

## Up to Category 3, EN 954-1 PNOZ X5






### Unit features

- ▶ Positive-guided relay outputs:
    - 2 safety contacts (N/O), instantaneous
  - ▶ Connection options for:
    - E-STOP pushbutton
    - Safety gate limit switch
    - Reset button
  - ▶ LED indicator for:
    - Switch status channel 1/2
    - Supply voltage
  - ▶ See order reference for unit types
- ▶ The safety function remains effective in the case of a component failure.
  - ▶ The correct opening and closing of the safety function relays is tested automatically in each on-off cycle.
  - ▶ The unit has an electronic fuse.

Safety relay for monitoring E-STOP pushbuttons and safety gates.

### Approvals

	PNOZ X5
	◆
	◆
	◆

### Unit description

The safety relay meets the requirements of EN 60204-1 and IEC 60204-1 and may be used in applications with

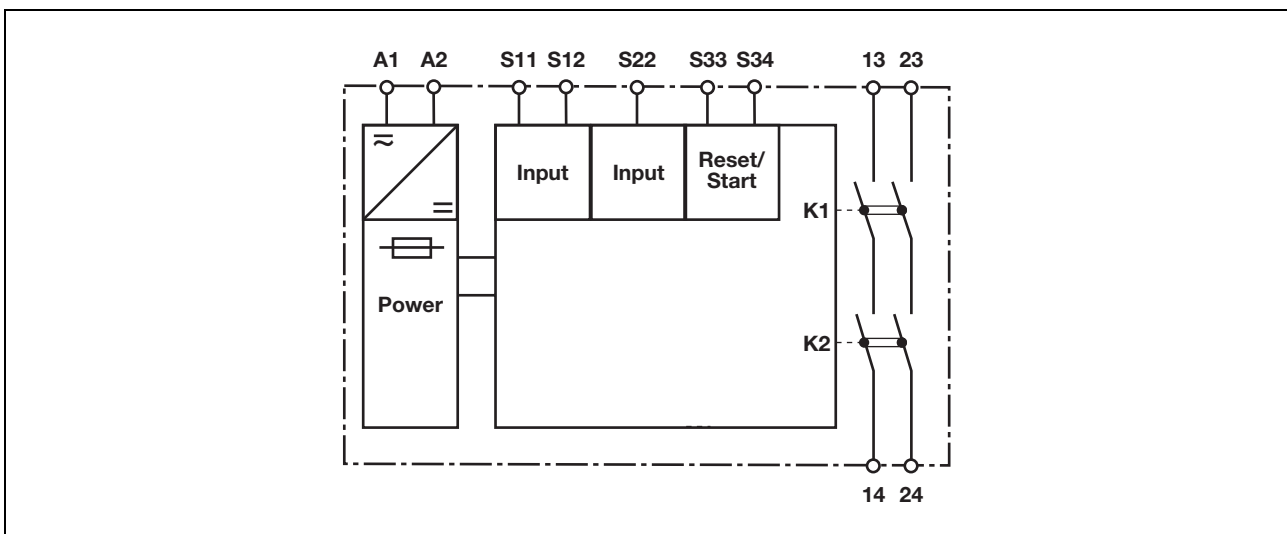
- ▶ E-STOP pushbuttons
- ▶ Safety gates

### Safety features

The relay conforms to the following safety criteria:

- ▶ The circuit is redundant with built-in self-monitoring.

