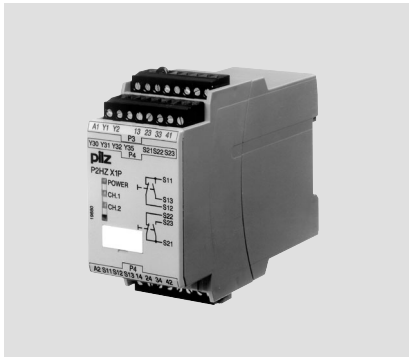


## Up to PL e of EN ISO 13849-1 P2HZ X1P



Two-hand control unit for press controllers and safety circuits

### Approvals

	P2HZ X1P
	◆
	◆
	◆

### Unit features

- ▶ Positive-guided relay outputs:
  - 3 safety contacts (N/O), instantaneous
  - 1 auxiliary contact (N/C), instantaneous
- ▶ 2 semiconductor outputs
- ▶ Connection options for:
  - 2 operator elements (buttons)
- ▶ LED indicator for:
  - Switch status channel 1/2
  - Supply voltage
- ▶ Semiconductor outputs signal:
  - Switch status channel 1/2
  - Supply voltage is present
- ▶ Plug-in connection terminals (either spring-loaded terminal or screw terminal)
- ▶ See order reference for unit types

### Unit Description

The two-hand control relay meets the requirements of EN 574 Type IIIC. It forces the operator to keep his hands outside the danger zone area during the hazardous movement. The unit is suitable for use on controllers for metalworking presses as a component for simultaneous switching.

It can be used in applications with

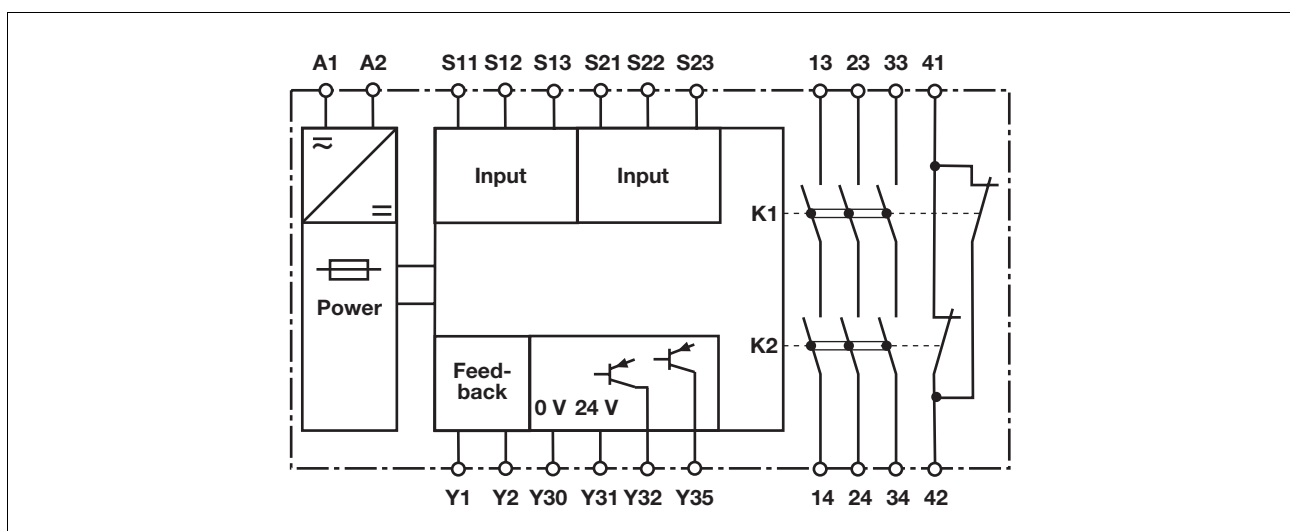
- ▶ Mechanical presses (EN 692)
- ▶ Hydraulic presses (EN 693)
- ▶ Safety circuits in accordance with EN 60204-1

### Safety features

The two-hand control relay meets the following safety requirements:

- ▶ The circuit is redundant with built-in self-monitoring
- ▶ The safety function remains effective in the case of a component failure
- ▶ The circuit prevents a further press stroke in the case of:
  - Relay failure
  - Contact welding
  - Coil defect on a relay
  - Open circuit
  - Short circuit

