

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



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
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#### 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 <sub>PP</sub>
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 <sub>rms</sub>
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 <sub>PP</sub>
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 <sub>rms</sub>
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)
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#### 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

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



2906156

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

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 <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>
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]

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



2906156

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

	[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 $\Omega$
Safety-related maximum voltage $U_m$	253 V AC
	125 V DC
I/A/I (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	34.3 mH / 2.29 $\mu$ F
I/B/II/C (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	17.1 mH / 0.686 $\mu$ F
I/C (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	4.3 mH / 0.078 $\mu$ F
I/A (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	20 mH / 0.47 $\mu$ F, 0.5 mH / 0.62 $\mu$ F, 0.2 mH / 0.8 $\mu$ F, 0.1 mH / 0.89 $\mu$ F
I/B/II/C (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
I/C (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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2906156

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Housing material	PA 6.6-FR
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## 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 ( $\leq 2000$ m)

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)	-20 °C ... 70 °C
Safety-related maximum voltage $U_m$	253 V AC 125 V DC
Rated insulation voltage	375 V <sub>PP</sub> 300 V AC/DC

### Altitude range ( $\leq 3000$ 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 ( $\leq 4000$ 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 ( $\leq 5000$ 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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2906156

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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
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## Safety Integrity Level (SIL, IEC 61508)

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

## Noise emission

Standards/regulations	EN 61000-6-4
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## 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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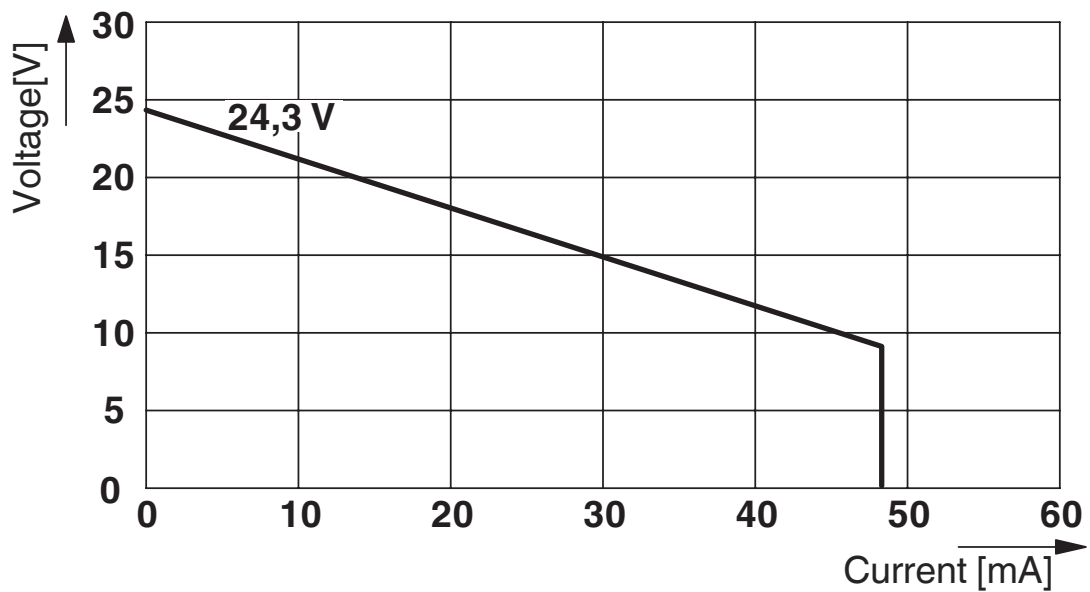
<https://www.phoenixcontact.com/us/products/2906156>

## Drawings

Dimensional drawing



Diagram



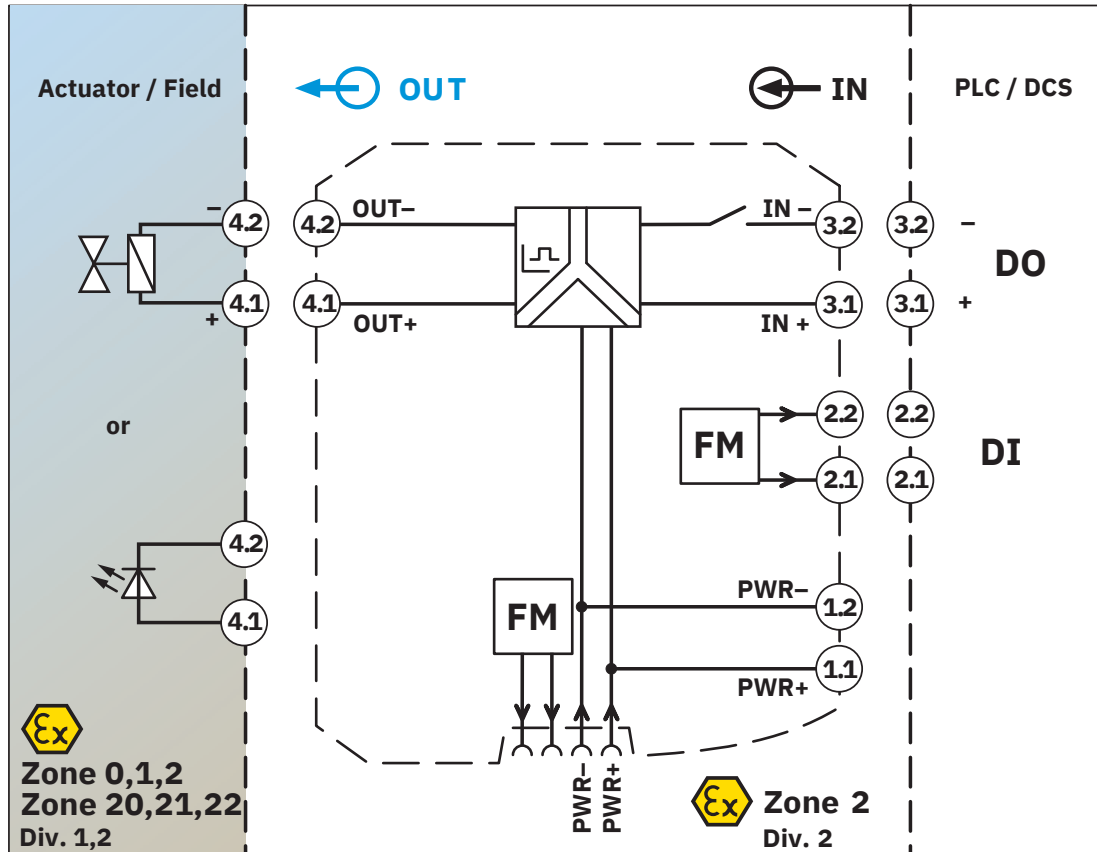
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Block diagram



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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
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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	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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