

PSR-MS21-1NO-1DO-24DC-SC - Safety relays



2702192

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Safety relay for failsafe controllers up to SIL 3, Cat. 4, PL e, 1-channel operation, autostart, 1 enabling current path, $U_S = 24 \text{ V DC}$ in accordance with IEC 61131-6, fixed screw terminal block

Your advantages

- Up to Cat. 4/PL e in accordance with EN ISO 13849-1, SIL 3 in accordance with EN IEC 62061
- Low housing width of just 6.8 mm
- 1-channel control
- 1 enabling current path, 1 digital signal output
- Couples digital output signals from failsafe controllers to I/O devices (valves, etc.) for electrical isolation and power adaptation
- Automatic activation

Technical data

Notes

Note on application

Note on application	Only for industrial use
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Product properties

Product family	PSRmini
Application	Controllers
Control	1-channel
Relay type	Electromechanical relay with force-guided contacts in accordance with IEC/EN 61810-3

Insulation characteristics

Overtoltage category	III
Degree of pollution	2

Times

Typical response time	< 150 ms (automatic start)
Typ. starting time with U_S	< 250 ms (when controlled via A1)
Typical release time	< 20 ms (when controlled via A1)
Restart time	< 1 s (Boot time, after switching on the supply voltage)
Recovery time	< 500 ms (following demand of the safety function)

Electrical properties

Maximum power dissipation for nominal condition	3.1 W ($U_S = 30\text{ V}$, $I_L^2 = 36\text{ A}^2$, $P_{\text{Total max}} = 1.3\text{ W} + 1.8\text{ W}$)
Nominal operating mode	100% operating factor
Rated insulation voltage	250 V AC
Rated surge voltage/insulation	Safe isolation, reinforced insulation 6 kV between input circuit and enabling current path (13/14) Basic insulation 4 kV between all current paths and housing

Supply

Designation	24V
Rated control circuit supply voltage U_S	24 V DC -20 % / +25 %
Inrush current	< 11.5 A (typ. with U_S , $\Delta t = 25\text{ ns}$)
Protective circuit	Serial protection against polarity reversal; Suppressor diode Short-circuit protection

Input data

Digital: A1

Description of the input	NPN
Number of inputs	1 (safety-related)
Input voltage range "0" signal	0 V DC ... 5 V DC
Input voltage range "1" signal	19.2 V ... 30 V

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Input current range "0" signal	0 mA ... 2 mA
Inrush current	< 150 mA (typ. with U_S , $\Delta t = 25$ ns)
Filter time	3 ms (Test pulse width of low test pulses)
	1 s (Test pulse rate for low test pulse)
	1 ms (Test pulse width, high test pulse)
	100 ms (Test pulse rate, high test pulse)
	Unless switch-on pulses/light tests are safety-related, they should be disabled.
Max. permissible overall conductor resistance	150 Ω (Input and start circuits at U_S)
Protective circuit	Suppressor diode
Current consumption	typ. 35 mA (at 24 V)

Digital: Start circuit (S35)

Description of the input	NPN
Number of inputs	1 (non-safety-related)
Input voltage range "1" signal	20.4 V ... 26.4 V
Inrush current	< 10 mA
Max. permissible overall conductor resistance	150 Ω
Voltage at input/start and feedback circuit	24 V DC -20 % / +25 %
Current consumption	< 10 mA

Output data

Relay: Enabling current path (13/14)

Output description	2 N/O contacts each in series, safety-related, floating
Number of outputs	1 (undelayed)
Contact switching type	1 enabling current path
Contact material	AgSnO ₂
Switching voltage	min. 12 V AC/DC
	max. 250 V AC/DC
Switching power	min. 60 mW
Inrush current	min. 3 mA
	max. 6 A
Switching capacity	5 A (AC15)
	4 A (DC13)
Limiting continuous current	6 A
Sq. Total current	36 A ² (observe derating)
Switching frequency	max. 0.1 Hz
Mechanical service life	10x 10 ⁶ cycles
Output fuse	6 A gL/gG
	4 A gL/gG (for low-demand applications)

