TURCK

excom I/O System
Integration in Honeywell
Experion via EtherNet/IP

Integration Manual

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1 About this manual

This manual describes the integration of the excom system in the Honeywell control system via EtherNet/IP.

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 possibilities for the EDS-based integration will be outlined, from the installation of the EDS 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 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.
ℹ	**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.

1.2 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

1.3 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 excom system.

2.2 Turck service

Turck supports you with your projects, from initial analysis to the commissioning of your application. The Turck product database under www.turck.com contains software tools for programming, configuration or commissioning, data sheets and CAD files in numerous export formats.

The contact details of Turck subsidiaries worldwide can be found on p. [▸ 41].

3   For your safety

The product is designed according to state-of-the-art technology. However, residual risks still exist. Observe the following warnings and safety notices to prevent damage to persons and property. Turck accepts no liability for damage caused by failure to observe these warning and safety notices.

3.1   Intended use

The excom I/O system is integrated into the Honeywell control system via EDS-based Ethernet/IP.

The devices may 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 may only be assembled, installed, operated, parameterized and maintained by professionally-trained personnel.
- The device may only be used in accordance with applicable national and international regulations, standards and laws.
- The device meets the EMC requirements for industrial areas. When used in residential areas, take measures to avoid radio 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 operating the device in a hazardous area, the user must have a working knowledge of explosion protection (IEC/EN 60079-14, etc.).
- Use the device only within the permissible operating and ambient conditions (see approval data and Ex approval specifications).
- Fit blank modules (BM1) on unused slots on the module rack.
- 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).
- Perform "Proof of intrinsic safety".
- Never connect equipment to intrinsically safe circuits if this equipment was previously used once in non-intrinsically safe circuits.
- 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).
- Please follow the instructions for use for the built-in equipment.

4 Commissioning

Requirements

- An Ethernet gateway and all required I/O modules are inserted into the module rack.
- When power is supplied by the PSM24-…: The knurled screw under the supply module is fully tightened.
- When power is supplied by the PSM24-…1: The locking cap is inserted over the module cap and fully engaged.
- The gateway must be connected to a PC.
- The Turck Service Tool must have been installed on the PC.

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

4.1 Setting the IP address

The device is factory set to IP address 192.168.1.254. The IP address can be set via the Turck Service Tool, the DTM or the web server. The following example shows the setting of the IP address via the Turck Service Tool. The Turck Service Tool can be downloaded free of charge at **www.turck.com**.

> **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. 1: Turck Service Tool

▶ Click the gateway (example: **GEN-N**).

▶ Click **Change** or press [F2].

▶ Set the IP address and if necessary the network mask and gateway.
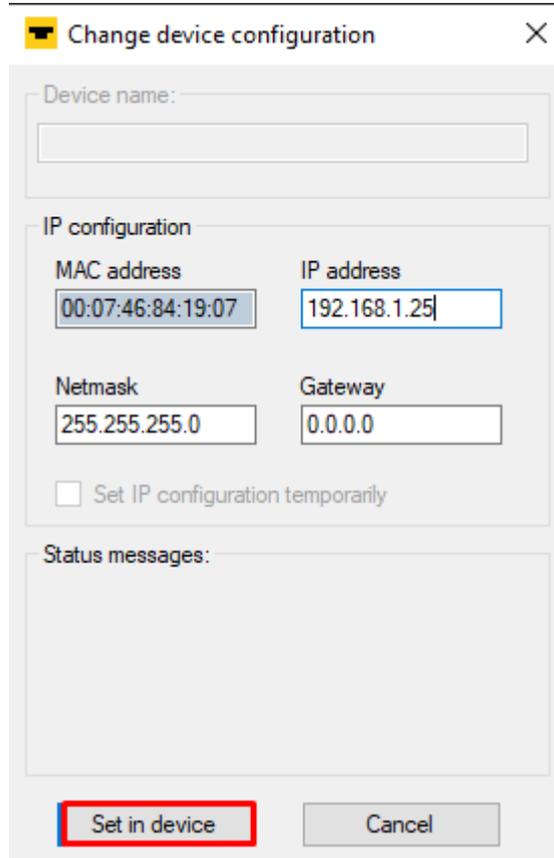
▶ Accept the changes by clicking **Set in device**.

Fig. 2: Setting the IP address

4.2 Web server — list inserted modules

The device is factory set to IP address 192.168.1.254. To open the web server via a web browser, enter **http://192.168.1.254** in the address bar of the web browser. If the IP address has been changed, enter the new IP address in the address bar of the web browser.

Alternatively, double-click 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 start page of the web server.

▶ Click **Login**.

▶ In the navigation bar on the left, select **Gateway** → **Gateway Configuration**.

▶ Click **Update Module List Configuration**.

⇨ All modules are listed in the navigation bar on the left-hand side. The Status LED on the module is green. The input and the output LEDs light up in red or yellow depending on the type of module and the configuration. Further information can be found in the manuals.

Fig. 3: **Gateway Configuration** — **Update Module List Configuration**

5 Integrating the excom system in Honeywell

5.1 Requirements

5.1.1 Requirements — hardware

This example uses the following hardware:

Honeywell hardware

■ Honeywell Unit Operations Controller: ControlEdge 900 platform

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

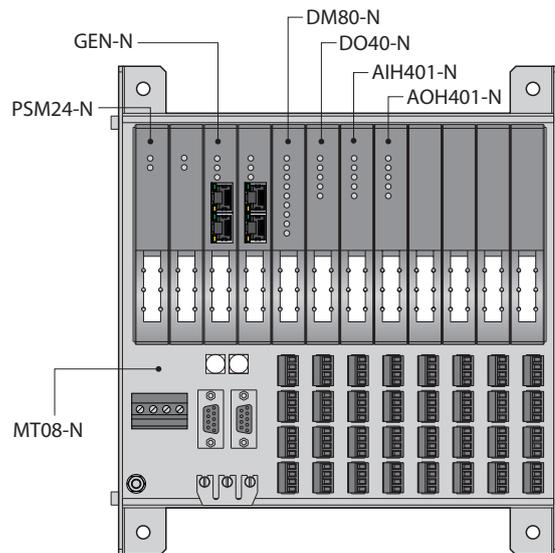Fig. 4: Example setup of the excom station

5.1.2 Requirements — software

This example uses the following software:

Honeywell software

■ Honeywell Experion R511
■ EDS configuration file

Turck software

■ Gateway firmware V1.2.25.5

5.2   Installing an EDS configuration file

> **NOTE**
> Honeywell provides the EDS configuration file for the excom system as a zip file.

The configuration files describe the scope of configuration and the communication properties of an EtherNet/IP participant. To configure the excom station, the EDS configuration file must be integrated into the hardware configurator of the host system. This provides the EtherNet/IP master with the valid information and data records for the excom station during system configuration.

▶   Open **Configuration Studio 4.0**.

▶   Establish a connection to the Experion server.

▶   Select **Control Strategy** from the navigation bar on the left-hand side.

▶   Click **Configure process control strategies**.
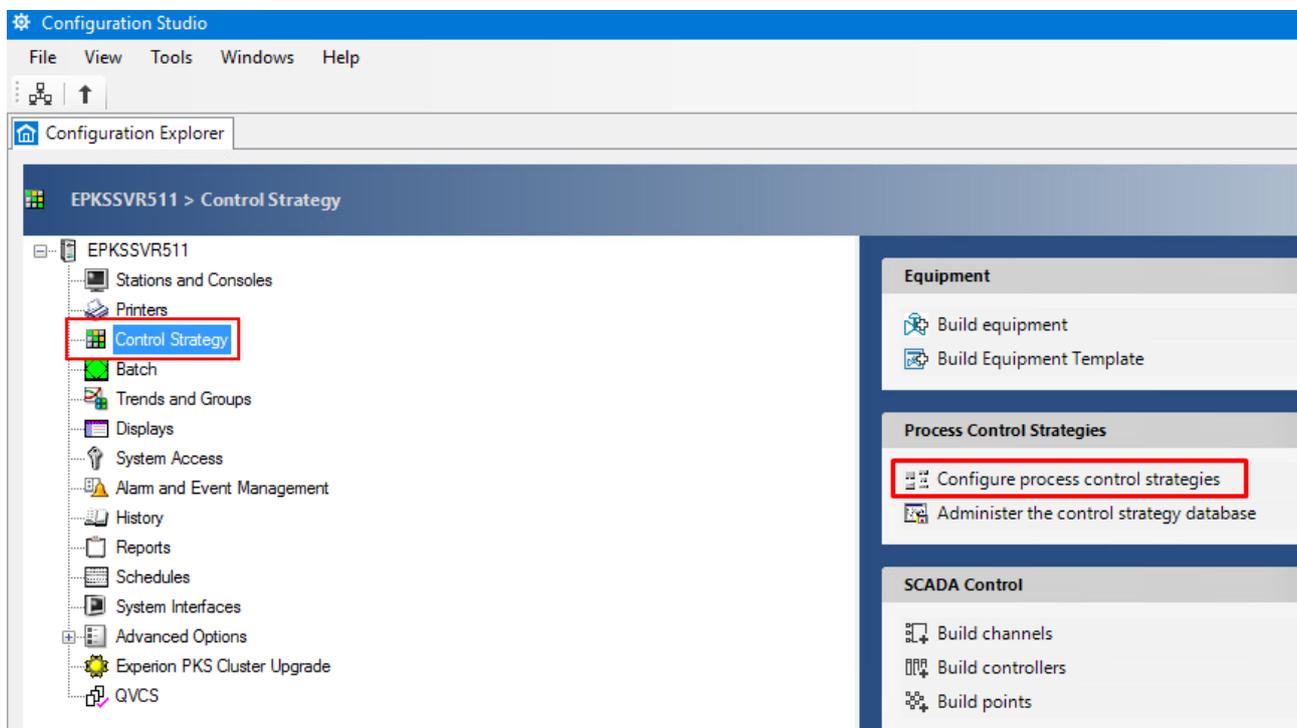
Fig. 5: Opening the Control Builder

⇨   The **Control Builder** opens.

