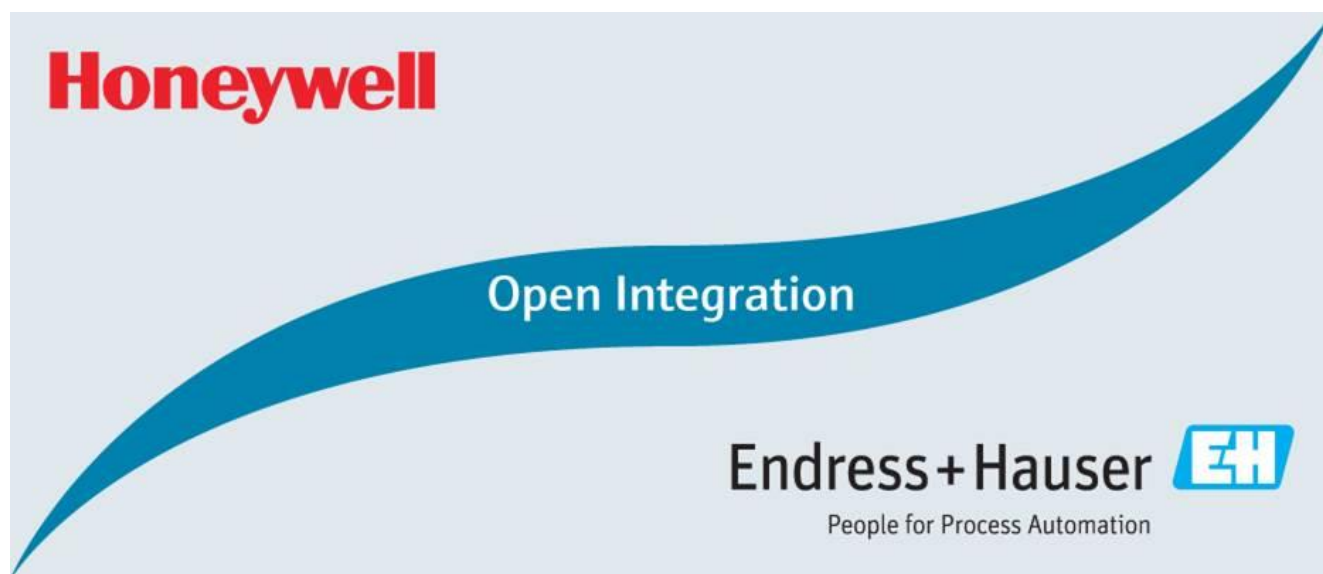


Integration Tutorial HON04

Honeywell Experion®PKS and PROFINET over Ethernet-APL
for Chemical Industry



Supported by:

 **PEPPERL+FUCHS**

 **PHOENIX
CONTACT**

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FLUID CONTROL SYSTEMS

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1 Document Information

1.1 Purpose and Scope

This document provides a step by step description on how to integrate PROFINET and PROFINET-APL devices with a Honeywell Experion®PKS System. All content of this document is jointly developed, reviewed and approved by Honeywell and Endress+Hauser as a common deliverable of Open Integration.

1.2 Document History

This is version 1.00.00 of this document. Version history:

Version	Released	Description
1.00.00	2024-09	Initial version

1.3 Related Documents

Please refer to related documents as listed below:

Document	Description
SD02920S/04/EN/01.24	Reference Topology HON04
SD02922S/04/EN/01.24	Integration Test Summary HON04
SD02923S/04/EN/01.24	List of Tested Devices and Versions HON04

2 Pre-Requisites

Readers of this document should be familiar with related documents as listed in chapter 1.3 and basics on how to work with the Honeywell Experion®PKS System as well as PROFINET in general. Please refer to recommended literature as listed in chapter 2.1.

2.1 Recommended Literature

2.1.1 Honeywell

Please refer to online help of the Honeywell Configuration Studio for latest information about the Honeywell control system.

2.1.2 Endress+Hauser

Document	Description
KA01303S/04/EN/09.22-00	FieldCare / DeviceCare Getting started

2.1.3 Other

2.1.3.1 Pepperl+Fuchs

Document	Description
tdoct7025e_eng	Ethernet-APL Rail Field Switch Hardware manual

2.1.3.2 Phoenix Contact

Document	Description
um_en_sw_fl_switch_2000_108998_en_06	Configuration of the FL SWITCH 2000 and FL NAT 2000 product family

2.2 Operable Control System

This document assumes an operable Honeywell Experion®PKS as defined by Reference Topology HON04. Please refer to the manuals listed in chapter 2.1.1 for an explanation on how to use hard- and software provided by Honeywell.

2.3 Operable Asset Management System

This document assumes operable Honeywell FDM and Endress+Hauser FieldCare environments as defined by Reference Topology HON04.

2.4 Operable Field Network Infrastructure

This document assumes an operable PROFINET and PROFINET APL network, as defined by Reference Topology HON04. Please refer to manuals listed in chapter 2.1.3 for installing of hardware and software provided by other parties.

2.5 Operable Field Devices

This document assumes an operable selection of PROFINET and PROFINET APL devices, as defined by Reference Topology HON04. Each field device is powered if needed and adequately connected to the field network infrastructure. Please refer to individual device manuals for further advice.

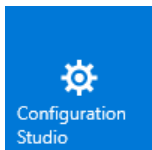
3 Basic Integration

3.1 System Configuration

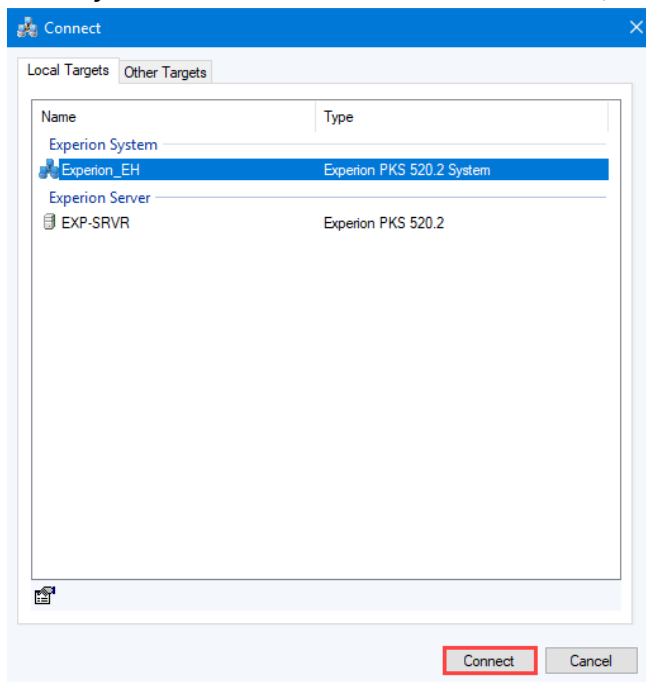
This chapter describes the control system configuration in the Honeywell environment.

3.1.1 New Project

- Start the software Configuration Studio:



- Select the system under the header "SystemName" and click on the button "Connect" (Honeywell EPKS System must be connected to the network):

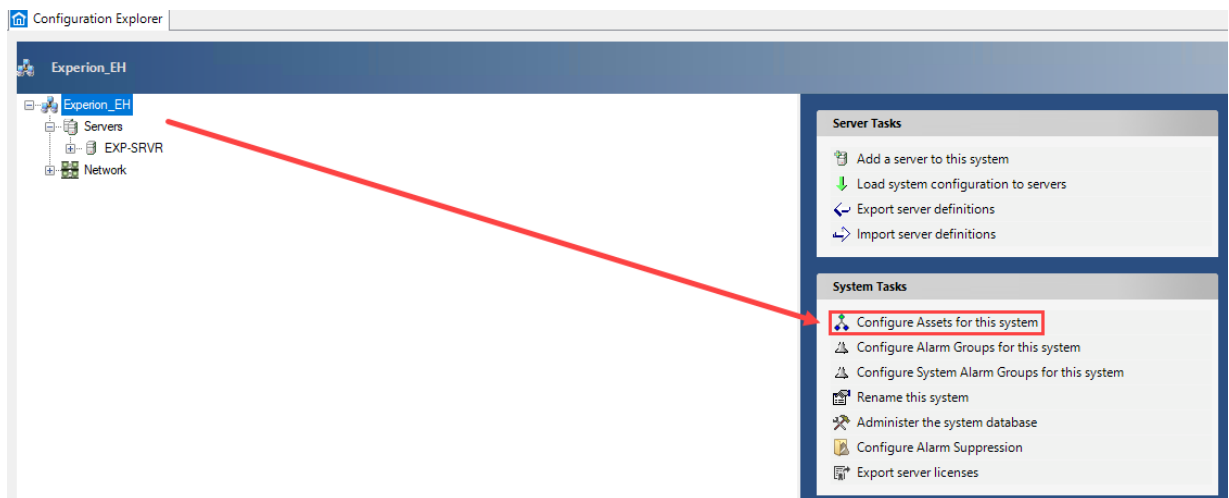


3.1.2 System Offline Configuration

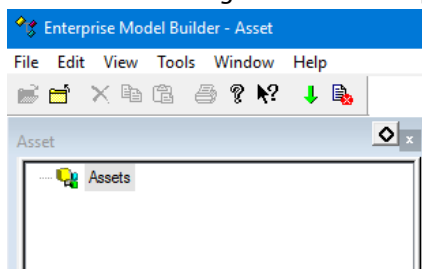
3.1.2.1 Enterprise Model Configuration (Asset Configuration)

Assets are used to fix the scope of responsibilities in a project. These items are mandatory for Control Strategy. This chapter explains how creating Assets.

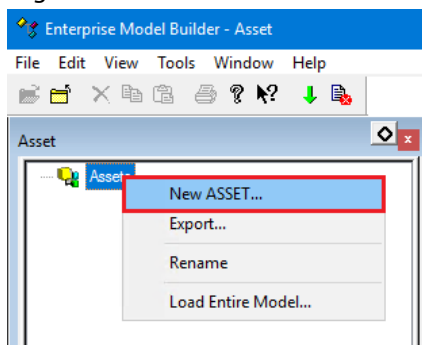
- In Configuration Studio, select the root of the system ("Experion_EH" in the screenshot below)" in the Configuration Explorer and click on the menu "Configure Assets for this system":



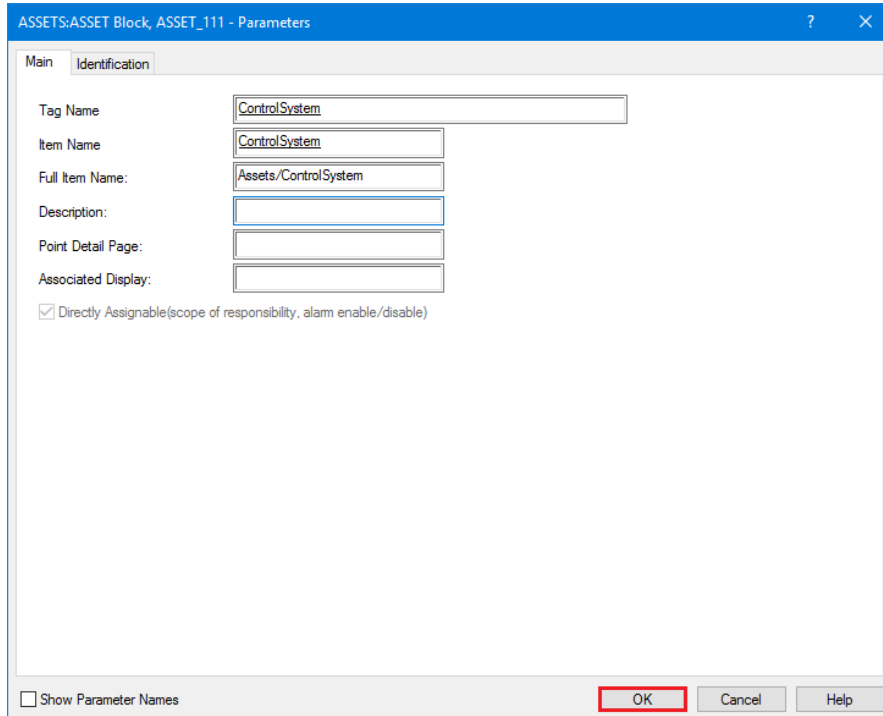
- The Assets management tool is opened and displays configured assets:



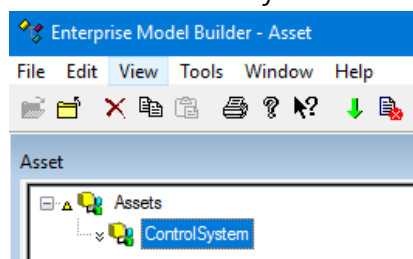
- Right-click on "Assets" and select the menu "New ASSET":



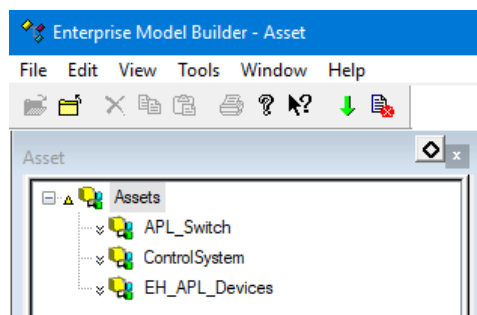
- Configure the Asset "Tag Name" and "Item Name". The parameter "Full Item Name" is refreshed automatically. Click on the button "OK".



- New Asset "ControlSystem" has been inserted:

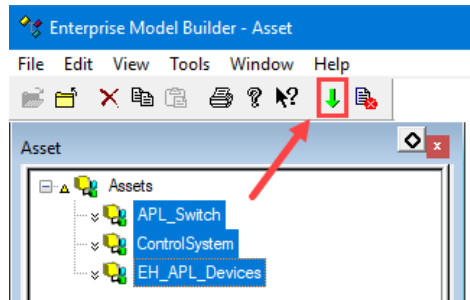


- Further relevant assets have been added as well:

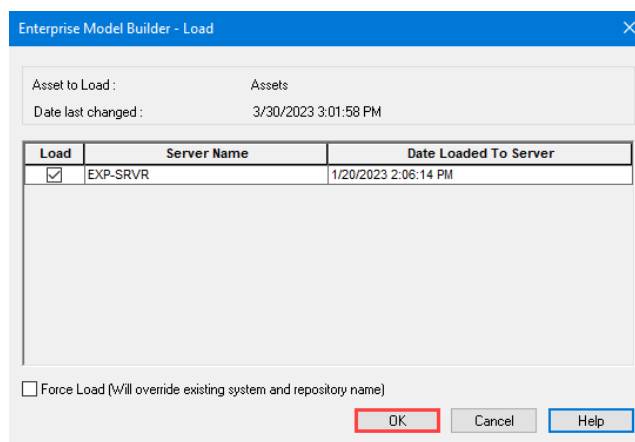


TIP: To avoid overloading the operators with device alarms it is recommended to create one or more assets specific for Instrumentation.

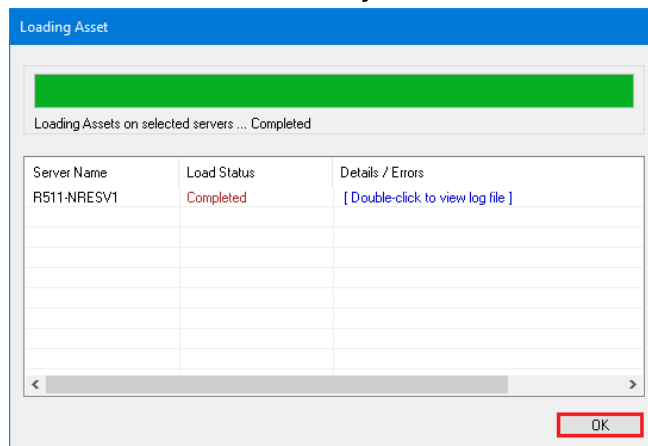
- Select all created assets and click on the shortcut button “Load Entire Model”:



- Click on the button “OK”:



- Assets have been successfully loaded. Click on the button “OK”:

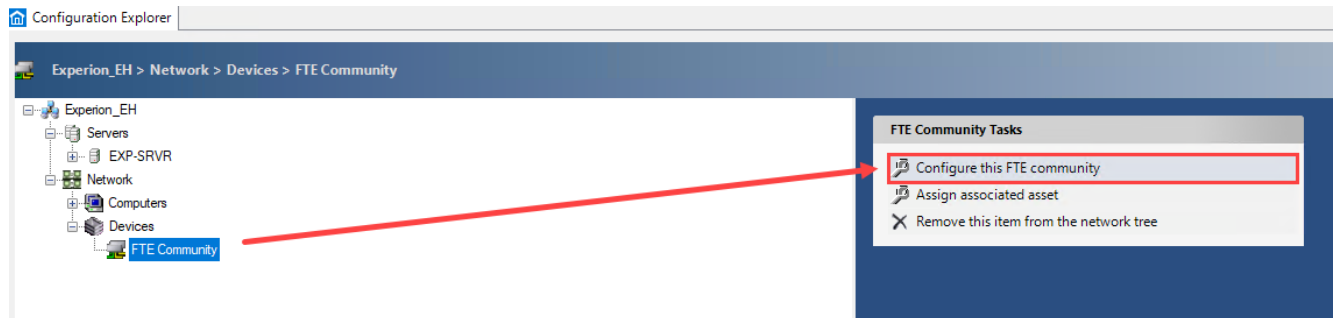


Remark:

- Assets can be created as a hierarchy until 5 levels deep.
- There are direct assignable assets and non-direct assignable assets. Direct assignable assets can be directly included or excluded from a Scope of Responsibility (SOR) while non-direct assignable assets are always following the SOR assignment of its parent.

3.1.2.2 Experion PKS Server FTE Network

In the Configuration Explorer, select the menu "FTE Community" and select the FTE Community Tasks "Configure this FTE community":



- Configure the Supervisory network segment according to your network configuration:

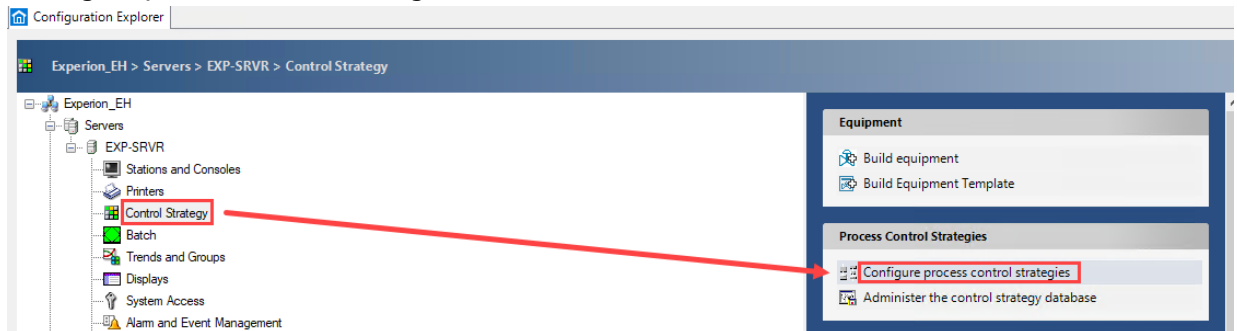
The screenshot shows the 'Add/Configure FTE Community' dialog box. The 'FTE Community Name' field is set to 'FTE Community'. The 'Description' field is empty. The 'System Event Server' dropdown is set to 'EXP-SRVR'. The 'Configure Network Segments' checkbox is checked, with a note: 'Option must be selected to add CDA nodes to the FTE Community.' Below this, the 'Supervisory(FTE) Network Segment' section is expanded, showing the following fields: Base IP (192.168.2.0), Subnet Mask (255.255.255.0), Primary Time Server (192.168.2.7), Default Gateway IP (0.0.0.0), VLAN ID (101), and Secondary Time Server (0.0.0.0). All IP fields are highlighted with red boxes.

- Configure the Supervisory Monitoring network according to your network configuration:

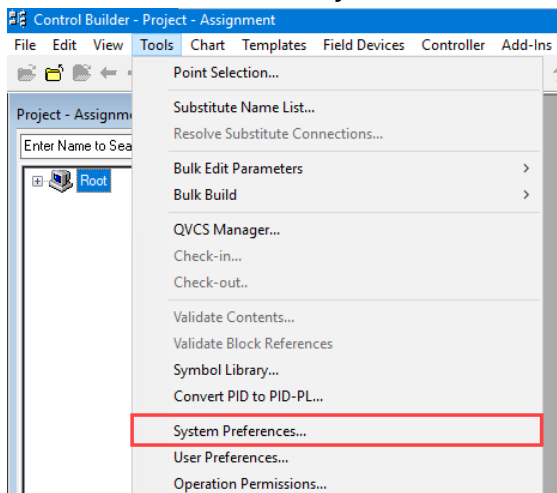
The screenshot shows the 'Supervisory(FTE) Monitoring' dialog box. The 'FTE Multicast IP' field is set to 234.5.6.7. The 'Primary SNMP IP' field is set to 192.168.2.7, and the 'Secondary SNMP IP' field is set to 0.0.0.0. Below these, there are three expandable sections: 'Control and IO Network Segment', 'Control HIVE Management Network Segment', and 'Advanced Security'. The 'Advanced Security' section is expanded, showing the 'CA Server IP' field set to 0.0.0.0. At the bottom, there are 'Save' and 'Close' buttons.

- If IO Hive or Control Hive are being used, it is also required to enter the network information for these networks.
- Save the configuration.

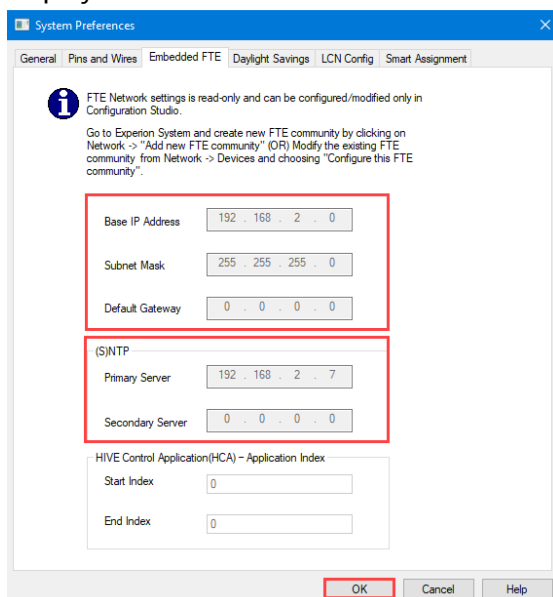
- Open Control Builder by selecting the menu "Control Strategy" and then clicking on the menu "Configure process control strategies":



- Select the menu "Tools→System Preferences":



- Select the tab "Embedded FTE" and verify that the network settings configured previously are displayed:



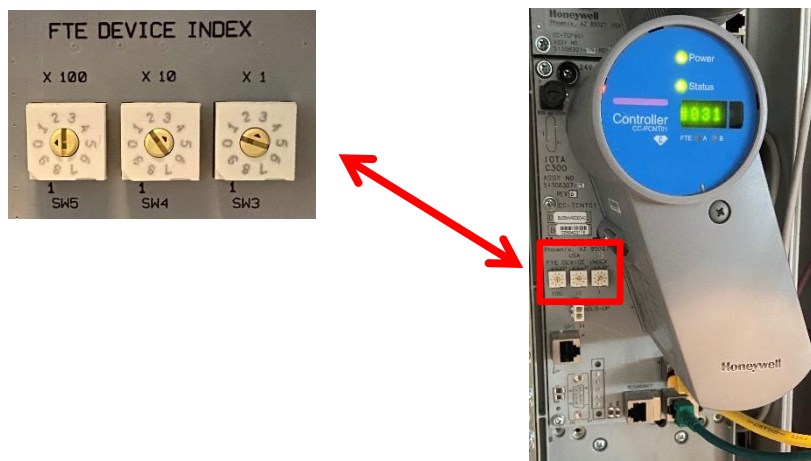
3.1.2.3 Control System

3.1.2.3.1 Firewall

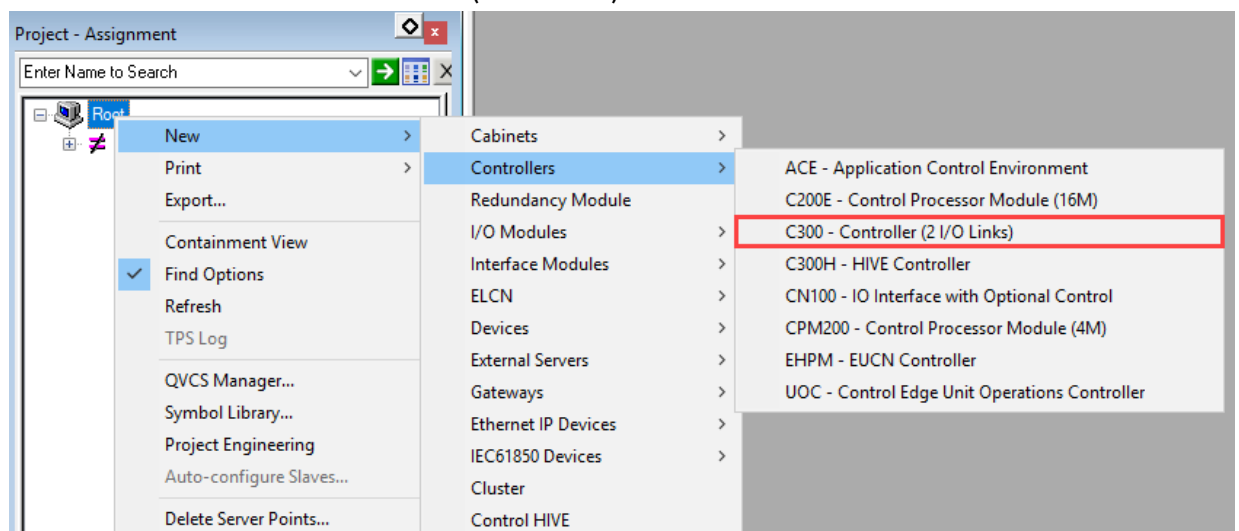
No configuration is needed for this example.

3.1.2.3.2 C300 Controller

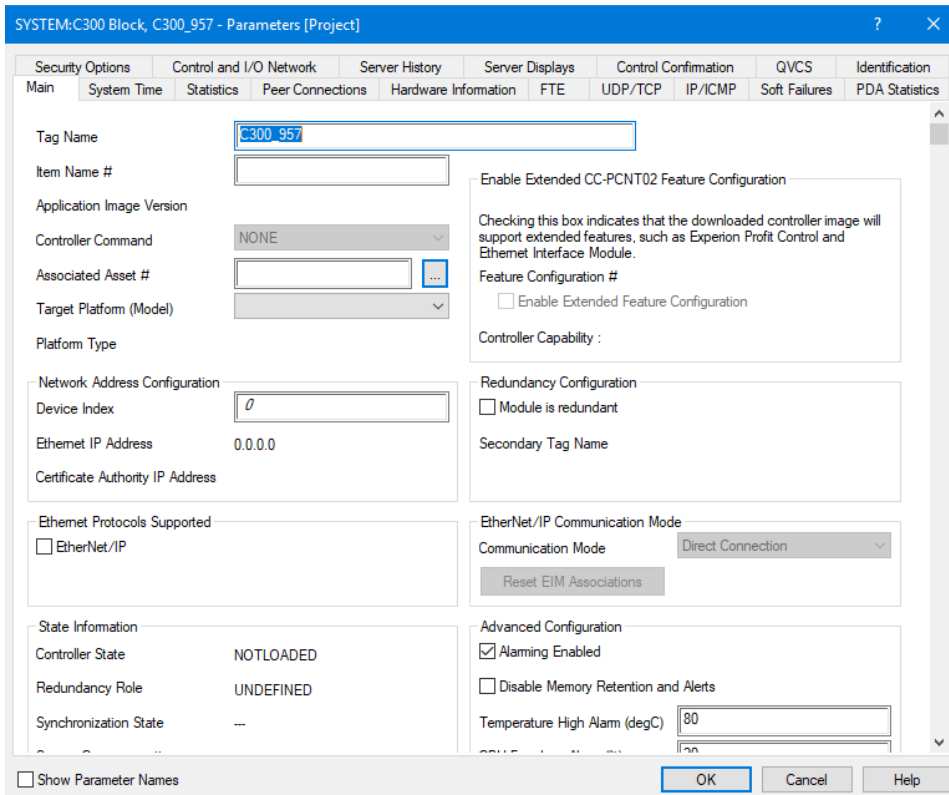
- In our example, the C300 controller IP address is 192.168.2.31.
The last part of this IP address (192.168.2.031), which is the FTE device index, must be configured with a screwdriver on the switches of the C300 card. The first switch is set to "0", the second one to "3" and the last one to "1":



- In the Project-Assignment view, right-click on "Root" and select the option "New→Controllers→C300-Controller(2I/O Links)":



- This opens the C300 configuration window:



SYSTEM: C300 Block, C300_957 - Parameters [Project]

Security Options | Control and I/O Network | Server History | Server Displays | Control Confirmation | QVCS | Identification

Main | System Time | Statistics | Peer Connections | Hardware Information | FTE | UDP/TCP | IP/ICMP | Soft Failures | PDA Statistics

Tag Name: C300_957

Item Name #

Application Image Version

Controller Command: NONE

Associated Asset #

Target Platform (Model)

Platform Type

Network Address Configuration

Device Index: 0

Ethernet IP Address: 0.0.0.0

Certificate Authority IP Address

Ethernet Protocols Supported

☐ EtherNet/IP

State Information

Controller State: NOTLOADED

Redundancy Role: UNDEFINED

Synchronization State: ---

Enable Extended CC-PCNT02 Feature Configuration

Checking this box indicates that the downloaded controller image will support extended features, such as Experion Profit Control and Ethernet Interface Module.

