



Visualisation; Diagnostics

Easy to Configure

Programming IEC 61131-3

Rapid Installation

PNOZ X7

► Safety relays

PILZ
THE SPIRIT OF SAFETY

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SD means Secure Digital

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Introduction

Validity of documentation

This documentation is valid for the product PNOZ X7. It is valid until new documentation is published.

This operating manual explains the function and operation, describes the installation and provides guidelines on how to connect the product.

Using the documentation

This document is intended for instruction. Only install and commission the product if you have read and understood this document. The document should be retained for future reference.

Definition of symbols

Information that is particularly important is identified as follows:



DANGER!

This warning must be heeded! It warns of a hazardous situation that poses an immediate threat of serious injury and death and indicates preventive measures that can be taken.



WARNING!

This warning must be heeded! It warns of a hazardous situation that could lead to serious injury and death and indicates preventive measures that can be taken.



CAUTION!

This refers to a hazard that can lead to a less serious or minor injury plus material damage, and also provides information on preventive measures that can be taken.



NOTICE

This describes a situation in which the product or devices could be damaged and also provides information on preventive measures that can be taken. It also highlights areas within the text that are of particular importance.

**INFORMATION**

This gives advice on applications and provides information on special features.


Safety**Intended use**

The safety relay PNOZ X7 provides a safety-related interruption of a safety circuit.

The safety relay meets the requirements of EN 60947-5-1, EN 60204-1 and VDE 0113-1 and may be used in applications with

- ▶ E-STOP pushbuttons
- ▶ Safety gates

The following is deemed improper use in particular:

- ▶ Any component, technical or electrical modification to the product
- ▶ Use of the product outside the areas described in this manual
- ▶ Use of the product outside the technical details (see [Technical details](#) [ 14]).

**NOTICE****EMC-compliant electrical installation**

The product is designed for use in an industrial environment. The product may cause interference if installed in other environments. If installed in other environments, measures should be taken to comply with the applicable standards and directives for the respective installation site with regard to interference.

Safety regulations**Safety assessment**

Before using a unit it is necessary to perform a safety assessment in accordance with the Machinery Directive.

Functional safety is guaranteed for the product as a single component. However, this does not guarantee the functional safety of the overall plant/machine. In order to achieve the required safety level for the overall plant/machine, define the safety requirements for the plant/machine and then define how these must be implemented from a technical and organisational standpoint.

Use of qualified personnel

The products may only be assembled, installed, programmed, commissioned, operated, maintained and decommissioned by competent persons.

A competent person is someone who, because of their training, experience and current professional activity, has the specialist knowledge required to test, assess and operate the work equipment, devices, systems, plant and machinery in accordance with the general standards and guidelines for safety technology.

It is the company's responsibility only to employ personnel who:

- ▶ Are familiar with the basic regulations concerning health and safety / accident prevention
- ▶ Have read and understood the information provided in this description under "Safety"
- ▶ And have a good knowledge of the generic and specialist standards applicable to the specific application.

Warranty and liability

All claims to warranty and liability will be rendered invalid if

- ▶ The product was used contrary to the purpose for which it is intended
- ▶ Damage can be attributed to not having followed the guidelines in the manual
- ▶ Operating personnel are not suitably qualified
- ▶ Any type of modification has been made (e.g. exchanging components on the PCB boards, soldering work etc.).

Disposal

- ▶ In safety-related applications, please comply with the mission time T_M in the safety-related characteristic data.
- ▶ When decommissioning, please comply with local regulations regarding the disposal of electronic devices (e.g. Electrical and Electronic Equipment Act).

For your safety

The unit meets all the necessary conditions for safe operation. However, please note the following:

- ▶ Note for overvoltage category III: If voltages higher than low voltage (>50 VAC or >120 VDC) are present on the unit, connected control elements and sensors must have a rated insulation voltage of at least 250 V.

Unit features

- ▶ Positive-guided relay outputs:
 - 2 safety contacts (N/O), instantaneous
- ▶ Connection options for:
 - E-STOP pushbutton
 - Safety gate limit switch
 - Start button
- ▶ LED display for:
 - Supply voltage
 - Switch status of the safety contacts
- ▶ See order reference for unit types

Safety features

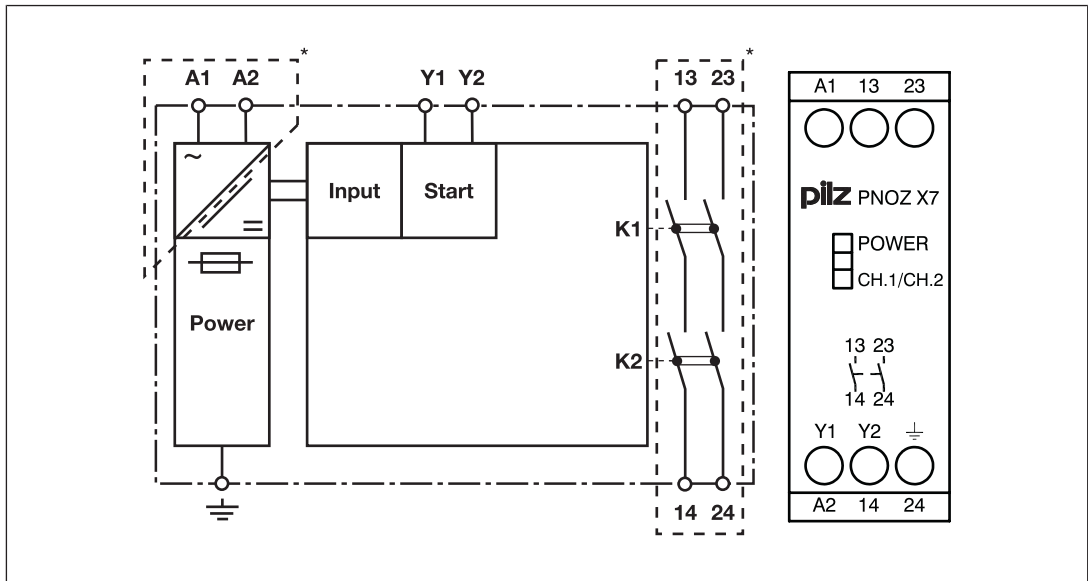
The safety relay meets the following safety requirements:

- ▶ The circuit is internally redundant with built-in self-monitoring.
- ▶ The safety device remains effective in the case of a component failure.
- ▶ The correct opening and closing of the safety device relays is tested automatically in each on-off cycle.

Block diagram/terminal configuration

Types: AC

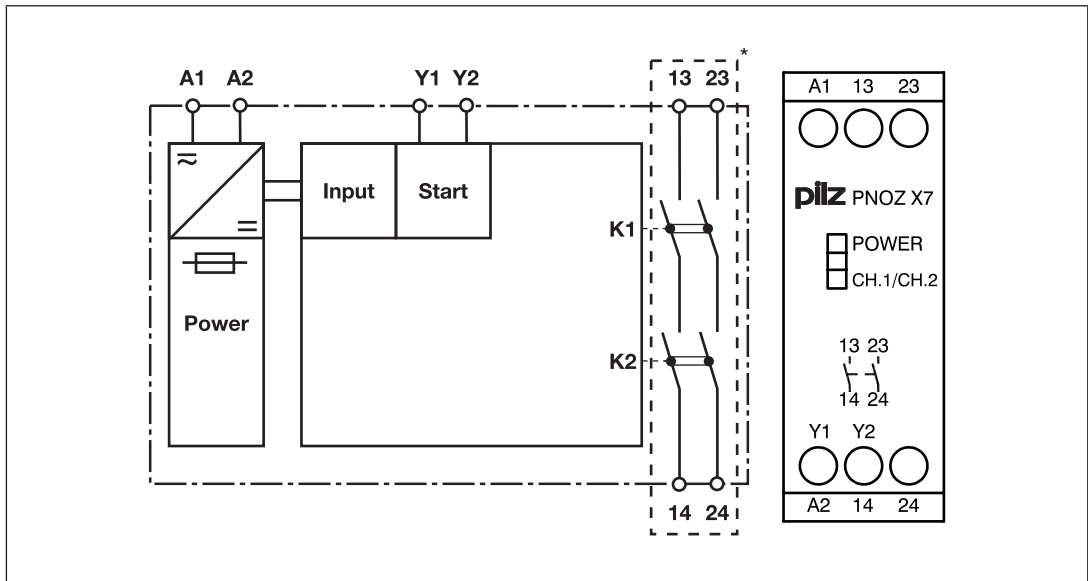
- ▶ U_B : 42 VAC; Order no. 774058
- ▶ U_B : 48 VAC; Order no. 774049
- ▶ U_B : 110 VAC; Order no. 774053
- ▶ U_B : 115 VAC; Order no. 774054
- ▶ U_B : 120 VAC; Order no. 774055
- ▶ U_B : 230 VAC; Order no. 774056
- ▶ U_B : 240 VAC; Order no. 774057



*Insulation between the non-marked area and the relay contacts: Basic insulation (over-voltage category III), Protective separation (overvoltage category II)

Type: AC/DC

▶ U_B : 24 VAC/DC; Order no. 774059



*Insulation between the non-marked area and the relay contacts: Basic insulation (over-voltage category III), Protective separation (overvoltage category II)

Function Description

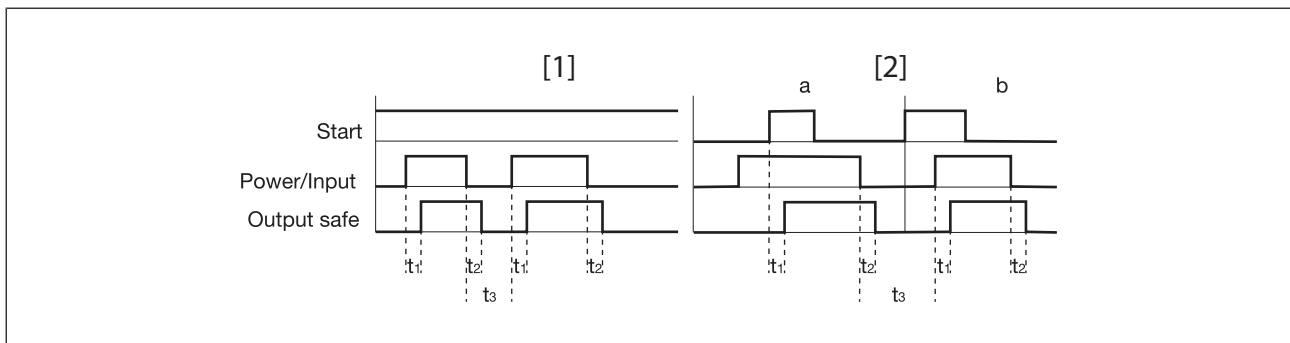
The safety relay PNOZ X7 provides a safety-oriented interruption of a safety circuit. When the supply voltage is applied via the E-STOP pushbutton, the "POWER" LED is lit. The unit is ready for operation when the start circuit and feedback loop Y1-Y2 is closed.