### Block diagram



## Up to PL e of EN ISO 13849-1 P2HZ X1P

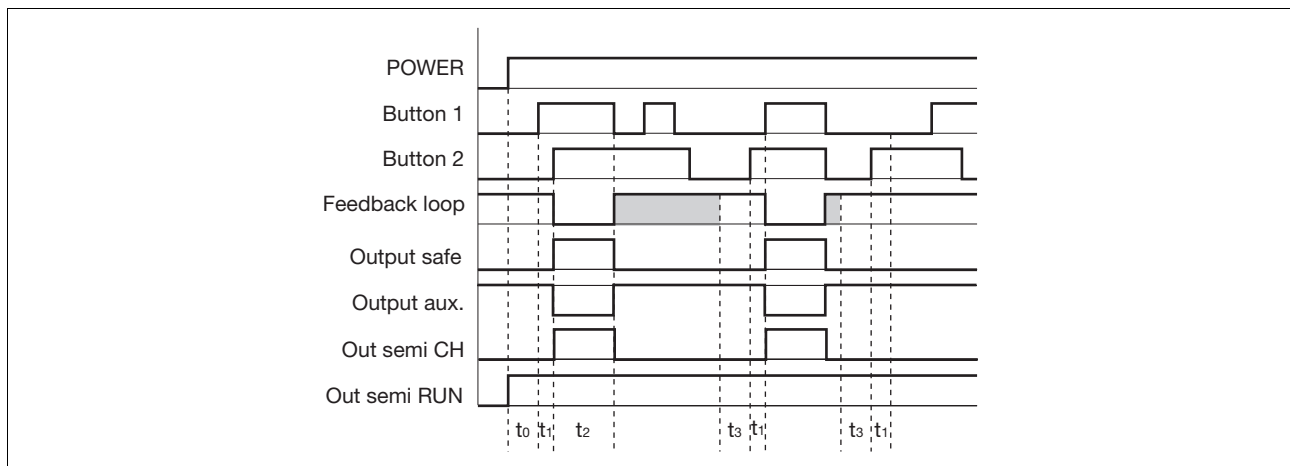
### Function description

- ▶ The two-hand control relay must be activated by simultaneously pressing two buttons within **500 ms**. If

one or both of the buttons are released, the unit interrupts the control command for the hazardous movement.

- ▶ **Reactivation:** The output relays will not re-energise until both operator elements have been released and then re-operated simultaneously.

### Timing diagram



### Key

- ▶ **POWER:** Supply voltage
- ▶ **Button 1/Button 2:** Input circuits S11-S12-S13, S21-S22-S23
- ▶ **Feedback loop:** Feedback loop Y1-Y2
- ▶ **Output safe:** Safety outputs 13-14, 23-24, 33-34

- ▶ **Output aux.:** Auxiliary contacts 41-42
- ▶ **Out semi RUN:** Semiconductor output for operational readiness Y35
- ▶ **Out semi CH:** Semiconductor output switch status Y32
- ▶  $t_0$ : Recovery time after power on

- ▶  $t_1$ : Simultaneity, channel 1 and 2
- ▶  $t_2$ : Operating cycle ended through button 1 or 2
- ▶  $t_3$ : Y1-Y2 must be closed before before the button is operated (recovery time)

Shaded area: Status irrelevant

### Wiring

Please note:

- ▶ Information given in the "Technical details" must be followed.
- ▶ Outputs 13-14, 23-24, 33-34 are safety contacts, output 41-42 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.

## Up to PL e of EN ISO 13849-1 P2HZ X1P

### Preparing for operation

#### ▶ Supply voltage

Supply voltage	AC	DC

#### ▶ Input circuit

Input circuit	Single-channel	Dual-channel
<b>Two-hand button</b> with detection of shorts across contacts		

