

# Output signal conditioner - MACX MCR-EX-SL-IDS-I



2865405

<https://www.phoenixcontact.com/za/products/2865405>

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Ex i output signal conditioner, HART. Isolates and transmits 0/4 - 20 mA signals with intrinsic safety to a load (I/P converters, regulating valves, displays) in the Ex area. Open-circuit detection, SIL 2 in accordance with IEC 61508. Replacement item: 2908060 MACX MCR-EX-IDS-I-I.

## Your advantages

- Power supply possible via DIN rail connector
- Up to SIL 2 according to EN 61508
- Installation in zone 2, protection type "n" (EN 60079-15) permitted
- Line fault detection (LFD)
- 3-way electrical isolation
- Output 0/4 mA ... 20 mA, [Ex ia] IIC
- Plug-in screw or spring-cage connection technology (Push-in technology), with integrated sockets for HART communicators
- Bidirectional transmission of digital HART communication signals
- Input: 0/4 mA ... 20 mA

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## Commercial Data

Item number	2865405
Packing unit	1 pc
Minimum order quantity	1 pc
Sales Key	097
Product Key	CK3112
Catalog Page	Page 144 (C-5-2017)
GTIN	4046356160421
Weight per Piece (including packing)	175,5 g
Weight per Piece (excluding packing)	139,3 g
Customs tariff number	85437090
Country of origin	DE

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## Technical Data

### Product properties

Product type	Output signal conditioner
Application	Analog OUT
No. of channels	1
Type	Ex i signal conditioners with SIL functional safety

### Insulation characteristics

Overvoltage category	II
Pollution degree	2

### Electrical properties

No. of channels	1
Electrical isolation between input and output	yes
Maximum power dissipation for nominal condition	< 1.1 W (24 V DC / 20 mA)
Step response (10-90%)	< 140 $\mu$ s (for 4 mA ... 20 mA step)
Maximum temperature coefficient	< 0.01 %/K
Maximum transmission error	< 0.1 % (of final value)

### Electrical isolation Input/output/power supply

Test voltage	1.5 kV AC (50 Hz, 60 s)
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### Electrical isolation Output/input

Electrical isolation	375 V (Peak value in accordance with IEC/EN 60079-11)
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### Electrical isolation Output/supply

Electrical isolation	375 V (Peak value in accordance with IEC/EN 60079-11)
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### Supply

Supply voltage range	19.2 V DC ... 30 V DC (24 V DC, -20 % ... +25 %)
Max. current consumption	< 46 mA (at 24 V DC / 20 mA)
Power dissipation	< 1.1 W (at 24 V DC / 20 mA)

## Input data

### Signal

Number of inputs	1
Current input signal	0 mA ... 20 mA 4 mA ... 20 mA
Input impedance	> 100 k $\Omega$ (If there is a line fault)
Voltage drop	5.4 V (20 mA)

## Output data

### Signal: Current

Output description	Current output
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Number of outputs	1
Current output signal	0 mA ... 20 mA (intrinsically safe) 4 mA ... 20 mA (intrinsically safe)
Transmission Behavior	1:1 to input signal
Load/output load current output	< 800 $\Omega$ (20 mA) < 730 $\Omega$ (22.5 mA)
Output ripple	< 20 mV <sub>rms</sub>

## Connection data

Connection method	Screw connection
Stripping length	7 mm
Screw thread	M3
Conductor cross section solid	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
Torque	0.5 Nm ... 0.6 Nm

## Ex data

### Safety data

Max. output voltage $U_o$	27.7 V
Max. output current $I_o$	92 mA
Max. output power $P_o$	633 mW
Safety-related maximum voltage $U_m$	253 V AC (125 V DC)
IIC: Max. external inductivity $L_o$ / Max. external capacitance $C_o$	2 mH / 85 nF
IIB: Max. external inductivity $L_o$ / Max. external capacitance $C_o$	4 mH / 663 nF

## Interfaces

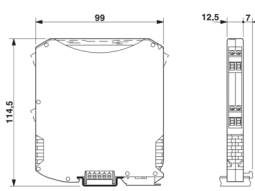
### Data communication (bypass)

HART function	Yes
Protocols supported	HART

## LED signaling

Status display	Green LED (supply voltage)
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## Dimensions

