

Temperature measuring transducer - MACX MCR-EX-SL-RTD-I-SP-NC - 2924168

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Ex-i temperature measuring transducer: Converts signals from resistance thermometers installed in Ex areas and transmits a 0/4-20 mA signal to a load in the safe area. Freely programmable, 3-way isolation, SIL2, spring-cage terminal blocks.

The illustration shows the versions with screw connection

Product Features

- Power supply possible via DIN rail connector
- Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Input for resistance thermometers and resistance-type sensors, [Ex ia] IIC
- Installation in zone 2, protection type "n" (EN 60079-15) permitted
- Up to SIL 2 according to EN 61508
- 3-way electrical isolation
- 0 ... 20 mA or 4 ... 20 mA output
- Status indicator for supply voltage, cable, sensor, and module errors
- Configuration via software (FDT/DTM): sensor type, connection technology, measuring range, measuring unit, filter, alarm signal, and output range

Key commercial data

package_quantity	1
GTIN	4046356438957

Technical data

Note:

Utilization restriction	EMC: class A product, see manufacturer's declaration in the download area
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Dimensions

Width	12.5 mm
Height	99 mm
Depth	114.5 mm

Ambient conditions

Ambient temperature (operation)	-20 °C ... 60 °C (Any mounting position)
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Maximum altitude	≤ 2000 m

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Ambient conditions

Permissible humidity (operation)	5 % ... 95 % (no condensation)
Degree of protection	IP20

Input data

Sensor types (RTD) that can be used	Pt, Ni, Cu sensors: 2, 3, 4-wire
Temperature measuring range	-200 °C ... 850 °C (Range depending on the sensor type)
Input signal range	0 Ω ... 2000 Ω
Cable resistance	(50 Ω per line)
Sensor input current	(200 μA ... 1 mA)
Measuring range span	min. 50 K

Output data

Signal output	Current output
Current output signal	0 mA ... 20 mA
Current output signal	4 mA ... 20 mA
Load/output load current output	max. 500 Ω
Output ripple (current)	< 50 μA _{pp}
Behavior in the event of a sensor error	As per NE 43 or can be freely defined

Power supply

Supply voltage range	19.2 V DC ... 30 V DC (24 V DC (-20% ... +25%))
Max. current consumption	< 40 mA (24 V DC)
Power consumption	< 1 W

Connection data

Conductor cross section solid min.	0.2 mm ²
Conductor cross section solid max.	1.5 mm ²
Conductor cross section stranded min.	0.2 mm ²
Conductor cross section stranded max.	1.5 mm ²
Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max	16
Stripping length	8 mm
Connection method	Spring-cage conn.

General

No. of channels	1
Temperature coefficient, typical	0.01 %/K
Step response (0–99%)	typ. 800 ms (With SIL)
Step response (0–99%)	max. 1200 ms (With SIL)
Step response (0–99%)	typ. 700 ms (Without SIL)
Step response (0–99%)	max. 1100 ms (Without SIL)
Alignment zero	± 5 %
Alignment span	± 5 %

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General

Status display	Green LED (supply voltage, PWR)
Status display	Red LED, flashing (line, sensor error, ERR)
Status display	Red LED (module error, ERR)
Inflammability class according to UL 94	V0
Pollution degree	2
Surge voltage category	II
Housing material	PA 66-FR
Color	green
Name	Input/output/power supply
Electrical isolation	300 V _{rms} (Rated insulation voltage (surge voltage category II; pollution degree 2, safe isolation as per EN 61010-1))
Electrical isolation	2.5 kV (50 Hz, 1 min., test voltage)
Name	Input/output
Electrical isolation	375 V (Peak value in accordance with EN 60079-11)
Name	Input/power supply
Electrical isolation	375 V (Peak value in accordance with EN 60079-11)
Conformance	CE-compliant, additionally EN 61326
ATEX	# II (1) G [Ex ia Ga] IIC
ATEX	# II (1) D [Ex ia Da] IIIC
ATEX	# II 3(1) G Ex nA ic [ia Ga] IIC T4 Gc X
IECEX	[Ex ia Ga] IIC
IECEX	[Ex ia Da] IIIC
IECEX	Ex nA ic [ia Ga] IIC T4 Gc
UL, USA / Canada	Class I Div 2; IS for Class I, II, III Div 1
Functional safety (SIL)	SIL 2 TÜV Rheinland 968/EZ374.00/09

Safety characteristic data

Integrity requirement	IEC 61508 - Low demand
Architecture	Single-channel, 1oo1
Equipment type	Type B
Safety Integrity Level (SIL)	2
Safe Failure Fraction (SFF)	91.3 %
MTBF	119 Years
λ_{SU}	1.5×10^{-7} (150 FIT)
λ_{SD}	4.61×10^{-7} (461 FIT)
λ_{DU}	3.23×10^{-7} (323 FIT)
λ_{DD}	3.18×10^{-8} (31.8 FIT)
Probability of a hazardous failure on demand (PFD _{AVG})	1.3×10^{-4} (1 year)
Probability of a hazardous failure on demand (PFD _{AVG})	2.6×10^{-4} (2 years)
Probability of a hazardous failure on demand (PFD _{AVG})	3.91×10^{-4} (3 years)

