

# PSR-PC20-1NO-1NC-24DC-SC - Coupling relay



2700577

<https://www.phoenixcontact.com/pc/products/2700577>

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Coupling relay for SIL 3 high- and low-demand applications, couples digital output signals to the periphery, 1 enabling current path, 1 confirmation current path, 1 digital signal output, safe state off applications, test pulse filter, TBUS connection, plug-in screw terminal block

## Your advantages

- Up to SIL 3 in accordance with IEC 61508
- Force-guided contacts in accordance with EN 50205
- Easy proof test according to IEC 61508 thanks to integrated signal contact
- Approved for Class I, Zone 2 applications
- Low housing width of just 12.5 mm
- Enabling current path protected via internal fuse as an option
- Long service life thanks to filtering of controller test pulses
- 1 enabling current path, 1 digital signal output, 1 diagnostic current path
- Couples digital output signals from failsafe controllers to I/O devices (valves, etc.) for electrical isolation and power adaptation
- Corrosion protection through protective coating on the PCB

## Commercial data

|                                      |                     |
|--------------------------------------|---------------------|
| Item number                          | 2700577             |
| Packing unit                         | 1 pc                |
| Minimum order quantity               | 1 pc                |
| Product key                          | DNA182              |
| Catalog page                         | Page 252 (C-6-2019) |
| GTIN                                 | 4046356916417       |
| Weight per piece (including packing) | 204 g               |
| Weight per piece (excluding packing) | 189.1 g             |
| Customs tariff number                | 85364900            |
| Country of origin                    | DE                  |

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## Technical data

### Notes

#### Note on application

|                     |                         |
|---------------------|-------------------------|
| Note on application | Only for industrial use |
|---------------------|-------------------------|

#### Utilization restriction

|            |                                                               |
|------------|---------------------------------------------------------------|
| CCCex note | Use in potentially explosive areas is not permitted in China. |
|------------|---------------------------------------------------------------|

### Product properties

|                |                                                                                      |
|----------------|--------------------------------------------------------------------------------------|
| Product type   | Coupling relay                                                                       |
| Product family | PSRmini                                                                              |
| Application    | Safe switch off                                                                      |
|                | High demand                                                                          |
|                | Low demand                                                                           |
|                | Ex                                                                                   |
| Relay type     | Electromechanical relay with force-guided contacts in accordance with IEC/EN 61810-3 |

#### Data management status

|                  |    |
|------------------|----|
| Article revision | 07 |
|------------------|----|

#### Times

|                               |                                              |
|-------------------------------|----------------------------------------------|
| Typ. starting time with $U_s$ | < 100 ms (with $U_s$ when controlled via A1) |
| Typical release time          | < 35 ms (when controlled via A1)             |
| Recovery time                 | 500 ms                                       |

### Electrical properties

|                                                 |                                     |
|-------------------------------------------------|-------------------------------------|
| Maximum power dissipation for nominal condition | 3.43 W ( $I_L^2 = 36 \text{ A}^2$ ) |
| Nominal operating mode                          | 100% operating factor               |

#### Air clearances and creepage distances between the power circuits

|                                |                                                                                                                                                                                                                    |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rated insulation voltage       | 250 V AC                                                                                                                                                                                                           |
| Rated surge voltage/insulation | Safe isolation, 6 kV reinforced insulation from control circuit, start circuit, confirmation current path, signal output to the enabling current path; 4 kV/basic insulation between all current paths and housing |

#### Supply

|                                            |                                               |
|--------------------------------------------|-----------------------------------------------|
| Designation                                | A1/A2                                         |
| Rated control circuit supply voltage $U_s$ | 20.4 V DC ... 26.4 V DC                       |
| Rated control circuit supply voltage $U_s$ | 24 V DC -15 % / +10 %                         |
| Rated control supply current $I_s$         | typ. 50 mA                                    |
| Power consumption at $U_s$                 | typ. 1.2 W                                    |
| Inrush current                             | typ. ( $\Delta t < 10 \mu\text{s}$ at $U_s$ ) |
| Filter time                                | max. 2 ms (at A1-A2; test pulse width)        |

