

# Safety device - PSR-MC31-2SDO-1DO-24DC-SP - 1015503

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Safety relay module for safety shut-off mats, switching strips, emergency stop, safety doors, and light grids up to SILCL 3, Cat. 4, PL e, 1 or 2-channel operation, automatic or manual start, 2 safe HL outputs, 1 signal output,  $U_S = 24\text{ V DC}$ , pluggable Push-in terminal block

## Your advantages

- ✓ Up to Cat.4/PL e according to ISO 13849-1, SILCL 3 according to IEC 62061
- ✓ Low housing width of just 12.5 mm
- ✓ Cascade input
- ✓ Compatible with numerous signal generators
- ✓ One or two-channel activation
- ✓ 2 safe digital outputs, 1 digital signal output
- ✓ Time saving push-in connection, tools not required
- ✓ Potentials can be easily looped through – ideal for BUS applications
- ✓ Intuitive use through colour coded actuation lever
- ✓ Can be combined with the MSTB 2,5 range
- ✓ Quick and convenient testing using integrated test option



## Key Commercial Data

Packing unit	1
GTIN	 4 055626 496467
GTIN	4055626496467
Custom tariff number	85371098

## Technical data

### Note

Utilization restriction	EMC: class A product, see manufacturer's declaration in the download area
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## Dimensions

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## Technical data

### Dimensions

Width	12.5 mm
Height	116.6 mm
Depth	114.5 mm

### Ambient conditions

Ambient temperature (operation)	-40 °C ... 70 °C (observe derating)
Ambient temperature (storage/transport)	-40 °C ... 70 °C
Max. permissible relative humidity (operation)	75 % (on average, 85% infrequently, non-condensing)
Max. permissible humidity (storage/transport)	75 % (on average, 85% infrequently, non-condensing)
Maximum altitude	≤ 2000 m (Above sea level)

### Power supply

Designation	A1/A2
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 ( $\Delta t = 200 \mu s$ 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

### Digital inputs

Input name	Sensor circuit
	S10, S12, S22
Description of the input	safety-related sensor inputs
	NPN, 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, $\Delta t = 500 \mu s$ )
Current consumption	4 mA (S10, S12)
	-4 mA (S22)
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.
Max. permissible overall conductor resistance	150 $\Omega$
Concurrence input 1/2	$\infty$

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### Digital inputs

Protective circuit/component	Suppressor diode
Input name	Start circuit
	S34, S35
Description of the input	non-safety-related
	NPN
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)
Current consumption	< 7 mA (Typically with $U_s$ at S34)
	< 5 mA (Typically with $U_s$ at S35)
Max. permissible overall conductor resistance	150 $\Omega$
Protective circuit/component	Suppressor diode
Input name	External release
	S36
Description of the input	safety-related
	NPN, 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
Current consumption	7 mA
Protective circuit/component	Suppressor diode

### Digital outputs

Output name	14, 24
Output description	Safety-related digital outputs
	PNP, IEC 61131-2 Type 2
Number of outputs	2
Output voltage	$\geq 23$ V DC ( $U_s - 1$ V)
Output current	max. 2.4 A
Inrush current	max. 4.8 A ( $\Delta t = 10$ ms)
Output voltage when switched off	< 5 V DC (in the safe state)
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
Min. load current	2 mA
Switching frequency	1 Hz (Resistive, inductive, capacitive)
Type of protection	Freewheeling circuit for inductive loads
Limitation of the voltage induced on circuit interruption	max. 50 V

### Alarm outputs

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## Technical data

### Alarm outputs

Designation	M1
Output description	PNP
	non-safety-related
Number of outputs	1
Voltage	approx. 22 V DC ( $U_s - 2 V$ )
Current	max. 100 mA
Maximum inrush current	500 mA ( $\Delta t = 1 \text{ ms}$ at $U_s$ )
Protective circuit/component	Suppressor diode
Short-circuit protection	Yes

