

## Sensor/actuator cable - SAC-5P-MS/ 2,0-28R/FS SCO RAIL - 1407337

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Sensor/actuator cable, 5-position, PE-X halogen-free, black, shielded, Plug straight M12 SPEEDCON, coding: A, on Socket straight M12 SPEEDCON, coding: A, cable length: 2 m, For railway applications

### Your advantages

- ✓ Easy and safe: 100% electrically tested plug-in components
- ✓ Safety thanks to flame retardancy: PA 6.6 grip and radiation-cross-linked cables satisfy the most stringent requirements
- ✓ Securely locked by special vibration brake
- ✓ Resistant to temperature influences – tested for an extended temperature range and for resistance to temperature shocks
- ✓ Reliable signal transmission – 360° shielding in environments with electromagnetic interference



### Key Commercial Data

Packing unit	1 pc
GTIN	 4 046356 774536
GTIN	4046356774536

### Technical data

#### Dimensions

Length of cable	2 m
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#### Ambient conditions

Ambient temperature (operation)	-40 °C ... 85 °C (Plug / socket)
Degree of protection	IP65

#### General

Note	Further products with variable cable type and variable cable length can be found in the accessories section
Rated current at 40°C	4 A
Rated voltage	48 V AC
	60 V DC
Number of positions	5

# Sensor/actuator cable - SAC-5P-MS/ 2,0-28R/FS SCO RAIL - 1407337

## Technical data

### General

Color handle area	black
Insulation resistance	≥ 100 MΩ
Coding	A - standard
Standards/regulations	M12 connector IEC 61076-2-101
	Shock, vibration EN 50155
Status display	No
Protective circuit/component	unwired
Overvoltage category	II
Degree of pollution	3
Insertion/withdrawal cycles	≥ 100
Torque	0.4 Nm (M12 connector)

### Material

Flammability rating according to UL 94	V0
Contact material	CuSn
Contact surface material	Ni/Au
Contact carrier material	PA 6.6
Material of grip body	PA 6.6
Material, knurls	Zinc die-cast, nickel-plated
Sealing material	NBR

### Standards and Regulations

Standards/specifications	M12 connector IEC 61076-2-101
	Shock, vibration EN 50155
Flammability rating according to UL 94	V0

### Cable

Cable type	Shielded black RADOX®
Cable type (abbreviation)	28R
Conductor cross section	5x 0.5 mm <sup>2</sup>
AWG signal line	20
Conductor structure signal line	19x 0.18 mm
Core diameter including insulation	1.43 mm
Wire colors	White 1, white 2, white 3, white 4, white 5
Overall twist	5 cores, twisted
Shielding	Tinned copper braided shield
External sheath, color	black
External cable diameter D	6.2 mm ±0.3 mm
Minimum bending radius, fixed installation	3 x D
Minimum bending radius, flexible installation	4 x D
Cable weight	70 kg/km
Outer sheath, material	PE-X

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### Technical data

#### Cable

Material conductor insulation	PE-X
Conductor material	Tin-plated Cu litz wires
Conductor resistance	≤ 40.1 Ω/km
Nominal voltage, cable	600 V AC (Core-ground, U <sub>0</sub> )
	1000 V AC (Core-ground, U)
	≤ 720 V AC (core-ground)
	≤ 1200 V AC (Core-ground, U <sub>m</sub> )
	≤ 900 V DC (Core-ground, V <sub>0</sub> )
	≤ 1500 V DC (core-core)
Test voltage, cable	3500 V AC (50 Hz, 5 min.)
	8400 V DC (50 Hz, 5 min.)
Fire protection in rail vehicles	BS 6853 (Category Ia, Ib, II)
	GM/RT 2130 (Category Ia, Ib, II)
	EN 45545 (Risk level HL1 - HL3)
	DIN 5510 (Fire protection level 1, 2, 3, 4)
	NF F16-101 (Category A1, A2, B)
	NF F16-101 (Class C/F0)
	NFPA 130
	UNI CEI 11170 (Risk level LR1 - LR4)
Flame resistance	EN 60332-1-2
	EN 50266
	EN 60332-3-25
	NF C32-070, 2.1
	NF C32-070, 2.2
	UL 1685, 12 (FT4)
	in accordance with ISO 6722-1 5.22 (UN ECE-R 118.01)
Halogen-free	According to EN 50267-2-1
Resistance to oil	according to IRM 902, 72 h at 100 °C
Other resistance	Resistance to fuels according to IRM 903, 168 h at 70 °C
Concentration of fumes	BS 6853 D.8.7
	EN 61034-2
	UL 1685, 12 (FT4)
Fume corrosiveness	EN 50267-2-2
Fume toxicity	BS 6853 B.1
	EN 50305, 9.2
Ambient temperature (operation)	-50 °C ... 120 °C (cable, fixed installation)
	-25 °C ... 90 °C (cable, flexible installation)