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|                                 |                                                                     |
|---------------------------------|---------------------------------------------------------------------|
|                                 | ≥ 100 ms (at A1-A2; test pulse rate)                                |
| Protective circuit              | Serial protection against polarity reversal; Suppressor diode 33 V  |
| Supply                          |                                                                     |
| Designation                     | 31/A2, TBUS                                                         |
| Diagnostic supply voltage $U_D$ | 24 V DC -15 % / +10 %                                               |
| Input current at $U_D$          | 6 mA (at 31-A2 for $U_D$ ; depending on load + 100 mA at M1 and 32) |
| Inrush current at $U_D$         | typ. 2.5 A ( $\Delta t < 20 \mu s$ at $U_D$ )                       |
| Protective circuit              | Serial protection against polarity reversal; Suppressor diode 33 V  |

## Output data

Relay: Enabling current path (13/14 (13F/14))

|                                                     |                                                                                                                         |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Output description                                  | 2 N/O contacts in series, without delay, floating                                                                       |
| Number of outputs                                   | 1 (safety-related)                                                                                                      |
| Contact switching type                              | 1 enabling current path                                                                                                 |
| Contact material                                    | AgSnO <sub>2</sub>                                                                                                      |
| Switching voltage                                   | min. 12 V AC/DC<br>max. 250 V AC/DC                                                                                     |
| Switching capacity                                  | min. 60 mW                                                                                                              |
| Inrush current                                      | min.<br>max. (N/O contact 13/14)<br>N/O contact 13F/14                                                                  |
| Switching capacity in accordance with IEC 60947-5-1 | 4 A (24 V (DC13); N/O contact 13/14)<br>5 A (250 V (AC15); N/O contact 13/14)<br>4 A (250 V (AC15); N/O contact 13F/14) |
| Limiting continuous current                         | 6 A (13/14 for high-demand)<br>4 A (13F/14 with high/low demand, 13/14 with low demand)                                 |
| Sq. Total current                                   | 36 A <sup>2</sup> (13/14, see to derating)<br>16 A <sup>2</sup> (13F/14, see to derating)                               |
| Switching frequency                                 | max. 0.1 Hz                                                                                                             |
| Mechanical service life                             | 10x 10 <sup>6</sup> cycles                                                                                              |
| Output fuse                                         | 6 A gL/gG (N/O contact 13/14)<br>4 A gL/gG (for low-demand applications)                                                |

Relay: Confirmation current path (31/32)

|                        |                                                                              |
|------------------------|------------------------------------------------------------------------------|
| Output description     | 2 N/C contacts in series, without delay, not floating (reference ground: A2) |
| Number of outputs      | 1 (safety-related)                                                           |
| Contact switching type | 1 confirmation current path                                                  |
| Contact material       | AgCuNi, + Au                                                                 |
| Switching voltage      | min. 20.4 V DC<br>max. 26.4 V DC                                             |
| Switching capacity     | min. 20 mW                                                                   |
| Inrush current         | min.                                                                         |

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|                             |                            |
|-----------------------------|----------------------------|
|                             | max.                       |
| Limiting continuous current | 100 mA                     |
| Switching frequency         | max. 0.1 Hz                |
| Mechanical service life     | 10x 10 <sup>6</sup> cycles |
| Output fuse                 | 150 mA Fast-blow           |

Signal: M1

|                          |                                              |
|--------------------------|----------------------------------------------|
| Output description       | PNP                                          |
| Number of outputs        | 1 (non-safety-related)                       |
| Voltage                  | approx. 22 V DC ( $U_D - 2\text{ V}$ )       |
| Current                  | max. 100 mA                                  |
| Maximum inrush current   | 500 mA ( $\Delta t = 1\text{ ms}$ at $U_s$ ) |
| Short-circuit protection | no                                           |
| Output fuse              | 150 mA fast blow                             |

