

PowerXL™

DX-NET-PROFINET-2
Field bus connection PROFINET
for Variable Frequency Drives DA1



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Original Operating Instructions

The German-language edition of this document is the original operating manual.

Translation of the original operating manual

All editions of this document other than those in German language are translations of the original German manual.

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Danger! **Dangerous electrical voltage!**

Before commencing the installation

- Disconnect the power supply of the device.
- Ensure that devices cannot be accidentally restarted.
- Verify isolation from the supply.
- Earth and short circuit the device.
- Cover or enclose any adjacent live components.
- Follow the engineering instructions (AWA/IL) for the device concerned.
- Only suitably qualified personnel in accordance with EN 50110-1/-2 (VDE 0105 Part 100) may work on this device/system.
- Before installation and before touching the device ensure that you are free of electrostatic charge.
- The functional earth (FE, PES) must be connected to the protective earth (PE) or the potential equalisation. The system installer is responsible for implementing this connection.
- Connecting cables and signal lines should be installed so that inductive or capacitive interference does not impair the automation functions.
- Install automation devices and related operating elements in such a way that they are well protected against unintentional operation.
- Suitable safety hardware and software measures should be implemented for the I/O interface so that an open circuit on the signal side does not result in undefined states in the automation devices.
- Ensure a reliable electrical isolation of the extra-low voltage of the 24 V supply. Only use power supply units complying with IEC 60364-4-41 (VDE 0100 Part 410) or HD384.4.41 S2.
- Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation.
- Emergency stop devices complying with IEC/EN 60204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency-stop devices must not cause a restart.
- Devices that are designed for mounting in housings or control cabinets must only be operated and controlled after they have been installed and with the housing closed. Desktop or portable units must only be operated and controlled in enclosed housings.
- Measures should be taken to ensure the proper restart of programs interrupted after a voltage dip or failure. This should not cause dangerous operating states even for a short time. If necessary, emergency-stop devices should be implemented.
- Wherever faults in the automation system may cause injury or material damage, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (for example, by means of separate limit switches, mechanical interlocks etc.).
- Depending on their degree of protection, frequency inverters may contain live bright metal parts, moving or rotating components or hot surfaces during and immediately after operation.
- Removal of the required covers, improper installation or incorrect operation of motor or frequency inverter may cause the failure of the device and may lead to serious injury or damage.
- The applicable national accident prevention and safety regulations apply to all work carried on live frequency inverters.
- The electrical installation must be carried out in accordance with the relevant regulations (e. g. with regard to cable cross sections, fuses, PE).
- Transport, installation, commissioning and maintenance work must be carried out only by qualified personnel (IEC 60364, HD 384 and national occupational safety regulations).
- Installations containing frequency inverters must be provided with additional monitoring and protective devices in accordance with the applicable safety regulations. Modifications to the frequency inverters using the operating software are permitted.
- All covers and doors must be kept closed during operation.
- To reduce the hazards for people or equipment, the user must include in the machine design measures that restrict the consequences of a malfunction or failure of the drive (increased motor speed or sudden standstill of motor). These measures include:
 - Other independent devices for monitoring safety-related variables (speed, travel, end positions etc.).
 - Electrical or non-electrical system-wide measures (electrical or mechanical interlocks).
 - Never touch live parts or cable connections of the frequency inverter after it has been disconnected from the power supply. Due to the charge in the capacitors, these parts may still be live after disconnection. Fit appropriate warning signs.

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0 About this Manual

0.1 Target group

This manual describes the PROFINET connection DX-NET-PROFINET-2 for the variable frequency drives of the DA1 device series.

It is aimed at experienced drive specialists and automation technicians. A thorough knowledge of the PROFINET field bus and the programming of a PROFINET master is required. Knowledge of handling the DA1 variable frequency drive is also required.

Please read this manual carefully before installing and operating the PROFINET connection.

We assume that you have a good knowledge of engineering fundamentals, and that you are familiar with handling electrical systems and machines, as well as with reading technical drawings.



To make it easier to understand some of the figures included in this manual, the housing and other safety-relevant parts have been left out.

The components described here must be used only with a properly fitted housing and all necessary safety-relevant parts.



Please follow the notes in the IL040004ZU instruction leaflet.



All the specifications in this manual refer to the hardware and software versions documented in it.



More information on the series described here can be found on the Internet under:

www.eaton.com/moeller → **Support**

0.2 Reading conventions

Symbols used in this manual have the following meanings:

- ▶ Indicates instructions to be followed.

0.2.1 Hazard warnings of material damages

NOTICE

Warns about the possibility of material damage.

0.2.2 Hazard warnings of personal injury



CAUTION

Warns of the possibility of hazardous situations that may possibly cause slight injury.



WARNING

Warns of the possibility of hazardous situations that could result in serious injury or even death.



DANGER

Warns of hazardous situations that result in serious injury or death.

0.2.3 Tips



Indicates useful tips.

0.3 Abbreviations and symbols

The following abbreviations are used in this manual:

ADI	Application Data Instance
CW	Command
EMC	Electromagnetic compatibility
FB	Field bus
FS	Frame size
GND	Ground (0 V potential)
GSDML	Generic Station Description Markup Language
LED	Light Emitting Diode
LSB	Least significant bit
MSB	Most significant bit
PC	Personal Computer
PNU	Parameter number
PD	Process Data
PROFINET	Process field network
PLC	Programmable logic controller
SW	Status Word
UL	Underwriters Laboratories

0.4 Units

Every physical dimension included in this manual uses international metric system units, otherwise known as SI (Système International d'Unités) units. For the purpose of the equipment's UL certification, some of these dimensions are accompanied by their equivalents in imperial units.

Table 1: Unit conversion examples

Designation	US-American value	US-American designation	SI value	Conversion value
Length	1 in (")	inch	25.4 mm	0.0394
Power	1 HP = 1.014 PS	horsepower	0.7457 kW	1.341
Moment of torque	1 lbf in	pound-force inches	0.113 Nm	8.851
Temperature	1 °F (T _F)	Fahrenheit	-17.222 °C (T _C)	T _F = T _C × 9/5 + 32
Rotational speed	1 rpm	Revolutions per minute	1 min ⁻¹	1
Weight	1 lb	pound	0.4536 kg	2.205
Flow rate	1 cfm	cubic feet per minute	1.698 m ³ /n	0.5889

0 About this Manual

0.4 Units

1 Device series

1.1 Checking the Delivery



Before opening the package, please check the nameplate on it to make sure that you received the correct connection.

Your field bus connection was carefully packaged and handed over for shipment. The devices should be shipped only in their original packaging with suitable transportation materials. Please observe the labels and instructions on the packaging and for handling the unpacked device.

- ▶ Open the packaging with adequate tools and inspect the contents immediately after receipt in order to ensure that they are complete and undamaged.

The packaging must contain the following parts:

- A field bus connection DX-NET-PROFINET-2,
- the instruction leaflet IL040004ZU.

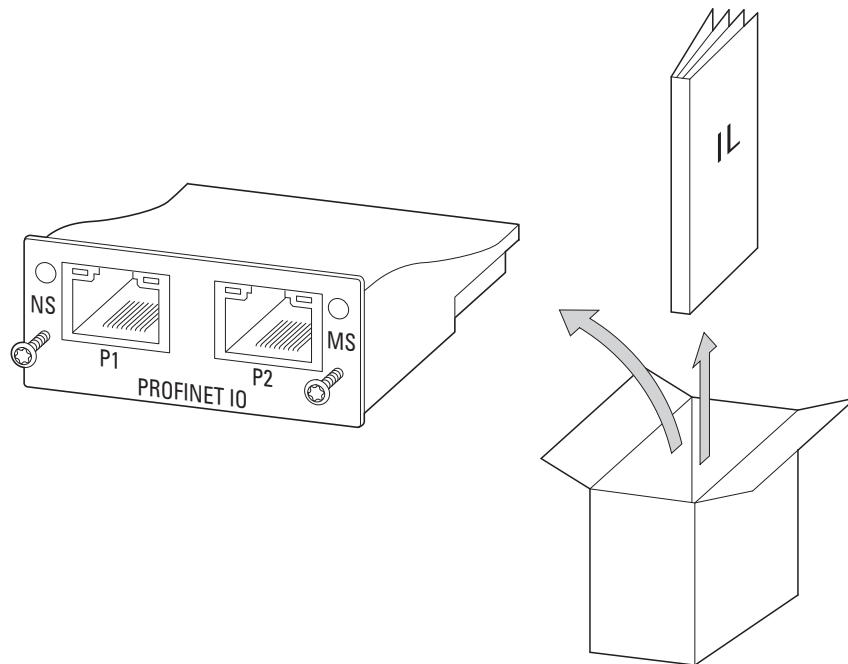


Figure 1: Equipment supplied with field bus connection DX-NET-PROFINET-2

1 Device series

1.2 Key to part numbers

1.2 Key to part numbers

The catalog number selection and the part no. for the DX-NET-... field bus connection card have the following syntax:

