

## Sensor interface PDP20 F 4 mag

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### Unit features

- ▶ Connection of 4 sensors with a N/O / N/O combination
- ▶ 2 safety outputs
- ▶ 1 signal output
- ▶ LED for:
  - State of the outputs
  - State of the inputs
  - Operational readiness
- ▶ Multiple PDP20 F 4 mag may be connected in series
- ▶ Plug-in connection terminals:  
either spring-loaded terminals or screw terminals available as accessories (see order reference)

### Unit description

The sensor interface PDP20 F 4 mag enables up to 4 sensors to be connected in series.

Permitted sensors are sensors with a N/O / N/O combination and the Pilz sensors listed in the section entitled "Permitted sensors from Pilz".

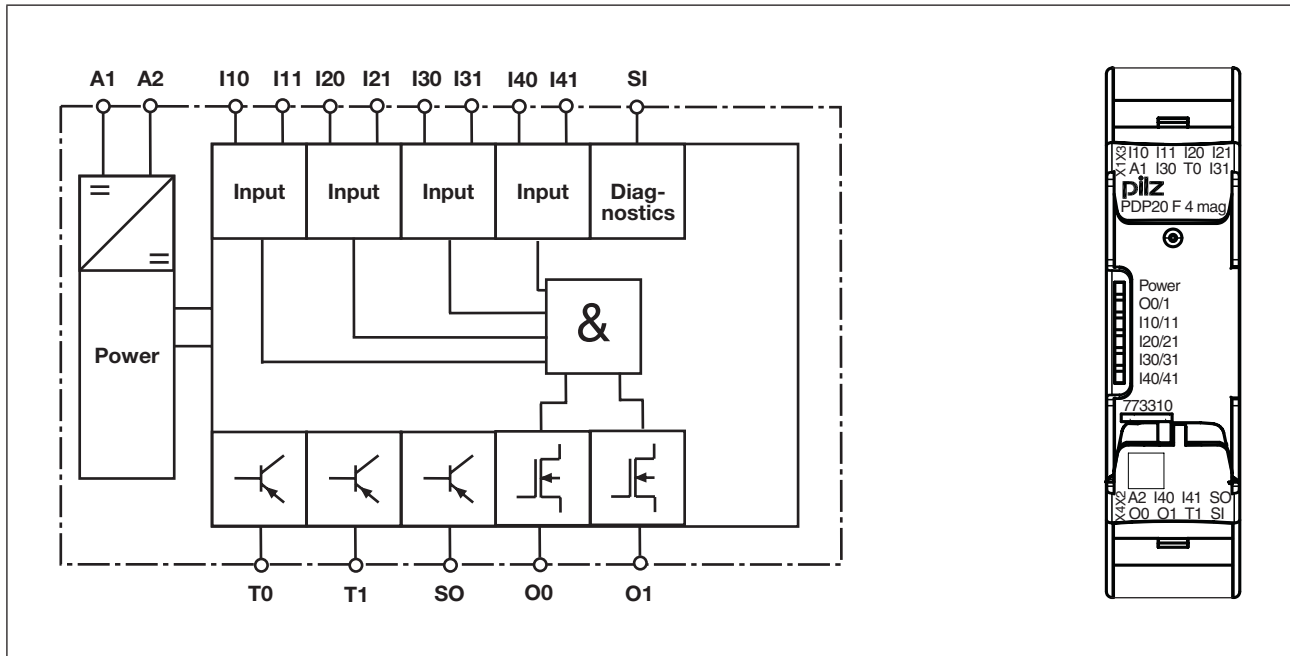
The sensor interface meets the requirements in accordance with:

- ▶ EN 60204-1
- ▶ EN 60947-5-3: PDF-M
- ▶ EN 62061: up to max. SIL CL 3
- ▶ EN ISO 13849-1: 2006: up to max. PL e

If multiple sensor interfaces PDP20 F 4 mag are connected in series, 3 additional sensors per sensor interface may be connected in series.

## Sensor interface PDP20 F 4 mag

### Block diagram



### Function description

The inputs of the PDP20 F 4 mag are AND-linked. The result of the logic AND operation is expressed via safety outputs O0 and O1.

A signal output (SO) indicates the state of the sensors.

### Safety outputs

- ▶ There is a high signal at safety outputs O0, O1 when all the input circuits I10 ... I41 are closed.
- ▶ If at least one of the input circuits is open or a sensor is partially operated, the safety outputs will switch to a low signal.

