

# MACX MCR-EX-SL-2NAM-R-UP-SP - Isolation switch amplifier



2924249

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2-channel Ex i NAMUR signal conditioner with wide range power supply for proximity sensors and switches. In terms of signal output, for each channel there is a relay with a changeover contact available. Fault detection (LFD), 3-way isolation, SIL 2.

## Your advantages

- Up to SIL 2 in accordance with EN 61508
- Installation in zone 2, protection type "n" (EN 60079-15) permitted
- Line fault detection (LFD), can be activated/deactivated, error indicated by flashing red LED with de-excitation of output relay
- Wide-range power supply of 19.2 ... 253 V AC/DC
- Direction of operation can be selected (operating or closed circuit current behavior)
- LED indicators for supply voltage, switching state, and malfunction in accordance with NAMUR NE 44
- Signal output relay (changeover contact)
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia] IIC
- 3-way electrical isolation
- 2-channel

## Commercial data

Item number	2924249
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	C430
Product key	DK1213
GTIN	4046356463683
Weight per piece (including packing)	195.7 g
Weight per piece (excluding packing)	100 g
Customs tariff number	85365019
Country of origin	DE

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## Technical data

### Product properties

Product type	Isolating switch amplifier
Product family	MACX Analog
No. of channels	2
Configuration	DIP switches

### System properties

#### Functionality

Configuration	DIP switches
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### Electrical properties

Electrical isolation	3-way isolation
Electrical isolation between input and output	yes
Maximum power dissipation for nominal condition	$\leq 1.3 \text{ W}$
Step response (10-90%)	typ. 6 ms (N/O contact: OFF/ON)
	typ. 6 ms (N/O contact: ON/OFF)
	typ. 4 ms (N/C contact: ON/OFF)
	typ. 10 ms (N/C contact: OFF/ON)

#### Electrical isolation

Test voltage	2.5 kV AC (50 Hz, 60 s)
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#### Electrical isolation Input/output IEC/EN 60079-11

Standards/regulations	IEC/EN 60079-11
Rated insulation voltage	375 V <sub>PP</sub>
Overvoltage category	III
Pollution degree	2

#### Electrical isolation Input/power supply IEC/EN 60079-11

Standards/regulations	IEC/EN 60079-11
Rated insulation voltage	375 V <sub>PP</sub>
Overvoltage category	II
Pollution degree	2

#### Electrical isolation Input/power supply IEC/EN 61010-1

Standards/regulations	IEC/EN 61010-1
Rated insulation voltage	300 V <sub>rms</sub>
Overvoltage category	II
Pollution degree	2
Insulation	Safe isolation

#### Electrical isolation Output 1/output 2/input, power supply IEC/EN 61010-1

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Standards/regulations	IEC/EN 61010-1
Rated insulation voltage	300 V <sub>rms</sub>
Overvoltage category	III
Pollution degree	2
Insulation	Safe isolation

## Supply

Nominal supply voltage range	24 V AC/DC ... 230 V AC/DC -20 % ... +10 % (50/60 Hz)
Supply voltage range	19.2 V AC/DC ... 253 V AC/DC (50/60 Hz)
Max. current consumption	< 80 mA
	< 42 mA (24 V DC)
Power dissipation	< 1.1 W
Power consumption	< 1.1 W

## Input data

Signal: NAMUR

Description of the input	intrinsically safe
Number of inputs	2
Available input sources	NAMUR proximity sensors (IEC/EN 60947-5-6)
	floating switch contacts
	Switch contacts with resistance circuit
Switching threshold "0" signal current	< 1.2 mA (blocking)
Switching threshold "1" signal, current	> 2.1 mA (conductive)
Short-circuit current	8 mA
Switching hysteresis	< 0.2 mA
Line fault detection	< 0.05 mA ... 0.35 mA (Line break)
	< 100 Ω ... 360 Ω (Short circuit)
	Activated /deactivated via DIP switch
Open-circuit voltage	8 V DC

## Output data

Switching: Relay

Contact switching type	1 changeover contact per channel
Contact material	AgSnO <sub>2</sub> , hard gold-plated
Maximum switching voltage	250 V AC (2 A, 60 Hz)
	120 V DC (0.2 A)
	30 V DC (2 A)
Maximum switching power	500 VA
Recommended minimum load	5 V / 10 mA

Signal

Number of outputs	2
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## Connection data

