

## Sensor/actuator cable - SAC-5P-MS/ 5,0-28R/FS SCO RAIL - 1407338

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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: 5 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         | <br>4 046356 774543 |
| GTIN         | 4046356774543                                                                                           |

### Technical data

#### Dimensions

|                 |     |
|-----------------|-----|
| Length of cable | 5 m |
|-----------------|-----|

#### 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/ 5,0-28R/FS SCO RAIL - 1407338

## Technical data

### General

|                              |                               |
|------------------------------|-------------------------------|
| Color handle area            | black                         |
| Insulation resistance        | $\geq 100 \text{ M}\Omega$    |
| 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  | $\geq 100$                    |
| 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/regulations                  | PA 6.6: Fire protection in rail vehicles - requirement sets R22, R23, and R24 acc. to DIN EN 45545-2 (Risk level HL1 - HL3) |

### 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 $\pm 0,3 \text{ mm}$                 |
| Minimum bending radius, fixed installation    | 3 x D                                       |
| Minimum bending radius, flexible installation | 4 x D                                       |

# Sensor/actuator cable - SAC-5P-MS/ 5,0-28R/FS SCO RAIL - 1407338

## Technical data

### Cable

|                                  |                                                          |
|----------------------------------|----------------------------------------------------------|
| Cable weight                     | 70 kg/km                                                 |
| Outer sheath, material           | PE-X                                                     |
| Material conductor insulation    | PE-X                                                     |
| Conductor material               | Tin-plated Cu litz wires                                 |
| Conductor resistance             | $\leq 40.1 \text{ } \Omega/\text{km}$                    |
| Nominal voltage, cable           | 600 V AC (Core-ground, $U_0$ )                           |
|                                  | 1000 V AC (Core-ground, U)                               |
|                                  | $\leq 720 \text{ V AC (core-ground)}$                    |
|                                  | $\leq 1200 \text{ V AC (Core-ground, } U_m)$             |
|                                  | $\leq 900 \text{ V DC (Core-ground, } V_0)$              |
|                                  | $\leq 1500 \text{ V DC (core-core)}$                     |
| 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

## Sensor/actuator cable - SAC-5P-MS/ 5,0-28R/FS SCO RAIL - 1407338

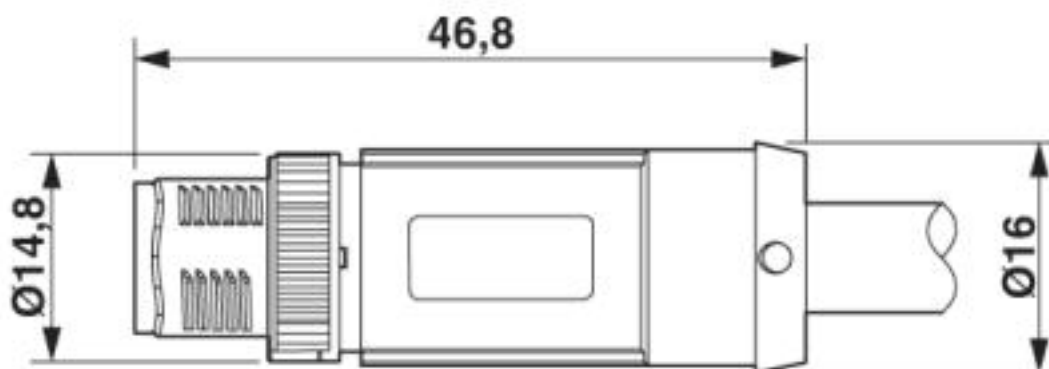
### Technical data

#### Environmental Product Compliance

|            |                                                         |
|------------|---------------------------------------------------------|
| China RoHS | Environmentally friendly use period: unlimited = EFUP-e |
|            | No hazardous substances above threshold values          |

