

PNOZ m ES ETH

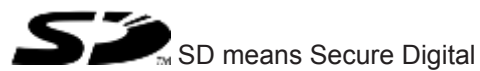
Configurable Control System PNOZmulti

The PILZ logo is displayed in a grey, lowercase, sans-serif font. The letters are bold and modern, with a small dot above the 'i'.

This document is a translation of the original document.

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Section 1	Introduction	4
	1.1 Validity of documentation	4
	1.2 Retaining the documentation	4
	1.3 Definition of symbols	4
Section 2	Overview	6
	2.1 Scope of delivery	6
	2.2 Unit features	6
	2.3 Front view	7
Section 3	Safety	8
	3.1 Intended use	8
	3.2 System requirements	8
	3.3 Safety regulations	8
	3.3.1 Use of qualified personnel	8
	3.3.2 Warranty and liability	9
	3.3.3 Disposal	9
	3.3.4 For your safety	9
Section 4	Function description	10
	4.1 Unit properties	10
	4.2 Block diagram	10
Section 5	Installation	11
	5.1 General installation guidelines	11
	5.2 Dimensions	11
	5.3 Connecting the base unit and expansion modules	11
Section 6	Commissioning	13
	6.1 General wiring guidelines	13
	6.2 Preparing for operation	13
	6.3 Download modified project to the PNOZmulti safety system	13
	6.4 Ethernet interfaces	13
	6.4.1 RJ45 interfaces ("Ethernet")	13
	6.4.2 Requirements of the connection cable and connector	14
	6.4.3 Interface configuration	14
	6.4.4 RJ45 connection cable	15
	6.4.5 Process data exchange	16
Section 7	Operation	17
	7.1 Messages	17
	7.2 Reset Ethernet connection settings	18
Section 8	Tecnical details	19
Section 9	Order reference	21
	9.1 Module	21
	9.2 Accessories	21

1 Introduction

1.1 Validity of documentation

This documentation is valid for the product PNOZ m ES ETH. It is valid until new documentation is published.

This operating manual explains the function and operation, describes the installation and provides guidelines on how to connect the product.

1.2 Retaining the documentation

This documentation is intended for instruction and should be retained for future reference.

1.3 Definition of symbols

Information that is particularly important is identified as follows:



DANGER!

This warning must be heeded! It warns of a hazardous situation that poses an immediate threat of serious injury and death and indicates preventive measures that can be taken.



WARNING!

This warning must be heeded! It warns of a hazardous situation that could lead to serious injury and death and indicates preventive measures that can be taken.



CAUTION!

This refers to a hazard that can lead to a less serious or minor injury plus material damage, and also provides information on preventive measures that can be taken.



NOTICE

This describes a situation in which the product or devices could be damaged and also provides information on preventive measures that can be taken. It also highlights areas within the text that are of particular importance.



INFORMATION

This gives advice on applications and provides information on special features.

