

PSR-MC31-2SDO-1DO-24DC-SC - Safety relay module



1015520

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Safety relay module for safety shut-off mats, switching strips, emergency stop, safety doors, and light grids up to SIL 3, Cat. 4, PL e, 1 or 2-channel operation, automatic or manual start, 2 safe HL outputs, 1 signal output, $U_S = 24\text{ V DC}$, plug-in 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 12.5 mm
- Cascade input
- Compatible with numerous signal generators
- 1 or 2-channel control
- 2 safe digital outputs, 1 digital signal output

Commercial data

Item number	1015520
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	DN01
Product key	DNA181
GTIN	4055626496931
Weight per piece (including packing)	142.24 g
Weight per piece (excluding packing)	108.657 g
Customs tariff number	85371098
Country of origin	DE

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Technical data

Product properties

Product type	Safety relays
Product family	PSRmini
Application	Emergency stop
	Safety door
	Safety shut-off mats
	Light grid

Insulation characteristics

Protection class	II (EN 50178)
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Times

Typical response time	< 200 ms (automatic start)
	< 175 ms (manual, monitored start)
Typ. starting time with U_s	< 200 ms (with U_s when controlled via A1)
Response time	< 10 ms (Take the extension of the response time into consideration if you switch several devices in sequence.)
Restart time	< 250 ms (Boot time)
Recovery time	250 ms (following demand of the safety function)

Electrical properties

Maximum power dissipation for nominal condition	3.1 W ($U_B = 30\text{ V}$, $I_{L1} = I_{L2} = 2.4\text{ A}$)
Nominal operating mode	100% operating factor

Air clearances and creepage distances between the power circuits

Rated insulation voltage	50 V
	50 V AC
Rated surge voltage/insulation	Basic insulation 4 kV between all current paths and housing

Supply

Designation	A1/A2
Rated control circuit supply voltage U_S	19.2 V DC ... 30 V DC
Rated control circuit supply voltage U_S	24 V DC -20 % / +25 % (provide external protection)
Rated control supply current I_S	typ. 54 mA (No load)
Power consumption at U_S	typ. 1.3 W
Inrush current	< 5 A ($\Delta t = 200\ \mu\text{s}$ at U_S)
Filter time	1 ms (For the logic. At A1 in the event of voltage dips at U_S)
Protective circuit	Parallel protection against polarity reversal; Suppressor diode (Provide external protection, see safety notes. Fuse type: 5 A FF)

Input data

Digital: Sensor circuit (S10, S12, S22)

Description of the input	safety-related sensor inputs
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	IEC 61131-2 type 3 (S10, S12) PNP (S22)
Number of inputs	3
Input voltage range "0" signal	0 V DC ... 5 V DC (S10, S12) S22 open
Input voltage range "1" signal	11 V DC ... 30 V DC (S10, S12) 0 V ... 0 V (S22)
Input current range "0" signal	0 mA ... 2 mA (S10, S12)
Inrush current	< 10 mA (Typically with U_S at S10/S12, $\Delta t = 500 \mu s$) > -5 mA (typ. with U_S at S22, $\Delta t = 500 \mu s$)
Filter time	max. 1.5 ms (Test pulse width of low test pulses) Test pulse rate = 5 x Test pulse width Does not apply for S22 Deactivate the switch-on pulses for safety applications.
Concurrence	∞
Max. permissible overall conductor resistance	150 Ω
Protective circuit	Suppressor diode
Current consumption	4 mA (S10, S12) -4 mA (S22)

Digital: Start circuit (S34, S35)

Description of the input	non-safety-related
Number of inputs	2
Input voltage range "1" signal	19.2 V DC ... 30 V DC
Inrush current	< 10 mA (Typically with U_S , $\Delta t < 100 ms$)
Cable length	100 m
Max. permissible overall conductor resistance	150 Ω
Protective circuit	Suppressor diode
Current consumption	< 7 mA (Typically with U_S at S34) < 5 mA (Typically with U_S at S35)

Digital: External release (S36)

Description of the input	safety-related IEC 61131-2 type 3
Number of inputs	1
Input voltage range "0" signal	0 V DC ... 5 V DC
Input voltage range "1" signal	11 V DC ... 30 V DC
Input current range "0" signal	0 mA ... 2 mA
Inrush current	< 10 mA ($\Delta t = 500 \mu s$)
Filter time	max. 1.5 ms (Test pulse width of low test pulses) Test pulse rate = 5 x Test pulse width
Max. permissible overall conductor resistance	150 Ω
Protective circuit	Suppressor diode
Current consumption	7 mA

