

MACX MCR-EX-SL-2NAM-T - Isolation amplifier



2865489

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Ex i NAMUR isolating amplifier, 2-channel. For operating proximity sensors and switches in Ex areas. The signals are transmitted via transistor outputs (passive) to the safe area. Line fault detection (LFD), 3-way isolation, SIL 2.

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
- Line fault detection (LFD), can be activated/deactivated, error indicated by flashing red LED with disabling of transistor output
- Transistor signal output (passive); up to 5 kHz
- Direction of operation can be selected (operating or closed circuit current behavior)
- LED indicators for supply voltage, switching state, and malfunction in accordance with NAMUR NE 44
- 3-way electrical isolation
- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia] IIC

Technical data

Notes

Utilization restriction

| | |
|----------|---|
| EMC note | EMC: class A product, see manufacturer's declaration in the download area |
|----------|---|

Product properties

| | |
|-----------------|---|
| Product type | Isolating switch transf. |
| Product family | MACX Analog |
| Application | Digital IN |
| No. of channels | 2 |
| Type | Ex i signal conditioners with SIL functional safety |
| Configuration | DIP switches |

Insulation characteristics: GB Standard

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

System properties

Functionality

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

Electrical properties

| | |
|---|-----------------|
| Electrical isolation | 3-way isolation |
| Electrical isolation between input and output | yes |

Electrical isolation Input/output

| | |
|----------------------|---|
| Electrical isolation | 375 V (Peak value in accordance with IEC/EN 60079-11) |
|----------------------|---|

Electrical isolation Input/output/supply, DIN rail connector

| | |
|--------------------------|--|
| Rated insulation voltage | 300 V _{rms} |
| Test voltage | 2.5 kV AC (50 Hz, 60 s) |
| Insulation | Safe isolation in accordance with IEC/EN 61010-1 |

Electrical isolation Input/supply, DIN rail connector

| | |
|----------------------|---|
| Electrical isolation | 375 V (Peak value in accordance with IEC/EN 60079-11) |
|----------------------|---|

Electrical isolation Output 1/output 2

| | |
|--------------------------|--|
| Rated insulation voltage | 50 V _{rms} |
| Test voltage | 1 kV AC (50 Hz, 60 s) |
| Insulation | Basic insulation in accordance with IEC/EN 61010-1 |

Supply

| | |
|------------------------|--|
| Nominal supply voltage | 24 V DC |
| Supply voltage range | 19.2 V DC ... 30 V DC (24 V DC, -20 % ... +25 %) |

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| | |
|--------------------------|-------------------|
| Max. current consumption | < 34 mA (24 V DC) |
| Power dissipation | ≤ 1000 mW |
| Power consumption | 0.8 W |

Input data

Signal: NAMUR

| | |
|---|---|
| Description of the input | Intrinsically safe |
| 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: 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 mm ² ... 2.5 mm ² |
| Conductor cross section flexible | 0.2 mm ² ... 2.5 mm ² |
| Conductor cross section AWG | 24 ... 14 |
| Tightening torque | 0.5 Nm ... 0.6 Nm |

Test socket

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

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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 |
| IIA (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 / 510 nF, 50 mH / 580 nF, 5 mH / 600 nF, 1 mH / 600 nF, 10 μ H / 600 nF |
| IIB/IIA/IIIC (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o | 100 mH / 1 μ F, 5 mH / 1 μ F, 1 mH / 1 μ F, 10 μ H / 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

| | |
|---------------------|---------|
| Dimensional drawing | |
| Width | 12.5 mm |

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| | |
|-----------------|--|
| 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 | 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 ... 70 °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 ($U_{\text{Isolation "ec"}}$: 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 ($U_{\text{Isolation "ec"}}$: 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 |

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

UKCA Ex (UKEX)

| | |
|----------------|--------------------------------------|
| Identification | ⊕ I (M1) [Ex ia Ma] I |
| | ⊕ II (1) G [Ex ia Ga] IIC |
| | ⊕ II (1) D [Ex ia Da] IIIC |
| | ⊕ II 3 (1) G Ex ec [ia Ga] IIC T4 Gc |
| Certificate | CML 22UKEX3527X |

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 iaD] |
| | Ex nA [ia Ga] IIC T4 Gc |
| Certificate | NEPSI GYJ20.1313X |

UL, USA/Canada

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

Shipbuilding approval

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

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Safety Integrity Level (SIL, IEC 61508)

| | |
|----------------|---|
| Identification | 2 |
|----------------|---|

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 |

EAC Ex

| | |
|----------------|-------------------------|
| Identification | Ex [Ex ia Ga] IIC |
| | Ex [Ex ia Da] IIIC |
| Certificate | RU C-DE.AB72.B.00093/19 |

DNV GL 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 |
| Electromagnetic compatibility | Conformance with EMC directive |
| Noise emission | 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

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| | |
|-----------------------|------------|
| Standards/regulations | GB 3626.20 |
| | GB 3836.1 |
| | GB 3836.4 |
| | GB 3836.8 |
| | GB 12476.1 |
| | GB 12476.4 |