2 Overview

2.1 Scope of delivery

- ▶ Expansion module PNOZ m ES ETH
- ▶ Jumper 779 260

2.2 Unit features

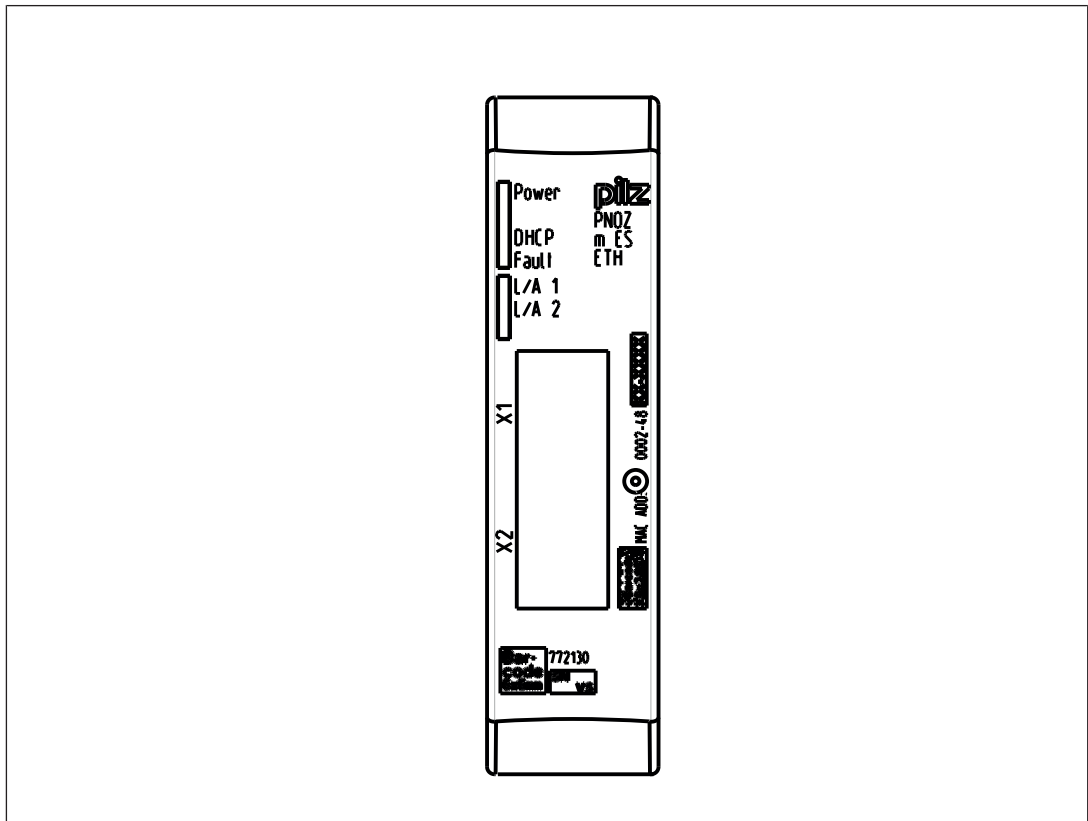
Using the product PNOZ m ES ETH:

Communication module for connection to a base unit from the configurable control system PNOZmulti 2.

The product has the following features:

- ▶ Can be configured in the PNOZmulti Configurator
- ▶ 2 Ethernet interfaces
- ▶ Status indicators for supply voltage, communication and errors
- ▶ Max. 1 communication module can be connected to the left of the base unit PNOZmulti 2
- ▶ Please refer to the document "PNOZmulti System Expansion" for the PNOZmulti base units that can be connected

2.3 Front view



Legend:

- ▶ X1, X2:
Ethernet interfaces
- ▶ LEDs:
 - Power
 - DHCP
 - L/A 1 (Link/Act 1)
 - L/A 2 (Link/Act 2)

3 Safety

3.1 Intended use

The expansion module PNOZ m ES ETH is used for communication of the configurable control system PNOZmulti 2 via Ethernet.

The expansion module may only be connected to a base unit from the configurable control system PNOZmulti 2 (please refer to the document "PNOZmulti System Expansion" for details of the base units that can be connected).

The configurable control system PNOZmulti 2 is used for the safety-related interruption of safety circuits and is designed for use in:

- ▶ E-STOP equipment
- ▶ Safety circuits in accordance with VDE 0113 Part 1 and EN 60204-1

The expansion module may not be used for safety-related functions.

Intended use includes making the electrical installation EMC-compliant. The product is designed for use in an industrial environment. It is not suitable for use in a domestic environment, as this can lead to interference.

The following is deemed improper use in particular:

- ▶ Any component, technical or electrical modification to the product
- ▶ Use of the product outside the areas described in this manual
- ▶ Use of the product outside the technical details (see chapter entitled "Technical Details")

3.2 System requirements

Please refer to the "Product Modifications" document in the "Version overview" section for details of which versions of the base unit and PNOZmulti Configurator can be used for this product.

