

# PSR-M-EM7-SINCOS2-PI - Extension module



1105093

<https://www.phoenixcontact.com/us/products/1105093>

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Safe extension module for monitoring zero-speed, speed, direction of rotation, monitoring of 2 axes, NPN/PNP proximity switch, 2 x sin/cos encoder, TBUS interface, up to SIL 3, Cat. 4/PL e, pluggable Push-in terminal block, TBUS connector included

## Product description

The configurable and individually scalable PSRmodular safety system is a flexible safety solution for monitoring your machine or system. The safe extension module is used to monitor downtimes, speed, and direction of rotation. The module is suitable for connection of NPN/PNP proximity switches and sine/cosine encoders.

## Your advantages

- Cost-effective safety solution with a high level of adaptability to individual requirements
- Fast startup, thanks to easy hardware and software configuration
- Machine downtimes minimized with comprehensive, easy-to-understand diagnostics
- Tool-free and time-saving installation thanks to Push-in technology
- Narrow housing width of just 22.6 mm
- Up to Cat. 4/PL e in accordance with EN ISO 13849-1, SIL 3 in accordance with EN IEC 62061, SIL 3 in accordance with IEC 61508
- Suitable for elevator applications in accordance with EN 81-20

## Commercial data

|                                      |               |
|--------------------------------------|---------------|
| Item number                          | 1105093       |
| Packing unit                         | 1 pc          |
| Minimum order quantity               | 1 pc          |
| Sales key                            | DN02          |
| Product key                          | DNA363        |
| GTIN                                 | 4055626975405 |
| Weight per piece (including packing) | 193.5 g       |
| Weight per piece (excluding packing) | 170 g         |
| Customs tariff number                | 85371098      |
| Country of origin                    | IT            |

## Technical data

### Product properties

|              |                                      |
|--------------|--------------------------------------|
| Product type | Safety device                        |
| Application  | Over-speed safety relay              |
|              | Zero-speed safety relay              |
|              | Monitoring the direction of rotation |

### Insulation characteristics

|                  |     |
|------------------|-----|
| Protection class | III |
|------------------|-----|

### Times

|               |                       |
|---------------|-----------------------|
| Response time | see user manual       |
| Restart time  | min. 5 s (Boot time)  |
|               | max. 10 s (Boot time) |

### Electrical properties

|                                                 |                                                                         |
|-------------------------------------------------|-------------------------------------------------------------------------|
| Maximum power dissipation for nominal condition | 3.68 W ( $U_B = 28,8$ V, $I_{N1} = I_{N2} = 50$ mA)                     |
| Nominal operating mode                          | 100% operating factor                                                   |
| Interfaces                                      | DIN rail TBUS for connection to the master module, supplied as standard |
|                                                 | Encoder                                                                 |
|                                                 | Proximity switches                                                      |

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

|                                |                                                                         |
|--------------------------------|-------------------------------------------------------------------------|
| Rated insulation voltage       | 250 V AC                                                                |
| Rated surge voltage/insulation | Basic insulation 4 kV between 24 V power supply and I/Os to the housing |

### Supply

|                                            |                                                                    |
|--------------------------------------------|--------------------------------------------------------------------|
| Designation                                | A1/A2                                                              |
| Rated control circuit supply voltage $U_S$ | 19.2 V DC ... 28.8 V DC                                            |
| Rated control circuit supply voltage $U_S$ | 24 V DC -20 % / +20 % (provide external protection, typically 1 A) |
| Rated control supply current $I_S$         | typ. 80 mA                                                         |
| Power consumption at $U_S$                 | typ. 1.92 W                                                        |
| Inrush current                             | 20 A ( $\Delta t = 500$ $\mu$ s at $U_S$ )                         |
| Filter time                                | typ. 5 ms (at A1 in the event of voltage dips at $U_S$ )           |
| Protective circuit                         | Serial protection against polarity reversal                        |
|                                            | Suppressor diode                                                   |

### Input data

#### Measurement

|                          |                          |
|--------------------------|--------------------------|
| Input name               | Proximity switch inputs  |
|                          | IN1, IN2                 |
| Description of the input | NPN / PNP (3- or 4-wire) |

