PHŒNIX CONTACT

Network cable - NBC-MSX/ 2,0-94S SCO RAIL - 1415599

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Network cable, Ethernet CAT6$_A$ (10 Gbps), 8-position, PE-X halogen-free, black, shielded, Plug straight M12 SPEEDCON / IP67, coding: X, on free cable end, cable length: 2 m

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

RoHS

Ethernet CAT6$_A$

Key Commercial Data

Packing unit	1 pc
GTIN	4 055626 047669
GTIN	4055626047669

Technical data

Dimensions

Length of cable	2 m

Ambient conditions

Degree of protection	IP65
	IP67
Ambient temperature (operation)	-25 °C ... 90 °C (M12 connector)

General data

Rated current at 40°C	0.5 A
Rated voltage	48 V AC
	60 V DC
Number of positions	8

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Network cable - NBC-MSX/ 2,0-94S SCO RAIL - 1415599

Technical data

General data

Signal type/category	Ethernet CAT6$_A$, 10 Gbps
Standards/regulations	M12 connector IEC 61076-2-109
	Shock, vibration EN 50155
Degree of protection	IP65/IP67
Transmission characteristics (category)	CAT6$_A$

Characteristics head 1

Head type	Plug straight M12 SPEEDCON / IP67
No. of positions (pin connector pattern)	8
Coding	X (Data)
Color	black
Material (component)	CuZn (Contact)
	Ni/Au (Contact surface)
	TPU (Contact carriers)
	PA 6.6 (Grip)
	Zinc die-cast, nickel-plated (Screw connection)
Standards/regulations material	PA 6.6: Fire protection in rail vehicles - requirement sets R22, R23, and R24 acc. to DIN EN 45545-2 (Risk level HL1 - HL3)
Insulation resistance	$\geq$ 100 MΩ
Insertion/withdrawal cycles	$\geq$ 100
Torque	0.4 Nm
Ambient temperature (operation)	-25 °C ... 90 °C
Shielded	yes
Outer sheath, material	PE-X
External sheath, color	black
Type type, plug side	Plug straight
Type type, socket side	free cable end

Characteristics head 2

Head type	free cable end
Color	black
Stripping length of the sheath (free conductor end)	0.5 mm

Standards and Regulations

Standards/specifications	M12 connector IEC 61076-2-109
	Shock, vibration EN 50155

Cable

Cable type	Ethernet BETAtrans® railway application CAT7
Cable type (abbreviation)	94S
Signal type/category	Ethernet CAT7, 10 Gbps
Cable structure	4x2xAWG26/7; S/FTP
Conductor cross section	4x 2x 0.14 mm²

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Technical data

Cable

AWG signal line	26
Conductor structure signal line	7x 0.16 mm
Core diameter including insulation	1.05 mm ±0.1 mm
Wire colors	White-blue, white-orange, white-green, white-brown
Twisted pairs	2 cores to the pair
Type of pair shielding	Aluminum-lined polyester foil
Overall twist	4 pairs, twisted
Shielding	Tinned copper braided shield
External sheath, color	black
External cable diameter D	6.6 mm ±0.2 mm
Minimum bending radius, fixed installation	6 x D
Tensile strength GRP	$\leq$ 60 N (temporary)
	$\leq$ 15 N (Permanent)
Cable weight	59 kg/km
Copper weight	28 kg/km
Outer sheath, material	PE-X
Material conductor insulation	Cell PE
Conductor material	Tin-plated Cu litz wires
Insulation resistance	$\geq$ 5 GΩ*km
Conductor resistance	$\leq$ 145 Ω/km
Working capacitance	44 nF (per kilometer)
Wave impedance	100 Ω ±5 Ω (at 100 MHz)
Near end crosstalk attenuation (NEXT)	100 dB (with 1 MHz)
	99 dB (at 10 MHz)
	95 dB (at 100 MHz)
	92 dB (at 200 MHz)
	90 dB (at 250 MHz)
	83 dB (at 500 MHz)
	81 dB (at 600 MHz)
	80 dB (at 700 MHz)
	77 dB (at 800 MHz)
	75 dB (at 900 MHz)
	74 dB (at 1000 MHz)
	72 dB (at 1100 MHz)
	70 dB (at 1200 MHz)
Power-summated near end crosstalk attenuation (PSNEXT)	97 dB (with 1 MHz)
	96 dB (at 10 MHz)
	92 dB (at 100 MHz)
	89 dB (at 200 MHz)
	87 dB (at 250 MHz)