### Block diagram

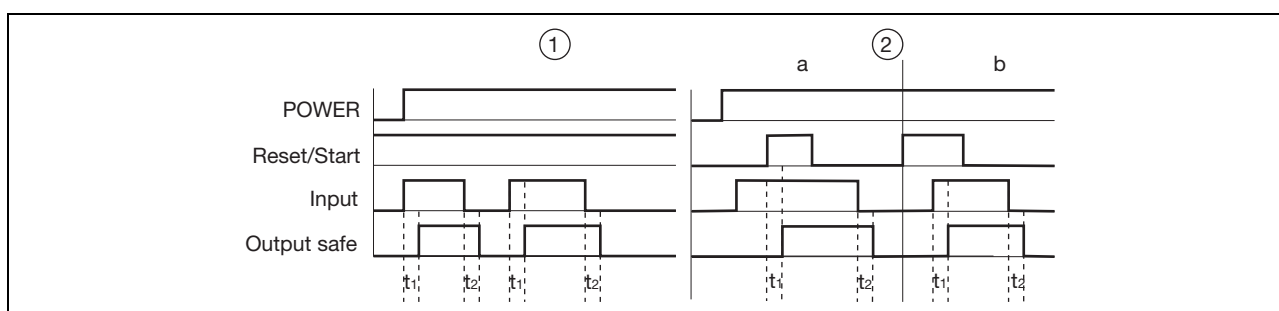


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### Function description

- ▶ Single-channel operation: no redundancy in the input circuit, earth faults in the reset circuit are detected.
- ▶ Dual-channel operation without detection of shorts across contacts: redundant input circuit, detects
  - earth faults in the reset and input circuit,
  - short circuits in the input circuit and, with a monitored reset, in the reset circuit too.
- ▶ Automatic start: Unit is active once the input circuit has been closed.
- ▶ Manual reset: Unit is active once the input circuit is closed and then the reset circuit is closed.
- ▶ Increase in the number of available contacts by connecting contact expander modules or external contactors/relays.

### Timing diagram



### Key

- ▶ Power: Supply voltage
- ▶ Reset/start: Reset S33-S34
- ▶ Input: Input circuits S11, S12, S22
- ▶ Output safe: Safety contacts 13-14, 23-24
- ▶ ①: Automatic reset
- ▶ ②: Manual reset
- ▶ a: Input circuit closes before reset circuit
- ▶ b: Reset circuit closes before input circuit
- ▶ t<sub>1</sub>: Switch-on delay
- ▶ t<sub>2</sub>: Delay-on de-energisation

### Wiring

Please note:

- ▶ Information given in the “Technical details” must be followed.
- ▶ Outputs 13-14, 23-24 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:

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

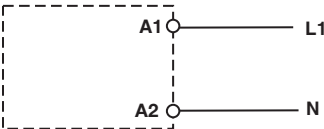
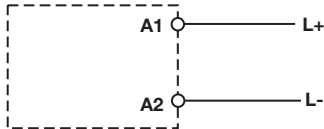
$R_{lmax}$  = max. overall cable resistance (see technical details)  
 $R_l / km$  = cable resistance/km

- ▶ Use copper wire that can withstand 60/75 °C.
- ▶ Sufficient fuse protection must be provided on all output contacts with capacitive and inductive loads.

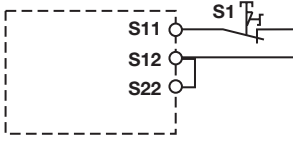
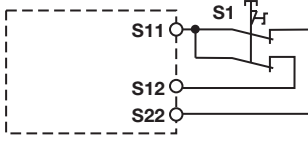
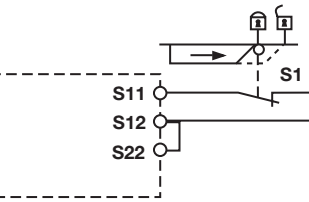
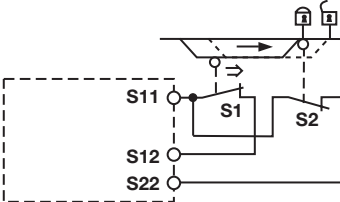
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### Preparing for operation



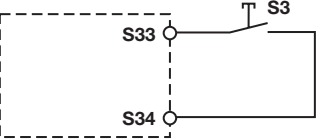
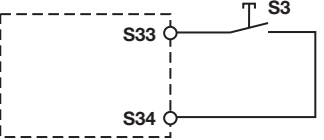
#### ▶ Supply voltage

Supply voltage	AC	DC
		




#### ▶ Input circuit

Input circuit	Single-channel	Dual-channel
E-STOP <b>without</b> detection of shorts across contacts		
Safety gate <b>without</b> detection of shorts across contacts		

#### ▶ Reset circuit

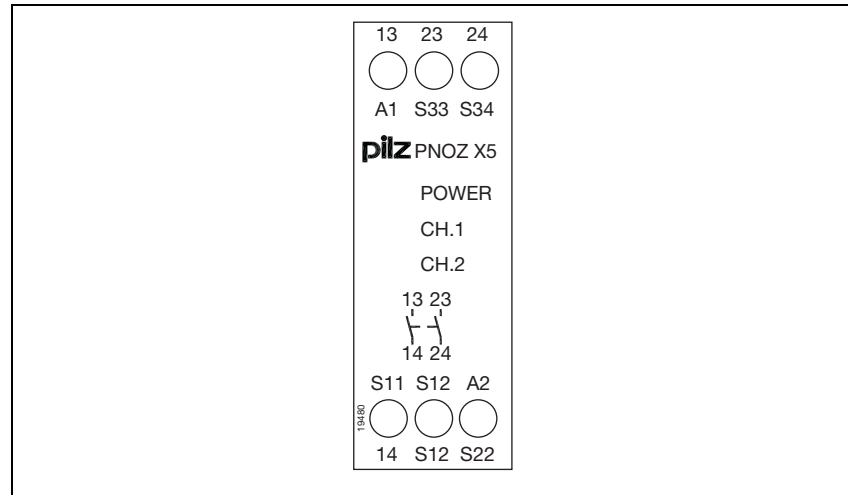
Reset circuit	E-STOP wiring (single-channel) Safety gate (single-channel)	E-STOP wiring (dual-channel) Safety gate (dual-channel)
Automatic reset		
Manual reset		

