

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



2865751

<https://www.phoenixcontact.com/us/products/2865751>

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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. Standard configuration, 4-way isolation, Safety Integrity Level (SIL, IEC 61508): 2, Performance Level (ISO 13849): d, Systematic Capability: 2, Screw connection

## Your advantages

- Input for resistance thermometers, thermocouples, resistance-type sensors, potentiometers, and mV sources, [Ex ia] IIC
- 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
- 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
- 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)
- Wide-range power supply of 19.2 ... 253 V AC/DC
- Measure differential temperatures

## Commercial data

Item number	2865751
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	C430
Product key	DK1215
GTIN	4046356288781
Weight per piece (including packing)	351.9 g
Weight per piece (excluding packing)	200 g
Customs tariff number	85437090
Country of origin	DE

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## Technical data

### Notes

#### Utilization restriction

EMC note	EMC: class A product, see manufacturer's declaration in the download area
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### Product properties

Product type	Temperature transmitter
Product family	MACX Analog
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)
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#### Electrical isolation Input/output IEC/EN 60079-11

Standards/regulations	IEC/EN 60079-11
Rated insulation voltage	375 V <sub>P</sub>

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

Standards/regulations	IEC/EN 60079-11
Rated insulation voltage	375 V <sub>P</sub>

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

Standards/regulations	IEC/EN 60079-11
Rated insulation voltage	375 V <sub>P</sub>

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## Electrical isolation Output/supply IEC/EN 61010-1

Standards/regulations	IEC/EN 61010-1
Rated insulation voltage	300 V <sub>rms</sub>
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

### 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 <sub>2</sub> , 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

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Load/output load voltage output	$\geq 10 \text{ k}\Omega$
Load/output load current output	$\leq 600 \Omega$ (20 mA)
Behavior in the event of a sensor error	freely programmable

## Connection data

Connection method	Screw connection
Stripping length	7 mm
Screw thread	M3
Conductor cross-section rigid	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross-section flexible	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross-section AWG	24 ... 14
Tightening torque	0.5 Nm ... 0.6 Nm

## Test socket

Max. diameter	2 mm
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## 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 $\mu$ F

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IIB/IIIC (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	100 mH / 100 $\mu$ F
IIC (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	100 mH / 10 $\mu$ F
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 $\mu$ F, 10 mH / 1 $\mu$ F, 1 mH / 1 $\mu$ F

## 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	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 ( $\leq$ 2000 m)

Altitude	$\leq$ 2000 m (The technical data refers to altitudes $\leq$ 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)

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## Altitude range ( $\leq 3000$ 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 ( $\leq 4000$ 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 ( $\leq 5000$ 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
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### ATEX

Identification	⊕ II (1) G [Ex ia Ga] IIC
	⊕ II (1) D [Ex ia Da] IIIC
	⊕ II 3 G Ex ec ic nC [ia Ga] IIC T4 Gc
	⊕ 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

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	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
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## Safety Integrity Level (SIL, IEC 61508)

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

## Systematic Capability

Identification	2
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## Performance Level (ISO 13849)

Identification	d
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## 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
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## Electromagnetic HF field

Designation	Electromagnetic RF field
Standards/regulations	EN 61000-4-3
Typical deviation from the measuring range final value	2 %

## Fast transients (burst)

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

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## Conducted interference

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

## Standards and regulations

Electrical isolation	4-way isolation
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## Mounting

Mounting type	DIN rail mounting
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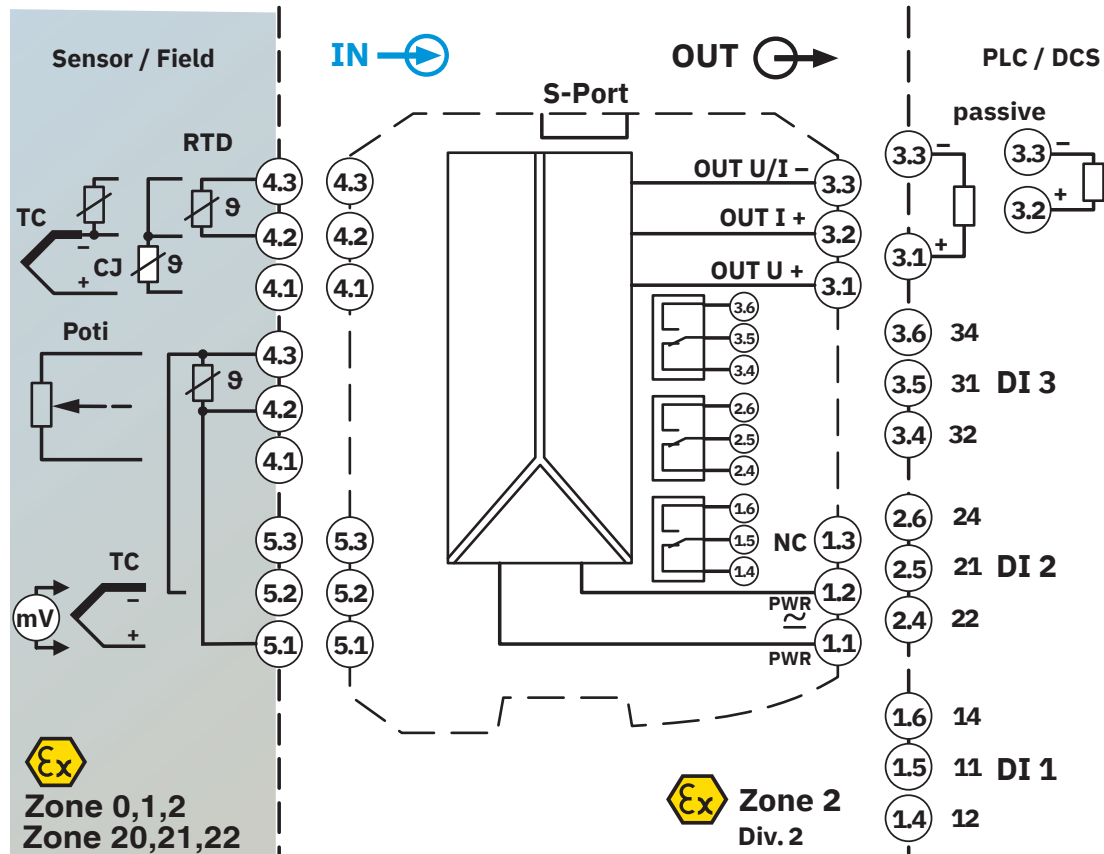


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## Drawings

Block diagram



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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2865751>

### DNV

Approval ID: TAA000020C



### UL Listed

Approval ID: E238705



### cUL Listed

Approval ID: E238705



### Functional Safety

Approval ID: SEBS-A.20170608



### 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

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## Classifications

### ECLASS

ECLASS-13.0	27210129
ECLASS-15.0	27210129

### ETIM

ETIM 10.0	EC002919
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### UNSPSC

UNSPSC 21.0	41112100
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## 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)
	2,2',6,6'-tetrabromo-4,4'-isopropylidenediphenol(CAS: 79-94-7)
SCIP	bbce92ed-4697-451e-936e-4ba2c38c7d38

### EF3.1 Climate Change

CO2e kg	11.629 kg CO2e
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