#### ▶ Feedback loop

Feedback loop	
Contacts from external contactors	

#### ▶ Semiconductor output

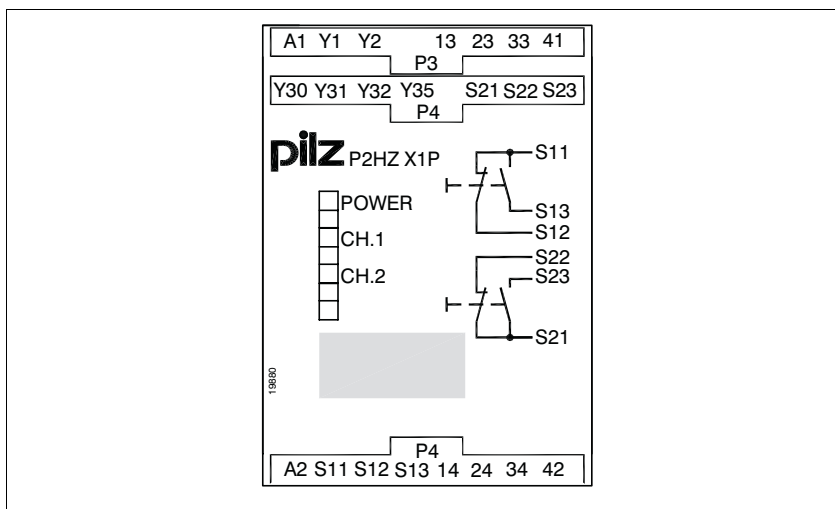
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#### ▶ Key

S1/S2	Two-hand button
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## Up to PL e of EN ISO 13849-1 P2HZ X1P

### Terminal configuration



### Installation

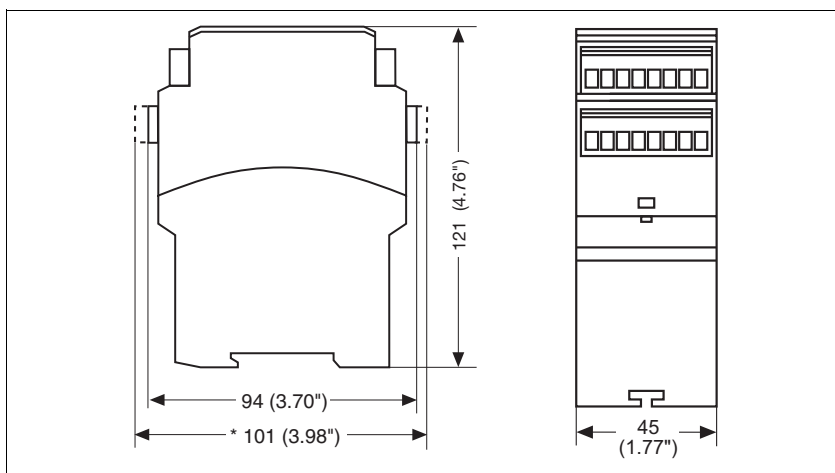
- ▶ The safety relay should be installed in a control cabinet with a protection type of at least IP54.
- ▶ Use the notch on the rear of the unit to attach it to a DIN rail.
- ▶ Ensure the unit is mounted securely on a vertical DIN rail (35 mm) by using a fixing element (e.g. retaining bracket or an end angle).

### Notice

The distance of the button connected to the two-hand relay from the nearest danger zone must be large enough that if one of the buttons is released, the dangerous moment is interrupted before the operator can reach into the danger zone (see EN 999 "The positioning of protective equipment in respect of approach speeds of parts of the human body").

