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

Contact expansion module for increasing the number of available contacts

Approvals

	PNOZ s7.1
c UL us LISTED	◆
	◆
	◆

Unit features

- Positive-guided relay outputs:
  - 3 safety contacts (N/O), instantaneous
- Safe separation of safety contacts 13-14, 23-24, 33-34 from all other circuits
- Supply voltage for expansion modules
- LED for:
  - Supply voltage at B1 and B2
  - Input status, channel 1
  - Input status, channel 2
  - Switch status of the safety contacts
  - Fault
- Plug-in connection terminals (either spring-loaded terminal or screw terminal)

Unit description

The unit meets the requirements of EN 60947-5-1, EN 60204-1 and VDE 0113-1. The contact expansion module is used to increase the number of instantaneous safety contacts available on a base unit. Base units are all safety relays with feedback loop monitoring.

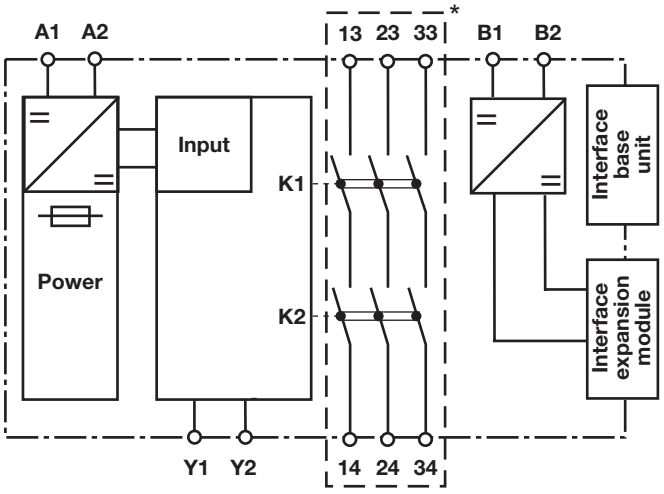
The category that can be achieved in accordance with EN 954-1 and EN ISO 13849-1 depends on the category of the base unit. The contact expansion module may not exceed this.

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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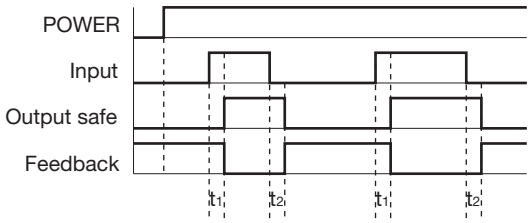
Function description

with PNOZsigma base unit:
- Dual-channel operation via PNOZsigma connector

without PNOZsigma base unit:
- Single-channel operation: one input circuit affects the output relays

with PNOZsigma s7.2 expander units:
- Dual-channel operation and supply voltage via PNOZsigma connector

Timing diagram



Key
- Power: Supply voltage
- Input: Input circuits
- Output safe: Safety contacts
- 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 are safety contacts.
- To prevent contact welding, a fuse should be connected before the output contacts (see technical details).
- Calculation of the max. cable runs I_{max} in the input circuit:

$$I_{max} = \frac{R_{lmax}}{R_l / km}$$

R_{lmax} = max. overall cable resistance (see technical details)
R_l /km = cable resistance/km

- 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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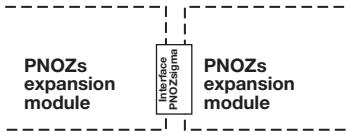
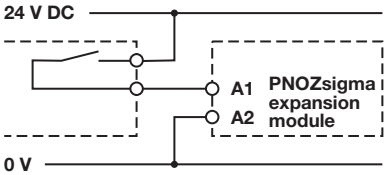
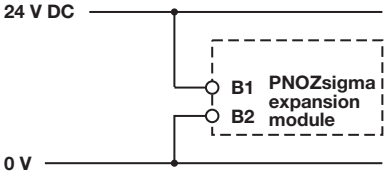
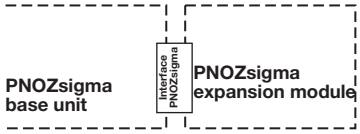
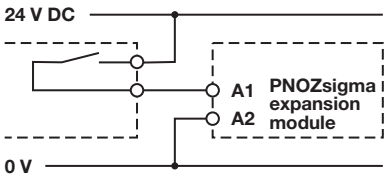
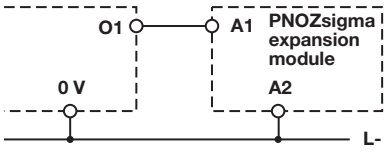
Preparing for operation