## Connection data

Connection technology

|           |     |
|-----------|-----|
| pluggable | yes |
|-----------|-----|

Conductor connection

|                                  |                                             |
|----------------------------------|---------------------------------------------|
| Connection method                | Screw connection                            |
| Conductor cross section rigid    | 0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> |
| Conductor cross section flexible | 0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup> |
| Conductor cross-section AWG      | 24 ... 12                                   |
| Stripping length                 | 7 mm                                        |
| Screw thread                     | M3                                          |
| Tightening torque                | 0.5 Nm ... 0.6 Nm                           |

## Signaling

|                           |                  |
|---------------------------|------------------|
| Status display            | 1 x LED (green)  |
| Operating voltage display | 1 x LED (yellow) |
| Error indication          | 1 x LED (red)    |

## Dimensions

|        |          |
|--------|----------|
| Width  | 12.5 mm  |
| Height | 112.2 mm |
| Depth  | 114.5 mm |

## Material specifications

|                  |                   |
|------------------|-------------------|
| Color (Housing)  | yellow (RAL 1018) |
| Housing material | Polyamide         |

## Characteristics

Safety data

|               |   |
|---------------|---|
| Stop category | 0 |
|---------------|---|

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Safety data: EN 50156

|                              |   |
|------------------------------|---|
| Safety Integrity Level (SIL) | 3 |
|------------------------------|---|

Safety data: IEC 61508 - High demand

|                              |   |
|------------------------------|---|
| Safety Integrity Level (SIL) | 3 |
|------------------------------|---|

Safety data: IEC 61508 - Low demand

|                              |   |
|------------------------------|---|
| Safety Integrity Level (SIL) | 3 |
|------------------------------|---|

## Environmental and real-life conditions

Ambient conditions

|                                                |                                                     |
|------------------------------------------------|-----------------------------------------------------|
| Degree of protection                           | IP20                                                |
| Min. degree of protection of inst. location    | IP54                                                |
| Ambient temperature (operation)                | -40 °C ... 70 °C (observe derating)                 |
| Ambient temperature (storage/transport)        | -40 °C ... 85 °C                                    |
| Maximum altitude                               | ≤ 2000 m (Above sea level)                          |
| Max. permissible humidity (storage/transport)  | 75 % (on average, 85% infrequently, non-condensing) |
| Max. permissible relative humidity (operation) | 75 % (on average, 85% infrequently, non-condensing) |
| Shock                                          | 15g                                                 |
| Vibration (operation)                          | 10 Hz ... 150 Hz, 2g                                |

## Approvals

ATEX

|                |                             |
|----------------|-----------------------------|
| Identification | Ex II 3G Ex ec nC IIC T4 Gc |
| Certificate    | UL 22 ATEX 2912X            |

IECEX

|                |                    |
|----------------|--------------------|
| Identification | Ex ec nC IIC T4 Gc |
| Certificate    | IECEX UL 22.0037X  |

UL, USA/Canada

|                |         |
|----------------|---------|
| Identification | cULus   |
| Certificate    | E140324 |

UL Ex, USA / Canada

|                |                                                                                                    |
|----------------|----------------------------------------------------------------------------------------------------|
| Identification | Class I, Zone 2, AEx ec nC IIC T4 / Ex ec nC IIC Gc T4 X<br>Class I, Div. 2, Groups A, B, C, D, T4 |
| Certificate    | E360692                                                                                            |

CE

|                |              |
|----------------|--------------|
| Identification | CE-compliant |
|----------------|--------------|

Environmental simulation test

|                |            |
|----------------|------------|
| Identification | G3         |
| Certificate    | ISA-S71.04 |

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## CCC / China-Ex

|                |                    |
|----------------|--------------------|
| Identification | Ex ec nC IIC T4 Gc |
| Certificate    | 2022122304115695   |

