

Isolation amplifier - MACX MCR-SL-2NAM-RO-SP - 2924294

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NAMUR 2-channel signal conditioner for operating proximity sensors and switches. The signals are transferred to the control level using relay outputs (N/O contact). Line fault detection, 3-way electrical isolation, SIL 2, Push-in connection.

Your advantages

- ✓ Power supply and error indication possible via DIN rail connector
- ✓ Up to SIL 2 according to EN 61508
- ✓ Installation in zone 2, protection type "n" (EN 60079-15) permitted
- ✓ Line fault detection (LFD), can be activated/deactivated, error indicated by red flashing LED with de-excitation of output relay
- ✓ LED indicators for supply voltage, switching state, and malfunction according to NAMUR NE 44
- ✓ Direction of operation can be selected (operating or closed circuit current behavior)
- ✓ 3-way electrical isolation
- ✓ 2-channel
- ✓ Relay signal output (N/O contact)
- ✓ Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit



Key Commercial Data

| | |
|--------------------------------------|---|
| Packing unit | 1 pc |
| GTIN |  4 046356 492096 |
| GTIN | 4046356492096 |
| Weight per Piece (excluding packing) | 140.000 g |
| Custom tariff number | 85437090 |
| Country of origin | Germany |

Technical data

Note

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

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Technical data

Dimensions

| | |
|--------|----------|
| Width | 12.5 mm |
| Height | 116.7 mm |
| Depth | 113.7 mm |

Ambient conditions

| | |
|---|--|
| Ambient temperature (operation) | -20 °C ... 60 °C (Any mounting position) |
| Ambient temperature (storage/transport) | -40 °C ... 85 °C |
| Maximum altitude | ≤ 2000 m |
| Permissible humidity (operation) | 5 % ... 95 % (non-condensing) |
| Noise immunity | EN 61000-6-2 EN 61326 |

Input data

| | |
|---------------------------------|--|
| Non-load voltage | ~ 8 V DC |
| Switching points (attenuated) | < 1.2 mA (blocking) |
| Switching points (unattenuated) | > 2.1 mA (conductive) |
| Available input sources | NAMUR proximity sensors (EN 60947-5-6) |
| Short-circuit current | ~ 8 mA |
| Switching hysteresis | < 0.2 mA |
| Line fault detection | Break 0.05 mA < IIN < 0.35 mA |
| | Short circuit 100 Ω < RSensor < 360 Ω |

Output data

| | |
|----------------------------|---------------------------------------|
| Switching output | Relay output |
| Contact type | 1 N/O contact per channel |
| 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 capacity | 500 VA |
| Mechanical service life | 10 ⁷ cycles |
| Switching frequency | ≤ 20 Hz (without load) |

Power supply

| | |
|--------------------------|---|
| Nominal supply voltage | 24 V DC |
| Supply voltage range | 19.2 V DC ... 30 V DC (24 V DC -20%...+25%) |
| Max. current consumption | 35 mA (24 V DC) |
| Power dissipation | < 1 W |
| Power consumption | < 1 W |

General

| | |
|-----------------|------------------------------|
| No. of channels | 2 |
| Status display | Green LED (supply voltage) |
| | LED yellow (switching state) |

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General

| | |
|-------------------------------|---|
| | Red LED (line errors) |
| Degree of pollution | 2 |
| Overvoltage category | III |
| Electromagnetic compatibility | Conformance with EMC directive |
| Interference emission | EN 61000-6-4 |
| Housing material | PA 6.6-FR |
| Color | gray |
| Designation | Input/output |
| Electrical isolation | 375 V (Peak value in accordance with EN 60079-11) |
| Designation | Input/supply, DIN rail connector |
| Electrical isolation | 375 V (Peak value in accordance with EN 60079-11) |
| | 300 V _{rms} (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) |
| Designation | Output 1/output 2/input, power supply, DIN rail connector |
| Electrical isolation | 300 V _{rms} (Rated insulation voltage (overvoltage category III; degree of pollution 2, safe isolation as per EN 61010-1)) |
| Designation | Output 1/output 2/input/power supply, DIN rail connector |
| Electrical isolation | 2.5 kV (50 Hz, 1 min., test voltage) |
| Conformance | CE-compliant, additionally EN 61326-1 |
| ATEX | # II 3 G Ex nA nC IIC T4 Gc X |
| UL, USA/Canada | UL 508 Listed |
| | UL 61010 Listed |
| | Class I, Div. 2, Groups A, B, C, D T4 |
| | Class I, Zone 2, Group IIC T4 |
| SIL | 2 |

