

## Network cable - NBC-MSD/10.0-93E SCO - 1407359

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Network cable, Ethernet CAT5 (100 Mbps), 4-position, PUR, water blue RAL 5021, shielded, Plug straight M12 SPEEDCON / IP67, coding: D, on free cable end, cable length: 10 m



### Key Commercial Data

|                                      |   |
|--------------------------------------|---|
| Packing unit                         | 1 pc  |
| GTIN                                 | <br>4 046356 774871 |
| GTIN                                 | 4046356774871   |
| Weight per Piece (excluding packing) | 449.300 g   |
| Custom tariff number                 | 85444210  |
| Country of origin                    | Poland  |

### Technical data

#### Dimensions

|                 |      |
|-----------------|------|
| Length of cable | 10 m |
|-----------------|------|

#### Ambient conditions

|                                 |                                  |
|---------------------------------|----------------------------------|
| Degree of protection            | IP65                             |
|                                 | IP67                             |
| Ambient temperature (operation) | -25 °C ... 85 °C (M12 connector) |

#### General data

|                       |   |
|-----------------------|---|
| 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 (Plug/socket in accordance with IEC 61076-2-101, cable technical data is to be observed)                |
| Rated voltage         | 48 V AC   |
|                       | 60 V DC   |
| Number of positions   | 4   |
| Signal type/category  | Ethernet CAT5 (IEC 11801), 100 Mbps   |

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## Technical data

### General data

|                          |                               |
|--------------------------|-------------------------------|
| Standards/regulations    | M12 connector IEC 61076-2-101 |
| Contact material         | CuSn                          |
| Contact carrier material | TPU GF                        |
| Contact surface material | Ni/Au                         |

### Characteristics head 1

|  |  |
|--|--|
| Head type                                | Plug straight M12 SPEEDCON / IP67                  |
| No. of positions (pin connector pattern) | 4  |
| Coding                                   | D (Data)   |
| Color                                    | black  |
| Material (component)                     | CuZn (Contact)                                     |
|  | Ni/Au (Contact surface)                            |
|  | PA (Contact carriers)                              |
|  | TPU, hardly inflammable, self-extinguishing (Grip) |
|  | Zinc die-cast, nickel-plated (Screw connection)    |
| Insulation resistance                    | ≥ 100 MΩ   |
| Insertion/withdrawal cycles              | ≥ 100  |
| Torque                                   | 0.4 Nm   |
| Ambient temperature (operation)          | -25 °C ... 90 °C                                   |

### Characteristics head 2

|           |                |
|-----------|----------------|
| Head type | free cable end |
| Color     | black          |

### Standards and Regulations

|                       |                 |
|-----------------------|-----------------|
| Standard designation  | M12 connector   |
| Standards/regulations | IEC 61076-2-101 |

### Cable

|                                    |  |
|------------------------------------|--|
| Cable type                         | PUR ETHERNET 2x2 FLEX                              |
| Cable type (abbreviation)          | 93E  |
| UL AWM style                       | 20963 (80°C/30 V)                                  |
| Signal type/category               | Ethernet CAT5 (IEC 11801), 100 Mbps                |
| Cable structure                    | 2x2xAWG26/7; SF/UTP                                |
| Conductor cross section            | 2x 2x 0.14 mm <sup>2</sup>                         |
| AWG signal line                    | 26   |
| Conductor structure signal line    | 7x 0.16 mm   |
| Core diameter including insulation | 0.98 mm  |
| Wire colors                        | white/orange-orange, white/green-green             |
| Twisted pairs                      | 2 cores to the pair                                |
| Overall twist                      | Two pairs with two fillers to the core             |
| Shielding                          | Aluminum-coated foil, tinned copper braided shield |
| Optical shield covering            | 70 %   |