Importing an EtherNet/IP library

▶ Unzip the zip file to a local folder.
▶ Select **File → Import…** in the Control Builder.
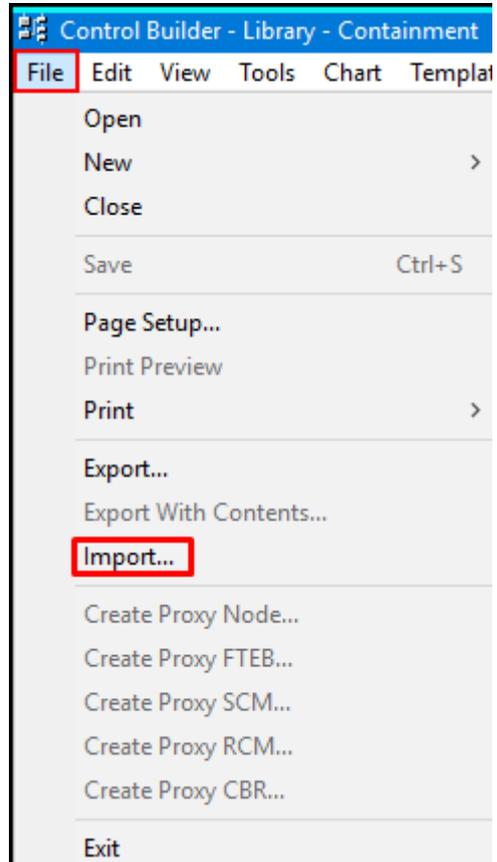
Fig. 6: Select Control Builder — **Import…**

▶ Click **Browse…** and select the appropriate file.

▶ Click **OK**.

▶ Click **Select All** to load the Product Library.

▶ Click **Import**.

> **i** **NOTE**
> The **Selected Objects For Import** are displayed in red if the Product Library has already been loaded.
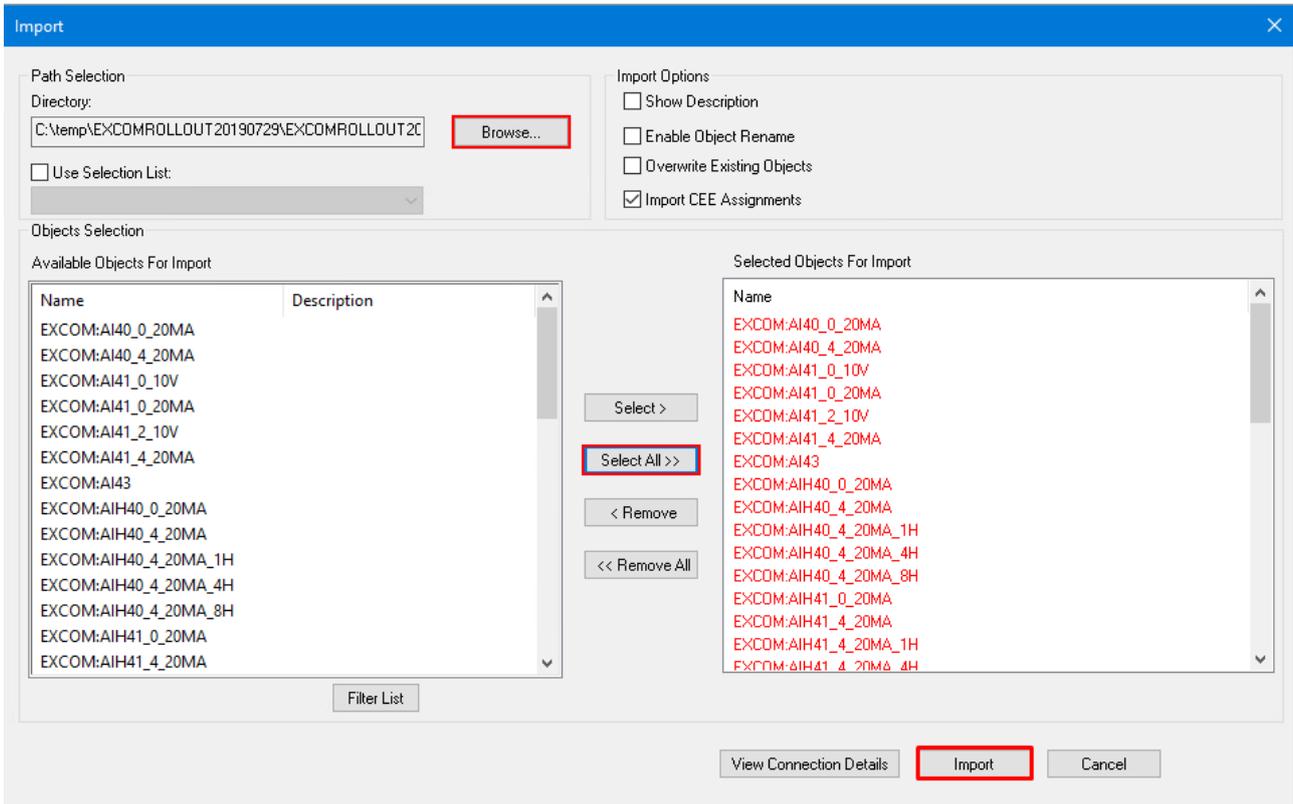
Fig. 7: Importing a Product Library

⇨ The Product Library with the excom modules appears in the **Library – Containment** window.
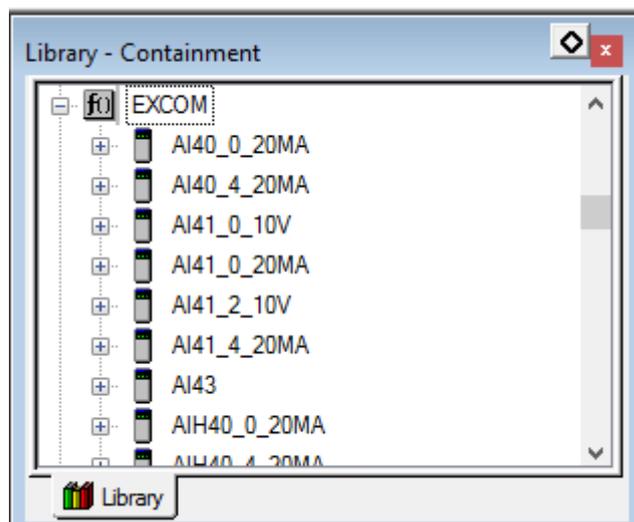
Fig. 8: Modules in the **Library – Containment** window

5.3 Creating a Honeywell Unit Operation Controller

The Honeywell Unit Operation Controller (UOC) must be created.

▶ Select **File → New → Controllers → UOC – Control Edge Unit Operations Controller**.
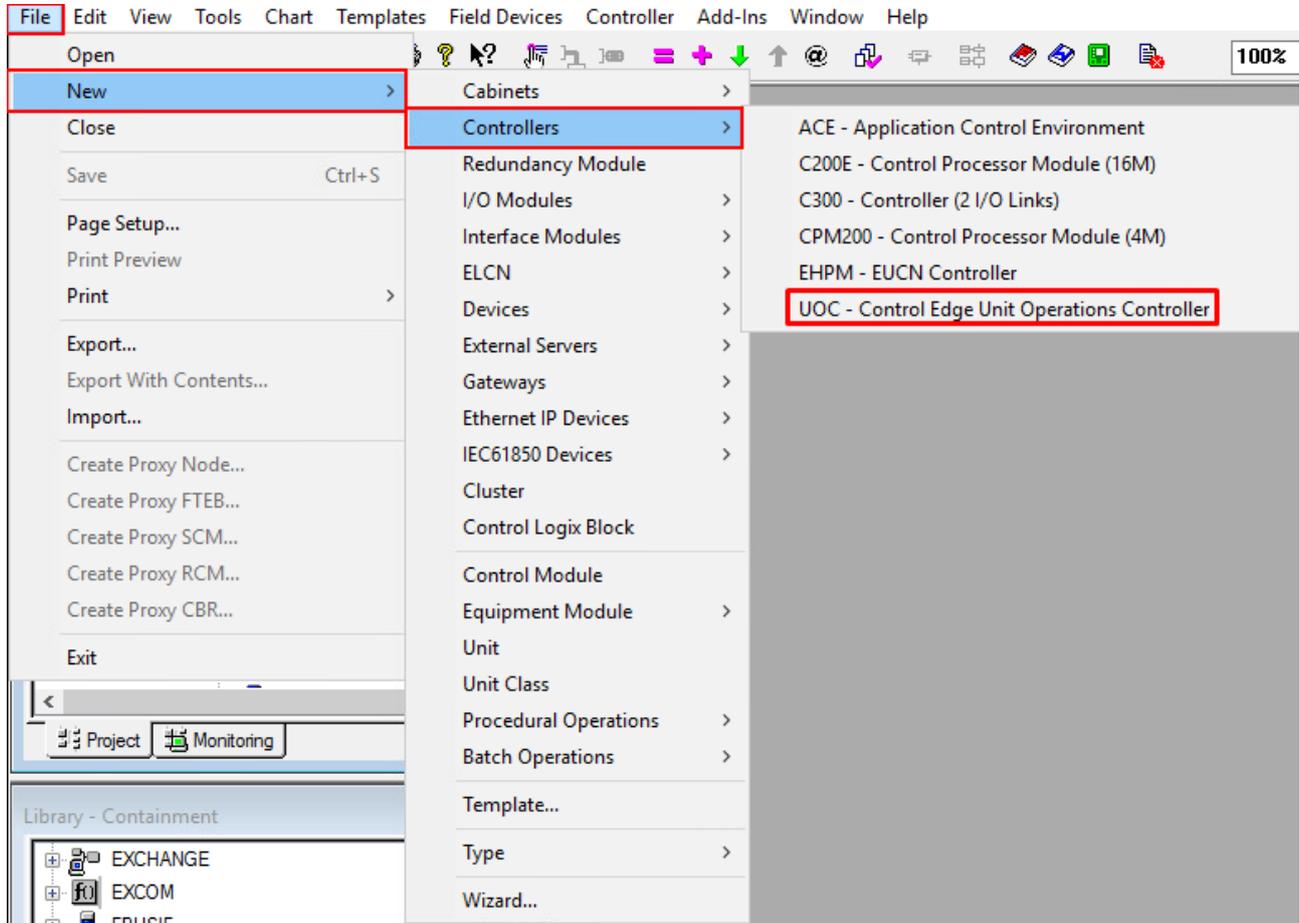
Fig. 9: Creating the UOC

⇨ The UOC has been created.

5.4 Configuring a Honeywell Unit Operation Controller

The Honeywell Unit Operation Controller must be configured.

> **NOTE**
> The last three digits of the IP address must be between 101 and 253.