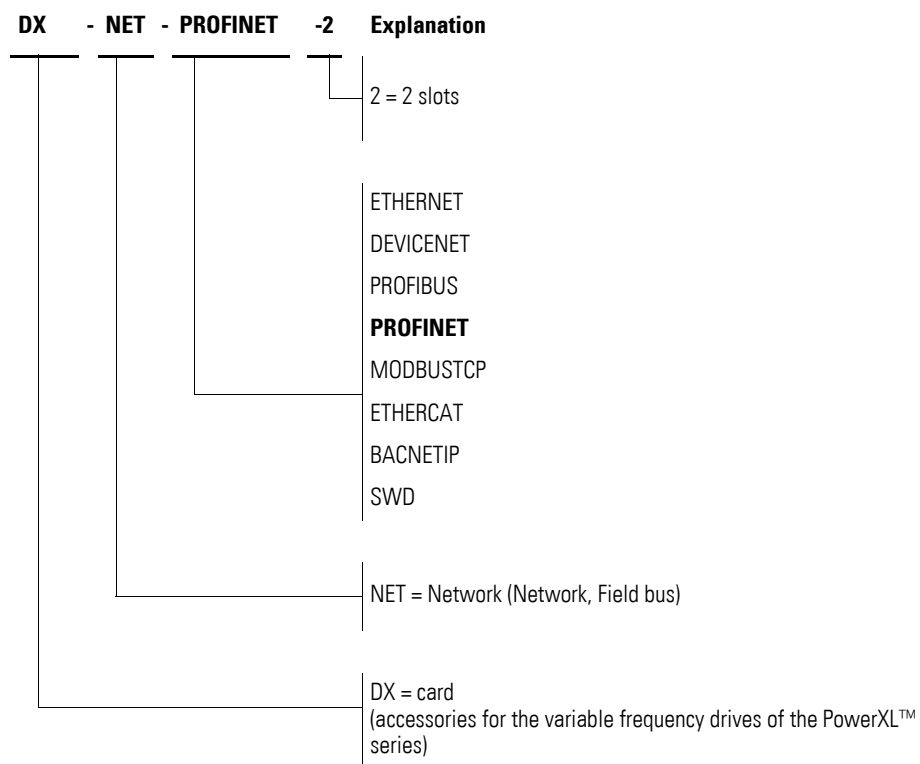


Figure 2: Catalog number selection of field bus interface card DX-NET-...

1.3 General rated operational data

Technical Data	Symbol	Unit	&Value
General			
Standards			meets the requirements of the EN 50178 (standard for electrical safety)
Production quality			RoHS, ISO 9001
Environmental conditions			
Operation temperature	ϑ	°C	-40 (no hoarfrost) up to +70
Storage temperature	ϑ	°C	-40 - +85
Climatic proofing	ρ_w	%	< 95, relative humidity, no condensation permitted
Altitude	H	m	max. 1000
Vibration	g	m/s ²	5 – according to IEC 68-2-6; 10 - 500 Hz; 0.35 mm
PROFINET connections			
Interface			RJ45 plug
Data transfer			100 Mbit/s full-duplex
Transfer cable			Twisted two-pair balanced cable (screened)
Communication protocol			
PROFINET			IEC 61158
Baud rate		MBit/s	100

1 Device series

1.4 Designation at DX-NET-PROFINET-2

1.4 Designation at DX-NET-PROFINET-2

The following drawing shows the DX-NET-PROFINET-2 field bus connection for PROFINET with two RJ45 ports.

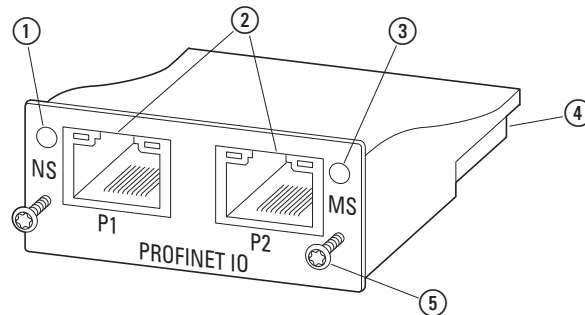


Figure 3: Designations at DX-NET-PROFINET-2

- ① Network status LED (NS)
- ② RJ45 sockets
- ③ Module status LED (MS)
- ④ 50-pole adapter extension
- ⑤ Screws for securing DA1 variable frequency drive

1.5 Proper use

The DX-NET-PROFINET-2 field bus connection is an electrical piece of equipment that can be used to control DA1 variable frequency drives and connect them to a standard PROFINET field bus system. It is intended to be installed in a machine or assembled with other components into a machine or system. It makes it possible for DA1 series variable frequency drives to be integrated as I/O devices into PROFINET field bus systems.

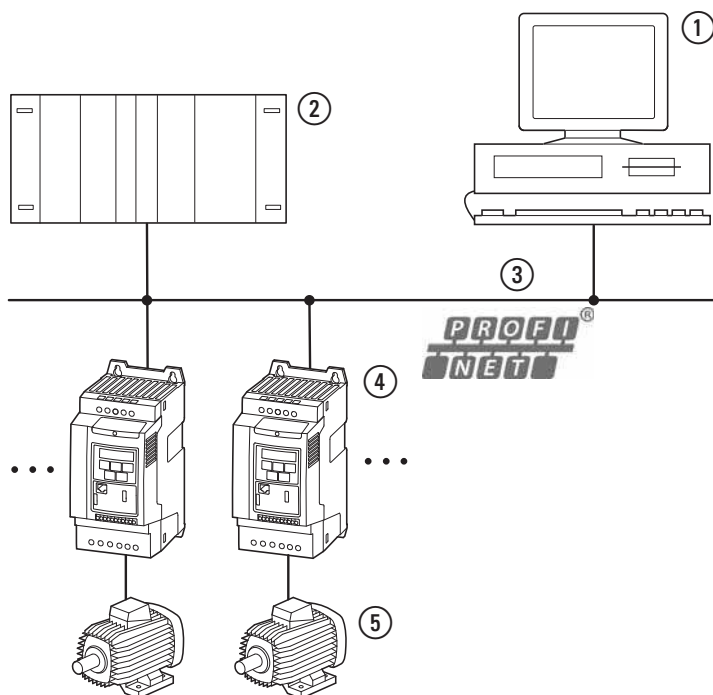


Figure 4: How the DX-NET-PROFINET-2 field bus connection can be integrated into a PROFINET network

- ① PC
- ② Head controller (I/O controller)
- ③ PROFINET cable
- ④ DA1 variable frequency drive with DX-NET-PROFINET-2 connection (I/O device)
- ⑤ Motor(s)



The DX-NET-PROFINET-2 field bus connection is not a household appliance, but rather a component intended exclusively for use in commercial applications.



Observe the technical data and connection requirements described in this manual.

Any other usage constitutes improper use.

1 Device series

1.6 Maintenance and inspection

1.6 Maintenance and inspection

The DX-NET-PROFINET-2 field bus connection will not require any maintenance if the general rated operational data (→ Page 9), as well as all PROFINET-specific technical data, is adhered to. However, external factors can influence the components's lifespan and function.

We therefore recommend that the devices be checked regularly and that the following maintenance measures be carried out at the specified intervals.

Table 2: Recommended maintenance

Maintenance measures	Maintenance interval
Clean cooling vents (cooling slits)	please enquire
Check the filter in the control panel doors (see the manufacturer's specifications)	6 - 24 months (depending on the environment)
Check the tightening torques of the control signal terminals	regularly
Check connection terminals and all metallic surfaces for corrosion	6 - 24 months (depending on the environment)

The DX-NET-PROFINET-2 field bus connection has not been designed in such a way as to make it possible to replace or repair it. If the card is damaged by external influences, repair is not possible.

1.7 Storage

If the field bus connection is stored before use, suitable ambient conditions must be ensured at the site of storage:

- Storage temperature: -40 - +85 °C,
- Relative average air humidity: < 95 %, no condensation permitted.

1.8 Service and warranty

Contact your local sales partner if you have a problem with your Eaton field bus connection.

When you call, have following data ready:

- the exact part no. (= DX-NET-PROFINET-2),
- the date of purchase,
- a detailed description of the problem which has occurred with the DX-NET-PROFINET-2 field bus connection.

Information concerning the guarantee can be found in the Terms and Conditions Eaton Industries GmbH.

24-hour hotline: +49 (0) 180 5 223 822

e-mail: AfterSalesEGBonn@Eaton.com

1.9 Disposal

The DX-NET-PROFINET-2 field bus connection can be disposed of as electrical waste in accordance with the currently applicable national regulations. Dispose of the device according to the applicable environmental laws and provisions for the disposal of electrical or electronic devices.

2 Engineering

2.1 PROFINET

PROFINET is an open Industrial Ethernet standard (IEC 61158) designed for a wide range of applications. It can be used to connect devices of different manufacturers and implement communication between them.

PROFINET emerged from the combination of PROFIBUS and Industrial Ethernet. This means that existing PROFIBUS systems can generally be integrated into the new PROFINET system. Since PROFINET is based on 100-Mbit/s full-duplex Ethernet, it enables all cards to access the corresponding network at any time.

Generally speaking, a PROFINET system will have various devices that can be subdivided into controllers and devices (master and slave devices). Within this context, controller devices are responsible for controlling the communications on the bus. A controller can send a message without first receiving an external request. Meanwhile, devices consist of peripheral devices that can be subdivided into sensors and actuators, e.g., light barriers, valves, and variable frequency drives. Devices respond to requests from controllers by sending information or executing commands.

PROFINET systems allow for a variety of topologies. Many PROFINET devices feature an integrated switch and two integrated ports so as to make it possible to establish a linear or tree topology, eliminating the need for external switches. The number of cards on a PROFINET system is virtually unlimited.

2.2 LED indicators

The module's LED indicators are used to indicate operating and network statuses, making quick diagnostics possible.

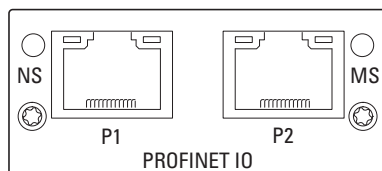


Figure 5: NS and MS LED indicators

2.2.1 NS (Network status)

The network status LED (NS) is used to indicate network statuses.

LED status	Description
off	offline – the I/O device is switched off. No connection to the I/O controller
Green illuminating	online – connection to the I/O controller established
Green flashing	online – I/O controller stopped

2.2.2 MS (Module Status)

The module status LED (MS) is used to indicate the PROFINET module's status.