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### Technical data

#### Cable

|  |                                      |
|--|--------------------------------------|
| External sheath, color                               | water blue RAL 5021                  |
| Outer sheath thickness                               | 1.2 mm                               |
| External cable diameter D                            | 6.4 mm ±0.2 mm                       |
| Minimum bending radius, fixed installation           | 4 x D                                |
| Minimum bending radius, flexible installation        | 8 x D                                |
| Tensile strength GRP                                 | ≤ 80 N                               |
| Cable weight   | 42 kg/km                             |
| Outer sheath, material                               | PUR                                  |
| Material conductor insulation                        | Foamed PE                            |
| Conductor material                                   | Bare Cu litz wires                   |
| Standards/specifications                             | Electrical requirements EN 50288-2-2 |
| Insulation resistance                                | ≥ 500 MΩ*km                          |
| Loop resistance                                      | ≤ 290.00 Ω/km                        |
| Cable capacity                                       | approx. 45 nF/km (at 1 kHz)          |
| Wave impedance                                       | 100 Ω ±5 Ω (at 100 MHz)              |
| Near end crosstalk attenuation (NEXT)                | 65.3 dB (with 1 MHz)                 |
|  | 56.3 dB (at 4 MHz)                   |
|  | 50.3 dB (at 10 MHz)                  |
|  | 47.2 dB (at 16 MHz)                  |
|  | 45.8 dB (at 20 MHz)                  |
|  | 42.9 dB (at 31.25 MHz)               |
|  | 38.4 dB (at 62.5 MHz)                |
|  | 35.3 dB (at 100 MHz)                 |
| Power-summed near end crosstalk attenuation (PSNEXT) | 62.3 dB (with 1 MHz)                 |
|  | 53.3 dB (at 4 MHz)                   |
|  | 47.3 dB (at 10 MHz)                  |
|  | 44.2 dB (at 16 MHz)                  |
|  | 42.8 dB (at 20 MHz)                  |
|  | 39.9 dB (at 31.25 MHz)               |
|  | 35.4 dB (at 62.5 MHz)                |
|  | 32.3 dB (at 100 MHz)                 |
| Attenuation  | 3.2 dB (with 1 MHz)                  |
|  | 6 dB (at 4 MHz)                      |
|  | 9.5 dB (at 10 MHz)                   |
|  | 12.1 dB (at 16 MHz)                  |
|  | 13.6 dB (at 20 MHz)                  |
|  | 17.1 dB (at 31.25 MHz)               |
|  | 24.8 dB (at 62.5 MHz)                |
|  | 32 dB (at 100 MHz)                   |
| Return loss (RL)                                     | 23 dB (at 4 MHz)                     |

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## Technical data

### Cable

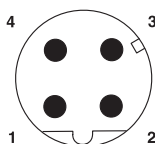
|   |   |
|---|---|
|   | 24.1 dB (at 8 MHz)                                    |
|   | 25 dB (at 10 MHz)                                     |
|   | 25 dB (at 16 MHz)                                     |
|   | 25 dB (at 20 MHz)                                     |
|   | 23.6 dB (at 31.25 MHz)                                |
|   | 21.5 dB (at 62.5 MHz)                                 |
|   | 20.1 dB (at 100 MHz)                                  |
| Signal runtime                          | 5.3 ns/m  |
| Coupling resistance                     | ≤ 100.00 mΩ/m (at 10 MHz)                             |
| Nominal voltage, cable                  | ≤ 100 V (Peak value, not for high-power applications) |
| Test voltage Core/Core                  | 700 V (50 Hz, 1 min.)                                 |
| Test voltage Core/Shield                | 700 V (50 Hz, 1 min.)                                 |
| Current carrying capacity of cable      | 2 A (according to DIN VDE 0891-1)                     |
| Flame resistance                        | according to IEC 60332-1-2                            |
|   | in acc. to UL VW1                                     |
| Halogen-free                            | according to IEC 60754-1                              |
| Resistance to oil                       | according to EN 60811-2-1                             |
| Ambient temperature (operation)         | -40 °C ... 80 °C (cable, fixed installation)          |
|   | -20 °C ... 80 °C (cable, flexible installation)       |
| Ambient temperature (installation)      | -20 °C ... 80 °C                                      |
| Ambient temperature (storage/transport) | -20 °C ... 80 °C                                      |