- ▶ Double-click **UOC…**
- ▶ Under **Main → Device Index**, set the last three digits of the IP address (here: **103**).
- ▶ Under **Downlink Address Configuration**, set the IP address range of the excom gateway (here: **10.110.101.1**).
- ▶ Under **Connection Type** select **Star-PRP** (star topology).
- ▶ Confirm with **OK**.
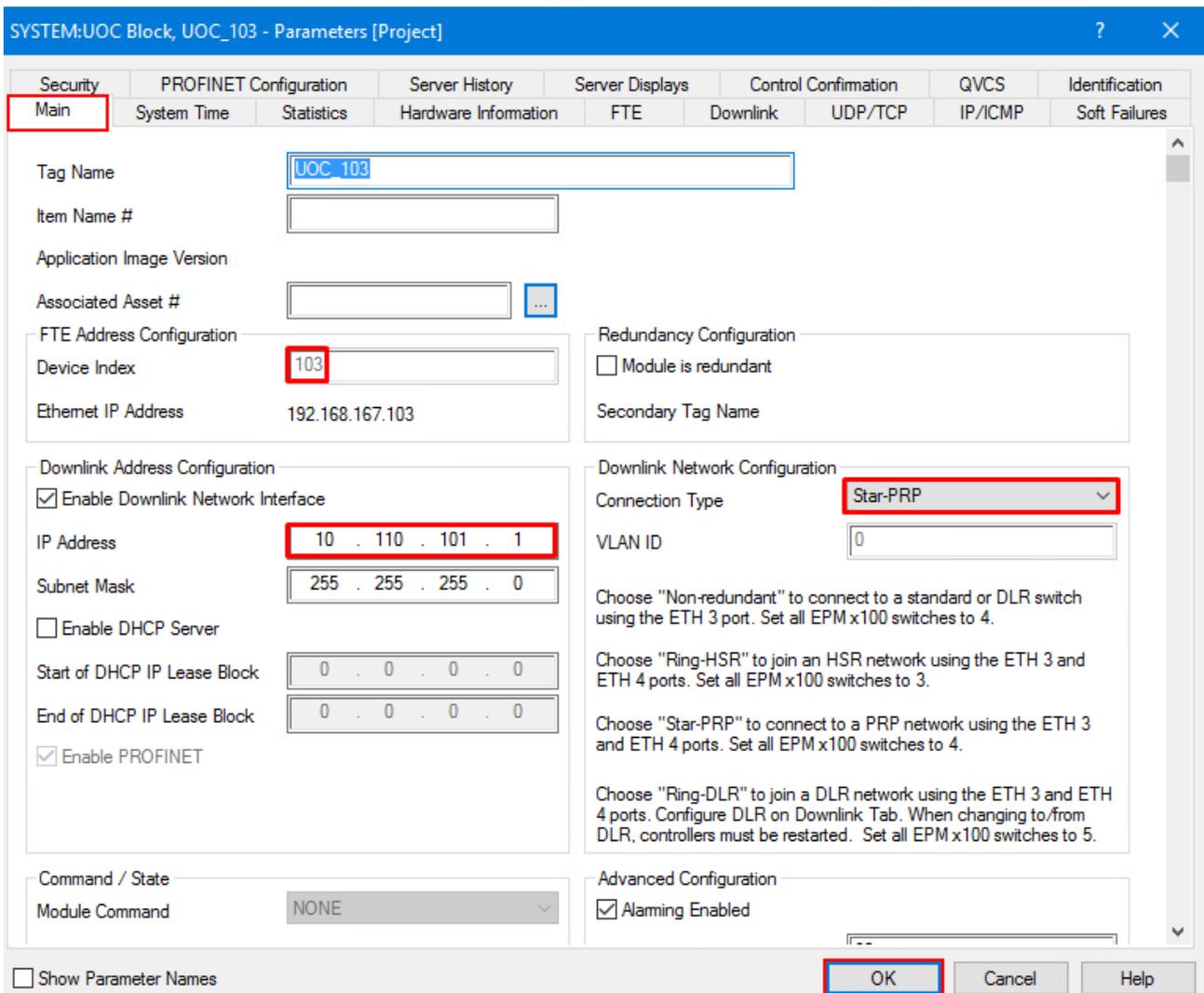
Fig. 10: Configuring the UOC

⇨ The UOC has been configured.

5.5 Creating an excom station

5.5.1 Creating an Ethernet/IP adapter

The excom system Ethernet/IP adapter must be created as a slave of the UOC.

▶ Drag the EtherNet/IP adapter (here: **GENADAPTER**) from the **Library – Containment** window to the **Project – Assignment** → **CEEUOC…** window.
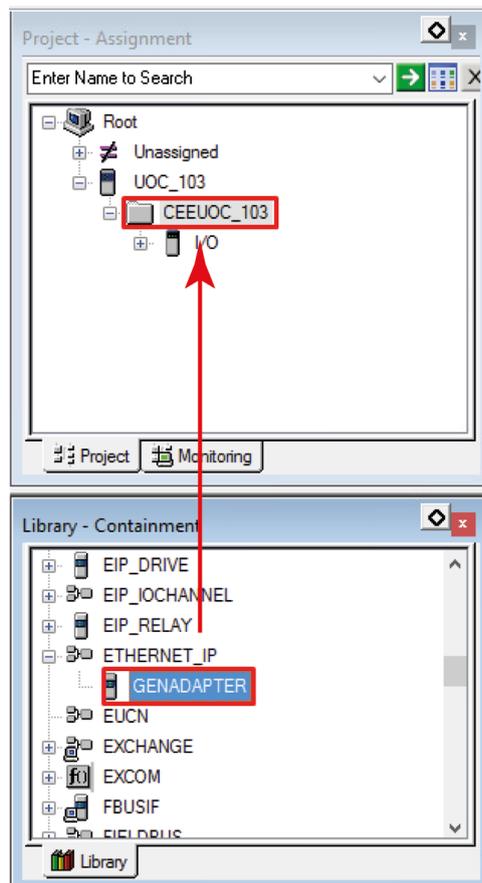
Fig. 11: Creating an EtherNet/IP adapter using drag-and-drop

⇨ The EtherNet/IP adapter has been created.

5.5.2 Configuring an Ethernet/IP adapter

For the Honeywell controller to communicate with the excom station, the excom gateway must be configured.

▶ Under **Project – Assignment** → expand the **UOC…** section.
▶ Double-click **GENADAPTER.**
⇨ The configuration window opens.

▶ Select **Main.**
▶ Under **Tag Name**, assign a name to the EtherNet/IP adapter (here: **excom-demo**).
▶ Under **IP address of the device**, set the IP address of the gateway.
▶ Under **Chassis Size**, enter the number of slots in the excom station plus one (+1) (e.g. for MT08-N: **9** slots).
▶ Confirm with **OK.**
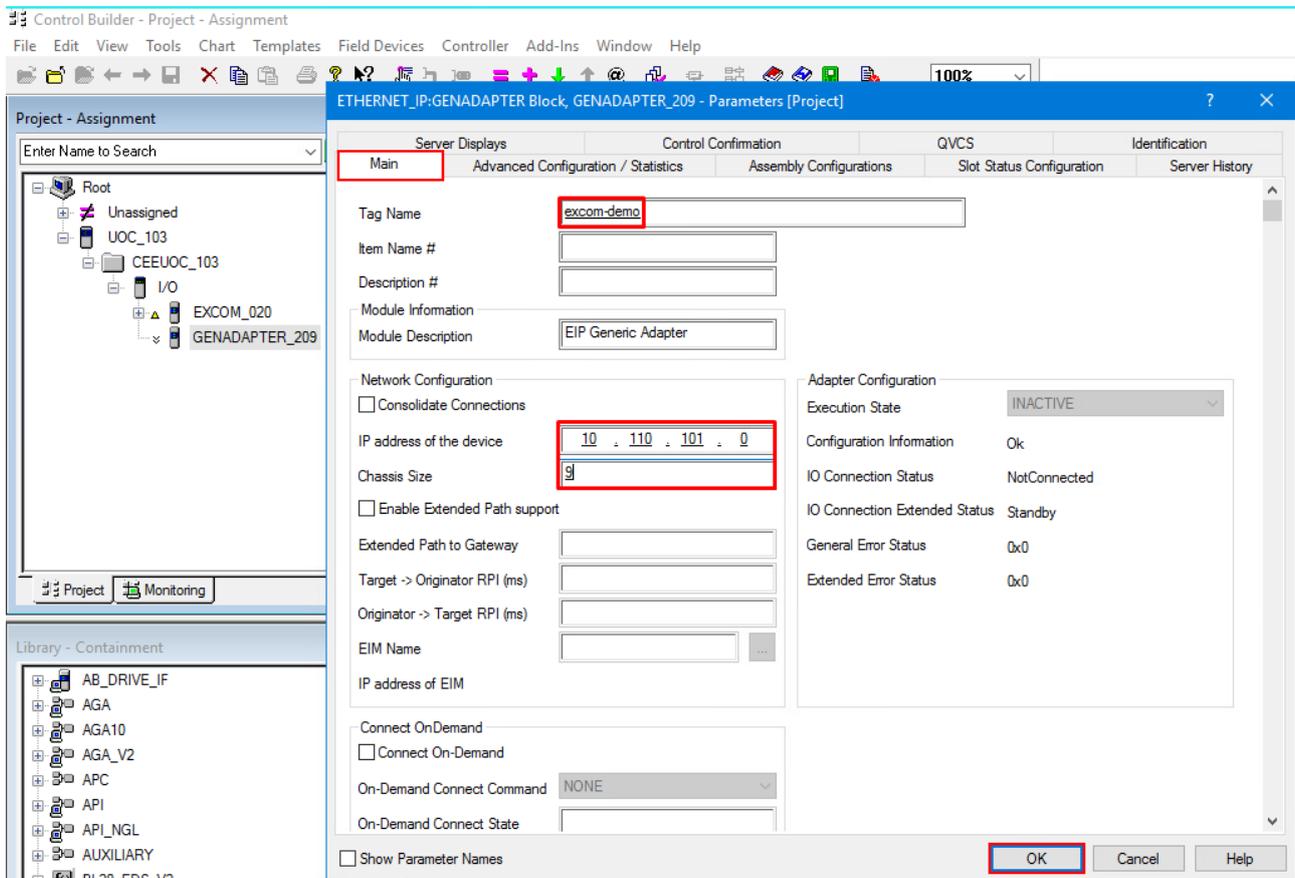
Fig. 12: Configuring an Ethernet/IP adapter

⇨ The EtherNet/IP adapter has been configured.

5.5.3 Creating slaves

The excom station modules must be created as slaves.