LED status	Description
off	Module off
Green illuminating	Module is online. Data exchange is taking place.
Green flashing	Diagnostics active
illuminated red	Bus error – a fault is active
Red, flashing once	Configuration error / identification error
Red, flashing twice	IP address not configured
Red, flashing three times	Station name error
Red, flashing four times	Internal error

2.2.3 LINK/Activity-LED

The LINK/Activity LED is used to indicate communications statuses.

LED status	Description
off	No data exchange taking place. There is no Ethernet connection.
Green illuminating	No data exchange taking place. An Ethernet connection has been established.
Green flashing	Data exchange is taking place. An Ethernet connection has been established.

3 Installation

3.1 Introduction

This chapter provides a description of the mounting and the electrical connection for the field bus connection DX-NET-PROFINET-2.

- ➔ While installing and/or mounting the field bus connection, cover all ventilation slots in order to ensure that no foreign bodies can enter the device.
- ➔ Perform all installation work with the specified tools and without the use of excessive force.

In the case of DA1 variable frequency drives, the way in which the DX-NET-PROFINET-2 field bus connection needs to be installed will depend on the corresponding variable frequency drive's size.

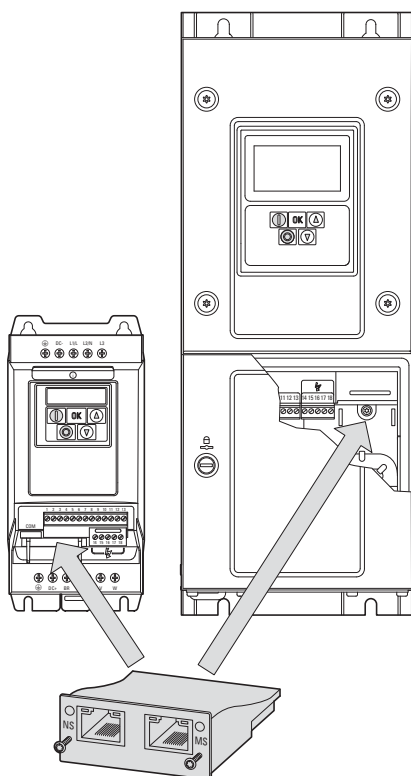


Figure 6: Flush mounting of field bus connection

In the case of DA1 variable frequency drives with sizes FS2 and FS3, the card will need to be plugged into the variable frequency drive from below. In the case of sizes FS4 and up, the card will need to be mounted on the right side, underneath the variable frequency drive's front enclosure cover.

3 Installation

3.2 Notes on the documentation

3.2 Notes on the documentation

Documents containing installation instructions:

- IL4020010Z instruction leaflet for DA1 variable frequency drive in size FS2 and FS3
- IL4020011Z instruction leaflet for DA1 variable frequency drive from size FS4

These documents are also available as PDF files on the Eaton Internet website. They can be quickly located at

www.eaton.com/moeller → Support

by entering the document number as the search term.

3.3 Notes on the mechanical surface mounting



DANGER

Make sure that the equipment is fully de-energized when performing the handling and installation work required to mechanically set up and install the field bus connection.



When installing the DX-NET-PROFINET-2 field bus connection, it will be necessary to open the DA1 variable frequency drive's enclosure. We recommend that this mounting work be carried out before the electrical installation of the variable frequency drive.

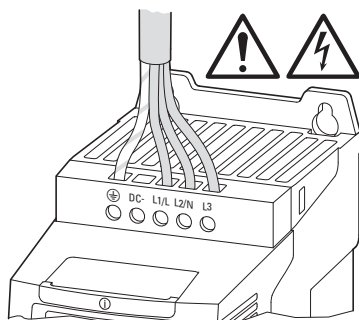


Figure 7: Make sure that the equipment is de-energized when performing installation work

3.4 Mounting for frame sizes FS2 and FS3

In the case of DA1 variable frequency drives with sizes FS2 and FS3, the DX-NET-PROFINET-2 field bus connection needs to be installed on the bottom of the variable frequency drive. To do this, use a flat-blade screwdriver to lift off the cover at the marked cutout (without forcing it) and then remove the cover by hand.

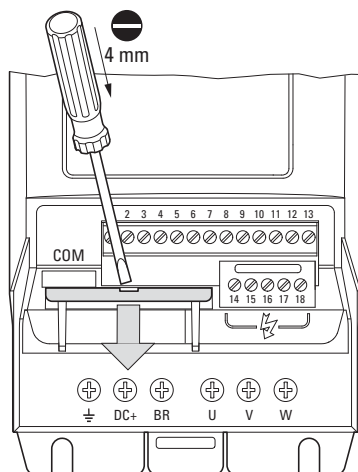


Figure 8: Opening the interface cover

NOTICE

Do not insert tools or other objects into the opened variable frequency drive.
Ensure that foreign bodies do not enter the opened housing wall.

After doing so, you can insert the connection and secure it with the two screws.

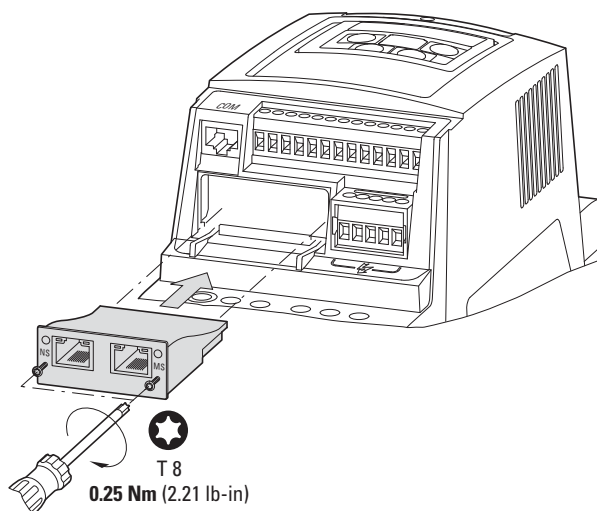


Figure 9: Inserting the field bus connection

3 Installation

3.5 Mounting from construction size FS4

3.5 Mounting from construction size FS4

When working with DA1 variable frequency drives of size FS4 or larger, the DX-NET-PROFINET-2 field bus connection must be installed inside the variable frequency drive. To do so, use a standard screwdriver to turn the two screws on the front cover 90°. Then proceed to remove the cover.

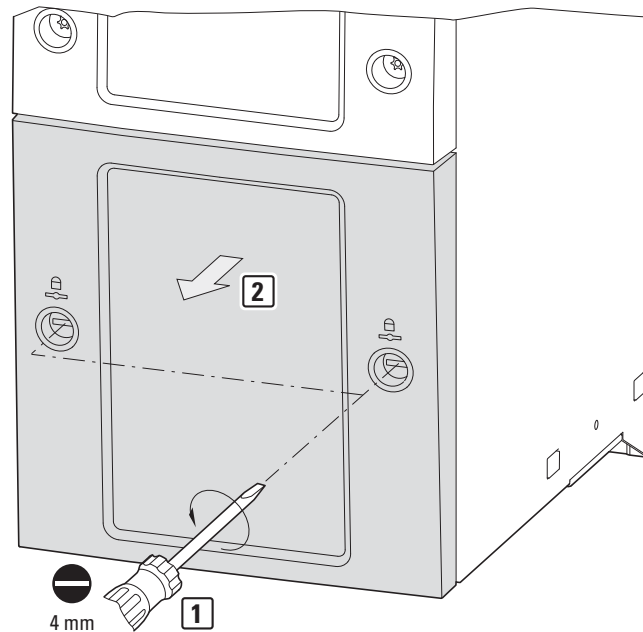


Figure 10: Opening the enclosure of DA1 variable frequency drives with size FS4 and up

NOTICE

Do not insert tools or other objects into the opened variable frequency drive.
Ensure that foreign bodies do not enter the opened housing wall.

3 Installation
3.5 Mounting from construction size FS4

After doing so, you can insert the connection on the right-hand side and use the screws to secure it.

Then put the cover back on and use the two screws (turn them 90°) to secure it.

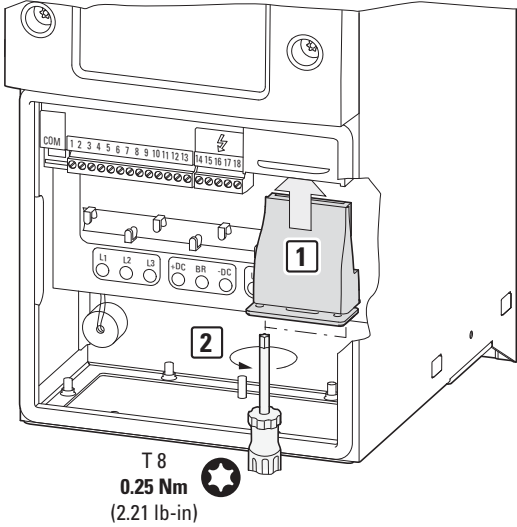


Figure 11: Inserting the field bus connection

3 Installation

3.6 Installing the field bus connection

3.6 Installing the field bus connection

An RJ45 plug is used in order to establish a connection to the PROFINET field bus.

Generally, connection cables with RJ45 plugs for PROFINET are available as standard ready-for-use cables. They can also be prepared individually. This will require the connections shown below (pinout).

