

MACX MCR-EX-SL-NAM-R-SP - Isolation switch amplifier



2924045

<https://www.phoenixcontact.com/gb/products/2924045>

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Ex i NAMUR isolation amplifier. For operating proximity sensors and switches in a potentially explosive area. The signals are transmitted by a relay output (changeover contact) to a safe area. Line fault detection (LFD), 3-way isolation, SIL 2.

Your advantages

- Power supply and error indication possible via DIN rail connector
- 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
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia] IIC
- Signal output relay (changeover contact)
- 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

Commercial data

| | |
|--------------------------------------|---------------|
| Item number | 2924045 |
| Packing unit | 1 pc |
| Minimum order quantity | 1 pc |
| Sales key | DK1213 |
| Product key | DK1213 |
| GTIN | 4046356338059 |
| Weight per piece (including packing) | 170 g |
| Weight per piece (excluding packing) | 131.5 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 |
| Application | Digital IN |
| No. of channels | 1 |
| 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 | < 650 mW |

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 _{PP} |
| Overvoltage category | II |
| Pollution degree | 2 |

Electrical isolation Input/output/supply, DIN rail connector IEC/EN 61010-1

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

Electrical isolation Output/input, supply, TBUS IEC/EN 61010-1

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

Electrical isolation Input/supply, DIN rail connector IEC/EN 60079-11

| | |
|--------------------------|---------------------|
| Standards/regulations | IEC/EN 60079-11 |
| Rated insulation voltage | 375 V _{PP} |
| Overvoltage category | II |

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| | |
|------------------|---|
| Pollution degree | 2 |
|------------------|---|

Supply

| | |
|--------------------------|-------------------------|
| Nominal supply voltage | 24 V DC -20 % ... +25 % |
| Supply voltage range | 19.2 V DC ... 30 V DC |
| Max. current consumption | 21 mA (24 V DC) |
| Power dissipation | < 1 W |
| Power consumption | < 1 W |

Input data

Signal: NAMUR

| | |
|---|--|
| Description of the input | intrinsically safe |
| Number of inputs | 1 |
| 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 |
| Open-circuit voltage | 8 V DC |

Output data

Switching: Relay

| | |
|---------------------------|---------------------------------------|
| Contact switching type | 1 changeover contact |
| Contact material | AgSnO ₂ , hard gold-plated |
| Maximum switching voltage | 250 V AC (2 A) |
| | 120 V DC (0.2 A) |
| | 30 V DC (2 A) |
| Maximum switching power | 500 VA |
| Recommended minimum load | 5 V / 10 mA |
| Switching frequency | ≤ 20 Hz (without load) |

Signal

| | |
|-------------------|---|
| Number of outputs | 1 |
|-------------------|---|

Connection data

| | |
|----------------------------------|---|
| Connection method | Push-in connection |
| Stripping length | 10 mm |
| Conductor cross-section rigid | 0.2 mm ² ... 2.5 mm ² |
| Conductor cross-section flexible | 0.2 mm ² ... 2.5 mm ² |

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| | |
|---|---|
| Conductor cross-section flexible (2 conductors with same cross section) | 0.25 mm ² ... 0.34 mm ² (TWIN ferrule without plastic sleeve) |
| | 0.5 mm ² ... 1.5 mm ² (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 |
| Ex i circuits (EPL) | [Ga] |
| | [Da] |
| | [Ma] |
| | [Div. 1] |

Safety data

| | |
|--|--|
| Max. internal inductance L_i | negligible |
| Max. internal capacitance C_i | 11 nF |
| Max. output voltage U_o | 9.6 V |
| Max. output current I_o | 10 mA |
| Max. output power P_o | 25 mW |
| Safety-related maximum voltage U_m | 253 V AC |
| | 125 V DC |
| I/A/I (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o | 1000 mH / 210 μ F |
| IIB/IIIC (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o | 1000 mH / 26 μ F |
| IIC (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o | 300 mH / 3.6 μ F |
| IIC (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o | 100 mH / 500 nF, 50 mH / 570 nF, 5 mH / 590 nF |
| I/IIIB/IIA/IIIC (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o | 100 mH / 1 μ F |