▶ Drag and drop the configuration for the respective module from the **Library – Containment** window to the **Project – Assignment** → excom station window (here: **excom demo**).
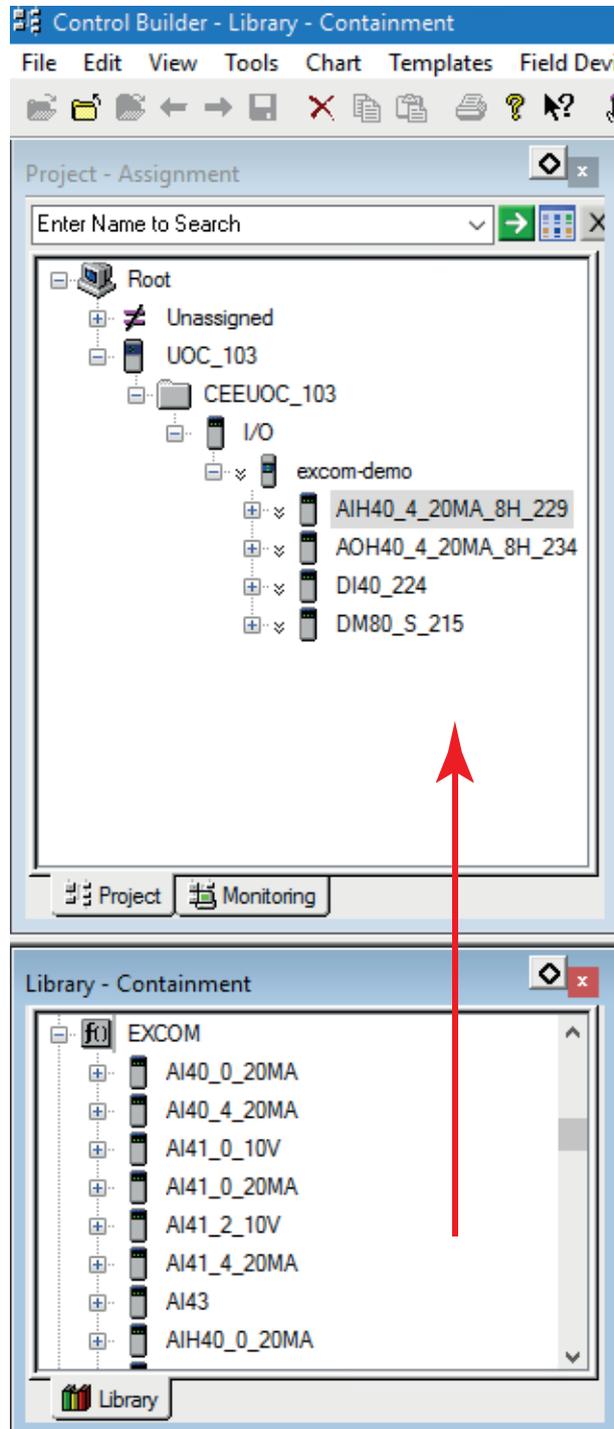
Fig. 13: Creating modules as slaves

⇨ The slave has been created.

5.5.4 Configuring the slave

▶ In the **Project – Assignment** window, double-click the module (example: **DM80-N**).

⇨ The configuration window opens.

▶ Select **Main**.

▶ Under **Tag Name**, assign a name to the module.

▶ Under **Extended Path to Device**, enter the number of the slot in which the module is inserted in the excom station.

▶ Optional: Change the parameters under **Channel Configuration**.

▶ Confirm with **OK**.
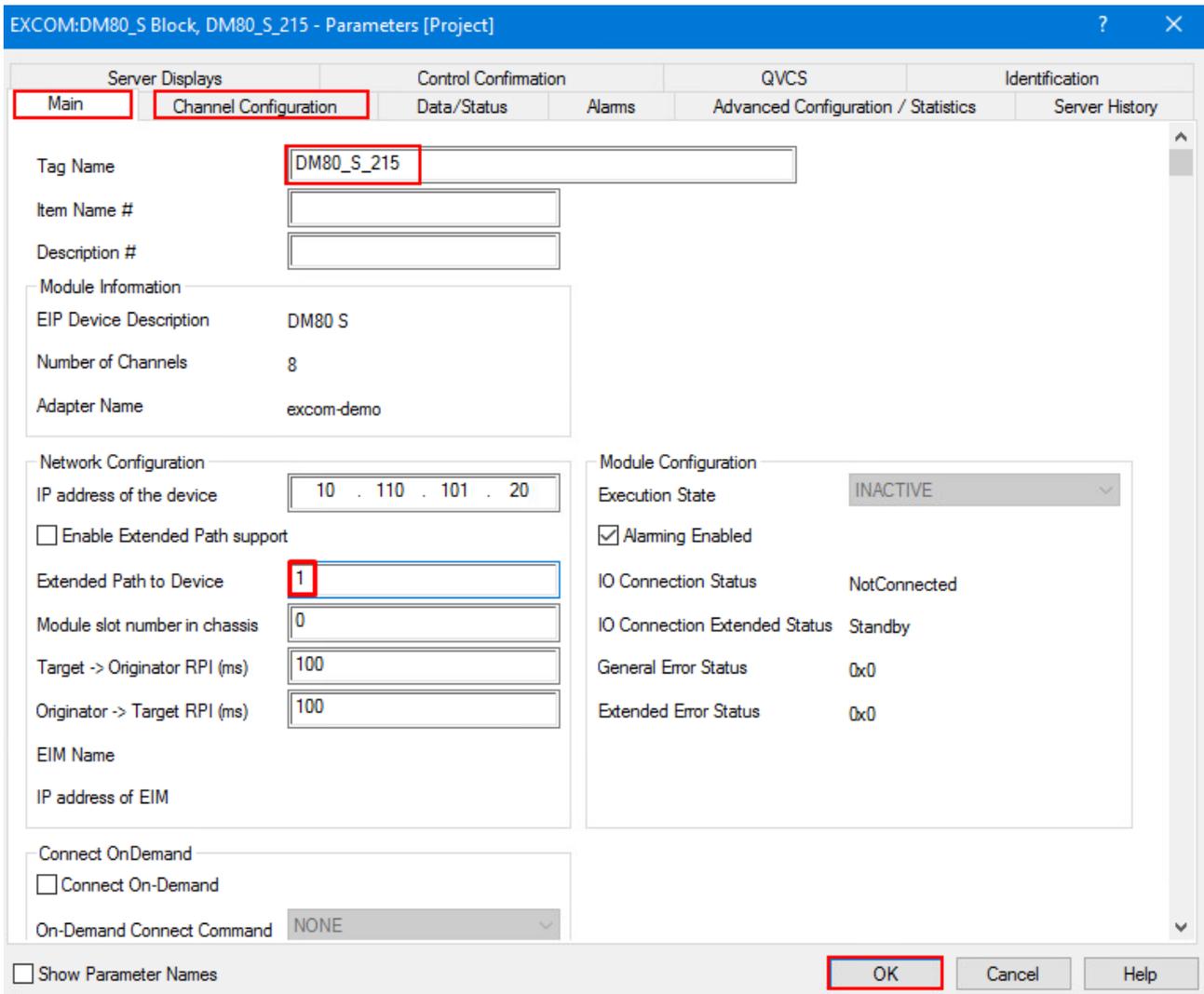
Fig. 14: Configuring the slave — entering the slot

⇨ The slave has been configured.

5.5.5 Configuring the signal types

The signal types must be configured to allow communication with the excom system and the Honeywell controller.

▶ In the **Project – Assignment** window, expand the module (here: **AIH40_20MA_8H_229**).

▶ Right-click the desired channel (here: **SPARE_01**).

▶ Select the signal type by double-clicking on it under **Channel Type Setting**.
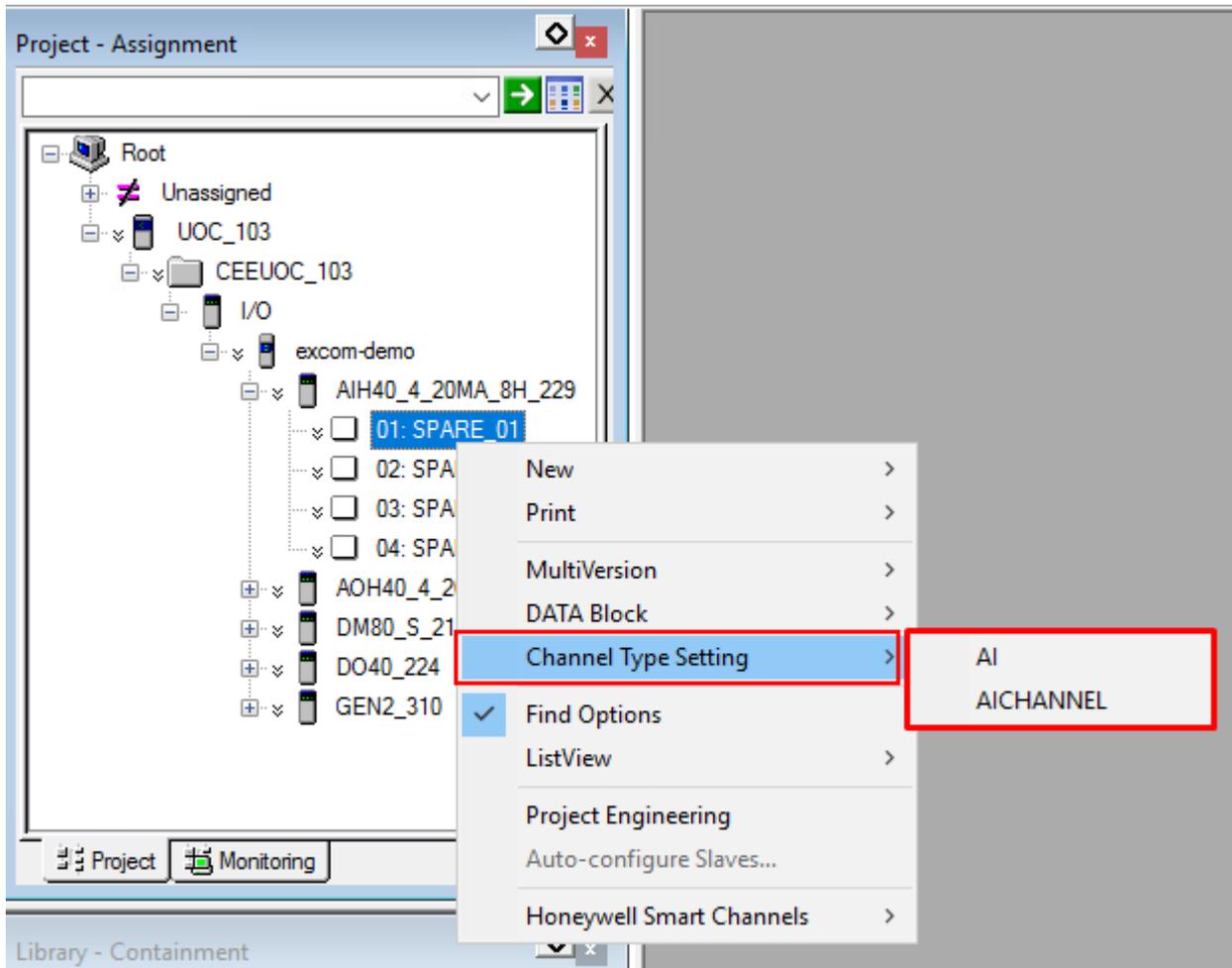
Fig. 15: Creating a signal

⇨ The configuration window opens.

