

PSR-SPP- 24DC/FSP/2X1/1X2 - Coupling relay



2986957

<https://www.phoenixcontact.com/us/products/2986957>

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Safe coupling relay for SIL 3 high and low demand applications, coupled digital output signals to the I/O, 2 enabling current paths, 1 signal contact, module for safe state off applications, integrated test pulse filter, width: 17.5 mm, pluggable Push-in terminal block

Your advantages

- Narrow 17.5 mm housing
- Up to SIL 3 in accordance with IEC 61508
- Easy proof test according to IEC 61508 thanks to integrated signal contact
- Long service life thanks to filtering of controller test pulses
- Force-guided contacts in accordance with EN 50205
- 2 enabling current paths
- Couples digital output signals from failsafe controllers to I/O devices (valves, etc.) for electrical isolation and power adaptation

Commercial Data

Item number	2986957
Packing unit	1 pc
Minimum order quantity	1 pc
Sales Key	C18
Product Key	DNA161
Catalog Page	Page 255 (C-6-2019)
GTIN	4046356520928
Weight per Piece (including packing)	159.8 g
Weight per Piece (excluding packing)	137.48 g
Customs tariff number	85364900
Country of origin	DE

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Technical Data

Product properties

Product type	Coupling relay
Product family	PSRclassic
Application	Safe switch off
	High demand
	Low demand
Mechanical service life	10x 10 ⁶ cycles
Relay type	Electromechanical relay with force-guided contacts in accordance with IEC/EN 61810-3

Electrical properties

Maximum power dissipation for nominal condition	2.4 W
Nominal operating mode	100% operating factor

Air clearances and creepage distances between the power circuits

Rated insulation voltage	250 V
Rated surge voltage/insulation	Safe isolation, reinforced insulation 6 kV between the control circuits (A1/A2), (31/32), (13/14, 23/24)

Input data

General

Rated control circuit supply voltage U_S	24 V DC -15 % / +10 %
Power consumption at U_S	typ. 1.32 W
Rated control supply current I_S	typ. 55 mA
Input voltage range	20.4 V DC ... 26.4 V DC
Inrush current	max. 100 mA
Filter time	max. 5 ms (at A1 in the event of voltage dips at U_S)
	max. 2 ms (Test pulse width; high test pulse at A1/A2)
	≥ 100 ms (Test pulse width; high test pulse at A1/A2)
	Test pulse rate = 80 x Test pulse width
	max. 5 ms (Test pulse width; low test pulse at A1/A2)
	≥ 50 ms (Test pulse rate; low test pulse at A1/A2)
Test pulse rate = 15 x Test pulse width	
Typ. starting time with U_S	50 ms
Typical release time	50 ms
Recovery time	1 s
Maximum switching frequency	0.5 Hz
Protective circuit	Surge protection; Suppressor diode, 33 V (A1 - A2)
Operating voltage display	1 x yellow LED

Output data

Contact type	2 enabling current paths
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	1 confirmation current path
Contact material	AgCuNi, + 0.2 µm Au
Maximum switching voltage	250 V AC/DC (N/O contact / N/C contact, observe the load curve)
Minimum switching voltage	15 V AC/DC (N/O contact / N/C contact)
Limiting continuous current	5 A (N/O contact, pay attention to the derating)
	100 mA (N/C contact)
Maximum inrush current	5 A (N/O contact)
	100 mA (N/C contact)
Inrush current, minimum	5 mA (N/O contact / N/C contact)
Sq. Total current	50 A ² (observe derating)
Interrupting rating (ohmic load) max.	120 W (24 V DC, τ = 0 ms, N/C contact: 2.4 W)
	192 W (48 V DC, τ = 0 ms, N/C contact: 4.8 W)
	162 W (60 V DC, τ = 0 ms, N/C contact: 6 W)
	66 W (110 V DC, τ = 0 ms, N/C contact: 11 W)
	60 W (220 V DC, τ = 0 ms, N/C contact: 22 W)
	1250 VA (250 V AC, τ = 0 ms, N/C contact: 25 VA)
Maximum interrupting rating (inductive load)	72 W (24 V DC, τ = 40 ms, N/C contact: 2.4 W)
	43 W (48 V DC, τ = 40 ms, N/C contact: 4.8 W)
	41 W (60 V DC, τ = 40 ms, N/C contact: 6 W)
	35 W (110 V DC, τ = 40 ms, N/C contact: 11 W)
	48 W (220 V DC, τ = 40 ms, N/C contact: 22 W)
Switching capacity	min. 75 mW
Switching capacity (3600/h cycles)	5 A (24 V (DC13))
	5 A (230 V (AC15))
Output fuse	10 A gL/gG (N/O contact)
	4 A gL/gG (for low-demand applications)
	150 mA Fast-blow (N/C contact)