Dimensional drawing	
Width	12.5 mm
Height	112.5 mm

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Depth	114.5 mm
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## Material specifications

Flammability rating according to UL 94	V0 (Housing)
Housing material	PA 6.6-FR

## Characteristics

Safety data: IEC 61508 - High demand

Equipment type	Type A
Safety Integrity Level (SIL)	2
Safe Failure Fraction (SFF)	94.68 %
$\lambda_{SU}$	$4.965 \times 10^{-7}$ (496.5 FIT)
$\lambda_{SD}$	0
$\lambda_{DU}$	$2.79 \times 10^{-8}$ (27.9 FIT)
$\lambda_{DD}$	0
Probability of a hazardous failure per hour (PFH <sub>D</sub> )	$2.79 \times 10^{-8}$
Diagnostic coverage (DC)	DC <sub>S</sub> =0 %, DC <sub>D</sub> =0 %

Safety data: IEC 61508 - Low demand

Equipment type	Type A
Safety Integrity Level (SIL)	2
Safe Failure Fraction (SFF)	94.68 %
$\lambda_{SU}$	$4.965 \times 10^{-7}$ (496.5 FIT)
$\lambda_{SD}$	0
$\lambda_{DU}$	$2.79 \times 10^{-8}$ (27.9 FIT)
$\lambda_{DD}$	0
Probability of a hazardous failure on demand (PFD <sub>AVG</sub> )	$1.22 \times 10^{-4}$ (1 year) $6.1 \times 10^{-4}$ (5 years) $12.2 \times 10^{-4}$ (10 years)
Diagnostic coverage (DC)	DC <sub>S</sub> =0 %, DC <sub>D</sub> =0 %

## 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
Altitude	≤ 2000 m
Permissible humidity (operation)	10 % ... 95 % (non-condensing)

## Approval data

CE

Certificate	CE-compliant
Note	and EN 61326

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CE

Identification	<input type="checkbox"/> II (1) G [Ex ia Ga] IIC/IIB
	<input type="checkbox"/> II (1) D [Ex ia Da] IIIC
	<input type="checkbox"/> II 3(1) G Ex nA [ia Ga] IIC/IIB T4 Gc
Certificate	IECEX BVS 08.0025 X

CE

Identification	[Ex ia Ga] IIC/IIB
	[Ex ia Da] IIIC
	Ex nA [ia Ga] IIC/IIB T4 Gc
Certificate	IECEX BVS 08.0025 X

CE

Identification	Class I Div 2; IS for Class I, II, III Div 1
Certificate	<input type="checkbox"/> , C.D.-No 83104549

CE

Identification	[Ex ia] IIC/IIB
Certificate	17-KA4BO-0413X

CE

Certificate	DNV GL TAA00000AG
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CE

Identification	2
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CE

Identification	<input type="checkbox"/> [Ex ia Ga] IIC
	<input type="checkbox"/> [Ex ia Da] IIIC
Certificate	RU C-DE.AB72.B.00093/19

DNV GL 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
Noise emission	EN 61000-6-4
Noise immunity	EN 61000-6-2
Note	When being exposed to interference, there may be minimal deviations.

Electromagnetic HF field

Designation	Electromagnetic RF field
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Standards/regulations	EN 61000-4-3
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## Mounting

