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

2865751

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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

- 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

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
Type	Ex i signal conditioners with SIL and PL Functional Safety
Configuration	DIP switches
	Software

Insulation characteristics

Overvoltage category	II
Pollution degree	2

Electrical properties

Electrical isolation	4-way isolation
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 (50/60 Hz)
Supply voltage range	19.2 V AC/DC ... 253 V AC/DC (24 V AC/DC ... 230 V AC/DC (-20 % ... +10 %, 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 (250 V 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)
	120 V DC (Terminals 3.1, 3.2)
	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	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)
	110 V DC (Terminals 3.1, 3.2)
	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)
	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)
	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.150520/17TB

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

EAC Ex

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
Certificate	RU C-DE.AB72.B.00093/19

DNV GL 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

Noise immunity	EN 61000-6-2
Note	When being exposed to interference, there may be minimal deviations.
Electromagnetic compatibility	Conformance with EMC directive
Noise emission	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

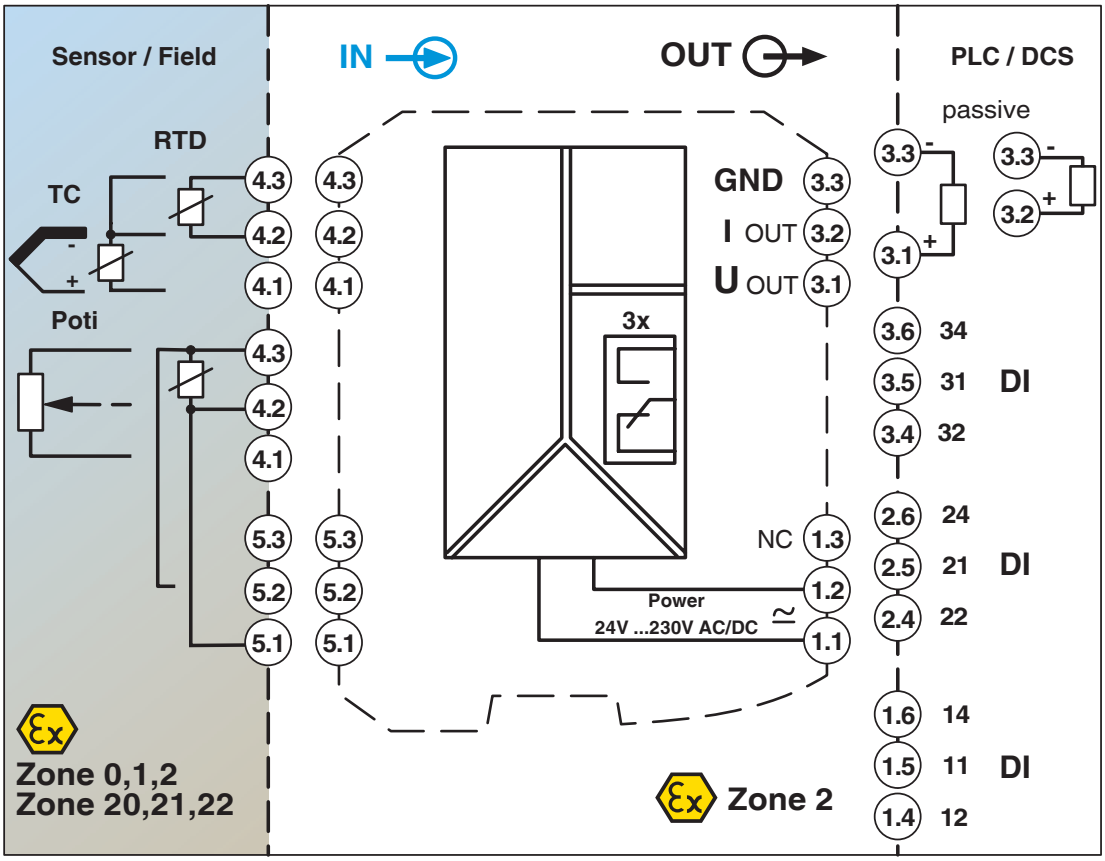
Electrical isolation	4-way isolation

Mounting

Mounting type	DIN rail mounting

Drawings

Block diagram



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