#### Environmental Product Compliance

China RoHS	Environmentally friendly use period: unlimited = EFUP-e
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# Sensor/actuator cable - SAC-5P-MS/ 2,0-28R/FS SCO RAIL - 1407337

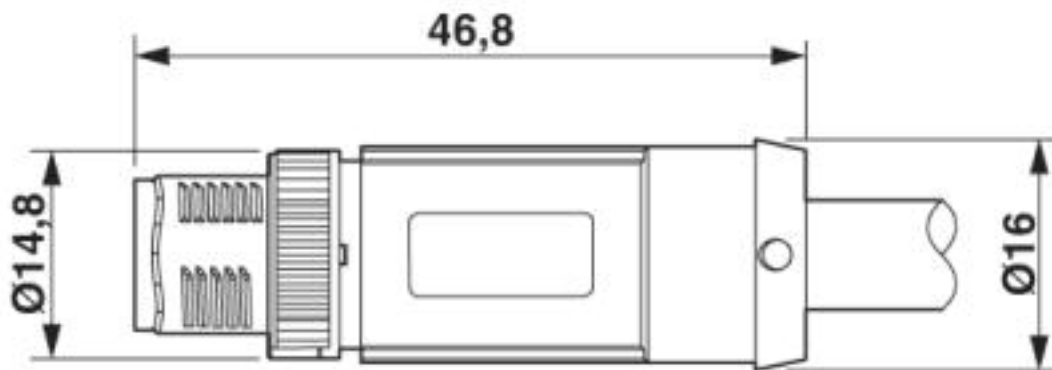
## Technical data

### Environmental Product Compliance

	No hazardous substances above threshold values
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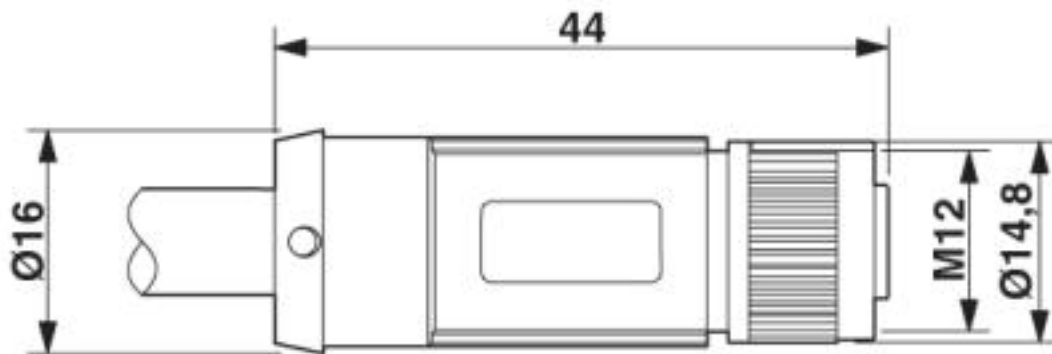
## Drawings