Mounting type	DIN rail mounting
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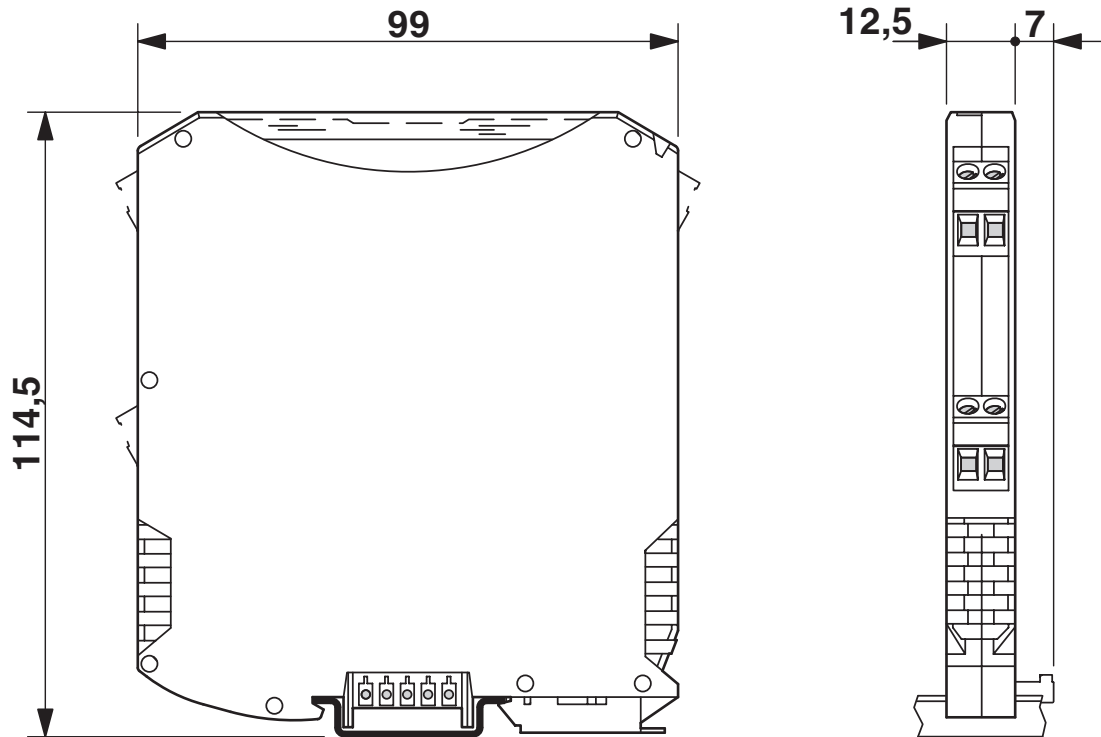