3.3 Safety regulations

3.3.1 Use of qualified personnel

The products may only be assembled, installed, programmed, commissioned, operated, maintained and decommissioned by competent persons.

A competent person is someone who, because of their training, experience and current professional activity, has the specialist knowledge required to test, assess and operate the work equipment, devices, systems, plant and machinery in accordance with the general standards and guidelines for safety technology.

It is the company's responsibility only to employ personnel who:

- ▶ Are familiar with the basic regulations concerning health and safety / accident prevention
- ▶ Have read and understood the information provided in this description under "Safety"
- ▶ And have a good knowledge of the generic and specialist standards applicable to the specific application.

3.3.2 Warranty and liability

All claims to warranty and liability will be rendered invalid if

- ▶ The product was used contrary to the purpose for which it is intended
- ▶ Damage can be attributed to not having followed the guidelines in the manual
- ▶ Operating personnel are not suitably qualified
- ▶ Any type of modification has been made (e.g. exchanging components on the PCB boards, soldering work etc.).

3.3.3 Disposal

- ▶ In safety-related applications, please comply with the mission time t_M in the safety-related characteristic data.
- ▶ When decommissioning, please comply with local regulations regarding the disposal of electronic devices (e.g. Electrical and Electronic Equipment Act).

3.3.4 For your safety

The unit meets all necessary conditions for safe operation. However, you should always ensure that the following safety requirements are met:

- ▶ This operating manual only describes the basic functions of the unit. Information on the advanced functions can be found in the online help for the PNOZmulti Configurator and in the PNOZmulti technical catalogue. Only use these functions after you have read and understood the documentation. All necessary documentation can be found on the PNOZmulti Configurator CD.
- ▶ Do not open the housing or make any unauthorised modifications.
- ▶ Please make sure you shut down the supply voltage when performing maintenance work (e.g. exchanging contactors).

4 Function description

4.1 Unit properties

The product PNOZ m ES ETH has two Ethernet interfaces to

- ▶ Download the project
- ▶ Read the diagnostic data
- ▶ Set virtual inputs for standard functions
- ▶ Read virtual outputs for standard functions

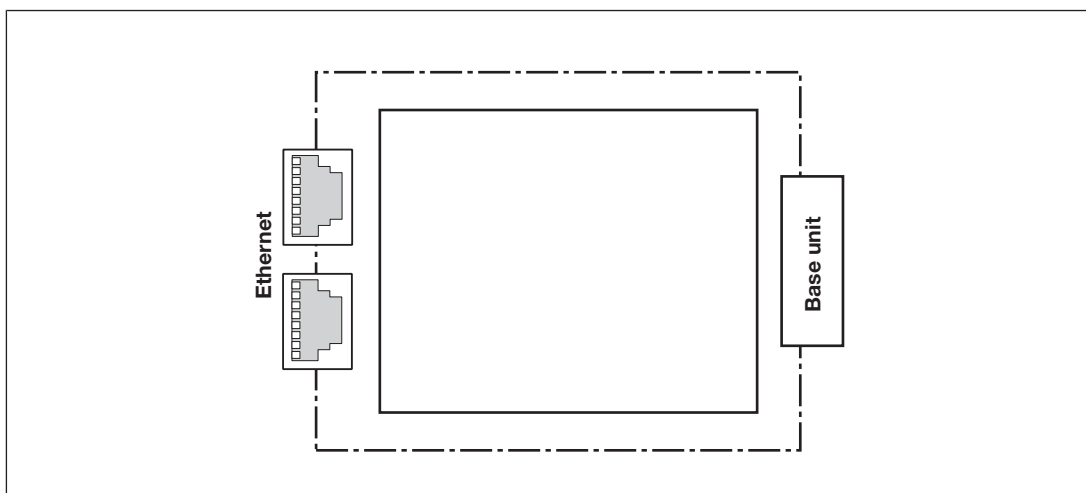
via Ethernet (TCP/IP, Modbus/TCP).

