# Signal conditioner - MACX MCR-UI-UI-SP-NC - 2811556

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Configurable 3-way isolating amplifier with safe electrical isolation, 24 V, power bridging. DIP switches on the front, over 1600 signal conversions can be set. Standard configuration (IN 0 ... 10 V/ OUT 0 ... 20 mA), spring-cage connection, SIL.

## Product Features

- Power supply possible via DIN rail connector
- Over 1600 signal conversions can be set via DIP switches on the front
- Installation in zone 2 permitted
- Up to SIL 2 according to EN 61508
- Active or passive output
- Status indicator for supply voltage
- Plug-in screw or spring-cage connection technology (Push-in technology)
- Analog signal conditioner for isolating, filtering, amplifying, and converting standard analog signals
- Configurable input and output signals, including bipolar current and voltage signals
- 3-way electrical isolation
- 10 kHz limit frequency for time-critical applications

## Key commercial data

| | |
|---|---|
| **package_quantity** | 1 |
| **GTIN** | 4046356467001 |

## Technical data

### Note:

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

### Dimensions

| | |
|---|---|
| **Width** | 12.5 mm |
| **Height** | 99 mm |
| **Depth** | 114.5 mm |

### Ambient conditions

| | |
|---|---|
| **Ambient temperature (operation)** | -20 °C ... 70 °C |
| **Ambient temperature (storage/transport)** | -40 °C ... 85 °C |

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## Technical data

### Ambient conditions

| | |
|---|---|
| **Maximum altitude** | ≤ 2000 m |
| **Degree of protection** | IP20 |

### Input data

| | |
|---|---|
| **Voltage input signal** | 0 mV ... 50 mV |
| **Voltage input signal** | 0 mV ... 60 mV |
| **Voltage input signal** | 0 mV ... 75 mV |
| **Voltage input signal** | 0 mV ... 100 mV |
| **Voltage input signal** | 0 mV ... 120 mV |
| **Voltage input signal** | 0 mV ... 150 mV |
| **Voltage input signal** | 0 mV ... 200 mV |
| **Voltage input signal** | 0 mV ... 300 mV |
| **Voltage input signal** | 0 mV ... 500 mV |
| **Voltage input signal** | 0 V ... 1 V |
| **Voltage input signal** | 0 V ... 1.5 V |
| **Voltage input signal** | 0 V ... 2 V |
| **Voltage input signal** | 0 V ... 3 V |
| **Voltage input signal** | 0 V ... 5 V |
| **Voltage input signal** | 0 V ... 10 V (please indicate if different setting when ordering) |
| **Voltage input signal** | 0 V ... 15 V |
| **Voltage input signal** | 0 V ... 20 V |
| **Voltage input signal** | 0 V ... 30 V |
| **Voltage input signal** | 0 V ... 50 V |
| **Voltage input signal** | 0 V ... 100 V |
| **Voltage input signal** | -50 mV ... 50 mV |
| **Voltage input signal** | -60 mV ... 60 mV |
| **Voltage input signal** | -75 mV ... 75 mV |
| **Voltage input signal** | -100 mV ... 100 mV |
| **Voltage input signal** | -120 mV ... 120 mV |
| **Voltage input signal** | -150 mV ... 150 mV |
| **Voltage input signal** | -200 mV ... 200 mV |
| **Voltage input signal** | -300 mV ... 300 mV |
| **Voltage input signal** | -500 mV ... 500 mV |
| **Voltage input signal** | -1 V ... 1 V |
| **Voltage input signal** | -1.5 V ... 1.5 V |
| **Voltage input signal** | -2 V ... 2 V |
| **Voltage input signal** | -3 V ... 3 V |
| **Voltage input signal** | -5 V ... 5 V |
| **Voltage input signal** | -10 V ... 10 V |
| **Voltage input signal** | -15 V ... 15 V |
| **Voltage input signal** | -20 V ... 20 V |
| **Voltage input signal** | -30 V ... 30 V |