### Signal Output

- ▶ There is a high signal at the signal output SO when the connected sensors are operated (N/O contact closed).
- ▶ If at least one of the sensors is not operated or is partially operated, the signal output SO will switch to a low signal.

### Detection of shorts across contacts

2 test pulse outputs T0 and T1 enable shorts across contacts to be detected at the inputs. The two test pulse outputs are permanently assigned to the inputs. If the test pulses are swapped or there is a short circuit at the inputs, the device switches off the safety outputs safely (low signal) and registers an error.

## Sensor interface PDP20 F 4 mag

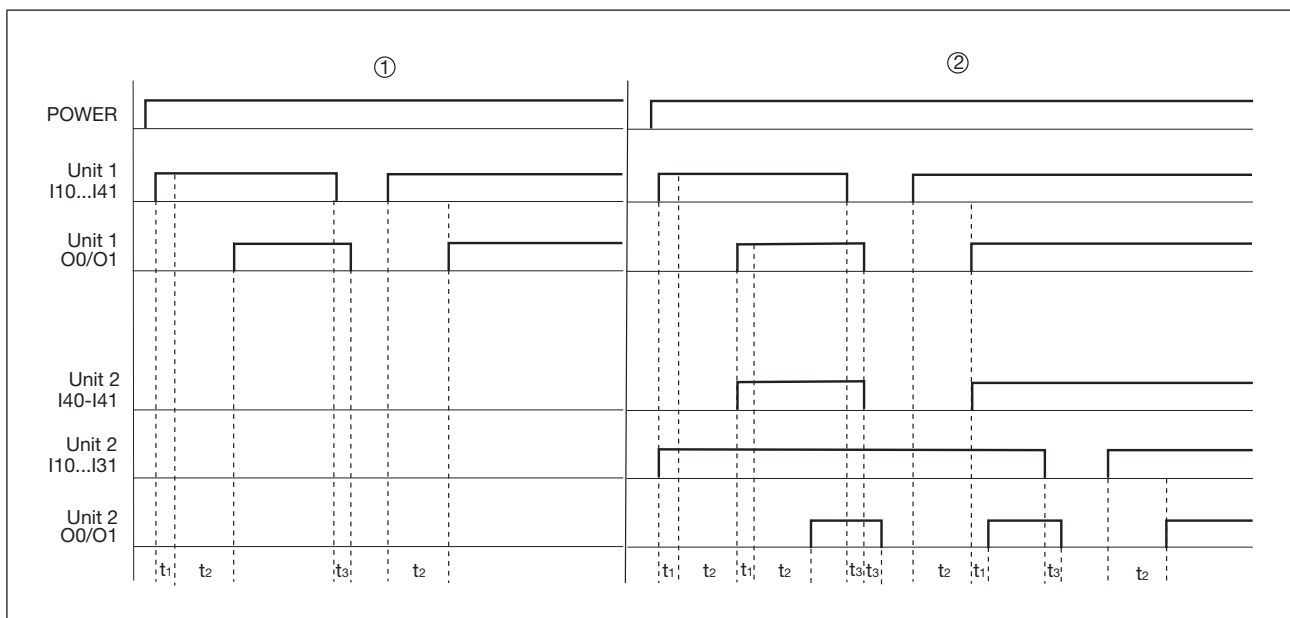
### Series connection

The safety outputs of a PDP20 F 4 mag may be connected to the cascading inputs I40 - I41 on another PDP20 F 4 mag. 3 additional sensors may be AND-linked via this device. In the event of a short across the contacts, the safety outputs will be switched off safely (low signal).

### Input SI

The input SI is reserved for future functions and may not be used.

### Timing diagram



### Legend

- ▶ ①: Single connection with Unit 1
- ▶ ②: Series connection of Unit 1 and Unit 2
- ▶ Power: Supply voltage
- ▶ Unit 1, I10 ... I41: Input circuits of Unit 1
- ▶ Unit 1, O0/O1: Safety outputs of Unit 1
- ▶ Unit 2, I40- I41: Cascading input of Unit 2
- ▶ Unit 2, I10 ... I31: Input circuits of Unit 2
- ▶ Unit 2, O0/O1: Safety outputs of Unit 2
- ▶  $t_1$ : Max. processing time for input when signal changes from "0" to "1"
- ▶  $t_2$ : Typ. switch-on delay
- ▶  $t_3$ : Max. processing time for semiconductor output when signal changes from "1" to "0"