Feature Configuration #

☐ Enable Extended Feature Configuration

Controller Capability :

Redundancy Configuration

☐ Module is redundant

Secondary Tag Name

EtherNet/IP Communication Mode

Communication Mode: Direct Connection

Reset EIM Associations

Advanced Configuration

☒ Alarming Enabled

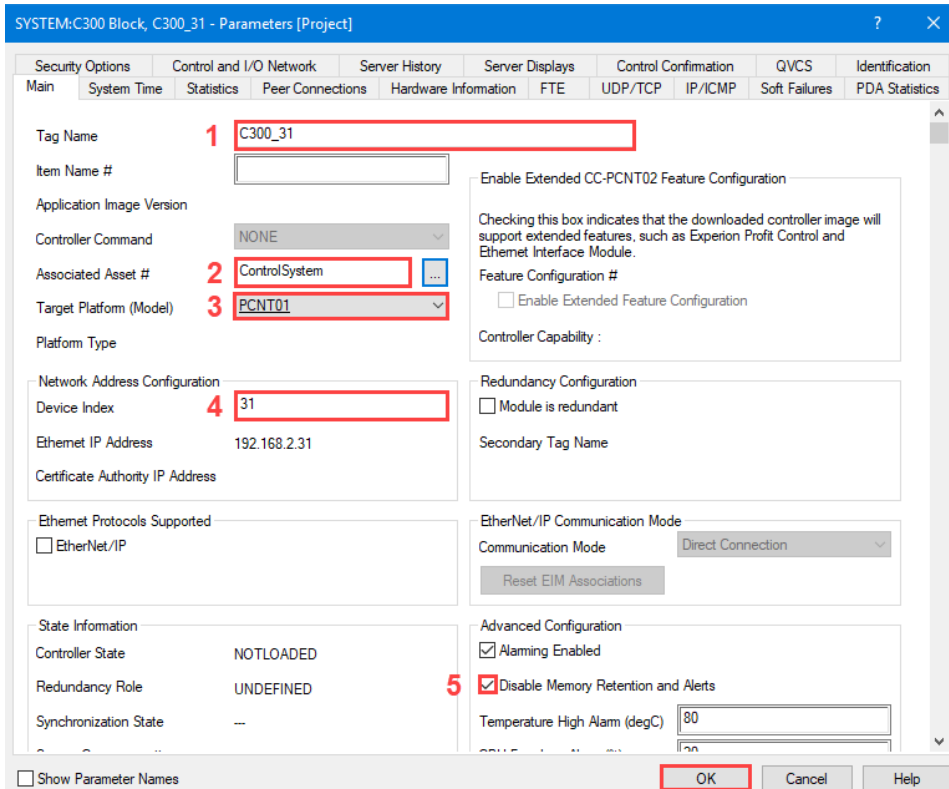
☐ Disable Memory Retention and Alerts

Temperature High Alarm (degC): 80

☐ Show Parameter Names

OK Cancel Help

- Following settings have been configured:



SYSTEM: C300 Block, C300_31 - Parameters [Project]

Security Options | Control and I/O Network | Server History | Server Displays | Control Confirmation | QVCS | Identification

Main | System Time | Statistics | Peer Connections | Hardware Information | FTE | UDP/TCP | IP/ICMP | Soft Failures | PDA Statistics

Tag Name: C300_31

Item Name #

Application Image Version

Controller Command: NONE

Associated Asset #: ControlSystem

Target Platform (Model): PCNT01

Platform Type

Network Address Configuration

Device Index: 31

Ethernet IP Address: 192.168.2.31

Certificate Authority IP Address

Ethernet Protocols Supported

☐ EtherNet/IP

State Information

Controller State: NOTLOADED

Redundancy Role: UNDEFINED

Synchronization State: ---

Enable Extended CC-PCNT02 Feature Configuration

Checking this box indicates that the downloaded controller image will support extended features, such as Experion Profit Control and Ethernet Interface Module.

Feature Configuration #

☐ Enable Extended Feature Configuration

Controller Capability :

Redundancy Configuration

☐ Module is redundant

Secondary Tag Name

EtherNet/IP Communication Mode

Communication Mode: Direct Connection

Reset EIM Associations

Advanced Configuration

☒ Alarming Enabled

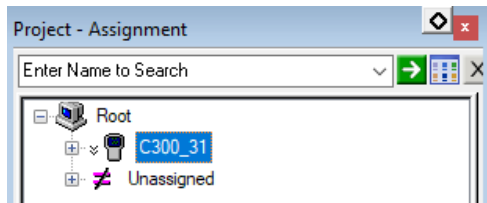
☒ Disable Memory Retention and Alerts

Temperature High Alarm (degC): 80

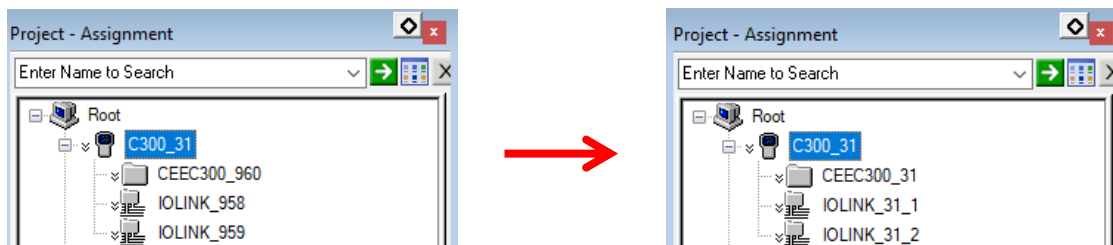
☐ Show Parameter Names

OK Cancel Help

- Note the target platform needs to be defined according to the used version of the controller, Also note that for PROFINET, PCNT02 is the minimum supported controller platform.
- In this example,
 - The TAG Name is "C300_31" (name referring to the FTE device index).
 - The selected Associated Asset is "ControlSystem" (Associated Asset is an optional setting).
 - The entered Device Index is 31 (index referring to the IP address).
 - The option "Disable Battery Alarm and Soft Fail" shall be enabled, unless a battery support module is installed with the C300 controller.
- Click on the button "OK" to set the configuration.
- The C300 controller is successfully inserted in the project:



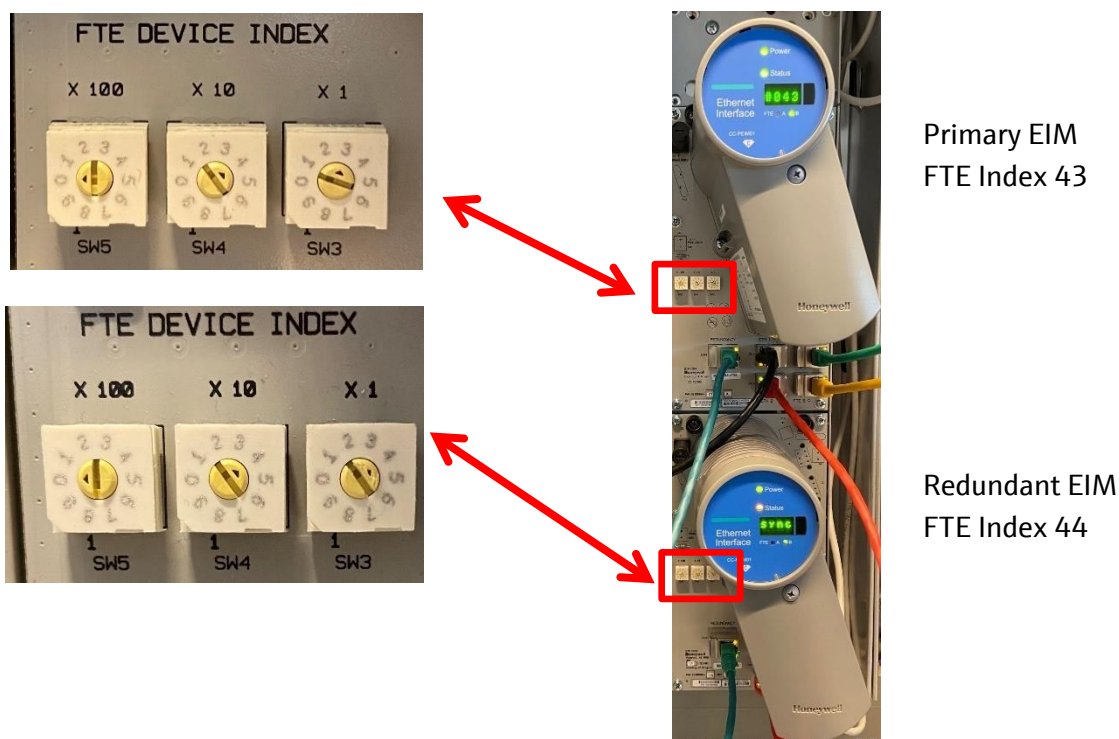
- Expand the "C300_31" menu and rename the default module names with controller index number for a better overview:



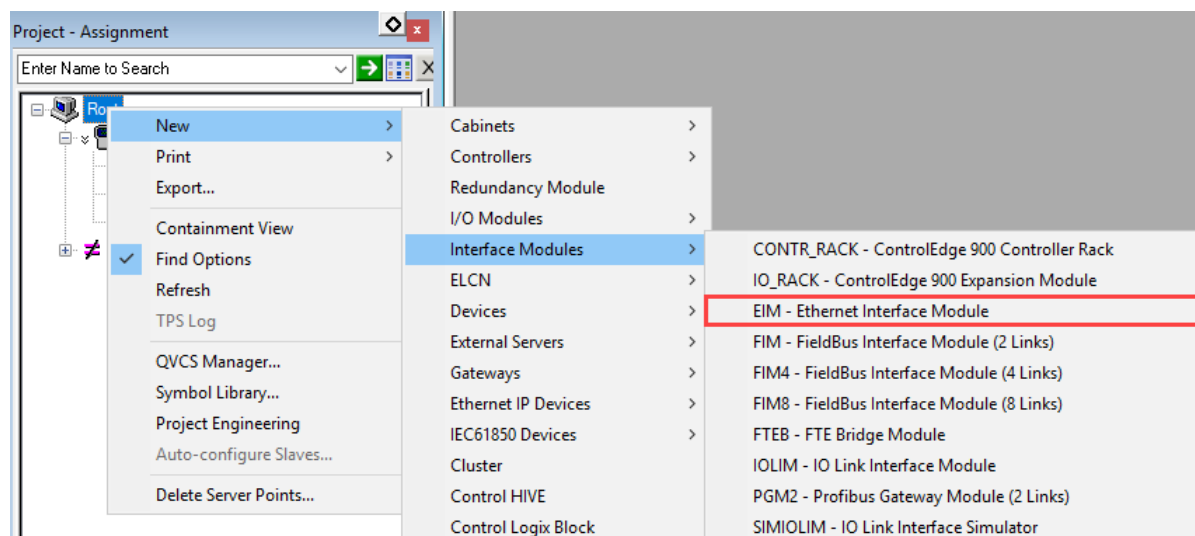
3.1.2.3.3 Ethernet Interface Module

- In our example, the primary EIM IP address is 192.168.2.43 and the secondary EIM IP address is 192.168.2.44.

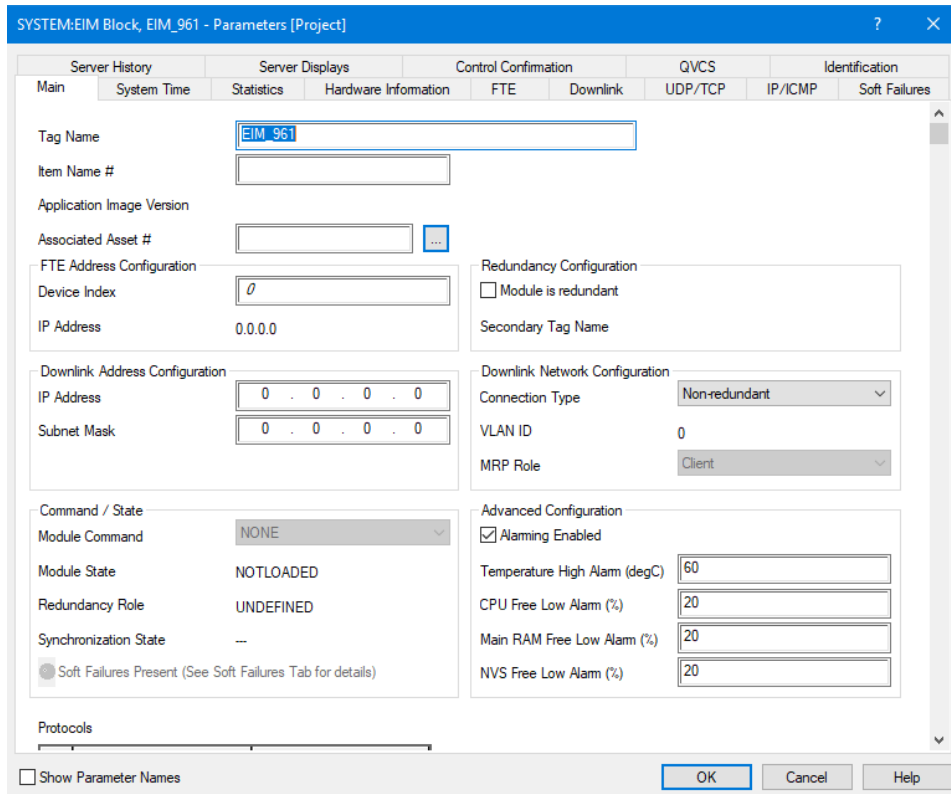
The last part of the IP address (192.168.2.043), which is the FTE device index, must be configured with a screwdriver on the switches of the EIM card. The first switch is set to "0", the second one to "4" and the last one to "3" (Same action for the secondary EIM):



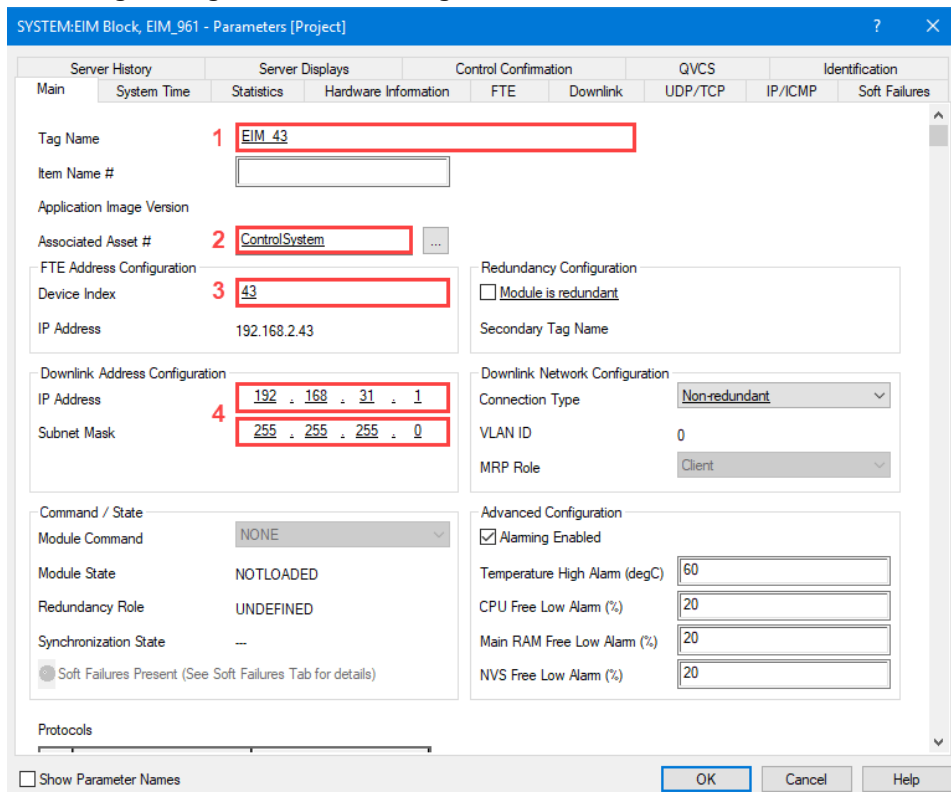
- In the Project-Assignment view, right-click on "Root" and select the option "New→Interface Modules→EIM-Ethernet Interface Module":



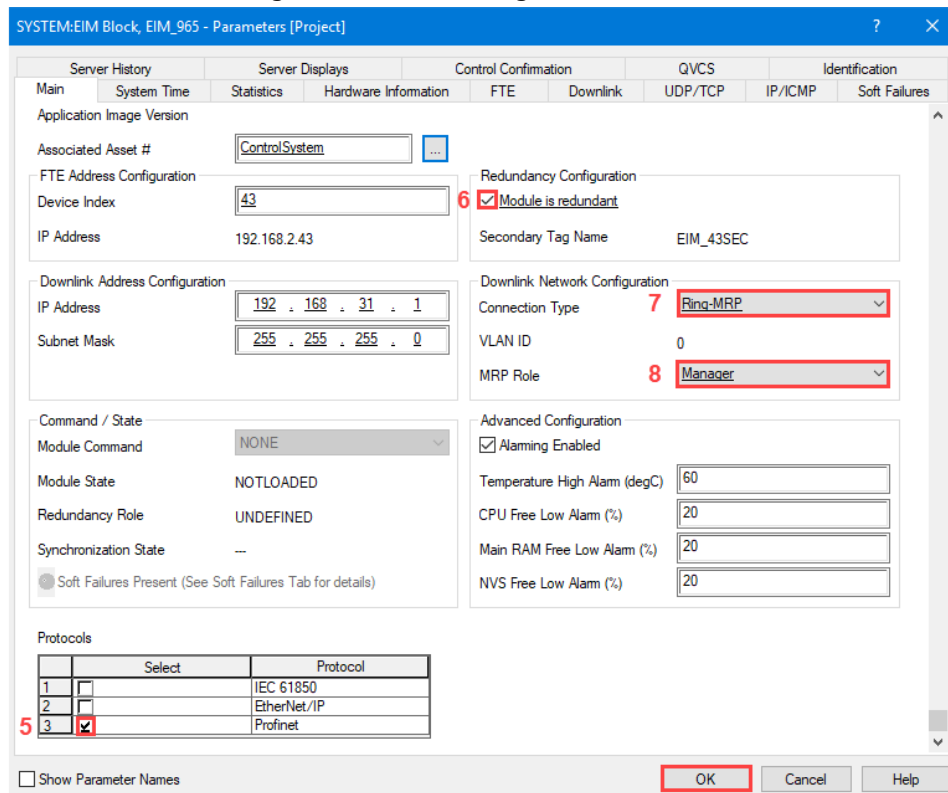
- This opens the EIM configuration window:



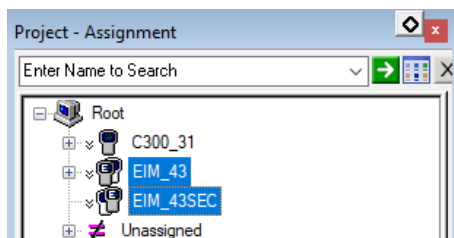
- Following settings have been configured:



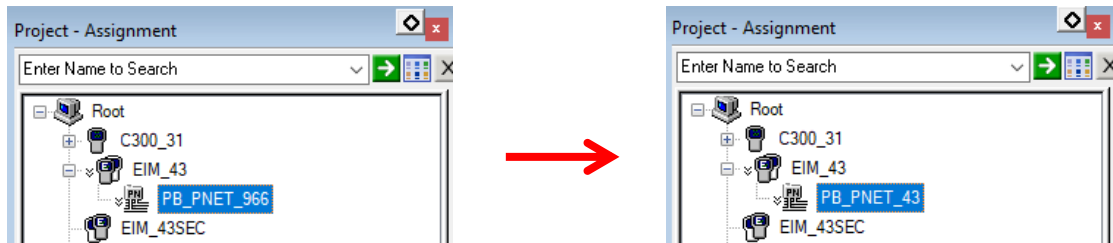
- Scroll down and configure the next settings:



- In this example,
 - The TAG Name is "EIM_43" (name referring to the FTE device index).
 - The selected Associated Asset is "ControlSystem" (Associated Asset is an optional setting).
 - The entered Device Index is 43 (index referring to the IP address).
 - The selected protocol is "PROFINET".
 - The module is redundant.
 - The connection type is "Ring-MRP" and the MRP role is "Manager". That means that all other components of the MRP ring have to be configured as "Client".
- Click on the button "OK":



- Expand the "EIM_43" menu and rename the default module name with EIM index number for a better overview:



3.1.2.4 Basic Settings Configuration Download

- Download the configuration of the C300 and EIM modules.
Please refer to part 3.4.1 to proceed.

3.2 Field Network Configuration

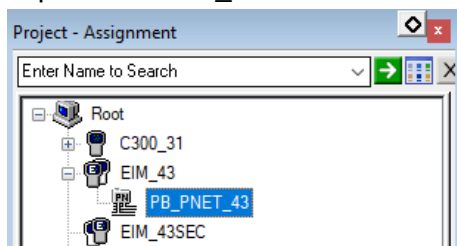
This chapter describes the configuration of the field network switches.

3.2.1 IP Address Configuration

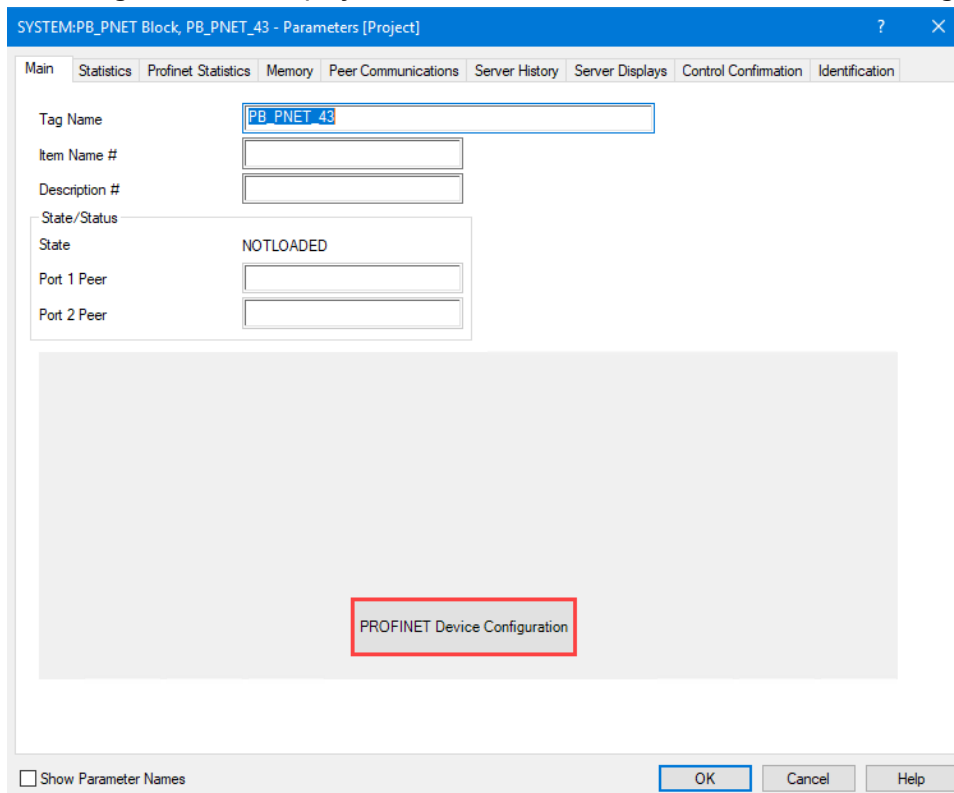
This chapter describes how to configure Station names and IP settings.

3.2.1.1 Network Scan

- Expand the "EIM_43" module and double-click on "PB_PNET_43":



- Following window is displayed. Click on the button "PROFINET Device Configuration":



- Click on the top left button "Station Discovery and Configuration":



- This automatically executes a scan of the network and displays the results in the page:






The screenshot shows the Honeywell Profinet Device Configuration software interface. The title bar indicates 'Profinet Device Configuration | PB_PNET_43'. The main window is titled 'Station Discovery and Configuration (83)'. The table displays scanned field devices with their Station Name, IP Address, MAC Address, Device ID, Vendor ID, Signal, Reset, and Set.

Station Name	IP Address	MAC Address	Device ID	Vendor ID	Signal	Reset	Set
pnio-cpx-fb44	192.168.31.213	00-0e-f0-6d-7b-34	0x101	0x14D	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
pfs4-p22-cbar	192.168.31.83	00-07-05-00-06-2a	0xA22A	0x11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
phxsw-p05-cbar	192.168.31.79	00-07-05-00-06-2b	0xA22A	0x11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
pfs4-p24-cbar-prof	192.168.31.80	00-07-05-00-06-28	0xA22A	0x11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
pfs4-p23-cbar	192.168.31.84	00-07-05-00-06-24	0xA22A	0x11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
pfs4-p1-mass	192.168.31.101	00-07-05-75-c8-69	0xA43B	0x11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
pfs3-p04-tmt	192.168.31.62	00-07-05-32-ac-41	0xA3FF	0x11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
phxsw-p06-cbar	192.168.31.90	00-07-05-00-06-30	0xA22A	0x11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
pfs2-p22-tmt	192.168.31.56	00-07-05-32-ac-78	0xA3FF	0x11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
phxsw-p02-tmt	192.168.31.32	00-07-05-32-ac-48	0xA3FF	0x11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
pfs2-p04-tmt	192.168.31.38	00-07-05-32-ac-64	0xA3FF	0x11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
pfs2-p14-tmt	192.168.31.48	00-07-05-32-ac-51	0xA3FF	0x11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
pfs3-p08-tmt	192.168.31.66	00-07-05-32-ac-92	0xA3FF	0x11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
pfs2-p05-tmt	192.168.31.39	00-07-05-32-ac-5c	0xA3FF	0x11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
pfs2-p18-tmt	192.168.31.52	00-07-05-32-ac-63	0xA3FF	0x11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Scanned field devices are displayed with their Station Name, IP address, MAC Address, Device and Vendor ID.

3.2.1.2 Station Name / IP Address Configuration






- Station name and IP address can be updated by clicking on the field and then on validating by clicking on the "Set" Checkbox.

Station Name	IP Address	MAC Address	Device ID	Vendor ID	Signal	Reset	Set
pfs3-p04-tmt	192.168.31.62	00-07-05-32-ac-41	0xA3FF	0x11	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
phxsw-p06-cbar	192.168.31.90	00-07-05-00-06-30	0xA22A	0x11	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
pfs2-p22-tmt	192.168.31.56	00-07-05-32-ac-78	0xA3FF	0x11	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
phxsw-p02-tmt	192.168.31.32	00-07-05-32-ac-48	0xA3FF	0x11	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
pfs2-p04-tmt	192.168.31.38	00-07-05-32-ac-64	0xA3FF	0x11	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

3.2.1.3 Station Name / IP Address Reset


Both parameters "Station Name" and "IP Address" can be reset to factory.

- Click on the arrow symbol of the Reset column to select the device settings to reset:

Station Name	IP Address	MAC Address	Device ID	Vendor ID	Signal	Reset	Set
pfs3-p04-tmt	192.168.31.62	00-07-05-32-ac-41	0xA3FF	0x11	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
phxsw-p06-cbar	192.168.31.90	00-07-05-00-06-30	0xA22A	0x11	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
pfs2-p22-tmt	192.168.31.56	00-07-05-32-ac-78	0xA3FF	0x11	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
phxsw-p02-tmt	192.168.31.32	00-07-05-32-ac-48	0xA3FF	0x11	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
pfs2-p04-tmt	192.168.31.38	00-07-05-32-ac-64	0xA3FF	0x11	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

- Confirm by clicking on the button "Yes":

PROFINET Device Configuration



The Station Name or IP Address will be reset to factory. Please ensure the device is not in cyclic communication. If device is in cyclic communication the operation might fail. Do you want to proceed?