▶ Select **Main**.

▶ Activate HART: Check the **Enable HART** option.

▶ Optional: Under **Tag Name**, assign a name to the signal.

▶ Confirm with **OK**.
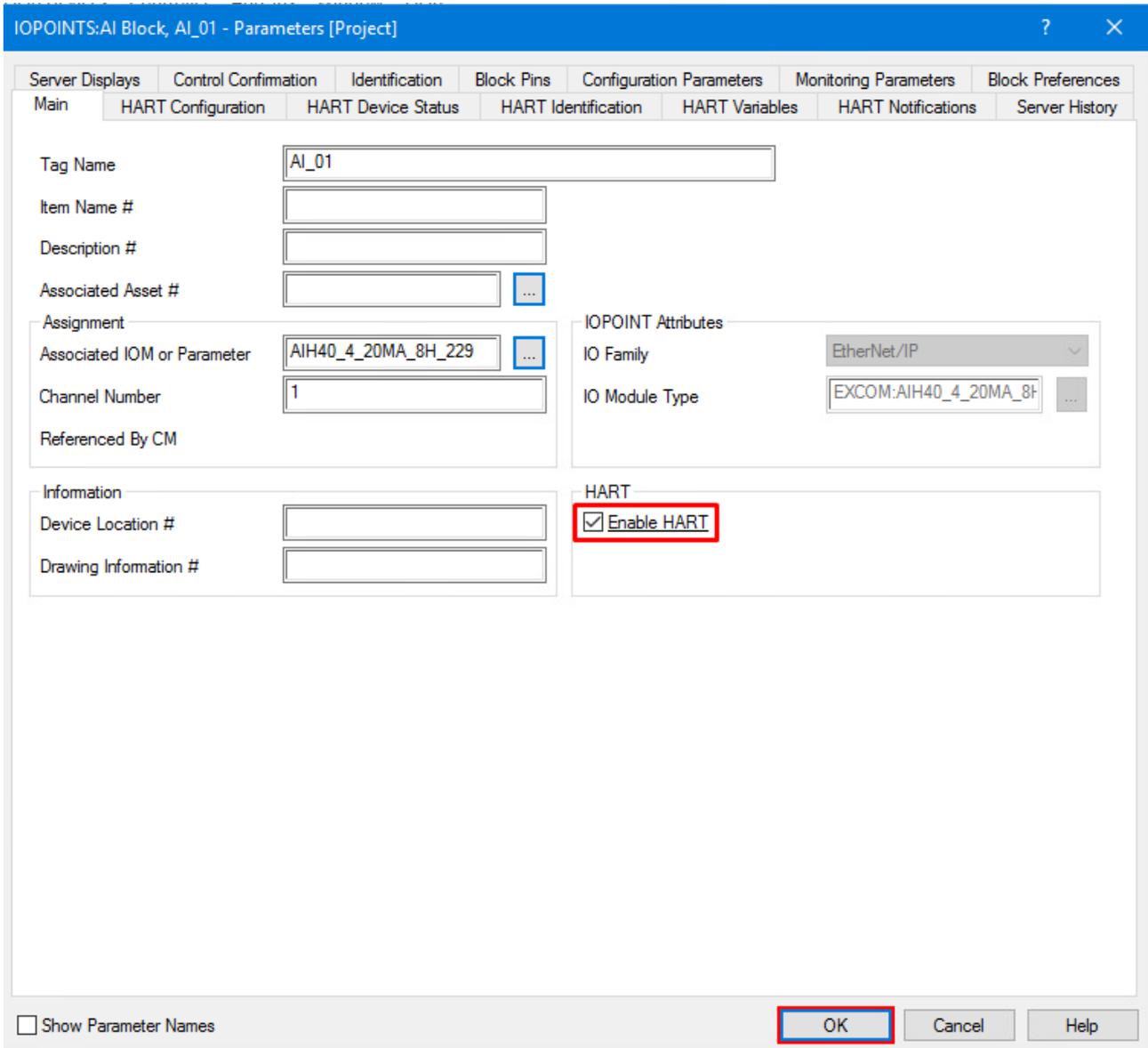
Fig. 16: Activating HART

Loading a configuration

▶ Right-click **UOC…**
▶ Click **Load With Contents…**
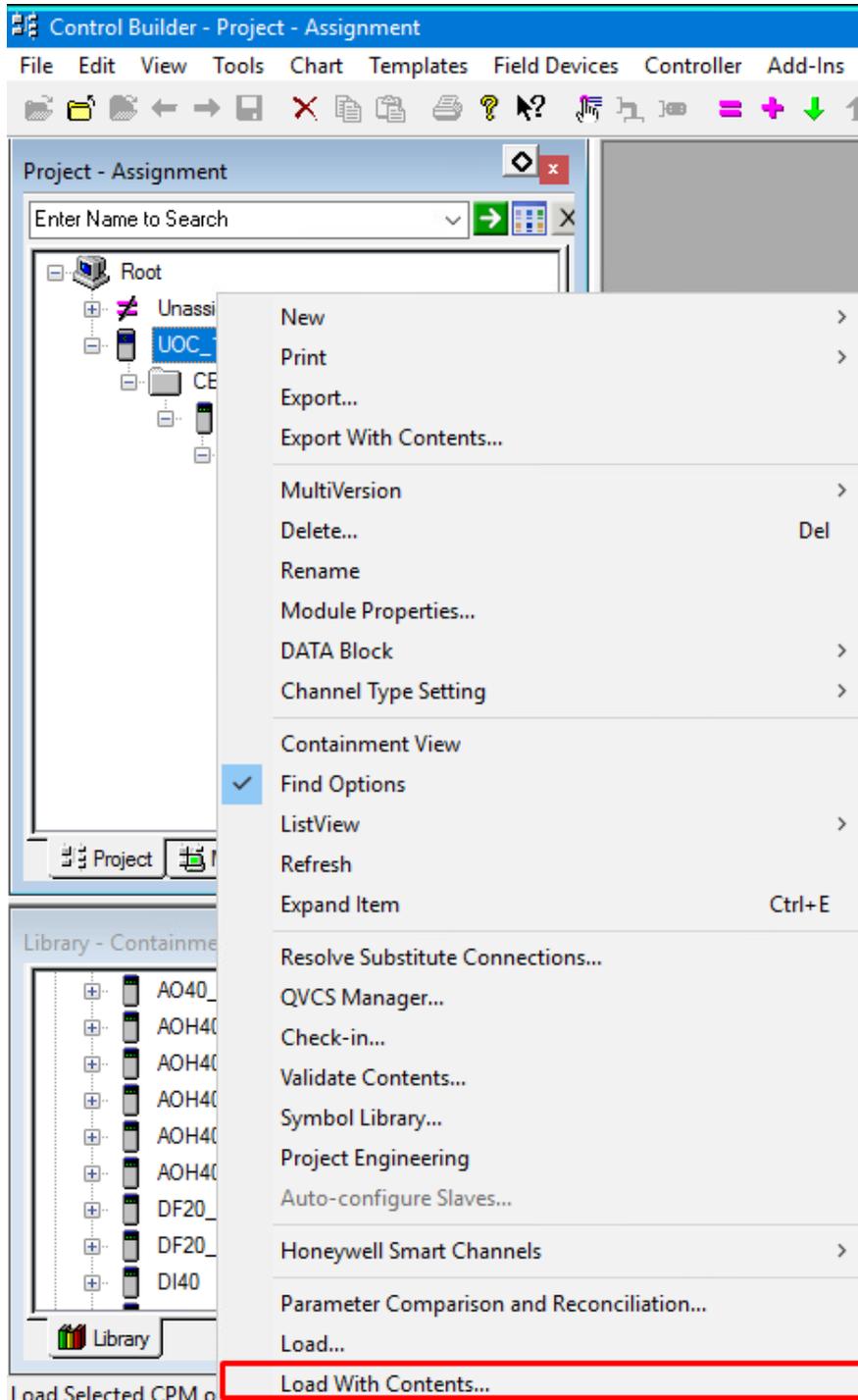
Fig. 17: Loading a configuration

⇨ The **Load Operation** window opens.
▶ Click **Load**.

5.6   Loading an excom module

▶   In the **Project – Assignment** window, right-click the excom station (here: **CEEUOC_103**).

▶   Click **Load With Contents…**
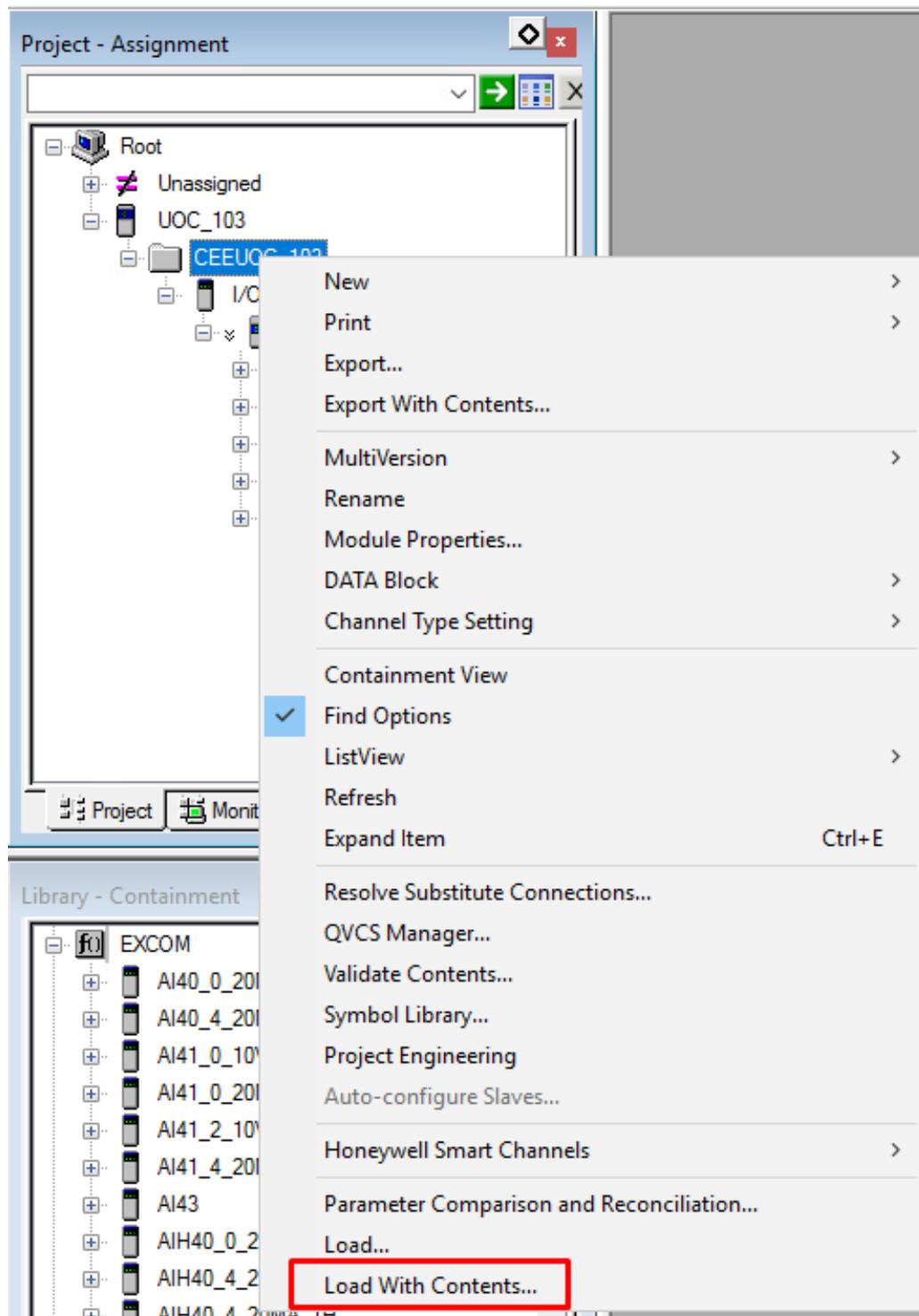
Fig. 18: Right-clicking excom modules

