MACX MCR-EX-TC-I - Temperature measuring transducer

1050233

https://www.phoenixcontact.com/us/products/1050233

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Ex i temperature transducer: converts signals from thermocouples installed in Ex areas and mV sources and transmits a 0/4…20 mA signal to a load in the safe area. Freely programmable. 3-way isolation, screw connection, SIL.

Your advantages

- Input for thermocouples and mV sources
- 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 "ec" (EN 60079-7) permitted
- 3-way electrical isolation
- 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
- Output: 0 mA ... 20 mA or 4 mA ... 20 mA

Commercial data

Item number	1050233
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	C430
Product key	CK3121
Catalog page	Page 148 (C-5-2019)
GTIN	4055626663463
Weight per piece (including packing)	184.1 g
Weight per piece (excluding packing)	150 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
Application	Temperature
No. of channels	1
Type	Ex i signal conditioners with SIL functional safety
Configuration	Software

Insulation characteristics: GB Standard

Overvoltage category	II
Pollution degree	2

Electrical properties

Electrical isolation	3-way isolation
Electrical isolation between input and output	No
Cold point error, max.	± 2 K
Step response (0–99%)	1 s
	≤ 1.7 s
Temperature coefficient, typical	0.01 %/K
Transmission error, typical	0.1 % (For full identification of transmission errors, see the data sheet)

Electrical isolation Input/output/power supply

Rated insulation voltage	300 V_{rms}
Test voltage	2.5 kV AC (50 Hz, 60 s)
Insulation	Safe isolation in accordance with IEC/EN 61010-1

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)

Supply

Nominal supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (24 V DC, -20 % ... +25 %)
Max. current consumption	< 40 mA (24 V DC)
Power dissipation	≤ 0.76 W
Power consumption	≤ 1 W

Input data

Signal

Number of inputs	1
Input signal	Temperature
	Voltage

Measurement

Description of the input	Intrinsically safe
Sensor types that can be used (TC)	B, E, J, K, N, R, S, T, L, U, C, D, A-1, A-2, A-3, M, Lr
Temperature measuring range	-250 °C ... 2500 °C (Range depending on the sensor type)
Sensor type:	500 °C ... 1820 °C
	-230 °C ... 1000 °C
	-210 °C ... 1200 °C
	-250 °C ... 1372 °C
	-200 °C ... 1300 °C
	-50 °C ... 1768 °C
	-50 °C ... 1768 °C
	-200 °C ... 400 °C
	-200 °C ... 900 °C
	-200 °C ... 600 °C
	0 °C ... 2315 °C
	0 °C ... 2315 °C
	0 °C ... 2500 °C
	0 °C ... 1800 °C
	0 °C ... 1800 °C
	-200 °C ... 100 °C
	-200 °C ... 800 °C
Linear mV signal range	-1000 mV ... 1000 mV
Temperature measuring range	Min. 50 K with thermocouple, 10% of the nominal span of the respective range with mV sources

Output data

Signal: Current

Number of outputs	1
Configurable/programmable	Yes
Current output signal	0 mA ... 20 mA
	4 mA ... 20 mA (SIL)
Load/output load current output	≤ 600 Ω
Output ripple (current)	< 15 μA_{PP}
	< 10 μA_{rms}
Behavior in the event of a sensor error	As per NE 43 or can be freely defined

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: Terminals: 4.1, 4.2, 5.1, 5.2

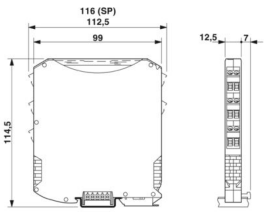
Max. internal capacitance C_i	44 nF
Max. output voltage U_o	6 V
Max. output current I_o	4.3 mA (mV)
	7.1 mA (TC with internal cold junction compensation)
	16.8 mA (TC with external cold junction, TC and cold junction connected)
Max. output power P_o	25.2 mW (Linear)
Safety-related maximum voltage U_m	253 V AC
	125 V DC
	30 V DC (Zone 2: 3.1, 3.2)
IIA/I (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o	850 mH / 1000 µF
IIB/IIIC (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o	460 mH / 1000 µF
IIC (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o	100 mH / 40 µF
IIB/IIA (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o	100 mH / 950 nF, 50 mH / 950 nF, 5 mH / 950 nF, 1 mH / 950 nF
IIIC/I (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o	100 mH / 950 nF, 50 mH / 950 nF, 5 mH / 950 nF, 1 mH / 950 nF
IIC (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o	100 mH / 555 nF, 50 mH / 555 nF, 5 mH / 555 nF, 1 mH / 555 nF, 10 µH / 555 nF

