




Up to Category 3, EN 954-1 PNOZ X6



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

Approvals

	PNOZ X6
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Unit features

- ▶ Positive-guided relay outputs:
 - 3 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
- ▶ Suitable to be driven via a semiconductor output
- ▶ See order reference for unit types
- ▶ Simultaneity monitoring, selectable

- ▶ The circuit is redundant with built-in self-monitoring.
- ▶ 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 transformer is short circuit-proof. An electronic fuse is used on a DC supply.

Unit description

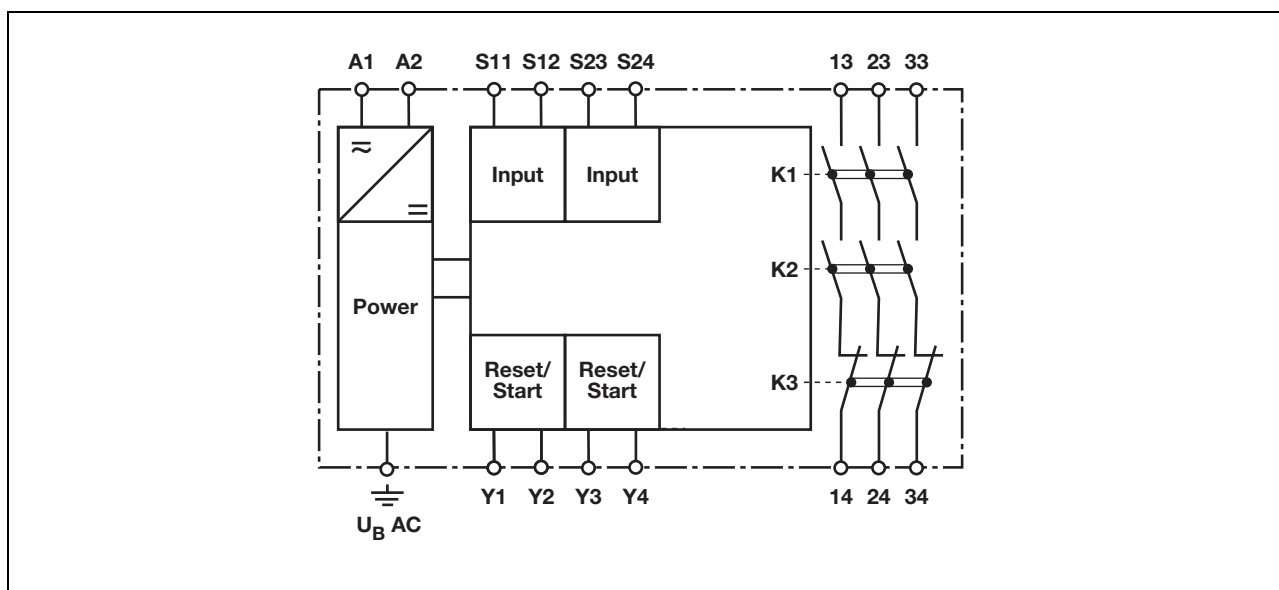
The safety relay meets the requirements of EN 60204-1 and IEC 60204-1 and may be used in applications with

- ▶ E-STOP pushbuttons
- ▶ Safety gates

Safety features

The relay conforms to the following safety criteria:

