

## Up to PL e of EN ISO 13849-1 PNOZ s11



Contact expansion module for increasing the number of available contacts

### Approvals

	PNOZ s11
	◆
	◆
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### Unit features

- ▶ Positive-guided relay outputs:
  - 8 safety contacts (N/O), instantaneous
  - 1 auxiliary contact (N/C), instantaneous
- ▶ Safe separation of safety contacts from all other circuits
- ▶ LED indicator for:
  - Input status, channel 1
  - Input status, channel 2
  - Switch status, safety contacts
  - Error
- ▶ 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 cate-

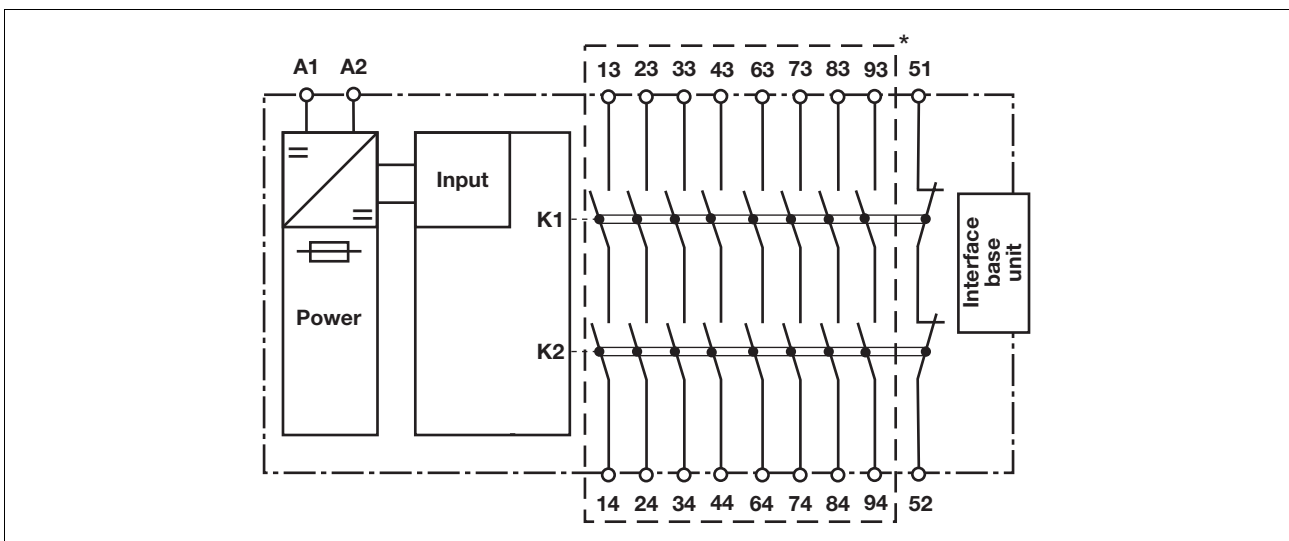
gory of the base unit. The contact expansion module may not exceed this.

### 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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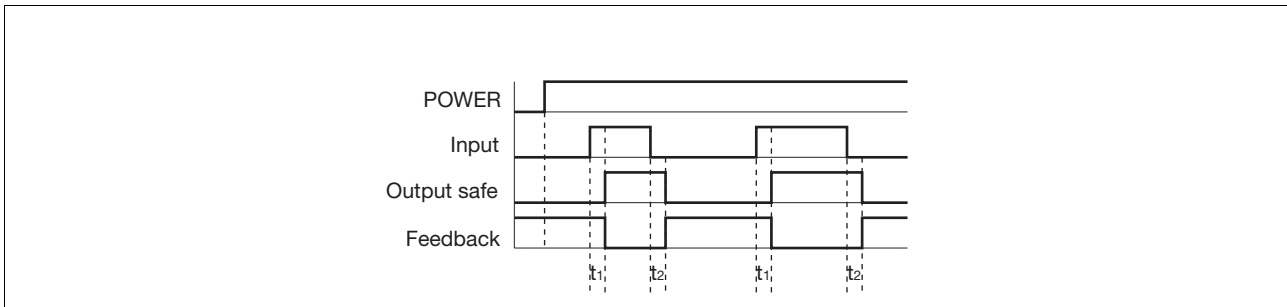
### Function description

with PNOZsigma base unit:

▶ Dual-channel operation via PNOZsigma connector without PNOZsigma base unit:

▶ Single-channel operation: one input circuit affects the output relays

### Timing diagram



### Key

- ▶ Power: Supply voltage
- ▶ Input: Input circuits A1
- ▶ Output safe: Safety contacts 13-14, 23-24, 33-34, 43-44, 63-64, 73-74, 83-84, 93-94
- ▶ 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, 63-64, 73-74, 83-84, 93-94 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).
- ▶ Calculation of the max. cable runs  $l_{max}$  in the input circuit:

