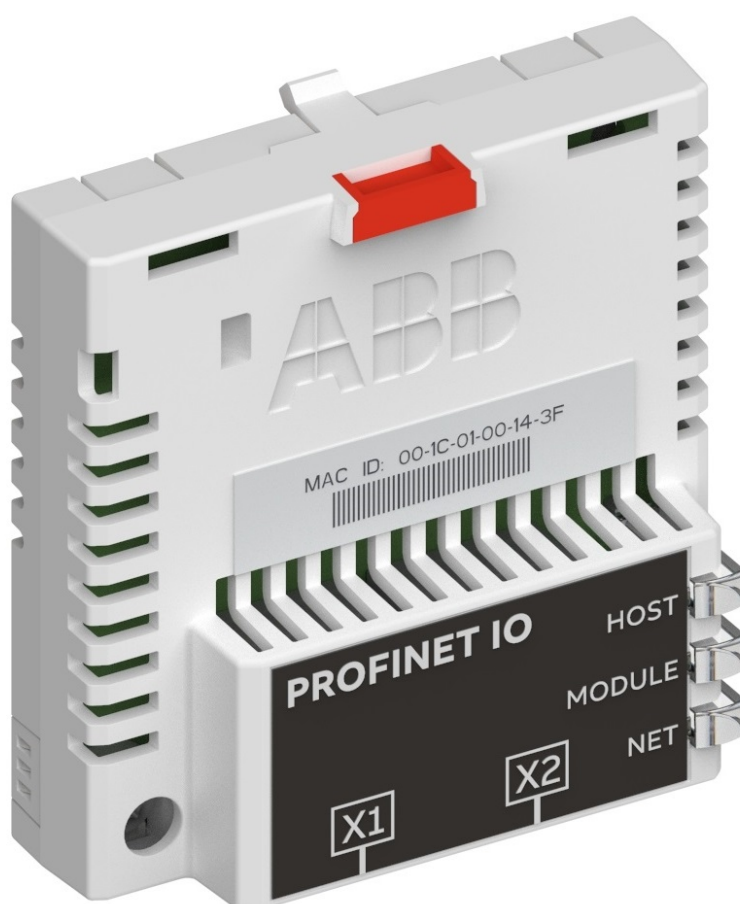


OPTIONS FOR ABB DRIVES

# FPNO-21 PROFINET fieldbus adapter module

## User's manual





# FPNO-21 PROFINET fieldbus adapter module

## User's manual

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4. Mechanical installation



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## **Further information**





# 1

## Safety instructions

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### Contents of this chapter

The chapter describes the warning symbols used in this manual and refers to the safety instructions which you must obey when you install or connect an option module. If you ignore the safety instructions, injury, death or damage can occur. Read this chapter before you start the installation.

### Safety messages

These safety messages help to prevent personal injury and damage to the equipment. The hazard levels comply with standard ANSI Z535.6.

The manual uses these warning symbols:



**▲DANGER** Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



**▲WARNING** Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



**▲CAUTION** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

**NOTICE** Is used to address practices not related to physical injury, but which can result in equipment damage.

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## Safety in installation and maintenance

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**⚠ WARNING** Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation, commissioning, or maintenance work.

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2

# Introduction to the manual

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## Contents of this chapter

This chapter introduces this manual.

## Applicability

This manual applies to the FPNO-21 PROFINET fieldbus adapter module (referred to as FPNO-21 module from here on), adapter revision Q or firmware version 3.0 or later.

## Compatibility

### ■ Drives

The FPNO-21 module is compatible with:

- ACS355 drives firmware version 5.090 and later
- ACS380 machinery control program version 2.02.0.1 and later
- ACS480 standard control program 2.02.0.3 and later
- ACS560 standard control program 2.08.0.0 and later
- ACS580 standard control program version 2.02.0.1 and later
- ACH580 HVAC control program 2.01.0.4 and later
- ACQ580 pump control program 2.03.0.3 and later
- ACS880 primary control program version 2.51.0.0 and later

**Note:** Not all compatible drives are listed here. For information on compatibility, refer to the drive firmware manual. You can check the current firmware version of the drive from parameter 07.05 Firmware version.

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## ■ Protocol

The FPNO-21 module is compatible with Ethernet standards IEEE 802.3 and IEE 802.3u, and it supports the PROFINET IO protocol.

All PROFINET IO masters that support:

- GSDML file version 2.4
- PROFINET IO protocol according to IEC standards 61158 and 61784
- PROFINET IO conformance class B
- PROFINET Security Class 1 (SC1)

are compatible with the PROFINET IO module.

The FPNO-21 module can run other protocols. You can enable and disable these protocols via web pages:

- ABB IP configuration tool
- Simple Network Time Protocol (SNTP)
- HTTPS for web page
- Open Platform Communications Unified Architecture (OPC UA)
- Multicast DNS (mDNS)
- Simple Network Management Protocol (SNMP)
- Drive composer tool via Ethernet tool network.

The FPNO-21 module can also run the NONE protocol which is the no communication protocol. In this setup, the FPNO-21 module is used to run only Ethernet services. When the PROFINET protocol is not required, select the NONE protocol.

## Target audience

This manual is intended for people who plan the installation, install, start up, use and service the module. Before you do work on the module, read this manual and the applicable drive manual that contains the hardware and safety information for the product.

You are expected to know the fundamentals of electricity, wiring, electrical components, and electrical schematic symbols.

## Purpose of the manual

The manual provides information on how to install, commission and use the FPNO-21 module.

## Cyber security disclaimer

This product is designed to be connected to and to communicate information and data via a network interface. It is the Customer's sole responsibility to provide and continuously ensure a secure connection between the product and the Customer network or any other network (as the case may be). The Customer shall establish and maintain any appropriate measures (such as, but not limited to, the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc.) to protect the product, the network, its system, and the

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interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage, and/or theft of data or information.

ABB and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage, and/or theft of data or information.

## Terms and abbreviations

| Term                    | Description                                                                                                                                                                                                                                             |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACT                     | Actual value                                                                                                                                                                                                                                            |
| Acyclic communication   | Communication in which messages are sent only once on request                                                                                                                                                                                           |
| Array                   | Parameter consisting of data fields of equal data type                                                                                                                                                                                                  |
| Command word            | See Control word.                                                                                                                                                                                                                                       |
| Control word            | 16-bit or 32-bit word from a controller to the controlled device with bit-coded control signals (sometimes called the Command word).                                                                                                                    |
| Cyclic communication    | Communication in which messages are sent cyclically at pre-defined intervals                                                                                                                                                                            |
| DAP                     | Device access point                                                                                                                                                                                                                                     |
| Data object             | Special object that contains parameter and process data                                                                                                                                                                                                 |
| DCP                     | Discovery Control Protocol. A protocol that allows the master controller to find every PROFINET IO device on a subnet.                                                                                                                                  |
| DHCP                    | Dynamic Host Control Protocol. A protocol for automating the configuration of IP devices. DHCP can be used to automatically assign IP addresses and related network information.                                                                        |
| DP                      | Decentralized Periphery                                                                                                                                                                                                                                 |
| DP-V0                   | PROFINET IO extension to the EN 50170 standard, providing the basic functionality of DP, including cyclic data exchange                                                                                                                                 |
| DP-V1                   | PROFINET IO extension to the EN 50170 standard, including, eg, acyclic data exchange                                                                                                                                                                    |
| Drive                   | Frequency converter for controlling AC motors                                                                                                                                                                                                           |
| EMC                     | Electromagnetic compatibility                                                                                                                                                                                                                           |
| Fault                   | Event that leads to tripping of the device                                                                                                                                                                                                              |
| FBA                     | Fieldbus adapter                                                                                                                                                                                                                                        |
| Fieldbus adapter module | Device through which the drive is connected to an external communication network, that is, a fieldbus                                                                                                                                                   |
| GSD file                | General Station Description file, an ASCII-format device description file in a specified form. Each different slave type on the PROFINET IO network needs to have its own GSD file. GSD files in PROFINET IO are written in GSDML.                      |
| GSDML                   | General Station Description Markup Language                                                                                                                                                                                                             |
| I/O controller          | Control system with bus initiative. In PROFINET IO terminology, I/O controllers are also called master stations.                                                                                                                                        |
| Index                   | Access reference for objects in PROFINET IO                                                                                                                                                                                                             |
| ISW                     | See ACT.                                                                                                                                                                                                                                                |
| LSB                     | Least significant bit                                                                                                                                                                                                                                   |
| MAC address             | Media Access Control address                                                                                                                                                                                                                            |
| MAP                     | Module access point                                                                                                                                                                                                                                     |
| Master                  | Control system with bus initiative. In PROFINET IO terminology, master stations are also called active stations.                                                                                                                                        |
| MSB                     | Most significant bit                                                                                                                                                                                                                                    |
| OPC UA                  | Open Platform Communications Unified Architecture                                                                                                                                                                                                       |
| PAP                     | Parameter access point                                                                                                                                                                                                                                  |
| Parameter               | In the drive or converter control program, parameter is a user-adjustable setting, or a read-only monitoring signal.<br>In some (for example fieldbus) contexts, a value that can be accessed as an object. For example, variable, constant, or signal. |

| Term                          | Description                                                                                                                                                |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameter/Process data object | Special object that contains parameter and process data                                                                                                    |
| PD                            | Process data                                                                                                                                               |
| PKE                           | Parameter identification                                                                                                                                   |
| PKW                           | Parameter identification value                                                                                                                             |
| PLC                           | Programmable logic controller                                                                                                                              |
| PNU                           | Parameter number                                                                                                                                           |
| PPO                           | Parameter/Process data object                                                                                                                              |
| Process data                  | Data that contains a Control word and reference value or a Status word and actual value. May also contain other (user-definable) control information.      |
| Profile                       | Adaptation of a communication protocol for a certain application field (for example, drives)                                                               |
| PROFINET S2                   | PROFINET S2 system redundancy device has one Network Access Point (NAP) interface which supports two redundant connections from two redundant controllers. |
| PWE                           | Parameter value                                                                                                                                            |
| PZD                           | PD, Process data                                                                                                                                           |
| PZDO                          | Process data object                                                                                                                                        |
| SAP                           | Service access point                                                                                                                                       |
| Slave                         | Passive bus participant. In PROFINET IO terminology, slave stations (or slaves) are also called passive stations. Also referred to as a node.              |
| SNTP                          | Simple Network Time Protocol. A protocol to synchronize drive time with the network time server.                                                           |
| SOW                           | Reference                                                                                                                                                  |
| Status word                   | 16-bit or 32-bit word from a controlled device to the controller with bit-coded status signals                                                             |
| STW                           | Control word                                                                                                                                               |
| Warning                       | Signal caused by an existing alarm which does not lead to tripping of the device                                                                           |
| ZSW                           | Status word                                                                                                                                                |

## Related documents

| Manual                                                 | Code                            |
|--------------------------------------------------------|---------------------------------|
| <b>Drive hardware manuals and guides</b>               |                                 |
| ACS380-04 manuals                                      | <a href="#">9AAK10103A6193</a>  |
| ACS480 manuals                                         | <a href="#">9AKK106930A8739</a> |
| ACH480 manuals                                         | <a href="#">9AKK107046A8101</a> |
| ACS580-01 manuals                                      | <a href="#">9AKK105713A8085</a> |
| ACH580-01 manuals                                      | <a href="#">9AKK10103A0587</a>  |
| ACQ580-01 manuals                                      | <a href="#">9AKK106713A2709</a> |
| ACS580-04 manuals                                      | <a href="#">9AKK106930A9060</a> |
| ACH580-04 manuals                                      | <a href="#">9AKK106930A9059</a> |
| ACQ580-04 manuals                                      | <a href="#">9AKK106930A9053</a> |
| ACS580-07 manuals                                      | <a href="#">9AKK106930A5239</a> |
| ACH580-07 manuals                                      | <a href="#">9AKK106930A5241</a> |
| ACQ580-07 manuals                                      | <a href="#">9AKK106930A3150</a> |
| ACS880-01 manuals                                      | <a href="#">9AKK105408A7004</a> |
| ACS880-04 manuals                                      | <a href="#">9AKK105713A4819</a> |
| ACS880-07 (45 to 710 kW) manuals                       | <a href="#">9AKK105408A8149</a> |
| ACS880-07 (560 to 2800 kW) manuals                     | <a href="#">9AKK105713A6663</a> |
| ACS880-07LC manuals                                    | <a href="#">9AKK107680A9275</a> |
| ACS880-11 manuals                                      | <a href="#">9AKK106930A9565</a> |
| ACS880-14 manuals                                      | <a href="#">9AKK107045A8023</a> |
| ACS880-17 (45 to 400 kW) manuals                       | <a href="#">9AKK106930A3466</a> |
| ACS880-17 (160 to 3200 kW) manuals                     | <a href="#">9AKK106354A1499</a> |
| ACS880-17LC manuals                                    | <a href="#">9AKK107492A4721</a> |
| ACS880-31 manuals                                      | <a href="#">9AKK106930A9564</a> |
| ACS880-34 manuals                                      | <a href="#">9AKK107045A8025</a> |
| ACS880-37 (45 to 400 kW) manuals                       | <a href="#">9AKK106930A3467</a> |
| ACS880-37 (160 to 3200 kW) manuals                     | <a href="#">9AKK106354A1500</a> |
| ACS880-37LC manuals                                    | <a href="#">9AKK107492A4722</a> |
| ACS880 multidrive manuals                              | <a href="#">9AKK106103A9122</a> |
| ACS880 multidrive module manuals                       | <a href="#">9AKK105713A3673</a> |
| <b>Option manuals and guides</b>                       |                                 |
| FPNO-21 PROFINET fieldbus adapter module user's manual | <a href="#">3AXD50000158614</a> |
| FPNO-21 PROFINET adapter module quick guide            | <a href="#">3AXD50000158577</a> |

The links above contain lists of documents.

For more documentation, go to [www.abb.com/drives/documents](http://www.abb.com/drives/documents).

For manuals not available in ABB Library, contact your local ABB representative.



FPNO-21 PROFINET fieldbus adapter module  
User's manual



Fieldbus connectivity web page

# 3

## Overview of the Ethernet network and the FPNO-21 module

---

### Contents of this chapter

This chapter contains a short description of the Ethernet network and the topology supported by the FPNO-21 module.

### Ethernet network

Ethernet standards support a variety of physical media (coaxial cable, twisted pair, fiber optics) and topologies (bus and star).

The FPNO-21 module supports:

- twisted pair as the physical media
- star topology, daisy chain topology and ring topology ([Media Redundancy Protocol \(MRP\) \(page 67\)](#))
- PROFINET S2 system redundancy with two redundant controllers.

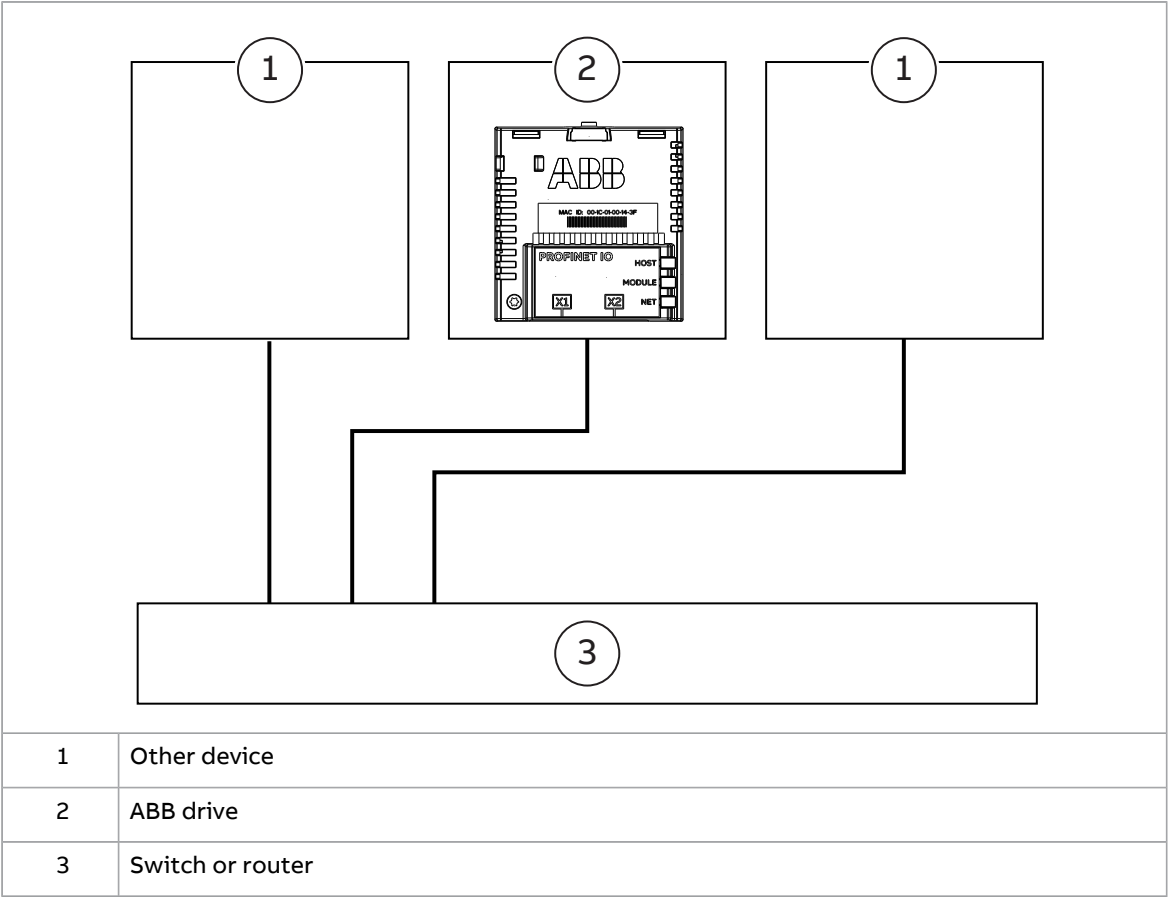
The maximum length for an Ethernet segment on twisted pair media is 100 m (328 ft). All twisted pair media between the Ethernet node and the switch or router must be shorter than 100 m (328 ft), including media within patch panels.

#### ■ Example topology of the Ethernet link

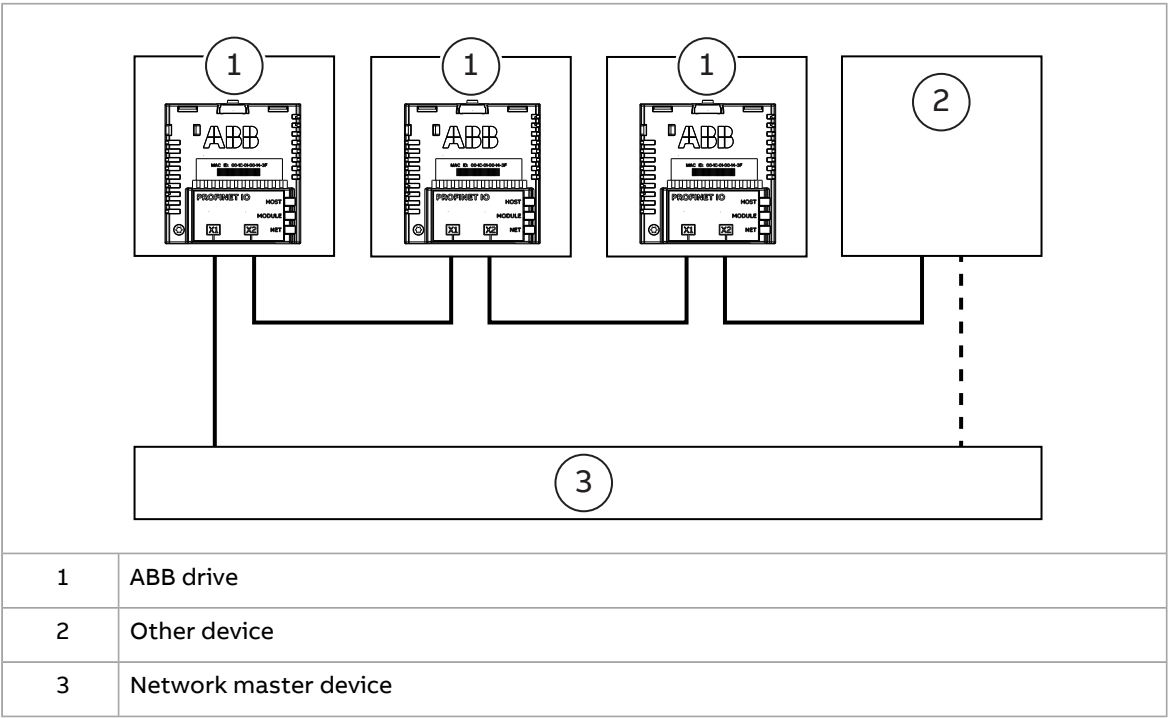
The figures below show example topologies for an Ethernet network with FPNO-21 module.

---

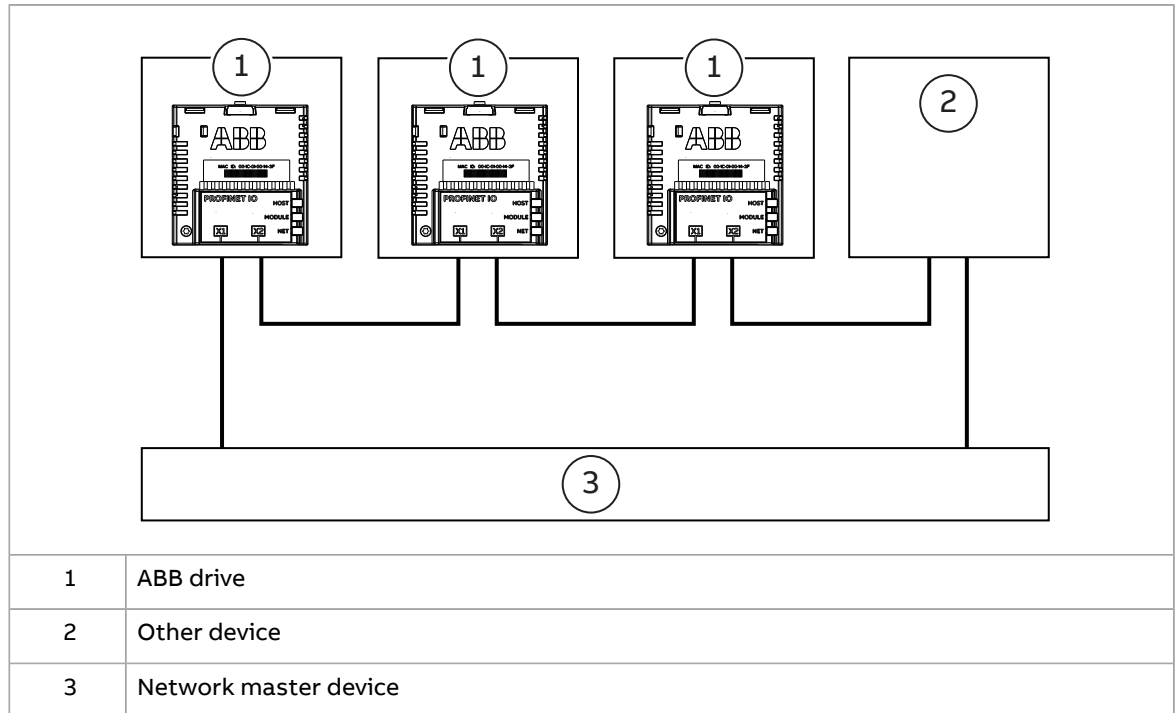
Star topology



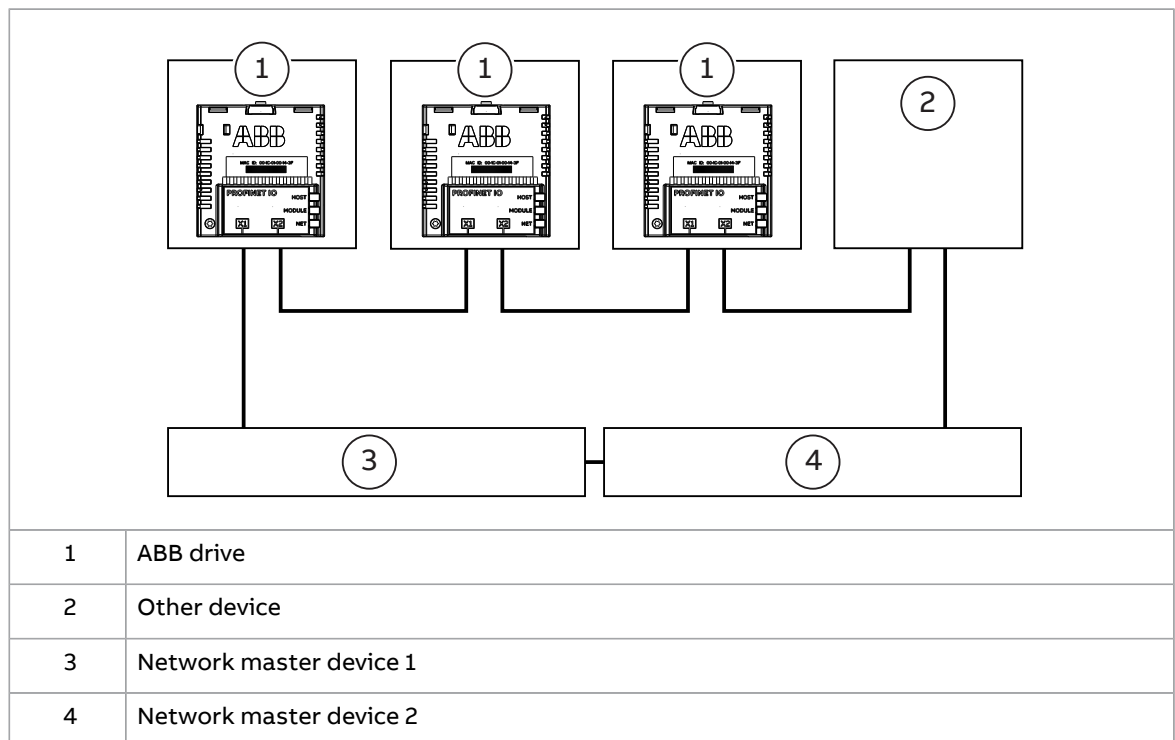
Daisy chain topology



### Ring (MRP) topology



### Ring topology with two redundant controllers



## **FPNO-21 module overview**

The FPNO-21 adapter module is a plug-in device for ABB drives which enables the connection of the drive to a PROFINET IO network.

Through the FPNO-21 module you can:

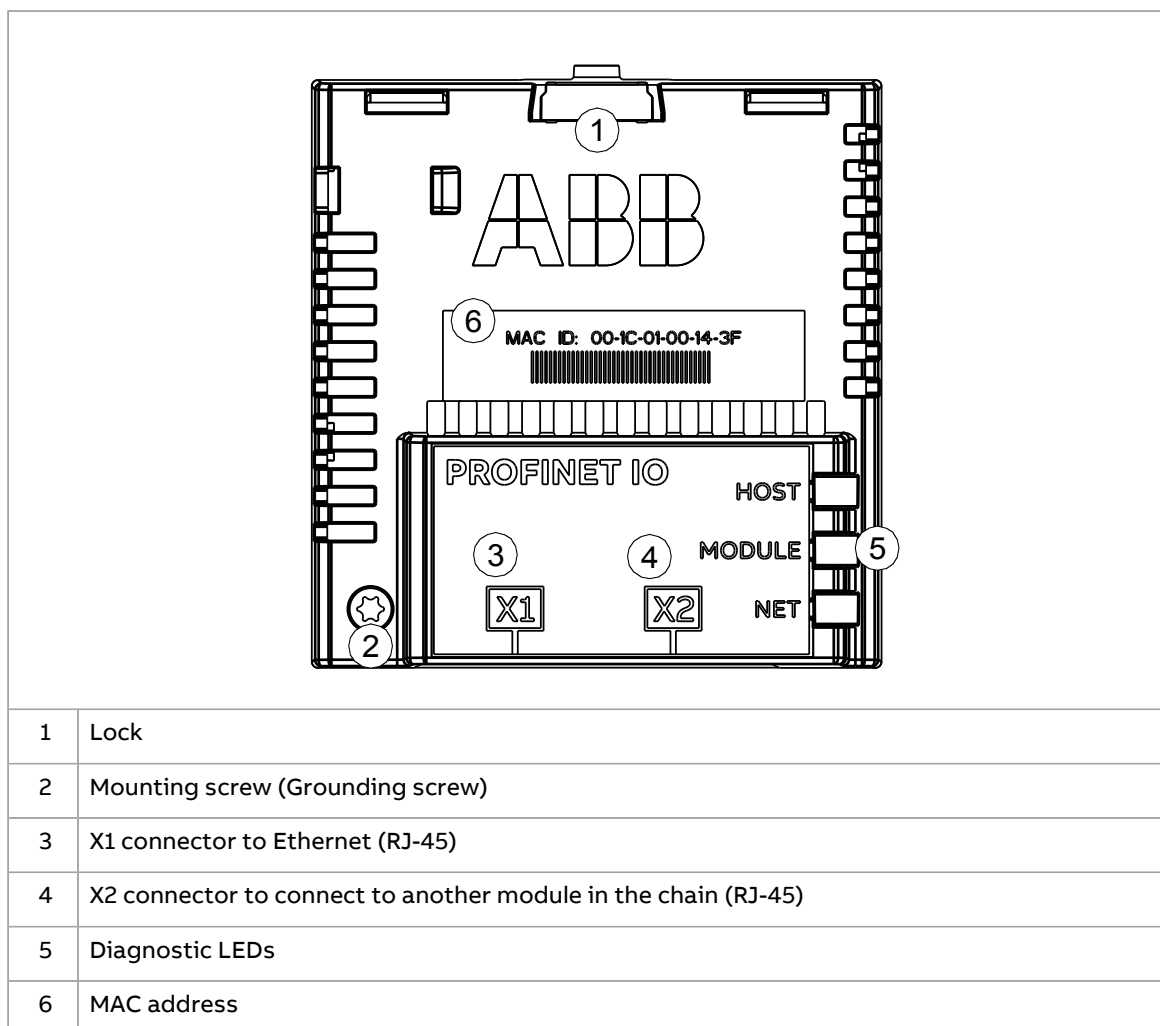
- give control commands to the drive (for example, Start, Stop, Run enable)
- feed a motor speed or torque reference to the drive
- give a process actual value or a process reference to the PID controller of the drive
- read status information and actual values from the drive
- reset a drive fault
- read/write parameters of the drive
- synchronize the real time clock
- connect to the drive via OPC UA client for monitoring and diagnostics of the drive
- connect a PC with the Drive Composer pro tool.

The adapter module supports 10 Mbit/s and 100 Mbit/s data transfer rates and automatically detects the data transfer rate of the network.

**Note:** PROFINET IO uses only 100 Mbit/s in the full-duplex mode.

The FPNO-21 module is installed into an option slot on the drive control unit. Refer to the drive manuals for module placement options.

### ■ FPNO-21 module layout



# 4

## Mechanical installation

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### Contents of this chapter

This chapter contains a delivery checklist and instructions on installing the module.

### Necessary tools and instructions

Use a Torx TX10 screwdriver to attach the FPNO-21 module to the drive. For more information, refer to the drive hardware manual.

### Unpacking and examining the delivery

1. Open the option package.
2. Make sure that the package contains:
  - fieldbus module, type FPNO-21
  - quick guide.
3. Make sure that there are no signs of damage.

### Before you start

Install the FPNO-21 module in a free option slot on the drive control unit. Plastic pins, a lock and one screw hold the module in place. The screw also makes an electrical connection between the FPNO-21 module and drive frame for cable shield grounding.

Do not install the FPNO-21 module on the FEA-03 F-series extension adapter.

When you install the FPNO-21 module, it makes the signal and power connection to the drive through a 20-pin connector.

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## Installing option modules



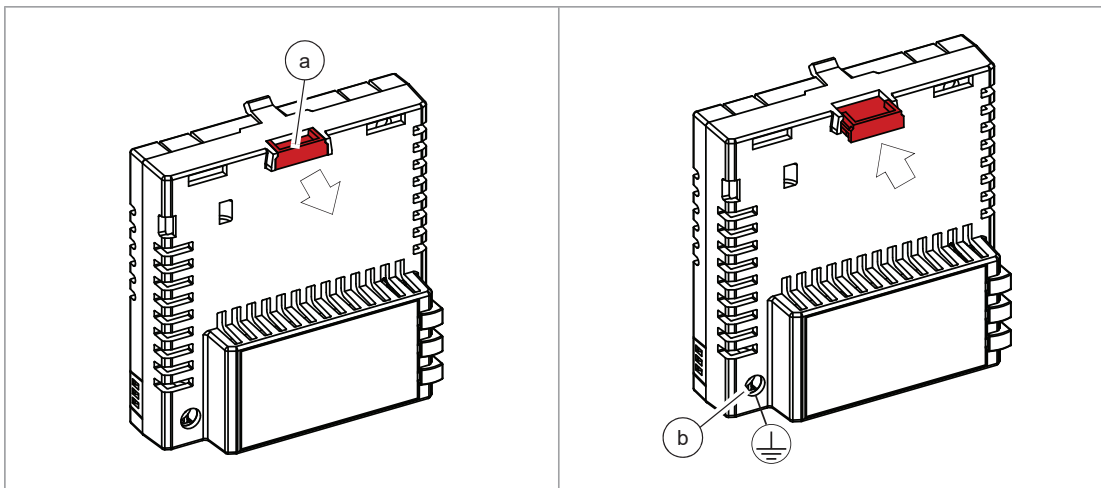
**⚠ WARNING** Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do electrical installation, commissioning or maintenance work.

Pay attention to the free space required by the cabling and terminals that connect to the option modules.

1. Stop the drive and do the steps in section **Electrical safety precautions** of the drive hardware manual.
2. Get access to the drive control unit. For the location of the control unit, refer to the drive hardware manual.
3. Pull out the lock on the module (a).
4. Install the module in a free option module slot on the control unit.
5. Push in the lock on the module (a).
6. Torque the grounding screw (b) to 0.8 N·m (7 lbf·in).

**Note:** The screw tightens the connections and grounds the module. It is necessary for fulfilling the EMC requirements and for correct operation of the module.

**NOTICE** Do not tighten the screw too much or too little. If you tighten the screw too much, damage to the threads or to the module can occur. A loose screw can cause a malfunction.



7. Connect the wiring to the module. Obey the instructions in this manual.

If you must remove the adapter module after it was installed into the drive, use a suitable tool (for example, small pliers) to carefully pull out the lock.

# 5

## Electrical installation

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### Contents of this chapter

This chapter contains general cabling instructions and instructions on how to connect the FPNO-21 module to the Ethernet network and the drive.

### Necessary tools and instructions

Refer to the drive hardware manual.



### General cabling instructions

- Arrange the bus cables as far away from the motor cables as possible.
- Avoid parallel runs.
- Use grommets at cable entries.

### Connecting the FPNO-21 module to the network

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**⚠ WARNING** Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur.

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The network cable can be CAT5 or higher, braided and foiled shield, with a minimum wire size of AWG 22 / 0.32mm<sup>2</sup>. Use a PROFINET-certified cable. The cable shield is connected to the drive frame through an RC network. Use a dedicated PROFINET-cable for PROFINET installation.

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**Note:** Further information on PROFINET-wiring is available from the PROFIBUS organization publications at <https://www.profibus.com/download/profinet-installation-guidelines/>

- Design guideline, Order no. 8.062
  - Installation guideline for cabling and assembly, Order no. 8.072
  - Commissioning guide, Order no. 8.082
1. Connect the network cable to the RJ-45 connector (X1) on the adapter module.
  2. If you want to create a daisy chain with FPNO-21 modules, connect the X2 connector of the first adapter module to X1 on the next adapter module, and so on.

**Note:** If a device in the daisy chain is powered off or fails, the rest of the chain is disconnected from the network. In applications where this is not acceptable, consider using ring topology instead.



# 6

## PROFINET IO – Start-up

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### Contents of this chapter

This chapter contains:

- information on how to configure the drive for operation with the module
- drive-specific instructions on how to start-up the drive with the module
- examples of configuring the master station for communication with the module.

### Warnings

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**⚠ WARNING** Obey the safety instructions given in this manual and the drive documentation.

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### Drive configuration

This information applies to all drive types that are compatible with the FPNO-21 module, unless otherwise stated.

#### ■ PROFINET IO connection configuration

After the FPNO-21 module is mechanically and electrically installed, prepare the drive for communication with the module.

The procedure to set the module for PROFINET IO communication with the drive depends on the drive type. Typically, you must set the PROFINET parameters to establish the communication. Refer to [Starting up fieldbus communication for drives \(page 41\)](#).

When the communication between the drive and the FPNO-21 module is established, the user can see several configuration parameters. These parameters are listed in the

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tables below. Examine the parameters and adjust them if it is necessary. You can adjust the parameters through a drive control panel, a web user interface, or a PC tool.

- The new parameter settings take effect only when you power up the module the next time or when you activate the fieldbus adapter refresh parameter.

### FPNO-21 configuration parameters – group A (group 1)

**Note:** The actual parameter group number depends on the drive type. Group A (group 1) corresponds to:

- parameter group 51 in ACS380, ACS480, ACH580, ACQ580 and ACS580.
- parameter group 51 in ACS880 if the adapter is installed as fieldbus adapter A or group 54 if the adapter is installed as fieldbus adapter B.

| No. | Name/Value                   | Description                                                                                                                                                                                                                     | Default                  |
|-----|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 01  | FBA type                     | <b>Read-only.</b> Shows the fieldbus adapter type as detected by the drive. The value cannot be adjusted by the user.<br>If the value is 0 = None, the communication between the drive and the module has not been established. | <b>132</b> = PROFINET IO |
| 02  | Protocol.Profile             | Selects the application protocol and communication profile for the network connection.<br>The selections available for PROFINET IO communication are listed below.                                                              | <b>11</b> = PNIO ABB Pro |
|     | <b>10</b> = PNIO Pdrive      | PROFINET IO protocol: PROFIdrive profile                                                                                                                                                                                        |                          |
|     | <b>11</b> = PNIO ABB Pro     | PROFINET IO protocol: ABB Drives profile                                                                                                                                                                                        |                          |
|     | <b>12</b> = PNIO T16         | PROFINET IO protocol: Transparent 16-bit profile                                                                                                                                                                                |                          |
|     | <b>13</b> = PNIO T32         | PROFINET IO protocol: Transparent 32-bit profile                                                                                                                                                                                |                          |
|     | <b>14</b> = PNIO PdriveM     | PROFINET IO protocol: PROFIdrive positioning mode                                                                                                                                                                               |                          |
|     | <b>15</b> = PNIO Pdrive v4.2 | PROFINET IO protocol: PROFIdrive v4.2 profile                                                                                                                                                                                   |                          |
| 03  | Commrate                     | Sets the bit rate for the Ethernet interface.                                                                                                                                                                                   | <b>0</b> = Auto          |
|     | <b>0</b> = Auto              | Auto-negotiate                                                                                                                                                                                                                  |                          |
|     | <b>1</b> = 100 Mbps FD       | 100 Mbps, full-duplex                                                                                                                                                                                                           |                          |
|     | <b>2</b> = 100 Mbps HD       | 100 Mbps, half-duplex                                                                                                                                                                                                           |                          |
|     | <b>3</b> = 10 Mbps FD        | 10 Mbps, full-duplex                                                                                                                                                                                                            |                          |
|     | <b>4</b> = 10 Mbps HD        | 10 Mbps, half-duplex                                                                                                                                                                                                            |                          |

| No.             | Name/Value       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Default       |
|-----------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 04              | IP configuration | Sets the method for configuring the IP address, subnet mask and gateway address for the module. In a PROFINET IO network, the master controller has a Duplicate Address Detection mechanism.<br><br><b>Note:</b> It is recommended to use IP setting for PROFINET as Static IP and address 0.0.0.0. Use PLC hardware configuration to set the IP address for each device in the network.                                                                                                                                                                               | 0 = Static IP |
|                 | 0 = Static IP    | Configuration will be obtained from parameters 05...13 or from the PLC via DCP. The DCP protocol allows the master controller to find every PROFINET IO device on a subnet. When the adapter module is configured for the PROFINET IO protocol, the IP address is transferred to the PROFINET IO communication stack.<br>If there is a need to change the IP address configured via DCP, it should be done with a DCP tool, such as Siemens Step7. If some of the other methods are used to change the IP address, the module must be restarted to enable any changes. |               |
|                 | 2 = Temp IP      | IP address is set as Temporary through DCP by the controller.<br>Parameters 05...13 shows the set IP. After adapter refresh this setting goes back to static IP and address 0.0.0.0 is taken to use. This setting cannot be set by the user.                                                                                                                                                                                                                                                                                                                           |               |
| 05<br>...<br>08 | IP address 1     | An IP address is assigned to each IP node on a network. An IP address is a 32-bit number that is typically represented in "dotted decimal" notation consisting of four decimal integers, on the range 0...255, separated by periods. Each integer represents the value of one octet (8-bits) in the IP address. Parameters 05...08 define the four octets of the IP address.                                                                                                                                                                                           | 0             |
|                 | 0...255          | IP address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |
|                 | ...              | ...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ...           |
|                 | IP address 4     | See parameter 05 IP address 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0             |
|                 | 0...255          | IP address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |

### 30 PROFINET IO – Start-up

| No.             | Name/Value    | Description                                                                                                                                                                                                                                                                                                                             | Default   |                |
|-----------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------|
| 09              | Subnet CIDR   | Subnet masks are used for splitting networks into smaller networks called subnets. A subnet mask is a 32-bit binary number that splits the IP address into a network address and host address. Subnet masks are typically represented in either dotted decimal notation or the more compact CIDR notation, as shown in the table below. | 0         |                |
|                 |               |                                                                                                                                                                                                                                                                                                                                         |           |                |
|                 | CIDR          | Dotted decimal                                                                                                                                                                                                                                                                                                                          | CIDR      | Dotted decimal |
|                 | 31            | 255.255.255.254                                                                                                                                                                                                                                                                                                                         | 15        | 255.254.0.0    |
|                 | 30            | 255.255.255.252                                                                                                                                                                                                                                                                                                                         | 14        | 255.252.0.0    |
|                 | 29            | 255.255.255.248                                                                                                                                                                                                                                                                                                                         | 13        | 255.248.0.0    |
|                 | 28            | 255.255.255.240                                                                                                                                                                                                                                                                                                                         | 12        | 255.240.0.0    |
|                 | 27            | 255.255.255.224                                                                                                                                                                                                                                                                                                                         | 11        | 255.224.0.0    |
|                 | 26            | 255.255.255.192                                                                                                                                                                                                                                                                                                                         | 10        | 255.192.0.0    |
|                 | 25            | 255.255.255.128                                                                                                                                                                                                                                                                                                                         | 9         | 255.128.0.0    |
|                 | 24            | 255.255.255.0                                                                                                                                                                                                                                                                                                                           | 8         | 255.0.0.0      |
|                 | 23            | 255.255.254.0                                                                                                                                                                                                                                                                                                                           | 7         | 254.0.0.0      |
|                 | 22            | 255.255.252.0                                                                                                                                                                                                                                                                                                                           | 6         | 252.0.0.0      |
|                 | 21            | 255.255.248.0                                                                                                                                                                                                                                                                                                                           | 5         | 248.0.0.0      |
|                 | 20            | 255.255.240.0                                                                                                                                                                                                                                                                                                                           | 4         | 240.0.0.0      |
|                 | 19            | 255.255.224.0                                                                                                                                                                                                                                                                                                                           | 3         | 224.0.0.0      |
|                 | 18            | 255.255.192.0                                                                                                                                                                                                                                                                                                                           | 2         | 192.0.0.0      |
| 17              | 255.255.128.0 | 1                                                                                                                                                                                                                                                                                                                                       | 128.0.0.0 |                |
| 16              | 255.255.0.0   |                                                                                                                                                                                                                                                                                                                                         |           |                |
|                 |               |                                                                                                                                                                                                                                                                                                                                         |           |                |
| 1...31          |               | Subnet mask in CIDR notation                                                                                                                                                                                                                                                                                                            |           |                |
| 10<br>...<br>13 | GW address 1  | IP gateways connect individual physical IP subnets into a unified IP network. When an IP node needs to communicate with an IP node on another subnet, the IP node sends the data to the IP gateway for forwarding. Parameters 10...13 define the four octets of the gateway address.                                                    | 0         |                |
|                 | 0...255       | GW address                                                                                                                                                                                                                                                                                                                              |           |                |
|                 | ...           | ...                                                                                                                                                                                                                                                                                                                                     | ...       |                |
|                 | GW address 4  | See parameter 10 GW address 1.                                                                                                                                                                                                                                                                                                          | 0         |                |
|                 | 0...255       | GW address                                                                                                                                                                                                                                                                                                                              |           |                |

| No. | Name/Value              | Description                                                                           | Default         |
|-----|-------------------------|---------------------------------------------------------------------------------------|-----------------|
| 14  | Commrate 2              | Sets the bit rate for the Ethernet port 2.                                            | <b>0</b> = Auto |
|     | <b>0</b> = Auto         | Autonegotiate                                                                         |                 |
|     | <b>1</b> = 100 Mbps FD  | 100 Mbps, full-duplex                                                                 |                 |
|     | <b>2</b> = 100 Mbps HD  | 100 Mbps, half-duplex                                                                 |                 |
|     | <b>3</b> = 10 Mbps FD   | 10 Mbps, full-duplex                                                                  |                 |
|     | <b>4</b> = 10 Mbps HD   | 10 Mbps, half-duplex                                                                  |                 |
|     | <b>5</b> = Disable Port | Disable Ethernet port. ABB recommends to disable the second port if it is not in use. |                 |

| No.                 | Name/Value            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Default                       |                                                                                                                                                                                                                                                                                         |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                  |   |                |                                                                                                                                                                               |   |                    |                                                                       |   |             |                                                                                                   |  |
|---------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|---|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------|---------------------------------------------------------------------------|---|--------------------------|-----------------------------------------------------------------------------------------------------|---|-----------------------|---------------------------------------------------------------------|---|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------|--------------------------------------------------------|---|---------------------------|------------------------------------------------------------------|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------|-----------------------------------------------------------------------|---|-------------|---------------------------------------------------------------------------------------------------|--|
| 15                  | Service configuration | Disables services that are not required.<br>Each service is represented by a single bit. Bit 0, Lock configuration, can be used to prevent accidental changing of this parameter.<br>By default, all services are enabled and configuration is unlocked.<br>ABB recommends to disable all services that are not used after commissioning.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                               |                                                                                                                                                                                                                                                                                         |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                  |   |                |                                                                                                                                                                               |   |                    |                                                                       |   |             |                                                                                                   |  |
|                     |                       | <table><tr><th>Bit</th><th>Name</th><th>Information</th></tr><tr><td>0</td><td>Lock configuration</td><td>Changing this bit to one will lock service configuration and no bit can be changed. Only resetting the fieldbus configuration will unlock the parameter. To reset the fieldbus configuration, choose "Reset all fieldbus settings" or "Clear all" in parameter 96.06 Parameter restore.</td></tr><tr><td>1</td><td>Disable IP config tool</td><td>When this bit is set, access from ABB IP Configuration tool is prevented.</td></tr><tr><td>2</td><td>Disable ETH tool network</td><td>When this bit is set, access from Ethernet tool network (eg, ABB Drive Composer tool) is prevented.</td></tr><tr><td>3</td><td>Disable ping response</td><td>When this bit is set, response to ICMP (ping) message is prevented.</td></tr><tr><td>4</td><td>Unsecured ETH tool network</td><td>When this bit is set, access from Ethernet tool network is unsecured.<br/><b>Note:</b> Drive Composer pro before V2.7 supports unsecured communication only.</td></tr><tr><td>5</td><td>Disable configuring web pages</td><td>When this bit is set, access to web pages is disabled.</td></tr><tr><td>6</td><td>Web-based firmware update</td><td>When this bit is set, the web-based firmware update is disabled.</td></tr><tr><td>7</td><td>Disable OPC UA</td><td>When this bit is set, the OPC UA server is disabled. OPC UA is not enabled by default. For more information, refer to <a href="#">Appendix E - OPC UA server (page 181)</a>.</td></tr><tr><td>8</td><td>Unencrypted OPC UA</td><td>When this bit is set, connection to the OPC UA server is unencrypted.</td></tr><tr><td>9</td><td>Enable mDNS</td><td>To enable mDNS, set this bit to 1. To disable mDNS set to 0.<br/>By default, the mDNS is disabled.</td></tr></table> |                               | Bit                                                                                                                                                                                                                                                                                     | Name | Information | 0 | Lock configuration | Changing this bit to one will lock service configuration and no bit can be changed. Only resetting the fieldbus configuration will unlock the parameter. To reset the fieldbus configuration, choose "Reset all fieldbus settings" or "Clear all" in parameter 96.06 Parameter restore. | 1 | Disable IP config tool | When this bit is set, access from ABB IP Configuration tool is prevented. | 2 | Disable ETH tool network | When this bit is set, access from Ethernet tool network (eg, ABB Drive Composer tool) is prevented. | 3 | Disable ping response | When this bit is set, response to ICMP (ping) message is prevented. | 4 | Unsecured ETH tool network | When this bit is set, access from Ethernet tool network is unsecured.<br><b>Note:</b> Drive Composer pro before V2.7 supports unsecured communication only. | 5 | Disable configuring web pages | When this bit is set, access to web pages is disabled. | 6 | Web-based firmware update | When this bit is set, the web-based firmware update is disabled. | 7 | Disable OPC UA | When this bit is set, the OPC UA server is disabled. OPC UA is not enabled by default. For more information, refer to <a href="#">Appendix E - OPC UA server (page 181)</a> . | 8 | Unencrypted OPC UA | When this bit is set, connection to the OPC UA server is unencrypted. | 9 | Enable mDNS | To enable mDNS, set this bit to 1. To disable mDNS set to 0.<br>By default, the mDNS is disabled. |  |
|                     |                       | Bit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Name                          | Information                                                                                                                                                                                                                                                                             |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                  |   |                |                                                                                                                                                                               |   |                    |                                                                       |   |             |                                                                                                   |  |
|                     |                       | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Lock configuration            | Changing this bit to one will lock service configuration and no bit can be changed. Only resetting the fieldbus configuration will unlock the parameter. To reset the fieldbus configuration, choose "Reset all fieldbus settings" or "Clear all" in parameter 96.06 Parameter restore. |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                  |   |                |                                                                                                                                                                               |   |                    |                                                                       |   |             |                                                                                                   |  |
|                     |                       | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Disable IP config tool        | When this bit is set, access from ABB IP Configuration tool is prevented.                                                                                                                                                                                                               |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                  |   |                |                                                                                                                                                                               |   |                    |                                                                       |   |             |                                                                                                   |  |
|                     |                       | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Disable ETH tool network      | When this bit is set, access from Ethernet tool network (eg, ABB Drive Composer tool) is prevented.                                                                                                                                                                                     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                  |   |                |                                                                                                                                                                               |   |                    |                                                                       |   |             |                                                                                                   |  |
|                     |                       | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Disable ping response         | When this bit is set, response to ICMP (ping) message is prevented.                                                                                                                                                                                                                     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                  |   |                |                                                                                                                                                                               |   |                    |                                                                       |   |             |                                                                                                   |  |
|                     |                       | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Unsecured ETH tool network    | When this bit is set, access from Ethernet tool network is unsecured.<br><b>Note:</b> Drive Composer pro before V2.7 supports unsecured communication only.                                                                                                                             |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                  |   |                |                                                                                                                                                                               |   |                    |                                                                       |   |             |                                                                                                   |  |
|                     |                       | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Disable configuring web pages | When this bit is set, access to web pages is disabled.                                                                                                                                                                                                                                  |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                  |   |                |                                                                                                                                                                               |   |                    |                                                                       |   |             |                                                                                                   |  |
|                     |                       | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Web-based firmware update     | When this bit is set, the web-based firmware update is disabled.                                                                                                                                                                                                                        |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                  |   |                |                                                                                                                                                                               |   |                    |                                                                       |   |             |                                                                                                   |  |
|                     |                       | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Disable OPC UA                | When this bit is set, the OPC UA server is disabled. OPC UA is not enabled by default. For more information, refer to <a href="#">Appendix E - OPC UA server (page 181)</a> .                                                                                                           |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                  |   |                |                                                                                                                                                                               |   |                    |                                                                       |   |             |                                                                                                   |  |
|                     |                       | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Unencrypted OPC UA            | When this bit is set, connection to the OPC UA server is unencrypted.                                                                                                                                                                                                                   |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                  |   |                |                                                                                                                                                                               |   |                    |                                                                       |   |             |                                                                                                   |  |
| 9                   | Enable mDNS           | To enable mDNS, set this bit to 1. To disable mDNS set to 0.<br>By default, the mDNS is disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                               |                                                                                                                                                                                                                                                                                         |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                  |   |                |                                                                                                                                                                               |   |                    |                                                                       |   |             |                                                                                                   |  |
| 000000b ... 111111b | Service configuration |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                               |                                                                                                                                                                                                                                                                                         |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                  |   |                |                                                                                                                                                                               |   |                    |                                                                       |   |             |                                                                                                   |  |

| No.      | Name/Value       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Default          |
|----------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| 16       | Module emulation | Emulation mode for PROFINET IO identification data of FENA modules. Activates/inactivates the emulation mode, and selects the PROFINET IO identification data for the emulation. Refer to <a href="#">Emulation modes</a> .                                                                                                                                                                                                                                                     | 0 = No emulation |
|          | 0 = No emulation | FPNO-21 native identification data used. Use FPNO-21 GSDML to configure PLC.                                                                                                                                                                                                                                                                                                                                                                                                    |                  |
|          | 1 = FENA-01      | FENA-01 identification data used. Use when PLC is configured for FENA-01. Connect only port 1 to Profinet network.                                                                                                                                                                                                                                                                                                                                                              |                  |
|          | 2 = FENA-11      | FENA-11 identification data used. Use when PLC is configured for FENA-11. Connect only port 1 to Profinet network.                                                                                                                                                                                                                                                                                                                                                              |                  |
|          | 3 = FENA-21      | FENA-21 identification data used. Use when PLC is configured for FENA-21.                                                                                                                                                                                                                                                                                                                                                                                                       |                  |
|          | 4 = VIK-NAMUR    | VIK-NAMUR identification data used. Use when PLC is configured for VIK-NAMUR drive.                                                                                                                                                                                                                                                                                                                                                                                             |                  |
| 17<br>18 | Reserved         | These parameters are not used by the adapter module when the module is configured for PROFINET IO.                                                                                                                                                                                                                                                                                                                                                                              | N/A              |
| 19       | T16 scale        | Defines the scaling for reference 1 and actual 1 with Transparent 16 profile. (Protocol.Profile = PNIO T16)<br>Scaling also depends on the selected Reference type on 50.04 FBA A Ref 1 type and 50.34 FBA B Ref 1 type and 50.07 and 50.37 for the actual 1.<br>Ref type = Transparent<br>$\text{FBA\_A/B\_Ref1} = \text{Ref1\_from\_PLC} * (\text{T16\_Scale} + 1)$<br>Ref type = General<br>$\text{FBA\_A/B\_Ref1} = \text{Ref1\_from\_PLC} * (\text{T16\_Scale} + 1) / 100$ | 99               |
|          | 0...65535        | Reference multiplier/actual value divisor                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |

| No.          | Name/Value          | Description                                                                                                                                                                                                                                                                               | Default            |
|--------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 20           | Telegram type       | <b>Read-only.</b> Indicates the telegram type selected for PROFINET IO communication. The adapter module automatically detects the telegram type defined in the PLC.<br>For more information on the supported PPO message types, refer to <a href="#">PPO types (page 104)</a> .          | <b>0</b> = Unknown |
|              | <b>0</b> = Unknown  | Cyclical communication between the master and the module has not been established yet.                                                                                                                                                                                                    |                    |
|              | <b>3</b> = PPO3     | PPO3 selected                                                                                                                                                                                                                                                                             |                    |
|              | <b>4</b> = PPO4     | PPO4 selected                                                                                                                                                                                                                                                                             |                    |
|              | <b>6</b> = PPO6     | PPO6 selected                                                                                                                                                                                                                                                                             |                    |
|              | <b>7</b> = PPO7     | PPO7 selected                                                                                                                                                                                                                                                                             |                    |
|              | <b>8</b> = ST1      | ST1 selected                                                                                                                                                                                                                                                                              |                    |
|              | <b>9</b> = ST2      | ST2 selected                                                                                                                                                                                                                                                                              |                    |
|              | <b>20</b> = ST20    | Standard Telegram 20. Visible only in VIK-NAMUR emulation mode.                                                                                                                                                                                                                           |                    |
| 21           | Diagnostic alarm    | Disables the PROFIdrive alarm mechanism which generates alarms in case of drive faults. But the standard PROFINET alarms are still sent. For more information on the diagnostics and alarm mechanism for PROFIdrive, refer to <a href="#">Diagnostic and alarm mechanism (page 124)</a> . | <b>0</b> = Enabled |
|              | <b>0</b> = Enabled  | PROFIdrive alarms are enabled.                                                                                                                                                                                                                                                            |                    |
|              | <b>1</b> = Disabled | PROFIdrive alarms are disabled.                                                                                                                                                                                                                                                           |                    |
| 22           | Map selection       | Defines the preferred data type of mapped parameters when mapping is done through PROFIdrive parameters.                                                                                                                                                                                  | <b>1</b> = 16bit   |
|              | <b>0</b> = 32bit    | 32 bits                                                                                                                                                                                                                                                                                   |                    |
|              | <b>1</b> = 16bit    | 16 bits                                                                                                                                                                                                                                                                                   |                    |
| 23 ...<br>24 | Reserved            | This parameter is not used by the adapter module when the module is configured for PROFINET IO.                                                                                                                                                                                           | N/A                |

| No. | Name/Value            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Default  |
|-----|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 25  | PN Name Index         | <p>Allows to use pre-defined format of the PROFINET station name.</p> <p>By default this value is 0 and the station name is set from the network. When the value is set to other than 0, the PROFINET station name is overwritten in the format “abbdrive-xx”, where xx is the value of the parameter name index.</p> <p>Example: Setting this value to 12 results in the name “abbdrive-12”.</p> <p><b>Note:</b> During every boot the FPNO-21 module checks the value of PN Name Index,</p> <ul style="list-style-type: none"> <li>• If the value is not Zero then the active PN Name Index overrides the PROFINET station name.</li> <li>• If the new name is set by DCP Set command as permanent, the new name is used and stored to flash. The PN Name Index parameter value is not changed, so after next boot, the name is taken according to the PN Name Index.</li> <li>• If the new name is set by DCP Set command as temporary, the new name is used and the empty name is stored to flash. The PN Name Index parameter value is not changed, so after next boot name is taken according to the PN Name Index.</li> <li>• The PROFINET DCP factory reset also resets the PN Name Index value to default (0).</li> </ul> | 0        |
|     | 0...65535             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |
| 26  | Reserved              | Reserved for web page functionality. For more information, see <a href="#">Appendix C - FPNO-21 configuration web pages (page 157)</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | N/A      |
| 27  | FBA A/B par refresh   | <p>Validates any changed adapter module configuration parameter settings. After refreshing, the value reverts automatically to 0 = Done.</p> <p><b>Note:</b> This parameter cannot be changed while the drive is running.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0 = Done |
|     | 0 = Done              | Refreshing done                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |
|     | 1 = Refresh           | Refreshing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |
| 28  | FBA A/B par table ver | <p><b>Read-only.</b> Displays the parameter table revision of the fieldbus adapter module mapping file stored in the memory of the drive. In format <b>xyz</b>, where</p> <p><b>x</b> = major revision number<br/> <b>y</b> = minor revision number<br/> <b>z</b> = correction number</p> <p>OR</p> <p>in format <b>axyz</b>, where</p> <p><b>a</b> = major revision number<br/> <b>xy</b> = minor revision numbers<br/> <b>z</b> = correction number or letter.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | N/A      |
|     |                       | Parameter table revision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |

| No. | Name/Value               | Description                                                                                                                                                                                                                                                                                                                                                                          | Default                                     |
|-----|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| 29  | FBA A/B drive type code  | <b>Read-only.</b> Displays the drive type code of the fieldbus adapter module mapping file stored in the memory of the drive.                                                                                                                                                                                                                                                        | N/A                                         |
|     |                          | Drive type code of the fieldbus adapter module mapping file                                                                                                                                                                                                                                                                                                                          |                                             |
| 30  | FBA A/B mapping file ver | <b>Read-only.</b> Displays the fieldbus adapter module mapping file revision stored in the memory of the drive in decimal format.                                                                                                                                                                                                                                                    | N/A                                         |
|     |                          | Mapping file revision                                                                                                                                                                                                                                                                                                                                                                |                                             |
| 31  | D2FBA A/B comm status    | <b>Read-only.</b> Displays the status of the fieldbus adapter module communication.<br><b>Note:</b> The value names may vary by drive.<br><b>Note:</b> Only active drive-controlled channel will change comm status <i>online</i> . PROFIsafe alone will not change the comm status.                                                                                                 | <b>0</b> = Idle<br>or<br><b>4</b> = Offline |
|     | <b>0</b> = Idle          | Adapter is not configured                                                                                                                                                                                                                                                                                                                                                            |                                             |
|     | <b>1</b> = Exec.init     | Adapter is initializing.                                                                                                                                                                                                                                                                                                                                                             |                                             |
|     | <b>2</b> = Time out      | A timeout has occurred in the communication between the adapter and the drive.                                                                                                                                                                                                                                                                                                       |                                             |
|     | <b>3</b> = Conf.err      | There is an internal error in the communication between the adapter and the drive. Contact your local ABB representative.                                                                                                                                                                                                                                                            |                                             |
|     | <b>4</b> = Off-line      | Adapter is off-line                                                                                                                                                                                                                                                                                                                                                                  |                                             |
|     | <b>5</b> = On-line       | Adapter is on-line                                                                                                                                                                                                                                                                                                                                                                   |                                             |
|     | <b>6</b> = Reset         | Adapter is performing a hardware reset.                                                                                                                                                                                                                                                                                                                                              |                                             |
| 32  | FBA A/B comm SW ver      | <b>Read-only.</b> Displays patch and build numbers of the adapter module's firmware version in <b>xyy</b> format, where:<br><b>xx</b> = patch number<br><b>yy</b> = build number.<br>Example: If the firmware version (<major>.<minor>.<patch>.<build>) is 3.10.200.13, the value C80D is displayed. If the version is 3.10.0.0, the value 0 is displayed.<br>See also parameter 33. | N/A                                         |
| 33  | FBA A/B appl SW ver      | <b>Read-only.</b> Displays major and minor revision numbers of the adapter module's firmware version in <b>xyy</b> format, where:<br><b>xx</b> = major revision number<br><b>yy</b> = minor revision number<br>Example: If the firmware version (<major>.<minor>.<patch>.<build>) is 3.10.200.13 or 3.10.0.0, the value 310 is displayed.<br>See also parameter 32.                  | N/A                                         |

**FPNO-21 configuration parameters – group B (group 2)**

Note: The actual parameter group number depends on the drive type. Group B (group 2) corresponds to:

- parameter group 53 in ACS380, ACS480, ACH580, ACQ580 and ACS580
- parameter group 53 in ACS880 if the adapter is installed as fieldbus adapter A or group 56 if the adapter is installed as fieldbus adapter B.

| No. 1) | Name/Value                       | Description                                                                      | Default               |
|--------|----------------------------------|----------------------------------------------------------------------------------|-----------------------|
| 01     | FBA data out 1 (master to drive) | Selects the resolution of control word (16 bit or 32 bit) received by the drive. | 1 or 11 <sup>2)</sup> |
|        | <b>1</b> = CW 16bit              | Control word (16 bits)                                                           |                       |
|        | <b>11</b> = CW 32bit             | Control word (32 bits)                                                           |                       |

| No. 1)       | Name/Value                                                                                                                                                                                                                    | Description                                                                                                                                                                                                                                                                                                                                                                                               | Default |          |        |                                       |            |                             |        |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|--------|---------------------------------------|------------|-----------------------------|--------|
| 02           | FBA data out 2                                                                                                                                                                                                                | Selects data word 1 received by the drive over the PROFINET network. The content is defined by a decimal number in the range of 0 to 9999 as follows: <table><tr><td>0</td><td>Not used</td></tr><tr><td>1...99</td><td>Virtual address area of drive control</td></tr><tr><td>101...9999</td><td>Parameter area of the drive</td></tr></table>                                                           | 0       | Not used | 1...99 | Virtual address area of drive control | 101...9999 | Parameter area of the drive | 0 or 2 |
|              | 0                                                                                                                                                                                                                             | Not used                                                                                                                                                                                                                                                                                                                                                                                                  |         |          |        |                                       |            |                             |        |
|              | 1...99                                                                                                                                                                                                                        | Virtual address area of drive control                                                                                                                                                                                                                                                                                                                                                                     |         |          |        |                                       |            |                             |        |
|              | 101...9999                                                                                                                                                                                                                    | Parameter area of the drive                                                                                                                                                                                                                                                                                                                                                                               |         |          |        |                                       |            |                             |        |
|              | 0 = None                                                                                                                                                                                                                      | Not used                                                                                                                                                                                                                                                                                                                                                                                                  |         |          |        |                                       |            |                             |        |
|              | 1 = CW 16bit                                                                                                                                                                                                                  | Control word (16 bits)                                                                                                                                                                                                                                                                                                                                                                                    |         |          |        |                                       |            |                             |        |
|              | 2 = Ref1 16bit                                                                                                                                                                                                                | Reference REF1 (16 bits)<br>Ref1 16bit is only allowed to FBA data out 2.                                                                                                                                                                                                                                                                                                                                 |         |          |        |                                       |            |                             |        |
|              | 3 = Ref2 16bit                                                                                                                                                                                                                | Reference REF2 (16 bits)<br>Ref2 can be only be mapped to the FBA Data out 3, 4 or 5 depending of Ref1 mapping and profile used.<br>Ref2 is only allowed to the FBA Data out 3 if Ref1 16bit is mapped to the FBA Data out 2.<br>Ref2 is only allowed to the Data out 4 if Ref1 32bit is mapped to the FBA Data out 2.<br>Ref2 can only be mapped to the FBA Data out 5 if Transparent32 profile is used. |         |          |        |                                       |            |                             |        |
|              | 11 = CW 32bit                                                                                                                                                                                                                 | Control word (32 bits)                                                                                                                                                                                                                                                                                                                                                                                    |         |          |        |                                       |            |                             |        |
|              | 12 = Ref1 32bit                                                                                                                                                                                                               | Reference REF1(32 bits)<br>Ref1 32bit is only allowed to the FBA Data out 3 with Transparent32 profile. With other profiles, the Ref1 32bit is only allowed to FBA Data out 2.                                                                                                                                                                                                                            |         |          |        |                                       |            |                             |        |
|              | 13 = Ref2 32bit                                                                                                                                                                                                               | Reference REF2 (32 bits)                                                                                                                                                                                                                                                                                                                                                                                  |         |          |        |                                       |            |                             |        |
|              | 21 = CW2 16bit                                                                                                                                                                                                                | Control word 2 (16 bits)                                                                                                                                                                                                                                                                                                                                                                                  |         |          |        |                                       |            |                             |        |
| 101...9999   | Parameter index with format <b>xyyy</b> , where <ul style="list-style-type: none"><li><b>xx</b> is the parameter group number (1...99)</li><li><b>yy</b> is the parameter number index within that group (01...99).</li></ul> |                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |        |                                       |            |                             |        |
| Other        | Path to parameter area selection.                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                           |         |          |        |                                       |            |                             |        |
| 03 ...<br>10 | FBA data out 3 ...<br>FBA data out12                                                                                                                                                                                          | See parameter <a href="#">02 FBA data out 1</a> .                                                                                                                                                                                                                                                                                                                                                         | 0       |          |        |                                       |            |                             |        |

<sup>1)</sup> The number of parameters in this group may vary by drive type and drive firmware.