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Safety characteristic data

Probability of a hazardous failure on demand (PFD _{AVG})	6.51 x 10 ⁻⁴ (5 years)
Probability of a hazardous failure on demand (PFD _{AVG})	9.11 x 10 ⁻⁴ (7 years)
Probability of a hazardous failure on demand (PFD _{AVG})	1.04 x 10 ⁻³ (8 years)
Diagnostic coverage (DC)	90.2 %
Integrity requirement	IEC 61508 - High demand
Architecture	Single-channel, 1oo1
Equipment type	Type B
Safety Integrity Level (SIL)	Up to 2
Safe Failure Fraction (SFF)	91.3 %
MTBF	119 Years
λ _{SU}	1.5 x 10 ⁻⁷ (150 FIT)
λ _{SD}	4.61 x 10 ⁻⁷ (461 FIT)
λ _{DU}	3.23 x 10 ⁻⁷ (323 FIT)
λ _{DD}	3.18 x 10 ⁻⁸ (31.8 FIT)
Probability of a hazardous failure per hour (PFH ₀)	3,23 x 10 ⁻⁸
Diagnostic coverage (DC)	90.2 %

Safety data

Max. output voltage U _o	6 V
Max. output current I _o	6.3 mA
Max. output power P _o	9.4 mW
Gas group	IIC
Max. external inductivity L _o	100 mH
Max. external capacity C _o	1.4 μF
Gas group	IIC
Max. external inductivity L _o	10 mH
Max. external capacity C _o	1.9 μF
Gas group	IIC
Max. external inductivity L _o	1 mH
Max. external capacity C _o	2.7 μF
Gas group	IIB
Max. external inductivity L _o	100 mH
Max. external capacity C _o	6.9 μF
Gas group	IIB
Max. external inductivity L _o	10 mH
Max. external capacity C _o	9.4 μF
Gas group	IIB
Max. external inductivity L _o	1 mH
Max. external capacity C _o	15 μF

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Technical data

Safety data

Safety-related maximum voltage U_m	253 V AC (125 V DC)
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classifications

eCl@ss

eCl@ss 4.0	27200206
eCl@ss 4.1	27200206
eCl@ss 5.0	27200206
eCl@ss 5.1	27200206
eCl@ss 6.0	27200206
eCl@ss 7.0	27200206
eCl@ss 8.0	27200206

ETIM

ETIM 2.0	EC001446
ETIM 3.0	EC001446
ETIM 4.0	EC001446
ETIM 5.0	EC001446

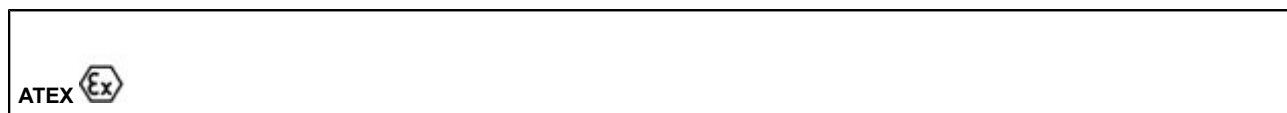
UNSPSC

UNSPSC 6.01	30211506
UNSPSC 7.0901	39121008
UNSPSC 11	39121008
UNSPSC 12.01	39121008
UNSPSC 13.2	39121008

approvals

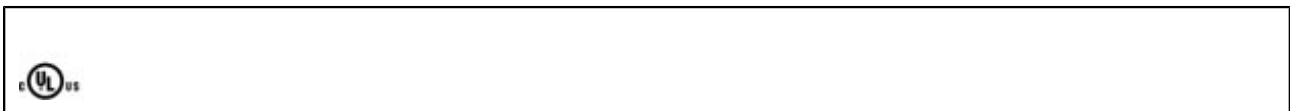
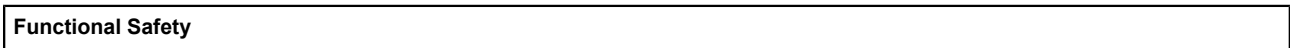
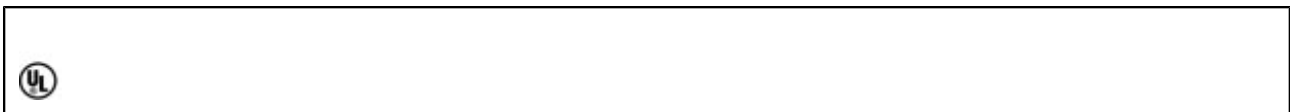
ATEX / UL Listed / cUL Listed / cULus Listed / UL Listed / cUL Listed / Functional Safety / cULus Listed /