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## Technical data

### Input data

| | |
|---|---|
| **Voltage input signal** | -50 V ... 50 V |
| **Voltage input signal** | -100 V ... 100 V |
| **Voltage input signal** | 1 V ... 5 V |
| **Voltage input signal** | 2 V ... 10 V |
| **Current input signal** | 0 mA ... 1 mA (Configurable via DIP switches) |
| **Current input signal** | 0 mA |
| **Current input signal** | 0 mA ... 2 mA |
| **Current input signal** | 0 mA ... 3 mA |
| **Current input signal** | 0 mA ... 5 mA |
| **Current input signal** | 0 mA ... 10 mA |
| **Current input signal** | 0 mA ... 15 mA |
| **Current input signal** | 0 mA ... 20 mA |
| **Current input signal** | 0 mA ... 30 mA |
| **Current input signal** | 0 mA ... 50 mA |
| **Current input signal** | 0 mA ... 100 mA |
| **Current input signal** | -1 mA ... 1 mA |
| **Current input signal** | -1.5 mA ... 1.5 mA |
| **Current input signal** | -2 mA ... 2 mA |
| **Current input signal** | -3 mA ... 3 mA |
| **Current input signal** | -5 mA ... 5 mA |
| **Current input signal** | -10 mA ... 10 mA |
| **Current input signal** | -15 mA ... 15 mA |
| **Current input signal** | -20 mA ... 20 mA |
| **Current input signal** | -30 mA ... 30 mA |
| **Current input signal** | -50 mA ... 50 mA |
| **Current input signal** | -100 mA ... 100 mA |
| **Current input signal** | 1 mA ... 5 mA |
| **Current input signal** | 2 mA ... 10 mA |
| **Current input signal** | 4 mA ... 20 mA |
| **Max. input voltage** | ± 100 V |
| **Max. input current** | ± 100 mA |
| **Input resistance of voltage input** | approx. 1 MΩ (± 1 V DC ... ± 100 V DC) |
| **Input resistance current input** | approx. 10 Ω (± 10 mA DC ... ± 100 mA DC) |

### Output data

| | |
|---|---|
| **Configurable/programmable** | Yes, can be switched |
| **Voltage output signal** | 0 V ... 10 V (Configurable via DIP switches) |
| **Voltage output signal** | 0 V ... 5 V |
| **Voltage output signal** | 2 V ... 10 V |
| **Voltage output signal** | 1 V ... 5 V |
| **Voltage output signal** | -10 V ... 10 V |
| **Voltage output signal** | -5 V ... 5 V |

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## Technical data

### Output data

| | |
|---|---|
| **Voltage output signal** | 0 V ... 2.5 V |
| **Voltage output signal** | 0.5 V ... 2.5 V |
| **Voltage output signal** | -2.5 V ... 2.5 V |
| **Current output signal** | 0 mA ... 5 mA |
| **Current output signal** | 0 mA ... 10 mA |
| **Current output signal** | 0 mA ... 20 mA (please indicate if different setting when ordering) |
| **Current output signal** | 1 mA ... 5 mA |
| **Current output signal** | 2 mA ... 10 mA |
| **Current output signal** | 4 mA ... 20 mA |
| **Current output signal** | -5 mA ... 5 mA |
| **Current output signal** | -10 mA ... 10 mA |
| **Current output signal** | -20 mA ... 20 mA |
| **Load/output load voltage output** | ≥ 1 kΩ (10 V) |
| **Load/output load current output** | ≤ 600 Ω (20 mA; active) |
| **Load/output load current output** | (passive: ≤ (UB-2 V) / $I_{outmax}$) |

### Power supply

| | |
|---|---|
| **Supply voltage range** | 12 V DC ... 24 V DC (-20% / +25%) |

### Connection data

| | |
|---|---|
| **Connection method** | Spring-cage conn. |
| **Conductor cross section solid min.** | 0.2 mm² |
| **Conductor cross section solid max.** | 1.5 mm² |
| **Conductor cross section stranded min.** | 0.2 mm² |
| **Conductor cross section stranded max.** | 1.5 mm² |
| **Conductor cross section AWG/kcmil min.** | 24 |
| **Conductor cross section AWG/kcmil max** | 16 |
| **Stripping length** | 8 mm |

### General

| | |
|---|---|
| **Maximum transmission error** | ≤ 0.1 % (Compared to the final value) |
| **Maximum temperature coefficient** | 0.0075 %/K |
| **Limit frequency (3 dB)** | 10 kHz (Can be switched to 30 Hz) |
| **Alignment zero** | ± 4 % |
| **Alignment span** | ± 4 % |
| **Step response (10-90%)** | 35 µs (at 10 kHz) |
| **Step response (10-90%)** | 11 ms (At 30 Hz) |
| **Protective circuit** | Transient protection |
| **Surge voltage category** | II |
| **Pollution degree** | 2 |
| **Rated insulation voltage** | 300 V AC |
| **Test voltage, input/output/supply** | 2.5 kV (50 Hz, 1 min.) |
| **Color** | green |