Block diagram

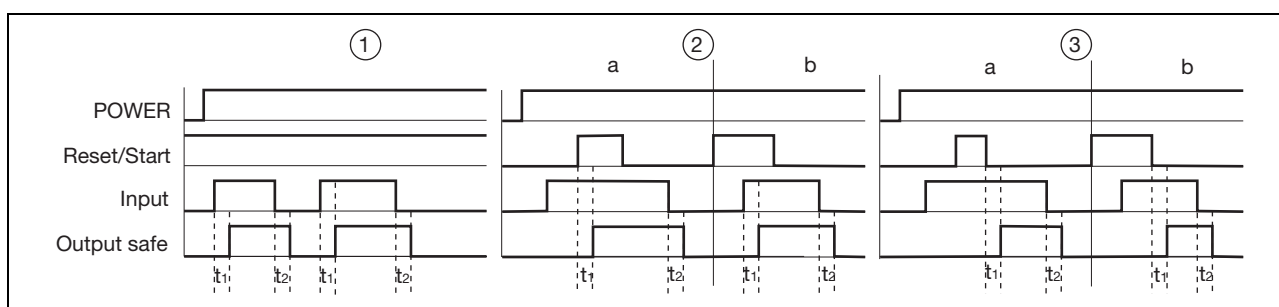


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Function description

- ▶ Single-channel operation: no redundancy in the input circuit, earth faults in the reset and input 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.
- ▶ Monitored reset: Unit is active once
 - the input circuit is closed and then the reset circuit is closed and opened again.
 - the reset circuit is closed and then opened again once the input 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 circuit Y1-Y2, Y3-Y4
- ▶ Input: Input circuits S11-S12, S23-S24
- ▶ Output safe: Safety contacts 13-14, 23-24, 33-34
- ▶ ①: Automatic reset
- ▶ ②: Manual reset
- ▶ ③: Monitored reset
- ▶ a: Input circuit closes before reset circuit
- ▶ b: Reset circuit closes before input circuit
- ▶ 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 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 l_{max} in the input circuit:

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

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

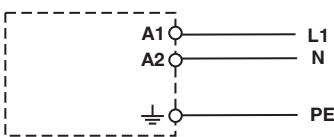
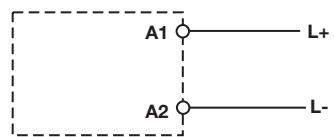
R_l / km = cable resistance/km

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

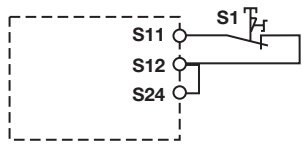
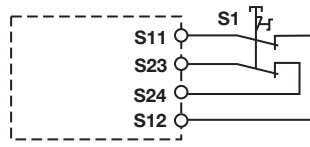
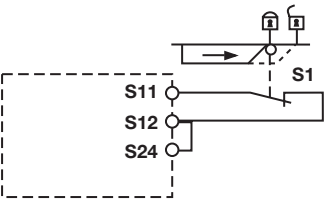
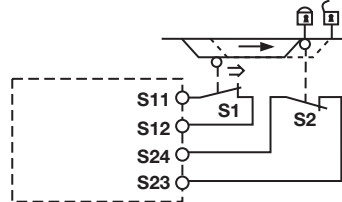
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Preparing for operation


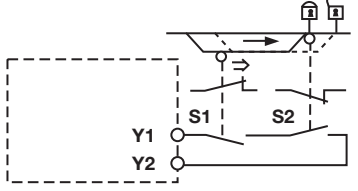
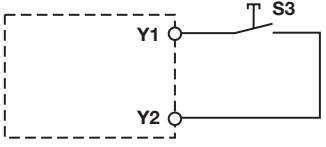
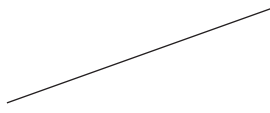
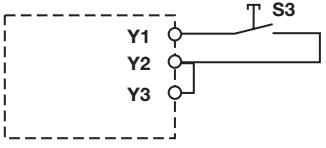
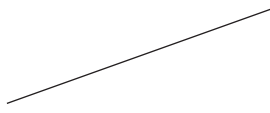
► Supply voltage

Supply voltage	AC	DC
		

► Input circuit



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

► Reset circuit

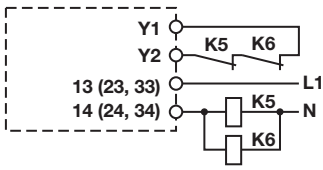
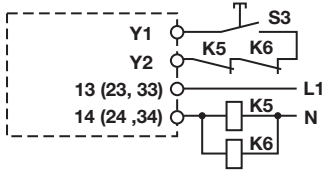
Reset circuit	E-STOP wiring, safety gate	Safety gate (dual-channel)
Automatic reset		
Manual reset		
Monitored reset		

