

Output signal conditioner - MACX MCR-EX-SL-IDS-I - 2865405

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Ex i output signal conditioner, HART. Isolates and transmits 0/4 - 20 mA signals with intrinsic safety to a load (I/P converters, regulating valves, displays) in the Ex area. Open-circuit detection, SIL 2 in accordance with IEC 61508. Replacement item: 2908060 MACX MCR-EX-IDS-I-I.

Your advantages

- ✓ Power supply possible via DIN rail connector
- ✓ Up to SIL 2 according to EN 61508
- ✓ Installation in zone 2, protection type "n" (EN 60079-15) permitted
- ✓ Line fault detection (LFD)
- ✓ 3-way electrical isolation
- ✓ 0/4 ... 20 mA output, [Ex ia] IIC
- ✓ Plug-in screw or spring-cage connection technology (Push-in technology), with integrated sockets for HART communicators
- ✓ Bidirectional transmission of digital HART communication signals
- ✓ 0/4 ... 20 mA input



Key Commercial Data

Packing unit	1 pc
GTIN	 4 046356 160421
GTIN	4046356160421
Weight per Piece (excluding packing)	166.400 g
Custom tariff number	85437090
Country of origin	Germany

Technical data

Dimensions

Width	12.5 mm
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Technical data

Dimensions

Height	112.5 mm
Depth	113.7 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)	10 % ... 95 % (non-condensing)
Degree of protection	IP20 (not assessed by UL)
Noise immunity	EN 61000-6-2 When being exposed to interference, there may be minimal deviations.

Input data

Current input signal	0 mA ... 20 mA
	4 mA ... 20 mA
Input impedance	> 100 kΩ (If there is a line fault)
Voltage drop	5.4 V (20 mA)

Output data

Signal output	Current output
Current output signal	0 mA ... 20 mA (intrinsically safe)
	4 mA ... 20 mA (intrinsically safe)
Transmission Behavior	1:1 to input signal
Load/output load current output	< 800 Ω (20 mA)
	< 730 Ω (22.5 mA)
Output ripple	< 20 mV _{rms}

Power supply

Supply voltage range	19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
Max. current consumption	< 46 mA (at 24 V DC / 20 mA)
Power dissipation	< 1.1 W (at 24 V DC / 20 mA)

Connection data

Connection method	Screw connection
Stripping length	7 mm
Screw thread	M3
Conductor cross section solid	0.2 mm ² ... 2.5 mm ²
Conductor cross section flexible	0.2 mm ² ... 2.5 mm ²
Conductor cross section AWG	24 ... 14
Torque	0.5 Nm ... 0.6 Nm

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Technical data

General

No. of channels	1
Maximum transmission error	< 0.1 % (of final value)
Maximum temperature coefficient	< 0.01 %/K
Step response (10-90%)	< 140 µs (for 4 mA ... 20 mA step)
Status display	Green LED (supply voltage)
Degree of pollution	2
Overvoltage category	II
Electromagnetic compatibility	Conformance with EMC directive
Interference emission	EN 61000-6-4
Housing material	PA 6.6-FR
Color	gray
Designation	Input/output/power supply
	Output/input
Electrical isolation	375 V (Peak value in accordance with IEC/EN 60079-11)
Designation	Output/supply
Electrical isolation	375 V (Peak value in accordance with IEC/EN 60079-11)

Data communication (bypass)

HART function	Yes
Protocols supported	HART

Safety characteristic data

Integrity requirement	IEC 61508 - Low demand
Equipment type	Type A
Safety Integrity Level (SIL)	2
Safe Failure Fraction (SFF)	94.68 %
λ_{SU}	4.965×10^{-7} (496.5 FIT)
λ_{SD}	0
λ_{DU}	2.79×10^{-8} (27.9 FIT)
λ_{DD}	0
Probability of a hazardous failure on demand (PFD _{AVG})	1.22×10^{-4} (1 year)
	6.1×10^{-4} (5 years)
	12.2×10^{-4} (10 years)
Diagnostic coverage (DC)	DC _S =0 %, DC _D =0 %
Integrity requirement	IEC 61508 - High demand
Equipment type	Type A
Safety Integrity Level (SIL)	2

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Technical data

Safety characteristic data

Safe Failure Fraction (SFF)	94.68 %
λ_{SU}	4.965×10^{-7} (496.5 FIT)
λ_{SD}	0
λ_{DU}	2.79×10^{-8} (27.9 FIT)
λ_{DD}	0
Probability of a hazardous failure per hour (PFH ₀)	$2,79 \times 10^{-8}$
Diagnostic coverage (DC)	DC _S =0 %, DC _D =0 %

