MACX MCR-EX-T-UI-UP-SP - Temperature measuring transducer

2924689

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Freely programmable Ex i temperature measuring transducer with analog output and 1 limit value relay, 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, Push-in 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
- Plug-in screw or spring-cage connection technology (Push-in technology)
- Status indicator for supply voltage, cable, sensor, and module errors
- Measure differential temperatures
- Wide-range power supply of 19.2 ... 253 V AC/DC
- Freely programmable input and output
- Inverse output signal ranges as an option
- Relay switching output

Commercial data

Item number	2924689
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	C430
Product key	DK1215
GTIN	4046356629102
Weight per piece (including packing)	251 g
Weight per piece (excluding packing)	163.7 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
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., at Pt 100, 300 K min. span)

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	< 50 mA (24 V DC)
Power consumption	< 1.5 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	1 changeover contact
Contact material	$AgSnO_2$, hard gold-plated
Maximum switching voltage	30 V AC/DC
Max. switching current	0.5 A (30 V AC)
	1 A (30 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

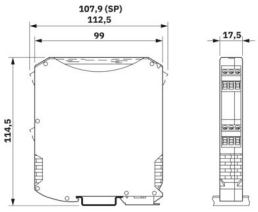
Max. internal inductance L_i	negligible
Max. internal capacitance C_i	44 nF
Max. output voltage U_o	6 V DC
Max. output current I_o	7 mA (RTD in 2-conductor technology)
	13 mA (RTD in 3-conductor technology)
	16 mA (RTD in 4-conductor technology)
	13 mA (TC with internal cold junction compensation)
	10 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

Dimensional drawing	
Width	17.5 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

KC-s

Identification	[Ex ia] IIC
Certificate	17-KA4BO-0411X

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 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 %

