

MACX MCR-EX-SL-SD-24-48-LFD-SP - Solenoid driver



2906156

<https://www.phoenixcontact.com/us/products/2906156>

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Ex i solenoid driver for controlling Ex i solenoid valves in hazardous areas, logic input, open-circuit voltage 24.3 V, current limitation at 48 mA, line fault transparency, error message output, up to SIL 3 according to IEC 61508, Push-in connection.

Your advantages

- Input: logic
- Output: intrinsically safe [Ex ia]; open-circuit voltage > 24.3 V DC; current limitation > 48 mA
- Line fault detection (can be enabled/disabled), via the signal circuit or via a separate error message output
- Transparent for test pulses
- Up to SIL 3 according to IEC/EN 61508
- Safe electrical isolation between output, input, supply, and error message output
- Power supply and error indication possible via DIN rail connector
- Plug-in connection terminals, push-in connection technology
- Installation in zone 2 permitted
- Housing width: 12.5 mm

Commercial data

| | |
|--------------------------------------|---------------|
| Item number | 2906156 |
| Packing unit | 1 pc |
| Minimum order quantity | 1 pc |
| Sales key | C430 |
| Product key | DK1214 |
| GTIN | 4055626040882 |
| Weight per piece (including packing) | 168.1 g |
| Weight per piece (excluding packing) | 151.9 g |
| Customs tariff number | 85437090 |
| Country of origin | DE |

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Technical data

Product properties

| | |
|-----------------|-----------------|
| Product type | Solenoid driver |
| Product family | MACX Analog |
| No. of channels | 1 |
| Configuration | DIP switches |

Electrical properties

| | |
|---|-----|
| Electrical isolation between input and output | yes |
|---|-----|

Electrical isolation

| | |
|----------------------|----|
| Overvoltage category | II |
| Pollution degree | 2 |

Electrical isolation Output/input, error message output IEC/EN 60079-11

| | |
|--------------------------|-------------------------|
| Standards/regulations | IEC/EN 60079-11 |
| Rated insulation voltage | 375 V _{PP} |
| Test voltage | 2.5 kV AC (50 Hz, 60 s) |

Electrical isolation Output/input, error message 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 Output/supply, DIN rail connector IEC/EN 60079-11

| | |
|--------------------------|-------------------------|
| Standards/regulations | IEC/EN 60079-11 |
| Rated insulation voltage | 375 V _{PP} |
| Test voltage | 2.5 kV AC (50 Hz, 60 s) |

Electrical isolation Output/supply, DIN rail connector 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/error message output/supply

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

Supply

| | |
|------------------------|-------------------------|
| Nominal supply voltage | 24 V DC -20 % ... +25 % |
| Supply voltage range | 19.2 V DC ... 30 V DC |
| Power dissipation | < 1.62 W |

Input data

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Signal: Logic

| | |
|----------------------------|---|
| Number of inputs | 1 |
| Switching level "0" signal | 0 V DC ... 5 V DC (or open) |
| Switching level "1" signal | 15 V DC ... 30 V DC |
| Input current | < 12 mA |
| Input impedance | 3 MΩ (high-resistance in the event of a line fault at the output) |
| Immune to test pulses | Yes |

Output data

Signal: Error message output

| | |
|---------------------------|----------------------------|
| Contact switching type | N/O contact |
| Type of output signal | Transistor output, passive |
| Maximum switching voltage | 30 V DC |
| Max. switching current | 50 mA |
| Short-circuit-proof | yes |

Signal: Voltage

| | |
|----------------------|---|
| Output description | intrinsically safe |
| Number of outputs | 1 |
| Output voltage | ≥ 9.7 V DC (48 mA) |
| Current limitation | > 48 mA (with line fault detection) |
| Response time | < 30 ms |
| Open-circuit voltage | > 24.3 V DC |
| Short-circuit-proof | yes |
| Line fault detection | > 10 kΩ (Line break) < 50 Ω (Short circuit) Activated /deactivated via DIP switch |

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 |
| 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] |

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| | |
|--|----------|
| | [Ma] |
| | [Div. 1] |

Safety data

| | |
|--|--|
| Max. internal inductance L_i | negligible |
| Max. internal capacitance C_i | 11 nF |
| Max. output voltage U_o | 27.06 V |
| Max. output current I_o | 91.11 mA |
| Max. output power P_o | 616 mW |
| Maximum internal resistance R_i | 297 Ω |
| Safety-related maximum voltage U_m | 253 V AC |
| | 125 V DC |
| IIA/I (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o | 34.3 mH / 2.29 μ F |
| IIB/IIIC (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o | 17.1 mH / 0.686 μ F |
| IIC (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o | 4.3 mH / 0.078 μ F |
| IIA (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o | 20 mH / 0.47 μ F, 0.5 mH / 0.62 μ F, 0.2 mH / 0.8 μ F, 0.1 mH / 0.89 μ F |
| IIB/IIIC (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o | 5 mH / 189 nF, 2 mH / 289 nF, 0.15 mH / 489 nF |
| IIC (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o | 1 mH / 39 nF, 0.5 mH / 59 nF, 0.15 mH / 89 nF |

