

# MACX MCR-EX-SL-SD-21-25-LFD - Solenoid driver



2905669

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Ex i solenoid driver for controlling Ex i solenoid valves in hazardous areas, logic input, off-load voltage 21.1 V, current limitation at 25.1 mA, line fault transparency, error message output, up to SIL 3 according to IEC 61508; screw connection.

## Your advantages

- Input: logic
- Output: intrinsically safe [Ex ia]; off-load voltage > 21.1 V DC; current limitation > 25.1 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, screw connection technology
- Installation in zone 2 permitted
- Housing width: 12.5 mm

## Technical data

### Notes

#### Utilization restriction

EMC note	EMC: class A product, see manufacturer's declaration in the download area
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### Product properties

Product type	Solenoid driver
Product family	MACX Analog
No. of channels	1
Type	Ex i signal conditioners with SIL functional safety

### Electrical properties

#### 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 %
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Supply voltage range	19.2 V DC ... 30 V DC
Power dissipation	< 0.8 W

## Input data

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 M $\Omega$ (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	$\geq 4.64$ V DC (25.1 mA)
Output resistor	$\geq 641$ $\Omega$ (Internal resistance $R_i$ )
Current limitation	> 25.1 mA (with line fault detection)
Response time	< 30 ms
Non-load voltage	> 21.1 V DC
Short-circuit-proof	yes
Line fault detection	> 10 k $\Omega$ (Line break) < 50 $\Omega$ (Short circuit) Activated /deactivated via DIP switch

## Connection data

Connection method	Screw connection
Stripping length	7 mm
Screw thread	M3
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 AWG	24 ... 14
Tightening torque	0.5 Nm ... 0.6 Nm

Test socket

Max. diameter	2.3 mm
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## 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 $C_i$	11 nF
Max. output voltage $U_o$	23.98 V
Max. output current $I_o$	37.4 mA
Max. output power $P_o$	224 mW
Safety-related maximum voltage $U_m$	253 V AC
	125 V DC
IIC: Max. external inductivity $L_o$ / Max. external capacitance $C_o$	22 mH / 110 nF
IIB/IIIC: Max. external inductivity $L_o$ / Max. external capacitance $C_o$	100 mH / 910 nF
IIA/II: Max. external inductivity $L_o$ / Max. external capacitance $C_o$	200 mH / 3330 nF

## Signaling

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

## Dimensions

Dimensional drawing	
Width	12.5 mm
Height	112.5 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	V0 (Housing)
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)
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 ... 60 °C
Rated insulation voltage	253 V AC (Power supply, input / output)
	125 V DC (Power supply, input / output)

### Altitude range (≤ 3000 m)

Height range	> 2000 m ... 3000 m
Ambient temperature (operation)	-20 °C ... 54 °C
Rated insulation voltage	190 V AC (Power supply, input / output)
	110 V DC (Power supply, input / output)

### Altitude range (≤ 4000 m)

Height range	> 3000 m ... 4000 m
Ambient temperature (operation)	-20 °C ... 48 °C
Rated insulation voltage	60 V AC/DC (Power supply, input / output)

### Altitude range (≤ 5000 m)

Height range	> 4000 m ... 5000 m
Ambient temperature (operation)	-20 °C ... 42 °C
Rated insulation voltage	60 V AC/DC (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
	⊕ II (1) D [Ex ia Da] IIIC
	⊕ II 3(1) G Ex ec [ia Ga] IIC T4 Gc X
Certificate	IBExU 13 ATEX1045X

### UKCA Ex (UKEX)

Identification	⊕ II (1) G [Ex ia Ga] IIC
	⊕ II (1) D [Ex ia Da] IIIC

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	Ⓜ II 3 (1) G Ex ec [ia Ga] IIC T4 Gc
	Ⓜ I (M1) [Ex ia Ma] I
Certificate	CML 22UKEX3530X

## 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] IIC
	[Ex iaD]
	Ex nA [ia Ga] IIC T4 Gc
Certificate	NEPSI GYJ20.1315X

## 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

## EAC Ex

Identification	ERC [Ex ia Ga] IIC
	ERC [Ex ia Da] IIIC
Certificate	RU C-DE.AB72.B.00093/19

## DNV GL 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

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Noise immunity	EN 61000-6-2
Note	When being exposed to interference, there may be minimal deviations.
Electromagnetic compatibility	Conformance with EMC directive
Noise emission	EN 61000-6-4

