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

2865722

https://www.phoenixcontact.com/us/products/2865722

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Programmable temperature transducer with analog output and 3 limit value relays, intrinsically safe signal input, resistance thermometer in 2-, 3-, or 4-conductor technology, thermocouples, electrical isolation, wide-range power supply, screw connection, SIL, PL.

## Your advantages

- Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Cold junction compensation with separate plug
- Input for resistance thermometers, thermocouples, resistance-type sensors, potentiometers, and mV sources, [Ex ia] IIC
- 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
- Measure differential temperatures
- Wide-range power supply of 19.2 ... 253 V AC/DC
- Status indicator for supply voltage, cable, sensor, and module errors
- Freely programmable input and output
- Inverse output signal ranges as an option
- Three limit value relays, can be used in combination as a safe limit value relay
- Plug-in screw or spring-cage connection technology (Push-in technology)

## Commercial data

| | |
|---|---|
| Item number | 2865722 |
| Packing unit | 1 pc |
| Minimum order quantity | 1 pc |
| Note | Made to order (non-returnable) |
| Sales key | C490 |
| Product key | DK1215 |
| Weight per piece (including packing) | 281.5 g |
| Weight per piece (excluding packing) | 281.5 g |
| Customs tariff number | 85437090 |
| Country of origin | DE |

## Technical data

### 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

| | |
|---|---|
| Electrical isolation | 375 V (Peak value in accordance with IEC/EN 60079-11) |

Electrical isolation Input/power supply

| | |
|---|---|
| Electrical isolation | 375 V (Peak value in accordance with IEC/EN 60079-11) |

Electrical isolation Input/switching output

| | |
|---|---|
| Electrical isolation | 375 V (Peak value in accordance with IEC/EN 60079-11) |

Electrical isolation Output/supply

| | |
|---|---|
| Rated insulation voltage | 300 $V_{rms}$ |
| Insulation | Safe isolation in accordance with IEC/EN 61010-1 |

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

### Signal

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

### 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: Current

| | |
|---|---|
| Number of outputs | 1 |
| Configurable/programmable | Yes |
| Max. voltage output signal | ± 11 V |
| Current output signal | 4 mA ... 20 mA (in the case of SIL; further free configuration without SIL) |
| 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 | according to NE 43 or freely configurable |

## 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 |
| 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) |
| Safety-related maximum voltage $U_m$ | 253 V AC (Terminals 1.1, 1.2) |
| | 125 V 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) |
| IIC (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$ | 100 mH / 600 nF |
| I/IIB/IIA/IIIC (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$ | 100 mH / 1 µF |

## Signaling

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

## Dimensions

| | |
|---|---|
| Width | 35 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 (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.) |

### 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 |

UKCA Ex (UKEX)

| | |
|---|---|
| Identification | Ⓔx I (M1) [Ex ia Ma] I |
| | Ⓔx II (1) G [Ex ia Ga] IIC |
| | Ⓔx II (1) D [Ex ia Da] IIIC |
| | Ⓔx II 3 (1) G Ex ec ic nC [ia Ga] IIC T4 Gc |
| Certificate | CML 22UKEX3529X |

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 |

UL, USA/Canada

| | |
|---|---|
| Identification | UL 508 Listed |
| Certificate | cULus 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 |

Performance Level (ISO 13849)

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

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 |

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

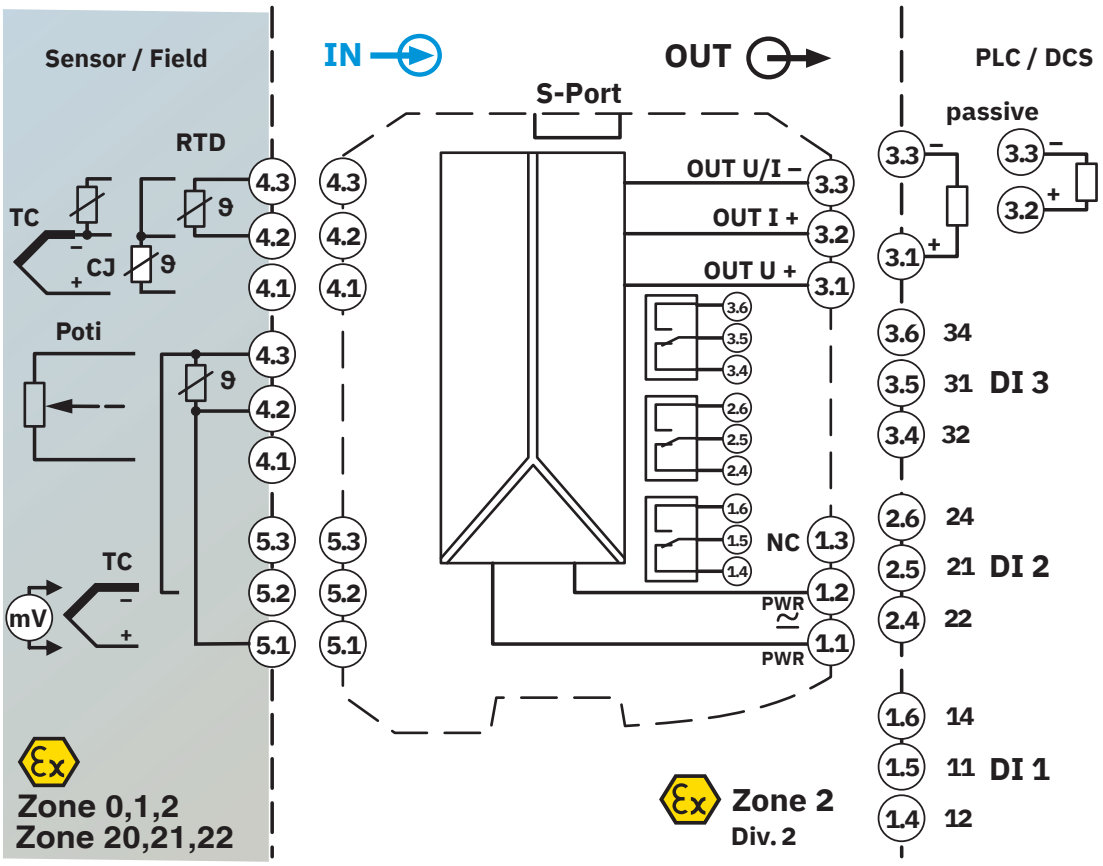
| | |
|---|---|
| Electrical isolation | 4-way isolation |

## Mounting

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

## Drawings

Block diagram



## Classifications

### ECLASS

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

### UNSPSC

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

## Environmental product compliance

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.) | No substance above 0.1 wt% |


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