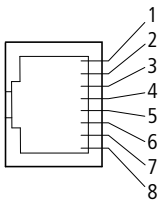
	Pin	Meaning
	1	TD+
	2	TD-
	3	RD+
	4	To GND via RC circuit
	5	To GND via RC circuit
	6	RD-
	7	To GND via RC circuit
	8	To GND via RC circuit

Figure 12:RJ45 plug pinout

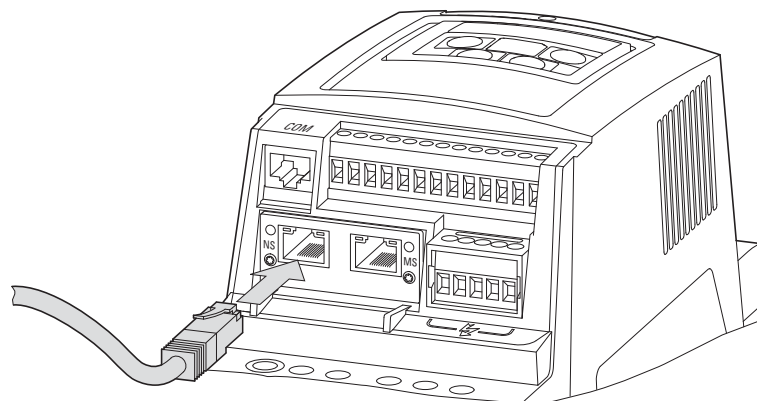


Figure 13:Connecting the RJ45 plug

3.7 Install field bus



Never lay the cable of a field bus system directly parallel to the energy carrying cables.

When installing the connection, make sure that the control and signal cables (0 - 10 V, 4 - 20 mA, 24 VDC, etc.), as well as the field bus system's (PROFINET) connection cables, are not routed directly parallel to mains connection or motor connection cables conveying power.

With parallel cable routing, the clearances between control, signal and field bus cables ② and energy-carrying mains and motor cables ① must be greater than 30 cm. Cables should always intersect at right angles.

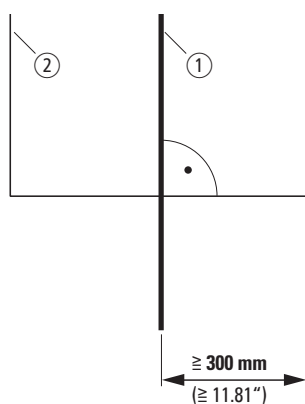


Figure 14: Routing cables for PROFINET ② and mains/motor cables ①

If the system requires a parallel routing in cable ducts, a partition must be installed between the field bus cable ② and the mains and motor cable ①, in order to prevent electromagnetic interference on the field bus.

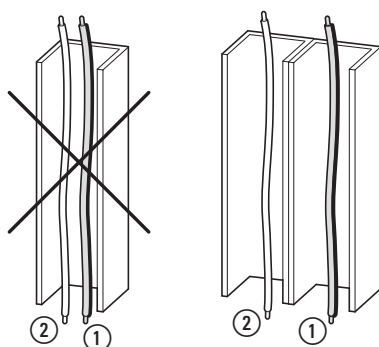


Figure 15: Separate routing in the cable duct

- ① Mains and motor connection cable
- ② PROFINET cable



In all cases only use approved PROFINET cables.

3 Installation

3.7 Install field bus

4 Commissioning

4.1 DA1 variable frequency drives

→ First of all complete all measures for commissioning the DA1 variable frequency drive as described in the respective manual MN04020005Z-EN.

→ Check the settings and installations for the connection to the PROFINET field bus system which are described in this manual.

NOTICE

Make sure that there is no danger in starting the motor. Disconnect the driven machine if there is a danger in an incorrect operating state.

→ The following parameter settings listed below are required for operation with PROFINET.

4.2 GSDML file

The properties of a PROFINET card are described in the corresponding GSDML file. This file is required in order to be able to integrate a DA1 variable frequency drive into a PROFINET network.

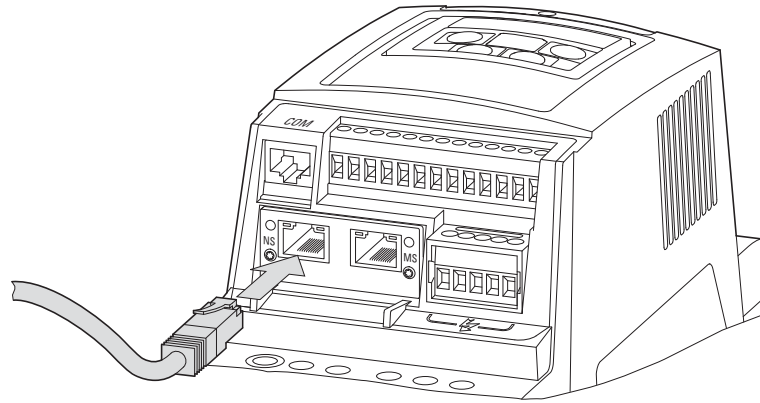
→ The GSDML file, named "Eatn0109tbd.gsdml", can be found on the CD-ROM and on the Internet at:

www.eaton.com/moeller → **Support** → **Downloads**

4.3 Configuring the module

The following instructions explain how to configure the communication module with a DA1 variable frequency drive.

- ▶ Connect the device to the network (connect the RJ-45 plug).



- ▶ Then connect the device to the PROFINET environment. You will need the following components to do so:
 - Head controller (I/O controller functioning as a master)
 - Computer (for programming and configuration purposes)
 - I/O device (e.g., DA1 variable frequency drive with DX-NET-PROFINET-2 connection)

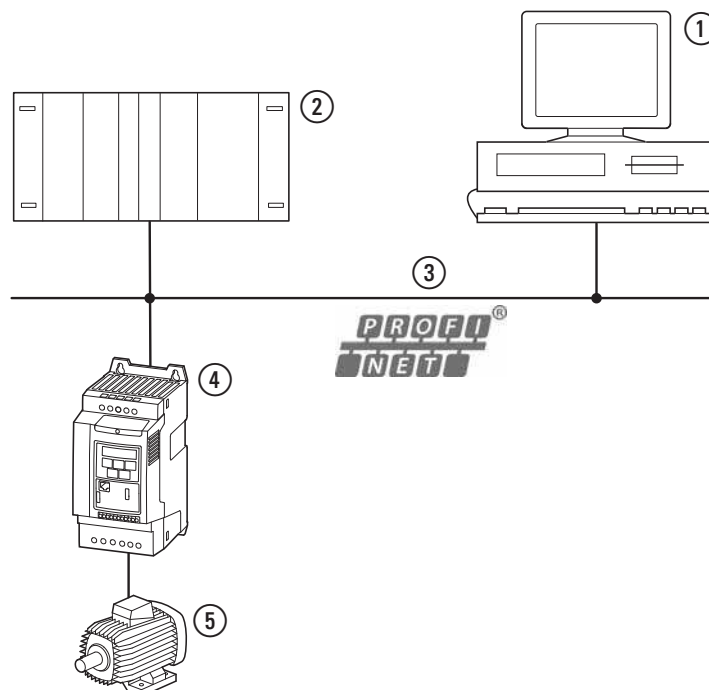


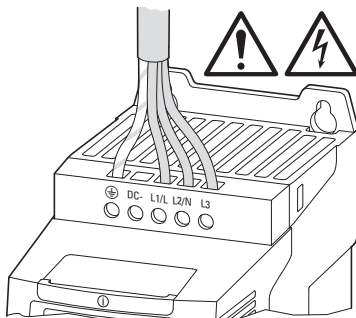
Figure 16:Engineering

- ① PC (with configuration tool)
- ② Head controller (I/O controller)
- ③ PROFINET cable
- ④ DA1 variable frequency drives
- ⑤ Motor

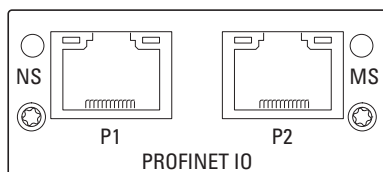
4 Commissioning

4.3 Configuring the module

- ▶ Switch the device on (turn on the power supply!).



- ▶ Now configure the project. (For information on a detailed configuration, please consult the manual provided by the PLC's manufacturer.)
- ▶ Check the LED indicators.
The I/O controller must recognize the device name and the module must light up with a green light (→ Section 2.2, „LED indicators”).



4.4 Parameters

The abbreviations used in the parameter lists below have the following meaning:

PNU	Parameter number
ID	Identification number of the parameter
RUN	Access rights to the parameters during operation (RUN): / = Modification permissible - = Modification only possible in STOP
ro/rw	Parameter read and write permissions via a field bus connection: ro = read only rw = read and write (read and write)
Value	Setting of the parameter
DS	Default setting: (P1.1 = 1) base parameter



Access rights are not shown in the drivesConnect PC software.

Manual						
PNU	ID	Access right		Value	Description	DS
		RUN	ro/rw			
①				②	③	④

PC Software					
PNU	Description	&Value	Range	Default	Visible
①	③	②		④	

figure 17: How the parameters are shown in the manual and in the software

PNU	ID	Access right		Designation	Value range	DS	Value that must be configured
		RUN	ro/rw				
P1-12	112	-	rw	Control level	0 = Control signal terminals (I/O) 1 = Keypad (KEYPAD FWD) 2 = Keypad (KEYPAD FWD/REV) 3 = PID control 4 = field bus system (PROFINET-2, Modbus RTU, etc.) 5 = Slave mode 6 = field bus CANopen	0	4

The Baud rate will automatically be set to match the master.

4.5 Addressing

PROFINET-IO devices are addressed with a MAC address and an IP address. Every single device has a globally unique MAC address (6-byte-long Ethernet address): The first three bytes define the manufacturer-specific ID, while the three remaining bytes define the device's serial device number.

→ The MAC address will be printed on the corresponding nameplate.
The DHCP function will be enabled by default.

PROFINET modules have specific names, ensuring that it will be possible to assign every I/O device uniquely within a project. All I/O devices within a project can be set up and configured using this name. It will not be possible to establish a connection to the PLC if the name is incorrect or if there is an incorrect configuration, as the PLC uses this name to recognize the I/O device on the network.