<sup>2)</sup> 11 (CW 32bit) is the default setting if the Transparent32 profile is used.

**FPNO-21 configuration parameters – group C (group 3)**

**Note:** The actual parameter group number depends on the drive type. Group C (group 3) corresponds to:

- parameter group 52 in ACS380, ACS480, ACH580, ACQ580 and ACS580
- parameter group 52 in ACS880 if the adapter is installed as fieldbus adapter A or group 55 if the adapter is installed as fieldbus adapter B.

| No. <sup>1)</sup> | Name/Value                      | Description                                                                 | Default               |
|-------------------|---------------------------------|-----------------------------------------------------------------------------|-----------------------|
| 01                | FBA data in 1 (drive to master) | Selects the resolution of status word (16 bit or 32 bit) sent by the drive. | 4 or 14 <sup>2)</sup> |
|                   | <b>4</b> = SW 16bit             | Status word (16 bits)                                                       |                       |
|                   | <b>14</b> = SW 32bit            | Status word (32 bits)                                                       |                       |

| No.1)        | Name/Value                                                                                                                                                                                                                    | Description                                                                                                                                                                                                                                                                                                                                                                                            | Default |          |        |                                       |            |                             |        |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|--------|---------------------------------------|------------|-----------------------------|--------|
| 02           | FBA data in 2 (drive to master)                                                                                                                                                                                               | Selects data word 1 sent by the drive over the PROFINET network. The content is defined by a decimal number in the range of 0 to 9999 as follows: <table><tr><td>0</td><td>Not used</td></tr><tr><td>1...99</td><td>Virtual address area of drive control</td></tr><tr><td>101...9999</td><td>Parameter area of the drive</td></tr></table>                                                            | 0       | Not used | 1...99 | Virtual address area of drive control | 101...9999 | Parameter area of the drive | 0 or 5 |
|              | 0                                                                                                                                                                                                                             | Not used                                                                                                                                                                                                                                                                                                                                                                                               |         |          |        |                                       |            |                             |        |
|              | 1...99                                                                                                                                                                                                                        | Virtual address area of drive control                                                                                                                                                                                                                                                                                                                                                                  |         |          |        |                                       |            |                             |        |
|              | 101...9999                                                                                                                                                                                                                    | Parameter area of the drive                                                                                                                                                                                                                                                                                                                                                                            |         |          |        |                                       |            |                             |        |
|              | 0 = None                                                                                                                                                                                                                      | Not used                                                                                                                                                                                                                                                                                                                                                                                               |         |          |        |                                       |            |                             |        |
|              | 4 = SW 16bit                                                                                                                                                                                                                  | Status word (16 bits)                                                                                                                                                                                                                                                                                                                                                                                  |         |          |        |                                       |            |                             |        |
|              | 5 = Act1 16bit                                                                                                                                                                                                                | Actual value ACT1 (16 bits)<br>Act1 16bit is allowed only for FBA Data in 2.                                                                                                                                                                                                                                                                                                                           |         |          |        |                                       |            |                             |        |
|              | 6 = Act2 16bit                                                                                                                                                                                                                | Actual value ACT2 (16 bits)<br>Act2 can be only be mapped to the FBA Data in 3, 4 or 5 depending on Act1 mapping and profile used.<br>Act2 is only allowed to the FBA Data in 3 if Act1 16bit is mapped to the FBA Data in 2.<br>Act2 is only allowed to the Data in 4 if Act1 32bit is mapped to the FBA Data in 2.<br>Act2 can only be mapped to the FBA Data in 5 if Transparent32 profile is used. |         |          |        |                                       |            |                             |        |
|              | 14 = SW 32bit                                                                                                                                                                                                                 | Status word (32 bits)                                                                                                                                                                                                                                                                                                                                                                                  |         |          |        |                                       |            |                             |        |
|              | 15 = Act1 32bit                                                                                                                                                                                                               | Actual value ACT1 (32 bits)<br>Act1 32bit is only allowed to the FBA Data in 3 with Transparent32 profile. With other profiles, the Act1 32bit is only allowed to FBA Data in 2.                                                                                                                                                                                                                       |         |          |        |                                       |            |                             |        |
|              | 16 = Act2 32bit                                                                                                                                                                                                               | Actual value ACT2 (32 bits)                                                                                                                                                                                                                                                                                                                                                                            |         |          |        |                                       |            |                             |        |
|              | 24 = SW2 16bit                                                                                                                                                                                                                | Status word 2 (16 bits)                                                                                                                                                                                                                                                                                                                                                                                |         |          |        |                                       |            |                             |        |
| 101...9999   | Parameter index with format <b>xyyy</b> , where <ul style="list-style-type: none"><li><b>xx</b> is the parameter group number (1...99)</li><li><b>yy</b> is the parameter number index within that group (01...99).</li></ul> |                                                                                                                                                                                                                                                                                                                                                                                                        |         |          |        |                                       |            |                             |        |
| Other        | Path to parameter area selection.                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                        |         |          |        |                                       |            |                             |        |
| 03 ...<br>10 | DATA IN 3... DATA IN 12                                                                                                                                                                                                       | Refer to parameter <a href="#">01 FBA data in 1.</a>                                                                                                                                                                                                                                                                                                                                                   | 0       |          |        |                                       |            |                             |        |

<sup>1)</sup> The number of parameters in this group may vary by drive type and drive firmware.

<sup>2)</sup> 14 (SW 32bit) is the default setting if the Transparent32 profile is used.

## Emulation modes

The FPNO-21 module supports emulation modes for FENA-01, FENA-11 or FENA-21 Ethernet adapter modules, or a drive with the VIK-NAMUR control program. In emulation mode, the FPNO-21 module changes its identification information to accept connections from a PLC which is configured to communicate with FENA-01, FENA-11 or FENA-21 module, or drive with the VIK-NAMUR control program.

### VIK-NAMUR mode

You can use the VIK-NAMUR mode in combination with the drive with the VIK-NAMUR control program. With this mode, FPNO-21 acts in the transparent mode and the drive control program provides cyclic data content for Standard Telegram 20. Use this mode with the generic VIK-NAMUR GSDML file.

#### ■ Control locations

ABB drives can receive control information from multiple sources including digital inputs, analog inputs, the drive control panel and a fieldbus adapter module. ABB drives allow the user to separately determine the source for each type of control information (Start, Stop, Direction, Reference, Fault reset, and so on).

To give the fieldbus master the most complete control over the drive, select the adapter module as the source of this information. The drive-specific parameter setting examples below contain the drive control parameters that are relevant in the examples. For a complete parameter list, refer to the drive documentation.

## Starting up fieldbus communication for drives

1. Power up the drive.
  2. To enable the communication between the adapter module and the drive, select the correct slot number in parameter 50.01 FBA A enable.  
The selection must correspond to the slot where the adapter module is installed. For example, if the adapter module is installed in slot 2, select "slot 2".
  3. With parameter 50.02 FBA A comm loss func, select how the drive reacts to a fieldbus communication break.  
Note that this function monitors both communication between the fieldbus master and the adapter module and communication between the adapter module and the drive.
  4. With parameter 50.03 FBA A comm loss t out, define the time between communication break detection and the selected action.
  5. Select application-specific values for the rest of the parameters in group 50, starting from 50.04.  
Examples of appropriate values are shown in the tables below.
  6. Set the module configuration parameters in group 51.  
At the minimum, select the communication protocol and profile with parameter 51.02 Protocol/Profile and configure the network settings with parameters 51.03...51.13.
  7. Deactivate all services that are not used in the installation with parameter 51.15 Service configuration.
  8. Define the process data transferred to and from the drive in parameter groups 52 and 53.  
**Note:** The adapter module automatically sets the communication profile-specific virtual address for the Status word in parameter 52.01 and for the Control word in parameter 53.01.
  9. Save the valid parameter values to permanent memory with parameter 96.07 Parameter save manually.
-

10. Validate the settings in parameter groups 51, 52 and 53 with parameter 51.27 FBA A par refresh.
11. Set the relevant drive control parameters to control the drive according to the application.  
Examples of appropriate values are shown in the tables below.

## Parameter setting examples – ACS380, ACS480, ACH580, ACQ580, and ACS580

### ■ Frequency control using PROFIdrive communication profile with PPO Type 4

This example shows how to configure a basic frequency control application that uses the PROFIdrive profile. In addition, some application-specific data is added to the communication.

The start/stop commands and reference are according to the PROFIdrive profile, speed control mode. For more information, refer to the PROFIdrive state machine on page 87.

The reference value  $\pm 16384$  (4000h) corresponds to parameter **46.02 Frequency scaling** in the forward and reverse directions.

| Direction | PZD1         | PZD2                   | PZD3                               | PZD4 | PZD5                               | PZD6 |
|-----------|--------------|------------------------|------------------------------------|------|------------------------------------|------|
| Out       | Control word | Frequency reference    | Constant frequency 1 <sup>1)</sup> |      | Constant frequency 2 <sup>1)</sup> |      |
| In        | Status word  | Frequency actual value | Power <sup>1)</sup>                |      | DC bus voltage <sup>1)</sup>       |      |

1) Example

The table gives an example of the drive parameter settings.

| Drive parameter        | Setting for drives                     | Description                                                                                                       |
|------------------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 50.01 FBA A enable     | <b>1</b> = Enable                      | Enables communication between the drive and the fieldbus adapter module.                                          |
| 50.04 FBA A ref1 type  | <b>5</b> = Frequency                   | Selects the fieldbus A reference 1 type and scaling.                                                              |
| 50.07 FBA A act1 type  | <b>5</b> = Frequency                   | Selects the actual value type and scaling according to the currently active Ref1 mode defined in parameter 50.04. |
| 51.01 FBA A type       | <b>132</b> = PROFINET IO <sup>1)</sup> | Displays the type of the fieldbus adapter module.                                                                 |
| 51.02 Protocol/Profile | <b>10</b> = PNIO Pdrive                | Selects the PROFINET IO protocol and the PROFIdrive profile.                                                      |
| 51.03 Commrate         | <b>0</b> = Auto                        | Ethernet communication rate is negotiated automatically by the device.                                            |
| 51.04 IP configuration | <b>0</b> = Static IP                   | Configuration will be obtained from parameters 51.05...13 or from the PLC via the DCP protocol.                   |
| 52.01 FBA DATA IN1     | <b>4</b> = SW 16bit                    | Status word                                                                                                       |

| Drive parameter         | Setting for drives     | Description                                                                                                    |
|-------------------------|------------------------|----------------------------------------------------------------------------------------------------------------|
| 52.02 FBA DATA IN2      | <b>5</b> = Act1 16bit  | Actual value 1                                                                                                 |
| 52.03 FBA data in3      | 01.14                  | Output power                                                                                                   |
| 52.05 FBA data in5      | 01.11                  | DC voltage                                                                                                     |
| 53.01 FBA DATA out1     | <b>1</b> = CW 16bit    | Control word                                                                                                   |
| 53.02 FBA DATA out2     | <b>2</b> = Ref1 16bit  | Reference 1 (frequency)                                                                                        |
| 53.03 FBA data out3     | 28.26                  | Constant frequency 1                                                                                           |
| 53.05 FBA data out5     | 28.27                  | Constant frequency 2                                                                                           |
| 51.27 FBA A par refresh | <b>1</b> = Refresh     | Validates the configuration parameter settings.                                                                |
| 19.12 Ext1 control mode | <b>2</b> = Speed       | Selects speed control as the control mode 1 for external control location 1.                                   |
| 20.01 Ext1 commands     | <b>12</b> = Fieldbus A | Selects the fieldbus A interface as the source of the start and stop commands for external control location 1. |
| 22.11 Speed ref1 source | <b>4</b> = FB A REF1   | Selects the fieldbus A reference 1 as the source for speed reference 1.                                        |

<sup>1)</sup> Read-only or automatically detected/set

The start sequence for the parameter example above is given below.

Control word:

- Reset the fieldbus communication fault (if active).
- Enter 47Eh (1150 decimal) → READY TO SWITCH ON.  
Enter 47Fh (1151 decimal) → OPERATING.

## Parameter setting examples – ACS880

### ■ Speed control using PROFIdrive communication profile with PPO Type 4

This example shows how to configure a basic speed control application that uses the PROFIdrive profile. Some application-specific data is added to the communication.

The start/stop commands and reference are according to the PROFIdrive profile, speed control mode. For more information, refer to the PROFIdrive state machine on page [87](#).

The reference value  $\pm 16384$  (4000h) corresponds to parameter **46.01 Speed scaling** in the forward and reverse directions.

| Direction | PZD1         | PZD2               | PZD3                           | PZD4 | PZD5                           | PZD6 |
|-----------|--------------|--------------------|--------------------------------|------|--------------------------------|------|
| Out       | Control word | Speed reference    | Constant speed 1 <sup>1)</sup> |      | Constant speed 2 <sup>1)</sup> |      |
| In        | Status word  | Speed actual value | Power <sup>1)</sup>            |      | DC bus voltage <sup>1)</sup>   |      |

<sup>1)</sup> Example

#### 44 PROFINET IO – Start-up

The table below gives an example of the drive parameter settings.

| Drive parameter         | Setting for drives                     | Description                                                                                                       |
|-------------------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 50.01 FBA A enable      | <b>1</b> = Option slot 2 <sup>2)</sup> | Enables communication between the drive and the fieldbus adapter module.                                          |
| 50.04 FBA A ref1 type   | <b>4</b> = Speed                       | Selects the fieldbus A reference 1 type and scaling.                                                              |
| 50.07 FBA A act1 type   | <b>4</b> = Speed                       | Selects the actual value type and scaling according to the currently active Ref1 mode defined in parameter 50.04. |
| 51.01 FBA A type        | <b>132</b> = PROFINET IO <sup>1)</sup> | Displays the type of the fieldbus adapter module.                                                                 |
| 51.02 Protocol/Profile  | <b>10</b> = PNIO Pdrive                | Selects the PROFINET IO protocol and the PROFIdrive profile.                                                      |
| 51.03 Commrate          | <b>0</b> = Auto <sup>2)</sup>          | Ethernet communication rate is negotiated automatically by the device.                                            |
| 51.04 IP configuration  | <b>0</b> = Static IP                   | Configuration will be obtained from parameters 51.05...13 or from the PLC via the DCP protocol.                   |
| 52.01 FBA DATA IN1      | <b>4</b> = SW 16bit                    | Status word                                                                                                       |
| 52.02 FBA DATA IN2      | <b>5</b> = Act1 16bit                  | Actual value 1                                                                                                    |
| 52.03 FBA data in3      | 01.14                                  | Output power                                                                                                      |
| 52.05 FBA data in5      | 01.11                                  | DC voltage                                                                                                        |
| 53.01 FBA DATA out1     | <b>1</b> = CW 16bit                    | Control word                                                                                                      |
| 53.02 FBA DATA out2     | <b>2</b> = Ref1 16bit                  | Reference 1 (speed)                                                                                               |
| 53.03 FBA data out3     | 22.26                                  | Constant speed 1                                                                                                  |
| 53.05 FBA data out5     | 22.27                                  | Constant speed 2                                                                                                  |
| 51.27 FBA A par refresh | <b>1</b> = Refresh                     | Validates the configuration parameter settings.                                                                   |
| 19.12 Ext1 control mode | <b>2</b> = Speed                       | Selects speed control as the control mode 1 for external control location 1.                                      |
| 20.01 Ext1 commands     | <b>12</b> = Fieldbus A                 | Selects the fieldbus A interface as the source of the start and stop commands for external control location 1.    |
| 22.11 Speed ref1 source | <b>4</b> = FB A REF1                   | Selects the fieldbus A reference 1 as the source for speed reference 1.                                           |

1) Read-only or automatically detected/set

2) Example

The start sequence for the parameter example above is given below.

Control word:

- Reset the fieldbus communication fault (if active).
- Enter 47Eh (1150 decimal) → READY TO SWITCH ON.  
Enter 47Fh (1151 decimal) → OPERATING.

## Configuring the master station

After the adapter module is initialized by the drive, prepare the master station for communication with the module. Examples of an ABB AC500 PLC and Siemens SIMATIC S7 PLC are given below. If you are using another master system, refer to its documentation.

The examples apply to all drive types that are compatible with the module.

### ■ Downloading the GSD file

Configuration of the master station requires a type definition (GSD) file. In PROFINET IO, the GSD file is written in XML-based language called GSDML.

Download the FPNO-21 GSD file from the Document library (<http://new.abb.com/drives/connectivity/fieldbus-connectivity/profinet>). The file name format is **GSDML-Vx.x-ABB-FPNO-yyyymmdd.xml**.

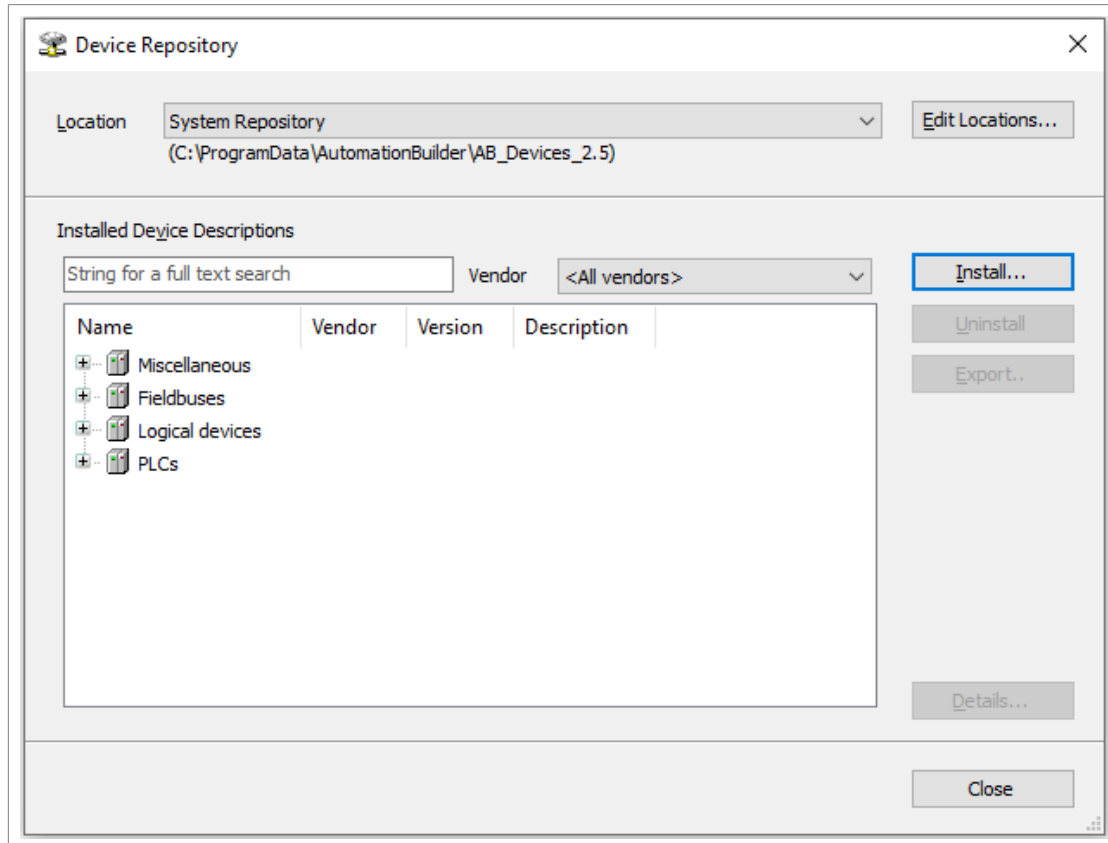
The GSD file describes the vendor-specific and PROFIdrive-specific features of the adapter module. Vendor-specific features can be used, for example, in the ABB Drives communication profile. The PROFIdrive profile supports a set of services described in the PROFIdrive specification.

### ■ Configuring an ABB AC500 PLC

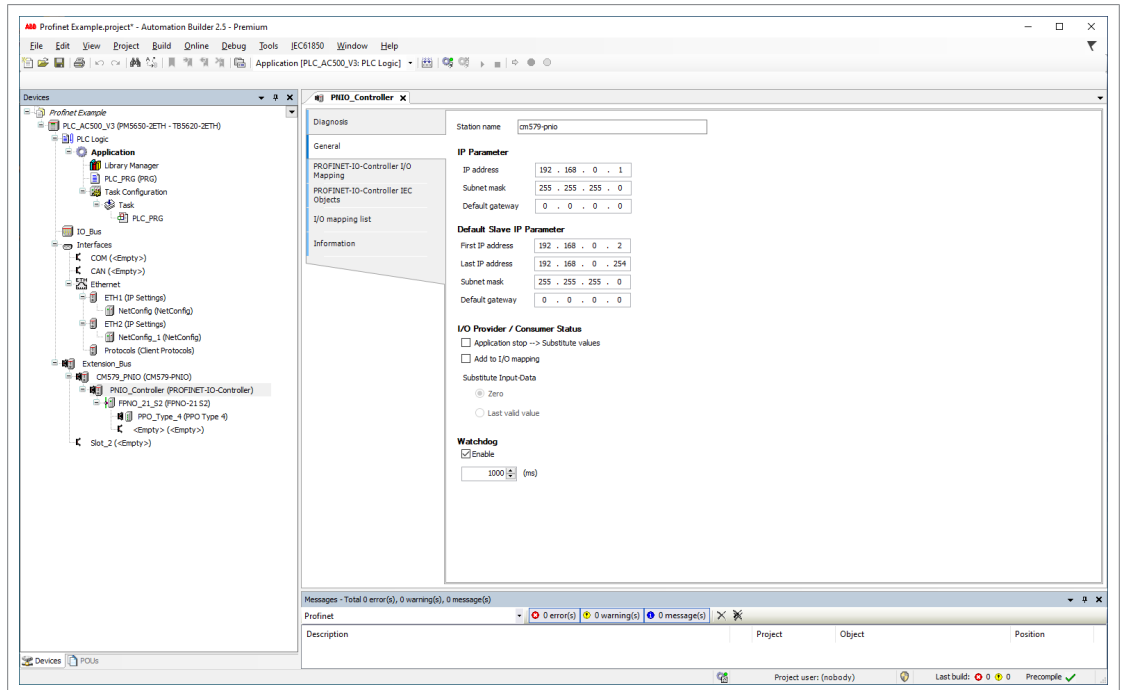
This example shows how to configure communication between an ABB AC500 PLC and the adapter module using Automation builder, software version 2.1.0 and later.

Before you start, make sure that you have downloaded the FPNO-21 GSD file from the Document library.

1. Start the ABB Automation Builder software.
  2. In the **Tools** menu, select **Device Repository**.
  3. In the window that opens, click **Install...** and browse for the GSD file.
-

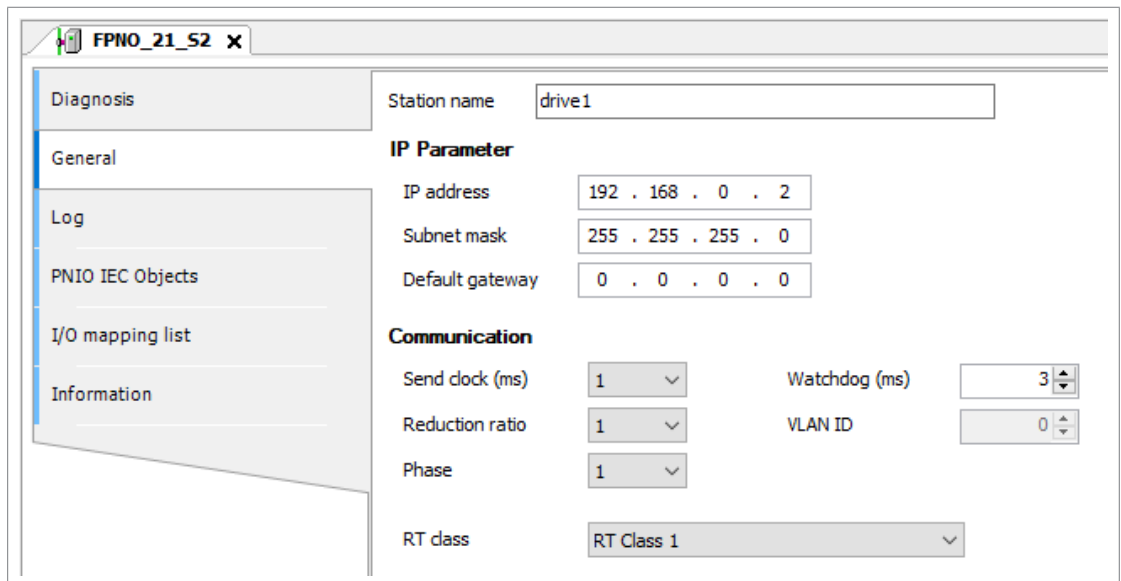


4. Open or create the PLC project that is used to control the drive.
5. Add the CM579-PNIO PROFINET master device to the PLC project, if it is necessary.
6. Add the adapter module to the PROFINET IO network.
7. Add the I/O module, for example, PPO Type 4 to the adapter module to define cyclical communication between the module and the PLC.
8. Define the CM579-PNIO master properties, such as the IP address and address settings for slaves.



9. Define the adapter module properties:

On the **PNIO identification** tab, select the IP address and Subnet mask, and type the Station name. **Note:** Use only small letters for the Station name.



10. Open the PLC program.

11. Compile the project and download it to the PLC.

This is necessary for you to be able to configure the CM579-PNIO master device and allow it to scan the network.

12. Return to the CM579-PNIO master properties. On the **Assign station name** tab, do these tasks:

- Click **Connect to PLC (Login)** and select the communication link between Automation builder and the PLC. Then, click **Scan slaves** to find all PROFINET slaves connected to the network.

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**PNIO\_Controller**

Found devices

Scan  
Compare

Press scan button to start the scan.

| ID | Type    | Name | IP-Address | Network Mask | Gateway Address | MAC Address       | Vendor ID | Device ID |
|----|---------|------|------------|--------------|-----------------|-------------------|-----------|-----------|
| 1  | FPNO-21 |      | 0.0.0.0    | 0.0.0.0      | 0.0.0.0         | 00-1C-01-3A-89-DF | 1A        | 4         |

IO-Device name:

MAC address:

IP address:

Network mask:

Gateway address:

Parameter flag:

- In the **Configure station name** box, select the station name that was given for the module in step 9, and then click **Assign station name**.
- In the **IP address** and **Network mask** boxes, select/type the IP address and subnet mask defined in step 9, and then click **Assign IP configuration**.

### 13. Define the I/O module properties:

- On the **PNIO parameters** tab, configure the Stop mode and Control-zero mode functionalities, and define fail safe values for the PLC output process data (PZDs).

**PPO\_Type\_4**

Diagnosis  
General  
PNIO Module I/O Mapping  
PNIO Module IEC Objects  
I/O mapping list  
Information

**Module Information**

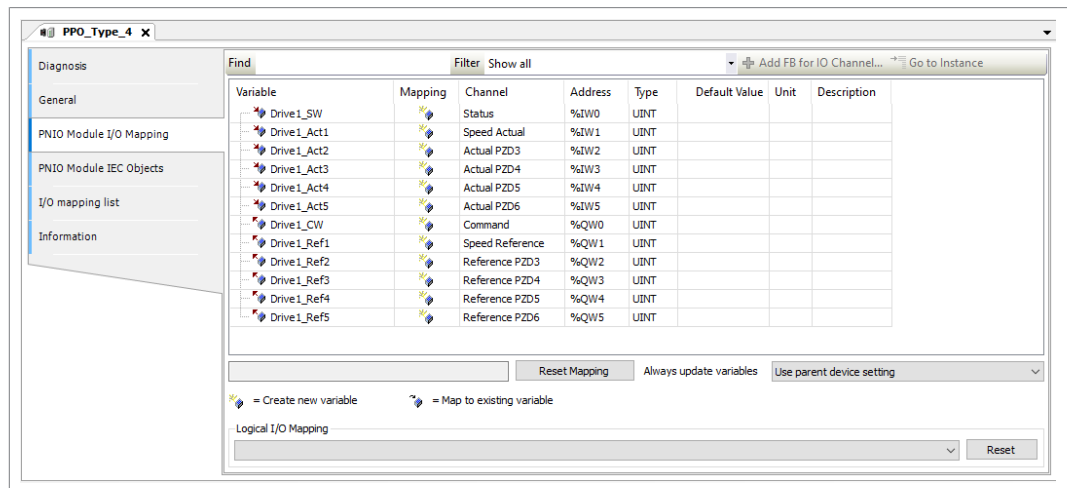
ID number:

Slot number:

**Settings**

| Parameters                  | Value       | Data Type   | Allowed Values | Description |
|-----------------------------|-------------|-------------|----------------|-------------|
| <b>General parameters</b>   |             |             |                |             |
| Stop Mode Action selection  | Freeze data | Integer8    |                |             |
| Control-zero mode selection | Use data    | Integer8    |                |             |
| Fail safe Control Word      | 0           | Unsigned 16 | 0..65535       |             |
| Fail safe Reference         | 0           | Unsigned 16 | 0..65535       |             |
| Fail safe value of Ref PZD3 | 0           | Unsigned 16 | 0..65535       |             |
| Fail safe value of Ref PZD4 | 0           | Unsigned 16 | 0..65535       |             |
| Fail safe value of Ref PZD5 | 0           | Unsigned 16 | 0..65535       |             |
| Fail safe value of Ref PZD6 | 0           | Unsigned 16 | 0..65535       |             |

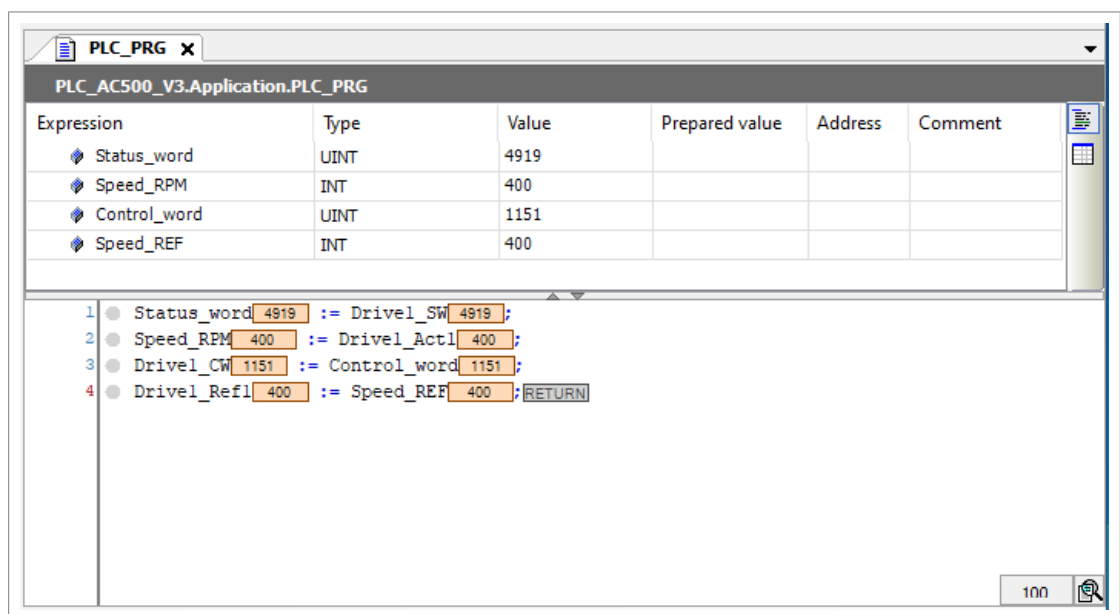
- On the **PNIO Module I/O Mapping** tab, type names for the variables that refer to the drive signals in the PLC program.



14. Open the PLC program and create a program that controls the drive.

15. Compile the project and download it to the PLC.

Make sure that the variable names defined for the drive signals are used in the PLC program. Otherwise the communication will not work



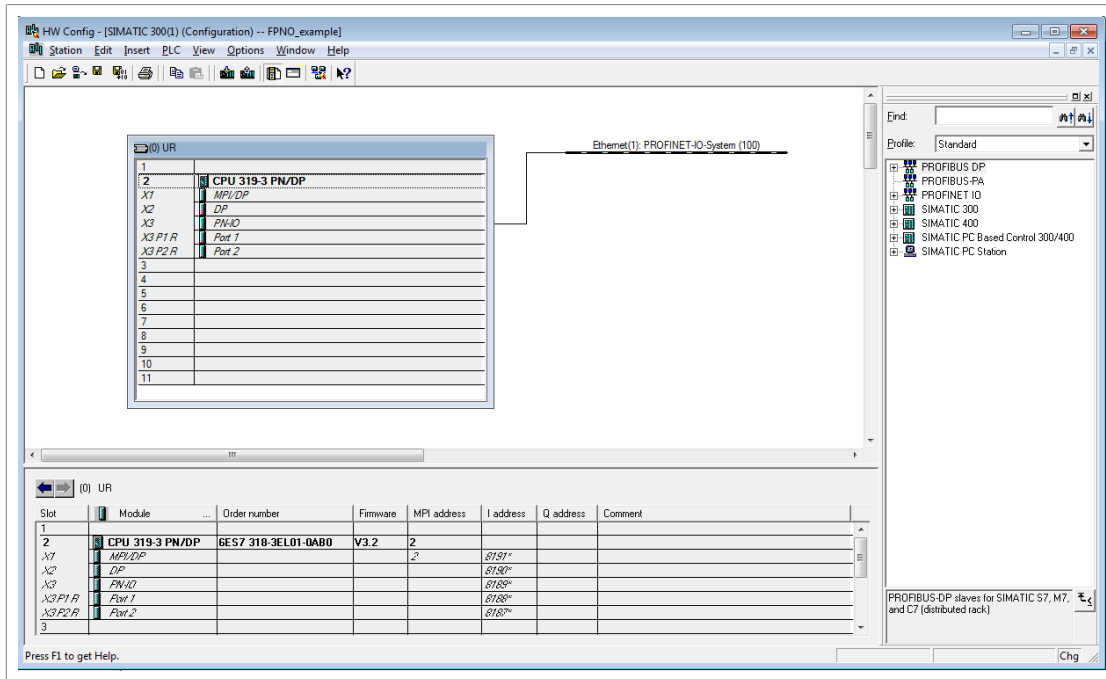
## ■ Configuring a Siemens SIMATIC S7 PLC

This example shows how to configure communication between a Siemens SIMATIC S7 PLC and the adapter module using SIMATIC Manager Step 7.

Before you start, make sure that you have the FPNO-21 GSD file from the Document library.

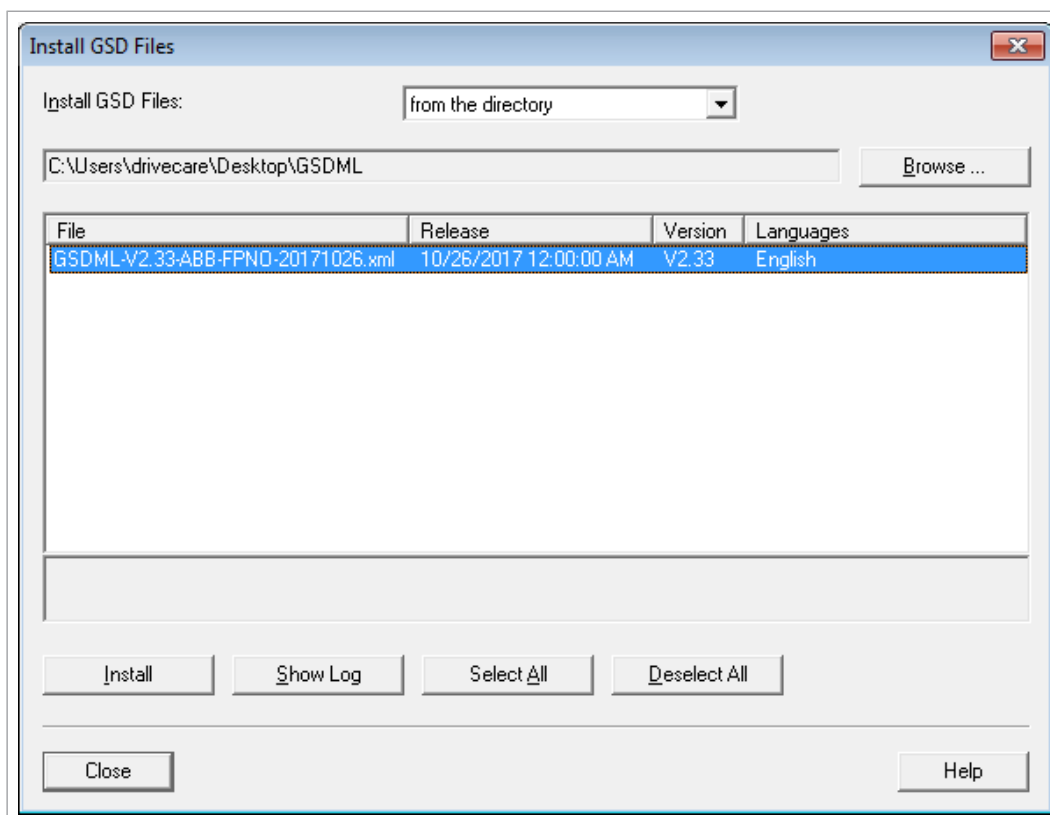
1. Start the SIMATIC manager and open/create a SIMATIC program.
2. Open the hardware configuration of the project.

## 50 PROFINET IO – Start-up

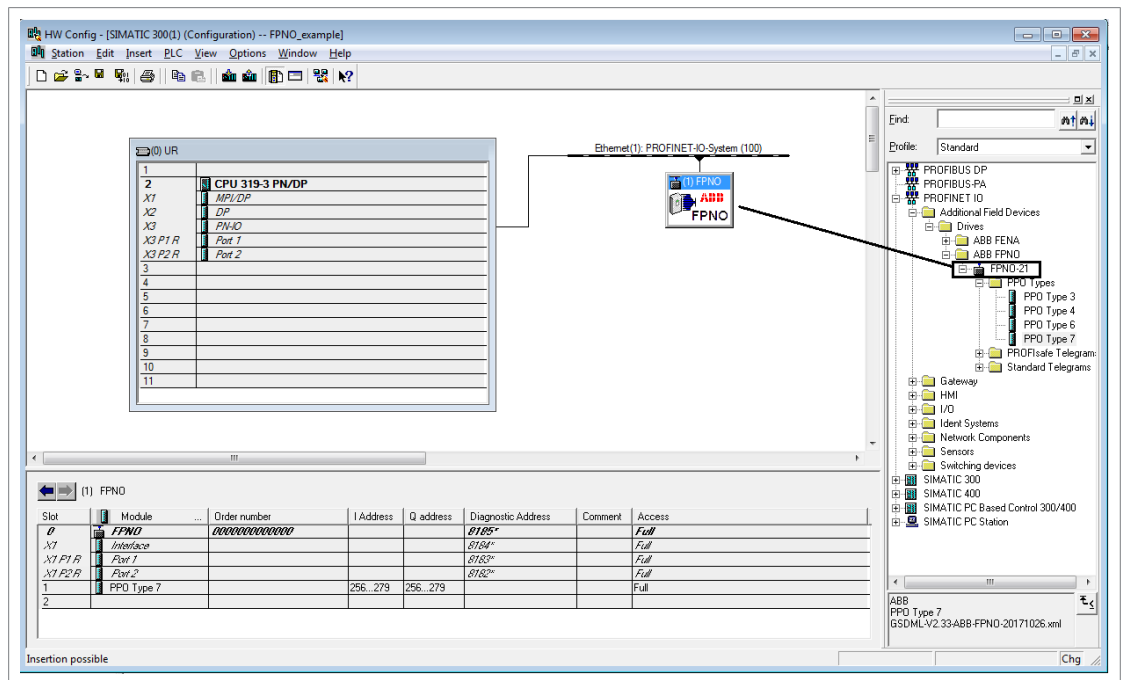


### 3. Install the FPNO-21 GSD file:

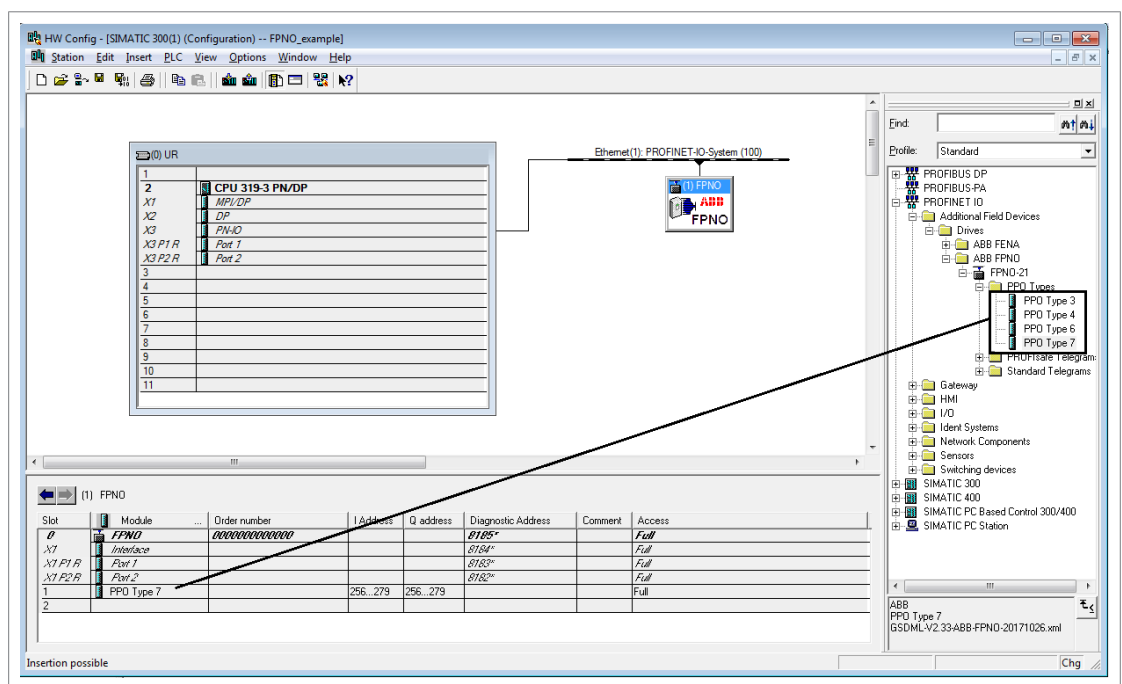
- In the **Options** menu, select **Install GSD Files**.
- Browse for the GSD file downloaded from the Document library and click **Install**.



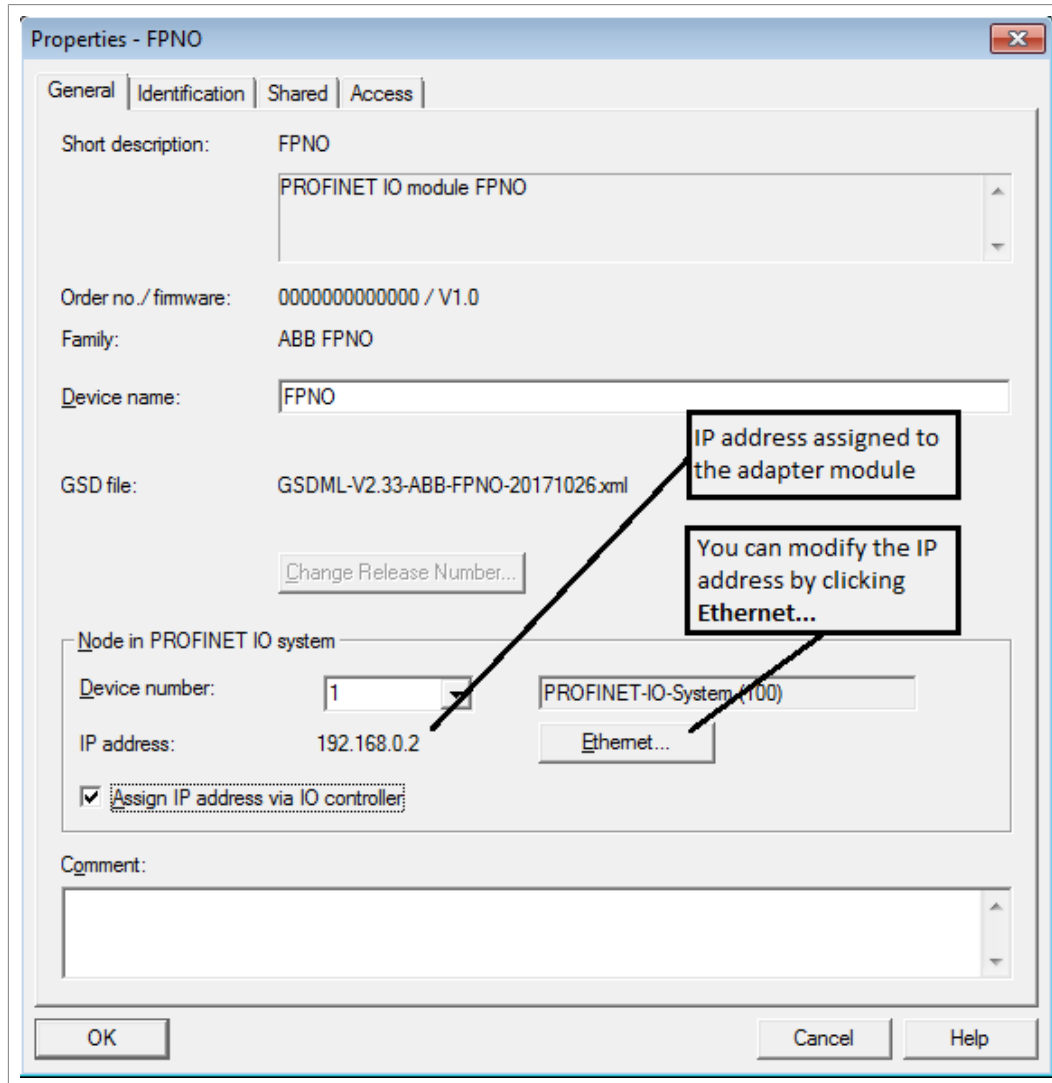
- Click and drag the FPNO-21 object from the device catalog to the Ethernet (1): PROFINET-IO-System.



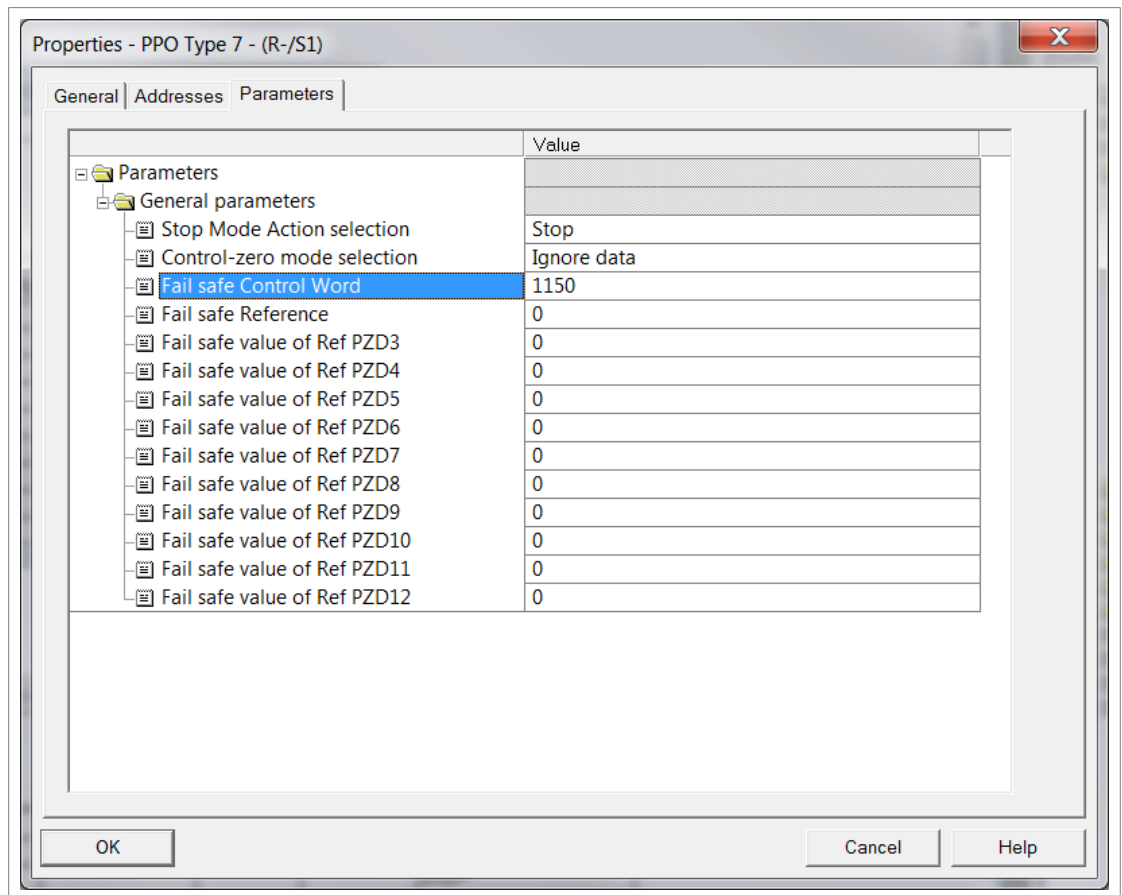
- Click and drag the PP0 Type 7 object to Slot 1.  
Then, double-click FPNO-21 to open the **Properties** window.



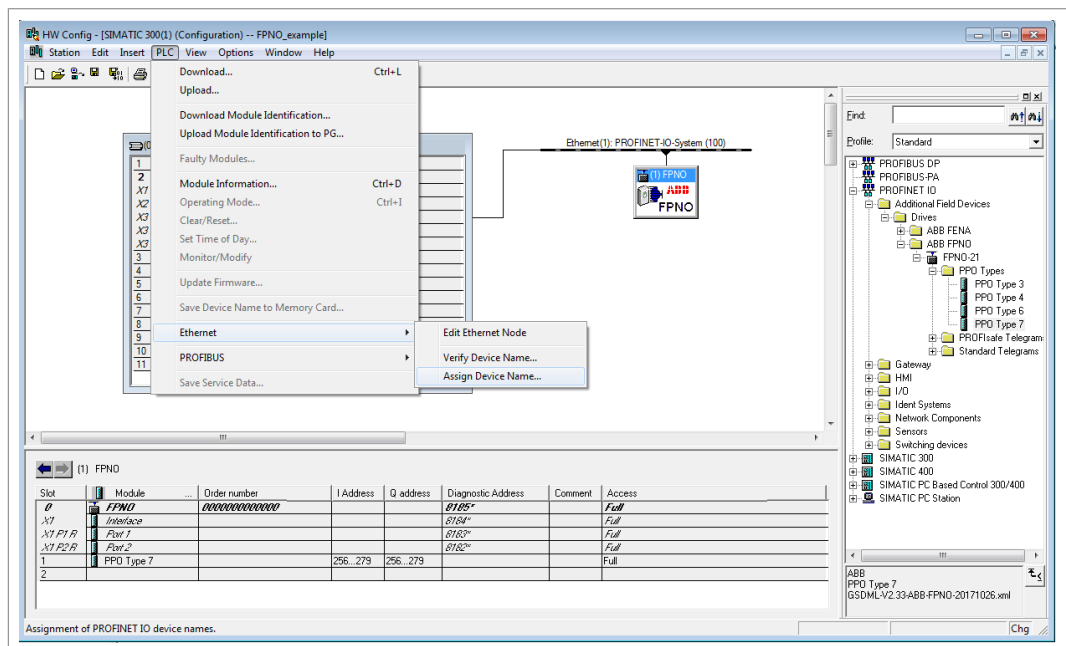
- On the **General** tab, type a name for the adapter module in the **Device name** box.



7. In the hardware configuration, double-click PPO Type 7 in Slot 1 to open the **Properties** window.
8. On the **Parameters** tab, configure the stop mode and control-zero mode functionality, and set fail safe values for the PLC output process data (PZDs).

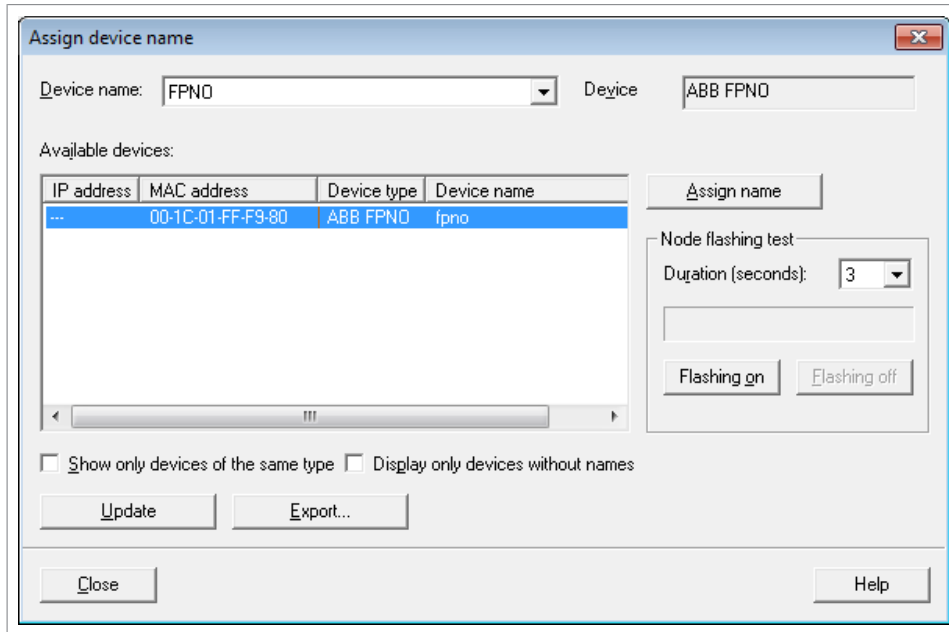


9. Assign the device name (set in step 6) to the adapter module:
  - In the hardware configuration, click FPNO-21.
  - On the **PLC** menu, select **Ethernet**, and then select **Assign Device Name**.



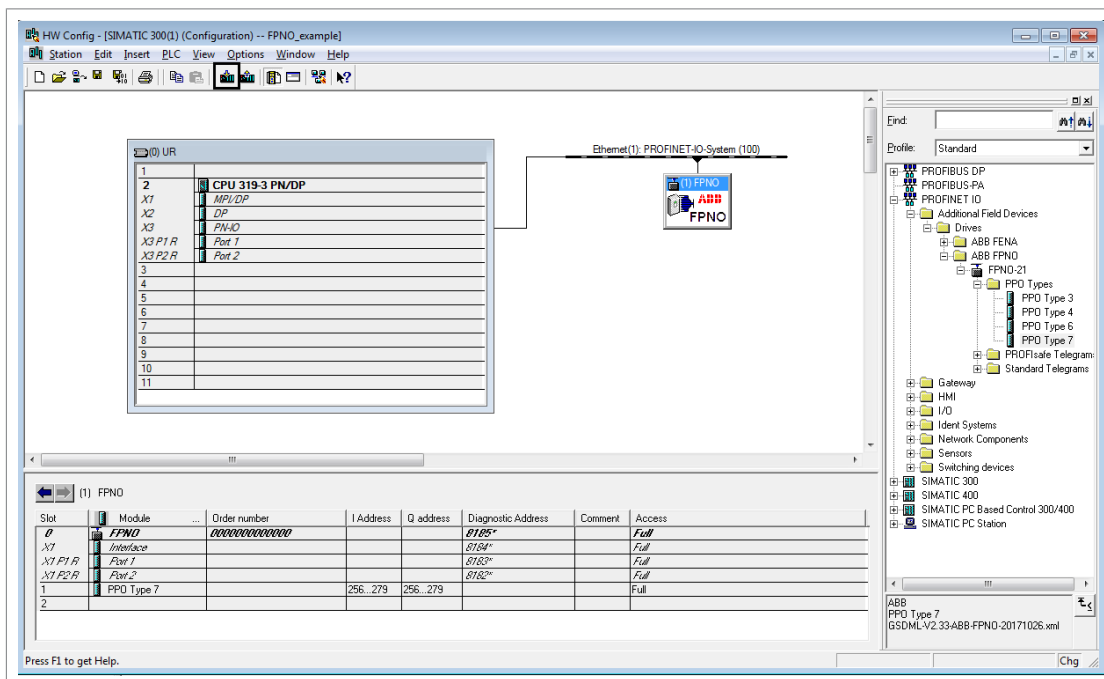
- Click the available device with the correct MAC address to which the device name is to be assigned. This assigns the name to the FPNO-21 adapter module. Then click **Assign name**.

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### 10. Download the hardware configuration to the PLC.

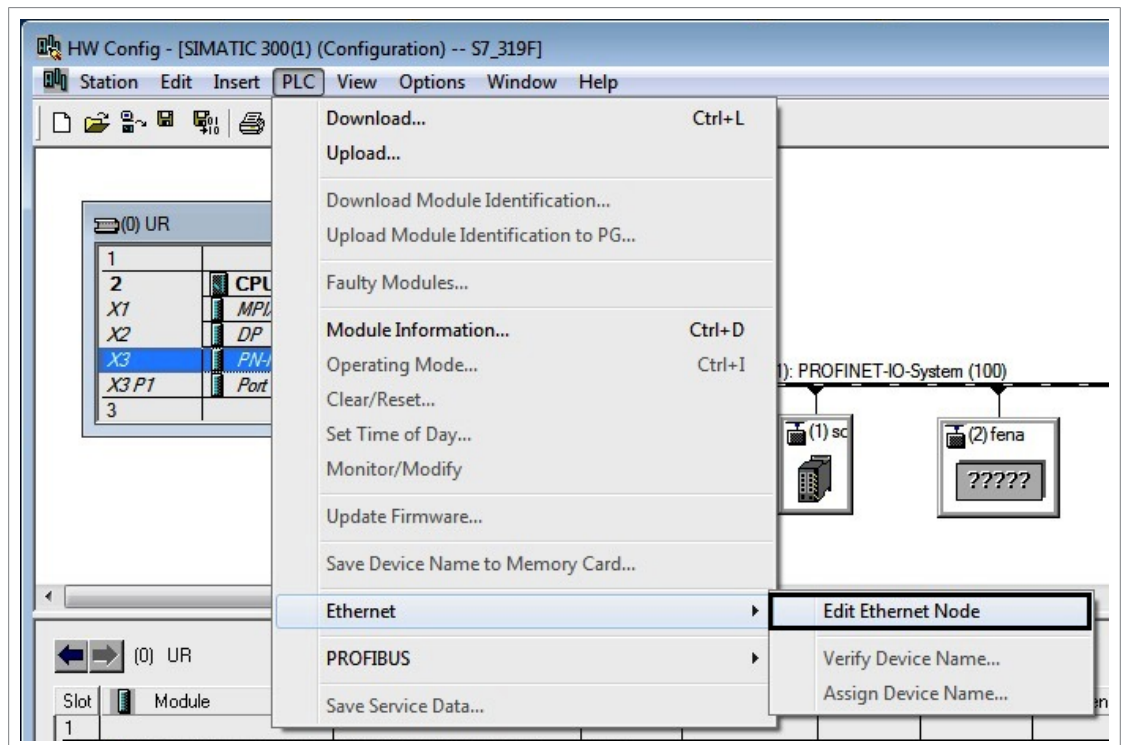
The PLC is now ready for communication with the adapter module.



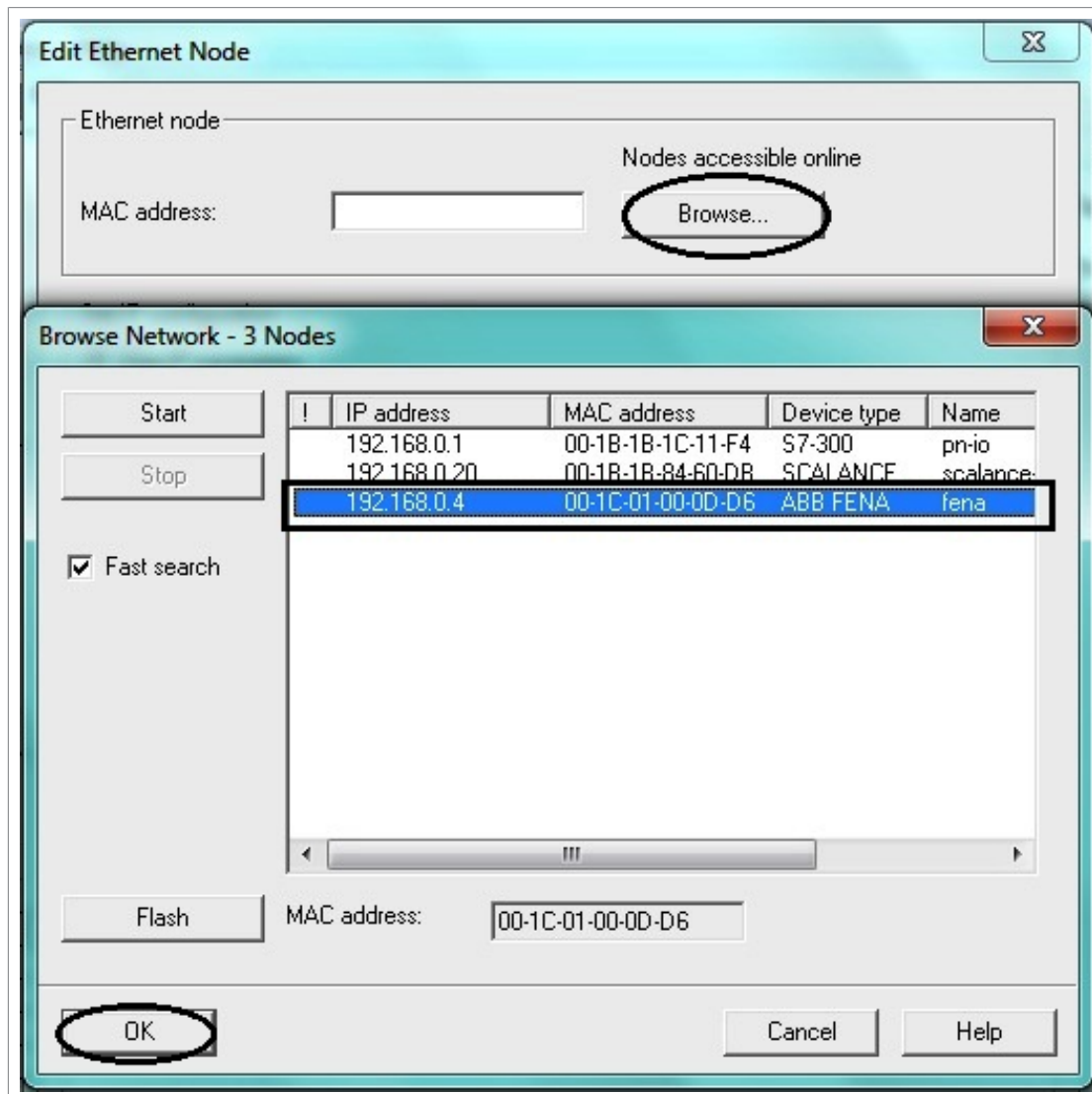
## ■ Resetting PROFINET IO device to factory default via S7

You can reset the PROFINET IO device to the factory default state.

1. In HW configuration, go to PLC → Ethernet → Edit Ethernet Node.



2. In the Edit Ethernet Node window, click **Browse...**



The list of available devices appears.

3. Select the device that needs to be reset to default. Click **OK**.
4. Click **Reset** to clear configuration.

**Edit Ethernet Node**

Ethernet node

MAC address: 00-1C-01-00-0D-D6 Nodes accessible online

Browse...

Set IP configuration

☒ Use IP parameters

IP address: 192.168.0.4 Gateway

Subnet mask: 255.255.255.0 ☒ Do not use router

☐ Use router

Address: 192.168.0.4

☐ Obtain IP address from a DHCP server

Identified by

☒ Client ID ☐ MAC address ☐ Device name

Client ID:

Assign IP Configuration

Assign device name

Device name: fena Assign Name

Reset to factory settings

**Reset**

Close Help

5. A pop-up window appears when the reset starts. Click **OK**.

**Edit Ethernet Node (4502:920)**

X

i Resetting to factory settings was started.