⇨   The **Load Operation** window opens.

▶ Click **Load**.

Fig. 19: Loading an excom module

⇨ The excom station is loaded with the full tree structure.

5.6.1 Loading a signal

Each module signal must be created individually.

▶ Right-click the desired signal in the **Project – Assignment** window.

▶ Click **Load…**
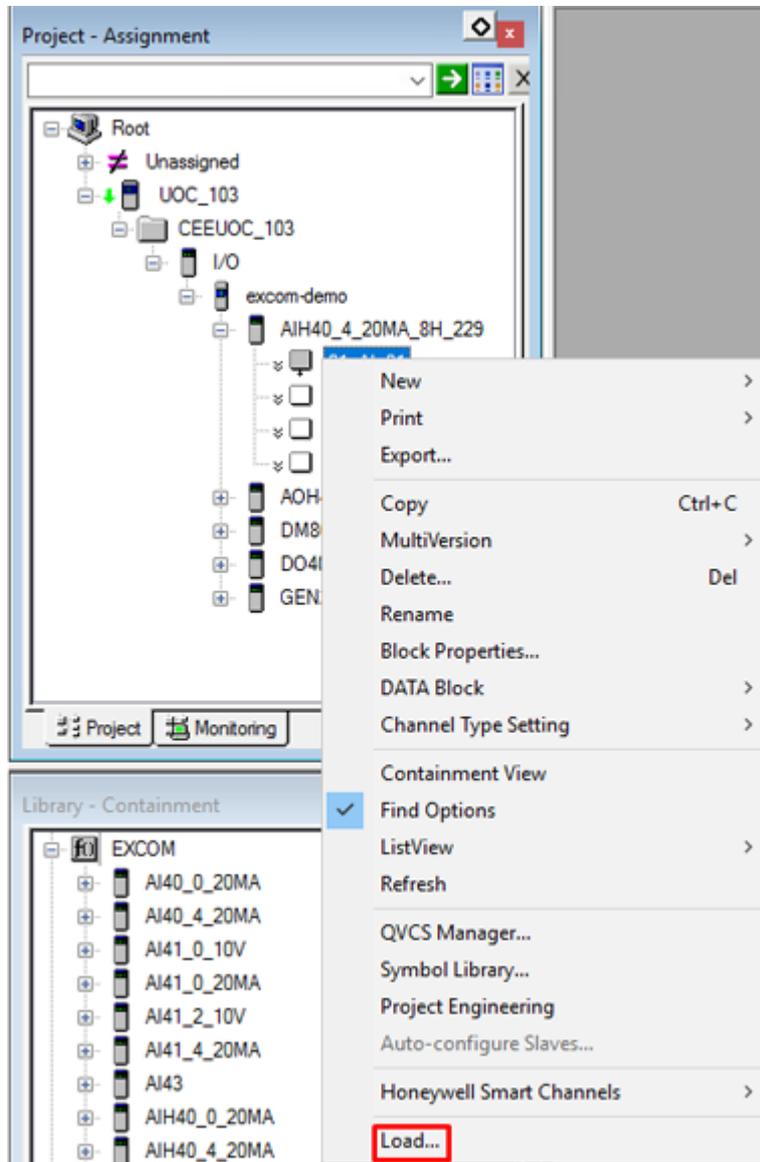
Fig. 20: Loading a signal

⇨ The signal is loaded.

▶ Load additional signals according to the individual configuration.

⇨ The planning for the excom station and the modules is complete. The corresponding data has been uploaded to the Honeywell controller.

5.7 Switching to monitoring

Monitoring is a live view of the Honeywell controller. The excom station and modules must first be activated in order to start the controller.

▶ Click **Monitoring**.
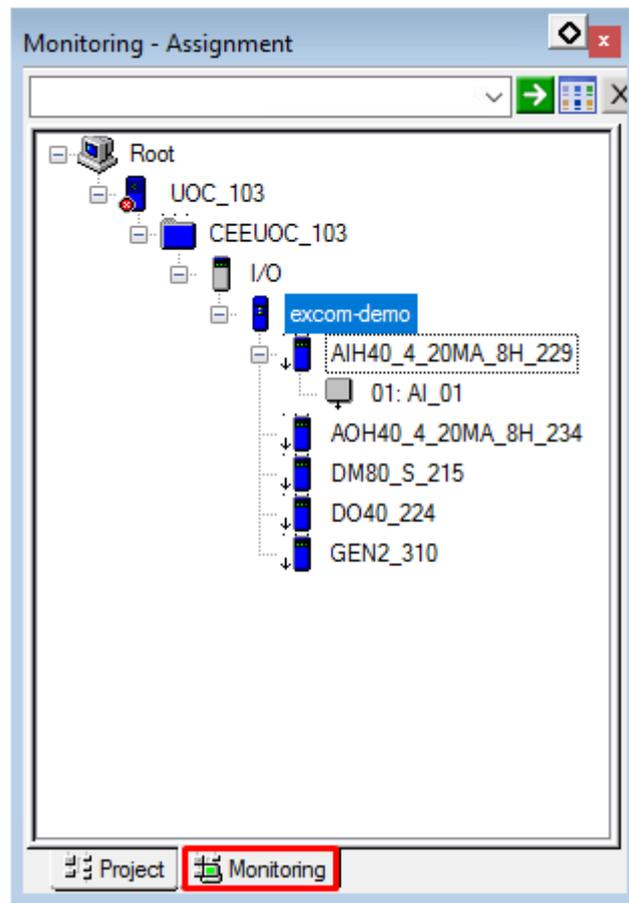
Fig. 21: Switching to **Monitoring**

5.8 Activating an excom station

The excom station must be activated.

▶ In the **Monitoring – Assignment** window, right-click the excom station (here: **excom-demo**).

▶ Click **Load With Contents...**
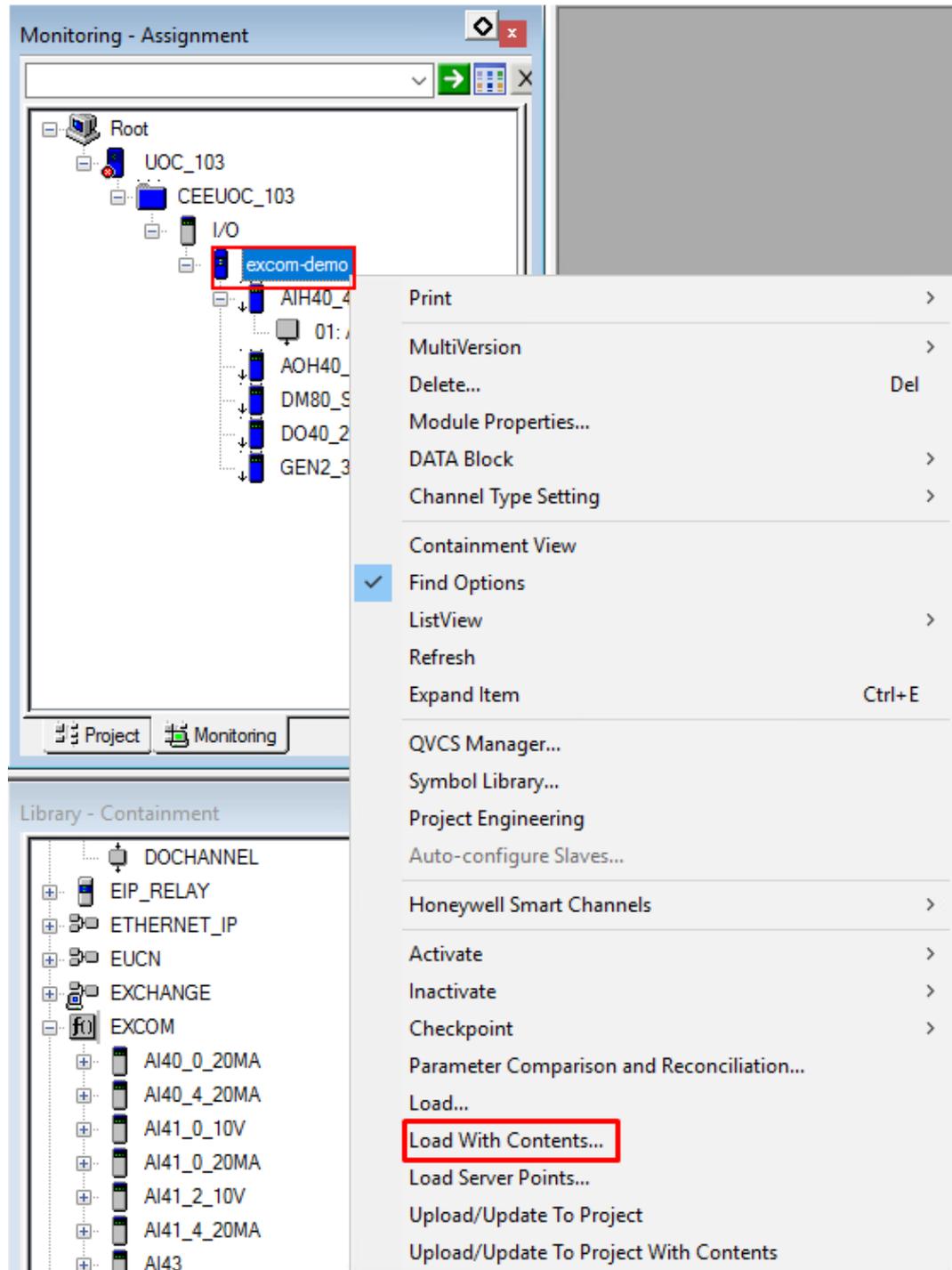
Fig. 22: Activating an excom station

⇨ The **Load Operation** window opens.

