

# Temperature measuring transducer - MACX MCR-SL-RTD-I-NC - 2865078

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Temperature transducer, converts signals from resistance thermometers and resistors into 0/4 - 20 mA signals. Freely programmable, 3-way electrical isolation, SIL 2.

## Product Features

- ✓ Power supply possible via DIN rail connector
- ✓ Installation in zone 2, protection type "n" (EN 60079-15) permitted
- ✓ Up to SIL 2 according to EN 61508
- ✓ Status indicator for supply voltage, cable, sensor, and module errors
- ✓ Configuration via software (FDT/DTM): sensor type, connection technology, measuring range, measuring unit, filter, alarm signal, and output range
- ✓ Programming during operation and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- ✓ 3-way electrical isolation
- ✓ Input for resistance thermometers and resistance-type sensors
- ✓ 0 ... 20 mA or 4 ... 20 mA output



## Key commercial data

|                                      |           |
|--------------------------------------|-----------|
| Packing unit                         | 1 pc      |
| Weight per Piece (excluding packing) | 140.0 GRM |
| 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 |
|-------------------------|---|

## Dimensions

# Temperature measuring transducer - MACX MCR-SL-RTD-I-NC - 2865078

## Technical data

### Dimensions

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

### Ambient conditions

|   |  |
|---|--|
| Ambient temperature (operation)         | -20 °C ... 60 °C (Any mounting position) |
| Ambient temperature (storage/transport) | -40 °C ... 80 °C                         |
| Maximum altitude                        | ≤ 2000 m                                 |
| Permissible humidity (operation)        | 5 % ... 95 % (non-condensing)            |
| Degree of protection                    | IP20                                     |

### Input data

|                                     |   |
|-------------------------------------|---|
| Sensor types (RTD) that can be used | Pt, Ni, Cu sensors: 2, 3, 4-wire                        |
| Temperature measuring range         | -200 °C ... 850 °C (Range depending on the sensor type) |
| Input signal range                  | 0 Ω ... 2000 Ω  |
| Cable resistance                    | 50 Ω per line   |
| Sensor input current                | 200 μA ... 1 mA   |
| Measuring range span                | min. 50 K   |

### Output data

|   |                                       |
|---|---------------------------------------|
| Signal output                           | Current output                        |
| Current output signal                   | 0 mA ... 20 mA                        |
|   | 4 mA ... 20 mA                        |
| Load/output load current output         | ≤ 500 Ω                               |
| Output ripple (current)                 | < 50 μA <sub>pp</sub>                 |
| Behavior in the event of a sensor error | As per NE 43 or can be freely defined |

### Power supply

|                          |                       |
|--------------------------|-----------------------|
| Supply voltage range     | 19.2 V DC ... 30 V DC |
| Max. current consumption | < 40 mA (24 V DC)     |
| Power consumption        | < 1 W                 |

### Connection data

|  |                     |
|--|---------------------|
| Conductor cross section solid min.     | 0.2 mm <sup>2</sup> |
| Conductor cross section solid max.     | 2.5 mm <sup>2</sup> |
| Conductor cross section stranded min.  | 0.2 mm <sup>2</sup> |
| Conductor cross section stranded max.  | 2.5 mm <sup>2</sup> |
| Conductor cross section AWG/kcmil min. | 24                  |
| Conductor cross section AWG/kcmil max. | 14                  |
| Stripping length                       | 7 mm                |

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### Connection data

|                        |                  |
|------------------------|------------------|
| Screw thread           | M3               |
| Connection method      | Screw connection |
| Tightening torque, min | 0.5 Nm           |
| Tightening torque max  | 0.6 Nm           |

### General

|   |   |
|---|---|
| Temperature coefficient, typical        | 0.01 %/K  |
| Step response (0–99%)                   | typ. 800 ms (With SIL)  |
|   | max. 1200 ms (With SIL)   |
|   | typ. 700 ms (Without SIL)   |
|   | max. 1100 ms (Without SIL)  |
| Alignment zero                          | ± 5 %   |
| Alignment span                          | ± 5 %   |
| Status display                          | Green LED (supply voltage, PWR)   |
|   | Red LED, flashing (line, sensor error, ERR)   |
|   | Red LED (module error, ERR)   |
| Inflammability class according to UL 94 | V0  |
| Pollution degree                        | 2   |
| Surge voltage category                  | II  |
| Housing material                        | PA 66-FR  |
| Color                                   | green   |
| Designation                             | Input/output/power supply   |
| Electrical isolation                    | 2.5 kV (50 Hz, 1 min., test voltage)  |
|   | 300 V <sub>rms</sub> (Rated insulation voltage (surge voltage category II; pollution degree 2, safe isolation as per EN 61010-1)) |
| Designation                             | Input/output  |
| Electrical isolation                    | 375 V (Peak value in accordance with EN 60079-11)   |
| Designation                             | Input/power supply  |
| Electrical isolation                    | 375 V (Peak value in accordance with EN 60079-11)   |
| Conformance                             | CE-compliant, additionally EN 61326   |
| ATEX                                    | # II 3G Ex nA ic IIC T4 Gc X  |
| Functional Safety (SIL)                 | SIL 2 according to EN 61508   |

