

Up to PL e of EN ISO 13849-1 PNOZ s7.2



Contact expansion module for increasing the number of available contacts

Approvals

	PNOZ s7.2
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Unit features

- ▶ Positive-guided relay outputs:
 - 4 safety contacts (N/O), instantaneous
 - 1 auxiliary contact (N/C), instantaneous
- ▶ Safe separation of safety contacts 13-14, 23-24, 33-34 from all other circuits
- ▶ Connection options for expansion modules
- ▶ LED for:
 - Input status, channel 1
 - Input status, channel 2
 - Switch status of the safety contacts
- ▶ Plug-in connection terminals (either spring-loaded terminals or screw terminals)

Unit description

The unit meets the requirements of EN 60947-5-1, EN 60204-1 and VDE 0113-1. The contact expander module is used to increase the number of instantaneous safety contacts available on a base unit. The category that can be achieved in accordance with EN 954-1 and EN ISO 13849-1 depends on the category of the base

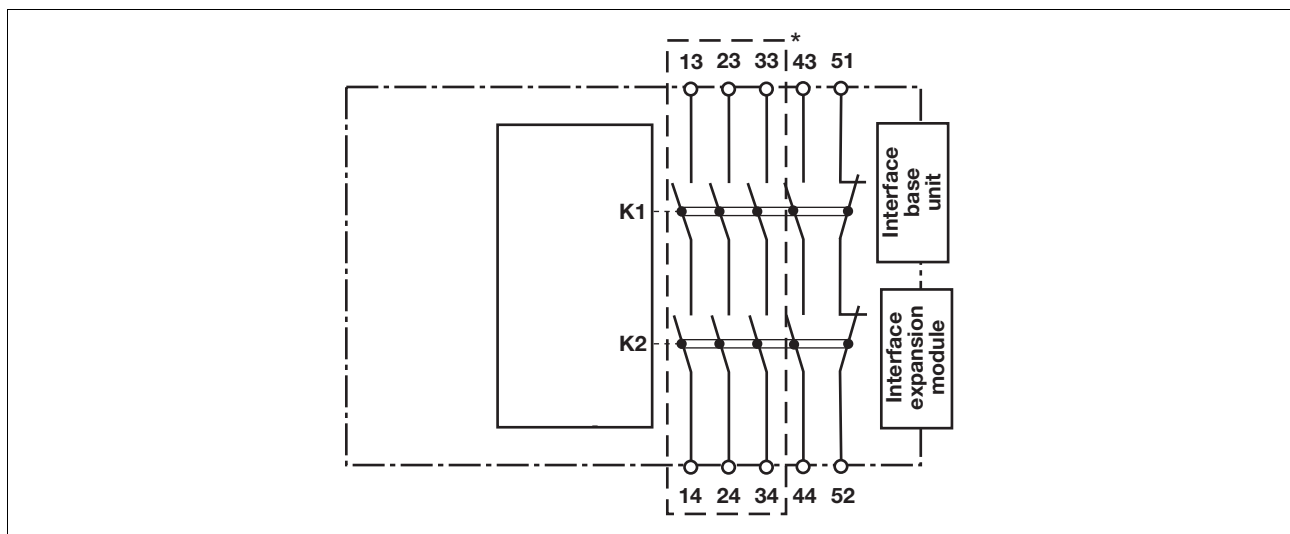
unit. The contact expander module may not exceed this.

Safety features

The unit meets the following safety requirements:

- ▶ The contact expansion module expands an existing circuit. As the output relays are monitored via the base unit's feedback loop, the safety functions on the existing circuit are transferred to the contact expansion module.
- ▶ The safety function remains effective in the case of a component failure.
- ▶ Earth fault in the feedback loop: Detected, depending on the base unit that is used.
- ▶ Earth fault in the input circuit: The output relays de-energise and the safety contacts open.

Block diagram



*Safe separation in accordance with EN 60947-1, 6 kV

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Function description

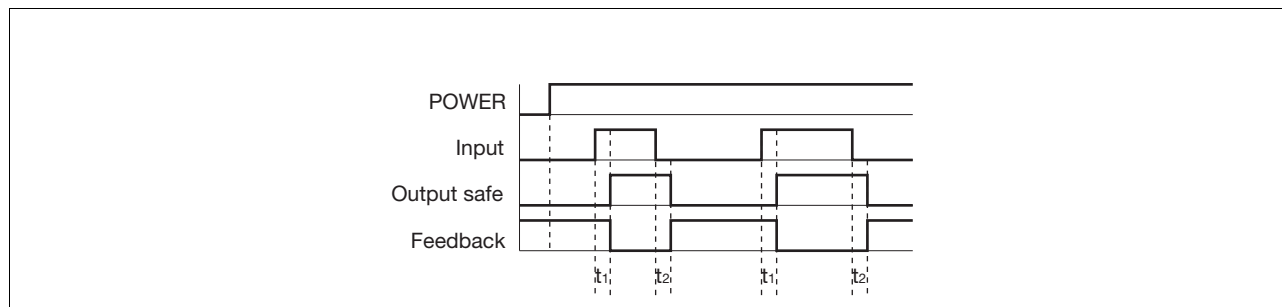
with PNOZsigma s7.1:

- ▶ Dual-channel operation and supply voltage via PNOZsigma connector

with PNOZsigma expander modules:

- ▶ Dual-channel operation and supply voltage via PNOZsigma connector

Timing diagram



Key

- ▶ Power: Supply voltage
- ▶ Input: Input circuits
- ▶ Output safe: Safety contacts 13-14, 23-24, 33-34, 43-44
- ▶ Feedback: Feedback loop 51-52
- ▶ t_1 : Switch-on delay
- ▶ t_2 : Delay-on de-energisation

Wiring

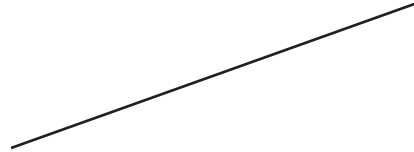
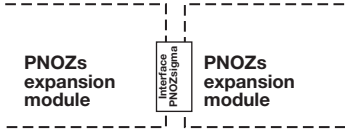
Please note:

- ▶ Information given in the "Technical details" must be followed.
- ▶ Outputs 13-14, 23-24, 33-34, 43-44 are safety contacts, output 51-52 is an auxiliary contact (e.g. for display).
- ▶ To prevent contact welding, a fuse should be connected before the output contacts (see technical details).
- ▶ Use copper wire that can withstand 60/75 °C.
- ▶ Sufficient fuse protection must be provided on all output contacts with capacitive and inductive loads.

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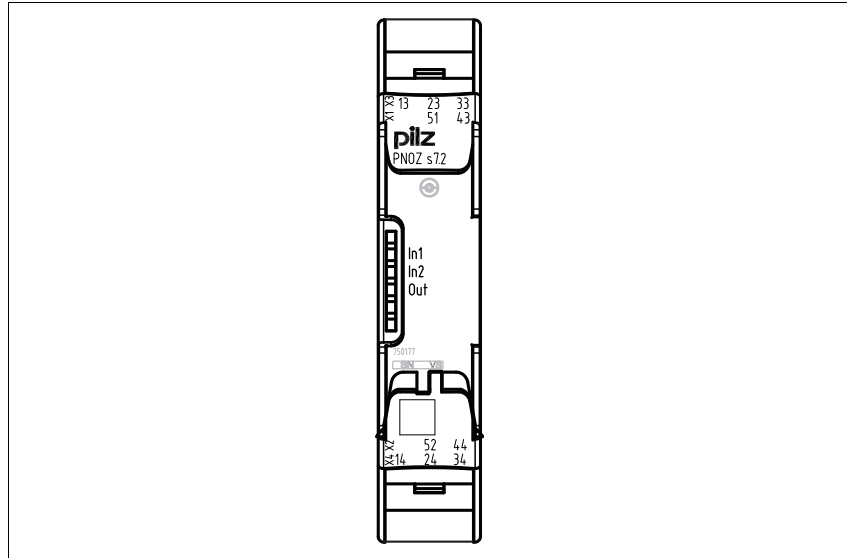
Preparing for operation

- ▶ Supply voltage/input circuit/feedback loop

Supply voltage/input circuit/feedback loop	AC	DC
Contact expansion module PNOZ s7.2		

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Terminal configuration



Installation

Connect contact expansion module PNOZ s7.2 to PNOZsigma contact expansion modules

- ▶ Connect the contact expansion modules using the connector supplied.

Control cabinet installation

- ▶ The safety relay should be installed in a control cabinet with a protection type of at least IP54.
- ▶ Use the notch on the rear of the unit to attach it to a DIN rail.
- ▶ Ensure the unit is mounted securely on a vertical DIN rail (35 mm) by us-

ing a fixing element (e.g. retaining bracket or an end angle). Push the unit upwards or downwards before lifting it from the DIN rail.