OK

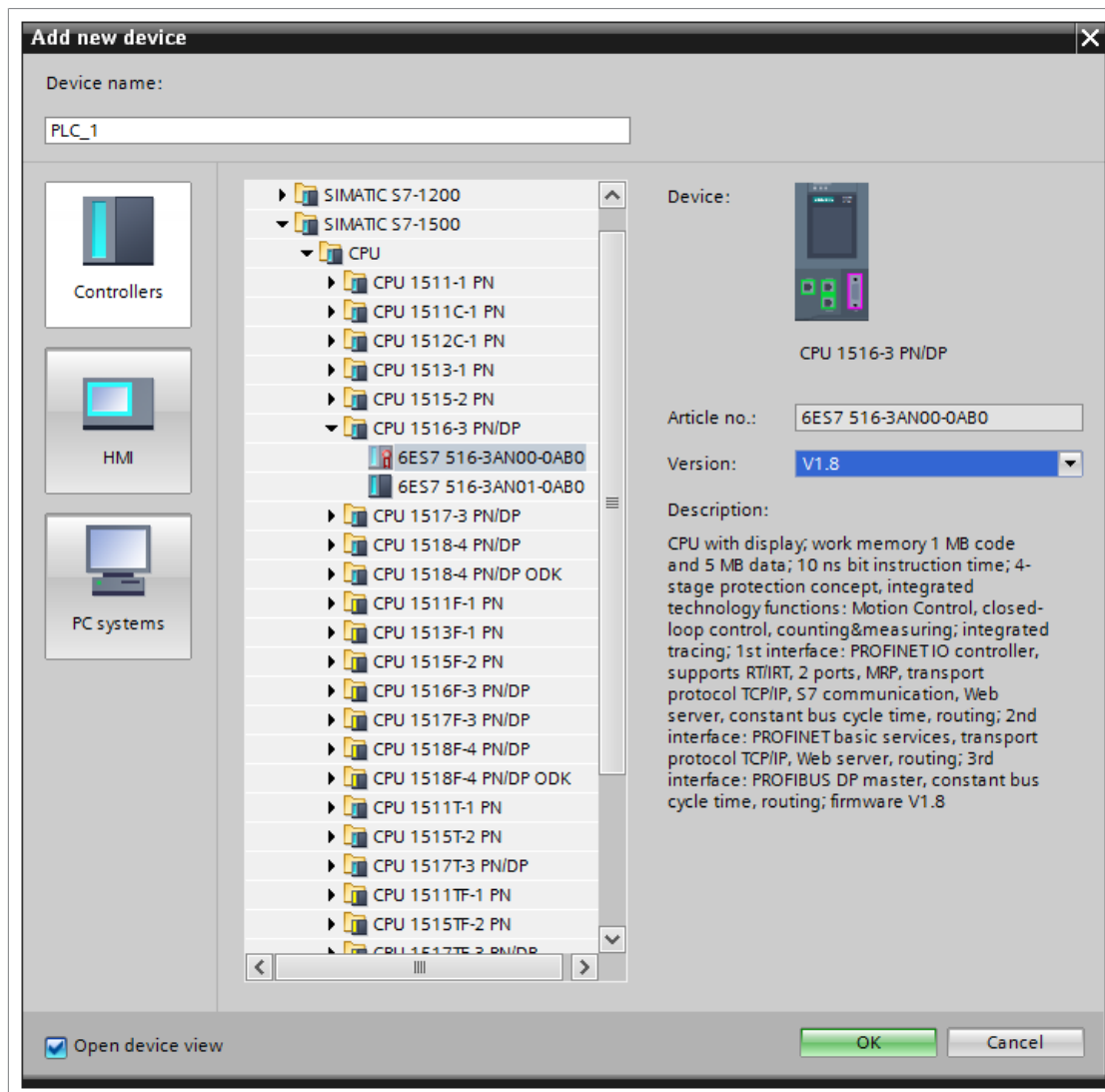
The configuration is now reset to the default settings (PROFINET IO station name, Ethernet services configuration).

### ■ Configuring a Siemens PLC with TIA14

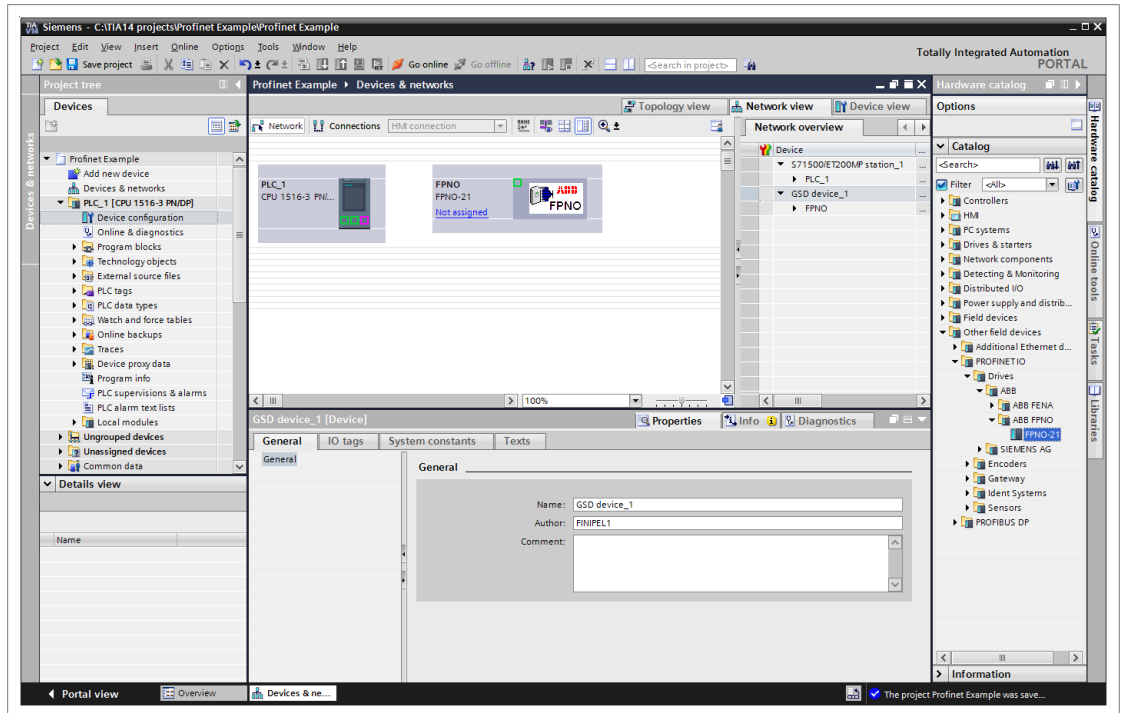
This example shows how to configure communication between a Siemens SIMATIC S7 PLC and the adapter module using SIMATIC Manager Step 7.

Before you start, make sure that you have the FPNO-21 GSD file from the Document library.

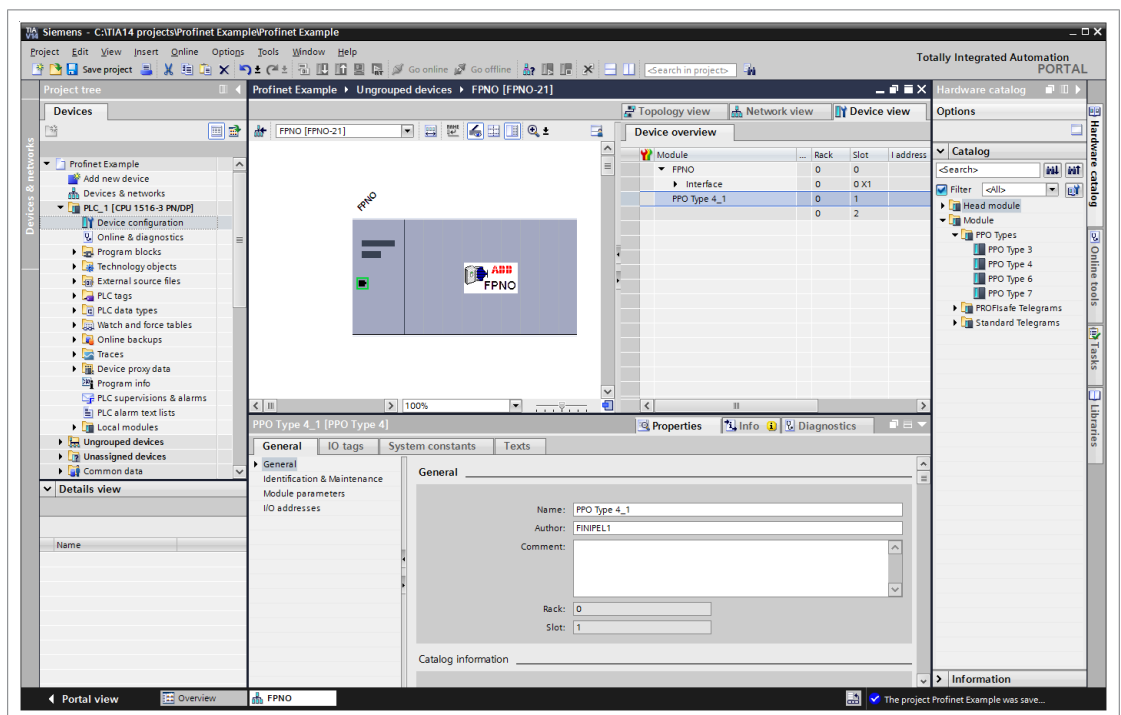
1. Start TIA14 and create new project.
2. Change to project view.
3. Install the FPNO-21 GSD file:
  - Options > Manage general station description files
  - Browse to source path where GSDML file is located.
  - Select the check box and click Install.
4. Add new device and select CPU from list.



5. Add FPNO-21 to the device configuration.

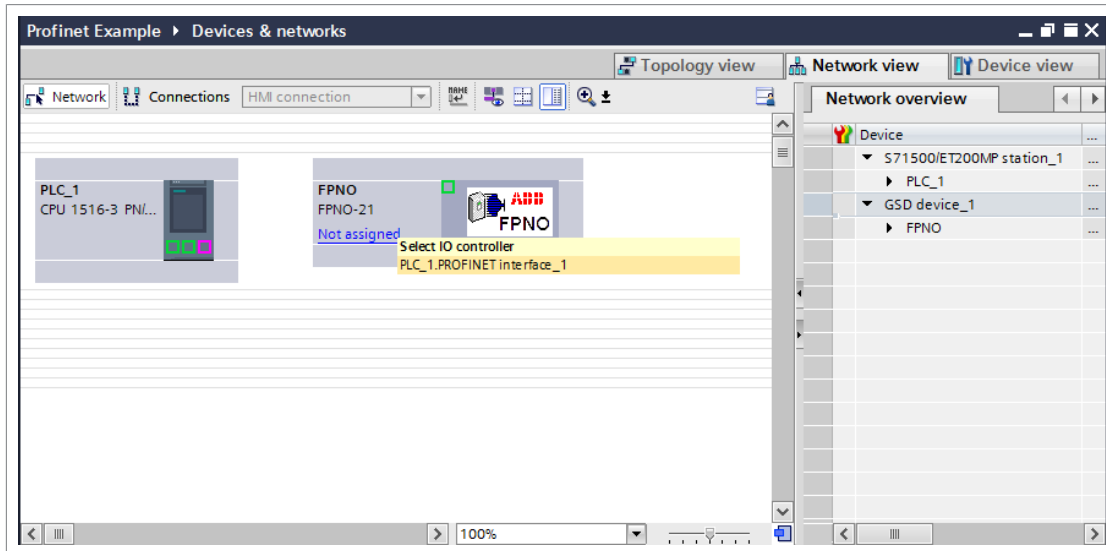


6. Open the FPNO-21 device view and add the desired telegram to slot 1.

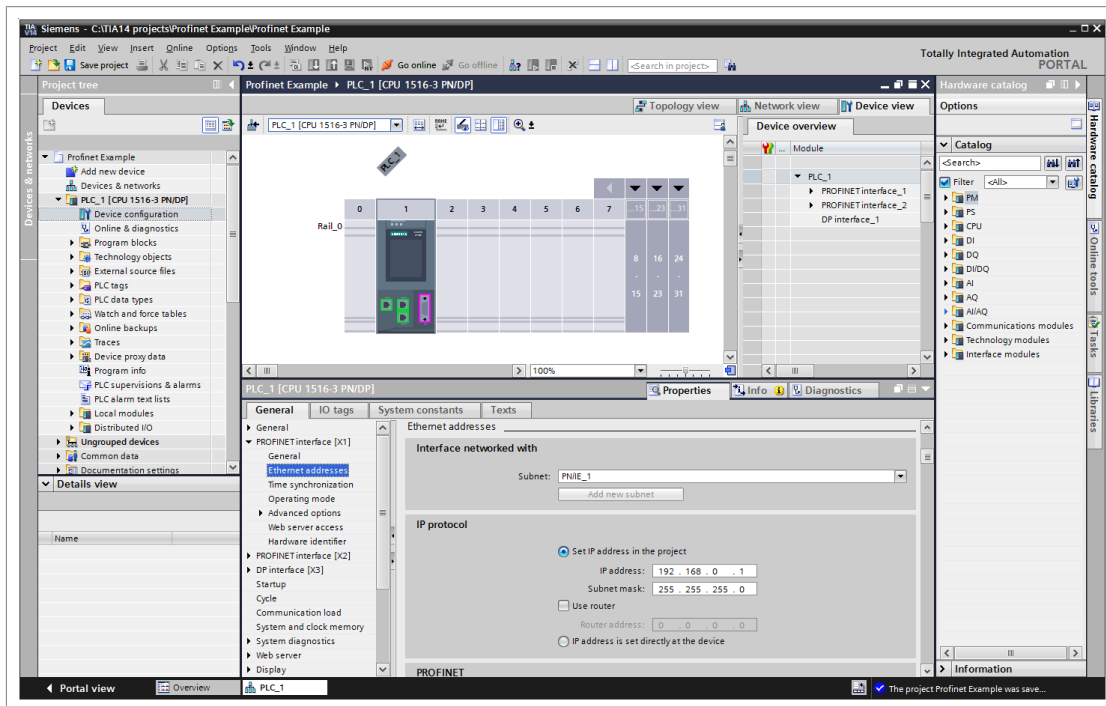


7. Assign FPNO-21 to the PROFINET controller.

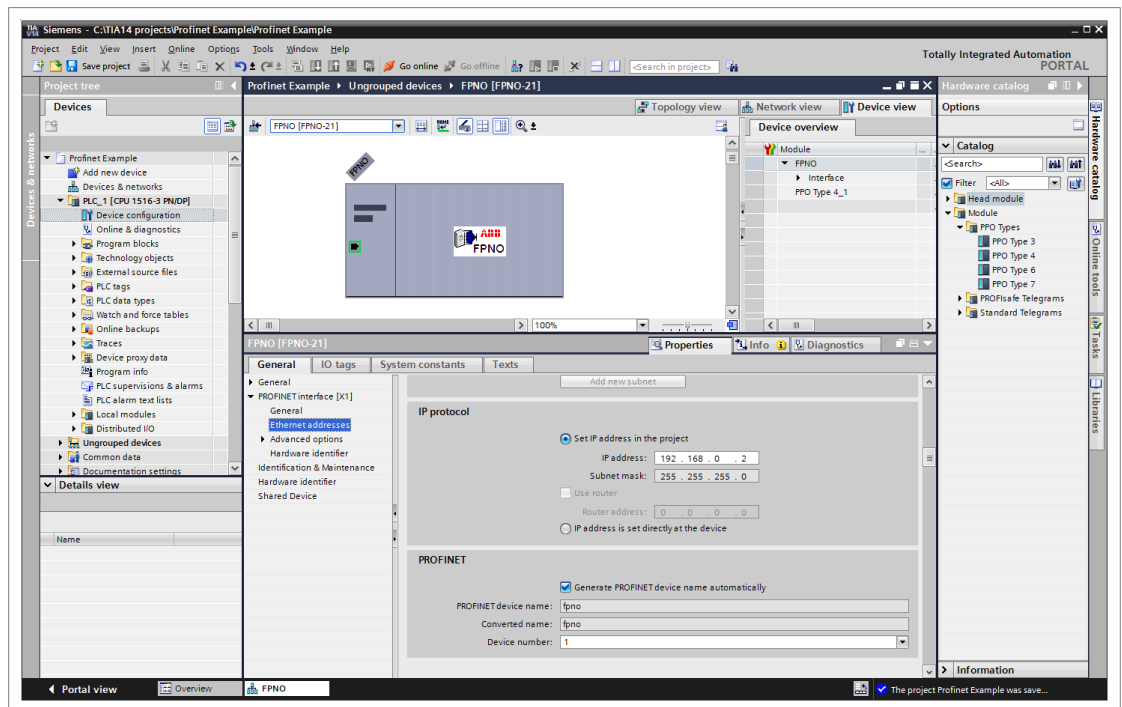
## 60 PROFINET IO – Start-up



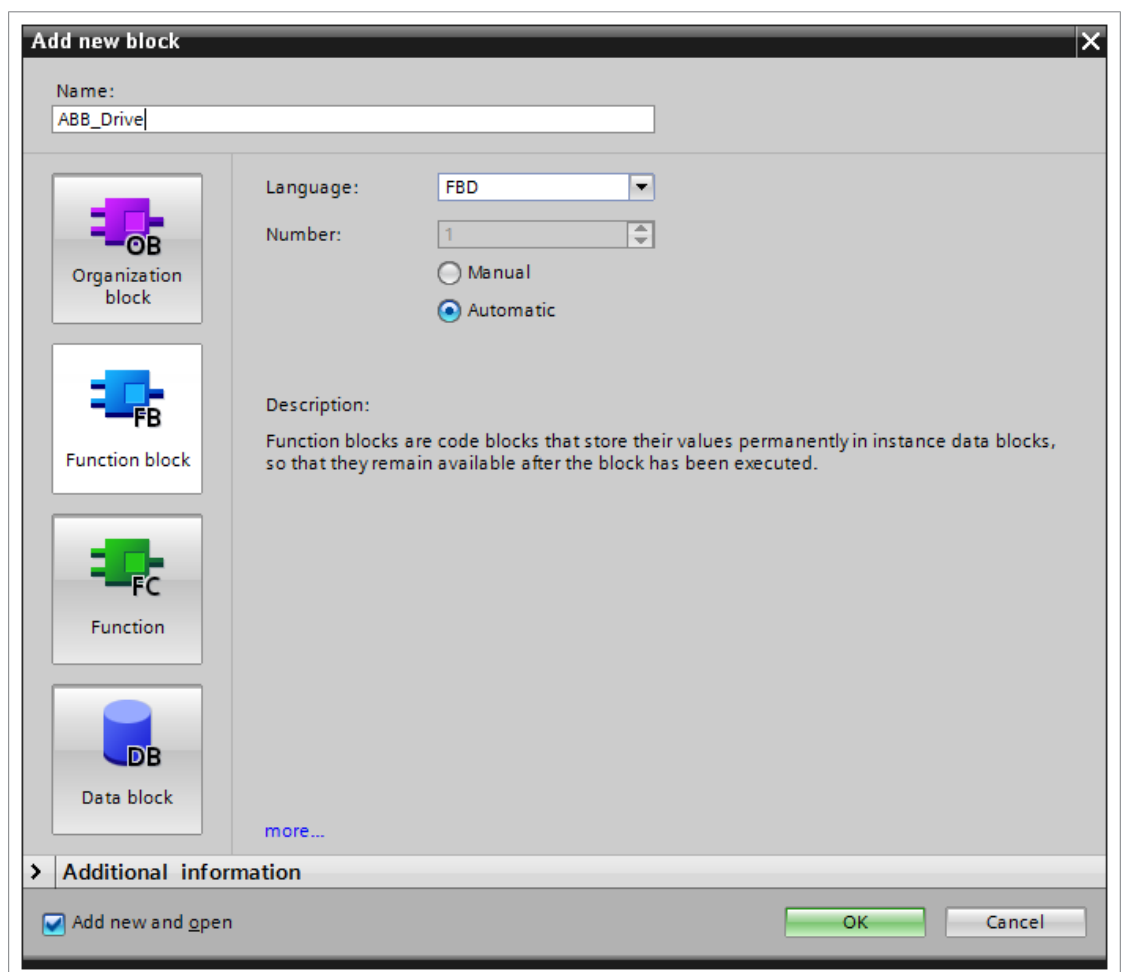
8. Select the Properties tab > General tab > Ethernet addresses submenu, and set the PLC IP address.



9. In the FPNO-21 properties, Ethernet addresses submenu, set the FPNO-21 IP address and PROFINET device name. Device name is used as identification. After successful identification, the PLC sets an IP address for the FPNO-21 module.

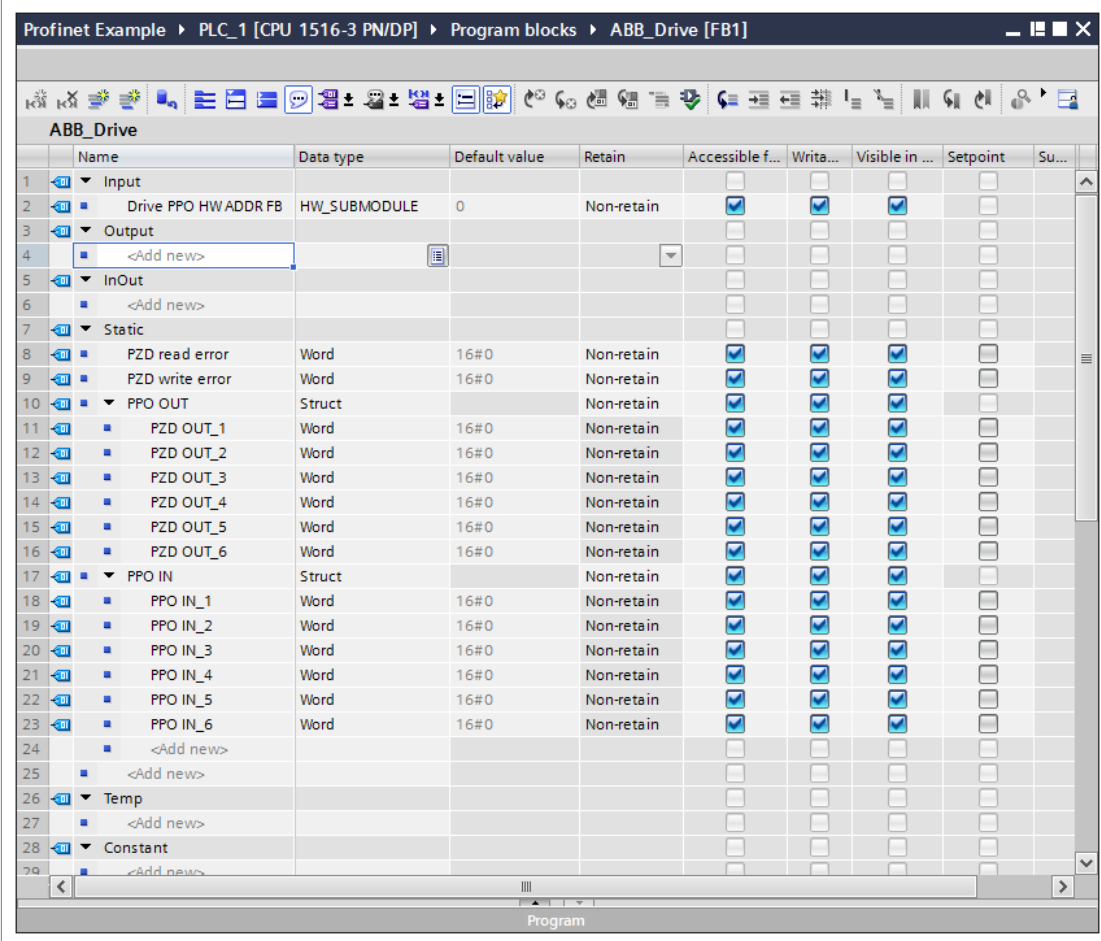


10. Add the new function block ABB\_Drive.



11. Add variables to ABB\_Drive FB.

## 62 PROFINET IO – Start-up



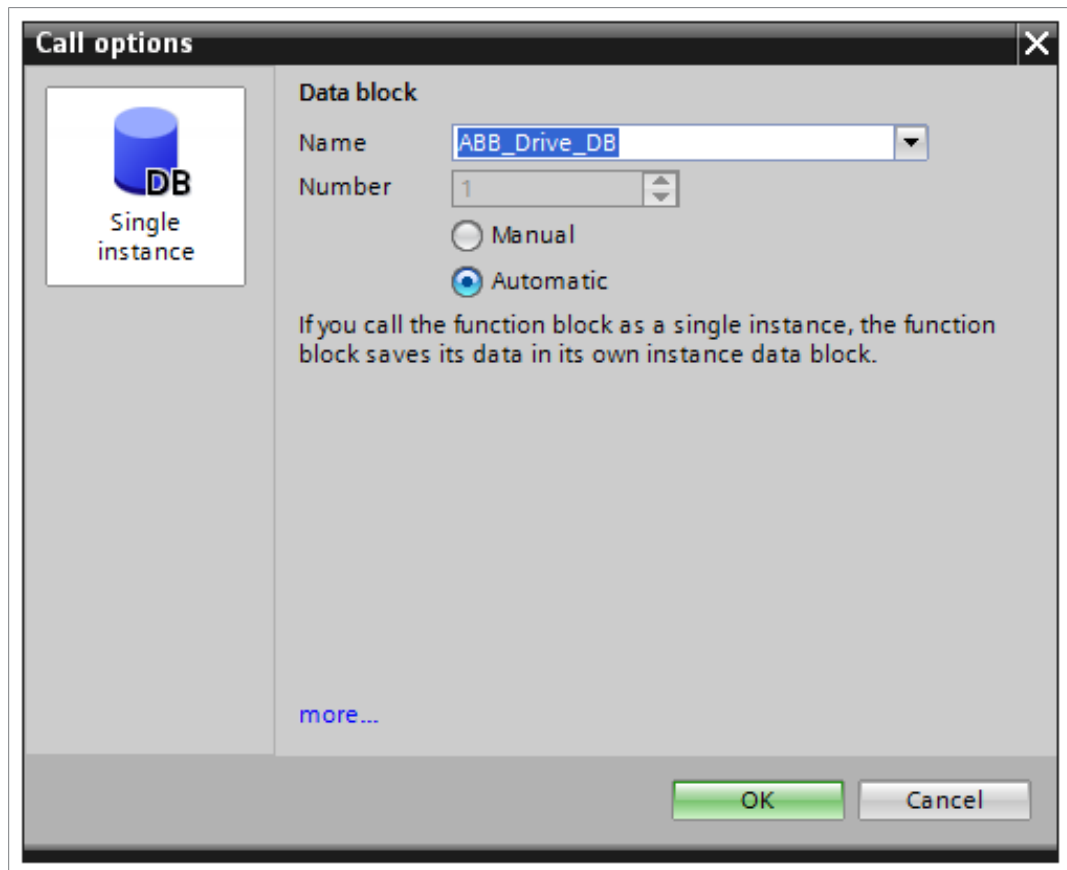
Profinet Example ▸ PLC\_1 [CPU 1516-3 PN/DP] ▸ Program blocks ▸ ABB\_Drive [FB1]

ABB\_Drive

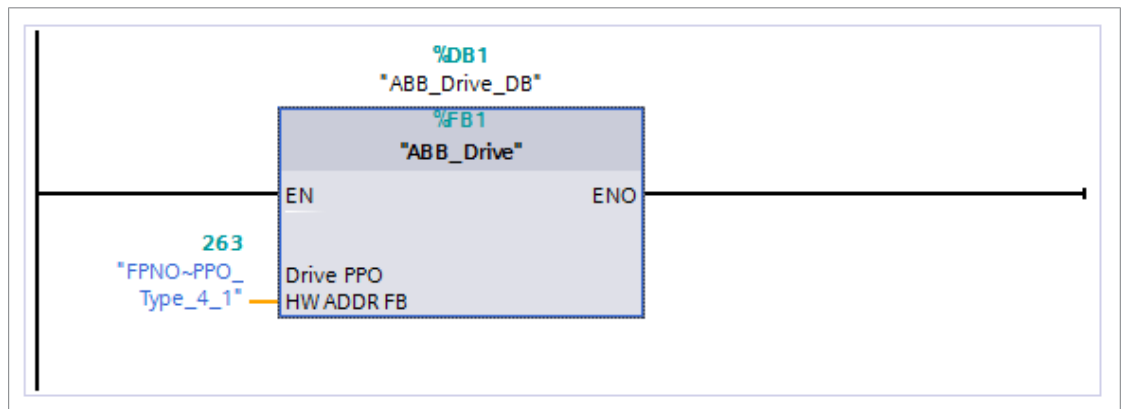
|    | Name                 | Data type    | Default value | Retain     | Accessible f...                     | Writa...                            | Visible in ...                      | Setpoint                 | Su... |
|----|----------------------|--------------|---------------|------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|-------|
| 1  | ▼ Input              |              |               |            |                                     |                                     |                                     |                          |       |
| 2  | Drive PPO HW ADDR FB | HW_SUBMODULE | 0             | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 3  | ▼ Output             |              |               |            |                                     |                                     |                                     |                          |       |
| 4  | <Add new>            |              |               |            |                                     |                                     |                                     |                          |       |
| 5  | ▼ InOut              |              |               |            |                                     |                                     |                                     |                          |       |
| 6  | <Add new>            |              |               |            |                                     |                                     |                                     |                          |       |
| 7  | ▼ Static             |              |               |            |                                     |                                     |                                     |                          |       |
| 8  | PZD read error       | Word         | 16#0          | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 9  | PZD write error      | Word         | 16#0          | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 10 | ▼ PPO OUT            | Struct       |               | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 11 | PZD OUT_1            | Word         | 16#0          | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 12 | PZD OUT_2            | Word         | 16#0          | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 13 | PZD OUT_3            | Word         | 16#0          | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 14 | PZD OUT_4            | Word         | 16#0          | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 15 | PZD OUT_5            | Word         | 16#0          | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 16 | PZD OUT_6            | Word         | 16#0          | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 17 | ▼ PPO IN             | Struct       |               | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 18 | PPO IN_1             | Word         | 16#0          | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 19 | PPO IN_2             | Word         | 16#0          | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 20 | PPO IN_3             | Word         | 16#0          | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 21 | PPO IN_4             | Word         | 16#0          | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 22 | PPO IN_5             | Word         | 16#0          | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 23 | PPO IN_6             | Word         | 16#0          | Non-retain | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |       |
| 24 | <Add new>            |              |               |            |                                     |                                     |                                     |                          |       |
| 25 | <Add new>            |              |               |            |                                     |                                     |                                     |                          |       |
| 26 | ▼ Temp               |              |               |            |                                     |                                     |                                     |                          |       |
| 27 | <Add new>            |              |               |            |                                     |                                     |                                     |                          |       |
| 28 | ▼ Constant           |              |               |            |                                     |                                     |                                     |                          |       |
| 29 | <Add new>            |              |               |            |                                     |                                     |                                     |                          |       |

Program

12. Add ABB\_Drive to OB1. Assign a new instance Data Block for ABB\_Drive FB.

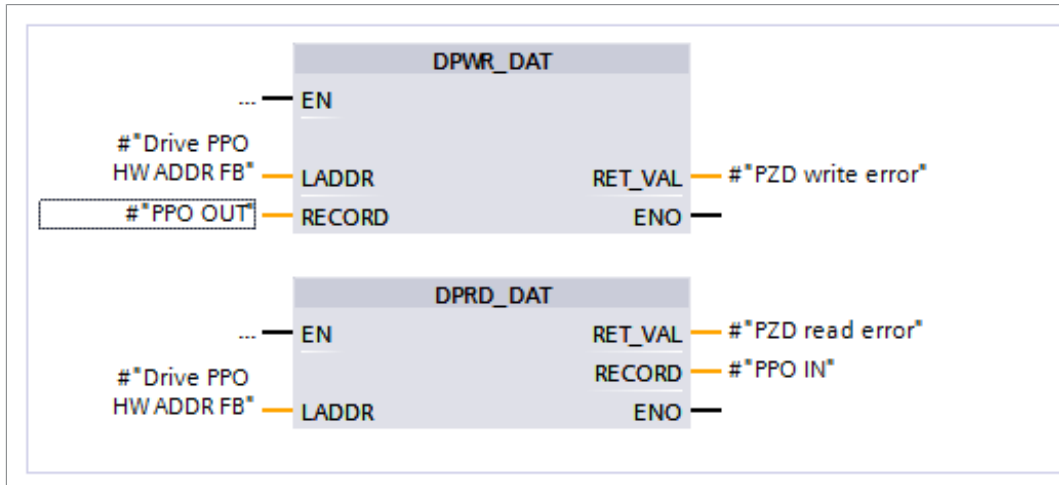


13. Add the FPNO-21 PPO HW address to Drive PPO HW ADDR FB input.

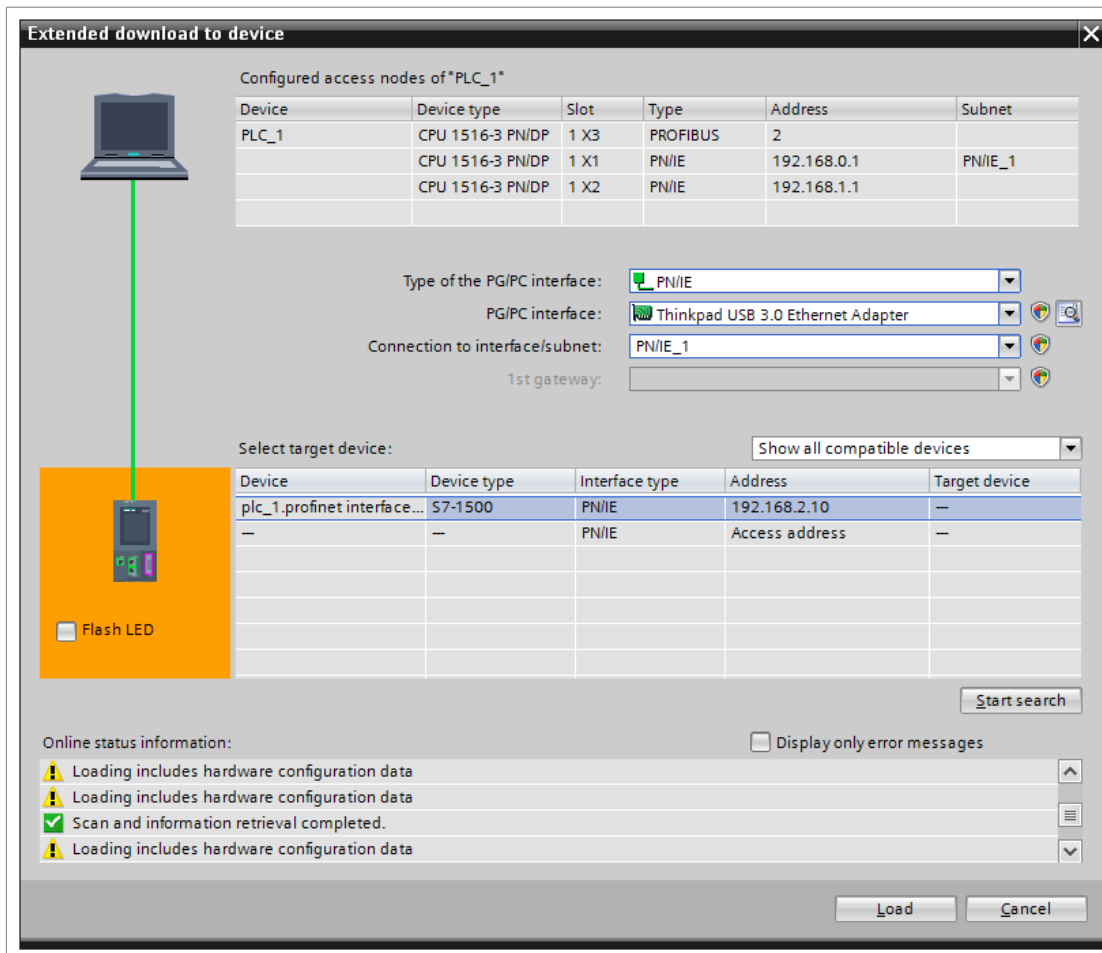


14. Add blocks DPRD\_DAT and DPWR\_DAT to ABB\_Drive FB. Map the inputs and outputs.

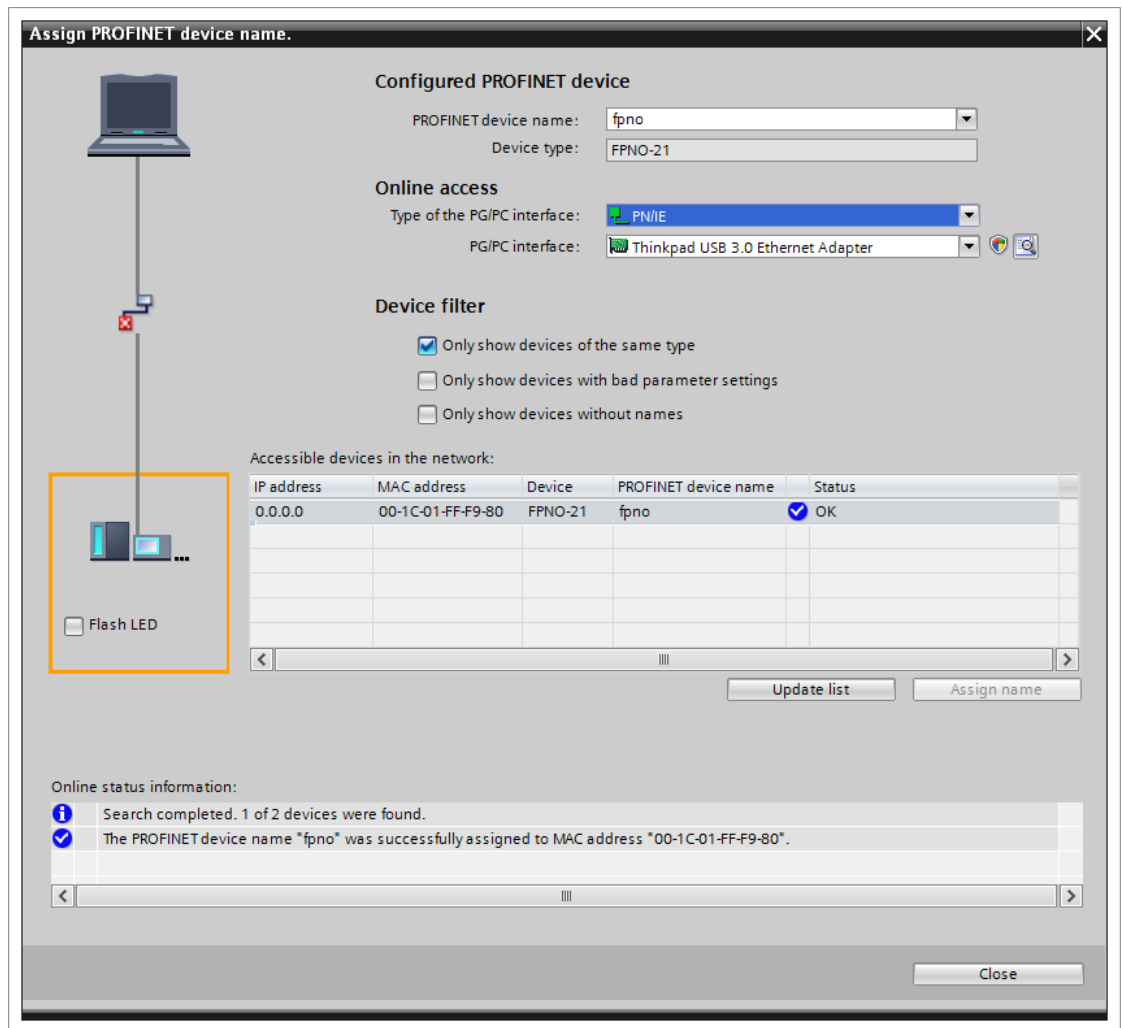
## 64 PROFINET IO – Start-up



15. Save and download the project to the PLC.

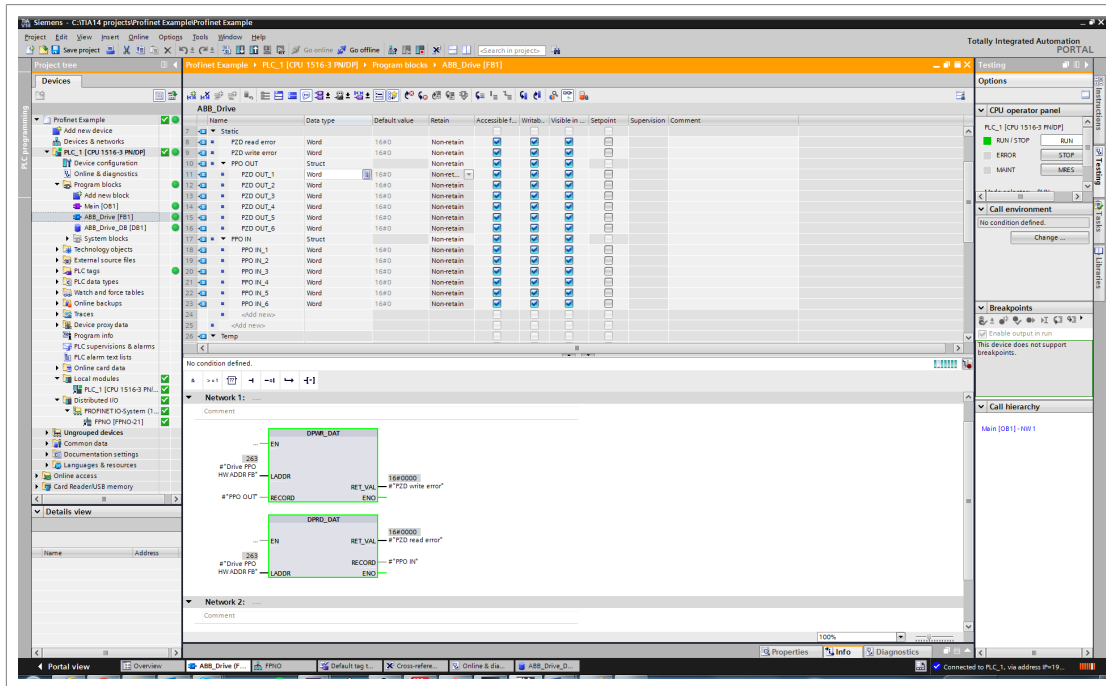


16. In the device configuration, right-click the FPNO-21 icon and select Assign device name.



17. Values can now be monitored when online.

## 66 PROFINET IO – Start-up



18. If the values need to be forced, add the FPNO-21 addresses to the tag table, and add the tag table variables to the force table.

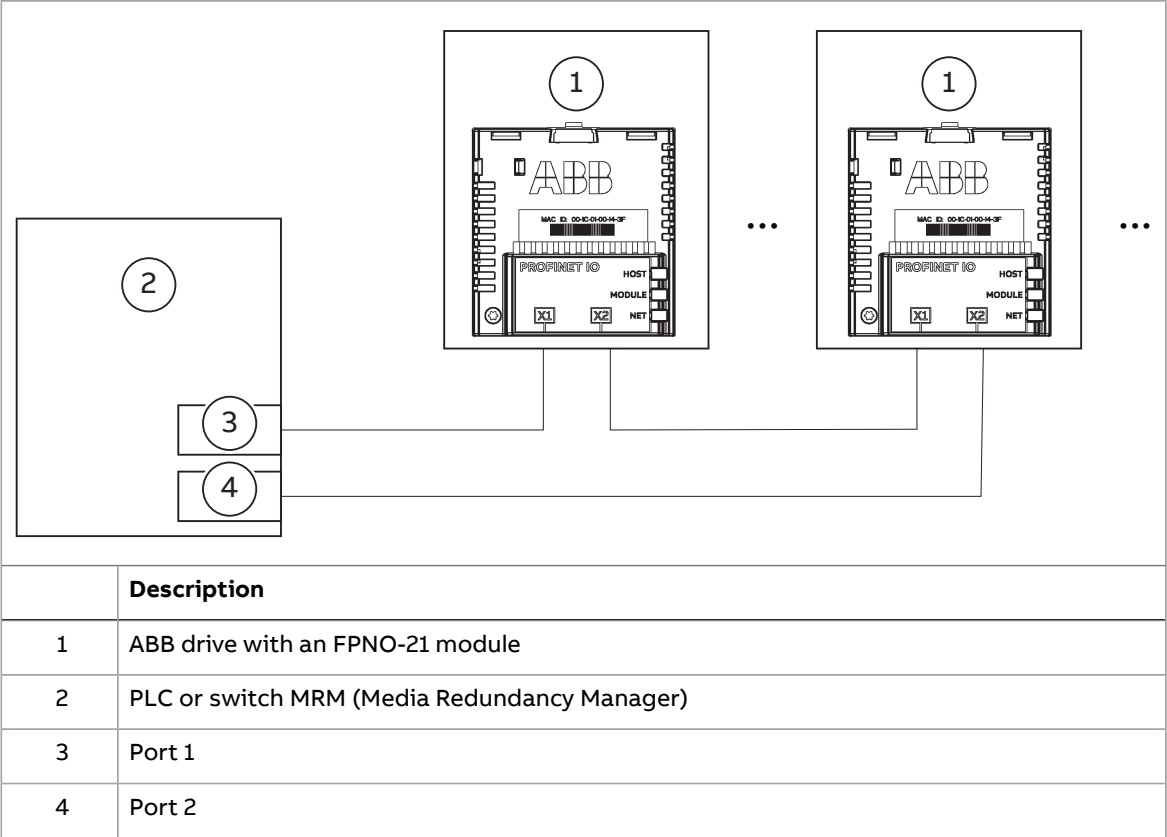
| Profinet Example > PLC_1 [CPU 1516-3 PN/DP] > Watch and force tables > Force table |                                      |         |                |               |                      |             |                                     |      |  |
|------------------------------------------------------------------------------------|--------------------------------------|---------|----------------|---------------|----------------------|-------------|-------------------------------------|------|--|
|                                                                                    | Name                                 | Address | Display format | Monitor value | Monitor with trig... | Force value | F                                   | C... |  |
| 1                                                                                  | "ABB_Drive_DB"."PPO IN"."PPO IN_1"   |         | Hex            | 16#1231       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 2                                                                                  | "ABB_Drive_DB"."PPO IN"."PPO IN_2"   |         | Hex            | 16#0000       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 3                                                                                  | "ABB_Drive_DB"."PPO IN"."PPO IN_3"   |         | Hex            | 16#0000       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 4                                                                                  | "ABB_Drive_DB"."PPO IN"."PPO IN_4"   |         | Hex            | 16#0000       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 5                                                                                  | "ABB_Drive_DB"."PPO IN"."PPO IN_5"   |         | Hex            | 16#0000       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 6                                                                                  | "ABB_Drive_DB"."PPO IN"."PPO IN_6"   |         | Hex            | 16#0000       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 7                                                                                  | "ABB_Drive_DB"."PPO OUT"."PZD OUT_1" |         | Hex            | 16#0000       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 8                                                                                  | "ABB_Drive_DB"."PPO OUT"."PZD OUT_2" |         | Hex            | 16#0000       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 9                                                                                  | "ABB_Drive_DB"."PPO OUT"."PZD OUT_3" |         | Hex            | 16#0000       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 10                                                                                 | "ABB_Drive_DB"."PPO OUT"."PZD OUT_4" |         | Hex            | 16#0000       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 11                                                                                 | "ABB_Drive_DB"."PPO OUT"."PZD OUT_5" |         | Hex            | 16#0000       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 12                                                                                 | "ABB_Drive_DB"."PPO OUT"."PZD OUT_6" |         | Hex            | 16#0000       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 13                                                                                 | "ABB_Drive_DB"."PZD read error"      |         | Hex            | 16#0000       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 14                                                                                 | "ABB_Drive_DB"."PZD write error"     |         | Hex            | 16#0000       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 15                                                                                 | "SW":P                               | %IWD:P  | Hex            | 16#1231       | Permanent            |             | <input type="checkbox"/>            |      |  |
| 16                                                                                 | "Act1":P                             | %IW2:P  | DEC            | 0             | Permanent            |             | <input type="checkbox"/>            |      |  |
| 17                                                                                 | "CW":P                               | %QWD:P  | Hex            | 16#047E       | Permanent            | 16#047E     | <input checked="" type="checkbox"/> |      |  |
| 18                                                                                 | "Ref1":P                             | %QW2:P  | DEC            | 500           | Permanent            | 500         | <input checked="" type="checkbox"/> |      |  |
| 19                                                                                 | <Add new>                            |         |                |               |                      |             | <input type="checkbox"/>            |      |  |

## Media Redundancy Protocol (MRP)

The Media Redundancy Protocol (MRP) network uses a ring topology that includes multiple nodes as shown in the connection diagram. One of the nodes has the Media Redundancy Manager (MRM) role and the nodes with FPNO-21 module(s) have the role of Media Redundancy Clients (MRC). Each node, MRM or MRC, has a pair of ports to connect to the ring.

For the FPNO-21 module, the link speed of both ports is 100 Mbit/s, full-duplex.

**Note:** The maximum number of nodes in the ring is 50.

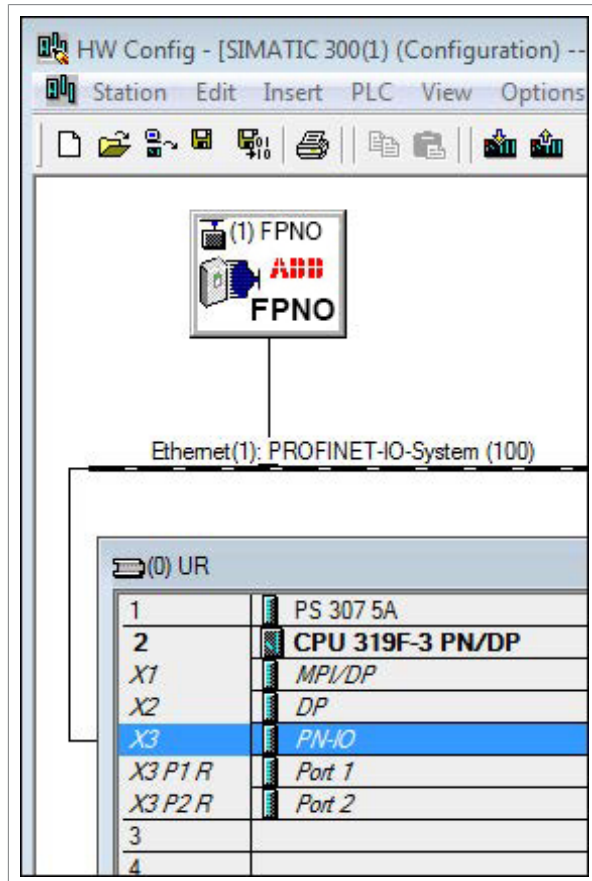


### ■ Configuring Media Redundancy Protocol (MRP) with Siemens PLC

You can configure MRP for Siemens PLC with SIMATIC S7 after you set the basic configuration. For instructions on the basic configuration, refer to [Configuring a Siemens SIMATIC S7 PLC \(page 49\)](#).

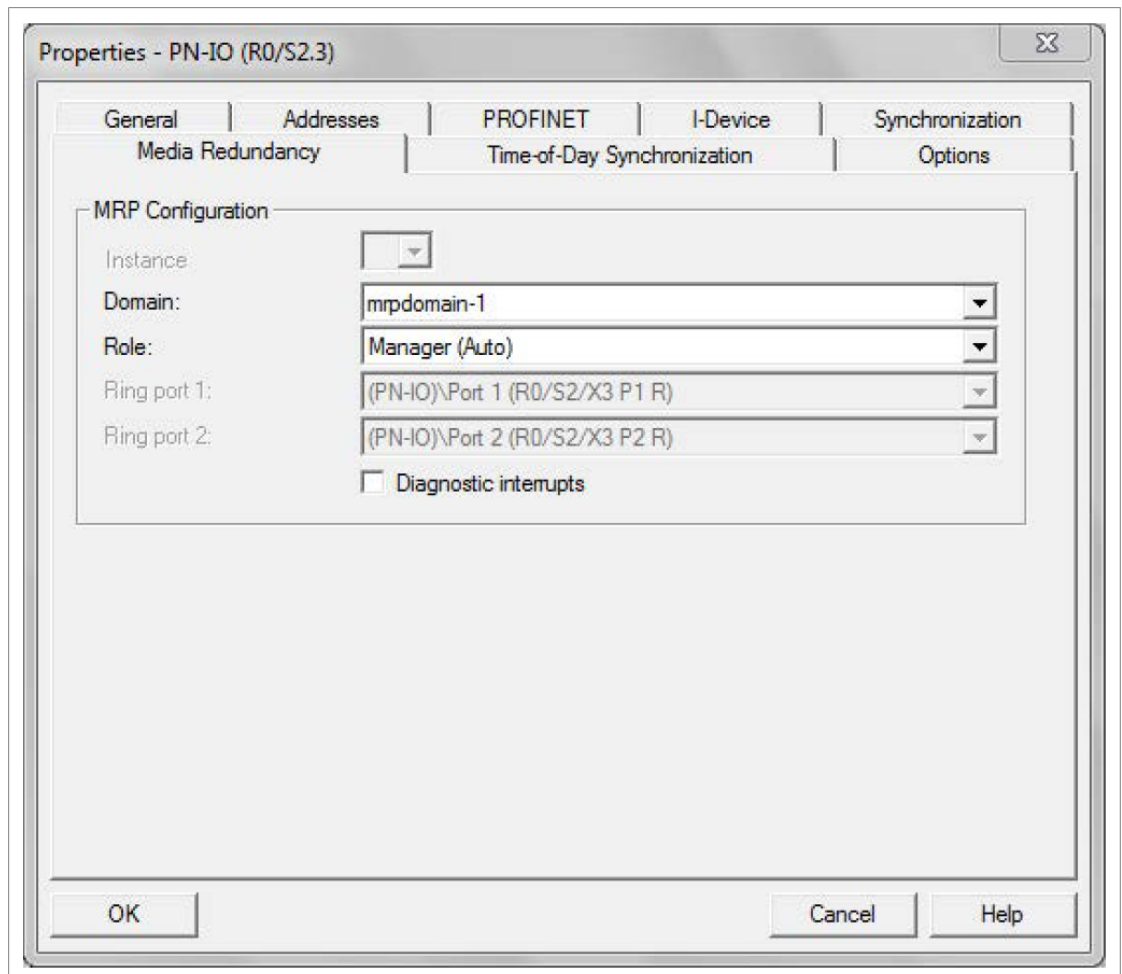
1. Double-click PN-IO in the station window.

## 68 PROFINET IO – Start-up



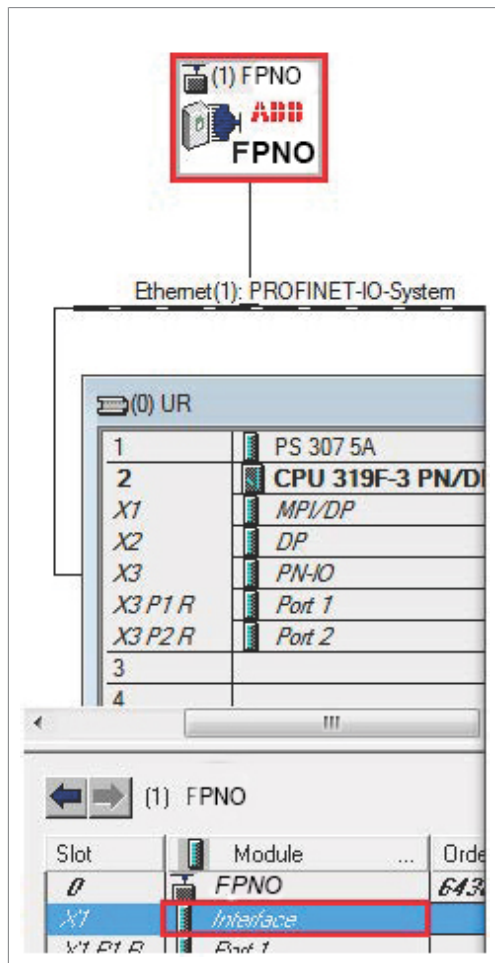
PN-IO properties window is displayed.

2. In the Properties PN-IO window, select Media Redundancy tab.



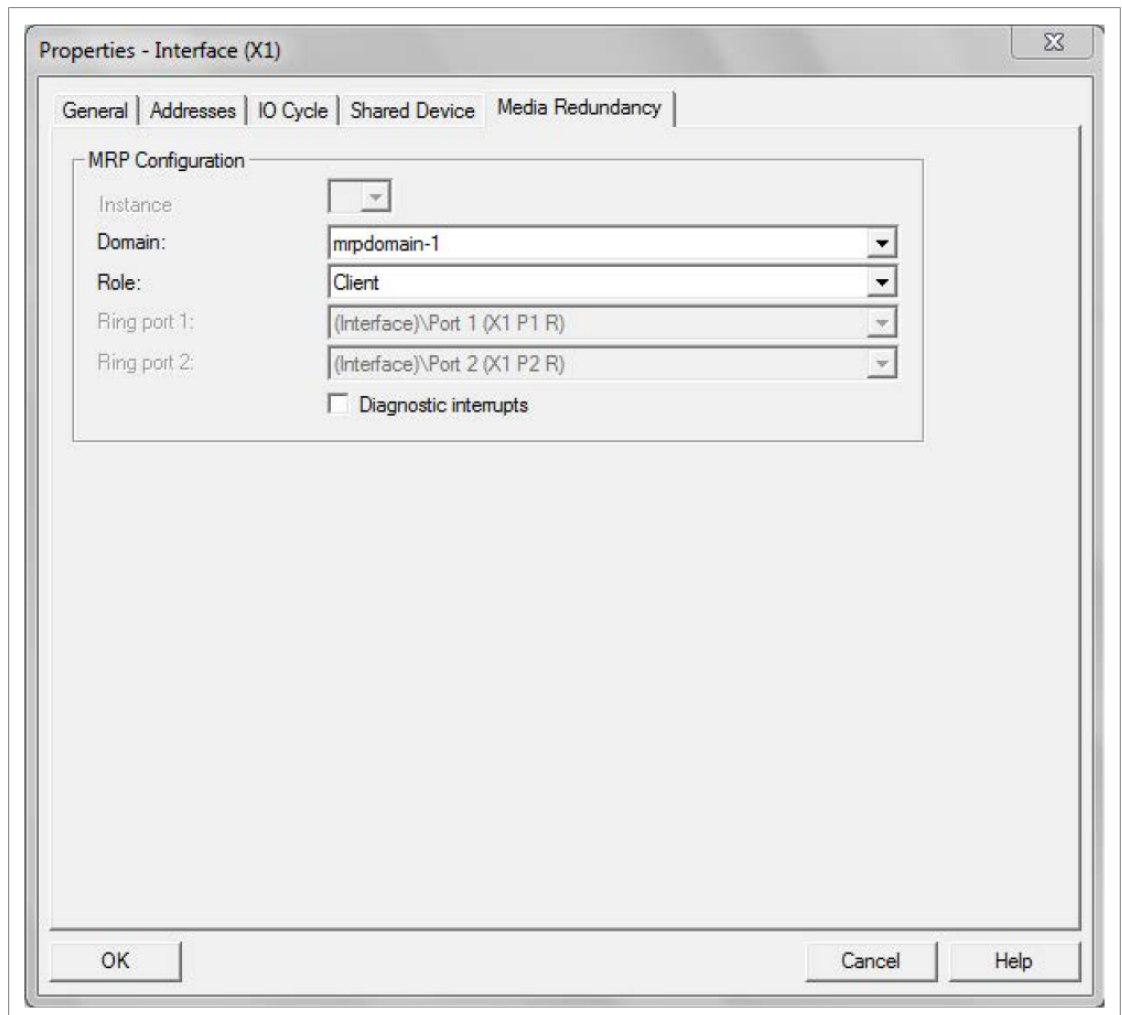
3. From the Role drop-down list, select the Manager (Auto) role for the PLC and then click OK.
4. In the master station window, click FPNO and then double-click Interface.

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The Properties-Interface window is displayed.

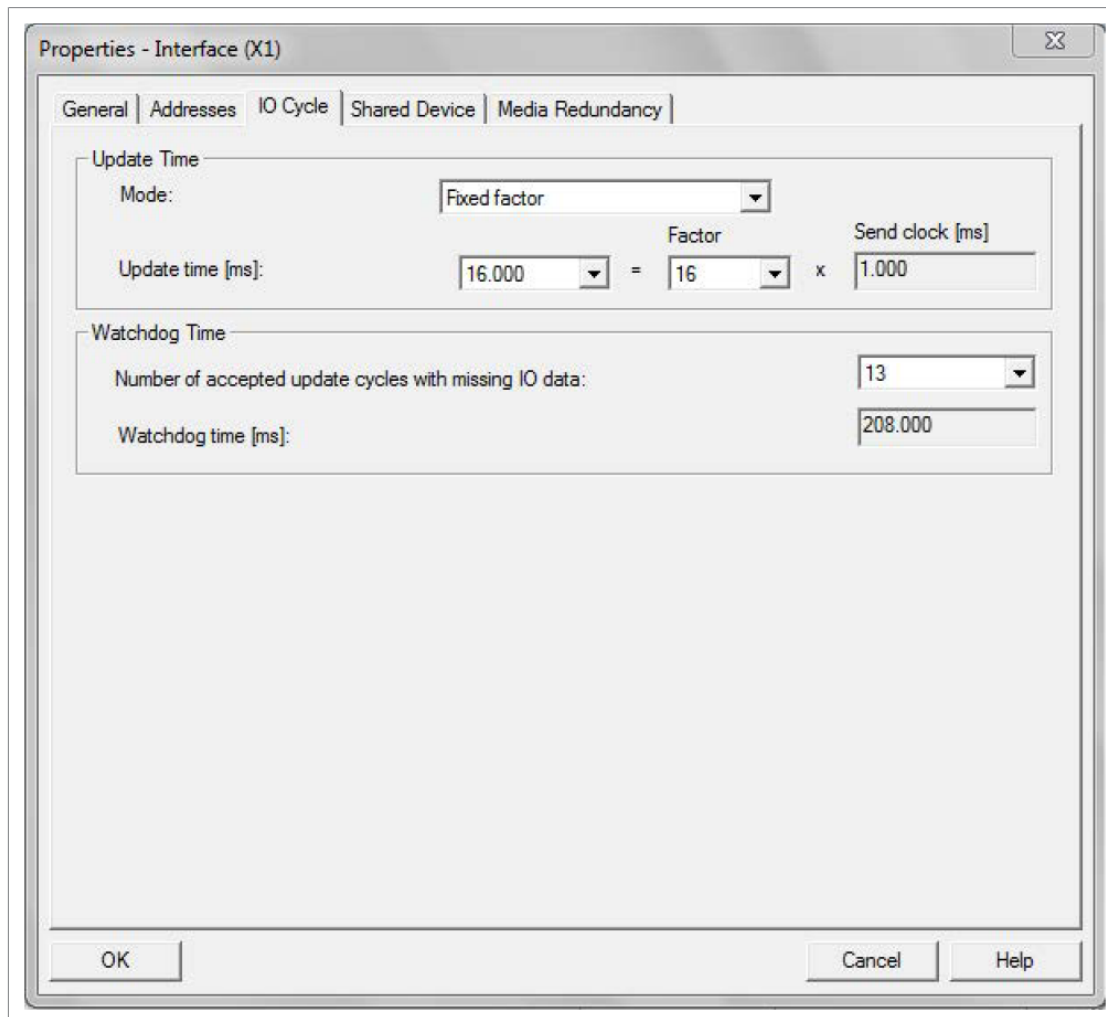
5. In the Properties-Interface window, select Media Redundancy tab.



6. From the Role drop-down list, select the Client role for the FPNO-21 module.
7. In the Properties-Interface window, select IO Cycle and set the watchdog time.

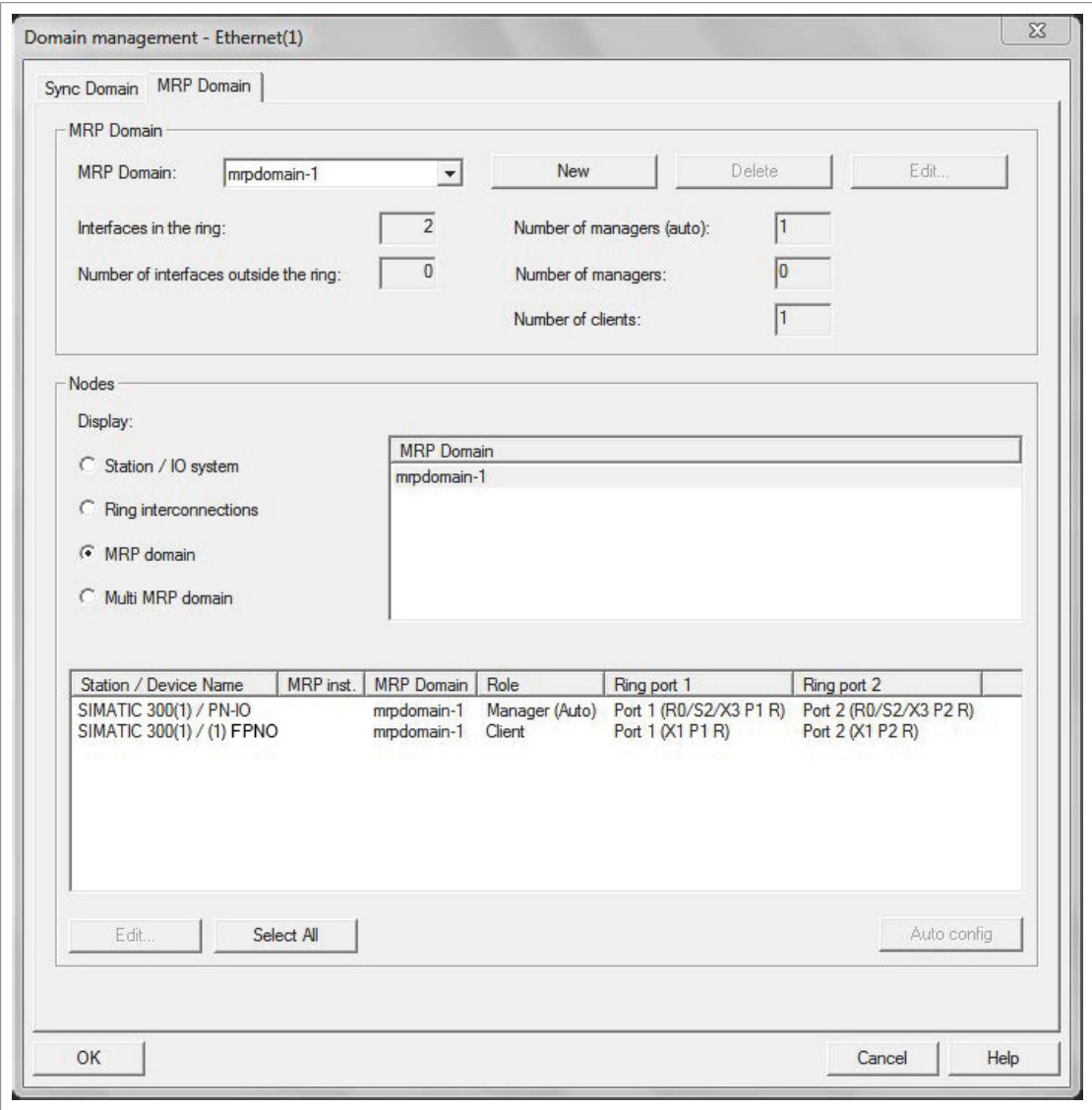
A recommended value for the watchdog time is 200 ms. Make sure that the connection is maintained during the ring break.

## 72 PROFINET IO – Start-up



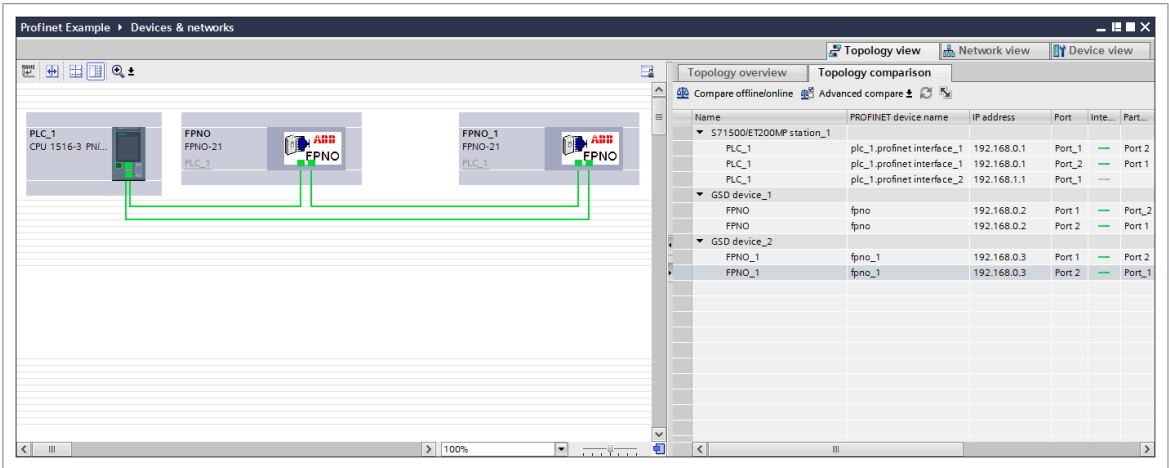
8. In the master station window, right-click on PROFINET IO System and select PROFINET IO Domain Management.