- ▶ Input circuit is closed (e.g. E-STOP pushbutton not operated):
 - The LED "CH.1/CH.2" will light.
 - Safety contacts 13-14 and 23-24 are closed. The unit is active.
- ▶ Input circuit is opened (e.g. E-STOP pushbutton operated):
 - The LEDs "CH.1" and "CH.2" goes out.
 - Safety contacts 13-14 and 23-24 are redundantly opened.

Operating modes

- ▶ Single-channel operation: No redundancy in the input circuit, earth faults in the start and input circuit are detected.
- ▶ Automatic start: Unit is active once the input circuit has been closed.
- ▶ Manual start: Unit is active once the input circuit and the start circuit are closed.
- ▶ Increase in the number of available contacts by connecting contact expander modules or external contactors/relays.

Timing diagram



Legend

- ▶ Power: Supply voltage
- ▶ Start: Start circuit
- ▶ Input: Input circuit
- ▶ Output safe: Safety contacts
- ▶ [1]: Automatic start
- ▶ [2]: Manual start
- ▶ a: Input circuit closes before start circuit
- ▶ b: Start circuit closes before input circuit
- ▶ t_1 : Switch-on delay
- ▶ t_2 : Delay-on de-energisation
- ▶ t_3 : Recovery time

Installation

- ▶ The unit 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).

Wiring

Please note:

- ▶ Information given in the "Technical details [14]" must be followed.
- ▶ Calculating the max. cable length l_{max} in the input circuit on PNOZ X7 24 VAC/DC:

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

R_{lmax} = max. overall cable resistance (see Technical details [14])

R_l / km = cable resistance/km

- ▶ Calculating the max. cable length l_{max} in the input circuit on PNOZ X7 AC units:

$$l_{max} = \frac{C_{lmax}}{C_l / km}$$

C_{lmax} = max. overall line capacitance (see Technical details [14])

C_l / km = line capacitance/km

Stub circuit: The max. permitted cable length l_{max} depends on the max. overall line capacitance C_{lmax} (see Technical details [14]).

Alternative: Loop circuit: Capacitance is negligible; 1 phase: Max. cable length l_{max} : 1 km

	Stub circuit	Loop circuit
Cable length		



WARNING!

If the max. overall line capacitance is exceeded, the unit will no longer switch off safely and serious injuries and death may result.

Always comply with the max. overall line capacitance.

- ▶ The outputs 13-14, 23-24 are safety contacts.
- ▶ Do not connect undesignated terminals.
- ▶ To prevent contact welding, a fuse should be connected before the output contacts (see [Technical details \[14\]](#)).
- ▶ Use copper wire that can withstand 60/75 °C.
- ▶ Sufficient fuse protection must be provided on all output contacts with capacitive and inductive loads.
- ▶ Do not switch low currents using contacts that have been used previously with high currents.
- ▶ On AC units: Connect operational earth terminal to functional earth.
- ▶ On 24 VAC/DC units:
The power supply must comply with the regulations for extra low voltages with safe electrical separation (SELV, PELV) in accordance with VDE 0100, Part 410.
- ▶ Ensure the wiring and EMC requirements of IEC 60204-1 are met.

Preparing for operation

Supply voltage	AC	24 VAC/DC
Input circuit	Single-channel	Dual-channel
E-STOP		
Safety gate		
Start circuit	Automatic start	Manual start



NOTICE

In the event of an automatic start or manual start with bridged start contact (fault):

The unit starts up automatically when the safeguard is reset, e.g. when the E-STOP pushbutton is released. Use external circuit measures to prevent an unexpected restart.

Feedback loop	Automatic start	Manual start
Contacts from external contactors		

Legend

- ▶ S1: E-STOP/safety gate switch
- ▶ S3: Start button
- ▶ Gate open
- ▶ Gate closed

Operation



NOTICE

The safety function should be checked after initial commissioning and each time the plant/machine is changed. The safety functions may only be checked by qualified personnel.

Status indicators

LEDs indicate the status and errors during operation:



LED on



POWER

Supply voltage is present.