Dimensional drawing



M12 SPEEDCON plug, straight, shielded

Dimensional drawing



Socket M12-SPEEDCON, straight, shielded

## Sensor/actuator cable - SAC-5P-MS/ 2,0-28R/FS SCO RAIL - 1407337

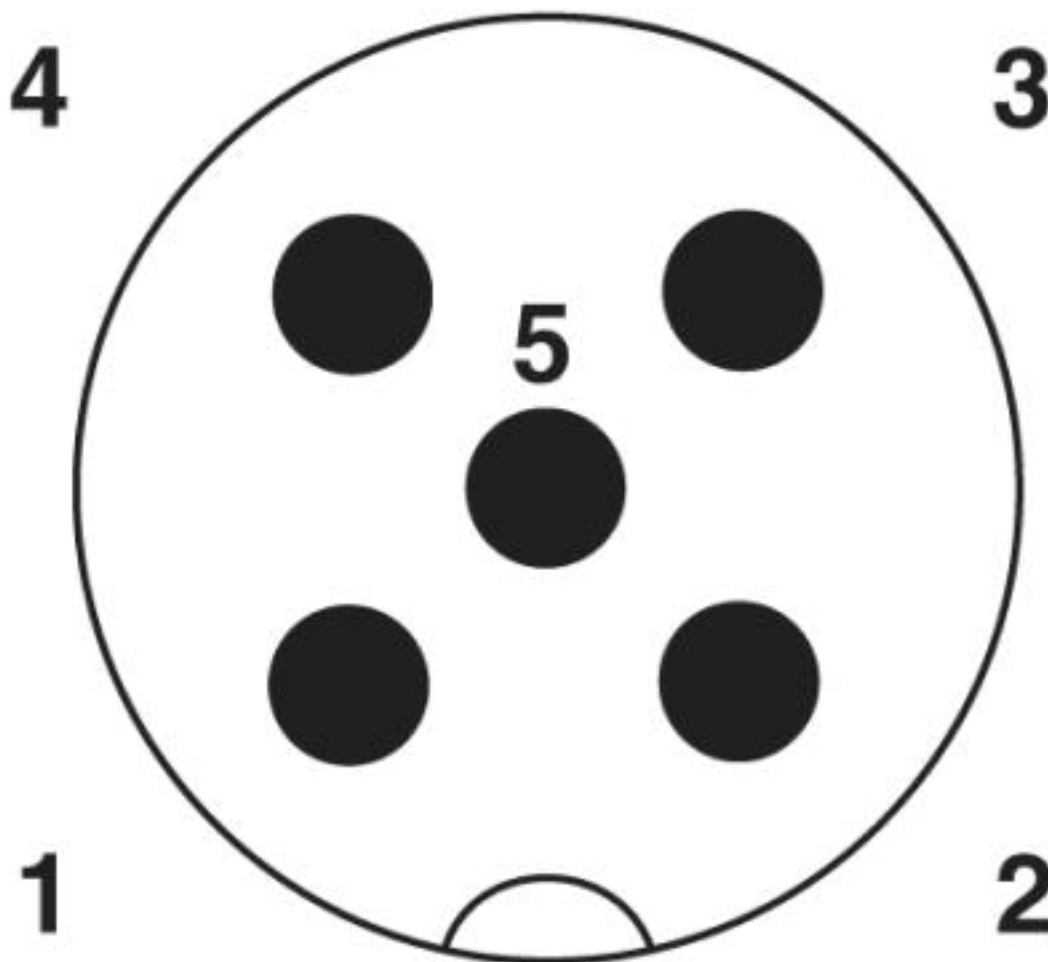
Circuit diagram



Contact assignment of the M12 plug and the M12 socket

# Sensor/actuator cable - SAC-5P-MS/ 2,0-28R/FS SCO RAIL - 1407337

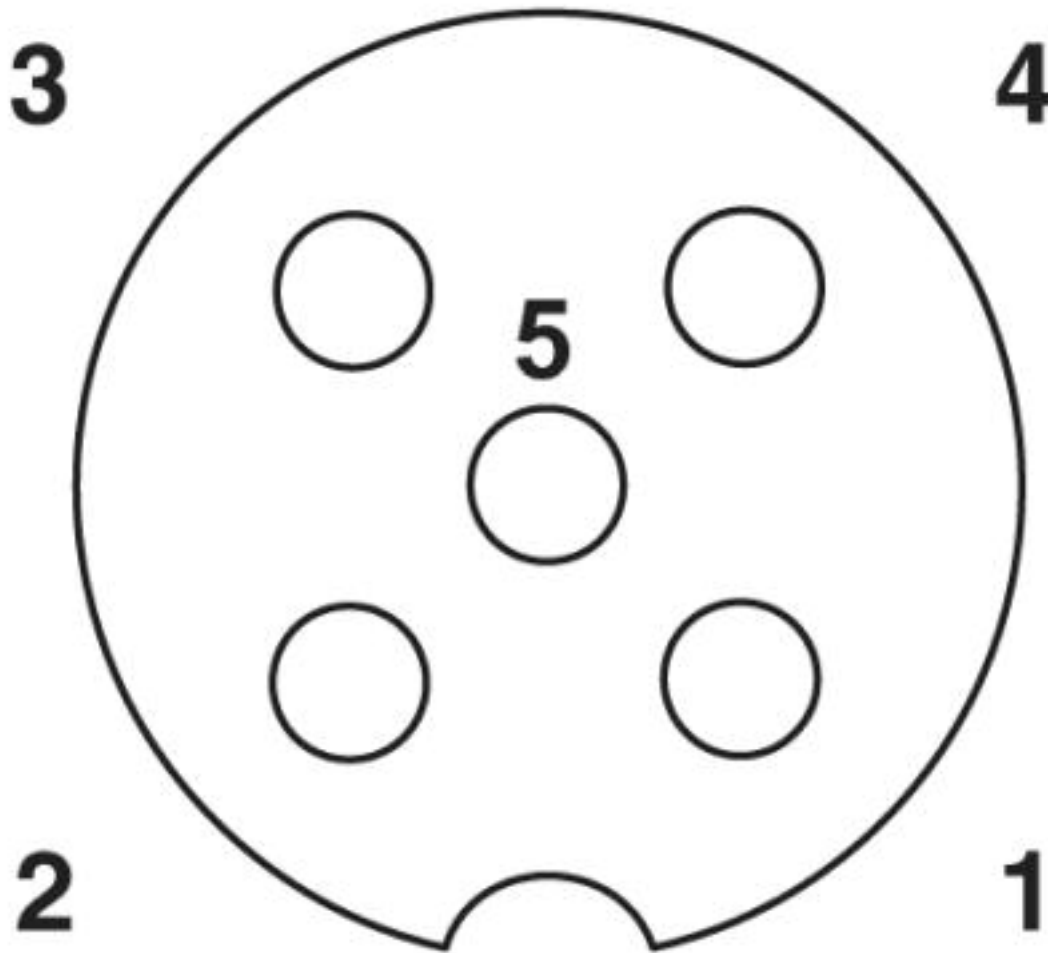
Schematic diagram



Pin assignment M12 male connector, 5-pos., A-coded, male side

# Sensor/actuator cable - SAC-5P-MS/ 2,0-28R/FS SCO RAIL - 1407337

Schematic diagram



Pin assignment M12 socket, 5-pos., A-coded, socket side view

# Sensor/actuator cable - SAC-5P-MS/ 2,0-28R/FS SCO RAIL - 1407337

Cable cross section



Shielded black RADOX® [28R]

## Classifications

eCl@ss

eCl@ss 10.0.1	27060311
eCl@ss 4.0	27060300
eCl@ss 4.1	27060300
eCl@ss 5.0	27061800