Signaling

Status display	Green LED (supply voltage)
	Red LED, flashing 2.4 Hz (cable error, sensor error on input or output, ERR)

	Red LED, flashing 1.2 Hz (service operation, ERR)
	Red LED, permanently on (module error, ERR)

Dimensions

Dimensional drawing	
Width	12.5 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
Ambient temperature (operation)	-40 °C ... 70 °C (Any mounting position)
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Permissible humidity (operation)	5 % ... 95 % (non-condensing)

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)	-40 °C ... 70 °C
Test voltage	2.5 kV
Rated insulation voltage	300 V_{rms} (IEC/EN 60079-11)
	375 V_{PP} (IEC/EN 60079-11)

Altitude range (≤ 3000 m)

Height range	> 2000 m ... 3000 m
Ambient temperature (operation)	-40 °C ... 60 °C
Test voltage	2.25 kV
Safety-related maximum voltage U_m	190 V AC
	110 V DC
Rated insulation voltage	190 V_{rms} (IEC/EN 60079-11)

Altitude range (≤ 4000 m)

Height range	> 3000 m ... 4000 m
Ambient temperature (operation)	-40 °C ... 55 °C
Test voltage	2 kV
Safety-related maximum voltage U_m	60 V AC/DC
Rated insulation voltage	60 V_{rms} (IEC/EN 60079-11)

Altitude range (≤ 5000 m)

Height range	> 4000 m ... 5000 m
Ambient temperature (operation)	-40 °C ... 49 °C
Test voltage	1.75 kV
Safety-related maximum voltage U_m	60 V AC/DC
Rated insulation voltage	60 V_{rms} (IEC/EN 60079-11)

Approvals

CE

Certificate	CE-compliant
Note	and EN 61326

ATEX

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 [ia Ga] IIC T4 Gc
Certificate	IBExU19ATEX1006 X

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 [ia Ga] IIC T4 Gc
Certificate	CML 22UKEX3531X

IECEx

Identification	[Ex ia Ma] I
	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec ic [ia Ga] IIC T4 Gc
Certificate	IECEx IBE 19.0001 X

CCC / China-Ex

Identification	[Ex ia Ga] IIC
	[Ex iaD]
	Ex nA ic [ia Ga] IIC T4 Gc
Certificate	NEPSI GYJ20.1305X

UL, USA/Canada

Identification	UL 61010 Listed
	Class I Div 2; IS for Class I, II, III Div 1
Certificate	cULus C.D.-No 83104549

Shipbuilding approval

Certificate	DNV GL TAA00000AG

Safety Integrity Level (SIL, IEC 61508)

Identification	2

INMETRO

Identification	[Ex ia Ma] I
	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec ic [ia Ga] IIC T4 Gc
Certificate	DNV 21.0064 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	B
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	1 %

Fast transients (burst)

Designation	Fast transients (burst)
Standards/regulations	EN 61000-4-4
Typical deviation from the measuring range final value	1 %

Conducted interference

Designation	Conducted interferences
Standards/regulations	EN 61000-4-6
Typical deviation from the measuring range final value	1 %

Standards and regulations

Electrical isolation	3-way isolation

GB Standard

Standards/regulations	GB 3626.20
	GB 3836.1
	GB 3836.4
	GB 3836.8
	GB 12476.1
	GB 12476.4

Mounting

Mounting type	DIN rail mounting

Classifications

ECLASS

ECLASS-11.0	27210129
ECLASS-12.0	27210129
ECLASS-13.0	27210129

ETIM

ETIM 9.0	EC002919

UNSPSC

UNSPSC 21.0	41112100

Environmental product compliance

REACh SVHC	Lead 7439-92-1

China RoHS	Environmentally Friendly Use Period = 50 years
	For information on hazardous substances, refer to the manufacturer’s declaration available under “Downloads”

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