

PNOZ mc1p

PILZ
THE SPIRIT OF SAFETY

- ▶ Configurable safety systems PNOZmulti

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SD means Secure Digital

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1 Introduction

1.1 Validity of documentation

This documentation is valid for the product PNOZ mc1p. 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


- ▶ Expansion module PNOZ mc1p
- ▶ Jumper

2.2 Unit features

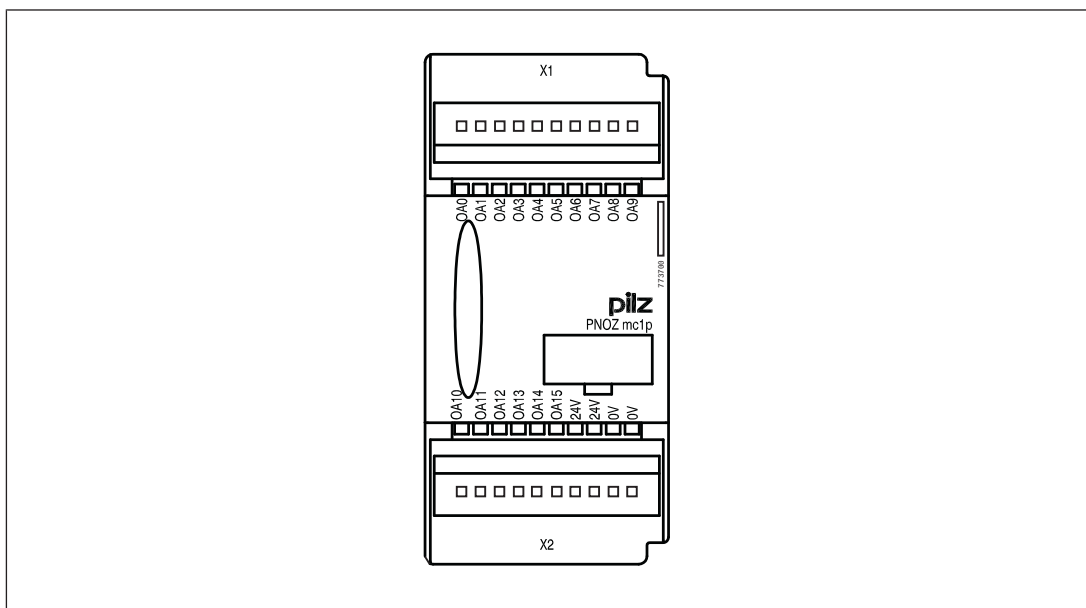
Using the product PNOZ mc1p:

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
- ▶ Semiconductor outputs:
 - 16 auxiliary outputs
- ▶ Status indicators
- ▶ Coated version:
 - Increased environmental requirements (see [Technical details](#) [ 14])
- ▶ Plug-in connection terminals:
 - either spring-loaded terminal or screw terminal available as an accessory (see order reference)
- ▶ Please refer to the document "PNOZmulti System Expansion" for the PNOZmulti base units that can be connected.

2.3 Front view



3 Safety


3.1 Intended use

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 coated version of the product PNOZ mc1p is suitable for use where there are increased environmental requirements (see [Technical details](#) [ 14]).