#### ▶ Key

S1/S2	E-STOP pushbutton/ safety gate switch
S3	Reset button
	Switch operated
	Gate open
	Gate closed

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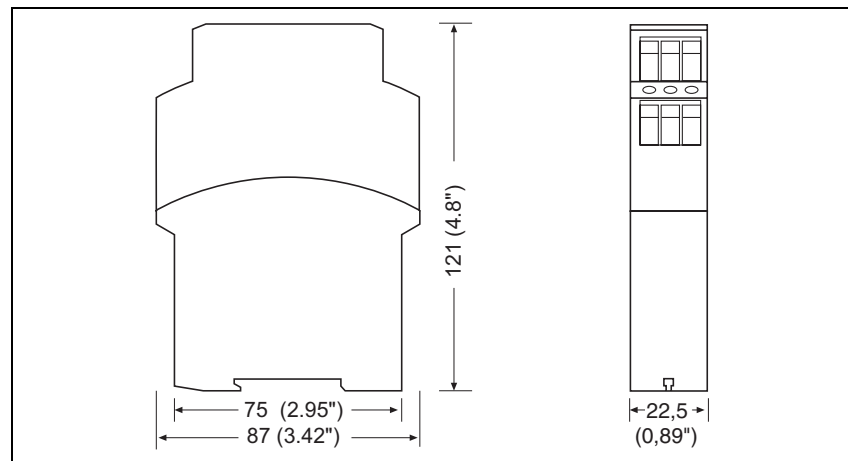
### Terminal configuration