The configured devices (PN-IO and FPNO) are shown in the Domain management window.



■ **Configuring Media Redundancy Protocol (MRP) with TIA14**

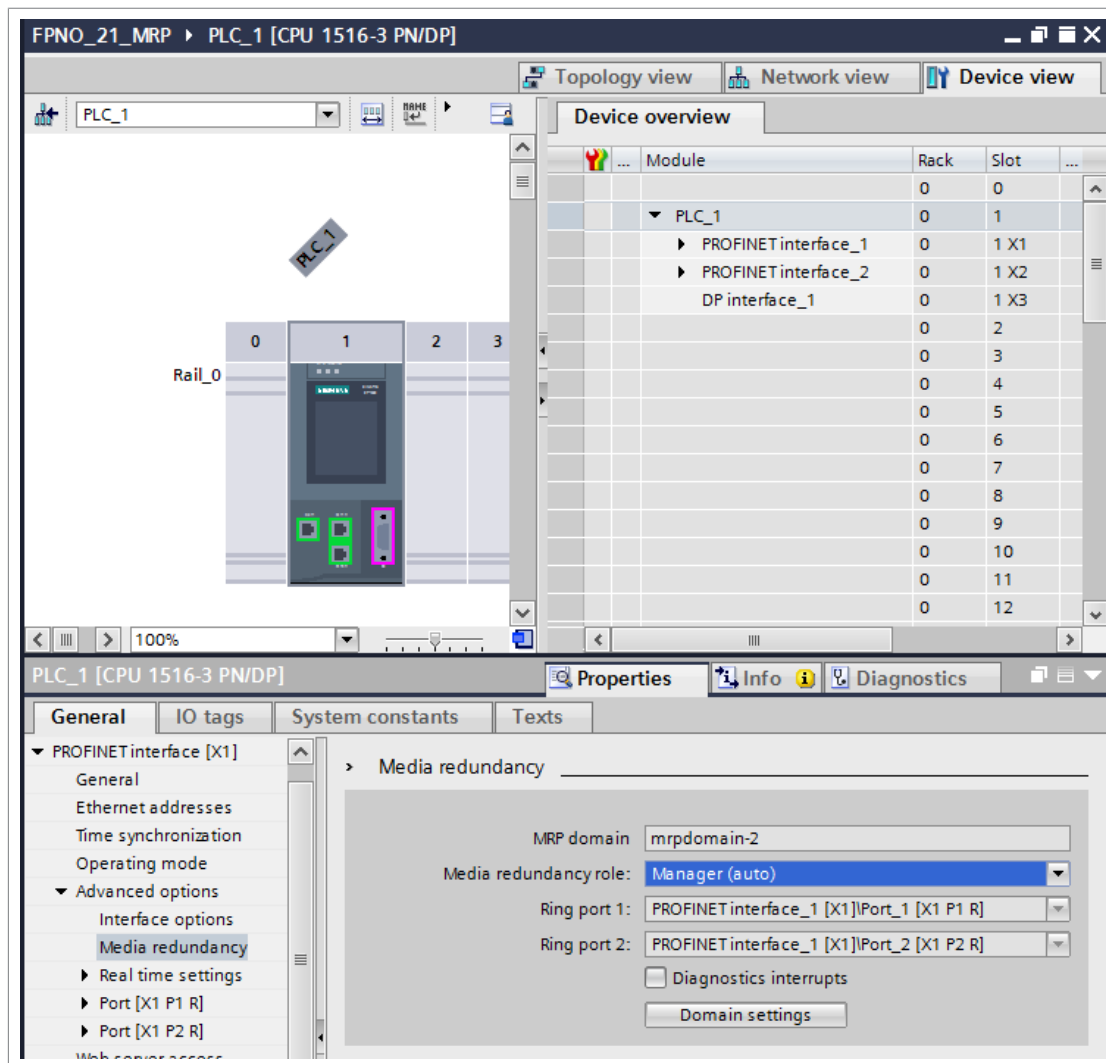
You can configure MRP for Siemens PLC with TIA14 after you set the basic configuration. For instructions of the basic configuration, refer to [Configuring a Siemens PLC with TIA14 \(page 58\)](#).



To configure an MRP with TIA portal:

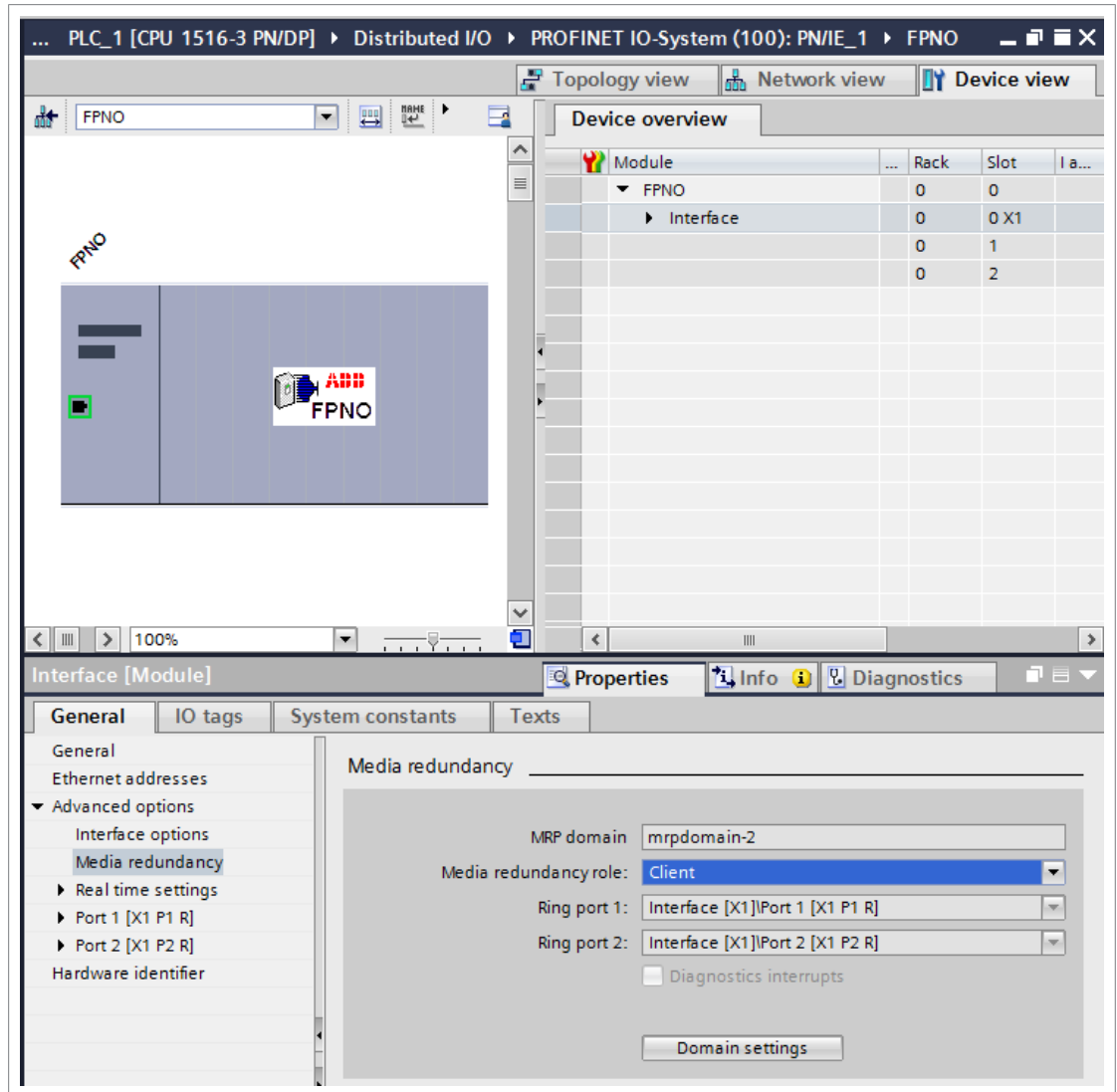
1. In TIA portal Device overview, expand the PLC and select the desired PROFINET interface.

The PROFINET interface view is displayed.



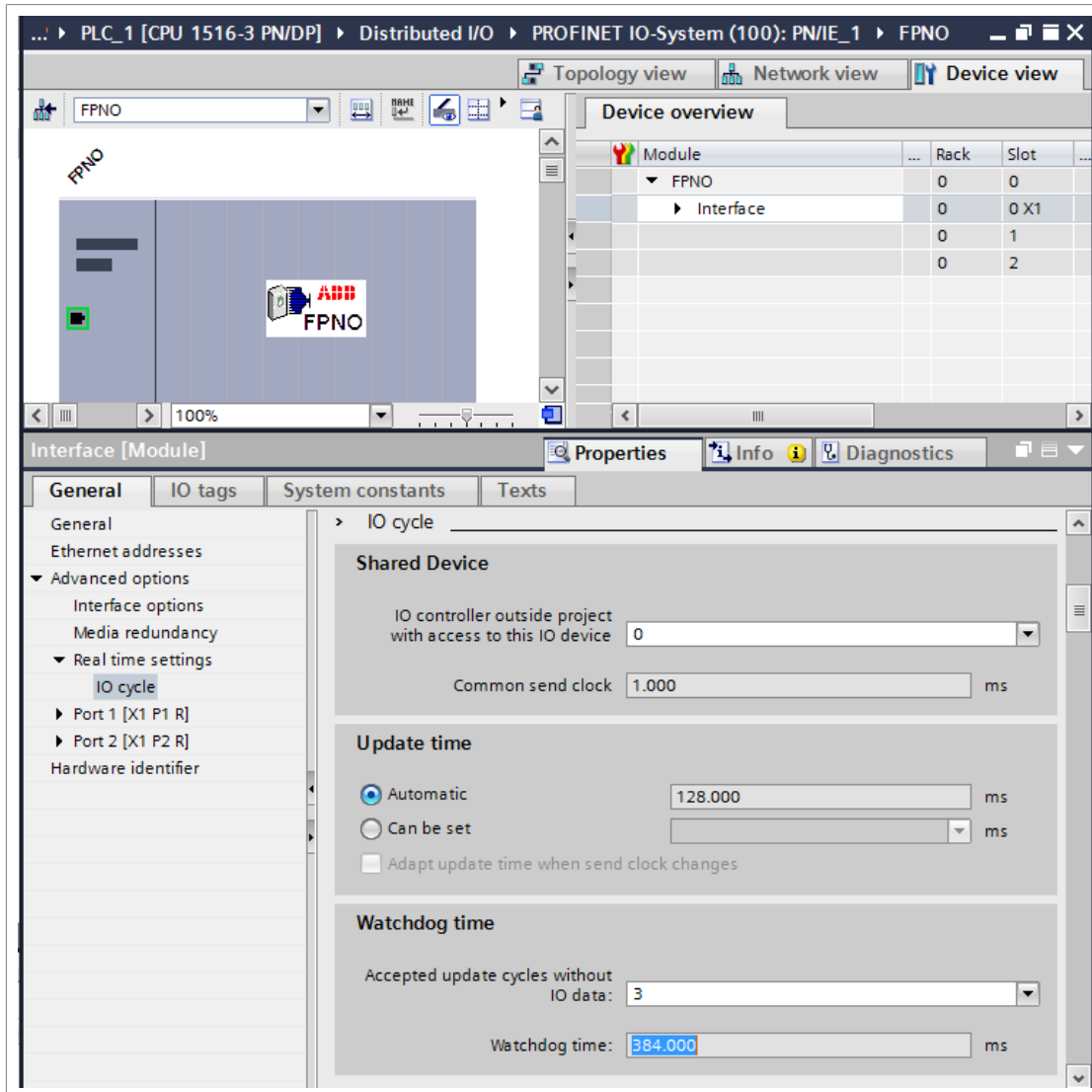
2. In PROFINET interface view, click the General tab and select Media Redundancy and then select the Manager (auto) role for the PLC.
3. In the Device overview, expand FPNO-21 and select Interface.

The PROFINET interface view is displayed.



4. In PROFINET interface view, click the General tab and select Media Redundancy and then select the Client role for the FPNO-21 module.
5. In the General tab, select IO cycle and set the watchdog time.

The recommended value for the watchdog time is 200 ms. Make sure that the connection is maintained during the ring break.



For MRP domain management, go to the Media Redundancy view and click the Domain settings button.

## Shared Device

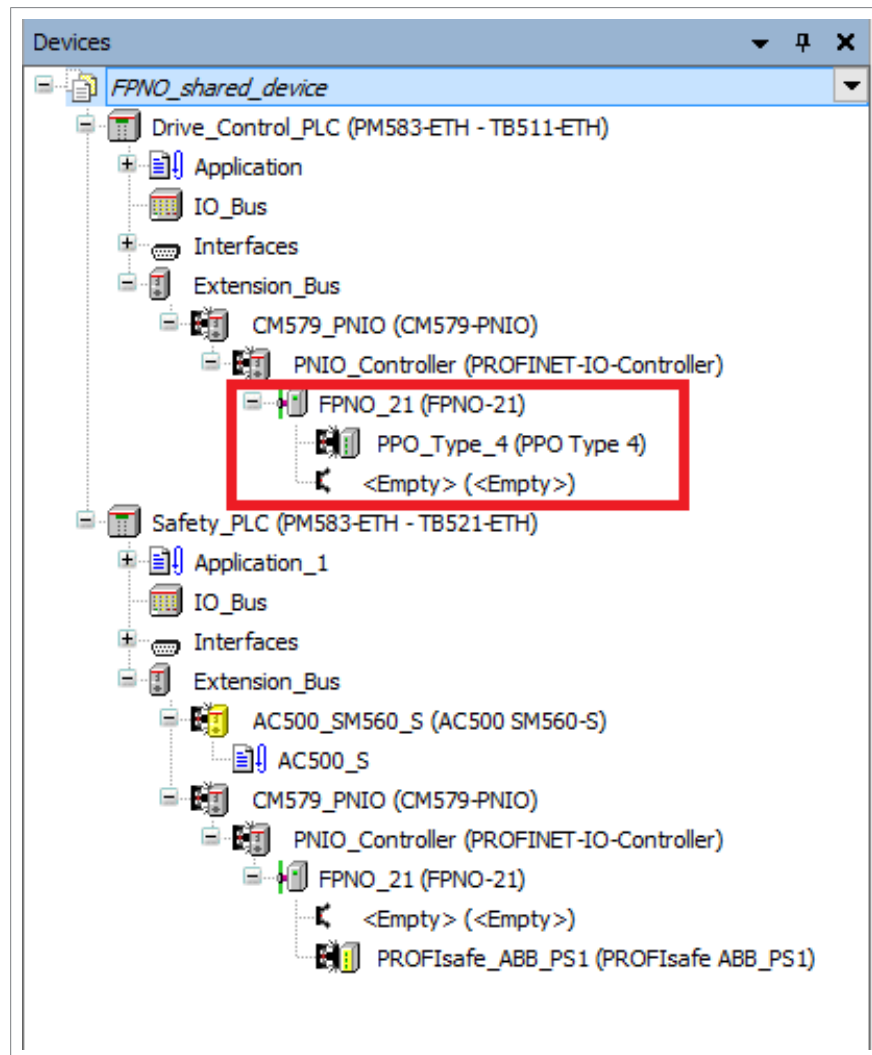
With the Shared Device enable option, you can access one drive from two controllers through one FPNO-21 module.

For example, one PLC controls the drive and the other Safety PLC is for safety communication. The PROFINET drive control and PROFIsafe can be used by separate PLCs.

### ■ Configuring Shared Device for ABB PLC with Automation Builder

#### Configuring the drive control PLC

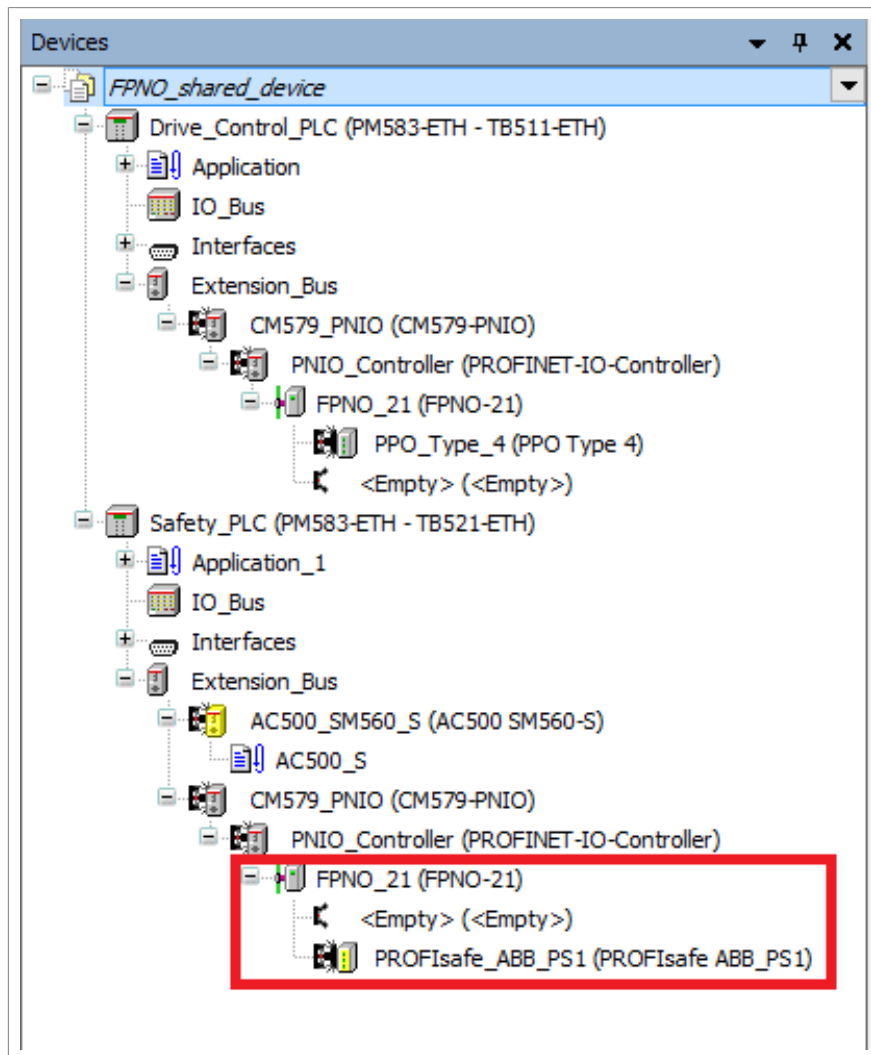
1. Select the PPO telegram to use on slot 1. Leave slot 2 empty.
2. Define the PROFINET station name and the IP address based on the network.



### Configuring the safety PLC

1. Select the safety telegram to use on slot 2. Leave slot 1 empty.

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2. Use the same PROFINET station name as in the drive control PLC configuration.
3. On the Options tab, tick the Shared Device check box.

## ■ Configuring Shared Device for Siemens PLC with TIA portal

### Configuring the drive control PLC

1. Select the PPO telegram to use on slot 1. Leave slot 2 empty.
2. Define the PROFINET station name and IP address.

### Configuring the safety PLC

1. Select FPNO-21 in the Device view.
2. Select the safety telegram to use on slot 2. Leave slot 1 empty.
3. Use the same PROFINET station name as in the drive control PLC configuration.
4. From the Shared Device tab, select the access rights to the PROFI-safe slot for the Safety PLC.

**FPNO\_1 [FPNO-21]**

General | IO tags | System constants | Texts

▼ General

    Catalog information

▼ PROFINET interface [X1]

    General

    Ethernet addresses

▼ Advanced options

    Interface options

    Media redundancy

    ▶ Real time settings

▼ Port 1 [X1 P1 R]

    General

    Port interconnection

    Port options

    Hardware identifier

▼ Port 2 [X1 P2 R]

    General

    Port interconnection

    Port options

    Hardware identifier

    Hardware identifier

    Identification & Maintenance

    Hardware identifier

    Shared Device

**Shared Device**

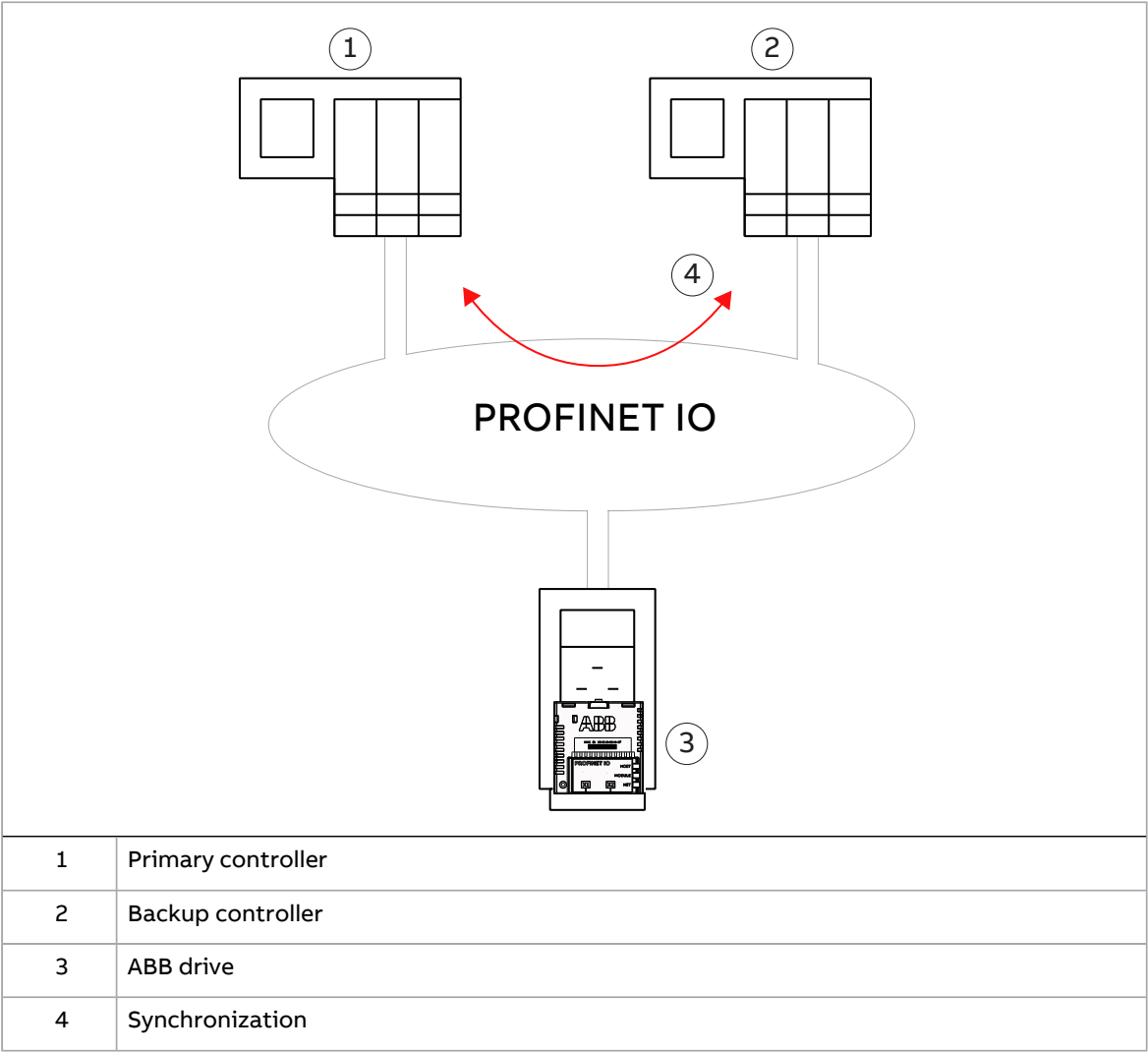
| Name                 | Fail-safe                                        | Access |
|----------------------|--------------------------------------------------|--------|
| ▼ FPNO_1             |                                                  | PLC_1  |
| ▼ Interface          |                                                  | —      |
| Port 1               |                                                  | —      |
| Port 2               |                                                  | —      |
| PROFI-safe ABB_PS1_1 | <span style="background-color: yellow;"> </span> | PLC_1  |

## S2 system redundancy

System redundancy can increase system availability by making it more fault tolerant. In S2 system redundancy there are redundant PROFINET controllers in the network. In case of a failure in the primary controller connection a backup controller detects the failure and takes control of the devices in the network. S2 system redundancy is topology independent. You can combine the S2 system redundancy with the ring topology (MRP).

Note that both primary and backup controllers establish their own cyclic PROFINET connections to the devices and give double the amount of cyclic communication data. Take this into account in the network dimensioning.

FPNO-21 supports S2 system redundancy from firmware version 1.10 onwards with GSDML-V2.4-ABB-FPNO-20201118 and later.



7

# PROFINET IO – Communication profiles

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## Contents of this chapter

This chapter describes the communication profiles that are used in the communication between the PROFINET IO master, the adapter module and the drive.

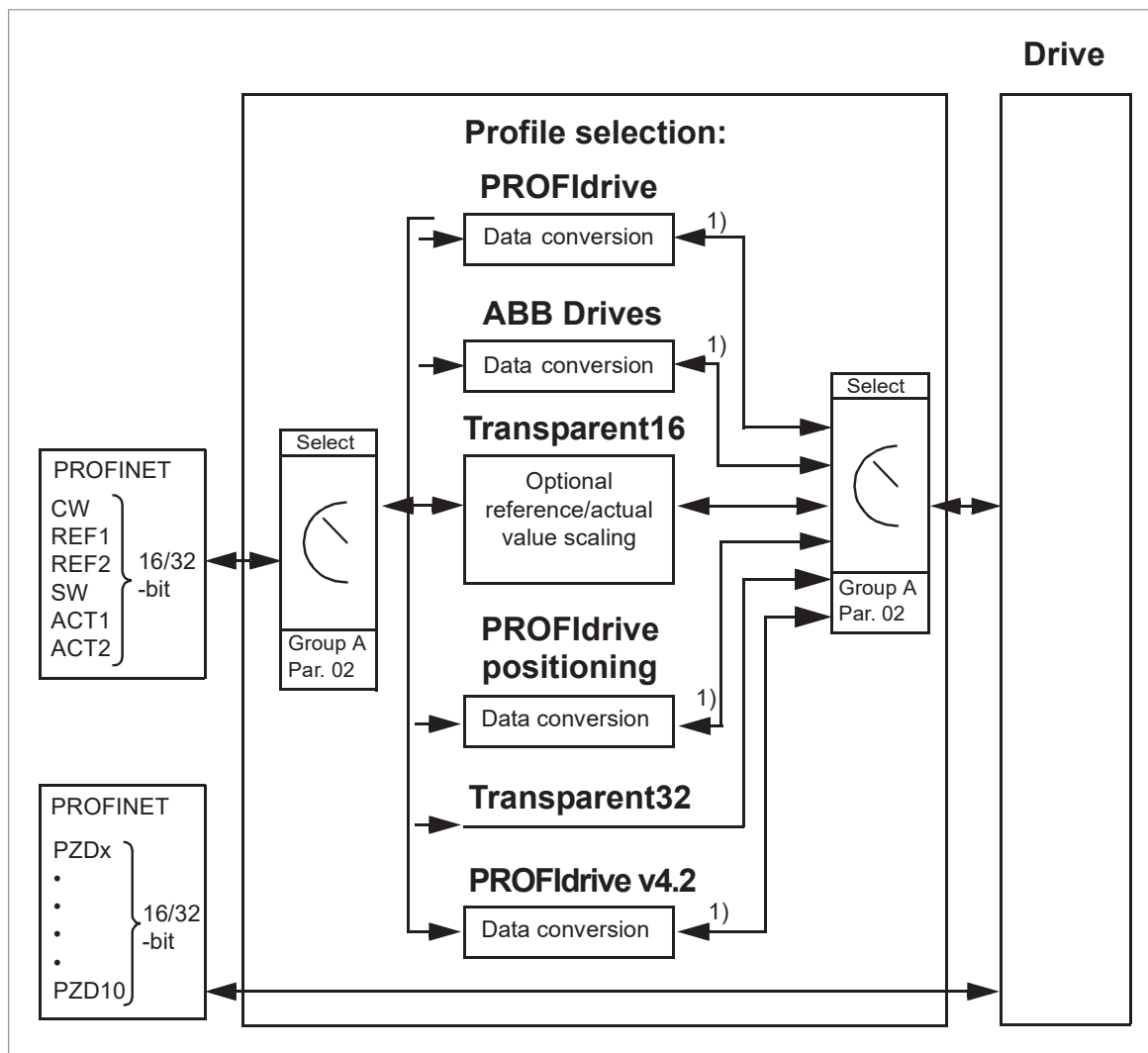
## Communication profiles

Communication profiles are ways of conveying control commands (Control word, Status word, references and actual values) between the master station and the drive.

With the FPNO-21 module, the PROFINET network can use either the PROFIdrive v4.2, legacy PROFIdrive (referred to as PROFIdrive from here on) or the ABB Drives profile. All are converted to the native profile (for example, DCU or FBA) by the adapter module. In addition, two Transparent modes (for 16-bit and 32-bit words) are available. With the Transparent modes, no data conversion takes place.

---

This figure shows the profile selection:



<sup>1)</sup> Native profile (for example, DCU or FBA).

**Note:** The diagram is applicable only when PPO messaging is used. If Standard Telegrams (ST) are used, the communication profile is selected automatically.

The sections that follow describe the Control word, the Status word, references and actual values for the PROFIdrive and ABB Drives communication profiles. Refer to the drive manuals for details on the native profiles.

## PROFIdrive communication profile

### ■ Control word and Status word

The Control word (PROFIdrive parameter 967) is the primary procedure to control the drive from a fieldbus system. The fieldbus master station sends it to the drive through the adapter module. The drive switches between its states according to the bit-coded instructions in the Control word and returns status information to the master in the Status word (PROFIdrive parameter 968).

The contents of the Control word and the Status word are detailed below. Refer to the drive documentation for information on the drive-specific bits. For the drive states, refer to page 87. For the drive states for the positioning mode, refer to page 88.

### Control word contents

The table below shows the contents of the Control word for the PROFIdrive communication profile (PROFIdrive parameter 967). The upper case boldface text refers to the states of the state machine on page 87.

| Bit | Name                                           | Value | STATE/Description                                                                                                                                                                                                                                                                                                                              |                                                                                                                                  |
|-----|------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
|     |                                                |       | Speed control mode                                                                                                                                                                                                                                                                                                                             | Positioning mode                                                                                                                 |
| 0   | ON                                             | 1     | Proceed to <b>READY TO OPERATE</b> .                                                                                                                                                                                                                                                                                                           |                                                                                                                                  |
|     | OFF1                                           | 0     | Emergency OFF, stop by the selected deceleration ramp. Proceed to <b>OFF1 ACTIVE</b> ; proceed further to <b>READY TO SWITCH ON</b> unless other interlocks (OFF2, OFF3) are active.                                                                                                                                                           |                                                                                                                                  |
| 1   | OFF2                                           | 1     | Continue operation (OFF2 inactive).                                                                                                                                                                                                                                                                                                            |                                                                                                                                  |
|     |                                                | 0     | Emergency OFF, coast to stop. Proceed to <b>OFF2 ACTIVE</b> ; proceed further to <b>SWITCH-ON INHIBIT</b> .                                                                                                                                                                                                                                    |                                                                                                                                  |
| 2   | OFF3                                           | 1     | Continue operation (OFF3 inactive).                                                                                                                                                                                                                                                                                                            |                                                                                                                                  |
|     |                                                | 0     | Emergency stop, stop according to fastest possible deceleration mode. Proceed to <b>OFF3 ACTIVE</b> ; proceed further to <b>SWITCH-ON INHIBIT</b> .<br><br> <b>WARNING</b> Make sure that the motor and driven machine can be stopped using this stop mode. |                                                                                                                                  |
| 3   | OPERATION_ENABLE                               | 1     | Proceed to <b>ENABLE OPERATION</b> .                                                                                                                                                                                                                                                                                                           |                                                                                                                                  |
|     |                                                | 0     | Inhibit operation. Proceed to <b>OPERATION INHIBIT</b> .                                                                                                                                                                                                                                                                                       |                                                                                                                                  |
| 4   | ENABLE_RAMP_GENERATOR<br>or<br>TRAVERSING_TASK | 1     | Normal operation. Proceed to <b>RAMP FUNCTION GENERATOR: ENABLE OUTPUT</b> .                                                                                                                                                                                                                                                                   | Normal operation. Do not reject the traversing task.                                                                             |
|     |                                                | 0     | Stop according to the selected stop type.                                                                                                                                                                                                                                                                                                      | Reject the traversing task.                                                                                                      |
| 5   |                                                | 1     | Normal operation. Proceed to <b>RAMP FUNCTION GENERATOR: ENABLE ACCELERATION</b> .                                                                                                                                                                                                                                                             | Normal operation. No intermediate stop.                                                                                          |
|     |                                                | 0     | Halt ramping (Ramp Function Generator output held).                                                                                                                                                                                                                                                                                            | Intermediate stop                                                                                                                |
| 6   |                                                | 1     | Normal operation. Proceed to <b>OPERATING</b> .<br>Note: This bit is effective only if the fieldbus interface is set as the source for this signal by drive parameters.                                                                                                                                                                        | Activate traversing task (0 → 1). This is a toggle bit; each rising edge of signal enables a traversing task or a new set point. |
|     |                                                | 0     | Force Ramp Function Generator input to zero.                                                                                                                                                                                                                                                                                                   |                                                                                                                                  |

| Bit | Name       | Value | STATE/Description                                                                                                                                                                                       |                         |
|-----|------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
|     |            |       | Speed control mode                                                                                                                                                                                      | Positioning mode        |
| 7   | RESET      | 0 → 1 | Fault reset if an active fault exists. Proceed to SWITCH-ON INHIBIT.<br><br><b>Note:</b> This bit is effective only if the fieldbus interface is set as the source for this signal by drive parameters. |                         |
|     |            | 0     | (Continue normal operation)                                                                                                                                                                             |                         |
| 8   | JOGGING_1  |       | Jogging 1 (Not supported by all drive types)                                                                                                                                                            |                         |
| 9   | JOGGING_2  |       | Jogging 2 (Not supported by all drive types)                                                                                                                                                            |                         |
| 10  | REMOTE_CMD | 1     | Fieldbus control enabled                                                                                                                                                                                |                         |
|     |            | 0     | Control word <> 0 or reference <> 0: Retain last Control word and reference. Control word = 0 and reference = 0: Fieldbus control enabled.                                                              |                         |
| 11  |            | 1     | Vendor-specific bit as defined by PROFIdrive parameter 933                                                                                                                                              | Start homing procedure. |
|     |            | 0     |                                                                                                                                                                                                         | Stop homing procedure.  |
| 12  |            |       | Vendor-specific bit as defined by PROFIdrive parameter 934.<br>As default mapped to Drive Main CW bit 12.                                                                                               |                         |
| 13  |            |       | Vendor-specific bit as defined by PROFIdrive parameter 935.<br>As default mapped to Drive Main CW bit 13.                                                                                               |                         |
| 14  |            |       | Vendor-specific bit as defined by PROFIdrive parameter 936.<br>As default mapped to Drive Main CW bit 14.                                                                                               |                         |
| 15  |            |       | Vendor-specific bit as defined by PROFIdrive parameter 937.<br>As default mapped to Drive Main CW bit 15.                                                                                               |                         |

### Status word contents

The table below shows the contents of the Status word for the PROFIdrive communication profile (PROFIdrive parameter 968). The upper case boldface text refers to the states of the state machine on page [87](#).

| Bit | Name    | Value | STATE/Description             |                  |
|-----|---------|-------|-------------------------------|------------------|
|     |         |       | Speed control mode            | Positioning mode |
| 0   | RDY_ON  | 1     | <b>READY TO SWITCH ON</b>     |                  |
|     |         | 0     | <b>NOT READY TO SWITCH ON</b> |                  |
| 1   | RDY_RUN | 1     | <b>READY TO OPERATE</b>       |                  |
|     |         | 0     | <b>OFF1 ACTIVE</b>            |                  |
| 2   | RDY_REF | 1     | <b>ENABLE OPERATION</b>       |                  |
|     |         | 0     | <b>OPERATION INHIBIT</b>      |                  |

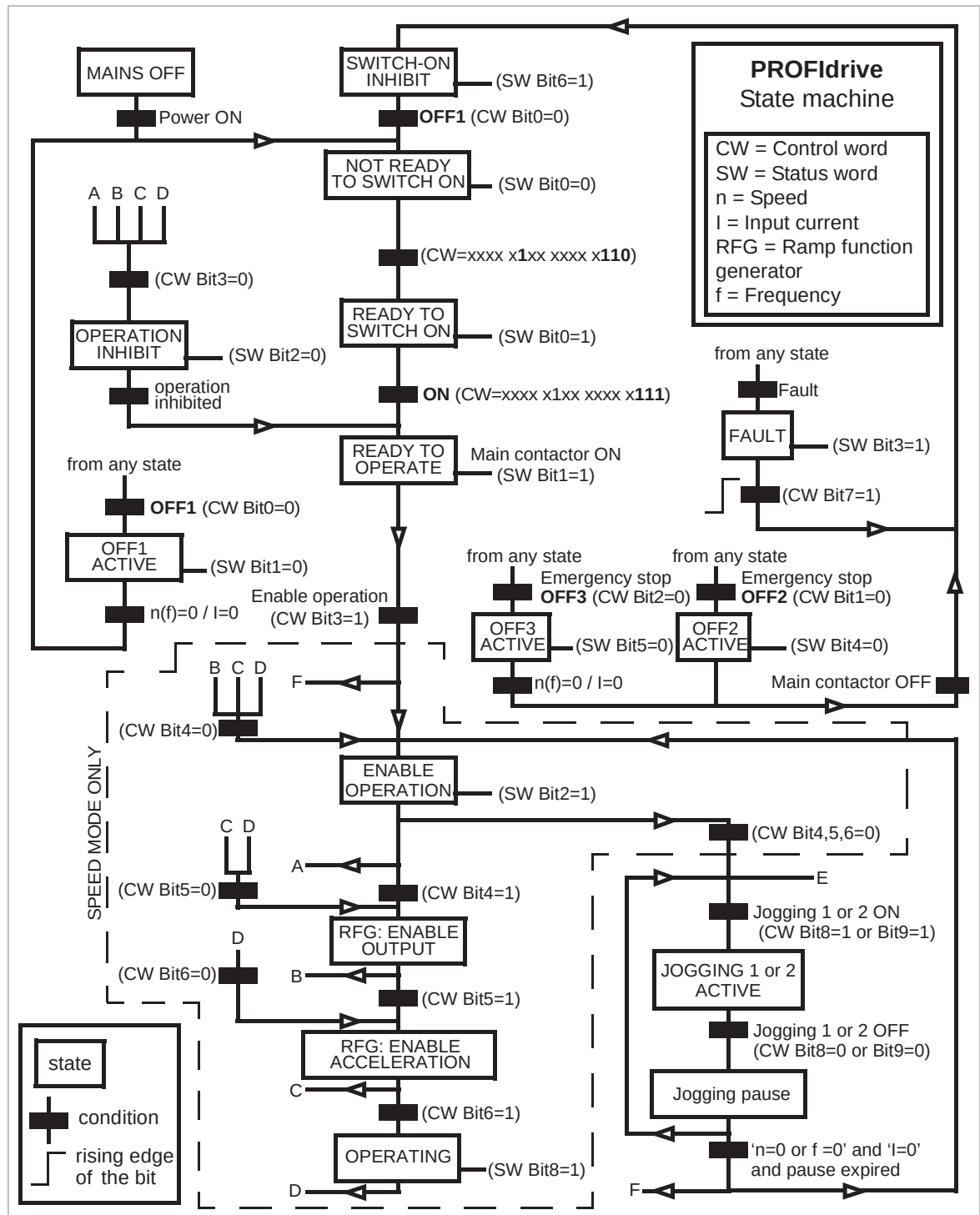
| Bit | Name         | Value | STATE/Description                                                                                             |                                             |
|-----|--------------|-------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------|
|     |              |       | Speed control mode                                                                                            | Positioning mode                            |
| 3   | TRIPPED      | 1     | <b>FAULT</b>                                                                                                  |                                             |
|     |              | 0     | No fault                                                                                                      |                                             |
| 4   | OFF_2_STA    | 1     | OFF2 inactive                                                                                                 |                                             |
|     |              | 0     | <b>OFF2 ACTIVE</b>                                                                                            |                                             |
| 5   | OFF_3_STA    | 1     | OFF3 inactive                                                                                                 |                                             |
|     |              | 0     | <b>OFF3 ACTIVE</b>                                                                                            |                                             |
| 6   | SWC_ON_INHIB | 1     | <b>SWITCH-ON INHIBIT ACTIVE</b>                                                                               |                                             |
|     |              | 0     | <b>SWITCH-ON INHIBIT NOT ACTIVE</b>                                                                           |                                             |
| 7   | ALARM        | 1     | Warning/Alarm                                                                                                 |                                             |
|     |              | 0     | No Warning/Alarm                                                                                              |                                             |
| 8   | AT_SETPOINT  | 1     | <b>OPERATING.</b> Actual value equals reference value (= is within tolerance limits).                         |                                             |
|     |              | 0     | Actual value differs from reference value (= is outside tolerance limits).                                    |                                             |
| 9   | REMOTE       | 1     | Automation system is requested to assume control.                                                             |                                             |
|     |              | 0     | Control by automation system is not possible. Control is possible only at the device or by another interface. |                                             |
| 10  |              | 1     | Actual frequency or speed value equals or is greater than supervision limit.                                  | Target position reached.                    |
|     |              | 0     | Actual frequency or speed value is within supervision limit.                                                  | Not at target position                      |
| 11  |              | 1     | Mapped to PROFIdrive SW bit 11.                                                                               | Homing procedure was executed and is valid. |
|     |              | 0     | Vendor-specific bit as defined by PROFIdrive parameter 939.<br>As default mapped to PROFIdrive SW bit 11.     | No valid home position available.           |
| 12  |              | 1     | Mapped to PROFIdrive SW bit 11.                                                                               | Traversing task acknowledgement (0 → 1)     |
|     |              | 0     | Vendor-specific bit as defined by PROFIdrive parameter 940.<br>As default mapped to PROFIdrive SW bit 12.     |                                             |

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| Bit | Name | Value | STATE/Description                                                                                         |                                                       |
|-----|------|-------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
|     |      |       | Speed control mode                                                                                        | Positioning mode                                      |
| 13  |      | 1     | Mapped to PROFIdrive SW bit 11.                                                                           | Drive stopped.                                        |
|     |      | 0     | Vendor-specific bit as defined by PROFIdrive parameter 941.<br>As default mapped to PROFIdrive SW bit 13. | Drive operates. Traversing task is executed (n <> 0). |
| 14  |      |       | Vendor-specific bit as defined by PROFIdrive parameter 942.<br>As default mapped to PROFIdrive SW bit 14. |                                                       |
| 15  |      |       | Vendor-specific bit as defined by PROFIdrive parameter 943                                                |                                                       |

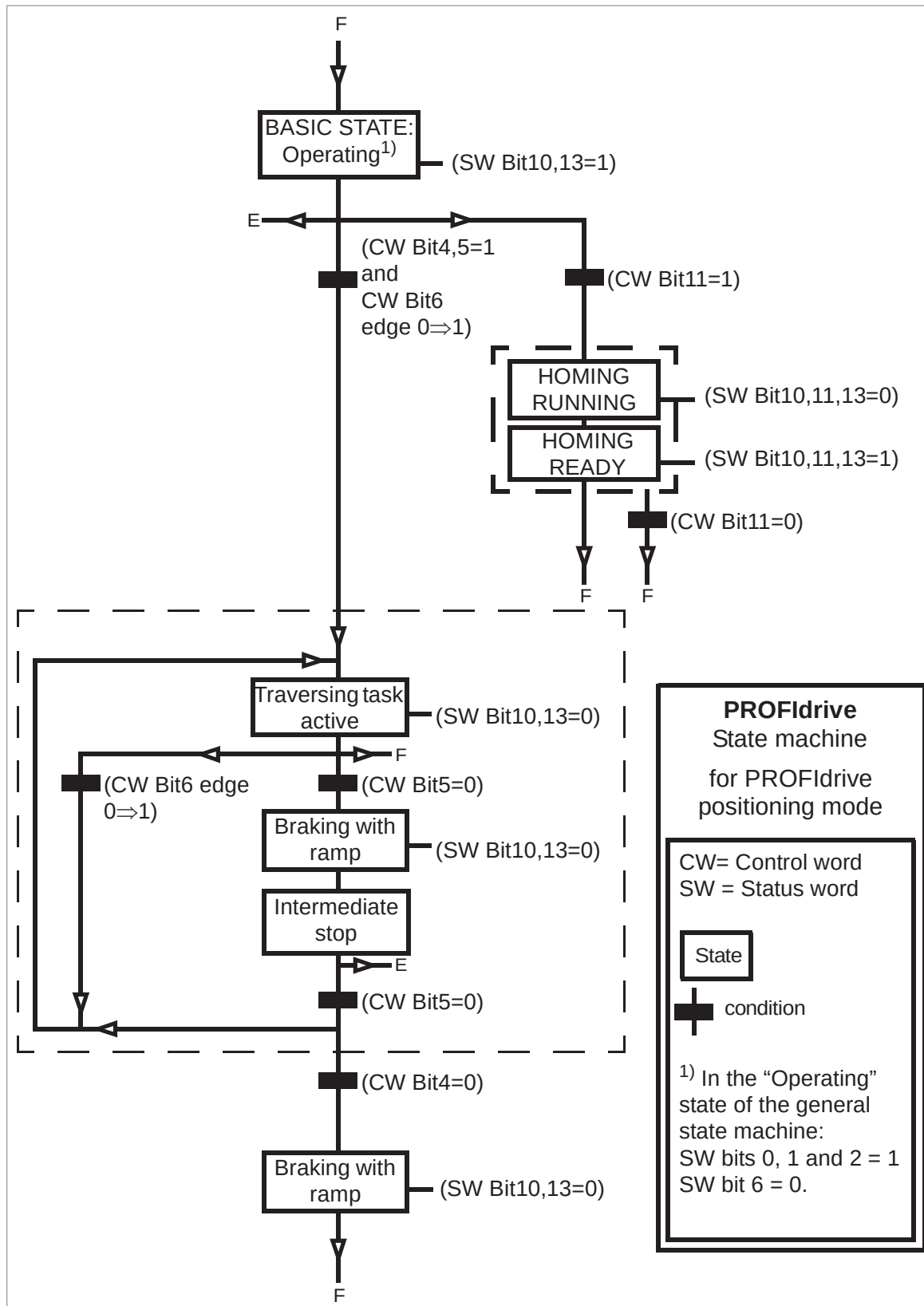
## State machine for all operating modes

The general PROFIdrive state machine for all operating modes is shown below.



### State machine for the positioning mode

The PROFIdrive state machine for the positioning mode is shown below.



## ■ References

ABB drives can receive control information from multiple sources including analog and digital inputs, the drive control panel and a fieldbus adapter module (for example, the FPNO-21 module). To control the drive through PROFINET, select the module as the source for control information, for example, reference.

### References in speed control mode

In the speed control mode, references are 16-bit or 32-bit words that contain a sign bit and a 15-bit or 31-bit integer. A negative reference (indicating reversed direction of rotation) is formed by calculating the two's complement from the corresponding positive reference.

A 16-bit speed reference (REF or NSOLL\_A) in hexadecimal (0...4000h) corresponds to 0...100% of Maximum Reference (as defined with a drive parameter).

A 32-bit speed reference (NSOLL\_B) in hexadecimal (0...4000 0000h) corresponds to 0...100% of Maximum Reference (as defined with a drive parameter).

## ■ Actual values

The actual values are 16-bit or 32-bit words that contain information on the operation of the drive. Select the functions to be monitored with a drive parameter.

### Actual values in speed control mode

The scaling of 16-bit actual speed values (ACT or NIST\_A) in hexadecimal (0...4000h) corresponds to 0...100% of the maximum reference (as defined with a drive parameter, for example, speed scaling in ACSM1, ACS850, ACQ810, ACS480, ACS580 and ACS880, and external reference in ACS355).

The scaling of 32-bit actual speed values (NIST\_B) in hexadecimal (0...4000 0000h) corresponds to 0...100% of the maximum reference (as defined with a drive parameter, for example, speed scaling in ACSM1, ACS850, ACQ810, ACS480, ACS580 and ACS880, and external reference in ACS355).

## ABB Drives communication profile

### ■ Control word and Status word

The Control word is the primary procedure to control the drive from a fieldbus system. The fieldbus master station sends it to the drive through the adapter module. The drive switches between its states according to the bit-coded instructions in the Control word and returns status information to the master in the Status word.

The contents of the Control word and the Status word are detailed below. For the drive states, refer to page [93](#).

### Control word contents

The table below shows the contents of the Control word for the ABB Drives communication profile. The upper case boldface text refers to the states shown on page [93](#).

| Bit     | Name              | Value | STATE/Description                                                                                                                                                                                                                                                                                                               |
|---------|-------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0       | OFF1_CONTROL      | 1     | Proceed to <b>READY TO OPERATE</b> .                                                                                                                                                                                                                                                                                            |
|         |                   | 0     | Stop along currently active deceleration ramp. Proceed to <b>OFF1 ACTIVE</b> ; proceed to <b>READY TO SWITCH ON</b> unless other interlocks (OFF2, OFF3) are active.                                                                                                                                                            |
| 1       | OFF2_CONTROL      | 1     | Continue operation (OFF2 inactive).                                                                                                                                                                                                                                                                                             |
|         |                   | 0     | Emergency OFF, coast to stop. Proceed to <b>OFF2 ACTIVE</b> , proceed to <b>SWITCH-ON INHIBITED</b> .                                                                                                                                                                                                                           |
| 2       | OFF3_CONTROL      | 1     | Continue operation (OFF3 inactive).                                                                                                                                                                                                                                                                                             |
|         |                   | 0     | Emergency stop, stop within time defined by drive parameter. Proceed to <b>OFF3 ACTIVE</b> ; proceed to <b>SWITCH-ON INHIBITED</b> .<br><br> <b>⚠ WARNING</b> Make sure that the motor and driven machine can be stopped using this stop mode. |
| 3       | INHIBIT_OPERATION | 1     | Proceed to <b>OPERATION ENABLED</b> .<br><br><b>Note:</b> Run enable signal must be active; see drive documentation. If the drive is set to receive the Run enable signal from the fieldbus, this bit activates the signal.                                                                                                     |
|         |                   | 0     | Inhibit operation. Proceed to <b>OPERATION INHIBITED</b> .                                                                                                                                                                                                                                                                      |
| 4       | RAMP_OUT_ZERO     | 1     | Normal operation. Proceed to <b>RAMP FUNCTION GENERATOR: OUTPUT ENABLED</b> .                                                                                                                                                                                                                                                   |
|         |                   | 0     | Force Ramp Function Generator output to zero. Drive ramps to stop (current and DC voltage limits in force).                                                                                                                                                                                                                     |
| 5       | RAMP_HOLD         | 1     | Enable ramp function.<br>Proceed to <b>RAMP FUNCTION GENERATOR: ACCELERATOR ENABLED</b> .                                                                                                                                                                                                                                       |
|         |                   | 0     | Halt ramping (Ramp Function Generator output held).                                                                                                                                                                                                                                                                             |
| 6       | RAMP_IN_ZERO      | 1     | Normal operation. Proceed to <b>OPERATION</b> .<br><br><b>Note:</b> This bit is effective only if the fieldbus interface is set as the source for this signal by drive parameters.                                                                                                                                              |
|         |                   | 0     | Force Ramp Function Generator input to zero.                                                                                                                                                                                                                                                                                    |
| 7       | RESET             | 0 → 1 | Fault reset if an active fault exists. Proceed to <b>SWITCH-ON INHIBITED</b> .<br><br><b>Note:</b> This bit is effective only if the fieldbus interface is set as the source for this signal by drive parameters.                                                                                                               |
|         |                   | 0     | Continue normal operation.                                                                                                                                                                                                                                                                                                      |
| 8 ... 9 | Reserved          |       |                                                                                                                                                                                                                                                                                                                                 |
| 10      | REMOTE_CMD        | 1     | Fieldbus control enabled                                                                                                                                                                                                                                                                                                        |
|         |                   | 0     | Control word and reference not getting through to the drive, except for CW bits OFF1, OFF2 and OFF3.                                                                                                                                                                                                                            |

| Bit          | Name                                                                | Value | STATE/Description                                                                                                |
|--------------|---------------------------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------|
| 11           | EXT_CTRL_LOC                                                        | 1     | Select External Control Location EXT2. Effective if control location parameterized to be selected from fieldbus. |
|              |                                                                     | 0     | Select External Control Location EXT1. Effective if control location parameterized to be selected from fieldbus. |
| 12 ...<br>15 | Drive-specific (For information, refer to the drive documentation.) |       |                                                                                                                  |

### Status word contents

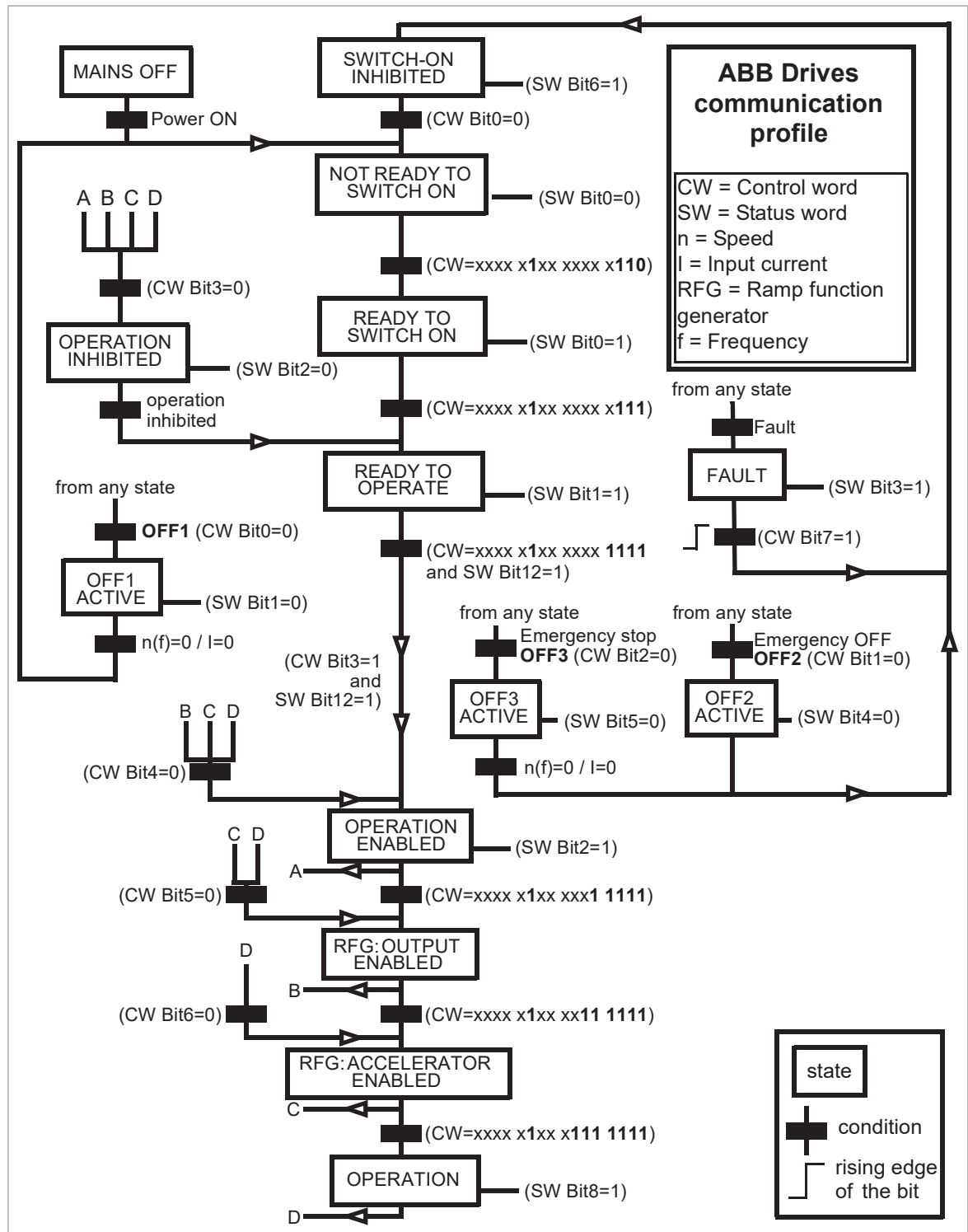
The table below shows the contents of the Status word for the ABB Drives communication profile. The upper case boldface text refers to the states shown on page 93.

| Bit | Name         | Value | STATE/Description                                                                                                                                          |
|-----|--------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0   | RDY_ON       | 1     | <b>READY TO SWITCH ON</b>                                                                                                                                  |
|     |              | 0     | <b>NOT READY TO SWITCH ON</b>                                                                                                                              |
| 1   | RDY_RUN      | 1     | <b>READY TO OPERATE</b>                                                                                                                                    |
|     |              | 0     | <b>OFF1 ACTIVE</b>                                                                                                                                         |
| 2   | RDY_REF      | 1     | <b>OPERATION ENABLED</b>                                                                                                                                   |
|     |              | 0     | <b>OPERATION INHIBITED</b>                                                                                                                                 |
| 3   | TRIPPED      | 1     | <b>FAULT</b>                                                                                                                                               |
|     |              | 0     | No fault                                                                                                                                                   |
| 4   | OFF_2_STA    | 1     | OFF2 inactive                                                                                                                                              |
|     |              | 0     | <b>OFF2 ACTIVE</b>                                                                                                                                         |
| 5   | OFF_3_STA    | 1     | OFF3 inactive                                                                                                                                              |
|     |              | 0     | <b>OFF3 ACTIVE</b>                                                                                                                                         |
| 6   | SWC_ON_INHIB | 1     | <b>SWITCH-ON INHIBITED</b>                                                                                                                                 |
|     |              | 0     | –                                                                                                                                                          |
| 7   | ALARM        | 1     | Warning/Alarm                                                                                                                                              |
|     |              | 0     | No warning/alarm                                                                                                                                           |
| 8   | AT_SETPOINT  | 1     | <b>OPERATION.</b> Actual value equals reference (= is within tolerance limits, that is, in speed control, speed error is 10% max. of nominal motor speed). |
|     |              | 0     | Actual value differs from reference (= is outside tolerance limits).                                                                                       |
| 9   | REMOTE       | 1     | Drive control location: REMOTE (EXT1 or EXT2)                                                                                                              |
|     |              | 0     | Drive control location: LOCAL                                                                                                                              |
| 10  | ABOVE_LIMIT  | 1     | Actual frequency or speed equals or exceeds supervision limit (set by drive parameter). Valid in both directions of rotation.                              |
|     |              | 0     | Actual frequency or speed within supervision limit                                                                                                         |

| Bit          | Name                                                                | Value | STATE/Description                                                                                                                                                                                                   |
|--------------|---------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11           | EXT_CTRL_LOC                                                        | 1     | External Control Location EXT2 selected. <b>Note concerning ACS880:</b> This bit is effective only if the fieldbus interface is set as the target for this signal by drive parameters. User bit 0 selection (06.33) |
|              |                                                                     | 0     | External Control Location EXT1 selected                                                                                                                                                                             |
| 12           | EXT_RUN_ENABLE                                                      | 1     | External Run Enable signal received.<br><b>Note concerning ACS880:</b> This bit is effective only if the fieldbus interface is set as the target for this signal by drive parameters. User bit 1 selection (06.34)  |
|              |                                                                     | 0     | No External Run Enable signal received                                                                                                                                                                              |
| 13 ...<br>14 | Drive-specific (For information, refer to the drive documentation.) |       |                                                                                                                                                                                                                     |
| 15           | FBA_ERROR                                                           | 1     | Communication error detected by fieldbus adapter module                                                                                                                                                             |
|              |                                                                     | 0     | Fieldbus adapter communication OK                                                                                                                                                                                   |

## State machine

The state machine for the ABB Drives communication profile is shown below.



## References

References are 16-bit words containing a sign bit and a 15-bit integer. A negative reference (indicating reversed direction of rotation) is formed by calculating the two's complement from the corresponding positive reference.

ABB drives can receive control information from multiple sources including analog and digital inputs, the drive control panel and a fieldbus adapter module (for example,

FPNO-21). To have the drive controlled through the fieldbus, you must select the module as the source for control information, for example, reference.

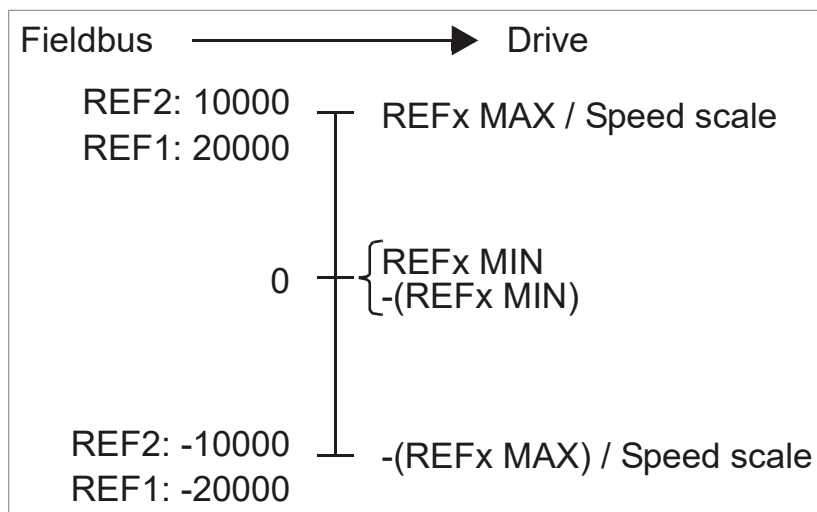
### Scaling

References are scaled as shown below.

**Note:** The values of REF1 MAX and REF2 MAX are set with drive parameters. Refer to the drive manuals for further information.

In ACSM1, ACS850, ACQ810, ACS480, ACS580 and ACS880, the speed reference (REFx) in decimal (0...20000) corresponds to 0...100% of the speed scaling value (as defined with a drive parameter). You can adjust the minimum reference value in some drives. For more information, refer to parameter 46.06 or 46.07 in the drive firmware manual.

In ACS355, drive parameter REFx MIN may limit the actual minimum reference.



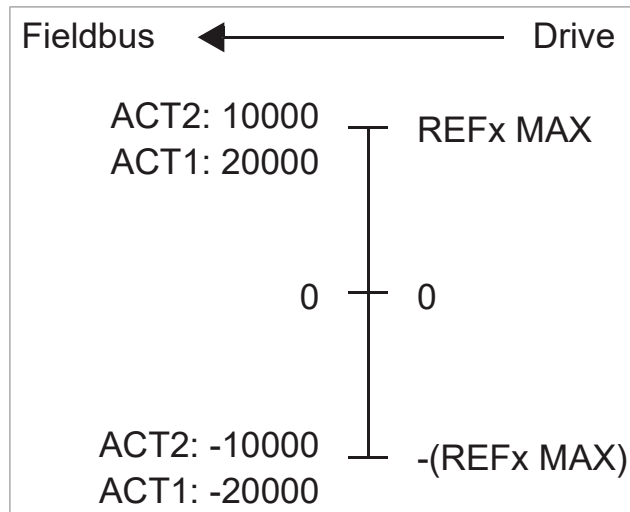
### ■ Actual values

Actual values are 16-bit words containing information on the operation of the drive. The functions to be monitored are selected with a drive parameter.

### Scaling

Actual values are scaled as shown below.

**Note:** The values of REF1 MAX and REF2 MAX are set with drive parameters. See the drive manuals for further information.



## PROFIdrive v4.2 communication profile

### ■ Supported drives

PROFIdrive v4.2 is compatible with the following drives:

- ACS880 primary control program version v3.47.0.0 and later
- ACS580 standard control program version 2.20.0.20 and later
- ACH580 HVAC control program 2.20.0.20 and later
- ACQ580 pump control program 2.20.0.20 and later
- ACS480 standard control program version 2.20.0.20 and later
- ACS380 machinery control program version 2.20.0.20 and later

### ■ Control word and Status word

The Control word (PROFIdrive parameter 967) is the primary procedure to control the drive from a fieldbus system. The fieldbus master station sends it to the drive through the adapter module. The drive switches between its states according to the bit-coded instructions in the Control word and returns status information to the master in the Status word (PROFIdrive parameter 968).

The contents of the Control word and the Status word are detailed below. See the drive documentation for information on the drive-specific bits. For the drive states, refer to page 98.

