

# MACX MCR-SL-2NAM-R-UP-SP - Isolation switch amplifier



2924304

<https://www.phoenixcontact.com/gb/products/2924304>

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2-channel NAMUR signal conditioner with wide range power supply for proximity sensors and switches. In terms of signal output, for each channel there is a relay with a changeover contact available. Line fault detection (LFD), 3-way isolation, Push-in connection, SIL 2.

## Your advantages

- Installation in zone 2, protection type "n" (EN 60079-15) permitted
- Up to SIL 2 in accordance with EN 61508
- Line fault detection (LFD), can be activated/deactivated, error indicated by flashing red LED with de-excitation of output relay
- Direction of operation can be selected (operating or closed circuit current behavior)
- 3-way electrical isolation
- LED indicators for supply voltage, switching state, and malfunction in accordance with NAMUR NE 44
- Signal output relay (changeover contact)
- 2-channel
- Wide-range power supply of 19.2 ... 253 V AC/DC
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit

## Commercial data

|                                      |                     |
|--------------------------------------|---------------------|
| Item number                          | 2924304             |
| Packing unit                         | 1 pc                |
| Minimum order quantity               | 1 pc                |
| Sales key                            | DK1113              |
| Product key                          | DK1113              |
| Catalog page                         | Page 137 (C-5-2019) |
| GTIN                                 | 4046356491747       |
| Weight per piece (including packing) | 193.3 g             |
| Weight per piece (excluding packing) | 185.4 g             |
| Customs tariff number                | 85365019            |
| Country of origin                    | DE                  |

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## Technical data

### Product properties

|                 |  |
|-----------------|--|
| Product type    | Isolating switch amplifier                     |
| Product family  | MACX Analog                                    |
| No. of channels | 2  |
| Type            | Signal conditioners with SIL functional safety |
| Configuration   | DIP switches                                   |

### System properties

#### Functionality

|               |              |
|---------------|--------------|
| Configuration | DIP switches |
|---------------|--------------|

### Electrical properties

|   |                                  |
|---|----------------------------------|
| Electrical isolation                            | 3-way isolation                  |
| Electrical isolation between input and output   | yes                              |
| Maximum power dissipation for nominal condition | $\leq 1.3 \text{ W}$             |
| Step response (10-90%)                          | typ. 6 ms (N/O contact: OFF/ON)  |
|   | typ. 6 ms (N/O contact: ON/OFF)  |
|   | typ. 4 ms (N/C contact: ON/OFF)  |
|   | typ. 10 ms (N/C contact: OFF/ON) |

#### Electrical isolation

|              |                         |
|--------------|-------------------------|
| Test voltage | 2.5 kV AC (50 Hz, 60 s) |
|--------------|-------------------------|

#### Electrical isolation Input/output IEC/EN 60079-11

|                          |                     |
|--------------------------|---------------------|
| Standards/regulations    | IEC/EN 60079-11     |
| Rated insulation voltage | 375 V <sub>PP</sub> |
| Overvoltage category     | III                 |
| Pollution degree         | 2                   |

#### Electrical isolation Input/power supply IEC/EN 60079-11

|                          |                     |
|--------------------------|---------------------|
| Standards/regulations    | IEC/EN 60079-11     |
| Rated insulation voltage | 375 V <sub>PP</sub> |
| Overvoltage category     | II                  |
| Pollution degree         | 2                   |

#### Electrical isolation Input/power supply IEC/EN 61010-1

|                          |                      |
|--------------------------|----------------------|
| Standards/regulations    | IEC/EN 61010-1       |
| Rated insulation voltage | 300 V <sub>rms</sub> |
| Overvoltage category     | II                   |
| Pollution degree         | 2                    |
| Insulation               | Safe isolation       |

#### Electrical isolation Output 1/output 2/input, power supply IEC/EN 61010-1

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|                          |                      |
|--------------------------|----------------------|
| Standards/regulations    | IEC/EN 61010-1       |
| Rated insulation voltage | 300 V <sub>rms</sub> |
| Overvoltage category     | III                  |
| Pollution degree         | 2                    |
| Insulation               | Safe isolation       |

