PHŒNIX CONTACT

Temperature measuring transducer - MACX MCR-EX-SL-RTD-I-SP - 2924142

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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, spring-cage terminal blocks, custom-configured.

The illustration shows the versions with screw connection

Why buy this product

☑ Input for resistance thermometers and resistance-type sensors, [Ex ia] IIC

☑ Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter

☑ Power supply possible via DIN rail connector

☑ Installation in zone 2, protection type "n" (EN 60079-15) permitted

☑ 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

RoHS

Key Commercial Data

Packing unit	1 STK
Weight per Piece (excluding packing)	164.600 g
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

Dimensions

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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
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

Sensor types (RTD) that can be used	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 cable
Sensor input current	200 µA ... 1 mA
Measuring range span	min. 50 K

Output data

Signal output	Current output
Configurable/programmable	Yes
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
Configurable/programmable	no

Power supply

Nominal supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
Power consumption	< 1 W

Connection data

Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	1.5 mm²

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Connection data

Conductor cross section flexible min.	0.2 mm²
Conductor cross section flexible max.	1.5 mm²
Conductor cross section AWG min.	24
Conductor cross section AWG max.	16
Stripping length	8 mm
Connection method	Push-in connection

General

No. of channels	1
Temperature coefficient, typical	0.01 %/K
Step response (0–99%)	typ. 700 ms
	≤ 1100 ms
Alignment zero	± 5 %
Alignment span	± 5 %
Status display	Green LED (supply voltage, PWR)
	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)
Flammability rating according to UL 94	V0
Degree of pollution	2
Overvoltage category	II
Interference emission	EN 61000-6-4
Housing material	PA 66-FR
Color	green
Designation	Input/output/power supply
Electrical isolation	300 V_{rms} (Rated insulation voltage (overvoltage category II; degree of pollution 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/IIB
	# II (1) D [Ex ia Da] IIIC
	# II 3(1) G Ex nA ic [ia Ga] IIC T4 Gc X

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Technical data

General

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
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)
	2.6×10^{-4} (2 years)
	3.91×10^{-4} (3 years)
	6.51×10^{-4} (5 years)
	9.11×10^{-4} (7 years)
	1.04×10^{-3} (8 years)
Diagnostic coverage (DC)	90.2 %
Integrity requirement	IEC 61508 - High demand
Architecture	Single-channel, 1oo1
Equipment type	Type B
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 per hour (PFH_D)	$3,23 \times 10^{-8}$
Diagnostic coverage (DC)	90.2 %

Safety data

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Technical data

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
Group	IIC
Max. external inductivity L_o	100 mH
Max. external capacity C_o	1.4 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	6.9 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	4 %
Designation	Fast transients (burst)
Standards/regulations	EN 61000-4-4
Typical deviation from the measuring range final value	4 %
Designation	Conducted interferences
Standards/regulations	EN 61000-4-6
Typical deviation from the measuring range final value	4 %

Standards and Regulations

Noise emission	EN 61000-6-4

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Standards and Regulations

Designation	Electromagnetic RF field
Standards/regulations	EN 61000-4-3
	EN 61000-4-4
Designation	Conducted interferences
Standards/regulations	EN 61000-4-6
Flammability rating according to UL 94	V0
Conformance	CE-compliant, additionally EN 61326
ATEX	# II (1) G [Ex ia Ga] IIC/IIB
	# 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
Group	IIC
	IIC
	IIC
	IIB
	IIB
	IIB

Environmental Product Compliance

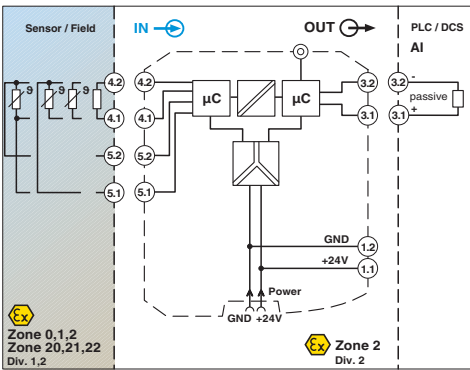| China RoHS	Environmentally Friendly Use Period = 50
	For details about hazardous substances go to tab "Downloads", Category "Manufacturer's declaration"

Drawings

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Temperature measuring transducer - MACX MCR-EX-SL-RTD-I-SP - 2924142

Dimensional drawing
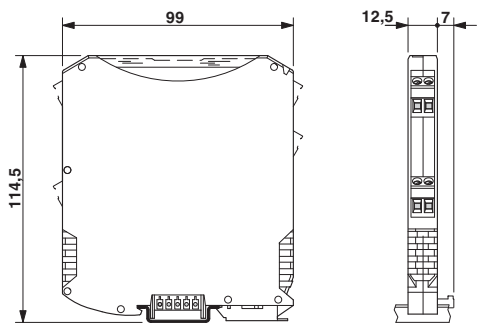
Block diagram

Pictogram
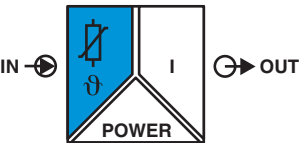
Classifications

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
eCl@ss 9.0	27210129

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Classifications

ETIM

ETIM 2.0	EC001446
ETIM 3.0	EC001446
ETIM 4.0	EC001446
ETIM 5.0	EC001446
ETIM 6.0	EC001446

UNSPSC

UNSPSC 6.01	30211506
UNSPSC 7.0901	39121008
UNSPSC 11	39121008
UNSPSC 12.01	39121008
UNSPSC 13.2	41112105

Approvals

Approvals

Approvals

UL Listed / cUL Listed / DNV GL / cULus Listed

Ex Approvals

UL Listed / cUL Listed / IECEx / ATEX / EAC Ex / cULus Listed

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Approval details

UL Listed		http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm	FILE E 330267

cUL Listed		http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm	FILE E 330267

