# MACX MCR-EX-SL-NAM-2T - NAMUR isolation switch amplifier

2865463

https://www.phoenixcontact.com/us/products/2865463

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Ex i-NAMUR signal conditioner for operating proximity sensors and switches in the Ex area. The signals are transmitted to the safe area via 2 transistor outputs (passive). number of channels: 1, Standard configuration, 3-way isolation, Line fault detection, Safety Integrity Level (SIL, IEC 61508): 2, Systematic Capability: 3, Screw connection

## Your advantages

- Power supply and error indication possible via DIN rail connector
- Up to SIL 2 in accordance with EN 61508
- Installation in zone 2, protection type "n" (EN 60079-15) permitted
- Signal output 2 can also be used as an error signaling output
- Line fault detection (LFD), can be activated/deactivated, error indicated by flashing red LED with disabling of transistor output
- LED indicators for supply voltage, switching state, and malfunction in accordance with NAMUR NE 44
- 4-way electrical isolation
- Direction of operation can be selected (operating or closed circuit current behavior)
- 2 transistor signal outputs (passive); up to 5 kHz
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia] IIC

## Commercial data

| | |
|---|---|
| Item number | 2865463 |
| Packing unit | 1 pc |
| Minimum order quantity | 1 pc |
| Sales key | C430 |
| Product key | DK1213 |
| GTIN | 4046356160483 |
| Weight per piece (including packing) | 175.3 g |
| Weight per piece (excluding packing) | 130.8 g |
| Customs tariff number | 85365019 |
| Country of origin | DE |

# 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 |
| Line monitoring | Line fault detection |

### Electrical isolation

| | |
|---|---|
| Overvoltage category | II |
| Pollution degree | 2 |

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

| | |
|---|---|
| Standards/regulations | IEC/EN 60079-11 |
| Rated insulation voltage | 375 $V_{PP}$ |

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

| | |
|---|---|
| Standards/regulations | IEC/EN 60079-11 |
| Rated insulation voltage | 375 $V_{PP}$ |

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

| | |
|---|---|
| Standards/regulations | IEC/EN 61010-1 |
| Rated insulation voltage | 300 $V_{rms}$ |
| Test voltage | 2.5 kV AC (50 Hz, 60 s) |
| Insulation | Safe isolation |

### Electrical isolation Output 1/output 2 IEC/EN 61010-1

| | |
|---|---|
| Standards/regulations | IEC/EN 61010-1 |
| Rated insulation voltage | 50 $V_{rms}$ |
| Test voltage | 1 kV AC (50 Hz, 60 s) |
| Insulation | Basic insulation |

### Supply

| | |
|---|---|
| Nominal supply voltage | 24 V DC -20 % ... +25 % |

| | |
|---|---|
| Supply voltage range | 19.2 V DC ... 30 V DC |
| Max. current consumption | < 28 mA (24 V DC) |
| Power dissipation | ≤ 800 mW |
| Power consumption | ≤ 800 mW |

## 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: Transistor

| | |
|---|---|
| Output description | passive |
| Minimum switching voltage | 3 V DC |
| Maximum switching voltage | 30 V DC |
| Drop (ΔU) | < 1.4 V |
| Max. switching current | 50 mA (short-circuit-proof) |
| Min. switching current | 5 mA (short-circuit-proof) |
| Switching frequency | ≤ 5 kHz |

Signal

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

## Connection data

| | |
|---|---|
| Connection method | Screw connection |
| Stripping length | 7 mm |
| Screw thread | M3 |
| Conductor cross-section rigid | 0.2 mm² ... 2.5 mm² |
| Conductor cross-section flexible | 0.2 mm² ... 2.5 mm² |
| Conductor cross-section AWG | 24 ... 14 |
| Tightening torque | 0.5 Nm ... 0.6 Nm |

Test socket

| | |
|---|---|
| Max. diameter | 2 mm |

## 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 $C_i$ | 1.1 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 |
| IIC (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$ | 300 mH / 3.6 µF |
| IIB/IIIC (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$ | 1000 mH / 26 µF |
| IIA (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$ | 1000 mH / 210 µF |
| IIC (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$ | 100 mH / 510 nF, 50 mH / 580 nF, 5 mH / 600 nF |
| IIB/IIA/IIIC (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$ | 100 mH / 1 µF |

## Interfaces

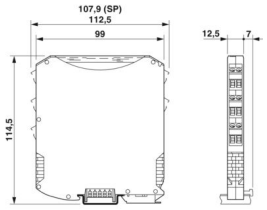
Data

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

## Signaling

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

## Dimensions

| | |
|---|---|
| Dimensional drawing |   |
| Width | 12.5 mm |
| Height | 112.5 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 |