Connection data

Connection technology

pluggable	yes
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Conductor connection

Connection method	Push-in connection
Conductor cross section solid	0.2 mm ² ... 1.5 mm ²
Conductor cross section flexible	0.2 mm ² ... 1.5 mm ²
Conductor cross section, flexible, with ferrule, with plastic sleeve	0.25 mm ² ... 1.5 mm ² (only together with CRIMPFOX 6)
Conductor cross section flexible, with ferrule without plastic sleeve	0.25 mm ² ... 1.5 mm ² (only together with CRIMPFOX 6)
Conductor cross-section AWG	24 ... 16
Stripping length	8 mm

Dimensions

Width	17.5 mm
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Height	112 mm
Depth	114.5 mm

Material specifications

Housing material	Polyamide
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Characteristics

Safety data

Stop category	0
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Safety data: EN ISO 13849

Category	4 (Diagnostic coverage (DC) of the control unit at A1/A2 must be $\geq 99\%$)
Performance level (PL)	e (Diagnostic coverage (DC) of the control unit at A1/A2 must be $\geq 99\%$)

Safety data: EN 50156

Safety Integrity Level (SIL)	3
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Safety data: IEC 61508 - High demand

Equipment type	Type A
Safety Integrity Level (SIL)	3 (max. 10% of the entire SIL; diagnostic coverage (DC) of the control unit at A1/A2 must be $\geq 90\%$)
Safe Failure Fraction (SFF)	99.99 %
MTBF	342 Years (includes errors which are not part of the safety function; MTTR = 8 h)
λ_{SU}	63.9 FIT
λ_{SD}	198 FIT
λ_{DU}	0.02 FIT
λ_{DD}	3.66 FIT
Probability of a hazardous failure per hour (PFH _D)	2.02×10^{-11} (4 A DC13; 5 A AC15; 8760 switching cycles/year)
Diagnostic coverage (DC)	99 % (during evaluation of the confirmation current path)
Proof test interval	240 Months
Duration of use	240 Months

Safety data: IEC 61508 - Low demand

Designation	The safety characteristic data is calculated assuming an average ambient temperature of 40°C. At higher ambient temperatures, a safety factor of 1.8 should be applied to the characteristics.
Equipment type	Type A
Safety Integrity Level (SIL)	3 (max. 10% of the entire SIL; diagnostic coverage (DC) of the control unit at A1/A2 must be $\geq 90\%$)
Safe Failure Fraction (SFF)	99.76 %
MTBF	104 Years (includes errors which are not part of the safety function; MTTR = 8 h)
λ_{SU}	1026.9 FIT
λ_{SD}	0 FIT
λ_{DU}	2.42 FIT

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λ_{DD}	0 FIT
Probability of a hazardous failure on demand (PFD _{AVG})	9.88 x 10 ⁻⁰⁵ 1.06 x 10 ⁻⁵ (for proof test interval = 1 year)
Proof test interval	60 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)	-20 °C ... 55 °C (observe derating)
Ambient temperature (storage/transport)	-40 °C ... 70 °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

Approval data

CE

Certificate	CE-compliant
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Standards and regulations

Air clearances and creepage distances between the power circuits

Standards/regulations	DIN EN 50178/VDE 0160
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Mounting

Mounting type	DIN rail mounting
Mounting position	any

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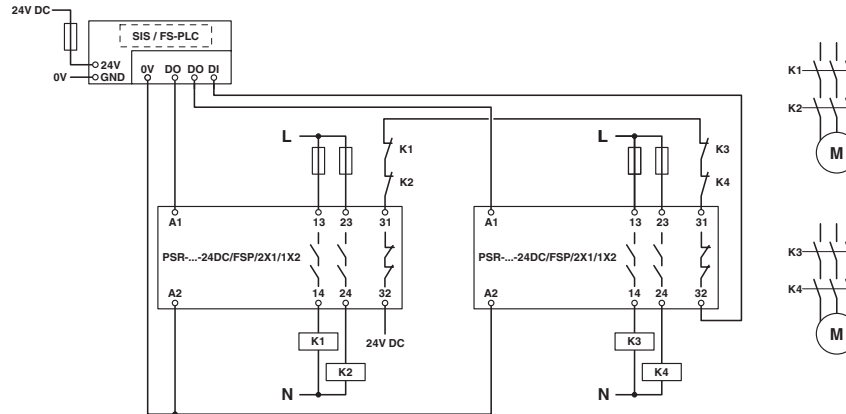


