

# MACX MCR-EX-SL-UI-REL-SP - Limit value switch



2906165

<https://www.phoenixcontact.com/pc/products/2906165>

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Limit value switch with Ex i input for active current and voltage signals and a limit-value relay output (changeover contact). Can be set via DIP switch and potentiometer, galvanic 3-way electrical isolation, up to SIL2 (SC3), PLc Cat.1, Push-in connection.

## Commercial data

Item number	2906165
Packing unit	1 pc
Minimum order quantity	1 pc
Product key	CK3143
Catalog page	Page 168 (C-5-2019)
GTIN	4055626043739
Weight per piece (including packing)	268.2 g
Weight per piece (excluding packing)	268.2 g
Customs tariff number	85437090
Country of origin	DE

## Technical data

### Product properties

Product type	Limit value switch
Product family	MACX Analog
Type	Ex i signal conditioners with SIL and PL Functional Safety
Configuration	DIP switches
	Potentiometer

### Insulation characteristics: GB Standard

Overvoltage category	II
Pollution degree	2

### System properties

#### Functionality

Configuration	DIP switches
	Potentiometer

### Electrical properties

Electrical isolation	3-way isolation
Switching point accuracy	< 0.1 %
Step response (0–99%)	≤ 22 ms
Maximum temperature coefficient	0.01 %/K
Maximum transmission error	0.1 %

#### Electrical isolation Output/supply

Rated insulation voltage	250 V AC (IEC/EN 60079-11)
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#### Electrical isolation Input/output/power supply

Rated insulation voltage	300 V AC (EN 61010-1)
Test voltage	2.5 kV AC (50 Hz, 60 s)
Insulation	Safe isolation in accordance with IEC/EN 61010-1

#### Electrical isolation Input/output, power supply

Rated insulation voltage	375 V AC (IEC/EN 60079-11)
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#### Supply

Nominal supply voltage	24 V DC
Supply voltage range	9.6 V DC ... 30 V DC (12 V DC ... 24 V DC (-20 % ... +25 %))
Typical current consumption	38 mA (24 V DC)
Max. current consumption	90 mA (10 V DC)
Power dissipation	< 0.9 W
Power consumption	≤ 1.2 W

### Input data

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Signal: Voltage/current

Description of the input	Intrinsically safe
Voltage input signal	0.1 V ... 10 V
	0.1 V ... 10.5 V (Maximum range)
Total error of the voltage input maximum	± 10 mV
Current input signal	0.2 mA ... 20 mA
	0.18 mA ... 21 mA (Maximum range)
Total error of the current input maximum	± 20 µA
Input resistance of voltage input	> 100 kΩ
Input resistance current input	< 28 Ω
Switching threshold "0" signal current	Configurable via DIP switch (in 1.25% increments) and potentiometer (linearly up to 2% of the switching threshold set via the DIP switch)
Switching hysteresis	off: approx. 0.5 %, on: approx. 1 %
Line fault detection	< 0.1 mA (Line break)
	> 21.1 mA (Short circuit)

## Output data

Switching: Relay

Contact switching type	1 changeover contact
Contact material	AgSnO <sub>2</sub> , hard gold-plated
Max. switching current	≤ 4 A AC (cos phi = 1)
	≤ 1 A DC (ohmic load, 24 V DC, 50 mW)
	≤ 0.2 A DC (ohmic load, 120 V DC)

## Connection data

Connection method	Push-in connection
Stripping length	8 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 AWG	24 ... 14

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

Input voltage U <sub>i</sub>	30 V (Current and voltage input)
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Input current $I_i$	120 mA (Current and voltage input)
Input power $P_i$	900 mW (Current and voltage input)
Max. internal inductance $L_i$	negligible
Max. internal capacitance $C_i$	75 nF (for current input) Negligible at voltage input
Max. output voltage $U_o$	0 V DC (Current input) 3.9 V DC (Voltage input)
Max. output current $I_o$	0 mA (Current input) 0.1 mA (Voltage input)
Max. output power $P_o$	0 mW (Current input) 0.5 mW (Voltage input)
Safety-related maximum voltage $U_m$	253 V AC 125 V DC
IIC: Max. external inductivity $L_o$ / Max. external capacitance $C_o$	100 mH / 3.3 $\mu$ F, 5 mH / 4.7 $\mu$ F, 1 mH / 6.3 $\mu$ F
IIB/IIIC: Max. external inductivity $L_o$ / Max. external capacitance $C_o$	100 mH / 16 $\mu$ F, 5 mH / 24 $\mu$ F, 1 mH / 35 $\mu$ F

## Signaling

Status display	Green LED (supply voltage)
	Yellow LED (switching output)
	Red LED, flashing (line, sensor error, ERR)

## Dimensions

Width	12.5 mm
Height	116 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

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
Ambient temperature (operation)	-20 °C ... 65 °C (Any mounting position)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Altitude	$\leq$ 2000 m
Permissible humidity (operation)	5 % ... 95 % (non-condensing)