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## Technical data

### General

| | |
|---|---|
| **Housing material** | PA 66-FR |
| **Mounting position** | Any |
| **Conformance** | CE-compliant |
| **ATEX** | # II 3 G Ex nA IIC T4 Gc |
| **IECEx** | Ex nA IIC T4 Gc |
| **UL, USA / Canada** | UL applied for |
| **Functional safety (SIL)** | SIL 2 |

### Safety characteristic data

| | |
|---|---|
| **Integrity requirement** | IEC 61508 - Low demand |
| **Designation** | Input isolator (live zero signals) |
| **Architecture** | Single-channel, 1oo1 |
| **Equipment type** | Type A |
| **Safety Integrity Level (SIL)** | Up to 2 |
| **Safe Failure Fraction (SFF)** | 83.43 % |
| **MTBF** | 258 Years |
| **$\lambda_{SU}$** | 3.16 x $10^{-7}$ (316 FIT) |
| **$\lambda_{SD}$** | 0 |
| **$\lambda_{DU}$** | 6.28 x $10^{-8}$ (63 FIT) |
| **$\lambda_{DD}$** | 0 |
| **Probability of a hazardous failure on demand ($PFD_{AVG}$)** | 2.76 x $10^{-4}$ (1 year) |
| **Diagnostic coverage (DC)** | 0 % |
| **Integrity requirement** | IEC 61508 - Low demand |
| **Designation** | Output isolator (live zero signals) |
| **Architecture** | Single-channel, 1oo1 |
| **Equipment type** | Type A |
| **Safety Integrity Level (SIL)** | Up to 2 |
| **Safe Failure Fraction (SFF)** | 82.92 % |
| **MTBF** | 258 Years |
| **$\lambda_{SU}$** | 3.14 x $10^{-7}$ (314 FIT) |
| **$\lambda_{SD}$** | 0 |
| **$\lambda_{DU}$** | 6.48 x $10^{-8}$ (65 FIT) |
| **$\lambda_{DD}$** | 0 |
| **Probability of a hazardous failure on demand ($PFD_{AVG}$)** | 2.84 x $10^{-4}$ (1 year) |
| **Diagnostic coverage (DC)** | 0 % |
| **Integrity requirement** | IEC 61508 - High demand |
| **Designation** | Input isolator (live zero signals) |
| **Architecture** | Single-channel, 1oo1 |
| **Equipment type** | Type A |
| **Safety Integrity Level (SIL)** | Up to 2 |
| **Safe Failure Fraction (SFF)** | 83.43 % |

# Signal conditioner - MACX MCR-UI-UI-SP-NC - 2811556

## Technical data

### Safety characteristic data

| | |
|---|---|
| **MTBF** | 258 Years |
| **$\lambda_{SU}$** | 3.16 x $10^{-7}$ (316 FIT) |
| **$\lambda_{SD}$** | 0 |
| **$\lambda_{DU}$** | 6.28 x $10^{-8}$ (63 FIT) |
| **$\lambda_{DD}$** | 0 |
| **Probability of a hazardous failure per hour ($PFH_D$)** | 6,28 x $10^{-8}$ |
| **Diagnostic coverage (DC)** | 0 % |
| **Integrity requirement** | IEC 61508 - High demand |
| **Designation** | Output isolator (live zero signals) |
| **Architecture** | Single-channel, 1oo1 |
| **Equipment type** | Type A |
| **Safety Integrity Level (SIL)** | Up to 2 |
| **Safe Failure Fraction (SFF)** | 82.92 % |
| **MTBF** | 258 Years |
| **$\lambda_{SU}$** | 3.14 x $10^{-7}$ (314 FIT) |
| **$\lambda_{SD}$** | 0 |
| **$\lambda_{DU}$** | 6.48 x $10^{-8}$ (65 FIT) |
| **$\lambda_{DD}$** | 0 |
| **Probability of a hazardous failure per hour ($PFH_D$)** | 6,48 x $10^{-8}$ |
| **Diagnostic coverage (DC)** | 0 % |

