

Isolation amplifier - MACX MCR-EX-SL-NAM-R-SP - 2924045

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Ex i NAMUR isolating amplifier For operating proximity sensors and switches in Ex areas. The signals are transmitted via a relay output (PDT contact) to the safe area. Line fault detection (LFD), 3-way isolation, SIL 2.

The illustration shows the versions with screw connection

Product Features

- Power supply and error indication possible via DIN rail connector
- Installation in zone 2, protection type "n" (EN 60079-15) permitted
- Up to SIL 2 according to EN 61508
- Line fault detection (LFD), can be activated/deactivated, error indicated by red flashing LED with de-excitation of output relay
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia] IIC
- Relay signal output (PDT)
- Direction of operation can be selected (operating or closed circuit current behavior)
- 3-way electrical isolation
- LED indicators for supply voltage, switching state, and malfunction according to NAMUR NE 44



Key commercial data

package_quantity	1
GTIN	4046356338059

Technical data

Note

Utilization restriction	EMC: class A product, see manufacturer's declaration in the download area
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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 ... 85 °C
Maximum altitude	≤ 2000 m

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Ambient conditions

Permissible humidity (operation)	10 % ... 95 % (non-condensing)
Noise immunity	EN 61000-6-2 EN 61326
Degree of protection	IP20

Input data

Non-load voltage	~ 8 V DC
Switching points (attenuated)	< 1.2 mA (blocking)
Switching points (unattenuated)	> 2.1 mA (conductive)

Output data

Switching output	Relay output
Contact type	1 PDT
Contact material	AgSnO ₂ , hard gold-plated
Maximum switching voltage	250 V AC (2 A)
Maximum switching voltage	120 V DC (0.2 A)
Maximum switching voltage	30 V DC (2 A)
Maximum switching capacity	500 VA
Mechanical service life	10 ⁷ cycles

Power supply

Nominal supply voltage	24 V DC -20 % ... +25 %
Supply voltage range	19.2 V DC ... 30 V DC (24 V DC (-20% ... +25%))
Max. current consumption	21 mA (24 V DC)
Power consumption	< 650 mW

Connection data

Conductor cross section solid min.	0.2 mm ²
Conductor cross section solid max.	1.5 mm ²
Conductor cross section stranded min.	0.2 mm ²
Conductor cross section stranded max.	1.5 mm ²
Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max	16
Stripping length	8 mm
Connection method	Spring-cage connection

General

No. of channels	1
Status display	Green LED (supply voltage)
Status display	LED yellow (switching state)
Status display	Red LED (line errors)
Inflammability class according to UL 94	V0
Pollution degree	2
Surge voltage category	II
Housing material	PA 66-FR

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General

Color	green
Designation	Input/output
Electrical isolation	375 V (Peak value in accordance with EN 60079-11)
Designation	Input/output/supply, T-connector
Electrical isolation	300 V _{rms} (Rated insulation voltage (surge voltage category II; pollution degree 2, safe isolation as per EN 61010-1))
Electrical isolation	2.5 kV (50 Hz, 1 min., test voltage)
Designation	Input/supply, T-connector
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
ATEX	# II (1) D [Ex ia Da] IIIC
IECEX	[Ex ia Ga] IIC
IECEX	[Ex ia Da] IIIC
IECEX	Ex nA nC 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
Designation	Non-inverted operation
Equipment type	Type A
Safety Integrity Level (SIL)	Up to 2
Safe Failure Fraction (SFF)	78 %
λ_{SU}	2.49×10^{-7} (249 FIT)
λ_{SD}	6×10^{-9} (6 FIT)
λ_{DU}	6.4×10^{-8} (64 FIT)
λ_{DD}	7×10^{-9} (7 FIT)
Probability of a hazardous failure on demand (PFD_{AVG})	3.09×10^{-4} (1 year)
Probability of a hazardous failure on demand (PFD_{AVG})	6.17×10^{-4} (2 years)
Probability of a hazardous failure on demand (PFD_{AVG})	1.54×10^{-3} (5 years)
Diagnostic coverage (DC)	DC _S = 2.4%, DC _D = 9%
Integrity requirement	IEC 61508 - Low demand
Designation	Inverted operation
Equipment type	Type A
Safety Integrity Level (SIL)	Up to 2
Safe Failure Fraction (SFF)	78 %
λ_{SU}	2.48×10^{-7} (248 FIT)
λ_{SD}	1×10^{-9} (1 FIT)
λ_{DU}	6.2×10^{-8} (62 FIT)
λ_{DD}	6×10^{-9} (6 FIT)

