

# MACX MCR-EX-SL-SD-21-60-LP - Solenoid driver



2865515

<https://www.phoenixcontact.com/au/products/2865515>

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Ex i solenoid driver. For the intrinsically safe control of Ex i solenoid valves, alarm modules or LEDs installed in the Ex area. Current limitation at 58 mA. For gases up to Group IIB, loop-powered, electrical isolation, SIL 3. Screw connection.

## Your advantages

- Mechanically compatible with the DIN rail connector
- Various output characteristic curves compatible with standard solenoid valves
- Loop-powered: the required power is supplied via the control signal on the input side.
- Installation in zone 2, protection type "n" (EN 60079-15) permitted
- Up to SIL 3 in accordance with IEC 61508
- 2-way electrical isolation
- Input: 19.2 V DC ... 30 V DC
- Output [Ex ia] IIB

## Commercial data

Item number	2865515
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	DK1214
Product key	DK1214
Catalog page	Page 167 (C-5-2019)
GTIN	4046356160575
Weight per piece (including packing)	163.9 g
Weight per piece (excluding packing)	120.8 g
Customs tariff number	85437090
Country of origin	DE

## Technical data

### Product properties

Product type	Solenoid driver
Product family	MACX Analog
No. of channels	1
Type	Ex i signal conditioners with SIL functional safety
Compatible valve	ASCO Coil 302 (12 V) ASCO Coil 302 (24 V) Bürkert Coil AC 10 standard Bürkert Coil AC 10 high resistance FESTO Coil MFH-...IA-SA-EX GBXE022AIAD03 FESTO Coil (J)MFH-...BIA-SA-EX GBXE022AIAD03 Norgren Herion Coil 2050 Norgren Herion Coil 2051 Norgren Herion Coil 2052 Norgren Herion Coil 2053 Parker Coil VZ95 482160.01 EEx ia IIB T6
Note	This is an extract of possible combinations of valves and solenoid drivers.

### Electrical properties

Electrical isolation	2-way isolation
Maximum temperature coefficient	0.01 %/K

#### Electrical isolation

Test voltage	2.5 kV AC (50 Hz, 60 s)
Overvoltage category	II
Pollution degree	2

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

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

#### Electrical isolation Output/input IEC/EN 61010-1

Standards/regulations	IEC/EN 61010-1
Rated insulation voltage	300 V <sub>rms</sub>
Insulation	Safe isolation

#### Supply

Supply voltage range	loop-powered, no external supply necessary
Power dissipation	< 1.325 W

### Input data

Signal: Voltage

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Number of inputs	1
Voltage input signal	19.2 V DC ... 30 V DC (24 V DC, -20 % ... +25 %)
Max. current input signal	95 mA ( $U_e = 24 \text{ V DC}$ )

## Output data

Signal: Voltage

Output description	intrinsically safe
Number of outputs	1
Output voltage	$\geq 12.9 \text{ V DC}$ (58 mA)
Current limitation	$> 58 \text{ mA}$
Response time	$< 20 \text{ ms}$
Non-load voltage	$> 21.9 \text{ V DC}$
Short-circuit-proof	yes

## 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 mm
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## Ex data

Ex installation (EPL)	Gc
	Div. 2
Ex i circuits (EPL)	Ga
	Da
	Ma
	Div. 1

Safety data

Note	The following Ex i values apply to the ATEX and IECEx approval. For all other Ex approvals, you must refer to the respective certificates for the Ex i values.
Input power $P_i$	negligible
Max. internal inductance $L_i$	negligible
Max. internal capacitance $C_i$	negligible
Max. output voltage $U_o$	25.1 V
Max. output current $I_o$	188 mA
Max. output power $P_o$	1.18 W
Maximum internal resistance $R_i$	133.4 $\Omega$

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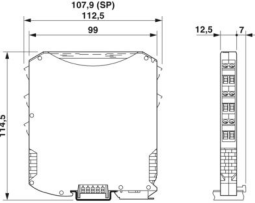
<https://www.phoenixcontact.com/au/products/2865515>

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 $C_o$	8 mH / 2.93 $\mu$ F
IIB/IIIC (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	4 mH / 0.83 $\mu$ F
I/A/I (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	5 mH / 510 nF, 1 mH / 560 nF, 0.5 mH / 660 nF, 0.1 mH / 1000 nF
IIB/IIIC (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$	2 mH / 300 nF, 0.15 mH / 500 nF