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

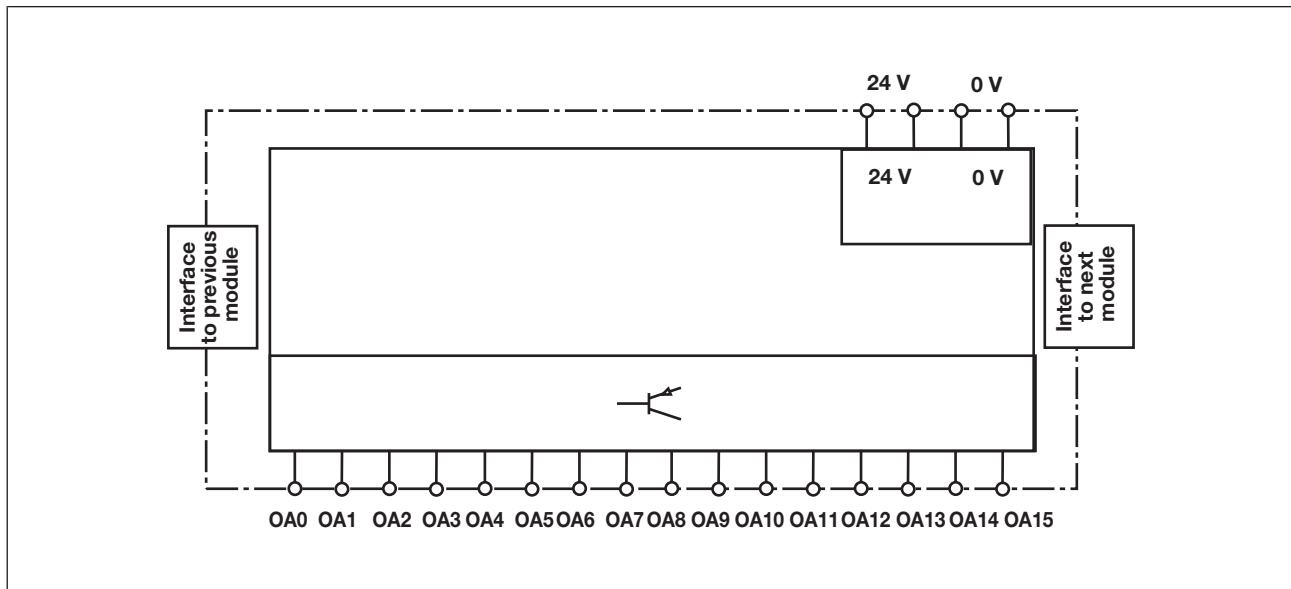
4.1 Functions

The expansion module operates as a signal module with non-safety-related outputs.

The function of the outputs on the safety system depends on the safety circuit created using the PNOZmulti Configurator. A chip card is used to download the safety circuit to the base unit. The base unit has 2 microcontrollers that monitor each other. They evaluate the input circuits on the base unit and expansion modules and switch the outputs on the base unit and expansion modules accordingly.

The online help on the PNOZmulti Configurator contains descriptions of the operating modes and all the functions of the PNOZmulti safety system, plus connection examples.

4.2 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 notches 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 PNOZmulti units in the control cabinet must not exceed the figure stated in the technical details, otherwise air conditioning will be required.
- ▶ To comply with EMC requirements, the mounting rail must have a low impedance connection to the control cabinet housing.

