive the output data via the IP addresses. One gateway is the primary gateway while the second gateway acts as a backup. If the primary gateway fails, a bumpless switchover to the backup gateway is carried out automatically. The redundancy function makes it possible to implement interruption-free communication. The output word of the gateway enables the forcing of a redundancy switchover.

When system redundancy is implemented with two masters and two gateways, two independent Ethernet masters communicate with the associated gateway. Both masters can be controlled via one or two process control system controllers. The process data is processed via two separate and independent Ethernet connections to the excom system.

PROFINET system redundancy

The PROFINET system redundancies are specified by the PNO (PROFIBUS user organization). The specification distinguishes between the following redundancy topologies which are currently available for the Turck-excom system:

- PROFINET S1 represents system redundancy with one master and one gateway. A ring topology can be set up via the two Ethernet interfaces of the gateway for increased availability.
- PROFINET S2 represents system redundancy with two masters and one gateway. Each individual Ethernet interface of the gateway can be connected to a master.

5.2 Redundancy setup

NOTE
Both gateways must have the same configuration, parameterization and firmware.

The **Redundancy mode** gateway parameter must be set for **system redundancy**.

5.3 System redundancy

NOTE
System redundancy via PROFINET is in the form of application redundancy.

NOTE
Both gateways must have the same configuration, parameterization and firmware.

If the **Redundancy mode** parameter is set to **System redundancy** in the DTM, web server or control system, the excom station operates in system redundancy mode. Both gateways communicate with their respective master. The PRIO LED is lit on the active gateway. The active gateway takes over the output data transferred by the master and sends this to the output modules.

The gateway communicating with the secondary master ignores the received output data as the secondary module does not have write access to the output modules.

The gateway is provided with one input word and one output word for monitoring redundancy. The input word describes the current state of the gateway.

The output word is used for the manual redundancy switchover in the master. It is possible to switch in the process control system from the primary gateway to the secondary gateway. A switchover is carried out in response to the following events:

- The primary gateway was removed.
- Communication to the primary gateway was interrupted. The outputs are set to 0 until the switchover to the other gateway is completed. After the timer for interrupted connections has elapsed, the switchover to the other gateway is carried out.

After a switchover, an automatic switchover to the former primary gateway is no longer carried out.

When the excom system is started, the gateway on the left starts to operate as the primary gateway. If communication with the left gateway fails, the gateway on the right tries to establish primary communication.

Assignment of the gateway process data bits

The input word of the gateway process data is used to view the gateway and system redundancy of the excom station:

	Bit							
Status bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
0	Not used			Left power supply module	Right power supply module	Gateway redundancy	Gateway slot	Redundancy status
1	Not used							

Meaning of the gateway process data bits

Designation	Meaning
Left power supply unit	0: Left power supply unit not present
	1: Left power supply unit fitted
Right power supply unit	0: Right power supply unit not present
	1: Right power supply unit fitted
Gateway redundancy	0: Redundant gateway or redundant communication not available
	1: Redundancy available
Slot	0: Gateway is located on the right slot (GW2)
	1: Gateway is located on the left slot (GW1)
Active/ passive	0: Gateway is passive
	1: Gateway is active

Assignment of the command bits

The output word of the gateway makes it possible to force a redundancy switchover in the “Red switching” web server:

	Bit							
Byte	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
0	Not used					Control bit	Redundancy switchover is initiated	Activation of the right or left gateway
						Control bits for edge change		
1	Not used							

Meaning of the command bits

Designation	Meaning
Bit 2 = 0 Redundancy switchover is initiated	11 → 01: Receiver is the passive gateway. The passive gateway requests control from the active gateway and becomes active.
	11 → 10: Receiver is the active gateway. The active gateway gives control to the passive gateway and becomes passive.
Bit 2 = 1 Activation of the right or left gateway	11 → 01: Receiver is the left gateway. The left gateway requests control from the right gateway and becomes active.
	11 → 10: Receiver is the right gateway. The right gateway requests control from the left gateway and becomes active.

From gateway firmware version 1.4, the gateways support PROFINET S2 redundancy.