## Signaling

Status display	Yellow LED (switching state / status, lights up when output circuit is active)
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## 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)	-40 °C ... 60 °C (Any mounting position)
	-40 °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)	-40 °C ... 70 °C

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Safety-related maximum voltage $U_m$	253 V AC
	125 V DC
Rated insulation voltage	375 V <sub>PP</sub> (IEC/EN 60079-11)
	265 V ( $U_{\text{Isolation rated "ec"}}$ )

## Altitude range ( $\leq 3000$ m)

Height range	> 2000 m ... 3000 m
Ambient temperature (operation)	-40 °C ... 63 °C
Safety-related maximum voltage $U_m$	190 V AC
	110 V DC
Rated insulation voltage	190 V (IEC/EN 60079-11)
	190 V ( $U_{\text{Isolation rated "ec"}}$ )

## Altitude range ( $\leq 4000$ m)

Height range	> 3000 m ... 4000 m
Ambient temperature (operation)	-40 °C ... 56 °C
Safety-related maximum voltage $U_m$	60 V
Rated insulation voltage	60 V (IEC/EN 60079-11)
	60 V ( $U_{\text{Isolation rated "ec"}}$ )

## Altitude range ( $\leq 5000$ m)

Height range	> 4000 m ... 5000 m
Ambient temperature (operation)	-40 °C ... 49 °C
Safety-related maximum voltage $U_m$	60 V
Rated insulation voltage	60 V (IEC/EN 60079-11)
	60 V ( $U_{\text{Isolation rated "ec"}}$ )

## Approvals

### CE

Certificate	CE-compliant
Note	and EN 61326

### ATEX

Identification	⊕ I (M1) [Ex ia Ma] I
	⊕ II (1) G [Ex ia Ga] IIB
	⊕ II (1) D [Ex ia Da] IIIC
	⊕ II 3 (1) G Ex ec [ia IIB Ga] IIC T4 Gc
Certificate	IBExU 07 ATEX 1133X

### IECEX

Identification	[Ex ia Ma] I
	[Ex ia Ga] IIB
	[Ex ia Da] IIIC
	Ex ec [ia IIB Ga] IIC T4 Gc
Certificate	IECEX IBE 08.0002X

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## CCC / China-Ex

Identification	[Ex ia Ga] IIB
	[Ex ia Da] IIIC
	Ex ec [ia IIB Ga] IIC T4 Gc
Certificate	2022122316115980

## UL, USA/Canada

Identification	UL 61010 Listed
	Class I, Div. 2, Groups A, B, C, D T4
	Class I, Div. 2, Groups IIC, IIB, IIA T4
	Associated apparatus for use in Class I, Division 1, Groups C,D
	Associated apparatus for use in Class II, Div.1 Groups E,F,G
	Associated apparatus for use in Class III, Division 1
Certificate	Associated apparatus for use in Class I, Zone 0,1,2, Groups IIB, IIA
	ⓈⓂⓂ C.D.-No 83104549

## UL, USA/Canada

Identification	Class I Div 2; IS for Class I, II, III Div 1
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] IIB
	[Ex ia Da] IIIC
	Ex ec [ia IIB Ga] IIC T4 Gc
Certificate	DNV 18.0115 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

## Noise emission

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Standards/regulations	EN 61000-6-4
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## Standards and regulations

Electrical isolation	2-way isolation
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## GB Standard

