# MACX MCR-EX-T-UIREL-UP-SP-C - Temperature measuring transducer

2924809

https://www.phoenixcontact.com/gb/products/2924809

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CRA-READY



Freely programmable Ex i temperature measuring transducer with analog output and 3 limit value relays, intrinsically safe signal inputs, resistance thermometer in 2-, 3-, or 4-conductor technology, thermocouples, wide-range supply. number of channels: 1, Order configuration, 4-way isolation, Safety Integrity Level (SIL, IEC 61508): 2, Performance Level (ISO 13849): d, Systematic Capability: 2, Push-in connection

## Your advantages

- Input for resistance thermometers, thermocouples, resistance-type sensors, potentiometers, and mV sources, [Ex ia] IIC
- Cold junction compensation with separate plug
- Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Configuration via software (FDT/DTM) or IFS-OP-UNIT operator interface and display unit
- Up to SIL 2 in accordance with EN 61508
- Installation in zone 2, protection type "n" (EN 60079-15) permitted
- Plug-in screw or spring-cage connection technology (Push-in technology)
- Measure differential temperatures
- Status indicator for supply voltage, cable, sensor, and module errors
- Wide-range power supply of 19.2 ... 253 V AC/DC
- Freely programmable input and output
- Three limit value relays, can be used in combination as a safe limit value relay
- Inverse output signal ranges as an option

## Commercial data

| | |
|---|---|
| Item number | 2924809 |
| Packing unit | 1 pc |
| Minimum order quantity | 1 pc |
| Note | Made to order (non-returnable) |
| Sales key | DK1215 |
| Product key | DK1215 |
| Weight per piece (including packing) | 347 g |
| Weight per piece (excluding packing) | 282.7 g |

| | |
|---|---|
| Customs tariff number | 85437090 |
| Country of origin | DE |

# Technical data

## Notes

Note on application

| | |
|---|---|
| Note on application | As things stand now, we are preparing the product so that, as of December 11, 2027, it will comply with the requirements of the EU Cyber Resilience Act (CRA) based on the information currently available regarding the CRA. |

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 |
| No. of channels | 1 |
| Configuration | DIP switches |
| | Software |

Insulation characteristics

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

## System properties

Functionality

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

## Electrical properties

| | |
|---|---|
| Electrical isolation | 4-way isolation |
| Electrical isolation between input and output | yes |
| Step response (0–99%) | ≤ 1.75 s (SIL on) |
| | 1.3 s (SIL off) |
| Maximum temperature coefficient | 0.01 %/K |
| Maximum transmission error | 0.1 % (e.g. for Pt 100, 300 K span, 4 ... 20 mA) |

Electrical isolation Input/output/power supply

| | |
|---|---|
| Test voltage | 2.5 kV AC (50 Hz, 60 s) |

Electrical isolation Input/output IEC/EN 60079-11

| | |
|---|---|
| Standards/regulations | IEC/EN 60079-11 |
| Rated insulation voltage | 375 $V_P$ |

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

| | |
|---|---|
| Standards/regulations | IEC/EN 60079-11 |
| Rated insulation voltage | 375 $V_P$ |

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

| | |
|---|---|
| Standards/regulations | IEC/EN 60079-11 |
| Rated insulation voltage | 375 $V_P$ |

Electrical isolation Output/supply IEC/EN 61010-1

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

Supply

| | |
|---|---|
| Nominal supply voltage range | 24 V AC/DC ... 230 V AC/DC -20 % ... +10 % (50/60 Hz) |
| Supply voltage range | 19.2 V AC/DC ... 253 V AC/DC (50/60 Hz) |
| Typical current consumption | < 100 mA (24 V DC) |
| Power consumption | < 2.4 W |

## Input data

Measurement

| | |
|---|---|
| Sensor types (RTD) that can be used | Pt, Ni, Cu sensors: 2, 3, 4-wire |
| Sensor types that can be used (TC) | B, E, J, K, N, R, S, T, L, U, CA, DA, A1G, A2G, A3G, MG, LG |
| Temperature measuring range | -250 °C ... 2500 °C (Range depending on the sensor type) |
| Linear resistance measuring range | 0 Ω ... 50 kΩ |
| Potentiometer resistance range | 0 Ω ... 50 kΩ |
| Linear mV signal range | -1000 mV ... 1000 mV |