Output data

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Digital: 14, 24

Output description	Safety-related digital outputs
	PNP, IEC 61131-2 Type 2
Number of outputs	2
Protective circuit	Freewheeling circuit for inductive loads
Output voltage	$\geq 23 \text{ V DC } (U_s - 1 \text{ V})$
Leakage current	max. 1 mA (in the safe state)
Ohmic load	min. 12 Ω
Max. capacitive load	max. 10 μF (2.4 A load)
	max. 4.7 μF (1 A load)
Max. inductive load	max. 1 H
Limitation of the voltage induced on circuit interruption	max. 50 V
Output current	max. 2.4 A
Inrush current	max. 4.8 A ($\Delta t = 10 \text{ ms}$)
Min. load current	2 mA
Switching frequency	1 Hz (Resistive, inductive, capacitive)
Output voltage when switched off	< 5 V DC (in the safe state)
Test pulses	< 1 ms (Test pulse width of low test pulses)

Signal: M1

Output description	PNP
	non-safety-related
Number of outputs	1
Voltage	approx. 22 V DC ($U_s - 2 \text{ V}$)
Current	max. 100 mA
Maximum inrush current	500 mA ($\Delta t = 1 \text{ ms at } U_s$)
Protective circuit	Suppressor diode
Short-circuit protection	Yes

Connection data

Connection technology

pluggable	yes
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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	24 ... 12
Stripping length	7 mm
Screw thread	M3
Tightening torque	0.5 Nm ... 0.6 Nm

Signaling

Status display	3 x green LED
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Operating voltage display	1 x green LED
Error indication	1 x red LED

Dimensions

Width	12.5 mm
Height	112.2 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
Performance level (PL)	e

Safety data: IEC 61508 - High demand

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

Safety Integrity Level (SIL)	3
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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 ... 70 °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	30g
Vibration (operation)	10 Hz ... 150 Hz, 5g

Approvals

CE

Identification	CE-compliant
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Standards and regulations

Air clearances and creepage distances between the power circuits

Standards/regulations	DIN EN 50178, EN 60947-5-1
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Mounting

Mounting type	DIN rail mounting
Assembly instructions	See derating curve
Mounting position	vertical or horizontal
Connection method	Screw connection

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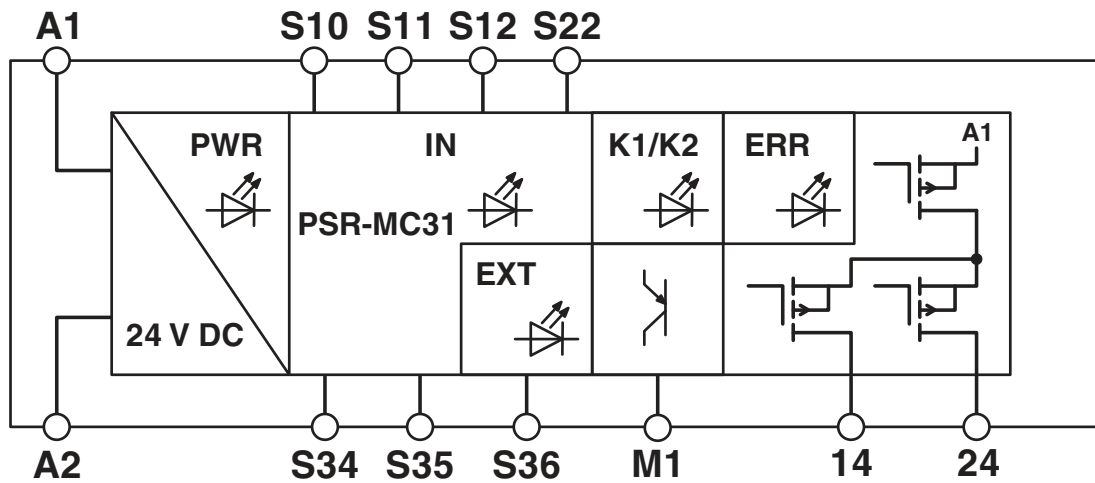