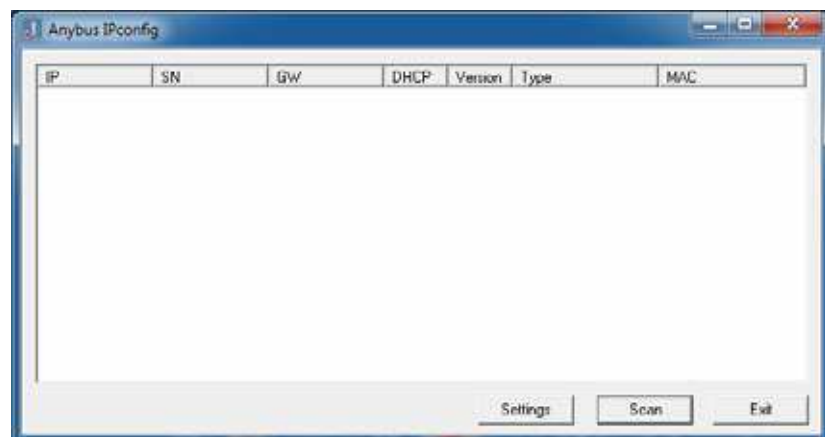
→ The IP address can be configured with a network tool (e.g., STEP 7/HW configuration or HMS IPconfig).

4.5.1 Configuring the IP address

The following instructions explain how to configure the IP address for the communication module.

→ The address is configured using the IPconfig program.
This program can be downloaded on the Internet at: www.anybus.com/support → **Support**
Select **Support Tools** from the drop-down menu.

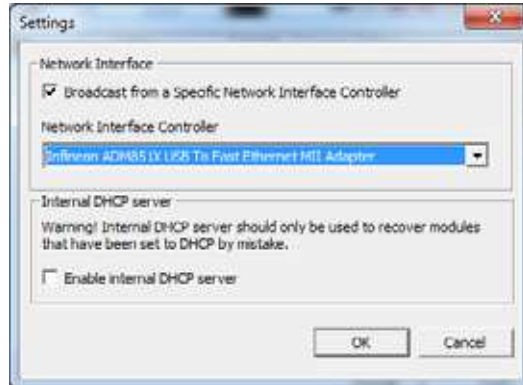
- ▶ Plug the module into the variable frequency drive (→ Figure 9, page 17).
- ▶ Connect the device to the computer and to the network (connect the RJ-45 plug → Figure 13, page 20).
- ▶ Switch on the device.
- ▶ Open the IPconfig program and click on **Settings**.



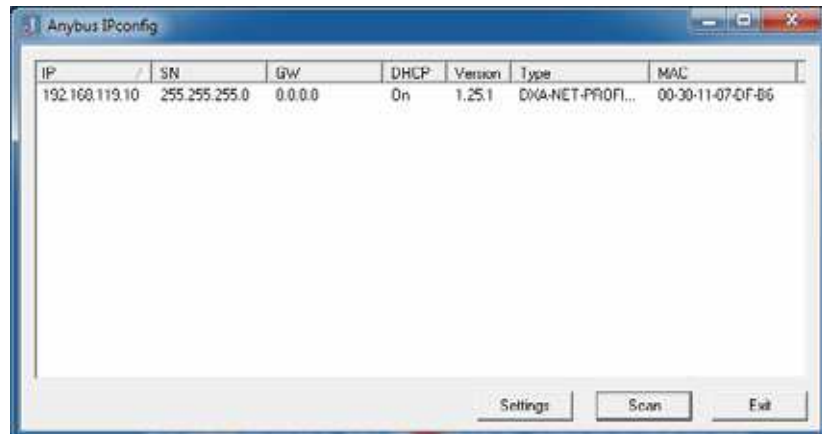
4 Commissioning

4.5 Addressing

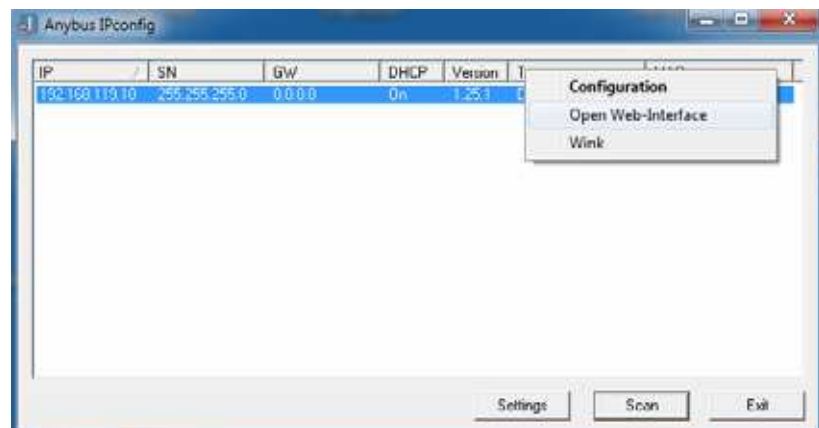
- ▶ Select the computer network adapter (Infinion ADM, etc.) from the **Network Interface Controller** drop-down menu and click on **OK**.



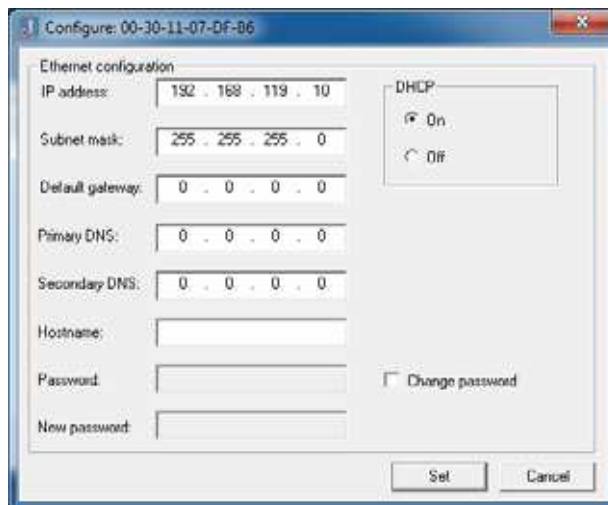
- ▶ Now click on **Scan**. The program will show all available modules.



- ▶ Right-click on the line for the module and select the **Configuration** option from the context menu in order to assign the module an IP address.



- ▶ Now set an IP address. Confirm with **OK**.



➔ For more information on the available parameter data, refer to
➔ Section 4.6.3, „Acyclic data“, page36.

4 Commissioning

4.6 Operation

4.6 Operation

4.6.1 Cyclic data

Process data field

Master → Slave	CW	REF	PDI 3	PDI 4
Slave → Master	SW	ACT	PDO 3	PDO 4

The length of each data unit is 1 word.

Description of data content

Byte:	Meaning	Explanation
CW	Control word	Command
SW	Status word	Status Word
REF	Reference Value	Setpoint value
ACT	Actual Value	Actual value
PDO	Process Data Out	Process data output
PDI	Process Data In	Process data input

Command

PNU	Description	
	value = 0	value = 1
0	stop	Operation
1	Clockwise rotating field (FWD)	Anticlockwise rotating field (REV)
2	No action	Fault Reset
3	No action	free coasting
4	Not used	
5	No action	Quick stop (ramp)
6	No action	Fixed frequency 1 (FF1)
7	No action	Overwrite setpoint value with 0
8	Not used	
9	Not used	
10	Not used	
11	Not used	
12	Not used	
13	Not used	
14	Not used	
15	Not used	

Setpoint value

The permissible values fall within a range of P1-02 (minimum frequency) to P1-01 (maximum frequency). This value will be scaled with a factor of 0.1 in the application.

Process data input 3 (PDI 3)

Configured with parameter P5-14.

The following settings can also be modified during operation:

Value	Description	DS
Field bus module PDI-3 input	0 = Torque limit / reference 1 = User PID reference register 2 = User register 3	0

Process data input 4 (PDI 4)

Configured with parameter P5-13.

The following settings can also be modified during operation:

Value	Description	DS
Field bus module PDI-4 input	0 = Ramp control field bus 1 = User register 4	0

Status Word

The status word (consisting of any error messages and the device status) provides information regarding the device status and any error messages.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
MSB															LSB
Error Messages								Device status							

Device status

Bit	Description	
	value = 0	value = 1
0	Drive not ready	READY
1	stop	Operation (RUN)
2	Clockwise rotating field (FWD)	Anticlockwise rotating field (REV)
3	no error	Fault detected (FAULT)
4	Acceleration ramp	Frequency actual value equals setpoint input
5	–	Zero speed
6	Speed control deactivated	Speed control activated
7	Not used	