Safety characteristic data

| | |
|--|--|
| Integrity requirement | IEC 61508 - Low demand |
| Designation | Non-inverted operation |
| Equipment type | Type A |
| Safety Integrity Level (SIL) | 2 |
| Safe Failure Fraction (SFF) | 78 % |
| λ_{SU} | 2.49×10^{-7} (249 FIT) |
| λ_{SD} | 6×10^{-9} (6 FIT) |
| λ_{DU} | 6.4×10^{-8} (64 FIT) |
| λ_{DD} | 7×10^{-9} (7 FIT) |
| Probability of a hazardous failure on demand (PFD _{AVG}) | 3.09×10^{-4} (1 year) |
| | 6.17×10^{-4} (2 years) |
| | 1.54×10^{-3} (5 years) |
| Diagnostic coverage (DC) | DC _S = 2.4 %, DC _D = 9 % |
| Integrity requirement | IEC 61508 - Low demand |

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Technical data

Safety characteristic data

| | |
|--|--|
| Designation | Inverted operation |
| Equipment type | Type A |
| Safety Integrity Level (SIL) | 2 |
| Safe Failure Fraction (SFF) | 78 % |
| λ_{SU} | 2.48×10^{-7} (248 FIT) |
| λ_{SD} | 1×10^{-9} (1 FIT) |
| λ_{DU} | 6.2×10^{-8} (62 FIT) |
| λ_{DD} | 6×10^{-9} (6 FIT) |
| Probability of a hazardous failure on demand (PFD _{AVG}) | 3.01×10^{-4} (1 year) |
| | 6.02×10^{-4} (2 years) |
| | 1.5×10^{-3} (5 years) |
| Diagnostic coverage (DC) | DC _S = 0.4 %, DC _D = 8 % |
| Safety Integrity Level (SIL) | 1 |

EMC data

| | |
|-----------------------|--------------------------|
| Designation | Electromagnetic RF field |
| Standards/regulations | EN 61000-4-3 |
| Evaluation criterion | A |
| Designation | Fast transients (burst) |
| Standards/regulations | EN 61000-4-4 |
| Evaluation criterion | A |
| Designation | Conducted interferences |
| Standards/regulations | EN 61000-4-6 |
| Evaluation criterion | A |

Standards and Regulations

| | |
|-------------------------------|---------------------------------------|
| Electromagnetic compatibility | Conformance with EMC directive |
| Noise emission | EN 61000-6-4 |
| Designation | Electromagnetic RF field |
| Standards/regulations | EN 61000-4-3 |
| Evaluation criterion | A |
| Standards/regulations | EN 61000-4-4 |
| Designation | Conducted interferences |
| Standards/regulations | EN 61000-4-6 |
| Evaluation criterion | A |
| Conformance | CE-compliant, additionally EN 61326-1 |
| ATEX | # II 3 G Ex nA nC IIC T4 Gc X |
| UL, USA/Canada | UL 508 Listed |
| | UL 61010 Listed |
| | Class I, Div. 2, Groups A, B, C, D T4 |
| | Class I, Zone 2, Group IIC T4 |

