

# 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

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## 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 $\mu$ s (for 4 mA ... 20 mA step)
Maximum temperature coefficient	0.01 %/K
Temperature coefficient, typical	$\leq$ 0.005 %/K
Maximum transmission error	0.1 % (of final value 20 mA)
Transmission error, typical	$\leq$ 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)
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#### Electrical isolation Output/input IEC/EN 60079-11

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

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## Electrical isolation Output/supply IEC/EN 60079-11

Standards/regulations	IEC/EN 60079-11
Rated insulation voltage	375 V <sub>PP</sub>

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

Standards/regulations	IEC/EN 60079-11
Rated insulation voltage	60 V <sub>PP</sub>

## 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 <sub>rms</sub>
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 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>

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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 $U_o$	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 $\mu$ F
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 $\mu$ H / 717 nF, 200 $\mu$ H / 907 nF, 100 $\mu$ H / 1.1 $\mu$ F
IIB (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	4 mH / 367 nF, 1 mH / 427 nF, 500 $\mu$ H / 507 nF, 200 $\mu$ H / 657 nF, 100 $\mu$ H / 817 nF
IIC (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	2 mH / 46 nF, 1 mH / 60 nF, 500 $\mu$ H / 77 nF, 200 $\mu$ H / 104 nF

## Interfaces

### Data communication (bypass)

HART function	HART transparency
Protocols supported	HART

## Signaling

Status display	Green LED (supply voltage)
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## Dimensions

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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

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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 ( $\leq 5000$ 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 ( $\leq 2000$ m)

Description	Non-Ex applications (EN 61010-1)
Altitude	$\leq 2000$ m (The technical data refers to altitudes $\leq 2000$ 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 ( $\leq 3000$ 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 ( $\leq 4000$ 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 ( $\leq 5000$ 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	Ⓜ I (M1) [Ex ia Ma] I
	Ⓜ II (1) G [Ex ia Ga] IIC

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	Ⓜ 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
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## Safety Integrity Level (SIL, IEC 61508)

Identification	3
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## Systematic Capability

Identification	3
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## 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
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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
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## Standards and regulations

Electrical isolation	4-way isolation
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## GB Standard

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

## Mounting

Mounting type	DIN rail mounting
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## Drawings

Dimensional drawing

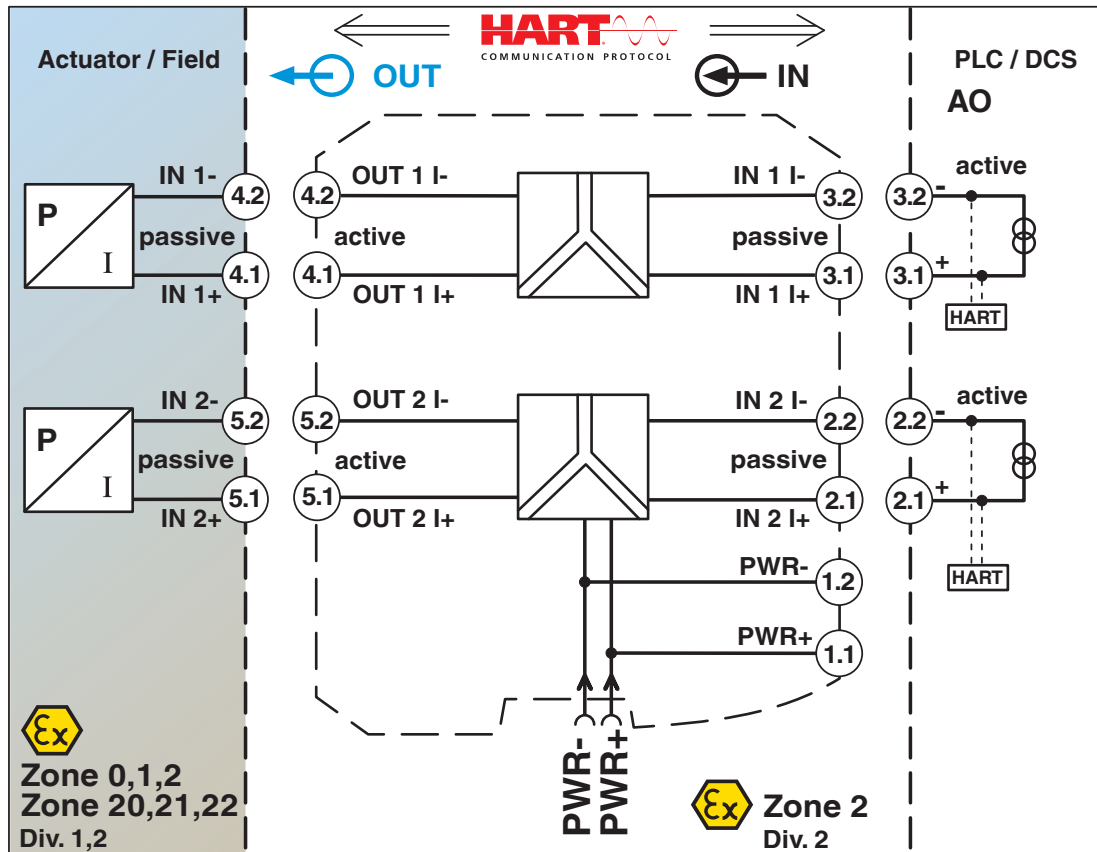


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Block diagram



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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2904931>



**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

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**EAC Ex**

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



**CCC**

Approval ID: 2021122316114080

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## Classifications

### ECLASS

ECLASS-13.0	27210120
ECLASS-15.0	27210120

### ETIM

ETIM 10.0	EC002653
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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	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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