## Standards and regulations

### GB Standard

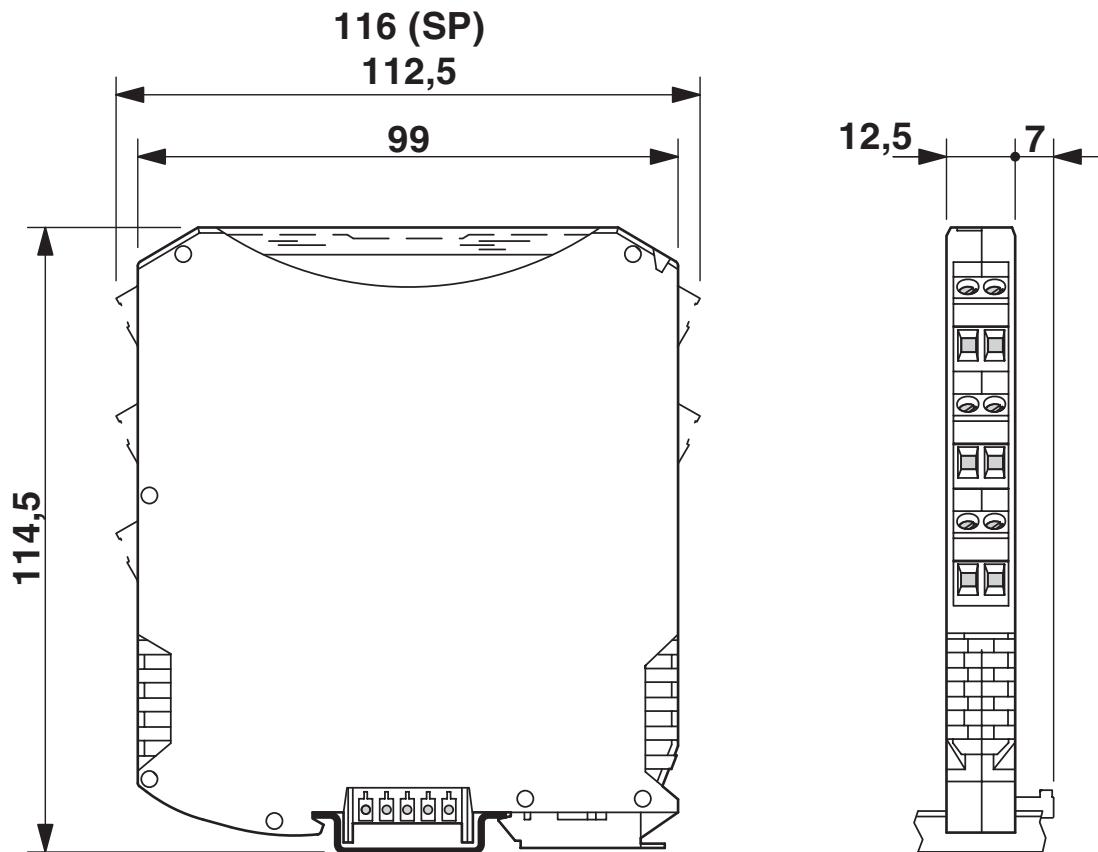
Standards/regulations	GB 3836.1
	GB 3836.4
	GB 3836.8
	GB 3626.20
	GB 12476.1
	GB 12476.4