### Environmental Product Compliance

|            |   |
|------------|---|
| REACH SVHC | Lead 7439-92-1  |
| China RoHS | Environmentally Friendly Use Period = 50  |
|            | For details about hazardous substances go to tab "Downloads", Category "Manufacturer's declaration" |

## Drawings

Schematic diagram



Pin assignment M12 male connector, 4-pos., D-coded, male side

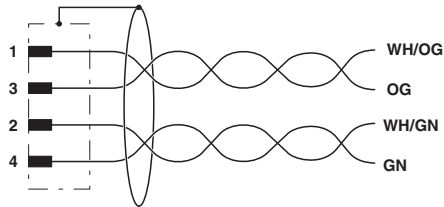
Cable cross section



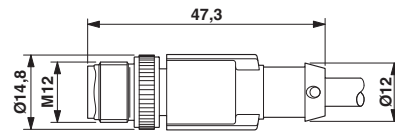
PUR ETHERNET 2x2 FLEX [93E]

# Network cable - NBC-MSD/10.0-93E SCO - 1407359

Circuit diagram



Dimensional drawing



Contact assignment of the M12 plug

Plug, M12 x 1, straight, shielded

## Classifications

eCl@ss

|            |          |
|------------|----------|
| eCl@ss 4.0 | 27060306 |
| eCl@ss 4.1 | 27060306 |
| eCl@ss 5.0 | 27061801 |
| eCl@ss 5.1 | 19030300 |
| eCl@ss 6.0 | 27061800 |
| eCl@ss 7.0 | 27061801 |
| eCl@ss 8.0 | 27061801 |
| eCl@ss 9.0 | 27060308 |

ETIM

|          |          |
|----------|----------|
| ETIM 3.0 | EC001855 |
| ETIM 4.0 | EC001855 |
| ETIM 5.0 | EC002599 |
| ETIM 6.0 | EC000830 |

UNSPSC

|               |          |
|---------------|----------|
| UNSPSC 6.01   | 31251501 |
| UNSPSC 7.0901 | 31251501 |
| UNSPSC 11     | 31251501 |
| UNSPSC 12.01  | 31251501 |
| UNSPSC 13.2   | 31251501 |

## Approvals

Approvals

Approvals

UL Recognized

Ex Approvals

# Network cable - NBC-MSD/10.0-93E SCO - 1407359

## Approvals

### Approval details

|                    |      |   |               |
|--------------------|------|---|---------------|
| UL Recognized      |      | <a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a> | FILE E 335024 |
| Nominal voltage UN | 30 V |   |               |
| Nominal current IN | 4 A  |   |               |

## Accessories

### Accessories

#### Cable connector

Conductor connectors - SACC-CC-4QO SH ETH - 1414415



Cable connector, Ethernet CAT5 (100 Mbps), 4-pos., halogen-free, shielded, insulation displacement connection, housing material: zinc die-cast, nickel-plated, outer cable diameter of 5 mm ... 9.7 mm

#### Circular connector (cable-side)

Connector - SACC-MSD-4QO SH ETH SCO - 1411066



Connector, Ethernet CAT5 (100 Mbps), 4-position, halogen-free, shielded, Plug straight M12 SPEEDCON, D-coded, Insulation displacement connection, knurl material: Zinc die-cast, nickel-plated, external cable diameter 5 mm ... 9.7 mm

Bus system connector - SACC-M12MRD-4Q SH - 1553624



Bus system connector, Ethernet CAT5 (100 Mbps), 4-position, shielded, Plug angled M12, D-coded, Insulation displacement connection, knurl material: Nickel-plated brass, external cable diameter 4 mm ... 8 mm