Yes

No




- Click on the button "OK":

PROFINET Device Configuration

Operation successful for MacAddress 00-07-05-32-ac-78

OK

- This deletes the Station Name and set IP address to 0.0.0.0:

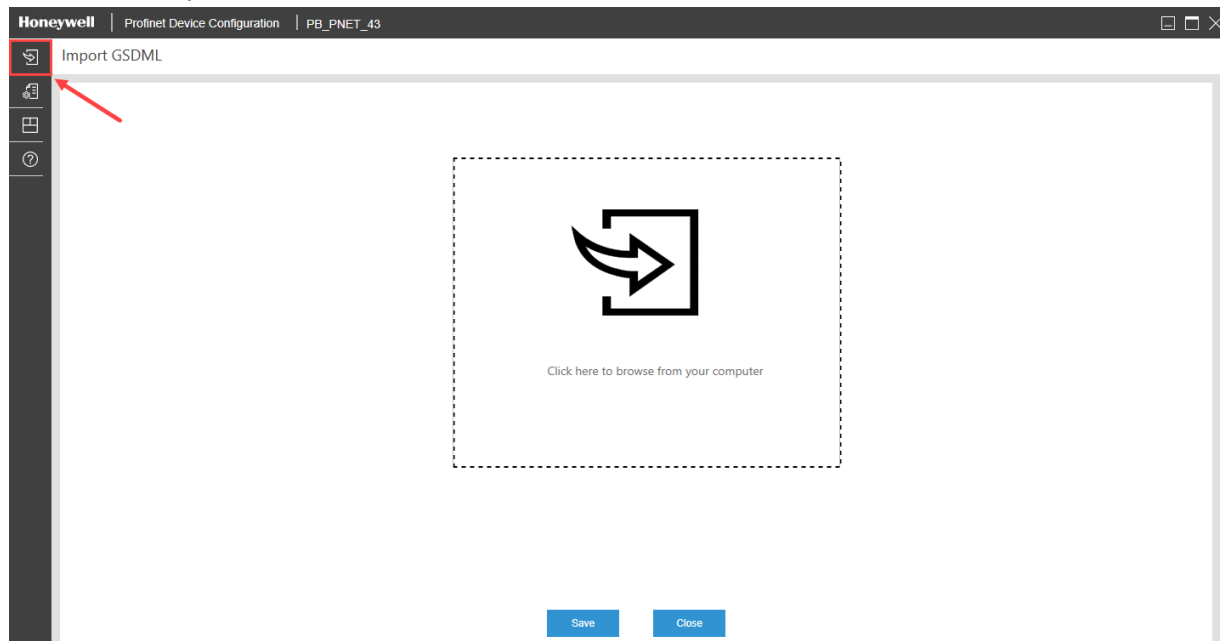
Station Name	IP Address	MAC Address	Device ID	Vendor ID	Signal	Reset	Set
pfs3-p05-tmt	192.168.31.39	00-07-05-32-ac-5c	0xA3FF	0x11	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
	0.0.0.0	00-07-05-32-ac-78	0xA3FF	0x11	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
pfs4-p03-tmt-prof	192.168.31.33	00-07-05-32-ac-44	0xA3FF	0x11	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

- Tip: If devices are used for replacing a failed device, then having an empty station name and an IP Address of 0.0.0.0 is required for the system to start loading of the Profile configuration of the failed device to the device that is replacing it. So it is good practice to store spare device with this resetted station and IP information.

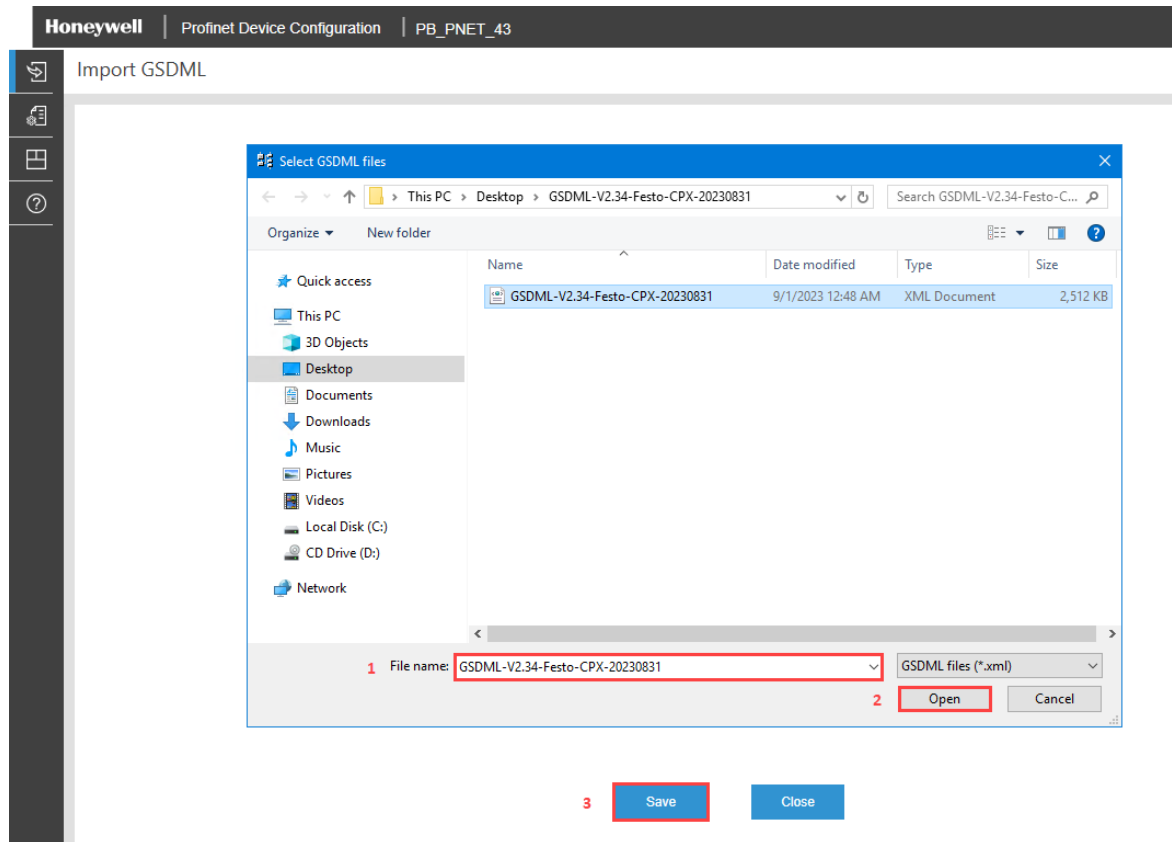
3.2.2 Field Device Library

Following example shows the workflow to import a GSDML file of a FESTO Valve island.

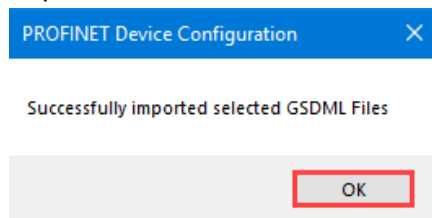
- Open the tool Profinet Device Configuration. Please refer to part 3.2.1.1 to proceed.
- Click on the top left button:



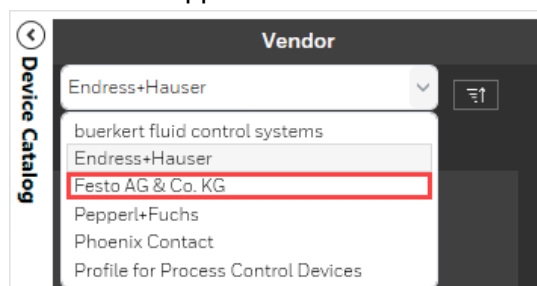
- Select the GSDML file to import and click on the button "Save":



- Import was successful. Click on the button "OK":



- New Vendor appears in the Vendor List:



- All required GSDML files for switches and field devices used in the project have to be imported in this way.

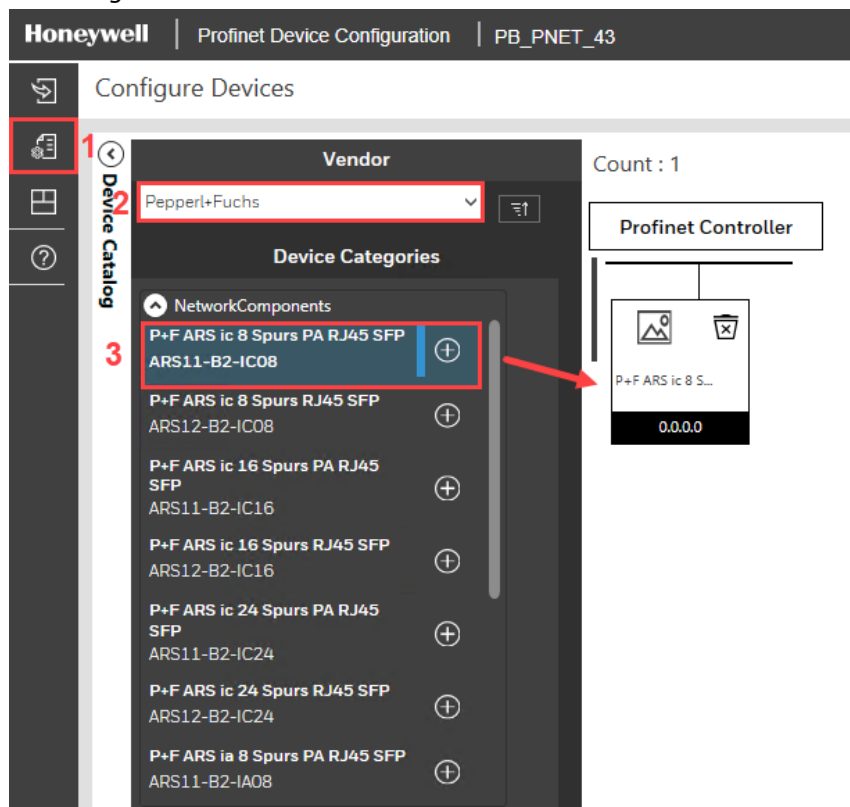
- Tip: When using the generic PA- profiles as provided by the PNO (PROFIBUS Nutzersorganisation), device exchange in case of failure allows to use any device as long as it supports the same PA-Profile definition and measurement range.

3.2.3 Ethernet-APL Switch Integration

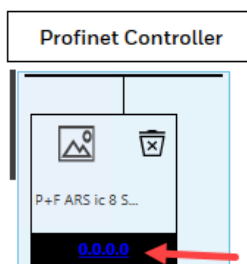
This chapter describes the integration of the Ethernet-APL switches.

3.2.3.1 Pepperl+Fuchs Switch

- From the "Profinet Device Configuration" wizard, click on the menu "Configure Device", select the Pepperl+Fuchs Vendor from the Vendor list and then the network component. In this example, we are using the P+F switch "ARS11-B2-IC08":



- Click on the IP address 0.0.0.0:



- Configure the switch Station name, Ips, MRP role and ports according to the network:

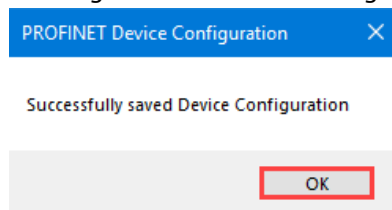
The screenshot shows the 'Profinet Device Configuration' window for device 'pfs4'. The configuration fields are as follows:

Field	Value
Station Name	pfs4
Station IP Address	192 . 168 . 31 . 244
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	0 . 0 . 0 . 0
Ignore IP Configuration	<input type="checkbox"/>
Vendor Id	0x005D
GUID	5abc5733-33a4-407c-9068-129f4825d3ef
Station Scan Time (ms)	32
Watch Dog Factor	6
Watch Dog Time (ms)	192
MRP Role	Client
MRP RingPort1	32769
MRP RingPort2	32770
Rule File	

Buttons at the bottom: 'Configure Module', 'Save', 'Close'.

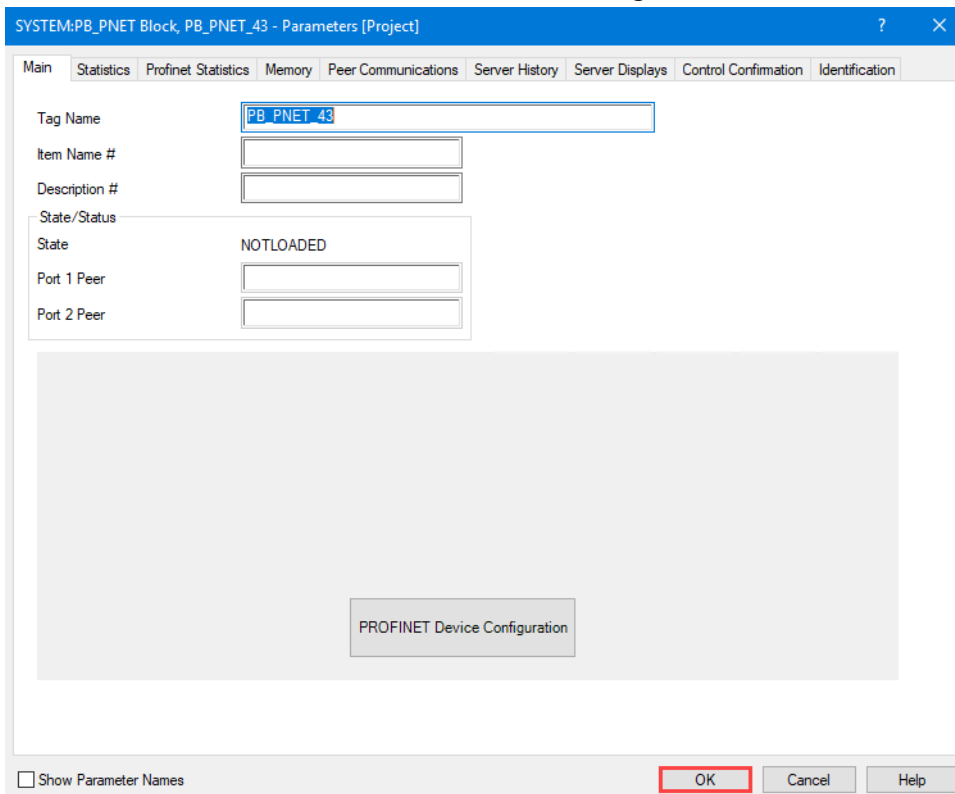
In this example, the switch is configured as a Client because the Ring manager is the EIM module.

- Save and close the Profinet Device Configuration wizard.
- Message indicates that configuration has been saved:



- Click on the button "OK" and then on the button "Close".

- Click on the button "OK" to confirm the saved configuration:



SYSTEM:PB_PNET Block, PB_PNET_43 - Parameters [Project]

Main Statistics Profinet Statistics Memory Peer Communications Server History Server Displays Control Confirmation Identification

Tag Name

Item Name #

Description #

State/Status

State NOTLOADED

Port 1 Peer

Port 2 Peer

PROFINET Device Configuration

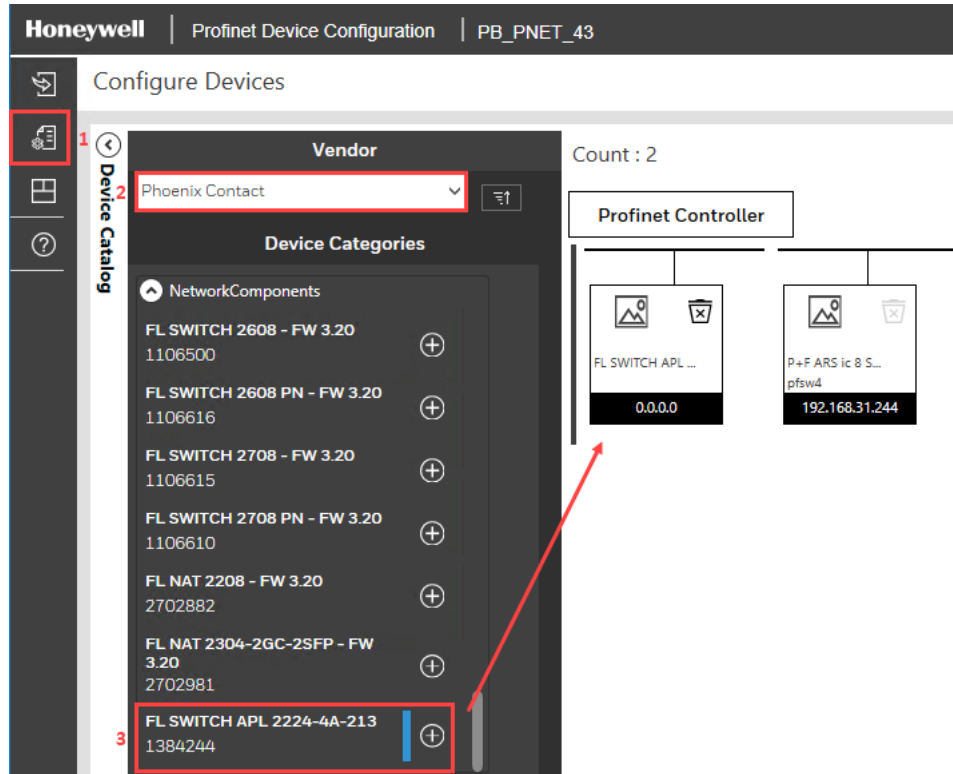
☐ Show Parameter Names

OK Cancel Help

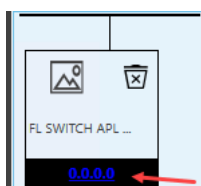
- Download the configuration of the Ethernet-APL switch.
Please refer to part 3.4.2 to proceed.

3.2.3.2 Phoenix Contact Switch

- From the "Profinet Device Configuration" wizard, click on the menu "Configure Device", select the Phoenix Contact Vendor from the Vendor list and then the network component. In this example, we are using the Phoenix Contact switch "FL SWITCH APL 2224-4A-213-PA":



- Click on the IP address 0.0.0.0:

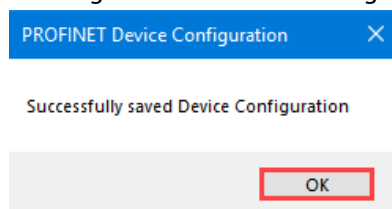


- Configure the switch Station name, IPs and MRP role according to the network:

In this example, the switch is configured as a Client because the Ring manager is the EIM module. MRP ring is built between Port 1 and Port 2. MRP RingPort numbers can be identified with gsdml file:

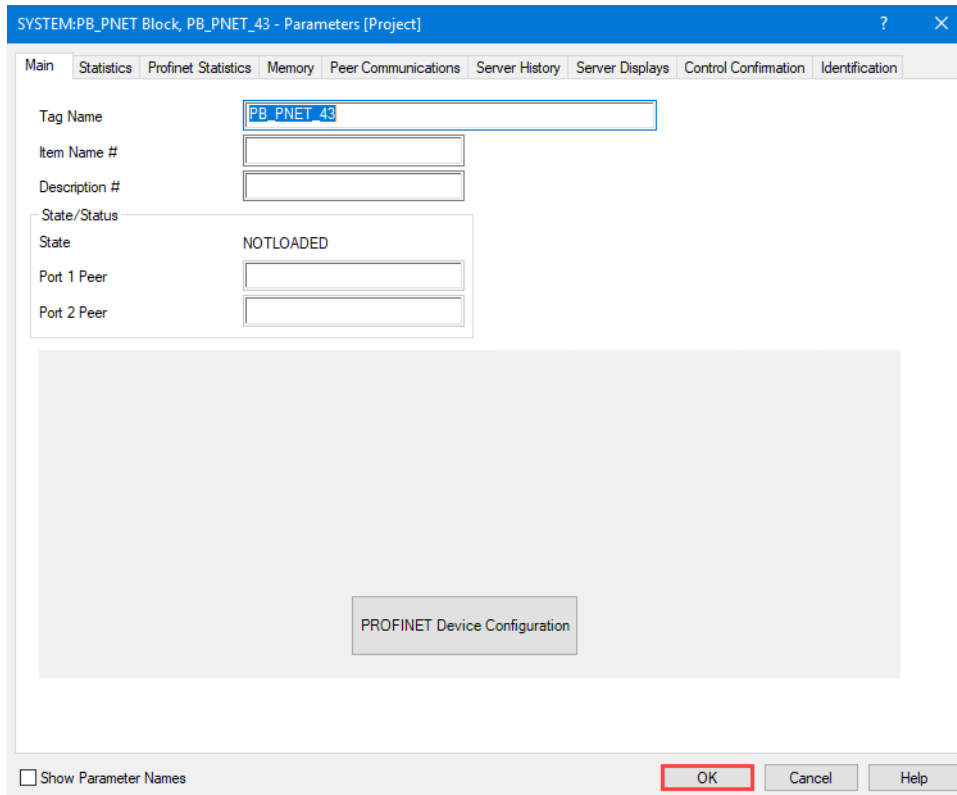
```
- <SubslotList>
  <SubslotItem SubslotNumber="32768" TextId="txtId_Interface0" />
  <SubslotItem SubslotNumber="32769" TextId="txtId_Port1" />
  <SubslotItem SubslotNumber="32770" TextId="txtId_Port2" />
  <SubslotItem SubslotNumber="32771" TextId="txtId_Port3" />
  <SubslotItem SubslotNumber="32772" TextId="txtId_Port4" />
```

- Save and close the Profinet Device Configuration wizard.
- Message indicates that configuration has been saved:



- Click on the button "OK" and then on the button "Close".

- Click on the button "OK" to confirm the saved configuration:



SYSTEM:PB_PNET Block, PB_PNET_43 - Parameters [Project]

Main Statistics Profinet Statistics Memory Peer Communications Server History Server Displays Control Confirmation Identification

Tag Name

Item Name #

Description #

State/Status

State NOTLOADED

Port 1 Peer

Port 2 Peer

PROFINET Device Configuration

☐ Show Parameter Names

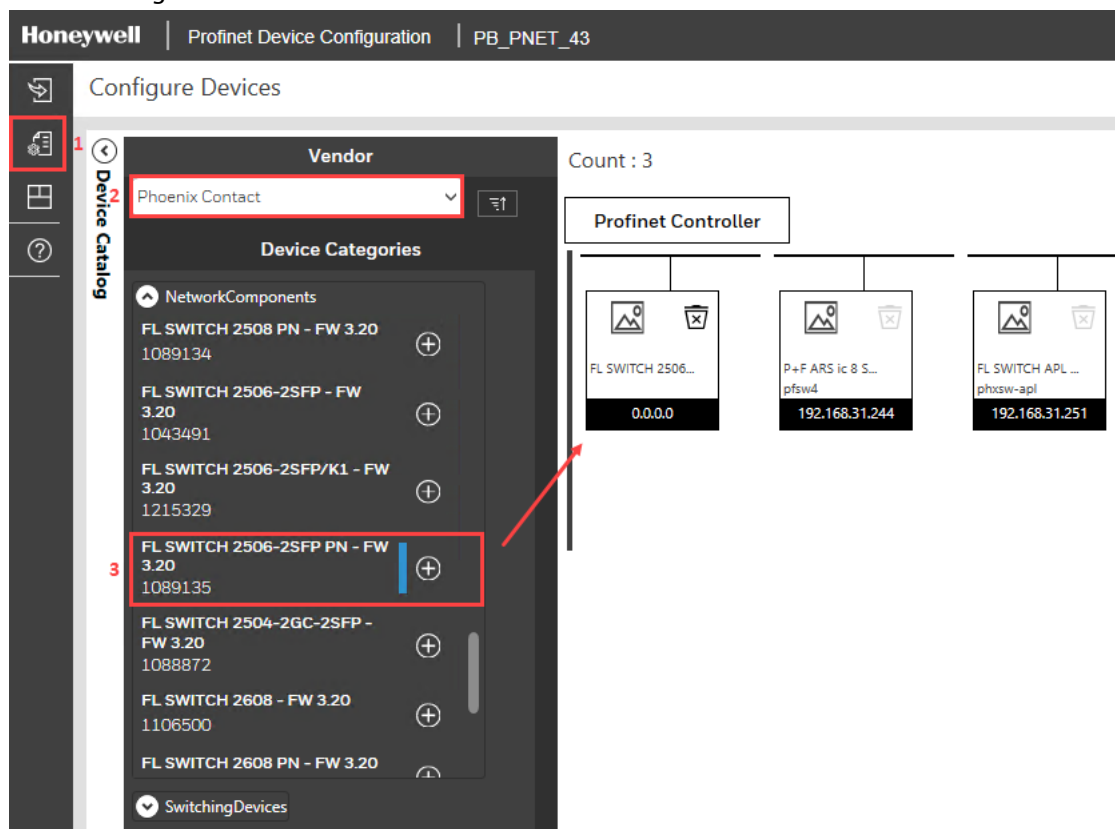
- Download the configuration of the Ethernet-APL switch.
Please refer to part 3.4.2 to proceed.

Please refer to Phoenix Contact document "Configuration of the FL SWITCH 2000 and NAT 2000 product family" for further details.

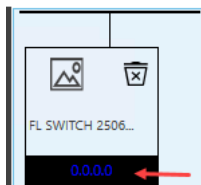
3.2.4 PROFINET Switch

Another switch is used in the topology as entry for Plant Asset Management. This Phoenix Contact Industrial Ethernet Switch can also be configured via gsdml in ControlBuilder.

- From the "Profinet Device Configuration" wizard, click on the menu "Configure Device", select the Phoenix Contact Vendor from the Vendor list and then the network component. In this example, we are using the Phoenix Contact switch "FL SWITCH 2506-2SFP PN -FW 3.20":



- Click on the IP address 0.0.0.0:

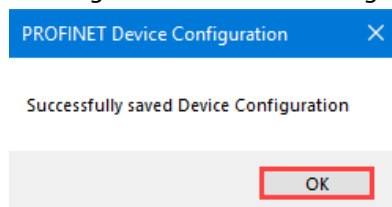


- Configure the switch Station name, Ips, MRP role and ports according to the network:

In this example, the switch is configured as a Client because the Ring manager is the EIM module. MRP ring is built between Port 3 and Port 4. MRP RingPort numbers can be identified with gsdml file:

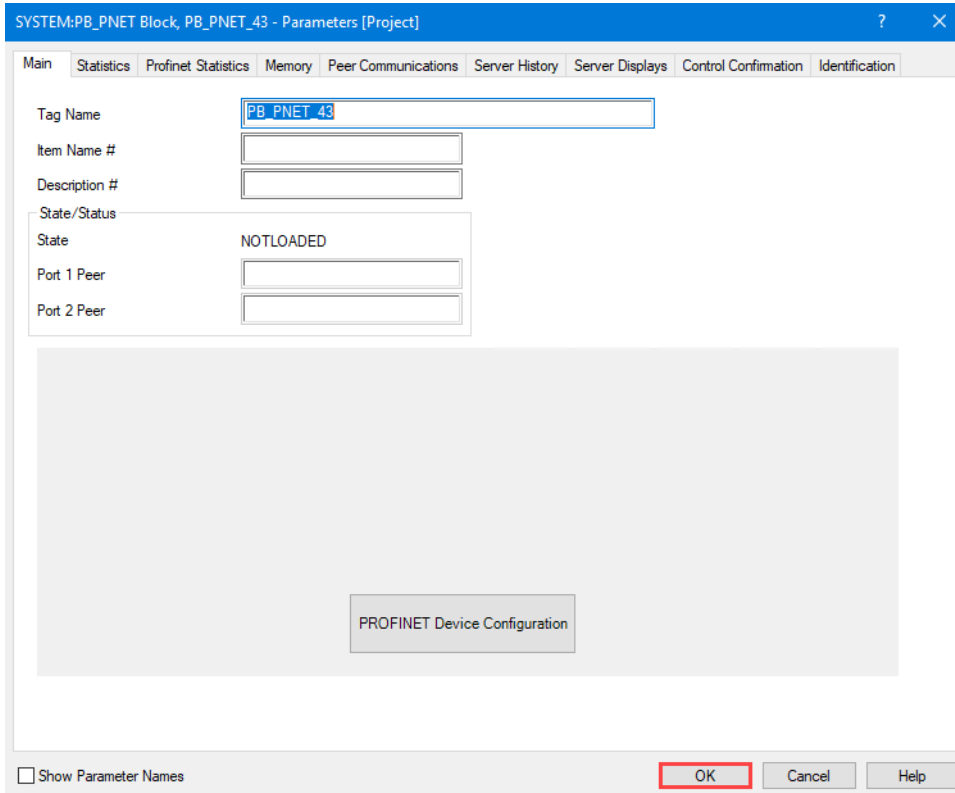
```
- <SubslotList>
  <SubslotItem SubslotNumber="32768" TextId="txtId_Interface0" />
  <SubslotItem SubslotNumber="32769" TextId="txtId_Port1" />
  <SubslotItem SubslotNumber="32770" TextId="txtId_Port2" />
  <SubslotItem SubslotNumber="32771" TextId="txtId_Port3" />
  <SubslotItem SubslotNumber="32772" TextId="txtId_Port4" />
  <SubslotItem SubslotNumber="32773" TextId="txtId_Port5" />
  <SubslotItem SubslotNumber="32774" TextId="txtId_Port6" />
  <SubslotItem SubslotNumber="32775" TextId="txtId_Port7" />
  <SubslotItem SubslotNumber="32776" TextId="txtId_Port8" />
```

- Save and close the Profinet Device Configuration wizard.
- Message indicates that configuration has been saved:



- Click on the button "OK" and then on the button "Close".

- Click on the button "OK" to confirm the saved configuration:



SYSTEM:PB_PNET Block, PB_PNET_43 - Parameters [Project]

Main Statistics Profinet Statistics Memory Peer Communications Server History Server Displays Control Confirmation Identification

Tag Name

Item Name #

Description #

State/Status

State NOTLOADED

Port 1 Peer

Port 2 Peer

PROFINET Device Configuration

☐ Show Parameter Names

OK Cancel Help

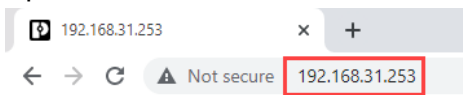
- Download the configuration of the Ethernet-APL switch.
Please refer to part 3.4.2 to proceed.

Please refer to Phoenix Contact document "Configuration of the FL SWITCH 2000 and NAT 2000 product family" for further details.

Remark

Switch can be configured via Web server as well.