## Supply

|                              |   |
|------------------------------|---|
| Nominal supply voltage range | 24 V AC/DC ... 230 V AC/DC -20 % ... +10 % (50/60 Hz) |
| Supply voltage range         | 19.2 V AC/DC ... 253 V AC/DC (50/60 Hz)               |
| Max. current consumption     | < 80 mA   |
|                              | < 42 mA (24 V DC)                                     |
| Power dissipation            | < 1.1 W   |
| Power consumption            | < 1.1 W   |

## Input data

Signal: NAMUR

|   |  |
|---|--|
| Number of inputs                        | 2  |
| Available input sources                 | NAMUR proximity sensors (IEC/EN 60947-5-6) |
|   | Floating switch contacts                   |
|   | Switch contacts with resistance circuit    |
| Switching threshold "0" signal current  | < 1.2 mA (blocking)                        |
| Switching threshold "1" signal, current | > 2.1 mA (conductive)                      |
| Short-circuit current                   | 8 mA                                       |
| Switching hysteresis                    | < 0.2 mA                                   |
| Line fault detection                    | < 0.05 mA ... 0.35 mA (Line break)         |
|   | < 100 Ω ... 360 Ω (Short circuit)          |
|   | Activated /deactivated via DIP switch      |
| Non-load voltage                        | 8 V DC                                     |

## Output data

Switching: Relay

|                            |                                       |
|----------------------------|---------------------------------------|
| Contact switching type     | 1 changeover contact per channel      |
| Contact material           | AgSnO <sub>2</sub> , hard gold-plated |
| Maximum switching voltage  | 250 V AC (2 A, 60 Hz)                 |
|                            | 120 V DC (0.2 A)                      |
|                            | 30 V DC (2 A)                         |
| Maximum switching capacity | 500 VA                                |
| Recommended minimum load   | 5 V / 10 mA                           |
| Switching frequency        | ≤ 20 Hz (Load-dependent)              |

Signal

|                   |   |
|-------------------|---|
| Number of outputs | 2 |
|-------------------|---|

## Connection data

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|   |   |
|---|---|
| Connection method   | Push-in connection  |
| Stripping length  | 10 mm   |
| 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 flexible (2 conductors with same cross section) | 0.25 mm <sup>2</sup> ... 0.34 mm <sup>2</sup> (TWIN ferrule without plastic sleeve) |
|   | 0.5 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> (TWIN ferrule with plastic sleeve)      |
| Conductor cross section AWG   | 24 ... 14   |
|   | 24 ... 22 (TWIN ferrule without plastic sleeve)                                     |
|   | 20 ... 16 (TWIN ferrule with plastic sleeve)  |

## Ex data

|                       |        |
|-----------------------|--------|
| Ex installation (EPL) | Gc     |
|                       | Div. 2 |

## Interfaces

### Data

|                 |   |
|-----------------|---|
| No. of channels | 0 |
|-----------------|---|

## Signaling

|                |                              |
|----------------|------------------------------|
| Status display | Green LED (supply voltage)   |
|                | LED yellow (switching state) |
|                | Red LED (line errors)        |

## Dimensions

|                     |  |
|---------------------|--|
| Dimensional drawing |  |
| Width               | 17.5 mm  |
| Height              | 107.9 mm   |
| Depth               | 113.7 mm   |
| Depth NS 35/7,5     | 114.5 mm (Snapped onto DIN rail NS 35/7,5 in accordance with EN 60715) |

## Material specifications

|  |                 |
|--|-----------------|
| Color                                  | gray (RAL 7042) |
| Flammability rating according to UL 94 | V0 (Housing)    |
| Housing material                       | PA 6.6-FR       |

## Characteristics

### Safety data

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|                              |   |
|------------------------------|---|
| Safety Integrity Level (SIL) | 2 |
|------------------------------|---|

## Safety data

|                              |   |
|------------------------------|---|
| Safety Integrity Level (SIL) | 2 |
|------------------------------|---|

## Environmental and real-life conditions

### Ambient conditions

|   |  |
|---|--|
| Ambient temperature (operation)         | -40 °C ... 60 °C (Any mounting position) |
|   | -40 °C ... 70 °C (Derating)              |
| Ambient temperature (storage/transport) | -40 °C ... 85 °C                         |
| Permissible humidity (operation)        | 10 % ... 95 % (non-condensing)           |