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|                                               |                                                                                                                                                    |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Number of inputs                              | 2                                                                                                                                                  |
| Input voltage range "0" signal                | 0 V DC ... 5 V DC (NPN)<br>16 V DC ... 28.8 V DC (PNP)                                                                                             |
| Input voltage range "1" signal                | 16 V DC ... 28.8 V DC (NPN)<br>0 V DC ... 5 V DC (PNP)                                                                                             |
| Input current range "0" signal                | < 2 mA (NPN)                                                                                                                                       |
| Precision                                     | 5 % (in reference to the parameterized limit value)                                                                                                |
| Limit frequency                               | max. 5 kHz                                                                                                                                         |
| Max. permissible overall conductor resistance | 150 Ω                                                                                                                                              |
| Protective circuit                            | Suppressor diode                                                                                                                                   |
| Current consumption                           | typ. 13 mA (NPN, at U <sub>S</sub> )<br>typ. -13 mA (PNP, at U <sub>S</sub> )<br>max. 17 mA (NPN, at 28.8 V DC)<br>max. -15 mA (PNP, at 28.8 V DC) |

## Measurement

|                                        |                                                                                                    |
|----------------------------------------|----------------------------------------------------------------------------------------------------|
| Input name                             | Encoder inputs                                                                                     |
| Description of the input               | Sin/Cos<br>Diagnostic function: $\sin^2(x) + \cos^2(x) = 1$                                        |
| Number of inputs                       | 2                                                                                                  |
| Input impedance                        | 120 Ω (per trace)                                                                                  |
| Precision                              | 5 % (in reference to the parameterized limit value)                                                |
| Limit frequency                        | max. 500 kHz                                                                                       |
| Sine / cosine Signal form/signal level | 0.8 V <sub>PP</sub> ... 1.2 V <sub>PP</sub> (Offset: 2.5 V ±20%, phase shift trace A, B: 90° ±30°) |
| Current consumption                    | typ. 8 mA (Per track for U <sub>S</sub> )                                                          |

## Output data

Digital: Proximity switch supply (24V/0V)

|                              |                                                  |
|------------------------------|--------------------------------------------------|
| Short-circuit protection     | no                                               |
| Nominal output voltage range | 16.7 V DC ... 26.3 V DC (U <sub>S</sub> - 2,5 V) |

## Connection data

Connection technology

|           |     |
|-----------|-----|
| pluggable | yes |
|-----------|-----|

Conductor connection

|                                  |                                             |
|----------------------------------|---------------------------------------------|
| Connection method                | Push-in 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 ... 14                                   |
| Stripping length                 | 10 mm                                       |

## Signaling

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|                           |                                                       |
|---------------------------|-------------------------------------------------------|
| Status display            | 1 x LED (green), 2 x LED (orange)<br>6 x LED (yellow) |
| Operating voltage display | 1 x green LED                                         |
| Error indication          | 2 x LED (red)                                         |

## Dimensions

|        |           |
|--------|-----------|
| Width  | 22.61 mm  |
| Height | 107.74 mm |
| Depth  | 114.5 mm  |

## Material specifications

|                  |                             |
|------------------|-----------------------------|
| Color (Housing)  | yellow (RAL 1018)           |
| Housing material | Polyamide PA non-reinforced |

## Characteristics

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)                | -10 °C ... 55 °C (observe derating)                                                |
| Ambient temperature (storage/transport)        | -20 °C ... 85 °C                                                                   |
| Maximum altitude                               | ≤ 2000 m (Above sea level)                                                         |
| Max. permissible humidity (storage/transport)  | 95 % (non-condensing)                                                              |
| Max. permissible relative humidity (operation) | 95 % (non-condensing)                                                              |
| Shock                                          | 10g for $\Delta t = 16$ ms (continuous shock, 1000 shocks in each space direction) |
| Vibration (operation)                          | 10 Hz ... 150 Hz, 2g                                                               |

## Approvals

CE

|                |              |
|----------------|--------------|
| Identification | CE-compliant |
|----------------|--------------|

## Mounting

|               |                   |
|---------------|-------------------|
| Mounting type | DIN rail mounting |
|---------------|-------------------|

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|                       |                        |
|-----------------------|------------------------|
| Assembly instructions | Observe derating       |
| Mounting position     | vertical or horizontal |

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## Classifications

### ECLASS

|             |          |
|-------------|----------|
| ECLASS-11.0 | 27371819 |
| ECLASS-13.0 | 27371819 |
| ECLASS-12.0 | 27371819 |

### ETIM

|          |          |
|----------|----------|
| ETIM 9.0 | EC001449 |
|----------|----------|

### UNSPSC

|             |          |
|-------------|----------|
| UNSPSC 21.0 | 39122200 |
|-------------|----------|

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## Environmental product compliance

|            |                                                                                                           |
|------------|-----------------------------------------------------------------------------------------------------------|
| China RoHS | Environmentally friendly use period: unlimited = EFUP-e<br>No hazardous substances above threshold values |
|------------|-----------------------------------------------------------------------------------------------------------|

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