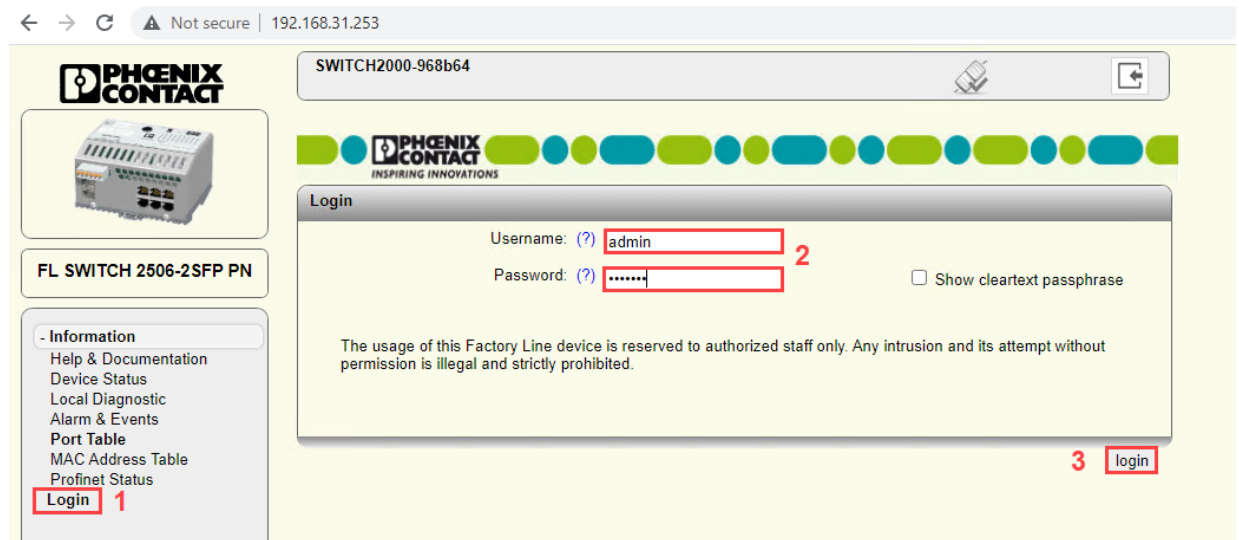
- Open a web browser and enter the switch IP address:



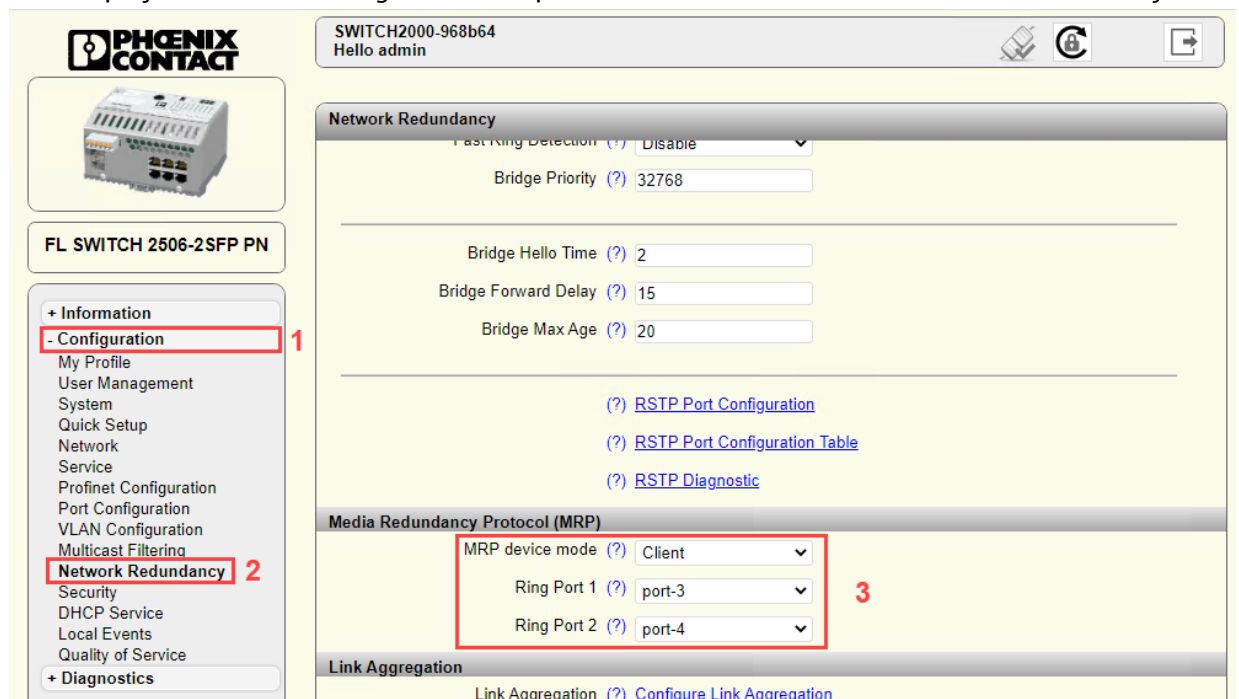
192.168.31.253

Not secure 192.168.31.253

- Login with admin rights:



- This displays the menu "Configuration". Expand this menu and click on "Network Redundancy":



In this example, the MRP device mode is client with Port-3 and Port-4.

Please refer to Phoenix Contact document "Configuration of the FL SWITCH 2000 and NAT 2000 product family" for further details.

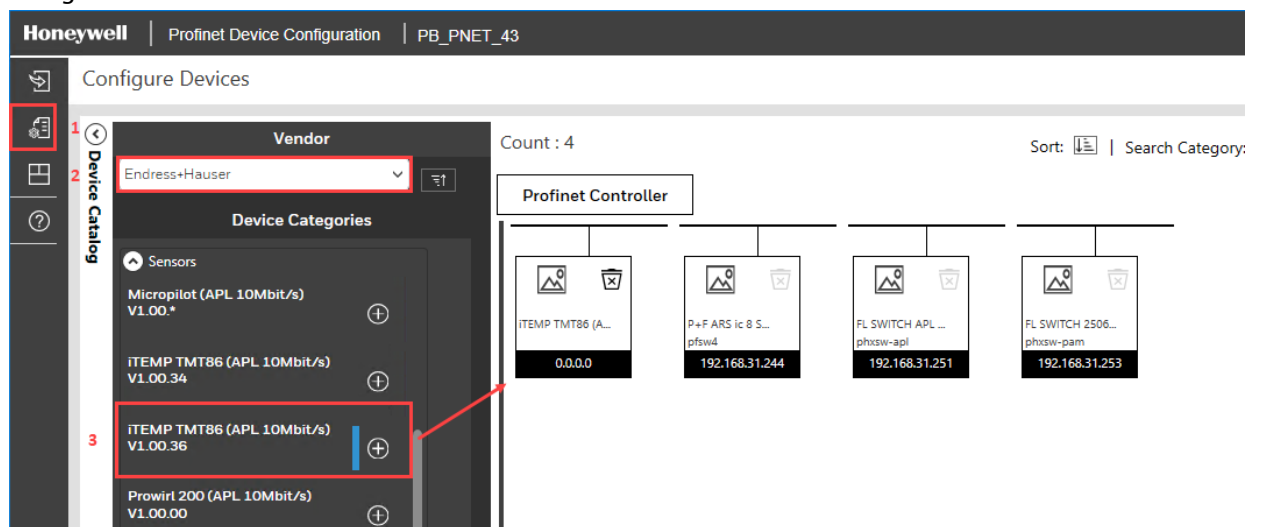
3.3 Field Device Configuration

This chapter describes the configuration of PROFINET field devices.

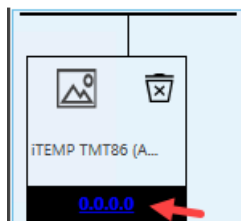
3.3.1 PROFINET-APL Field Device Integration with Vendor Specific GSDML

This chapter describes the integration of a PROFINET-APL TMT86 field device with Vendor Specific driver.

- From the "Profinet Device Configuration" wizard, click on the menu "Configure Device", select the Endress+Hauser Vendor from the Vendor list and then the TMT86 sensor. In this example, we are using the TMT86 V1.00.36:

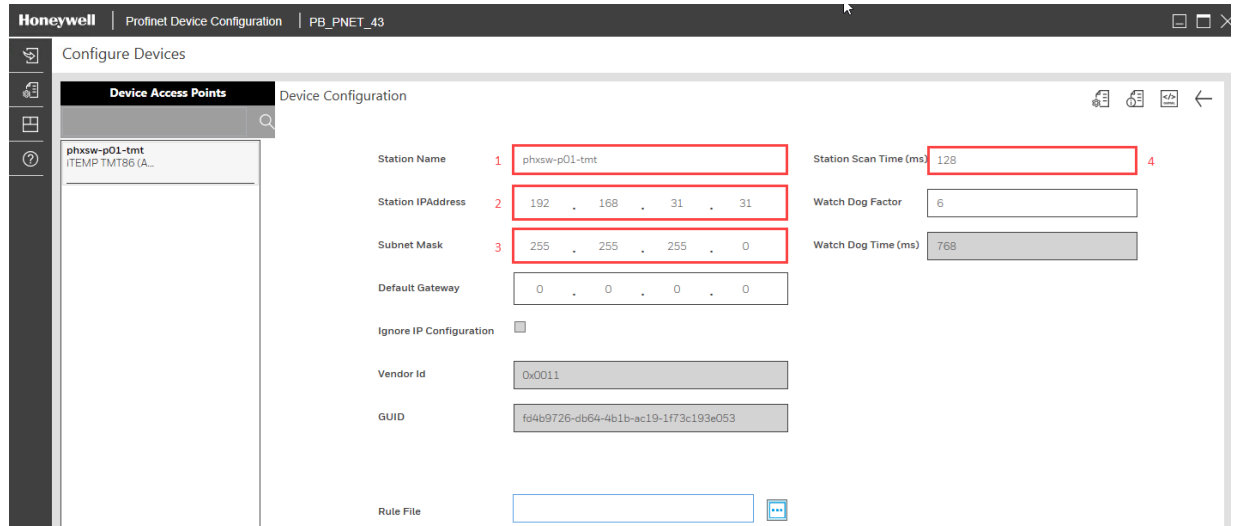


- Click on the IP address 0.0.0.0:



3.3.1.1 Basic Settings

- Configure the TMT86 Station name, IPs and Station Scan Time:



The screenshot shows the 'Configure Devices' window for 'PB_PNET_43'. On the left, a list of 'Device Access Points' includes 'phxsw-p01-tmt' and 'ITEMP TMT86 (A...'. The main area is titled 'Device Configuration'. It contains several input fields: 'Station Name' (phxsw-p01-tmt), 'Station IP Address' (192.168.31.31), 'Subnet Mask' (255.255.255.0), 'Default Gateway' (0.0.0.0), 'Ignore IP Configuration' (unchecked), 'Vendor Id' (0x0011), 'GUID' (fd4b9726-db64-4b1b-ac19-1f73c193e053), and 'Rule File' (empty). On the right, 'Station Scan Time (ms)' is set to 128, 'Watch Dog Factor' is 6, and 'Watch Dog Time (ms)' is 768. Red boxes highlight the Station Name, IP Address, Subnet Mask, and Station Scan Time fields.


In this example, Station Scan Time is set to 128ms which is the minimal value for this Endress+Hauser temperature device. This value is not automatically set from the system and must be updated manually according to the device GSDML file.

- On the top right side, click on the GSDML button to display the GSDML file:



The screenshot shows the same 'Configure Devices' window. In the top right corner, there is a toolbar with icons for saving, loading, and a GSDML button (represented by a document icon with a red 'X'). The GSDML button is highlighted with a red box.

- Then look for the parameter "MinDeviceInterval":



The screenshot shows the 'GSDML Information' window. It displays the GSDML file path: '\\EXP-SRVR\GSDMLCatalog\GSDMLFiles\GSDML-V2.43-EH-ITEMPTMT86-20230428.xml'. Below the path, the GSDML file content is shown in XML format. The 'MinDeviceInterval' parameter is highlighted in red: `MinDeviceInterval="4096"`. Other parameters include 'ModuleIdentNumber', 'DNS_CompatibleName', 'MultipleWriteSupported', 'MaxSupportedRecordSize', 'FixedInSlots', 'ObjectUUID_LocalIndex', 'RequiredSchemaVersion', 'CheckDeviceID_Allowed', 'RemoteApplicationTimeout', 'NameOfStationNotTransferable', 'SharedDeviceSupported', 'SharedInputSupported', 'DeviceAccessSupported', 'NumberOfDeviceAccessAR', 'PrmBeginPrmEndSequenceSupported', 'CIR_Supported', 'LLDP_NoD_Supported', 'ResetToFactoryModes', and 'PowerOnToCommReady'.

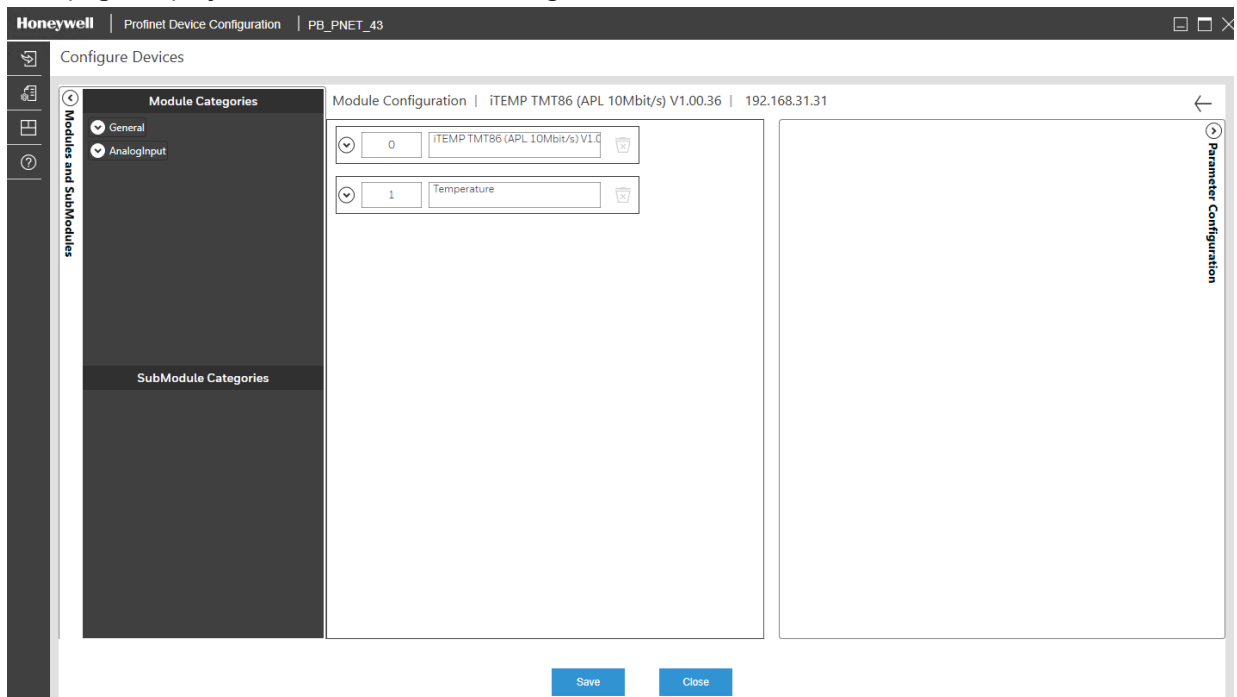
The GSDML file parameter "MinDeviceInterval" has the value "4096". This corresponds to the fastest cyclic data exchange time (every $4096 \times 31.25\mu s = 128\text{ ms}$).

3.3.1.2 Module Configuration

- Click on the button "Configure Module":

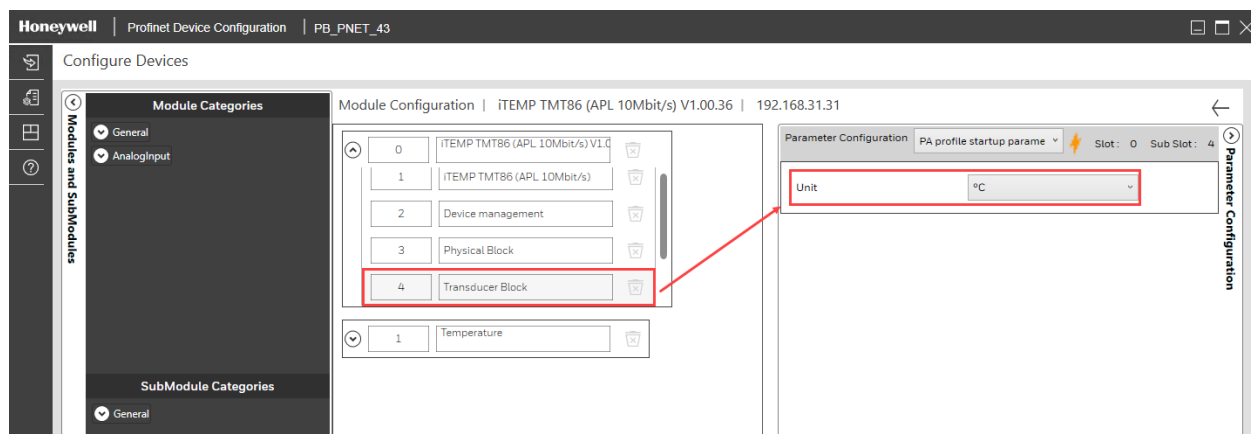
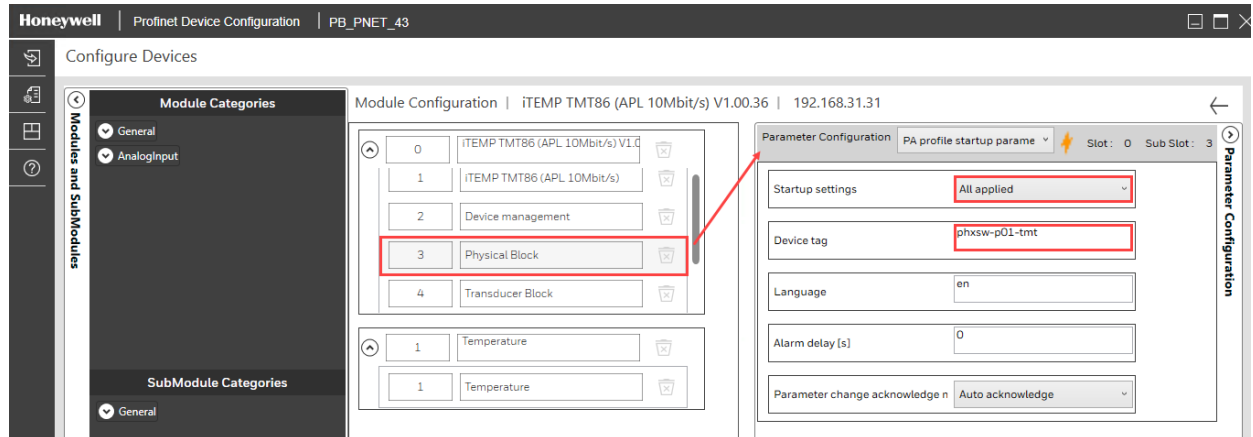


- This page displays the default module configuration:

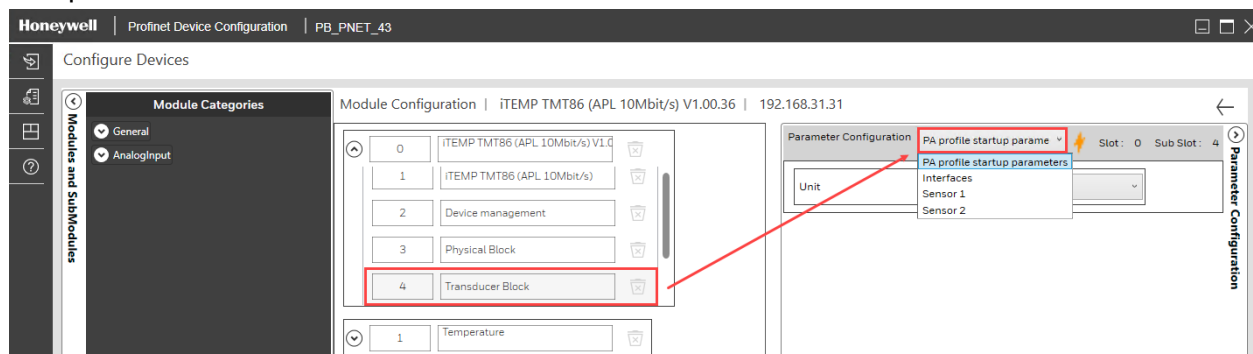


Module Parameters

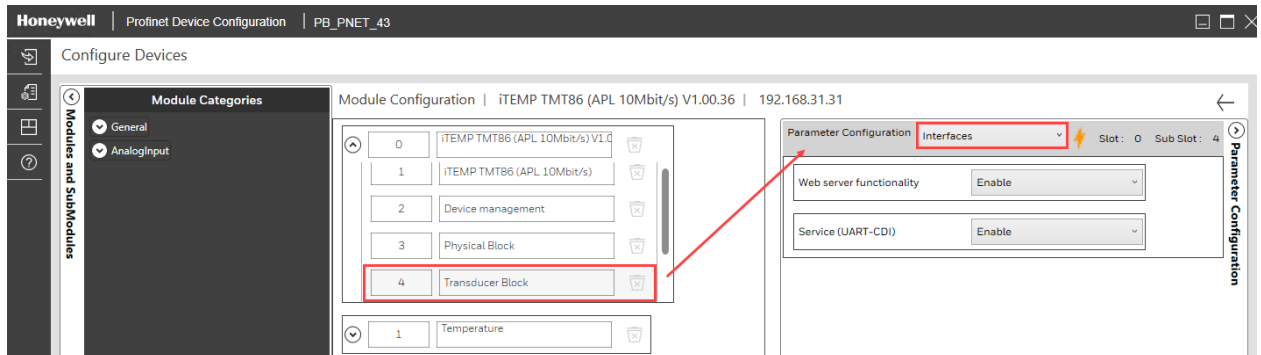
- In this example, the Physical Block has been selected, default "Device tag" has been configured and "Startup settings" have been set to "All Applied", that means all configured parameters will be written in the device after each new connection.



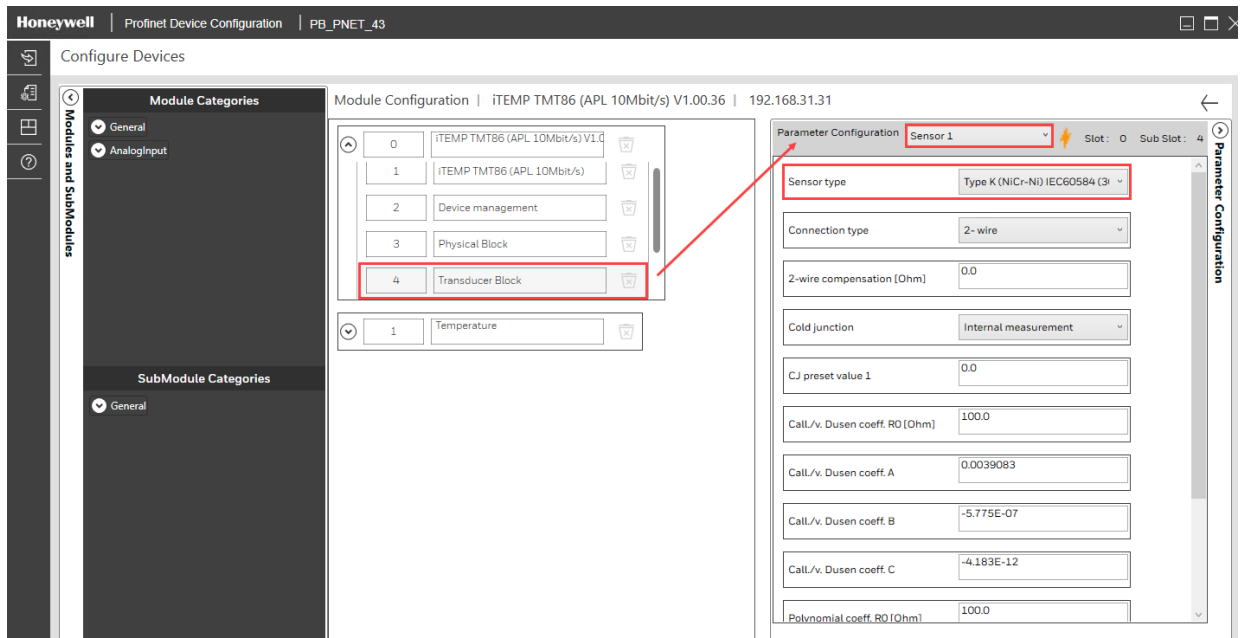
- Other parameters may be contained in other submodules according to the device. Select for example the Transducer Block. In the Device Parameter Configuration list of the TMT86, there are four possible choices:



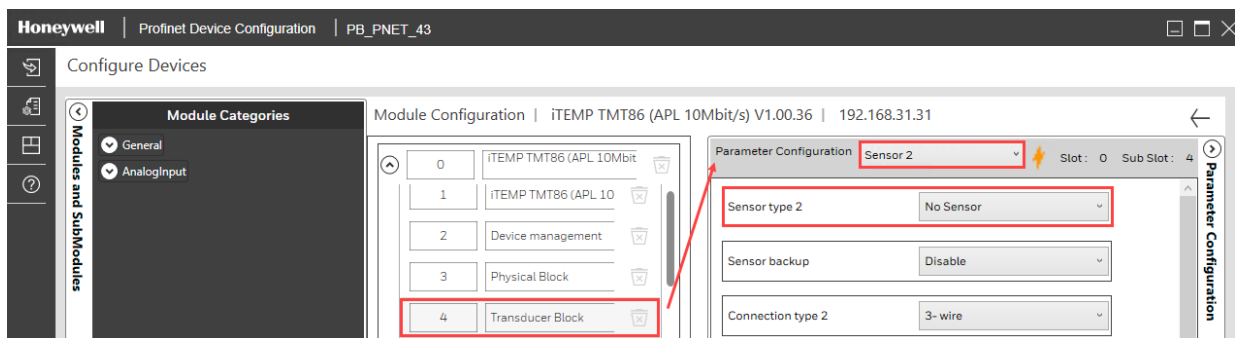
For example, Parameter Configuration “Interfaces” allows the user to enable/disable Web server and Service Port connection:



For example, Parameter Configuration “Sensor1” allows the user to configure the TMT sensor type:

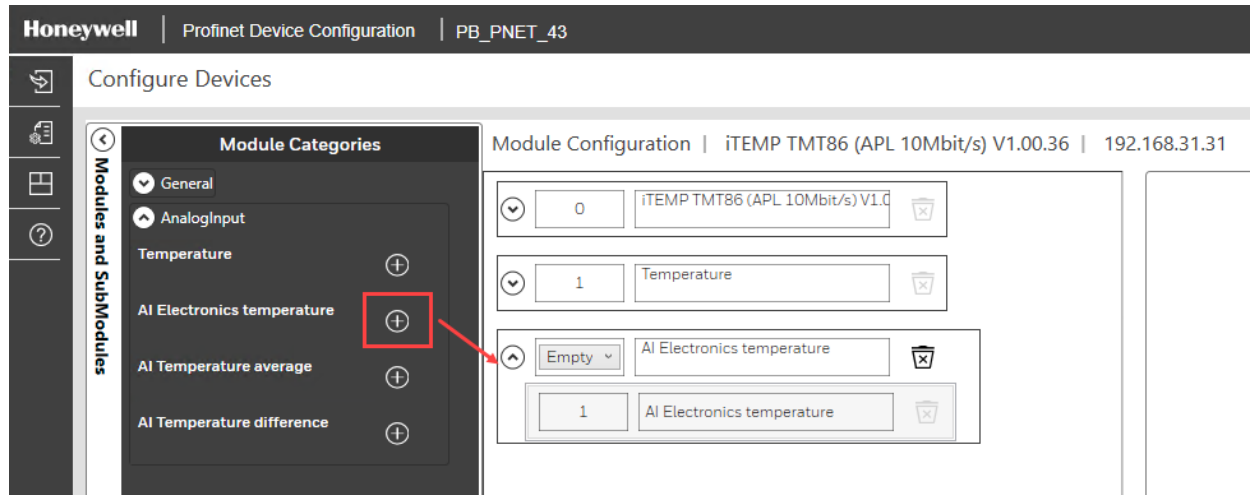


No sensor are connected on “Sensor2”:



New Module

- Additional modules can be added according to the device. Add for example the Analog Input module "AI Electronics temperature" module:



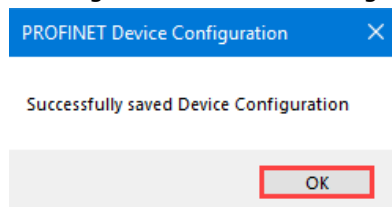
- Click on the slot list and choose the proposed slot:



- Save and close the "Profinet Device Configuration" wizard:



- Message indicates that configuration has been saved:

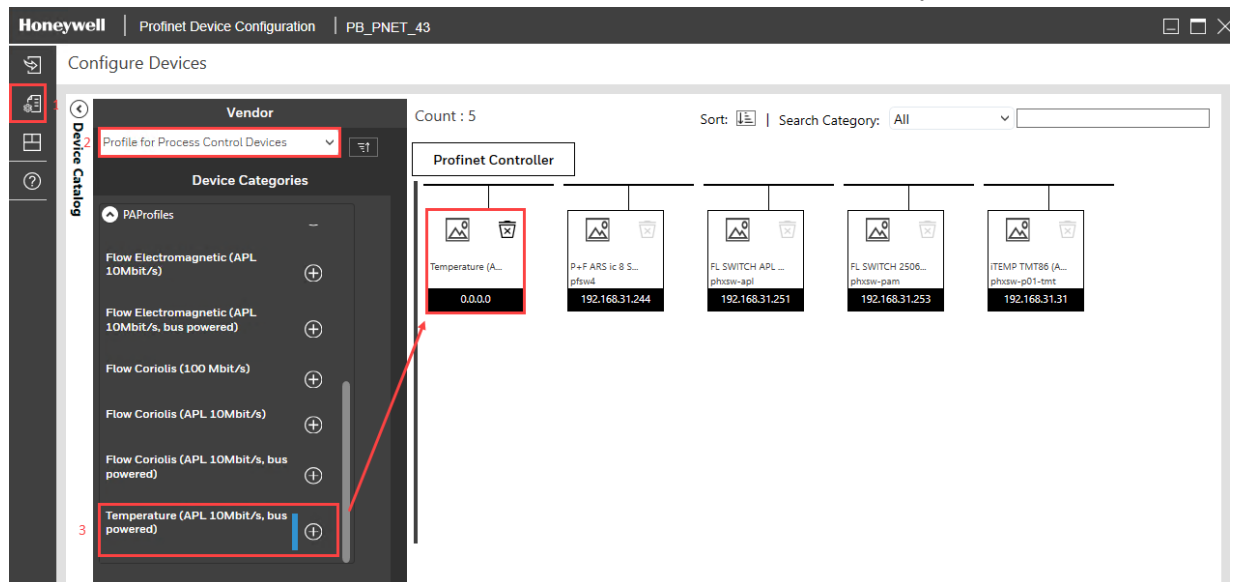


- Click on the button "OK" and then on the button "Close".
- Download the configuration of the Ethernet-APL switch. Please refer to part 3.4.2 to proceed.