### Times

Typical pickup time at US	< 200 ms (with $U_s$ when controlled via A1)
Typical response time at US	< 200 ms (automatic start)
	< 175 ms (manual, monitored start)
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)

### General

Nominal operating mode	100% operating factor
Net weight	104.382 g
Mounting position	vertical or horizontal
Mounting type	DIN rail mounting
Assembly instructions	See derating curve
Degree of protection	IP20
Min. degree of protection of inst. location	IP54
Housing material	PBT
Housing color	yellow
Operating voltage display	1 x green LED
Status display	3 x green LED
Indication	1 x red LED

### Connection capacity

Connection method	Push-in spring connection
pluggable	Yes
Conductor cross section solid	0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section flexible	0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross section AWG / kcmil	24 ... 16
Conductor cross section flexible, with ferrule without plastic sleeve	0.25 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> (only together with CRIMPFOX 6)
Conductor cross section, flexible, with ferrule, with plastic sleeve	0.25 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> (only together with CRIMPFOX 6)
Cylindrical gauge a x b / diameter	2.4 mm x 1.5 mm / 1.9 mm

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## Technical data

### Connection capacity

Stripping length	8 mm
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### Safety-related characteristic data

Stop category	0
Designation	IEC 61508 - High demand
Safety Integrity Level (SIL)	3
Designation	EN ISO 13849
Performance level (PL)	e
Category	4
Designation	EN 62061
Safety Integrity Level Claim Limit (SIL CL)	3

### Standards and Regulations

Designation	Air clearances and creepage distances between the power circuits
Standards/regulations	DIN EN 50178, EN 60947-5-1
Rated insulation voltage	50 V
	50 V AC
Rated surge voltage/insulation	Basic insulation 4 kV between all current paths and housing
Degree of pollution	2
Overvoltage category	III
Shock	30g
Vibration (operation)	10 Hz ... 150 Hz, 5g
Conformance	CE-compliant