## Characteristics

Safety data

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

Safety data

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

## 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 ... 80 °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 | 265 V AC/DC ($U_{Isolation\ "ec"}$: 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) |
| Safety-related maximum voltage $U_m$ | 190 V AC |
| | 110 V DC |
| Rated insulation voltage | 190 V AC/DC ($U_{Isolation\ "ec"}$: 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) |
| Safety-related maximum voltage $U_m$ | 60 V |
| Rated insulation voltage | 60 V AC/DC ($U_{Isolation\ "ec"}$: 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) |
| Safety-related maximum voltage $U_m$ | 60 V |
| Rated insulation voltage | 60 V AC/DC ($U_{Isolation\ "ec"}$: Supply, input / output) |

## Approvals

CE

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

ATEX

| | |
|---|---|
| Identification | Ⓔx II (1) G [Ex ia Ga] IIC |
| | Ⓔx II (1) D [Ex ia Da] IIIC |
| | Ⓔx II 3(1) G Ex ec [ia Ga] IIC T4 Gc |
| | Ⓔx I (M1) [Ex ia Ma] I |
| Certificate | IBExU 08 ATEX 1100 X |

IECEx

| | |
|---|---|
| Identification | [Ex ia Ga] IIC |
| | [Ex ia Da] IIIC |
| | Ex ec [ia Ga] IIC T4 Gc |
| | [Ex ia Ma] I |
| Certificate | IECEx IBE 08.0005X |

CCC / China-Ex

| | |
|---|---|
| Identification | [Ex ia Ga] IIC |
| | [Ex ia Da] IIIC |
| | Ex ec [ia Ga] IIC T4 Gc |
| Certificate | 2022122316115977 |

UL, USA/Canada

| | |
|---|---|
| Identification | Class I Div 2; IS for Class I, II, III Div 1 |
| Certificate | cULus C.D.-No 83104549 |

Shipbuilding approval

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

Safety Integrity Level (SIL, IEC 61508)

| | |
|---|---|
| Identification | 2 |
| Certificate | IN-AT-AS-MRL-25-00008 |

Systematic Capability

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

INMETRO

| | |
|---|---|
| Identification | [Ex ia Ga] IIC |
| | [Ex ia Da] IIIC |
| | Ex ec [ia Ga] IIC T4 Gc |
| | [Ex ia Ma] I |
| Certificate | DNV 18.0141 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

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

Noise emission

| | |
|---|---|
| Standards/regulations | EN 61000-6-4 |

Electromagnetic HF field

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

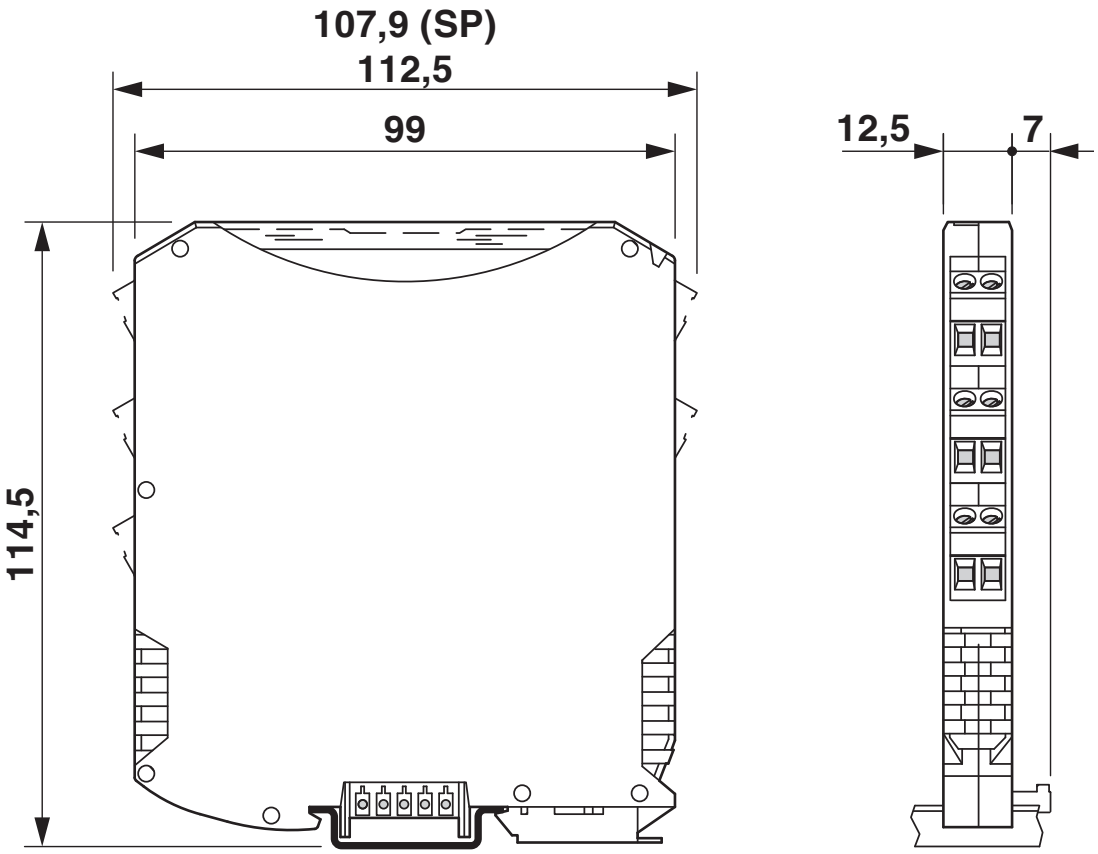
| | |
|---|---|
| Standards/regulations | GB/T 3836.1 |
| | GB/T 3836.3 |
| | GB/T 3836.4 |