Expansion options	Please note the max. power consumption of the contact expansion modules (see Technical data PNOZ s7.1).
<p>①: Base unit</p> <p>②: Contact expansion module PNOZ s7.1</p> <p>③: Contact expansion module PNOZ s7.2</p> <p>④: Contact expansion module PNOZ s7.2 with terminator</p>	

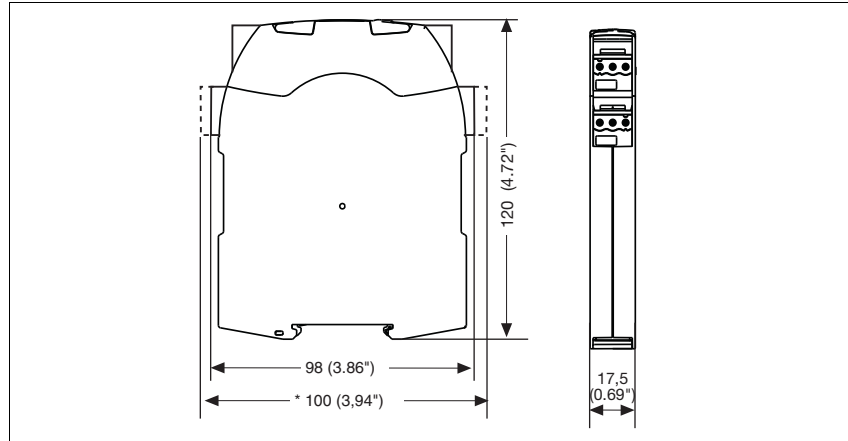
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<p>①: Base unit</p> <p>②: Contact expansion module PNOZ s7.1</p> <p>③: Contact expansion module PNOZ s7.2</p> <p>④: Contact expansion module PNOZ s7, s8, s9, s10, s11 as terminator</p>	
<p>①: Contact expansion module PNOZ s7.1 with terminator</p> <p>②: Contact expansion module PNOZ s7.2</p> <p>③: Contact expansion module PNOZ s7.2 with terminator</p>	
<p>①: Contact expansion module PNOZ s7.1 with terminator</p> <p>②: Contact expansion module PNOZ s7.2</p> <p>③: Contact expansion module PNOZ s7, s8, s9, s10, s11 as terminator</p>	
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Dimensions

*with spring-loaded terminals



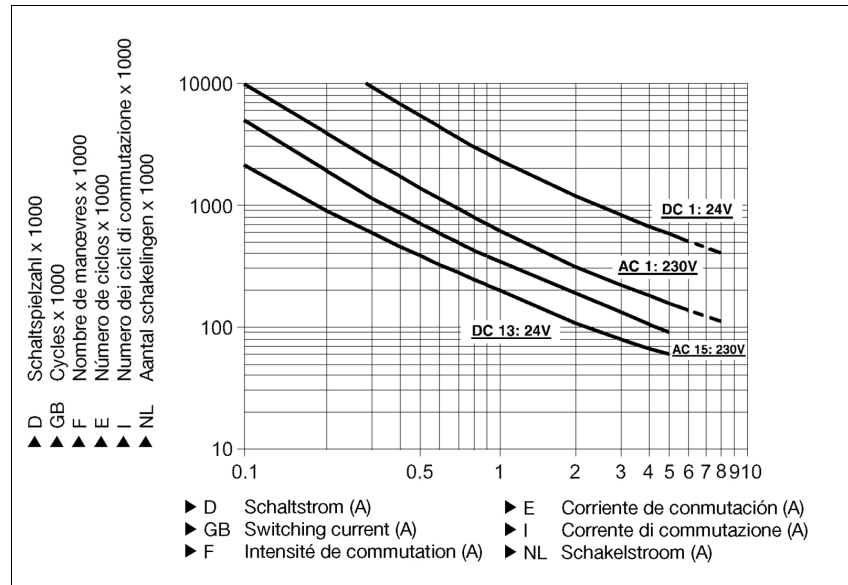
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NOTICE

This data sheet is only intended for use during configuration. Please refer to the operating manual for installation and operation.

Service life graph

The service life graphs indicate the number of cycles from which failures due to wear must be expected. The wear is mainly caused by the electrical load; the mechanical load is negligible.



Example

- ▶ Inductive load: 0,2 A
- ▶ Utilisation category: AC15
- ▶ Contact service life: 2,000,000 cycles

Provided the application requires fewer than 2,000,000 cycles, the PFH value (see technical details) can be used in the calculation.

To increase the service life, sufficient spark suppression must be provided on all output contacts. With capacitive loads, any power surges that occur must be noted. With contactors, use freewheel diodes for spark suppression.