Approval details



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approvals



accessories

Programming adapter

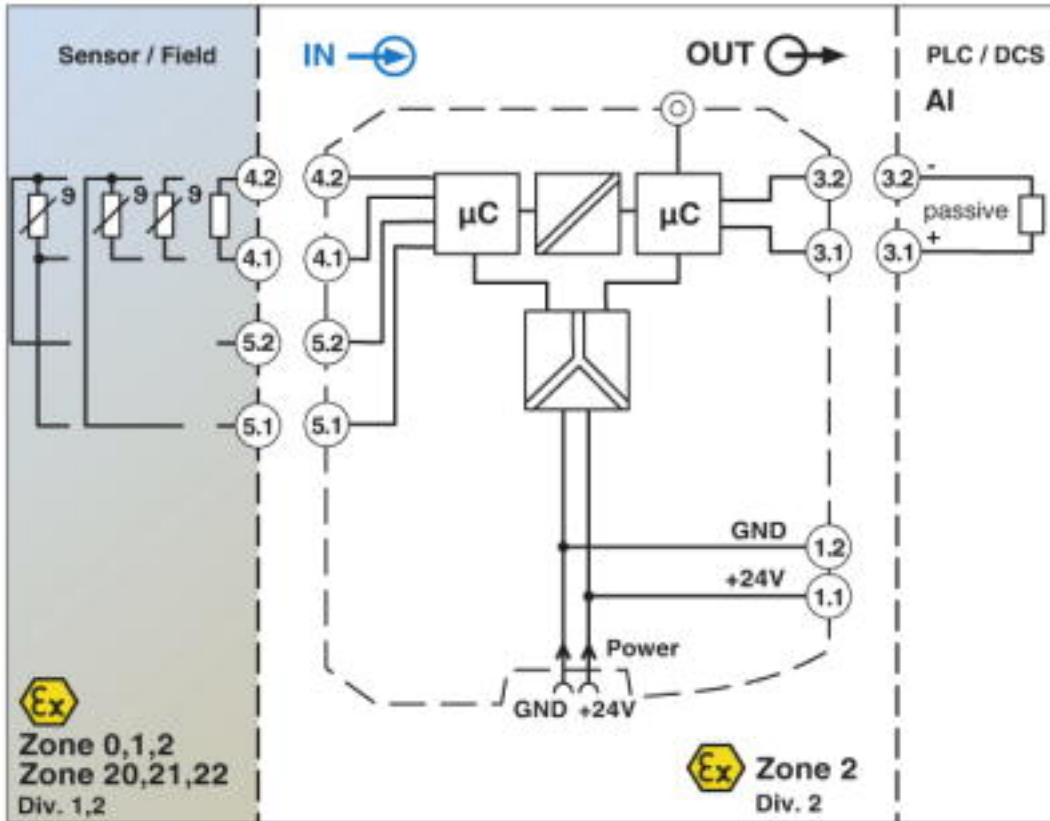
IFS-USB-PROG-ADAPTER - 2811271



Drawings

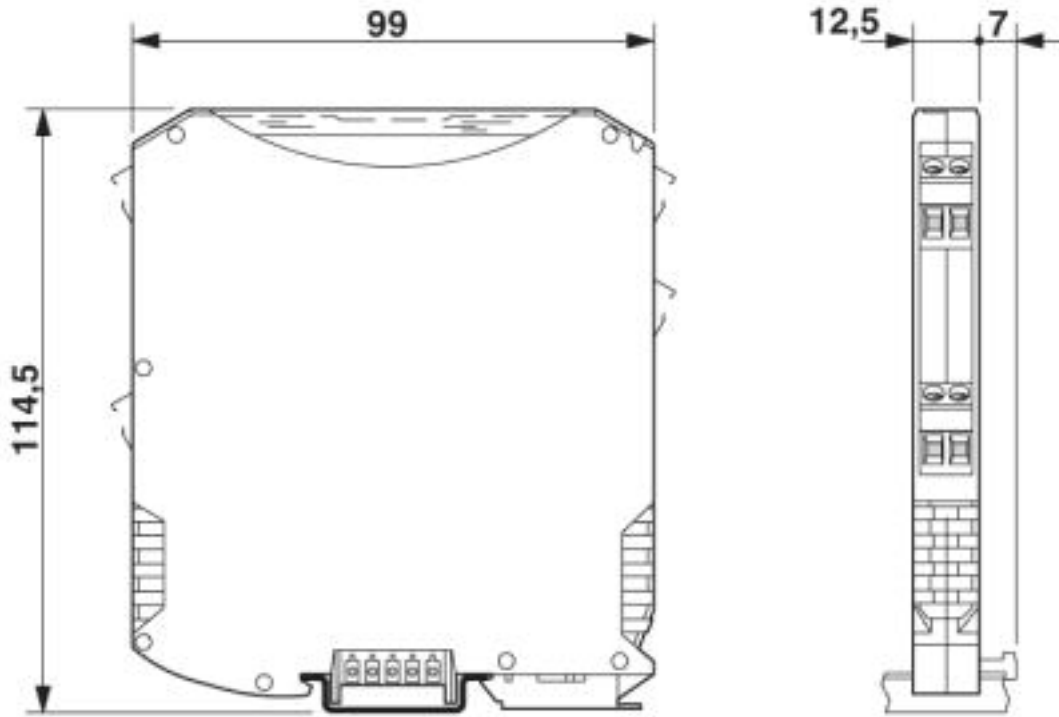
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Block diagram



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Dimensioned drawing



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