

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



1015520

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

### Notes

#### Note on application

Note on application	Only for industrial use
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### Product properties

Product type	Safety relays
Product family	PSRmini
Application	Emergency stop
	Safety door
	Safety shut-off mats
	Light grid
Control	1 and 2 channel

#### Insulation characteristics

Protection class	II (EN 50178)
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#### Insulation characteristics

Overvoltage category	III
Degree of pollution	2

#### 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)
	100 ms (Availability time after activating the sensor circuit during manual start)
Start pulse length	min. 250 ms (manual start)

### 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
Rated insulation voltage	50 V AC
Rated surge voltage/insulation	See data sheet, section "Insulation coordination".

#### 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)

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Power consumption at $U_S$	typ. 1.3 W
Inrush current	< 5 A ( $\Delta t = 200 \mu s$ 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 fuse protection, see safety notes. Fuse type: 5 AT)

## Input data

### Digital: Sensor circuit (S10, S12, S22)

Description of the input	safety-related sensor inputs
	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 (typ. 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.
Concurrency	$\infty$
Max. permissible overall conductor resistance	150 $\Omega$
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 (typ. with $U_S$ , $\Delta t < 100 ms$ )
Cable length	100 m
Max. permissible overall conductor resistance	150 $\Omega$
Protective circuit	Suppressor diode
Current consumption	< 7 mA (typ. with $U_S$ at S34)
	< 5 mA (typ. 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

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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 $\Omega$
Protective circuit	Suppressor diode
Current consumption	7 mA

## Output data

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 $\Omega$
Max. capacitive load	max. 10 $\mu F$ (2.4 A load) max. 4.7 $\mu F$ (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

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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	3 x LED (green)
Operating voltage display	1 x LED (green)
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	PA

## Characteristics

### Safety data

Stop category (EN 60204-1)	0
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### Safety data: EN ISO 13849

Performance level (PL)	e
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### 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

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Vibration (operation)	10 Hz ... 150 Hz, 5g
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## Approvals

CE

Identification	CE-compliant
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## Mounting

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

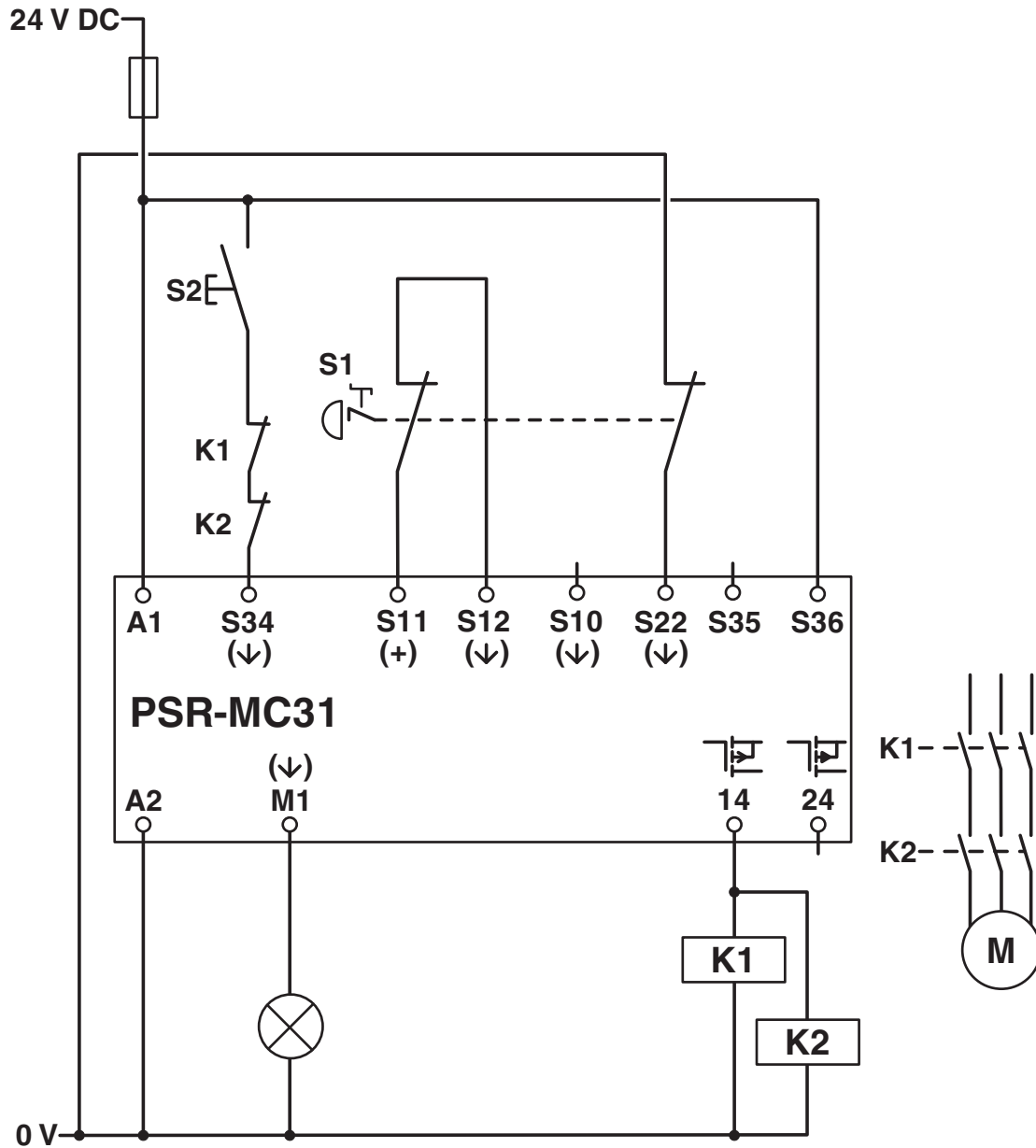
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## Drawings