Conducted interference

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

Standards and regulations

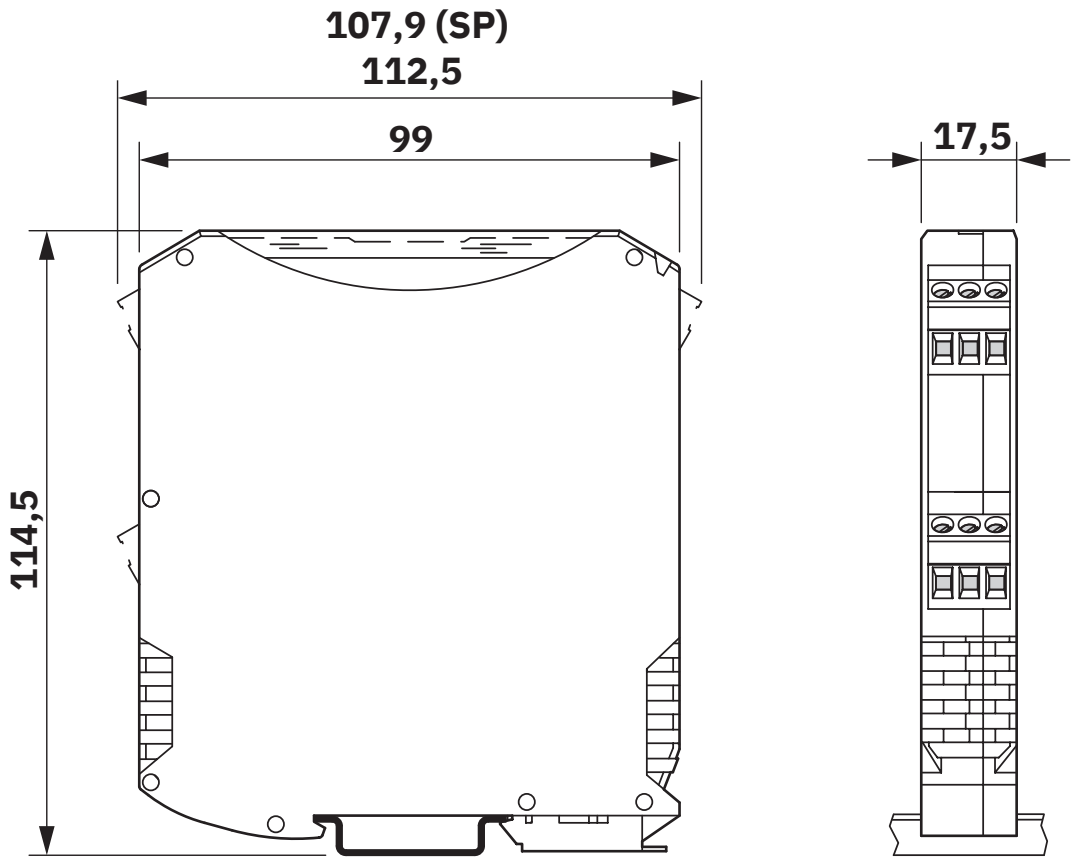
Electrical isolation	4-way isolation

Mounting

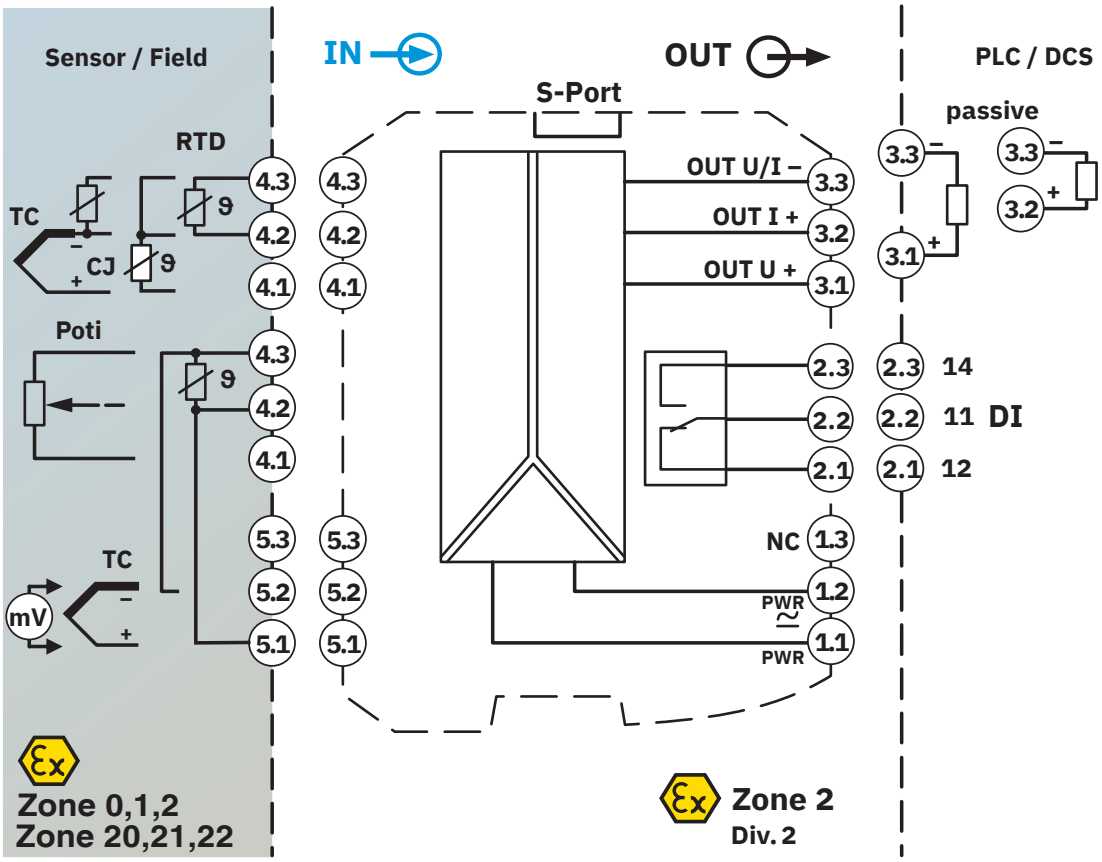
Mounting type	DIN rail mounting

Drawings

Dimensional drawing



Block diagram



Approvals

To download certificates, visit the product detail page: https://www.phoenixcontact.com/us/products/2924689

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

KC-s
Approval ID: 17-KA4BO-0411X

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(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	1f55ef29-2776-44e9-b413-4cfddd56281a

EF3.1 Climate Change

CO2e kg	10.455 kg CO2e

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