

# PSR-PS21-1NO-1NC-24DC-SC - Coupling relay



2700357

<https://www.phoenixcontact.com/pc/products/2700357>

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Coupling relay for SIL 2 high- and low-demand applications, couples digital output signals to the I/O, 1 enabling current path, 1 confirmation current path, 1 digital signal output, safe state off applications, test pulse filter, fixed screw terminal block

## Your advantages

- Up to SIL 2 according to 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 6.8 mm
- 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	2700357
Packing unit	1 pc
Minimum order quantity	1 pc
Product Key	DNA172
Catalog Page	Page 249 (C-6-2019)
GTIN	4046356912907
Weight per Piece (including packing)	160 g
Weight per Piece (excluding packing)	63.593 g
Customs tariff number	85364900
Country of origin	DE

## Technical Data

### Notes

#### Utilization restriction

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

### 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	2.35 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

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 % (A1/A2)
Rated control supply current $I_S$	typ. 45 mA
Power consumption at $U_S$	typ. 1.08 W
Inrush current	typ. 400 mA ( $\Delta t < 10 \mu\text{s}$ at $U_S$ )
Filter time	max. 2 ms (at A1-A2; test pulse width)
	$\geq 100$ ms (at A1-A2; test pulse rate)
Diagnostic supply voltage $U_D$	24 V DC -15 % / +10 % (21/A2)
Input current at $U_D$	6 mA (at 21-A2 for $U_D$ ; depending on load + 100 mA at M1 and 22)
Inrush current at $U_D$	typ. 2.5 A ( $\Delta t < 20 \mu\text{s}$ at $U_D$ )
Protective circuit	Serial protection against polarity reversal; Suppressor diode 33 V (A1/A2), 38 V (21/A2)

## Output data

### Relay: Enabling current path

Output description	1 N/O contact, without delay, floating
Number of outputs	1 (safety-related N/O contacts: 13/14)
Contact type	1 enabling current path
Contact material	AgSnO <sub>2</sub>
Switching voltage	min. 12 V AC/DC max. 250 V AC/DC (Observe the load curve)
Switching capacity	min. 60 mW
Inrush current	min. 3 mA max. 6 A
Switching capacity in accordance with IEC 60947-5-1	4 A (24 V (DC13)) 5 A (250 V (AC15))
Limiting continuous current	6 A (High demand) 4 A (Low demand)
Sq. Total current	36 A <sup>2</sup> (observe derating)
Switching frequency	max. 1 Hz
Mechanical service life	10x 10 <sup>6</sup> cycles
Output fuse	6 A gL/gG 4 A gL/gG (for low-demand applications)

### Relay: Confirmation current path

Output description	1 N/C contact, without delay, not floating (reference ground: A2)
Number of outputs	1 (safety-related N/C contacts: 21/22)
Contact type	1 confirmation current path
Contact material	AgCuNi, + Au
Switching voltage	min. 20.4 V DC max. 26.4 V DC
Switching capacity	min. 20 mW
Inrush current	min. 1 mA max. 100 mA
Limiting continuous current	100 mA
Switching frequency	max. 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 <sub>D</sub> - 2 V)
Current	max. 100 mA
Maximum inrush current	500 mA (Δt = 1 ms at U <sub>s</sub> )
Short-circuit protection	no

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Output fuse	150 mA fast blow
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## Connection data

### Connection technology

pluggable	no
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### 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	12 mm
Screw thread	M3
Tightening torque	0.5 Nm ... 0.6 Nm

## Signaling

Status display	2 x green LEDs
Operating voltage display	1 x yellow LED
Error indication	1 x red LED

## Dimensions

Width	6.8 mm
Height	93.1 mm
Depth	102.5 mm

## Material specifications

Housing material	PBT
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## Characteristics

### Safety data

Stop category	0
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### Safety data: EN 50156

Safety Integrity Level (SIL)	2
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### Safety data: IEC 61508 - High demand

Designation	For use in high-demand applications, the diagnostics function must be implemented via the confirmation current path.
Equipment type	Type A
Safety Integrity Level (SIL)	2
Safe Failure Fraction (SFF)	99.18 %
MTBF	91.65 Years
$\lambda_{SU}$	79.10 FIT
$\lambda_{SD}$	494.66 FIT
$\lambda_{DU}$	8.80 FIT