▸ Supply voltage

Supply voltage	AC	DC
Base unit: Safety relay PNOZsigma		
Base unit: Safety relay PNOZ X		
Supply voltage for expansion modules PNOZsigma		

▸ Input circuit

Input circuit	Single-channel	Dual-channel
Base unit: Safety relay PNOZsigma		
Base unit: Safety relay PNOZ X		
Base unit: Safety relay PNOZelog Driven via semiconductor outputs (24 VDC)		

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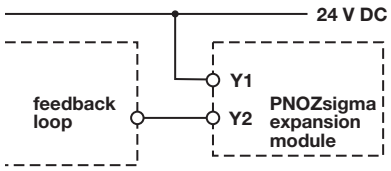
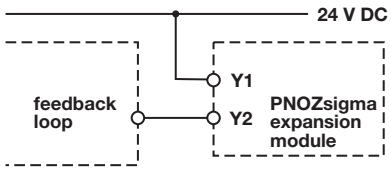
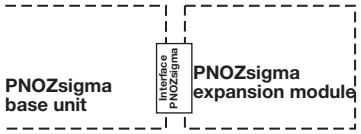
- Reset circuit/feedback loop

Reset circuit/feedback loop	Base unit: Safety relay PNOZ X	Base unit: Safety relay PNOZelog
The inputs that evaluate the feedback loop depend on the base unit and application		

- Connection to PNOZsigma base unit

	Base unit: Safety relay PNOZsigma
The feedback loop is connected and evaluated via the connector.	

INFORMATION
If a base unit and a contact expansion module from the PNOZsigma range are linked via the connector, no additional wiring is necessary.
Do not connect A1 und Y1/Y2 to the expansion module!

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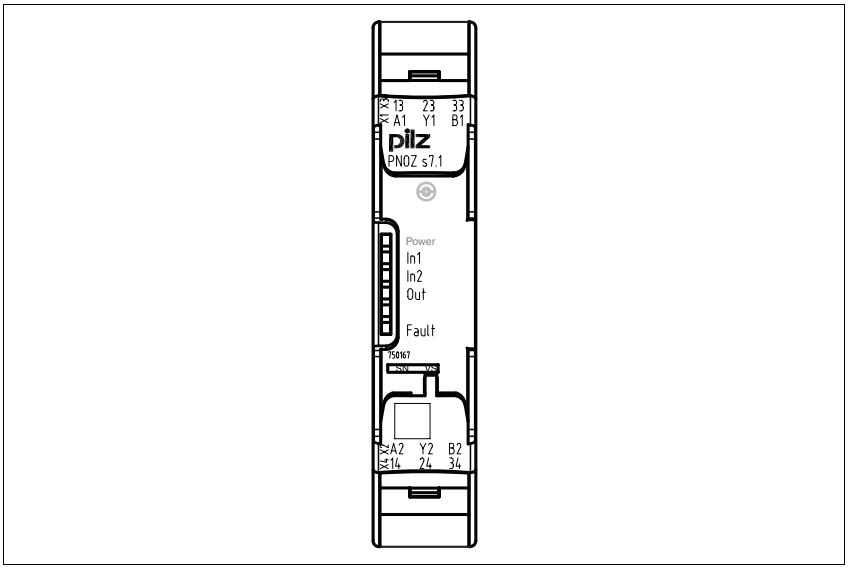
Terminal configuration



Installation

Install contact expansion module without base unit:

- Ensure that the plug terminator is inserted at the side of the unit.

Connect base unit and contact expansion module PNOZ s7.1:

- Remove the plug terminator at the side of the base unit and at the left of the contact expansion module
- Connect the base unit and the contact expansion module using the connector supplied, before mounting the units to the DIN rail.

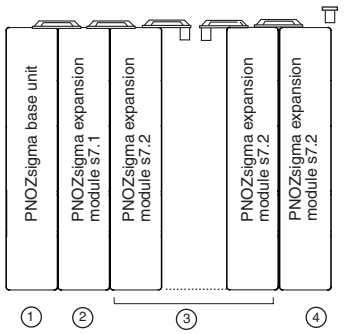
Connect contact expansion module PNOZ s7.1 to PNOZsigma contact expansion modules

- 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 using 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).
①: Base unit ②: Contact expansion module PNOZ s7.1 ③: Contact expansion module PNOZ s7.2 ④: Contact expansion module PNOZ s7.2 with terminator	