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▶ Simultaneity monitoring

Simultaneity	Simultaneity max. 200 ms	Simultaneity ∞
		

▶ Feedback loop

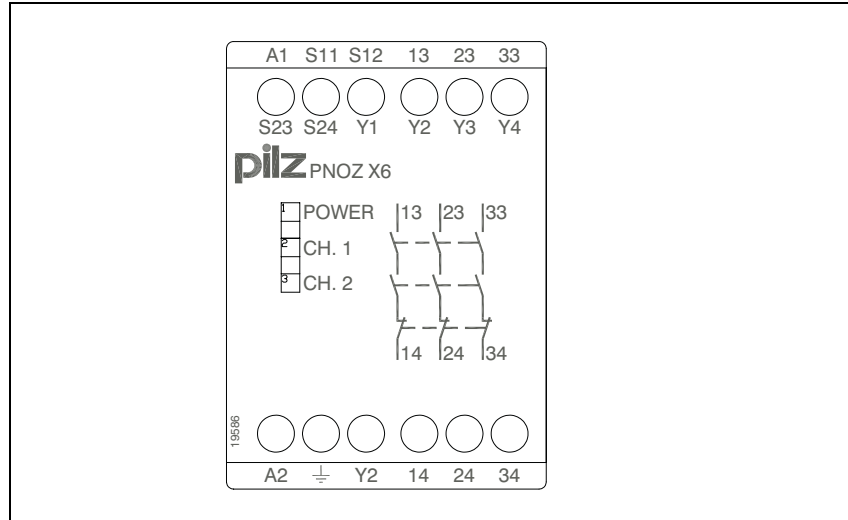
Feedback loop	Automatic reset	Manual reset
Contacts from external contactors		

▶ Key

S1/S2	Two-hand button
S3	Reset button
	Switch operated
	Gate open
	Gate closed

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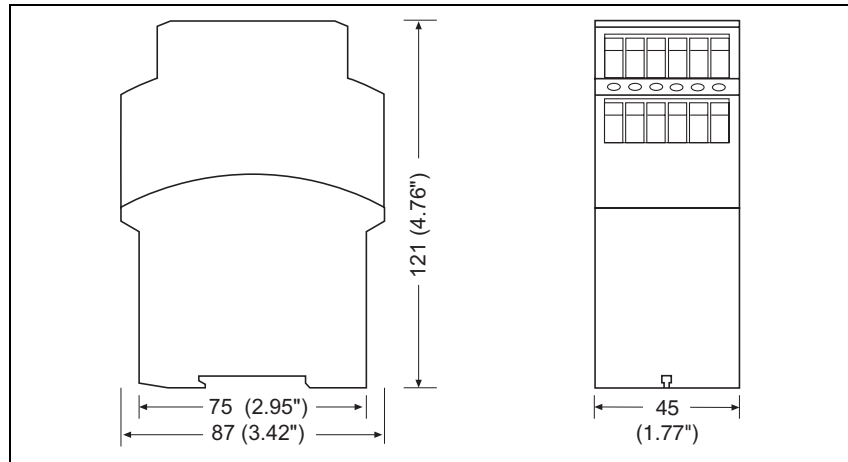
Terminal configuration