### Dimensions

\* with spring-loaded terminals

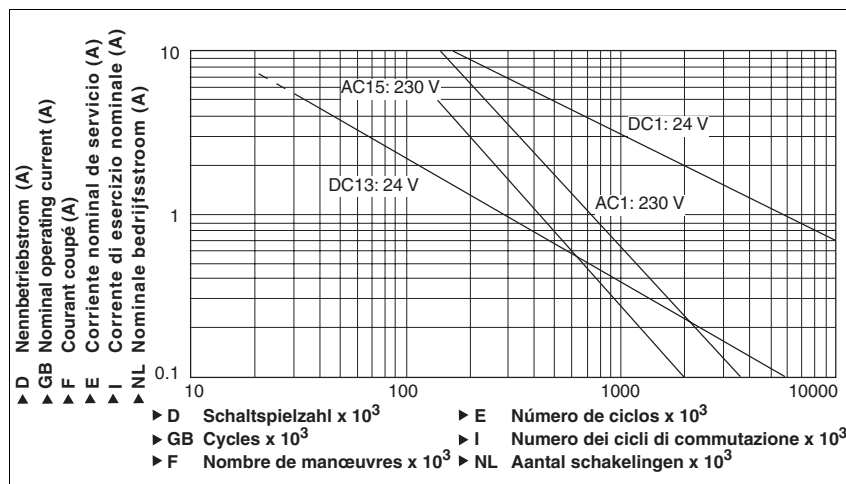


## Up to PL e of EN ISO 13849-1 P2HZ X1P

### 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 <sub>B</sub> AC	<b>24 V, 42 V, 48 V, 110 V, 115 V, 120 V, 230 V, 240 V</b>
Supply voltage U <sub>B</sub> DC	<b>24 V</b>
Voltage tolerance	<b>-15 %/+10 %</b>
Power consumption at U <sub>B</sub> AC	<b>6.0 VA</b> Order no.: 777330, 777331, 777332, 777434, 777435, 777436, 777438, 777439, 787330, 787331, 787332, 787434, 787435, 787436, 787438, 787439
Power consumption at U <sub>B</sub> DC	<b>2.5 W</b> Order no.: 777340, 787340
Frequency range AC	<b>50 - 60 Hz</b>
Residual ripple DC	<b>10 %</b>
Voltage and current at	
Input circuit DC: <b>24.0 V</b>	
N/O contact	<b>30 mA</b>
N/C contact	<b>20 mA</b>
Feedback loop DC: <b>24.0 V</b>	<b>45.0 mA</b>
Number of output contacts	
Safety contacts (S) instantaneous:	<b>3</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 <sub>min</sub> : <b>0.01 A</b> , I <sub>max</sub> : <b>5.0 A</b> P <sub>max</sub> : <b>1250 VA</b>
Safety contacts: DC1 at <b>24 V</b>	I <sub>min</sub> : <b>0.01 A</b> , I <sub>max</sub> : <b>5.0 A</b> P <sub>max</sub> : <b>125 W</b>
Auxiliary contacts: AC1 at <b>240 V</b>	I <sub>min</sub> : <b>0.01 A</b> , I <sub>max</sub> : <b>2.0 A</b> P <sub>max</sub> : <b>500 VA</b>
Auxiliary contacts: DC1 at <b>24 V</b>	I <sub>min</sub> : <b>0.01 A</b> , I <sub>max</sub> : <b>2.0 A</b> P <sub>max</sub> : <b>50 W</b>
Utilisation category in accordance with <b>EN 60947-5-1</b>	
Safety contacts: AC15 at <b>230 V</b>	I <sub>max</sub> : <b>2.5 A</b>
Safety contacts: DC13 at <b>24 V</b> (6 cycles/min)	I <sub>max</sub> : <b>1.5 A</b>
Auxiliary contacts: AC15 at <b>230 V</b>	I <sub>max</sub> : <b>2.0 A</b>
Auxiliary contacts: DC13 at <b>24 V</b> (6 cycles/min)	I <sub>max</sub> : <b>1.5 A</b>
Contact material	<b>AgSnO2 + 0.2 µm Au</b>

## Up to PL e of EN ISO 13849-1 P2HZ X1P

### Electrical data

External contact fuse protection ( $I_k = 1 \text{ kA}$ ) to <b>EN 60947-5-1</b>	
Blow-out fuse, quick	
Safety contacts:	<b>6 A</b>
Auxiliary contacts:	<b>4 A</b>
Blow-out fuse, slow	
Safety contacts:	<b>4 A</b>
Auxiliary contacts:	<b>2 A</b>
Circuit breaker 24 VAC/DC, characteristic B/C	
Safety contacts:	<b>4 A</b>
Auxiliary contacts:	<b>2 A</b>
Semiconductor outputs (short circuit proof)	<b>24.0 V DC, 20 mA</b>
External supply voltage	<b>24.0 V DC</b>
Voltage tolerance	<b>-15% / +10%</b>
Max. overall cable resistance $R_{lmax}$ per input circuit	<b>14 Ohm</b>

### Safety-related characteristic data

PL in accordance with <b>EN ISO 13849-1</b>	<b>PL e (Cat. 4)</b>
Category in accordance with <b>EN 954-1</b>	<b>Cat. 4</b>
SIL CL in accordance with <b>EN IEC 62061</b>	<b>SIL CL 3</b>
PFH in accordance with <b>EN IEC 62061</b>	<b>1.06E-09</b>
SIL in accordance with <b>IEC 61511</b>	<b>SIL 3</b>
PFD in accordance with <b>IEC 61511</b>	<b>1.84E-06</b>
$t_M$ in years	<b>20</b>

### Times

Delay-on de-energisation (reaction time in accordance with EN 574)	
N/O contact	<b>15 ms</b>
N/C contact	<b>30 ms</b>
Recovery time	<b>250 ms</b>
Simultaneity, channel 1 and 2	<b>500 ms</b>