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Technical data

Standards and Regulations

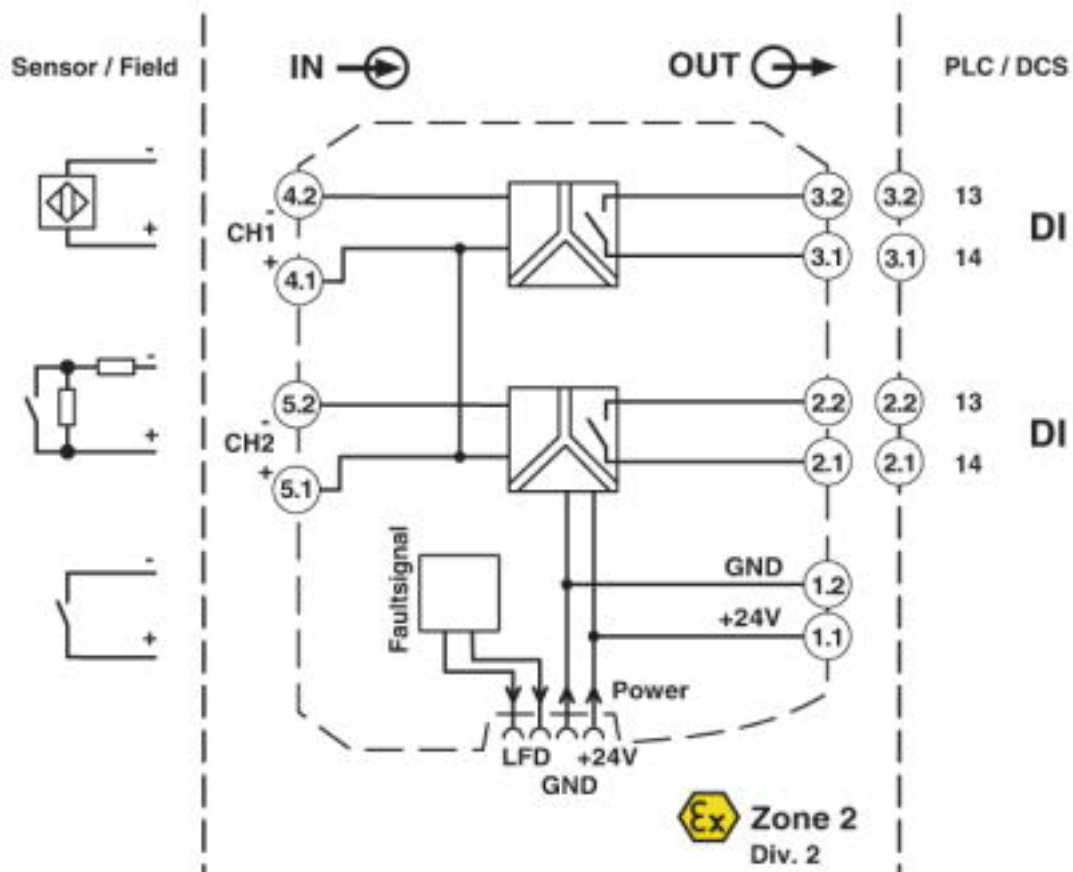
| | |
|--------------------|---|
| DNV GL-Temperature | B |
| DNV GL-Humidity | B |
| DNV GL-Vibration | A |
| DNV GL-EMC | B |
| DNV GL-Enclosure | Required protection according to the Rules shall be provided upon installation on board |

Environmental Product Compliance

| | |
|------------|---|
| REACH SVHC | Lead 7439-92-1 |
| China RoHS | Environmentally Friendly Use Period = 50 |
| | For details about hazardous substances go to tab "Downloads", Category "Manufacturer's declaration" |