## classifications

### eCl@ss

| | |
|---|---|
| **eCl@ss 4.0** | 27210120 |
| **eCl@ss 4.1** | 27210120 |
| **eCl@ss 5.0** | 27210120 |
| **eCl@ss 5.1** | 27210120 |
| **eCl@ss 6.0** | 27210120 |
| **eCl@ss 7.0** | 27210120 |
| **eCl@ss 8.0** | 27210120 |

### ETIM

| | |
|---|---|
| **ETIM 2.0** | EC001485 |
| **ETIM 3.0** | EC001485 |
| **ETIM 4.0** | EC001485 |
| **ETIM 5.0** | EC001485 |

### UNSPSC

| | |
|---|---|
| **UNSPSC 6.01** | 30211506 |
| **UNSPSC 7.0901** | 39121008 |
| **UNSPSC 11** | 39121008 |

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## classifications

UNSPSC

| | |
|---|---|
| **UNSPSC 12.01** | 39121008 |
| **UNSPSC 13.2** | 39121008 |

## approvals

IECEx / ATEX / Functional Safety /

### Approval details

| |
|---|
| **IECEx** |

| |
|---|
| **ATEX** |

| |
|---|
| **Functional Safety** |

## accessories

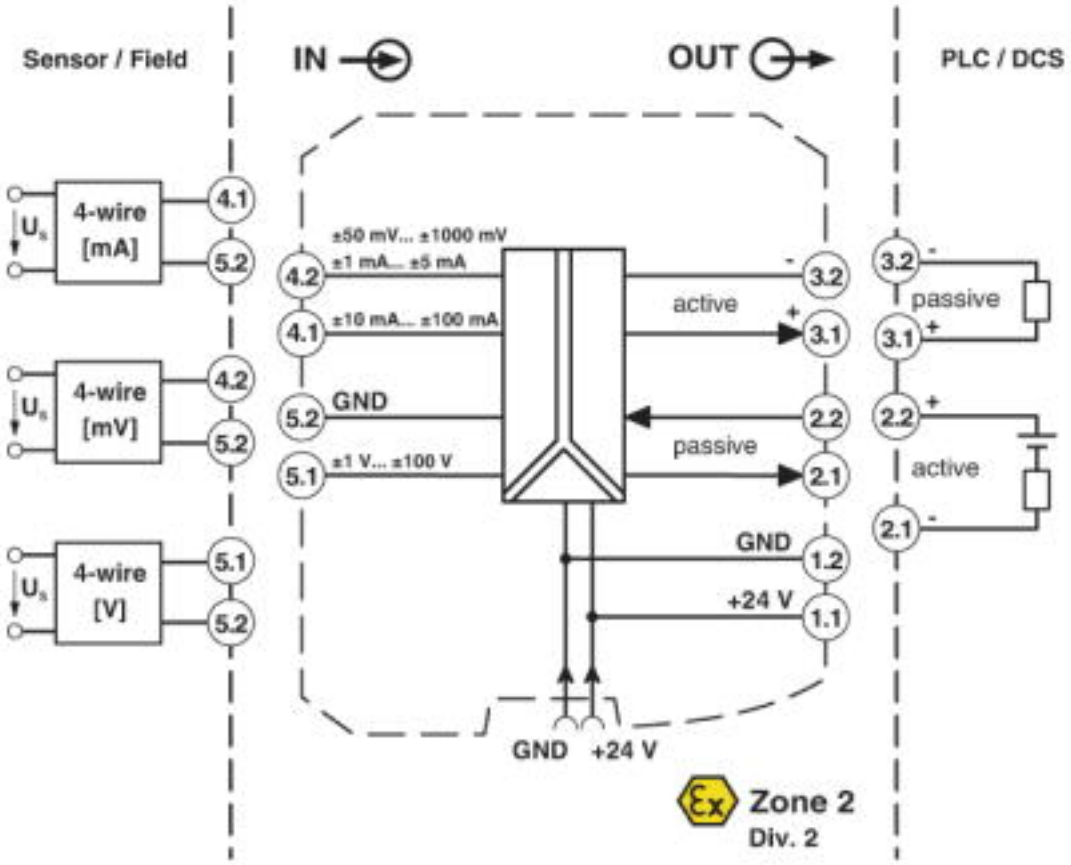
**DIN rail connector**

ME 6,2 TBUS-2 1,5/5-ST-3,81 GN - 2869728

## Drawings

# Signal conditioner - MACX MCR-UI-UI-SP-NC - 2811556

Block diagram



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Dimensioned drawing