Interfaces

Data

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

Signaling

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

Dimensions

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| | |
|---------------------|--|
| Dimensional drawing | |
| Width | 12.5 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 (Housing) | V0 (Housing) |
| Housing material | PA 6.6-FR |

Environmental and real-life conditions

Ambient conditions

| | |
|--|---|
| Degree of protection | IP20 (not assessed by UL) |
| 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) |
| Permissible humidity (storage/transport) | 5 % ... 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 |

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| | |
|---------------------------------|---|
| | -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 |

ATEX

| | |
|----------------|---|
| Identification | Ⓜ II (1) G [Ex ia Ga] IIC |
| | Ⓜ II (1) D [Ex ia Da] IIIC |
| | Ⓜ II 3 (1) G Ex ec [ia Ga] nC IIC T4 Gc |
| | Ⓜ I (M1) [Ex ia Ma] I |
| Certificate | IBExU 07 ATEX 1069 X |

IECEX

| | |
|----------------|----------------------------|
| Identification | [Ex ia Ga] IIC |
| | [Ex ia Da] IIIC |
| | Ex ec [ia Ga] nC IIC T4 Gc |
| | [Ex ia Ma] I |
| Certificate | IECEX IBE 08.0001X |

CCC / China-Ex

| | |
|----------------|----------------------------|
| Identification | [Ex ia Ga] IIC |
| | [Ex ia Da] IIIC |
| | Ex ec nC [ia Ga] IIC T4 Gc |
| Certificate | 2022122316115975 |

UL, USA/Canada

| | |
|----------------|---|
| Identification | UL 61010 Listed |
| | Class I, Div. 2, Groups A, B, C, D T4 |
| | Class I, Div. 2, Groups IIC, IIB, IIA T4 |
| | Associated apparatus for use in Class I, Division 1, Groups A,B,C,D |
| | Associated apparatus for use in Class II, Div.1 Groups E,F,G |
| | Associated apparatus for use in Class III, Division 1 |
| | Associated apparatus for use in Class I, Zone 0,1,2, Groups IIC,IIB,IIA |
| Certificate | Ⓜ-Ⓜ C.D.-No 83104549 |

KC-s

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| | |
|----------------|-----------------|
| Identification | [Ex ia] IIC/IIB |
| Certificate | 17-KA4BO-0408X |

Shipbuilding approval

| | |
|-------------|-------------------|
| Certificate | DNV GL TAA00000AG |
|-------------|-------------------|

Safety Integrity Level (SIL, IEC 61508)

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

Systematic Capability

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

INMETRO

| | |
|----------------|----------------------------|
| Identification | [Ex ia Ga] IIC |
| | [Ex ia Da] IIC |
| | Ex ec nC [ia Ga] IIC T4 Gc |
| | [Ex ia Ma] I |
| Certificate | DNV 18.0114 X |

Shipbuilding data

| | |
|-------------|---|
| Temperature | B |
| Humidity | B |
| Vibration | A |
| EMC | B |
| Enclosure | Required protection according to the Rules shall be provided upon installation on board |

EMC data

| | |
|----------------|--------------|
| Noise immunity | EN 61000-6-2 |
| | EN 61326 |

Standards and regulations

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

GB Standard

| | |
|-----------------------|-------------|
| Standards/regulations | GB/T 3836.1 |
| | GB/T 3836.3 |
| | GB/T 3836.4 |
| | GB/T 3836.8 |