Signaling

| | |
|----------------|------------------------------|
| Status display | Green LED (supply voltage) |
| | LED yellow (switching state) |
| | Red LED (line errors) |

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) |

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| | |
|------------------|-----------|
| Housing material | PA 6.6-FR |
|------------------|-----------|

Environmental and real-life conditions

Ambient conditions

| | |
|---|---|
| Degree of protection | IP20 (not assessed by UL) |
| Ambient temperature (operation) | -20 °C ... 60 °C (Any mounting position) -20 °C ... 70 °C (Derating) |
| Ambient temperature (storage/transport) | -40 °C ... 80 °C |
| Permissible humidity (operation) | 10 % ... 95 % (non-condensing) |

Altitude range (≤ 2000 m)

| | |
|--------------------------------------|--|
| 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) | -20 °C ... 70 °C |
| Safety-related maximum voltage U_m | 253 V AC 125 V DC |
| Rated insulation voltage | 375 V _{PP} 300 V AC/DC |

Altitude range (≤ 3000 m)

| | |
|--------------------------------------|----------------------|
| Height range | > 2000 m ... 3000 m |
| Ambient temperature (operation) | -20 °C ... 63 °C |
| Safety-related maximum voltage U_m | 190 V AC 110 V DC |
| Rated insulation voltage | 190 V |

Altitude range (≤ 4000 m)

| | |
|--------------------------------------|---------------------|
| Height range | > 3000 m ... 4000 m |
| Ambient temperature (operation) | -20 °C ... 56 °C |
| Safety-related maximum voltage U_m | 60 V AC/DC |
| Rated insulation voltage | 60 V AC/DC |

Altitude range (≤ 5000 m)

| | |
|--------------------------------------|---------------------|
| Height range | > 4000 m ... 5000 m |
| Ambient temperature (operation) | -20 °C ... 49 °C |
| Safety-related maximum voltage U_m | 60 V AC/DC |
| Rated insulation voltage | 60 V AC/DC |

Approvals

CE

| | |
|-------------|--------------|
| Certificate | CE-compliant |
| Note | and EN 61326 |

ATEX

| | |
|--|-----------------------|
| | Ⓔ I (M1) [Ex ia Ma] I |
|--|-----------------------|

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| | |
|----------------|---------------------------------------|
| Identification | Ⓜ 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 X |
| Certificate | IBExU 13 ATEX1045X |

IECEX

| | |
|----------------|-------------------------|
| Identification | [Ex ia Ma] I |
| | [Ex ia Ga] IIC |
| | [Ex ia Da] IIIC |
| | Ex ec [ia Ga] IIC T4 Gc |
| Certificate | IECEX IBE 13.0014X |

CCC / China-Ex

| | |
|----------------|-----------------------------|
| Identification | [Ex ia Ga] IIB |
| | [Ex ia Da] IIIC |
| | Ex ec [ia IIB Ga] IIC T4 Gc |
| Certificate | 2022122316115979 |

UL, USA/Canada

| | |
|----------------|----------------------|
| Identification | UL 61010 Listed |
| Certificate | Ⓜ-Ⓜ C.D.-No 83104549 |

Shipbuilding approval

| | |
|-------------|-------------------|
| Certificate | DNV GL TAA000020C |
|-------------|-------------------|

Safety Integrity Level (SIL, IEC 61508)

| | |
|----------------|---|
| 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 18.0145 X |

Shipbuilding data

| | |
|-------------|---|
| Temperature | B |
| Humidity | B |
| Vibration | A |
| EMC | A |
| 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. |

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Noise emission

| | |
|-----------------------|--------------|
| Standards/regulations | EN 61000-6-4 |
|-----------------------|--------------|