eCl@ss 5.1	27061800
eCl@ss 6.0	27279200
eCl@ss 7.0	27279218
eCl@ss 8.0	27279218
eCl@ss 9.0	27060311



# Sensor/actuator cable - SAC-5P-MS/ 2,0-28R/FS SCO RAIL - 1407337

## Classifications

### ETIM

ETIM 3.0	EC001855
ETIM 4.0	EC001855
ETIM 5.0	EC001855
ETIM 6.0	EC001855
ETIM 7.0	EC001855

### UNSPSC

UNSPSC 6.01	31251501
UNSPSC 7.0901	31251501
UNSPSC 11	31251501
UNSPSC 12.01	31251501
UNSPSC 13.2	31251501
UNSPSC 19.0	31251501
UNSPSC 20.0	31251501
UNSPSC 21.0	31251501

## Accessories

### Accessories

#### Conductor marking

##### Cable marker - WMTB HF (40X12)R YE - 0830408



Cable marker, Roll, yellow, unlabeled, can be labeled with: THERMOMARK ROLLMASTER 300/600, THERMOMARK X1.2, THERMOMARK ROLL X1, THERMOMARK ROLL 2.0, THERMOMARK ROLL, mounting type: Assembly with cable binders, cable diameter:  $\geq 6$  mm, lettering field size: 40 x 12 mm, Number of individual labels: 1000

