# MACX MCR-TC-I - Temperature measuring transducer

1050228

https://www.phoenixcontact.com/us/products/1050228

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Temperature transducer: converts signals from thermocouples and mV sources into 0/4…20 mA signals. Freely programmable, 3-way electrical isolation, screw connection, SIL.

## Your advantages

- Input for thermocouples and mV sources
- Power supply possible via DIN rail connector
- Programming possible during operation, when measuring circuit is connected, and also when power is switched off using the IFS-USB-PROG-ADAPTER programming adapter
- Installation in zone 2, protection type "ec" (EN 60079-7) permitted
- 3-way electrical isolation
- 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
- Output: 0 mA ... 20 mA or 4 mA ... 20 mA

## Commercial data

| | |
|---|---|
| Item number | 1050228 |
| Packing unit | 1 pc |
| Minimum order quantity | 1 pc |
| Sales key | C402 |
| Product key | DK1115 |
| GTIN | 4055626662794 |
| Weight per piece (including packing) | 168.8 g |
| Weight per piece (excluding packing) | 150 g |
| Customs tariff number | 85437090 |
| Country of origin | DE |

## Technical data

### Notes

#### Utilization restriction

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

### Product properties

| | |
|---|---|
| Product type | Temperature transmitter |
| Product family | MACX Analog |
| Application | Temperature |
| No. of channels | 1 |
| Configuration | Software |

### System properties

#### Functionality

| | |
|---|---|
| Configuration | Software |

### Electrical properties

| | |
|---|---|
| Electrical isolation | 3-way isolation |
| Electrical isolation between input and output | yes |
| Cold point error, max. | ± 2 K |
| Step response (0–99%) | ≤ 1.7 s |
| Temperature coefficient, typical | 0.01 %/K |
| Transmission error, typical | 0.1 % (For full identification of transmission errors, see the data sheet) |

#### Electrical isolation

| | |
|---|---|
| Test voltage | 2.5 kV AC (50 Hz, 60 s) |
| Overvoltage category | II |
| Pollution degree | 2 |

#### Electrical isolation Input/output/power supply IEC/EN 61010-1

| | |
|---|---|
| Standards/regulations | IEC/EN 61010-1 |
| Rated insulation voltage | 300 $V_{rms}$ |
| Insulation | Safe isolation |

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

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

#### Electrical isolation Input/power supply IEC/EN 60079-11

| | |
|---|---|
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## Supply

| | |
|---|---|
| Nominal supply voltage | 24 V DC -20 % ... +25 % |
| Supply voltage range | 19.2 V DC ... 30 V DC |
| Max. current consumption | < 40 mA (24 V DC) |
| Power dissipation | ≤ 0.76 W |
| Power consumption | ≤ 1 W |

## Input data

### Signal

| | |
|---|---|
| Number of inputs | 1 |
| Input signal | Temperature |
| | Voltage |

### Measurement

| | |
|---|---|
| Sensor types that can be used (TC) | B, E, J, K, N, R, S, T, L, U, C, D, A-1, A-2, A-3, M, Lr |
| Temperature measuring range | -250 °C ... 2500 °C (Range depending on the sensor type) |
| Temperature measuring range: Thermoelement Typ B | 500 °C ... 1820 °C |
| Temperature measuring range: Thermoelement Typ E | -230 °C ... 1000 °C |
| Temperature measuring range: Thermoelement Typ J | -210 °C ... 1200 °C |
| Temperature measuring range: Thermoelement Typ K | -250 °C ... 1372 °C |
| Temperature measuring range: Thermoelement Typ N | -200 °C ... 1300 °C |
| Temperature measuring range: Thermoelement Typ R | -50 °C ... 1768 °C |
| Temperature measuring range: Thermoelement Typ S | -50 °C ... 1768 °C |
| Temperature measuring range: Thermoelement Typ T | -200 °C ... 400 °C |
| Temperature measuring range: Thermoelement Typ L | -200 °C ... 900 °C |
| Temperature measuring range: Thermoelement Typ U | -200 °C ... 600 °C |
| Temperature measuring range: Thermoelement Typ C | 0 °C ... 2315 °C |
| Temperature measuring range: Thermoelement Typ D | 0 °C ... 2315 °C |
| Temperature measuring range: Thermoelement Typ A1 GOST | 0 °C ... 2500 °C |
| Temperature measuring range: Thermoelement Typ A2 GOST | 0 °C ... 1800 °C |
| Temperature measuring range: Thermoelement Typ A3 GOST | 0 °C ... 1800 °C |
| Temperature measuring range: Thermoelement Typ M GOST | -200 °C ... 100 °C |
| Temperature measuring range: Thermoelement Typ L GOST | -200 °C ... 800 °C |
| Linear mV signal range | -1000 mV ... 1000 mV |
| Temperature measuring range | Min. 50 K with thermocouple, 10% of the nominal span of the respective range with mV sources |