Connection method	Push-in connection
Stripping length	10 mm
Conductor cross-section rigid	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross-section flexible	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross-section flexible (2 conductors with same cross section)	0.25 mm <sup>2</sup> ... 0.34 mm <sup>2</sup> (TWIN ferrule without plastic sleeve)
	0.5 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> (TWIN ferrule with plastic sleeve)
Conductor cross-section AWG	24 ... 14
	24 ... 22 (TWIN ferrule without plastic sleeve)
	20 ... 16 (TWIN ferrule with plastic sleeve)

## Ex data

Ex installation (EPL)	Gc
	Div. 2
Ex i circuits (EPL)	[Ga]
	[Da]
	[Ma]
	[Div. 1]

## Safety data

Max. internal inductance $L_i$	negligible
Max. internal capacitance $C_i$	negligible
Max. output voltage $U_o$	9.56 V
Max. output current $I_o$	10.3 mA
Max. output power $P_o$	25 mW
Safety-related maximum voltage $U_m$	253 V AC/DC (Supply terminals)
	250 V AC (Output terminals)
	120 V DC (Output terminals)
IIA (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	1000 mH / 210 $\mu$ F
IIB/IIIC (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	1000 mH / 26 $\mu$ F
IIC (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	300 mH / 3.6 $\mu$ F
IIB/IIA/I (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	100 mH / 1 $\mu$ F
IIC (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	100 mH / 510 nF, 50 mH / 580 nF, 5 mH / 600 nF

## Signaling

Status display	Green LED (supply voltage)
	LED yellow (switching state)
	Red LED (line errors)

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## Dimensions

Dimensional drawing	
Width	17.5 mm
Height	107.9 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 (Housing)	V0 (Housing)
Housing material	PA 6.6-FR

## Environmental and real-life conditions

### Ambient conditions

Degree of protection	IP20 (not assessed by UL)
Ambient temperature (operation)	-40 °C ... 60 °C (Any mounting position) -40 °C ... 70 °C (Derating)
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Permissible humidity (operation)	10 % ... 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 ... 60 °C -40 °C ... 70 °C (Derating)
Rated insulation voltage	253 V AC (Power supply, input / output) 125 V DC (Power supply, input / output)

### Altitude range (≤ 3000 m)

Height range	> 2000 m ... 3000 m
Ambient temperature (operation)	-40 °C ... 54 °C -40 °C ... 63 °C (Derating)
Rated insulation voltage	190 V AC (Power supply, input / output) 110 V DC (Power supply, input / output)

### Altitude range (≤ 4000 m)

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Height range	> 3000 m ... 4000 m
Ambient temperature (operation)	-40 °C ... 48 °C
	-40 °C ... 56 °C (Derating)
Rated insulation voltage	60 V AC/DC (Power supply, input / output)

## Altitude range (≤ 5000 m)

Height range	> 4000 m ... 5000 m
Ambient temperature (operation)	-40 °C ... 42 °C
	-40 °C ... 49 °C (Derating)
Rated insulation voltage	60 V AC/DC (Power supply, input / output)

## Approvals

### CE

Certificate	CE-compliant
Note	and EN 61326

### ATEX

Identification	⊕ II (1) G [Ex ia Ga] IIC
	⊕ II (1) D [Ex ia Da] IIIC
	⊕ II 3 (1) G Ex ec [ia Ga] nC IIC T4 Gc
	⊕ I (M1) [Ex ia Ma] I
Certificate	IBExU 10 ATEX 1005

### IECEX

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec [ia Ga] nC IIC T4 Gc
	[Ex ia Ma] I
Certificate	IECEX IBE 10.0002X

### CCC / China-Ex

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec nC [ia Ga] IIC T4 Gc
Certificate	2022122316115976

### UL, USA/Canada

Identification	Class I Div 2; IS for Class I, II, III Div 1
Certificate	Ⓢ.Ⓢ. C.D.-No 83104549

### Shipbuilding approval

Certificate	DNV GL TAA000020C
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### Safety Integrity Level (SIL, IEC 61508)

Identification	2
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Certificate	IN-AT-AS-MRL-24-00163
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## Systematic Capability

Identification	3
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## INMETRO

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec nC [ia Ga] IIC T4 Gc
	[Ex ia Ma] I
Certificate	DNV 18.0116 X

## Shipbuilding data

Temperature	B
Humidity	B
Vibration	A
EMC	A
Enclosure	Required protection according to the Rules shall be provided upon installation on board