Safety data

Max. output voltage U _o	27.7 V
Max. output current I _o	92 mA
Max. output power P _o	633 mW
Group	IIC
Max. external inductivity L _o	2 mH
Max. external capacitance C _o	85 nF
Group	IIB
Max. external inductivity L _o	4 mH
Max. external capacitance C _o	663 nF
Safety-related maximum voltage U _m	253 V AC (125 V DC)

EMC data

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

Standards and Regulations

Electromagnetic compatibility	Conformance with EMC directive
Noise emission	EN 61000-6-4
Designation	Electromagnetic RF field
Standards/regulations	EN 61000-4-3
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 [ia Ga] IIC/IIB T4 Gc
IECEX	[Ex ia Ga] IIC/IIB
	[Ex ia Da] IIIC
	Ex nA [ia Ga] IIC/IIB T4 Gc
UL, USA/Canada	Class I Div 2; IS for Class I, II, III Div 1
DNV GL-Temperature	B

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Technical data

Standards and Regulations

DNV GL-Humidity	B
DNV GL-Vibration	A
DNV GL-EMC	B
DNV GL-Enclosure	Required protection according to the Rules shall be provided upon installation on board
Group	IIC
	IIB

Conformance/approvals

Designation	CE
Identification	CE-compliant
Additional text	and EN 61326
Designation	ATEX
Identification	# II (1) G [Ex ia Ga] IIC/IIB
	# II (1) D [Ex ia Da] IIIC
	# II 3(1) G Ex nA [ia Ga] IIC/IIB T4 Gc
Certificate	IECEX BVS 08.0025 X
Designation	IECEX
Identification	[Ex ia Ga] IIC/IIB
	[Ex ia Da] IIIC
	Ex nA [ia Ga] IIC/IIB T4 Gc
Certificate	IECEX BVS 08.0025 X
Designation	UL, USA/Canada
Identification	Class I Div 2; IS for Class I, II, III Div 1
Certificate	#, C.D.-No 83104549
Designation	KC-s
Identification	[Ex ia] IIC/IIB
Certificate	17-KA4BO-0413X
Designation	Shipbuilding approval
Certificate	DNV GL TAA00000AG
Designation	Safety Integrity Level (SIL, IEC 61508)
Identification	2
Designation	EAC Ex
Identification	# [Ex ia Ga] IIC
	# [Ex ia Da] IIIC
Certificate	RU C-DE.AB72.B.00093/19
Temperature	B
Humidity	B

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Technical data

Conformance/approvals

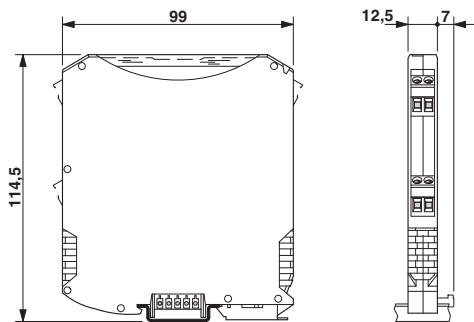
Vibration	A
EMC	B
Enclosure	Required protection according to the Rules shall be provided upon installation on board

Environmental Product Compliance

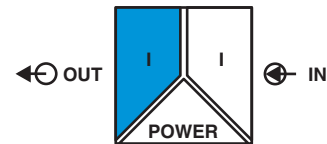
REACH SVHC	Lead 7439-92-1
China RoHS	Environmentally Friendly Use Period = 50 years
	For details about hazardous substances go to tab "Downloads", Category "Manufacturer's declaration"

Drawings

Dimensional drawing



Pictogram



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Block diagram



Classifications

eCl@ss

eCl@ss 10.0.1	27210120
eCl@ss 4.0	27210100
eCl@ss 4.1	27210100
eCl@ss 5.0	27210100
eCl@ss 5.1	27210100
eCl@ss 6.0	27210100
eCl@ss 7.0	27210120
eCl@ss 8.0	27210120
eCl@ss 9.0	27210120

ETIM

ETIM 4.0	EC002653
ETIM 5.0	EC002653
ETIM 6.0	EC002653
ETIM 7.0	EC002653

UNSPSC

UNSPSC 6.01	30211506
UNSPSC 7.0901	39121008

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Classifications

UNSPSC

UNSPSC 11	39121008
UNSPSC 12.01	39121008
UNSPSC 13.2	39121008
UNSPSC 18.0	39121008
UNSPSC 19.0	39121008
UNSPSC 20.0	39121008
UNSPSC 21.0	39121008

Approvals

Approvals

Approvals

DNV GL / UL Listed / cUL Listed / Functional Safety / cULus Listed

Ex Approvals

KC-s / IECEx / ATEX / UL Listed / cUL Listed / EAC Ex / cULus Listed

Approval details

DNV GL		https://approvalfinder.dnvgl.com/	TAA00000AG
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UL Listed		http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm	FILE E 330267
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cUL Listed		http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm	FILE E 330267
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Functional Safety			BVS Pb 05/08
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cULus Listed			
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