Signal: M1

Output description	non-safety-related
Number of outputs	1 (digital, PNP)
Voltage	22 V DC ($U_S - 2$ V DC)

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Current	max. 100 mA
Maximum inrush current	500 mA ($\Delta t = 1 \text{ ms at } U_s$)
Protective circuit	Suppressor diode

Connection data

Connection technology

pluggable	no
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Conductor connection

Connection method	Screw connection
Conductor cross-section rigid	0.2 mm ² ... 2.5 mm ²
Conductor cross-section flexible	0.2 mm ² ... 2.5 mm ²
Conductor cross-section AWG	26 ... 12
Stripping length	12 mm
Screw thread	M3
Tightening torque	0.5 Nm ... 0.6 Nm

Signaling

Status display	2 x LED (green)
Operating voltage display	1 x LED (green)

Dimensions

Width	6.8 mm
Height	93.1 mm
Depth	102.5 mm

Material specifications

Color (Housing)	yellow (RAL 1018)
Housing material	PBT

Characteristics

Safety data

Stop category	0
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Safety data: EN ISO 13849

Performance level (PL)	e (4 A DC13; 5 A AC15; 8760 switching cycles/year)
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Safety data: IEC 61508 - High demand

Safety Integrity Level (SIL)	3 (4 A DC13; 5 A AC15; 8760 switching cycles/year)
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Safety data: IEC 61508 - Low demand

Safety Integrity Level (SIL)	3
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Safety data: EN IEC 62061

Safety Integrity Level (SIL)	3 (4 A DC13; 5 A AC15; 8760 switching cycles/year)
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Environmental and real-life conditions

Ambient conditions

Degree of protection	IP20
Min. degree of protection of inst. location	IP54
Ambient temperature (operation)	-40 °C ... 60 °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, amplitude 0.15 mm, 2g

Approvals

CE

Certificate	CE-compliant
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Mounting

Mounting type	DIN rail mounting
Assembly note	See derating curve
Mounting position	vertical or horizontal