### Environmental data

EMC	<b>EN 60947-5-1, EN 61000-6-2</b>
Vibration to <b>EN 60068-2-6</b>	
Frequency	<b>10 - 55 Hz</b>
Amplitude	<b>0.35 mm</b>
Climatic suitability	<b>EN 60068-2-78</b>
Airgap creepage in accordance with <b>VDE 0110-1</b>	
Pollution degree	<b>2</b>
Overtoltage category	<b>III</b>
Ambient temperature	<b>-25 - 55 °C</b>
Storage temperature	<b>-25 - 85 °C</b>
Protection type	
Mounting (e.g. cabinet)	<b>IP54</b>
Housing	<b>IP40</b>
Terminals	<b>IP20</b>

### Mechanical data

Housing material	
Housing	<b>PPO UL 94 V0</b>
Front	<b>ABS UL 94 V0</b>
Cross section of external conductors with screw terminals	
1 core flexible	<b>0.25 - 2.50 mm<sup>2</sup>, 24 - 12 AWG</b> Order no.: 777330, 777331, 777332, 777340, 777434, 777435, 777436, 777438, 777439
2 core, same cross section, flexible:	
with crimp connectors, without insulating sleeve	<b>0.25 - 1.00 mm<sup>2</sup>, 24 - 16 AWG</b> Order no.: 777330, 777331, 777332, 777340, 777434, 777435, 777436, 777438, 777439
without crimp connectors or with TWIN crimp connectors	<b>0.20 - 1.50 mm<sup>2</sup>, 24 - 16 AWG</b> Order no.: 777330, 777331, 777332, 777340, 777434, 777435, 777436, 777438, 777439

## Up to PL e of EN ISO 13849-1 P2HZ X1P

Mechanical data	
Torque setting with screw terminals	<b>0.50 Nm</b> Order no.: 777330, 777331, 777332, 777340, 777434, 777435, 777436, 777438, 777439
Cross section of external conductors with spring-loaded terminals: Flexible with/without crimp connectors	<b>0.20 - 1.50 mm<sup>2</sup>, 24 - 16 AWG</b> Order no.: 787330, 787331, 787332, 787340, 787434, 787435, 787436, 787438, 787439
Spring-loaded terminals: Terminal points per connection	<b>2</b> Order no.: 787330, 787331, 787332, 787340, 787434, 787435, 787436, 787438, 787439
Stripping length	<b>8 mm</b> Order no.: 787330, 787331, 787332, 787340, 787434, 787435, 787436, 787438, 787439
Dimensions	
Height	<b>101.0 mm</b> Order no.: 787330, 787331, 787332, 787340, 787434, 787435, 787436, 787438, 787439 <b>94.0 mm</b> Order no.: 777330, 777331, 777332, 777340, 777434, 777435, 777436, 777438, 777439
Width	<b>45.0 mm</b>
Depth	<b>121.0 mm</b>
Weight	<b>240 g</b> Order no.: 787340 <b>250 g</b> Order no.: 777340 <b>350 g</b> Order no.: 787330, 787331, 787332, 787434, 787435, 787436, 787438, 787439 <b>360 g</b> Order no.: 777330, 777331, 777332, 777434, 777435, 777436, 777438, 777439

The standards current on **08/03** apply.

Order reference			
Type	Features	Terminals	Order no.
P2HZ X1P C	24 VAC	Spring-loaded terminals	787 330
P2HZ X1P	24 VAC	Screw terminals	777 330
P2HZ X1P C	42 VAC	Spring-loaded terminals	787 331
P2HZ X1P	42 VAC	Screw terminals	777 331
P2HZ X1P C	48 VAC	Spring-loaded terminals	787 332
P2HZ X1P	48 VAC	Screw terminals	777 332
P2HZ X1P C	110 VAC	Spring-loaded terminals	787 434
P2HZ X1P	110 VAC	Screw terminals	777 434
P2HZ X1P C	115 VAC	Spring-loaded terminals	787 435
P2HZ X1P	115 VAC	Screw terminals	777 435
P2HZ X1P C	120 VAC	Spring-loaded terminals	787 436
P2HZ X1P	120 VAC	Screw terminals	777 436
P2HZ X1P C	230 VAC	Spring-loaded terminals	787 438
P2HZ X1P	230 VAC	Screw terminals	777 438
P2HZ X1P C	240 VAC	Spring-loaded terminals	787 439
P2HZ X1P	240 VAC	Screw terminals	777 439
P2HZ X1P C	24 VDC	Spring-loaded terminals	787 340
P2HZ X1P	24 VDC	Screw terminals	777 340