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

$R_{lmax}$  = 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

#### Input circuit

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

#### Feedback loop

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

#### Connection to PNOZsigma base unit

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

### INFORMATION

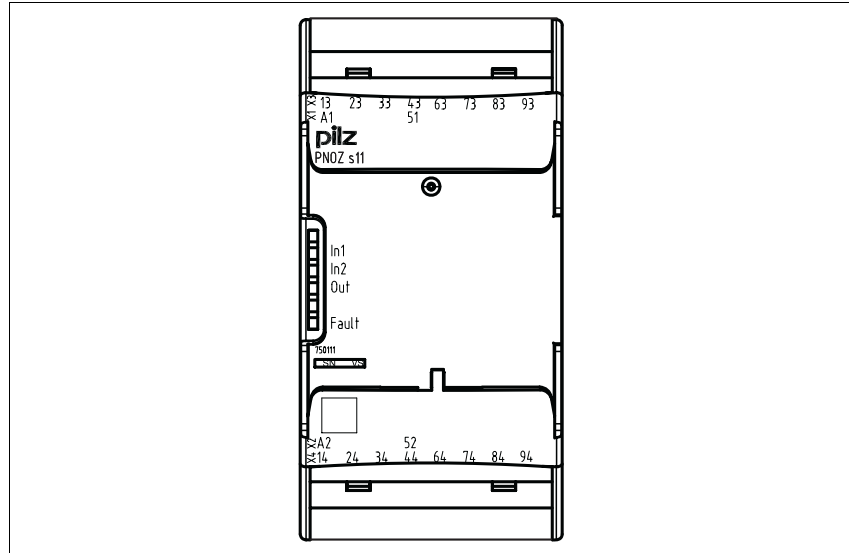
If a base unit and a contact expander module from the PNOZsigma range

are connected via the connector, no additional wiring is necessary.

Do not connect A1 to the contact expander module!

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### Terminal configuration



### Installation

#### Install contact expander module without base unit:

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

#### Connect base unit and PNOZsigma contact expander module:

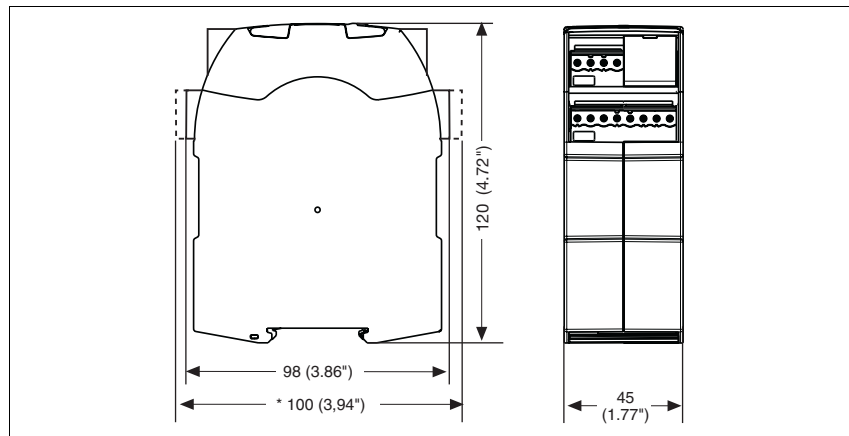
- ▶ Remove the plug terminator at the side of the base unit and at the contact expander module
- ▶ Connect the base unit and the contact expander module to the supplied connector before mounting the units to the DIN rail.

#### Installation in control cabinet

- ▶ 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.