### Control word contents

The table below shows the contents of the Control word for the PROFIdrive v4.2 communication profile. The upper case boldface text refers to the states shown on page 98.

| Bit | Name                     | Value | STATE/Description                                                                                                                                                                                                                                                                                                                                |
|-----|--------------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0   | ON                       | 1     | Proceed to <b>READY TO OPERATE</b> .                                                                                                                                                                                                                                                                                                             |
|     | OFF1                     | 0     | Emergency OFF, stop by the selected deceleration ramp. Proceed to <b>RAMP STOP</b> ; proceed further to <b>READY TO SWITCH ON</b> unless other interlocks (OFF2, OFF3) are active.                                                                                                                                                               |
| 1   | OFF2                     | 1     | Continue operation (OFF2 inactive).                                                                                                                                                                                                                                                                                                              |
|     |                          | 0     | Emergency OFF, coast to stop. Proceed to <b>SWITCHING ON INHIBITED</b> .                                                                                                                                                                                                                                                                         |
| 2   | OFF3                     | 1     | Continue operation (OFF3 inactive).                                                                                                                                                                                                                                                                                                              |
|     |                          | 0     | Emergency stop, stop according to the fastest possible deceleration mode. Proceed to <b>QUICK STOP</b> ; proceed further to <b>SWITCHING ON INHIBITED</b> .<br> <b>WARNING</b> Make sure that the motor and driven machine can be stopped using this stop mode. |
| 3   | OPERATION_ENABLE         | 1     | Proceed to <b>ENABLE OPERATION</b> .                                                                                                                                                                                                                                                                                                             |
|     |                          | 0     | Inhibit operation. Proceed to <b>READY TO OPERATE</b> .                                                                                                                                                                                                                                                                                          |
| 4   | ENABLE_RAMP_GENERATOR    | 1     | Normal operation. Enables the ramp function generator's output.                                                                                                                                                                                                                                                                                  |
|     |                          | 0     | Ramp function generator's output is forced to zero.                                                                                                                                                                                                                                                                                              |
| 5   | UN-FREEZE_RAMP_GENERATOR | 1     | Normal operation. Turns on the ramp function generator.                                                                                                                                                                                                                                                                                          |
|     |                          | 0     | Ramp function generator's output is frozen to its current value.                                                                                                                                                                                                                                                                                 |
| 6   | ENABLE_SETPOINT          | 1     | Normal operation. Sets the velocity reference as the ramp function generator's input.                                                                                                                                                                                                                                                            |
|     |                          | 0     | Ramp function generator's input is forced to zero.                                                                                                                                                                                                                                                                                               |
| 7   | RESET                    | 0 → 1 | Fault reset if an active fault exists.                                                                                                                                                                                                                                                                                                           |
|     |                          | 0     | Continue normal operation.                                                                                                                                                                                                                                                                                                                       |
| 8   | JOGGING_1                |       | Not supported in PROFIdrive v4.2.                                                                                                                                                                                                                                                                                                                |
| 9   | JOGGING_2                |       | Not supported in PROFIdrive v4.2.                                                                                                                                                                                                                                                                                                                |
| 10  | REMOTE_CMD               | 1     | Fieldbus control enabled                                                                                                                                                                                                                                                                                                                         |
|     |                          | 0     |                                                                                                                                                                                                                                                                                                                                                  |
| 11  | EXT_CTRL_LOC             |       | Vendor-specific bit.                                                                                                                                                                                                                                                                                                                             |
| 12  |                          |       | Vendor-specific bit. Mapped to Drive Main CW bit 12.                                                                                                                                                                                                                                                                                             |
| 13  |                          |       | Vendor-specific bit. Mapped to Drive Main CW bit 13.                                                                                                                                                                                                                                                                                             |
| 14  |                          |       | Vendor-specific bit. Mapped to Drive Main CW bit 14.                                                                                                                                                                                                                                                                                             |

| Bit | Name | Value | STATE/Description              |
|-----|------|-------|--------------------------------|
| 15  |      |       | Vendor-specific bit. Not used. |

### Status word contents

The table below shows the contents of the Status word for the PROFIdrive v4.2 communication profile. The upper case boldface text refers to the states shown in the state machine on page 98.

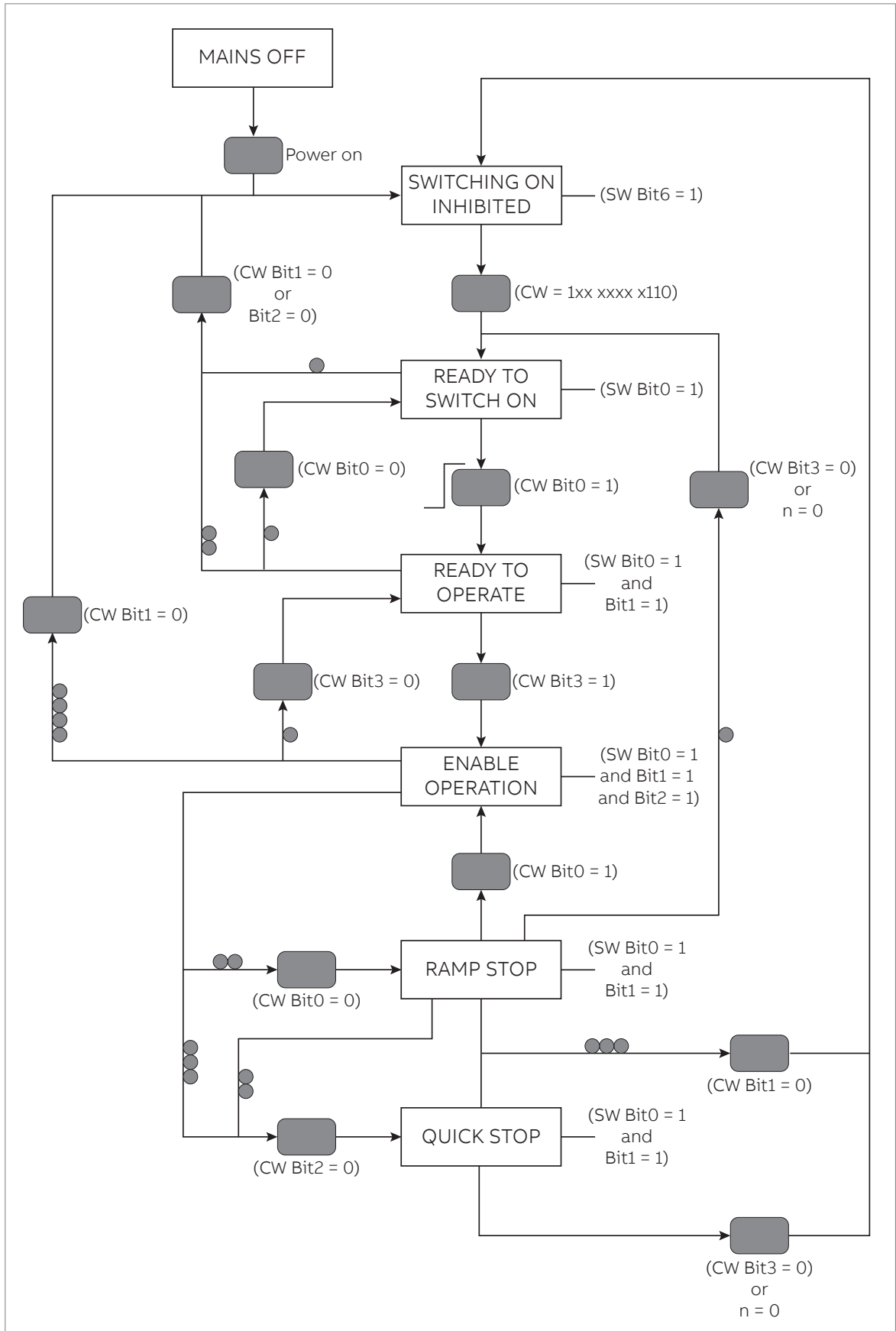
| Bit | Name                                | Value | STATE/Description                                                                                                                                                                                                                                    |
|-----|-------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0   | RDY_ON                              | 1     | <b>READY TO SWITCH ON</b>                                                                                                                                                                                                                            |
|     |                                     | 0     | Not <b>READY TO SWITCH ON</b>                                                                                                                                                                                                                        |
| 1   | RDY_RUN                             | 1     | <b>READY TO OPERATE</b>                                                                                                                                                                                                                              |
|     |                                     | 0     | Not <b>READY TO OPERATE</b>                                                                                                                                                                                                                          |
| 2   | RDY_REF                             | 1     | <b>OPERATION ENABLED</b>                                                                                                                                                                                                                             |
|     |                                     | 0     | Operation disabled                                                                                                                                                                                                                                   |
| 3   | TRIPPED                             | 1     | <b>FAULT</b>                                                                                                                                                                                                                                         |
|     |                                     | 0     | No fault                                                                                                                                                                                                                                             |
| 4   | OFF_2_STA                           | 1     | OFF2 inactive                                                                                                                                                                                                                                        |
|     |                                     | 0     | OFF2 active                                                                                                                                                                                                                                          |
| 5   | OFF_3_STA                           | 1     | OFF3 inactive                                                                                                                                                                                                                                        |
|     |                                     | 0     | OFF3 active                                                                                                                                                                                                                                          |
| 6   | SWC_ON_INHIB                        | 1     | <b>SWITCHING ON INHIBITED</b>                                                                                                                                                                                                                        |
|     |                                     | 0     | Not <b>SWITCHING ON INHIBITED</b>                                                                                                                                                                                                                    |
| 7   | ALARM                               | 1     | Warning/alarm                                                                                                                                                                                                                                        |
|     |                                     | 0     | No warning/alarm                                                                                                                                                                                                                                     |
| 8   | SPEED_ERROR_WITH-IN_TOLERANCE_RANGE | 1     | Actual value is within tolerance limits of ramp function generator's output.<br><br><b>Note:</b> Not applicable if the motor control is in scalar mode.<br><b>Note:</b> The behavior is different from PROFIdrive's status word bit 8 (AT_SETPOINT). |
|     |                                     | 0     | Actual value is outside tolerance limits of ramp function generator's output.                                                                                                                                                                        |
| 9   | REMOTE                              | 1     | Automation system is requested to assume control.                                                                                                                                                                                                    |
|     |                                     | 0     | Control by automation system is not possible. Control is possible only at the device by or by another interface.                                                                                                                                     |
| 10  | ABOVE_LIMIT                         | 1     | Actual frequency or speed value equals or is larger than supervision limit.                                                                                                                                                                          |
|     |                                     | 0     | Actual frequency or speed value is within supervision limit.                                                                                                                                                                                         |
| 11  |                                     |       | Vendor-specific bit. Mapped to Drive Main SW bit 11.                                                                                                                                                                                                 |

| Bit | Name | Value | STATE/Description                                    |
|-----|------|-------|------------------------------------------------------|
| 12  |      |       | Vendor-specific bit. Mapped to Drive Main SW bit 12. |
| 13  |      |       | Vendor-specific bit. Mapped to Drive Main SW bit 13. |
| 14  |      |       | Vendor-specific bit. Mapped to Drive Main SW bit 14. |
| 15  |      |       | Vendor-specific bit. Not used.                       |

State machine

The table shows state machine and definitions for the PROFIdrive v4.2 communication profile. The jogging mode is not available in PROFIdrive v4.2.

| Symbol                                                                              | Definition                                                                                                                             |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| n                                                                                   | Speed                                                                                                                                  |
|    | State transition priority. Transitions with more circles have a higher priority. A transition with no circles has the lowest priority. |
|    | Rising edge of the bit                                                                                                                 |
|  | Condition                                                                                                                              |



For PROFIdrive v4.2, the ramp function generator operates the same as in the PROFIdrive profile. The only difference is that if the PROFIdrive control word bit4 is set to false while in the **RAMP STOP** state, the drive stops as fast as possible within

the current and DC voltage limits. This occurs because setting bit4 to false forces the output of the ramp function generator to 0.

**Note:** PROFIdrive v4.2 does not have a separate fault state. Drive faults trigger a state transition to SWITCHING ON INHIBITED.

## ■ References

ABB drives can receive control information from multiple sources including analog and digital inputs, the drive control panel and a fieldbus adapter module (for example, FPNO-21). To have the drive controlled through PROFINET, you must select the module as the source for control information, for example, reference.

### References in speed control mode

In the speed control mode, references are 16-bit or 32-bit words containing a sign bit and a 15-bit or 31-integer. A negative reference (indicating reversed direction of rotation) is formed by calculating the two's complement from the corresponding positive reference.

A 16-bit speed reference (REF or NSOLL\_A) in hexadecimal (0...4000h) corresponds to 0...100% of Maximum Reference (as defined with a drive parameter).

A 32-bit speed reference (NSOLL\_B) in hexadecimal (0...4000 0000h) corresponds to 0...100% of Maximum Reference (as defined with a drive parameter).

## ■ Actual values

Actual values are 16-bit or 32-bit words containing information on the operation of the drive. The functions to be monitored are selected with a drive parameter.

### Actual values in speed control mode

The scaling of 16-bit actual speed values (ACT or NIST\_A) in hexadecimal (0...4000h) corresponds to 0...100% of the maximum reference (as defined with a drive parameter, for example, speed scaling in ACS880).

The scaling of 32-bit actual speed values (NIST\_B) in hexadecimal (0...4000 0000h) corresponds to 0...100% of the maximum reference (as defined with a drive parameter, for example, speed scaling in ACS880).

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8

# PROFINET IO – Communication protocol

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## Contents of this chapter

This chapter describes the PROFINET IO communication protocol for the adapter module. For detailed information on PROFINET IO communication, refer to the PROFINET specification Application Layer protocol for decentralized periphery and distributed automation v2.0.

## PROFINET IO

PROFINET IO is a fieldbus protocol for communication between programmable controllers and distributed field devices in an Ethernet network. The protocol classifies devices into I/O controllers, I/O supervisors and I/O devices, which have a specific collection of services.

PROFINET IO uses three different communication channels to exchange data:

- The standard UDP/IP and TCP/IP channel for parameterization and configuration of devices and for acyclic operations.
- The real time (RT) channel for cyclic data transfer and alarms.
- The isochronous real time (IRT) channel, for example, in motion control applications (not implemented in FPNO-21).

PROFINET IO devices are structured in slots and sub-slots, that can contain modules and sub-modules correspondingly. A device can have almost any number of slots and sub-slots, and they can be virtual or real. Device-specific data is represented in slot 0; module-specific and sub-module-specific data in subsequent slots and sub-slots.

One of the benefits of PROFINET IO is the diagnostics and alarm mechanism. Every module and sub-module provide alarm data to the I/O controller using the cyclic

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channel. Diagnostic data can be read non-cyclically from the device by using record data.

The properties and services of a PROFINET IO device are described in a GSD file written in GSDML (General Station Description Markup Language). The GSD file describes the device-specific modules and the method of assigning modules and sub-modules to predefined slots and sub-slots. For more information, refer to [Downloading the GSD file \(page 45\)](#).

## PROFINET network settings

In PROFINET, the network devices are identified with station names. The controller uses DCP (Discovery and Configuration protocol) to find devices with configured names from the network. The device with the given name responds with an Identity response that also contains its current IP address.

If the current IP address differs from the address in the hardware configuration of the controller, the controller gives the device a new IP address according to the configuration. This IP is set as temporary, which means that after refresh of the device, the IP address will be 0.0.0.0 as specified in the PROFINET standard.

The recommended IP setting for PROFINET is Static IP and address is 0.0.0.0. With this setting, there is need to configure the IP in only one place (hardware configuration) and this avoids any IP conflicts among the devices.

## PROFINET IO in FPNO-21

When PROFINET IO is selected as the communication protocol, the FPNO-21 module can use the ABB Drives, Transparent 16 and Transparent 32 communication profiles, PROFIdrive or PROFIdrive v4.2 profiles. You can select the profile with FPNO-21 configuration parameter 02 Protocol/Profile. You can also select the device access point (DAP) and functional module with the tool.

- Slot 0 has sub-slots, and the DAP module attached to it represents the device itself. These sub-slots are available:
  - sub-slot 0x0001 is DAP
  - sub-slot 0x8000 is interface sub-module
  - sub-slot 0x8001 is port 1
  - sub-slot 0x8002 is port 2.
- Slot 1 and its sub-slots support other functional modules and sub-modules described in the GSD file. These sub-slots are available:
  1. For PPO types
    - sub-slot 0x0001 is the telegram
  2. For Standard telegrams
    - sub-slot 0x0001 is the Module Access point
    - sub-slot 0x0002 is the telegram
- Slot 2 is used for PROFIsafe
  - sub-slot 0x0001 is PROFIsafe telegram

## The services provided by the FPNO-21 module

- Cyclic messaging
- Acyclic parameter access mechanism
- Identification & Maintenance functions (I&M)
- Media Redundancy Protocol (MRP)
- System redundancy (S2)
- Shared Device
- Network Diagnostic (SNMP)
- Topology information (LLDP) with LLDP-MIB
- PROFINET parameters (limited in the ABB Drives and Transparent profiles)
- Diagnostic and alarm mechanism (only with the PROFINET profiles)
- Fault buffer mechanism (limited in the ABB Drives and Transparent profiles)
- Support PROFINET profile for standardized way of controlling drive. Standard telegram 1 & 2 are supported.
- PROFINET Security Class 1 (SC1)

## PROFINET Security Class 1

The FPNO-21 supports PROFINET Security Class 1 (SC1) from version 3.0 onwards.

PROFINET Security Class 1 improves the security of industrial networks by using defined security measures. One key feature is the use of the Discovery and Configuration Protocol (DCP) in read-only mode. After a communication relationship is established, DCP parameters are read-only. This includes IP addresses and device names. This prevents unintended or malicious changes.

Devices can restrict the use of Simple Network Management Protocol (SNMP). SNMP can be disabled or set to read-only mode. You can also change the community strings for read and write access. These options increase SNMP security. SNMP is used to monitor and configure network devices.

Security Class 1 also protects General Station Description Markup Language (GSDML) files. These files describe device capabilities in the network. To ensure integrity and authenticity, the system signs the folder that contains the GSDML files. This process creates a GSDX file.

**Note:** To use SC1 and GSDX, use a PROFINET controller and engineering tools that support these features.

You can configure the security features via the FPNO-21 web page. Refer to [Configuring SNMP \(page 165\)](#). You can also configure the features via the PLC.

### ■ Example of Security Class 1 settings in TIA Portal

Open **Advanced configuration** in the adapter properties to access the related parameters.

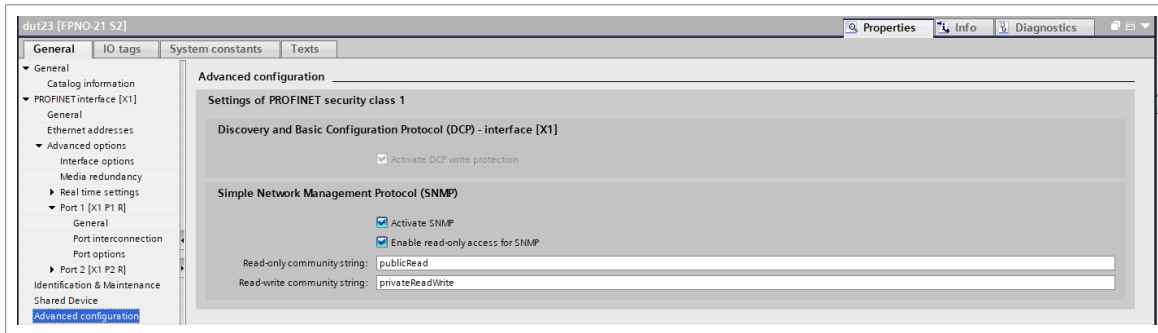
If **Activate SNMP** is disabled, SNMP control is in **Off** state.

If **Enable read-only access for SNMP** is enabled, SNMP control is in **Read only** state.

Otherwise, SNMP control is in **Read and write** state.

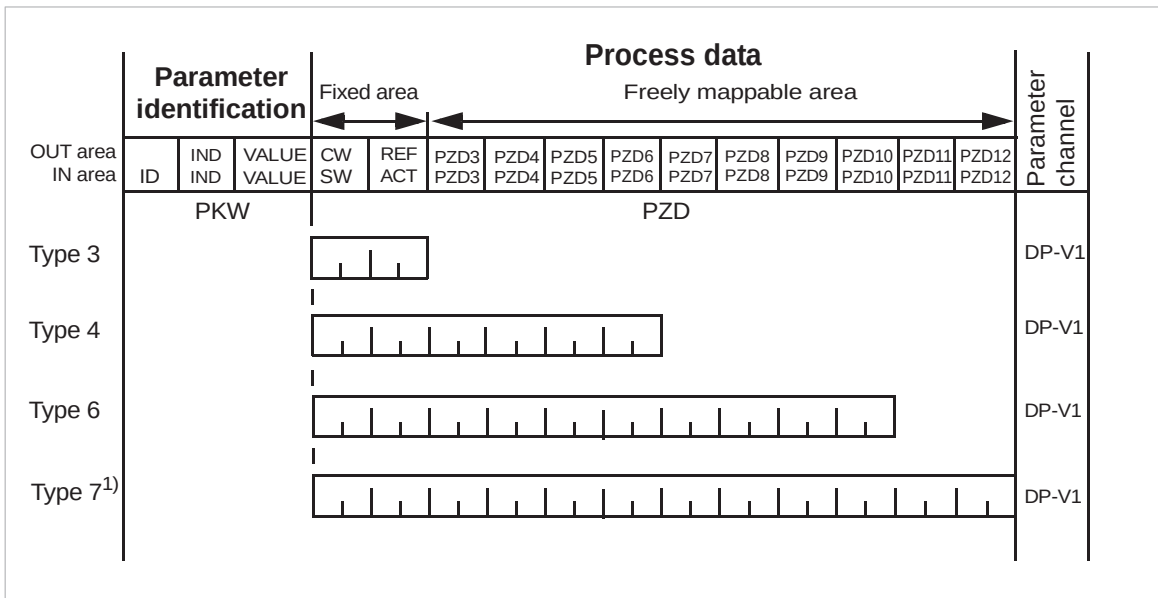
---

You can modify also the community strings in TIA portal.



## Cyclic message types

### ■ PPO types



**OUT area** – Data sent from master to slave (control data)

**IN area** – Data sent from slave to master (actual data)

#### Parameter identification:

ID – Parameter identification

IND – Index for arrays

VALUE – Parameter value (Max. 4 bytes)

PKW – Parameter ID/value

#### Process data:

CW – Control word

SW – Status word

REF – Reference

ACT – Actual value

PZD – Process data (application-specific)

DW – Data word

## ■ Standard telegram (ST) types (DP-V1)

### ST1

|          | PZD1                   | PZD2                           |
|----------|------------------------|--------------------------------|
| OUT area | STW1<br>Control word 1 | NSOLL_A<br>Speed set point A   |
| IN area  | ZSW1<br>Status word 1  | NIST_A<br>Speed actual value A |

### ST2

|          | PZD1                   | PZD2...3                       | PZD4                   |
|----------|------------------------|--------------------------------|------------------------|
| OUT area | STW1<br>Control word 1 | NSOLL_B<br>Speed set point B   | STW2<br>Control word 2 |
| IN area  | ZSW1<br>Status word 1  | NIST_B<br>Speed actual value B | ZSW2<br>Status word 2  |

### ST20

ST20 applies to VIK-Namur profile and to ACS880 with VIK-NAMUR control program.

|          | PZD1                   | PZD2                                                                                              | PZD3                          | PZD4                                                                                 | PZD5                       | PZD6                           |
|----------|------------------------|---------------------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------------------------------------------------|----------------------------|--------------------------------|
| OUT area | STW1<br>Control word 1 | NSOLL_A/FSOLL<br>Either speed setpoint or frequency setpoint (depends on the drive control mode)  | -                             | -                                                                                    | -                          | -                              |
| IN area  | ZSW1<br>Status word 1  | NIST_A_GLATT / FIST_GLATT<br>Speed actual or frequency actual (depends on the drive control mode) | IAIST_GLATT<br>Output current | ITIST_GLATT or MIST_GLATT<br>Active current (par set 1) or Torque actual (par set 2) | PIST_GLATT<br>Active power | MELD_NAMUR<br>Drive fault word |

**Note:** For the contents of the Control word, the Status word, references and actual values, refer to chapter [PROFINET IO – Communication profiles](#).

## ■ Behavior of output data

| If                             | Then                            |
|--------------------------------|---------------------------------|
| IOPS (PLC provider status)=Bad | Output data retains last values |
| Connection loss                | Output data retains last values |
| After power-up                 | All output data is 0            |

## Parameter handling using acyclic parameter access mechanism (DP-V1)

PROFINET IO offers record read and write services for the acyclic parameter access mechanism. When the drive parameters or FPNO-21 parameters are accessed, the corresponding slot, sub-slot and index are set, and a PROFINET DP-V1 message is placed on the data block of the record read or write frame.

### ■ Header and frame structures

PROFINET IO uses the DCE RPC (Distributed Computing Environment Remote Procedure Call) protocol for acyclic read and write services. I/O controllers and supervisors take care of formulating most of the request frames. However, it is possible that handling the PROFINET request and response headers must be performed in the application logic. The acyclic frame structure, headers and error codes are described further below.

| Frames | Dest addr. | Src addr. | Ether type | IP UDP | RPC | NDR | Read or Write | Data |
|--------|------------|-----------|------------|--------|-----|-----|---------------|------|
| Bytes  | 6          | 6         | 2          | 28     | 80  | 20  | 64            | ...  |

**Dest addr.** and **Src addr.** are the destination and the source of the communication relationship. The addresses are in hexadecimal format, for example, 00-30-11-02-57-AD.

**Ether type** is 0x800 for non-real-time communication.

**IP** and **UDP** fields contain the IP address of the source and the destination as well as the communication ports and length of the message.

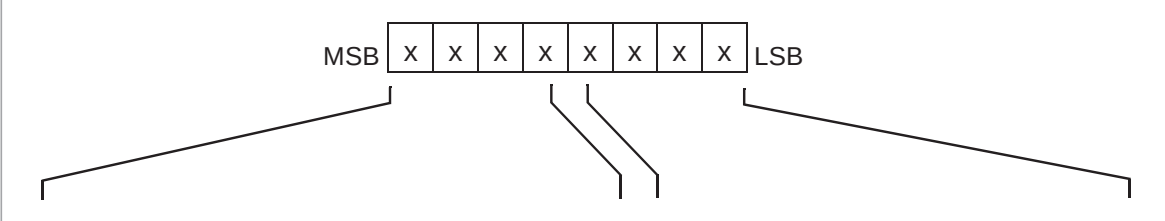
**RPC** contains, for example, the read or write service ID, interface description and selected objects.

**NDR** request block describes the length of the following data block. The response block also contains bytes **ErrorCode**, **ErrorDecode**, **ErrorCode1** and **ErrorCode2** for presenting the status of the request. The response error codes are listed in the table below.

| Byte        | Value and meaning                                                                               |
|-------------|-------------------------------------------------------------------------------------------------|
| ErrorCode   | 0xDF (Error Write)                                                                              |
|             | 0xDE (Error Read)                                                                               |
| ErrorDecode | 0x80 (PNIORW) ErrorCode1 decoded as in <a href="#">ErrorCode1 (page 106)</a> . ErrorCode2 is 0. |
|             | 0x81 (PNIO) ErrorCode1 and ErrorCode2 decoded as in <a href="#">ErrorCode1 (page 106)</a> .     |
| ErrorCode1  | Error class and error code. Refer to <a href="#">ErrorCode1 (page 106)</a> .                    |
| ErrorCode2  | Not described here                                                                              |

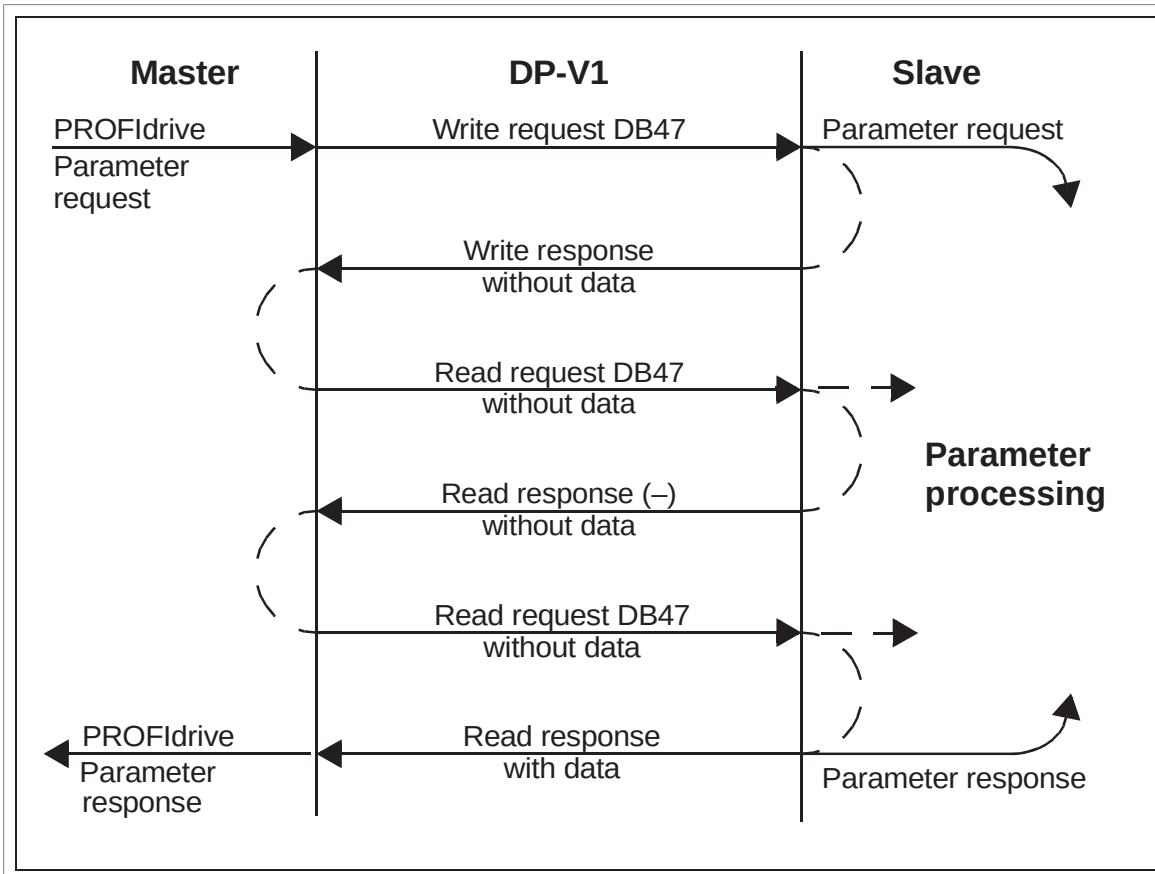
### ErrorCode1

The table below lists the ErrorCode1 with PNIO decoding.

|  |               |                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Error class                                                                        | Meaning       | Error code                                                                                                                                                                                                                                       |
| 0...9                                                                              | (Reserved)    |                                                                                                                                                                                                                                                  |
| 10 (0x0A)                                                                          | Application   | 0 = Read error<br>1 = Write error<br>2 = Module failure<br>3...7 = Reserved<br>8 = Version conflict<br>9 = Feature not supported<br>10...15 = User-specific                                                                                      |
| 11 (0x0B)                                                                          | Access        | 0 = Invalid index<br>1 = Write length error<br>2 = Invalid slot<br>3 = Type conflict<br>4 = Invalid area<br>5 = State conflict<br>6 = Access denied<br>7 = Invalid range<br>8 = Invalid parameter<br>9 = Invalid type<br>10...15 = User-specific |
| 12 (0x0C)                                                                          | Resource      | 0 = Read constraint conflict<br>1 = Write constraint conflict<br>2 = Resource busy<br>3 = Resource unavailable<br>4...7 = Reserved<br>8...15 = User-specific                                                                                     |
| 13...15                                                                            | User-specific |                                                                                                                                                                                                                                                  |

### ■ DP-V1 read/write request sequence

A read/write service on a drive parameter is illustrated below.



The messaging employs DP-V1 data units. The PROFIdrive parameter request is included within the DP-V1 request as data. Likewise, the DP-V1 response contains the PROFIdrive parameter response as data.

A write request is first sent containing the parameter request. If the write request is valid, the adapter module acknowledges it with a DP-V1 write response with no data. The master will then send a read request. If the adapter module is still busy performing the internal parameter request, it will return a negative response with the DP-V1 error code B5h (State conflict). In this case, the master will repeat the read request until the adapter module has the PROFIdrive response data ready.

If the write request is invalid, a negative response is returned with a DP-V1 error code (refer to [ErrorCode1 \(page 106\)](#)).

### Read and write blocks

A read block is used in read requests and responses, while a write block is used in write requests and responses. A request consists of unique identifiers for the connection, addressing information and the length of the record data. A response also contains two additional fields for transferring information.

The table below shows the structure of the read and write blocks in detail.

| Field(s)  | Description                 | Range                             | Type |
|-----------|-----------------------------|-----------------------------------|------|
| Service   | Request or Response service | Request (0x00)<br>Response (0x80) | UI8  |
| Operation | Read or Write operation     | Write (0x08)<br>Read (0x09)       | UI8  |

| Field(s)                           | Description                                                                                                                                         | Range                                               | Type                                         |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------|
| Block length                       | Length of the block                                                                                                                                 | 0...0xFFFF                                          | UI16                                         |
| ARUUID                             | Identifier <ul style="list-style-type: none"> <li>time low</li> <li>time mid</li> <li>time high and version</li> <li>clock</li> <li>node</li> </ul> |                                                     | UI32<br>UI16<br>UI16<br>Octet[2]<br>Octet[6] |
| API                                | Application process identifier                                                                                                                      | Device access point (0x0000)<br>PROFIdrive (0x3A00) | UI32                                         |
| Slot                               | Slot of the module access point (MAP/PAP)                                                                                                           | 0x01                                                | UI16                                         |
| Subslot                            | Subslot of the module access point (MAP/PAP)                                                                                                        | 0x01                                                | UI16                                         |
| Padding                            | 2 bytes                                                                                                                                             |                                                     |                                              |
| Index                              | Index of the record data object                                                                                                                     | 0x2F<br>0xB02E<br>0xB02F                            | UI16                                         |
| Data length                        | Length of the data block                                                                                                                            | 0...0xFFFFFFFF                                      | UI32                                         |
| Additional value 1 (response only) | Field for transferring additional data                                                                                                              |                                                     | UI16                                         |
| Additional value 2 (response only) | Field for transferring additional data                                                                                                              |                                                     | UI16                                         |
| Padding                            | 24 bytes for request, 20 bytes for response.                                                                                                        |                                                     |                                              |
| Data block                         | Used only with write request and read response.                                                                                                     |                                                     |                                              |

### Data block

The data block contains a PROFIdrive-specific request or response header.

The table below shows the contents of the PROFIdrive request.

| Field(s)          | Description                                                                          | Range                                             | Byte/ Word |
|-------------------|--------------------------------------------------------------------------------------|---------------------------------------------------|------------|
| Request Reference | Unique identification set by the master. Changed for each new request.               | 1...255                                           | Byte       |
| Request ID        | Request type for the issued block                                                    | Request Parameter (01h)<br>Change Parameter (02h) | Byte       |
| Drive Object ID   | To be set to 0 or 1.                                                                 | 0...255                                           | Byte       |
| No. of Parameters | Number of the parameters that are present in the request                             | 1...37                                            | Byte       |
| Attribute         | Type of the object being accessed. Note: "Description" and "Text" are not supported. | Value (10h) Description (20h) Text (30h)          | Byte       |

| Field(s)                       | Description                                                                                                                                                                                                                             | Range                           | Byte/ Word                     |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------------------|
| No. of Elements                | Number of the array elements accessed or length of the string accessed. Set to 0 if non-array parameters are used.                                                                                                                      | 0, 1...234                      | Byte                           |
| Parameter Index                | Address of the parameter that is being accessed. "0" is allowed by FPNO-21.                                                                                                                                                             | 1...65535                       | Word                           |
| Subindex                       | Addresses <ul style="list-style-type: none"> <li>the first array element of the parameter or</li> <li>the beginning of a string access or</li> <li>the text array or</li> <li>the description element that is being accessed</li> </ul> | 0...65535                       | Word                           |
| Format <sup>1)</sup>           | Refer to the table on page 111.                                                                                                                                                                                                         | Refer to the table on page 111. | Byte                           |
| Number of Values <sup>1)</sup> | Number of the values that follow                                                                                                                                                                                                        | 0...234                         | Byte                           |
| Values <sup>1)</sup>           | The values of the request. In case of an odd number of bytes, a zero byte is appended to ensure the word structure of the telegram.                                                                                                     | –                               | Refer to the the Format field. |

<sup>1)</sup> Only if Request ID is 02h (Change Parameter). The Format, Number of Values and Values fields are repeated for other parameters.

The table below shows the contents of the PROFIdrive response.

| Field(s)                       | Description                                                                                                                         | Range                                                                                                |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Request Reference (mirrored)   | Mirrored from the request.                                                                                                          | 1...255                                                                                              |
| Response ID                    | Response from the slave. In case any requested services fail, a "not acknowledged" (NAK) response will be indicated.                | Request Param OK (01h)<br>Request Param NAK (81h)<br>Change Param OK (02h)<br>Change Param NAK (82h) |
| Drive Object ID                | To be set to 1.                                                                                                                     | 0...255                                                                                              |
| No. of Parameters              | Number of the parameters that are present in the response                                                                           | 1...37                                                                                               |
| Format <sup>1)</sup>           | Refer to the table on page 111.                                                                                                     | Refer to the table on page 111.                                                                      |
| Number of Values <sup>1)</sup> | Number of the values that follow                                                                                                    | 0...234                                                                                              |
| Values <sup>1)</sup>           | The values of the request. In case of an odd number of bytes, a zero byte is appended to ensure the word structure of the telegram. | –                                                                                                    |

<sup>1)</sup> Only if Response ID is 01h (Request Parameter OK). The Format, Number of Values and Values fields are repeated for other parameters.

The table below shows the data types for the Format field in the PROFIdrive response.

| Code        | Type                                                                                                                                                                                                                                                                |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0x00        | (Reserved)                                                                                                                                                                                                                                                          |
| 0x01...0x36 | Standard data types<br>1. Boolean (not supported)<br>2. Integer8 (not supported)<br>3. Integer16<br>4. Integer32<br>5. Unsigned8 (not supported)<br>6. Unsigned16<br>7. Unsigned32<br>8. Floating point (not supported)<br>9. Visible string (not supported)<br>... |
| 0x37...0x3F | (Reserved)                                                                                                                                                                                                                                                          |
| 0x40        | Zero                                                                                                                                                                                                                                                                |
| 0x41        | Byte                                                                                                                                                                                                                                                                |
| 0x42        | Word                                                                                                                                                                                                                                                                |
| 0x43        | Double word                                                                                                                                                                                                                                                         |
| 0x44        | Error                                                                                                                                                                                                                                                               |
| 0x45...0xFF | (Reserved)                                                                                                                                                                                                                                                          |

The table below shows the PROFIdrive parameter request error codes.

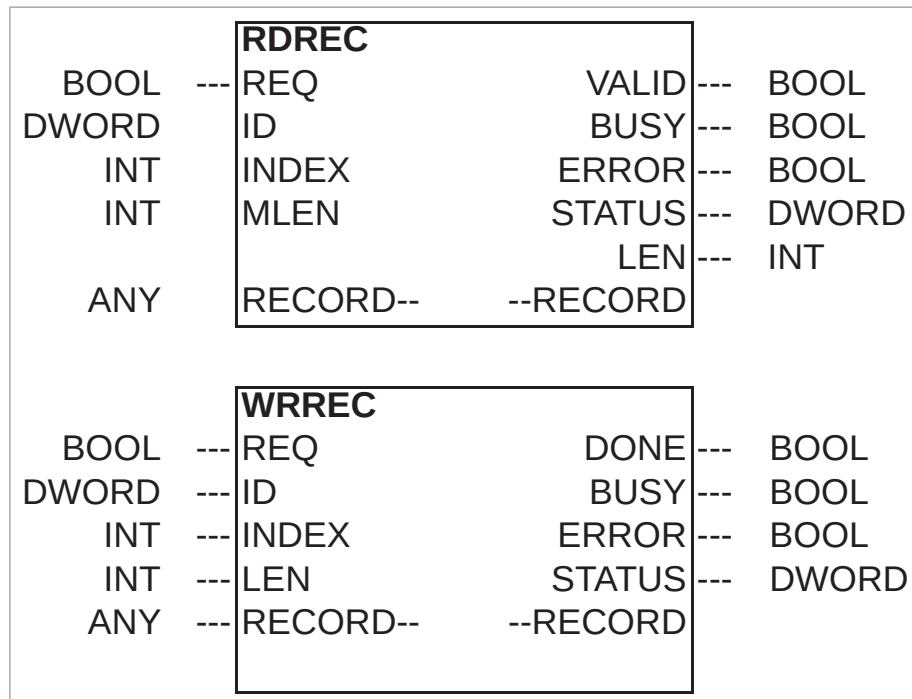
| Error # | Meaning                                   | Used at                                                                       |
|---------|-------------------------------------------|-------------------------------------------------------------------------------|
| 00h     | Impermissible parameter number            | Access to an unavailable parameter                                            |
| 01h     | Parameter value cannot be changed         | Change access to a parameter value that cannot be changed                     |
| 02h     | Low or high limit exceeded                | Change access with a value outside the limits                                 |
| 03h     | Invalid subindex                          | Access to an unavailable subindex                                             |
| 04h     | No array                                  | Access with a subindex to a non-indexed parameter                             |
| 05h     | Incorrect data type                       | Change access with a value that does not match the data type of the parameter |
| 06h     | Setting not permitted (can only be reset) | Change access with a value unequal to 0 when this is not permitted            |
| 07h     | Description element cannot be changed     | Change access to a description element that cannot be changed                 |
| 09h     | No description data available             | Access to an unavailable description (parameter value is available)           |
| 0Bh     | No operation priority                     | Change access rights without rights to change parameters                      |
| 0Fh     | No text array available                   | Access to a text array that is not available (Parameter value is available.)  |

| Error #    | Meaning                                              | Used at                                                                                                                                    |
|------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 11h        | Request cannot be executed because of operating mode | Access is temporarily not possible for reasons that are not specified in detail.                                                           |
| 14h        | Value impermissible                                  | Change access with a value that is within limits but is not permissible for other long-term reasons (parameter with defined single values) |
| 15h        | Response too long                                    | The length of the current response exceeds the maximum transmittable length.                                                               |
| 16h        | Parameter address impermissible                      | Illegal value or value that is not supported for the attribute, number of elements, parameter number or sub-index, or a combination        |
| 17h        | Illegal format                                       | Write request: Illegal format or format of parameter data that is not supported                                                            |
| 18h        | Number of values inconsistent                        | Write request: Number of values of the parameter data does not match the number of elements at the parameter address.                      |
| 21h        | Service not supported                                | Illegal or unknown request ID (response ID will be 80h)                                                                                    |
| 65h ... FF | Manufacturer-specific error area                     | –                                                                                                                                          |
| 65h        | Vendor-specific error                                | Vendor-specific error                                                                                                                      |
| 66h        | Request not supported                                | Request not supported                                                                                                                      |
| 67h        | Communication error                                  | Request cannot be completed because of a communication error.                                                                              |
| 6Eh        | Non-volatile error                                   | Failure during write to non-volatile memory                                                                                                |
| 6Fh        | Time-out error                                       | Request aborted because of a timeout.                                                                                                      |
| 78h        | PZD map failure                                      | Parameter cannot be mapped to PZD (size mismatch or non-existent).                                                                         |
| 79h        | PZD memory failure                                   | Parameter cannot be mapped to PZD (out of memory).                                                                                         |
| 7Ah        | Multiple PZD map                                     | Parameter cannot be mapped to PZD (multiple PZD write).                                                                                    |
| 82h        | Control word bit map                                 | Cannot map Control word bit (parameter 933...937, eg, double mapping of bits).                                                             |
| 8Ch        | Set torque mode error                                | Cannot change mode to TORQUE (frequency is used).                                                                                          |
| 90h        | Illegal Request ID                                   | The request ID of the response is illegal.                                                                                                 |
| 96h        | Internal buffer                                      | Buffer overflow                                                                                                                            |
| A0h        | Internal communication                               | Communication error between the module and the drive                                                                                       |

## ■ Function blocks for sending DP-V1 messages (Siemens S7)

In IEC 61131-3 compatible systems, function blocks are available for accessing data non-cyclically. In Siemens S7, SFB 52 "RDREC" can be used for reading and SFB53 "WRREC" for writing data records as follows:

- On INDEX: Connect the value 0xB02F, 0xB02E or 0x2F.
- On Write record: Set the length of the DP-V1 write request to MLEN.
- On Read record: Set the maximum length of the DP-V1 read response.
- Connect the DP-V1 message to RECORD.



**Note:** The function block names for Siemens 12xx and 15xx series PLCs are RD\_REC and WR\_REC, and this naming convention is also applicable for other blocks.

For more information on the above function blocks, see document Communication Function Blocks for PROFIBUS DP and PROFINET IO v2.0 available at [www.profibus.com](http://www.profibus.com).

## ■ Parameter data transfer examples

These examples show how the DP-V1 READ and WRITE mechanisms transfer parameter data.

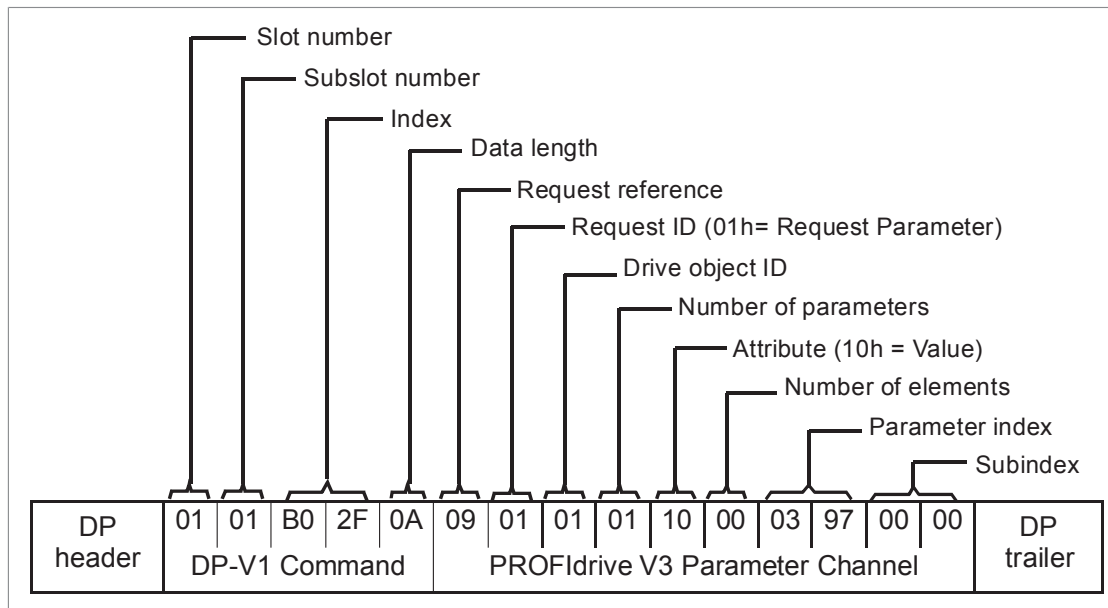
Only the data block part of the request is presented in the examples. Refer to [Read and write blocks \(page 108\)](#).

**Example 1a: Reading a drive parameter (array element)**

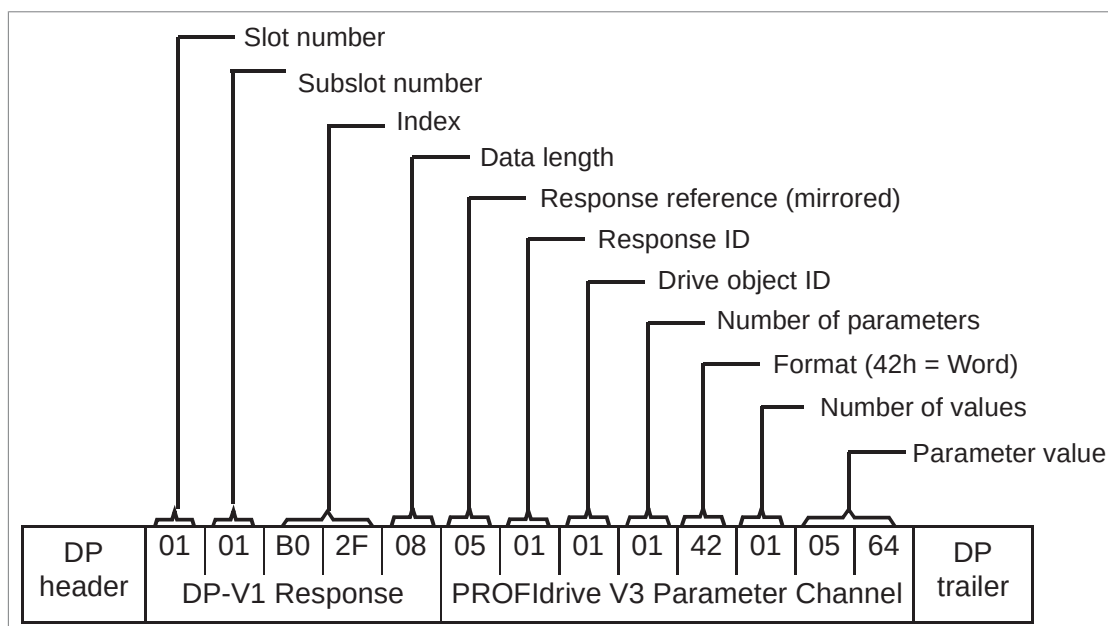
**Note:** Drive parameter access is not available in PROFIdrive v4.2 profile. Refer to parameter [02 Protocol.Profile](#).

Drive parameters are addressed so that the drive parameter group corresponds to the Parameter index (PNU), and the drive parameter number within the group corresponds to the Subindex (IND). In the following example, a value is read from drive parameter 12.04 (0C.04h).

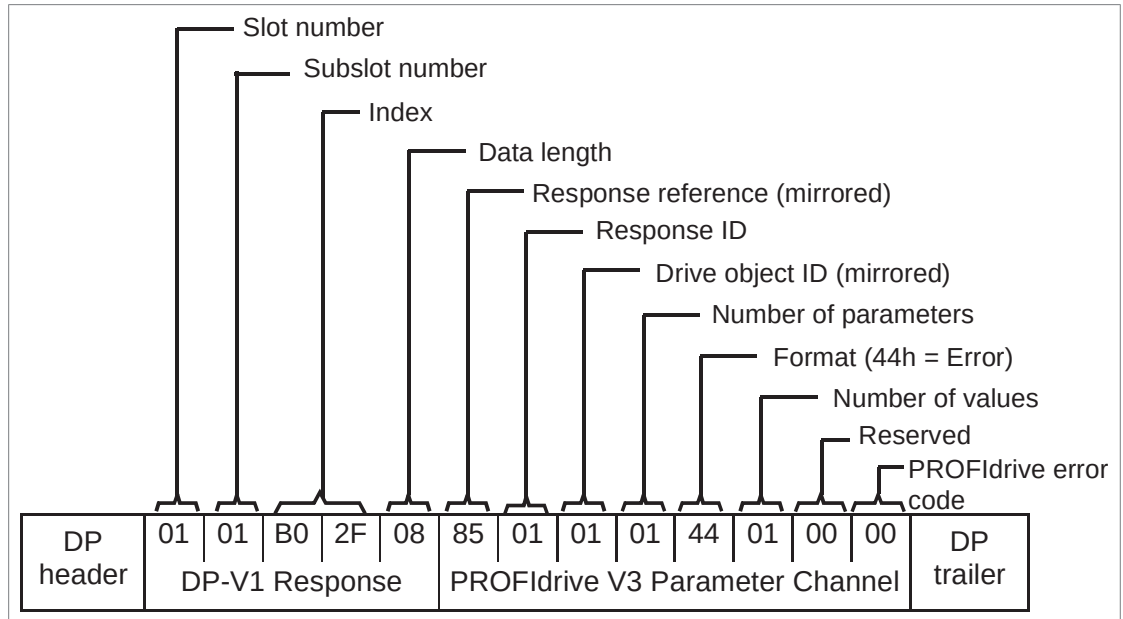
- DP-V1 Write request (Read parameter value):



- Positive Read response to DP-V1 Read request:



- Negative response to PROFIdrive Read request:

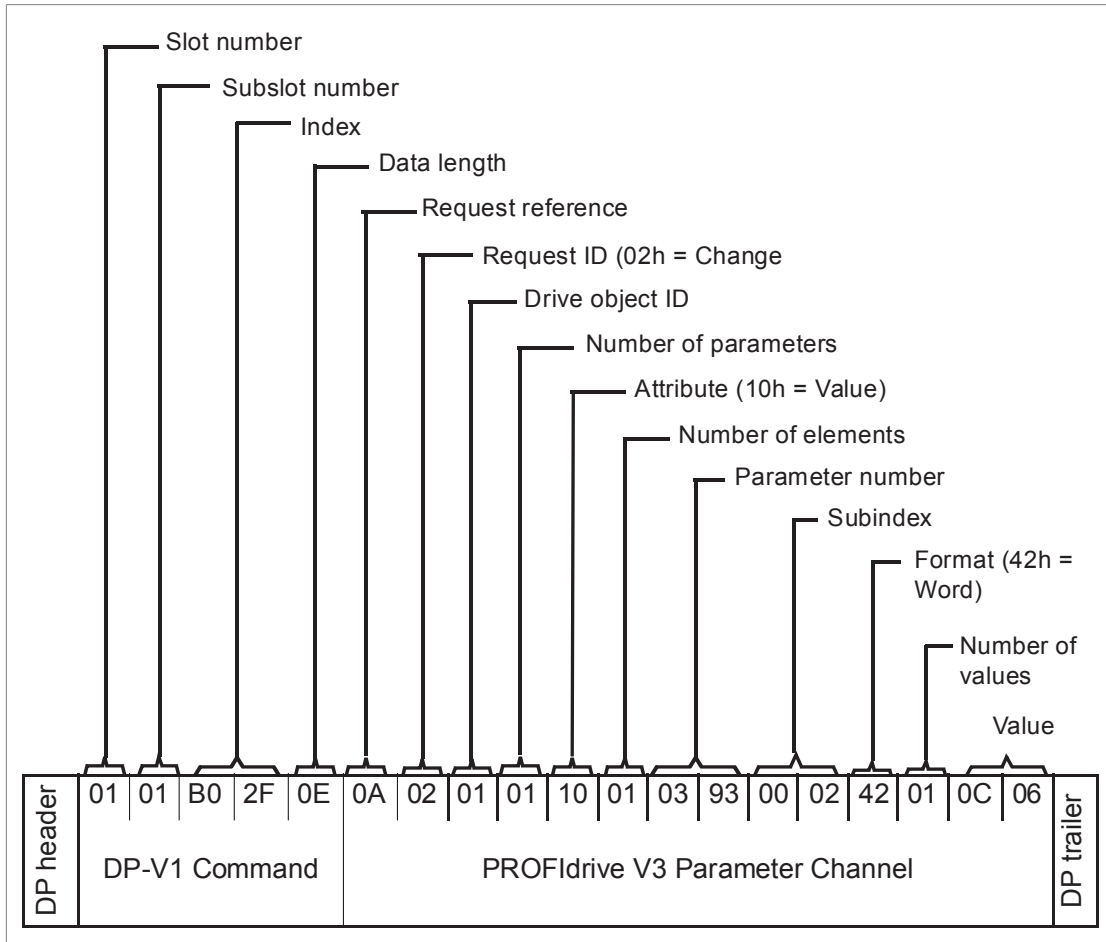


### Example 1b: Reading 3 drive parameters (multi-parameter)

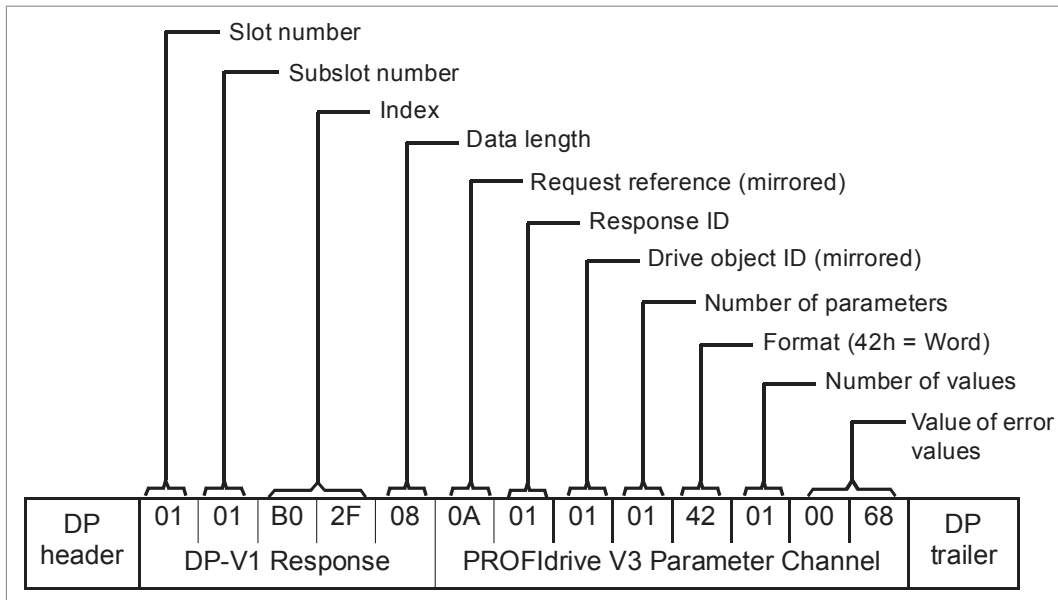
**Note:** Drive parameter access is not available in PROFIdrive v4.2 profile. Refer to parameter [02 Protocol.Profile](#).

In this example, three parameters (12.04, 20.08 and 30.19) are read using one telegram.

- DP-V1 Write request (Read parameter value)



- Positive Read response to DP-V1 Read request:

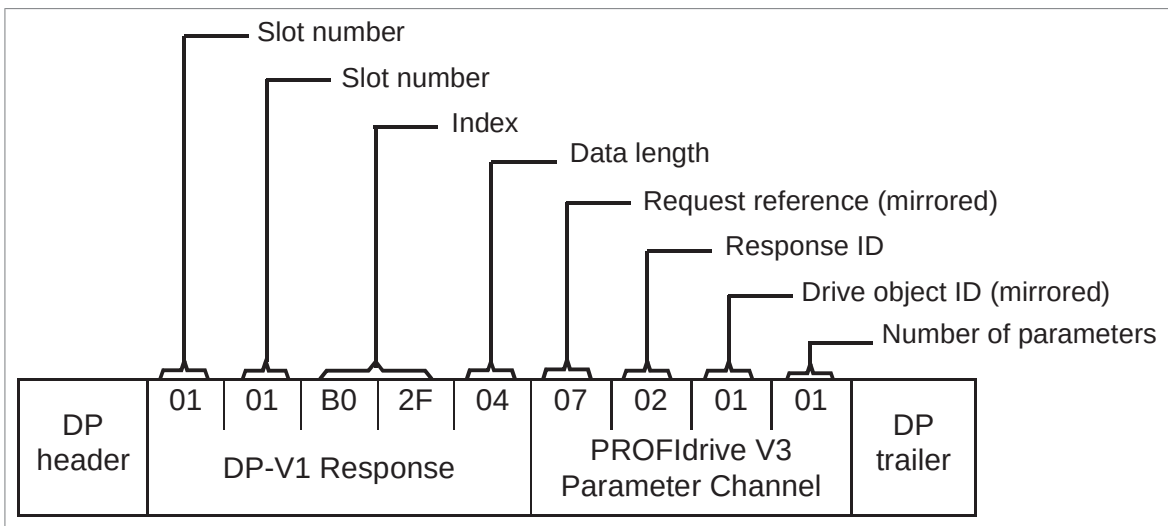
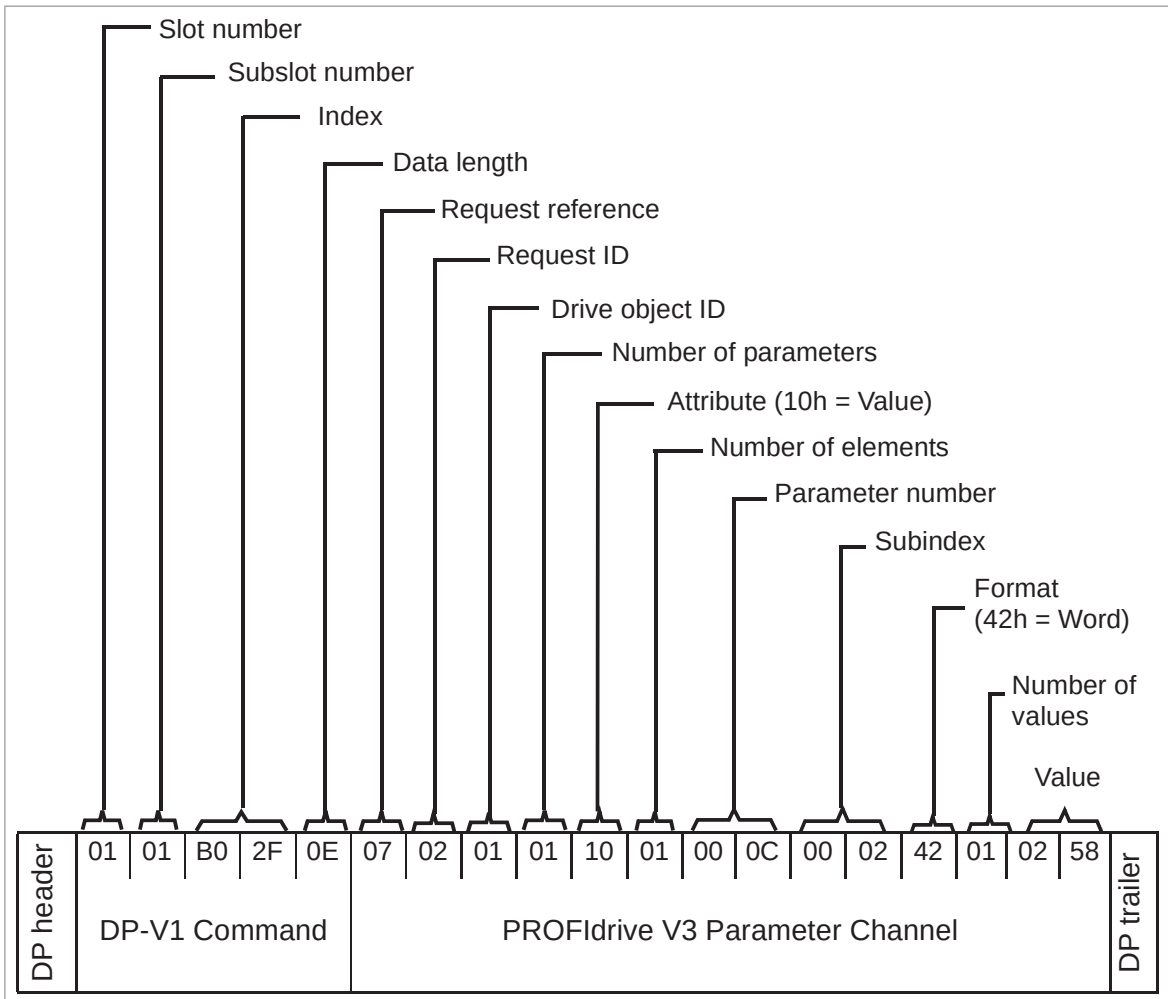


The values 190h (400), 1F4h (500) and 1Eh (30) are returned.

### Example 2a: Writing a drive parameter (one array element)

**Note:** Drive parameter access is not available in PROFIdrive v4.2 profile. Refer to parameter [02 Protocol.Profile](#).

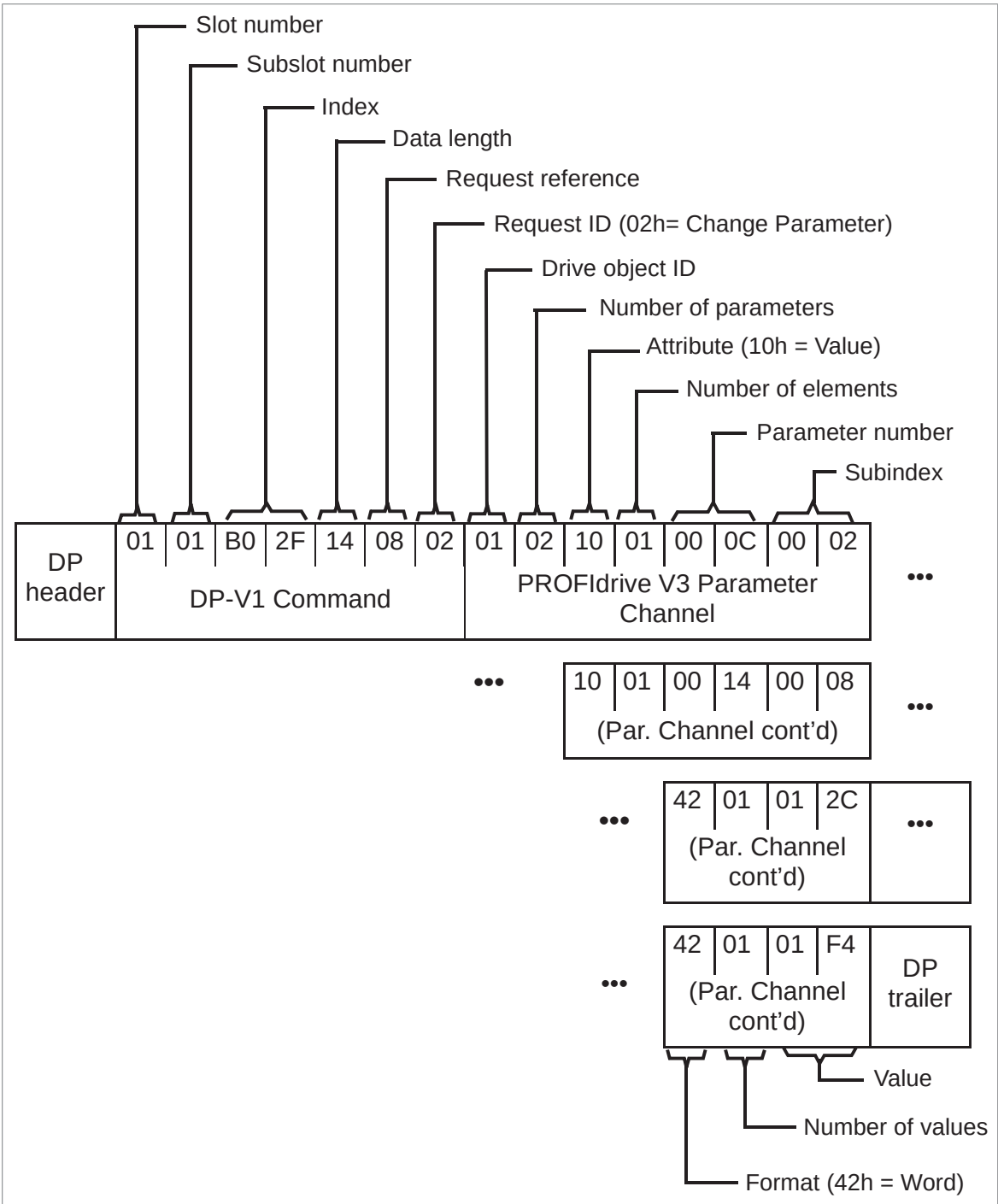
Drive parameters are addressed so that the drive parameter group corresponds to the Parameter index (PNU), and the drive parameter number within that group corresponds to the Subindex (IND). In the following example, a value is written to drive parameter 12.02 (0C.02h).