4 Commissioning

4.6 Operation

Error Messages

Failure code [hex]	Value shown on display	Meaning
00	<i>no - F i t</i>	Stop, ready for operation
01	<i>01 - b</i>	Braking chopper overcurrent
02	<i>0L - br</i>	Braking resistance overload
03	<i>0 - l</i>	<ul style="list-style-type: none"> Overcurrent at variable frequency drive output Motor overload Overtemperature on variable frequency drive (heat sink)
04	<i>l t - t r P</i>	Motor, thermal overload
05	<i>5 R F E - 1</i>	Short-circuit at safety circuit input
06	<i>0 U o l t 5</i>	Overvoltage (DC link)
07	<i>U - u o l t 5</i>	Undervoltage (DC link)
08	<i>0 - t</i>	Overtemperature (heat sink)
09	<i>U - t</i>	Undertemperature (heat sink)
0A	<i>P - d E F</i>	Default settings, parameters have been loaded
0B	<i>E - t r i P</i>	External error message
0C	<i>5 C - 0 b 5</i>	Error, OP bus
0D	<i>F L t - d c</i>	Excessively large voltage waves in DC link
0E	<i>P - L O S S</i>	Phase failure (mains side)
0F	<i>h 0 - l</i>	Overcurrent at variable frequency drive output
10	<i>t h - F l t</i>	Thermistor fault, internal (heat sink)
11	<i>d R A R - F</i>	EEPROM checksum fault
12	<i>4 - 2 0 F</i>	Analog input: <ul style="list-style-type: none"> Out-of-range value Wire breakage (4 mA monitoring)
13	<i>d R A R - E</i>	Error in internal memory
14	<i>U - d E F</i>	User-definable factory parameters have been loaded
15	<i>F - P t c</i>	Excessively high temperature, motor PTC
16	<i>F A N - F</i>	Fault, internal fan
17	<i>0 - h E R t</i>	Excessively high ambient temperature
18	<i>0 - t o r 9</i>	Maximum torque limit exceeded
19	<i>U - t o r 9</i>	Output torque too low
1A	<i>0 u t - F</i>	Fault at variable frequency drive output
1D	<i>5 R F E - 2</i>	Short-circuit at safety circuit input
1D	<i>E n c - 0 1</i>	Encoder, communication lost
1F	<i>E n c - 0 2</i>	Encoder, speed error
20	<i>E n c - 0 3</i>	Encoder, wrong PPRs set
21	<i>E n c - 0 4</i>	Encoder, channel A fault
22	<i>E n c - 0 5</i>	Encoder, channel B fault
23	<i>E n c - 0 6</i>	Encoder, channel A and B fault
24	<i>E n c - 0 7</i>	Encoder, RS485 data channel error

Failure code [hex]	Value shown on display	Meaning
25	<i>ENC-08</i>	Encoder, I/O communications loss
26	<i>ENC-09</i>	Encoder, incorrect type
27	<i>ENC-10</i>	Encoder
28	<i>AEF-01</i>	Motor stator resistance fluctuating between phases
29	<i>AEF-02</i>	The motor's stator resistance is too high
2B	<i>AEF-03</i>	Motor inductance too low
2B	<i>AEF-04</i>	Motor inductance too high
2C	<i>AEF-05</i>	The motor parameters do not match the motor
32	<i>SC-F01</i>	Fault: Modbus communication loss error
33	<i>SC-F02</i>	Fault: CANopen communication loss error
34	<i>SC-F03</i>	Communications with field bus module disconnected
35	<i>SC-F04</i>	Loss of communications (I/O cards)
3C	<i>DF-01</i>	Connection to add-on card lost
3D	<i>DF-02</i>	Add-on card in unknown state
46	<i>PLC-01</i>	Unsupported PLC function
47	<i>PLC-02</i>	PLC program too big
48	<i>PLC-03</i>	Division by 0
49	<i>PLC-04</i>	Lower limit value is higher than upper limit value

Actual value

The variable frequency drive's actual value falls within a value range of 0 to P1-01 (maximum frequency). This value will be scaled with a factor of 0.1 in the application.

Process data output 3 (PDO 3)

Configured with parameter P5-12.

The following settings can also be modified during operation:

Value	Description	DS
Field bus module PDO-3 output	0 = Output current 1 = Output power 2 = DI status 3 = AI2 signal level 4 = Heat sink temperature 5 = User register 1 6 = User register 2 7 = P0-80	0

Process data output 4 (PDO 4)

Configured with parameter P5-08.

The following settings can also be modified during operation:

Value	Description	DS
Field bus module PDO-4 output	0 = Motor torque 1 = Output power 2 = DI status 3 = AI2 signal level 4 = Heat sink temperature	0

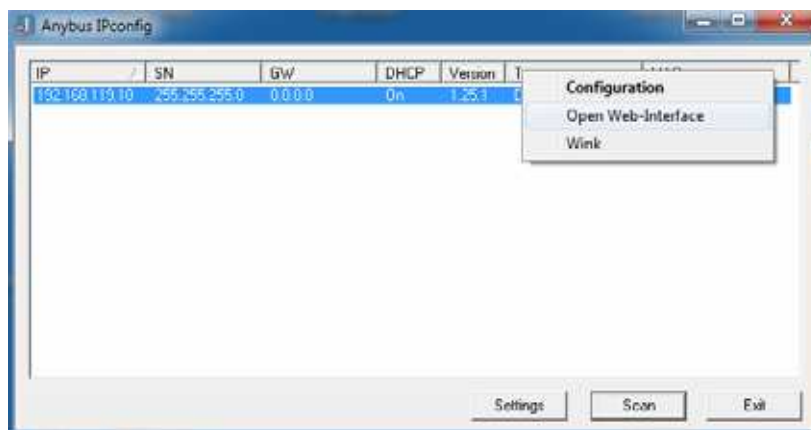
4.6.2 Acyclic data access

DX-NET-PROFINET-2 allows for acyclic communications.

This requires certain settings so that it will be possible to write parameter values to the variable frequency drive and read them from it.

Follow the steps below:

- ▶ In IPconfig, right-click on the line and select the **Open Web-Interface** option from the context menu.



- ▶ Then click on **Parameter data**. (The following screenshot shows an excerpt.)



- ▶ Now enter the parameter values you want in the **Value** column.

Parameter data

Number of parameters per page: 10

#	Parameter	Value
1	ADI-0001	<input type="text" value=""/>
2	ADI-0002	<input type="text" value="0x0001000000000000"/>
3	ADI-0003	<input type="text" value="0x00000147001707d0"/>
4	ADI-0004	<input type="text" value="0x0000000000000005"/>
5	ADI-0005	<input type="text" value="0x0038264900010028"/>
6	ADI-0006	<input type="text" value="0x2240160000780078"/>
7	ADI-0007	<input type="text" value="0x0000000000000000"/>
8	ADI-0008	<input type="text" value="0x0000000000000000"/>
9	ADI-0009	<input type="text" value="8768"/>
10	ADI-0010	<input type="text" value="5632"/>

- ▶ Finally, click on **Set** in order to transfer the values to the variable frequency drive.

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4.6 Operation

4.6.3 Acyclic data

Base Mode Parameter Access can be used to read or modify parameters.

The corresponding index number can be found in the following table.

Select a value of 0 for the API and slot and a value of 1 for the sub-slot.

Table 3: Parameter Data

	PNU	Description	Access right	ADI number	API	Slot	Sub-slot	Index
1		Variable frequency drive ID	ro	9	0	0	1	0009
2		Variable frequency drive part no.	ro	10	0	0	1	000A
3		Control section software	ro	11	0	0	1	000B
4		Control section checksum	ro	12	0	0	1	000C
5		Software power section	ro	13	0	0	1	000D
6		Power section checksum	ro	14	0	0	1	000E
7		Serial number 1	ro	15	0	0	1	000F
8		Serial number 2	ro	16	0	0	1	0010
9		Serial number 3	ro	17	0	0	1	0011
10		Serial number 4	ro	18	0	0	1	0012
11	P1-01	maximum frequency / maximum speed	rw	101	0	0	1	0065
12	P1-02	minimum frequency/DX-NET-PROFINET-2; minimum speed	rw	102	0	0	1	0066
13	P1-03	Acceleration time (acc1)	rw	103	0	0	1	0067
14	P1-04	Deceleration time (dec1)	rw	104	0	0	1	0068
15	P1-05	Stop Function	rw	105	0	0	1	0069
16	P1-06	Energy optimization	rw	106	0	0	1	006A
17	P1-07	Motor, rated operating voltage	rw	107	0	0	1	006B
18	P1-08	Motor, rated operational current	rw	108	0	0	1	006D
19	P1-09	Motor, rated frequency	rw	109	0	0	1	006E
20	P1-10	Motor, rated speed	rw	110	0	0	1	006F
21	P1-11	Output voltage at zero frequency	rw	111	0	0	1	0070
22	P1-12	Control level	rw	112	0	0	1	0071
23	P1-13	Function of the digital input	rw	113	0	0	1	0072
24	P1-14	Parameter range access code (depends on P2-40 and P6-30)	rw	114	0	0	1	0073
25	P2-01	Fixed frequency FF1 / speed 1	rw	201	0	0	1	00C9
26	P2-02	Fixed frequency FF2 / speed 2	rw	202	0	0	1	00CA
27	P2-03	Fixed frequency FF3 / speed 3	rw	203	0	0	1	00CB
28	P2-04	Fixed frequency FF4 / speed 4	rw	204	0	0	1	00CC
29	P2-05	Fixed frequency FF5 / speed 5	rw	205	0	0	1	00CD
30	P2-06	Fixed frequency FF6 / speed 6	rw	206	0	0	1	00CE