## Sensor interface PDP20 F 4 mag

### 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" must be followed.
- ▶ Calculation of the max. cable length  $l_{\max}$  in the input circuit:

$$l_{\max} = \frac{R_{l_{\max}} - R_i}{R_l / \text{km}}$$

$R_{l_{\max}}$  = Max. overall cable resistance (see evaluation device's techn. details)

$R_i$  = Internal sensor resistance (see sensor's techn. details)

$R_l / \text{km}$  = Cable resistance/km (see cable manufacturer's techn. details)

- ▶ The power supply must meet the regulations for extra low voltages with safe separation (SELV, PELV).
- ▶ 1 wire may be connected per terminal. Use a terminal block if you need multiple connections per terminal.
- ▶ Use copper wire that can withstand 60/75 °C.

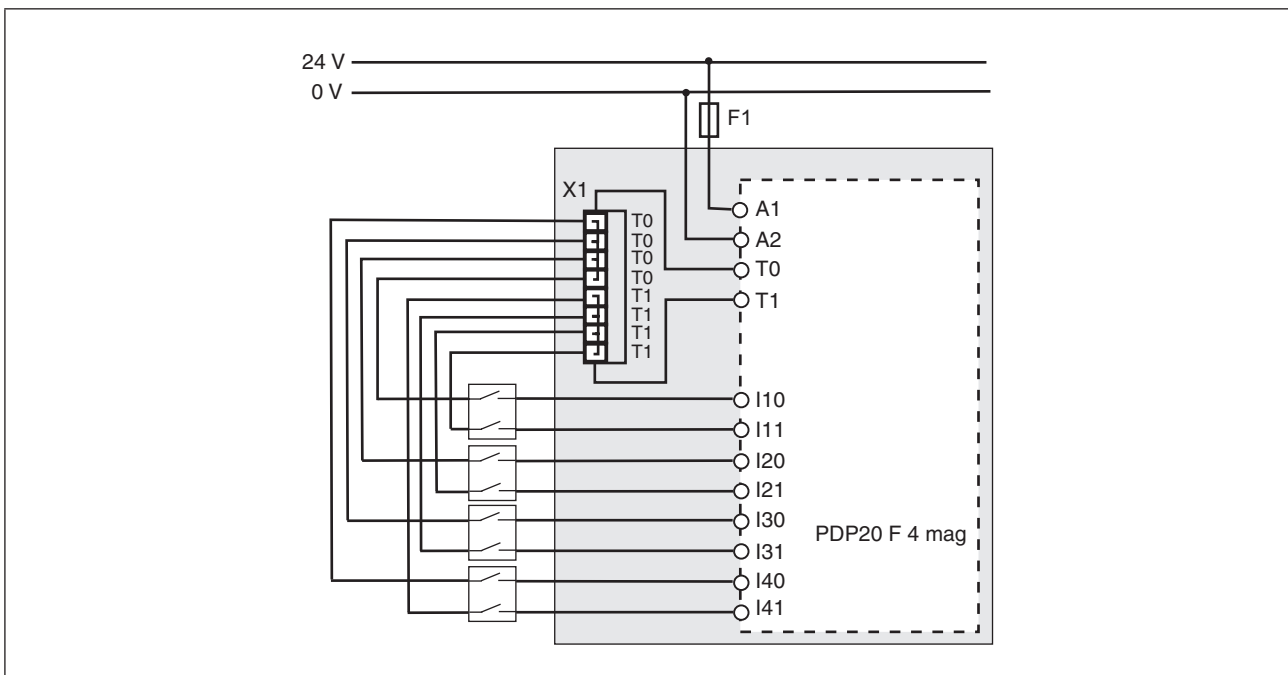
### Permitted sensors from Pilz

- ▶ PSENm<sub>mag</sub>:
  - PSEN 1.1p-10, PSEN 1.1p-20
  - PSEN ma1.3-20 M12, PSEN ma1.3a-20, PSEN ma1.3b-20, PSEN ma1.3b-23, PSEN ma1.3n-20, PSEN ma1.3p-20
  - PSEN ma1.4-51 M12, PSEN ma1.4a-50, PSEN ma1.4a-51, PSEN ma1.4n-50, PSEN ma1.4n-51, PSEN ma1.4p-50, PSEN ma1.4p-51
- ▶ PSEN<sub>hinge</sub>
  - PSEN hs1.1p
  - PSEN hs1.2p
- ▶ PSEN<sub>rope</sub>
  - PSEN rs1.0
  - PSEN rs2.0