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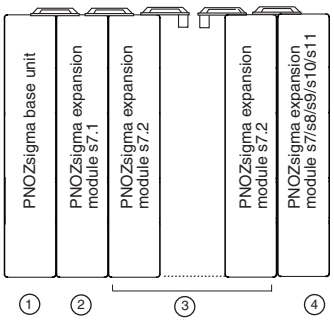
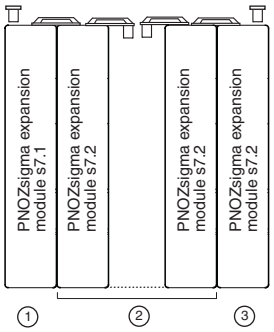
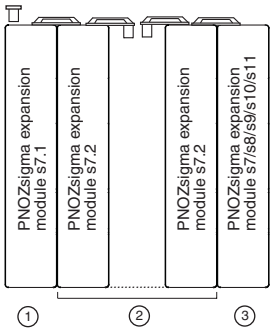
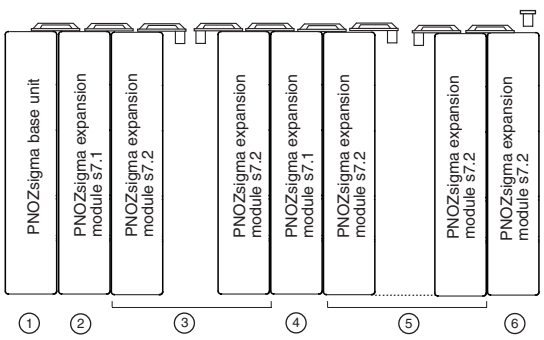
①: Base unit ②: Contact expansion module PNOZ s7.1 ③: Contact expansion module PNOZ s7.2 ④: Contact expansion module PNOZ s7, s8, s9, s10, s11 as terminator	
①: Contact expansion module PNOZ s7.1 with terminator ②: Contact expansion module PNOZ s7.2 ③: Contact expansion module PNOZ s7.2 with terminator	
①: Contact expansion module PNOZ s7.1 with terminator ②: Contact expansion module PNOZ s7.2 ③: Contact expansion module PNOZ s7, s8, s9, s10, s11 as terminator	
①: Base unit ②: Contact expansion module PNOZ s7.1 ③: Contact expansion module PNOZ s7.2 ④: Contact expansion module PNOZ s7.1 ⑤: Contact expansion module PNOZ s7.2 ⑥: Contact expansion module PNOZ s7.2 with terminator	

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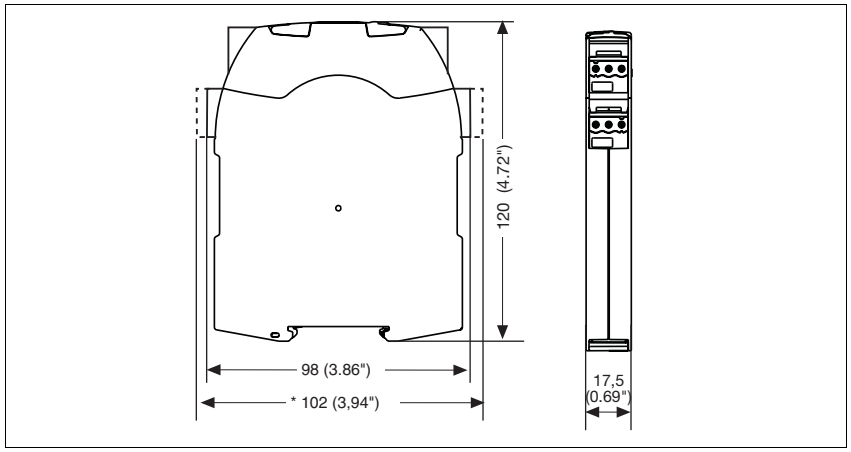
Dimensions

*with spring-loaded terminals



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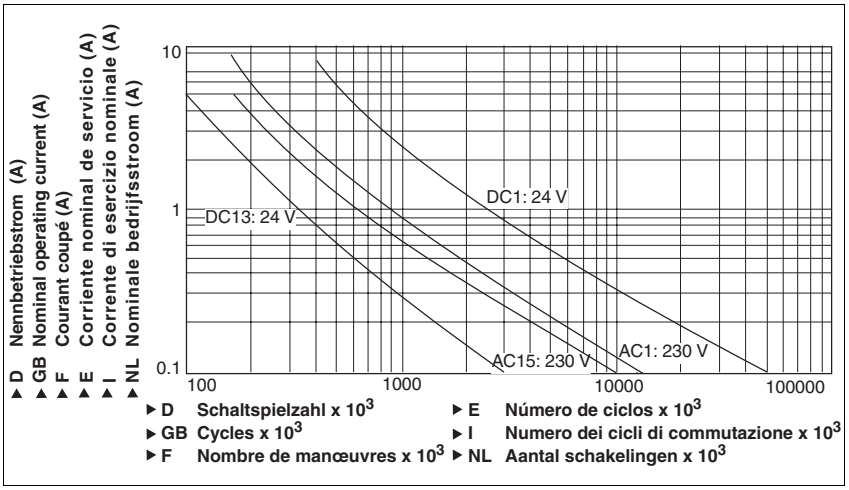
NOTICE

