MACX MCR-EX-IDS-2I-2I-SP - Output signal conditioner

2904931

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2-channel Ex i output signal conditioner, HART-transparent. Isolates and transmits 0/4 mA … 20 mA signals with intrinsic safety to a load in the Ex area. 4-way electrical isolation, line fault detection, SIL 2 (SC3) in accordance with IEC 61508, Push-in connection.

Commercial data

Item number	2904931
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	C430
Product key	DK1212
GTIN	4046356900829
Weight per piece (including packing)	180.5 g
Weight per piece (excluding packing)	180 g
Customs tariff number	85437090
Country of origin	DE

Technical data

Product properties

Product type	Output signal conditioner
Product family	MACX Analog
No. of channels	2

Electrical properties

Electrical isolation	4-way isolation
Electrical isolation between input and output	yes
Signal transmission behavior	In = Out
Step response (10-90%)	< 140 µs (for 4 mA ... 20 mA step)
Maximum temperature coefficient	0.01 %/K
Temperature coefficient, typical	≤ 0.005 %/K
Maximum transmission error	0.1 % (of final value 20 mA)
Transmission error, typical	≤ 0.05 % (of final value 20 mA)

Electrical isolation

Overvoltage category	II
Pollution degree	2

Electrical isolation Input/output IEC/EN 61010-1

Standards/regulations	IEC/EN 61010-1
Rated insulation voltage	300 V_{rms}
Test voltage	2.5 kV AC (50 Hz, 60 s)
Insulation	Safe isolation

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

Standards/regulations	IEC/EN 61010-1
Rated insulation voltage	50 V_{rms}
Test voltage	1.5 kV AC (50 Hz, 60 s)
Insulation	Basic insulation

Electrical isolation Output/supply IEC/EN 61010-1

Standards/regulations	IEC/EN 61010-1
Rated insulation voltage	300 V_{rms}
Test voltage	2.5 kV AC (50 Hz, 60 s)
Insulation	Safe isolation

Electrical isolation Input 1/input 2, output 1/output 2

Test voltage	1.5 kV AC (50 Hz, 60 s)

Electrical isolation Output/input IEC/EN 60079-11

Standards/regulations	IEC/EN 60079-11
Rated insulation voltage	375 V_{PP}

Electrical isolation Output/supply IEC/EN 60079-11

Standards/regulations	IEC/EN 60079-11
Rated insulation voltage	375 V_{PP}

Electrical isolation Output 1/output 2 IEC/EN 60079-11

Standards/regulations	IEC/EN 60079-11
Rated insulation voltage	60 V_{PP}

Supply

Nominal supply voltage	24 V DC -20 % ... +25 %
Supply voltage range	19.2 V DC ... 30 V DC
Max. current consumption	< 85 mA (24 V DC / 20 mA)
Power dissipation	< 1.4 W (24 V DC / 20 mA)
Power consumption	≤ 2 W (24 V DC / 20 mA)

Input data

Signal: Current

Current input signal	0.2 mA ... 20 mA (Function)
	4 mA ... 20 mA (Safety)
	0 mA ... 24 mA (Underload/overload range)
Input current	≤ 30 mA
Input impedance	> 1 MΩ (If there is a line fault)
Line fault detection	> 0.2 mA (Response threshold of input current)
Voltage drop	< 2.4 V (at 20 mA)

Output data

Signal: Current

Output description	intrinsically safe
Current output signal	0.2 mA ... 20 mA (Function)
	4 mA ... 20 mA (Safety)
	0 mA ... 24 mA (Underload/overload range)
Load	100 Ω ... 700 Ω (20 mA)
	100 Ω ... 650 Ω (20.5 mA)
	100 Ω ... 500 Ω (24 mA)
Output ripple	< 20 mV_{rms}
Open-circuit voltage	≤ 27 V
Line fault detection	> 10 kΩ (Line break)
	< 50 Ω (Short circuit)

Connection data

Connection method	Push-in connection
Stripping length	10 mm
Conductor cross-section rigid	0.2 mm² ... 2.5 mm²
Conductor cross-section flexible	0.2 mm² ... 2.5 mm²