Information on diagnostics via the Ethernet interfaces can be found in the document entitled "PNOZmulti 2 communication interfaces".

The connection to Ethernet is made via the two 8-pin RJ45 sockets.

The Ethernet interface is configured in the PNOZmulti Configurator and is described in the online help for the PNOZmulti Configurator.

4.2 Block diagram



5 Installation

5.1 General installation guidelines

- ▶ The unit should be installed in a single mounting area with a protection type of at least IP54.
- ▶ Fit the safety system to a horizontal mounting rail. The venting slots must face upwards and downwards. Other mounting positions could destroy the safety system.
- ▶ Use the locking slide on the rear of the unit to attach it to a mounting rail.
- ▶ In environments exposed to heavy vibration, the unit should be secured using a fixing element (e.g. retaining bracket or end angle).
- ▶ Open the locking slide before lifting the unit from the mounting rail.
- ▶ To comply with EMC requirements, the mounting rail must have a low impedance connection to the control cabinet housing.
- ▶ The ambient temperature of the PNOZmulti units in the control cabinet must not exceed the figure stated in the technical details, otherwise air conditioning will be required.

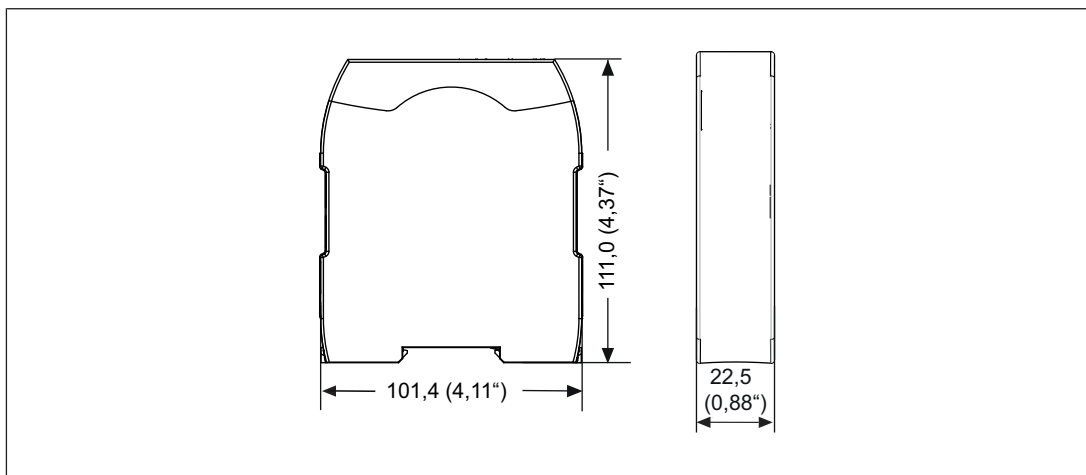


CAUTION!

Damage due to electrostatic discharge!

Electrostatic discharge can damage components. Ensure against discharge before touching the product, e.g. by touching an earthed, conductive surface or by wearing an earthed armband.

5.2 Dimensions



5.3 Connecting the base unit and expansion modules

Connect the base unit and the expansion module as described in the operating instructions for the base units.

- ▶ Install the expansion module in the position in which it is configured in the PNOZmulti Configurator.

- ▶ Connect the base unit and expansion modules using the yellow/black jumper.
- ▶ Connect the black/yellow terminator to the expansion module.

6 Commissioning

6.1 General wiring guidelines

The wiring is defined in the circuit diagram of the PNOZmulti Configurator.

Please note:

- ▶ Information given in the "Technical details" must be followed.
- ▶ Use copper wire that can withstand 75°C.

6.2 Preparing for operation

Detection and activation of the Ethernet interface, depending on the USB interface on the base unit:

- ▶ **USB interface on the base unit not connected**

If the USB interface on the base unit is not connected, the Ethernet interface will be detected and activated by the base unit as soon as the communication module has been connected to the base unit.