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

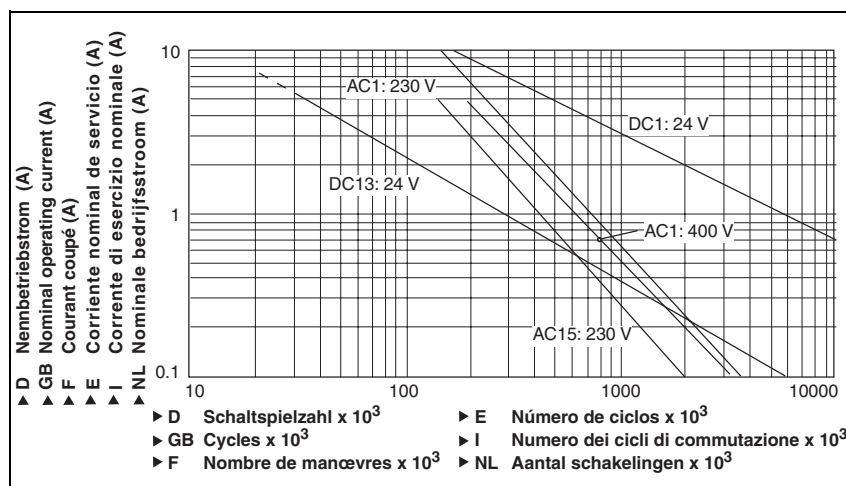


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Notice

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_B AC	24 V, 42 V, 110 - 120 V, 230 - 240 V
Supply voltage U_B DC	24 V
Voltage tolerance	-15 % / 10 %
Power consumption at U_B AC	6.5 VA Order no.: 774721, 774725, 774726 3.0 VA Order no.: 774729
Power consumption at U_B DC	2.0 W Order no.: 774729
Frequency range AC	50 - 60 Hz
Residual ripple DC	160 %
Voltage and current at input circuit: 24 VDC reset circuit: 24 VDC	50.0 mA 100.0 mA Order no.: 774721, 774725, 774726 55.0 mA Order no.: 774729
feedback loop: 24 VDC	100.0 mA Order no.: 774721, 774725, 774726 55.0 mA Order no.: 774729
Output contacts in accordance with EN 954-1 , Category 3	Safety contacts (N/O): 3
Utilisation category in accordance with EN 60947-4-1 AC1: 240 V	I_{min} : 0.01 A , I_{max} : 8.00 A P_{max} : 2000 VA
AC1: 400 V	I_{min} : 0.01 A , I_{max} : 5.00 A P_{max} : 2000 VA
DC1: 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 AC15: 230 V DC13 (6 cycles/min): 24 V	I_{max} : 5.0 A I_{max} : 7.0 A
Contact material	AgSnO₂ + 0.2 µm Au
External contact fuse protection (EN 60947-5-1) Blow-out fuse, quick Blow-out fuse, slow Circuit breaker	10 A 6 A 6 A, 24 VAC/DC, characteristic B/C
Max. overall cable resistance R_{lmax} input circuits, reset circuits Single-channel Dual-channel without detection of shorts across contacts	100 Ohm 200 Ohm

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Times	
Switch-on delay with automatic reset typ.	270 ms Order no.: 774721, 774725, 774726 250 ms Order no.: 774729
with automatic reset max.	370 ms Order no.: 774721, 774725, 774726 350 ms Order no.: 774729
with automatic reset after power on typ.	260 ms
with automatic reset after power on max.	350 ms
Delay-on de-energisation with E-STOP typ.	15 ms
with E-STOP max.	30 ms
with power failure typ.	150 ms Order no.: 774721, 774725, 774726 110 ms Order no.: 774729
with power failure max.	200 ms Order no.: 774721, 774725, 774726 160 ms Order no.: 774729
Recovery time at max. switching frequency 1/s after E-STOP after power failure	50 ms 250 ms Order no.: 774721, 774725, 774726 200 ms Order no.: 774729
Min. start pulse duration with a monitored reset	30 ms
Simultaneity, channel 1 and 2	200 ms / ∞
Supply interruption before de-energisation	20 ms
Environmental data	
EMC	EN 61000-6-2, EN 60947-5-1
Vibration in accordance with EN 60068-2-6 Frequency	10 - 55 Hz
Amplitude	0.35 mm
Climatic suitability	EN 600068-2-78
Airgap creepage	EN 60947-1
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	PPO UL 94 V0
Front	ABS UL 94 V0
Max. cross section of external conductors with screw terminals 1 core flexible	0.20 - 4.00 mm²
2 core, same cross section, flexible: with crimp connectors, without insulating sleeve	0.20 - 2.50 mm²
without crimp connectors or with TWIN crimp connectors	0.20 - 2.50 mm²
Torque setting with screw terminals	0.60 Nm
Dimensions (H x W x D) with screw terminals	87.0 mm x 45.0 mm x 121.0 mm
Weight	390 g Order no.: 774721, 774725, 774726 295 g Order no.: 774729

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

Max. continuous current		
Number of contacts	I_{\max} (A) at U_B DC	I_{\max} (A) at U_B AC
1	8.00 A Order no.: 774 729	8.00 A
2	8.00 A Order no.: 774 729	7.30 A
3	8.00 A Order no.: 774 729	6.00 A

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Order reference

Type	Features	Terminals	Order no.
PNOZ X6	42 VAC	Screw terminals	774 721
PNOZ X6	110 - 120 VAC	Screw terminals	774 725
PNOZ X6	230 - 240 VAC	Screw terminals	774 726
PNOZ X6	24 VAC/DC	Screw terminals	774 729