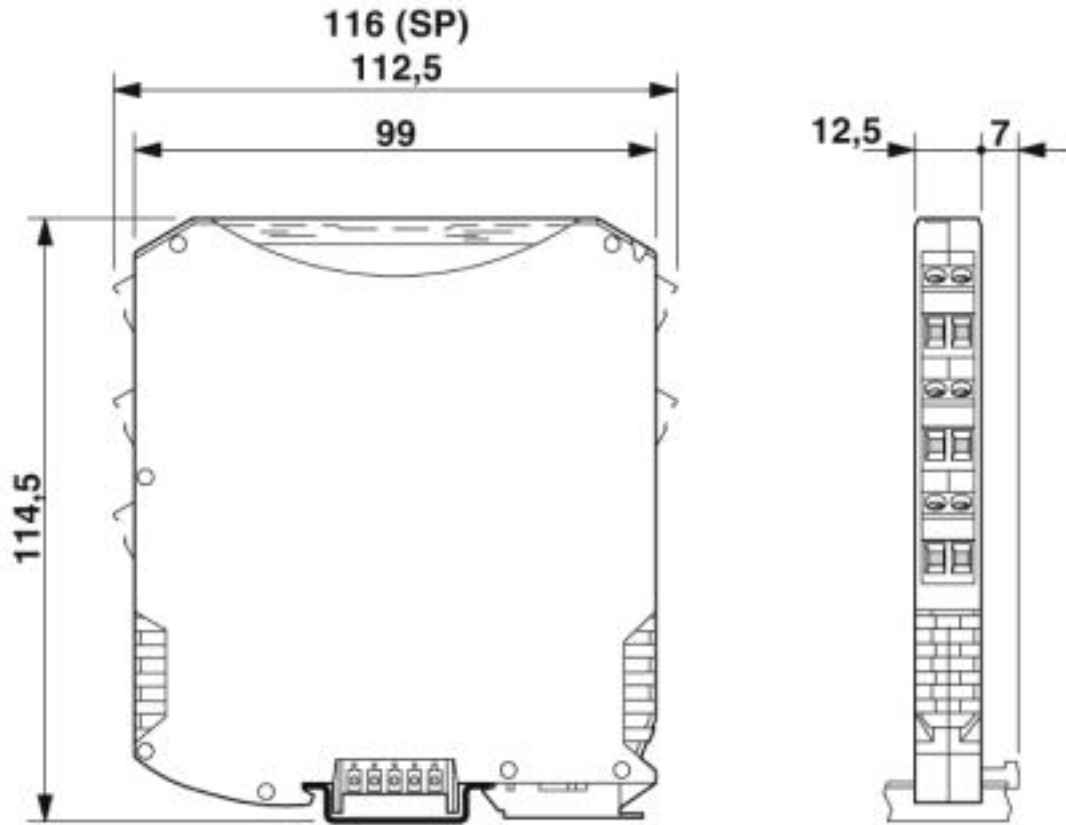
Drawings

Block diagram



Isolation amplifier - MACX MCR-SL-2NAM-RO-SP - 2924294

Dimensional drawing



Classifications

eCl@ss

| | |
|------------|----------|
| eCl@ss 4.0 | 27210100 |
| eCl@ss 4.1 | 27210100 |
| eCl@ss 5.0 | 27210100 |
| eCl@ss 5.1 | 27210100 |
| eCl@ss 6.0 | 27210100 |
| eCl@ss 7.0 | 27210121 |
| eCl@ss 8.0 | 27210121 |
| eCl@ss 9.0 | 27210121 |

ETIM

| | |
|----------|----------|
| ETIM 2.0 | EC001485 |
| ETIM 3.0 | EC001485 |
| ETIM 4.0 | EC001485 |
| ETIM 5.0 | EC001485 |
| ETIM 6.0 | EC001485 |
| ETIM 7.0 | EC001485 |

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Classifications

UNSPSC

| | |
|---------------|----------|
| UNSPSC 6.01 | 30211506 |
| UNSPSC 7.0901 | 39121008 |
| UNSPSC 11 | 39121008 |
| UNSPSC 12.01 | 39121008 |
| UNSPSC 13.2 | 39121008 |
| UNSPSC 18.0 | 39121008 |
| UNSPSC 19.0 | 39121008 |
| UNSPSC 20.0 | 39121008 |
| UNSPSC 21.0 | 39121008 |

Approvals

Approvals

Approvals

DNV GL / UL Listed / cUL Listed / Functional Safety / cULus Listed


Ex Approvals

ATEX / UL Listed / cUL Listed / EAC Ex / cULus Listed

Approval details

| | | | |
|--------|---|---|------------|
| DNV GL |  | https://approvalfinder.dnvgl.com/ | TAA00000AG |
|--------|---|---|------------|

| | | | |
|-----------|---|---|---------------|
| UL Listed |  | http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm | FILE E 330267 |
|-----------|---|---|---------------|

| | | | |
|------------|---|---|---------------|
| cUL Listed |  | http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm | FILE E 330267 |
|------------|---|---|---------------|

| | | | |
|-------------------|--|--|--------------------|
| Functional Safety | | | 07-06-39 R005 V2R2 |
|-------------------|--|--|--------------------|

| | | | |
|--------------|---|--|--|
| cULus Listed |  | | |
|--------------|---|--|--|

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Accessories

Accessories

Device marking

Plastic label - UC-EMLP (11X9) - 0819291



Plastic label, Sheet, white, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, PLOTMARK, CMS-P1-PLOTTER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 10