### Altitude range (≤ 2000 m)

|                                 |  |
|---------------------------------|--|
| Altitude                        | ≤ 2000 m (The technical data refers to altitudes ≤2000 m above mean sea level. For altitudes >2000 m above mean sea level, refer to the data sheet.) |
| Ambient temperature (operation) | -40 °C ... 60 °C   |
|                                 | -40 °C ... 70 °C (Derating)  |
| Rated insulation voltage        | 253 V AC (Power supply, input / output)  |
|                                 | 125 V DC (Power supply, input / output)  |

### Altitude range (≤ 3000 m)

|                                 |   |
|---------------------------------|---|
| Height range                    | > 2000 m ... 3000 m                     |
| Ambient temperature (operation) | -40 °C ... 54 °C                        |
|                                 | -40 °C ... 63 °C (Derating)             |
| Rated insulation voltage        | 190 V AC (Power supply, input / output) |
|                                 | 110 V DC (Power supply, input / output) |

### Altitude range (≤ 4000 m)

|                                 |   |
|---------------------------------|---|
| Height range                    | > 3000 m ... 4000 m                       |
| Ambient temperature (operation) | -40 °C ... 48 °C                          |
|                                 | -40 °C ... 56 °C (Derating)               |
| Rated insulation voltage        | 60 V AC/DC (Power supply, input / output) |

### Altitude range (≤ 5000 m)

|                                 |   |
|---------------------------------|---|
| Height range                    | > 4000 m ... 5000 m                       |
| Ambient temperature (operation) | -40 °C ... 42 °C                          |
|                                 | -40 °C ... 49 °C (Derating)               |
| Rated insulation voltage        | 60 V AC/DC (Power supply, input / output) |

## Approvals

### CE

|             |                |
|-------------|----------------|
| Certificate | CE-compliant   |
| Note        | and EN 61326-1 |

### ATEX

|                |                            |
|----------------|----------------------------|
| Identification | ⊕ II 3G Ex ec nC IIC T4 Gc |
|----------------|----------------------------|

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|             |                      |
|-------------|----------------------|
| Certificate | IBExU 20 ATEX B011 X |
|-------------|----------------------|

## IECEX

|                |                    |
|----------------|--------------------|
| Identification | Ex ec nC IIC T4 Gc |
| Certificate    | IBE 10.0002 X      |

## CCC / China-Ex

|                |                    |
|----------------|--------------------|
| Identification | Ex ec nC IIC T4 Gc |
| Certificate    | 2021122304114199   |

## UL, USA/Canada

|                |                                       |
|----------------|---------------------------------------|
| Identification | UL 508 Listed                         |
|                | UL 61010 Listed                       |
|                | Class I, Div. 2, Groups A, B, C, D T4 |
|                | Class I, Zone 2, Group IIC T4         |

## Shipbuilding approval

|             |                   |
|-------------|-------------------|
| Certificate | DNV GL TAA000020C |
|-------------|-------------------|

## Safety Integrity Level (SIL, IEC 61508)

|                |                       |
|----------------|-----------------------|
| Identification | 2                     |
| Certificate    | IN-AT-AS-MRL-24-00163 |

## Systematic Capability

|                |   |
|----------------|---|
| Identification | 3 |
|----------------|---|

## INMETRO

|                |                    |
|----------------|--------------------|
| Identification | Ex ec nC IIC T4 Gc |
| Certificate    | DNV 18.0116 X      |

## EAC Ex

|                |   |
|----------------|---|
| Identification | Ex ec nC IIC T4 Gc  |
| Certificate    | BY/112 02.01 TP012 103.01 00078   |
| Temperature    | B   |
| Humidity       | B   |
| Vibration      | A   |
| EMC            | A   |
| Enclosure      | Required protection according to the Rules shall be provided upon installation on board |

## EMC data

|                               |                                |
|-------------------------------|--------------------------------|
| Electromagnetic compatibility | Conformance with EMC directive |
| Noise immunity                | EN 61000-6-2                   |
| Noise emission                | EN 61000-6-4                   |

