

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



1015503

<https://www.phoenixcontact.com/us/products/1015503>

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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,  $U_S = 24\text{ V DC}$ , pluggable Push-in 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                          | 1015503       |
| Packing unit                         | 1 pc          |
| Minimum order quantity               | 1 pc          |
| Sales key                            | DN01          |
| Product key                          | DNA181        |
| GTIN                                 | 4055626496467 |
| Weight per piece (including packing) | 137.382 g     |
| Weight per piece (excluding packing) | 104.382 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           |

### 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 ( $\Delta t = 200\text{ }\mu\text{s}$ 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            |
|                                | 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)            |

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|   |  |
|---|--|
|   | 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                                   | $\infty$   |
| 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 (Typically with $U_S$ , $\Delta t < 100 ms$ ) |
| Max. permissible overall conductor resistance | 150 $\Omega$  |
| 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 $\Omega$                                      |
| 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        |

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|   |  |
|---|--|
| 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 $\mu\text{F}$ (2.4 A load)                     |
|   | max. 4.7 $\mu\text{F}$ (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                          | $< 5 \text{ V DC}$ (in the safe state)                 |
| Test pulses   | $< 1 \text{ ms}$ (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 |
|-----------|-----|

Conductor connection

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

## Signaling

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

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## Dimensions

|        |          |
|--------|----------|
| Width  | 12.5 mm  |
| Height | 116.6 mm |
| Depth  | 114.5 mm |

## Material specifications

|                  |           |
|------------------|-----------|
| Housing material | Polyamide |
|------------------|-----------|

## Characteristics

### Safety data

|               |   |
|---------------|---|
| Stop category | 0 |
|---------------|---|

### Safety data: EN ISO 13849

|                        |   |
|------------------------|---|
| Category               | 4 |
| Performance level (PL) | e |

### Safety data: IEC 61508 - High demand

|                              |   |
|------------------------------|---|
| Safety Integrity Level (SIL) | 3 |
|------------------------------|---|

### Safety data: EN IEC 62061

|                              |   |
|------------------------------|---|
| Safety Integrity Level (SIL) | 3 |
|------------------------------|---|

## 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 |
|----------------|--------------|

## Standards and regulations

### Air clearances and creepage distances between the power circuits

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

## Mounting

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|                       |                        |
|-----------------------|------------------------|
| Mounting type         | DIN rail mounting      |
| Assembly instructions | See derating curve     |
| Mounting position     | vertical or horizontal |
| Connection method     | Push-in connection     |

