

MACX MCR-EX-SL-2NAM-T - Isolation amplifier



2865489

<https://www.phoenixcontact.com/us/products/2865489>

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Ex i NAMUR isolating amplifier, 2-channel. For operating proximity sensors and switches in Ex areas. The signals are transmitted via transistor outputs (passive) to the safe area. Line fault detection (LFD), 3-way isolation, SIL 2.

Your advantages

- Power supply and error indication possible via DIN rail connector
- Up to SIL 2 in accordance with EN 61508
- Installation in zone 2, protection type "n" (EN 60079-15) permitted
- Line fault detection (LFD), can be activated/deactivated, error indicated by flashing red LED with disabling of transistor output
- Transistor signal output (passive); up to 5 kHz
- Direction of operation can be selected (operating or closed circuit current behavior)
- LED indicators for supply voltage, switching state, and malfunction in accordance with NAMUR NE 44
- 3-way electrical isolation
- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia] IIC

Commercial data

Item number	2865489
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	C430
Product key	CK3141
Catalog page	Page 159 (C-5-2019)
GTIN	4046356160506
Weight per piece (including packing)	191.2 g
Weight per piece (excluding packing)	135 g
Customs tariff number	85365019
Country of origin	DE

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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	Isolating switch transf.
Product family	MACX Analog
Application	Digital IN
No. of channels	2
Type	Ex i signal conditioners with SIL functional safety
Configuration	DIP switches

Insulation characteristics: GB Standard

Overvoltage category	II
Pollution degree	2

System properties

Functionality

Configuration	DIP switches
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Electrical properties

Electrical isolation	3-way isolation
Electrical isolation between input and output	yes

Electrical isolation Input/output

Electrical isolation	375 V (Peak value in accordance with IEC/EN 60079-11)
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Electrical isolation Input/output/supply, DIN rail connector

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

Electrical isolation Input/supply, DIN rail connector

Electrical isolation	375 V (Peak value in accordance with IEC/EN 60079-11)
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Electrical isolation Output 1/output 2

Rated insulation voltage	50 V _{rms}
Test voltage	1 kV AC (50 Hz, 60 s)
Insulation	Basic insulation in accordance with IEC/EN 61010-1

Supply

Nominal supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (24 V DC, -20 % ... +25 %)

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Max. current consumption	< 34 mA (24 V DC)
Power dissipation	≤ 1000 mW
Power consumption	0.8 W

Input data

Signal: NAMUR

Description of the input	Intrinsically safe
Number of inputs	2
Available input sources	NAMUR proximity sensors (IEC/EN 60947-5-6)
	Floating switch contacts
	Switch contacts with resistance circuit
Switching threshold "0" signal current	< 1.2 mA (blocking)
Switching threshold "1" signal, current	> 2.1 mA (conductive)
Short-circuit current	8 mA
Switching hysteresis	< 0.2 mA
Line fault detection	< 0.05 mA ... 0.35 mA (Line break)
	< 100 Ω ... 360 Ω (Short circuit)
	Activated /deactivated via DIP switch
Non-load voltage	8 V DC

Output data

Switching: Transistor

Output description	passive
Minimum switching voltage	3 V DC
Maximum switching voltage	30 V DC
Drop (ΔU)	< 1.4 V
Max. switching current	50 mA (short-circuit-proof)
Min. switching current	5 mA (short-circuit-proof)
Switching frequency	≤ 5 kHz

Signal

Number of outputs	2
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Connection data

Connection method	Screw connection
Stripping length	7 mm
Screw thread	M3
Conductor cross section rigid	0.2 mm² ... 2.5 mm²
Conductor cross section flexible	0.2 mm² ... 2.5 mm²
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

Max. internal inductance L_i	negligible
Max. internal capacitance C_i	1.1 nF
Max. output voltage U_o	9.6 V
Max. output current I_o	10 mA
Max. output power P_o	25 mW
Safety-related maximum voltage U_m	253 V AC
	125 V DC
IIA (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o	1000 mH / 210 μ F
IIB/IIIC (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o	1000 mH / 26 μ F
IIC (simple circuit): Max. external inductivity L_o / Max. external capacitance C_o	300 mH / 3.6 μ F
IIC (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o	100 mH / 510 nF, 50 mH / 580 nF, 5 mH / 600 nF, 1 mH / 600 nF, 10 μ H / 600 nF
IIB/IIA/IIIC (mixed circuit): Max. external inductivity L_o / Max. external capacitance C_o	100 mH / 1 μ F, 5 mH / 1 μ F, 1 mH / 1 μ F, 10 μ H / 1 μ F

Interfaces

Data

No. of channels	0
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Signaling

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

Dimensions

Dimensional drawing	
Width	12.5 mm

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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