- ▶ **USB interface on the base unit connected**

If the USB interface on the base unit is already connected, the "Ethernet" interface will first need to be selected on the base unit display to enable the Ethernet interface on the base unit to be detected and activated (see operating manual for the base unit for details of the setting).

6.3 Download modified project to the PNOZmulti safety system

As soon as an additional expansion module has been connected to the system, the project must be amended using the PNOZmulti Configurator. Proceed as described in the operating instructions for the base unit.

**NOTICE**

For the commissioning and after every program change, you must check whether the safety devices are functioning correctly.

6.4 Ethernet interfaces

6.4.1 RJ45 interfaces ("Ethernet")

Two free switch ports are provided as Ethernet interfaces via an internal autosensing switch. The autosensing switch automatically detects whether data transfer is occurring at 10 Mbit/s or 100 Mbit/s.

**INFORMATION**

The connected subscribers must support the autosensing/autonegotiation function. If not, the communication partner must be set permanently to "10 Mbit/s, half duplex".

The switch's automatic crossover function means there is no need to distinguish on the connection cable between patch cable (uncrossed data line connection) and crossover cable (crossover data line connection). The switch automatically creates the correct data line connection internally. Patch cable can therefore be used as the connection cable for end devices as well as cascading.

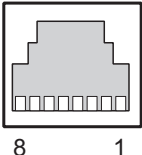
Both Ethernet interfaces use RJ45 technology.

6.4.2 Requirements of the connection cable and connector

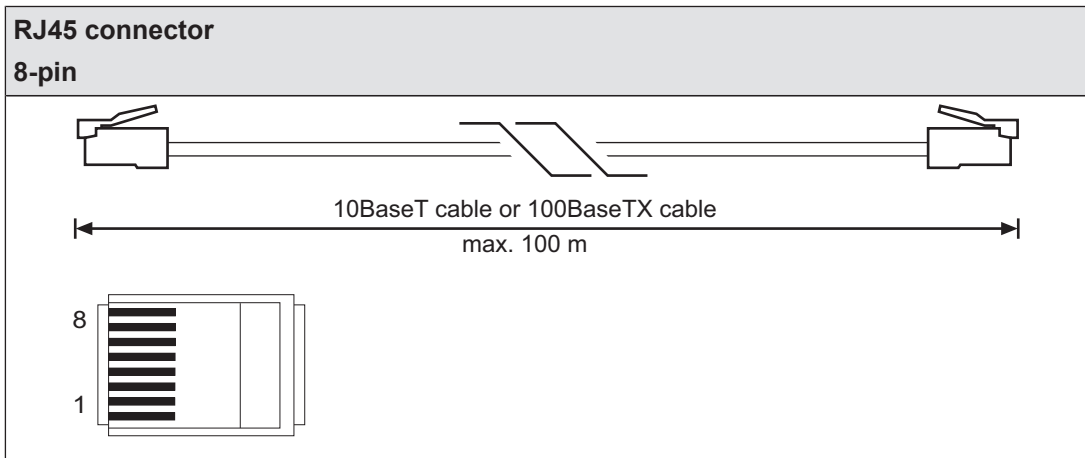
The following minimum requirements must be met:

- ▶ Ethernet standards (min. Category 5) 10BaseT or 100BaseTX
- ▶ Double-shielded twisted pair cable for industrial Ethernet use
- ▶ Shielded RJ45 connectors (industrial connectors)

6.4.3 Interface configuration

RJ45 socket 8-pin	PIN	Standard	Crossover
	1	TD+ (Transmit+)	RD+ (Receive+)
	2	TD- (Transmit-)	RD- (Receive-)
	3	RD+ (Receive+)	TD+ (Transmit+)
	4	n.c.	n.c.
	5	n.c.	n.c.
	6	RD- (Receive-)	TD- (Transmit-)
	7	n.c.	n.c.
	8	n.c.	n.c.