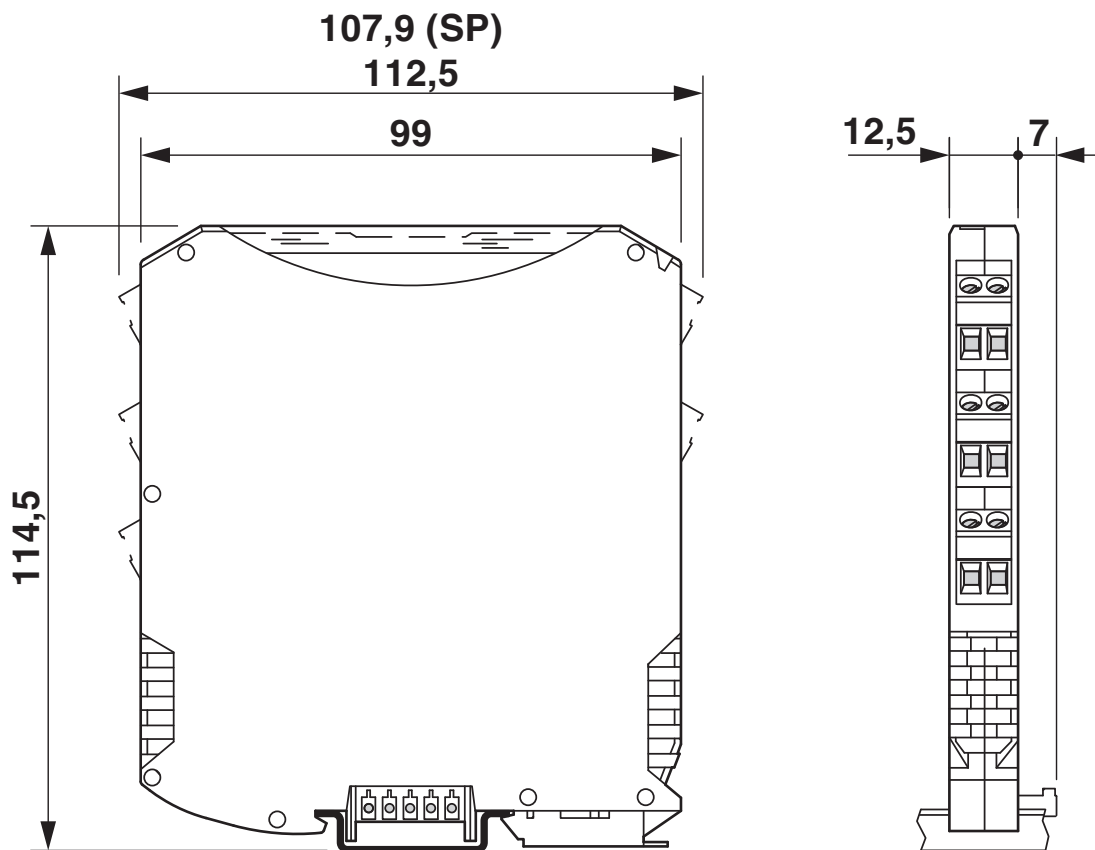
Standards/regulations	GB/T 3836.1
	GB/T 3836.3
	GB/T 3836.4

## Mounting

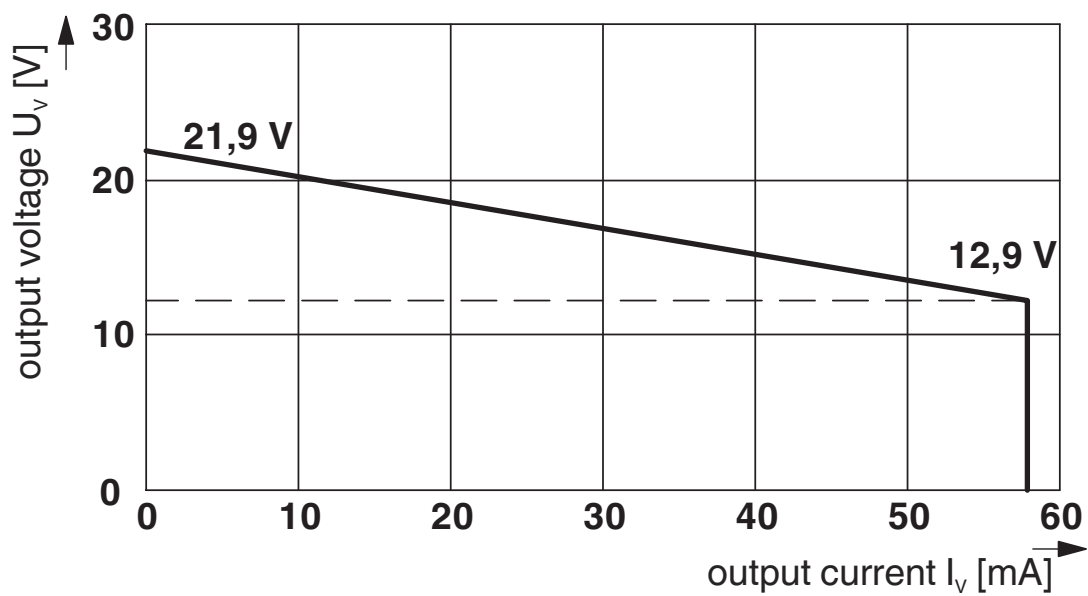
Mounting type	DIN rail mounting
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Drawings