▶ Check the **Change state to Post-Load State after load** option.

▶ Click **Load**.

Load Operation

Groups of Items to be loaded

Load	Item Names	Current State	Required State	Post-Load State
☑	excom-demo	INACTIVE	Inactive	ACTIVE
☑	AIH40_4_20MA_8H_229	INACTIVE	INACTIVE	ACTIVE
	AI_01	Inactive	N/A	N/A
☑	AOH40_4_20MA_8H_234	INACTIVE	INACTIVE	ACTIVE
☑	DM80_S_215	INACTIVE	INACTIVE	ACTIVE
☑	DO40_224	INACTIVE	INACTIVE	ACTIVE
☑	GEN2_310	INACTIVE	INACTIVE	ACTIVE

*Items in Bold represent user-selected items. Items with a * belong to multiple groups.*

Selected Item Details

Options

☐ Change state to Required State before load

☑ Change state to Post-Load State after load

⚠ The Load operation should not be initiated if a
Checkpoint Restore operation is already in progress.

[Load] [Close] [Help...]

Fig. 23: **Load Operation** window

Starting the Honeywell controller

The Honeywell controller must be started after activating the excom station.

▶ Double-click in the **Monitoring – Assignment → CEEUOC…** window.

▶ Under **Main → CEE State →** select **COLDSTART** or **WARMSTART**.

⇨ A query window opens.

▶ Click **Yes** in the query window.

▶ Confirm with **OK**.

⇨ The excom station is online. The excom station and modules are marked in green.
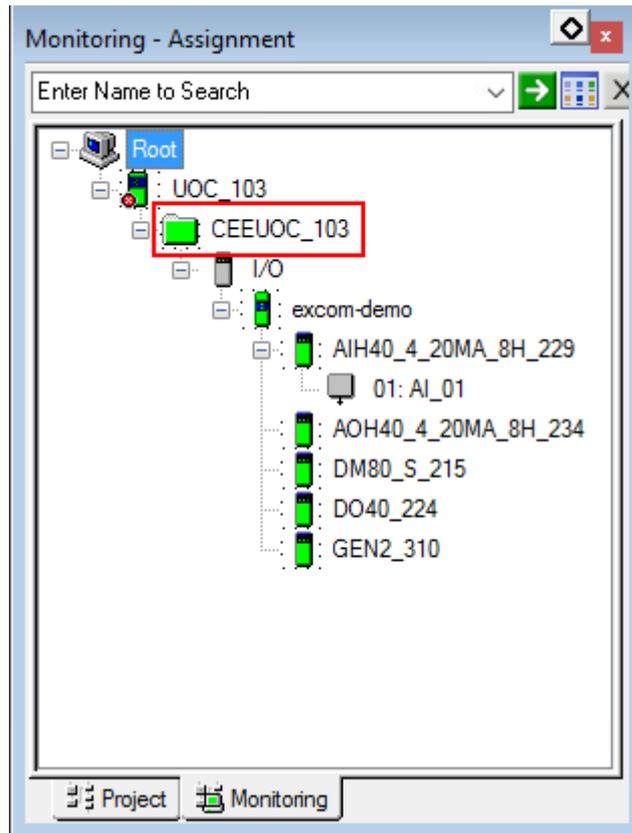
Fig. 24: Online excom station

5.9   HART information

The HART information can be read.

▶   In the **Monitoring – Assignment** window, double-click the channel (here: **01: AI_01**).
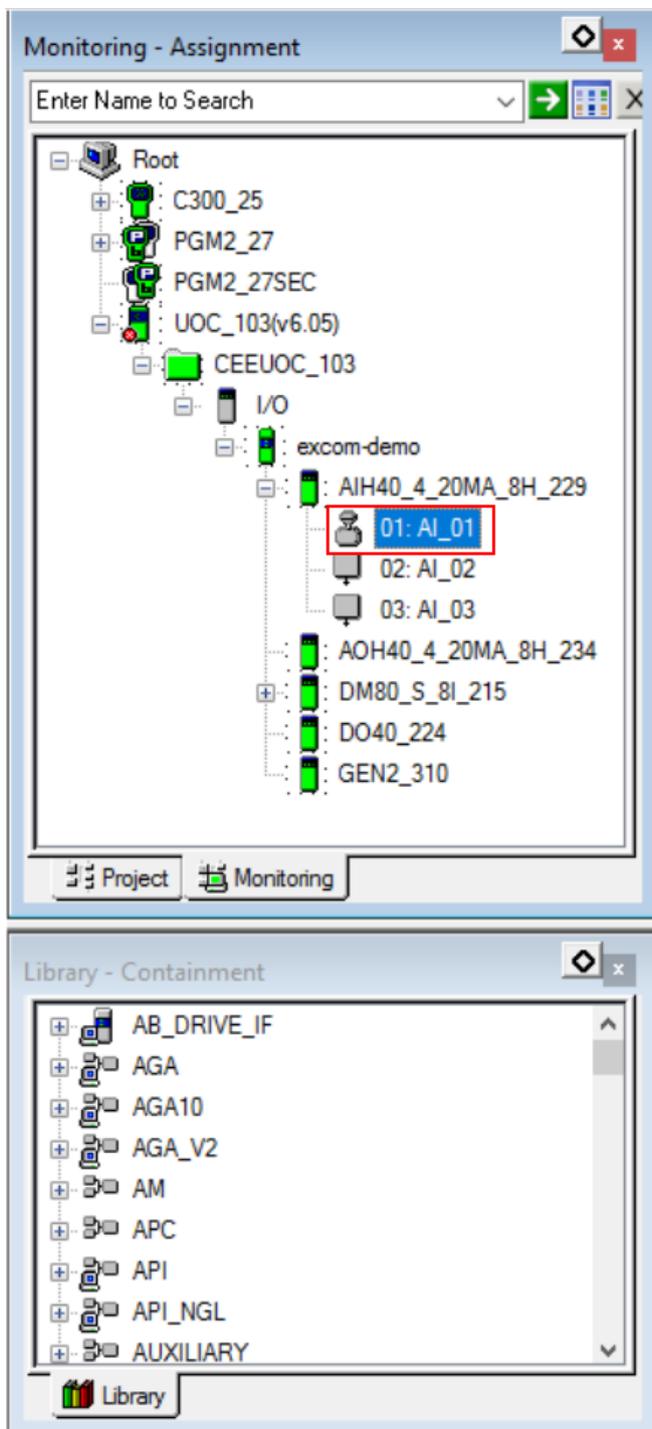
Fig. 25: Opening the desired channel

⇨   The configuration window opens.

HART information and errors can be viewed in the upper menu bar under **HART Configuration**, **HART Device Status**, **HART Identification** and **HART Variables**.
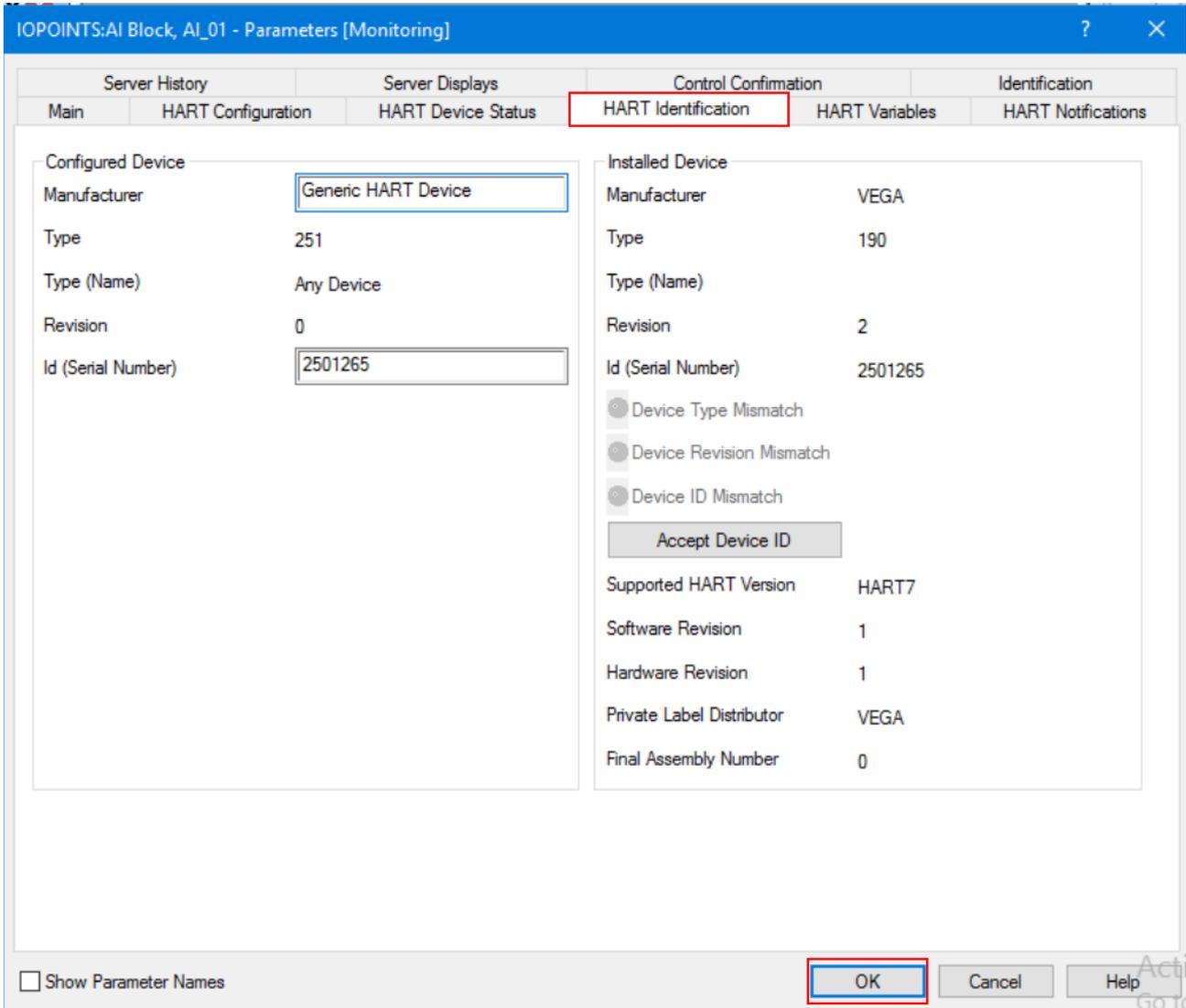
Fig. 26: Example — **HART Identification** window

5.10   Reading diagnostic information

The diagnostic information can be viewed in two ways:

- **Alarms**
- **Data/Status**

Diagnostic information — alarms

For **Alarms**, the diagnostic information is also displayed on the Honeywell Experion Station.