Circuit diagram



Example application

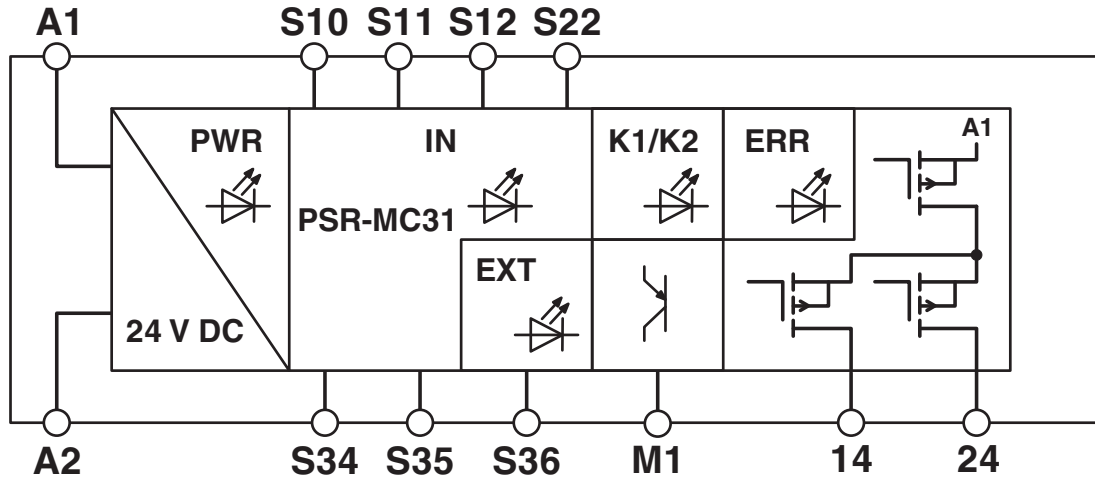
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Block diagram



Block diagram

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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/1015520>



### Functional Safety

Approval ID: 44 780 15124315



### Functional Safety

Approval ID: 44 205 15124315



### cULus Listed

Approval ID: E140324

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## Classifications

### ECLASS

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

### ETIM

ETIM 10.0	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	79bbe32c-6641-4f8c-bcd0-b46906e25b66

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