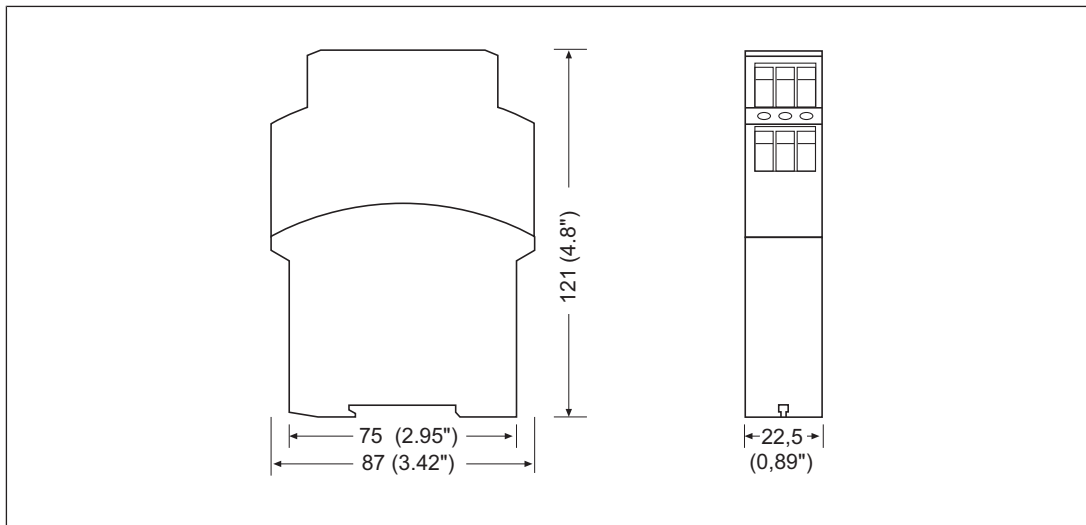
CH.1/CH.2

Safety contacts of channel 1 and 2 are closed.

Faults – Interference

- ▶ Earth fault: The supply voltage fails and the safety contacts open. Once the cause of the respective fault has been rectified and the supply voltage is switched off for approx. 1 minute, the unit is ready for operation again.
- ▶ Contact malfunctions: If the contacts have welded, reactivation will not be possible after the input circuit has opened.
- ▶ LED "POWER" does not light: Short circuit or no supply voltage.

Dimensions in mm



Technical details

Order no. 774049 – 774054

See below for more order numbers

General	774049	774053	774054
Approvals	CCC, CE, EAC (Eurasian), KOSHA, TÜV, cULus Listed	CCC, CE, EAC (Eurasian), KOSHA, TÜV, cULus Listed	CCC, CE, EAC (Eurasian), KOSHA, TÜV, cULus Listed
Electrical data	774049	774053	774054
Supply voltage			
Voltage	48 V	110 V	115 V
Kind	AC	AC	AC
Voltage tolerance	-15 %/+10 %	-15 %/+10 %	-15 %/+10 %
Output of external power supply (AC)	2 VA	2 VA	2 VA
Frequency range AC	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Duty cycle	100 %	100 %	100 %
Inputs	774049	774053	774054
Number	1	1	1
Voltage at			
Input circuit DC	48 V	110 V	115 V
Start circuit DC	24 V	24 V	24 V
Feedback loop DC	24 V	24 V	24 V
Current at			
Input circuit DC	45 mA	14 mA	17 mA
Start circuit DC	40 mA	40 mA	40 mA
Feedback loop DC	40 mA	40 mA	40 mA
Max. overall line capacitance C _{lmax}	37 nF	37 nF	37 nF
Relay outputs	774049	774053	774054
Number of output contacts			
Safety contacts (N/O), instantaneous	2	2	2
Max. short circuit current I _K	1 kA	1 kA	1 kA
Utilisation category			
In accordance with the standard	EN 60947-4-1	EN 60947-4-1	EN 60947-4-1

Relay outputs	774049	774053	774054
Utilisation category of safety contacts			
AC1 at	240 V	240 V	240 V
Min. current	0,01 A	0,01 A	0,01 A
Max. current	4 A	4 A	4 A
Max. power	1000 VA	1000 VA	1000 VA
DC1 at	24 V	24 V	24 V
Min. current	0,01 A	0,01 A	0,01 A
Max. current	4 A	4 A	4 A
Max. power	100 W	100 W	100 W
Utilisation category			
In accordance with the standard	EN 60947-5-1	EN 60947-5-1	EN 60947-5-1
Utilisation category of safety contacts			
AC15 at	230 V	230 V	230 V
Max. current	4 A	4 A	4 A
DC13 (6 cycles/min) at	24 V	24 V	24 V
Max. current	4 A	4 A	4 A
Utilisation category in accordance with UL			
Voltage	240 V AC G. P.	240 V AC G. P.	240 V AC G. P.
With current	4 A	4 A	4 A
Voltage	24 V DC Resistive	24 V DC Resistive	24 V DC Resistive
With current	4 A	4 A	4 A
Pilot Duty	C300, R300	C300, R300	C300, R300
External contact fuse protection, safety contacts			
In accordance with the standard	EN 60947-5-1	EN 60947-5-1	EN 60947-5-1
Max. melting integral	240 A²s	240 A²s	240 A²s
Blow-out fuse, quick	4 A	4 A	4 A
Blow-out fuse, slow	4 A	4 A	4 A
Blow-out fuse, gG	4 A	4 A	4 A
Circuit breaker 24V AC/DC, characteristic B/C	4 A	4 A	4 A
Contact material	AgSnO₂ + 0,2 µm Au	AgSnO₂ + 0,2 µm Au	AgSnO₂ + 0,2 µm Au
Conventional thermal current while loading several contacts	774049	774053	774054
I _{th} per contact at UB AC; AC1: 240 V, DC1: 24 V			
Conv. therm. current with 1 contact	4 A	4 A	4 A
Conv. therm. current with 2 contacts	3 A	3 A	3 A