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- ▶ PITestop
  - PIT es Set1s-5, PIT es Set1s-5c, PIT es Set1s-5ns
  - PIT esc1, PIT esc1c, PIT esc2, PIT esc2c

### Preparing for operation



### Single connection

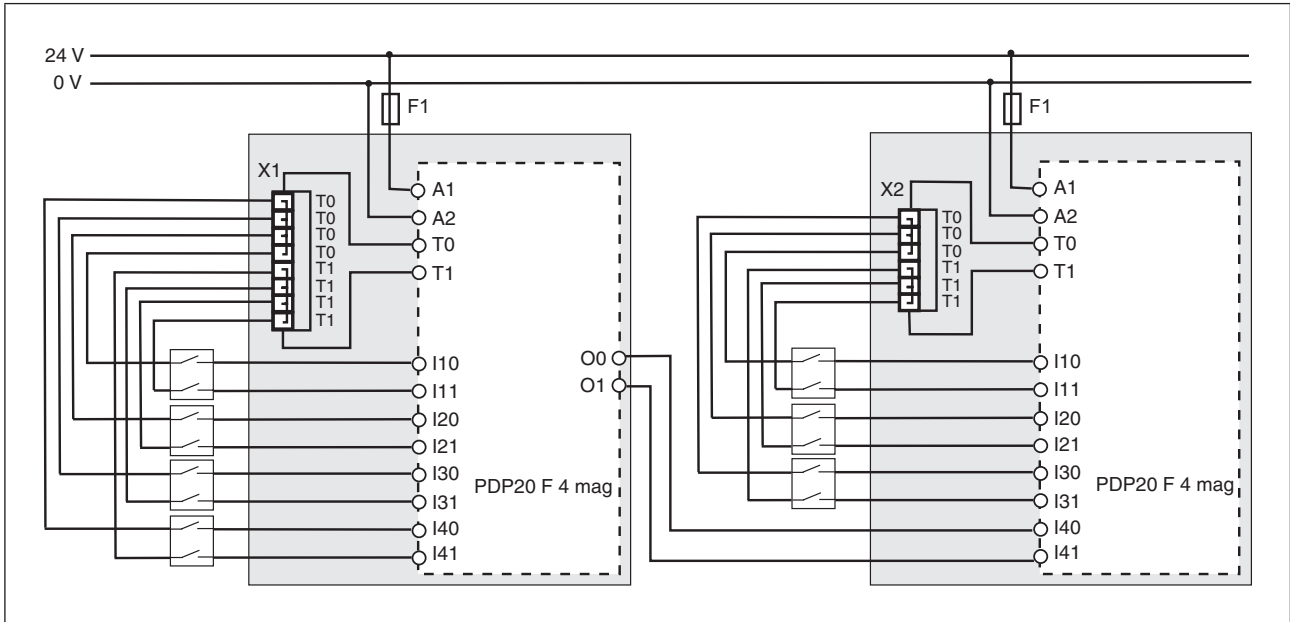
X1: Terminal block

Grey area: Control cabinet

### CAUTION!

- The test pulses are permanently assigned to the inputs (T0 to I10, I20, I30, I40 and T1 to I11, I21, I31, I41) and must be connected as shown in the wiring diagram.
- Unused inputs must also be connected to the assigned test pulse.

## Sensor interface PDP20 F 4 mag



### Series connection

X1, X2: Terminal block

Grey area: Control cabinet

### CAUTION!

- **No** sensor should be connected between safety outputs O0 and O1 of the first PDP20 F 4 mag and inputs I40 and I41 of the second PDP20 F 4 mag. With a series connection, only safety output O0/O1 may be connected to the cascading inputs I40 - I41.
- The signal output SO indicates the state of the connected sensors. The state at input circuit I40 - I41 is not considered.

