

Isolation amplifier - MACX MCR-EX-SL-NAM-R - 2865434

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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.

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
- 3-way electrical isolation
- LED indicators for supply voltage, switching state, and malfunction according to NAMUR NE 44
- Relay signal output (PDT)
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia] IIC
- Direction of operation can be selected (operating or closed circuit current behavior)



Key Commercial Data

Packing unit	1 pc
Weight per Piece (excluding packing)	165.8 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
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Dimensions

Isolation amplifier - MACX MCR-EX-SL-NAM-R - 2865434

Technical data

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
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) 120 V DC (0.2 A) 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 < 650 mW

Connection data

Conductor cross section solid min.	0.2 mm ²
Conductor cross section solid max.	2.5 mm ²
Conductor cross section flexible min.	0.2 mm ²
Conductor cross section flexible max.	2.5 mm ²
Conductor cross section AWG min.	24

Isolation amplifier - MACX MCR-EX-SL-NAM-R - 2865434

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Connection data

Conductor cross section AWG max.	14
Stripping length	7 mm
Screw thread	M3
Connection method	Screw connection
Tightening torque, min	0.5 Nm
Tightening torque max	0.6 Nm

General

No. of channels	1
Status display	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Flammability rating according to UL 94	V0
Degree of pollution	2
Overvoltage category	II
Housing material	PA 66-FR
Color	green
Designation	Input/output
Electrical isolation	375 V (Peak value in accordance with EN 60079-11)
Designation	Input/output/supply, DIN rail connector
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	Output/input, supply, TBUS
Electrical isolation	300 V _{rms} (Rated insulation voltage (overvoltage category III; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Designation	Input/supply, DIN rail 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 # II (1) D [Ex ia Da] IIIC
IECEX	[Ex ia Ga] IIC [Ex ia Da] IIIC 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
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Isolation amplifier - MACX MCR-EX-SL-NAM-R - 2865434

Technical data

Safety characteristic data

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)
	6.17×10^{-4} (2 years)
	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)
Probability of a hazardous failure on demand (PFD _{AVG})	3.01×10^{-4} (1 year)
	6.02×10^{-4} (2 years)
	1.5×10^{-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	300 mH
Max. external capacity C _o	3.6 μ F

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Technical data

Safety data

Group	IIB/IIIC
Max. external inductivity L_o	1000 mH
Max. external capacity C_o	26 μ F
Safety-related maximum voltage U_m	253 V AC (125 V DC)

Standards and Regulations

Flammability rating according to UL 94	V0
Conformance	CE-compliant, additionally EN 61326
ATEX	# II (1) G [Ex ia Ga] IIC # II (1) D [Ex ia Da] IIIC
IECEX	[Ex ia Ga] IIC [Ex ia Da] IIIC
	Ex nA nC IIC T4 Gc
UL, USA / Canada	Class I Div 2; IS for Class I, II, III Div 1
Group	IIC IIB/IIIC

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

ETIM

ETIM 2.0	EC001430
ETIM 3.0	EC001599
ETIM 4.0	EC001485
ETIM 5.0	EC001485

UNSPSC

UNSPSC 6.01	30211506
UNSPSC 7.0901	39121008
UNSPSC 11	39121008

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Classifications

UNSPSC

UNSPSC 12.01	39121008
UNSPSC 13.2	39121008

Approvals

Approvals

Approvals

UL Listed / cUL Listed / Functional Safety / EAC / cULus Listed

Ex Approvals

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

Approvals submitted


Approval details

UL Listed 

cUL Listed 

Functional Safety

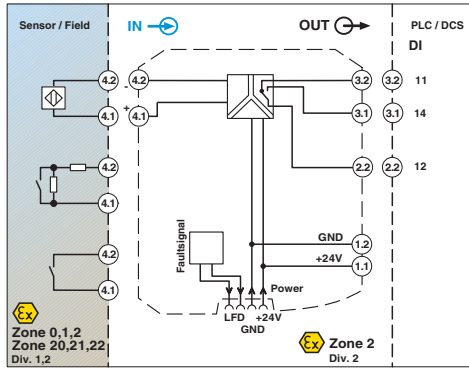
EAC

cULus Listed 

Drawings

Isolation amplifier - MACX MCR-EX-SL-NAM-R - 2865434

Block diagram



Dimensional drawing