## Output data

Switching: Relay

| | |
|---|---|
| Configurable/programmable | Yes |
| Contact switching type | 3 changeover contacts |
| Contact material | $AgSnO_2$, hard gold-plated |
| Maximum switching voltage | 250 V AC/DC |
| Max. switching current | 2 A (250 V AC) |
| | 0.1 A (250 V DC) |
| | 2 A (28 V DC) |

Signal: Voltage/current

| | |
|---|---|
| Number of outputs | 1 |
| Configurable/programmable | Yes |
| Max. voltage output signal | ± 11 V |
| Current output signal | 0 mA ... 20 mA (SIL off) |
| | 4 mA ... 20 mA (SIL on) |
| Max. current output signal | 22 mA |

| | |
|---|---|
| Load/output load voltage output | ≥ 10 kΩ |
| Load/output load current output | ≤ 600 Ω (20 mA) |
| Behavior in the event of a sensor error | freely programmable |

## Connection data

| | |
|---|---|
| Connection method | Push-in connection |
| Stripping length | 10 mm |
| Conductor cross-section rigid | 0.2 mm² ... 2.5 mm² |
| Conductor cross-section flexible | 0.2 mm² ... 2.5 mm² |
| Conductor cross-section flexible (2 conductors with same cross section) | 0.25 mm² ... 0.34 mm² (TWIN ferrule without plastic sleeve) |
| | 0.5 mm² ... 1.5 mm² (TWIN ferrule with plastic sleeve) |
| Conductor cross-section AWG | 24 ... 14 |
| | 24 ... 22 (TWIN ferrule without plastic sleeve) |
| | 20 ... 16 (TWIN ferrule with plastic sleeve) |

## 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 $C_i$ | 44 nF |
| Max. output voltage $U_o$ | 6 V DC |
| Max. output current $I_o$ | 7 mA (RTD in 2-conductor technology) |
| | 13 mA (RTD in 3-conductor technology) |
| | 16 mA (RTD in 4-conductor technology) |
| | 13 mA (TC with internal cold junction compensation) |
| | 10 mA (TC with external cold junction compensation) |
| | 5 mA (mV) |
| | 13 mA (Potentiometer) |
| Max. output power $P_o$ | 11 mW (RTD in 2-conductor technology) |
| | 20 mW (RTD in 3-conductor technology) |
| | 24 mW (RTD in 4-conductor technology) |
| | 20 mW (TC with internal cold junction compensation) |
| | 15 mW (TC with external cold junction compensation) |
| | 7.5 mW (mV) |
| | 20 mW (Potentiometer) |
| IIA/I (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$ | 100 mH / 150 µF |

| | |
|---|---|
| IIB/IIIC (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$ | 100 mH / 100 µF |
| IIC (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$ | 100 mH / 10 µF |
| IIC (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$ | 100 mH / 600 nF, 10 mH / 600 nF, 1 mH / 600 nF |
| I/IIB/IIA/IIIC (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$ | 100 mH / 1 µF, 10 mH / 1 µF, 1 mH / 1 µF |

## Signaling

| | |
|---|---|
| Status display | LED supply voltage, PWR (green) |
| | Red LED, flashing (line, sensor error, ERR) |
| | Red LED (module error, ERR) |
| | Yellow LED (switching output) |

## Dimensions

| | |
|---|---|
| Width | 35 mm |
| Height | 107.9 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 (not assessed by UL) |
| Ambient temperature (operation) | -20 °C ... 65 °C |
| Ambient temperature (storage/transport) | -40 °C ... 85 °C |
| Permissible humidity (operation) | typ. 5 % ... 95 % (non-condensing) |
| Shock (operation) | 15g (IEC 60068-2-27) |
| Vibration (operation) | 5g (IEC 60068-2-6) |