## Network cable - NBC-MSD/10.0-93E SCO - 1407359

### Accessories

Connector - SACC-FSD-4QO SH ETH SCO - 1411069



Connector, Ethernet CAT5 (100 Mbps), 4-position, halogen-free, shielded, Socket straight M12 SPEEDCON, D-coded, Insulation displacement connection, knurl material: Zinc die-cast, nickel-plated, external cable diameter 5 mm ... 9.7 mm

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Bus system connector - SACC-M12FRD-4Q SH - 1553637



Bus system connector, Ethernet CAT5 (100 Mbps), 4-position, shielded, Socket angled M12, D-coded, Insulation displacement connection, knurl material: Nickel-plated brass, external cable diameter 4 mm ... 8 mm

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### Corrugated pipe

Protective hose - WP-PA HF 13,0 BK - 3240681



Polyamide protective hose, inflammability class V0, UV resistant

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Protective hose - WP-PA HF-HB 13,0 BK - 3240839



Polyamide protective hose, inflammability class HB, UV resistant

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### Cutting tools

Cable-cutting tool - CUTFOX 12 - 1212128



Cable cutter, for copper and aluminum up to 12 mm diameter (up to 35 mm<sup>2</sup>)

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## Network cable - NBC-MSD/10.0-93E SCO - 1407359

### Accessories

Diagonal cutter - CUTFOX-S VDE - 1212207



Diagonal cutter for hard (piano wire) and soft wires, VDE 1000 V AC/1500 V DC tested

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### Data cable preassembled

Network cable - NBC-MSD SCO/.../... - 1408713



Network cable, Ethernet CAT5 (100 Mbps), 4-position, shielded, Plug straight M12 SPEEDCON / IP67, coding: D, on free cable end, cable length: Free input (0.2 ... 40.0 m)

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Network cable - NBC-MRD SCO/.../... - 1408705



Network cable, Ethernet CAT5 (100 Mbps), 4-position, shielded, Plug angled M12 SPEEDCON / IP67, coding: D, on free cable end, cable length: Free input (0.2 ... 40.0 m)

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Network cable - NBC-FSD SCO/.../... - 1408697



Network cable, Ethernet CAT5 (100 Mbps), 4-position, shielded, free cable end, on Socket straight M12 SPEEDCON / IP67, coding: D, cable length: Free input (0.2 ... 40.0 m)

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Network cable - NBC-FRD SCO/.../... - 1408690



Network cable, Ethernet CAT5 (100 Mbps), 4-position, shielded, free cable end, on Socket angled M12 SPEEDCON / IP67, coding: D, cable length: Free input (0.2 ... 40.0 m)

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### Data plug



## Network cable - NBC-MSD/10.0-93E SCO - 1407359

### Accessories

RJ45 connector - VS-08-RJ45-5-Q/IP20 - 1656725



RJ45 connector, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5 (IEC 11801:2002), material: PA, connection method: IDC fast connection, connection cross section: AWG 26- 23, cable outlet: straight, color: traffic grey A RAL 7042

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RJ45 connector - VS-08-RJ45-5-Q/IP20 BK - 1658008



RJ45 connector, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5 (IEC 11801:2002), material: PA, connection method: IDC fast connection, connection cross section: AWG 26- 23, cable outlet: straight, color: black

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RJ45 connector - CUC-IND-C1ZNI-S/R4IE8 - 1421607



RJ45 connector, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5 (IEC 11801:2002), material: Zinc die-cast, connection method: IDC fast connection, connection cross section: AWG 26- 24, cable outlet: straight

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RJ45 connector - CUC-IND-C1ZNI-T/R4IE8 - 1421877



RJ45 connector, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5 (IEC 11801:2002), material: Zinc die-cast, connection method: IDC fast connection, connection cross section: AWG 26- 24, cable outlet: angled

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RJ45 connector - CUC-IND-C1ZNI-B/R4IE8 - 1421876



RJ45 connector, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5 (IEC 11801:2002), material: Zinc die-cast, connection method: IDC fast connection, connection cross section: AWG 26- 24, cable outlet: angled