## DNV

|                |             |
|----------------|-------------|
| Identification | C, EMC2     |
| Certificate    | 11253-14 HH |

## Standards and regulations

### Air clearances and creepage distances between the power circuits

|                       |                                     |
|-----------------------|-------------------------------------|
| Standards/regulations | EN 60664-1, EN 60079-7, EN 60079-15 |
|-----------------------|-------------------------------------|

## Mounting

|                   |                                                   |
|-------------------|---------------------------------------------------|
| Mounting type     | DIN rail mounting                                 |
| Assembly note     | See derating curve                                |
| Mounting position | vertical, horizontal, with front of module upward |

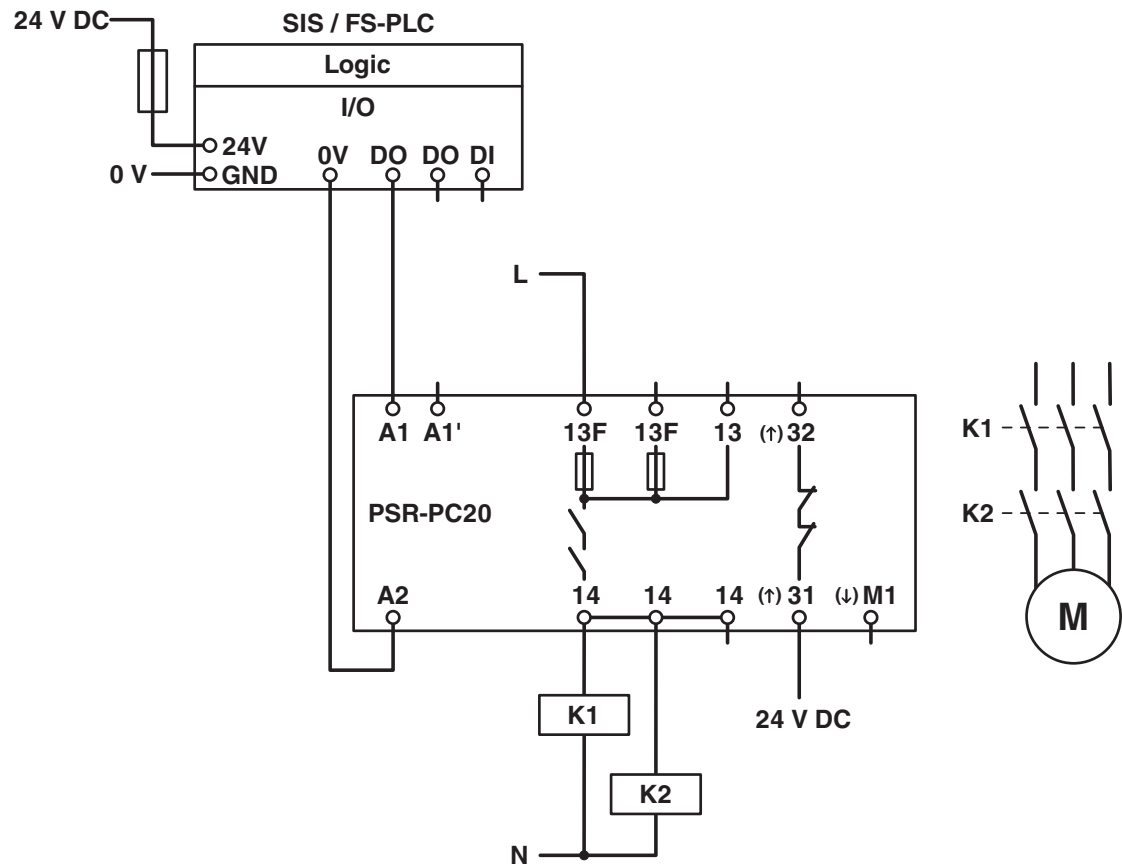
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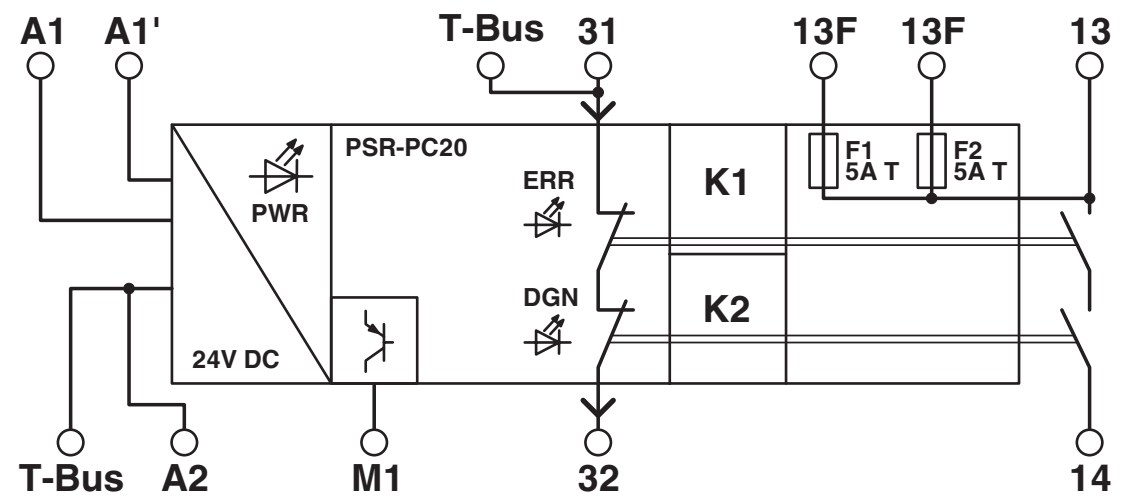
Drawings