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4.6 Operation

	PNU	Description	Access right	ADI number	API	Slot	Sub-slot	Index
31	P2-07	Fixed frequency FF7 / speed 7	rw	207	0	0	1	00CF
32	P2-08	Fixed frequency FF8 / speed 8	rw	208	0	0	1	00D0
33	P2-09	Frequency jump 1, bandwidth	rw	209	0	0	1	00D1
34	P2-10	Frequency skip 1, center	rw	210	0	0	1	00D2
35	P2-11	A01 signal (Analog Output)	rw	211	0	0	1	00D3
36	P2-12	A01, signal range	rw	212	0	0	1	00D4
37	P2-13	A02 signal (Analog Output)	rw	213	0	0	1	00D5
38	P2-14	A02, signal range	rw	214	0	0	1	00D6
39	P2-15	RO1 Signal (Relay 1 Output)	rw	215	0	0	1	00D7
40	P2-16	A01 / RO1 upper limit	rw	216	0	0	1	00D8
41	P2-17	A01 / RO1 lower limit	rw	217	0	0	1	00D9
42	P2-18	RO2 Signal (Relay Output)	rw	218	0	0	1	00DA
43	P2-19	A02 / RO2 upper limit	rw	219	0	0	1	00DB
44	P2-20	A02 / RO2 lower limit	rw	220	0	0	1	00DC
45	P2-21	Scaling factor for value	rw	221	0	0	1	00DD
46	P2-22	scaled display value	rw	222	0	0	1	00DE
47	P2-23	Holding time for speed of zero	rw	223	0	0	1	00DF
48	P2-24	Pulse frequency	rw	224	0	0	1	00E0
49	P2-25	Quick stop deceleration ramp time	rw	225	0	0	1	00E1
50	P2-26	Motor flying restart circuit	rw	226	0	0	1	00E2
51	P2-27	Delay time Standby mode	rw	227	0	0	1	00E3
52	P2-28	Slave speed scaling	rw	228	0	0	1	00E4
53	P2-29	Slave speed scaling factor	rw	229	0	0	1	00E5
54	P2-30	AI1 signal range	rw	230	0	0	1	00E6
55	P2-31	AI1 scaling factor	rw	231	0	0	1	00E7
56	P2-32	AI1 offset	rw	232	0	0	1	00E8
57	P2-33	AI2 signal range	rw	233	0	0	1	00E9
58	P2-34	AI2 scaling factor	rw	234	0	0	1	00EA
59	P2-35	AI2 offset	rw	235	0	0	1	00EB
60	P2-36	REAF, Start function with automatic restart, control signal terminals	rw	236	0	0	1	00EC
61	P2-37	REAF, start function with automatic restart	rw	237	0	0	1	00ED
62	P2-38	Response in the event of a power failure	rw	238	0	0	1	00EE
63	P2-39	Parameter access lock	rw	239	0	0	1	00EF
64	P2-40	Access codes - menu level 2	rw	240	0	0	1	00F0
65	P3-01	PID controllers, P amplification	rw	301	0	0	1	012D
66	P3-02	PID controller, I time constant	rw	302	0	0	1	012E
67	P3-03	PID controller, D time constant	rw	303	0	0	1	012F

4 Commissioning

4.6 Operation

	PNU	Description	Access right	ADI number	API	Slot	Sub-slot	Index
68	P3-04	PID controller, control deviation	rw	304	0	0	1	0130
69	P3-05	PID controller, setpoint source	rw	305	0	0	1	0131
70	P3-06	PID controller, digital reference value	rw	306	0	0	1	0132
71	P3-07	PID controller, actual value limiting, maximum	rw	307	0	0	1	0133
72	P3-08	PID controller, actual value limiting, minimum	rw	308	0	0	1	0134
73	P3-09	PID controller, actual value limiting	rw	309	0	0	1	0135
74	P3-10	PID controller, actual value (PV)	rw	310	0	0	1	0136
75	P3-11	Maximum PID error for enabling the ramps	rw	311	0	0	1	0137
76	P3-12	PID feedback display scaling factor	rw	312	0	0	1	0138
77	P3-13	PID feedback wake up level	rw	313	0	0	1	0139
78	P3-14	reserved	-	314	0	0	1	013A
79	P3-15	reserved	-	315	0	0	1	013B
80	P3-16	reserved	-	316	0	0	1	013C
81	P3-17	reserved	-	317	0	0	1	013D
82	P3-18	PID reset control	rw	318	0	0	1	013E
83	P4-01	Motor control mode selection	rw	401	0	0	1	0191
84	P4-02	Auto-tune enable	rw	402	0	0	1	0192
85	P4-03	Rotational speed controller P gain	rw	403	0	0	1	0193
86	P4-04	Speed controller integral time	rw	404	0	0	1	0194
87	P4-05	Motor power factor (cos ϕ)	rw	405	0	0	1	0195
88	P4-06	Torque setpoint/limit	rw	406	0	0	1	0196
89	P4-07	Maximum torque (motor)	rw	407	0	0	1	0197
90	P4-08	minimum torque	rw	408	0	0	1	0198
91	P4-09	Maximum torque (generator)	rw	409	0	0	1	0199
92	P4-10	V/Hz characteristic curve modification voltage	rw	410	0	0	1	019A
93	P4-11	V/Hz characteristic curve modification frequency	rw	411	0	0	1	019B
94	P5-01	Variable frequency drive: Slave address	rw	501	0	0	1	01F5
95	P5-02	CANopen baud rate	rw	502	0	0	1	01F6
96	P5-03	Modbus RTU Baud rate	rw	503	0	0	1	01F7
97	P5-04	Modbus RTU data format Parity type	rw	504	0	0	1	01F8
98	P5-05	Timeout: Communications dropout	rw	505	0	0	1	01F9
99	P5-06	Response in the event of a communications dropout	rw	506	0	0	1	01FA
100	P5-07	Ramp via field bus	rw	507	0	0	1	01FB
101	P5-08	Field bus module PDO-4 output	rw	508	0	0	1	01FC
102	P5-09	reserved	-	509	0	0	1	01FD
103	P5-10	reserved	-	510	0	0	1	01FE
104	P5-11	reserved	-	511	0	0	1	01FF
105	P5-12	Field bus module PDO-3 output	rw	512	0	0	1	0200

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	PNU	Description	Access right	ADI number	API	Slot	Sub-slot	Index
106	P5-13	Field bus module PDI-4 input	rw	513	0	0	1	0201
107	P5-14	Field bus module PDI-3 input	rw	514	0	0	1	0202
108	P6-01	Firmware upgrade enable	rw	601	0	0	1	0259
109	P6-02	Auto temperature management	rw	602	0	0	1	025A
110	P6-03	Auto-reset waiting time	rw	603	0	0	1	025B
111	P6-04	Relay hysteresis band	rw	604	0	0	1	025C
112	P6-05	Enable incremental encoder feedback	rw	605	0	0	1	025D
113	P6-06	Incremental encoder scale	rw	606	0	0	1	025E
114	P6-07	Maximum speed error	rw	607	0	0	1	025F
115	P6-08	Input frequency at maximum speed	rw	608	0	0	1	0260
116	P6-09	Droop speed	rw	609	0	0	1	0261
117	P6-10	PLC function enable	rw	610	0	0	1	0262
118	P6-11	Speed holding time in the event of an enable signal	rw	611	0	0	1	0263
119	P6-12	Speed holding time in the event of a disable signal	rw	612	0	0	1	0264
120	P6-13	Motor brake opening time	rw	613	0	0	1	0265
121	P6-14	Motor brake engagement delay	rw	614	0	0	1	0266
122	P6-15	Minimum torque for brake opening	rw	615	0	0	1	0267
123	P6-16	Minimum torque time limit	rw	616	0	0	1	0268
124	P6-17	Maximum torque time limit	rw	617	0	0	1	0269
125	P6-18	Voltage for DC injection braking	rw	618	0	0	1	026A
126	P6-19	Brake resistor value	rw	619	0	0	1	026B
127	P6-20	Brake resistor power	rw	620	0	0	1	026C
128	P6-21	Braking chopper cycle in the event of excessively low temperature	rw	621	0	0	1	026D
129	P6-22	Reset fan run-time	rw	622	0	0	1	026E
130	P6-23	kWh meter reset	rw	623	0	0	1	026F
131	P6-24	Service interval	rw	624	0	0	1	0270
132	P6-25	Service interval reset	rw	625	0	0	1	0271
133	P6-26	Scaling AO1	rw	626	0	0	1	0272
134	P6-27	Offset AO1	rw	627	0	0	1	0273
135	P6-28	Display index P0-80	rw	628	0	0	1	0274
136	P6-29	Save parameters as default	rw	629	0	0	1	0275
137	P6-30	Access code for menu level 3	rw	630	0	0	1	0276
138	P7-01	Motor stator resistance	rw	701	0	0	1	02BD
139	P7-02	Rotor resistance	rw	702	0	0	1	02BE
140	P7-03	Motor leakage inductance (d)	rw	703	0	0	1	02BF
141	P7-04	Motor magnetizing current	rw	704	0	0	1	02C0
142	P7-05	Motor leakage factor	rw	705	0	0	1	02C1

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4.6 Operation

	PNU	Description	Access right	ADI number	API	Slot	Sub-slot	Index
143	P7-06	Motor leakage inductance (q)	rw	706	0	0	1	02C2
144	P7-07	Advanced generator control	rw	707	0	0	1	02C3
145	P7-08	Enable motor parameter adaptation	rw	708	0	0	1	02C4
146	P7-09	Overvoltage current limit	rw	709	0	0	1	02C5
147	P7-10	Load inertia factor	rw	710	0	0	1	02C6
148	P7-11	Minimum PWM pulse width	rw	711	0	0	1	02C7
149	P7-12	Magnetizing time at the V/f method	rw	712	0	0	1	02C8
150	P7-13	Rotational speed controller D gain	rw	713	0	0	1	02C9
151	P7-14	Torque boost	rw	714	0	0	1	02CA
152	P7-15	Maximum frequency limit for torque boost	rw	715	0	0	1	02CB
153	P7-16	Enable, signal injection	rw	716	0	0	1	02CC
154	P7-17	Signal injection level	rw	717	0	0	1	02CD
155	P8-01	Second acceleration time (acc2)	rw	801	0	0	1	0321
156	P8-02	Transition frequency (acc1 - acc2)	rw	802	0	0	1	0322
157	P8-03	Third acceleration time (acc3)	rw	803	0	0	1	0323
158	P8-04	Transition frequency (acc2 - acc3)	rw	804	0	0	1	0324
159	P8-05	Fourth acceleration time (acc4)	rw	805	0	0	1	0325
160	P8-06	Transition frequency (acc3 - acc4)	rw	806	0	0	1	0326
161	P8-07	Fourth deceleration time (dec4)	rw	807	0	0	1	0327
162	P8-08	Transition frequency (dec3 - dec4)	rw	808	0	0	1	0328
163	P8-09	Third deceleration time (dec3)	rw	809	0	0	1	0329
164	P8-10	Transition frequency (dec2 - dec3)	rw	810	0	0	1	032A
165	P8-11	Second deceleration time (dec2)	rw	811	0	0	1	032B
166	P8-12	Transition frequency (dec1 - dec2)	rw	812	0	0	1	032C
167	P8-13	Ramp selection when there is a preset speed	rw	813	0	0	1	032D
168	P9-01	Control source - enable	rw	901	0	0	1	0385
169	P9-02	Control source - quick stop	rw	902	0	0	1	0386
170	P9-03	Control source - start signal 1 (FWD)	rw	903	0	0	1	0387
171	P9-04	Control source – start signal 2 (REV)	rw	904	0	0	1	0388
172	P9-05	Control source - Stay-put function	rw	905	0	0	1	0389
173	P9-06	Control source - enable (REV)	rw	906	0	0	1	038A
174	P9-07	Control source - reset	rw	907	0	0	1	038B
175	P9-08	Control source – external fault	rw	908	0	0	1	038C
176	P9-09	Control source - terminal control	rw	909	0	0	1	038D
177	P9-10	Source - speed 1	rw	910	0	0	1	038E
178	P9-11	Source - speed 2	rw	911	0	0	1	038F
179	P9-12	Source - speed 3	rw	912	0	0	1	0390
180	P9-13	Source - speed 4	rw	913	0	0	1	0391