► In the **Monitoring – Assignment** window, double-click the module (here: **DM80_S_8I_215**).
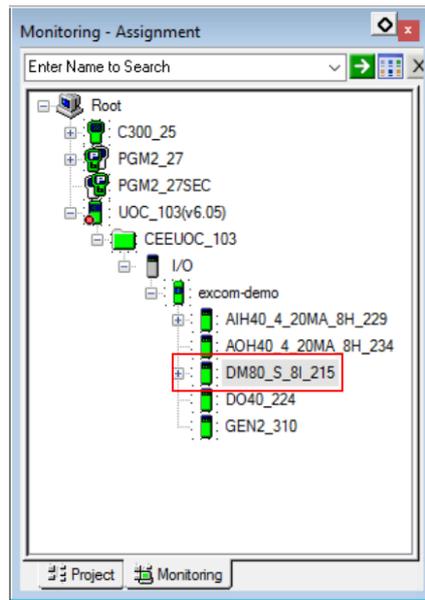
Fig. 27: Example — double-click the DM80-S module

⇨ The configuration window opens.

▶ Select **Alarms**.

	Alarm	Priority	Severity	Description	Alarm Active
0	PARAM	LOW	0	Parameter not plausible	☐
1	INVALID	LOW	0	Input bit invalid (Channel 1)	☐
2	INVALID	LOW	0	Input bit invalid (Channel 2)	☐
3	INVALID	LOW	0	Input bit invalid (Channel 3)	☑
4	INVALID	LOW	0	Input bit invalid (Channel 4)	☑
5	INVALID	LOW	0	Input bit invalid (Channel 5)	☑
6	INVALID	LOW	0	Input bit invalid (Channel 6)	☑
7	INVALID	LOW	0	Input bit invalid (Channel 7)	☑
8	INVALID	LOW	0	Input bit invalid (Channel 8)	☑
9	WIREBREAK	LOW	0	Wire break (Channel 1)	☐
10	WIREBREAK	LOW	0	Wire break (Channel 2)	☐
11	WIREBREAK	LOW	0	Wire break (Channel 3)	☑
12	WIREBREAK	LOW	0	Wire break (Channel 4)	☑
13	WIREBREAK	LOW	0	Wire break (Channel 5)	☑
14	WIREBREAK	LOW	0	Wire break (Channel 6)	☑
15	WIREBREAK	LOW	0	Wire break (Channel 7)	☑
16	WIREBREAK	LOW	0	Wire break (Channel 8)	☑
17	OVRCURR	LOW	0	Overcurrent (Channel 1)	☐
18	OVRCURR	LOW	0	Overcurrent (Channel 2)	☐
19	OVRCURR	LOW	0	Overcurrent (Channel 3)	☐
20	OVRCURR	LOW	0	Overcurrent (Channel 4)	☐
21	OVRCURR	LOW	0	Overcurrent (Channel 5)	☐
22	OVRCURR	LOW	0	Overcurrent (Channel 6)	☐
23	OVRCURR	LOW	0	Overcurrent (Channel 7)	☐
24	OVRCURR	LOW	0	Overcurrent (Channel 8)	☐

Fig. 28: Diagnostic information — clicking **Alarms**

⇨ Active diagnostics are marked with a check mark. In the example above, there is no input signal on channels 3…8 or the wire-break monitoring diagnostics is active.

Diagnostic information — Data/Status

▶ In the **Monitoring – Assignment** window, double-click the module (here: **DM80_S_8I_215**).

Fig. 29: Example — double-click the DM80-S module

⇨ The configuration window opens.

▶ Select **Data/Status**.

Fig. 30: Diagnostic information — clicking **Data/Status**

⇨ Active diagnostics are marked with a check mark. The module-related diagnostics are displayed for each channel. The left-hand column shows the available channels. The other columns indicate which diagnostics are active on each of the channels.
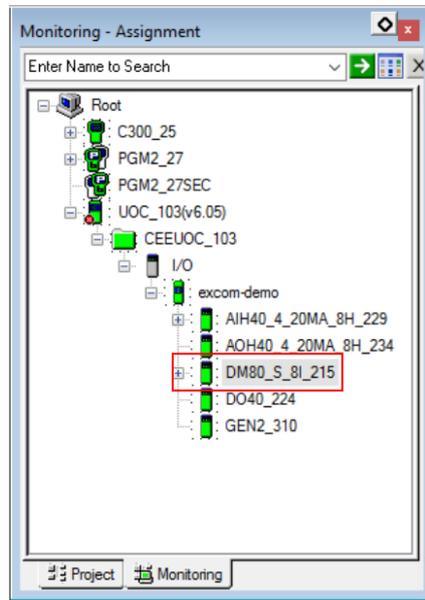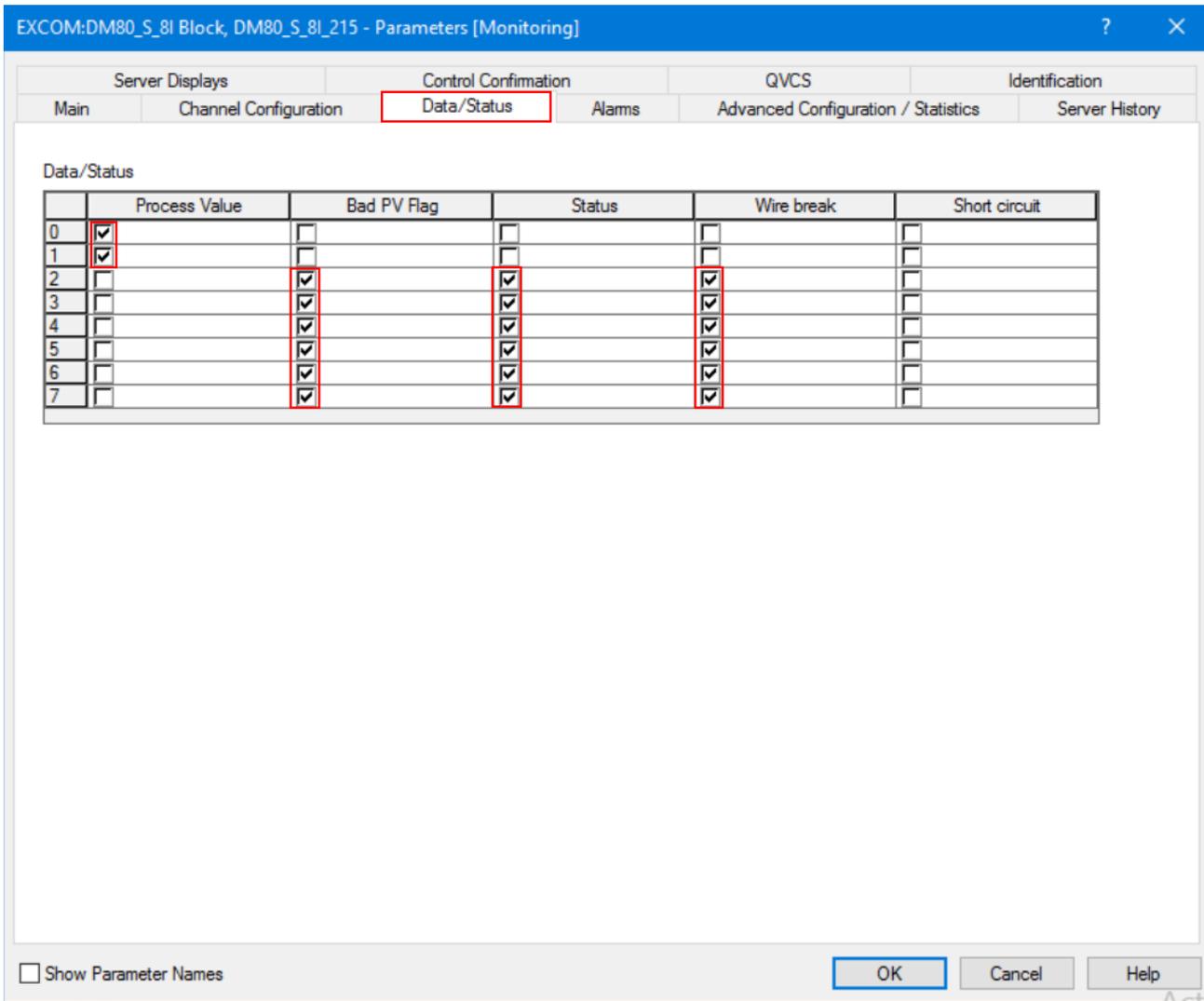
6 Redundancy strategies

6.1 Topology

The general topology of the Turck-specific system redundancy with the Ethernet protocols EtherNet/IP, Modbus TCP and PROFINET has the following structure:
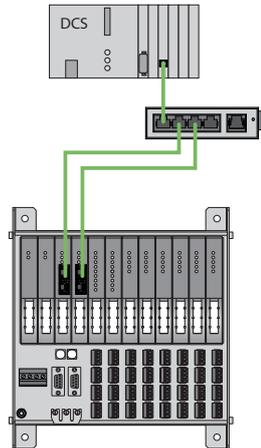
Fig. 31: System redundancy with one master and two gateways
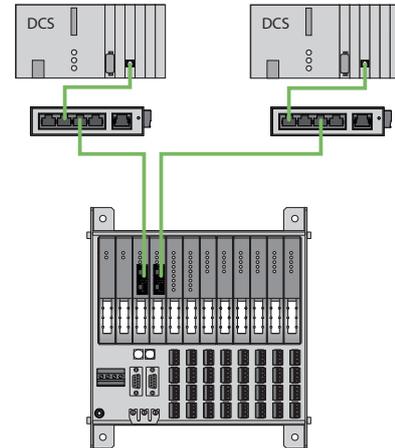
Fig. 32: System redundancy with two masters and two gateways

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 transmit 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.

6.2 Redundancy setup

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

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

6.3   System 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.

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