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$\lambda_{DD}$	494.66 FIT
Probability of a hazardous failure per hour (PFH <sub>D</sub> )	$8.8 \times 10^{-9}$ (4 A DC13; 5 A AC15; 8760 switching cycles/year)
Proof test interval	240 Months
Duration of use	240 Months

## Safety data: IEC 61508 - Low demand

Equipment type	Type A
Safety Integrity Level (SIL)	2
Safe Failure Fraction (SFF)	81.2 %
MTBF	99 Years
$\lambda_{SU}$	794.1 FIT
$\lambda_{SD}$	0 FIT
$\lambda_{DU}$	183.8 FIT
$\lambda_{DD}$	0 FIT
Probability of a hazardous failure on demand (PFD <sub>AVG</sub> )	$1.34 \times 10^{-3}$ $8.06 \times 10^{-4}$ (for proof test interval = 1 year)
Proof test interval	20 Months
Duration of use	240 Months

## Environmental and real-life conditions

### Ambient conditions

Degree of protection	IP20
Min. degree of protection of inst. location	IP54
Ambient temperature (operation)	-40 °C ... 65 °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	<input type="checkbox"/> II 3 G Ex nA nC IIC T4 Gc
Certificate	DEMKO 14 ATEX 1284X

### IECEX

Identification	Ex nA nC IIC T4 Gc
Certificate	IECEX ULD 14.0003X

### UL, USA/Canada

Identification	cULus
Certificate	E140324

### UL, USA/Canada

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Identification	Class I, Zone 2, AEx nA nC IIC T4 / Ex nA nC IIC Gc T4 X Class I, Div. 2, Groups A, B, C, D, T4
Certificate	E360692

## DNV

Identification	C, EMC2
Certificate	11253-14 HH

## CE

Certificate	CE-compliant
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## Standards and regulations

Air clearances and creepage distances between the power circuits

Standards/regulations	EN 60664-1, EN 60079-15
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## Mounting

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

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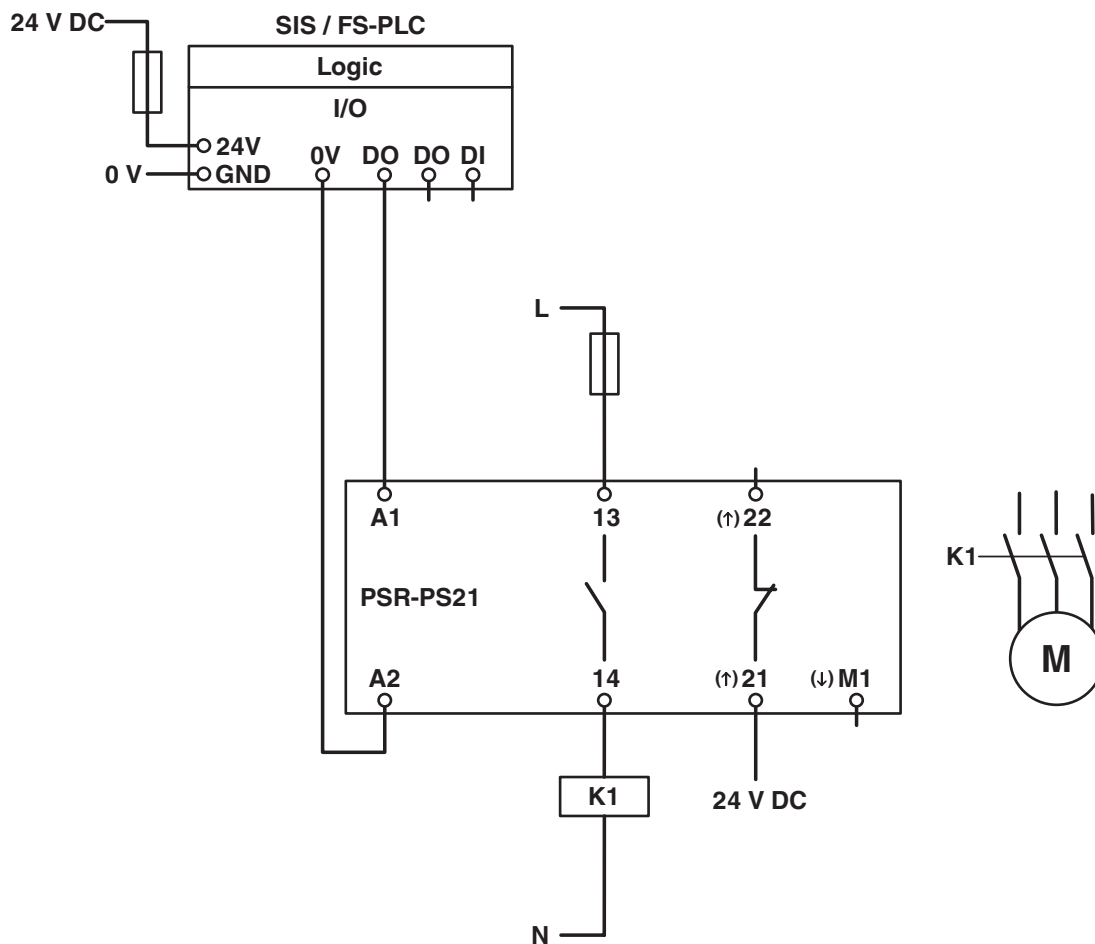