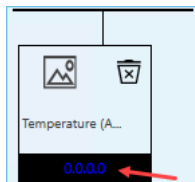
3.3.2 PROFINET-APL Field Device Integration with Profile GSDML

This chapter describes the integration of a PROFINET-APL TMT86 field device with Profile driver.

- From the "Profinet Device Configuration" wizard, click on the menu "Configure Device", select the Profile for Process Control Devices from the Vendor list and then the Temperature PA Profile:

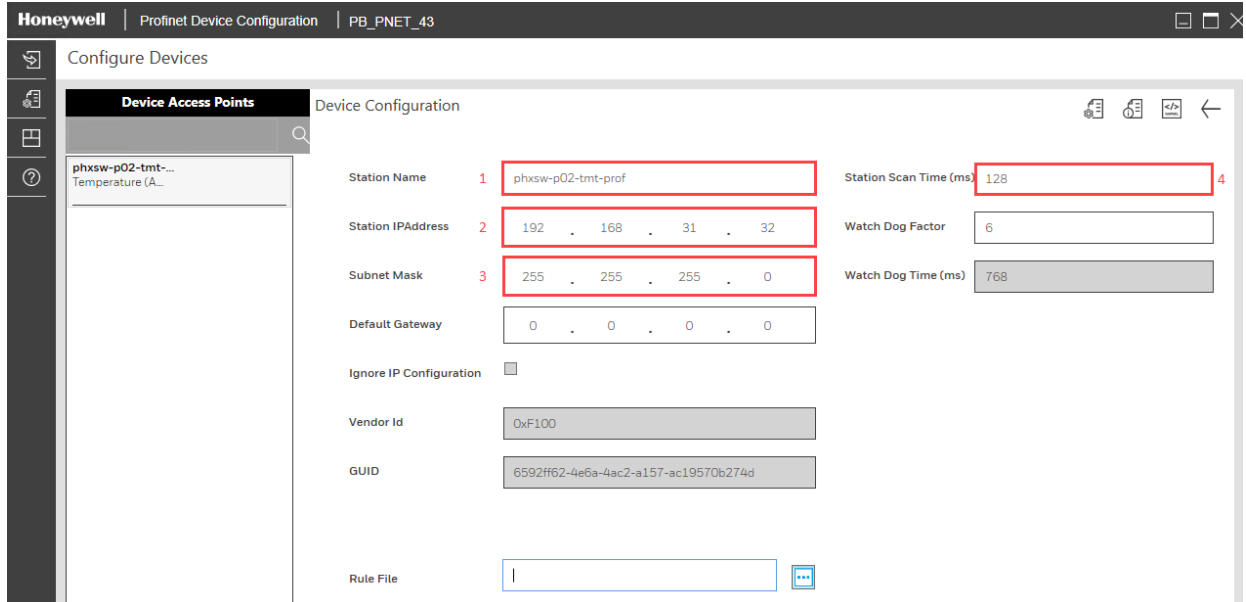


- Click on the IP address 0.0.0.0:



3.3.2.1 Basic Settings

- Configure the TMT86 Station name, IPs and Station Scan Time:

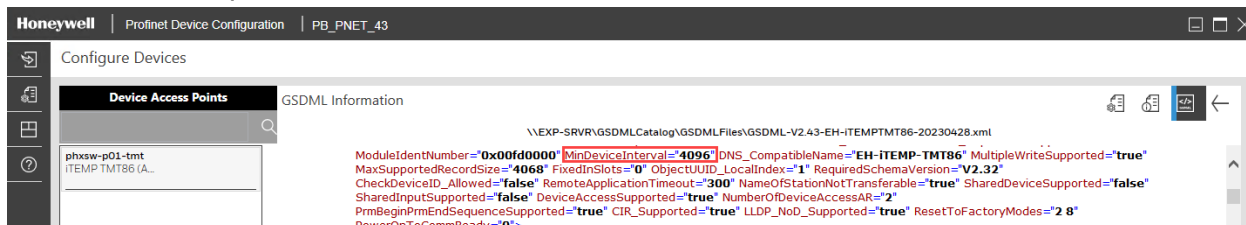


In this example, Station Scan Time is set to 128ms which is the minimal value for this Endress+Hauser temperature device. This value is not automatically set from the system and must be updated manually according to the device GSDML file.

- On the top right side, click on the GSDML button to display the GSDML file:



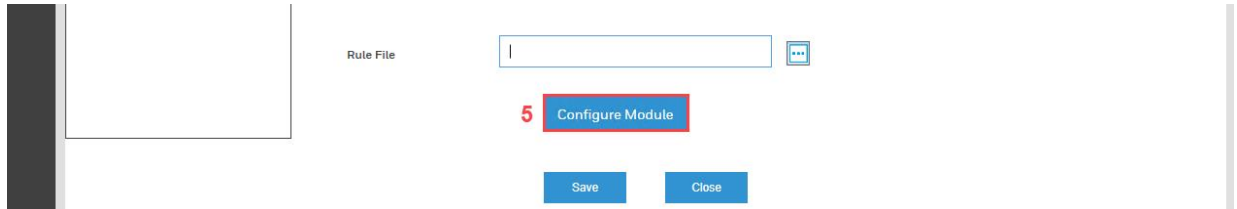
- Then look for the parameter "MinDeviceInterval":



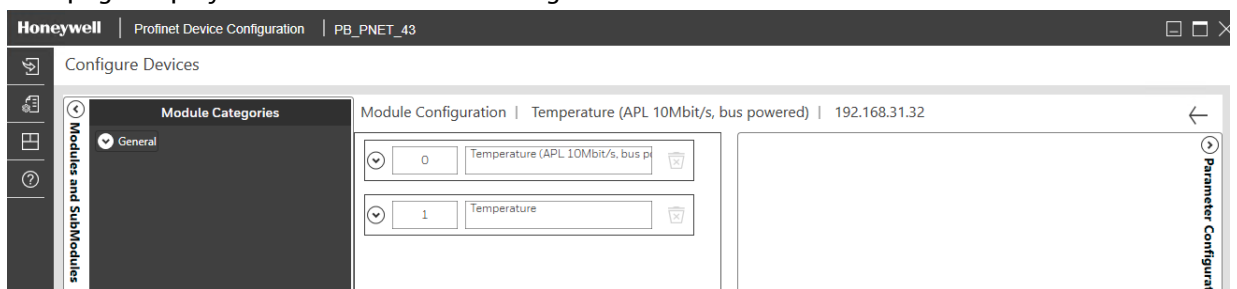
The GSDML file parameter "MinDeviceInterval" has the value "4096". This corresponds to the fastest cyclic data exchange time (every $4096 \times 31.25\mu s = 128\text{ ms}$).

3.3.2.2 Module Configuration

- Click on the button "Configure Module":

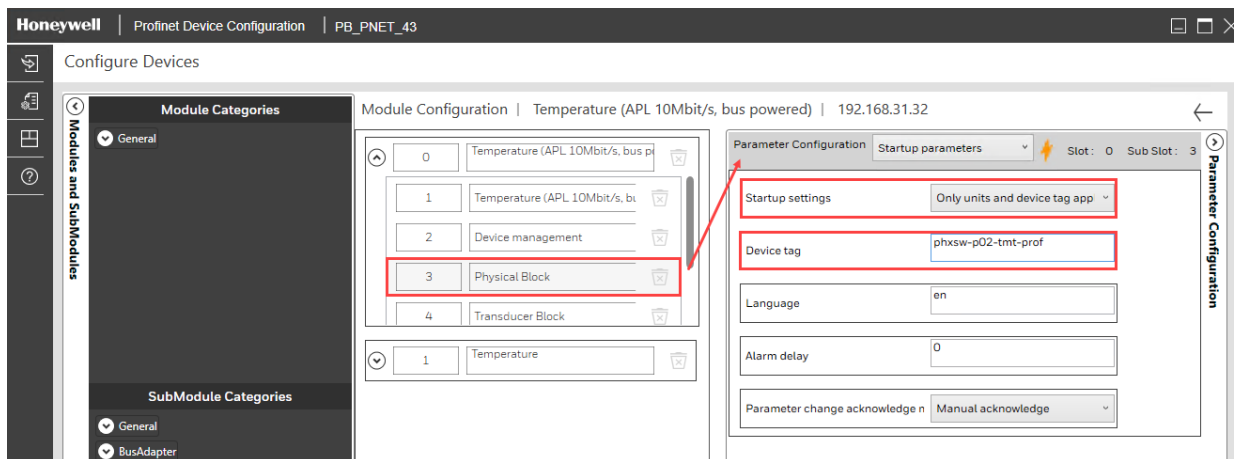


- This page displays the default module configuration:

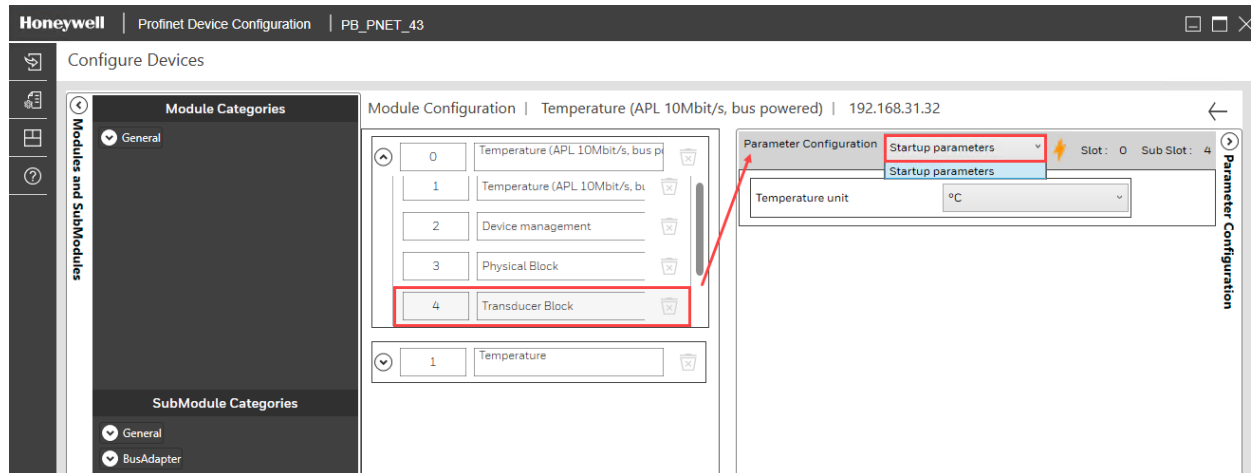


Module Parameters

- In this example, the Physical Block has been selected, default "Device tag" has been configured and "Startup settings" have been set to "All Applied", that means all configured parameters will be written in the device after each new connection.



- Transducer Block contains only Temperature unit parameter:



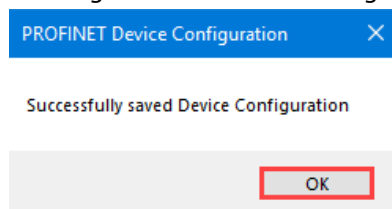
Remarks

- Sensor configuration shall be done via Webserver or Plant Asset Management.
- No additional module can be added as done with Device Vendor Specific GSDML.

- Save and close the "Profinet Device Configuration" wizard:



- Message indicates that configuration has been saved:



- Click on the button "OK" and then on the button "Close".
- Download the configuration of the Ethernet-APL switch.
Please refer to part 3.4.2 to proceed.

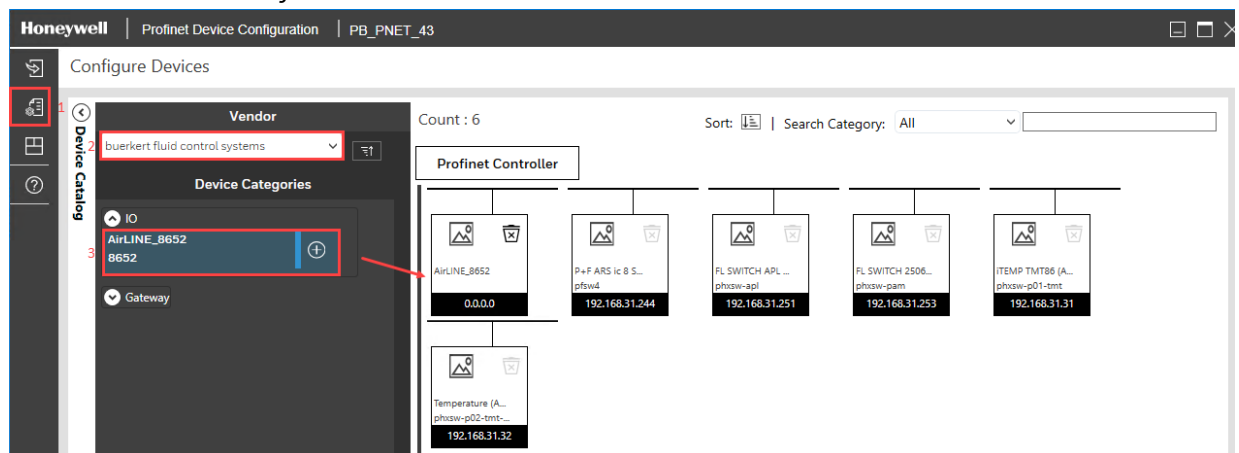
3.3.3 PROFINET Actuators Integration

3.3.3.1 Bürkert AirLINE 8652 Valve Island

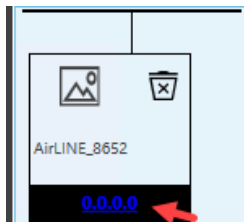
3.3.3.1.1 Basic Settings

This chapter describes the integration of a Bürkert Valve island AirLINE 8652.

- From the "Profinet Device Configuration" wizard, click on the menu "Configure Device", select the Bürkert fluid control systems Vendor from the Vendor list and then the "AirLINE 8652 IO":



- Click on the IP address 0.0.0.0:



- Configure the valve island Station name, IPs and MRP role according to the network:

The screenshot shows the 'Configure Devices' window for 'pnio-airline8652'. The configuration fields are as follows:

Field	Value
Station Name	pnio-airline8652
Station IP Address	192 . 168 . 31 . 212
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	0 . 0 . 0 . 0
Ignore IP Configuration	<input type="checkbox"/>
Vendor Id	0x0078
GUID	0096189d-a4a3-4eff-822d-1ed01c07041a
Station Scan Time (ms)	32
Watch Dog Factor	6
Watch Dog Time (ms)	192
MRP Role	Client
MRP RingPort1	32769
MRP RingPort2	32770

The Station Scan Time is not automatically set from the system and must be updated manually according to the device GSDML file.

- On the top right side, click on the GSDML button to display the GSDML file:

The screenshot shows the 'Configure Devices' window for 'pnio-airline8652'. The 'GSDML' button is highlighted with a red box in the top right corner.

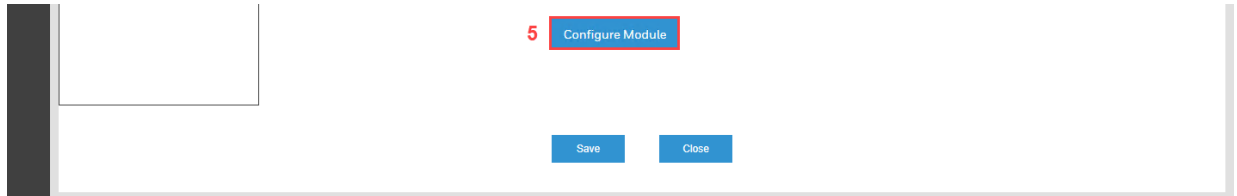
- Then look for the parameter "MinDeviceInterval":

The screenshot shows the 'GSDML Information' window for 'pnio-airline8652'. The GSDML file path is displayed as '\\EXP-SRVR\GSDMLCatalog\GSDMLFiles\GSDML-V2.42-Buerkert-AirLINE8652-20220805.xml'. The 'MinDeviceInterval' parameter is highlighted with a red box in the XML content.

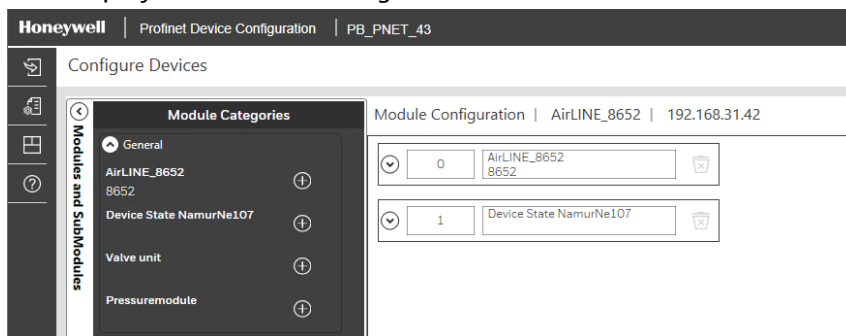
Finally, the valve island is configured as a Client because the Ring manager is the EIM module.

3.3.3.1.2 Module Configuration

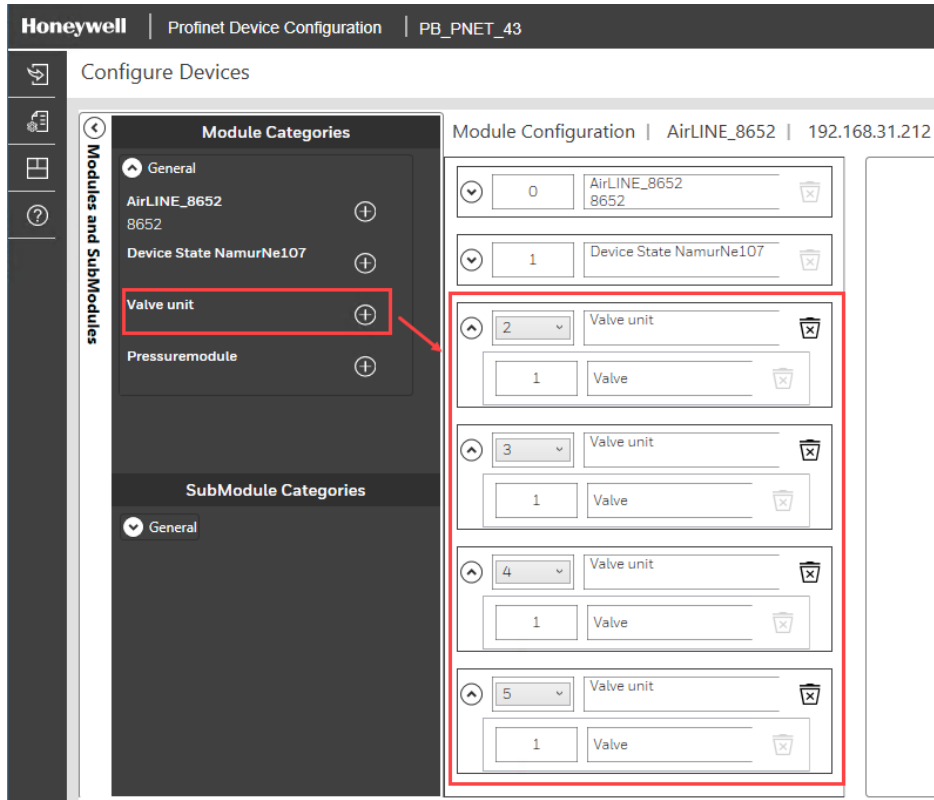
- Click on the button "Configure Module":



- This displays the default configuration:




- In this example, the Valve Island is composed of 4 valve modules:



- Specific parameters may be configured for the valve island. Check the “Parameter Configuration” list:

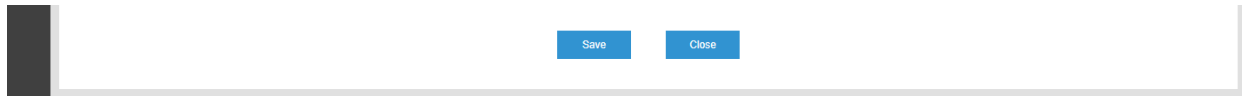
The screenshot shows the 'Parameter Configuration' window. On the left, a list of parameters is shown, with the 'Valve' parameter (ID 1) highlighted by a red box and a red arrow pointing to it. On the right, the 'Fault Action Valve' dropdown menu is open, showing a list of options. The 'Fault Action Valve' option is highlighted by a red box. The options in the dropdown menu are: Fault Action Valve, Fault Value Valve, Activate SCC Pilot, Activate SCC Actuator, Limit SCC Actuator 1, Limit SCC Actuator 2, Limit SCC Actuator 3, Limit SCC Actuator 4, Limit SCC Actuator 5, Limit SCC Actuator 6, Limit SCC Actuator 7, Limit SCC Actuator 8, Detect Wire break, Inverted Feedback up, and Inverted Feedback down.

- In this example, following parameters have set for the first valve unit:

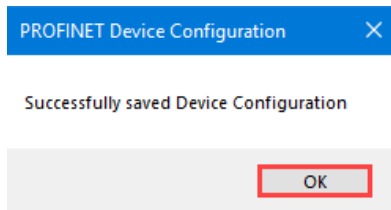


The screenshot shows the 'Parameter Configuration' window. The 'Fault Action Valve' dropdown menu is highlighted with a red box. The dropdown menu is open, showing a list of options: 'Keep last value', 'Use Fault Value', and 'Use Fault Value'. The 'Keep last value' option is selected. A red arrow points to the dropdown menu from the left.

- Save and close the "Profinet Device Configuration" wizard:



- Message indicates that configuration has been saved:



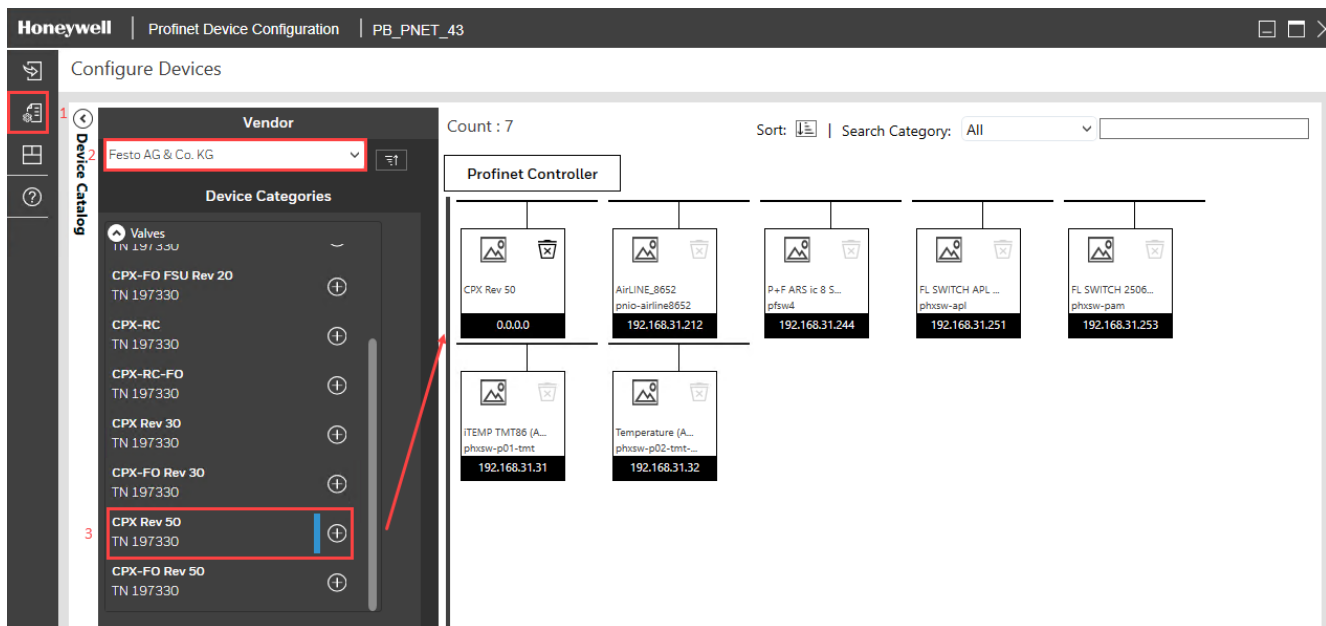
- Click on the button "OK" and then on the button "Close".
- Download the configuration of the Ethernet-APL switch.
Please refer to part 3.4.2 to proceed.

3.3.3.2 FESTO Valve Island

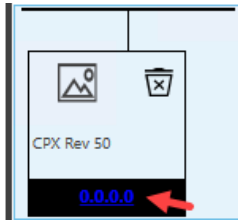
3.3.3.2.1 Basic Settings

This chapter describes the integration of a FESTO Valve island CPX.

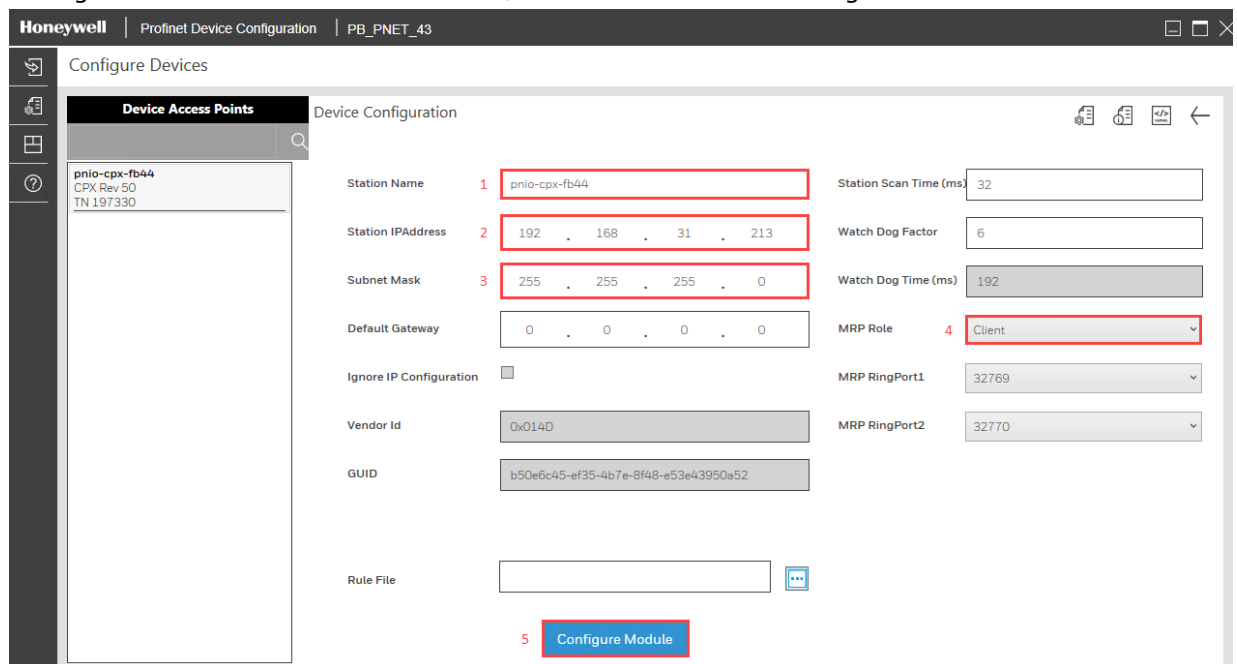
- From the "Profinet Device Configuration" wizard, click on the menu "Configure Device", select the FESTO Vendor from the Vendor list and then the CPX- Rev 50 valve:



- Click on the IP address 0.0.0.0:



- Configure the valve island Station name, IPs and MRP role according to the network:



Honeywell | Profinet Device Configuration | PB_PNET_43

Configure Devices

Device Access Points

pnio-cpx-fb44
CPX Rev 50
TN 197330

Device Configuration

Station Name 1 pnio-cpx-fb44

Station IP Address 2 192 . 168 . 31 . 213

Subnet Mask 3 255 . 255 . 255 . 0

Default Gateway 0 . 0 . 0 . 0

Ignore IP Configuration ☐

Vendor Id 0x014D

GUID b50e6c45-ef35-4b7e-8f48-e53e43950a52

Rule File

Station Scan Time (ms) 32

Watch Dog Factor 6

Watch Dog Time (ms) 192

MRP Role 4 Client

MRP RingPort1 32769

MRP RingPort2 32770

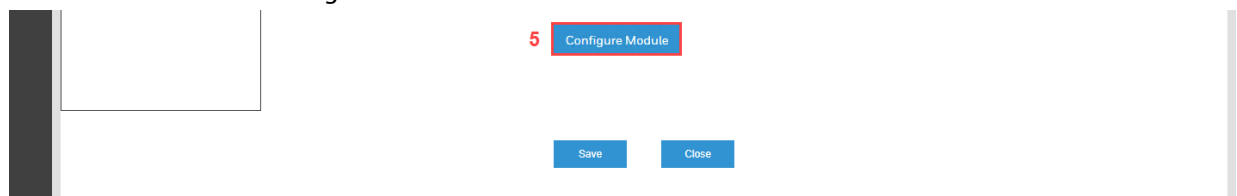
5 Configure Module

Save Close

In this example, the valve is configured as a Client because the Ring manager is the EIM module.