Dimensional drawing

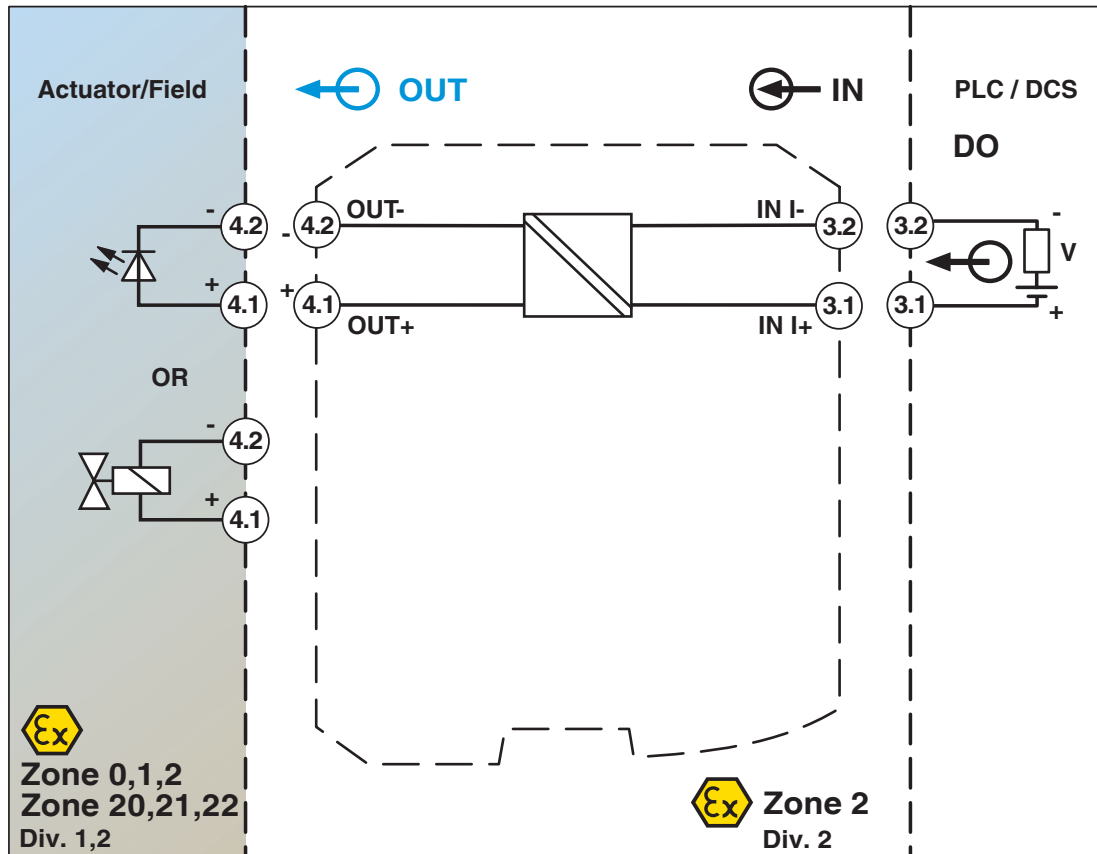


Diagram





Block diagram



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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/au/products/2865515>

### DNV

Approval ID: TAA000020C



### UL Listed

Approval ID: E330267



### cUL Listed

Approval ID: E330267

### Functional Safety

Approval ID: 16/04-017 R025 V1R1



### IECEx

Approval ID: IECEx IBE 08.0002X



### CCC

Approval ID: 2022122316115980



### cUL Listed

Approval ID: E199827



### UL Listed

Approval ID: E199827



### ATEX

Approval ID: IBExU 07 ATEX 1133 X

### INMETRO

Approval ID: DNV 18.0115 X

### INMETRO

Approval ID: DNV 18.0115 X

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**IECEx**

Approval ID: IECEx IBE 08.0002X



**ATEX**

Approval ID: IBExU 07 ATEX 1133 X

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## Classifications

### ECLASS

ECLASS-13.0

27210120

### ETIM

ETIM 9.0

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)
SCIP	487ef39d-a7b3-40ac-8eae-deb292519f8f

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