

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



2904931

<https://www.phoenixcontact.com/us/products/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 μ 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) |
|--------------|-------------------------|

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 _{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 mm ² ... 2.5 mm ² |
| Conductor cross-section flexible | 0.2 mm ² ... 2.5 mm ² |

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| | |
|---|---|
| Conductor cross-section flexible (2 conductors with same cross section) | 0.25 mm ² ... 0.34 mm ² (TWIN ferrule without plastic sleeve) |
| | 0.5 mm ² ... 1.5 mm ² (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 μ 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 μ H / 717 nF, 200 μ H / 907 nF, 100 μ H / 1.1 μ F |
| IIB (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o | 4 mH / 367 nF, 1 mH / 427 nF, 500 μ H / 507 nF, 200 μ H / 657 nF, 100 μ 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 μ H / 77 nF, 200 μ H / 104 nF |

Interfaces

Data communication (bypass)

| | |
|---------------------|-------------------|
| HART function | HART transparency |
| Protocols supported | HART |

Signaling

| | |
|----------------|----------------------------|
| Status display | Green LED (supply voltage) |
|----------------|----------------------------|

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 (≤ 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 | Ⓜ 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 |
|-------------|-------------------|

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 |
|-------------------------------|--------------------------------|

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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 |
|-----------------------|--------------|

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 |
|---------------|-------------------|

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Drawings

Dimensional drawing

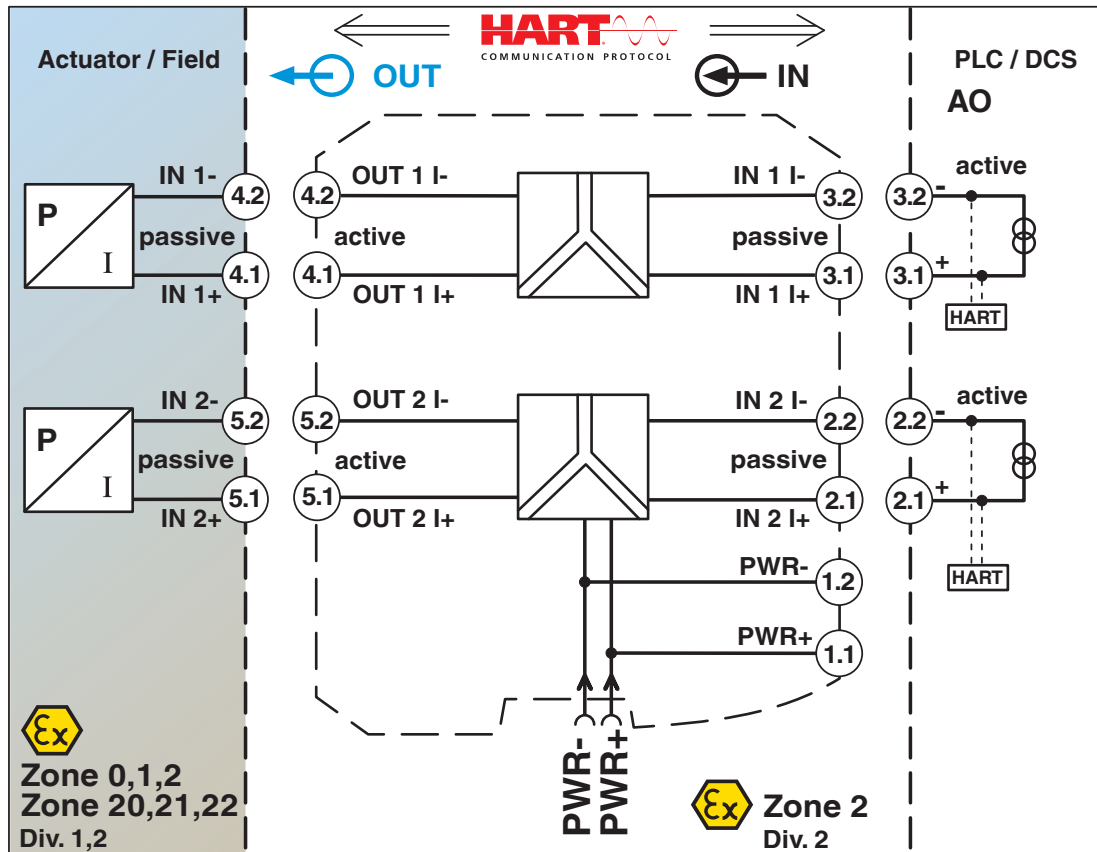


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Block diagram



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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

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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 |
|-----------|----------|

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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