3.3.3.2.2 Module Configuration

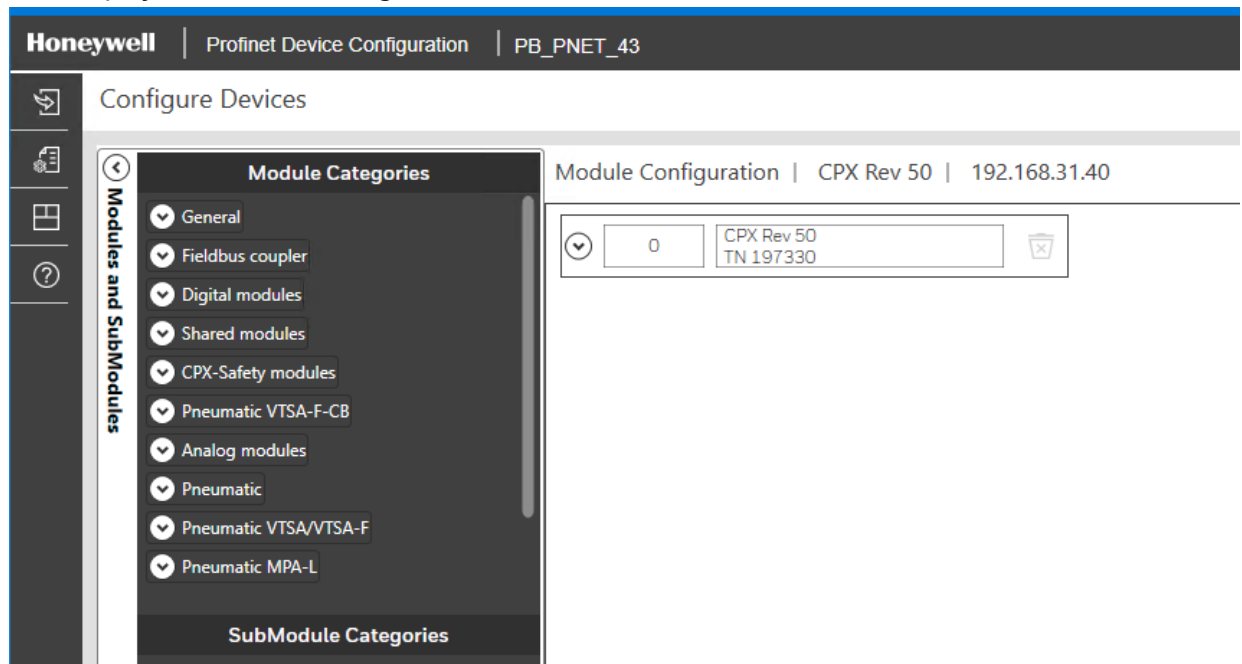
- Click on the button "Configure Module":



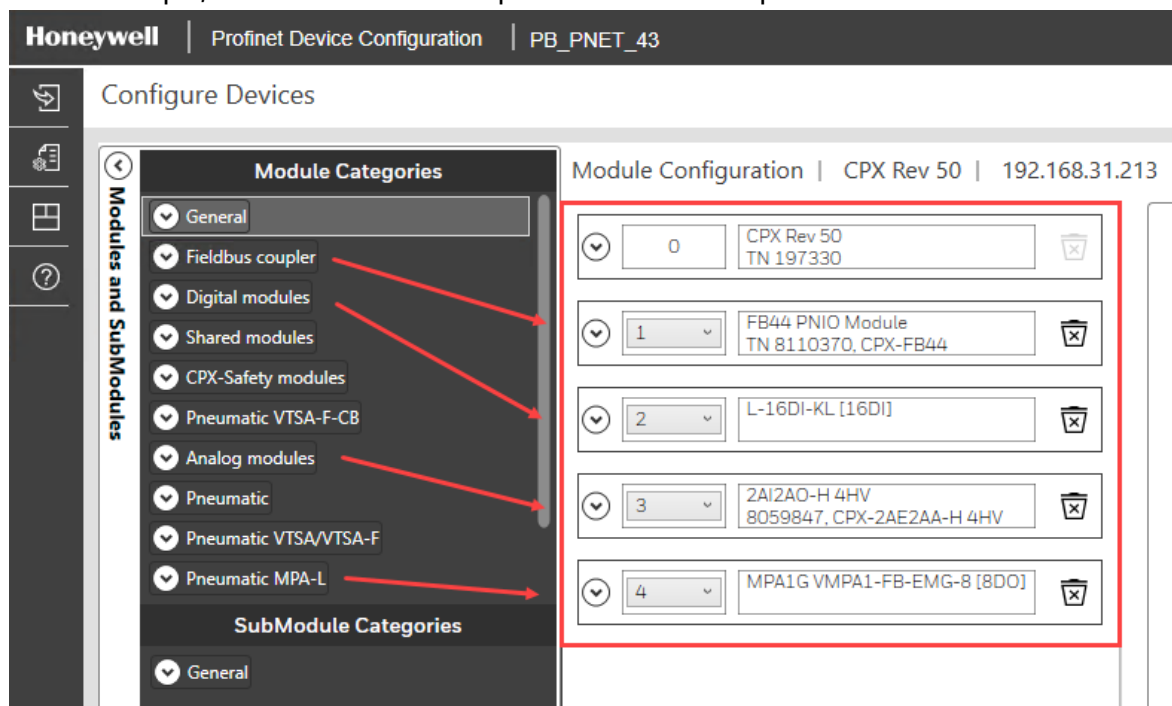
5 Configure Module

Save Close

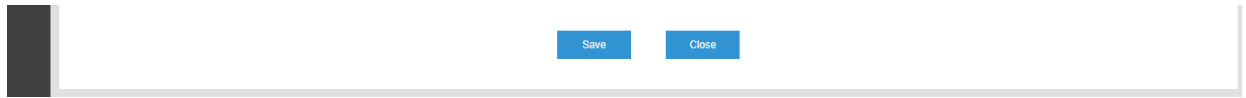
- This displays the default configuration:



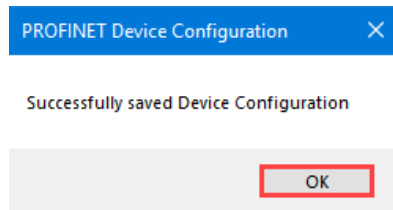
- In this example, the Valve Island is composed of one bus couple and four modules:



- Save and close the "Profinet Device Configuration" wizard:



- Message indicates that configuration has been saved:

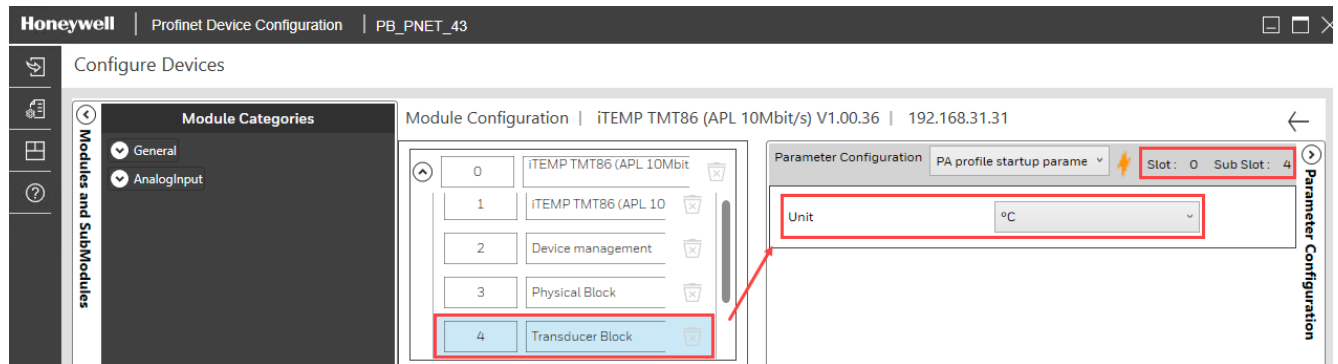


- Click on the button "OK" and then on the button "Close".
- Download the configuration of the Ethernet-APL switch.
Please refer to part 3.4.2 to proceed.

3.3.4 Acyclic Requests Configuration

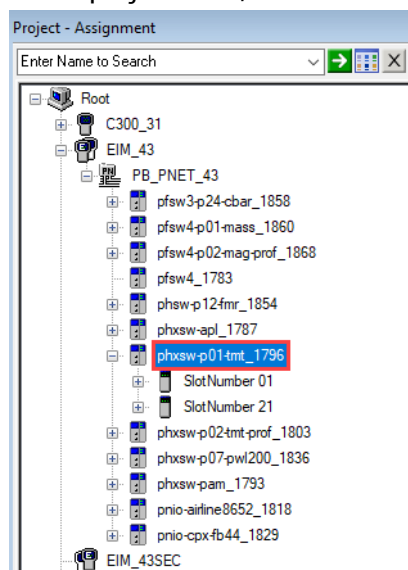
This chapter displays the workflow for reading and writing the temperature unit of a TMT86.

This "Unit" parameter can be found in the Transducer Block in "Slot 0 / Sub Slot 4" as mentioned below:

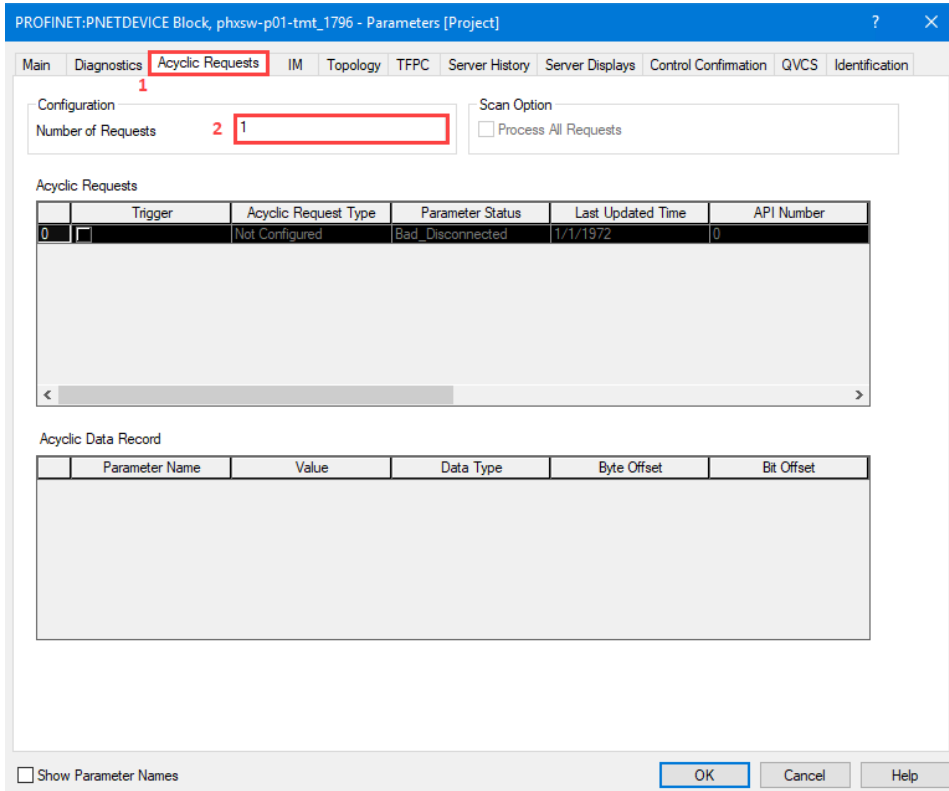


3.3.4.1 General

- In the project view, double-click on the configured TMT86:



- Select the tab “Acyclic Requests” and configure the parameter “Number of Requests” to 2 (One for the Read Request and one for the Write Request):



PROFINET-PNETDEVICE Block, phxsw-p01-trmt_1796 - Parameters [Project]

Main Diagnostics **Acyclic Requests** IM Topology TFPC Server History Server Displays Control Confirmation QVCS Identification

Configuration

Number of Requests 2

Scan Option

☐ Process All Requests

Acyclic Requests

	Trigger	Acyclic Request Type	Parameter Status	Last Updated Time	API Number
0	<input type="checkbox"/>	Not Configured	Bad_Disconnected	1/1/1972	0

Acyclic Data Record

	Parameter Name	Value	Data Type	Byte Offset	Bit Offset
--	----------------	-------	-----------	-------------	------------

☐ Show Parameter Names

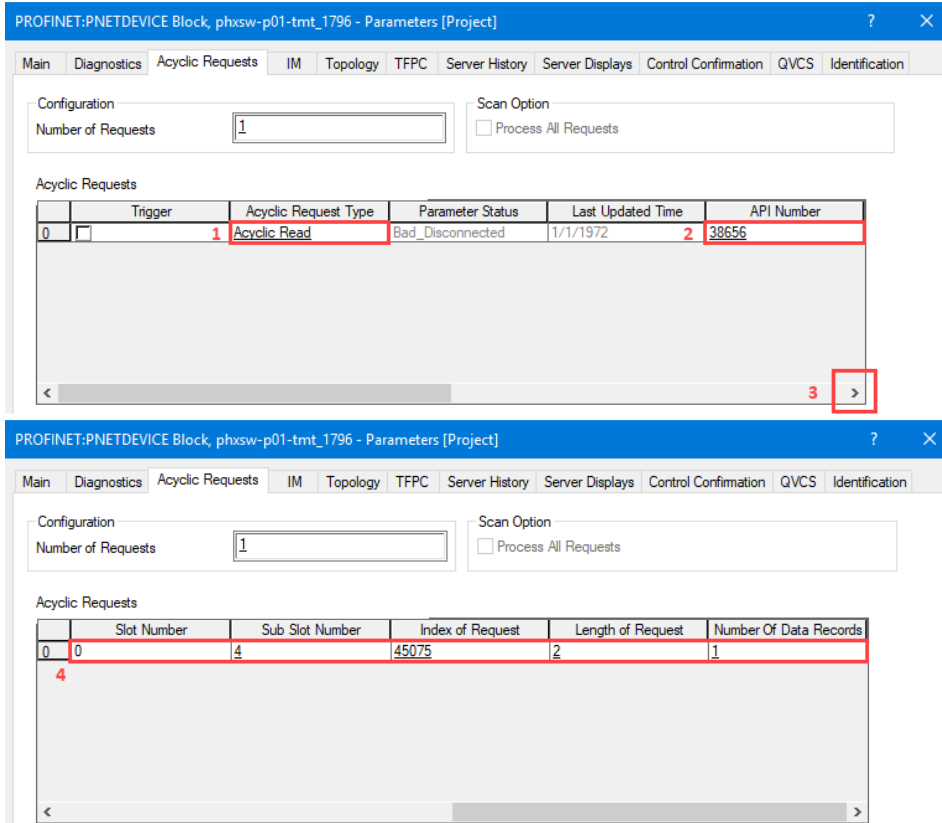
OK Cancel Help

- The “acyclic requests” requires the configuration of following parameters:
 - API number
 - Slot number
 - Sub slot number
 - Index of Request
 - Length of Request
 - Number of Data records
- These parameters can be found in the GSDML file:

```
</VirtualSubmoduleItem>
<VirtualSubmoduleItem ID="IDS_TRANSDUCERTemperaturePHI" SubmoduleIdentNumber="0x0030212" API="38656" FixedInSubslots="4" PROFIsafeSupported="false" MayIssueProcessAlarm="true">
  <IOData/>
  <RecordDataList>
    <ParameterRecordDataItem Index="45075" Length="2" TransferSequence="1">
      <Name TextId="IDT_UNIVERSALFILLER_USED_BY_TRTPNI_STARTUPRECORD_1"/>
      <Ref ID="ID_TRTPNI_TEMPERATUREUNITS_1" ValueItemTarget="TRTPNI_TemperatureUnits_1" ByteOffset="0" DataType="Unsigned16" DefaultValue="1001" AllowedValues="1001 1002 1000 1003 1281 1243"
```

3.3.4.2 Read Request Configuration

- Configure the requested parameters (scroll to the right to see the other parameters):



PROFINET.PNETDEVICE Block, phxsw-p01-tmt_1796 - Parameters [Project]

Main | Diagnostics | Acyclic Requests | IM | Topology | TFPC | Server History | Server Displays | Control Confirmation | QVCS | Identification

Configuration
Number of Requests: 1

Scan Option
☐ Process All Requests

Acyclic Requests

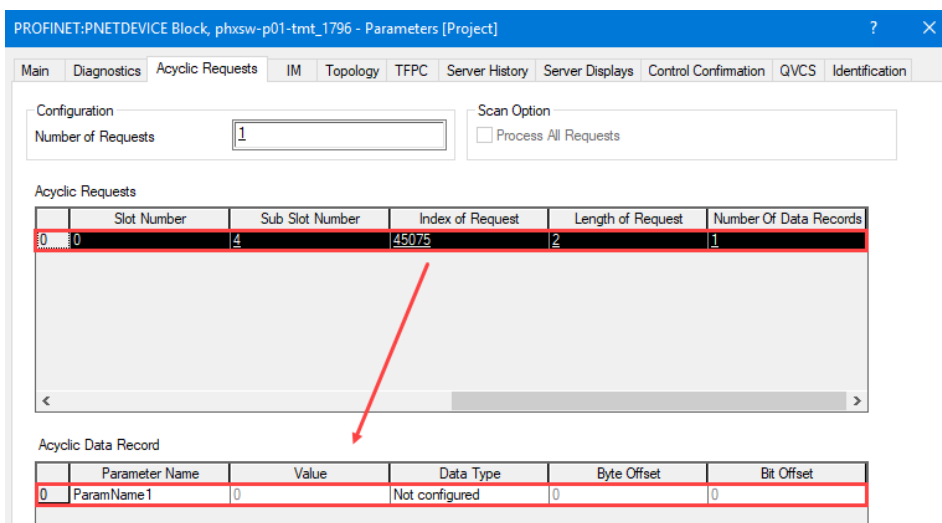
	Trigger	Acyclic Request Type	Parameter Status	Last Updated Time	API Number
0	<input type="checkbox"/>	1 Acyclic Read	Bad_Disconnected	1/1/1972	2 38656

4

Acyclic Data Record

	Slot Number	Sub Slot Number	Index of Request	Length of Request	Number Of Data Records
0	0	4	45075	2	1

- Select the complete line of the configured Acyclic Read Request, this will display the new Acyclic Data Record:



PROFINET.PNETDEVICE Block, phxsw-p01-tmt_1796 - Parameters [Project]

Main | Diagnostics | Acyclic Requests | IM | Topology | TFPC | Server History | Server Displays | Control Confirmation | QVCS | Identification

Configuration
Number of Requests: 1

Scan Option
☐ Process All Requests

Acyclic Requests

	Slot Number	Sub Slot Number	Index of Request	Length of Request	Number Of Data Records
0	0	4	45075	2	1

Acyclic Data Record

	Parameter Name	Value	Data Type	Byte Offset	Bit Offset
0	ParamName1	0	Not configured	0	0

- Configure the required parameters as Parameter Name, Data Type and Offsets:

Acyclic Data Record

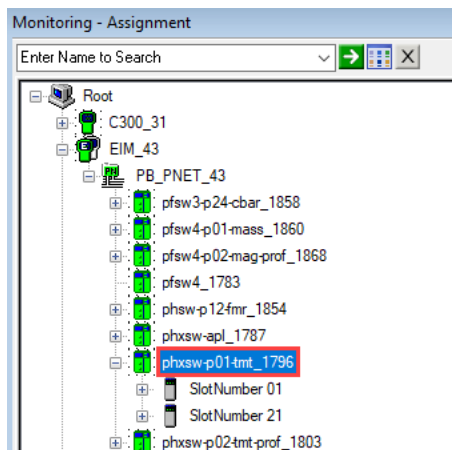
	Parameter Name	Value	Data Type	Byte Offset	Bit Offset
0	read_unit	0	UINT16	0	0

Data Type and Offsets parameters can be found in the GSDML file:

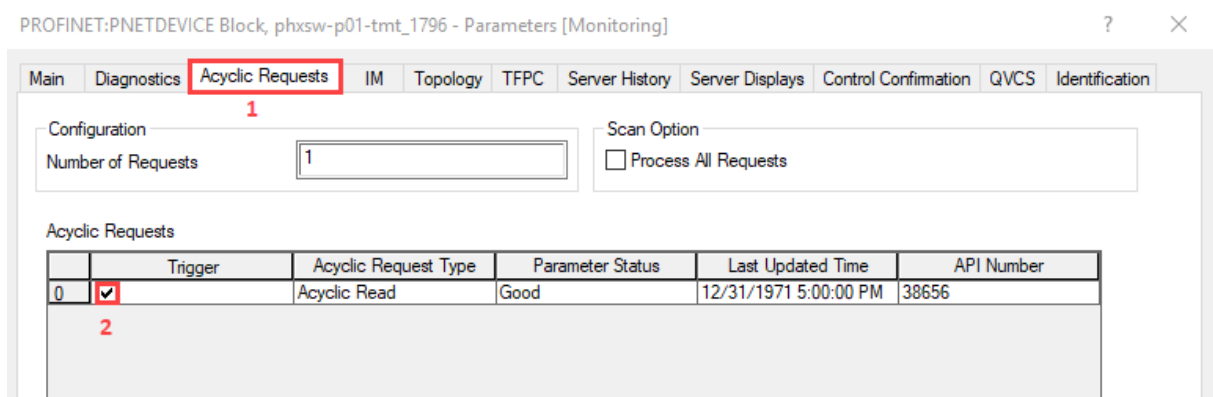
```
</VirtualSubmoduleItem>
<VirtualSubmoduleItem ID="IDS_TRANSOUCETEMPERATUREPNI" SubmoduleIdentNumber="0x00030212" API="38656" FixedInSublots="4" PROFIsafeSupported="false" MayIssueProcessAlarm="true">
  <IOData/>
  <RecordDataList>
    <ParameterRecordDataItem Index="45075" Length="2" TransferSequence="1">
      <Name TextId="IDT_UNIVERSALFILLER_USED_BY_TRTPNI_STARTUPRECORD_1"/>
      <Ref ID="ID_TRTPNI_TEMPERATUREUNITS_1" ValueItemTarget="TRTPNI_TemperatureUnits_1" ByteOffset="0" DataType="Unsigned16" DefaultValue="1001" AllowedValues="1001 1002 1000 1003 1281 1243"/>
    </ParameterRecordDataItem>
  </RecordDataList>
</VirtualSubmoduleItem>
```

3.3.4.3 Online Monitoring

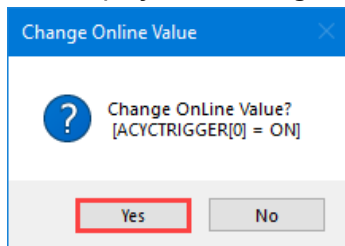
- Double-click on the device:



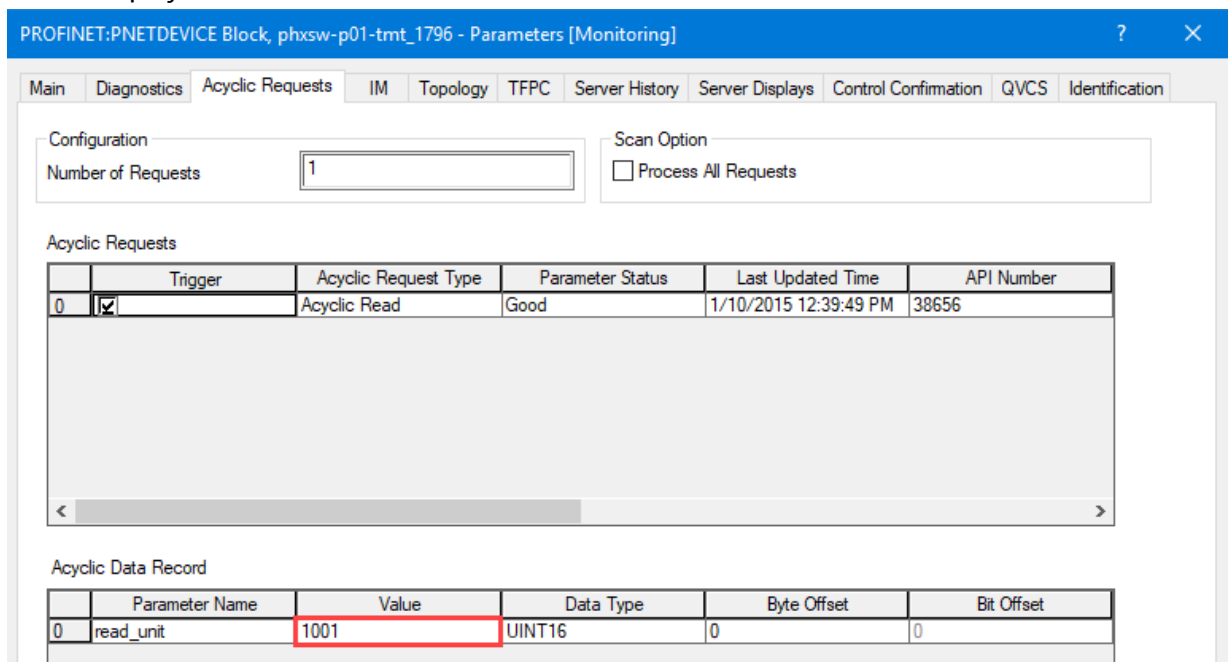
- Then select the tab "Acyclic Requests" and trigger the Read Request by selecting the check box of the Acyclic Read Request:



- This displays the "Change Online Value" popup window. Click on the button "Yes"



- Unit is displayed in the value Field:



Trigger	Acyclic Request Type	Parameter Status	Last Updated Time	API Number
0	Acyclic Read	Good	1/10/2015 12:39:49 PM	38656

Parameter Name	Value	Data Type	Byte Offset	Bit Offset
read_unit	1001	UINT16	0	0

- The value 1001 corresponds to the unit "Celsius". This can be decoded by using the GSDML file:

```
<ParameterRecordDataItem Index="45075" Length="2" TransferSequence="1">
  <Name TextId="IDT_UNIVERSALFILLER_USED_BY_TRTPNI_STARTUPRECORD_1"/>
  <Ref ID="ID_TRTPNI_TEMPERATUREUNITS_1" ValueItemTarget="TRTPNI_TemperatureUnits_1" ByteOffset="0" DataType="Unsigned16" DefaultValue="1001" AllowedValues="1001 1002 1000 1003 1281 1243"/>
</ParameterRecordDataItem>

<ValueItem ID="TRTPNI_TemperatureUnits_1">
  <Assignments>
    <Assign Content="1001" TextId="IDT_TEXT_CELSIUS_1_UNIT"/>
    <Assign Content="1002" TextId="IDT_TEXT_FAHRENHEIT_1_UNIT"/>
    <Assign Content="1000" TextId="IDT_TEXT_KELVIN_1_UNIT"/>
    <Assign Content="1003" TextId="IDT_TEXT_RANKINE_1_UNIT"/>
    <Assign Content="1281" TextId="IDT_TEXT_OHM_1_UNIT"/>
    <Assign Content="1243" TextId="IDT_TEXT_MILLIVOLT_1_UNIT"/>
  </Assignments>
</ValueItem>
```

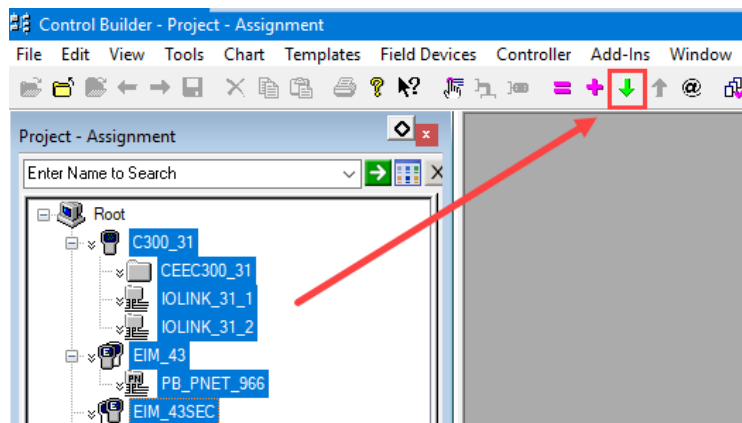
Same concept may be implemented for a Write Request.