Times	774049	774053	774054
Switch-on delay			
With automatic start typ.	230 ms	230 ms	230 ms
With automatic start max.	700 ms	700 ms	700 ms
With automatic start after power on typ.	230 ms	230 ms	230 ms
With automatic start after power on max.	700 ms	700 ms	700 ms
With manual start typ.	140 ms	140 ms	140 ms
With manual start max.	700 ms	700 ms	700 ms
Delay-on de-energisation			
With E-STOP typ.	70 ms	70 ms	70 ms
With E-STOP max.	100 ms	100 ms	100 ms
With power failure typ.	70 ms	70 ms	70 ms
With power failure max.	100 ms	100 ms	100 ms
Recovery time at max. switching frequency 1/s			
After E-STOP	120 ms	120 ms	120 ms
After power failure	120 ms	120 ms	120 ms
Supply interruption before de-energisation			
	20 ms	20 ms	20 ms
Environmental data			
Climatic suitability	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78
Ambient temperature			
Temperature range	-10 - 55 °C	-10 - 55 °C	-10 - 55 °C
Storage temperature			
Temperature range	-40 - 85 °C	-40 - 85 °C	-40 - 85 °C
Climatic suitability			
Humidity	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C
Condensation during operation			
	Not permitted	Not permitted	Not permitted
EMC			
	EN 60947-5-1, EN 61000-6-2, EN 61326-3-1	EN 60947-5-1, EN 61000-6-2, EN 61326-3-1	EN 60947-5-1, EN 61000-6-2, EN 61326-3-1
Vibration			
In accordance with the standard	EN 60068-2-6	EN 60068-2-6	EN 60068-2-6
Frequency	10 - 55 Hz	10 - 55 Hz	10 - 55 Hz
Amplitude	0,35 mm	0,35 mm	0,35 mm
Airgap creepage			
In accordance with the standard	EN 60947-1	EN 60947-1	EN 60947-1
Overvoltage category	III / II	III / II	III / II
Pollution degree	2	2	2
Rated insulation voltage			
	250 V	250 V	250 V
Rated impulse withstand voltage			
	4 kV	4 kV	4 kV

Environmental data	774049	774053	774054
Protection type			
Mounting area (e.g. control cabinet)	IP54	IP54	IP54
Housing	IP40	IP40	IP40
Terminals	IP20	IP20	IP20
Mechanical data	774049	774053	774054
Mounting position	Any	Any	Any
Mechanical life	10,000,000 cycles	10,000,000 cycles	10,000,000 cycles
Material			
Bottom	PPO UL 94 V0	PPO UL 94 V0	PPO UL 94 V0
Front	ABS UL 94 V0	ABS UL 94 V0	ABS UL 94 V0
Top	PPO UL 94 V0	PPO UL 94 V0	PPO UL 94 V0
Connection type	Screw terminal	Screw terminal	Screw terminal
Mounting type	Fixed	Fixed	Fixed
Conductor cross section with screw terminals			
1 core flexible	0,2 - 4 mm², 24 - 10 AWG	0,2 - 4 mm², 24 - 10 AWG	0,2 - 4 mm², 24 - 10 AWG
2 core with the same cross section, flexible with crimp connectors, no plastic sleeve	0,2 - 2,5 mm², 24 - 14 AWG	0,2 - 2,5 mm², 24 - 14 AWG	0,2 - 2,5 mm², 24 - 14 AWG
2 core with the same cross section, flexible without crimp connectors or with TWIN crimp connectors	0,2 - 2,5 mm², 24 - 14 AWG	0,2 - 2,5 mm², 24 - 14 AWG	0,2 - 2,5 mm², 24 - 14 AWG
Torque setting with screw terminals	0,6 Nm	0,6 Nm	0,6 Nm
Dimensions			
Height	87 mm	87 mm	87 mm
Width	22,5 mm	22,5 mm	22,5 mm
Depth	121 mm	121 mm	121 mm
Weight	225 g	225 g	225 g

Where standards are undated, the 2014-07 latest editions shall apply.

Order no. 774055 – 774057

See below for more order numbers

General	774055	774056	774057
Approvals	CCC, CE, EAC (Eurasian), KOSHA, TÜV, cULus Listed	CCC, CE, EAC (Eurasian), KOSHA, TÜV, cULus Listed	CCC, CE, EAC (Eurasian), KOSHA, TÜV, cULus Listed
Electrical data	774055	774056	774057
Supply voltage			
Voltage	120 V	230 V	240 V
Kind	AC	AC	AC
Voltage tolerance	-15 %/+10 %	-15 %/+10 %	-15 %/+10 %
Output of external power supply (AC)	2 VA	2 VA	2 VA
Frequency range AC	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
Duty cycle	100 %	100 %	100 %
Inputs	774055	774056	774057
Number	1	1	1
Voltage at			
Input circuit DC	120 V	230 V	240 V
Start circuit DC	24 V	24 V	24 V
Feedback loop DC	24 V	24 V	24 V
Current at			
Input circuit DC	18 mA	8 mA	7 mA
Start circuit DC	40 mA	40 mA	40 mA
Feedback loop DC	40 mA	40 mA	40 mA
Max. overall line capacitance C _{lmax}	37 nF	7 nF	7 nF
Relay outputs	774055	774056	774057
Number of output contacts			
Safety contacts (N/O), instantaneous	2	2	2
Max. short circuit current I _K	1 kA	1 kA	1 kA
Utilisation category			
In accordance with the standard	EN 60947-4-1	EN 60947-4-1	EN 60947-4-1
Utilisation category of safety contacts			
AC1 at	240 V	240 V	240 V
Min. current	0,01 A	0,01 A	0,01 A
Max. current	4 A	4 A	4 A
Max. power	1000 VA	1000 VA	1000 VA
DC1 at	24 V	24 V	24 V
Min. current	0,01 A	0,01 A	0,01 A
Max. current	4 A	4 A	4 A
Max. power	100 W	100 W	100 W