## Output data

### Signal: Current

| | |
|---|---|
| Number of outputs | 1 |
| Configurable/programmable | Yes |
| Current output signal | 0 mA ... 20 mA |
| | 4 mA ... 20 mA (SIL) |

| Load/output load current output | ≤ 600 Ω |
|---|---|
| Output ripple (current) | < 15 $\mu A_{PP}$ |
| | < 10 $\mu A_{rms}$ |
| Behavior in the event of a sensor error | Freely definable |

## 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 |

## Signaling

| Status display | Green LED (supply voltage) |
|---|---|
| | Red LED, flashing 2.8 Hz (cable error, sensor error on input or output, ERR) |
| | Red LED, flashing 1.2 Hz (simulation mode, ERR) |
| | Red LED, permanently on (module error, ERR) |

## 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 |

## Environmental and real-life conditions

### Ambient conditions

| | |
|---|---|
| Degree of protection | IP20 |
| Ambient temperature (operation) | -40 °C ... 70 °C (Any mounting position) |
| Ambient temperature (storage/transport) | -40 °C ... 80 °C |
| Permissible humidity (operation) | 5 % ... 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 ... 70 °C |
| Test voltage | 2.5 kV |
| Rated insulation voltage | 300 $V_{rms}$ |

### Altitude range (≤ 3000 m)

| | |
|---|---|
| Height range | > 2000 m ... 3000 m |
| Ambient temperature (operation) | -40 °C ... 60 °C |
| Test voltage | 2.25 kV |
| Rated insulation voltage | 150 $V_{rms}$ |

### Altitude range (≤ 4000 m)

| | |
|---|---|
| Height range | > 3000 m ... 4000 m |
| Ambient temperature (operation) | -40 °C ... 55 °C |
| Test voltage | 2 kV |
| Rated insulation voltage | 150 $V_{rms}$ |

### Altitude range (≤ 5000 m)

| | |
|---|---|
| Height range | > 4000 m ... 5000 m |
| Ambient temperature (operation) | -40 °C ... 49 °C |
| Test voltage | 1.75 kV |
| Rated insulation voltage | 150 $V_{rms}$ |

## Approvals

### CE

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

### ATEX

| | |
|---|---|
| Identification | ⟨Ex⟩ II 3 G Ex ec ic IIC T4 Gc |
| Certificate | IBExU19ATEX1006 X |

### IECEx

| | |
|---|---|
| Identification | Ex ec ic IIC T4 Gc |
| Certificate | IECEx IBE 19.0001 X |

| UL, USA/Canada | |
|---|---|
| Identification | UL 61010 Listed |
| | Class I, Div. 2, Groups A, B, C, D T4 |
| | Class I, Zone 2, Group IIC T4 |

| Shipbuilding approval | |
|---|---|
| Certificate | DNV GL TAA00000AG |

| Safety Integrity Level (SIL, IEC 61508) | |
|---|---|
| Identification | 2 |
| Certificate | SEBS-A.150520/17, V2.0 |

| Systematic Capability | |
|---|---|
| Identification | 2 |

| INMETRO | |
|---|---|
| Identification | Ex ec ic IIC T4 Gc |
| Certificate | DNV 21.0064 X |

| EAC Ex | |
|---|---|
| Identification | ⟨EAC Ex⟩ ⎍ Ex ec ic IIC T4 Gc |
| Certificate | BY/112 02.01 TP012 103.01 00082 |

| 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 |
| Note | When being exposed to interference, there may be minimal deviations. |