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## Drawings

Dimensional drawing



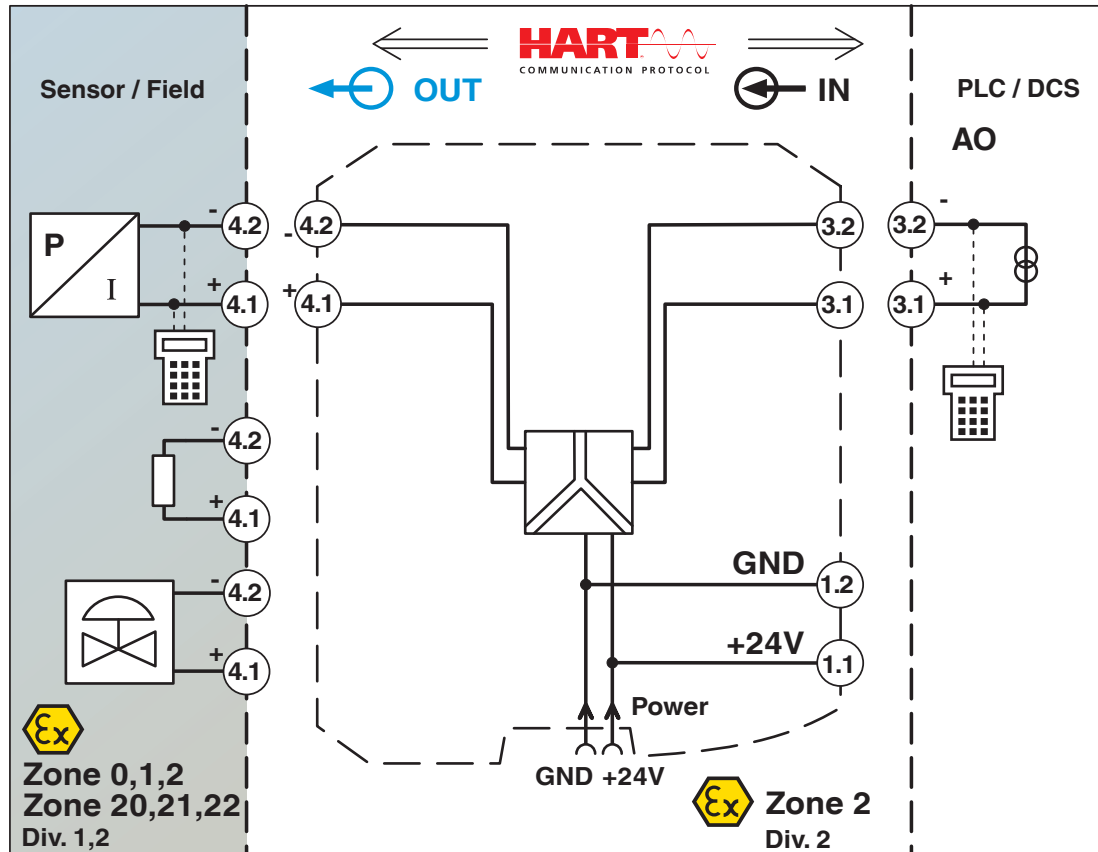


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Block diagram



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## Classifications

### ECLASS

ECLASS-9.0	27210120
ECLASS-10.0.1	27210120

### ETIM

ETIM 7.0	EC002653
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### UNSPSC

UNSPSC 21.0	39121008
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## Environmental Product Compliance

REACH SVHC	Lead 7439-92-1
China RoHS	Environmentally Friendly Use Period = 50 years
	For information on hazardous substances, refer to the manufacturer's declaration available under "Downloads"

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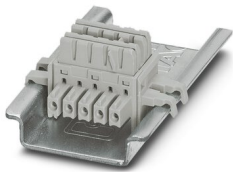
## Accessories

### DIN rail bus connectors

DIN rail bus connectors - ME 6,2 TBUS-2 1,5/5-ST-3,81 GY - 2695439

<https://www.phoenixcontact.com/za/products/2695439>

DIN rail connector (TBUS), 5-pos., for bridging the supply voltage, can be snapped onto NS 35/... DIN rails according to EN 60715



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### Power and error message module

Power and error message module - MACX MCR-PTB - 2865625

<https://www.phoenixcontact.com/za/products/2865625>

Power and fault signaling module with screw connection, including corresponding ME 17,5 TBUS 1,5/ 5-ST-3,81 GY DIN rail connector



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## Power and error message module

Power and error message module - MACX MCR-PTB-SP - 2924184

<https://www.phoenixcontact.com/za/products/2924184>



Power and fault signaling module with Push-in connection, including corresponding ME 17,5 TBUS 1,5/ 5-ST-3,81 GY DIN rail connector

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## Module carrier

Module carrier - TC-D37SUB-ADIO16-EX-P-UNI - 2924854

<https://www.phoenixcontact.com/za/products/2924854>



Universal termination carrier for connecting 16 MACX Analog Ex i signal conditioners to digital or analog I/O cards, via D-SUB connector, 37-pos. (1:1 connection)

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<https://www.phoenixcontact.com/za/products/2865405>

## Module carrier

Module carrier - TC-D37SUB-AIO16-EX-PS-UNI - 2902932

<https://www.phoenixcontact.com/za/products/2902932>



Universal termination carrier for connecting 16 MACX Analog Ex i signal conditioners to digital or analog I/O cards, via D-SUB connector, 37-pos. (1:1 connection), with HART multiplexer connection

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## Cable adapter

Cable adapter - GW HART USB MODEM - 1003824

<https://www.phoenixcontact.com/za/products/1003824>



USB HART modem cable for communication between a PC and HART devices, cable length: 1m.

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<https://www.phoenixcontact.com/za/products/2865405>

## Plastic label

Plastic label - UC-EMLP (11X9) - 0819291

<https://www.phoenixcontact.com/za/products/0819291>



Plastic label, Sheet, white, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, PLOTMARK, CMS-P1-PLOTTER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 10

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## Plastic label

Plastic label - UC-EMLP (11X9) CUS - 0824547

<https://www.phoenixcontact.com/za/products/0824547>



Plastic label, can be ordered: by sheet, white, labeled according to customer specifications, mounting type: adhesive, lettering field size: 11 x 9 mm

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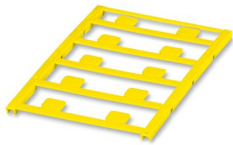
2865405

<https://www.phoenixcontact.com/za/products/2865405>

## Plastic label

Plastic label - UC-EMLP (11X9) YE - 0822602

<https://www.phoenixcontact.com/za/products/0822602>



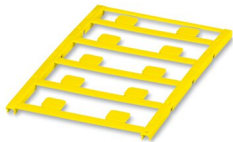
Plastic label, Sheet, yellow, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, PLOTMARK, CMS-P1-PLOTTER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 10