Conductor cross-section flexible (2 conductors with same cross section)	0.25 mm² ... 0.34 mm² (TWIN ferrule without plastic sleeve)
	0.5 mm² ... 1.5 mm² (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	25.2 V
Max. output current I_o	93 mA
Max. output power P_o	586 mW
Safety-related maximum voltage U_m	253 V AC
	125 V DC
IIA (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o	10 mH / 2.9 µF
IIB (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o	4 mH / 817 nF
IIC (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o	2 mH / 104 nF
IIA (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o	10 mH / 587 nF, 1 mH / 627 nF, 500 µH / 717 nF, 200 µH / 907 nF, 100 µH / 1.1 µF
IIB (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o	4 mH / 367 nF, 1 mH / 427 nF, 500 µH / 507 nF, 200 µH / 657 nF, 100 µH / 817 nF
IIC (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o	2 mH / 46 nF, 1 mH / 60 nF, 500 µH / 77 nF, 200 µH / 104 nF

Interfaces

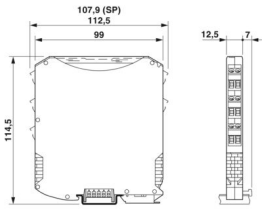
Data communication (bypass)

HART function	HART transparency
Protocols supported	HART

Signaling

Status display	Green LED (supply voltage)

Dimensions

Dimensional drawing	
Width	12.5 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
Ambient temperature (operation)	-40 °C ... 70 °C (Any mounting position)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Permissible humidity (operation)	5 % ... 95 % (non-condensing)

Altitude range (≤ 2000 m (Ex))

Description	Ex applications
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 ... 70 °C
Safety-related maximum voltage U_m	253 V AC
	125 V DC
Rated insulation voltage	320 V (Power supply, input / output)

Altitude range (≤ 3000 m (Ex))

Description	Ex applications
Height range	> 2000 m ... 3000 m
Ambient temperature (operation)	-40 °C ... 60 °C
Safety-related maximum voltage U_m	190 V AC
	110 V DC
Rated insulation voltage	190 V (Power supply, input / output)

Altitude range (≤ 4000 m (Ex))

Description	Ex applications
Height range	> 3000 m ... 4000 m

Ambient temperature (operation)	-40 °C ... 55 °C
Safety-related maximum voltage U_m	60 V AC
	60 V DC
Rated insulation voltage	63 V (Power supply, input / output)

Altitude range (≤ 5000 m (Ex))

Description	Ex applications
Height range	> 4000 m ... 5000 m
Ambient temperature (operation)	-40 °C ... 45 °C
Safety-related maximum voltage U_m	60 V AC
	60 V DC
Rated insulation voltage	63 V (Power supply, input / output)

Altitude range (≤ 2000 m)

Description	Non-Ex applications (EN 61010-1)
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 ... 70 °C
Rated insulation voltage	300 V (Power supply, input / output)

Altitude range (≤ 3000 m)

Description	Non-Ex applications (EN 61010-1)
Height range	> 2000 m ... 3000 m
Ambient temperature (operation)	-40 °C ... 60 °C
Rated insulation voltage	150 V (Power supply, input / output)

Altitude range (≤ 4000 m)

Description	Non-Ex applications (EN 61010-1)
Height range	> 3000 m ... 4000 m
Ambient temperature (operation)	-40 °C ... 55 °C
Rated insulation voltage	150 V (Power supply, input / output)

Altitude range (≤ 5000 m)

Description	Non-Ex applications (EN 61010-1)
Height range	> 4000 m ... 5000 m
Ambient temperature (operation)	-40 °C ... 45 °C
Rated insulation voltage	150 V (Power supply, input / output)

Approvals

CE

Certificate	CE-compliant
Note	and EN 61326

ATEX

Identification	Ⓔx I (M1) [Ex ia Ma] I
	Ⓔx II (1) G [Ex ia Ga] IIC

	II (1) D [Ex ia Da] IIIC
	II 3(1) G Ex ec [ia Ga] IIC T4 Gc
Certificate	BVS 20 ATEX E 004 X

IECEx

Identification	[Ex ia Ma] I
	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec [ia Ga] IIC T4 Gc
Certificate	IECEx BVS 20.0003X

CCC / China-Ex

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec [ia Ga] IIC T4 Gc
Certificate	2021122316114080