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Technical data

Safety characteristic data

Probability of a hazardous failure on demand (PFD _{AVG})	3.01 x 10 ⁻⁴ (1 year)
Probability of a hazardous failure on demand (PFD _{AVG})	6.02 x 10 ⁻⁴ (2 years)
Probability of a hazardous failure on demand (PFD _{AVG})	1.5 x 10 ⁻³ (5 years)
Diagnostic coverage (DC)	DC _S = 0.4%, DC _D = 8%

Safety data

Max. internal inductance L _i	negligible
Max. internal capacitance C _i	11 nF
Max. output voltage U _o	9.6 V
Max. output current I _o	10 mA
Max. output power P _o	25 mW
Group	IIC
Max. external inductivity L _o	100 mH
Max. external capacity C _o	510 nF
Group	IIC
Max. external inductivity L _o	5 mH
Max. external capacity C _o	840 nF
Group	IIC
Max. external inductivity L _o	1 mH
Max. external capacity C _o	1.2 µF
Group	IIC
Max. external inductivity L _o	10 µH
Max. external capacity C _o	3.6 µF
Group	IIB
Max. external inductivity L _o	100 mH
Max. external capacity C _o	2.7 µF
Group	IIB
Max. external inductivity L _o	5 mH
Max. external capacity C _o	4.4 µF
Safety-related maximum voltage U _m	253 V AC (125 V DC)

classifications

eCl@ss

eCl@ss 4.0	27210121
eCl@ss 4.1	27210121
eCl@ss 5.0	27210121
eCl@ss 5.1	27210121
eCl@ss 6.0	27210121
eCl@ss 7.0	27210121
eCl@ss 8.0	27210121

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classifications

ETIM

ETIM 2.0	EC001430
ETIM 3.0	EC001599
ETIM 4.0	EC001599
ETIM 5.0	EC001599

UNSPSC

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

approvals

IECEX / UL Listed / cUL Listed / ATEX / IECEx / UL Listed / cUL Listed / ATEX / cULus Listed / UL Listed / cUL Listed / GL / UL Listed / cUL Listed / GL / Functional Safety / cULus Listed /

Approval details

IECEX

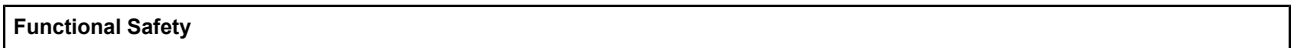
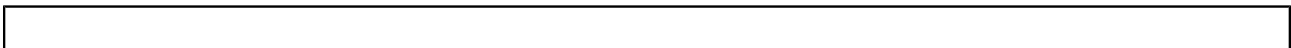
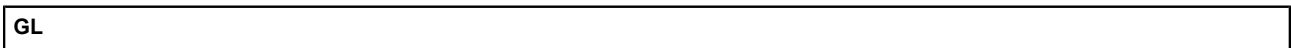
UL Listed

cUL Listed

ATEX

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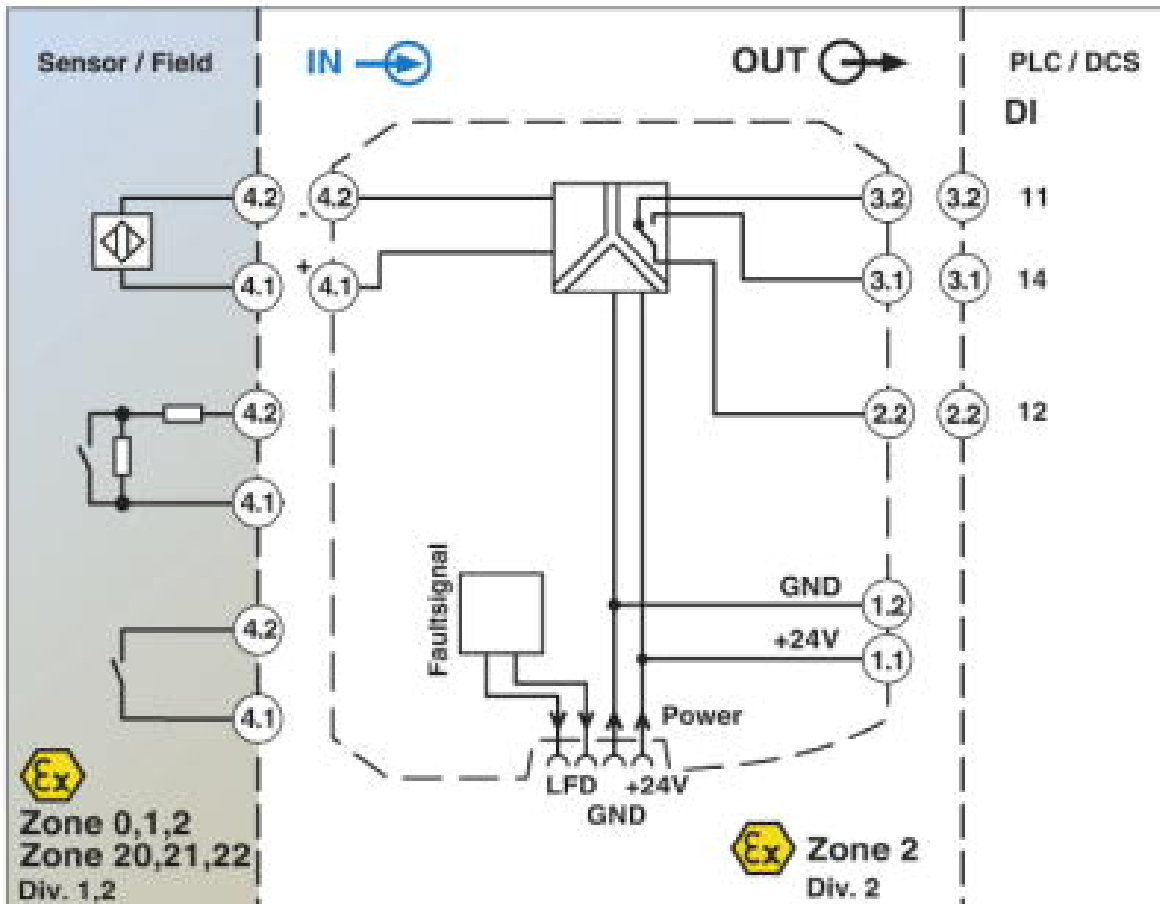
approvals