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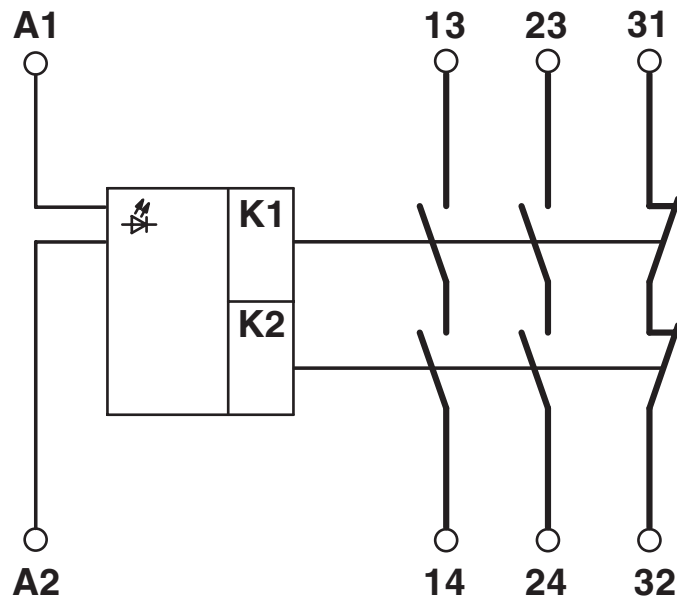
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Drawings

Circuit diagram



Circuit diagram

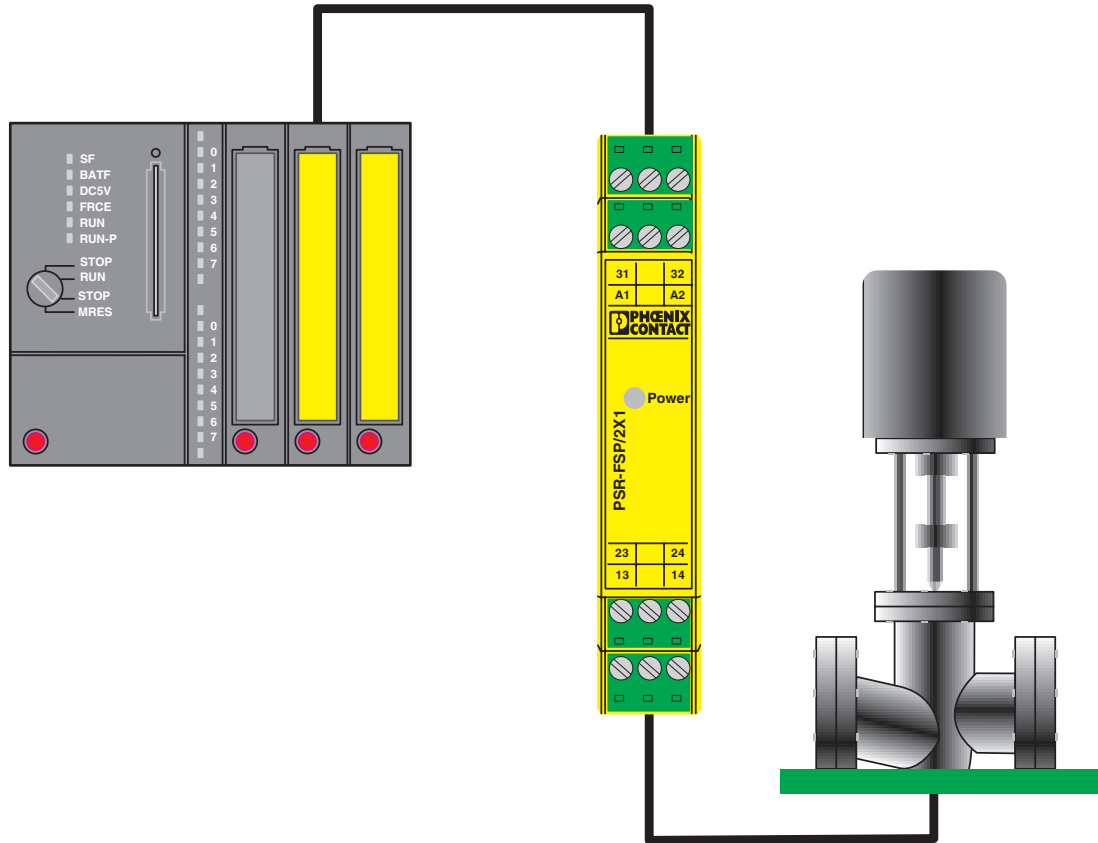


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Application drawing



Example of electrical isolation of a safety PLC output from the field.