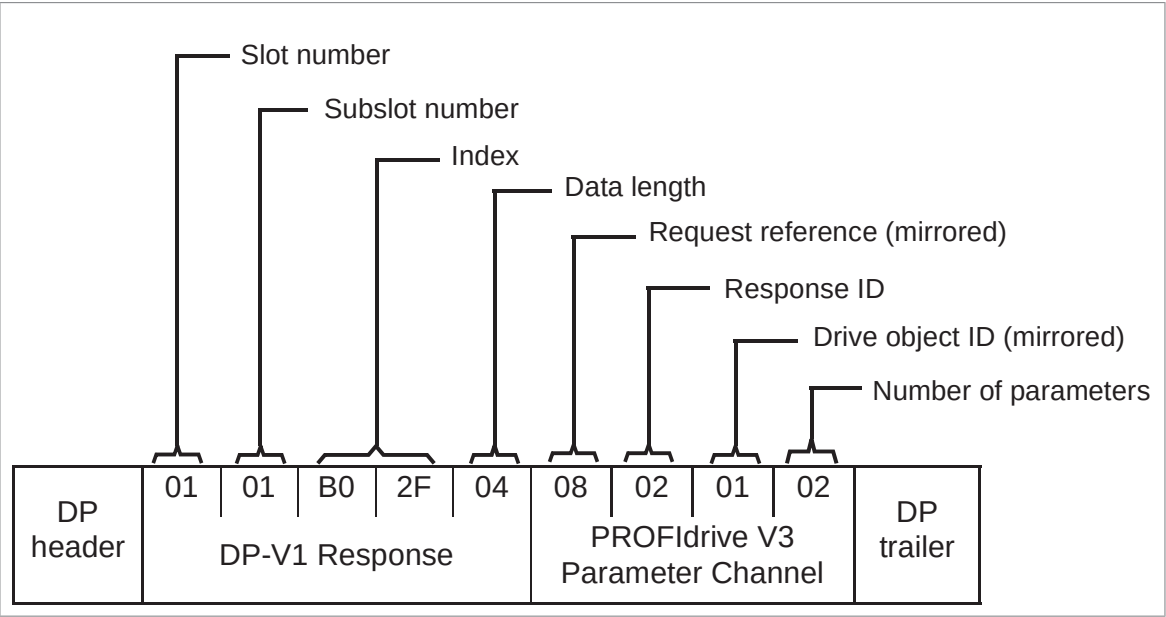


**Example 2b: Writing 2 drive parameters (multi-parameter)**

**Note:** Drive parameter access is not available in PROFIdrive v4.2 profile. Refer to parameter [02 Protocol.Profile](#).

In this example, the values 300 (12Ch) and 500 (1F4h) are written to drive parameters 12.02 (0C.02h) and 20.08 (14.08h) respectively using one telegram.

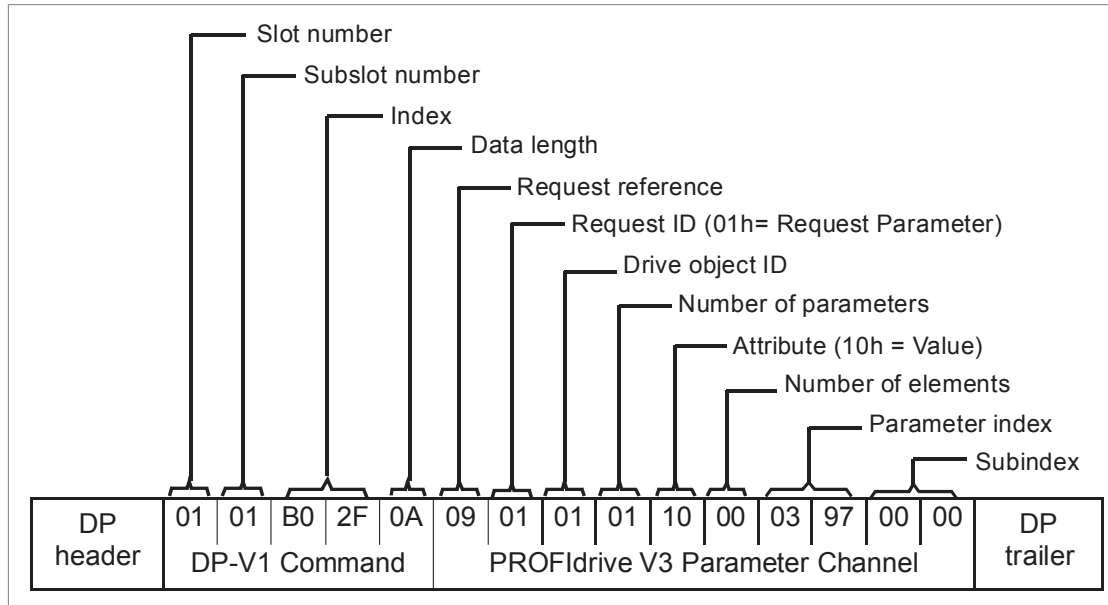




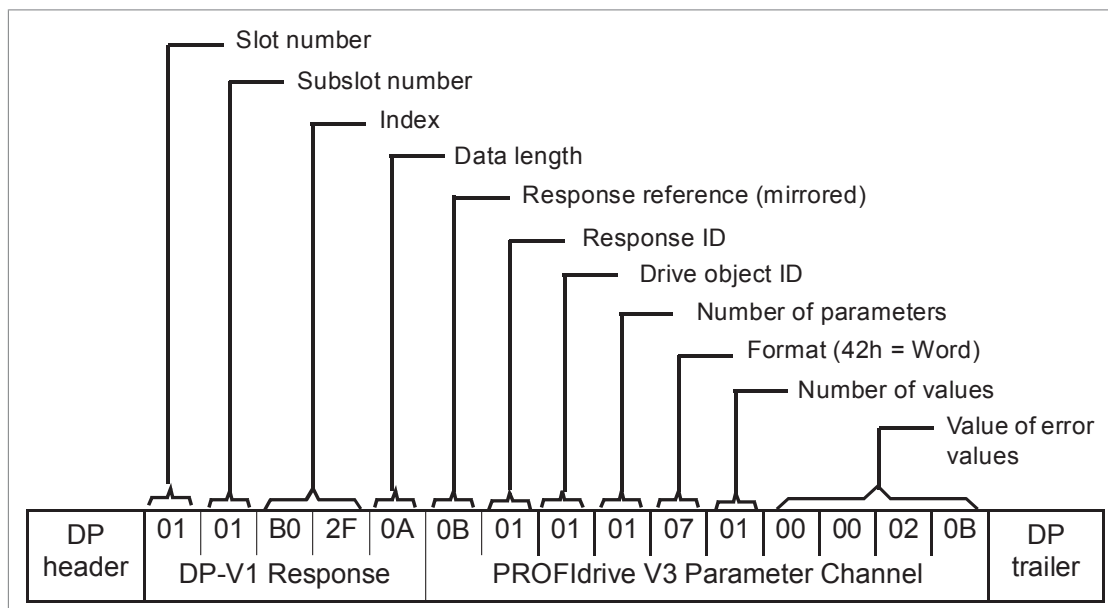
**Example 3: Reading a PROFIdrive parameter**

In this example, PROFIdrive parameter 919 (397h) is used to read the device system number of the slave, which is the product code of the drive.

- DP-V1 Write request (Reading a PROFIdrive parameter):



- DP-V1 Read response:



The slave returns the product code of the drive (20Bh in this example).

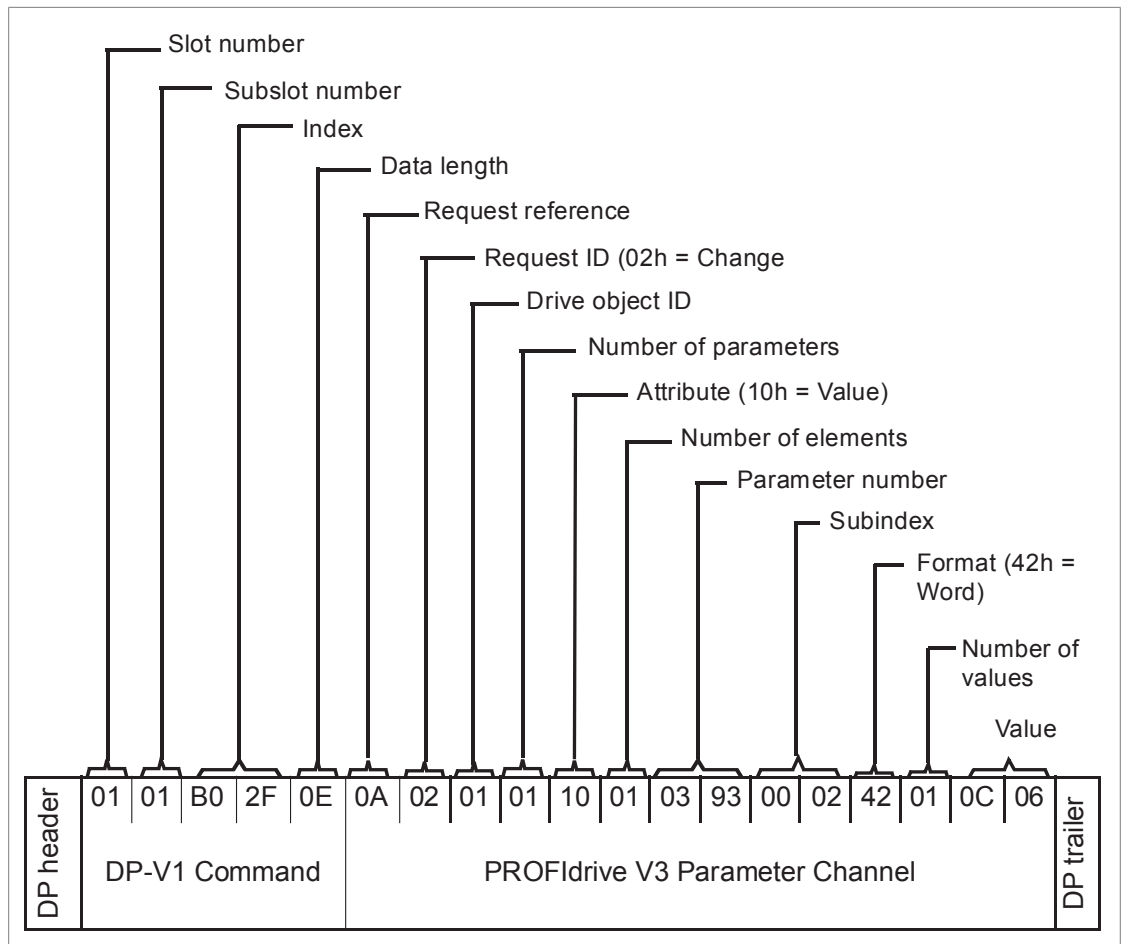
**Example 4: Configuring the process data written to the drive**

PROFIdrive parameter 915 (393h) can be used to define which data is written cyclically to a drive parameter as application-specific process data.

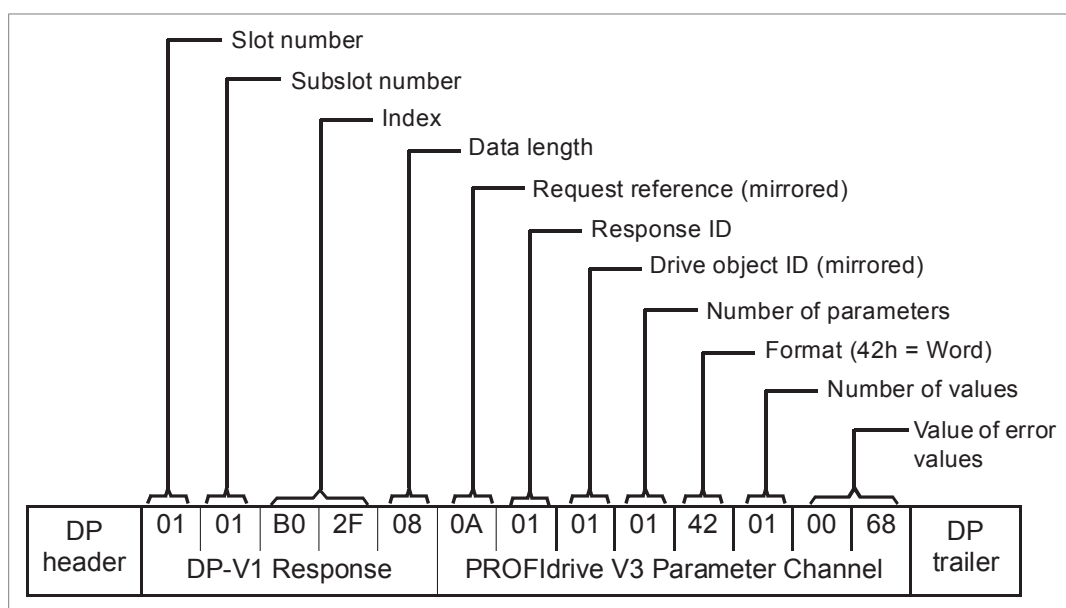
In the example below, the value of drive parameter 12.06 (0C.06h) is selected to be taken from PZD3. The parameter will continue to be updated with the contents of PZD3 in each Request frame until a different selection is made.

*Subindex* (IND) defines which process data word the required data is taken from. *Value* selects the drive parameter to which that word is mapped.

- DP-V1 Write request



- DP-V1 Read response:

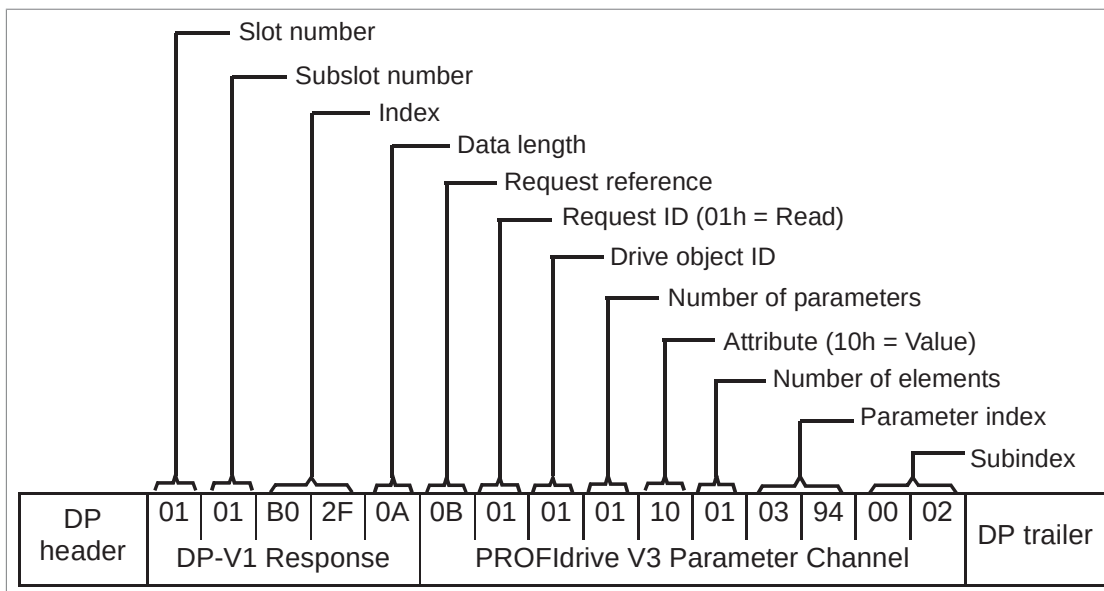


Subsequently, the contents of PZD3 in each Request frame are written to drive parameter 12.06 until a different selection is made.

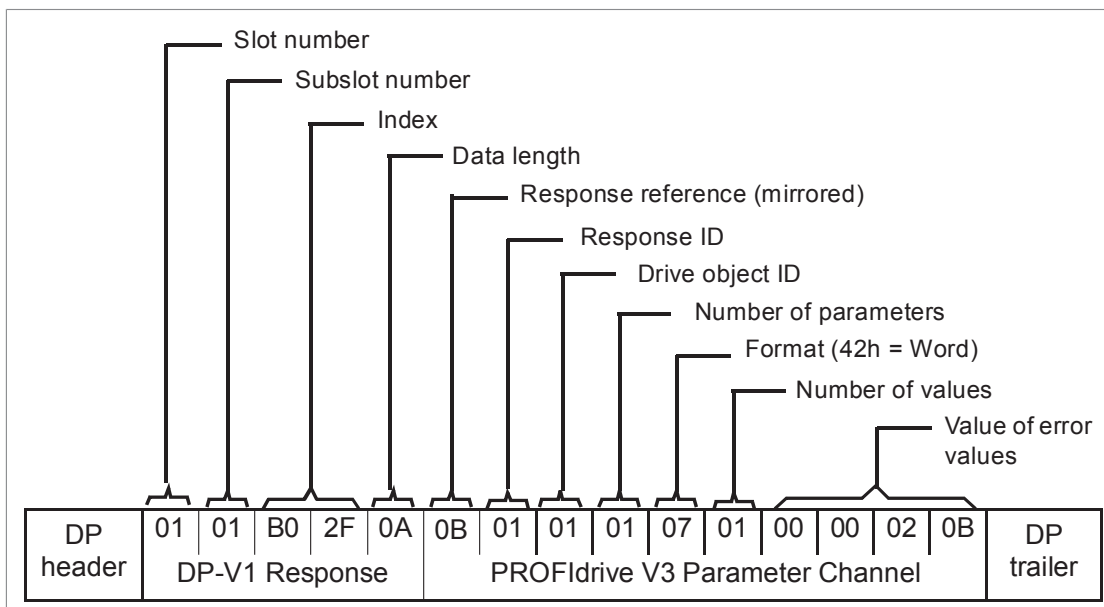
**Example 5: Determining the source of the process data read from the drive**

PROFIdrive parameter 916 (394h) can be used to define which data is read cyclically from the drive as application-specific process data. In the example below, the parameter is used to determine which drive parameter the contents of PZD3 are taken from. Subindex (IND) defines which process data word the required data is transmitted in.

- DP-V1 Write request



- DP-V1 Read response:



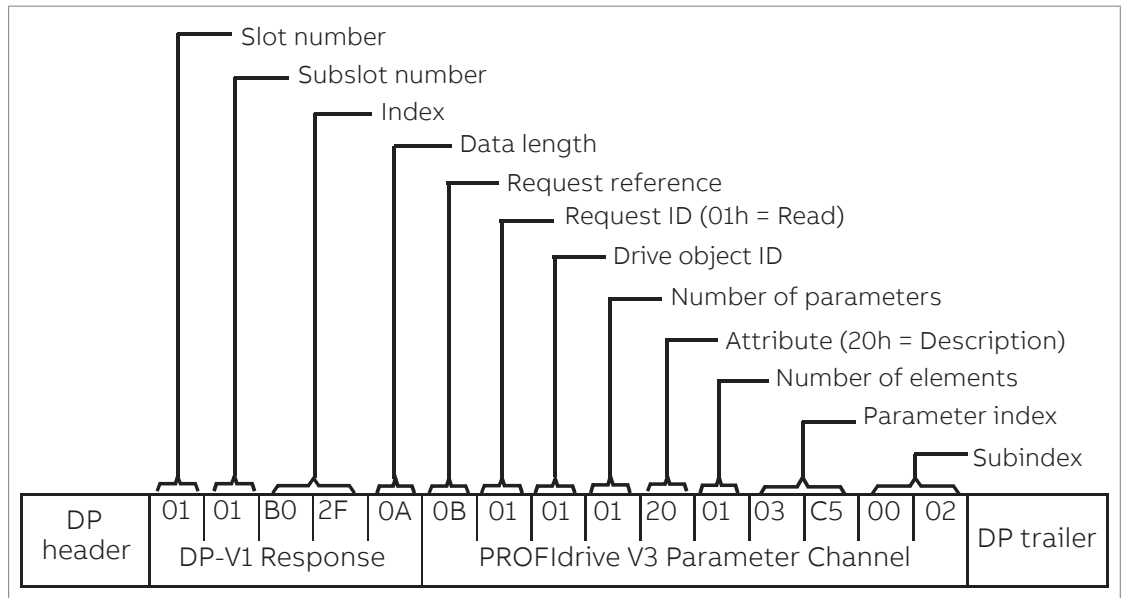
Value indicates the source of PZD3 as drive parameter 12.05 (0C.05h).

**Example 6: Reading one element from the parameter description**

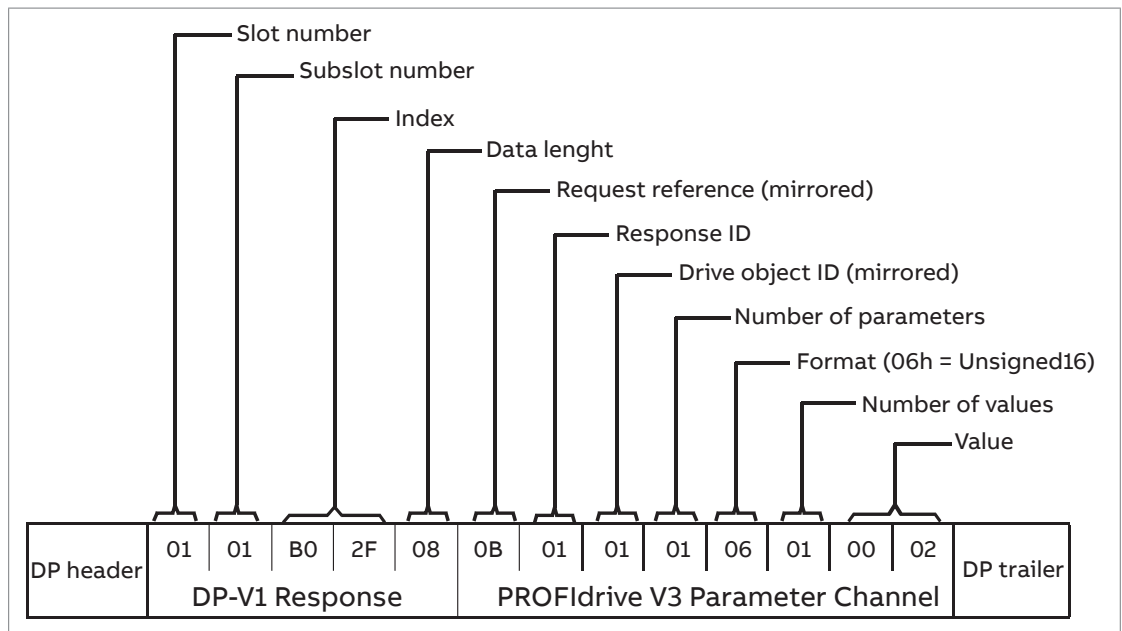
**Note:** This example works only with PROFINET v4.2 profile.

In the example below, PROFINET parameter 965 (3C5h) subindex 2 (length of the string) of parameter description is read.

- DP-V1 Write request:



- DP-V1 Read response:



## Diagnostic and alarm mechanism

The FPNO-21 module has mechanisms to send alarms and saving diagnostics data to a fault buffer. An alarm is triggered if the host or drive has faults in communication or operation. The alarm and fault buffer mechanisms are enabled by default and can be disabled with a configuration parameter 51.21, refer to [FPNO-21 configuration parameters – group A \(group 1\) \(page 28\)](#).

### ■ Alarm mechanism

When a fault situation occurs, the adapter module sends an alarm notification, which the master station has to acknowledge. Alarm notifications can be acknowledged, viewed and handled, for example, with Siemens S7 blocks OB82, OB83, OB86 and OB122.

- Block OB82 is used to make sure that the drive does not go to the stop mode during a diagnostic alarm.
- Block OB83 is called if a module is inserted or removed from the system or if the module is modified.
- Block OB86 indicates if there is a failure or event in the distributed periphery.
- Block OB122 is called if the CPU calls a device that is not accessible.

### Fault code mapping

An alarm notification contains a fault code, which is called ChannelErrorType. For PROFIdrive API, the drive internal DRIVECOM fault numbers are mapped to PROFIdrive ChannelErrorTypes according to the table below. The fault numbers that are not listed are mapped to ChannelErrorType Other.

| ChannelErrorType | Description                          | DRIVECOM fault numbers                                                                                                                                                       |
|------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0x9000           | Microcontroller hardware or software | 4211, 5000, 5401, 5402, 5403, 5484, 5691, 5693, 6100, 6180, 6300, 6306, 6306, 6320, 6481, 6487, 630D, 630F, 64A1, 64A2, 64A3, 64E1, 6581, 65A1, 6682, 6683, 6684, 6881, FF55 |
| 0x9001           | Mains supply                         | 3291                                                                                                                                                                         |
| 0x9002           | Low voltage supply                   | 3130, 3220                                                                                                                                                                   |
| 0x9003           | DC link overvoltage                  | 3210                                                                                                                                                                         |
| 0x9004           | Power electronics                    | 2211, 2281, 2310, 2312, 2340, 2381, 3180, 3181, 3182, 3183, 3184, 3185, 3186, 3187, 3381, 3385, 5400, 5482, 5682, 5692, FF56                                                 |
| 0x9005           | Overtemperature electronic device    | 4110, 4210, 4212, 4290, 4310, 4313, 4981, 7182, 42F1, 4380                                                                                                                   |
| 0x9006           | Earth/ground fault                   | 2330                                                                                                                                                                         |
| 0x9007           | Motor overload                       | 7121                                                                                                                                                                         |
| 0x9008           | Fieldbus system                      |                                                                                                                                                                              |
| 0x9009           | Safety channel                       | 8182, 8183, 5090, 5091, FA81, FA82, FF7A, FFA0, FFA1, FFA2                                                                                                                   |

| ChannelErrorType | Description            | DRIVECOM fault numbers                                                                         |
|------------------|------------------------|------------------------------------------------------------------------------------------------|
| 0x900A           | Feedback               | 7301, 7310, 7380, 7381, 7389, 7391, 8480, 8584, 738A, 738B, 738C, 73A0, 73A1                   |
| 0x900B           | Internal communication | 5480, 5681, 5690, 7000, 7080, 7081, 7510, 7520, 7540, 7584                                     |
| 0x900C           | Infeed                 |                                                                                                |
| 0x900D           | Brake resistor         | 7111, 7112, 7113, 7181, 7183, 7184, 7185, 7186, 7187, 7191, 71A2, 71A3, 71A5                   |
| 0x900E           | Line filter            |                                                                                                |
| 0x900F           | External               | 9000, 9001, 9081, 9082, 9083, 9084, 9085, FF81, FF82, FF8E, FF90                               |
| 0x9010           | Technology             | 6382                                                                                           |
| 0x9011           | Engineering            |                                                                                                |
| 0x9012           | Other                  | 5080, 5093, 5210, 5300, 6200, 7583, 8110, 8500, 8582, 8583, FF61, FF69, FF6A, FF83, FF84, FF95 |

### ■ Fault buffer mechanism

The PROFIdrive profiles have a mechanism that can store eight fault situations to PROFIdrive parameters. Fault and diagnostic data, such as fault numbers and fault codes, can be accessed simultaneously with only one subindex. The mechanism consists of five PROFIdrive parameters:

- PNU944: Fault message counter.
  - Incremented each time the fault buffer changes.
- PNU945: PROFIdrive fault codes presented in the table above.
- PNU946: Fault code list that converts fault numbers to fault codes.
  - Read using the fault number as a subindex to get the corresponding fault code.
- PNU947: Fault numbers according to the DRIVECOM profile.
- PNU950: Size of the fault buffer.

The table below illustrates the structure of a fault buffer. The fault buffer consists of two parameters: fault number (PNU 947) and fault code (PNU 945). The rows of the fault buffer are represented by the parameter subindices. Fault messages are entered into the buffer in the sequence they are detected. Each line in the fault buffer represents a fault message, which is a part of a fault situation. A fault situation lasts from a detection of a fault to its acknowledgement.

| Fault situation          | PNU947       | PNU945     | Subindex |
|--------------------------|--------------|------------|----------|
|                          | Fault number | Fault code |          |
| Actual fault situation n | 0x4210       | 0x9005     | 0        |

| Fault situation     | PNU947       | PNU945     | Subindex |
|---------------------|--------------|------------|----------|
|                     | Fault number | Fault code |          |
| Fault situation n-1 | 0x7510       | 0x900B     | 1        |
| Fault situation n-2 | 0            | 0          | 2        |
| Fault situation n-3 | 0            | 0          | 3        |
| Fault situation n-4 | 0            | 0          | 4        |
| Fault situation n-5 | 0            | 0          | 5        |
| Fault situation n-6 | 0            | 0          | 6        |
| Fault situation n-7 | 0            | 0          | 7        |

9

# PROFINET IO – Diagnostics

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## Contents of this chapter

This chapter explains how to trace faults with the status LEDs on the adapter module when the module is used for PROFINET IO communication.

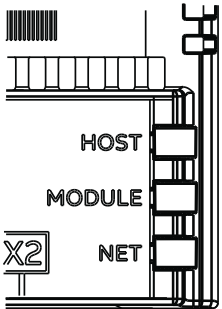
## Fault and warning messages

For the fault and warning messages concerning the adapter module, refer to the the drive firmware manual.

## LEDs

The adapter module has three bicolor diagnostic LEDs. The LEDs are described below.

---

|  |                                                             |                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name                                                                              | Color                                                       | Function                                                                                                                                                                                                                       |
| HOST                                                                              | Flashes green                                               | Establishing communication to the drive                                                                                                                                                                                        |
|                                                                                   | Green                                                       | The connection to the drive operates                                                                                                                                                                                           |
|                                                                                   | Flashes red                                                 | The connection to the drive is temporarily lost                                                                                                                                                                                |
|                                                                                   | Flashes orange, alternating with the MODULE flashing orange | Internal file system error. Cycle the drive power off and on. If the error persists, contact your local ABB representative.                                                                                                    |
| MODULE                                                                            | Off                                                         | The device does not have power.                                                                                                                                                                                                |
|                                                                                   | Flashes orange                                              | Used for identification. The PROFINET master starts to flash the MODULE LED and also flashes the NET LED.                                                                                                                      |
|                                                                                   | Flashes green                                               | The device waits for the for PROFINET connection. This can be caused by a missing PROFINET station name or if the PLC does not operate.                                                                                        |
|                                                                                   | Green                                                       | The device operates normally.                                                                                                                                                                                                  |
|                                                                                   | Flashes red (two times per second)                          | The network link is down. Examine the Ethernet cable connections.                                                                                                                                                              |
|                                                                                   | Flashes red (one time per second)                           | The mapped data is not fitting to the selected cyclic message type. Examine the group B and C parametrization.                                                                                                                 |
|                                                                                   | Red                                                         | The Ethernet interface is disabled. Duplicate Address Detection may have detected a duplicate address. Examine the IP configuration and either start a Fieldbus Adapter parameter refresh or cycle the drive power off and on. |
|                                                                                   | Flashes red-green                                           | The device is in Self Test.                                                                                                                                                                                                    |
|                                                                                   | Flashes orange, alternating with the HOST flashing orange   | Internal file system error. Cycle the drive power off and on. If the error persists, contact your local ABB representative.                                                                                                    |
| NETWORK/NET                                                                       | Off                                                         | Device is not on-line. <ul style="list-style-type: none"> <li>The device has not completed the duplicate address detection yet.</li> <li>The device may not have power. Look at the MODULE status LED.</li> </ul>              |
|                                                                                   | Flashes green                                               | Device is receiving/transmitting on the Ethernet.                                                                                                                                                                              |

# 10

## NONE – Start-up

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### Contents of this chapter

This chapter contains:

- information on how to configure the drive for operation with the adapter module
- drive-specific instructions on how to start-up the drive with the adapter module
- information on how to configure the client for communication with the adapter module.

### Warnings

---



**▲WARNING** Obey the safety instructions given in this manual and the drive documentation.

---

### Drive configuration

This information applies to all drive types that are compatible with the adapter module, unless it is otherwise stated.

#### ■ Connection configuration for the NONE protocol

After the adapter module is mechanically and electrically installed according to the instructions in chapters [Mechanical installation](#) and [Electrical installation](#), set the drive for communication with the module.

The detailed procedure of activating the module using the NONE protocol with the drive depends on the drive type. Normally, you must adjust a parameter to activate the communication. Refer to the the drive-specific start-up sections [Starting up fieldbus communication \(page 136\)](#).

---

When communication between the drive and the adapter module is established, several configuration parameters are copied to the drive. These parameters are shown in the tables below and must be checked first and adjusted if it is necessary. You can adjust the parameters via a drive control panel, a web user interface, or a PC tool.

**Note:**

- Not all drives show the descriptive names for the configuration parameters.
- The new parameter settings take effect only when you power up the module the next time or when you activate the fieldbus adapter refresh parameter.
- Use the NONE protocol selection when no fieldbus protocol is required. For example, when only the Ethernet tool network is used or to synchronize time.

**FPNO-21 configuration parameters – group A (group 1)**

**Note:** The actual parameter group number depends on the drive type. Group A (group 1) corresponds to:

- parameter group 51 in ACS380, ACS480, ACH480, ACS580, ACH580 and ACQ580.
- parameter group 51 in ACS880 if the adapter is installed as fieldbus adapter A or group 54 if the adapter is installed as fieldbus adapter B.

| No. | Name/Value             | Description                                                                                                                                                                                                                                                                                                          | Default                  |
|-----|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 01  | FBA TYPE               | <b>Read-only.</b> Shows the fieldbus adapter type as detected by the drive. The value cannot be adjusted by the user.<br>If the value is <b>0</b> = None, the communication between the drive and the module has not been established.                                                                               | <b>132</b> = PROFINET IO |
| 02  | Protocol/Profile       | Selects the application protocol and communication profile for the network connection.<br>Select NONE to disable PROFINET protocol. Other services (ABB IP Configuration tool, Ethernet tool network, OPC UA, SNTP, and so on) are still available, refer to <a href="#">Service configuration page (page 163)</a> . | <b>11</b> = PNIO ABB Pro |
|     | <b>200</b> = NONE      | NONE protocol                                                                                                                                                                                                                                                                                                        |                          |
| 03  | Commrate               | Sets the bit rate for the Ethernet interface.                                                                                                                                                                                                                                                                        | <b>0</b> = Auto          |
|     | <b>0</b> = Auto        | Autonegotiate                                                                                                                                                                                                                                                                                                        |                          |
|     | <b>1</b> = 100 Mbps FD | 100 Mbps, full-duplex                                                                                                                                                                                                                                                                                                |                          |
|     | <b>2</b> = 100 Mbps HD | 100 Mbps, half-duplex                                                                                                                                                                                                                                                                                                |                          |
|     | <b>3</b> = 10 Mbps FD  | 10 Mbps, full-duplex                                                                                                                                                                                                                                                                                                 |                          |
|     | <b>4</b> = 10 Mbps HD  | 10 Mbps, half-duplex                                                                                                                                                                                                                                                                                                 |                          |
| 04  | IP configuration       | Sets the method for configuring the IP address, subnet mask and gateway address for the module.                                                                                                                                                                                                                      | <b>0</b> = Static IP     |
|     | <b>0</b> = Static IP   | Configuration is obtained from parameters 05...13.                                                                                                                                                                                                                                                                   |                          |
|     | <b>1</b> = Dyn IP DHCP | Configuration is obtained via DHCP.                                                                                                                                                                                                                                                                                  |                          |

| No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Name/Value      | Description                                                                                                                                                                                                                                                                                                                                                          | Default        |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------|----------------|------|----------------|----|-----------------|----|-------------|----|-----------------|----|-------------|----|-----------------|----|-------------|----|-----------------|----|-------------|----|-----------------|----|-------------|----|-----------------|----|-------------|----|-----------------|---|-------------|----|---------------|---|-----------|----|---------------|---|-----------|----|---------------|---|-----------|----|---------------|---|-----------|----|---------------|---|-----------|----|---------------|---|-----------|----|---------------|---|-----------|----|---------------|---|-----------|----|-------------|--|--|
| 05<br>...<br>08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | IP address 1    | An IP address is assigned to each IP node on a network. An IP address is a 32-bit number that is typically represented in “dotted decimal” notation consisting of four decimal integers, on the range 0...255, separated by periods. Each integer represents the value of one octet (8-bits) in the IP address. Parameters define the four octets of the IP address. | 0              |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0...255         | IP address                                                                                                                                                                                                                                                                                                                                                           |                |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ...             | ...                                                                                                                                                                                                                                                                                                                                                                  | ...            |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | IP address 4    | Refer to parameter 05 IP address 1                                                                                                                                                                                                                                                                                                                                   | 0              |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0...255         | IP address                                                                                                                                                                                                                                                                                                                                                           |                |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Subnet CIDR     | <p>Subnet masks are used for splitting networks into smaller networks called subnets. A subnet mask is a 32-bit binary number that splits the IP address into a network address and host address.</p> <p>Subnet masks are typically represented in either dotted decimal notation or the more compact CIDR notation, as shown in the table below.</p>                | 0              |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| <table><tr><th>CIDR</th><th>Dotted decimal</th><th>CIDR</th><th>Dotted decimal</th></tr><tr><td>31</td><td>255.255.255.254</td><td>15</td><td>255.254.0.0</td></tr><tr><td>30</td><td>255.255.255.252</td><td>14</td><td>255.252.0.0</td></tr><tr><td>29</td><td>255.255.255.248</td><td>13</td><td>255.248.0.0</td></tr><tr><td>28</td><td>255.255.255.240</td><td>12</td><td>255.240.0.0</td></tr><tr><td>27</td><td>255.255.255.224</td><td>11</td><td>255.224.0.0</td></tr><tr><td>26</td><td>255.255.255.192</td><td>10</td><td>255.192.0.0</td></tr><tr><td>25</td><td>255.255.255.128</td><td>9</td><td>255.128.0.0</td></tr><tr><td>24</td><td>255.255.255.0</td><td>8</td><td>255.0.0.0</td></tr><tr><td>23</td><td>255.255.254.0</td><td>7</td><td>254.0.0.0</td></tr><tr><td>22</td><td>255.255.252.0</td><td>6</td><td>252.0.0.0</td></tr><tr><td>21</td><td>255.255.248.0</td><td>5</td><td>248.0.0.0</td></tr><tr><td>20</td><td>255.255.240.0</td><td>4</td><td>240.0.0.0</td></tr><tr><td>19</td><td>255.255.224.0</td><td>3</td><td>224.0.0.0</td></tr><tr><td>18</td><td>255.255.192.0</td><td>2</td><td>192.0.0.0</td></tr><tr><td>17</td><td>255.255.128.0</td><td>1</td><td>128.0.0.0</td></tr><tr><td>16</td><td>255.255.0.0</td><td></td><td></td></tr></table> |                 |                                                                                                                                                                                                                                                                                                                                                                      |                | CIDR | Dotted decimal | CIDR | Dotted decimal | 31 | 255.255.255.254 | 15 | 255.254.0.0 | 30 | 255.255.255.252 | 14 | 255.252.0.0 | 29 | 255.255.255.248 | 13 | 255.248.0.0 | 28 | 255.255.255.240 | 12 | 255.240.0.0 | 27 | 255.255.255.224 | 11 | 255.224.0.0 | 26 | 255.255.255.192 | 10 | 255.192.0.0 | 25 | 255.255.255.128 | 9 | 255.128.0.0 | 24 | 255.255.255.0 | 8 | 255.0.0.0 | 23 | 255.255.254.0 | 7 | 254.0.0.0 | 22 | 255.255.252.0 | 6 | 252.0.0.0 | 21 | 255.255.248.0 | 5 | 248.0.0.0 | 20 | 255.255.240.0 | 4 | 240.0.0.0 | 19 | 255.255.224.0 | 3 | 224.0.0.0 | 18 | 255.255.192.0 | 2 | 192.0.0.0 | 17 | 255.255.128.0 | 1 | 128.0.0.0 | 16 | 255.255.0.0 |  |  |
| CIDR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Dotted decimal  | CIDR                                                                                                                                                                                                                                                                                                                                                                 | Dotted decimal |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 31                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.255.254 | 15                                                                                                                                                                                                                                                                                                                                                                   | 255.254.0.0    |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.255.252 | 14                                                                                                                                                                                                                                                                                                                                                                   | 255.252.0.0    |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 29                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.255.248 | 13                                                                                                                                                                                                                                                                                                                                                                   | 255.248.0.0    |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.255.240 | 12                                                                                                                                                                                                                                                                                                                                                                   | 255.240.0.0    |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.255.224 | 11                                                                                                                                                                                                                                                                                                                                                                   | 255.224.0.0    |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.255.192 | 10                                                                                                                                                                                                                                                                                                                                                                   | 255.192.0.0    |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.255.128 | 9                                                                                                                                                                                                                                                                                                                                                                    | 255.128.0.0    |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.255.0   | 8                                                                                                                                                                                                                                                                                                                                                                    | 255.0.0.0      |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.254.0   | 7                                                                                                                                                                                                                                                                                                                                                                    | 254.0.0.0      |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.252.0   | 6                                                                                                                                                                                                                                                                                                                                                                    | 252.0.0.0      |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.248.0   | 5                                                                                                                                                                                                                                                                                                                                                                    | 248.0.0.0      |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.240.0   | 4                                                                                                                                                                                                                                                                                                                                                                    | 240.0.0.0      |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.224.0   | 3                                                                                                                                                                                                                                                                                                                                                                    | 224.0.0.0      |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.192.0   | 2                                                                                                                                                                                                                                                                                                                                                                    | 192.0.0.0      |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.128.0   | 1                                                                                                                                                                                                                                                                                                                                                                    | 128.0.0.0      |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 255.255.0.0     |                                                                                                                                                                                                                                                                                                                                                                      |                |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |
| 1...31                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 | Subnet mask in CIDR notation                                                                                                                                                                                                                                                                                                                                         |                |      |                |      |                |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |    |             |    |                 |   |             |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |               |   |           |    |             |  |  |

132 NONE – Start-up

| No.             | Name/Value              | Description                                                                                                                                                                                                                                                                  | Default         |
|-----------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 10<br>...<br>13 | GW address 1            | IP gateways connect individual physical IP subnets into a unified IP network. When an IP node needs to communicate with an IP node on another subnet, the IP node sends the data to the IP gateway for forwarding. Parameters define the four octets of the gateway address. | 0               |
|                 | 0...255                 | GW address                                                                                                                                                                                                                                                                   |                 |
|                 | ...                     | ...                                                                                                                                                                                                                                                                          | ...             |
|                 | GW address 4            | Refer to parameter 10 GW address 1.                                                                                                                                                                                                                                          | 0               |
|                 | 0.255                   | GW address                                                                                                                                                                                                                                                                   |                 |
| 14              | Commrate port 2         | Sets the bit rate for the Ethernet port 2.                                                                                                                                                                                                                                   | <b>0</b> = Auto |
|                 | <b>0</b> = Auto         | Autonegotiate                                                                                                                                                                                                                                                                |                 |
|                 | <b>1</b> = 100 Mbps FD  | 100 Mbps, full-duplex                                                                                                                                                                                                                                                        |                 |
|                 | <b>2</b> = 100 Mbps HD  | 100 Mbps, half-duplex                                                                                                                                                                                                                                                        |                 |
|                 | <b>3</b> = 10 Mbps FD   | 10 Mbps, full-duplex                                                                                                                                                                                                                                                         |                 |
|                 | <b>4</b> = 10 Mbps HD   | 10 Mbps, half-duplex                                                                                                                                                                                                                                                         |                 |
|                 | <b>5</b> = Disable Port | Disable Ethernet port. ABB recommends to disable the second port if it is not in use.                                                                                                                                                                                        |                 |

| No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Name/Value                    | Description                                                                                                                                                                                                                                                                                                                                                 | Default |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----|------|-------------|---|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------|---------------------------------------------------------------------------|---|--------------------------|-----------------------------------------------------------------------------------------------------|---|-----------------------|---------------------------------------------------------------------|---|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------------|--------------------------------------------------------|---|---------------------------|------------------------------------------------------------------------------------------------------|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------|------------------------------------------------------------------------------------------------------|---|-------------|------------------------------------------------------------------------------------------------|
| 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Service configuration         | <p>Disable services that are not required.</p> <p>Each service is represented by a single bit. Bit 0, Lock configuration, can be used to prevent accidental changing of this parameter.</p> <p>By default, all services are enabled and configuration is unlocked.</p> <p>ABB recommends to disable all services that are not used after commissioning.</p> |         |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
| <table><tr><th>Bit</th><th>Name</th><th>Information</th></tr><tr><td>0</td><td>Lock configuration</td><td>Changing this bit to one will lock service configuration and no bit can be changed. Only resetting the fieldbus configuration will unlock the parameter. To reset the fieldbus configuration, choose "Reset all fieldbus settings" or "Clear all" in parameter 96.06 Parameter restore.</td></tr><tr><td>1</td><td>Disable IP config tool</td><td>When this bit is set, access from ABB IP Configuration tool is prevented.</td></tr><tr><td>2</td><td>Disable ETH tool network</td><td>When this bit is set, access from Ethernet tool network (eg, ABB Drive Composer tool) is prevented.</td></tr><tr><td>3</td><td>Disable ping response</td><td>When this bit is set, response to ICMP (ping) message is prevented.</td></tr><tr><td>4</td><td>Unsecured ETH tool network</td><td>When this bit is set, access from Ethernet tool network is unsecured.<br/><b>Note:</b> Drive Composer pro before V2.7 supports unsecured communication only.</td></tr><tr><td>5</td><td>Disable configuring web pages</td><td>When this bit is set, access to web pages is disabled.</td></tr><tr><td>6</td><td>Web-based firmware update</td><td>When this bit is set, the web-based firmware update is disabled. The update is enabled as a default.</td></tr><tr><td>7</td><td>Disable OPC UA</td><td>When this bit is set, the OPC UA server is disabled. OPC UA is not enabled by default. For more information, refer to <a href="#">Appendix E - OPC UA server (page 181)</a>.</td></tr><tr><td>8</td><td>Unencrypted OPC UA</td><td>When this bit is set, connection to the OPC UA server can be selected as unencrypted and not signed.</td></tr><tr><td>9</td><td>Enable mDNS</td><td>To enable mDNS, set this bit to 1. To disable mDNS set to 0. By default, the mDNS is disabled.</td></tr></table> |                               |                                                                                                                                                                                                                                                                                                                                                             |         | Bit | Name | Information | 0 | Lock configuration | Changing this bit to one will lock service configuration and no bit can be changed. Only resetting the fieldbus configuration will unlock the parameter. To reset the fieldbus configuration, choose "Reset all fieldbus settings" or "Clear all" in parameter 96.06 Parameter restore. | 1 | Disable IP config tool | When this bit is set, access from ABB IP Configuration tool is prevented. | 2 | Disable ETH tool network | When this bit is set, access from Ethernet tool network (eg, ABB Drive Composer tool) is prevented. | 3 | Disable ping response | When this bit is set, response to ICMP (ping) message is prevented. | 4 | Unsecured ETH tool network | When this bit is set, access from Ethernet tool network is unsecured.<br><b>Note:</b> Drive Composer pro before V2.7 supports unsecured communication only. | 5 | Disable configuring web pages | When this bit is set, access to web pages is disabled. | 6 | Web-based firmware update | When this bit is set, the web-based firmware update is disabled. The update is enabled as a default. | 7 | Disable OPC UA | When this bit is set, the OPC UA server is disabled. OPC UA is not enabled by default. For more information, refer to <a href="#">Appendix E - OPC UA server (page 181)</a> . | 8 | Unencrypted OPC UA | When this bit is set, connection to the OPC UA server can be selected as unencrypted and not signed. | 9 | Enable mDNS | To enable mDNS, set this bit to 1. To disable mDNS set to 0. By default, the mDNS is disabled. |
| Bit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Name                          | Information                                                                                                                                                                                                                                                                                                                                                 |         |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
| 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Lock configuration            | Changing this bit to one will lock service configuration and no bit can be changed. Only resetting the fieldbus configuration will unlock the parameter. To reset the fieldbus configuration, choose "Reset all fieldbus settings" or "Clear all" in parameter 96.06 Parameter restore.                                                                     |         |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Disable IP config tool        | When this bit is set, access from ABB IP Configuration tool is prevented.                                                                                                                                                                                                                                                                                   |         |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Disable ETH tool network      | When this bit is set, access from Ethernet tool network (eg, ABB Drive Composer tool) is prevented.                                                                                                                                                                                                                                                         |         |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Disable ping response         | When this bit is set, response to ICMP (ping) message is prevented.                                                                                                                                                                                                                                                                                         |         |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Unsecured ETH tool network    | When this bit is set, access from Ethernet tool network is unsecured.<br><b>Note:</b> Drive Composer pro before V2.7 supports unsecured communication only.                                                                                                                                                                                                 |         |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Disable configuring web pages | When this bit is set, access to web pages is disabled.                                                                                                                                                                                                                                                                                                      |         |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Web-based firmware update     | When this bit is set, the web-based firmware update is disabled. The update is enabled as a default.                                                                                                                                                                                                                                                        |         |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Disable OPC UA                | When this bit is set, the OPC UA server is disabled. OPC UA is not enabled by default. For more information, refer to <a href="#">Appendix E - OPC UA server (page 181)</a> .                                                                                                                                                                               |         |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
| 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Unencrypted OPC UA            | When this bit is set, connection to the OPC UA server can be selected as unencrypted and not signed.                                                                                                                                                                                                                                                        |         |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Enable mDNS                   | To enable mDNS, set this bit to 1. To disable mDNS set to 0. By default, the mDNS is disabled.                                                                                                                                                                                                                                                              |         |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
| 000000b...111111b                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                               | Service configuration                                                                                                                                                                                                                                                                                                                                       |         |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
| 16<br>...<br>25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Reserved                      | These parameters are not used by the adapter module when using the NONE protocol.                                                                                                                                                                                                                                                                           | N/A     |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |
| 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Reserved                      | Reserved for web page functionality. For more information, refer to <a href="#">Appendix C - FPNO-21 configuration web pages (page 157)</a> .                                                                                                                                                                                                               | N/A     |     |      |             |   |                    |                                                                                                                                                                                                                                                                                         |   |                        |                                                                           |   |                          |                                                                                                     |   |                       |                                                                     |   |                            |                                                                                                                                                             |   |                               |                                                        |   |                           |                                                                                                      |   |                |                                                                                                                                                                               |   |                    |                                                                                                      |   |             |                                                                                                |

| No. | Name/Value               | Description                                                                                                                                                                                                                                                                                                                                                                                                                             | Default                                                                  |
|-----|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| 27  | FBA A/B par refresh      | Validates any changed adapter module configuration parameter settings. After refreshing, the value reverts automatically to <b>0</b> = Done.<br><br><b>Note:</b> This parameter cannot be changed while the drive is running.                                                                                                                                                                                                           | <b>0</b> = Done                                                          |
|     | <b>0</b> = Done          | Refreshing done                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                          |
|     | <b>1</b> = Refresh       | Refreshing                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                          |
| 28  | FBA A/B par table ver    | <b>Read-only.</b> Displays the parameter table revision of the fieldbus adapter module mapping file stored in the memory of the drive. In format <b>xyz</b> , where<br><b>x</b> = major revision number<br><b>y</b> = minor revision number<br><b>z</b> = correction number<br>OR<br>in format <b>axyz</b> , where<br><b>a</b> = major revision number<br><b>xy</b> = minor revision numbers<br><b>z</b> = correction number or letter. | N/A                                                                      |
|     |                          | Parameter table revision                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                          |
| 29  | FBA A/B drive type code  | <b>Read-only.</b> Displays the drive type code of the fieldbus adapter module mapping file stored in the memory of the drive.                                                                                                                                                                                                                                                                                                           | N/A                                                                      |
|     |                          | Drive type code of the fieldbus adapter module mapping file                                                                                                                                                                                                                                                                                                                                                                             |                                                                          |
| 30  | FBA A/B mapping file ver | <b>Read-only.</b> Displays the fieldbus adapter module mapping file revision stored in the memory of the drive in decimal format.                                                                                                                                                                                                                                                                                                       | N/A                                                                      |
|     |                          | Mapping file revision                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                          |
| 31  | D2FBA A/B comm status    | <b>Read-only.</b> Displays the status of the fieldbus adapter module communication.<br><br><b>Note:</b> The value names may vary by drive.                                                                                                                                                                                                                                                                                              | <b>0</b> = Idle<br>or<br><b>4</b> = Offline<br>or<br><b>2</b> = Time out |
|     | <b>0</b> = Idle          | Adapter is not configured.                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                          |
|     | <b>1</b> = Exec.init     | Adapter is initializing.                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                          |
|     | <b>2</b> = Time out      | A timeout has occurred in the communication between the adapter and the drive.                                                                                                                                                                                                                                                                                                                                                          |                                                                          |
|     | <b>3</b> = Conf.err      | There is an internal error in the communication between the adapter and the drive. Contact your local ABB representative.                                                                                                                                                                                                                                                                                                               |                                                                          |
|     | <b>4</b> = Off-line      | Adapter is off-line.                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                          |
|     | <b>5</b> = On-line       | Adapter is on-line.                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                          |
|     | <b>6</b> = Reset         | Adapter is performing a hardware reset.                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                          |

| No. | Name/Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                        | Default |
|-----|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 32  | FBA A/B comm SW ver | <p><b>Read-only.</b> Displays patch and build numbers of the adapter module's firmware version in <b>xyyy</b> format, where:</p> <p><b>xx</b> = patch number<br/> <b>yy</b> = build number.</p> <p>Example: If the firmware version (&lt;major&gt;.&lt;minor&gt;.&lt;patch&gt;.&lt;build&gt;) is 3.10.200.13, the value C80D is displayed. If the version is 3.10.0.0, the value 0 is displayed.</p> <p>Refer to parameter 33.</p> | N/A     |
| 33  | FBA A/B appl SW ver | <p><b>Read-only.</b> Displays major and minor revision numbers of the adapter module's firmware version in <b>xyyy</b> format, where:</p> <p><b>xx</b> = major revision number<br/> <b>yy</b> = minor revision number</p> <p>Example: If the firmware version (&lt;major&gt;.&lt;minor&gt;.&lt;patch&gt;.&lt;build&gt;) is 3.10.200.13 or 3.10.0.0, the value 310 is displayed.</p> <p>Refer to parameter 32.</p>                  | N/A     |

## Starting up fieldbus communication

1. Power up the drive.
  2. To enable communication between the adapter module and the drive, select the correct slot number in parameter 50.01 FBA A enable.  
The selection must correspond to the slot where the adapter module is installed. For example, if the adapter module is installed in slot 1, you must select slot 1.
  3. Set the module configuration parameters in group 51.
    - select the communication protocol as NONE (parameter 51.02 = NONE),
    - configure the network settings with parameters 51.03...51.13, and
    - deactivate all services that are not used in the installation with parameter 51.15 Service configuration.
  4. Save the valid parameter values to permanent memory with parameter 96.07 Parameter save manually.
  5. Validate the settings made in parameter groups 51 with parameter 51.27 FBA A par refresh.
-

# 11

## NONE – Diagnostics

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### Contents of this chapter

This chapter explains how to trace faults with the status LEDs on the adapter module using the NONE protocol.

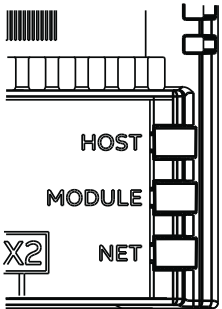
### Fault and warning messages

For the fault and warning messages concerning the adapter module, refer to the drive firmware manual.

### LEDs

The adapter module has three bicolor diagnostic LEDs. The LEDs are described below.

---

|  |                                                             |                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name                                                                              | Color                                                       | Function                                                                                                                                                                                                                      |
| HOST                                                                              | Flashes green                                               | Establishing communication to the drive                                                                                                                                                                                       |
|                                                                                   | Green                                                       | The connection to the drive operates                                                                                                                                                                                          |
|                                                                                   | Flashes red                                                 | The connection to the drive is temporarily lost                                                                                                                                                                               |
|                                                                                   | Flashes orange, alternating with the MODULE flashing orange | Internal file system error. Cycle the drive power off and on. If the error persists, contact your local ABB representative.                                                                                                   |
| MODULE                                                                            | Off                                                         | There is no PC tool connected to the device.                                                                                                                                                                                  |
|                                                                                   | Flashes orange                                              | The device is attempting to obtain IP configuration from the DHCP server.                                                                                                                                                     |
|                                                                                   | Orange                                                      | The device is executing duplicate address detection.                                                                                                                                                                          |
|                                                                                   | Green                                                       | The PC tool is connected to the device.                                                                                                                                                                                       |
|                                                                                   | Flashes red                                                 | The Ethernet link is down.                                                                                                                                                                                                    |
|                                                                                   | Red                                                         | Ethernet interface is disabled. Duplicate address detection may have detected a duplicate address. Examine the IP configuration and either initiate a Fieldbus Adapter parameter refresh or cycle the drive power off and on. |
|                                                                                   | Flashes orange, alternating with the HOST flashing orange   | Internal file system error. Cycle the drive power off and on. If the error persists, contact your local ABB representative.                                                                                                   |
| NETWORK / NET                                                                     | Off                                                         | The Ethernet link is down.                                                                                                                                                                                                    |
|                                                                                   | Flashes green                                               | The Ethernet link is up at 100 Mbps.<br>Flashes to show activity on the interface.                                                                                                                                            |
|                                                                                   | Flashes orange                                              | The Ethernet link is up at 10 Mbps.<br>Flashes to show activity on the interface.                                                                                                                                             |

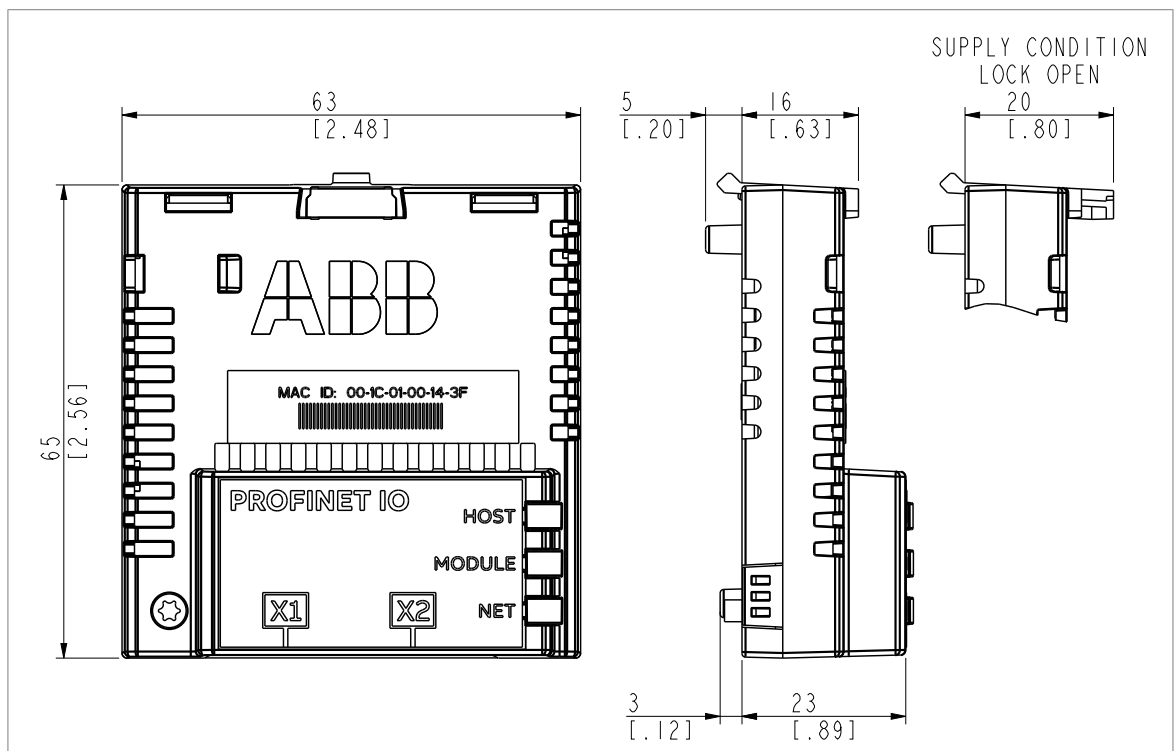
# 12

## Technical data

### Contents of this chapter

This chapter contains the technical specifications of the FPNO-21 module.

### Dimension drawing



## General data

|                             |                                                                                                                                 |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Installation</b>         | Into an option slot on the drive control unit                                                                                   |
| <b>Degree of protection</b> | IP20                                                                                                                            |
| <b>Ambient conditions</b>   | The applicable ambient conditions specified for the drive in its manuals are in effect.                                         |
| <b>Package</b>              | Cardboard. Plastic wrapping: Antistatic air bubble sheet (PE).                                                                  |
| <b>Indicators</b>           | Three bicolor LEDs (HOST, MODULE, NETWORK/NET)                                                                                  |
| <b>Connectors</b>           | A 20-pin connector to the drive<br>RJ-45 connector to Ethernet (X1)<br>RJ-45 connector for chaining another adapter module (X2) |
| <b>Power supply</b>         | +3.3 V $\pm 5\%$ max. 400 mA (supplied by the drive)                                                                            |
| <b>General</b>              | Complies with EMC standard EN 61800-3:2004<br>Printed circuit board conformal coated                                            |

## Ethernet link

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Compatible devices</b>        | Ethernet Standard IEEE 802.3 and IEEE 802.3u devices.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Medium</b>                    | 10BASE-TX or 100Base-TX with Auto-negotiation and Auto-MDIX (Auto-crossover) <ul style="list-style-type: none"> <li>• Wiring: CAT5e/6 S/FTP, CAT5e/6 S/STP, CAT5e/6 SF/FTP</li> <li>• Connector: RJ-45</li> <li>• Termination: Internal</li> <li>• Maximum segment length: 100 m (328 ft)</li> </ul>                                                                                                                                                                                                          |
| <b>Topology</b>                  | Bus, star or ring.<br>A maximum of 50 nodes is permitted for FPNO-21 module in a ring topology.<br>In a chain the maximum recommended number of nodes is 50.<br>More can be used but PROFINET cycle time should be adjusted because of the delays in the network. Each FPNO-21 has an integrated switch which adds 19 $\mu$ s forwarding delay for the minimum Ethernet frame. Length of PROFINET cyclic frame FPNO-21 uses is minimum Ethernet frame so 50 nodes will add 1 ms delay for the PROFINET frame. |
| <b>Transfer rate</b>             | 10 Mbit/s or 100 Mbit/s<br><br><b>Note:</b> PROFINET IO uses only 100 Mbit/s in the full-duplex mode.                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Serial communication type</b> | Half-duplex or full-duplex communication                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Protocol</b>                  | PROFINET IO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Number of connections</b>     | Three                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## TCP and UDP service ports

There are multiple in-bound and out-bound network services running on the module. Some ports are protocol-specific and are not used when other protocols are selected.

| Port            | Service       | Purpose                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 34962 (TCP/UDP) | PROFINET      | PROFINET RT Unicast.<br><b>Note:</b> Used only when PROFINET IO protocol is selected.                                                                                                                                                                                                                                                                                                                                       |
| 34963 (TCP/UDP) | PROFINET      | PROFINET RT Multicast.<br><b>Note:</b> Used only when PROFINET IO protocol is selected.                                                                                                                                                                                                                                                                                                                                     |
| 34964 (TCP/UDP) | PROFINET      | PROFINET Context Manager.<br><b>Note:</b> Used only when PROFINET IO protocol is selected.                                                                                                                                                                                                                                                                                                                                  |
| 80 (TCP)        | HTTP          | Used for Ethernet tool communication. To disable, go to <a href="#">Service configuration page (page 163)</a> via web interface.                                                                                                                                                                                                                                                                                            |
| 68 (UDP)        | DHCP          | DHCP client<br><b>Note:</b> Used only when IP configuration method is selected as "Dyn IP DHCP".                                                                                                                                                                                                                                                                                                                            |
| 24576 (UDP)     | ABB Netconfig | <ul style="list-style-type: none"> <li>• Auto discovery protocol</li> <li>• Used by ControlBuilder plus (IP Configuration tool) and Drive Composer pro and DriveWindow 2.40 PC tools</li> <li>• Discovers ABB-specific Ethernet devices in a local network segment, by listening to and responding to UDP broadcasts.</li> </ul> To disable, go to <a href="#">Service configuration page (page 163)</a> via web interface. |
| 161 (UDP)       | SNMP          | Simple Network Management Protocol (SNMP).<br><b>Note:</b> Used only when PROFINET IO protocol is selected.<br>To disable, go to <a href="#">Service configuration page (page 163)</a> via web interface.                                                                                                                                                                                                                   |
| 123 (UDP)       | SNTP          | Simple Network Time Protocol. This service is disabled by default. To enable the service, go to <a href="#">Service configuration page (page 163)</a> via web interface.                                                                                                                                                                                                                                                    |
| 4840 (TCP)      | OPC UA        | OPC UA server.                                                                                                                                                                                                                                                                                                                                                                                                              |
| 443 (TCP)       | HTTPS         | HTTPS protocol, used for access to FPNO-21 module's web page and for Ethernet tool Network (like Drive Composer pro).                                                                                                                                                                                                                                                                                                       |
| 5353 (UDP)      | mDNS          | mDNS Multicast DNS used for discovery drive                                                                                                                                                                                                                                                                                                                                                                                 |



# 13

## Appendix A – PROFIdrive parameters and I&M records of PROFINET IO

---

### Contents of this chapter

This chapter contains:

- PROFIdrive parameters of the PROFINET IO communication protocol
- telegram and response structures for the I&M (Identification & Maintenance) records of the PROFINET IO communication protocol.