Drawings

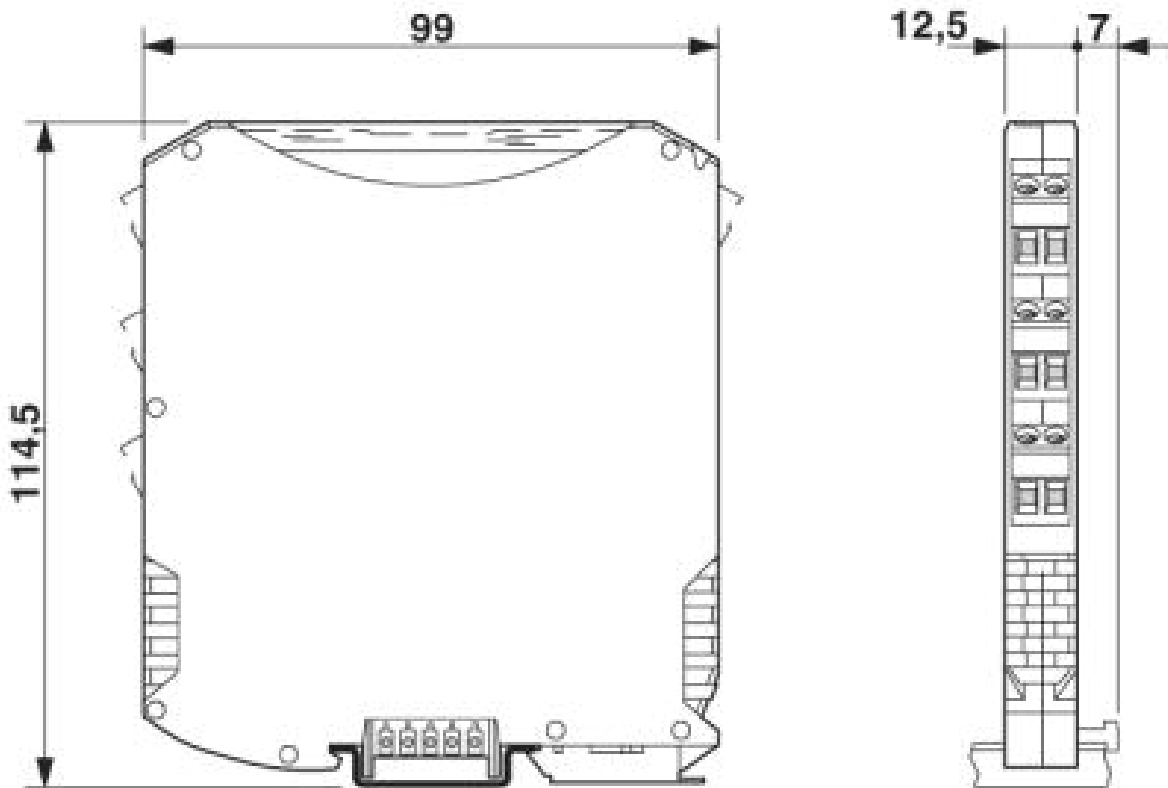
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Block diagram



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Dimensioned drawing



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