Characteristics

Safety data

Safety Integrity Level (SIL)	2
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Safety data

Safety Integrity Level (SIL)	2
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Environmental and real-life conditions

Ambient conditions

Degree of protection	IP20 (not assessed by UL)
Ambient temperature (operation)	-40 °C ... 70 °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 (≤ 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)	-40 °C ... 60 °C
	-40 °C ... 70 °C (Derating)
Rated insulation voltage	265 V AC/DC ($U_{\text{Isolation "ec"}}$: Supply, input / output)

Altitude range (≤ 3000 m)

Height range	> 2000 m ... 3000 m
Ambient temperature (operation)	-40 °C ... 54 °C
	-40 °C ... 63 °C (Derating)
Safety-related maximum voltage U_m	190 V AC
	110 V DC
Rated insulation voltage	190 V AC/DC ($U_{\text{Isolation "ec"}}$: Supply, input / output)

Altitude range (≤ 4000 m)

Height range	> 3000 m ... 4000 m
Ambient temperature (operation)	-40 °C ... 48 °C
	-40 °C ... 56 °C (Derating)
Safety-related maximum voltage U_m	60 V

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Rated insulation voltage	60 V AC/DC (U _{Isolation "ec"} : Supply, input / output)
Altitude range (≤ 5000 m)	
Height range	> 4000 m ... 5000 m
Ambient temperature (operation)	-40 °C ... 42 °C
	-40 °C ... 49 °C (Derating)
Safety-related maximum voltage U _m	60 V
Rated insulation voltage	60 V AC/DC (U _{Isolation "ec"} : Supply, input / output)

Approvals

CE

Certificate	CE-compliant
Note	and EN 61326

ATEX

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
	⊕ I (M1) [Ex ia Ma] I
Certificate	IBExU 08 ATEX 1100 X

UKCA Ex (UKEX)

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
Certificate	CML 22UKEX3527X

IECEX

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec [ia Ga] IIC T4 Gc
	[Ex ia Ma] I
Certificate	IECEX IBE 08.0005X

CCC / China-Ex

Identification	[Ex ia Ga] IIC
	[Ex iaD]
	Ex nA [ia Ga] IIC T4 Gc
Certificate	NEPSI GYJ20.1313X

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 TAA00000AG
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Safety Integrity Level (SIL, IEC 61508)

Identification	2
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INMETRO

Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex ec [ia Ga] IIC T4 Gc
	[Ex ia Ma] I
Certificate	DNV 18.0141 X

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

Noise immunity	EN 61000-6-2
Electromagnetic compatibility	Conformance with EMC directive
Noise emission	EN 61000-6-4

Electromagnetic HF field

Designation	Electromagnetic RF field
Standards/regulations	EN 61000-4-3
Evaluation criterion	A

Fast transients (burst)

Designation	Fast transients (burst)
Standards/regulations	EN 61000-4-4
Evaluation criterion	A

Conducted interference

Designation	Conducted interferences
Standards/regulations	EN 61000-4-6
Evaluation criterion	A

Standards and regulations

Electrical isolation	3-way isolation
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GB Standard

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

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	GB 12476.4
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Mounting