## Mounting

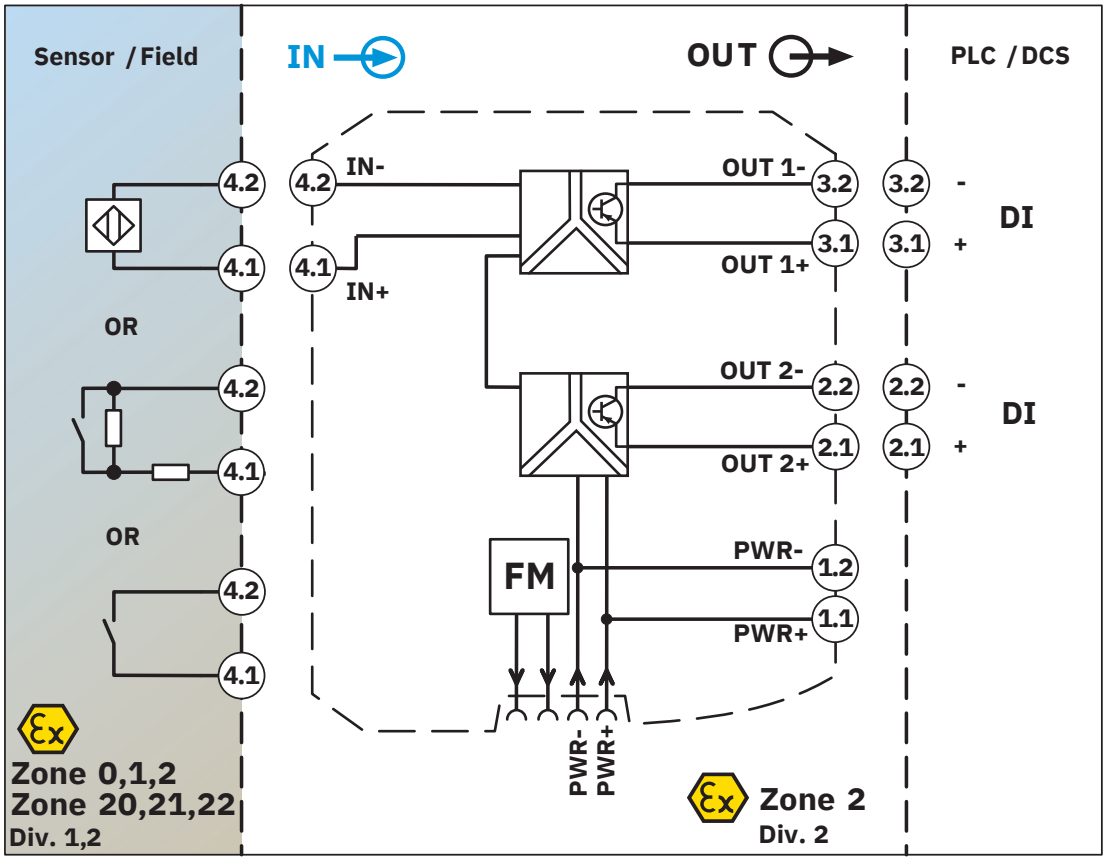
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|---|---|
| Mounting type | DIN rail mounting |

## Drawings

Dimensional drawing



Block diagram



## Approvals

To download certificates, visit the product detail page: https://www.phoenixcontact.com/us/products/2865463

**UL Listed**
Approval ID: E330267

**cUL Listed**
Approval ID: E330267

**DNV**
Approval ID: TAA00000AG

**TUEV Austria FS**
Approval ID: IN-AT-AS-MRL-25-0008

**ECAS**
Approval ID: 163682 E25 08 169507

**cULus Listed**
Approval ID: E330267

**DNV**
Approval ID: TAA000020C

**IECEx**
Approval ID: IECEx IBE 08.0005X

**cUL Listed**
Approval ID: E199827

**UL Listed**
Approval ID: E199827

**ATEX**
Approval ID: IBExU 08 ATEX 1100

**INMETRO**
Approval ID: DNV 18.0141 X

**CCC**
Approval ID: 2022122316115977

**cULus Listed**
Approval ID: E199827

## Classifications

### ECLASS

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

### ETIM

| | |
|---|---|
| ETIM 10.0 | EC001485 |

### UNSPSC

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

## Environmental product compliance

EU RoHS

| | |
|---|---|
| Fulfills EU RoHS substance requirements | Yes |
| Exemption | 7(a), 7(a)-I, 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 | f3f751fe-1081-46ac-89ca-8e324e048610 |


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