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Drawings

Block diagram



Block diagram

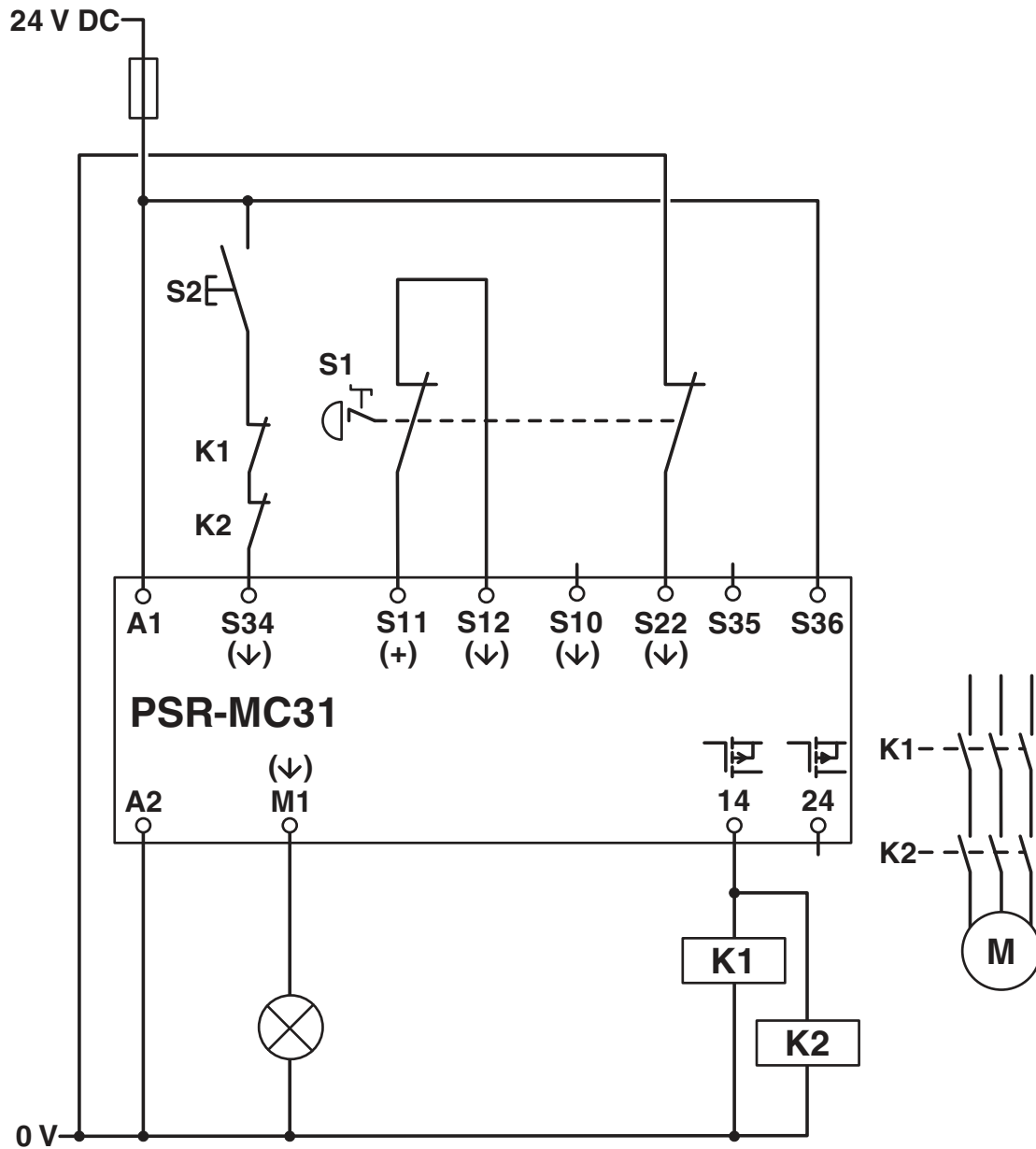
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Circuit diagram



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Approvals

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UL Listed

Approval ID: FILE E 140324



cUL Listed

Approval ID: FILE E 140324



Functional Safety

Approval ID: 44-780-15124315



Functional Safety

Approval ID: 44-205-15124315

cULus Listed

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Classifications

ECLASS

ECLASS-11.0	27371819
ECLASS-12.0	27371819
ECLASS-13.0	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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Accessories

CP-MSTB - Coding profile

1734634

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Coding profile, is inserted into the slot on the plug or inverted header, red insulating material



CRIMPFOX 6 - Crimping pliers

1212034

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Crimping pliers, for ferrules without insulating collar according to DIN 46228 Part 1 and ferrules with insulating collar according to DIN 46228 Part 4, 0.25 mm² ... 6.0 mm², lateral entry, trapezoidal crimp



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Phoenix Contact USA
586 Fulling Mill Road
Middletown, PA 17057, United States
(+717) 944-1300
info@phoenixcon.com