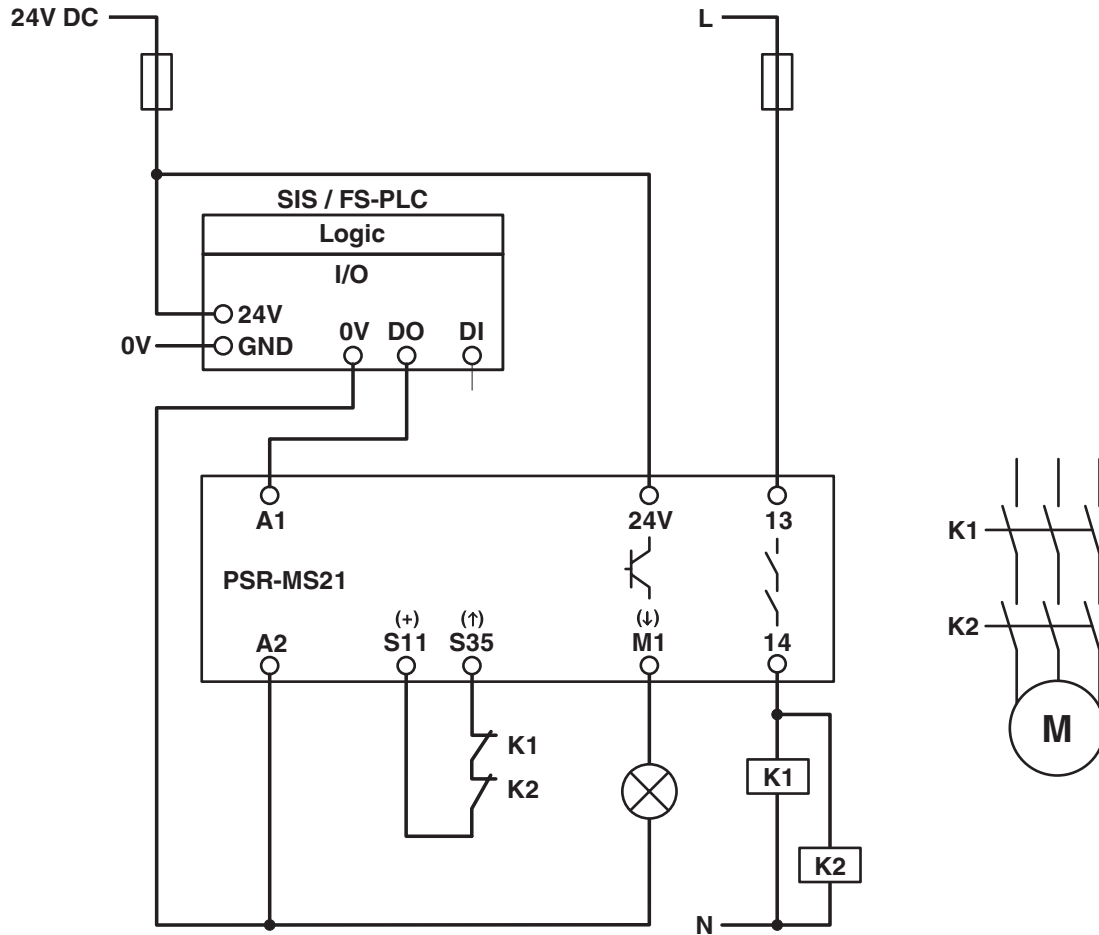
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Drawings

Circuit diagram

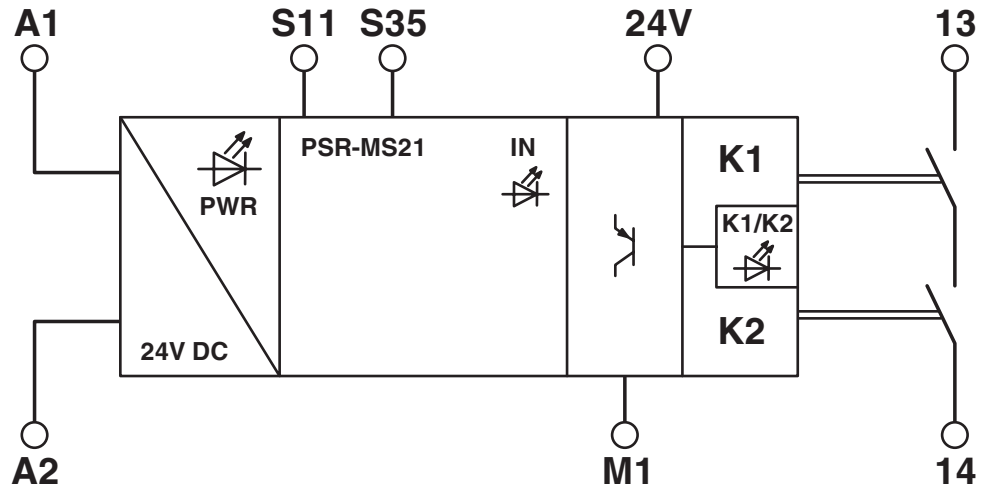


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Block diagram



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Approvals

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cULus Listed

Approval ID: E140324



Functional Safety

Approval ID: 44 205 15124301



Functional Safety

Approval ID: 44 780 15124301

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Classifications

ECLASS

ECLASS-13.0	27371819
ECLASS-15.0	27371819
ECLASS-15.0 ASSET	27250101

ETIM

ETIM 9.0	EC001449
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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	d482e8c4-47b3-4f50-a5f5-17993ad7e57b

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