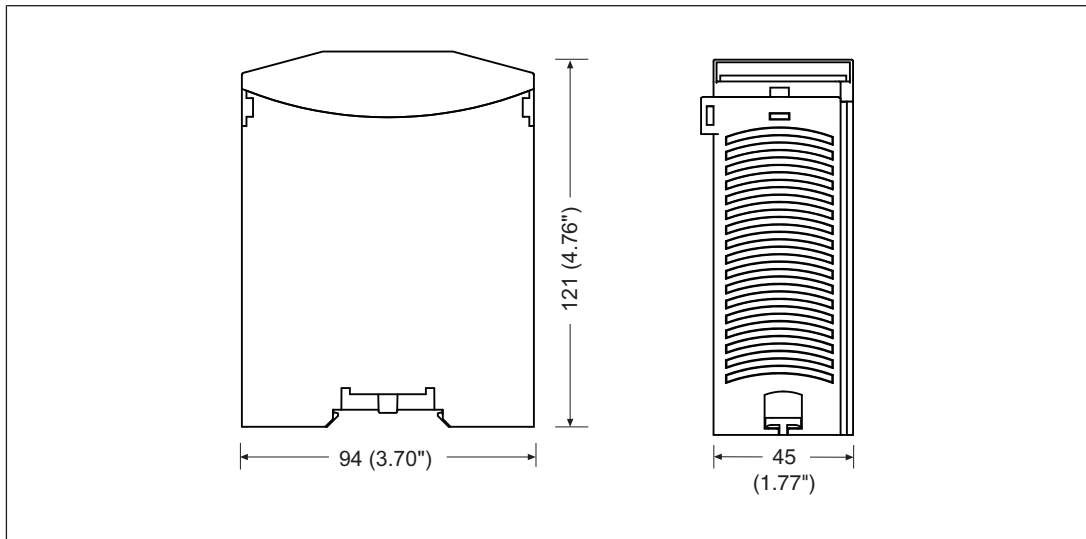


CAUTION!

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 modules as described in the operating manuals for the base modules.

- ▶ The terminator must be fitted to the last expansion module
- ▶ Install the expansion module in the position configured in the PNOZmulti Configurator.

The position of the expansion modules is defined in the PNOZmulti Configurator. The expansion modules are connected to the left or right of the base unit, depending on the type.

Please refer to the document "PNOZmulti System Expansion" for details of the number of modules that can be connected to the base unit and the module types.

6 Commissioning

6.1 General wiring guidelines

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

Please note:

- ▶ 2 connection terminals are available for each of the supply connections 24 V and 0 V. This means that the supply voltage can be looped through several connections. The current at each terminal may not exceed 3 A.
- ▶ Outputs OA0 to OA15 are auxiliary outputs using semiconductor technology.
- ▶ Use copper wiring with a temperature stability of 75 °C.
- ▶ Information given in the [Technical details](#) [14] must be followed.

6.2 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 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.

6.3 Connection

Supply voltage	AC	DC

Supply voltage

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Semiconductor outputs

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", "IFAULT" and "OFAULT" will light up on the base unit.

The PNOZmulti control system is ready for operation when the "POWER" and "RUN" LEDs on the base unit are lit continuously.

8 Technical details

General	773700	773705
Approvals	BG, CCC, CE, EAC (Eurasian), KOSHA, TÜV, cULus Listed	BG, CCC, CE, EAC (Eurasian), KOSHA, TÜV, cULus Listed
Electrical data	773700	773705
Supply voltage		
for	Supply to the SC outputs	Supply to the SC outputs
Voltage	24 V	24 V
Kind	DC	DC
Voltage tolerance	-15 %/+20 %	-15 %/+20 %
Output of external power supply (DC)	192,0 W	192,0 W
Potential isolation	yes	yes
Supply voltage		
for	Module supply	Module supply
internal	Via base unit	Via base unit
Voltage	5,0 V	5,0 V
Kind	DC	DC
Voltage tolerance	-2 %/+2 %	-2 %/+2 %
Power consumption	0,6 W	0,6 W
Status indicator	LED	LED
Semiconductor outputs (standard)	773700	773705
Number	16	16
Switching capability		
Voltage	24 V	24 V
Current	0,50 A	0,50 A
Power	12,0 W	12,0 W
Max. permitted overall performance of semiconductor outputs at an ambient temperature of > 50 °C	–	144 W
Galvanic isolation	yes	yes
Short circuit-proof	yes	yes
Residual current at "0"	0,5 mA	0,5 mA
Signal level at "1"	UB - 0.5 VDC at 0.5 A	UB - 0.5 VDC at 0.5 A
Times	773700	773705
Switch-on delay	5,00 s	5,00 s
Supply interruption before de-energisation	20 ms	20 ms
Environmental data	773700	773705
Ambient temperature		
In accordance with the standard	EN 60068-2-14	EN 60068-2-14
Temperature range	0 - 60 °C	-25 - 60 °C
Forced convection in control cabinet off	55 °C	–

