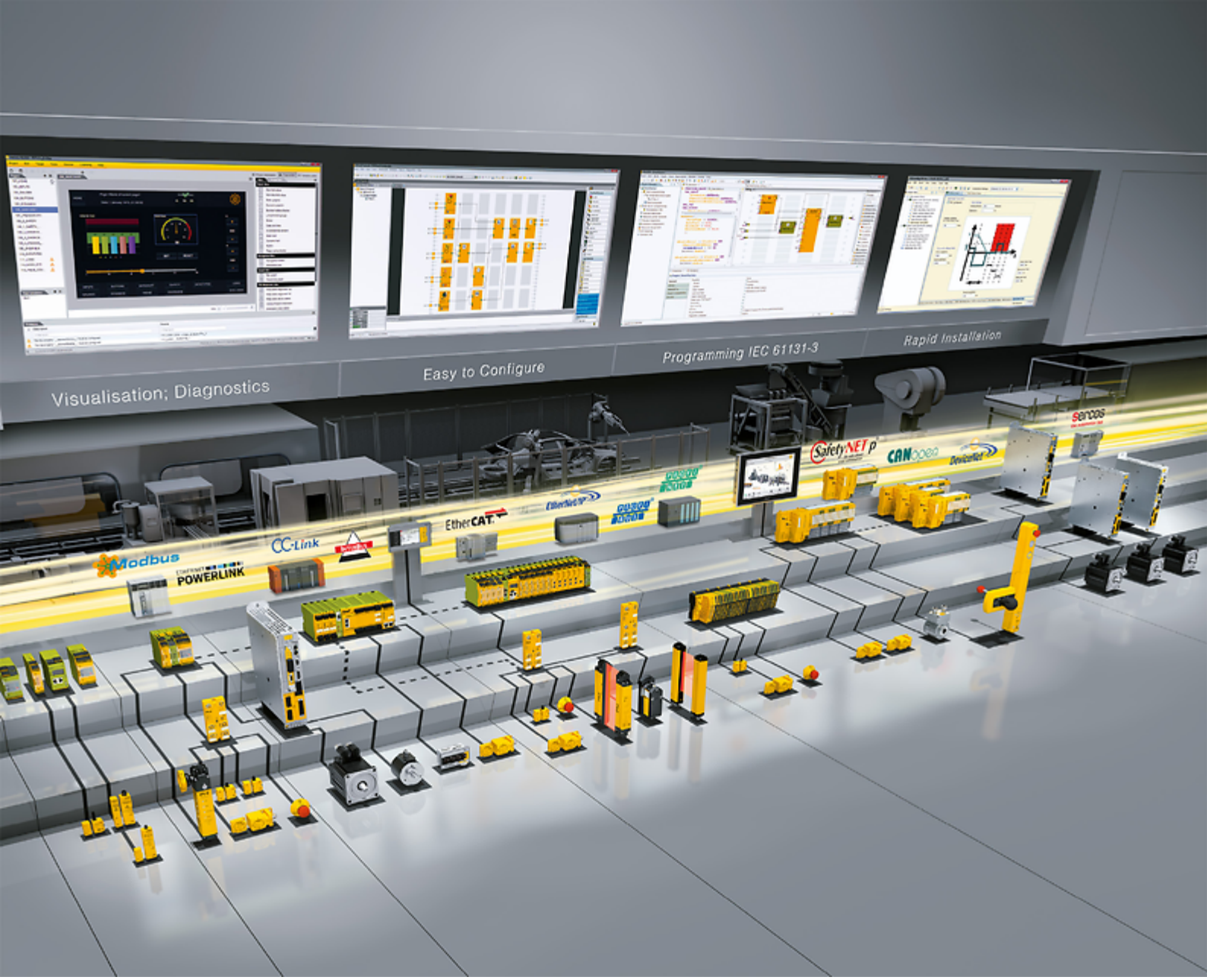


PNOZ mc10p

PILZ
THE SPIRIT OF SAFETY

- Configurable, safe small controllers PNOZmulti Classic

Operating Manual-1002696-EN-04

1 Introduction

1.1 Validity of documentation

This documentation is valid for the product PNOZ mc10p. 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 Using the documentation

This document is intended for instruction. Only install and commission the product if you have read and understood this document. The document 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 supply