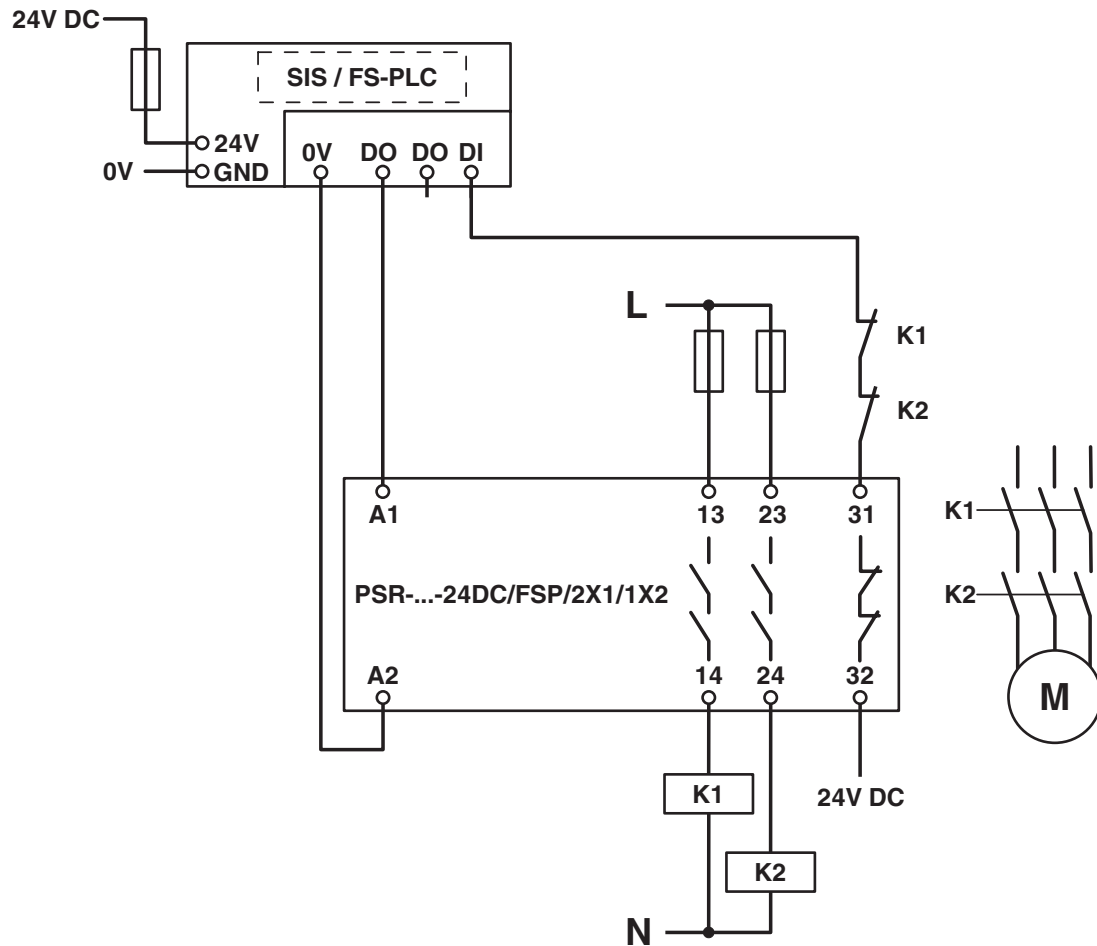
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Circuit diagram




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Approvals


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

 **DNV GL**
Approval ID: TAA00002UC

	Nominal Voltage U_N	Nominal Current I_N	Cross Section AWG	Cross Section mm^2
Applied for			-	-

 **UL Listed**
Approval ID: FILE E 140324

 **cUL Listed**
Approval ID: FILE E 140324

 **Functional Safety**
Approval ID: 968/EZ 365.10/22

cULus Listed

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Classifications

ECLASS

ECLASS-9.0	27371819
ECLASS-10.0.1	27371819
ECLASS-11.0	27371819

ETIM

ETIM 8.0	EC001449
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UNSPSC

UNSPSC 21.0	39122200
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Environmental Product Compliance

REACH SVHC	Lead 7439-92-1
China RoHS	Environmentally Friendly Use Period = 50 years
	For information on hazardous substances, refer to the manufacturer's declaration available under "Downloads"

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