Plastic label - UC-EMLP (11X9) YE - 0822602



Plastic label, Sheet, yellow, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, PLOTMARK, CMS-P1-PLOTTER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 10

Plastic label - UC-EMLP (11X9) SR - 0828094



Plastic label, Sheet, silver, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, PLOTMARK, CMS-P1-PLOTTER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 10

Plastic label - US-EMLP (11X9) - 0828789



Plastic label, Card, white, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 135

Plastic label - US-EMLP (11X9) YE - 0828871



Plastic label, Card, yellow, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 135

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Accessories

Plastic label - US-EMLP (11X9) SR - 0828872



Plastic label, Card, silver, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 135

Device marker - LS-EMLP (11X9) WH - 0831678



Device marker, Sheet, white, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 255

Device marker - LS-EMLP (11X9) YE - 0831732



Device marker, Sheet, yellow, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 255

Device marker - LS-EMLP (11X9) SR - 0831705



Device marker, Sheet, silver, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 255

DIN rail connector

DIN rail bus connectors - ME 6,2 TBUS-2 1,5/5-ST-3,81 GN - 2869728



DIN rail connector for DIN rail mounting. Universal for TBUS housing. Gold-plated contacts, 5-pos.

End cover

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Accessories

End cover - D-UKK 3/5 - 2770024



End cover, length: 56 mm, width: 2.5 mm, height: 52 mm, color: gray

End cover - D-UKK 3/5 BU - 2770105



End cover, length: 56 mm, width: 2.5 mm, height: 62 mm, color: blue

Insulating sleeve

Insulating sleeve - MPS-IH BK - 0201731



Insulating sleeve, color: black

Insulating sleeve - MPS-IH GY - 0201728



Insulating sleeve, color: gray

Insulating sleeve - MPS-IH GN - 0201702



Insulating sleeve, color: green

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Insulating sleeve - MPS-IH YE - 0201692

Insulating sleeve, color: yellow



Insulating sleeve - MPS-IH BU - 0201689

Insulating sleeve, color: blue



Insulating sleeve - MPS-IH RD - 0201676

Insulating sleeve, color: red



Insulating sleeve - MPS-IH WH - 0201663

Insulating sleeve, color: white



Labeled device marker

Plastic label - UC-EMLP (11X9) CUS - 0824547

Plastic label, can be ordered: by sheet, white, labeled according to customer specifications, mounting type: adhesive, lettering field size: 11 x 9 mm



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Accessories

Plastic label - UC-EMLP (11X9) YE CUS - 0824548



Plastic label, can be ordered: by sheet, yellow, labeled according to customer specifications, mounting type: adhesive, lettering field size: 11 x 9 mm

Plastic label - UC-EMLP (11X9) SR CUS - 0828098



Plastic label, can be ordered: by sheet, silver, labeled according to customer specifications, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 10

Module carrier

Module carrier - TC-D37SUB-ADIO16-EX-P-UNI - 2924854



Universal termination carrier for connecting 16 MACX Analog Ex i signal conditioners to digital or analog I/O cards, via D-SUB connector, 37-pos. (1:1 connection)

Module carrier - TC-D37SUB-AIO16-EX-PS-UNI - 2902932



Universal termination carrier for connecting 16 MACX Analog Ex i signal conditioners to digital or analog I/O cards, via D-SUB connector, 37-pos. (1:1 connection), with HART multiplexer connection

Power module

Power and error message module - MACX MCR-PTB - 2865625



Power and fault signaling module with screw connection, including corresponding ME 17,5 TBUS 1,5/ 5-ST-3,81 GY DIN rail connector

Isolation amplifier - MACX MCR-SL-2NAM-RO-SP - 2924294

Accessories

Power and error message module - MACX MCR-PTB-SP - 2924184



Power and fault signaling module with Push-in connection, including corresponding ME 17,5 TBUS 1,5/ 5-ST-3,81 GY DIN rail connector

Test plug terminal block

Test plugs - MPS-MT - 0201744



Test plugs, with solder connection up to 1 mm² conductor cross section, color: gray

Component terminal block - UKK 5-2R/NAMUR - 2941662



Double-level terminal block, with preassembled resistors