## EMC data

Electromagnetic compatibility	Conformance with EMC directive
Noise immunity	EN 61000-6-2

## Noise emission

Standards/regulations	EN 61000-6-4
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## Electromagnetic HF field

Designation	Electromagnetic RF field
Standards/regulations	EN 61000-4-3
Evaluation criterion	A

## Fast transients (burst)

Designation	Fast transients (burst)
Standards/regulations	EN 61000-4-4
Evaluation criterion	A

## Conducted interference

Designation	Conducted interferences
Standards/regulations	EN 61000-4-6
Evaluation criterion	A

## Standards and regulations

Electrical isolation	3-way isolation
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## GB Standard

	GB/T 3836.1
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Standards/regulations	GB/T 3836.3
	GB/T 3836.4
	GB/T 3836.8

## Mounting

Mounting type	DIN rail mounting
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# MACX MCR-EX-SL-2NAM-R-UP-SP - Isolation switch amplifier

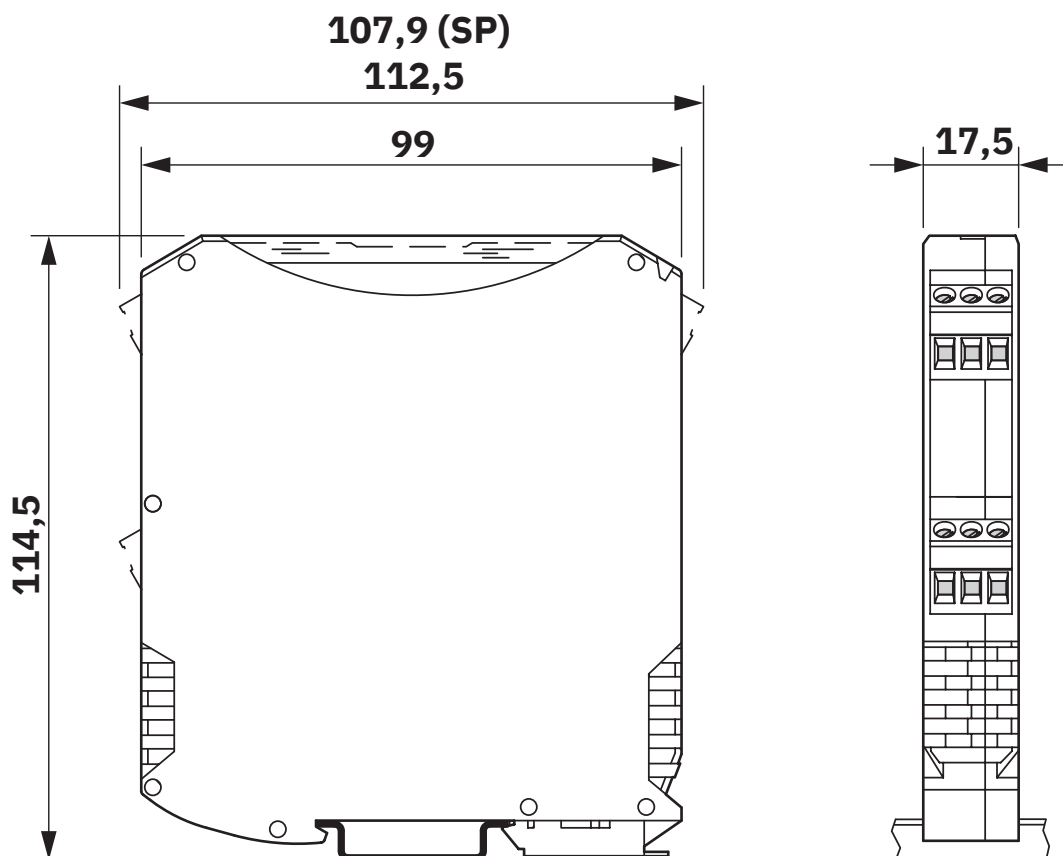


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## Drawings

Dimensional drawing



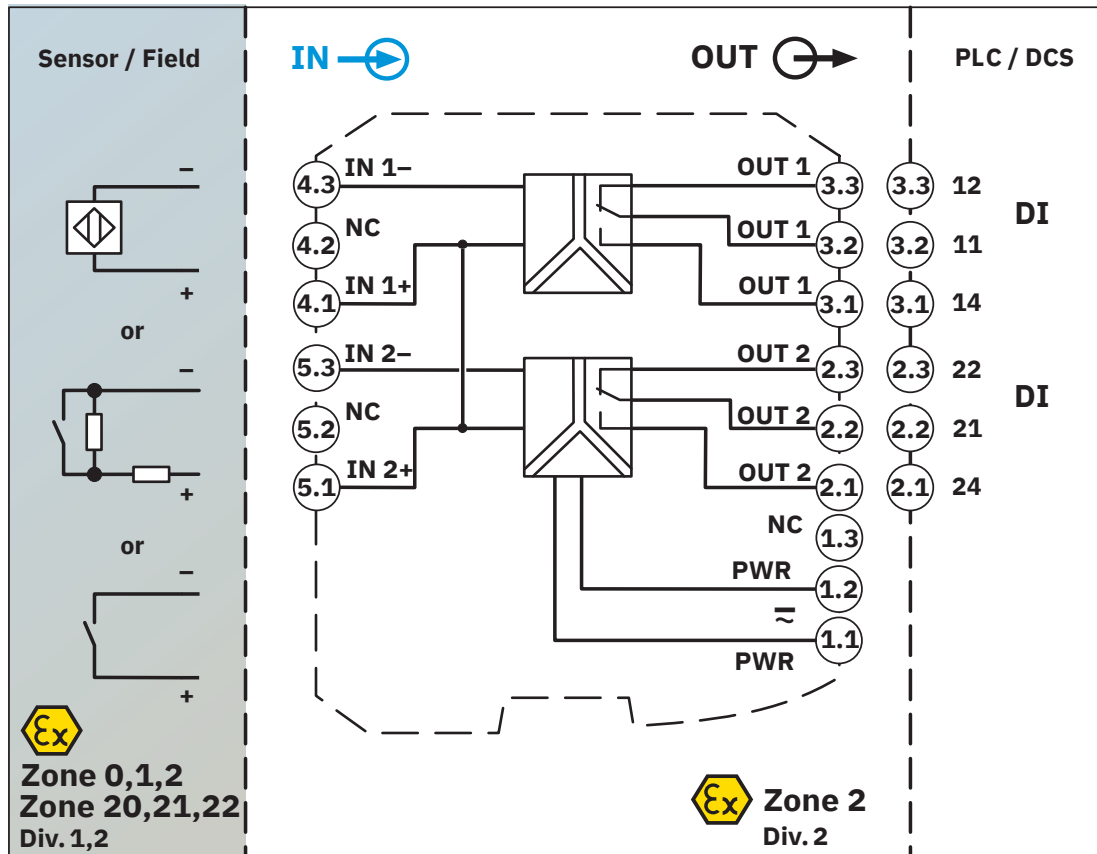
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Block diagram



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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2924249>



**UL Listed**

Approval ID: FILE E 330267



**cUL Listed**

Approval ID: E330267

**DNV**

Approval ID: TAA000020C