##### Cable marker - WMTB HF (55X15)R YE - 0830410



Cable marker, Roll, yellow, unlabeled, can be labeled with: THERMOMARK ROLLMASTER 300/600, THERMOMARK X1.2, THERMOMARK ROLL X1, THERMOMARK ROLL 2.0, THERMOMARK ROLL, mounting type: Assembly with cable binders, cable diameter:  $\geq 6$  mm, lettering field size: 55 x 15 mm, Number of individual labels: 1000

##### Cable marker - WMTB HF (55X25)R YE - 0830412



Cable marker, Roll, yellow, unlabeled, can be labeled with: THERMOMARK ROLLMASTER 300/600, THERMOMARK X1.2, THERMOMARK ROLL X1, THERMOMARK ROLL 2.0, THERMOMARK ROLL, mounting type: Assembly with cable binders, cable diameter:  $\geq 6$  mm, lettering field size: 55 x 25 mm, Number of individual labels: 500

## Sensor/actuator cable - SAC-5P-MS/ 2,0-28R/FS SCO RAIL - 1407337

### Accessories

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#### Conductor marking - UCT-WMCO 5,4 (23X8) - 0832105



Conductor marking, Sheet, white, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: clip on, cable diameter range: 4.7 ... 5.4 mm, lettering field size: 23 x 8 mm, Number of individual labels: 18

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#### Conductor marking - UCT-WMCO 6,1 (23X8) - 0832106



Conductor marking, Sheet, white, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: clip on, cable diameter range: 5.4 ... 6.1 mm, lettering field size: 23 x 8 mm, Number of individual labels: 18

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#### Conductor marking - UCT-WMCO 6,8 (23X8) - 0832107



Conductor marking, Sheet, white, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: clip on, cable diameter range: 6.1 ... 6.8 mm, lettering field size: 23 x 8 mm, Number of individual labels: 15

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#### Conductor marking - UCT-WMCO 7,5 (23X8) - 0832108



Conductor marking, Sheet, white, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: clip on, cable diameter range: 6.8 ... 7.5 mm, lettering field size: 23 x 8 mm, Number of individual labels: 15

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#### Cable marker - WMTB-AL (40X15) - 0830524



Cable marker, Aluminum label, aluminum color, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, mounting type: Assembly with cable binders, cable diameter: > 4.6 mm, lettering field size: 40 x 15 mm

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## Sensor/actuator cable - SAC-5P-MS/ 2,0-28R/FS SCO RAIL - 1407337

### Accessories

Cable marker - WMTB-AL (60X15) - 0830525



Cable marker, Aluminum label, aluminum color, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, mounting type: Assembly with cable binders, cable diameter: > 4.6 mm, lettering field size: 60 x 15 mm

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Cable marker - LS-WMTB-AL (40X15) - 0831501



Cable marker, Aluminum label, aluminum color, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: Assembly with cable binders, cable diameter: > 4.6 mm, lettering field size: 40 x 15 mm, Number of individual labels: 16

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Cable marker - LS-WMTB-AL (40X15) BK - 0831509



Cable marker, Aluminum label, black, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: Assembly with cable binders, cable diameter: > 4.6 mm, lettering field size: 40 x 15 mm, Number of individual labels: 16

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Cable marker - LS-WMTB-AL (60X15) - 0831502



Cable marker, Aluminum label, aluminum color, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: Assembly with cable binders, cable diameter: > 4.6 mm, lettering field size: 60 x 15 mm, Number of individual labels: 16

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Cable marker - LS-WMTB-AL (60X15) BK - 0831510



Cable marker, Aluminum label, black, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: Assembly with cable binders, cable diameter: > 4.6 mm, lettering field size: 60 x 15 mm, Number of individual labels: 16

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## Sensor/actuator cable - SAC-5P-MS/ 2,0-28R/FS SCO RAIL - 1407337

### Accessories

#### Cable marker - LS-WMTB-AL (100X15) - 0831503

Cable marker, Aluminum label, aluminum color, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: Assembly with cable binders, cable diameter: > 4.6 mm, lettering field size: 100 x 15 mm, Number of individual labels: 8



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#### Cable marker - LS-WMTB-AL (100X15) BK - 0831511

Cable marker, Aluminum label, black, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: Assembly with cable binders, cable diameter: > 4.6 mm, lettering field size: 100 x 15 mm, Number of individual labels: 8



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### Marker carrier cable

#### Cable marker carrier - KMK HP (25X6) - 0830720

Cable marker carrier, transparent, unlabeled, mounting type: Assembly with cable binders, cable diameter:  $\geq 6$  mm, lettering field size: 25 mm x 6 mm