### 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) | -20 °C ... 65 °C |
| Safety-related maximum voltage $U_m$ | 253 V AC/DC (Terminals 1.1, 1.2) |
| | 250 V AC (Terminals 3.1, 3.2, 3.3) |
| | 120 V DC (Terminals 3.1, 3.2, 3.3) |
| | 30 V (Installation in zone 2) |

Altitude range (≤ 3000 m)

| | |
|---|---|
| Height range | > 2000 m ... 3000 m |
| Ambient temperature (operation) | -20 °C ... 55 °C |
| Safety-related maximum voltage $U_m$ | 190 V AC (Terminals 1.1, 1.2) |
| | 110 V DC (Terminals 1.1, 1.2) |
| | 190 V AC (Terminals 3.1, 3.2, 3.3) |
| | 110 V DC (Terminals 3.1, 3.2, 3.3) |
| | 30 V (Installation in zone 2) |

Altitude range (≤ 4000 m)

| | |
|---|---|
| Height range | > 3000 m ... 4000 m |
| Ambient temperature (operation) | -20 °C ... 50 °C |
| Safety-related maximum voltage $U_m$ | 60 V AC/DC (Terminals 1.1, 1.2) |
| | 60 V AC/DC (Terminals 3.1, 3.2, 3.3) |
| | 30 V (Installation in zone 2) |

Altitude range (≤ 5000 m)

| | |
|---|---|
| Height range | > 4000 m ... 5000 m |
| Ambient temperature (operation) | -20 °C ... 45 °C |
| Safety-related maximum voltage $U_m$ | 60 V AC/DC (Terminals 1.1, 1.2) |
| | 60 V AC/DC (Terminals 3.1, 3.2, 3.3) |
| | 30 V (Installation in zone 2) |

## Approvals

CE

| | |
|---|---|
| Certificate | CE-compliant |

ATEX

| | |
|---|---|
| Identification | Ⓔx II (1) G [Ex ia Ga] IIC |
| | Ⓔx II (1) D [Ex ia Da] IIIC |
| | Ⓔx II 3 G Ex ec ic nC [ia Ga] IIC T4 Gc |
| | Ⓔx I (M1) [Ex ia Ma] I |
| Certificate | IBExU 10 ATEX 1044 X |

IECEx

| | |
|---|---|
| Identification | [Ex ia Ga] IIC |
| | [Ex ia Da] IIIC |
| | Ex ec ic nC [ia Ga] IIC T4 Gc |
| | [Ex ia Ma] I |
| Certificate | IECEx IBE 10.0004 X |

INMETRO

| | |
|---|---|
| Identification | [Ex ia Ga] IIC |
| | [Ex ia Da] IIIC |

| | |
|---|---|
| | Ex ec ic nC [ia Ga] IIC T4 Gc |
| | [Ex ia Ma] I |
| Certificate | DNV 18.0143 X |

UL, USA/Canada

| | |
|---|---|
| Identification | UL 508 Listed |
| Certificate | C.D.-No 83104549 |

Shipbuilding approval

| | |
|---|---|
| Certificate | DNV GL TAA000020C |

Safety Integrity Level (SIL, IEC 61508)

| | |
|---|---|
| Identification | 2 |
| Certificate | SEBS-A.150520/17, V2.0 |

Systematic Capability

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

Performance Level (ISO 13849)

| | |
|---|---|
| Identification | d |

Shipbuilding data

| | |
|---|---|
| Temperature | B |
| Humidity | B |
| Vibration | A |
| EMC | A |
| 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 upper range value | 2 % |

Fast transients (burst)

| | |
|---|---|
| Designation | Fast transients (burst) |
| Standards/regulations | EN 61000-4-4 |
| Typical deviation from the upper range value | 2 % |

Conducted interference

| | |
|---|---|
| Designation | Conducted interferences |
| Standards/regulations | EN 61000-4-6 |
| Typical deviation from the upper range value | 2 % |