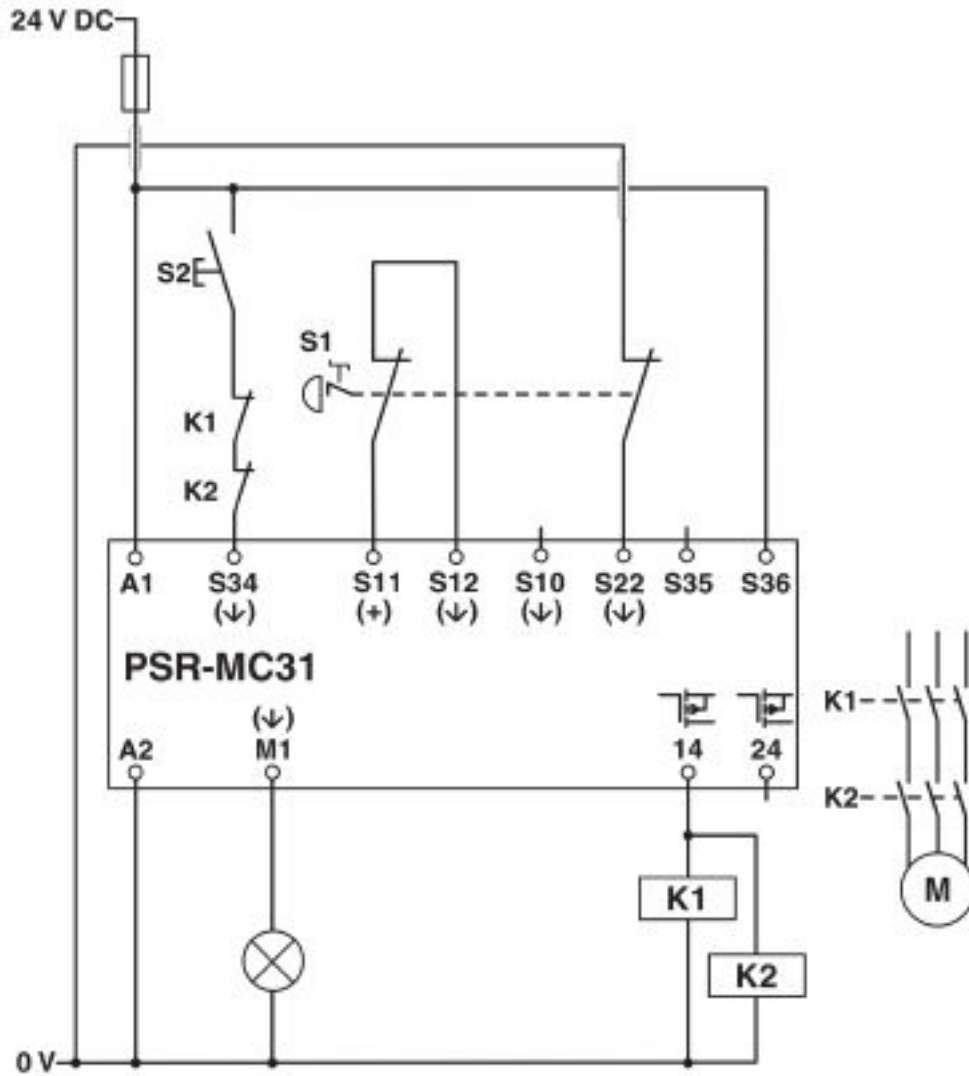
### Environmental Product Compliance

REACH SVHC	Lead 7439-92-1
China RoHS	Environmentally Friendly Use Period = 50 years
	For details about hazardous substances go to tab "Downloads", Category "Manufacturer's declaration"

## Drawings

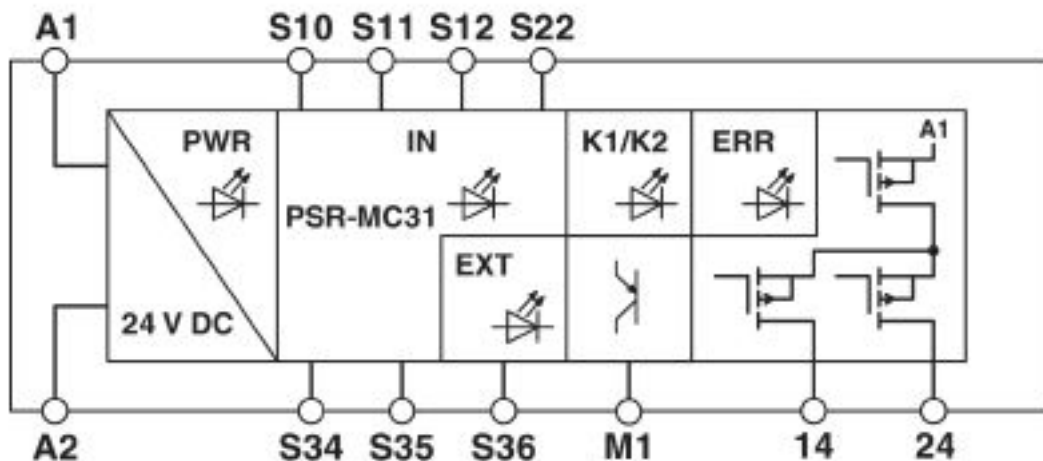
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Circuit diagram



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Block diagram



## Classifications

eCl@ss

eCl@ss 8.0	27371819
eCl@ss 9.0	27371819

ETIM

ETIM 5.0	EC001449
ETIM 6.0	EC001449
ETIM 7.0	EC001449

## Approvals

Approvals

Approvals

UL Listed / cUL Listed / cULus Listed

Ex Approvals

Approval details

UL Listed		<a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a>	FILE E 140324
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cULus Listed			
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## Accessories

### Accessories

#### Coding element

Coding profile - CP-MSTB - 1734634

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



Coding section - CR-MSTB - 1734401

Coding section, inserted into the recess in the header or the inverted plug, red insulating material