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

| Electromagnetic HF field | |
|---|---|
| Designation | Electromagnetic RF field |
| Standards/regulations | EN 61000-4-3 |
| Typical deviation from the measuring range final value | 1 % |

| Fast transients (burst) | |
|---|---|
| Designation | Fast transients (burst) |
| Standards/regulations | EN 61000-4-4 |

| | |
|---|---|
| Typical deviation from the measuring range final value | 1 % |

Conducted interference

| | |
|---|---|
| Designation | Conducted interferences |
| Standards/regulations | EN 61000-4-6 |
| Typical deviation from the measuring range final value | 1 % |

## Standards and regulations

| | |
|---|---|
| Electrical isolation | 3-way isolation |

## Mounting

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

## Drawings

Dimensional drawing
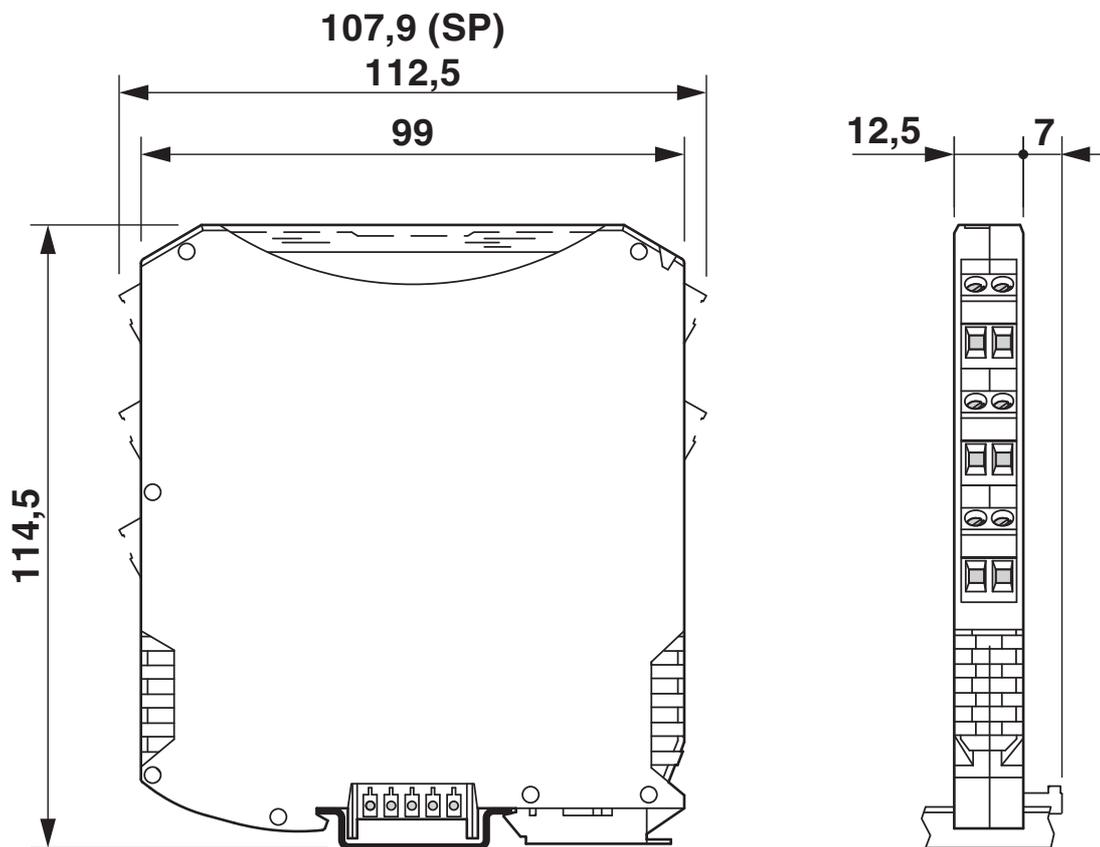
Block diagram
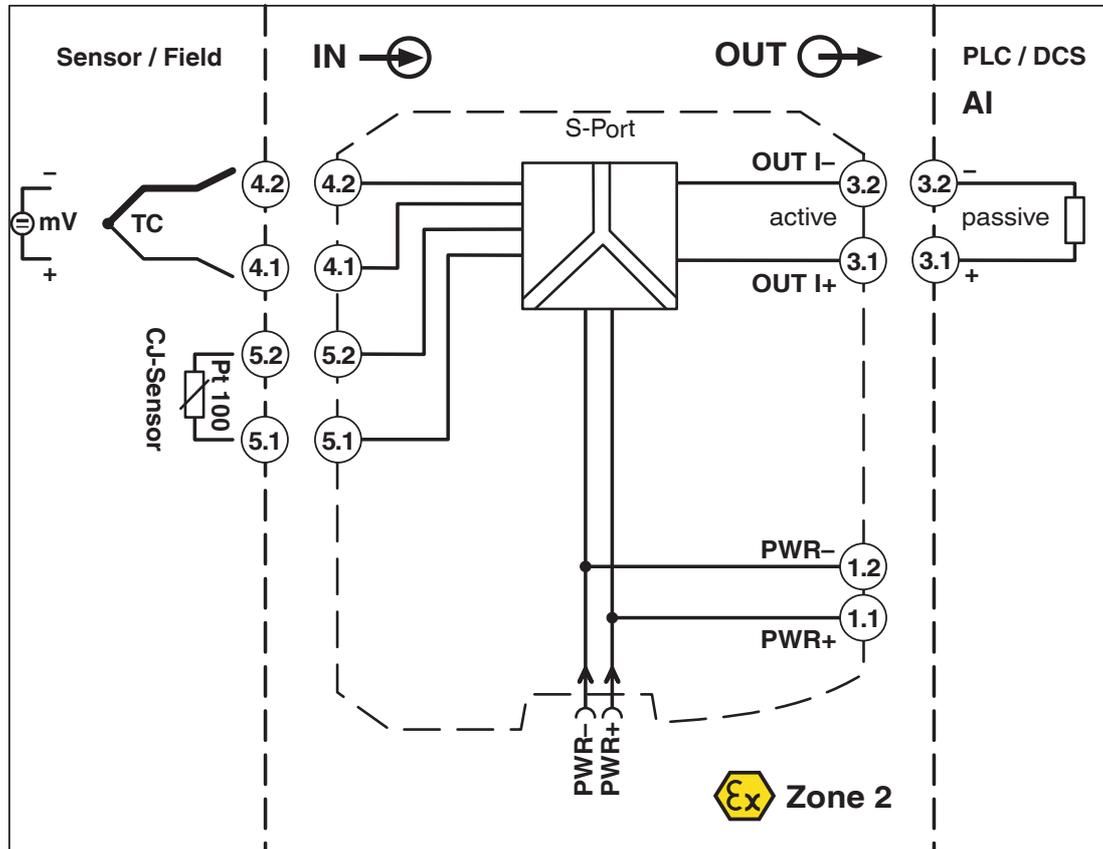
## Approvals

To download certificates, visit the product detail page: https://www.phoenixcontact.com/us/products/1050228

**UL Listed**
Approval ID: E330267

**cUL Listed**
Approval ID: FILE E 330267

**Functional Safety**
Approval ID: SEBS-A.20170608

**DNV**
Approval ID: TAA00000AG

**IECEx**
Approval ID: IECEx IBE 19.0001X

**cUL Listed**
Approval ID: E199827

**UL Listed**
Approval ID: E199827

**INMETRO**
Approval ID: DNV 21.0064 X

**EAC Ex**
Approval ID: TP012 103.01 00078

**ATEX**
Approval ID: IBExU 19 ATEX 1006 X

## Classifications

### ECLASS

| | |
|---|---|
| ECLASS-13.0 | 27210129 |
| ECLASS-15.0 | 27210129 |

### ETIM

| | |
|---|---|
| ETIM 9.0 | EC002919 |

### UNSPSC

| | |
|---|---|
| UNSPSC 21.0 | 41112100 |

## Environmental product compliance

### EU RoHS

| | |
|---|---|
| Fulfills EU RoHS substance requirements | Yes |
| Exemption | 7(a), 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 | ffc6b81a-d1f7-4898-b47a-c1405e396a4b |

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