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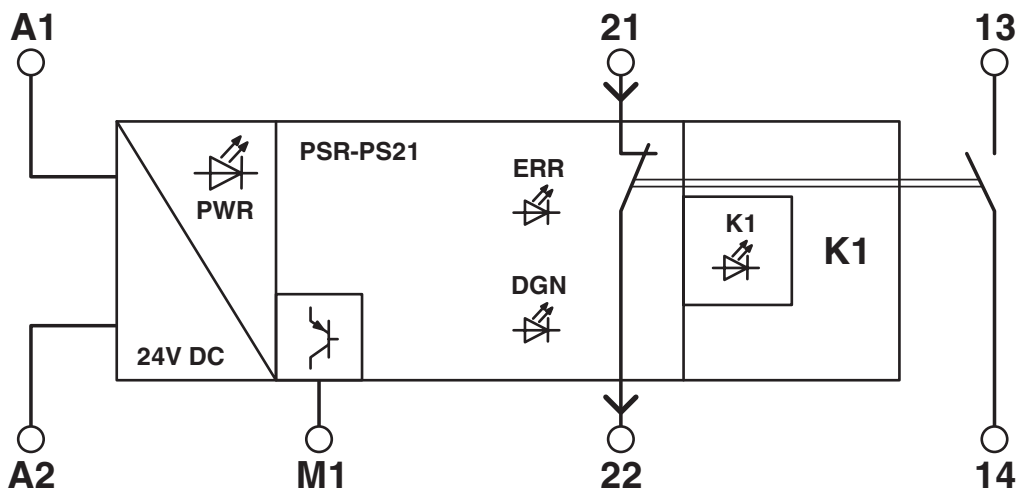
<https://www.phoenixcontact.com/pc/products/2700357>

## Drawings

Circuit diagram



Block diagram



Block diagram

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## Approvals



**EAC**

Approval ID: RU C-DE.A\*30.B.01082



**DNV GL**

Approval ID: TAA00002VZ



**EAC**

Approval ID: RU C-DE.A\*30.B.01082



**UL Listed**

Approval ID: FILE E 140324



**cUL Listed**

Approval ID: FILE E 140324



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Approval ID: FILE E 140324



**UL Listed**

Approval ID: FILE E 140324



**Functional Safety**

Approval ID: 44-780-13755203



**Functional Safety**

Approval ID: 44-205-13755205



**IECEX**

Approval ID: IECEX ULD 14.0003 X



**cUL Listed**

Approval ID: File E 360692



**UL Listed**

Approval ID: File E 360692



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**ATEX**

Approval ID: DEMKO 14 ATEX 1284 X

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## Classifications

### ECLASS

ECLASS-11.0

27371819

### ETIM

ETIM 8.0

EC001449

### UNSPSC

UNSPSC 21.0

39122200

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