UL, USA/Canada

Identification	UL 61010 Listed
	Class I Div 2; IS for Class I, II, III Div 1
Certificate	C.D.-No 83104549

Shipbuilding approval

Certificate	DNV GL TAA00000AG

Safety Integrity Level (SIL, IEC 61508)

Identification	3

Systematic Capability

Identification	3

INMETRO

Identification	[Ex ia Ma] I
	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec [ia Ga] IIC T4 Gc
Certificate	DNV 21.0092 X

Shipbuilding data

Temperature	B
Humidity	B
Vibration	A
EMC	B
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
Note	When being exposed to interference, there may be minimal deviations.

Noise emission

Standards/regulations	EN 61000-6-4

Standards and regulations

Electrical isolation	4-way isolation

GB Standard

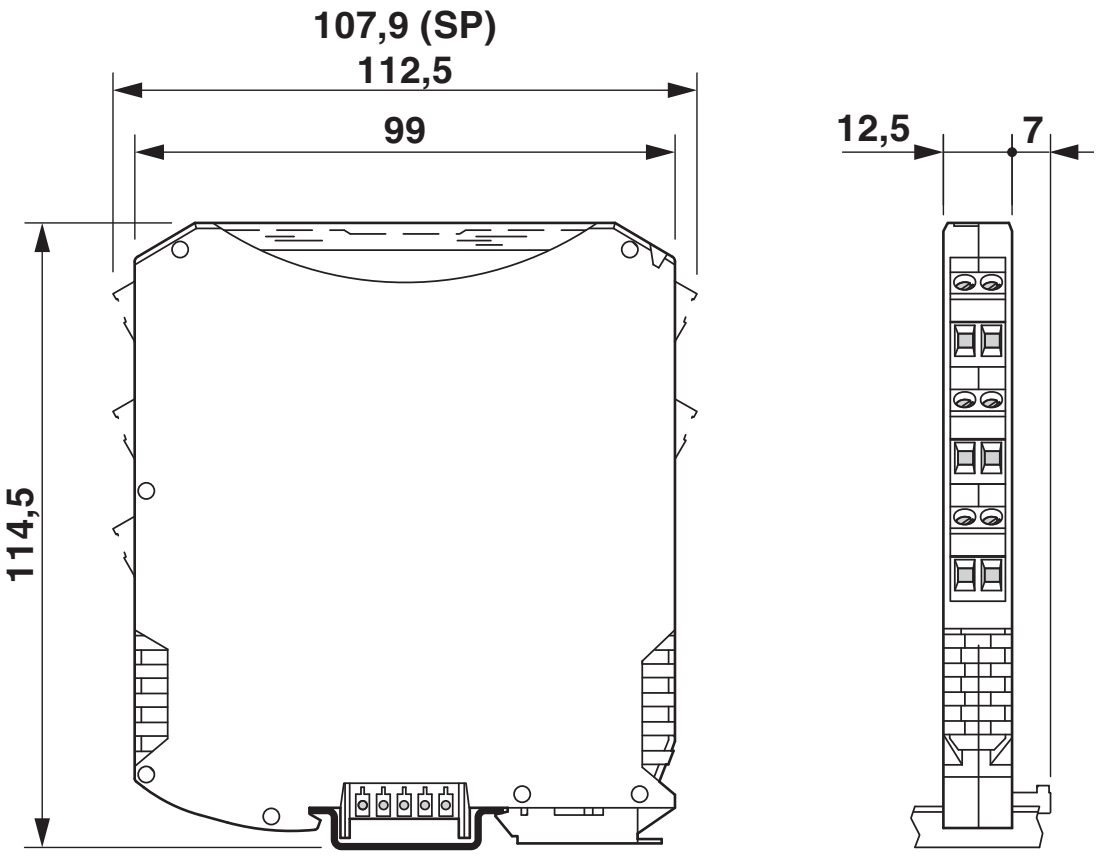
Standards/regulations	GB/T 3836.1
	GB/T 3836.3
	GB/T 3836.4