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## Network cable - NBC-MSD/10.0-93E SCO - 1407359

### Accessories

RJ45 connector - CUC-V06-C1PGY-S/R4CE8:1 - 1414383



RJ45 connector, degree of protection: IP67, number of positions: 8, 1 Gbps, CAT6, material: PA, connection method: Crimp connection, connection cross section: AWG 27- 24, cable outlet: straight, color: gray

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RJ45 connector - CUC-V06-C1PBK-S/R4CE8:1 - 1414408



RJ45 connector, degree of protection: IP67, number of positions: 8, 1 Gbps, CAT6, material: PA, connection method: Crimp connection, connection cross section: AWG 24- 27, cable outlet: straight, color: black

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RJ45 connector - CUC-V14-C1ZNI-S/R4E8 - 1422661



Push-pull connector (version 14), die-cast zinc, with RJ45 connector insert, 8-pos., with IDC fast connection technology, for 1 and 7-wire cores, 26 ... 24 AWG, for cable diameter of 5.5 mm ... 10 mm

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RJ45 connector - CUC-V14-C1ZNI-T/R4E8 - 1422663



Push-pull connector (version 14), die-cast zinc, with RJ45 connector insert, 8-pos., with IDC fast connection technology, for 1 and 7-wire cores, 26 ... 24 AWG, for cable diameter of 5.5 mm ... 10 mm

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RJ45 connector - CUC-V14-C1ZNI-B/R4E8 - 1422662



Push-pull connector (version 14), die-cast zinc, with RJ45 connector insert, 8-pos., with IDC fast connection technology, for 1 and 7-wire cores, 26 ... 24 AWG, for cable diameter of 5.5 mm ... 10 mm

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## Network cable - NBC-MSD/10.0-93E SCO - 1407359

### Accessories

RJ45 connector - VS-PPC-C1-RJ45-POBK-PG9-4Q5 - 1608126



RJ45 connector, IP67, with push-pull interlocking, plastic housing, CAT5e, 4-pos., with QUICKON fast connection technology, for 1-wire and 7-wire conductors AWG 26 ... 22, for cable cross section 5.0 mm ... 8.0 mm

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### Electronics pliers

Diagonal cutter - MICROFOX-SP-1 - 1212487



Electronic diagonal cutter, tapered head, without chamfer, with opening spring, non-reflective phosphate-treated surface, punched version

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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

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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

## Network cable - NBC-MSD/10.0-93E SCO - 1407359

### 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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### Stripping tool

Stripping tool - WIREFOX 4 - 1212156



Stripping tool, for cables and conductors (especially for rubber and silicone insulations) from 0.1 - 4 mm<sup>2</sup>, self-adjusting, stripping length of up to 18 mm, cutting capacity of up to 10 mm<sup>2</sup> stranded/1.5 mm<sup>2</sup> solid, replaceable stripping blade

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Stripping tool - WIREFOX-E 4 - 1212704



Stripping tool, for cables and conductors (especially for rubber and silicone insulations) from 0.1 - 4 mm<sup>2</sup>, self-adjusting, stripping length of up to 18 mm, cutting capacity of up to 10 mm<sup>2</sup> stranded/1.5 mm<sup>2</sup> solid, replaceable stripping blade

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Stripping tool - WIREFOX 10 - 1212150



Stripping tool, for cables and conductors from 0.02 - 10 mm<sup>2</sup>, self-adjusting, stripping length of up to 18 mm, cutting capacity of up to 10 mm<sup>2</sup> stranded/1.5 mm<sup>2</sup> solid, replaceable stripping blade

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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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## Network cable - NBC-MSD/10.0-93E SCO - 1407359

### 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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Stripping tool - VS-CABLE-STRIP-VARIO - 1657407



Stripping tool, for the multi-level stripping of shielded cables

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Protective hose adapter - WP-CTA POM 13,0 BK - 1422884



Protective hose adapter, for corrugated hoses with a nominal size of 13 (10 x 13), corrugated in parallel

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