6 Turck branches — contact data

Germany	Hans Turck GmbH & Co. KG Witzlebenstraße 7, 45472 Mülheim an der Ruhr www.turck.de
Australia	Turck Australia Pty Ltd Building 4, 19-25 Duerdin Street, Notting Hill, 3168 Victoria www.turck.com.au
Austria	Turck GmbH Graumanngasse 7/A5-1, A-1150 Vienna www.turck.at
Belgium	TURCK MULTIPROX Lion d'Orweg 12, B-9300 Aalst www.multiprox.be
Brazil	Turck do Brasil Automação Ltda. Rua Anjo Custódio Nr. 42, Jardim Anália Franco, CEP 03358-040 São Paulo www.turck.com.br
Canada	Turck Canada Inc. 140 Duffield Drive, CDN-Markham, Ontario L6G 1B5 www.turck.ca
China	Turck (Tianjin) Sensor Co. Ltd. 18,4th Xinghuazhi Road, Xiqing Economic Development Area, 300381 Tianjin www.turck.com.cn
Czech Republic	TURCK s.r.o. Na Brne 2065, CZ-500 06 Hradec Králové www.turck.cz
France	TURCK BANNER S.A.S. 11 rue de Courtalin Bat C, Magny Le Hongre, F-77703 MARNE LA VALLEE Cedex 4 www.turckbanner.fr
Hungary	TURCK Hungary kft. Árpád fejedelem útja 26-28., Óbuda Gate, 2. em., H-1023 Budapest www.turck.hu
India	TURCK India Automation Pvt. Ltd. 401-403 Aurum Avenue, Survey. No 109 /4, Near Cummins Complex, Baner-Balewadi Link Rd., 411045 Pune - Maharashtra www.turck.co.in
Italy	TURCK BANNER S.R.L. Via San Domenico 5, IT-20008 Bareggio (MI) www.turckbanner.it
Japan	TURCK Japan Corporation ISM Akihabara 1F, 1-24-2, Taito, Taito-ku, 110-0016 Tokyo www.turck.jp
Korea	Turck Korea Co, Ltd. B-509 Gwangmyeong Technopark, 60 Haan-ro, Gwangmyeong-si, 14322 Gyeonggi-Do www.turck.kr

Malaysia	Turck Banner Malaysia Sdn Bhd Unit A-23A-08, Tower A, Pinnacle Petaling Jaya, Jalan Utara C, 46200 Petaling Jaya Selangor **www.turckbanner.my**
Mexico	Turck Comercial, S. de RL de CV Blvd. Campestre No. 100, Parque Industrial SERVER, C.P. 25350 Arteaga, Coahuila **www.turck.com.mx**
Netherlands	Turck B. V. Ruiterlaan 7, NL-8019 BN Zwolle **www.turck.nl**
Poland	TURCK sp.z.o.o. Wroclawska 115, PL-45-836 Opole **www.turck.pl**
Romania	Turck Automation Romania SRL Str. Siriului nr. 6-8, Sector 1, RO-014354 Bucuresti **www.turck.ro**
Sweden	Turck AB Fabriksstråket 9, 433 76 Jonsered **www.turck.se**
Singapore	TURCK BANNER Singapore Pte. Ltd. 25 International Business Park, #04-75/77 (West Wing) German Centre, 609916 Singapore **www.turckbanner.sg**
South Africa	Turck Banner (Pty) Ltd Boeing Road East, Bedfordview, ZA-2007 Johannesburg **www.turckbanner.co.za**
Turkey	Turck Otomasyon Ticaret Limited Sirketi Inönü mah. Kayisdagi c., Yesil Konak Evleri No: 178, A Blok D:4, 34755 Kadiköy/ Istanbul **www.turck.com.tr**
United Kingdom	TURCK BANNER LIMITED Blenheim House, Hurricane Way, GB-SS11 8YT Wickford, Essex **www.turckbanner.co.uk**
USA	Turck Inc. 3000 Campus Drive, USA-MN 55441 Minneapolis **www.turck.us**

TURCK

Your Global Automation Partner

Over 30 subsidiaries and
60 representations worldwide!

100016755 | 2023/04

www.turck.com