Environmental data	773700	773705
Storage temperature		
In accordance with the standard	EN 60068-2-1/-2	EN 60068-2-1/-2
Temperature range	-25 - 70 °C	-25 - 70 °C
Climatic suitability		
In accordance with the standard	EN 60068-2-30, EN 60068-2-78	EN 60068-2-30, EN 60068-2-78
Humidity	93 % r. h. at 40 °C	93 % r. h. at 40 °C
Condensation during operation	Not permitted	Short-term
EMC	EN 61131-2	EN 61131-2
Vibration		
In accordance with the standard	EN 60068-2-6	EN 60068-2-6
Frequency	10,0 - 150,0 Hz	10,0 - 150,0 Hz
Acceleration	1g	1g
Corrosive gas check		
SO ₂ : Concentration 10 ppm, duration 10 days, passive	–	DIN V 40046-36
H ₂ S: Concentration 1 ppm, duration 10 days, passive	–	DIN V 40046-37
Shock stress		
In accordance with the standard	EN 60068-2-27	EN 60068-2-27
Acceleration	15g	15g
Duration	11 ms	11 ms
Max. operating height above sea level	2000 m	2000 m
Airgap creepage		
In accordance with the standard	EN 61131-2	EN 61131-2
Overvoltage category	III	III
Pollution degree	2	2
Rated insulation voltage	30 V	30 V
Protection type		
In accordance with the standard	EN 60529	EN 60529
Mounting area (e.g. control cabinet)	IP54	IP54
Housing	IP20	IP20
Terminals	IP20	IP20
Mechanical data	773700	773705
Mounting position	Horizontal on top hat rail	Horizontal on top hat rail
DIN rail		
Top hat rail	35 x 7,5 EN 50022	35 x 7,5 EN 50022
Recess width	27 mm	27 mm
Material		
Bottom	PPO UL 94 V0	PPO UL 94 V0
Front	ABS UL 94 V0	ABS UL 94 V0
Connection type	Spring-loaded terminal, screw terminal	Spring-loaded terminal, screw terminal

Mechanical data	773700	773705
Conductor cross section with screw terminals		
1 core flexible	0,25 - 1,50 mm², 24 - 16 AWG	0,25 - 1,50 mm², 24 - 16 AWG
2 core with the same cross section, flexible without crimp connectors or with TWIN crimp connectors	0,25 - 0,75 mm², 24 - 20 AWG	0,25 - 0,75 mm², 24 - 20 AWG
Torque setting with screw terminals	0,25 Nm	0,25 Nm
Stripping length with screw terminals	7 mm	7 mm
Conductor cross section with spring-loaded terminals		
1 core flexible without crimp connector	0,25 - 1,50 mm², 24 - 16 AWG	0,25 - 1,50 mm², 24 - 16 AWG
1 core flexible with crimp connector	0,25 - 0,75 mm², 24 - 20 AWG	0,25 - 0,75 mm², 24 - 20 AWG
Spring-loaded terminals: Terminal points per connection	1	1
Stripping length with spring-loaded terminals	9 mm	9 mm
Dimensions		
Height	94,0 mm	94,0 mm
Width	45,0 mm	45,0 mm
Depth	121,0 mm	121,0 mm
Weight	164 g	166 g

Where standards are undated, the 2008-03 latest editions shall apply.

9 Order reference

9.1 Product

Product type	Features	Order No.
PNOZ mc1p	Expansion module, 16 semiconductor outputs, standard	773 700
PNOZ mc1p coated version	Expansion module, 16 semiconductor outputs, standard, coated version	773 705

9.2 Accessories

Terminator, jumper

Product type	Features	Order No.
PNOZmulti bus terminator	Terminator	779 110
PNOZmulti bus terminator coated	Terminator, coated version	779 112
KOP-XE	Jumper	774 639
KOP-XE coated	Jumper, coated version	774 640

Connection terminals

Product type	Features	Order No.
Set spring terminals	1 set of spring-loaded terminals	783 700
Set screw terminals	1 set of screw terminals	793 700