- Expansion module PNOZ mc10p
- Jumper

2.2 Unit features

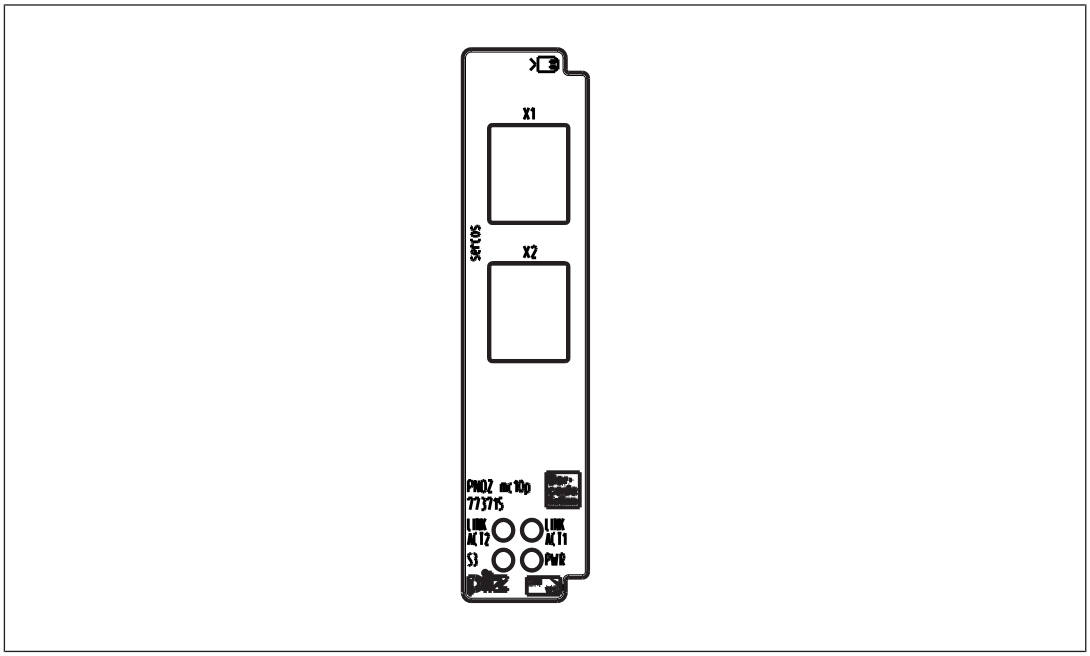
Application of the product PNOZ mc10p:

Expansion module for connection to a base unit from the configurable control system PNOZmulti

The product has the following features:

- Can be configured in the PNOZmulti Configurator
- Connection for sercos III
- Status indicators for communication with sercos III and for errors
- Delivery configuration with IP address: 192.168.1.64 and Sercos address: 64
- 24 virtual inputs and outputs on the control system PNOZmulti can be defined in the PNOZmulti Configurator for communication with the fieldbus sercos III . The number of inputs and outputs can be extended to 128. Please note that when the extended inputs and outputs 24 - 127 are used they have different properties (see document entitled "Communication Interfaces").
- Max. 1 PNOZ mc10p can be connected to the base unit
- Please refer to the document "PNOZmulti System Expansion" for the PNOZmulti base units that can be connected.

2.3 Front view



Legend

- X1, X2: sercos III interfaces
- LED:
  - LINK ACT1
  - LINK ACT2
  - PWR
  - S3

3 Safety

3.1 Intended use

The fieldbus module PNOZ mc10p is an expansion module of the configurable control system PNOZmulti. It is used for communication between the configurable control system PNOZmulti and sercos III.
Sercos III is designed for fast data exchange in the field of Motion Control. The expansion module PNOZ mc10p is a passive sercos III subscriber (Slave). The base functions of communication with sercos III correspond to the guidelines of the sercos International (SI) user group. The central controller (master) reads input information from the slaves and writes output information to the slaves as part of each cycle. As well as the cyclical transfer of usable data, the expansion module PNOZ mc10p can also be used for diagnostic and commissioning functions. Data traffic is monitored on the Master/Slave side.

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

The configurable small control systems PNOZmulti are used for the safety-related interruption of safety circuits and are 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.

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 Technical details [📖 18]).

NOTICE

EMC-compliant electrical installation

The product is designed for use in an industrial environment. The product may cause interference if installed in other environments. If installed in other environments, measures should be taken to comply with the applicable standards and directives for the respective installation site with regard to interference.