Mounting type	DIN rail mounting
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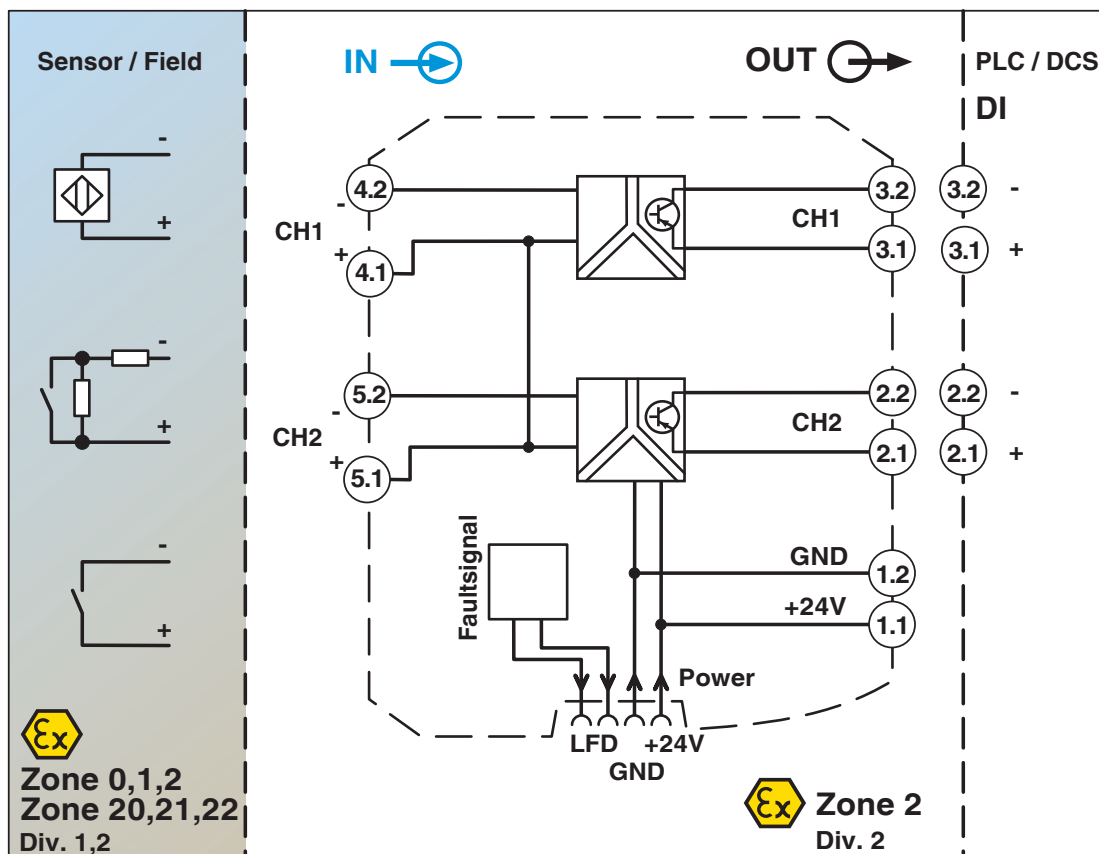


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Drawings

Block diagram



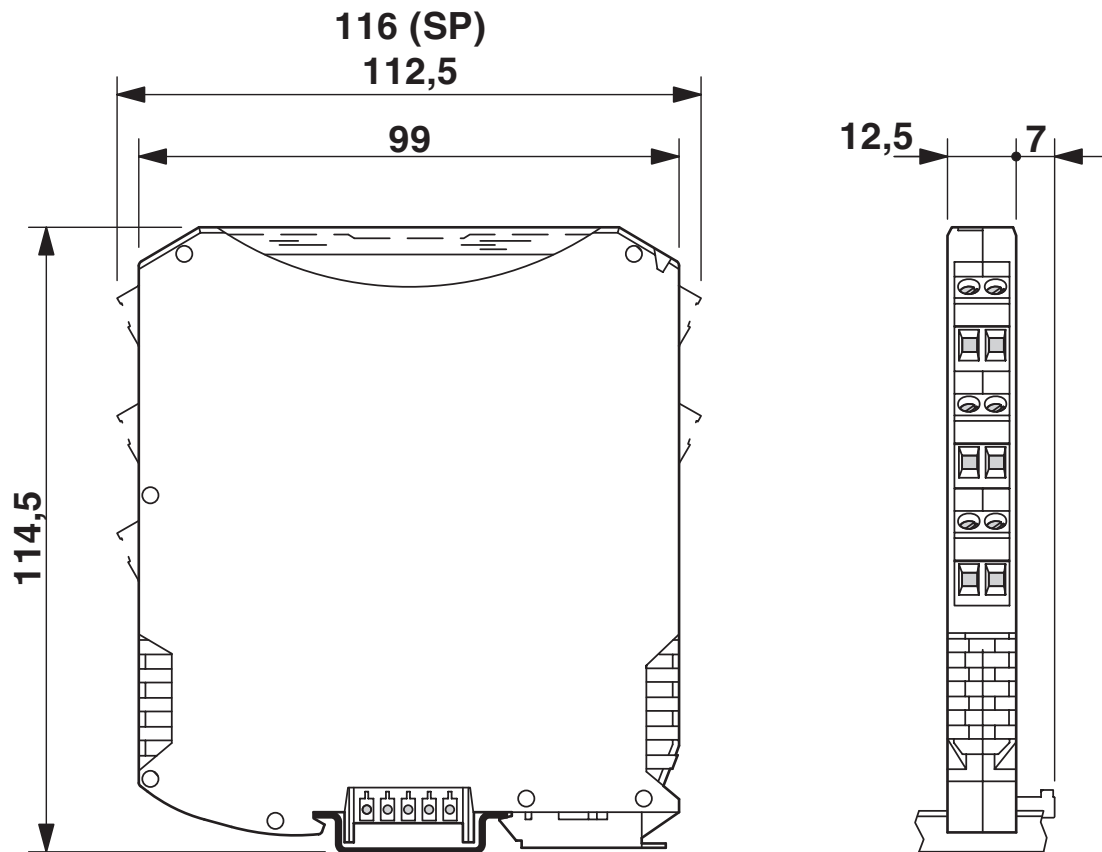
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Dimensional drawing