DNV GL	http://exchange.dnv.com/tari/	TAA00000AG

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Approvals

cULus Listed	c(UL)us LISTED

Accessories

Accessories

Device marking

Plastic label - UC-EMLP (11X9) - 0819291

Plastic label, Sheet, white, unlabeled, can be labeled with: BLUEMARK CLED, BLUEMARK LED, CMS-P1-PLOTTER, PLOTMARK, Mounting type: Adhesive, Lettering field: 11 x 9 mm

Plastic label - UC-EMLP (11X9) YE - 0822602

Plastic label, Sheet, yellow, unlabeled, can be labeled with: BLUEMARK CLED, BLUEMARK LED, CMS-P1-PLOTTER, PLOTMARK, Mounting type: Adhesive, Lettering field: 11 x 9 mm

Plastic label - UC-EMLP (11X9) SR - 0828094

Plastic label, Sheet, silver, unlabeled, can be labeled with: BLUEMARK CLED, BLUEMARK LED, CMS-P1-PLOTTER, PLOTMARK, Mounting type: Adhesive, Lettering field: 11 x 9 mm

Plastic label - US-EMLP (11X9) - 0828789

Plastic label, Card, white, unlabeled, can be labeled with: THERMOMARK PRIME, THERMOMARK CARD, Mounting type: Adhesive, Lettering field: 11 x 9 mm

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Accessories

Plastic label - US-EMLP (11X9) YE - 0828871

Plastic label, Card, yellow, unlabeled, can be labeled with: THERMOMARK PRIME, THERMOMARK CARD, Mounting type: Adhesive, Lettering field: 11 x 9 mm

Plastic label - US-EMLP (11X9) SR - 0828872

Plastic label, Card, silver, unlabeled, can be labeled with: THERMOMARK PRIME, THERMOMARK CARD, Mounting type: Adhesive, Lettering field: 11 x 9 mm

Device marker - LS-EMLP (11X9) WH - 0831678

Device marker, Sheet, white, unlabeled, can be labeled with: TOPMARK LASER, Mounting type: Adhesive, Lettering field: 11 x 9 mm

Device marker - LS-EMLP (11X9) YE - 0831732

Device marker, Sheet, yellow, unlabeled, can be labeled with: TOPMARK LASER, Mounting type: Adhesive, Lettering field: 11 x 9 mm

Device marker - LS-EMLP (11X9) SR - 0831705

Device marker, Sheet, silver, unlabeled, can be labeled with: TOPMARK LASER, Mounting type: Adhesive, Lettering field: 11 x 9 mm

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Accessories

DIN rail connector

DIN rail bus connectors - ME 6,2 TBUS-2 1,5/5-ST-3,81 GN - 2869728

DIN rail connector for DIN rail mounting. Universal for TBUS housing. Gold-plated contacts, 5-pos.

Insulating sleeve

Insulating sleeve - MPS-IH BK - 0201731

Insulating sleeve, Color: black

Insulating sleeve - MPS-IH GY - 0201728

Insulating sleeve, Color: gray

Insulating sleeve - MPS-IH GN - 0201702

Insulating sleeve, Color: green

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Accessories

Insulating sleeve - MPS-IH YE - 0201692

Insulating sleeve, Color: yellow

Insulating sleeve - MPS-IH BU - 0201689

Insulating sleeve, Color: blue

Insulating sleeve - MPS-IH RD - 0201676

Insulating sleeve, Color: red

Insulating sleeve - MPS-IH WH - 0201663

Insulating sleeve, Color: white

Labeled device marker

Plastic label - UC-EMLP (11X9) CUS - 0824547

Plastic label, can be ordered: by sheet, white, labeled according to customer specifications, Mounting type: Adhesive, Lettering field: 11 x 9 mm

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Accessories

Plastic label - UC-EMLP (11X9) YE CUS - 0824548

Plastic label, can be ordered: by sheet, yellow, labeled according to customer specifications, Mounting type: Adhesive, Lettering field: 11 x 9 mm

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Plastic label - UC-EMLP (11X9) SR CUS - 0828098

Plastic label, can be ordered: by sheet, silver, labeled according to customer specifications, Mounting type: Adhesive, Lettering field: 11 x 9 mm

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Module carrier

Module carrier - TC-D37SUB-ADIO16-EX-P-UNI - 2924854

Universal termination carrier for connecting 16 MACX Analog Ex i signal conditioners to digital or analog I/O cards, via D-SUB connector, 37-pos. (1:1 connection)

Module carrier - TC-D37SUB-AIO16-EX-PS-UNI - 2902932

Universal termination carrier for connecting 16 MACX Analog Ex i signal conditioners to digital or analog I/O cards, via D-SUB connector, 37-pos. (1:1 connection), with HART multiplexer connection

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Power module

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Accessories

Power and error message module - MACX MCR-PTB - 2865625

Power and fault signaling module with screw connection, including corresponding ME 17,5 TBUS 1,5/ 5-ST-3,81 GN DIN rail connector

Power and error message module - MACX MCR-PTB-SP - 2924184

Power and fault signaling module with push-in connection, including corresponding ME 17,5 TBUS 1,5/ 5-ST-3,81 GN DIN rail connector

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.

Test plug terminal block

Test plugs - MPS-MT - 0201744

Test plugs, with solder connection up to 1 mm² conductor cross section, Color: silver