## Mounting

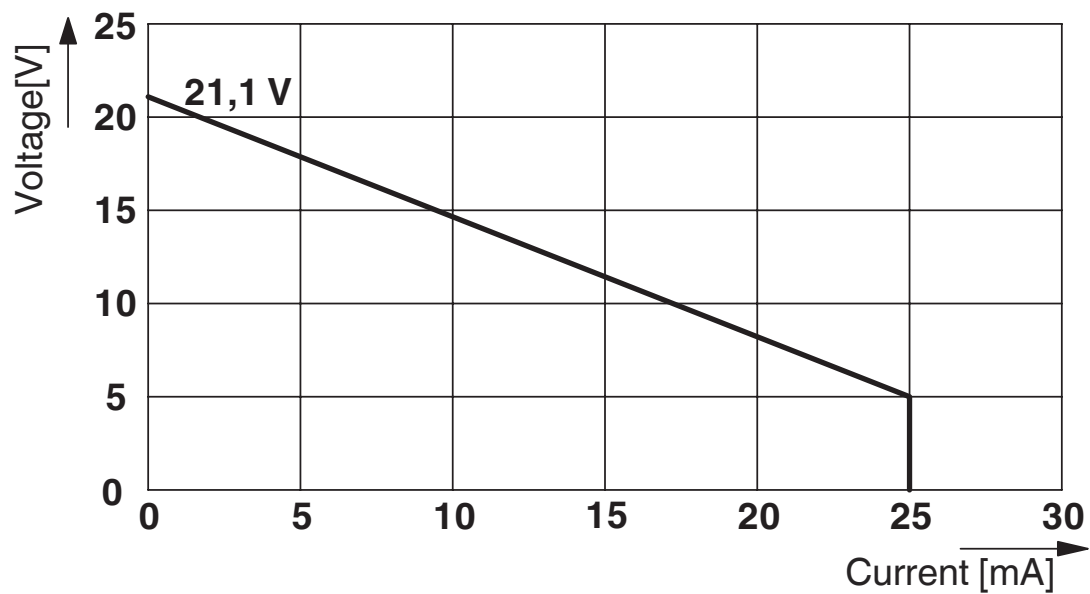
Mounting type	DIN rail mounting
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## Drawings

Dimensional drawing



Diagram



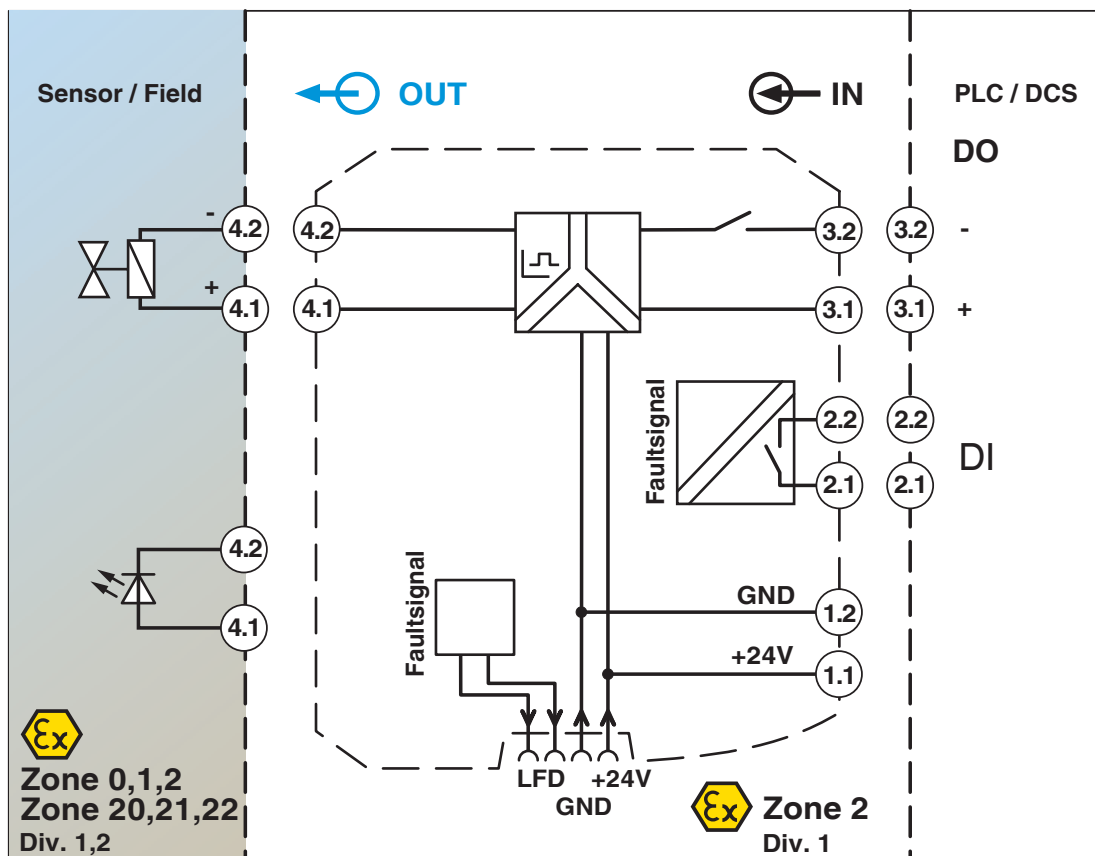
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Block diagram



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