Mounting

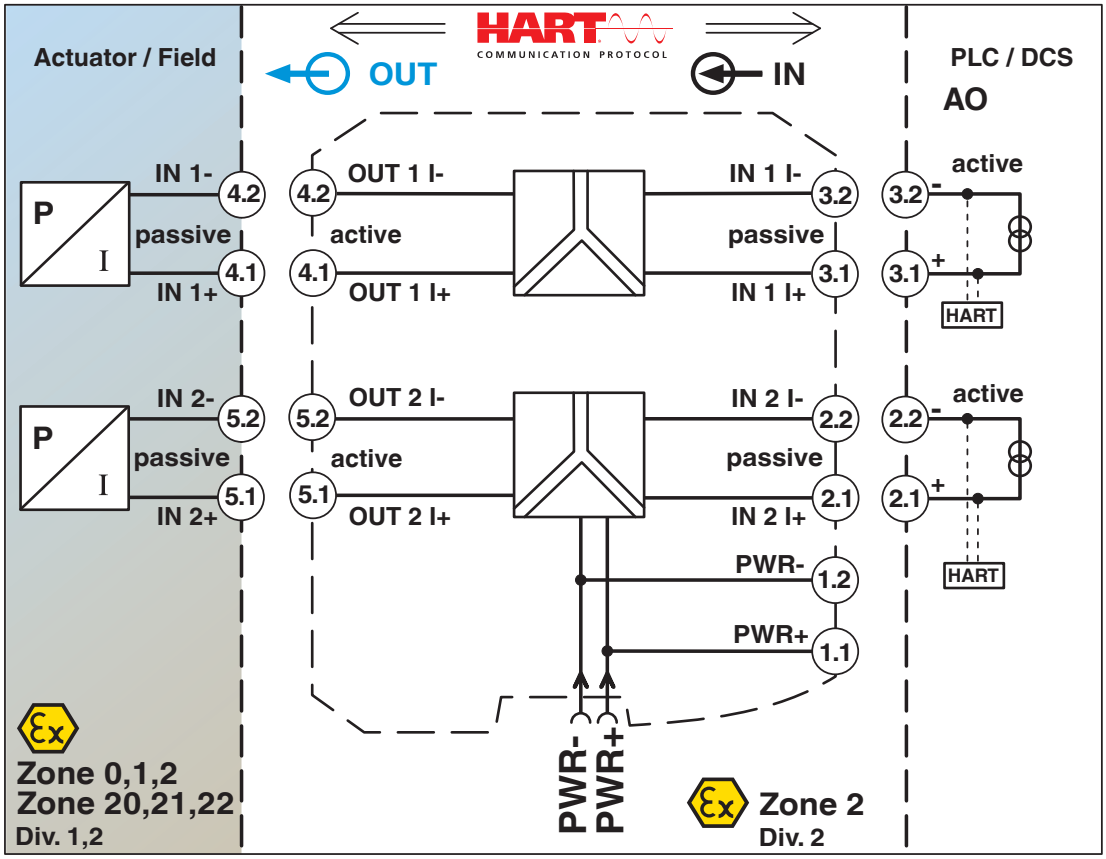
Mounting type	DIN rail mounting

Drawings

Dimensional drawing



Block diagram



Approvals

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DNV GL
Approval ID: TAA00000AG

UL Listed
Approval ID: E330267

cUL Listed
Approval ID: FILE E 330267

Functional Safety
Approval ID: ZP/C002/20

DNV
Approval ID: TAA00000AG

ECAS
Approval ID: 163684 E25 08 169501

IECEx
Approval ID: IECEx BVS 20.0003X

cUL Listed
Approval ID: FILE E 199827

UL Listed
Approval ID: E199827

ATEX
Approval ID: BVS 20 ATEX E 004 X

INMETRO
Approval ID: DNV 21.0092 X

EAC Ex
Approval ID: RU C-DE.HB49.B.00145

CCC
Approval ID: 2021122316114080

Classifications

ECLASS

ECLASS-13.0	27210120
ECLASS-15.0	27210120

ETIM

ETIM 10.0	EC002653

UNSPSC

UNSPSC 21.0	39121000

Environmental product compliance

EU RoHS

Fulfills EU RoHS substance requirements	Yes
Exemption	6(c), 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.

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	1885405b-f299-4850-8a63-c880677af057

EF3.1 Climate Change

CO2e kg	11.214 kg CO2e

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