Relay outputs	774055	774056	774057
Utilisation category			
In accordance with the standard	EN 60947-5-1	EN 60947-5-1	EN 60947-5-1
Utilisation category of safety contacts			
AC15 at	230 V	230 V	230 V
Max. current	4 A	4 A	4 A
DC13 (6 cycles/min) at	24 V	24 V	24 V
Max. current	4 A	4 A	4 A
Utilisation category in accordance with UL			
Voltage	240 V AC G. P.	240 V AC G. P.	240 V AC G. P.
With current	4 A	4 A	4 A
Voltage	24 V DC Resistive	24 V DC Resistive	24 V DC Resistive
With current	4 A	4 A	4 A
Pilot Duty	C300, R300	C300, R300	C300, R300
External contact fuse protection, safety contacts			
In accordance with the standard	EN 60947-5-1	EN 60947-5-1	EN 60947-5-1
Max. melting integral	240 A²s	240 A²s	240 A²s
Blow-out fuse, quick	4 A	4 A	4 A
Blow-out fuse, slow	4 A	4 A	4 A
Blow-out fuse, gG	4 A	4 A	4 A
Circuit breaker 24V AC/DC, characteristic B/C	4 A	4 A	4 A
Contact material	AgSnO₂ + 0,2 µm Au	AgSnO₂ + 0,2 µm Au	AgSnO₂ + 0,2 µm Au
Conventional thermal current while loading several contacts	774055	774056	774057
I _{th} per contact at UB AC; AC1: 240 V, DC1: 24 V			
Conv. therm. current with 1 contact	4 A	4 A	4 A
Conv. therm. current with 2 contacts	3 A	3 A	3 A
Times	774055	774056	774057
Switch-on delay			
With automatic start typ.	230 ms	230 ms	230 ms
With automatic start max.	700 ms	700 ms	700 ms
With automatic start after power on typ.	230 ms	230 ms	230 ms
With automatic start after power on max.	700 ms	700 ms	700 ms
With manual start typ.	140 ms	140 ms	140 ms
With manual start max.	700 ms	700 ms	700 ms

Times	774055	774056	774057
Delay-on de-energisation			
With E-STOP typ.	70 ms	70 ms	70 ms
With E-STOP max.	100 ms	100 ms	100 ms
With power failure typ.	70 ms	70 ms	70 ms
With power failure max.	100 ms	100 ms	100 ms
Recovery time at max. switching frequency 1/s			
After E-STOP	120 ms	120 ms	120 ms
After power failure	120 ms	120 ms	120 ms
Supply interruption before de-energisation			
	20 ms	20 ms	20 ms
Environmental data	774055	774056	774057
Climatic suitability			
	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78
Ambient temperature			
Temperature range	-10 - 55 °C	-10 - 55 °C	-10 - 55 °C
Storage temperature			
Temperature range	-40 - 85 °C	-40 - 85 °C	-40 - 85 °C
Climatic suitability			
Humidity	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C
Condensation during operation			
	Not permitted	Not permitted	Not permitted
EMC			
	EN 60947-5-1, EN 61000-6-2, EN 61326-3-1	EN 60947-5-1, EN 61000-6-2, EN 61326-3-1	EN 60947-5-1, EN 61000-6-2, EN 61326-3-1
Vibration			
In accordance with the standard	EN 60068-2-6	EN 60068-2-6	EN 60068-2-6
Frequency	10 - 55 Hz	10 - 55 Hz	10 - 55 Hz
Amplitude	0,35 mm	0,35 mm	0,35 mm
Airgap creepage			
In accordance with the standard	EN 60947-1	EN 60947-1	EN 60947-1
Overvoltage category	III / II	III / II	III / II
Pollution degree	2	2	2
Rated insulation voltage			
	250 V	250 V	250 V
Rated impulse withstand voltage			
	4 kV	4 kV	4 kV
Protection type			
Mounting area (e.g. control cabinet)	IP54	IP54	IP54
Housing	IP40	IP40	IP40
Terminals	IP20	IP20	IP20
Mechanical data	774055	774056	774057
Mounting position			
	Any	Any	Any
Mechanical life			
	10,000,000 cycles	10,000,000 cycles	10,000,000 cycles

Mechanical data	774055	774056	774057
Material			
Bottom	PPO UL 94 V0	PPO UL 94 V0	PPO UL 94 V0
Front	ABS UL 94 V0	ABS UL 94 V0	ABS UL 94 V0
Top	PPO UL 94 V0	PPO UL 94 V0	PPO UL 94 V0
Connection type	Screw terminal	Screw terminal	Screw terminal
Mounting type	Fixed	Fixed	Fixed
Conductor cross section with screw terminals			
1 core flexible	0,2 - 4 mm², 24 - 10 AWG	0,2 - 4 mm², 24 - 10 AWG	0,2 - 4 mm², 24 - 10 AWG
2 core with the same cross section, flexible with crimp connectors, no plastic sleeve	0,2 - 2,5 mm², 24 - 14 AWG	0,2 - 2,5 mm², 24 - 14 AWG	0,2 - 2,5 mm², 24 - 14 AWG
2 core with the same cross section, flexible without crimp connectors or with TWIN crimp connectors	0,2 - 2,5 mm², 24 - 14 AWG	0,2 - 2,5 mm², 24 - 14 AWG	0,2 - 2,5 mm², 24 - 14 AWG
Torque setting with screw terminals	0,6 Nm	0,6 Nm	0,6 Nm
Dimensions			
Height	87 mm	87 mm	87 mm
Width	22,5 mm	22,5 mm	22,5 mm
Depth	121 mm	121 mm	121 mm
Weight	225 g	225 g	225 g

Where standards are undated, the 2014-07 latest editions shall apply.