3.4 Commissioning of the Control Project

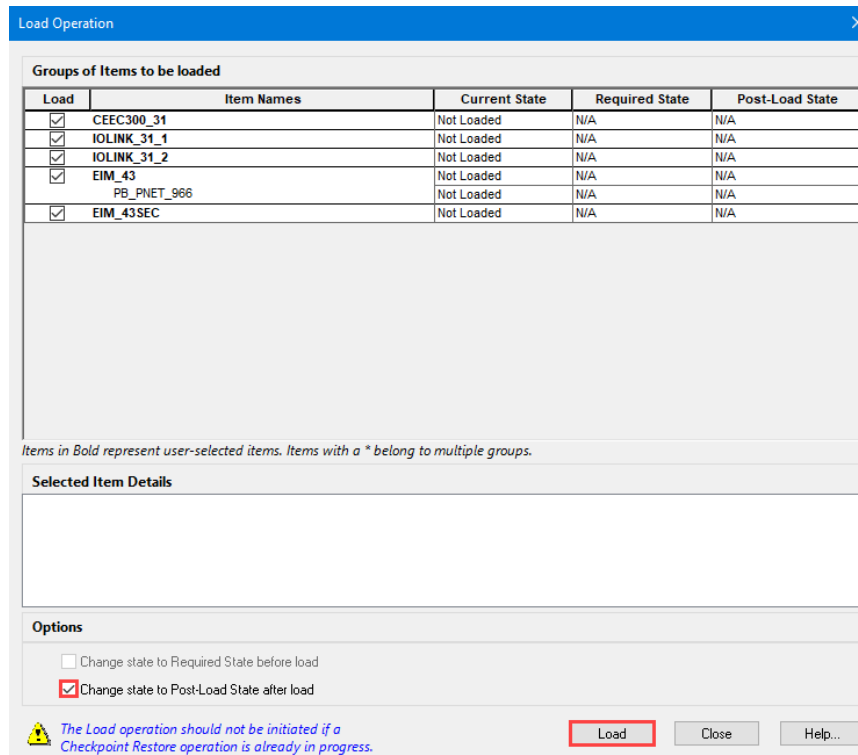
3.4.1 First Download

This part concerns the hardware configuration download of the C300 and the EIM modules.

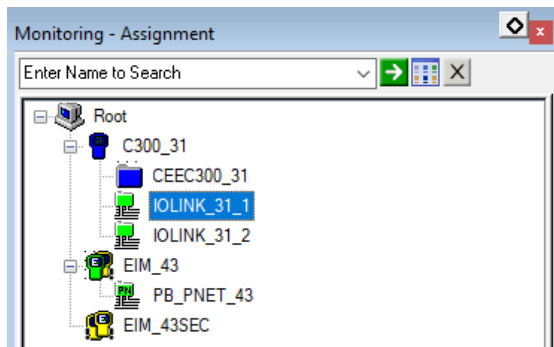
- In the project assignment view, select the C300 and EIM modules, then click on the shortcut button "Load" in the tool bar menu:



- This opens the "Load Operation" window. Click on the button "Load":

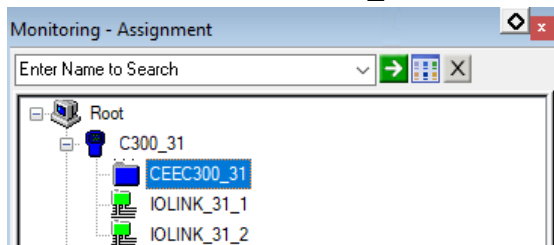


- Download is successful:

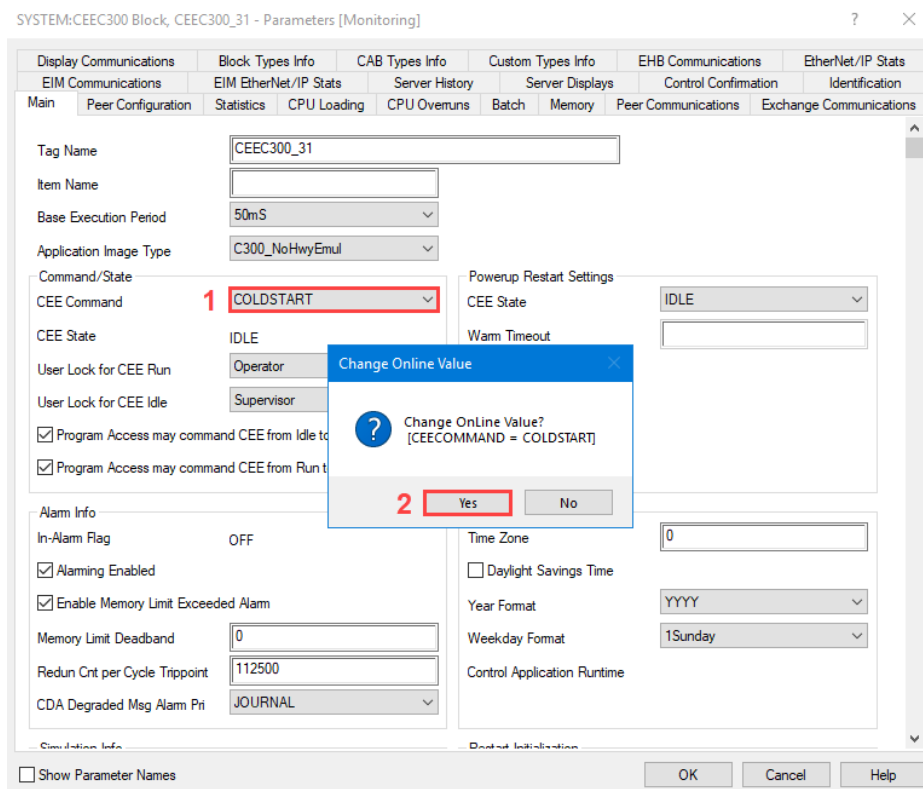


EIM automatically activates itself after few seconds. C300 needs to be activated.

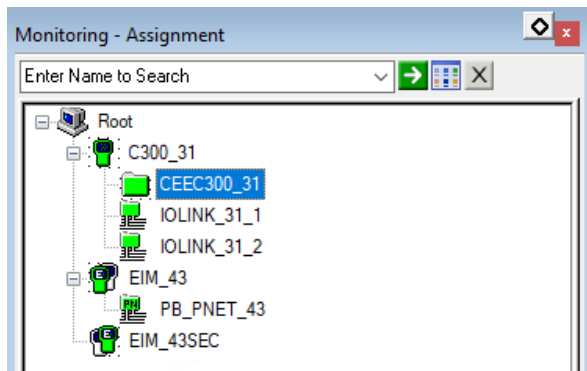
- Double-click on the CEEC300_31 field and select the menu Change State:



- Select the option "COLD START":



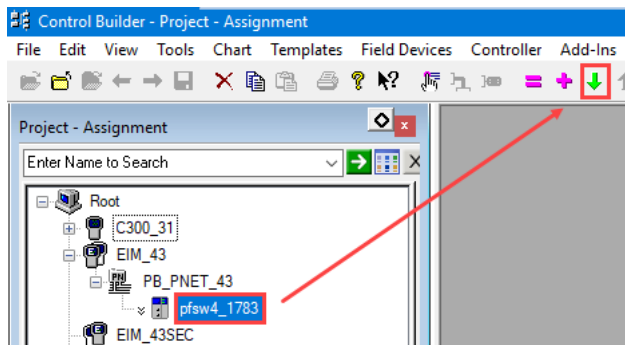
- C300 Controller is now activated:



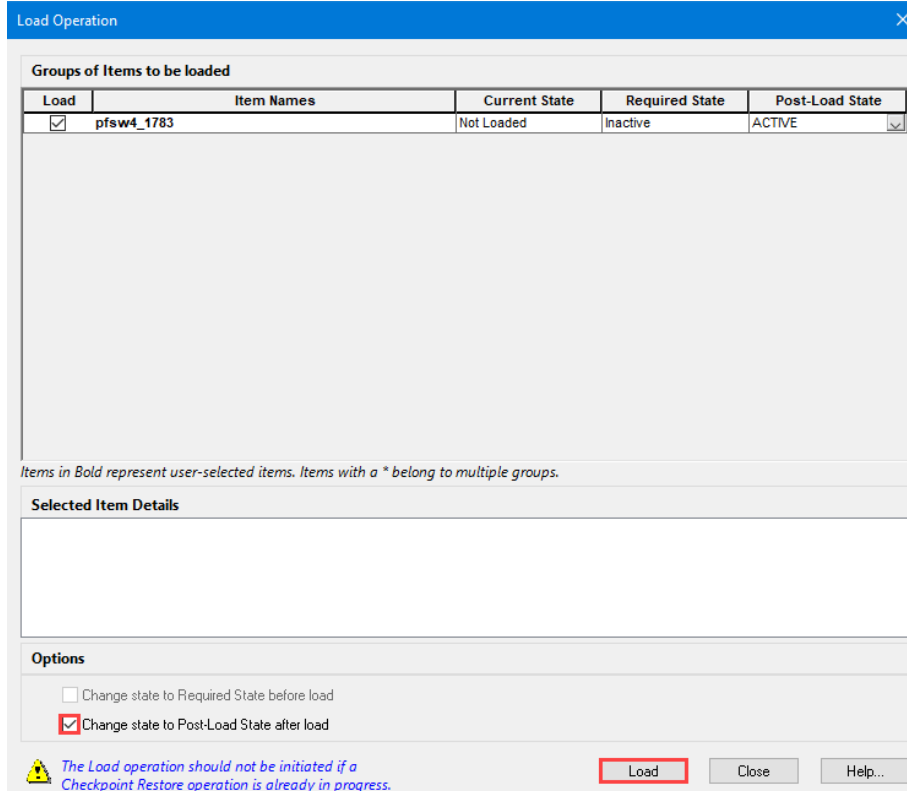
3.4.2 PROFINET IO Device Download

This part concerns the hardware configuration download of a PROFINET IO device.

- Select the configured IO device, in this example the Ethernet-APL “pfs-8p” switch and click on the button “Download”:



- Select the configured IO device, in this example the Ethernet-APL switch and click on the button "Download":



Load Operation

Load	Item Names	Current State	Required State	Post-Load State
<input checked="" type="checkbox"/>	pfs4_1783	Not Loaded	Inactive	ACTIVE


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

Selected Item Details

Options

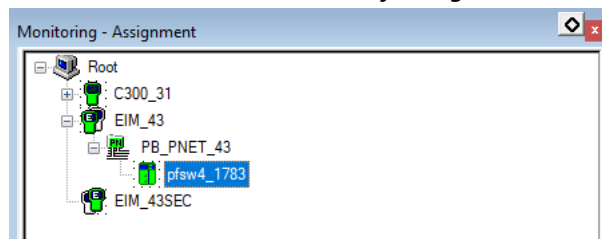
☐ Change state to Required State before load

☒ 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...

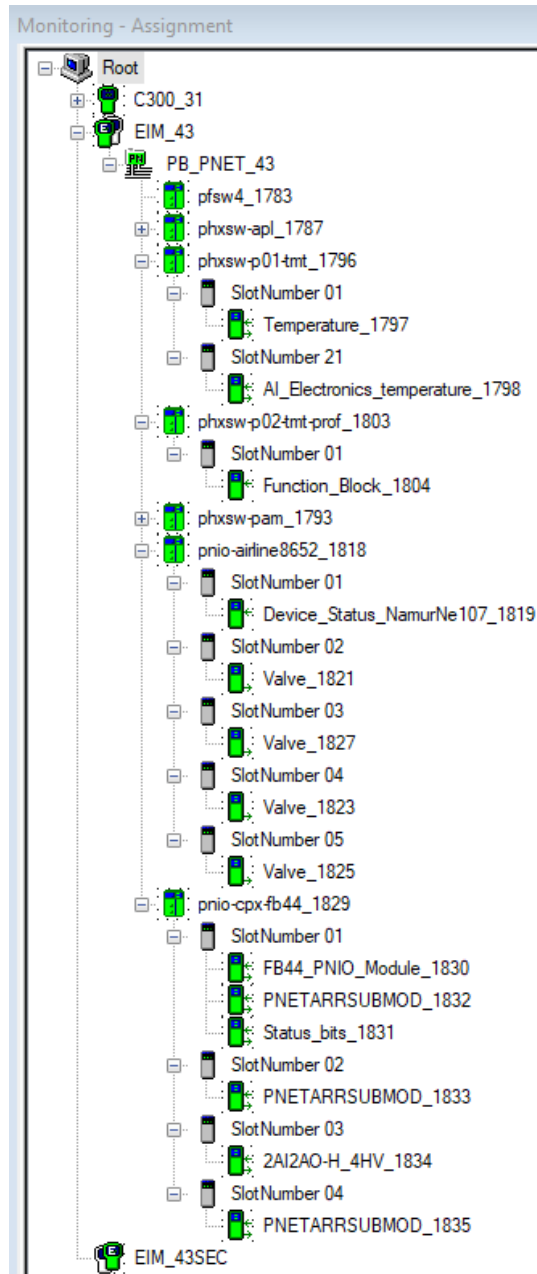
- IO device has been successfully integrated in the system:



3.5 Monitoring of Process Values and Status Information

3.5.1 Connected Field Devices

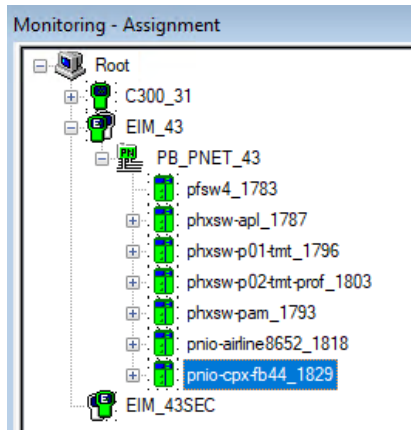
- Connected field devices:



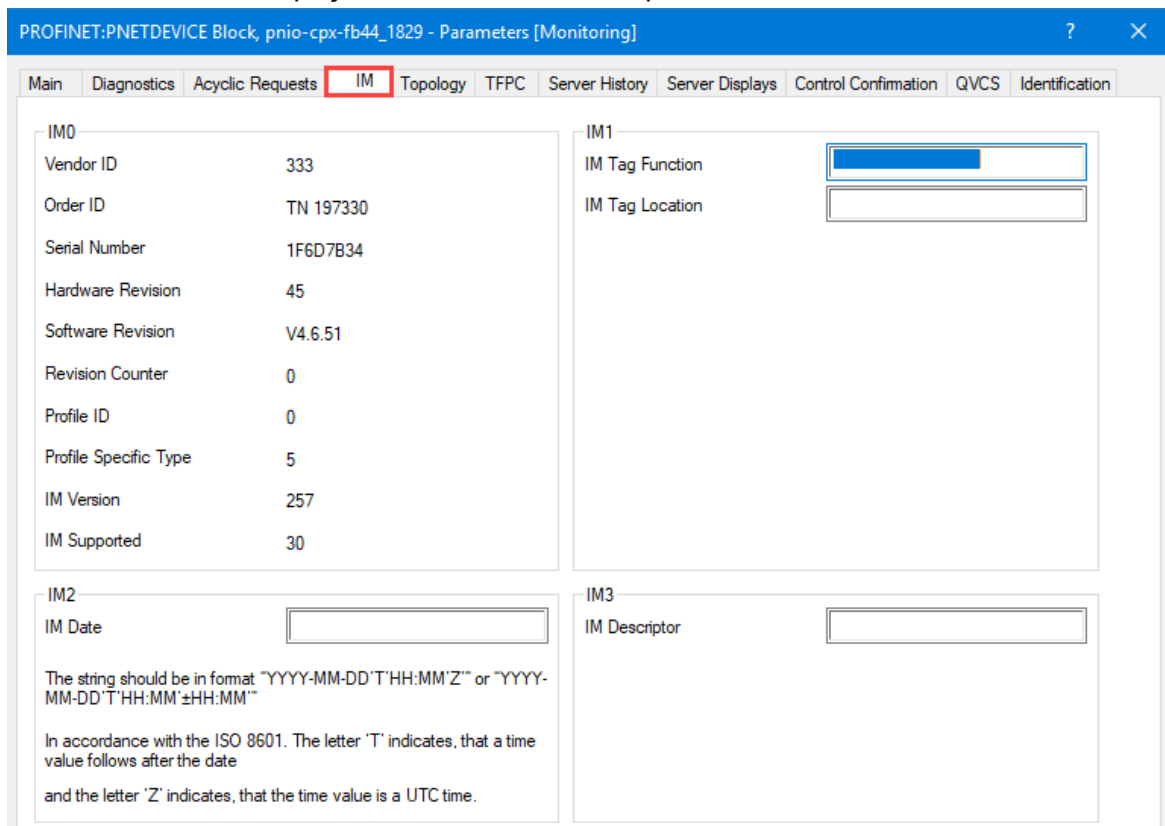
3.5.2 Identification and Maintenance (IM) Data

PROFINET Identification and Maintenance (IM) parameters can be accessed for each connected field device in the Online monitoring view.

- Double click for example on the FESTO valve island:



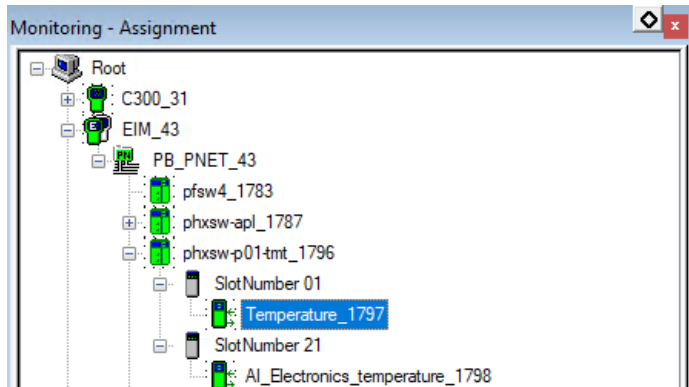
- Select the tab IM to display the available IM device parameters:



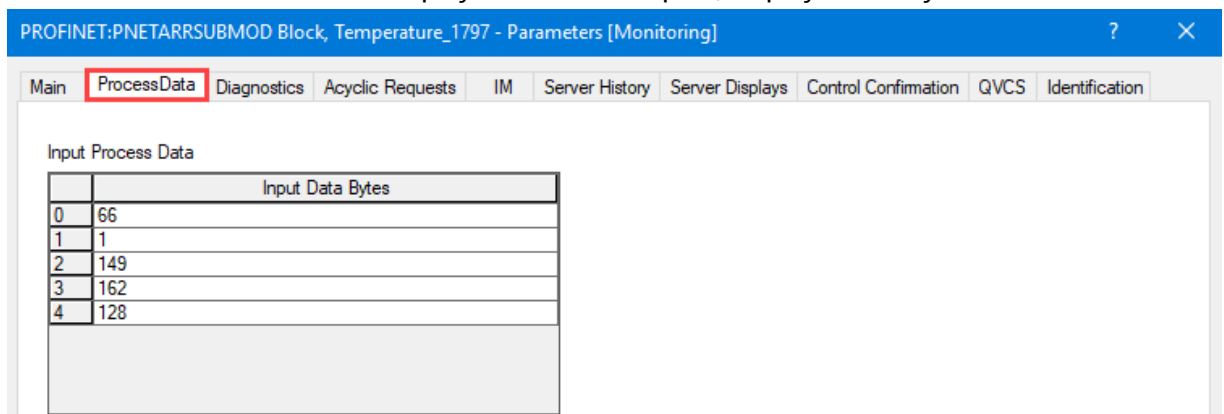
3.5.3 Online Monitoring Values of Inputs

3.5.3.1 Integration with Vendor Specific GSDML

- Double click for example on the temperature measurement of Slot1:



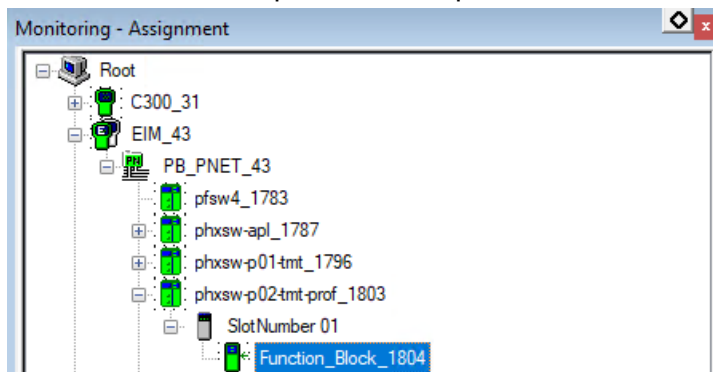
- Select the tab "ProcessData" to display the received inputs, displayed in a byte Format:



Vendor specific integration only displays the 4 bytes values + 1 byte status.

3.5.3.2 Integration with Profile GSDML

- Double click for example on the temperature measurement of Slot1:



- Select the tab "InputChannels" to display the input Channel data displayed:

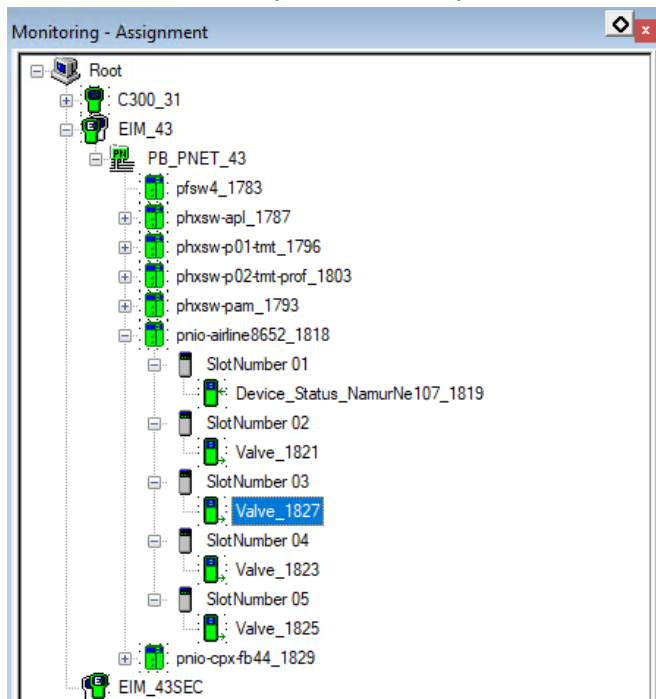
PROFINET:PNETA1 Block, Function_Block_1804 - Parameters [Monitoring]

Control Confirmation		QVCS		Identification			
Main	Input Channels	ProcessData	Diagnostics	Acyclic Requests	IM	Server History	Server Displays
Input Channel Configuration							
	Input Channel Description	Input Channel Low Range	Input Channel High Rang	Input Channel Scale facto	Input channel Bias		
0	Temperature + status	0	100	1	0		
Input Channel Data/Status							
	Input Channel Data Raw	Input Channel Data Real	Input Channel status	Input Channel data status			
0	32.47655	32.47655	NORMAL	GOOD			

3.5.4 Online Monitoring Values of Outputs

- Double click for example on the temperature measurement of Slot1:

Monitoring - Assignment



```

graph TD
    Root[Root] --> C300_31[C300_31]
    C300_31 --> EIM_43[EIM_43]
    EIM_43 --> PB_PNET_43[PB_PNET_43]
    PB_PNET_43 --> pfs4_1783[pfs4_1783]
    PB_PNET_43 --> phxsw-apl_1787[phxsw-apl_1787]
    PB_PNET_43 --> phxsw-p01-tmt_1796[phxsw-p01-tmt_1796]
    PB_PNET_43 --> phxsw-p02-tmt-prof_1803[phxsw-p02-tmt-prof_1803]
    PB_PNET_43 --> phxsw-pam_1793[phxsw-pam_1793]
    PB_PNET_43 --> pnio-airline8652_1818[pnio-airline8652_1818]
    PB_PNET_43 --> SlotNumber_01[SlotNumber 01]
    PB_PNET_43 --> SlotNumber_02[SlotNumber 02]
    PB_PNET_43 --> SlotNumber_03[SlotNumber 03]
    PB_PNET_43 --> SlotNumber_04[SlotNumber 04]
    PB_PNET_43 --> SlotNumber_05[SlotNumber 05]
    PB_PNET_43 --> pnio-cpx-fb44_1829[pnio-cpx-fb44_1829]
    EIM_43 --> EIM_43SEC[EIM_43SEC]
    SlotNumber_03 --> Device_Status_NamurNe107_1819[Device_Status_NamurNe107_1819]
    SlotNumber_03 --> Valve_1821[Valve_1821]
    SlotNumber_03 --> Valve_1827[Valve_1827]
    SlotNumber_03 --> Valve_1823[Valve_1823]
    SlotNumber_03 --> Valve_1825[Valve_1825]
  
```

- Select the tab "Output Channels" and set for example the output to 128 (=0x80 in hexadecimal):

PROFINET:PNETA0 Block, Valve_1827 - Parameters [Monitoring]

? X

Control Confirmation

QVCS

Identification

Main 1 **Output Channels** ProcessData Diagnostics Acyclic Requests IM Server History Server Displays

Output Channel Configuration

	Output Channel Descriptio	Output Channel Low Ran	Output Channel High Ran	Output Data Fault Action	Output Data Safe Value
0	Valve	0	100	HOLDLAST	0

Output Channel Data/Status

	Output Channel Data Raw	Output Channel Data Real	Output Channel status	Output Channel data status
0	0	2 128	NORMAL	BAD_NON_SPCFK

Change Online Value

Change OnLine Value?
[OUTCHDATAREAL[0] = 128]

3 **Yes** No

- Process value has been successfully received on the Bürkert valve island:

← → ↻ ⚠ Not secure 192.168.31.212/#ProcessValues

Menu | Login | ↻

Valve Island 1001

Language DE EN

Process values

Name	Value
Device Status NamurNe107	1
BM0_Valves	0
BM1_Valves	128
BM2_Valves	0
BM3_Valves	0

Valve island

Device information

Messages

Valve unit

Configuration

Switching time monitoring

Maintenance

Status

Pressure measurement

Configuration / Diagnosis

Installation

Industrial communication

Configuration

Process values

Contact

4 Advanced Integration

This chapter describes the main workflow for integration of PROFINET-APL devices into the Honeywell FDM Plant Asset Management tool by means of FDI packages.

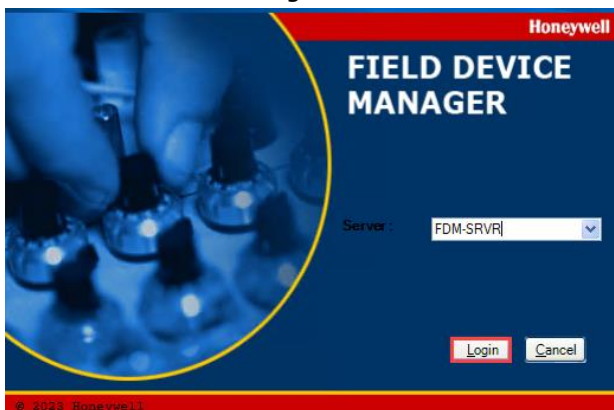
As of today, field devices can only be operated with FDM, if the EPKS integration has been done with vendor specific GDSML files. Field Devices integrated with PA Profile GDSML in Control Builder cannot be configured with FDM.

4.1 FDI Package Library Management

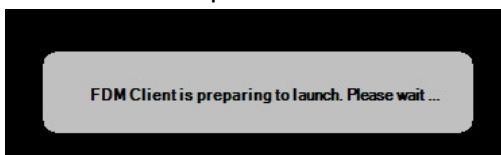
- Start the FDM Client:



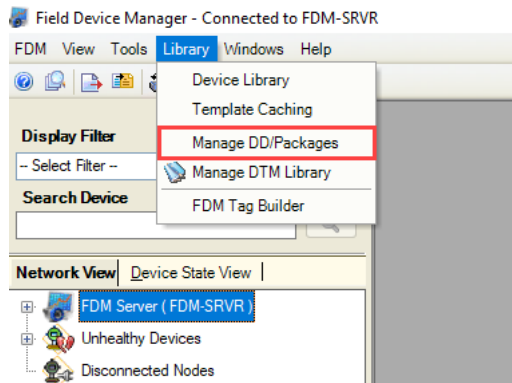
- Click on the button "Login":



- Connection is in process:



- FDM Client is connected to FDM Server. Select the menu "Library→Manage DD/Packages":




- This page displays all packages. Click on the button "Add DD/PACKAGE" to import a new FDI package:

Manage DD/Package Add DD/PACKAGE 

Protocol	Manufacturer	Device Type
All Protocols	All Manufacturers	All DeviceTypes


- Search the FDI package to install and click on the button "ADD TO LIBRARY":

Add DD/PACKAGE File 

DD/PACKAGE File Type

Package Files(.fdix) | *.fdix

Locate DD/PACKAGE File

cs_user\Desktop\Endress+Hauser.Promag_300_500_APL.01.01.01.PROFINET.fdi  1

CANCEL
ADD TO LIBRARY 2

- Package has been successfully installed. Click on the button "OK":

Manage DD/Packages

Package added successfully!

Package Details :

Protocol Name : PROFINET
 Manufacturer : Endress+Hauser
 Device Type : Promag 300/500 APL
 Device Revision : 01.00.*
 Package Version : 01.01.01

OK

- List of installed PROFINET installed packages:

Manage DD/Package Add DD/PACKAGE ✕

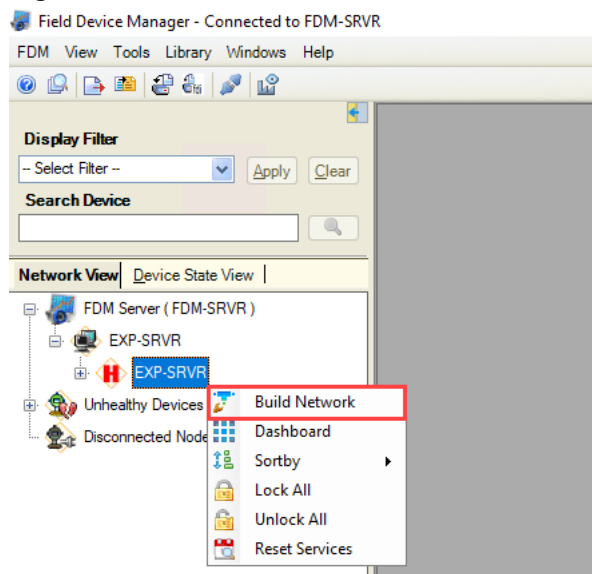
Protocol: **PROFINET** Manufacturer: All Manufacturers Device Type: All DeviceTypes

List of available DD/Packages. Please select a DD/Package and click on DELETE. Please note generic/profile DD/Packages cannot be deleted.



