


# MACX MCR-EX-SL-RTD-I-SP-NC

Order No.: 2924168

The illustration shows the versions with screw connection



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.

Commercial data	
EAN	4  046356 438957
Pack	1
Customs tariff	85389091
Product key	09724
Country of Origin	DE
Catalog page information	Page 456 (IF-2011)

#### Product notes

WEEE/RoHS-compliant since:  
05/08/2008



Please note that the data given here has been taken from the online catalog. For comprehensive information and data, please refer to the user documentation at <http://www.download.phoenixcontact.com>. The General Terms and Conditions of Use apply to Internet downloads.

## Technical data

Input data	
Sensor types (RTD) that can be used	Pt, Ni, Cu sensors: 2, 3, 4-wire
Input signal range	0 $\Omega$ ... 2000 $\Omega$
Cable resistance	(50 $\Omega$ per line)
Sensor input current	(200 $\mu$ A ... 1 mA)
Measuring range span	min. 50 K

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**Output data**

Signal output	Current output
Current output signal	0 mA ... 20 mA
	4 mA ... 20 mA
Load/output load current output	max. 500 $\Omega$
Output ripple (current)	< 50 $\mu\text{A}_{\text{pp}}$
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 <sup>2</sup>
Conductor cross section solid max.	1.5 mm <sup>2</sup>
Conductor cross section stranded min.	0.2 mm <sup>2</sup>
Conductor cross section stranded max.	1.5 mm <sup>2</sup>
Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max	16
Stripping length	8 mm
Connection method	Spring-cage conn.

**General data**

No. of channels	1
Temperature coefficient, typical	0.01 %/K
Ambient temperature (operation)	-20 °C ... 60 °C (Any mounting position)
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Maximum altitude	2000 m (Above sea level)
Permissible humidity (operation)	5 % ... 95 % (no condensation)
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	$\pm 5$ %
Alignment span	$\pm 5$ %

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Status display	Green LED (supply voltage, PWR) Red LED, flashing (line, sensor error, ERR) Red LED (module error, ERR)
Width	12.5 mm
Height	99 mm
Depth	114.5 mm
Inflammability class according to UL 94	V0
Pollution degree	2
Surge voltage category	II
Housing material	PA 66-FR
Degree of protection	IP20
Color	green
Electrical isolation input / output / supply	2.5 kV (50 Hz, 1 min., test voltage)
Electrical isolation input / output	375 V (Peak value in accordance with EN 60079-11)
Electrical isolation input / supply	375 V (Peak value in accordance with EN 60079-11)
Conformance	CE-compliant, additionally EN 61326
ATEX	Ex II (1) G [Ex ia] IIC Ex II (1) D [Ex iaD] Ex II 3G Ex nA ic IIC T4 X
IECEX	[Ex ia] IIC; [Ex iaD]; Ex nA ic [ia] IIC T4
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	for 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
$\lambda_{SU}$	$1.5 \times 10^{-7}$ (150 FIT)
$\lambda_{SD}$	$4.61 \times 10^{-7}$ (461 FIT)
$\lambda_{DU}$	$3.23 \times 10^{-7}$ (323 FIT)
$\lambda_{DD}$	$3.18 \times 10^{-8}$ (31.8 FIT)

Probability of a hazardous failure on demand (PFD <sub>AVG</sub> )	1.3 x 10 <sup>-4</sup> (1 year)
	2.6 x 10 <sup>-4</sup> (2 years)
	3.91 x 10 <sup>-4</sup> (3 years)
	6.51 x 10 <sup>-4</sup> (5 years)
	9.11 x 10 <sup>-4</sup> (7 years)
	1.04 x 10 <sup>-3</sup> (8 years)
Diagnostic coverage (DC)	90.2 %
Integrity requirement	for 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 <sub>SU</sub>	1.5 x 10 <sup>-7</sup> (150 FIT)
λ <sub>SD</sub>	4.61 x 10 <sup>-7</sup> (461 FIT)
λ <sub>DU</sub>	3.23 x 10 <sup>-7</sup> (323 FIT)
λ <sub>DD</sub>	3.18 x 10 <sup>-8</sup> (31.8 FIT)
Probability of a hazardous failure per hour (PFH <sub>D</sub> )	3,23 x 10 <sup>-8</sup>
Diagnostic coverage (DC)	90.2 %
<b>Safety data</b>	
Max. voltage U <sub>o</sub>	6 V
Max. current I <sub>o</sub>	6.3 mA
Max. power P <sub>o</sub>	9.4 mW
Gas group	II C
Max. external inductivity L <sub>o</sub>	100 mH
Max. external capacity C <sub>o</sub>	1.4 μF
Gas group	II C
Max. external inductivity L <sub>o</sub>	10 mH
Max. external capacity C <sub>o</sub>	1.9 μF
Gas group	II C
Max. external inductivity L <sub>o</sub>	1 mH
Max. external capacity C <sub>o</sub>	2.7 μF
Safety-related maximum voltage U <sub>m</sub>	253 V AC (125 V DC)

Gas group	II B
Max. external inductivity L <sub>o</sub>	100 mH
Max. external capacity C <sub>o</sub>	6.9 µF
Gas group	II B
Max. external inductivity L <sub>o</sub>	10 mH
Max. external capacity C <sub>o</sub>	9.4 µF
Gas group	II B
Max. external inductivity L <sub>o</sub>	1 mH
Max. external capacity C <sub>o</sub>	15 µF

### Certificates

Certification	TUEV-RH
Certification Ex:	IECEX
Certifications applied for:	UL Listed / CUL Listed

### Accessories

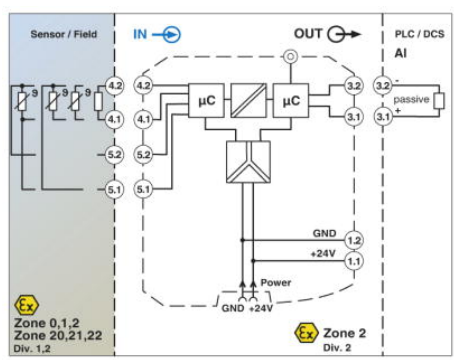
Item	Designation	Description
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#### Cable/conductor

2811271	IFS-USB-PROG-ADAPTER	Programming adapter with USB interface, for programming with the IFS-CONF, MACX-MCR-CONF and UPS-CONF software
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### Drawings

Block diagram



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Dimensioned drawing

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