3.2 System requirements

Please refer to the "Product Modifications PNOZmulti" 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

- 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 the 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. The expanded functions are described in the PNOZmulti Configurator's online help. Only use these functions once you have read and understood the documentations.
- 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 Functions

The virtual inputs and outputs that are to be transferred via the fieldbus sercos III are selected and configured in the PNOZmulti Configurator. The base unit and the fieldbus module PNOZ mc10p are connected via a jumper. The fieldbus module is also supplied with voltage via this jumper. After the supply voltage is switched on or the control system PNOZmulti is reset, the fieldbus module PNOZ mc10p is configured and started automatically.

LEDs indicate the status of the fieldbus module on the fieldbus sercos III .

The configuration is described in detail in the PNOZmulti Configurator's online help.

4.2 Input and output data

The data is structured as follows:

- Input area

  The inputs are defined in the master and transferred to the PNOZmulti. Each input has a number, e.g. input bit 4 of byte 1 has the number i12.

- Output range

  The outputs are defined in the PNOZmulti Configurator. Each output that is used is given a number there, e.g. o0, o5... The status of output o0 is stored in bit 0 of byte 0; the status of output o5 is stored in bit 5 of byte 0 etc.

- Output range only: Byte 3

  Bits 0 … 4: Status of LEDs on the PNOZmulti

  – Bit 0: OFAULT

  – Bit 1: IFAULT

  – Bit 2: FAULT

  – Bit 3: DIAG

  – Bit 4: RUN

  Bit 5: Data is being exchanged.

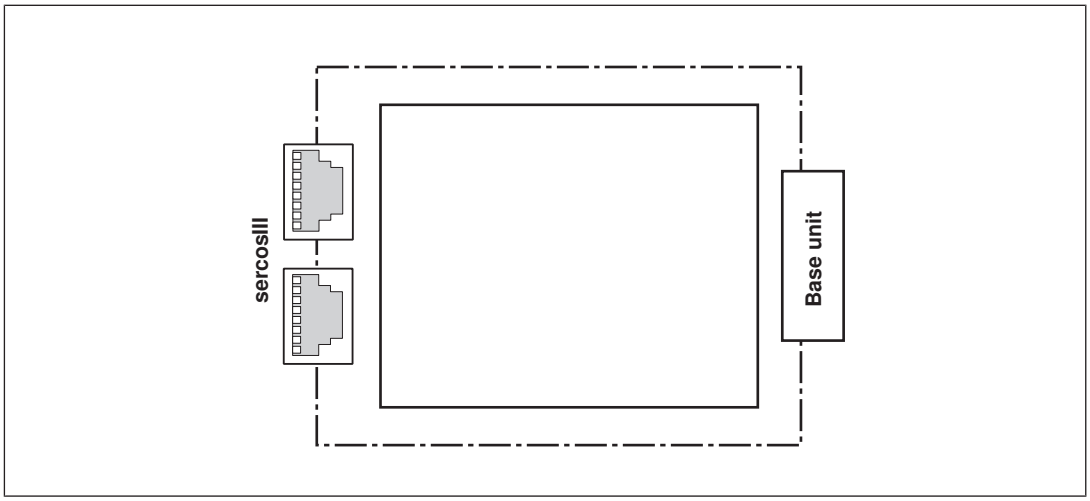
Detailed information on data exchange (tables, segments) is available in the document "Communication Interfaces" in the section entitled "Fieldbus modules".

4.3 Assigning the inputs/outputs in the PNOZmulti Configurator to the sercos III inputs/outputs

Virtual inputs on PNOZmulti Configurator	i0 ... I7	i8 ... i15	i16 ... i23
Input data sercos III	Byte 0: Bits 0 … 7	Byte 1: Bits 0 … 7	Byte 2: Bits 0 … 7
Virtual outputs on PNOZmulti Configurator	o0 ... o7	o8 ... o15	o16 ... o23
Output data sercos III	Byte 0: Bits 0 … 7	Byte 1: Bits 0 … 7	Byte 2: Bits 0 … 7

The number of virtual inputs and outputs can be extended to 128 (see document "Communication Interfaces" in the section entitled "Fieldbus modules")