6.4.4 RJ45 connection cable

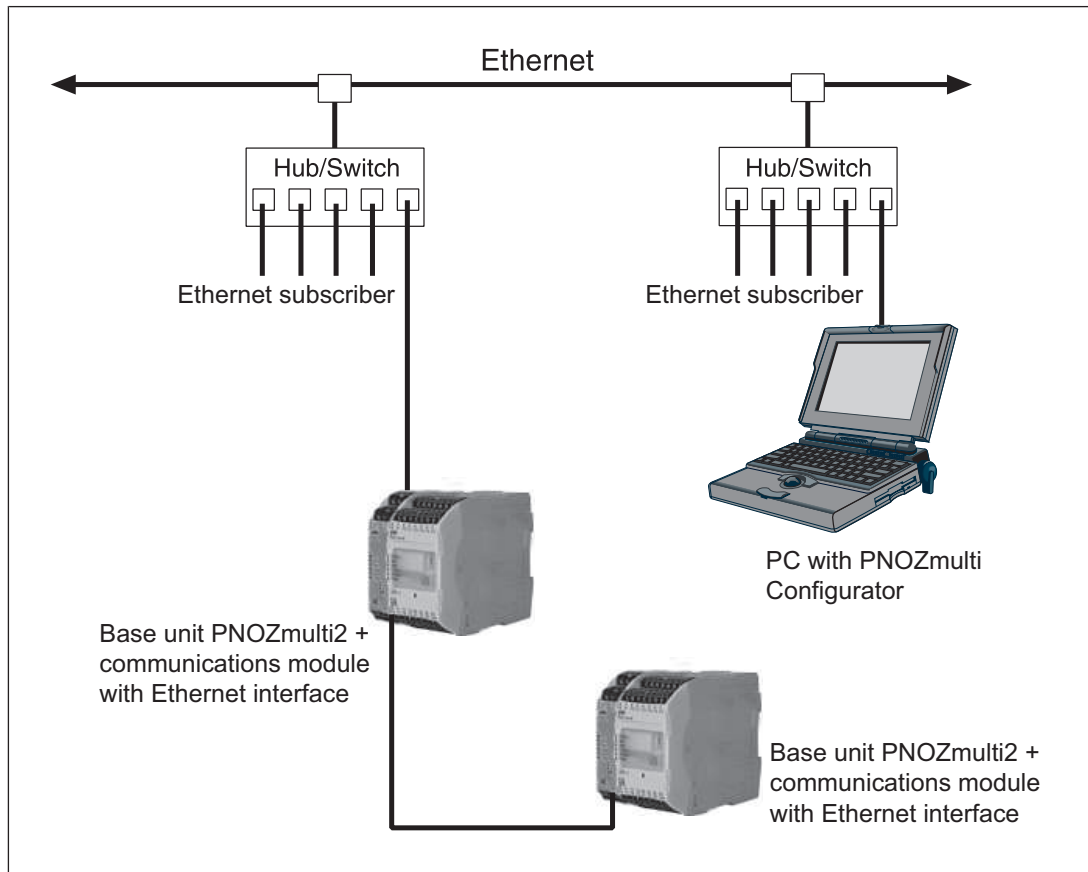
**NOTICE**

With the plug-in connection please note that the data cable and connector have a limited mechanical load capacity. Appropriate design measures should be used to ensure that the plug-in connection is insensitive to increased mechanical stress (e.g. through shock, vibration). Such measures include fixed routing with strain relief, for example.

6.4.5 Process data exchange

The RJ45 interfaces on the internal autosensing switch enable process data to be exchanged with other Ethernet subscribers within a network.

The product PNOZ m ES ETH can also be connected to Ethernet via a hub (hub or switch).



7 Operation

When the supply voltage is switched on, the PNOZmulti safety system copies the configuration from the chip card.