### PROFIdrive parameters

| Par. no. | R/W <sup>1)</sup> | Data type             | Description                                                                                                         |
|----------|-------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------|
| 915      | R/W               | Array [12] Unsigned16 | Assignment PZD1 to PZD12 in PPO-write<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile. |
| 916      | R/W               | Array [12] Unsigned16 | Assignment PZD1 to PZD12 in PPO-read<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.  |
| 919      | R                 | Unsigned32            | Device system number<br><b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.                  |
| 922      | R                 | Unsigned16            | Telegram selection                                                                                                  |

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| Par. no. | R/W <sup>1)</sup>                                             | Data type            | Description                                                                                                                        |                                                                    |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|----------|---------------------------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|---------------------------|--------------------------------------------------------------------|--------------------------|-----------------------------------------------|---------------------------|------------|--------------------------|------------|---------------------------------|----------|-----------------------------------|----------|---------------------------------|----------|-----------------------------------|----------|-------------------------------------|----------|---------------------------------------|----------|-----------------------------------------------------------|------------|---------------------------------------------------------|------------|-------------------------------------------------|----------|----------------------------|------------|-----------------------------|---|
| 923      | R                                                             | Array [n] Unsigned16 | List of all parameters for signals. Mandatory if process data normalization is used and/or parameters 915 and 916 are implemented. |                                                                    |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | Signal no. and name                                                                                                                | Type                                                               | 1 – Control word 1 (STW1) | Unsigned16                                                         | 2 – Status word 1 (ZSW1) | Unsigned16                                    | 3 – Control word 2 (STW2) | Unsigned16 | 4 – Status word 2 (ZSW2) | Unsigned16 | 5 – Speed set point A (NSOLL_A) | Signed16 | 6 – Speed actual value A (NIST_A) | Signed16 | 7 – Speed set point B (NSOLL_B) | Signed32 | 8 – Speed actual value B (NIST_B) | Signed32 | 27 – Position set point A (XSOLL_A) | Signed32 | 28 – Position actual value A (XIST_A) | Signed32 | 32 – Traversing block selection (SATZANW) (not supported) | Unsigned16 | 33 – Actual traversing block (AKT-SATZ) (not supported) | Unsigned16 | 34 – Target position (TARPOS_A) (not supported) | Signed32 | 35 – Velocity (VELOCITY_A) | Unsigned32 | 101...9999 – Drive-specific | – |
|          |                                                               |                      | Signal no. and name                                                                                                                | Type                                                               |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 1 – Control word 1 (STW1)                                                                                                          | Unsigned16                                                         |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 2 – Status word 1 (ZSW1)                                                                                                           | Unsigned16                                                         |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 3 – Control word 2 (STW2)                                                                                                          | Unsigned16                                                         |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 4 – Status word 2 (ZSW2)                                                                                                           | Unsigned16                                                         |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 5 – Speed set point A (NSOLL_A)                                                                                                    | Signed16                                                           |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 6 – Speed actual value A (NIST_A)                                                                                                  | Signed16                                                           |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 7 – Speed set point B (NSOLL_B)                                                                                                    | Signed32                                                           |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 8 – Speed actual value B (NIST_B)                                                                                                  | Signed32                                                           |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 27 – Position set point A (XSOLL_A)                                                                                                | Signed32                                                           |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 28 – Position actual value A (XIST_A)                                                                                              | Signed32                                                           |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 32 – Traversing block selection (SATZANW) (not supported)                                                                          | Unsigned16                                                         |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 33 – Actual traversing block (AKT-SATZ) (not supported)                                                                            | Unsigned16                                                         |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 34 – Target position (TARPOS_A) (not supported)                                                                                    | Signed32                                                           |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 35 – Velocity (VELOCITY_A)                                                                                                         | Unsigned32                                                         |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 101...9999 – Drive-specific                                                                                                        | –                                                                  |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | <b>Note:</b> this parameter is not available with PROFIdrive v4.2 profile.                                                         |                                                                    |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 927                                                                                                                                | R/W                                                                | Unsigned16                | Operator control rights (parameter identification, PKW)            |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
| Value    | Mode                                                          | 0                    |                                                                                                                                    |                                                                    |                           | Parameters cannot be written, only read (927 can be written).      | 1                        | Parameters can be written and read (default). |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
| Value    | Mode                                                          |                      |                                                                                                                                    |                                                                    |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
| 0        | Parameters cannot be written, only read (927 can be written). |                      |                                                                                                                                    |                                                                    |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
| 1        | Parameters can be written and read (default).                 |                      |                                                                                                                                    |                                                                    |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      |                                                                                                                                    |                                                                    |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
| 928      | R/W                                                           | Unsigned16           | Control rights (process data, PZD).                                                                                                |                                                                    |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | Value                                                                                                                              | Mode                                                               | 0                         | PZD part is disabled, that is, receipt of new PZD data is ignored. | 1                        | PZD part is enabled (default).                |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | Value                                                                                                                              | Mode                                                               |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      | 0                                                                                                                                  | PZD part is disabled, that is, receipt of new PZD data is ignored. |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
| 1        | PZD part is enabled (default).                                |                      |                                                                                                                                    |                                                                    |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      |                                                                                                                                    |                                                                    |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |
|          |                                                               |                      |                                                                                                                                    |                                                                    |                           |                                                                    |                          |                                               |                           |            |                          |            |                                 |          |                                   |          |                                 |          |                                   |          |                                     |          |                                       |          |                                                           |            |                                                         |            |                                                 |          |                            |            |                             |   |

| Par. no.                                                                                  | R/W <sup>1)</sup>           | Data type  | Description                                                                                                                                                                                                                                                                                                                               |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|-------------------------------------------------------------------------------------------|-----------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------|---|-----------------|--------|--------------------------------------|-------|----------------|-------|----------------|-------|-----------------------------|-------|-----------------|---|------|
| 929                                                                                       | R                           | Unsigned16 | Selected PPO type                                                                                                                                                                                                                                                                                                                         |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | <table><tr><th>Value</th><th>PPO type</th></tr><tr><td>1</td><td>PPO1</td></tr><tr><td>2</td><td>PPO2</td></tr><tr><td>3</td><td>PPO3</td></tr><tr><td>4</td><td>PPO4</td></tr><tr><td>5</td><td>PPO5</td></tr><tr><td>6</td><td>PPO6</td></tr><tr><td>7</td><td>PPO7</td></tr></table>                                                   | Value                                | PPO type                | 1 | PPO1            | 2      | PPO2                                 | 3     | PPO3           | 4     | PPO4           | 5     | PPO5                        | 6     | PPO6            | 7 | PPO7 |
|                                                                                           |                             |            | Value                                                                                                                                                                                                                                                                                                                                     | PPO type                             |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 1                                                                                                                                                                                                                                                                                                                                         | PPO1                                 |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 2                                                                                                                                                                                                                                                                                                                                         | PPO2                                 |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 3                                                                                                                                                                                                                                                                                                                                         | PPO3                                 |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 4                                                                                                                                                                                                                                                                                                                                         | PPO4                                 |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 5                                                                                                                                                                                                                                                                                                                                         | PPO5                                 |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 6                                                                                                                                                                                                                                                                                                                                         | PPO6                                 |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 7                                                                                                                                                                                                                                                                                                                                         | PPO7                                 |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
| <b>Note:</b> This parameter is not available if Standard telegram ST1 or ST2 is selected. |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
| <b>Note:</b> This parameter is not available with PROFIdrive v4.2 profile.                |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
| 930                                                                                       | R/W                         | Unsigned16 | Selection switch for communication profile.                                                                                                                                                                                                                                                                                               |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | Behavior when PROFIdrive v.4.2 is active:                                                                                                                                                                                                                                                                                                 |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | <table><tr><th>Value</th><th>Mode</th></tr><tr><td>1</td><td>PROFIdrive v4.2</td></tr><tr><td>8001h</td><td>ABB Drives</td></tr><tr><td>8002h</td><td>Transparent 16</td></tr><tr><td>8003h</td><td>Transparent 32</td></tr><tr><td>8004h</td><td>PROFIdrive positioning mode</td></tr><tr><td>8005h</td><td>PROFIdrive</td></tr></table> | Value                                | Mode                    | 1 | PROFIdrive v4.2 | 8001h  | ABB Drives                           | 8002h | Transparent 16 | 8003h | Transparent 32 | 8004h | PROFIdrive positioning mode | 8005h | PROFIdrive      |   |      |
|                                                                                           |                             |            | Value                                                                                                                                                                                                                                                                                                                                     | Mode                                 |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 1                                                                                                                                                                                                                                                                                                                                         | PROFIdrive v4.2                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 8001h                                                                                                                                                                                                                                                                                                                                     | ABB Drives                           |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 8002h                                                                                                                                                                                                                                                                                                                                     | Transparent 16                       |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 8003h                                                                                                                                                                                                                                                                                                                                     | Transparent 32                       |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 8004h                                                                                                                                                                                                                                                                                                                                     | PROFIdrive positioning mode          |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 8005h                                                                                                                                                                                                                                                                                                                                     | PROFIdrive                           |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | Behavior when any other profile is active:                                                                                                                                                                                                                                                                                                |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | <table><tr><th>Value</th><th>Mode</th></tr><tr><td>1</td><td>PROFIdrive</td></tr><tr><td>8001h</td><td>ABB Drives</td></tr><tr><td>8002h</td><td>Transparent 16</td></tr><tr><td>8003h</td><td>Transparent 32</td></tr><tr><td>8004h</td><td>PROFIdrive positioning mode</td></tr><tr><td>8005h</td><td>PROFIdrive v4.2</td></tr></table> | Value                                | Mode                    | 1 | PROFIdrive      | 8001h  | ABB Drives                           | 8002h | Transparent 16 | 8003h | Transparent 32 | 8004h | PROFIdrive positioning mode | 8005h | PROFIdrive v4.2 |   |      |
|                                                                                           |                             |            | Value                                                                                                                                                                                                                                                                                                                                     | Mode                                 |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 1                                                                                                                                                                                                                                                                                                                                         | PROFIdrive                           |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 8001h                                                                                                                                                                                                                                                                                                                                     | ABB Drives                           |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 8002h                                                                                                                                                                                                                                                                                                                                     | Transparent 16                       |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 8003h                                                                                                                                                                                                                                                                                                                                     | Transparent 32                       |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
| 8004h                                                                                     | PROFIdrive positioning mode |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
| 8005h                                                                                     | PROFIdrive v4.2             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
| 933                                                                                       | R/W                         | Unsigned16 | Selection switch for Control word, bit 11.                                                                                                                                                                                                                                                                                                |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | <table><tr><th>Value</th><th>Module Control with bit</th></tr><tr><td>0</td><td>None</td></tr><tr><td>1 to 5</td><td>Vendor-specific 1 to 5<sup>2)</sup></td></tr></table>                                                                                                                                                                | Value                                | Module Control with bit | 0 | None            | 1 to 5 | Vendor-specific 1 to 5 <sup>2)</sup> |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | Value                                                                                                                                                                                                                                                                                                                                     | Module Control with bit              |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 0                                                                                                                                                                                                                                                                                                                                         | None                                 |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            | 1 to 5                                                                                                                                                                                                                                                                                                                                    | Vendor-specific 1 to 5 <sup>2)</sup> |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
|                                                                                           |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |
| <b>Note:</b> This parameter is not available with PROFIdrive v4.2 profile.                |                             |            |                                                                                                                                                                                                                                                                                                                                           |                                      |                         |   |                 |        |                                      |       |                |       |                |       |                             |       |                 |   |      |

| Par. no. | R/W <sup>1)</sup>                    | Data type  | Description                                                                                                                                                                                                                                                                                       |       |                        |   |      |        |                                      |
|----------|--------------------------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------|---|------|--------|--------------------------------------|
| 934      | R/W                                  | Unsigned16 | Selection switch for Control word, bit 12. (See parameter <a href="#">933</a> for coding.)<br><br><b>Note:</b> This parameter is not available with PROFIdrive v4.2 profile.                                                                                                                      |       |                        |   |      |        |                                      |
| 935      | R/W                                  | Unsigned16 | Selection switch for Control word, bit 13. (See parameter <a href="#">933</a> for coding.)<br><br><b>Note:</b> This parameter is not available with PROFIdrive v4.2 profile.                                                                                                                      |       |                        |   |      |        |                                      |
| 936      | R/W                                  | Unsigned16 | Selection switch for Control word, bit 14. (See parameter <a href="#">933</a> for coding.)<br><br><b>Note:</b> This parameter is not available with PROFIdrive v4.2 profile.                                                                                                                      |       |                        |   |      |        |                                      |
| 937      | R/W                                  | Unsigned16 | Selection switch for Control word, bit 15. (See parameter <a href="#">933</a> for coding.)<br><br><b>Note:</b> This parameter is not available with PROFIdrive v4.2 profile.                                                                                                                      |       |                        |   |      |        |                                      |
| 939      | R/W                                  | Unsigned16 | Selection switch for Status word, bit 11. <table><tr><th>Value</th><th>Module Status word bit</th></tr><tr><td>0</td><td>None</td></tr><tr><td>1 to 4</td><td>Vendor-specific 1 to 4<sup>2)</sup></td></tr></table><br><b>Note:</b> This parameter is not available with PROFIdrive v4.2 profile. | Value | Module Status word bit | 0 | None | 1 to 4 | Vendor-specific 1 to 4 <sup>2)</sup> |
| Value    | Module Status word bit               |            |                                                                                                                                                                                                                                                                                                   |       |                        |   |      |        |                                      |
| 0        | None                                 |            |                                                                                                                                                                                                                                                                                                   |       |                        |   |      |        |                                      |
| 1 to 4   | Vendor-specific 1 to 4 <sup>2)</sup> |            |                                                                                                                                                                                                                                                                                                   |       |                        |   |      |        |                                      |
| 940      | R/W                                  | Unsigned16 | Selection switch for Status word, bit 12. (See parameter <a href="#">939</a> for coding.)<br><br><b>Note:</b> This parameter is not available with PROFIdrive v4.2 profile.                                                                                                                       |       |                        |   |      |        |                                      |
| 941      | R/W                                  | Unsigned16 | Selection switch for Status word, bit 13. (See parameter <a href="#">939</a> for coding.)<br><br><b>Note:</b> This parameter is not available with PROFIdrive v4.2 profile.                                                                                                                       |       |                        |   |      |        |                                      |
| 942      | R/W                                  | Unsigned16 | Selection switch for Status word, bit 14. (See parameter <a href="#">939</a> for coding.)<br><br><b>Note:</b> This parameter is not available with PROFIdrive v4.2 profile.                                                                                                                       |       |                        |   |      |        |                                      |
| 943      | R/W                                  | Unsigned16 | Selection switch for Status word, bit 15. (See parameter <a href="#">939</a> for coding.)<br><br><b>Note:</b> This parameter is not available with PROFIdrive v4.2 profile.                                                                                                                       |       |                        |   |      |        |                                      |
| 944      | R                                    | Unsigned16 | Fault message counter                                                                                                                                                                                                                                                                             |       |                        |   |      |        |                                      |

| Par. no. | R/W <sup>1)</sup> | Data type             | Description                                                                                                                                                                                                        |                            |
|----------|-------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 945      | R                 | Array[64] Unsigned16  | Fault code (Channel Error Type)                                                                                                                                                                                    |                            |
|          |                   |                       | Sub-index                                                                                                                                                                                                          | Contents                   |
|          |                   |                       | 0                                                                                                                                                                                                                  | Last fault                 |
|          |                   |                       | 8                                                                                                                                                                                                                  | Second last ackn. fault    |
|          |                   |                       | 16                                                                                                                                                                                                                 | Third last ackn. fault     |
|          |                   |                       | 24                                                                                                                                                                                                                 | Fourth last ackn. fault    |
|          |                   |                       | 32                                                                                                                                                                                                                 | Fifth last ackn. fault     |
|          |                   |                       | 40                                                                                                                                                                                                                 | Sixth last ackn. fault     |
|          |                   |                       | 48                                                                                                                                                                                                                 | Seventh last ackn. fault   |
|          |                   |                       | 56                                                                                                                                                                                                                 | Eighth last ackn. fault    |
| 946      | R                 | Array [n] Unsigned16  | Fault code list. Contains the mapping between DRIVECOM fault codes and Channel Error Types.<br>If you use a DRIVECOM fault code as an index when reading PNU946, the corresponding Channel Error Type is returned. |                            |
| 947      | R                 | Array [64] Unsigned16 | Fault number (coded according to the DRIVECOM profile).                                                                                                                                                            |                            |
|          |                   |                       | Subindex                                                                                                                                                                                                           | Contents                   |
|          |                   |                       | See parameter <a href="#">945</a> .                                                                                                                                                                                |                            |
| 950      | R                 | Array [2] Unsigned16  | Size of the fault buffer                                                                                                                                                                                           |                            |
|          |                   |                       | Sub-index                                                                                                                                                                                                          | Contents                   |
|          |                   |                       | 0                                                                                                                                                                                                                  | Amount of fault situations |
|          |                   |                       | 1                                                                                                                                                                                                                  | Amount of fault messages   |
| 953      | R                 | Unsigned16            | Last alarm <sup>3)</sup>                                                                                                                                                                                           |                            |
| 954      | R                 | Unsigned16            | Second last alarm <sup>3)</sup>                                                                                                                                                                                    |                            |
| 955      | R                 | Unsigned16            | Third last alarm <sup>3)</sup>                                                                                                                                                                                     |                            |
| 956      | R                 | Unsigned16            | Fourth last alarm <sup>3)</sup>                                                                                                                                                                                    |                            |
| 957      | R                 | Unsigned16            | Fifth last alarm <sup>3)</sup>                                                                                                                                                                                     |                            |
| 964      | R                 | Array [6] Unsigned16  | Sub-index                                                                                                                                                                                                          | Contents                   |
|          |                   |                       | 0                                                                                                                                                                                                                  | Manufacturer               |
|          |                   |                       | 1                                                                                                                                                                                                                  | Device type                |
|          |                   |                       | 2                                                                                                                                                                                                                  | Version                    |
|          |                   |                       | 3                                                                                                                                                                                                                  | Firmware date (year)       |
|          |                   |                       | 4                                                                                                                                                                                                                  | Firmware date (day/month)  |
|          |                   |                       | 5                                                                                                                                                                                                                  | Number of Axes             |
| 965      | R                 | Octet String2         | Profile number of this device.<br>Eg: 0302h = Profile 3, Version 2                                                                                                                                                 |                            |

| Par. no.   | R/W <sup>1)</sup>                                | Data type           | Description                                                                                                                                                                                                                                                                                                                                                                                           |           |             |   |                |   |                                                  |   |                 |
|------------|--------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------|---|----------------|---|--------------------------------------------------|---|-----------------|
| 967        | R                                                | V2                  | Control word (CW)                                                                                                                                                                                                                                                                                                                                                                                     |           |             |   |                |   |                                                  |   |                 |
| 968        | R                                                | V2                  | Status word (SW)                                                                                                                                                                                                                                                                                                                                                                                      |           |             |   |                |   |                                                  |   |                 |
| 970        | R/W                                              | Unsigned16          | <div>Load parameter record</div> <table><tr><th>Value</th><th>Description</th></tr><tr><td>0</td><td>No action</td></tr><tr><td>1</td><td>Restore factory settings</td></tr></table> <div>The parameter must do a zero-to-one transition and the motor must be stopped.</div>                                                                                                                         | Value     | Description | 0 | No action      | 1 | Restore factory settings                         |   |                 |
| Value      | Description                                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                       |           |             |   |                |   |                                                  |   |                 |
| 0          | No action                                        |                     |                                                                                                                                                                                                                                                                                                                                                                                                       |           |             |   |                |   |                                                  |   |                 |
| 1          | Restore factory settings                         |                     |                                                                                                                                                                                                                                                                                                                                                                                                       |           |             |   |                |   |                                                  |   |                 |
| 971        | R/W                                              | Unsigned16          | <div>Save parameter record</div> <table><tr><th>Value</th><th>Description</th></tr><tr><td>0</td><td>No action</td></tr><tr><td>1</td><td>Save the drive parameters to non-volatile memory</td></tr></table> <div>The parameter must do a zero-to-one transition and the motor must be stopped.<br/><b>Note:</b> This parameter is not available with PROFIdrive v4.2 profile.</div>                  | Value     | Description | 0 | No action      | 1 | Save the drive parameters to non-volatile memory |   |                 |
| Value      | Description                                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                       |           |             |   |                |   |                                                  |   |                 |
| 0          | No action                                        |                     |                                                                                                                                                                                                                                                                                                                                                                                                       |           |             |   |                |   |                                                  |   |                 |
| 1          | Save the drive parameters to non-volatile memory |                     |                                                                                                                                                                                                                                                                                                                                                                                                       |           |             |   |                |   |                                                  |   |                 |
| 972        | R/W                                              | Unsigned16          | <div>Software reset</div> <table><tr><th>Value</th><th>Description</th></tr><tr><td>0</td><td>No action</td></tr><tr><td>1</td><td>Re-boot PROFINET module</td></tr></table> <div>The parameter must do a zero-to-one transition and the motor must be stopped.</div>                                                                                                                                 | Value     | Description | 0 | No action      | 1 | Re-boot PROFINET module                          |   |                 |
| Value      | Description                                      |                     |                                                                                                                                                                                                                                                                                                                                                                                                       |           |             |   |                |   |                                                  |   |                 |
| 0          | No action                                        |                     |                                                                                                                                                                                                                                                                                                                                                                                                       |           |             |   |                |   |                                                  |   |                 |
| 1          | Re-boot PROFINET module                          |                     |                                                                                                                                                                                                                                                                                                                                                                                                       |           |             |   |                |   |                                                  |   |                 |
| 975        | R                                                | Array[n] Unsigned16 | <div>DO identification. For subindexes 0...4, see parameter <a href="#">964</a>.</div> <table><tr><th>Sub-index</th><th>Meaning</th></tr><tr><td>5</td><td>Value 2 = Axis</td></tr><tr><td>6</td><td>PROFIdrive DO sub class 1</td></tr><tr><td>7</td><td>Drive Object ID</td></tr></table>                                                                                                           | Sub-index | Meaning     | 5 | Value 2 = Axis | 6 | PROFIdrive DO sub class 1                        | 7 | Drive Object ID |
| Sub-index  | Meaning                                          |                     |                                                                                                                                                                                                                                                                                                                                                                                                       |           |             |   |                |   |                                                  |   |                 |
| 5          | Value 2 = Axis                                   |                     |                                                                                                                                                                                                                                                                                                                                                                                                       |           |             |   |                |   |                                                  |   |                 |
| 6          | PROFIdrive DO sub class 1                        |                     |                                                                                                                                                                                                                                                                                                                                                                                                       |           |             |   |                |   |                                                  |   |                 |
| 7          | Drive Object ID                                  |                     |                                                                                                                                                                                                                                                                                                                                                                                                       |           |             |   |                |   |                                                  |   |                 |
| 980<br>981 | R                                                | Array[n] Unsigned16 | <div>Number list of defined parameters. If the subindex is 0, the end of the list has been reached. If the subindex is the number of the next list parameter, the list is continued there.</div> <div><b>Note:</b> The value returned from this parameter is different in PROFIdrive v4.2 and PROFIdrive profiles. This is because the profiles have differences in their available parameters.</div> |           |             |   |                |   |                                                  |   |                 |

| Par. no.    | R/W <sup>1)</sup>                                         | Data type        | Description                                                                                                                                               |                     |             |             |                                                           |   |                      |
|-------------|-----------------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------|-------------|-----------------------------------------------------------|---|----------------------|
| 1000        | R/W                                                       | Unsigned16       | Map 16-bit selection <sup>3)</sup> . Used to request the data type for mapped parameters if mapping is done with parameter 915 or 916.                    |                     |             |             |                                                           |   |                      |
|             |                                                           |                  | <table><tr><th>Value</th><th>Description</th></tr><tr><td>1</td><td>User 16-bit mapping, if available.</td></tr></table>                                  | Value               | Description | 1           | User 16-bit mapping, if available.                        |   |                      |
|             |                                                           |                  | Value                                                                                                                                                     | Description         |             |             |                                                           |   |                      |
| 1           | User 16-bit mapping, if available.                        |                  |                                                                                                                                                           |                     |             |             |                                                           |   |                      |
|             |                                                           |                  |                                                                                                                                                           |                     |             |             |                                                           |   |                      |
| 1001        | R/W                                                       | Integer16        | SNTP time offset to UTC time.                                                                                                                             |                     |             |             |                                                           |   |                      |
|             |                                                           |                  | <table><tr><th>Value</th><th>Description</th></tr><tr><td>-1440, 1440</td><td>Time in minutes to offset the UTC time received from SNTP</td></tr></table> | Value               | Description | -1440, 1440 | Time in minutes to offset the UTC time received from SNTP |   |                      |
|             |                                                           |                  | Value                                                                                                                                                     | Description         |             |             |                                                           |   |                      |
| -1440, 1440 | Time in minutes to offset the UTC time received from SNTP |                  |                                                                                                                                                           |                     |             |             |                                                           |   |                      |
|             |                                                           |                  |                                                                                                                                                           |                     |             |             |                                                           |   |                      |
| 50000       | R/W                                                       | Unsigned16       | Disable alarms.                                                                                                                                           |                     |             |             |                                                           |   |                      |
|             |                                                           |                  | <table><tr><th>Value</th><th>Description</th></tr><tr><td>0</td><td>PNIO alarms enabled</td></tr><tr><td>1</td><td>PNIO alarms disabled</td></tr></table> | Value               | Description | 0           | PNIO alarms enabled                                       | 1 | PNIO alarms disabled |
|             |                                                           |                  | Value                                                                                                                                                     | Description         |             |             |                                                           |   |                      |
|             |                                                           |                  | 0                                                                                                                                                         | PNIO alarms enabled |             |             |                                                           |   |                      |
| 1           | PNIO alarms disabled                                      |                  |                                                                                                                                                           |                     |             |             |                                                           |   |                      |
|             |                                                           |                  |                                                                                                                                                           |                     |             |             |                                                           |   |                      |
|             |                                                           |                  |                                                                                                                                                           |                     |             |             |                                                           |   |                      |
| 60000       | R/W                                                       | Float32          | Velocity reference scaling value                                                                                                                          |                     |             |             |                                                           |   |                      |
| 61000       | R                                                         | OctetString[240] | Name of station                                                                                                                                           |                     |             |             |                                                           |   |                      |
| 61001       | R                                                         | OctetString[4]   | IP of station                                                                                                                                             |                     |             |             |                                                           |   |                      |
| 61002       | R                                                         | OctetString[6]   | MAC address of station                                                                                                                                    |                     |             |             |                                                           |   |                      |
| 61003       | R                                                         | OctetString[4]   | Default gateway of station                                                                                                                                |                     |             |             |                                                           |   |                      |
| 61004       | R                                                         | OctetString[4]   | Subnet mask of station                                                                                                                                    |                     |             |             |                                                           |   |                      |

<sup>1)</sup> Read and/or Write

<sup>2)</sup> The meaning of vendor-specific bits is defined by the drive control program.

<sup>3)</sup> Support depends on the drive type.

## PROFIdrive parameter descriptions

PROFIdrive v4.2 profile supports parameter descriptions for the PROFIdrive parameters. Parameter descriptions can be read using DP-V1 Write request with Attribute (20h = Description).

| Subindex | Data type       | Description                                  |
|----------|-----------------|----------------------------------------------|
| 0        | OctetString[46] | Complete description                         |
| 1        | V2              | Identifier (ID)                              |
| 2        | Unsigned16      | Number of array elements or length of string |
| 3        | Floating Point  | Standardization factor                       |
| 4        | OctetString[2]  | Variable attribute                           |
| 5        | OctetString[4]  | Reserved                                     |
| 6        | VisibleString16 | Name                                         |

| Subindex | Data type      | Description                    |
|----------|----------------|--------------------------------|
| 7        | OctetString[4] | Low limit                      |
| 8        | OctetString[4] | High limit                     |
| 9        | OctetString[2] | Reserved                       |
| 10       | V2             | ID extension                   |
| 11       | Unsigned16     | DO IO DATA reference parameter |
| 12       | V2             | DO IO DATA normalization       |

The table below shows the parameter description element "Identifier (ID)":

| Bit    | Description                                                                                                                                                                                 |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 to 7 | Numeric identifier of the parameter value's data type                                                                                                                                       |
| 8      | Standardization factor and variable attribute not relevant. This bit is set if parameters have data types to which physical values may not be calculated, for example the data type string. |
| 9      | Parameter not writable                                                                                                                                                                      |
| 10     | Additional text array available                                                                                                                                                             |
| 11     | Reserved                                                                                                                                                                                    |
| 12     | Parameter was changed with respect to the factory setting. This bit is set if the parameter value is unequal to the factory setting.                                                        |
| 13     | Parameter value may be reset only. If this bit is set, the associated parameter value is increased exclusively by internal processing, while externally, it may only be set to "0".         |
| 14     | Array                                                                                                                                                                                       |
| 15     | Reserved                                                                                                                                                                                    |

## I&M records

I&M (Identification & Maintenance) records can be read, for example, with the DTM tool. The FPNO-21 module supports the mandatory I&M0 record as well as the optional I&M1, I&M2, I&M3, and I&M4 records.

### ■ Call-REQ-PDU telegram for read/write access to I&M records

| Function | Record Data Index |
|----------|-------------------|
| I&M0     | 0xAFF0            |
| I&M1     | 0xAFF1            |
| I&M2     | 0xAFF2            |
| I&M3     | 0xAFF3            |
| I&M4     | 0xAFF4            |

### ■ Response structure for I&M0 (Read-only)

|           | Contents              | Size      | Coding                                                    |
|-----------|-----------------------|-----------|-----------------------------------------------------------|
| Header    |                       | 10 Octets | –                                                         |
| I&M block | MANUFACTURER_ID       | 2 Octets  | 0x1A = ABB Automation                                     |
|           | ORDER_ID              | 20 Octets | 6438177508335 = EAN code for FPNO-21 kit                  |
|           | SERIAL_NUMBER         | 16 Octets | Serial number of FPNO-21 module                           |
|           | HARDWARE_REVISION     | 2 Octets  | Hardware version of FPNO-21 module                        |
|           | SOFTWARE_REVISION     | 4 Octets  | Format: V255.255.255<br>Eg, V1.0.0 = software version 100 |
|           | REVISION_COUNTER      | 2 Octets  | (Marks a change of hardware or its parameters)            |
|           | PROFILE_ID            | 2 Octets  | 3A00 (...3AFF) PROFIdrive                                 |
|           | PROFILE_SPECIFIC_TYPE | 2 Octets  | 0 = no specific type                                      |
|           | IM_VERSION            | 2 Octets  | 0x0101 = version 1.1                                      |
|           | IM_SUPPORTED          | 2 Octets  | 30 = I&M0, I&M1, I&M2, I&M3 and I&M4 supported            |

### ■ Response structure for I&M1 (Read/Write)

|           | Contents     | Size      | Coding                  |
|-----------|--------------|-----------|-------------------------|
| Header    |              | 10 Octets | –                       |
| I&M block | TAG_FUNCTION | 32 Octets | Device function or task |
|           | TAG_LOCATION | 22 Octets | Device location         |

### ■ Response structure for I&M2 (Read/Write)

|           | Contents          | Size      | Coding                                            |
|-----------|-------------------|-----------|---------------------------------------------------|
| Header    |                   | 10 Octets | –                                                 |
| I&M block | INSTALLATION_DATE | 16 Octets | Installation date.<br>Eg, <b>2011-01-01 16:23</b> |
|           | RESERVED          | 38 Octets | Reserved                                          |

**Note:** I&M1, I&M2 and I&M3 are blank (0x20) by default.

### ■ Response structure for I&M3 (Read/Write)

|        | Contents | Size      | Coding |
|--------|----------|-----------|--------|
| Header |          | 10 Octets | –      |

|           | Contents   | Size      | Coding                                    |
|-----------|------------|-----------|-------------------------------------------|
| I&M block | DESCRIPTOR | 54 Octets | Description of the device set by the user |

### ■ Response structure for I&M4 (Read/Write)

I&M4 is read-only and shows the PROFIsafe configuration CRC.

|           | Contents  | Size      | Coding                                             |
|-----------|-----------|-----------|----------------------------------------------------|
| Header    |           | 10 Octets | –                                                  |
| I&M block | SIGNATURE | 54 Octets | Security code for identifying sessions and changes |

**Note:** I&M4 is filled with zeros (0x0) by default.

## Drive information

The FPNO-21 module enables the retrieval of drive-specific information through the reading of PROFINET records.

| Record data index | Description            |
|-------------------|------------------------|
| 0x03f0            | Drive type             |
| 0x03f1            | Drive application      |
| 0x03f2            | Drive firmware version |
| 0x03f3            | Drive serial number    |

# 14

## Appendix B – ABB IP configuration tool

---

### Contents of this chapter

This chapter shows how to use the ABB IP configuration tool to:

- find configured and unconfigured FPNO-21 modules in the network
- rewrite the IP configuration of the adapter modules.

### Installation

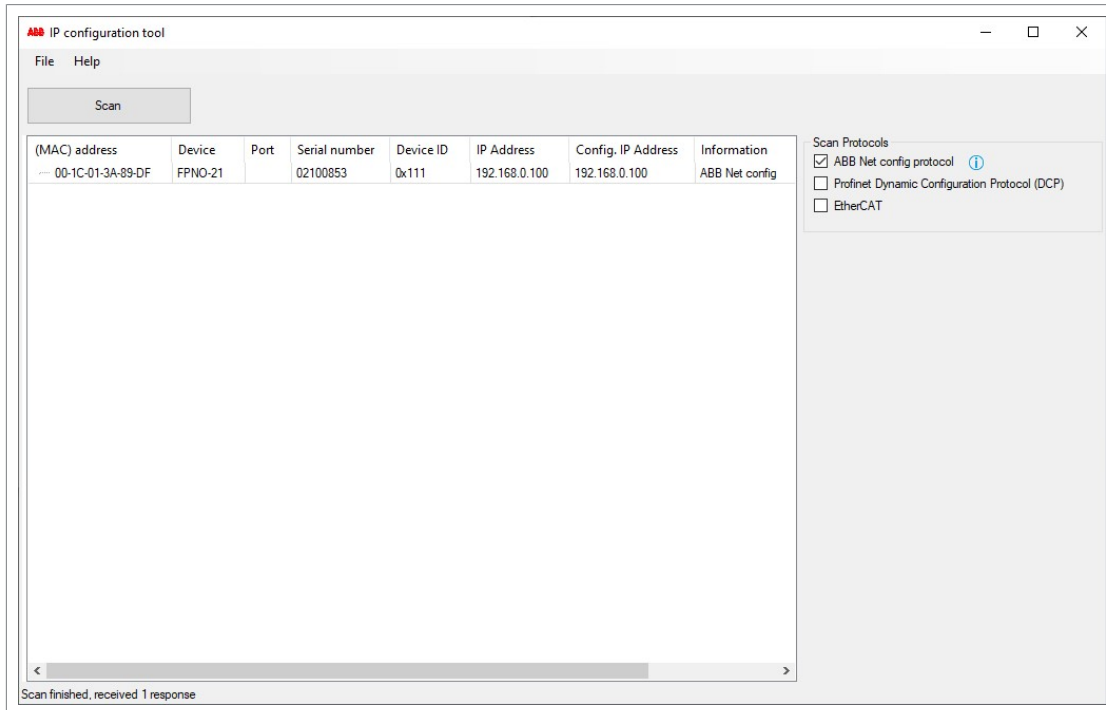
The ABB IP configuration tool is part of the ABB Automation Builder software. No separate installation is needed.

### Finding adapter modules in the network

1. Open the ABB IP configuration tool.
2. Click the **Scan** button.

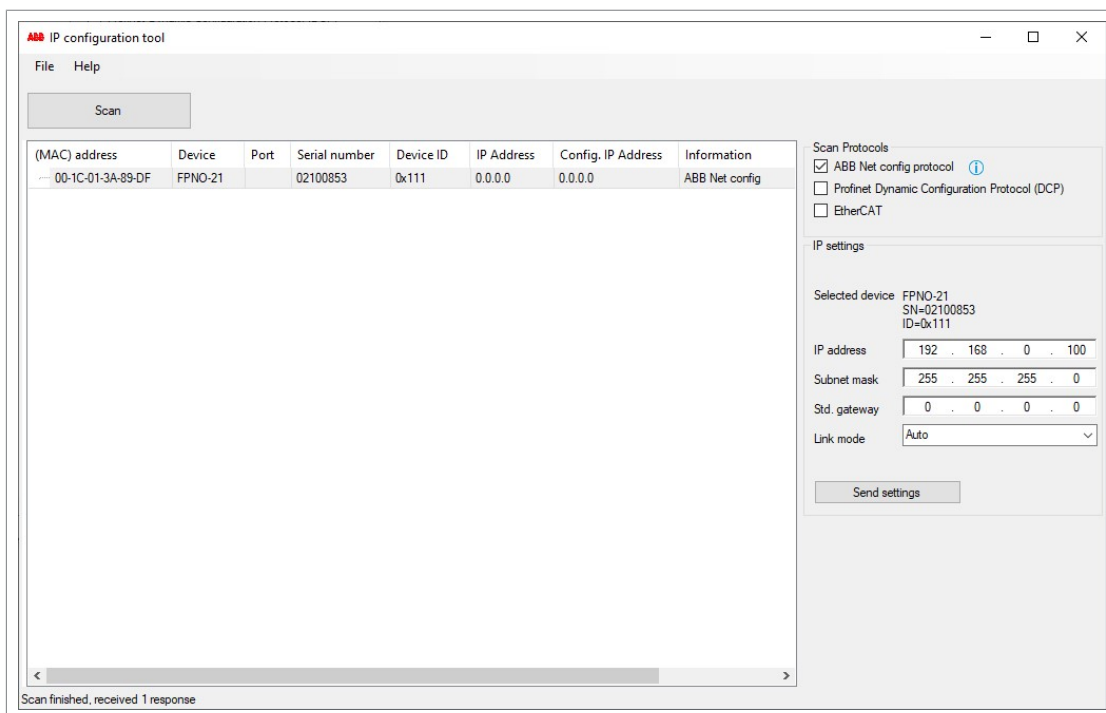
The FPNO-21 modules in the network are shown in the results list.

---



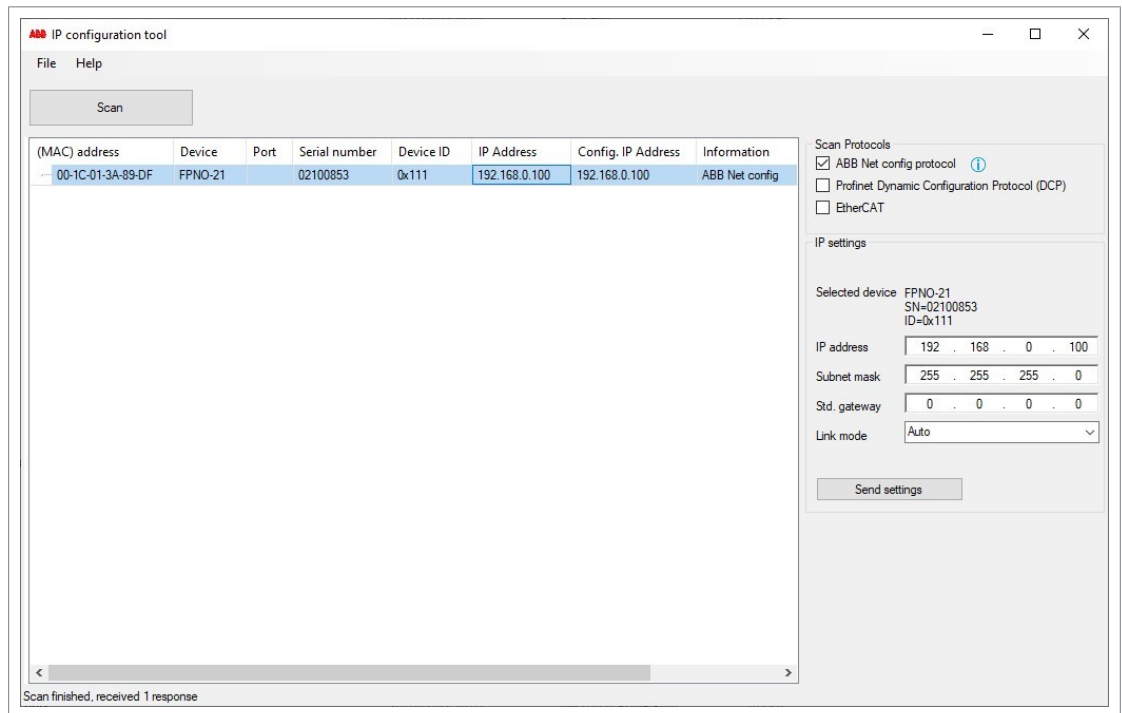
## Rewriting the IP configuration of adapter modules

1. Scan the network for adapter modules.  
For instructions, refer to section [Finding adapter modules in the network \(page 153\)](#).
2. In the results list, select the adapter module.



3. Below **IP settings**, define the IP configuration settings according to your network configuration.
4. To apply the new settings, click the **Send settings** button.

The new current IP address and configured IP address appear on the results list.





# 15

## Appendix C - FPNO-21 configuration web pages

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### Contents of this chapter

This chapter presents the FPNO-21 module configuration web pages.

**Note:** ABB recommends to disable the web pages after the commissioning to reduce cyber security risks. Refer to [Service configuration page \(page 163\)](#).

### Browser requirements

You can use any web browser.

### Compatibility

The web pages support all drives compatible with the FPNO-21 module.

For the compatibility table, refer to [Drives \(page 13\)](#).

---

## Logging in

1. Open a web browser and type the IP address of the adapter module in the address field. The IP address is visible in the FPNO-21 configuration parameters, group A, parameter 5...8.

Example: <https://192.168.0.100/>

2. Log in with a user name and a password.

Default user name: admin

Password: The last six digits of the MAC address of the adapter module, in upper case, without hyphens.

The MAC ID is visible on the cover of the adapter module and in the ABB IP configuration tool, refer to [Appendix B – ABB IP configuration tool \(page 153\)](#).

Example: If the MAC address of the adapter module is 00-1C-01-00-2F-73, the password is 002F73.

The browser opens the user interface.

| Login                   |                                                                                                                                                                                             |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Username                | <input type="text" value="Enter Username"/>                                                                                                                                                 |
| Password                | <input type="password" value="Enter Password"/>                                                                                                                                             |
| System Use Notification | <p><b>System usage may be monitored, recorded, and subject to audit. Unauthorized use of the system is prohibited. Use of the system indicates consent to monitoring and recording.</b></p> |
|                         | <input type="checkbox"/> Accept system use terms and cookies                                                                                                                                |
|                         | <input type="button" value="Submit"/>                                                                                                                                                       |

3. After successful login, you are prompted to change the default password for security reasons. ABB recommends that you change the default password. For the password restrictions, refer to [Password page \(page 169\)](#).

| Please change your password!                                                                          |                                                                 |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Your password is still the default administrative password. It is recommended to change the password. |                                                                 |
| Change password                                                                                       |                                                                 |
| Username                                                                                              | <input type="text"/>                                            |
| New password                                                                                          | <input type="password"/> <input type="checkbox"/> Show Password |
| Confirm new password                                                                                  | <input type="password"/> <input type="checkbox"/> Show Password |
|                                                                                                       | <input type="button" value="Change"/>                           |

## Menu overview

To navigate on the web pages, use the menu items available:

- Status
- Configuration
- Service configuration
- Security
- Support
- Password
- Audit log
- Firmware update
- OPC UA
- Licenses

|        |               |                       |          |         |          |           |                 |        |          |        |
|--------|---------------|-----------------------|----------|---------|----------|-----------|-----------------|--------|----------|--------|
| Status | Configuration | Service configuration | Security | Support | Password | Audit log | Firmware update | OPC UA | Licenses | Logout |
|--------|---------------|-----------------------|----------|---------|----------|-----------|-----------------|--------|----------|--------|

### ■ Status page

The Status page shows version information, as well as the serial number and MAC address (MAC ID) of the adapter module.

| Status information         |                                                                                             |
|----------------------------|---------------------------------------------------------------------------------------------|
| Firmware version           | 0203                                                                                        |
| FW patch and build version | 0000                                                                                        |
| Firmware version date      | Dec 22 2023                                                                                 |
| Serial number              | 1020259                                                                                     |
| MAC address                | The MAC address will not be displayed until you have <a href="#">changed the password</a> . |

## ■ Configuration page

On the Configuration page, you can modify parameter settings in the configuration parameter groups A (1), B (2) and C (3).


**FPNO-21** PROFINET ADAPTER

[Status](#)
[Configuration](#)
[Service configuration](#)
[Security](#)
[Support](#)
[Password](#)
[Audit log](#)
[Firmware update](#)
[OPC UA](#)
[Licenses](#)
[Logout](#)

**Configuration parameters - Group A**

**Module information**

|                             |          |
|-----------------------------|----------|
| 51.01 Fieldbus adapter type | PROFINET |
|-----------------------------|----------|

**Ethernet configuration**

|                                     |                              |
|-------------------------------------|------------------------------|
| 51.02 Protocol/Profile              | PROFINET IO, PROFIdrive (10) |
| 51.03 Communication rate            | Auto-negotiate (0)           |
| 51.04 IP configuration              | Static IP (0)                |
| 51.05-08 IP address                 | 192.168.0.10                 |
| 51.09 Subnet mask                   | 255.255.255.0 (24)           |
| 51.10-13 Gateway address            | 0.0.0.0                      |
| 51.14 Communication rate for Port 2 | Auto-negotiate (0)           |
| 51.19 Transparent16 scale           | 99                           |

**PROFINET IO configuration**

|                                 |                  |
|---------------------------------|------------------|
| 51.16 Module emulation          | No emulation (0) |
| 51.20 PROFINET IO Telegram type | 8                |
| 51.21 PROFINET IO Alarm sending | Enabled (0)      |
| 51.22 PROFINET IO Map selection | 16bit (1)        |
| 51.25 PROFINET IO Name Index    | 123              |
| PROFINET IO Station Name        | abbdrive-123     |

[Save and refresh](#)
[Save](#)

| Configuration parameters - Group B  |                                        |
|-------------------------------------|----------------------------------------|
| DATA OUT mapping (client to drive)  |                                        |
| 53.01 Data out 1                    | <input type="text" value="47.12[32]"/> |
| 53.02 Data out 2                    | <input type="text" value="0"/>         |
| 53.03 Data out 3                    | <input type="text" value="0"/>         |
| 53.04 Data out 4                    | <input type="text" value="0"/>         |
| 53.05 Data out 5                    | <input type="text" value="0"/>         |
| 53.06 Data out 6                    | <input type="text" value="0"/>         |
| 53.07 Data out 7                    | <input type="text" value="0"/>         |
| 53.08 Data out 8                    | <input type="text" value="0"/>         |
| 53.09 Data out 9                    | <input type="text" value="0"/>         |
| 53.10 Data out 10                   | <input type="text" value="0"/>         |
| 53.11 Data out 11                   | <input type="text" value="0"/>         |
| 53.12 Data out 12                   | <input type="text" value="0"/>         |
| <input type="button" value="Save"/> |                                        |

| Configuration parameters - Group C  |                                        |
|-------------------------------------|----------------------------------------|
| DATA IN mapping (drive to client)   |                                        |
| 52.01 Data in 1                     | <input type="text" value="47.11[32]"/> |
| 52.02 Data in 2                     | <input type="text" value="0"/>         |
| 52.03 Data in 3                     | <input type="text" value="0"/>         |
| 52.04 Data in 4                     | <input type="text" value="0"/>         |
| 52.05 Data in 5                     | <input type="text" value="0"/>         |
| 52.06 Data in 6                     | <input type="text" value="0"/>         |
| 52.07 Data in 7                     | <input type="text" value="0"/>         |
| 52.08 Data in 8                     | <input type="text" value="0"/>         |
| 52.09 Data in 9                     | <input type="text" value="0"/>         |
| 52.10 Data in 10                    | <input type="text" value="0"/>         |
| 52.11 Data in 11                    | <input type="text" value="0"/>         |
| 52.12 Data in 12                    | <input type="text" value="0"/>         |
| <input type="button" value="Save"/> |                                        |

After you change any setting in any of the groups, click Save and refresh at the bottom of Group A to validate the settings.

### Changing the PROFINET IO station name via web page

The PROFINET IO configuration web page is shown below with default values. The PROFINET IO Station Name field is blank by default.

| PROFINET IO configuration    |                      |
|------------------------------|----------------------|
| 16 Module emulation          | No emulation (0) ▼   |
| 20 PROFINET IO Telegram type | <input type="text"/> |
| 21 PROFINET IO Alarm sending | Enabled (0) ▼        |
| 22 PROFINET IO Map selection | 32bit (0) ▼          |
| 25 PROFINET IO Name Index    | <input type="text"/> |
| PROFINET IO Station Name     | <input type="text"/> |

To set a new name, type the name in the PROFINET IO Station Name field. Click Save, and then click Save and refresh to refresh FPNO-21. Refer to the screen on the Configuration page. The new name is effective only after FPNO-21 refresh.

**Note:** The value in PROFINET IO Name Index field must be 0 to use the set station name. Otherwise, the name generated by the PROFINET IO Name index overrides it.

Example: PROFINET IO Station Name is set as fpno-21.

After you click Save, and then click Save and refresh, the refreshed web page shows the Station Name.

| PROFINET IO configuration    |                        |
|------------------------------|------------------------|
| 16 Module emulation          | No emulation (0) ▼     |
| 20 PROFINET IO Telegram type | <input type="text"/>   |
| 21 PROFINET IO Alarm sending | Enabled (0) ▼          |
| 22 PROFINET IO Map selection | 32bit (0) ▼            |
| 25 PROFINET IO Name Index    | <input type="text"/>   |
| PROFINET IO Station Name     | fpno-21 <i>changed</i> |

The web page validates the Station name format and displays any correction to the new name, as in this example screen.

| PROFINET IO configuration                                                           |                                                                                     |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 16 Module emulation                                                                 | No emulation (0) ▼                                                                  |
| 20 PROFINET IO Telegram type                                                        |                                                                                     |
| 21 PROFINET IO Alarm sending                                                        | Enabled (0) ▼                                                                       |
| 22 PROFINET IO Map selection                                                        | 32bit (0) ▼                                                                         |
| 25 PROFINET IO Name Index                                                           |                                                                                     |
| PROFINET IO Station Name                                                            | 192.168.0.10 <i>changed Profinet name can't be in same format as an IP address.</i> |
| <input type="button" value="Save and refresh"/> <input type="button" value="Save"/> |                                                                                     |

If PROFINET IO Name Index was set from web page or from parameters, the PROFINET IO Station Name field shows its generated name after refresh, as in this example screen.

| PROFINET IO configuration                                                           |                    |
|-------------------------------------------------------------------------------------|--------------------|
| 51.16 Module emulation                                                              | No emulation (0) ▼ |
| 51.20 PROFINET IO Telegram type                                                     | 8                  |
| 51.21 PROFINET IO Alarm sending                                                     | Enabled (0) ▼      |
| 51.22 PROFINET IO Map selection                                                     | 16bit (1) ▼        |
| 51.25 PROFINET IO Name Index                                                        | 123                |
| PROFINET IO Station Name                                                            | abbdribe-123       |
| <input type="button" value="Save and refresh"/> <input type="button" value="Save"/> |                    |

### ■ Service configuration page

On the Service configuration page, you can enable, disable, or configure following Ethernet services:

- access to FPNO-21 module configuration web page
- allow changing IP settings remotely via ABB IP configuration tool
- remote access drive with Drive composer tool via Ethernet tool network
- Unsecured ABB Drive composer tool
- Ping response
- web-based firmware update
- OPC UA server
- OPC UA server unsecured
- mDNS
- configure SNTP
- configure SNMP
- configure DCP access mode

The new settings take effect after refresh of the module. You can click Save and refresh, to validate the new settings immediately or click Save if you want to do other settings also and refresh after all the changes are done.

| Ethernet service configuration (saved settings will be in use after refresh) |            |
|------------------------------------------------------------------------------|------------|
| FPNO configuration web pages                                                 | Enabled ▼  |
| Lock configuration                                                           | Disabled ▼ |
| ABB IP Configuration tool                                                    | Enabled ▼  |
| ABB Drive composer tool                                                      | Enabled ▼  |
| Unsecured ABB Drive composer tool                                            | Disabled ▼ |
| Ping response                                                                | Enabled ▼  |
| Web-based firmware update                                                    | Enabled ▼  |
| OPC UA Server                                                                | Disabled ▼ |
| OPC UA Server unsecured                                                      | Disabled ▼ |
| mDNS                                                                         | Disabled ▼ |

| Simple Network Time Protocol (SNTP) configuration (saved settings will be in use after refresh) |           |
|-------------------------------------------------------------------------------------------------|-----------|
| SNTP protocol                                                                                   | Enabled ▼ |
| SNTP update interval (seconds)                                                                  | 60        |
| SNTP time offset to UTC (minutes)                                                               | 0         |
| SNTP Server address 1                                                                           |           |
| SNTP Server address 2                                                                           |           |

| Simple Network Management Protocol (SNMP) configuration (saved settings will be in use after refresh) |           |
|-------------------------------------------------------------------------------------------------------|-----------|
| SNMP protocol                                                                                         | Enabled ▼ |
| Public community string                                                                               |           |
| Private community string                                                                              |           |
| SNMP control                                                                                          | Off ▼     |

| Discovery and Configuration Protocol (DCP) configuration (saved settings will be in use after refresh) |                                        |
|--------------------------------------------------------------------------------------------------------|----------------------------------------|
| DCP Access Mode                                                                                        | Configurable (Read/Write by Default) ▼ |

**Note:** These settings are available only through web pages. When you select to disable the web page, a warning appears to confirm before you can save the selection.

To enable the web page again, refer to [Enable web page access if it is disabled \(page 174\)](#).

ABB recommends that you disable all services that are not used after commissioning.

### Configuring SNTP

You can use the Simple Network Time Protocol (SNTP) to synchronize drive time with a network time server. When SNTP is enabled, FPNO-21 module requests the time from the configured server at a given interval. To receive this time synchronization, set parameter 96.20 Time sync primary source to Fieldbus A. The table shows the settings for SNTP:

| Settings                | Description                                                                                                                                                                                                          | Value                                      |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| SNTP update interval    | Interval to request time from server.                                                                                                                                                                                | Default: 30 seconds<br>Minimum: 30 seconds |
| SNTP time offset to UTC | Time offset to the time received from SNTP.<br>This value can also be set over PROFIdrive parameter 1001.<br><br><b>Note:</b> SNTP time offset change does not need a device refresh.                                | -1440...1440 minutes                       |
| SNTP server address 1   | Primary server address for requesting time.<br>Format: IP address followed by optional port number, eg:<br>192.168.0.1:123<br><br><b>Note:</b> If port number is missing, the default NTP port number "123" is used. | -                                          |
| SNTP server address 2   | Secondary server address used if the request to server 1 fails.                                                                                                                                                      | -                                          |

### Configuring SNMP

Simple Network Management Protocol (SNMP) is a protocol to monitor and manage network devices. Use the SNMP settings to configure protocol options, community strings, and access control for the device. These settings control how the device is monitored and managed on the network. The table lists the SNMP settings.

**Note:** FPNO-21 supports SNMP version 1 (SNMPv1).

| Settings                 | Description                                                       | Value                                                        |
|--------------------------|-------------------------------------------------------------------|--------------------------------------------------------------|
| SNMP protocol            | Enables or disables the SNMP protocol.                            | Disabled, Enabled                                            |
| Public community string  | The community string used for read-only access to the SNMP data.  | Default: public                                              |
| Private community string | The community string used for read-write access to the SNMP data. | Default: private                                             |
| SNMP control             | Controls the access mode for SNMP.                                | Off, Read only,<br>Read and write<br>Default: Read and write |

### Detailed descriptions

- **SNMP protocol:** Use this setting to turn SNMP on or off for the adapter. When SNMP is on, you can monitor and manage the adapter by SNMP. When SNMP is off, the adapter does not respond to SNMP requests.
- **Public community string:** This setting defines the read-only community string for SNMP. It lets users read SNMP data but not change it. The default value is "public". The PLC can replace this value during application relation establishment by using the SNMPAdjust feature.
- **Private community string:** This setting defines the read-write community string for SNMP. It lets users read SNMP data and change it. The default value is "private". The PLC can replace this value during application relation establishment by using the SNMPAdjust feature.
- **SNMP control:** This setting controls the access mode for SNMP. The PLC can replace the community string during application relation establishment by using the SNMPAdjust feature. The available options are:
  - **Off:** SNMP read and write are disabled. The adapter ignores SNMP requests.
  - **Read only:** SNMP read is enabled. SNMP write is disabled. The adapter ignores SNMP write requests.
  - **Read and write (default):** SNMP read and write are enabled.

### **Configuring DCP**

DCP (Discovery and Configuration Protocol) is a protocol to discover and configure network devices. Use the DCP settings to set the access mode for the device. These settings control whether DCP allows read and write actions or is locked to read only. The table lists the DCP settings.

| Setting         | Description                      | Value                                                   |
|-----------------|----------------------------------|---------------------------------------------------------|
| DCP Access Mode | Controls the access mode for DCP | Configurable (Read/Write by Default), Fixed (Read-Only) |

### Detailed descriptions

- **DCP Access Mode:** Controls the DCP access mode for the adapter. The available options are:
  - **Configurable (Read and write by default):** DCP is in read and write mode by default. During Application Relation (AR) establishment, the PLC can set the mode to read only or read and write. The PLC setting stays active for the duration of the AR.
  - **Fixed (Read only):** DCP is locked to read only. The PLC cannot change this mode.

### ■ **Security page**

On the Security page, you can upload a private key and certificates for FPNO-21 module to use instead of the self-signed certificate that FPNO-21 module uses as a default. You can upload and manage Drive Composer certificate files on Security page under "Drive Composer certificate settings". Up to four certificates are supported at a time.

FPNO-21 module uses secure HTTPS (TLS 1.2) communication for the web page server. By default, FPNO-21 module does not require client authentication for the PC tool communication. You can use client authentication to improve the system security.

If unsecured communication is required, you can enable it from Service configuration page or by setting bit 4 of parameter 51.15 Service configuration. When unsecured communication is enabled, the PC tool communication is not encrypted or authenticated.

For more details, refer to [Drive Composer start-up and maintenance PC tool user's manual \(3AUA0000094606 \[English\]\)](#).

**Note:** Secure PC tool communication is possible with Drive Composer Pro version 2.7 or later.

The screenshot shows two sections of a web configuration page. The top section, titled 'Server certificate settings', contains two rows for file uploads: 'Server certificate file for uploading' and 'Server private key file for uploading'. Each row has a 'Choose File' button and a 'No file chosen' status. Below these are two buttons: 'Submit certificate and key' and 'Remove certificate and key'. The bottom row shows 'User uploaded certificate' with a text field containing 'None'. The second section, titled 'Drive Composer certificate settings', lists four certificates: '[+] Certificate 1', '[+] Certificate 2', '[+] Certificate 3', and '[+] Certificate 4'. At the bottom of this section are 'Submit all' and 'Remove all' buttons.

**Note:** The uploaded certificates and keys take effect after you refresh the adapter.

### System use notification message editor

A system use notification message is displayed on the login page. On the security page, you can edit the system use message notification. Updates to the message will appear the next time a user visits the login page.

The screenshot shows a web interface titled 'System use notification message editor'. It features a text area on the right containing the message: 'System usage may be monitored, recorded, and subject to audit. Unauthorized use of the system is prohibited. Use of the system indicates consent to monitoring and recording.' Below the text area is an 'Update' button. On the left, there is a label 'Current system use notification message'.

### Configuring login restrictions

By default, the Login page allows up to 5 consecutive invalid login attempts in 1 minute. When the limit is reached, the page locks for 1 minute. It unlocks automatically at the end of the lockout period, and the user can try again. Use the Login restriction configuration to change these settings.

| Login restriction configuration                      |                                 |
|------------------------------------------------------|---------------------------------|
| Maximum number of consecutive invalid login attempts | <input type="text" value="5"/>  |
| Time window (s)                                      | <input type="text" value="60"/> |
| Lockout time (s)                                     | <input type="text" value="60"/> |
| <input type="button" value="Update"/>                |                                 |

### Password strength configuration

On the security page, you can use the password strength editor to enforce requirements for the password. You can set minimum password length and the requirement for at least one uppercase letter, lowercase letter and number. Any changes on the restrictions are applied next time when the password is changed on the Password page.

| Password strength configuration       |                                |
|---------------------------------------|--------------------------------|
| Minimum length                        | <input type="text" value="8"/> |
| Least 1 uppercase letter              | <input type="checkbox"/>       |
| Least 1 lowercase letter              | <input type="checkbox"/>       |
| Least 1 number                        | <input type="checkbox"/>       |
| <input type="button" value="Update"/> |                                |

### ■ Support page

On the Support page, you can access documentation related to the adapter module and the GSDML file.

The latest files corresponding to the drive firmware are available through the hyperlinks listed under "WWW documentation and downloads". You can find more information about each parameter under "Click here for more information about fieldbus parameters".

| <a href="#">Click here for more information about Profinet adapter parameters.</a> |                                          |
|------------------------------------------------------------------------------------|------------------------------------------|
| GSDML file                                                                         |                                          |
| Local PROFINET GSDML file                                                          | <a href="#">GSDML File</a>               |
| WWW documentation and downloads                                                    |                                          |
| Fieldbus connectivity web page:                                                    | <a href="#">Fieldbus communications</a>  |
| FPNO-21 web page:                                                                  | <a href="#">FPNO-21 Profinet adapter</a> |

## ■ Password page

**NOTICE** ABB recommends that you change the default password and username as soon as possible.

On the Password page, you can change your password and username.

FPNO-21 module supports only one user access level.

By default, the password must contain:

- 8 to 64 characters.

You can adjust the password strength settings on the Security page with the Password strength configuration, refer to [Password strength configuration \(page 168\)](#).

The username must contain:

- 5 to 20 characters
- no special characters or spaces (only uppercase letters, lowercase letters and numbers are allowed).

The screenshot displays two form sections on a web page. The top section, titled 'Change password', contains four input fields: 'Username' (with a blue border), 'Current password', 'New password', and 'Confirm new password'. Each password field has a 'Show Password' checkbox to its right. A 'Change' button is located at the bottom right of this section. The bottom section, titled 'Change username', contains four input fields: 'Current username', 'Current password', 'New username', and 'Confirm new username'. The 'Current password' field also has a 'Show Password' checkbox. A 'Change' button is located at the bottom right of this section. Both sections are enclosed in light gray borders.

## ■ Audit log page

On the Audit log page, you can view recent events. Administrator rights are required. To see the latest events, select Refresh content or reload the page.

| Audit log |                      |      |          |                     |      |         |           |                                                     |
|-----------|----------------------|------|----------|---------------------|------|---------|-----------|-----------------------------------------------------|
| #         | Timestamp            | ID   | Source   | Category            | Type | Result  | User      | Message                                             |
| 268       | 2025-01-28T09:39:42Z | 1110 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged in."                                   |
| 267       | 2025-01-28T09:39:36Z | 1426 | Fieldbus | AuditLogEvent       | Info | Success | System    | "User notification message integrity check passed." |
| 266       | 2022-12-31T00:00:11Z | 1426 | Fieldbus | AuditLogEvent       | Info | Success | System    | "Fieldbus settings integrity check passed."         |
| 265       | 2022-12-31T00:00:11Z | 1102 | AuditLog | AuditLogEvent       | Info | Success | Audit log | "The audit log file was overwritten."               |
| 264       | 2022-12-31T00:00:00Z | 5270 | Fieldbus | AccessControl       | Info | Success | System    | "System started."                                   |
| 263       | 2025-01-27T15:27:58Z | 1110 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged in."                                   |
| 262       | 2022-12-31T00:00:11Z | 1426 | Fieldbus | AuditLogEvent       | Info | Success | System    | "Fieldbus settings integrity check passed."         |
| 261       | 2022-12-31T00:00:00Z | 5270 | Fieldbus | AccessControl       | Info | Success | System    | "System started."                                   |
| 260       | 2025-01-27T15:15:01Z | 1110 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged in."                                   |
| 259       | 2025-01-27T15:13:19Z | 1380 | Fieldbus | ConfigurationChange | Info | Success | admin     | "Parameter changed."                                |
| 258       | 2025-01-27T15:13:19Z | 1110 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged in."                                   |
| 257       | 2025-01-27T15:10:46Z | 1110 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged in."                                   |
| 256       | 2025-01-27T15:09:24Z | 1210 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged out."                                  |
| 255       | 2025-01-27T15:09:13Z | 1110 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged in."                                   |
| 254       | 2025-01-27T15:09:08Z | 1210 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged out."                                  |
| 253       | 2025-01-27T15:08:53Z | 1110 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged in."                                   |
| 252       | 2025-01-27T15:08:27Z | 1210 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged out."                                  |
| 251       | 2025-01-27T15:07:14Z | 1110 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged in."                                   |
| 250       | 2025-01-27T15:05:38Z | 1210 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged out."                                  |
| 249       | 2025-01-27T15:05:29Z | 1110 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged in."                                   |
| 248       | 2025-01-27T15:05:20Z | 1210 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged out."                                  |
| 247       | 2025-01-27T15:05:15Z | 1110 | Fieldbus | AccessControl       | Info | Success | admin     | "User logged in."                                   |
| 246       | 2022-12-31T00:00:27Z | 1426 | Fieldbus | AuditLogEvent       | Info | Success | System    | "User notification message integrity check passed." |

Refresh content

## ■ Firmware update page

On the Firmware update page, you can view the current firmware version of the adapter module and update the firmware. The firmware update requires adapter restart, so you cannot start the firmware update if the drive is currently controlled by the fieldbus adapter. All Ethernet communication to the drive (including PROFINET, Drive composer and OPC UA) will be lost during the firmware update.

**NOTICE** ABB recommends that you update the FPNO-21 module only when the drive is in local mode and not operational.

To update the adapter firmware, first upload the firmware loading package:

**Note:** Contact ABB to get the firmware loading package

- Click Browse.
- Select the correct firmware loading package (.lpe).
- Click Submit.

After uploading the firmware loading package, click Update to start the firmware update. The adapter restarts to complete the firmware installation.

Fieldbus adapter loading package

Select loading package for uploading

Browse...

No file selected.

Submit

User uploaded loading package

No firmware loading package found. Upload the firmware loading package to the adapter.

Update

Remove

Current firmware version information

|                            |             |
|----------------------------|-------------|
| Firmware version           | 0203        |
| FW patch and build version | 0000        |
| Firmware version date      | Dec 22 2023 |

#### ■ OPC UA configuration page

On the OPC UA configuration page you can upload server certificates, maintain client trust, issuer and revocation lists, and install custom information models.

| Status                                                                                                       | Configuration | Service configuration                                                                           | Security | Support | Password | Audit log | Firmware update | OPC UA | Licenses | Logout |
|--------------------------------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------------------|----------|---------|----------|-----------|-----------------|--------|----------|--------|
| <b>Server certificate settings</b>                                                                           |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| Certificate Signing Request file download                                                                    |               | <a href="#">CSR file</a>                                                                        |          |         |          |           |                 |        |          |        |
| Server certificate file for uploading                                                                        |               | <input type="button" value="Choose File"/> No file chosen <input type="button" value="Submit"/> |          |         |          |           |                 |        |          |        |
| Uploaded server certificate info                                                                             |               | <input type="text" value="No info"/> <input type="button" value="Remove"/>                      |          |         |          |           |                 |        |          |        |
| <b>Client trust list settings</b>                                                                            |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <input type="button" value="[+] Certificate 1"/>                                                             |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <input type="button" value="[+] Certificate 2"/>                                                             |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <input type="button" value="[+] Certificate 3"/>                                                             |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <input type="button" value="[+] Certificate 4"/>                                                             |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <b>Client issuer list settings</b>                                                                           |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <input type="button" value="[+] Certificate 1"/>                                                             |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <input type="button" value="[+] Certificate 2"/>                                                             |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <input type="button" value="[+] Certificate 3"/>                                                             |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <input type="button" value="[+] Certificate 4"/>                                                             |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <b>Client revocation list settings</b>                                                                       |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <input type="button" value="[+] Certificate 1"/>                                                             |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <input type="button" value="[+] Certificate 2"/>                                                             |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <input type="button" value="[+] Certificate 3"/>                                                             |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <input type="button" value="[+] Certificate 4"/>                                                             |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <input type="button" value="Apply all certificates"/> <input type="button" value="Remove all certificates"/> |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| <b>Custom information model file</b>                                                                         |               |                                                                                                 |          |         |          |           |                 |        |          |        |
| Model file for uploading                                                                                     |               | <input type="button" value="Choose File"/> No file chosen <input type="button" value="Submit"/> |          |         |          |           |                 |        |          |        |
| Uploaded model file validity                                                                                 |               | <input type="text" value="None"/>                                                               |          |         |          |           |                 |        |          |        |
| Current model file ID                                                                                        |               | <input type="text" value="Factory"/>                                                            |          |         |          |           |                 |        |          |        |
| <input type="button" value="Apply custom model"/> <input type="button" value="Remove custom model"/>         |               |                                                                                                 |          |         |          |           |                 |        |          |        |

### OPC UA server certificate settings

To upload an OPC UA server certificate to FPNO-21 module:

1. Download the Certificate Signing Request file (CSR) from section Certificate Signing Request file download.
2. Have the CSR file signed by your Certificate Authority (CA).
3. Select **Choose file** and browse for the signed certificate file you want to upload.
4. Select **Submit**.
5. The Uploaded server certificate info shows ValidNotApplied.
6. Select **Apply all certificates**. The server will restart. After the restart, wait until the module becomes available before reconnecting via OPC UA.