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Technical details

Electrical data

Power consumption at U_B DC	2.0 W
Number of output contacts	
Safety contacts (S) instantaneous:	4
Auxiliary contacts (N/C):	1
Utilisation category in accordance with EN 60947-4-1	
Safety contacts: AC1 at 240 V	$I_{min}: 0.01 A, I_{max}: 6.0 A$ $P_{max}: 1500 VA$
Safety contacts: DC1 at 24 V	$I_{min}: 0.01 A, I_{max}: 6.0 A$ $P_{max}: 150 W$
Auxiliary contacts: AC1 at 240 V	$I_{min}: 0.01 A, I_{max}: 2.0 A$ $P_{max}: 500 VA$
Auxiliary contacts: DC1 at 24 V	$I_{min}: 0.01 A, I_{max}: 2.0 A$ $P_{max}: 50 W$
Utilisation category in accordance with EN 60947-5-1	
Safety contacts: AC15 at 230 V	$I_{max}: 5.0 A$
Safety contacts: DC13 at 24 V (6 cycles/min)	$I_{max}: 5.0 A$
Auxiliary contacts: AC15 at 230 V	$I_{max}: 2.0 A$
Auxiliary contacts: DC13 at 24 V (6 cycles/min)	$I_{max}: 2.0 A$
Contact material	AgCuNi + 0.2 µm Au
External contact fuse protection ($I_k = 1 kA$) to EN 60947-5-1	
Blow-out fuse, quick	
Safety contacts:	10 A
Auxiliary contacts:	4 A
Blow-out fuse, slow	
Safety contacts:	6 A
Auxiliary contacts:	2 A
Circuit breaker 24 VAC/DC, characteristic B/C	
Safety contacts:	6 A
Auxiliary contacts:	2 A
Max. overall cable resistance R_{lmax} input circuits, reset circuits single-channel at U_B DC	
	30 Ohm
Safety-related characteristic data	
PL in accordance with EN ISO 13849-1: 2006	PL e (Cat. 4)
Category in accordance with EN 954-1	Cat. 4
SIL CL in accordance with EN IEC 62061	SIL CL 3
PFH in accordance with EN IEC 62061	2.31E-09
SIL in accordance with IEC 61511	SIL 3
PFD in accordance with IEC 61511	2.03E-06
T_M [year] in accordance with EN ISO 13849-1: 2006	20
Times	
Switch-on delay	
with automatic reset after power on typ.	30 ms
with automatic reset after power on max.	50 ms
Delay-on de-energisation	
with E-STOP typ.	18 ms
with E-STOP max.	30 ms
with power failure typ.	18 ms
with power failure max.	30 ms
Environmental data	
EMC	EN 60947-5-1, EN 61000-6-2, EN 61000-6-4
Vibration to EN 60068-2-6	
Frequency	10.0 - 55.0 Hz
Amplitude	0.35 mm
Climatic suitability	EN 60068-2-78

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Environmental data	
Airgap creepage in accordance with EN 60947-1	
Pollution degree	2
Overvoltage category	III
Rated insulation voltage	250 V
Rated impulse withstand voltage	6.00 kV
Ambient temperature	-10 - 55 °C
Storage temperature	-40 - 85 °C
Protection type	
Mounting (e.g. cabinet)	IP54
Housing	IP40
Terminals	IP20
Mechanical data	
Housing material	
Housing	PC
Front	PC
Cross section of external conductors with screw terminals	
1 core flexible	0.25 - 2.50 mm ² , 24 - 12 AWG No. 750177
2 core, same cross section, flexible:	
with crimp connectors, without insulating sleeve	0.25 - 1.00 mm ² , 24 - 16 AWG No. 750177
without crimp connectors or with TWIN crimp connectors	0.20 - 1.50 mm ² , 24 - 16 AWG No. 750177
Torque setting with screw terminals	0.50 Nm No. 750177
Cross section of external conductors with spring-loaded terminals: Flexible with/without crimp connectors	0.20 - 2.50 mm ² , 24 - 12 AWG No. 751177
Spring-loaded terminals: Terminal points per connection	2 No. 751177
Stripping length	9 mm No. 751177
Dimensions	
Height	100.0 mm No. 751177 98.0 mm No. 750177
Width	17.5 mm
Depth	120.0 mm
Weight	170 g

No. stands for order number.

It is essential to consider the relay's service life graphs. The relay outputs' safety-related characteristic data is only valid if the values in the service life graphs are met.

The PFH value depends on the switching frequency and the load on the relay output.
If the service life graphs are not accessible, the stated PFH value can be

used irrespective of the switching frequency and the load, as the PFH value already considers the relay's B10d value as well as the failure rates of the other components.

All the units used within a safety function must be considered when calculating the safety characteristic data.

INFORMATION

A safety function's SIL/PL values are **not** identical to the SIL/PL values of the units that are used and may be different. We recommend that you use the PAScal software tool to calculate the safety function's SIL/PL values.

The standards current on **2007-07** apply.

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Conventional thermal current while loading several contacts

Number of contacts	I_{th} per contact at U_B DC
1	6.00 A
2	5.50 A
3	4.50 A
4	4.00 A

Order reference

Type	Features	Terminals	Order no.
PNOZ s7.2 C	24 VDC	With spring-loaded terminals	751 177
PNOZ s7.2	24 VDC	With screw terminals	750 177