### Dimensions

\*with spring-loaded terminals

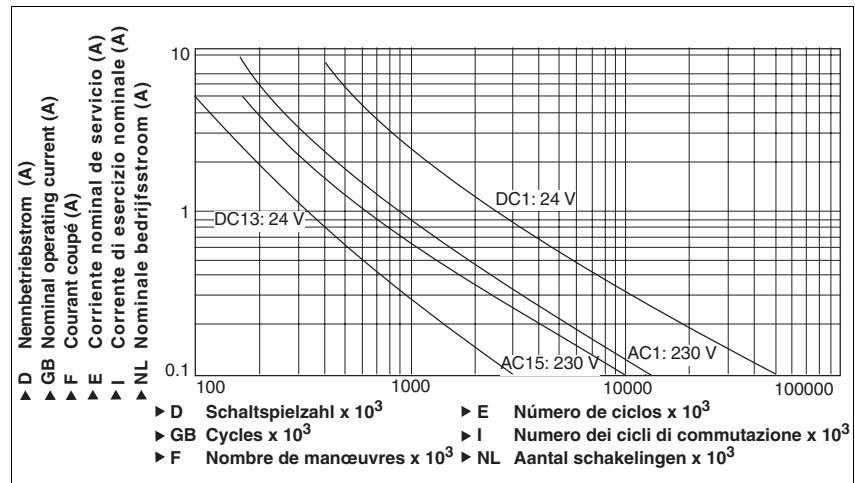


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### NOTICE

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	<b>24 V</b>
Voltage tolerance	<b>-20 %/+20 %</b>
Power consumption at $U_B$ DC	<b>3.0 W</b>
Residual ripple DC	<b>20 %</b>
Voltage and current at Input circuit DC: <b>24.0 V</b>	<b>95.0 mA</b>
Number of output contacts	
Safety contacts (S) instantaneous:	<b>8</b>
Auxiliary contacts (N/C):	<b>1</b>
Utilisation category in accordance with <b>EN 60947-4-1</b>	
Safety contacts: AC1 at <b>240 V</b>	$I_{min}$ : <b>0.01 A</b> , $I_{max}$ : <b>8.0 A</b> $P_{max}$ : <b>2000 VA</b>
Safety contacts: DC1 at <b>24 V</b>	$I_{min}$ : <b>0.01 A</b> , $I_{max}$ : <b>8.0 A</b> $P_{max}$ : <b>200 W</b>
Auxiliary contacts: AC1 at <b>240 V</b>	$I_{min}$ : <b>0.01 A</b> , $I_{max}$ : <b>8.0 A</b> $P_{max}$ : <b>2000 VA</b>
Auxiliary contacts: DC1 at <b>24 V</b>	$I_{min}$ : <b>0.01 A</b> , $I_{max}$ : <b>8.0 A</b> $P_{max}$ : <b>200 W</b>
Utilisation category in accordance with <b>EN 60947-5-1</b>	
Safety contacts: AC15 at <b>230 V</b>	$I_{max}$ : <b>6.0 A</b>
Safety contacts: DC13 at <b>24 V</b> (6 cycles/min)	$I_{max}$ : <b>5.0 A</b>
Auxiliary contacts: AC15 at <b>230 V</b>	$I_{max}$ : <b>6.0 A</b>
Auxiliary contacts: DC13 at <b>24 V</b> (6 cycles/min)	$I_{max}$ : <b>5.0 A</b>
Contact material	<b>AgCuNi + 0.2 µm Au</b>
External contact fuse protection ( $I_k = 1$ kA) to <b>EN 60947-5-1</b>	
Blow-out fuse, quick	
Safety contacts:	<b>10 A</b>
Auxiliary contacts:	<b>10 A</b>
Blow-out fuse, slow	
Safety contacts:	<b>6 A</b>
Auxiliary contacts:	<b>6 A</b>
Circuit breaker 24 VAC/DC, characteristic B/C	
Safety contacts:	<b>6 A</b>
Auxiliary contacts:	<b>6 A</b>

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Electrical data	
Max. overall cable resistance $R_{lmax}$ input circuits, reset circuits single-channel at $U_B$ DC	30 Ohm
Safety-related characteristic data	
<b>Performance level (PL)</b> in accordance with <b>EN ISO 13849-1</b>	
Safety contacts, instantaneous	e
<b>Category</b> of output contacts in accordance with <b>EN 954-1</b> , <b>EN ISO 13849-1</b>	
Safety contacts (S) instantaneous:	4
<b>SIL claim limit (SIL CL)</b> in accordance with <b>EN IEC 62061</b>	
Safety contacts, instantaneous	3
Probability of dangerous failure per hour ( $PFH_D$ ) in accordance with <b>EN IEC 62061</b>	
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
Recovery time at max. switching frequency 1/s	
Min. start pulse duration with a monitored reset	
Environmental data	
EMC	EN 60947-5-1, EN 61000-6-2, EN 61000-6-4
Vibration to <b>EN 60068-2-6</b>	
Frequency	10 - 55 Hz
Amplitude	0.35 mm
Climatic suitability	EN 60068-2-78
Airgap creepage in accordance with <b>EN 60947-1</b>	
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 mm <sup>2</sup> , 24 - 12 AWG Order no.: 750111
2 core, same cross section, flexible:	
with crimp connectors, without insulating sleeve	0.25 - 1.00 mm <sup>2</sup> , 24 - 16 AWG Order no.: 750111
without crimp connectors or with TWIN crimp connectors	0.20 - 1.50 mm <sup>2</sup> , 24 - 16 AWG Order no.: 750111
Torque setting with screw terminals	0.50 Nm Order no.: 750111
Cross section of external conductors with spring-loaded terminals: Flexible with/without crimp connectors	
	0.20 - 2.50 mm <sup>2</sup> , 24 - 12 AWG Order no.: 751111
Spring-loaded terminals: Terminal points per connection	2 Order no.: 751111
Stripping length	9 mm Order no.: 751111

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### Mechanical data

Dimensions	
Height	<b>100.0 mm</b> Order no.: 751111 <b>98.0 mm</b> Order no.: 750111
Width	<b>45.0 mm</b>
Depth	<b>120.0 mm</b>
Weight	<b>340 g</b>

The standards current on **2006-10** apply.

### Conventional thermal current

$I_{th}$  (A) at  $U_B$  DC

1 contact	<b>8.00 A</b>
2 contacts	<b>8.00 A</b>
3 contacts	<b>8.00 A</b>
4 contacts	<b>7.00 A</b>
5 contacts	<b>6.30 A</b>
6 contacts	<b>5.70 A</b>
7 contacts	<b>5.30 A</b>
8 contacts	<b>5.00 A</b>

### Order reference

Type	Features	Terminals	Order no.
PNOZ s11	24 VDC	With screw terminal	750 111
PNOZ s11 C	24 VDC	With spring-loaded terminal	751 111