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

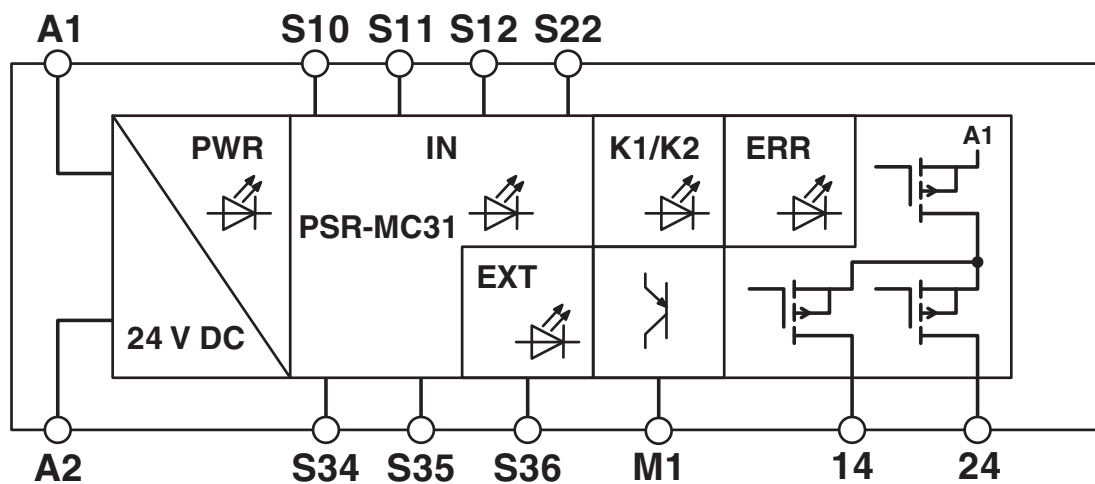


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## Drawings

Block diagram



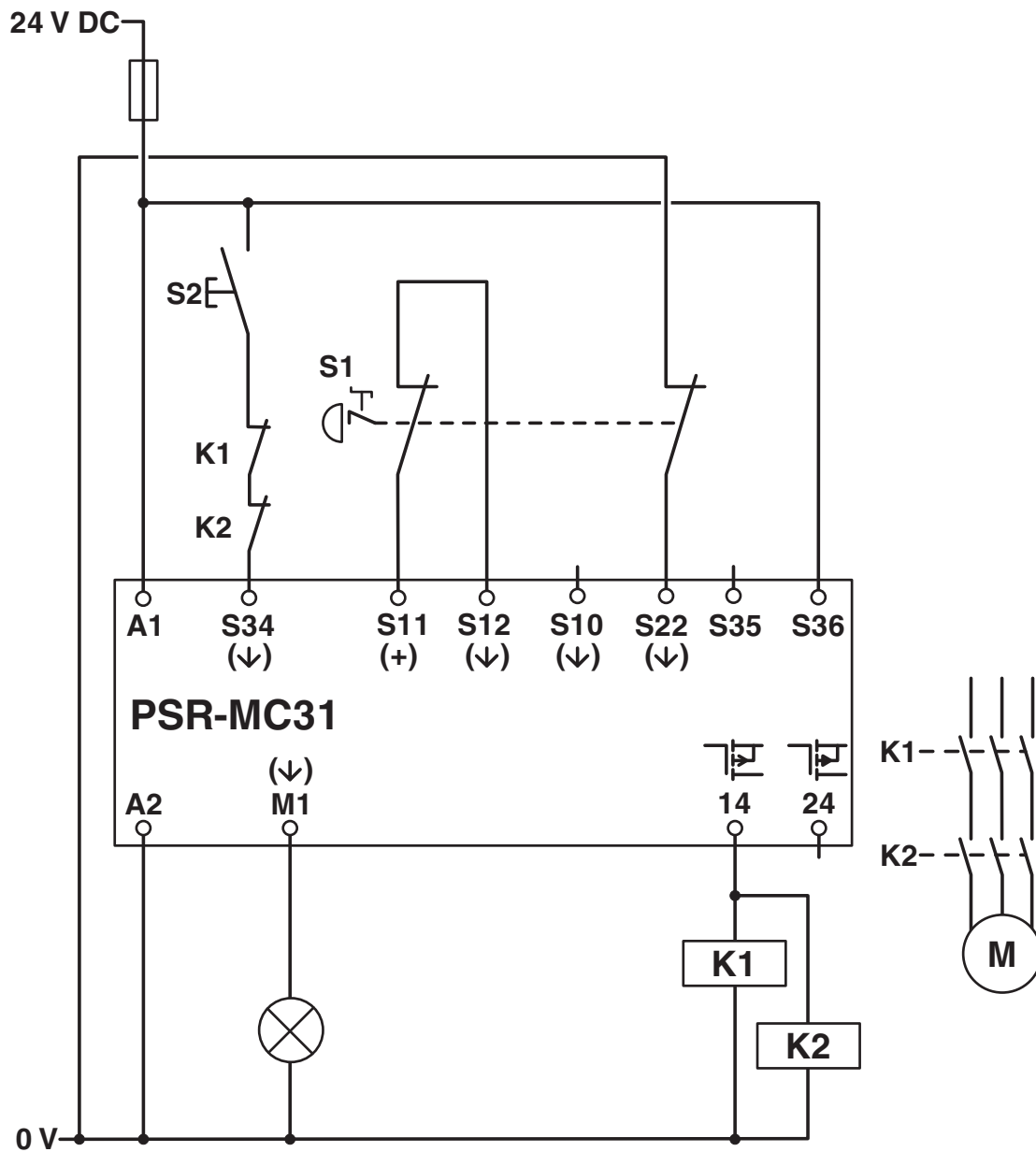
Block diagram

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Circuit diagram






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## Approvals

 To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/1015503>



### 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 |
|----------|----------|

### 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

<https://www.phoenixcontact.com/us/products/1734634>

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



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### CR-MSTB - Coding section

1734401

<https://www.phoenixcontact.com/us/products/1734401>

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



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## CRIMPFOX 6 - Crimping pliers

1212034

<https://www.phoenixcontact.com/us/products/1212034>



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 mm<sup>2</sup> ... 6.0 mm<sup>2</sup>, lateral entry, trapezoidal crimp

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