Mounting

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

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Drawings

Dimensional drawing



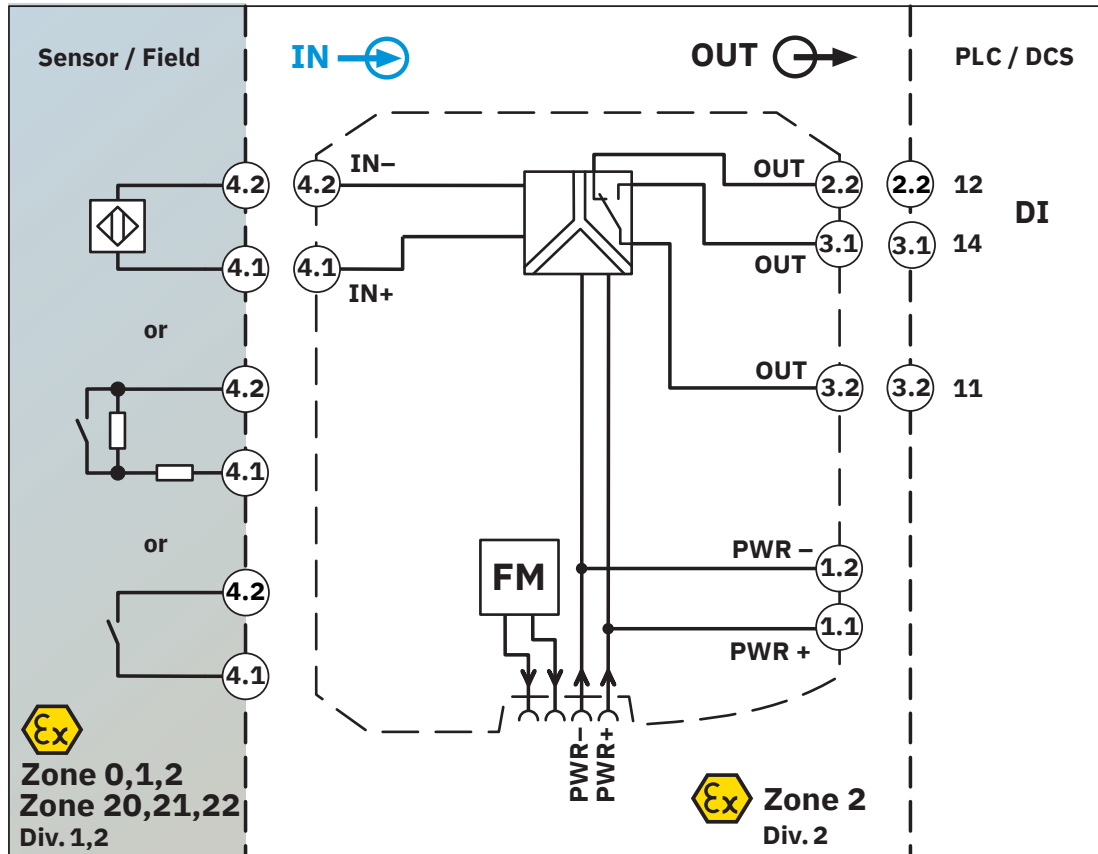
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Block diagram



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Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/gb/products/2924045>

 **UL Listed**
Approval ID: E330267


 **cUL Listed**
Approval ID: E330267


Functional Safety
Approval ID: 07-06-39 R005 V2R2

DNV
Approval ID: TAA00000AG

ECAS
Approval ID: 163683 E25 08 169506


TUEV Austria FS
Approval ID: IN-AT-AS-24-00163

 **EAC Ex**
Approval ID: TR TS_S_103.01.00078

 **IECEx**
Approval ID: IECEx IBE 08.0001X

 **cUL Listed**
Approval ID: E199827

 **UL Listed**
Approval ID: E199827

 **ATEX**
Approval ID: IBEExU07ATEX1069

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INMETRO

Approval ID: DNV 18.0114 X



KC-s

Approval ID: 17-KA4BO-0408X



CCC

Approval ID: 2022122316115975

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Classifications

ECLASS

| | |
|-------------|----------|
| ECLASS-13.0 | 27210121 |
| ECLASS-15.0 | 27210121 |

ETIM

| | |
|-----------|----------|
| ETIM 10.0 | 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) |
| | 2,2',6,6'-tetrabromo-4,4'-isopropylidenediphenol(CAS: 79-94-7) |
| SCIP | 501c891d-a118-4e8b-bbb5-3e252726e051 |

EF3.1 Climate Change

| | |
|---------|---------------|
| CO2e kg | 4.445 kg CO2e |
|---------|---------------|

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