Order no. 774058 – 774059

General	774058	774059
Approvals	CCC, CE, EAC (Eurasian), KOSHA, TÜV, cULus Listed	CCC, CE, EAC (Eurasian), KOSHA, TÜV, cULus Listed
Electrical data	774058	774059
Supply voltage		
Voltage	42 V	24 V
Kind	AC	AC/DC
Voltage tolerance	-15 %/+10 %	-15 %/+10 %
Output of external power supply (AC)	2 VA	3 VA
Output of external power supply (DC)	–	1,5 W
Frequency range AC	50 - 60 Hz	50 - 60 Hz
Residual ripple DC	–	160 %
Duty cycle	100 %	100 %
Max. inrush current impulse		
Current pulse, A1	–	1,7 A
Pulse duration, A1	–	8 ms
Inputs	774058	774059
Number	1	1
Voltage at		
Input circuit DC	42 V	24 V
Start circuit DC	24 V	24 V
Feedback loop DC	24 V	24 V
Current at		
Input circuit DC	49 mA	50 mA
Start circuit DC	40 mA	210 mA
Feedback loop DC	40 mA	210 mA
Max. overall cable resistance RI-max		
Single-channel at UB DC	–	15 Ohm
Single-channel at UB AC	–	15 Ohm
Max. overall line capacitance CImax	37 nF	–
Relay outputs	774058	774059
Number of output contacts		
Safety contacts (N/O), instantaneous	2	2
Max. short circuit current IK	1 kA	1 kA
Utilisation category		
In accordance with the standard	EN 60947-4-1	EN 60947-4-1

Relay outputs	774058	774059
Utilisation category of safety contacts		
AC1 at	240 V	240 V
Min. current	0,01 A	0,01 A
Max. current	4 A	6 A
Max. power	1000 VA	1500 VA
DC1 at	24 V	24 V
Min. current	0,01 A	0,01 A
Max. current	4 A	6 A
Max. power	100 W	150 W
Utilisation category		
In accordance with the standard	EN 60947-5-1	EN 60947-5-1
Utilisation category of safety contacts		
AC15 at	230 V	230 V
Max. current	4 A	5 A
DC13 (6 cycles/min) at	24 V	24 V
Max. current	4 A	6 A
Utilisation category in accordance with UL		
Voltage	240 V AC G. P.	240 V AC G. P.
With current	4 A	6 A
Voltage	24 V DC Resistive	24 V DC Resistive
With current	4 A	6 A
Pilot Duty	C300, R300	C300, R300
External contact fuse protection, safety contacts		
In accordance with the standard	EN 60947-5-1	EN 60947-5-1
Max. melting integral	240 A²s	240 A²s
Blow-out fuse, quick	4 A	6 A
Blow-out fuse, slow	4 A	4 A
Blow-out fuse, gG	4 A	6 A
Circuit breaker 24V AC/DC, characteristic B/C	4 A	4 A
Conventional thermal current	–	6 A
Contact material	AgSnO₂ + 0,2 µm Au	AgSnO₂ + 0,2 µm Au
Conventional thermal current while loading several contacts	774058	774059
I _{th} per contact at UB AC; AC1: 240 V, DC1: 24 V		
Conv. therm. current with 1 contact	4 A	–
Conv. therm. current with 2 contacts	3 A	–

Times	774058	774059
Switch-on delay		
With automatic start typ.	230 ms	50 ms
With automatic start max.	700 ms	150 ms
With automatic start after power on typ.	230 ms	50 ms
With automatic start after power on max.	700 ms	150 ms
With manual start typ.	140 ms	35 ms
With manual start max.	700 ms	150 ms
Delay-on de-energisation		
With E-STOP typ.	70 ms	45 ms
With E-STOP max.	100 ms	70 ms
With power failure typ.	70 ms	45 ms
With power failure max.	100 ms	70 ms
Recovery time at max. switching frequency 1/s		
After E-STOP	120 ms	50 ms
After power failure	120 ms	150 ms
Supply interruption before de-energisation		
	20 ms	20 ms
Environmental data		
	774058	774059
Climatic suitability	EN 60068-2-78	EN 60068-2-78
Ambient temperature		
Temperature range	-10 - 55 °C	-10 - 55 °C
Storage temperature		
Temperature range	-40 - 85 °C	-40 - 85 °C
Climatic suitability		
Humidity	93 % r. h. at 40 °C	93 % r. h. at 40 °C
Condensation during operation		
	Not permitted	Not permitted
EMC		
	EN 60947-5-1, EN 61000-6-2, EN 61326-3-1	EN 60947-5-1, EN 61000-6-2, EN 61326-3-1
Vibration		
In accordance with the standard	EN 60068-2-6	EN 60068-2-6
Frequency	10 - 55 Hz	10 - 55 Hz
Amplitude	0,35 mm	0,35 mm
Airgap creepage		
In accordance with the standard	EN 60947-1	EN 60947-1
Overvoltage category	III / II	III / II
Pollution degree	2	2
Rated insulation voltage		
	250 V	250 V
Rated impulse withstand voltage		
	4 kV	4 kV
Protection type		
Mounting area (e.g. control cabinet)	IP54	IP54
Housing	IP40	IP40
Terminals	IP20	IP20