Circuit diagram



High-demand application with failsafe controller

Block diagram



Block diagram

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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/pc/products/2700577>



**DNV GL**

Approval ID: TAA00002VZ



**Functional Safety**

Approval ID: 44-780-13755202



**Functional Safety**

Approval ID: 44-205-13755204



**cULus Listed**

Approval ID: E140324



**IECEx**

Approval ID: IECEx ULD 14.0003 X



**ATEX**

Approval ID: DEMKO 14 ATEX 1284 X



**cULus Listed**

Approval ID: E360692



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## Classifications

### ECLASS

|             |          |
|-------------|----------|
| ECLASS-11.0 | 27371819 |
| ECLASS-13.0 | 27371819 |
| ECLASS-12.0 | 27371819 |

### ETIM

|          |          |
|----------|----------|
| ETIM 9.0 | EC001449 |
|----------|----------|

### UNSPSC

|             |          |
|-------------|----------|
| UNSPSC 21.0 | 39122200 |
|-------------|----------|

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## Environmental product compliance

|                                         |                                                                                                                                                                                                                                   |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EU RoHS                                 |                                                                                                                                                                                                                                   |
| Fulfills EU RoHS substance requirements | Yes                                                                                                                                                                                                                               |
| Exemption                               | 7(a), 7(c)-I                                                                                                                                                                                                                      |
| China RoHS                              |                                                                                                                                                                                                                                   |
| Environment friendly use period (EFUP)  | EFUP-50                                                                                                                                                                                                                           |
|                                         | An article-related China RoHS declaration table can be found in the download area for the respective article under "Manufacturer declaration". For all articles with EFUP-E, no China RoHS declaration table issued and required. |
| EU REACH SVHC                           |                                                                                                                                                                                                                                   |
| REACH candidate substance (CAS No.)     | Lead(CAS: 7439-92-1)                                                                                                                                                                                                              |
| SCIP                                    | 90723e1b-e622-44f1-8c0e-abf4aeabfb56                                                                                                                                                                                              |

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