The LEDs "POWER", "DIAG", "FAULT", "IFAUULT" and "OFAULT" light up on the base unit.

The safety system PNOZmulti is ready for operation when the "POWER" and "RUN" LEDs on the base unit and the "POWER" LED on the PNOZ m ES ETH are lit continuously.

7.1 Messages

Legend:

	LED on
	LED flashes
	LED off

LED	LED status		Meaning
Power			No supply voltage
		Green	Supply voltage is present
L/A 1 (Link / Act 1)			No network connection at X1 / No data traffic at X1
		Green	Network connection present at X1 / Data traffic present at X1
L/A 2 (Link / Act 2)			No network connection at X2 / No data traffic at X2
		Green	Network connection present at X2 / Data traffic present at X2
Fault		Red	Internal fault
		Red	No connection to base unit
DHCP		Yellow	The unit could not be assigned an IP address by the DHCP Server.
		Yellow	The unit is waiting for the DHCP Server to assign an IP address

7.2 Reset Ethernet connection settings

The Ethernet connection settings of the base unit can be configured in the PNOZmulti Configurator.

You can reset the base unit's Ethernet connection settings to the default settings.

Proceed as follows:

- ▶ Switch off the supply voltage
- ▶ Remove the chip card
- ▶ Restart the base unit without the chip card inserted.

The Ethernet connection settings are now reset to the default settings.

8 Technical details

General	772130
Approvals	CCC, CE, GOST, cULus Listed
Application range	Standard
Module's device code	1202h
Electrical data	772130
Supply voltage	
for	Module supply
internal	Via base unit
Voltage	5,0 V
Kind	DC
Voltage tolerance	-2 %/+2 %
Current consumption	295 mA
Power consumption	1,0 W
Status indicator	LED
Ethernet interface	772130
Number	2
IP address (automatically off)	169.254.60.1
Connection type	RJ45
Transmission rate	10 MBit/s, 100 MBit/s
Fieldbus interface	772130
Fieldbus interface	Modbus TCP
Unit type	Slave
Connection	RJ45
Galvanic isolation	Yes
Environmental data	772130
Ambient temperature	
In accordance with the standard	EN 60068-2-14
Temperature range	0 - 60 °C
Forced convection in control cabinet off	55 °C
Storage temperature	
In accordance with the standard	EN 60068-2-1/-2
Temperature range	-25 - 70 °C
Climatic suitability	
In accordance with the standard	EN 60068-2-30, EN 60068-2-78
Condensation during operation	Not permitted
EMC	EN 61131-2
Vibration	
In accordance with the standard	EN 60068-2-6
Frequency	10,0 - 150,0 Hz
Acceleration	1g

Environmental data		772130
Shock stress		
In accordance with the standard		EN 60068-2-27
Acceleration		15g
Duration		11 ms
Max. operating height above sea level		2000 m
Airgap creepage		
In accordance with the standard		EN 61131-2
Overvoltage category		II
Pollution degree		2
Rated insulation voltage		30 V
Protection type		
In accordance with the standard		EN 60529
Mounting area (e.g. control cabinet)		IP54
Housing		IP20
Terminals		IP20
Mechanical data		772130
Mounting position		Horizontal on top hat rail
DIN rail		
Top hat rail		35 x 7,5 EN 50022
Recess width		27 mm
Max. cable length		
Max. cable length per input		0,1 km
Material		
Bottom		PC
Front		PC
Top		PC
Dimensions		
Height		101,4 mm
Width		22,5 mm
Depth		111,0 mm
Weight		80 g

The standards current on 2012-04 apply.

9 Order reference

9.1 Module

Product type	Features	Order no.
PNOZ m ES ETH	Expansion module	772 130

9.2 Accessories

Terminator, jumper

Product type	Features	Order no.
PNOZ mm0.xp connector left	Jumper yellow/black to connect the modules, 1 piece	779 260



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