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Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2865489>



DNV GL

Approval ID: TAA00000AG



UL Listed

Approval ID: FILE E 330267



CCC

Approval ID: 2020322 316001514



cUL Listed

Approval ID: FILE E 330267

Functional Safety

Approval ID: 07-06-39 R006 V1R2



EAC Ex

Approval ID: RU C-DE.AB72.B.00093



IECEx

Approval ID: IECEx IBE 08.0005X



cUL Listed

Approval ID: FILE E 199827



UL Listed

Approval ID: FILE E 199827



ATEX

Approval ID: IBExU 08 ATEX 1100

INMETRO

Approval ID: DNV 18.0141 X

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cULus Listed

cULus Listed

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Classifications

ECLASS

ECLASS-11.0	27210121
ECLASS-12.0	27210121
ECLASS-13.0	27210121

ETIM

ETIM 9.0	EC001485
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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	7d5e8b2e-1f89-4c1b-821e-de64fc40d5f4

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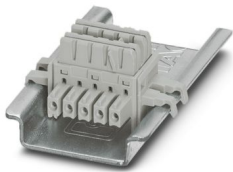
Accessories

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

2695439

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



TC-2D37SUB-ADIO32-2EX-P-UNI - Module carrier

2904684

<https://www.phoenixcontact.com/us/products/2904684>

Universal Termination Carrier for connecting 16 two-channel MACX Analog Ex i signal conditioners to digital or analog I/O cards, via two D-SUB connectors, 37-pos. (1:1 connection)



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EA-MSTB 2,5/ 5 - Accessories

1831016

<https://www.phoenixcontact.com/us/products/1831016>

Cover for screw shafts of the MSTB connector ranges with a pitch of 5.0 mm and 5.08 mm. These can be aligned and shortened for use with different numbers of positions.



MPS-IH WH - Insulating sleeve

0201663

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

Insulating sleeve, color: white



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MPS-IH RD - Insulating sleeve

0201676

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Insulating sleeve, color: red

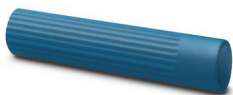


MPS-IH BU - Insulating sleeve

0201689

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

Insulating sleeve, color: blue



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MPS-IH YE - Insulating sleeve

0201692

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

Insulating sleeve, color: yellow



MPS-IH GN - Insulating sleeve

0201702

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

Insulating sleeve, color: green



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MPS-IH GY - Insulating sleeve

0201728

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

Insulating sleeve, color: gray



MPS-IH BK - Insulating sleeve

0201731

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

Insulating sleeve, color: black



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MPS-MT - Test plug

0201744

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



Test plug, with solder connection up to 1 mm² conductor cross section, number of positions: 1, color: gray

UC-EMLP (11X9) - Plastic label

0819291

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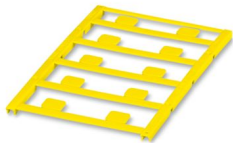
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UC-EMLP (11X9) YE - Plastic label

0822602

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

UC-EMLP (11X9) CUS - Plastic label

0824547

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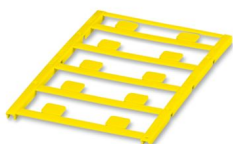
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UC-EMLP (11X9) YE CUS - Plastic label

0824548

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



UC-EMLP (11X9) SR - Plastic label

0828094

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

US-EMLP (11X9) - Plastic label

0828789

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

US-EMLP (11X9) SR - Plastic label

0828872

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

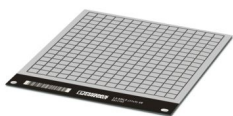


LS-EMLP (11X9) SR - Device marker

0831705

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



MACX MCR-PTB - Power and error message module

2865625

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

QUINT4-SYS-PS/1AC/24DC/2.5/SC - Power supply unit

2904614

<https://www.phoenixcontact.com/us/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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D-UKK 3/5 - End cover

2770024

<https://www.phoenixcontact.com/us/products/2770024>

End cover, depth: 52 mm, width: 2.5 mm, height: 56 mm, color: gray



D-UKK 3/5 BU - End cover

2770105

<https://www.phoenixcontact.com/us/products/2770105>

End cover, depth: 62 mm, width: 2.5 mm, height: 56 mm, color: blue



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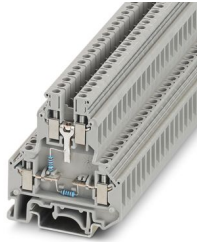
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UKK 5-2R/NAMUR - Component terminal block

2941662

<https://www.phoenixcontact.com/us/products/2941662>



Double-level terminal block, with preassembled resistors

SZS 0,6X3,5 - Screwdriver

1205053

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