Standards and regulations

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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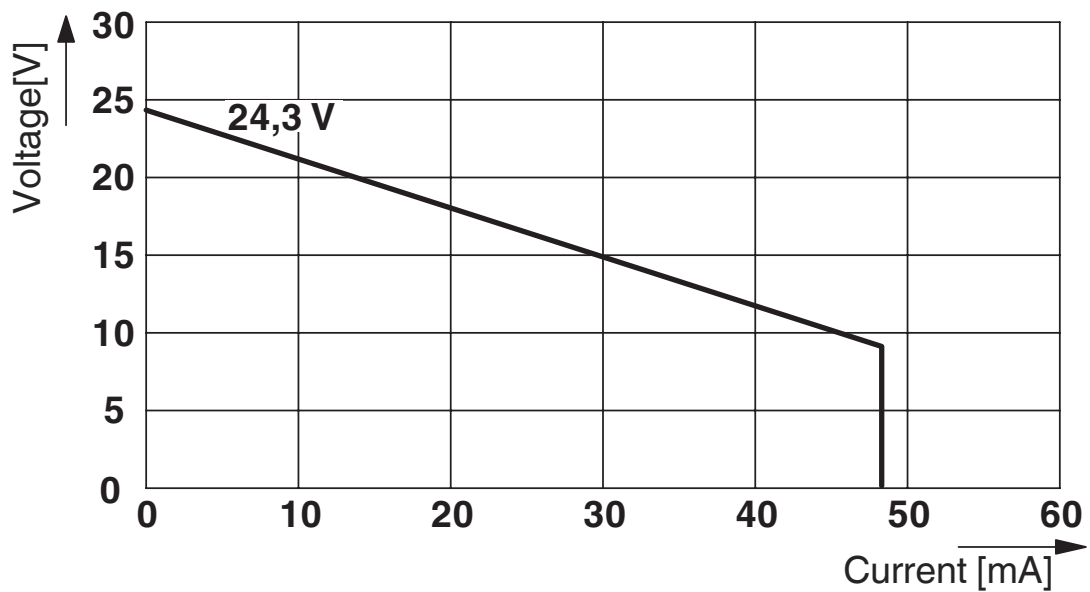
<https://www.phoenixcontact.com/us/products/2906156>

Drawings

Dimensional drawing



Diagram



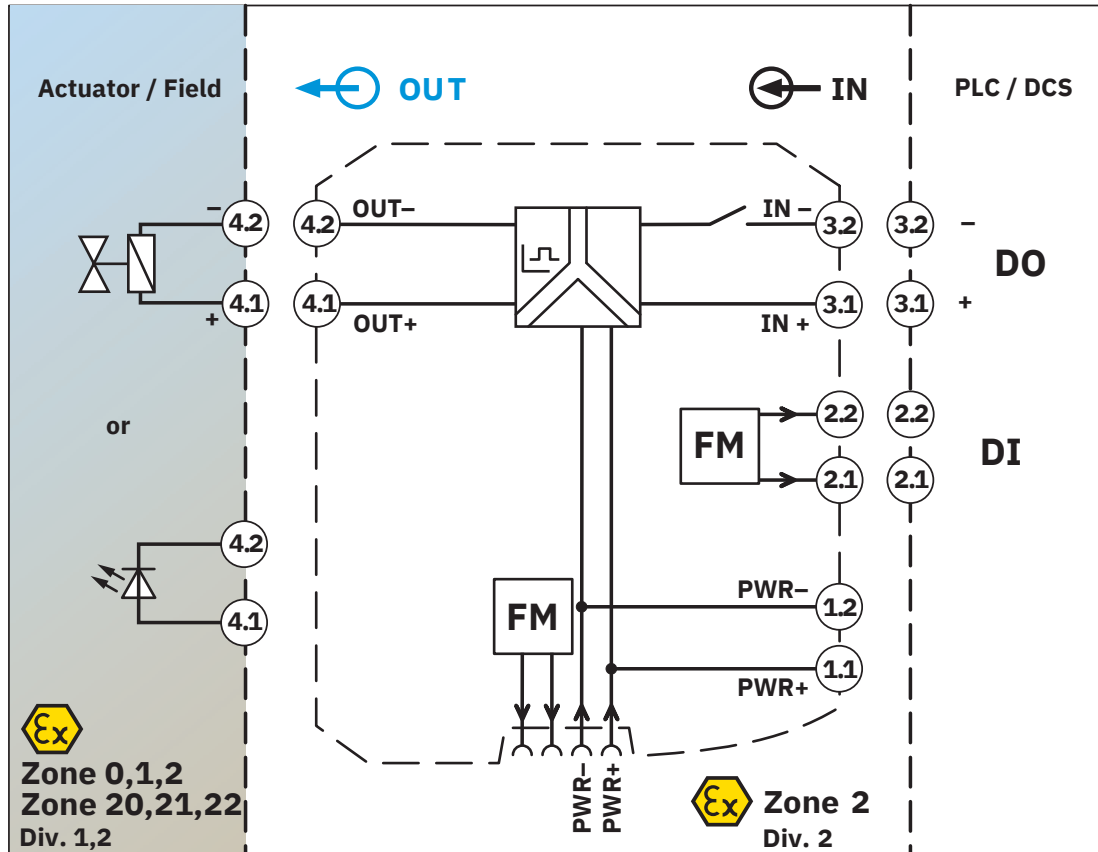
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Block diagram



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Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2906156>

Functional Safety

Approval ID: BVS Pb 11/13

DNV

Approval ID: TAA000020C



IECEX

Approval ID: IECEX IBE 13.0014X

INMETRO

Approval ID: DNV 18.0145 X



CCC

Approval ID: 2022122316115979



ATEX

Approval ID: IBExU13ATEX1045 X

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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 | 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 | 273f1e59-9724-4c30-968f-0626581be3ba |

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