4.4 Block diagram



5 Installation

5.1 General installation guidelines

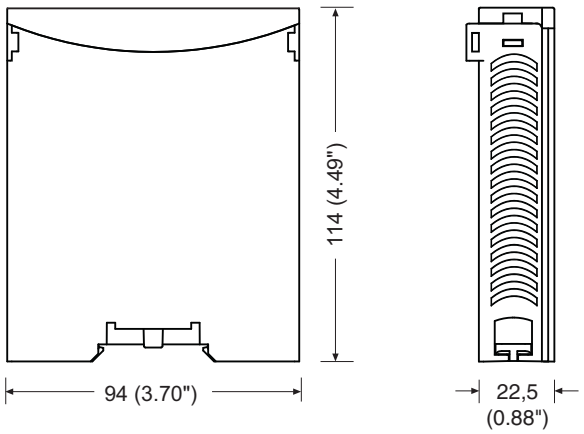
- The control system should be installed in a control cabinet with a protection type of at least IP54. Fit the control system to a horizontal mounting rail. The venting slots must face upward and downward. Other mounting positions could destroy the control system.
- Use the locking elements on the rear of the unit to attach it to a mounting rail. Connect the control system to the mounting rail in an upright position, so that the earthing springs on the control system are pressed on to the mounting rail.
- The ambient temperature of the devices in the control cabinet must not exceed the figure stated in the technical details. Air conditioning may otherwise be required.
- To comply with EMC requirements, the mounting rail must have a low impedance connection to the control cabinet housing.

NOTICE

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 in mm



5.3 Connecting the base unit and expansion modules

You can install a maximum of 1 PNOZ mc10p to the left of the base unit.

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

- Do **not** connect a terminator to the last expansion module on the left-hand side.
- Install the expansion module in the position in which it is configured in the PNOZmulti Configurator.

6 Commissioning

6.1 General wiring guidelines

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

It is possible to define which inputs and outputs on the safety system will communicate with sercos III.

Please note:

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

Please note the following when connecting to sercos III:

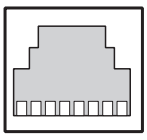
- The following minimum requirements of the connection cable and connector must be met:
  - Only use standard industrial Ethernet cable and connectors.
  - Only use double-shielded twisted pair cable and shielded RJ45 connectors (industrial connectors).
  - 100BaseTX cable in accordance with the Ethernet standard (min. Category 5)
- Measures to protect against interference:

  Ensure the requirements for the industrial use of sercos III are met, as stated in the Installation Manual published by the User Group.

CAUTION!

Only connect and disconnect the expansion module when the supply voltage is switched off.

6.2 Interface assignment

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

n.c.: Not connected

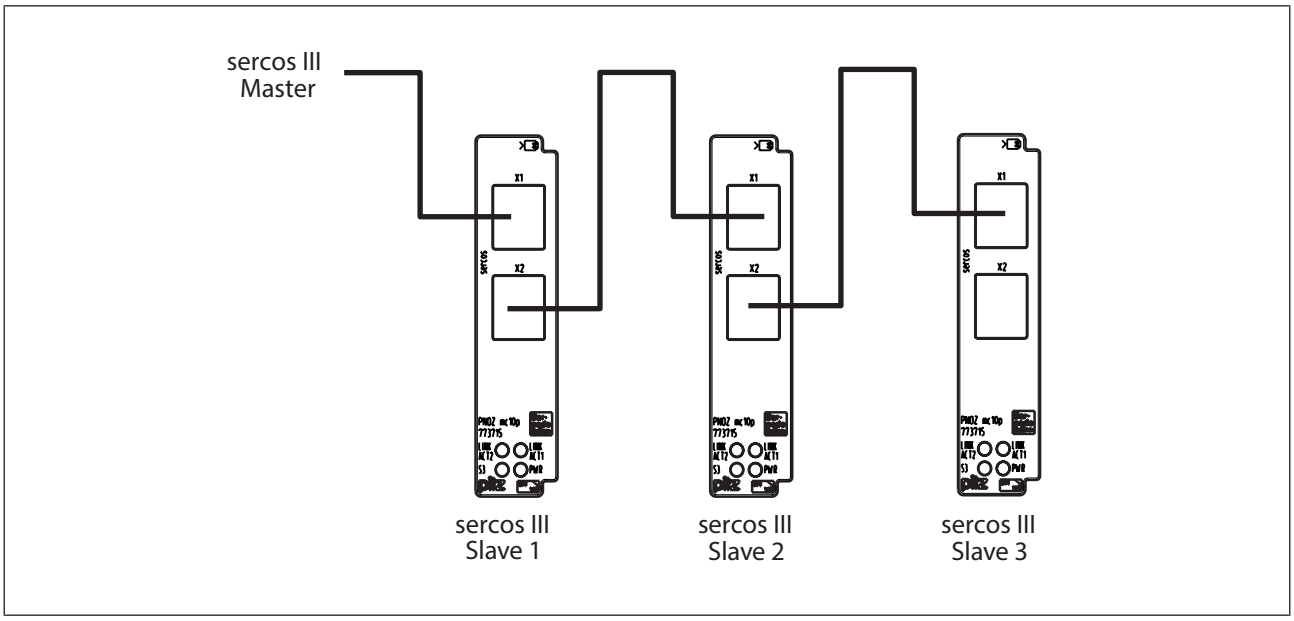
6.3 Download modified project to the PNOZmulti system