## Managing client certificate lists

FPNO-21 module supports three client certificate management lists that can be configured in OPC UA configuration page:

- **Client Trust List:** Contains trusted client certificates
- **Client Issuer List:** Contains Certificate Authority (CA) certificates for validating certificate chains
- **Client Revocation List:** Contains revoked certificates

**Note:** If all these lists are empty, no validation policy is used.

To upload a certificate to FPNO-21 module:

1. Select **Choose file** and browse for the certificate file you want to upload.
2. Select **Submit**.
3. The **Uploaded trust list info** shows ValidNotApplied.

**Note:** If you upload an issuer (CA) certificate or a revocation list (CRL), the text is **Uploaded issuer list validity**.

4. Select **Apply all certificates**. The server will restart. After the restart, wait until the module becomes available before reconnecting via OPC UA.

### Certificate chain validation requirements

The FPNO-21 module requires explicit management of both trust and issuer lists for CA-signed certificates.

1. **Self-signed certificates:** Must be in the Client trust list
2. **CA-signed certificates:** Require both the client certificate in the Client trust list and the issuing CA in the Client issuer list.

The table shows connection requirements by certificate type.

| Certificate type | Trust list requirement              | Issuer list requirement     | Connection result  |
|------------------|-------------------------------------|-----------------------------|--------------------|
| Self-signed      | Client certificate must be uploaded | Not required                | Connection allowed |
| CA-signed        | Client certificate must be uploaded | Issuing CA must be uploaded | Connection allowed |
| CA-signed        | Client certificate is missing       | Issuing CA must be uploaded | Connection denied  |
| CA-signed        | Client certificate is missing       | Issuing CA must be uploaded | Connection denied  |

## Using custom information model with OPC UA

You can install a custom OPC UA information model on the adapter. The custom model replaces the default information model.

**Note:** Contact ABB if you want your model to have access to other parameters and signals, including writing values.

Select **Choose file**. In the file dialog, select the .sqlite model file to apply and select **Submit**. The adapter uploads the file and runs a validity check. When the check

completes, the page shows a status message. If the file is valid, select **Apply custom model** to activate it. If the file is not valid, the adapter deletes the file.

When you apply a valid model, the OPC UA server restarts and uses the custom model instead of the default model. The page shows the model file ID after upload or activation.

To return to the factory model, select **Remove custom model**. The OPC UA server restarts and starts to use the default model.

| OPC UA custom information model file |                                                                                                 |
|--------------------------------------|-------------------------------------------------------------------------------------------------|
| Model file for uploading             | <input type="button" value="Choose File"/> No file chosen <input type="button" value="Submit"/> |
| Uploaded model file validity         | <input type="text" value="Model is valid"/> <input type="button" value="Apply custom model"/>   |
| Current model file ID                | <input type="text" value="Custom2"/> <input type="button" value="Remove custom model"/>         |

## ■ Licenses page

The License page shows a list of open-source licenses used in the adapter. Click the plus sign to expand a license and view its agreement.

| Product includes following open source licenses |
|-------------------------------------------------|
| [+] OPC UA licenses                             |
| [+] mbedtls                                     |
| [+] Embedded Template Library                   |
| [+] cJSON                                       |
| [+] lwip                                        |
| [+] jQuery                                      |

## Reset FPNO-21 module web page password to default

You can reset the FPNO-21 module web page password to factory default.

**Note:** The password can be reset only with local access to the drive.

1. Disconnect all cable connections to FPNO-21 module.  
The NET led should switch off.
2. Write 0 (zero) to the parameter 26 under Group A (for example, 51.26).
3. Refresh the settings by selecting Refresh in parameter 27 (for example, 51.27).
4. Write 17989 to parameter 26 under Group A.
5. Refresh the settings by selecting Refresh in parameter 27.
6. Write 20033 to parameter 26 under Group A.
7. Refresh the settings by selecting Refresh in parameter 27.
8. Write 0 to parameter 26 under Group A.

FPNO-21 module password is now reset to the default password. For information of default password, refer to [Logging in \(page 158\)](#).

## Enable web page access if it is disabled

You can enable the access to web pages with drive parameters.

1. Disconnect all cable connections to FPNO-21 module.  
The NET led should switch off.
2. Write 0 (zero) to the parameter 26 under Group A (for example, 51.26).
3. Refresh the settings by selecting Refresh in parameter 27 (for example, 51.27).
4. Write 87 to parameter 26 under Group A.
5. Refresh the settings by selecting Refresh in parameter 27.
6. Write 17730 to parameter 26 under Group A.
7. Refresh the settings by selecting Refresh in parameter 27.
8. Write 0 to parameter 26 under Group A.

Access to web pages is now enabled.

---



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## Appendix D - FPNO-21 configuration back-up

---

### Contents of this chapter

This chapter presents the settings for FPNO-21 module configuration backup.

### Compatibility

FPNO-21 module settings are stored in the drive parameters and also in the configuration files. FPNO-21 module supports backup of all settings to the drive. These settings are now also included in any backups made of the drive using the Drive composer PC tool or the control panel.

### Settings for backup

Consider these points:

- Backup is not slot-specific. For example, backup of FPNO-21 in FBA A, slot 1 can be restored to FPNO-21 FBA A, slot 2.
- Backup depends on the fieldbus channel. For example, backup of FPNO-21 in FBA A is not restored to FPNO-21 in FBA B.
- FPNO-21 module configuration parameters are included in the backup when drive parameters are saved.

#### ■ Configuration backup for all protocols in FPNO-21

Backup includes the following configuration for PROFINET IO in FPNO-21:

---

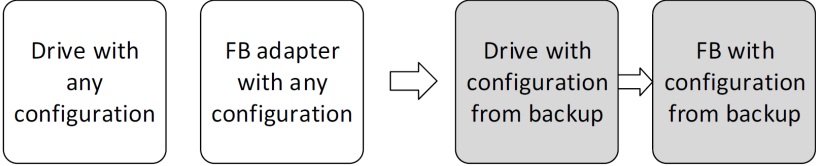
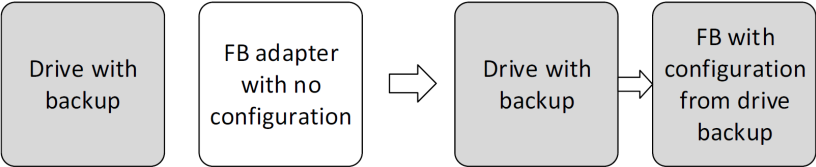
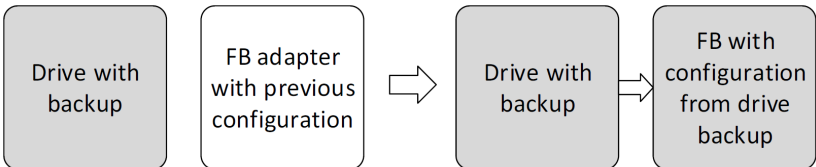
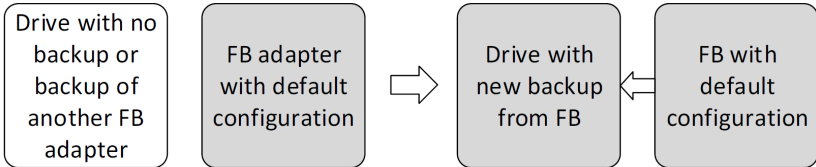
| Configuration                             | Description                                                                                                                                                                                                         |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ethernet service configuration            | Enables different Ethernet services. Refer to <a href="#">Service configuration page (page 163)</a> .<br>When set, backup automatically includes this configuration.                                                |
| Web page password                         | Login password for accessing FPNO-21 configuration web pages. Refer to <a href="#">Password page</a> .<br>Backup will automatically include the set password.<br><b>Note:</b> Backup includes the default password. |
| SNTP configuration                        | Enables SNTP, request interval, UTC offset, and server addresses. Refer to <a href="#">Service configuration page (page 163)</a> .<br>When set, backup will automatically include this configuration.               |
| Station name                              | Sets the station name using DCP. Refer to <a href="#">PROFINET network settings (page 102)</a> .<br>When set, backup will automatically include this configuration.                                                 |
| I&M 1-3                                   | Writable strings for identification and maintenance. Refer to <a href="#">I&amp;M records (page 150)</a> .<br>When set, backup will automatically include this configuration.                                       |
| PROFIdrive parameters 933-937 and 939-943 | PROFIdrive CW and SW user bit mapping. Refer to <a href="#">PROFIdrive parameters (page 143)</a> .<br><b>Note:</b> Backup will include this configuration only when it is stored with PROFIdrive parameter 971.     |
| System location                           | Writable SNMP MIB-2 string.<br>When set, backup will automatically include this configuration.                                                                                                                      |
| System name                               |                                                                                                                                                                                                                     |
| System contact                            |                                                                                                                                                                                                                     |

The settings are saved to the drive after 10 seconds. If a Refresh command is given to FPNO-21 module using parameter 51.27, the pending backup is transferred to drive immediately and FPNO-21 module is refreshed after the transfer is completed.

**Note:** The new setting is not saved to drive if the drive was powered off or the adapter was disconnected from the drive within 10 seconds of changing a setting.

### ■ Using the restored backup

The use cases in the below table show how FPNO-21 settings are used after you restored a backup or after you powered up or enabled the module. The matching status box colours indicate matching configurations.

| No. | Configuration status                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                  |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
|     | Before restore                                                                                                                                                                                                                                                                                                                                                                                                       | After restore                                                                    |
| 1   | Restoring a backup to drive with Drive composer or panel.                                                                                                                                                                                                                                                                                                                                                            |                                                                                  |
|     |  <pre> graph LR     subgraph Before         D1[Drive with any configuration]         F1[FB adapter with any configuration]     end     subgraph After         D2[Drive with configuration from backup]         F2[FB with configuration from backup]     end     D1 --&gt; D2     F1 --&gt; F2           </pre>                    |                                                                                  |
|     | Drive and fieldbus adapter can have any configuration.                                                                                                                                                                                                                                                                                                                                                               | Configuration from backup is used in drive and in FPNO-21                        |
| 2   | Replacing a new fieldbus adapter of the same type.                                                                                                                                                                                                                                                                                                                                                                   |                                                                                  |
|     |  <pre> graph LR     subgraph Before         D1[Drive with backup]         F1[FB adapter with no configuration]     end     subgraph After         D2[Drive with backup]         F2[FB with configuration from drive backup]     end     D1 --&gt; D2     F1 --&gt; F2           </pre>                                             |                                                                                  |
|     | Drive has a backup of FPNO-21 configuration and a new FPNO-21 with no configuration is installed.                                                                                                                                                                                                                                                                                                                    | Drive backup is used in FPNO-21.                                                 |
| 3   | Replacing a fieldbus adapter with another adapter of the same type. But the new adapter was used with some other drive previously.                                                                                                                                                                                                                                                                                   |                                                                                  |
|     |  <pre> graph LR     subgraph Before         D1[Drive with backup]         F1[FB adapter with previous configuration]     end     subgraph After         D2[Drive with backup]         F2[FB with configuration from drive backup]     end     D1 --&gt; D2     F1 --&gt; F2           </pre>                                     |                                                                                  |
|     | Drive has a backup of FPNO-21 configuration and a new FPNO-21 with existing configuration is attached.                                                                                                                                                                                                                                                                                                               | Drive backup is used in FPNO-21.                                                 |
| 4   | A new drive and fieldbus adapter are used.                                                                                                                                                                                                                                                                                                                                                                           |                                                                                  |
|     |  <pre> graph LR     subgraph Before         D1[Drive with no backup or backup of another FB adapter]         F1[FB adapter with default configuration]     end     subgraph After         D2[Drive with new backup from FB]         F2[FB with default configuration]     end     D1 --&gt; D2     F1 --&gt; F2           </pre> |                                                                                  |
|     | Drive has no backup or a backup of some other type of fieldbus adapter other than FPNO-21 exists.<br>FPNO-21 with no configuration is attached.                                                                                                                                                                                                                                                                      | FPNO-21 generates a new backup with its default settings and copies it to drive. |

| No. | Configuration status                                                                                                                                                                                                                   |                                                                                                                                                                    |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | Before restore                                                                                                                                                                                                                         | After restore                                                                                                                                                      |
| 5   | Replacing drive with a new drive and reusing the old Fieldbus adapter.                                                                                                                                                                 |                                                                                                                                                                    |
|     | <pre> graph LR     A[Drive with no backup or backup to another FB adapter] --&gt; D[Drive with new backup from FB]     B[Used FB adapter with previous configuration] --&gt; C[FB with previous configuration]     C --&gt; D   </pre> |                                                                                                                                                                    |
|     | Drive has no backup or a backup of some other type of fieldbus adapter other than FPNO-21 exists.<br>FPNO-21 with an existing configuration is attached.                                                                               | FPNO-21 copies its backup to drive.                                                                                                                                |
| 6   | Clearing fieldbus configuration from drive and module to defaults.                                                                                                                                                                     |                                                                                                                                                                    |
|     | <pre> graph LR     A[Drive with a backup] --&gt; D[Drive with no backup]     B[FB from drive backup] --&gt; C[FB adapter default configuration]   </pre>                                                                               |                                                                                                                                                                    |
|     | You can clear the fieldbus configuration from drive and module to defaults with parameter 96.06 Parameter restore using the selection Reset all fieldbus settings.                                                                     | Clears the fieldbus parameters and backup files for FBA A and FBA B on the drive side. If a FPNO-21 module is connected, its configurations are reset to defaults. |

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## Appendix E - OPC UA server

---

### Contents of this chapter

This chapter provides instructions on how to enable, configure, and use the OPC UA server and client.

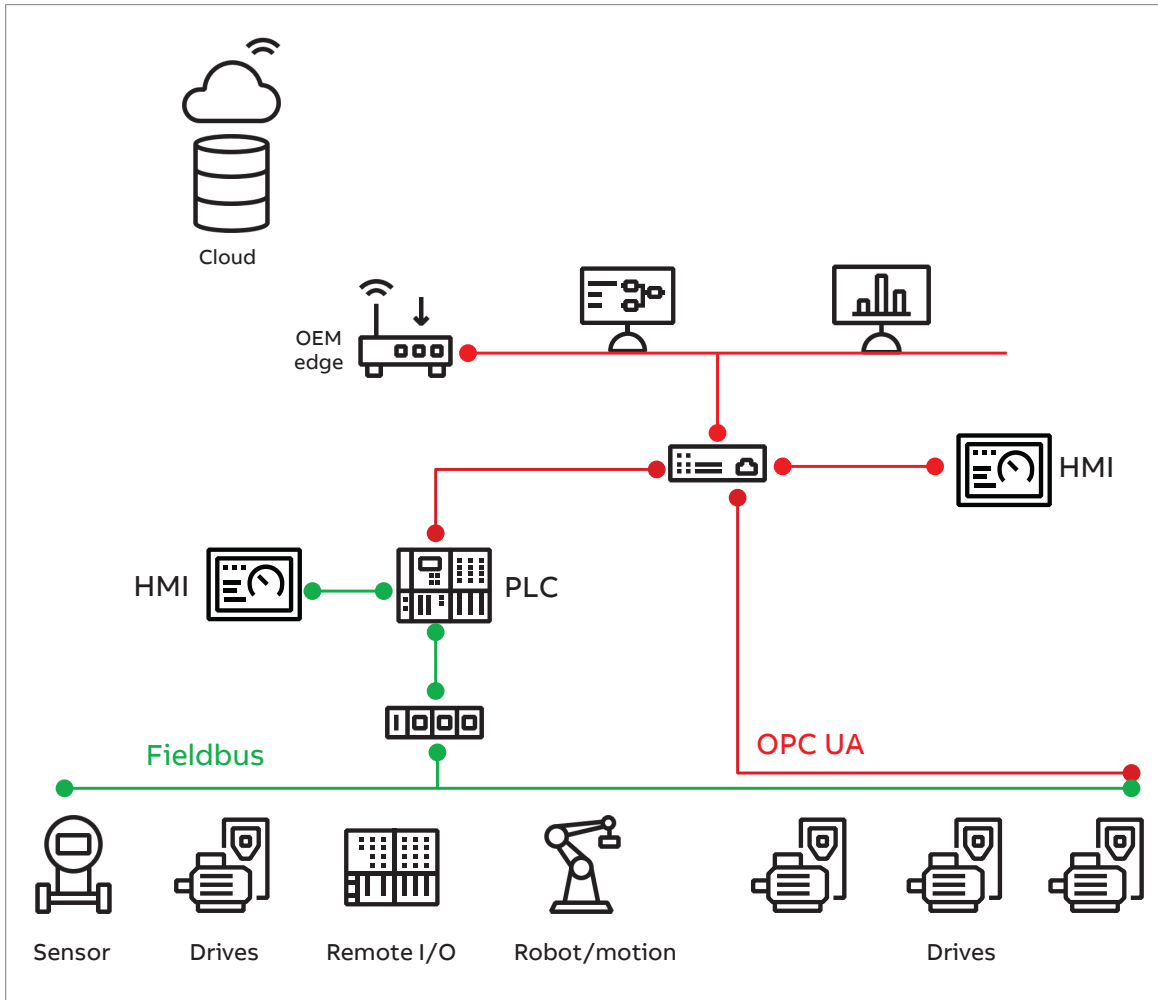
### OPC UA

OPC UA is a communication protocol for interoperability and data exchange between different devices, systems and applications. OPC UA stands for Open Platform Communications Unified Architecture, and it is based on open standards and technologies.

OPC UA provides a secure, reliable and scalable way to access data from drives and other sources. OPC UA supports different transport protocols, data formats and encryption methods. OPC UA supports strong authentication methods that differentiate the client and user with fine granular role-based access rights.

With OPC UA, users can access real-time and historical data and events from drives, such as speed, torque, current, voltage, temperature, alarms, faults and diagnostic codes. OPC UA allows users to create custom views and dashboards of the drive data, as well as to integrate the drive data with other systems and applications, such as SCADA, HMI, MES, ERP and cloud services. OPC UA enables data collection parallel to various protocols and networks, such as PROFINET.

---



## Compatibility

OPC UA server enables ABB drives to operate with any OPC UA compliant client. OPC UA requires FPNO-21 version 2.03 or later.

Supported drives:

- ACS380 machinery control program version 2.20.0.13 and later
- ACS480 standard control program version 2.20.0.13 and later
- ACH480 standard control program version 2.20.0.13 and later
- ACS580 standard control program version 2.20.0.13 and later
- ACH580 HVAC control program version 2.20.0.13 and later
- ACQ580 pump control program version 2.20.0.13 and later
- ACS880 primary control program version 2.90.0.0 and later

**Note:** The previous software version is also fully compatible with OPC UA, but it does not support access to drive events.

## Supported services and features

The OPC UA server supports these OPC UA services and features:

- Read and write service: Read and write OPC UA node data.
- Browse service: Examine the OPC UA server address space and read the OPC UA nodes and their attributes.
- Supported endpoints: For secure and encrypted communication between the OPC UA server and the client. Support for None, Sign and Sign & Encrypt security modes. Support for None, Basic128RSA15 and Basic 256 security policies. For more information, refer to [Encrypted Communication](#).
- Subscription and monitored item service: Subscribe to OPC UA node data and notifications when the data changes.
- Event service: Subscribe to Drives events, warnings, faults and receiving notifications when events occur. Historical event access is available.
- Information model: OPC UA Device Integration (DI) information model for asset and actual value monitoring. OPC UA FX (Field eXchange) information model to represent assets information for drives, motors and interface adapters.
- Anonymous user authentication modes
- Accessible to multiple OPC UA clients at the same time.
- The FPNO-21 module firmware updates over OPC UA
- Uploading and managing the OPC UA server certificate via the FPNO-21 web page
- Updating the OPC UA information model via the FPNO-21 web page
- Secure client authentication using certificates, enabling mutual trust and encrypted OPC UA communication between drives and external systems.

### ■ **Discovery service**

The Discovery Service enables OPC UA clients to automatically detect devices running an OPC UA server on the local network by using mDNS for service advertisement.

#### **Enabling and Disabling the Discovery service**

Set the Discovery service in parameter 51.15 bit 9. The default is disabled. To enable the Discovery service, set the bit to 1. To disable it, set the bit to 0.

#### **Availability**

The Discovery service works only if the OPC UA server is enabled and running.

#### **mDNS query**

To discover the OPC UA service, use query:

`_opcua-tcp._tcp.local.`

This query lists the devices that have the Discovery service enabled.

#### **Device hostnames**

If the device does not have a predefined hostname, the default hostname format is:

`<DriveType>-<SerialNumber>-<SlotNumber>`

## **Enabling OPC UA server on an ABB drive**

The OPC UA server on the ABB drive is not enabled by default. You can enable the OPC UA server with parameter [15 Service configuration](#), bit 7.

---

**Note:** After you enable the OPC UA server for the first time or if the IP address changes, the OPC UA server creates a self-signed certificate. This can take up to 60 seconds.

**Note:** For the OPC UA timestamps to function properly, the drive time must be synchronized with the universal coordinated time (UTC). Set the drive time to UTC before establishing the OPC UA connection. You can use the drive control panel or drive composer tool to adjust the drive time. ABB recommends SNTP (Simple Network Time Protocol) server to synchronize the time of all drives to same source. Refer to [Configuring SNTP \(page 165\)](#).

## ■ Encrypted Communication

The OPC UA server supports encrypted communication with different security policies. The OPC UA server provides the following endpoints for encrypted communication:

- **None:** No encryption or signing. It is deactivated by default. Use this only for testing or in trusted networks. To enable it, refer to parameter [15 Service configuration](#), bit 8.

---

**NOTICE** ABB recommends that you do not use None in unprotected networks to reduce cyber security risks.

---

- **Sign with Basic256Sha256:** This endpoint uses SHA-256 as the hash algorithm and RSA as the signature algorithm with 256-bit keys. It signs the messages but does not encrypt them. It is deactivated by default. Use this only when encryption is not required or supported by the client. To enable it, refer to parameter [15 Service configuration](#), bit 8.
- **SignAndEncrypt with Basic256Sha256:** This endpoint uses SHA-256 as the hash algorithm, RSA as the signature algorithm with 256-bit keys, and AES as the encryption algorithm with 256-bit keys. It signs and encrypts the messages. This is the recommended endpoint for most applications.
- **Sign with Aes128\_Sha256\_RsaOaep:** This endpoint uses SHA-256 as the hash algorithm, RSA with OAEP padding as the signature algorithm with 2048-bit keys, and AES as the encryption algorithm with 128-bit keys. It signs the messages but does not encrypt them. It is deactivated by default. Use this only when the client does not support Basic256Sha256. To enable it, refer to parameter [15 Service configuration](#), bit 8.
- **SignAndEncrypt with Aes128\_Sha256\_RsaOaep:** This endpoint uses SHA-256 as the hash algorithm, RSA with OAEP padding as the signature algorithm with 2048-bit keys, and AES as the encryption algorithm with 128-bit keys. It signs and encrypts the messages. This endpoint offers a higher level of security than Basic256Sha256. Use this endpoint when the client supports it.

To use an encrypted endpoint, the OPC UA client software must provide a valid certificate and trust the certificate of the OPC UA server. The certificates are used to authenticate the identity of the OPC UA server and the client and to exchange the encryption keys. The certificates can be self-signed or issued by a trusted authority. The OPC UA server and the client must also have the same security policy and security mode selected for the encrypted communication to work. The OPC UA client software can display the available endpoints of the OPC UA server and allow the user to choose the preferred one.

**Note:** Only a self-signed certificate is supported by FPNO-21 V2.03 OPC UA server.

---

## ■ Client-certificate authentication

Client-certificate authentication makes sure that only trusted OPC UA clients can connect to the device. During secure channel creation, the server validates the client certificate against its trust list. Communication continues only if both sides authenticate successfully. This provides strong cryptographic identity verification without the need of usernames or passwords. It also supports fully encrypted communication based on the selected OPC UA security policy.

For more information, refer to [OPC UA server certificate settings \(page 172\)](#).

## OPC UA subscription

The OPC UA server supports up to 50 subscriptions. An OPC UA subscription lets an OPC UA client software get data changes and events from the OPC UA server. The OPC UA client sets the monitored items, the sampling interval, the publishing interval, and other parameters for the subscription. The publishing interval is the time between notification messages from the OPC UA server. The monitored items are the variables or events that the OPC UA client software wants to get updates on. Each monitored item has a sampling interval, which is the frequency with which the OPC UA server checks its value or status. The OPC UA server sends notification messages with the data changes or events to the OPC UA client software at the publishing interval. The OPC UA client software can create, modify, or delete subscriptions as needed.

The screenshot shows the 'Monitored Item Settings' dialog box. It includes the following fields and controls:

- Sampling Interval:** A numeric input field with the value 250,00.
- Queue Size:** A numeric input field with the value 1.
- Discard Oldest:** A checked checkbox.
- Data Change Filter:** A checked checkbox.
- Data Change Trigger:** A dropdown menu showing 'Status/Value/Timestamp'.
- Deadband Type:** A dropdown menu showing 'Absolute'.
- Deadband Value:** A numeric input field with the value 4,00.
- Buttons:** 'OK' and 'Cancel' buttons at the bottom.

## Accessing drive events and event log with OPC UA

The OPC UA server can send OPC UA Events to inform an OPC UA client about drive events, such as warnings and faults.

Drive events use specific event types derived from 1:DriveEventType.

| Property<br>BrowseName | Data type | Description                                                                                             |
|------------------------|-----------|---------------------------------------------------------------------------------------------------------|
| EventId                | NodeId    | A unique identifier for the event. This identifier can be used to distinguish between different events. |

| Property<br>BrowseName | Data type     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                  |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
|------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------|-----------------------|-------------------|--------------------------------|---------------------------------|--------------------------------|----------------------------------|----------------------|----------------------------------|-----------------------------|-------------------------|
| EventType              | NodId         | Identifies the type of the event. It specifies the event type that is instantiated.<br>The following event types are supported:                                                                                                                                                                                                                                                                                                                                              |                                  |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
|                        |               | <table><tr><th>EventType</th><th>Description</th></tr><tr><td>1:DriveFaultEventType</td><td>Generate on fault</td></tr><tr><td>1:DriveWarningActiveEvent-Type</td><td>Generate when warning activates</td></tr><tr><td>1:DriveWarningClearedEventType</td><td>Generate when warning is cleared</td></tr><tr><td>1:DrivePureEventType</td><td>Generate on general notification</td></tr><tr><td>1:DriveFaultResetEvent-Type</td><td>Generate on fault reset</td></tr></table> | EventType                        | Description | 1:DriveFaultEventType | Generate on fault | 1:DriveWarningActiveEvent-Type | Generate when warning activates | 1:DriveWarningClearedEventType | Generate when warning is cleared | 1:DrivePureEventType | Generate on general notification | 1:DriveFaultResetEvent-Type | Generate on fault reset |
|                        |               | EventType                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Description                      |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
|                        |               | 1:DriveFaultEventType                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Generate on fault                |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
|                        |               | 1:DriveWarningActiveEvent-Type                                                                                                                                                                                                                                                                                                                                                                                                                                               | Generate when warning activates  |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
|                        |               | 1:DriveWarningClearedEventType                                                                                                                                                                                                                                                                                                                                                                                                                                               | Generate when warning is cleared |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
|                        |               | 1:DrivePureEventType                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Generate on general notification |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
|                        |               | 1:DriveFaultResetEvent-Type                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Generate on fault reset          |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
| SourceNode             | NodId         | Node that caused the event. SourceNode is always "i=2253".                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
| Message                | LocalizedText | A human-readable description of the event. It shows the drive event name including fault code and aux code in HEX format.                                                                                                                                                                                                                                                                                                                                                    |                                  |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
| Severity               | UInt16        | Represents the severity of the event. It provides an indication of the urgency or importance of the event.<br>50: Fault reset<br>100: Event<br>500: Warning<br>750: Fault                                                                                                                                                                                                                                                                                                    |                                  |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
| SourceName             | String        | DisplayName of the object node (SourceNode) that caused the event. = "Server"                                                                                                                                                                                                                                                                                                                                                                                                |                                  |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
| Time                   | UtcTime       | Indicates the time the event occurred. This is the time the event is generated.                                                                                                                                                                                                                                                                                                                                                                                              |                                  |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
| ReceiveTime            | UtcTime       | Indicates the time the server received the event over drive back end (option card interface)                                                                                                                                                                                                                                                                                                                                                                                 |                                  |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
| 1:BasicCode            | UInt16        | The drive event code                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                  |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |
| 1:AuxCode              | UInt32        | Auxiliary code of the drive event code                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                  |             |                       |                   |                                |                                 |                                |                                  |                      |                                  |                             |                         |

Note: ns=1: <http://www.abb.com/Motion>.

Example of the event notification:

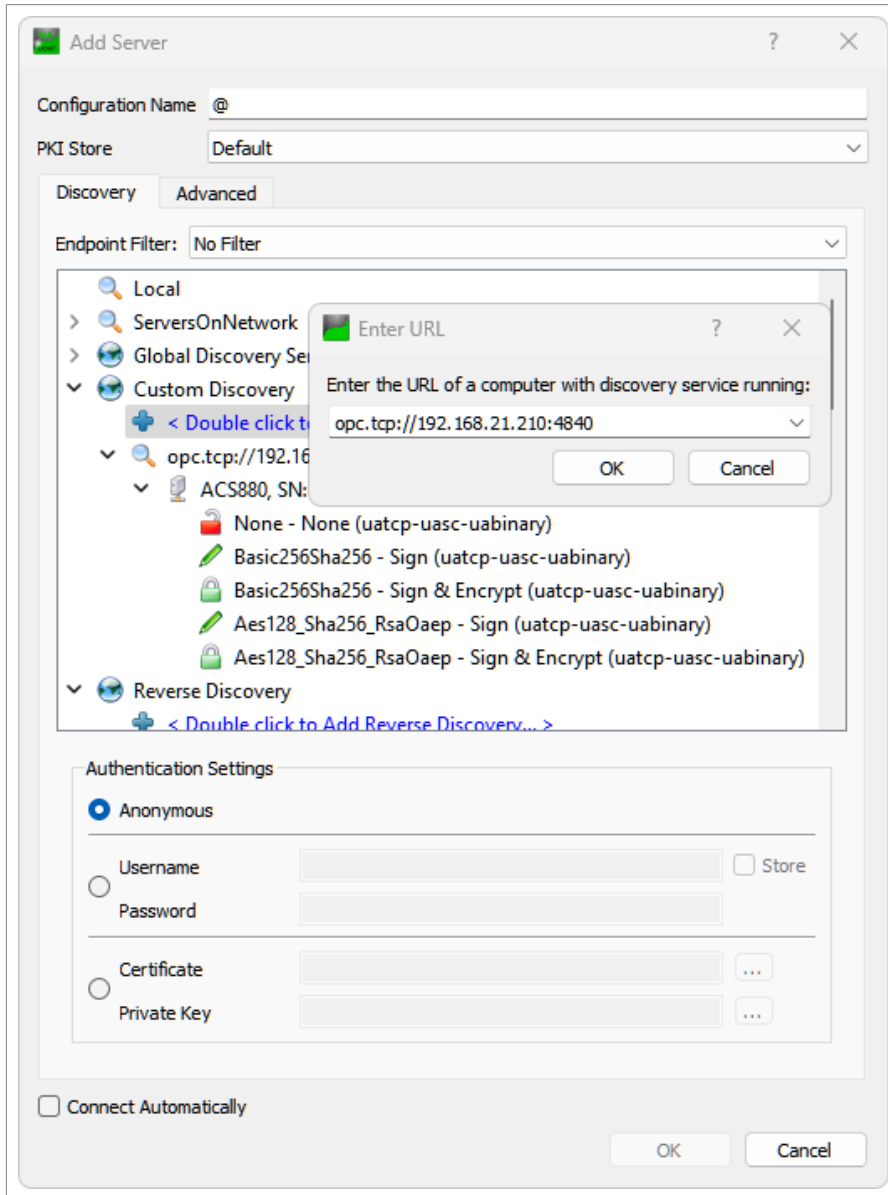
| Events Alarms Event History |   |                         |          |                                             |            |                             |                              |
|-----------------------------|---|-------------------------|----------|---------------------------------------------|------------|-----------------------------|------------------------------|
| A                           | C | Time                    | Severity | Server/Object                               | SourceName | Message                     | EventType                    |
|                             |   | 20.06.2024 15:34:19.789 | 500      | ACS580, SN: 1173000643@192.168.0.6 / Server | Server     | External warning 1 [A981:0] | DriveWarningActiveEventType  |
|                             |   | 20.06.2024 15:34:32.137 | 500      | ACS580, SN: 1173000643@192.168.0.6 / Server | Server     | External warning 1 [A981:0] | DriveWarningClearedEventType |
|                             |   | 20.06.2024 15:34:47.045 | 750      | ACS580, SN: 1173000643@192.168.0.6 / Server | Server     | External fault 3 [9083:0]   | DriveFaultEventType          |
|                             |   | 20.06.2024 15:35:35.307 | 50       | ACS580, SN: 1173000643@192.168.0.6 / Server | Server     | Fault reset [64FF:0]        | DriveFaultResetEventType     |

## Connection example

The OPC UA client software in this example is UaExpert® v1.7. from Unified Automation GmbH. For more information, refer to <https://www.unified-automation.com/products/development-tools/uaexpert.html>.

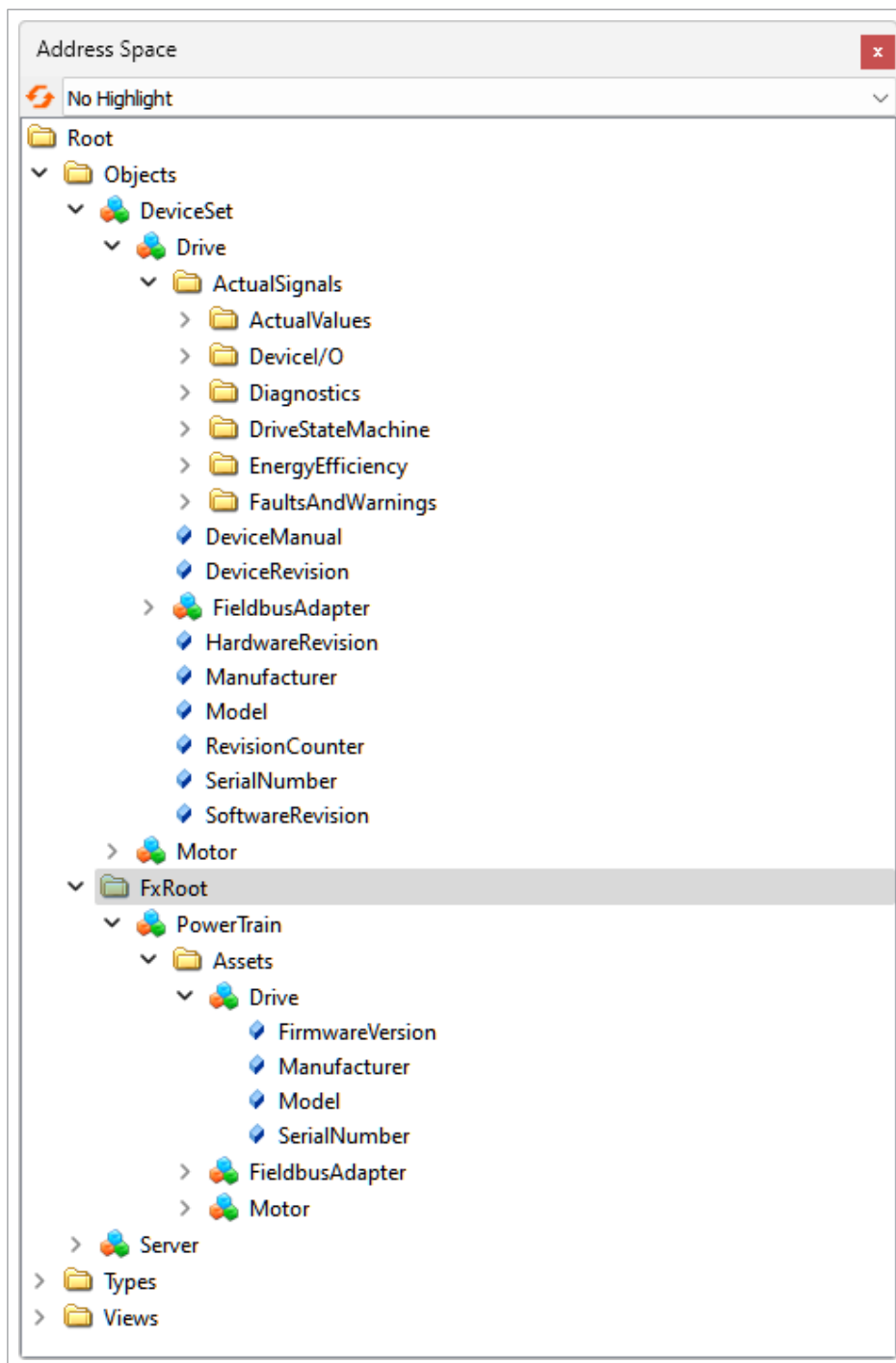
To connect the OPC UA client to an OPC UA server on an ABB drive:

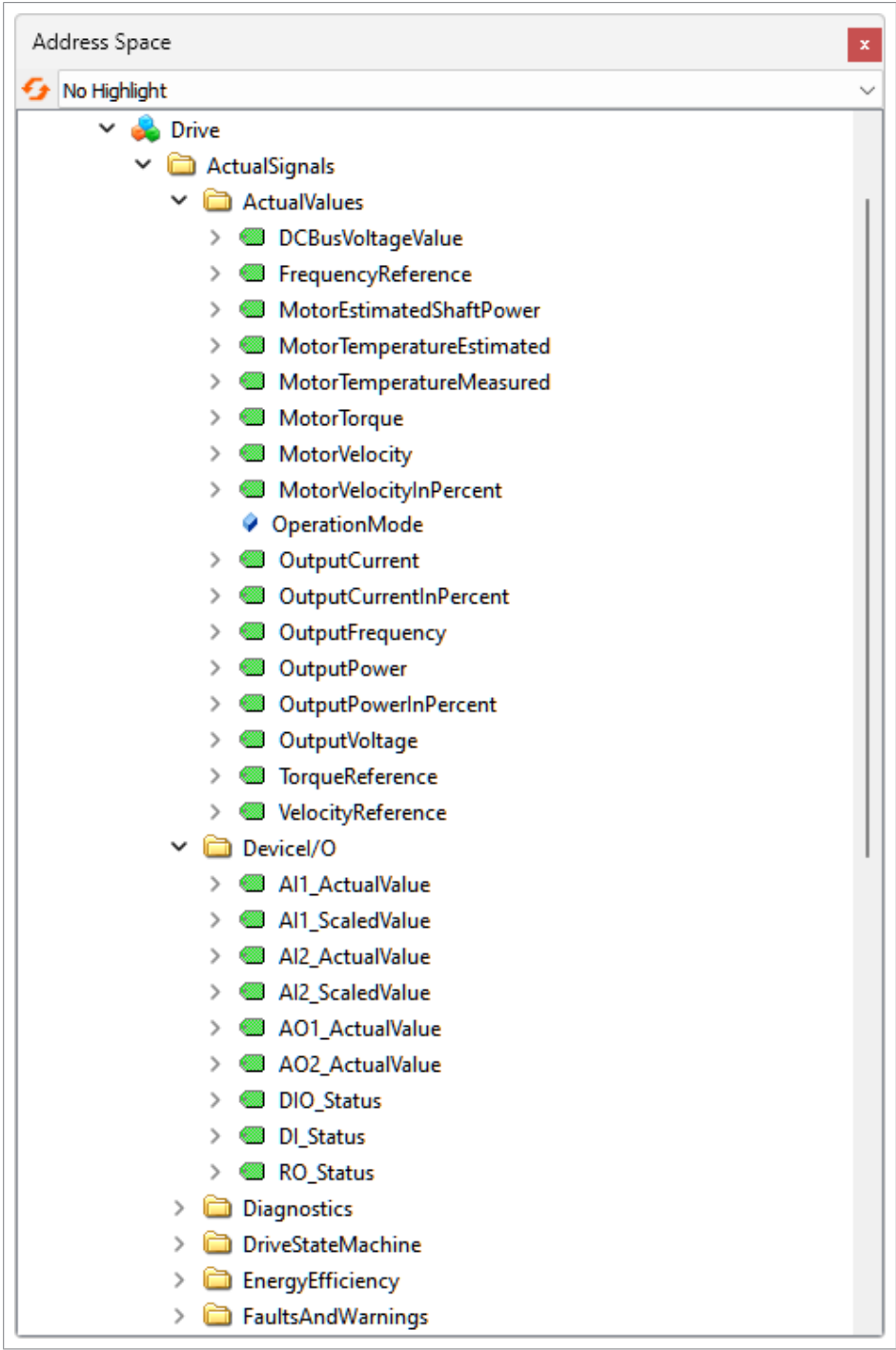
1. Enable the OPC UA server with parameter [15 Service configuration](#), bit 7.
  2. Start the OPC UA client software and open the project that was created or configured previously.
  3. Discover the OPC UA server.  
Enter the endpoint URL of the OPC UA server in the format "opc.tcp://<ip\_address>:4840". The <ip\_address> refers to the IP address of the Ethernet connection on the ABB drive. The default port number of the OPC UA server is 4840. Example: opc.tcp://192.168.21.210:4840.  
Alternatively you can select the OPC UA server from the list of available servers and click Connect.
  4. Select the security mode and the security policy for the OPC UA connection. The security mode can be none, sign, or sign and encrypt.
  5. Select the Anonymous Authentication method.
-



6. Accept the certificate of the OPC UA server.
7. Wait for the OPC UA connection to be established and verified. The OPC UA client software should show a message that the connection is successful and show the status and the details of the connection.

Example of the information model:





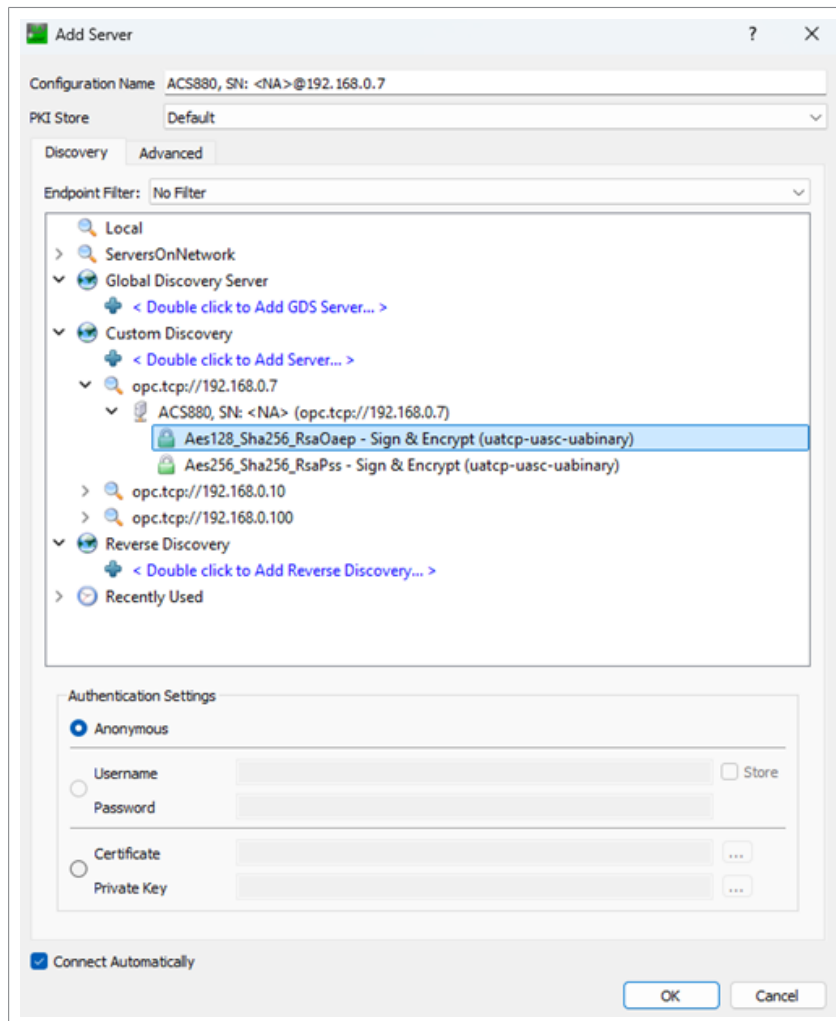
## FPNO-21 adapter firmware update over OPC UA

OPC UA server supports firmware update of FPNO-21 adapter. Implementation is based on OPC 10000-100, Device Model v1.05.0 specification.

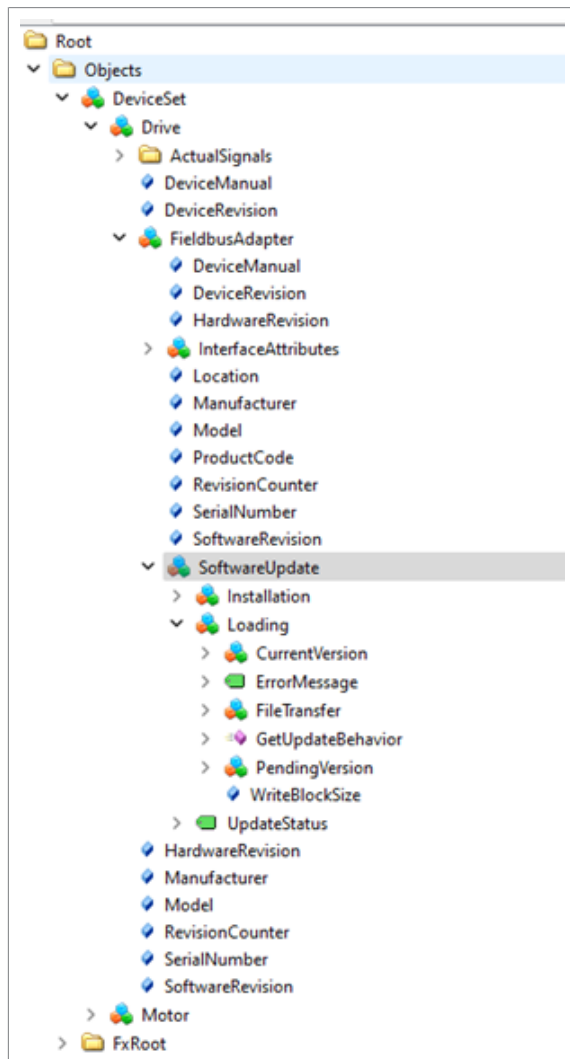
The OPC UA client software in this example is UaExpert® v1.7. from Unified Automation GmbH. For more information, refer to <https://www.unified-automation.com/products/development-tools/uaexpert.html>.

To update the FPNO-21 firmware using UaExpert®:

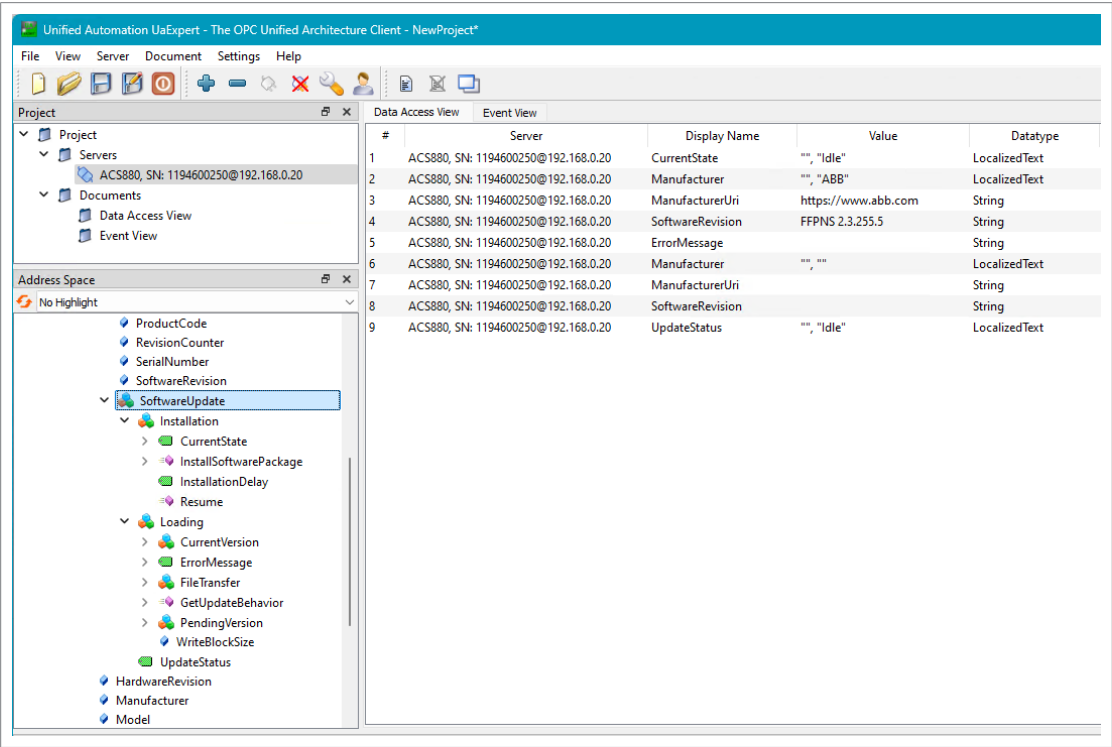
1. Connect to the OPC UA server.



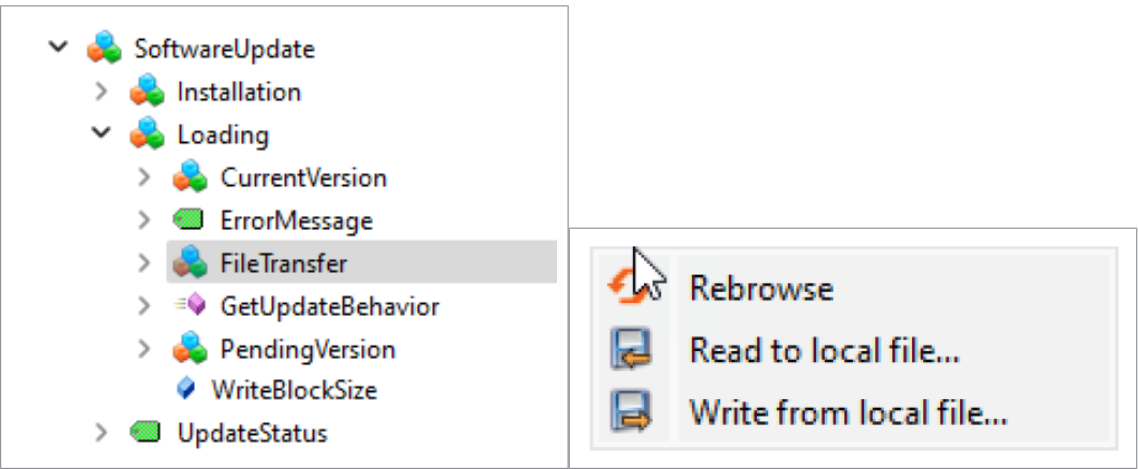
2. Go to Root > Objects > DeviceSet > Drive > FieldbusAdapter and select SoftwareUpdate.



3. Add these variable nodes as monitored items to the subscription  
Root/Objects/CurrentState/DeviceSet/Drive/FieldbusAdapter/...
  - SoftwareUpdate/Installation/CurrentState
  - SoftwareUpdate/Loading/CurrentVersion/Manufacturer
  - SoftwareUpdate/Loading/CurrentVersion/SoftwareRevision
  - SoftwareUpdate/Loading/ErrorMessage
  - SoftwareUpdate/Loading/PendingVersion/Manufacturer
  - SoftwareUpdate/Loading/PendingVersion/ManufacturerUri
  - SoftwareUpdate/Loading/PendingVersion/SoftwareRevision
  - SoftwareUpdate/UpdateStatus

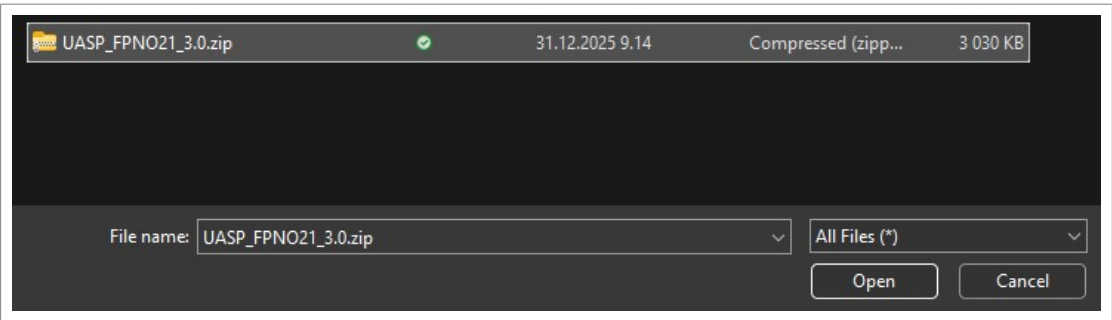


4. Go to SoftwareUpdate > Loading and right-click FileTransfer. From the context menu, select Write from local file...

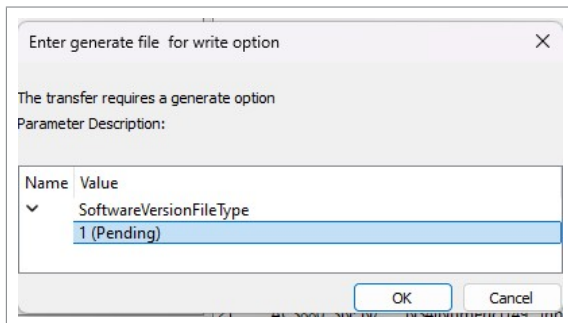


5. In the file browser, select the OpcUa software package for FPNO-21.

**Note:** Contact ABB for FPNO-21 OPC UA specific software package.

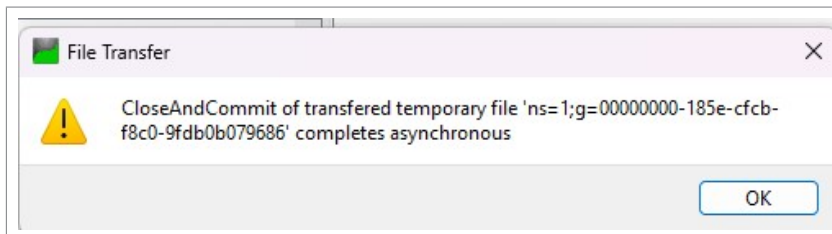


- Double-click "0 (Current)" to open the selection list. From the list, select 1 (Pending) and then select OK.

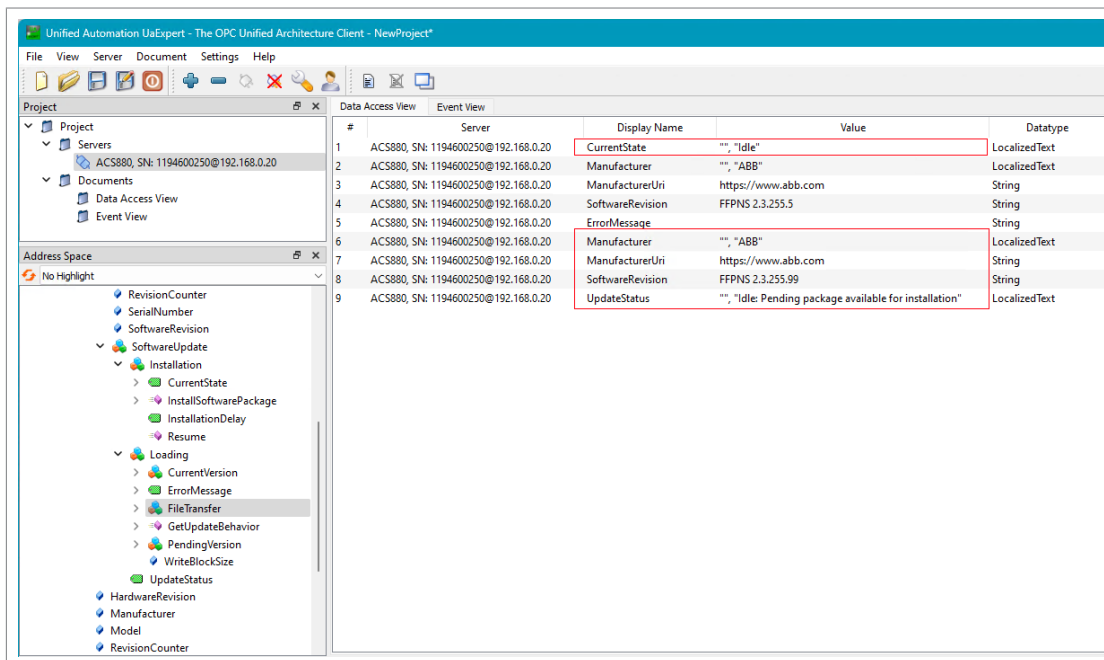


A status bar shows the file transfer progress. Wait until the transfer finishes. It can take several minutes.

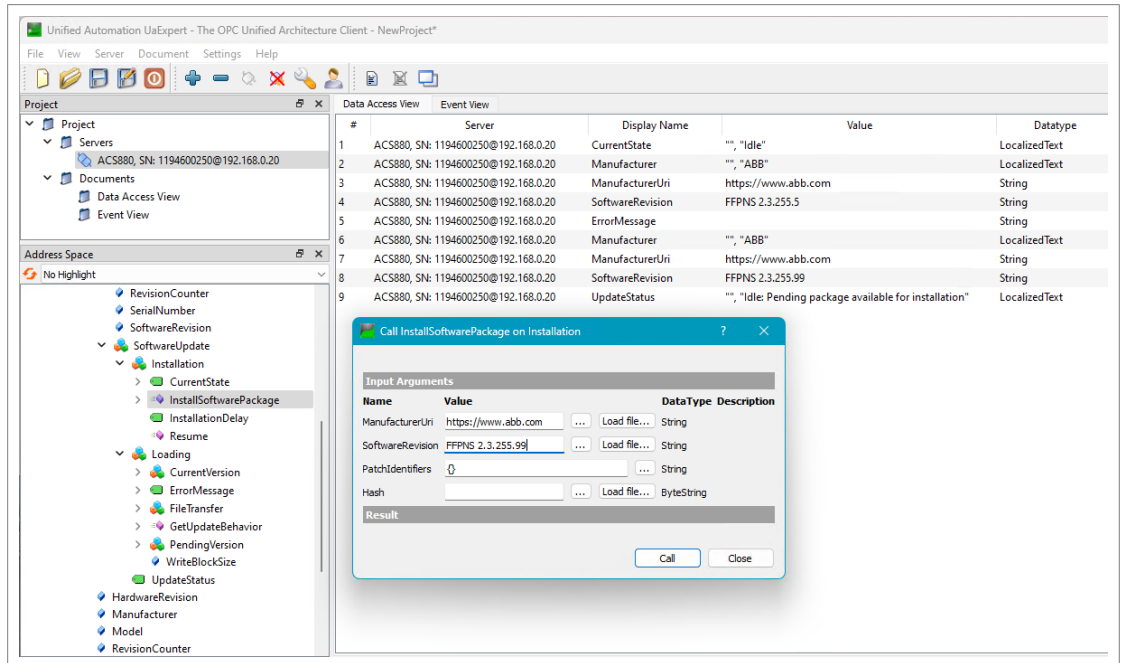
- When the transfer completes, a dialogue box opens with the text "CloseAndCommit will complete asynchronous". Select OK and monitor CurrentState in the FileTransfer > <TransferState> object.



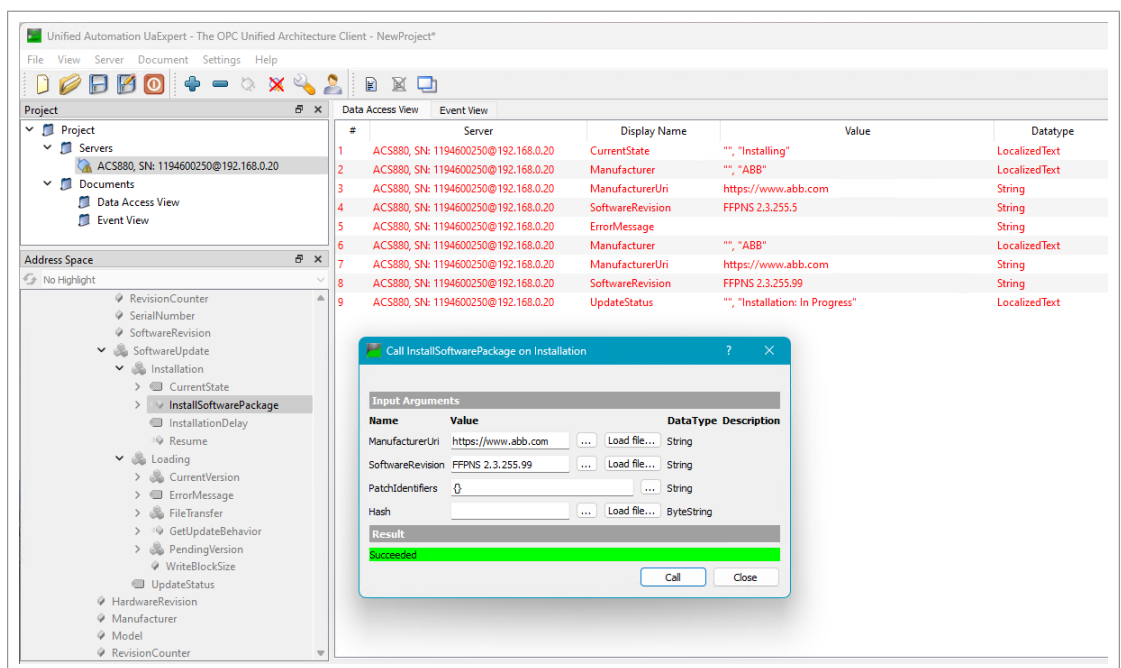
- After a succesful file transfer the metadata of the pending version becomes available. UpdateStatus shows that a pending version is available for installation. CurrentState changes from ApplyWrite to Idle.



- Double-click the InstallSoftwarePackage method under SoftwareUpdate > Installation. Update the ManufacturerUri and SoftwareVersion fields with the data in the PendingVersion object, and call the method.



10. The method call succeeds, and after a few seconds the connection to the server is lost. At this point, the FPNO-21 restarts to apply the firmware update.



11. Wait until the OPCUA server restarts and reconnects to the client. This can take several minutes. Once connected, verify that the new software is applied: check that the SoftwareRevision under Loading > CurrentVersion has the new software revision. The values of CurrentState and UpdateStatus return to "Idle".

Unified Automation UaExpert - The OPC Unified Architecture Client - NewProject\*

File View Server Document Settings Help

Project

- Project
  - Servers
    - ACS880, SN: 1194600250@192.168.0.20
      - Documents
        - Data Access View
        - Event View

Address Space

No Highlight

- RevisionCounter
- SerialNumber
- SoftwareRevision
- SoftwareUpdate
  - Installation
    - CurrentState
    - InstallSoftwarePackage
    - InstallationDelay
    - Resume
  - Loading
    - CurrentVersion
    - ErrorMessage
    - FileTransfer
    - GetUpdateBehavior
    - PendingVersion
    - WriteBlockSize
  - UpdateStatus
- HardwareRevision
- Manufacturer
- Model
- RevisionCounter

Data Access View

| # | Server                              | Display Name     | Value               | Datatype      |
|---|-------------------------------------|------------------|---------------------|---------------|
| 1 | ACS880, SN: 1194600250@192.168.0.20 | CurrentState     | "" , "Idle"         | LocalizedText |
| 2 | ACS880, SN: 1194600250@192.168.0.20 | Manufacturer     | "" , "ABB"          | LocalizedText |
| 3 | ACS880, SN: 1194600250@192.168.0.20 | ManufacturerUri  | https://www.abb.com | String        |
| 4 | ACS880, SN: 1194600250@192.168.0.20 | SoftwareRevision | FFPNS 2.3.255.99    | String        |
| 5 | ACS880, SN: 1194600250@192.168.0.20 | ErrorMessage     |                     | String        |
| 6 | ACS880, SN: 1194600250@192.168.0.20 | Manufacturer     | "" , ""             | LocalizedText |
| 7 | ACS880, SN: 1194600250@192.168.0.20 | ManufacturerUri  |                     | String        |
| 8 | ACS880, SN: 1194600250@192.168.0.20 | SoftwareRevision |                     | String        |
| 9 | ACS880, SN: 1194600250@192.168.0.20 | UpdateStatus     | "" , "Idle"         | LocalizedText |

## Technical data

The default OPC UA Application name is <Drive type>, SN: <drive serial number>.  
Example: ACS880, SN 1234567890.

The implementation of the OPC UA server is based on these specifications:

- OPC UA v1.05.02 (released 2022)
- OPC 10000-100, Device Model v1.04 (released 2022)
- OPC UA Field eXchange with:
  - OPC 10000-80, Overview and Concepts v1.00 (released 2022)
  - OPC 10000-81, Connecting Devices and Information Model v1.00.02 (released 2022)
- OPC 40400-1: OPC UA for Powertrain
  - Part 1: Asset Management

|                                                         |        |
|---------------------------------------------------------|--------|
| Maximum number of connections                           | 5      |
| Maximum number of subscription                          | 50     |
| Maximum number of monitored items<br>(over all clients) | 50     |
| Maximum monitored items per subscription                | 50     |
| Minimum sample rate                                     | 100 ms |



# Further information

## Product and service inquiries

Address any inquiries about the product to your local ABB representative, quoting the type designation and serial number of the unit in question. A listing of ABB sales, support and service contacts can be found by navigating to [new.abb.com/contact-centers](http://new.abb.com/contact-centers).

## Product training

For information on ABB product training, navigate to [new.abb.com/service/training](http://new.abb.com/service/training).

## Providing feedback on ABB manuals

Your comments on our manuals are welcome. Navigate to [forms.abb.com/form-26567](http://forms.abb.com/form-26567).

## Document library on the Internet

You can find manuals and other product documents in PDF format on the Internet at [www.abb.com/drives/documents](http://www.abb.com/drives/documents).



[www.abb.com/drives](http://www.abb.com/drives)



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