## Approvals

### CE

Certificate	CE-compliant
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Note	and EN 61326
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## ATEX

Identification	⊕ II (1) G [Ex ia Ga] IIC
	⊕ II (1) D [Ex ia Da] IIIC
	⊕ II 3(1) G Ex ec nC [ia Ga] IIC T4 Gc
Certificate	TÜV 17 ATEX 8061 X

## IECEX

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec nC [ia Ga] IIC T4 Gc
Certificate	IECEX TUR 18.0014X

## UKCA Ex (UKEX)

Identification	⊕ II (1) G [Ex ia Ga] IIC
	⊕ II (1) D [Ex ia Da] IIIC
	⊕ II 3(1) G Ex ec nC [ia Ga] IIC T4 Gc
	⊕ I (M1) [Ex ia Ma] I
Certificate	TÜV 22 UKEX 7081 X

## CCC / China-Ex

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec nC [ia Ga] IIC T4 Gc
Certificate	2022122316115960

## UL, USA/Canada

Identification	UL 61010 Listed
	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	2
Certificate	TÜV Rheinland 968/FSP 1481.00/17
Note	Single-channel

## Safety Integrity Level (SIL, IEC 61508)

Identification	3
Certificate	TÜV Rheinland 968/FSP 1481.00/17
Note	Two-channel

## Systematic Capability

Identification	3
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## Performance Level (ISO 13849)

Identification	c
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## INMETRO

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec nC [ia Ga] IIC T4 Gc
Certificate	DNV 21.0089 X

## EAC

Identification	[Ex ia Ga] IIC X
	2Ex e nC [ia Ga] IIC T4 Gc X
Certificate	RU C-DE.HB49.B.00145/21

## 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

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

Electrical isolation	3-way isolation
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## GB Standard

Standards/regulations	GB 3836.1
	GB 3836.3
	GB 3836.4
	GB 3836.8

## Mounting

Mounting type	DIN rail mounting
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# MACX MCR-EX-SL-UI-REL-SP - Limit value switch

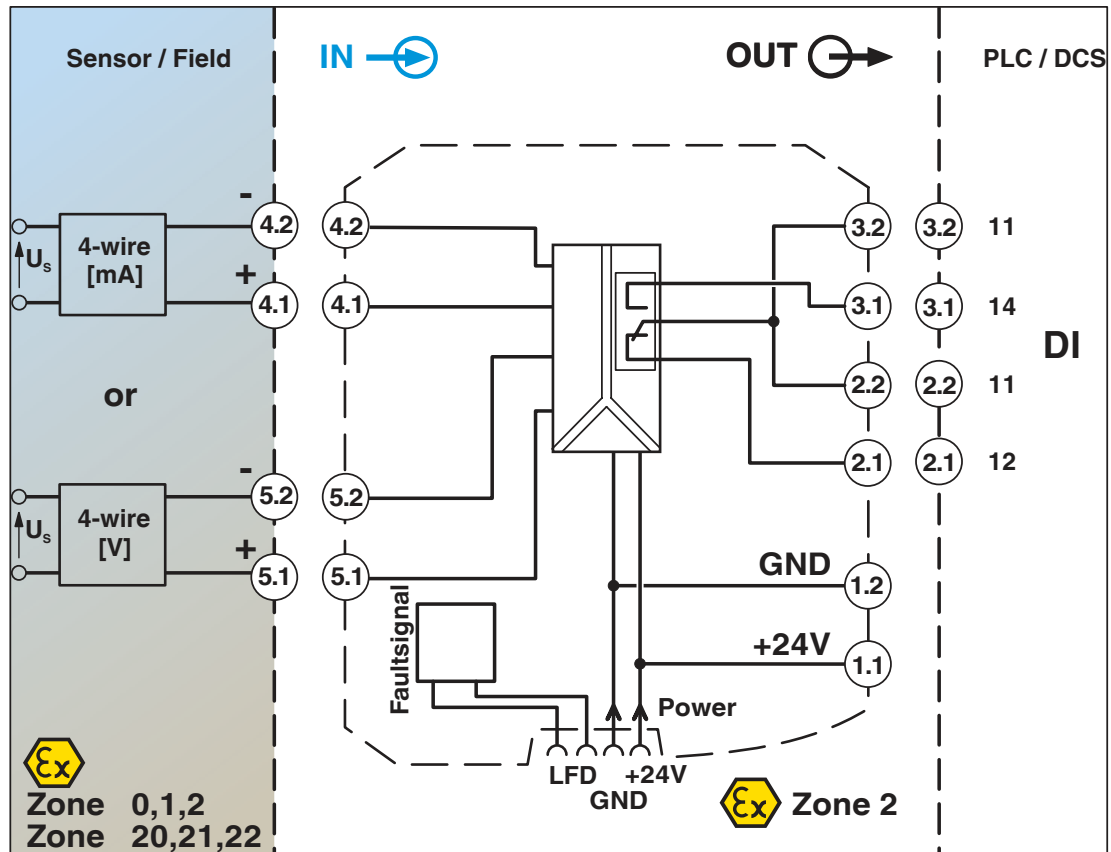


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## Drawings

Block diagram



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<https://www.phoenixcontact.com/pc/products/2906165>

## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/pc/products/2906165>



**DNV GL**

Approval ID: TAA000020C



**UL Listed**

Approval ID: FILE E 330267



**CCC**

Approval ID: 2020322 316001583



**cUL Listed**

Approval ID: FILE E 330267



**Functional Safety**

Approval ID: 968/FSP 1481.00/17



**IECEX**

Approval ID: IECEX TUR 18.0014X



**cUL Listed**

Approval ID: FILE E 199827



**UL Listed**

Approval ID: FILE E 199827



**ATEX**

Approval ID: TÜV 17 ATEX 8061 X



**EAC Ex**

Approval ID: RU C-DE.HB49.B.00145

**INMETRO**

Approval ID: DNV 21.0089 X



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**cULus Listed**

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## Classifications

### ECLASS

ECLASS-11.0	27210120
ECLASS-12.0	27210120
ECLASS-13.0	27210120

### ETIM

ETIM 8.0	EC002653
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### UNSPSC

UNSPSC 21.0	39121000
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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

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

2695439

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



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

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

2865625

<https://www.phoenixcontact.com/pc/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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## MACX MCR-PTB-SP - Power and error message module

2924184

<https://www.phoenixcontact.com/pc/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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## QUINT4-SYS-PS/1AC/24DC/2.5/SC - Power supply unit

2904614

<https://www.phoenixcontact.com/pc/products/2904614>



Primary-switched power supply, QUINT POWER, screw connection, DIN rail mounting, supply of devices possible via the TBUS DIN rail connector, protective coating, input: single-phase, output: 24 V DC/2.5 A

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

2902932

<https://www.phoenixcontact.com/pc/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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## TC-D37SUB-ADIO16-EX-P-UNI - Module carrier

2924854

<https://www.phoenixcontact.com/pc/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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## MPS-IH WH - Insulating sleeve

0201663

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

Insulating sleeve, color: white



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## MPS-IH RD - Insulating sleeve

0201676

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

Insulating sleeve, color: red



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## MPS-IH BU - Insulating sleeve

0201689

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

Insulating sleeve, color: blue



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## MPS-IH YE - Insulating sleeve

0201692

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

Insulating sleeve, color: yellow





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## MPS-IH GN - Insulating sleeve

0201702

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

Insulating sleeve, color: green



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## MPS-IH GY - Insulating sleeve

0201728

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

Insulating sleeve, color: gray



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## MPS-IH BK - Insulating sleeve

0201731

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

Insulating sleeve, color: black



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## MPS-MT - Test plugs

0201744

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

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



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

0819291

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



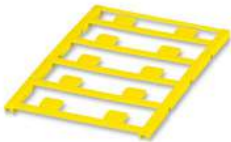
Plastic label, Sheet, white, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, PLOTMARK, CMS-P1-PLOTTER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 10

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

0822602

<https://www.phoenixcontact.com/pc/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

# MACX MCR-EX-SL-UI-REL-SP - Limit value switch



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<https://www.phoenixcontact.com/pc/products/2906165>

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

0824547

<https://www.phoenixcontact.com/pc/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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## UC-EMLP (11X9) YE CUS - Plastic label

0824548

<https://www.phoenixcontact.com/pc/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



# MACX MCR-EX-SL-UI-REL-SP - Limit value switch



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

0828094

<https://www.phoenixcontact.com/pc/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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## UC-EMLP (11X9) SR CUS - Plastic label

0828098

<https://www.phoenixcontact.com/pc/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

# MACX MCR-EX-SL-UI-REL-SP - Limit value switch



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

0828789

<https://www.phoenixcontact.com/pc/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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## US-EMLP (11X9) YE - Plastic label

0828871

<https://www.phoenixcontact.com/pc/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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## US-EMLP (11X9) SR - Plastic label

0828872

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



Plastic label, Card, silver, 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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## LS-EMLP (11X9) WH - Device marker

0831678

<https://www.phoenixcontact.com/pc/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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## LS-EMLP (11X9) SR - Device marker

0831705

<https://www.phoenixcontact.com/pc/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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## LS-EMLP (11X9) YE - Device marker

0831732

<https://www.phoenixcontact.com/pc/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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## SZS 0,6X3,5 - Screwdriver

1205053

<https://www.phoenixcontact.com/pc/products/1205053>



Actuation tool, for ST terminal blocks, insulated, also suitable for use as a bladed screwdriver, size: 0.6 x 3.5 x 100 mm, 2-component grip, with non-slip grip

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