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	PNU	Description	Access right	ADI number	API	Slot	Sub-slot	Index
181	P9-14	Source - speed 5	rw	914	0	0	1	0392
182	P9-15	Source - speed 6	rw	915	0	0	1	0393
183	P9-16	Source - speed 7	rw	916	0	0	1	0394
184	P9-17	Source - speed 8	rw	917	0	0	1	0395
185	P9-18	Speed - input 0	rw	918	0	0	1	0396
186	P9-19	Speed - input 1	rw	919	0	0	1	0397
187	P9-20	Speed - input 2	rw	920	0	0	1	0398
188	P9-21	Fixed frequency 0	rw	921	0	0	1	0399
189	P9-22	Fixed frequency 1	rw	922	0	0	1	039A
190	P9-23	Fixed frequency 2	rw	923	0	0	1	039B
191	P9-24	Acceleration ramp input 0	rw	924	0	0	1	039C
192	P9-25	Acceleration ramp input 1	rw	925	0	0	1	039D
193	P9-26	Deceleration time input 0	rw	926	0	0	1	039E
194	P9-27	Deceleration time input 1	rw	927	0	0	1	039F
195	P9-28	Control source - Up-pushbutton	rw	928	0	0	1	03A1
196	P9-29	Control source - Down-pushbutton	rw	929	0	0	1	03A2
197	P9-30	FWD limit switch	rw	930	0	0	1	03A3
198	P9-31	REV limit switch	rw	931	0	0	1	03A4
199	P9-32	reserved	-	932	0	0	1	03A5
200	P9-33	Source - analog output 1	rw	933	0	0	1	03A6
201	P9-34	Source - analog output 2	rw	934	0	0	1	03A7
202	P9-35	Control source - Relay 1	rw	935	0	0	1	03A8
203	P9-36	Control source - Relay 2	rw	936	0	0	1	03A9
204	P9-37	Control source - scaling	rw	937	0	0	1	03AA
205	P9-38	Source - PID setpoint value	rw	938	0	0	1	03AB
206	P9-39	Source - PID feedback	rw	939	0	0	1	03AC
207	P9-40	Source - torque control reference	rw	940	0	0	1	03AD
208	P9-41	Function choices - Relay output 3, 4, 5	rw	941	0	0	1	03AE
209		DI 1	ro	1001	0	0	1	03E9
210		DI 2	ro	1002	0	0	1	03EA
211		DI 3	ro	1003	0	0	1	03EB
212		DI 4	ro	1004	0	0	1	03EC
213		DI 5	ro	1005	0	0	1	03ED
214		DI 6	ro	1006	0	0	1	03EE
215		DI 7	ro	1007	0	0	1	03EF
216		DI 8	ro	1008	0	0	1	03F0
217		AO 1	ro	1009	0	0	1	03F1
218		AO 2	ro	1010	0	0	1	03F2

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4.6 Operation

	PNU	Description	Access right	ADI number	API	Slot	Sub-slot	Index
219		DO 1	ro	1011	0	0	1	03F3
220		DO 2	ro	1012	0	0	1	03F4
221		DO 3	ro	1013	0	0	1	03F5
222		DO 4	ro	1014	0	0	1	03F6
223		DO 5	ro	1015	0	0	1	03F7
224		User register 1	rw	1017	0	0	1	03F9
225		User register 2	rw	1018	0	0	1	03FA
226		User register 3	rw	1019	0	0	1	03FB
227		User register 4	rw	1020	0	0	1	03FC
228		User register 5	rw	1021	0	0	1	03FD
229		User register 6	rw	1022	0	0	1	03FE
230		User register 7	rw	1023	0	0	1	03FF
231		User register 8	rw	1024	0	0	1	0400
232		User register 9	rw	1025	0	0	1	0401
233		User register 10	rw	1026	0	0	1	0402
234		User register 11	rw	1027	0	0	1	0403
235		User register 12	rw	1028	0	0	1	0404
236		User register 13	rw	1029	0	0	1	0405
237		User register 14	rw	1030	0	0	1	0406
238		User register 15	rw	1031	0	0	1	0407
239		User AO 1	rw	1032	0	0	1	0408
240		User AO 2	rw	1033	0	0	1	0409
241		User RO 1	rw	1036	0	0	1	040C
242		User RO 2	rw	1037	0	0	1	040D
243		User RO 3	rw	1038	0	0	1	040E
244		User RO 4	rw	1039	0	0	1	040F
245		User RO 5	rw	1040	0	0	1	0410
246		User, scaling value	rw	1041	0	0	1	0411
247		User, decimal scaling	rw	1042	0	0	1	0412
248		User, speed reference	rw	1043	0	0	1	0413
249		User, torque reference	rw	1044	0	0	1	0414
250		Field bus / User ramp	rw	1045	0	0	1	0415
251		Scope index 1 / 2	rw	1046	0	0	1	0416
252		Scope index 3/4	rw	1047	0	0	1	0417
253		24hour timer	rw	1048	0	0	1	0418
254		User display Ctrl	rw	1049	0	0	1	0419
255		User display value	rw	1050	0	0	1	041A

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	PNU	Description	Access right	ADI number	API	Slot	Sub-slot	Index
256		AI 1 (Q12)	ro	1061	0	0	1	0425
257		AI 1 (%)	ro	1062	0	0	1	0426
258		AI 2 (Q12)	ro	1063	0	0	1	0427
259		AI 2 (%)	ro	1064	0	0	1	0428
260		DI status	ro	1065	0	0	1	0429
261		Speed reference	ro	1066	0	0	1	042A
262		Digital potentiometer value	ro	1067	0	0	1	042B
263		Field bus speed reference	ro	1068	0	0	1	042C
264		Master speed reference	ro	1069	0	0	1	042D
265		Slave speed reference	ro	1070	0	0	1	042E
266		Frequency on speed reference input	ro	1071	0	0	1	042F
267		Torque reference (Q12)	ro	1072	0	0	1	0430
268		Torque reference (%)	ro	1073	0	0	1	0431
269		Master torque reference (Q12)	ro	1074	0	0	1	0432
270		Field bus torque reference (Q12)	ro	1075	0	0	1	0433
271		PID user reference (Q12)	ro	1076	0	0	1	0434
272		PID user return value (Q12)	ro	1077	0	0	1	0435
273		PID controller reference (Q12)	ro	1078	0	0	1	0436
274		PID controller feedback value (Q12)	ro	1079	0	0	1	0437
275		PID controller output (Q12)	ro	1080	0	0	1	0438
276		Motor velocity	ro	1081	0	0	1	0439
277		Motor current	ro	1082	0	0	1	043A
278		Motor Torque	ro	1083	0	0	1	043B
279		Motor rating	ro	1084	0	0	1	043C
280		PID controller starting speed	ro	1085	0	0	1	043D
281		DC voltage	ro	1086	0	0	1	043E
282		Unit Temperature	ro	1087	0	0	1	043F
283		PCB controle temperature	ro	1088	0	0	1	0440
284		Drive scaling value 1	ro	1089	0	0	1	0441
285		Drive scaling value 2	ro	1090	0	0	1	0442
286		Motor, torque (%)	ro	1091	0	0	1	0443
287		Expansion, IO input status	ro	1093	0	0	1	0445
288		ID, Plug-in module	ro	1096	0	0	1	0448
289		ID, field bus boards	ro	1097	0	0	1	0449
290		Scope channel 1 - data	ro	1101	0	0	1	044D
291		Scope channel 2 - data	ro	1102	0	0	1	044E
292		Scope channel 3 - data	ro	1103	0	0	1	044F
293		Scope channel 4 - data	ro	1104	0	0	1	0450

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	PNU	Description	Access right	ADI number	API	Slot	Sub-slot	Index
294		OLED language number	ro	1105	0	0	1	0451
295		OLED version	ro	1106	0	0	1	0452
296		power section	ro	1107	0	0	1	0453
297		Service time	ro	1128	0	0	1	0468
298		Fan speed	ro	1129	0	0	1	0469
299		User kWh meter	ro	1130	0	0	1	046A
300		User, MWh meter	ro	1131	0	0	1	046B
301		Complete, kWh meter	ro	1132	0	0	1	046C
302		Complete, MWh meter	ro	1133	0	0	1	046D
303		Total, operating hours meter	ro	1134	0	0	1	046E
304		Total, operating minutes/seconds meter	ro	1135	0	0	1	046F
305		User, hours-run meter	ro	1136	0	0	1	0470
306		User, operating minutes/seconds meter	ro	1137	0	0	1	0471

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