This data sheet is only intended for use during configuration. For installation and operation, please refer to the operating instructions supplied with the unit.

Service life graph



Technical details	
Electrical data	
Supply voltage	
Supply voltage U_B DC	**24 V**
Voltage tolerance	**-20 %/+20 %**
Power consumption at U_B DC	**2.0 W**
Max. output of all expansion modules	**20 W**
Residual ripple DC	**20 %**
Voltage and current at	
Input circuit DC: **24.0 V**	**70.0 mA**
Number of output contacts	
Safety contacts (S) instantaneous:	**3**
Utilisation category in accordance with **EN 60947-4-1**	
Safety contacts: AC1 at **240 V**	I_{min}: **0.01 A** , I_{max}: **8.0 A** P_{max}: **2000 VA**
Safety contacts: DC1 at **24 V**	I_{min}: **0.01 A** , I_{max}: **8.0 A** P_{max}: **200 W**
Utilisation category in accordance with **EN 60947-5-1**	
Safety contacts: AC15 at **230 V**	I_{max}: **6.0 A**
Safety contacts: DC13 at **24 V** (6 cycles/min)	I_{max}: **5.0 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**
Blow-out fuse, slow	
Safety contacts:	**6 A**
Circuit breaker 24 VAC/DC, characteristic B/C	
Safety contacts:	**6 A**
Max. overall cable resistance R_{lmax} input circuits, reset circuits	
single-channel at U_B DC	**30 Ohm**
Safety-related characteristic data	
Performance level (PL) in accordance with **EN ISO 13849-1**	
Safety contacts, instantaneous	**e**
Category of output contacts in accordance with **EN 954-1**, **EN ISO 13849-1**	
Safety contacts (S) instantaneous:	**4**

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Safety-related characteristic data	
SIL claim limit (SIL CL) in accordance with **EN IEC 62061**	
Safety contacts, instantaneous	**3**
Probability of dangerous failure per hour **(PFH_D)** in accordance with **EN IEC 62061**	
Safety contacts, instantaneous	**2.31E-09 1/h**
Mission time/Proof test interval in years	**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**
Supply interruption before de-energisation	**5 ms**
Environmental data	
EMC	**EN 60947-5-1**, **EN 61000-6-2**, **EN 61000-6-4**
Vibration to **EN 60068-2-6**	
Frequency	**10 - 55 Hz**
Amplitude	**0.35 mm**
Climatic suitability	**EN 60068-2-78**
Airgap creepage in accordance with **EN 60947-1**	
Pollution degree	**2**
Rated insulation voltage	**250 V**
Rated impulse withstand voltage	**6.0 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 mm² , 24 - 12 AWG** Order no.: 750167
2 core, same cross section, flexible:	
with crimp connectors, without insulating sleeve	**0.25 - 1.00 mm² , 24 - 16 AWG** Order no.: 750167
without crimp connectors or with TWIN crimp connectors	**0.20 - 1.50 mm² , 24 - 16 AWG** Order no.: 750167
Torque setting with screw terminals	**0.50 Nm** Order no.: 750167
Cross section of external conductors with spring-loaded terminals: Flexible with/without crimp connectors	**0.20 - 2.50 mm² , 24 - 12 AWG** Order no.: 751167
Spring-loaded terminals: Terminal points per connection	**2** Order no.: 751167
Stripping length	**9 mm** Order no.: 751167
Dimensions	
Height	**102.0 mm** Order no.: 751167 **98.0 mm** Order no.: 750167
Width	**17.5 mm**
Depth	**120.0 mm**
Weight	**170 g**

The standards current on **2007-10** apply.

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Conventional thermal current

I_{th} (A) at U_B DC	
1 contact	**8.00 A**
2 contacts	**5.50 A**
3 contacts	**4.50 A**

Order reference

Type	Features		Terminals	Order no.
PNOZs 7.1 C		24 VDC	With spring-loaded terminals	751 167
PNOZs 7.1		24 VDC	With screw terminals	750 167