

Temperature measuring transducer - MACX MCR-EX-SL-TC-I-NC - 2865586

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Ex-i temperature measuring transducer: Converts signals from thermocouples installed in Ex areas and mV sources and transmits a 0/4-20 mA signal to a load in a safe area. Freely programmable, 3-way isolation, SIL2

Product Features

- ✓ Input for resistance thermometers and resistance-type sensors, [Ex ia] IIC
- ✓ 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
- ✓ Installation in zone 2, protection type "n" (EN 60079-15) permitted
- ✓ Up to SIL 2 according to EN 61508
- ✓ 3-way electrical isolation
- ✓ Status indicator for supply voltage, cable, sensor, and module errors
- ✓ 0 ... 20 mA or 4 ... 20 mA output
- ✓ Configuration via software (FDT/DTM): sensor type, connection technology, measuring range, measuring unit, filter, alarm signal, and output range



Key commercial data

Packing unit	1 pc
Weight per Piece (excluding packing)	120.0 GRM
Custom tariff number	85437090
Country of origin	Germany

Technical data

Note

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

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
Permissible humidity (operation)	5 % ... 95 % (non-condensing)
Noise immunity	EN 61000-6-2 When being exposed to interference, there may be minimal deviations.
Degree of protection	IP20

Input data

Input	Intrinsically safe
Sensor types that can be used (TC)	E, J, K, N as per IEC / EN 60584, L as per DIN 43760
Temperature measuring range	-250 °C ... 1372 °C (Range depending on the sensor type)
Input signal range	-20 mV ... 70 mV
Measuring range span	Min. 50 K for thermocouples, 3 mV for mV sources

Output data

Signal output	Current output
Current output signal	0 mA ... 20 mA
	4 mA ... 20 mA
Load/output load current output	≤ 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

Nominal supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC
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.	2.5 mm ²
Conductor cross section stranded min.	0.2 mm ²
Conductor cross section stranded max.	2.5 mm ²

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Connection data

Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max	14
Stripping length	7 mm
Screw thread	M3
Connection method	Screw connection
Tightening torque, min	0.5 Nm
Tightening torque max	0.6 Nm

General

No. of channels	1
Temperature coefficient, typical	0.01 %/K
Typical cold point errors	± 1 K
Step response (0–99%)	typ. 800 ms (With SIL)
	max. 1200 ms (With SIL)
	typ. 700 ms (Without SIL)
	max. 1100 ms (Without SIL)
Alignment zero	± 5 %
Alignment span	± 5 %
Status display	Green LED (supply voltage, PWR)
	Red LED, flashing (line, sensor error, ERR)
	Red LED (module error, ERR)
Inflammability class according to UL 94	V0
Pollution degree	2
Surge voltage category	II
Emitted interference	EN 61000-6-4
Housing material	PA 66-FR
Color	green
Designation	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))
	2.5 kV (50 Hz, 1 min., test voltage)
Designation	Input/output
Electrical isolation	375 V (Peak value in accordance with EN 60079-11)
Designation	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

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General

	# II (1) D [Ex ia Da] IIIC
	# II 3(1) G Ex nA ic [ia Ga] IIC T4 Gc X
IECEX	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex nA ic [ia Ga] IIC T4 Gc
UL, USA / Canada	Class I Div 2; IS for Class I, II, III Div 1

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)	96.5 %
MTBF	123 Years
λ_{SU}	1.42×10^{-7} (142 FIT)
λ_{SD}	4.38×10^{-7} (438 FIT)
λ_{DU}	3.24×10^{-8} (32.4 FIT)
λ_{DD}	3.14×10^{-7} (314 FIT)
Probability of a hazardous failure on demand (PFD _{AVG})	1.31×10^{-4} (1 year)
	2.62×10^{-4} (2 years)
	3.93×10^{-4} (3 years)
	6.55×10^{-4} (5 years)
	9.17×10^{-4} (7 years)
	1.05×10^{-3} (8 years)
Diagnostic coverage (DC)	90.7 %
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)	90.7 %
MTBF	123 Years
λ_{SU}	1.42×10^{-7} (150 FIT)
λ_{SD}	4.38×10^{-7} (438 FIT)
λ_{DU}	3.24×10^{-8} (32.4 FIT)

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Technical data

Safety characteristic data

λ_{DD}	3.14×10^{-7} (314 FIT)
Probability of a hazardous failure per hour (PFH ₀)	$3,24 \times 10^{-8}$
Diagnostic coverage (DC)	90.7 %

Safety data

Max. output voltage U _o	6 V
Max. output current I _o	4.7 mA
Max. output power P _o	7 mW
Group	IIC
Max. external inductivity L _o	100 mH
Max. external capacity C _o	1.5 µF
Group	IIC
Max. external inductivity L _o	10 mH
Max. external capacity C _o	1.9 µF
Group	IIC
Max. external inductivity L _o	1 mH
Max. external capacity C _o	2.7 µF
Group	IIB
Max. external inductivity L _o	100 mH
Max. external capacity C _o	7 µF
Group	IIB
Max. external inductivity L _o	10 mH
Max. external capacity C _o	9.4 µF
Group	IIB
Max. external inductivity L _o	1 mH
Max. external capacity C _o	15 µF
Safety-related maximum voltage U _m	253 V AC (125 V DC)

EMC data

Designation	Electromagnetic RF field
Standards/regulations	EN 61000-4-3
Typical deviation from the measuring range final value	3 %
Designation	Fast transients (burst)
Standards/regulations	EN 61000-4-4
Typical deviation from the measuring range final value	3 %
Designation	Conducted interferences

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EMC data

Standards/regulations	EN 61000-4-6
Typical deviation from the measuring range final value	3 %

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

Approvals

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UL Listed / cUL Listed / Functional Safety / cUL Listed / cULus Listed / cULus Listed / cULus Listed / null / null / null / null

Ex Approvals

IECEX / ATEX / UL Listed / cUL Listed / cUL Listed / cULus Listed / cULus Listed


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Approvals


Approvals submitted


Approval details


UL Listed 

cUL Listed 


Functional Safety

cUL Listed 

cULus Listed 

cULus Listed 

cULus Listed



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Approvals

Accessories

Accessories

Programming adapter

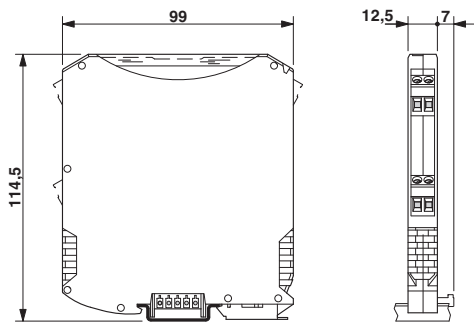
Programming adapter - IFS-USB-PROG-ADAPTER - 2811271



Programming adapter with USB interface, for programming with software. The USB driver is included in the software solutions for the products to be programmed, such as measuring transducers or motor managers.

Drawings

Dimensioned drawing



Block diagram