### 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).

### Dimensions

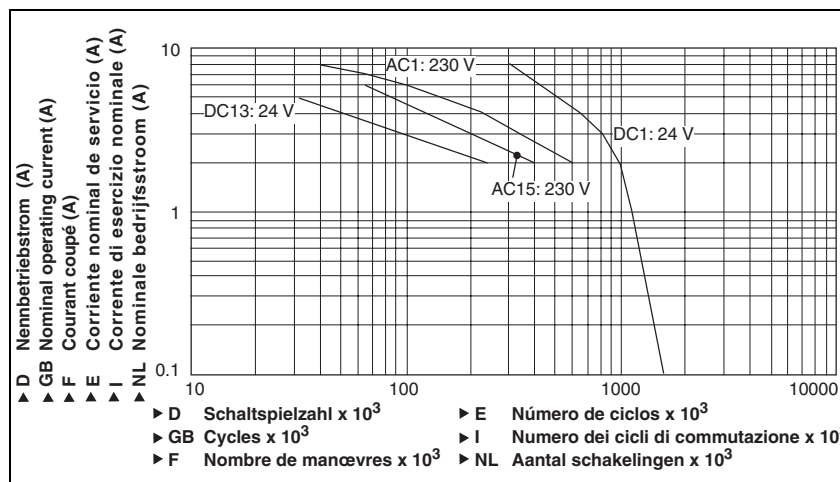


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### Notice

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 U <sub>B</sub> AC	<b>24 V</b>
Supply voltage U <sub>B</sub> DC	<b>12 V, 24 V</b>
Voltage tolerance	<b>-15% / +10%</b> Order No.: 774325 <b>-20% / +20%</b> Order No.: 774326
Power consumption at U <sub>B</sub> AC	<b>4.0 VA</b> Order no.: 774325
Power consumption at U <sub>B</sub> DC	<b>2.0 W</b> Order no.: 774325 <b>2.5 W</b> Order no.: 774326
Frequency range AC	<b>10 - 55 Hz</b>
Residual ripple DC	<b>20 %</b> Order no.: 774326 <b>160 %</b> Order no.: 774325
Voltage and current at input circuit: <b>24 VDC</b>	<b>55 mA</b> Order no.: 774325 <b>70 mA</b> Order no.: 774326
reset circuit: <b>24 VDC</b>	<b>55 mA</b> Order no.: 774325 <b>90 mA</b> Order no.: 774326
feedback loop: <b>24 VDC</b>	<b>55 mA</b> Order no.: 774325 <b>90 mA</b> Order no.: 774326
Output contacts in accordance with <b>EN 954-1, Category 3</b>	Safety contacts (N/O): <b>2</b>
Utilisation category in accordance with <b>EN 60947-4-1</b> AC1: <b>240 V</b>	I <sub>min</sub> : <b>0.01 A</b> , I <sub>max</sub> : <b>6 A</b> P <sub>max</sub> : <b>1500 VA</b>
DC1: <b>24 V</b>	I <sub>min</sub> : <b>0.01 A</b> , I <sub>max</sub> : <b>4 A</b> P <sub>max</sub> : <b>100 W</b>
Utilisation category in accordance with <b>EN 60947-5-1</b> AC15: <b>230 V</b> DC13 (6 cycles/min): <b>24 V</b>	I <sub>max</sub> : <b>5 A</b> I <sub>max</sub> : <b>4 A</b>
Contact material	<b>AgSnO<sub>2</sub> + 0.2 µm Au</b>

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Electrical data	
External contact fuse protection (EN 60947-5-1)	
Blow-out fuse, quick	6 A
Blow-out fuse, slow	4 A
Circuit breaker	4 A, 24 VAC/DC, characteristic B/C
Max. overall cable resistance $R_{lmax}$ input circuits, reset circuits	
Single-channel at $U_B$ DC	50 Ohm Order no.: 774325 20 Ohm Order no.: 774326
Single-channel at $U_B$ AC	150 Ohm Order no.: 774325
Dual-channel without detect. of shorts across contacts at $U_B$ DC	100 Ohm Order no.: 774325 35 Ohm Order no.: 774326
Dual-channel without detect. of shorts across contacts at $U_B$ AC	250 Ohm Order no.: 774325
Times	
Switch-on delay	
with automatic reset typ.	115 ms Order no.: 774325 124 ms Order no.: 774326
with automatic reset max.	180 ms Order no.: 774325 230 ms Order no.: 774326
with automatic reset after power on typ.	120 ms Order no.: 774325 124 ms Order no.: 774326
with automatic reset after power on max.	190 ms Order no.: 774325 230 ms Order no.: 774326
with manual reset typ.	40 ms Order no.: 774325 80 ms Order no.: 774326
with manual reset max.	180 ms Order no.: 774325 230 ms Order no.: 774326
Delay-on de-energisation	
with E-STOP typ.	12 ms Order no.: 774325 18 ms Order no.: 774326
with E-STOP max.	20 ms Order no.: 774325 30 ms Order no.: 774326
with power failure typ.	110 ms Order no.: 774325 20 ms Order no.: 774326
with power failure max.	160 ms Order no.: 774325 30 ms Order no.: 774326
Recovery time at max. switching frequency 1/s after E-STOP	50 ms Order no.: 774325 40 ms Order no.: 774326
after power failure	200 ms Order no.: 774325 50 ms Order no.: 774326
Simultaneity, channel 1 and 2	$\infty$
Supply interruption before de-energisation	20 ms Order no.: 774325 10 ms Order no.: 774326
Environmental data	
EMC	EN 60947-5-1, EN 61000-6-2
Vibration in accordance with EN 60068-2-6	
Frequency	10 - 55 Hz
Amplitude	0.35 mm
Climatic suitability	EN 60068-2-78
Airgap creepage	VDE 0110-1
Ambient temperature	-10 - 55 °C
Storage temperature	-40 - 85 °C
Protection type	
Mounting (e.g. cabinet)	IP54
Housing	IP 40
Terminals	IP 20

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Mechanical data	
Housing material	
Housing	<b>PPO UL 94 V0</b>
Front	<b>PPO UL 94 V0</b>
Max. cross section of external conductors with screw terminals	
1 core flexible	<b>0.20 - 4.00 mm<sup>2</sup></b>
2 core, same cross section, flexible:	
with crimp connectors, without insulating sleeve	<b>0.20 - 2.50 mm<sup>2</sup></b>
without crimp connectors or with TWIN crimp connectors	<b>0.20 - 2.50 mm<sup>2</sup></b>
Torque setting with screw terminals	<b>0.60 Nm</b>
Dimensions (H x W x D)	
with screw terminals	<b>87 mm x 22.5 mm x 121 mm</b>
Weight	<b>190 g</b>

The standards current on **09/04** apply.

Order reference			
Type	Features	Terminals	Order no.
PNOZ X5	24 VAC/DC	Screw terminals	774 325
PNOZ X5	12 VDC	Screw terminals	774 326