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#### Cable marker carrier - KMK HP (29X8) - 0830721

Cable marker carrier, transparent, unlabeled, mounting type: Assembly with cable binders, cable diameter:  $\geq 6$  mm, lettering field size: 29 x 8 mm



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### Marker pen

#### Marker pen - B-STIFT - 1051993



Marker pen, for manual labeling of unprinted Zack strips, smear-proof and waterproof, line thickness 0.5 mm

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### Plug for cable screw gland

## Sensor/actuator cable - SAC-5P-MS/ 2,0-28R/FS SCO RAIL - 1407337

### Accessories

Screw plug - PROT-M12 MS-PA-CHAIN - 1430899

M12 sealing cap with fixing band, for sensor cables, for free M12 sockets



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### Protective cap

Sealing cap - PROT-M12 FS-PA-CHAIN - 1430873

M12 sealing cap made of plastic with fixing band, for sensor cables, for free M12 plugs



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### Safety locking

Locking clip - SAC-M12-EXCLIP-M - 1558988



Locking clip for the pin side of sensor/actuator cables with M12 connector and M12 connectors for assembly, for knurl diameter: 15 mm or for Allen key with a wrench size of 14 mm, prevents the disconnection of plug-in connections without tools

Locking clip - SAC-M12-EXCLIP-F - 1558991



Locking clip for the socket side of sensor/actuator cables with M12 connector and M12 connectors for assembly, for knurl diameter: 15 mm or for Allen key with a wrench size of 14 mm, prevents the disconnection of plug-in connections without tools

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### Screwdriver tools

Adapter insert - TSD-M SAC-BIT ADAPTER - 1212600



Adapter bit for TSD-M...torque tools, E6.3-1/4" drive with 4 mm hexagon to accommodate SAC bits

## Sensor/actuator cable - SAC-5P-MS/ 2,0-28R/FS SCO RAIL - 1407337

### Accessories

Tool - SAC BIT M12-D15 - 1208432



Nut for assembling sensor/actuator cables with M12 connector and M12 connectors for assembly, with a knurl diameter of 15 mm, for 4 mm hexagonal drive

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### Sensor/actuator cable

Sensor/actuator cable - SAC-5P-MS SCO RAIL/.../... - 1412174



Sensor/actuator cable, 5-position, Variable cable type, shielded, Plug straight M12 SPEEDCON, coding: A, on free cable end, cable length: Free input (0.2 ... 40.0 m), For railway applications

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Sensor/actuator cable - SAC-5P-MR SCO RAIL/.../... - 1412175



Sensor/actuator cable, 5-position, Variable cable type, shielded, Plug angled M12 SPEEDCON, coding: A, on free cable end, cable length: Free input (0.2 ... 40.0 m), For railway applications

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Sensor/actuator cable - SAC-5P-FS SCO RAIL/.../... - 1412172



Sensor/actuator cable, 5-position, Variable cable type, shielded, free cable end, on Socket straight M12 SPEEDCON, coding: A, cable length: Free input (0.2 ... 40.0 m), For railway applications

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Sensor/actuator cable - SAC-5P-FR SCO RAIL/.../... - 1412173



Sensor/actuator cable, 5-position, Variable cable type, shielded, free cable end, on Socket angled M12 SPEEDCON, coding: A, cable length: Free input (0.2 ... 40.0 m), For railway applications

## Sensor/actuator cable - SAC-5P-MS/ 2,0-28R/FS SCO RAIL - 1407337

### Accessories

Sensor/actuator cable - SAC-5P-MS-FS SCO RAIL/.../... - 1412176



Sensor/actuator cable, 5-position, Variable cable type, shielded, Plug straight M12 SPEEDCON, coding: A, on Socket straight M12 SPEEDCON, coding: A, cable length: Free input (0.2 ... 40.0 m), For railway applications

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### Torque tool

Torque screwdriver - TSD 04 SAC - 1208429



Torque screwdriver, with preset torque of 0.4 Nm and 4 mm hexagonal drive for M12 connectors

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Torque screwdriver - TSD-M 1,2NM - 1212224



Torque screw driver, accuracy as per EN ISO 6789 standard, adjustable from 0.3 - 1.2 Nm

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