PROTOCOL	MANUFACTURER	DEVICE TYPE	DEVICE REVISION	DD/PACKAGE VERSION	DD/PACKAGE TYPE	DELETE
PROFINET	Endress+Hauser (11)	Micropilot 5x8/6xB (A1C1)	1	01.00.467	Package	DELETE
PROFINET	Pepperl+Fuchs (5D)	APL Rail Switch ic (2005)	1	1.4.128	Package	DELETE
PROFINET	Endress+Hauser (11)	Promag 300/500 APL (A43C)	1	01.01.01	Package	DELETE
PROFINET	Endress+Hauser (11)	Cerabar 5x8/7xB (A22A)	1	01.00.329	Package	DELETE
PROFINET	Endress+Hauser (11)	Prowirl 200 APL (A438)	1	01.00.173	Package	DELETE
PROFINET	Honeywell (00)	Profile	1	01.01.04	Package	DELETE
PROFINET	Endress+Hauser (11)	ITEMP TMT86 (A3FF)	1	01.01.01	Package	DELETE

4.2 Field Device Network

- Right-click on "EXP-SRVR" and select the menu "Build Network":

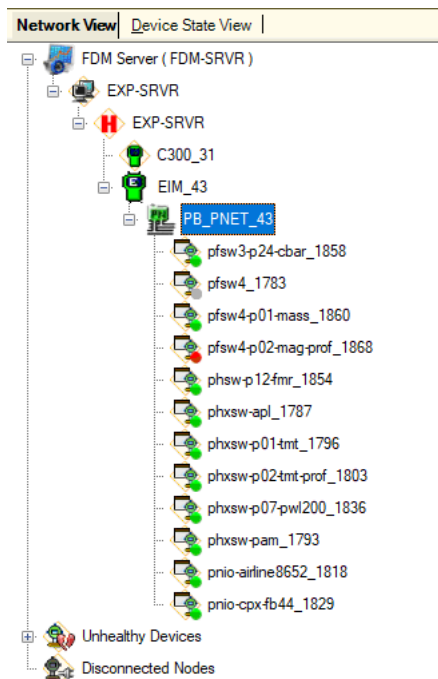


- Build is complete:

Information  		
Time Stamp	Entity	Description
6/10/2024 2:27:01 PM	EXP-SRVR	Starting network build operation...
6/10/2024 2:27:01 PM	EXP-SRVR	Network Build Operation for EXP-SRVR is in progress
6/10/2024 2:27:02 PM	EXP-SRVR	Network build operation for EXP-SRVR is complete.

Network build completed...

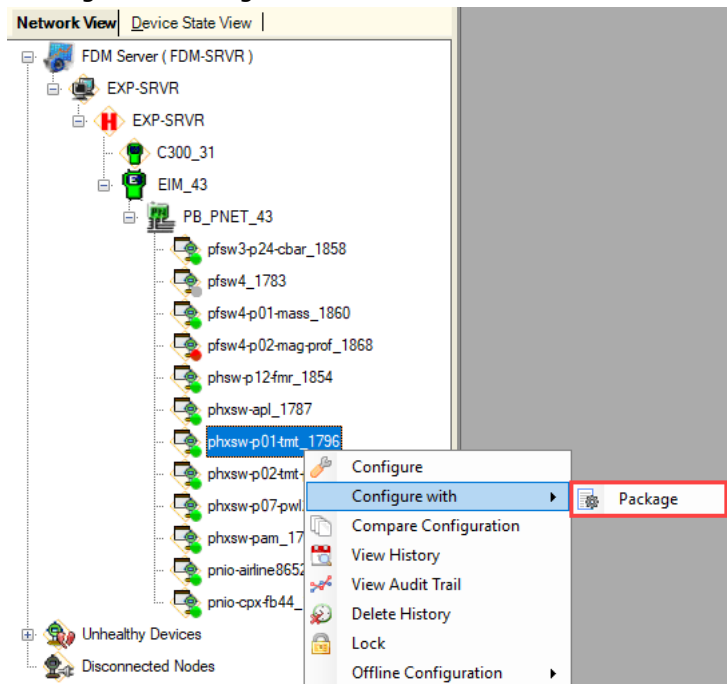
- Found devices:



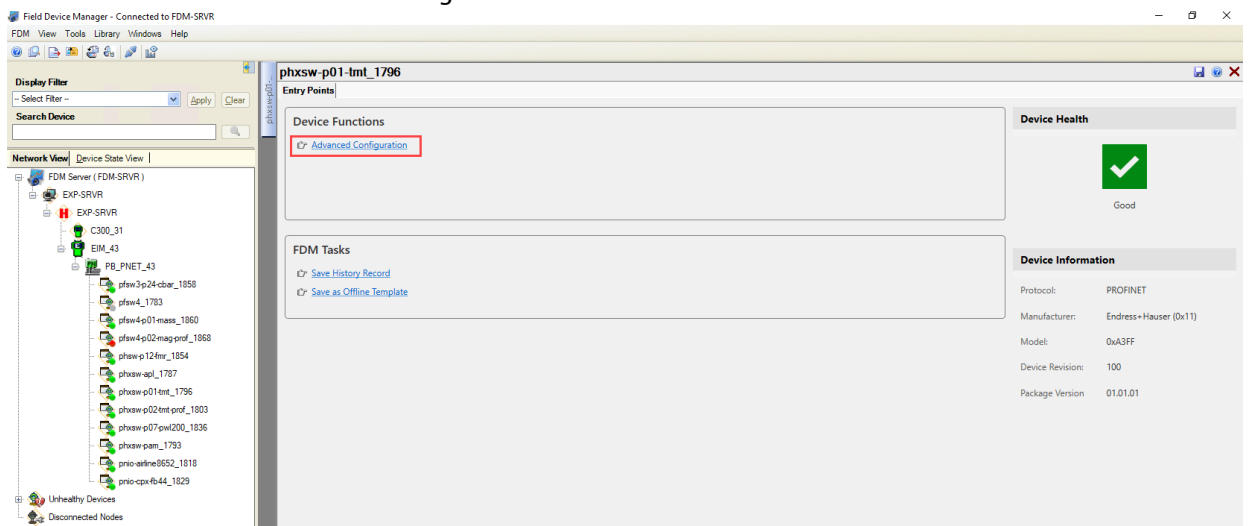
4.3 Device Connection

In this example, the device "phxsw-p01-tmt" has been integrated with a vendor specific gsdml file.

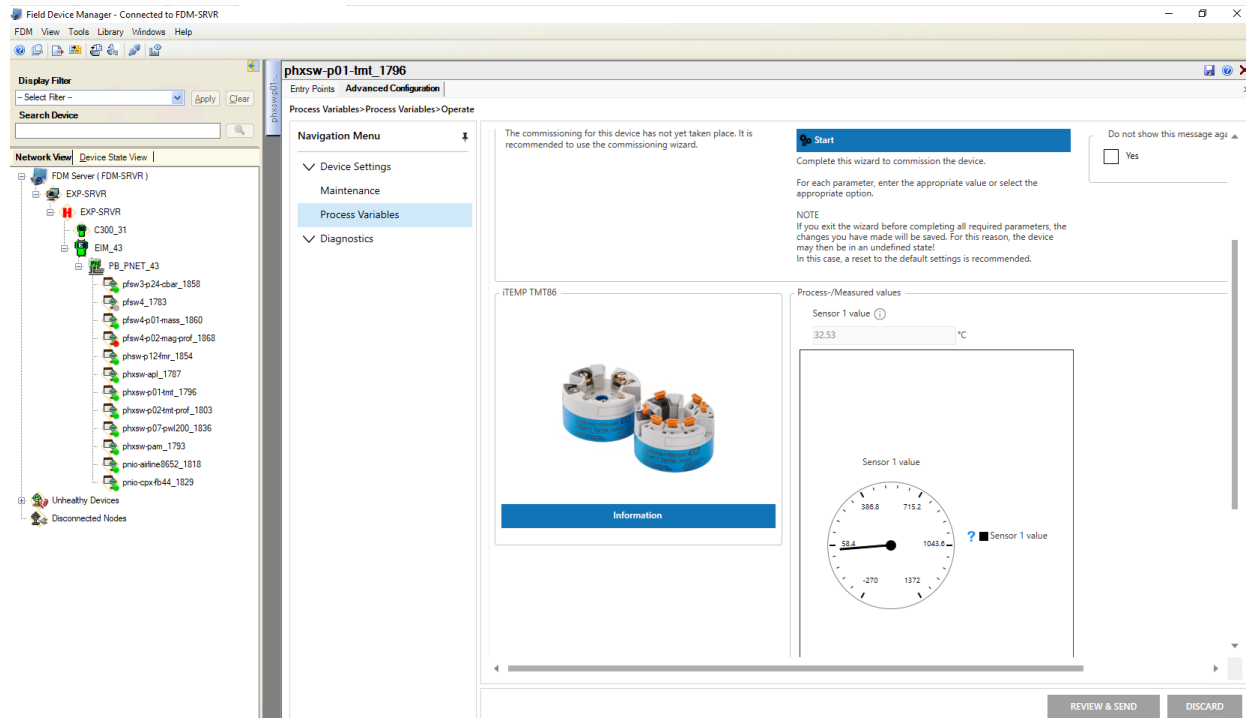
- Double click on the tmt86 or right-click for example on the tmt86 devices and select the menu "Configure→Package":



- Click on the menu "Advanced Configuration":



- This opens the device Online Parameterization:

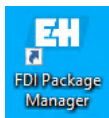


5 Bypassed Tool Integration

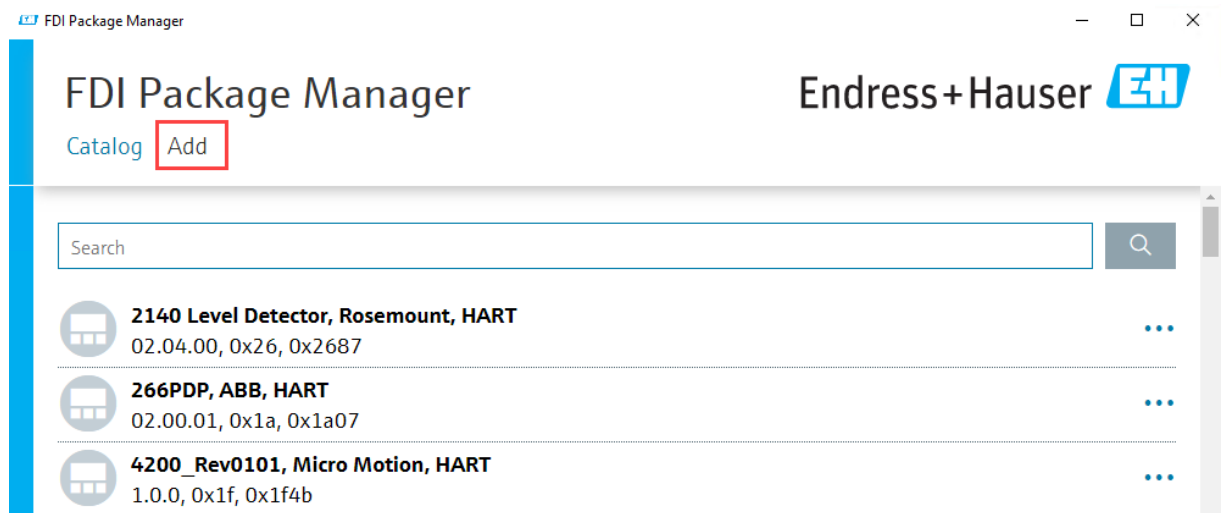
This chapter describes the main workflow for integration of PROFINET APL devices to the Endress+Hauser Plant Asset Management (PAM System) by means of FDI packages and iDTM-FDI Packages.

5.1 Import FDI Packages

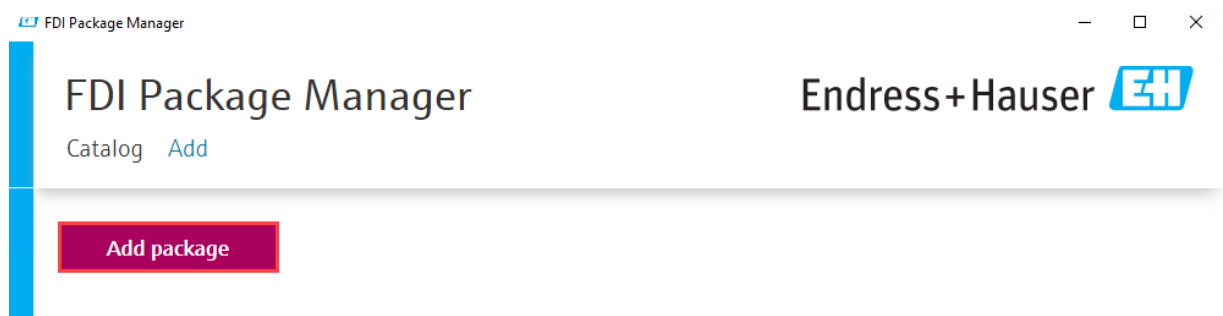
- Start the application FDI Package Manager:



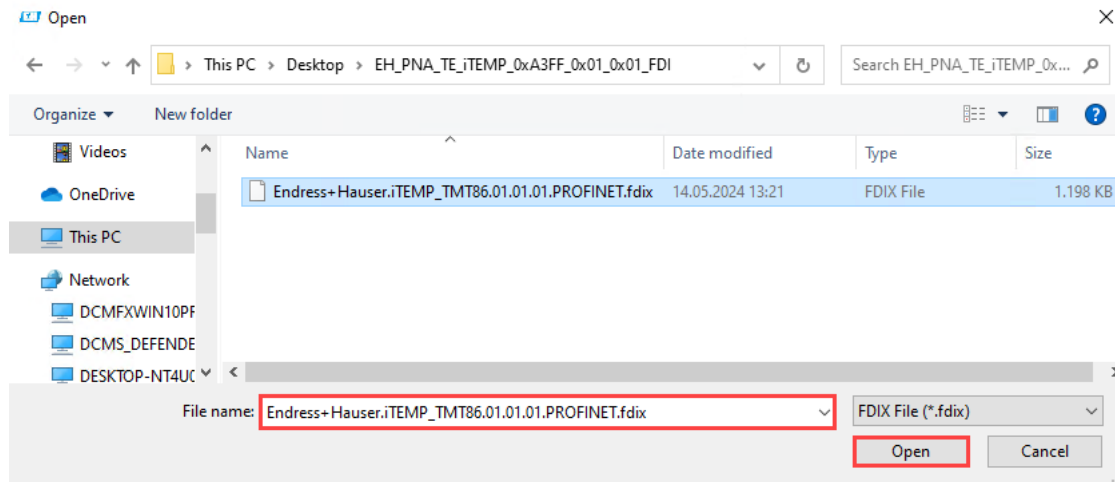
- Click on the menu "Add":



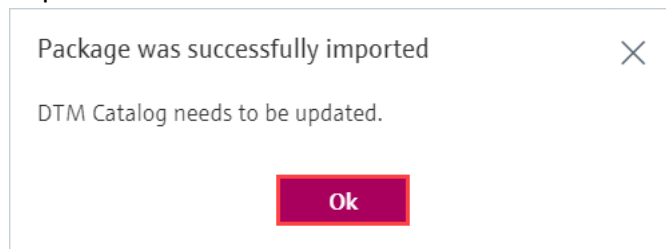
- Click on the button "Add package":



- Select for example, the TMT86 FDI Package and click on the button “Open”:



- Import was successful:



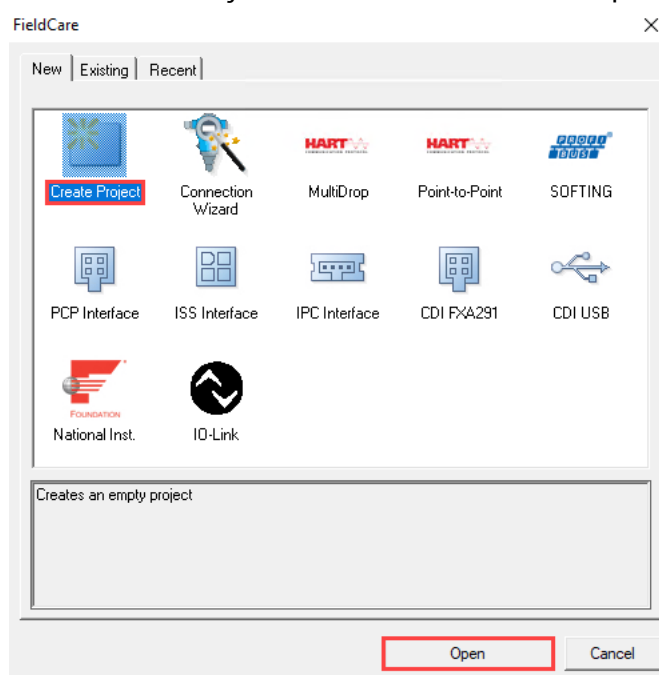
FieldCare catalog needs to be updated.

5.2 FieldCare Project Configuration

- Start the application FieldCare:



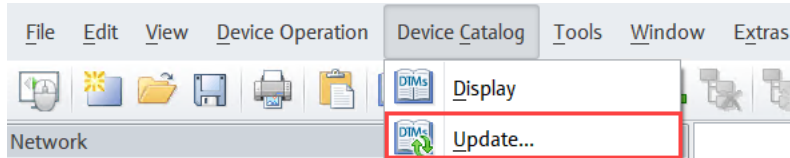
- Select "Create Project" and click on the button "Open":



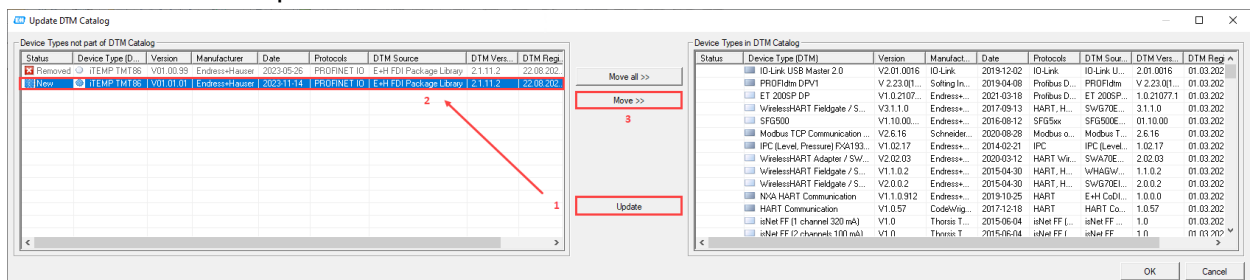
5.2.1 Catalog Update

After adding a new FDI package, the DTM catalog must be updated.

- Select the menu "Device Catalog → Update":



- Click on the button "Update":

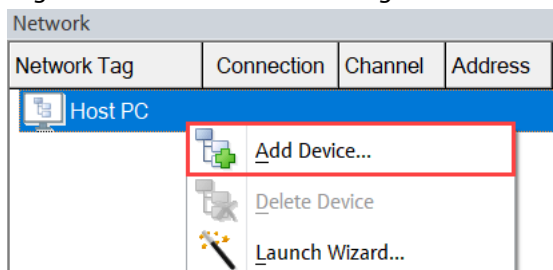


After the update, the new FDI package is displayed on the left side. Click on the button "Move".

- Driver is successfully imported in FieldCare:


Status	Device Type (DTM)	Version	Manufacturer	Date	Protocols
New	iTEMP TMT86	V01.01.01	Endress+Hauser	2023-11-14	PROFINET IO
	IO-Link USB Master 2.0	V2.01.0016	IO-Link	2019-12-02	IO-Link
	PROFIdm DPV1	V 2.23.0(1...	Softing Industrial ...	2019-04-08	Profibus DPV1
	ET 200SP DP	V1.0.2107...	Endress+Hauser	2021-03-18	Profibus DPV1

- Right-click on the Network Tag "Host PC" and select the menu "Add Device...":



5.2.2 Network Configuration

- Select the CommDTM "PROFINET CommDTM " from Endress+Hauser and click on the button "OK":


 Add New Device

Filter

Manufacturer:

Device:

Filter

Device	Version	Class	Manufacturer	Protocol
PROFINET CommDTM	V1.1.0.18 (2024-03-25)	 dtmSpecific	Endress+Hauser	PROFINET IO

Device type (DTM) information

Device: PROFINET CommDTM

Manufacturer: Endress+Hauser

Device ID / SubID:

Manufacturer ID:

Hardware revision:

Software revision:

Device revision:




Profile revision:

Is generic: No

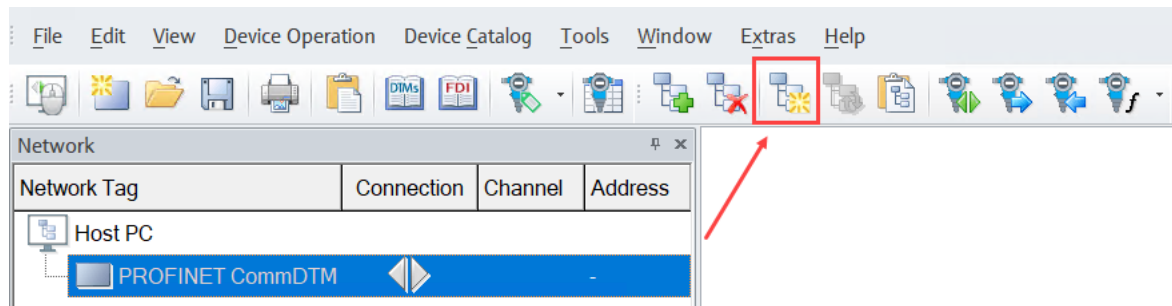
OK Cancel

- CommDTM is inserted in the project view:

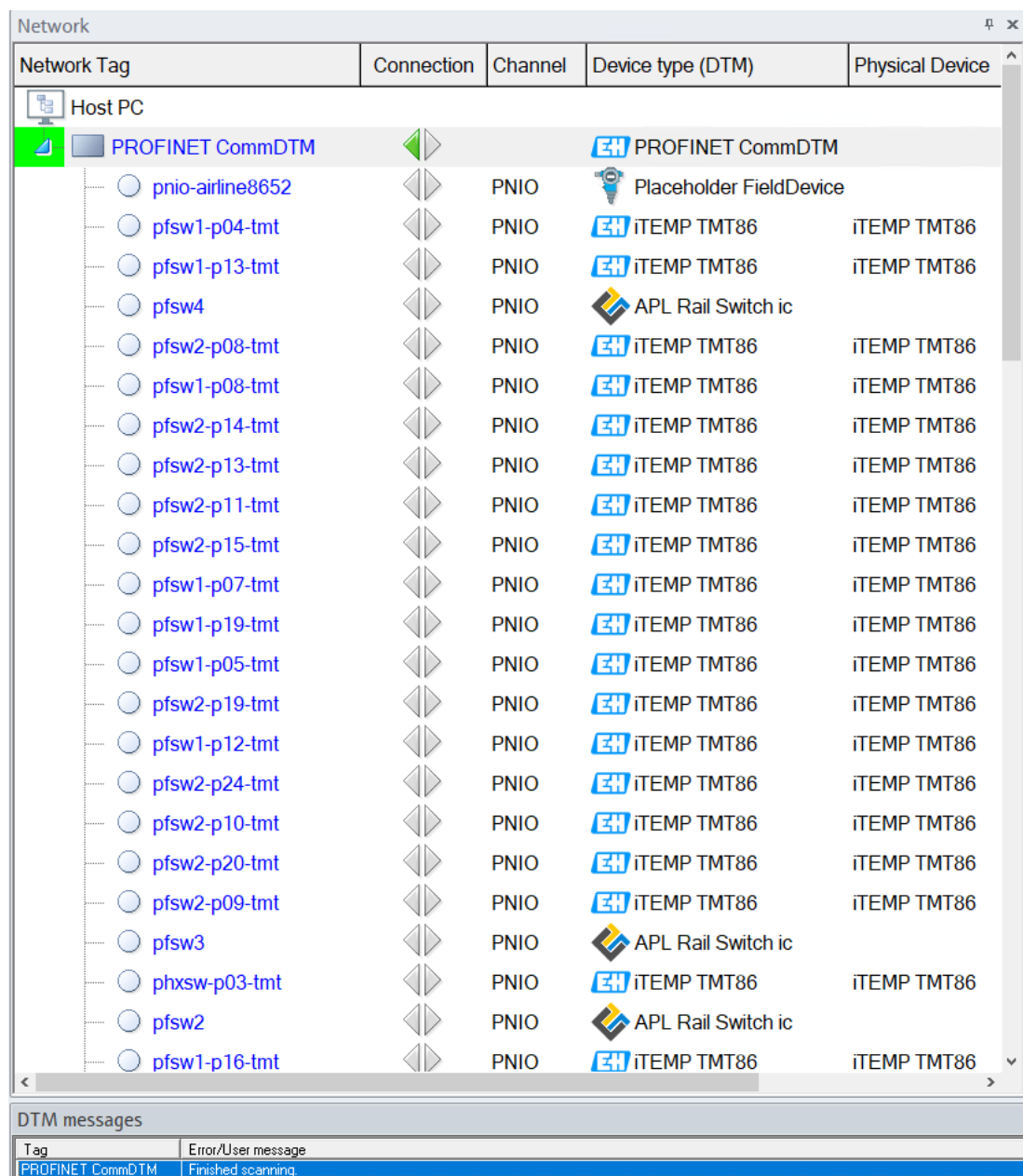
Network

Network Tag	Connection	Channel	Address
 Host PC			
 PROFINET CommDTM			-

- Select the CommDTM and click on "Create Network:"



- Network has been scanned:



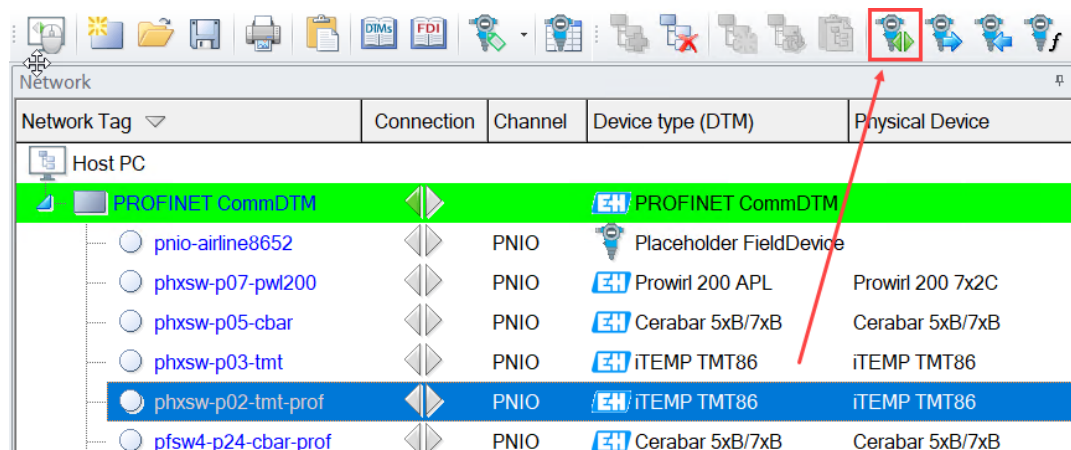
- In this example, we see different symbols in the Device Type column:



- Third party FDI Packages are marked with  (1) and have FDI standard UI.
- Endress+Hauser FDI Packages are marked with EH logo (2) and have E+H specific UI.

5.3 Device Connection

- Connect the device:



Network

Network Tag	Connection	Channel	Device type (DTM)	Physical Device
Host PC				
PROFINET CommDTM			PROFINET CommDTM	
pnio-airline8652		PNIO	Placeholder FieldDevice	
phxsw-p07-pwl200		PNIO	Prowirl 200 APL	Prowirl 200 7x2C
phxsw-p05-cbar		PNIO	Cerabar 5xB/7xB	Cerabar 5xB/7xB
phxsw-p03-tmt		PNIO	iTEMP TMT86	iTEMP TMT86
phxsw-p02-tmt-prof		PNIO	iTEMP TMT86	iTEMP TMT86
pfs4-p24-cbar-prof		PNIO	Cerabar 5xB/7xB	Cerabar 5xB/7xB


Network

Network Tag	Connection	Channel	Device type (DTM)	Physical Device
Host PC				
PROFINET CommDTM			PROFINET CommDTM	
pnio-airline8652		PNIO	Placeholder FieldDevice	
phxsw-p07-pwl200		PNIO	Prowirl 200 APL	Prowirl 200 7x2C
phxsw-p05-cbar		PNIO	Cerabar 5xB/7xB	Cerabar 5xB/7xB
phxsw-p03-tmt		PNIO	iTEMP TMT86	iTEMP TMT86
phxsw-p02-tmt-prof		PNIO	iTEMP TMT86	iTEMP TMT86
pfs4-p24-cbar-prof		PNIO	Cerabar 5xB/7xB	Cerabar 5xB/7xB


- iDTM is connected:

phxsw-p02-tmt-prof (Online Parameterize) x

Device tag
phxsw-p02-tmt-prof


Status signal
 OK


Device name
iTEMP TMT86



Locking status
 Unlocked

Sensor 1 value
32.55 °C

Device temperature
28.97 °C

Endress+Hauser 






Guidance >

Diagnostics >

Application >

System >



Do not show this message again

☐ Yes

The commissioning for this device has not yet taken place. It is recommended to use the commissioning wizard.

Maintenance ?

SD02921S/04/EN/01.24

81/84

www.endress.com/open-integration