## Electromagnetic HF field

|                       |                          |
|-----------------------|--------------------------|
| Designation           | Electromagnetic RF field |
| Standards/regulations | EN 61000-4-3             |

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|                      |   |
|----------------------|---|
| Evaluation criterion | A |
|----------------------|---|

## Fast transients (burst)

|                       |                         |
|-----------------------|-------------------------|
| Designation           | Fast transients (burst) |
| Standards/regulations | EN 61000-4-4            |
| Evaluation criterion  | A                       |

## Conducted interference

|                       |                         |
|-----------------------|-------------------------|
| Designation           | Conducted interferences |
| Standards/regulations | EN 61000-4-6            |
| Evaluation criterion  | A                       |

## Standards and regulations

|                      |                 |
|----------------------|-----------------|
| Electrical isolation | 3-way isolation |
|----------------------|-----------------|

## GB Standard

|                       |             |
|-----------------------|-------------|
| Standards/regulations | GB/T 3836.1 |
|                       | GB/T 3836.3 |
|                       | GB/T 3836.8 |

## Mounting

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

# MACX MCR-SL-2NAM-R-UP-SP - Isolation switch amplifier

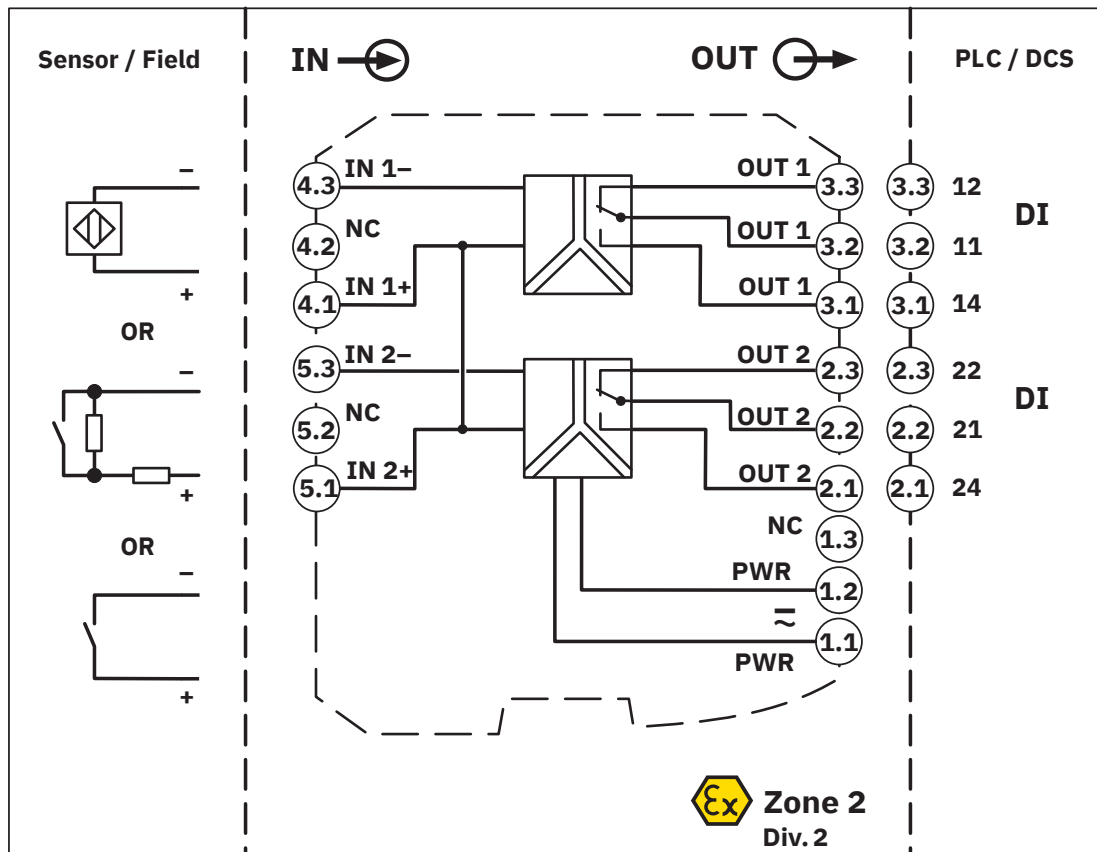


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## Drawings

Block diagram





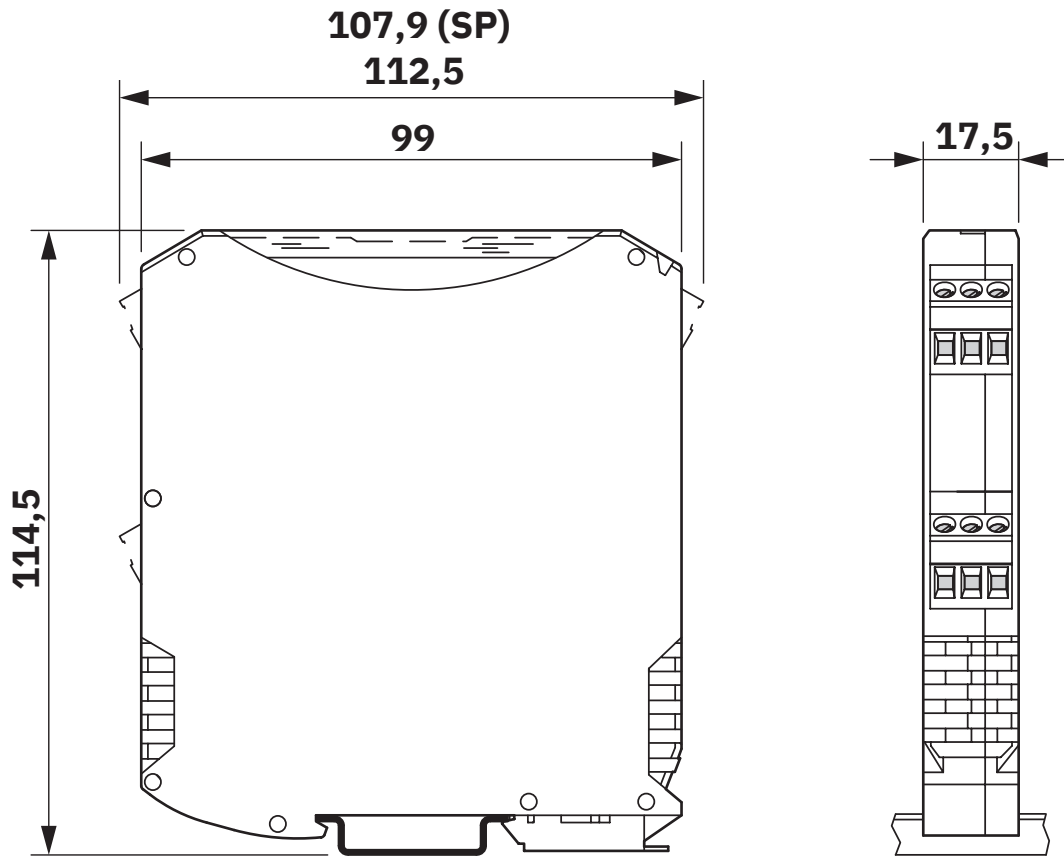
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Dimensional drawing



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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/gb/products/2924304>

### Functional Safety

Approval ID: 09/12-02 R010 V1R0

### DNV

Approval ID: TAA000020C



### IECEX

Approval ID: IECEX IBE 10.0002X



### EAC Ex

Approval ID: TP012 103.01 00078



### ATEX

Approval ID: IBExU20ATEXB011X

### INMETRO

Approval ID: DNV 18.0116 X



### CCC

Approval ID: 2021122304114199

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## Classifications

### ECLASS

|             |          |
|-------------|----------|
| ECLASS-11.0 | 27210121 |
| ECLASS-12.0 | 27210121 |
| ECLASS-13.0 | 27210121 |

### ETIM

|          |          |
|----------|----------|
| ETIM 9.0 | EC001485 |
|----------|----------|

### UNSPSC

|             |          |
|-------------|----------|
| UNSPSC 21.0 | 39121000 |
|-------------|----------|

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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                                | 223a7cff-5da7-4c2a-85bd-04482bc32cb4 |

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