## Standards and regulations

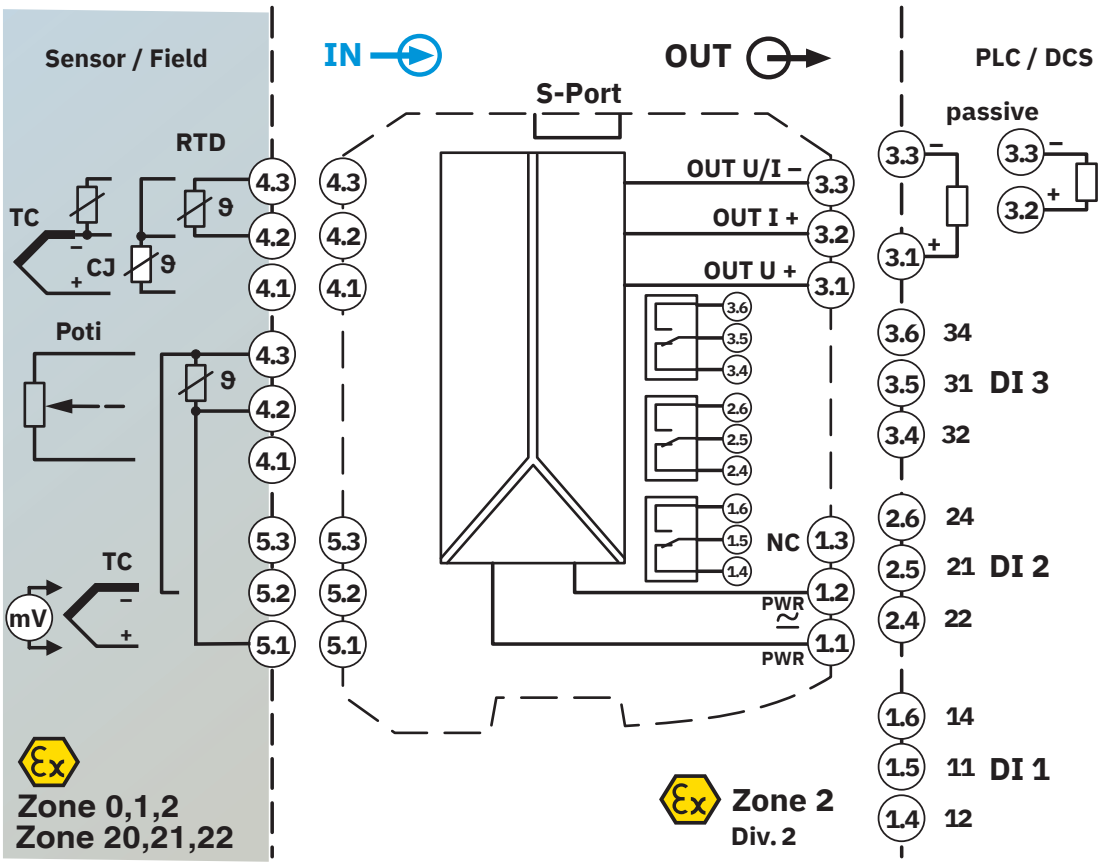
| | |
|---|---|
| Electrical isolation | 4-way isolation |

## Mounting

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

## Drawings

Block diagram



## Approvals

To download certificates, visit the product detail page: https://www.phoenixcontact.com/gb/products/2924809

**UL Listed**
Approval ID: E238705

**cUL Listed**
Approval ID: E238705

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

**cULus Listed**
Approval ID: E330267

**IECEx**
Approval ID: IECEx IBE 10.0004X

**cUL Listed**
Approval ID: E199827

**UL Listed**
Approval ID: E199827

**ATEX**
Approval ID: IBExU 10 ATEX 1044

**INMETRO**
Approval ID: DNV 18.0143 X

**cULus Listed**
Approval ID: E199827

**CCC**
Approval ID: 2025122310128118

## Classifications

### ECLASS

| | |
|---|---|
| ECLASS-13.0 | 27210129 |
| ECLASS-15.0 | 27210129 |
| ECLASS-15.0 ASSET | 27250101 |

### ETIM

| | |
|---|---|
| ETIM 10.0 | EC002919 |

### UNSPSC

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

## Environmental product compliance

EU RoHS

| | |
|---|---|
| Fulfills EU RoHS substance requirements | Yes |
| Exemption | 7(a), 7(a)-I, 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) |

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