Mounting

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

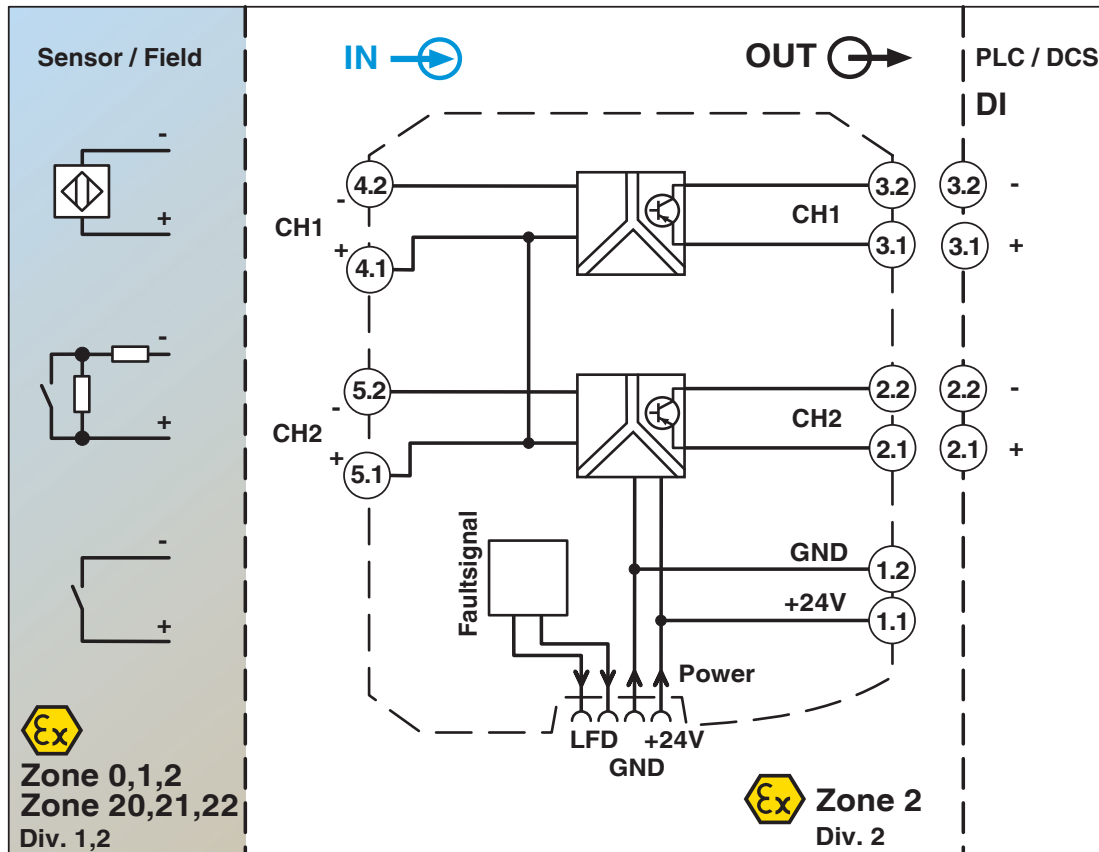
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Drawings

Block diagram



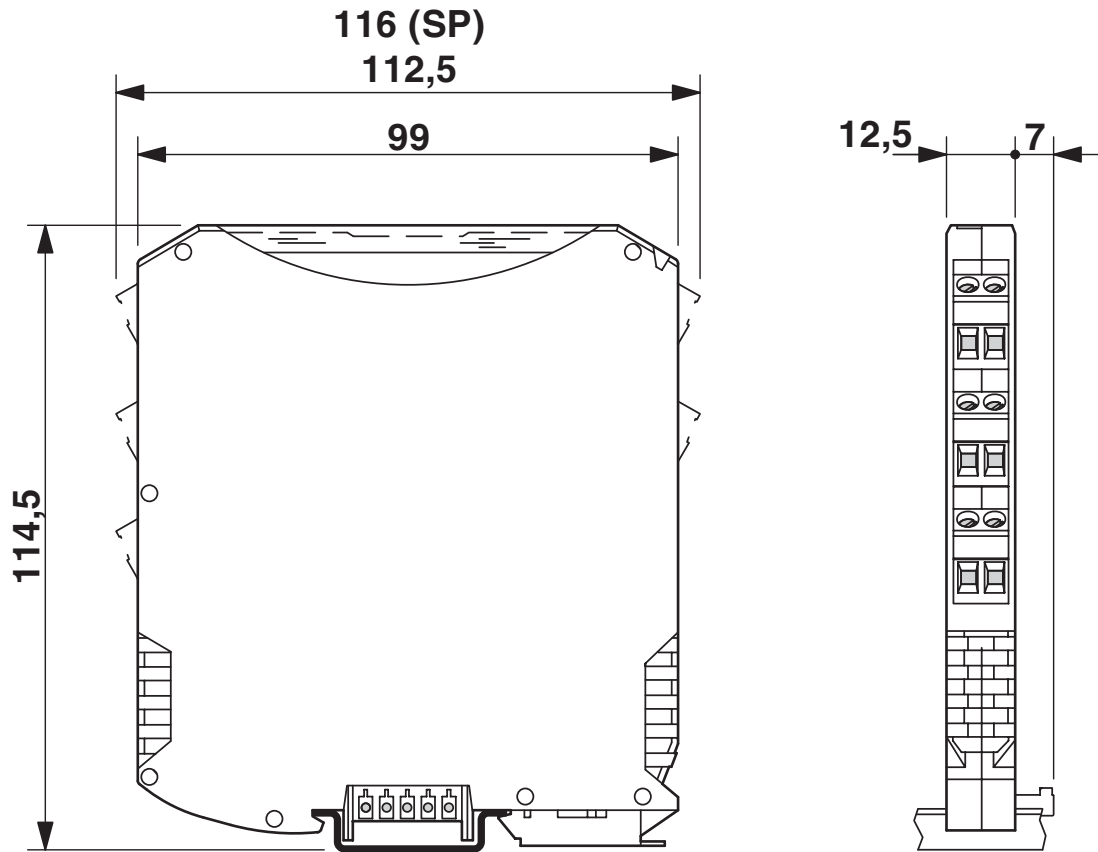
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Dimensional drawing



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