**TUEV Austria FS**

Approval ID: IN-AT-AS-24-00163

**ECAS**

Approval ID: 163681 E25 08 169508



**EAC Ex**

Approval ID: RU C-DE.AB72.B.00093



**IECEx**

Approval ID: IECEx IBE 10.0002X



**cUL Listed**

Approval ID: FILE E 199827



**UL Listed**

Approval ID: FILE E 199827

**INMETRO**

Approval ID: DNV 18.0116 X



**ATEX**

Approval ID: IBExU 10 ATEX 1005

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CCC

Approval ID: 2022122316115976

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## Classifications

### ECLASS

ECLASS-13.0	27210121
ECLASS-14.0 ASSET	27250101
ECLASS-15.0	27210121
ECLASS-15.0 ASSET	27250101

### ETIM

ETIM 10.0	EC001485
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### UNSPSC

UNSPSC 21.0	39121000
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## Environmental product compliance

### EU RoHS

Fulfills EU RoHS substance requirements	Yes
Exemption	7(a), 7(c)-I

### China RoHS

Environment friendly use period (EFUP)	EFUP-50 An article-related China RoHS declaration table can be found in the download area for the respective article under "Manufacturer declaration". For all articles with EFUP-E, no China RoHS declaration table issued and required.
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### EU REACH SVHC

REACH candidate substance (CAS No.)	Lead(CAS: 7439-92-1) 2,2',6,6'-tetrabromo-4,4'-isopropylidenediphenol(CAS: 79-94-7)
SCIP	5e58644f-ccb9-4ab9-8aca-e53521c3f1a2

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