Mechanical data	774058	774059
Mounting position	Any	Any
Mechanical life	10,000,000 cycles	10,000,000 cycles
Material		
Bottom	PPO UL 94 V0	PPO UL 94 V0
Front	ABS UL 94 V0	ABS UL 94 V0
Top	PPO UL 94 V0	PPO UL 94 V0
Connection type	Screw terminal	Screw terminal
Mounting type	Fixed	Fixed
Conductor cross section with screw terminals		
1 core flexible	0,2 - 4 mm², 24 - 10 AWG	0,2 - 4 mm², 24 - 10 AWG
2 core with the same cross section, flexible with crimp connectors, no plastic sleeve	0,2 - 2,5 mm², 24 - 14 AWG	0,2 - 2,5 mm², 24 - 14 AWG
2 core with the same cross section, flexible without crimp connectors or with TWIN crimp connectors	0,2 - 2,5 mm², 24 - 14 AWG	0,2 - 2,5 mm², 24 - 14 AWG
Torque setting with screw terminals	0,6 Nm	0,6 Nm
Dimensions		
Height	87 mm	87 mm
Width	22,5 mm	22,5 mm
Depth	121 mm	121 mm
Weight	225 g	185 g

Where standards are undated, the 2014-07 latest editions shall apply.

Safety characteristic data



NOTICE

You must comply with the safety-related characteristic data in order to achieve the required safety level for your plant/machine.

Operating mode	EN ISO 13849-1: 2008 PL	EN ISO 13849-1: 2008 Category	EN 62061 SIL CL	EN 62061 PFH _D [1/h]	IEC 61511 SIL	IEC 61511 PFD	EN ISO 13849-1: 2008 T _M [year]
–	PL e	Cat. 4	SIL CL 3	2,31E-09	SIL 3	2,03E-06	20

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.

Supplementary data



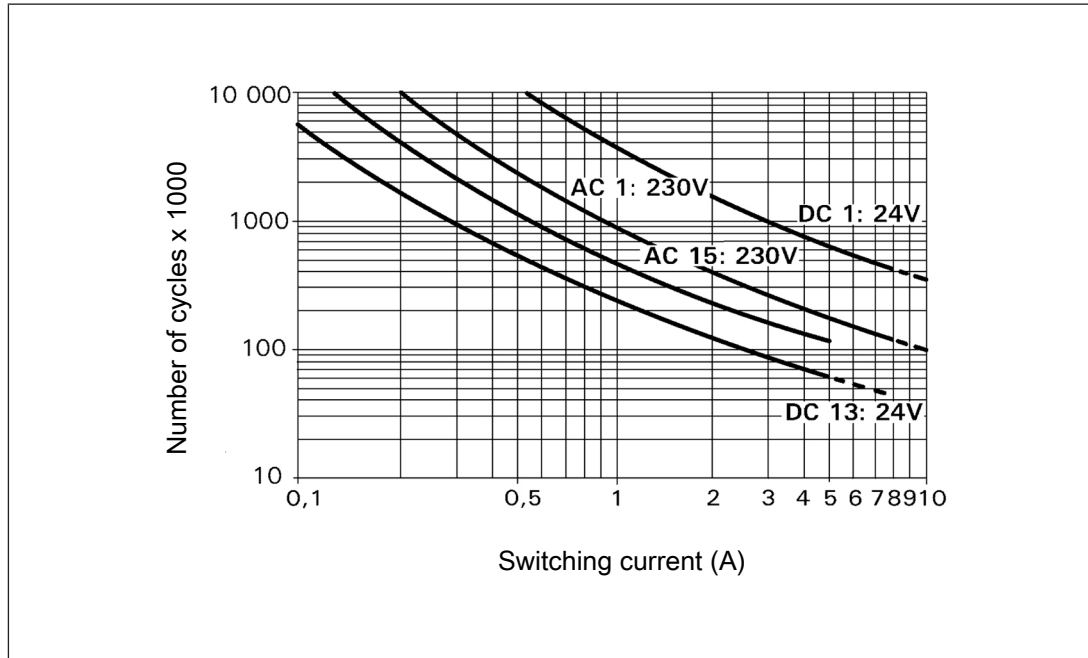
CAUTION!

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.

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: 4 000 000 cycles

Provided the application to be implemented requires fewer than 4 000 000 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 DC contactors, use flywheel diodes for spark suppression.

Order reference

Product type	Features	Connection type	Order no.
PNOZ X7	42 VAC	Screw terminals	774 058
PNOZ X7	48 V AC	Screw terminals	774 049
PNOZ X7	110 V AC	Screw terminals	774 053
PNOZ X7	115 V AC	Screw terminals	774 054
PNOZ X7	120 V AC	Screw terminals	774 055
PNOZ X7	230 V AC	Screw terminals	774 056
PNOZ X7	240 VAC	Screw terminals	774 057
PNOZ X7	24 VAC/DC	Screw terminals	774 059

EC declaration of conformity

This product/these products meet the requirements of the directive 2006/42/EC for machinery of the European Parliament and of the Council. The complete EC Declaration of Conformity is available on the Internet at www.pilz.com/support/downloads.

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