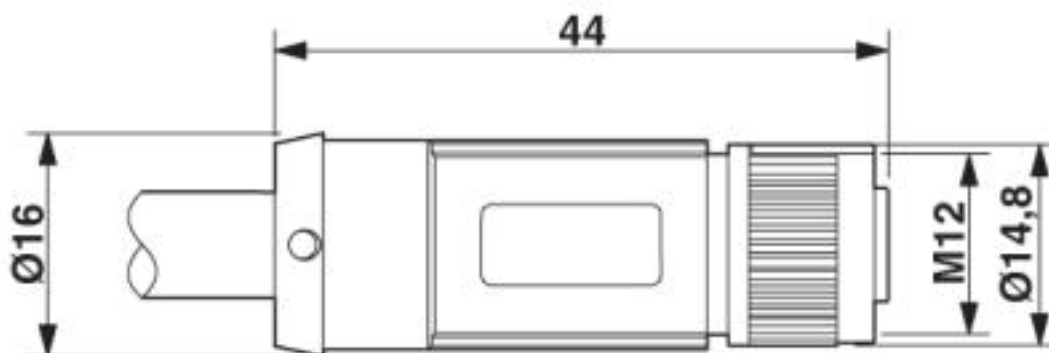
### Drawings

Dimensional drawing



M12 SPEEDCON plug, straight, shielded

Dimensional drawing



Socket M12-SPEEDCON, straight, shielded

## Sensor/actuator cable - SAC-5P-MS/ 5,0-28R/FS SCO RAIL - 1407338

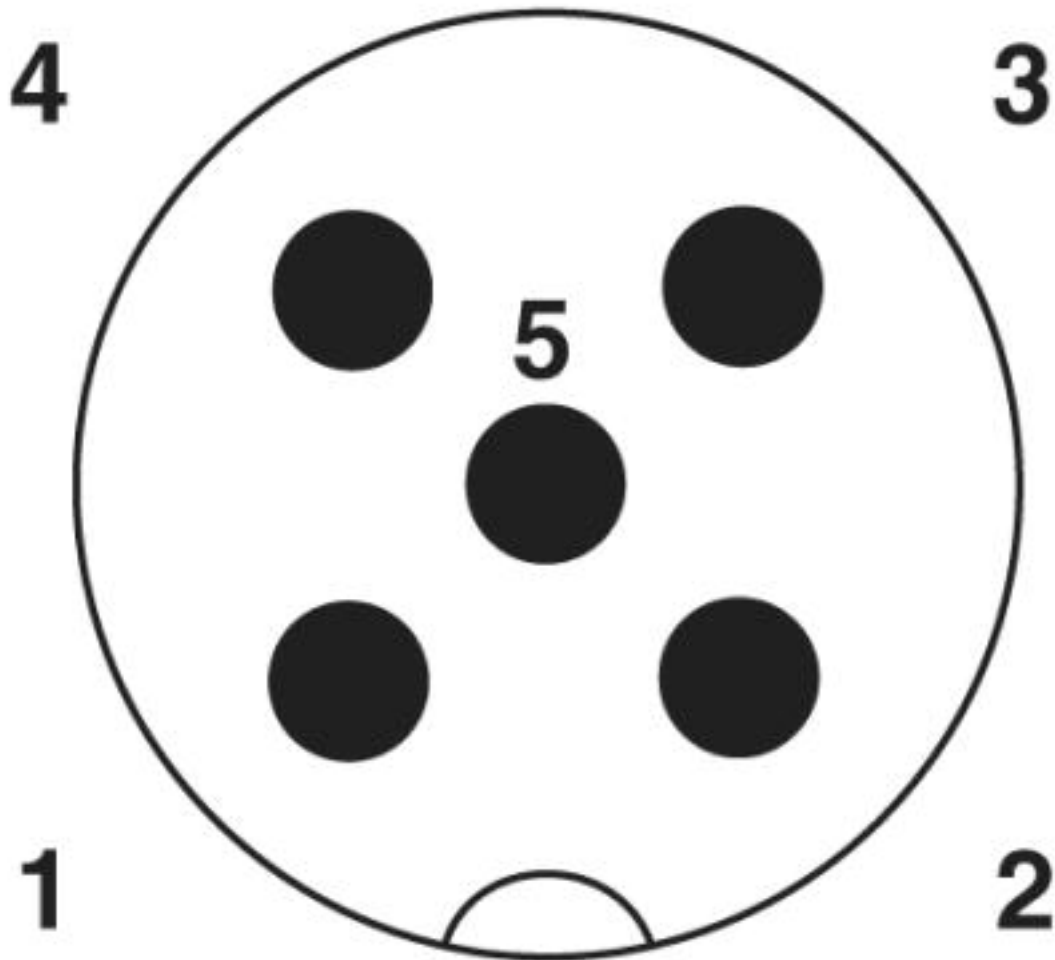
Circuit diagram



Contact assignment of the M12 plug and the M12 socket

## Sensor/actuator cable - SAC-5P-MS/ 5,0-28R/FS SCO RAIL - 1407338

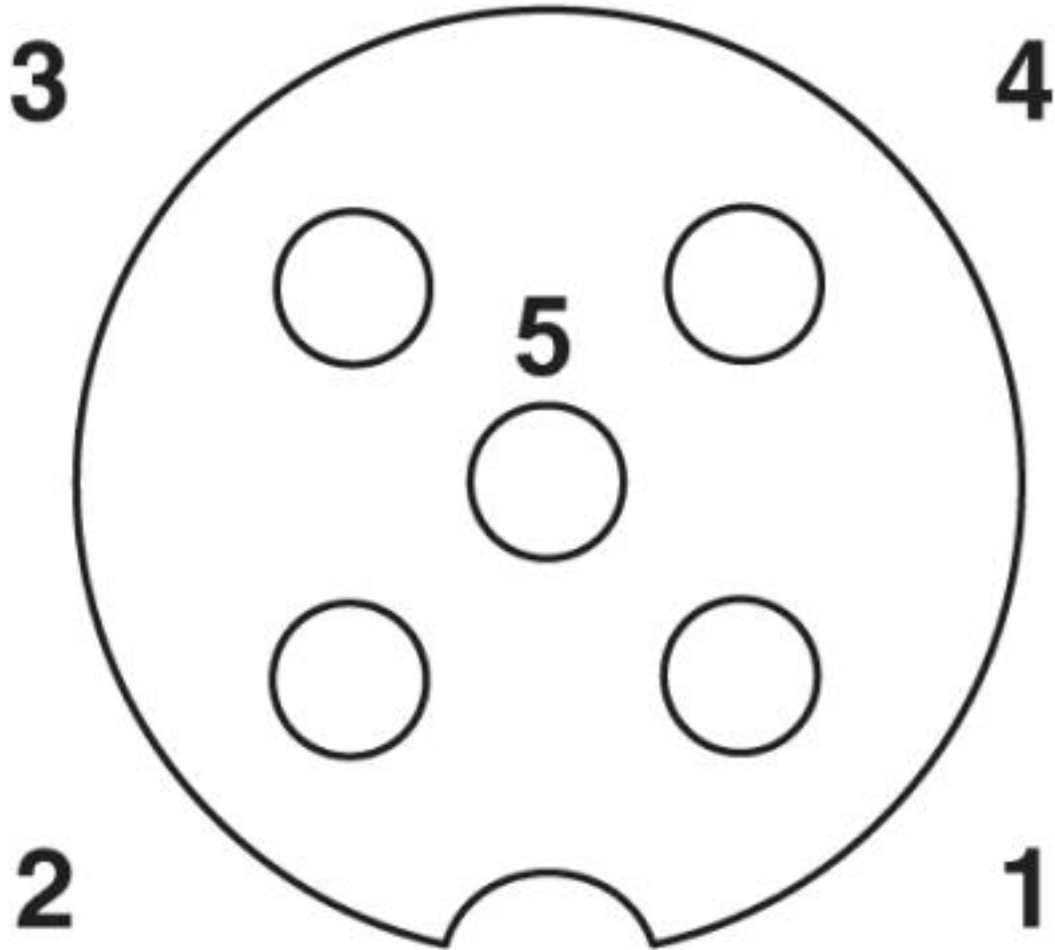
Schematic diagram



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

## Sensor/actuator cable - SAC-5P-MS/ 5,0-28R/FS SCO RAIL - 1407338

Schematic diagram



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

## Sensor/actuator cable - SAC-5P-MS/ 5,0-28R/FS SCO RAIL - 1407338

Cable cross section



Shielded black RADOX® [28R]

### Classifications

eCl@ss

|            |          |
|------------|----------|
| 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/ 5,0-28R/FS SCO RAIL - 1407338

### 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 |

### Approvals

#### Approvals

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Approvals

EAC

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Ex Approvals

#### Approval details

|     |                                                                                     |                          |
|-----|-------------------------------------------------------------------------------------|--------------------------|
| EAC |  | RU C-<br>DE.BL08.B.00286 |
|-----|-------------------------------------------------------------------------------------|--------------------------|

### Accessories

Accessories

Conductor marking

## Sensor/actuator cable - SAC-5P-MS/ 5,0-28R/FS SCO RAIL - 1407338

### Accessories

#### 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

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#### 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

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#### 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

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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

## Sensor/actuator cable - SAC-5P-MS/ 5,0-28R/FS SCO RAIL - 1407338

### Accessories

#### 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

#### 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

#### 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

#### 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

#### 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

## Sensor/actuator cable - SAC-5P-MS/ 5,0-28R/FS SCO RAIL - 1407338

### Accessories

#### 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

#### 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

#### 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

#### 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

#### 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

### Marker carrier cable

## Sensor/actuator cable - SAC-5P-MS/ 5,0-28R/FS SCO RAIL - 1407338

### Accessories

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

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

## Sensor/actuator cable - SAC-5P-MS/ 5,0-28R/FS SCO RAIL - 1407338

### Accessories

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

### 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

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

### 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

## Sensor/actuator cable - SAC-5P-MS/ 5,0-28R/FS SCO RAIL - 1407338

### Accessories

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

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

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-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

### 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

## Sensor/actuator cable - SAC-5P-MS/ 5,0-28R/FS SCO RAIL - 1407338

### Accessories

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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