## Sensor interface

### PDP20 F 4 mag

### Technical details

General	773310
Approvals	<b>CE, TÜV, cULus Listed</b>
Application area	<b>Failsafe</b>
Electrical data	773310
Supply voltage	
for	<b>Supply</b>
Voltage	<b>24 V</b>
Type	<b>DC</b>
Voltage tolerance	<b>-15 %/+10 %</b>
Output of external power supply (DC)	<b>3,5 W</b>
Supply voltage	
Residual ripple DC	<b>20 %</b>
Max. cable capacitance	<b>450 nF</b>
Max. overall cable resistance R <sub>lmax</sub>	
Single-channel at UB DC	<b>1000 Ohm</b>
Dual-channel without detection of shorts across contacts at UB DC	<b>2000 Ohm</b>
Dual-channel with detection of shorts across contacts at UB DC	<b>2000 Ohm</b>
Max. unit fuse protection F1	<b>6 A slow/10 A quick</b>
Inputs	773310
Number	<b>8</b>
Voltage at inputs	<b>24 V DC</b>
Input current range	<b>5,0 mA</b>
Max. processing time of input when signal changes from "0" to "1"	<b>40,000 ms</b>
Test pulse outputs	773310
Number of test pulse outputs	<b>2</b>
Voltage, test pulse outputs	<b>24 V DC</b>
Digital outputs	773310
Semiconductor output	<b>24 V DC</b>
Semiconductor outputs	773310
Overall performance ext. load, semiconductor	<b>40,0 W</b>
Number of positive-switching single-pole semiconductor outputs	<b>2</b>
Permitted current range	<b>0,00 - 0,50 A</b>
Max. processing time of semiconductor output when signal changes from "1" to "0"	<b>40,000 ms</b>
Relay outputs	773310
Contact material	<b>AgCdO</b>

## Sensor interface

### PDP20 F 4 mag

Times	773310
Switch-on delay	
Typ. switch-on delay	<b>500 ms</b>
Recovery time at max. switching frequency 1/s	
After power failure	<b>40 ms</b>
Supply interruption before de-energisation	<b>20 ms</b>
Environmental data	773310
Climatic suitability	<b>EN 60068-2-78</b>
Ambient temperature	
Temperature range	<b>-10 - 55 °C</b>
Storage temperature	
Temperature range	<b>-25 - 70 °C</b>
EMC	<b>EN 60947-5-1, EN 60947-5-3, EN 61000-6-2, EN 61000-6-4</b>
Vibration	
In accordance with the standard	<b>EN 60068-2-6</b>
Frequency	<b>10,0 - 55,0 Hz</b>
Amplitude	<b>0,35 mm</b>
Airgap creepage	
In accordance with the standard	<b>EN 60947-1</b>
Overvoltage category	<b>III</b>
Pollution degree	<b>2</b>
Rated insulation voltage	<b>30 V</b>
Rated impulse withstand voltage	<b>0,80 kV</b>
Mechanical data	773310
Mounting position	<b>Any</b>
Protection type	
In accordance with the standard	<b>EN 60529</b>
Mounting (e.g. cabinet)	<b>IP54</b>
Housing	<b>IP40</b>
Terminals	<b>IP 20</b>
Material	
Bottom	<b>PC</b>
Front	<b>PC</b>
Top	<b>PC</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>
2 core with the same cross section, flexible with crimp connectors, no plastic sleeve	<b>0,25 - 1,00 mm<sup>2</sup>, 24 - 16 AWG</b>
2 core with the same cross section, flexible without crimp connectors or with TWIN crimp connectors	<b>0,20 - 1,50 mm<sup>2</sup>, 24 - 16 AWG</b>
Torque setting with screw terminals	<b>0,50 Nm</b>
Connection type	<b>Spring-loaded terminal, screw terminal</b>



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Mechanical data	773310
Mounting type	plug in
Cross section of external conductors with spring-loaded terminals: flexible with/without crimp connector	0,20 - 2,50 mm <sup>2</sup> , 24 - 12 AWG
Spring-loaded terminals: Terminal points per connection	2
Stripping length	9 mm
Dimensions	
Height	98,0 mm
Width	22,5 mm
Depth	120,0 mm
Weight	110 g

The standards current on 2012-03 apply.

### Safety characteristic data

Operating mode	EN ISO 13849-1: 2006 PL	EN ISO 13849-1: 2006 Category	EN IEC 62061 SIL CL	EN IEC 62061 PFH [1/h]	IEC 61511 SIL	IEC 61511 PFD	EN ISO 13849-1: 2006 TM [year]
2-channel	PL e	Cat. 4	SIL CL 3	3,44E-09	SIL 3	4,36E-05	20
Cascading inputs	PL e	Cat. 4	SIL CL 3	3,72E-09	SIL 3	5,84E-05	20

### Order reference

<b>Order reference</b>		
<b>Product type</b>	<b>Features</b>	<b>Order no.</b>
PDP20 F 4 mag	Sensor interface	773 310
<b>Order reference: Accessories</b>		
<b>Product type</b>	<b>Features</b>	<b>Order no.</b>
Set spring terminals	1 set of spring-loaded terminals	751 004
Set screw terminals	1 set of screw terminals	750 004