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

NOTICE

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

6.4 Connection example



7 Operation

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

The expansion module PNOZ mc10p is configured and started automatically. The LED "S3" displays the status of PNOZ mc10p at sercos III.

7.1 Messages

Legend

 LED on

 LED flashes

● LED off

LED			Meaning
PWR			Supply voltage is present
	●		Supply voltage is not present
LINK ACT1		Green	Bus connection available at X1
		Green	Data traffic present at X1
	●		Bus connection is not available at X1
LINK ACT2		Green	Bus connection available at X2
		Green	Data traffic present at X2
	●		Bus connection not available at X2

LED			Meaning
S3	●		No communication with sercos III
		Orange	CP0 communication phase 0 is active
		Green: 1 x short orange: 1 x long	CP1 communication phase 1 is active
		green: 2 x short orange: 1 x long	CP2 communication phase 2 is active
		green: 3 x short orange: 1 x long	CP3 communication phase 3 is active
		green	CP4 communication phase 4 is active
		green	RT status switches from fast forward to loopback.
		red/orange	Application error, see GDP & FSP Status Codes Class Error
		green/red	MST failure (S-0-1003/2 exceeded) while the communication warning (S-DEV.Bit15) is active in the Device status, min. 2 s.
		red	sercos III communication faulty or disturbed (see SCP Status Codes Class Error)
		orange	Identification (triggered by C_DEV. Bit 15 in Device Control or SIP identification request)

8 Technical details

General	
Certifications	**CCC, CE, EAC (Eurasian), cULus Listed**
Electrical data	
Supply voltage	
for	**Module supply**
internal	**Via base unit**
Voltage	**5 V**
Kind	**DC**
Voltage tolerance	**-2 %/+2 %**
Power consumption	**2,5 W**
Status indicator	**LED**
Fieldbus interface	
Fieldbus interface	**sercos III**
Device type	**Slave**
Transmission rates	**100 MBit/s**
Connection	**RJ45**
Galvanic isolation	**yes**
Test voltage	**500 V AC**
Times	
Supply interruption before de-energisation	**20 ms**
Environmental data	
Ambient temperature	
In accordance with the standard	**EN 60068-2-14**
Temperature range	**0 - 60 °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**
Humidity	**93 % r. h. at 40 °C**
Condensation during operation	**Not permitted**
EMC	**EN 61131-2**
Vibration	
In accordance with the standard	**EN 60068-2-6**
Frequency	**10 - 150 Hz**
Acceleration	**1g**
Shock stress	
In accordance with the standard	**EN 60068-2-27**
Acceleration	**15g**
Duration	**11 ms**
Max. operating height above sea level	**2000 m**

Environmental data	
Airgap creepage	
In accordance with the standard	**EN 61131-2**
Overvoltage category	**III**
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	
Mounting position	**horizontally on mounting rail**
DIN rail	
Top hat rail	**35 x 7,5 EN 50022**
Recess width	**27 mm**
Material	
Bottom	**PPO UL 94 V0**
Front	**ABS UL 94 V0**
Dimensions	
Height	**94 mm**
Width	**22,5 mm**
Depth	**114 mm**
Weight	**125 g**

Where standards are undated, the 2020-07 latest editions shall apply.

9 Order reference

Product type	Features	Order no.
PNOZ mc10p	Fieldbus module, sercos III	773 715

Terminator, jumper

Product type	Features	Order no.
PNOZmulti bus terminator	Terminator	779 110
KOP-XE	Jumper	774 639

Support

Technical support is available from Pilz round the clock.

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