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## Plastic label

Plastic label - UC-EMLP (11X9) YE CUS - 0824548

<https://www.phoenixcontact.com/za/products/0824548>



Plastic label, can be ordered: by sheet, yellow, labeled according to customer specifications, mounting type: adhesive, lettering field size: 11 x 9 mm



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<https://www.phoenixcontact.com/za/products/2865405>

## Plastic label

Plastic label - UC-EMLP (11X9) SR - 0828094

<https://www.phoenixcontact.com/za/products/0828094>



Plastic label, Sheet, silver, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, PLOTMARK, CMS-P1-PLOTTER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 10

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## Plastic label

Plastic label - UC-EMLP (11X9) SR CUS - 0828098

<https://www.phoenixcontact.com/za/products/0828098>



Plastic label, can be ordered: by sheet, silver, labeled according to customer specifications, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 10

# Output signal conditioner - MACX MCR-EX-SL-IDS1-I



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<https://www.phoenixcontact.com/za/products/2865405>

## Plastic label

Plastic label - US-EMLP (11X9) - 0828789

<https://www.phoenixcontact.com/za/products/0828789>



Plastic label, Card, white, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 135

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## Plastic label

Plastic label - US-EMLP (11X9) YE - 0828871

<https://www.phoenixcontact.com/za/products/0828871>



Plastic label, Card, yellow, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 135

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<https://www.phoenixcontact.com/za/products/2865405>

## Plastic label

Plastic label - US-EMLP (11X9) SR - 0828872

<https://www.phoenixcontact.com/za/products/0828872>



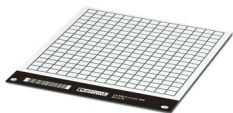
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## Device marker

Device marker - LS-EMLP (11X9) WH - 0831678

<https://www.phoenixcontact.com/za/products/0831678>



Device marker, Sheet, white, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 255

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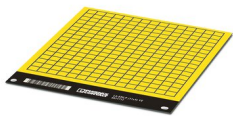
<https://www.phoenixcontact.com/za/products/2865405>

## Device marker

Device marker - LS-EMLP (11X9) YE - 0831732

<https://www.phoenixcontact.com/za/products/0831732>

Device marker, Sheet, yellow, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 255



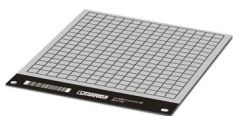
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## Device marker

Device marker - LS-EMLP (11X9) SR - 0831705

<https://www.phoenixcontact.com/za/products/0831705>

Device marker, Sheet, silver, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 255



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## Test plugs

Test plugs - MPS-MT - 0201744

<https://www.phoenixcontact.com/za/products/0201744>



Test plugs, with solder connection up to 1 mm<sup>2</sup> conductor cross section, color: gray

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## Insulating sleeve

Insulating sleeve - MPS-IH BK - 0201731

<https://www.phoenixcontact.com/za/products/0201731>

Insulating sleeve, color: black



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## Insulating sleeve

Insulating sleeve - MPS-IH GY - 0201728

<https://www.phoenixcontact.com/za/products/0201728>

Insulating sleeve, color: gray



## Insulating sleeve

Insulating sleeve - MPS-IH GN - 0201702

<https://www.phoenixcontact.com/za/products/0201702>

Insulating sleeve, color: green



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## Insulating sleeve

Insulating sleeve - MPS-IH YE - 0201692

<https://www.phoenixcontact.com/za/products/0201692>

Insulating sleeve, color: yellow



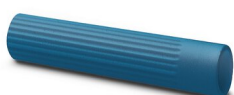
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## Insulating sleeve

Insulating sleeve - MPS-IH BU - 0201689

<https://www.phoenixcontact.com/za/products/0201689>

Insulating sleeve, color: blue



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## Insulating sleeve

Insulating sleeve - MPS-IH RD - 0201676

<https://www.phoenixcontact.com/za/products/0201676>

Insulating sleeve, color: red



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## Insulating sleeve

Insulating sleeve - MPS-IH WH - 0201663

<https://www.phoenixcontact.com/za/products/0201663>

Insulating sleeve, color: white



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