### Safety characteristic data

|                              |                        |
|------------------------------|------------------------|
| Integrity requirement        | IEC 61508 - Low demand |
| Architecture                 | Single-channel, 1oo1   |
| Equipment type               | Type B                 |
| Safety Integrity Level (SIL) | 2                      |
| Safe Failure Fraction (SFF)  | 91.3 %                 |

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## Technical data

### Safety characteristic data

|  |                                  |
|--|----------------------------------|
| MTBF   | 119 Years                        |
| $\lambda_{SU}$   | $1.5 \times 10^{-7}$ (150 FIT)   |
| $\lambda_{SD}$   | $4.61 \times 10^{-7}$ (461 FIT)  |
| $\lambda_{DU}$   | $3.23 \times 10^{-7}$ (323 FIT)  |
| $\lambda_{DD}$   | $3.18 \times 10^{-8}$ (31.8 FIT) |
| Probability of a hazardous failure on demand (PFD <sub>AVG</sub> ) | $1.3 \times 10^{-4}$ (1 year)    |
|  | $2.6 \times 10^{-4}$ (2 years)   |
|  | $3.91 \times 10^{-4}$ (3 years)  |
|  | $6.51 \times 10^{-4}$ (5 years)  |
|  | $9.11 \times 10^{-4}$ (7 years)  |
|  | $1.04 \times 10^{-3}$ (8 years)  |
| Diagnostic coverage (DC)   | 90.2 %                           |
| Integrity requirement  | IEC 61508 - High demand          |
| Architecture   | Single-channel, 1oo1             |
| Equipment type   | Type B                           |
| Safety Integrity Level (SIL)                                       | Up to 2                          |
| Safe Failure Fraction (SFF)  | 91.3 %                           |
| MTBF   | 119 Years                        |
| $\lambda_{SU}$   | $1.5 \times 10^{-7}$ (150 FIT)   |
| $\lambda_{SD}$   | $4.61 \times 10^{-7}$ (461 FIT)  |
| $\lambda_{DU}$   | $3.23 \times 10^{-7}$ (323 FIT)  |
| $\lambda_{DD}$   | $3.18 \times 10^{-8}$ (31.8 FIT) |
| Probability of a hazardous failure per hour (PFH <sub>D</sub> )    | $3,23 \times 10^{-8}$            |
| Diagnostic coverage (DC)   | 90.2 %                           |

## Classifications

### eCl@ss

|            |          |
|------------|----------|
| eCl@ss 4.0 | 27200206 |
| eCl@ss 4.1 | 27200206 |
| eCl@ss 5.0 | 27200206 |
| eCl@ss 5.1 | 27210121 |
| eCl@ss 6.0 | 27200206 |
| eCl@ss 7.0 | 27200206 |
| eCl@ss 8.0 | 27200206 |

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## Classifications

### ETIM

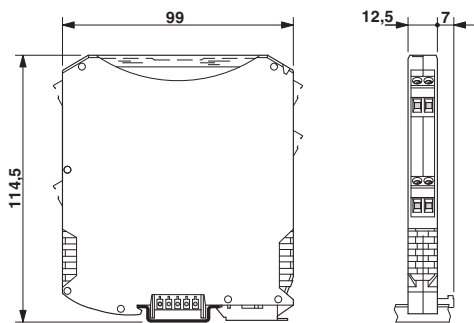
|          |          |
|----------|----------|
| ETIM 2.0 | EC001446 |
| ETIM 3.0 | EC001446 |
| ETIM 4.0 | EC001446 |
| ETIM 5.0 | EC001446 |

### UNSPSC

|               |          |
|---------------|----------|
| UNSPSC 6.01   | 30211506 |
| UNSPSC 7.0901 | 39121008 |
| UNSPSC 11     | 39121008 |
| UNSPSC 12.01  | 39121008 |
| UNSPSC 13.2   | 39121008 |

## Drawings

Dimensioned drawing



Block diagram