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Technical data

Cable

	80 dB (at 500 MHz)
	78 dB (at 600 MHz)
	77 dB (at 700 MHz)
	74 dB (at 800 MHz)
	72 dB (at 900 MHz)
	71 dB (at 1000 MHz)
	69 dB (at 1100 MHz)
	67 dB (at 1200 MHz)
Attenuation	0.25 dB (with 1 MHz)
	0.76 dB (at 10 MHz)
	2.49 dB (at 100 MHz)
	3.69 dB (at 200 MHz)
	4.18 dB (at 250 MHz)
	5.6 dB (at 500 MHz)
	6.74 dB (at 600 MHz)
	7.32 dB (at 700 MHz)
	7.89 dB (at 800 MHz)
	8.5 dB (at 900 MHz)
	9.11 dB (at 1000 MHz)
	9.5 dB (at 1100 MHz)
	9.9 dB (at 1200 MHz)
Return loss (RL)	24 dB (with 1 MHz)
	33.9 dB (at 10 MHz)
	38.3 dB (at 100 MHz)
	35.3 dB (at 200 MHz)
	32.9 dB (at 250 MHz)
	29.7 dB (at 500 MHz)
	30.6 dB (at 600 MHz)
	31 dB (at 700 MHz)
	26.7 dB (at 800 MHz)
	28.6 dB (at 900 MHz)
	27.5 dB (at 1000 MHz)
	26.9 dB (at 1100 MHz)
	26.3 dB (at 1200 MHz)
Crosstalk attenuation (ACR)	100 dB (with 1 MHz)
	99 dB (at 10 MHz)
	93 dB (at 100 MHz)
	88 dB (at 200 MHz)
	86 dB (at 250 MHz)
	78 dB (at 500 MHz)

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Technical data

Cable

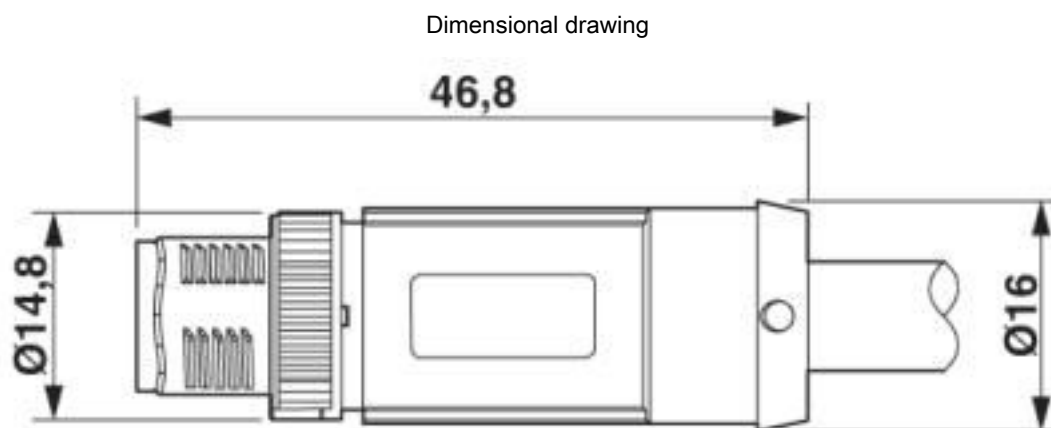|	
	74 dB (at 600 MHz)
	72 dB (at 700 MHz)
	69 dB (at 800 MHz)
	67 dB (at 900 MHz)
	65 dB (at 1000 MHz)
	63 dB (at 1100 MHz)
	61 dB (at 1200 MHz)
Power-summated crosstalk attenuation (PS-ACR)	97 dB (with 1 MHz)
	96 dB (at 10 MHz)
	90 dB (at 100 MHz)
	85 dB (at 200 MHz)
	83 dB (at 250 MHz)
	75 dB (at 500 MHz)
	71 dB (at 600 MHz)
	69 dB (at 700 MHz)
	66 dB (at 800 MHz)
	64 dB (at 900 MHz)
	62 dB (at 1000 MHz)
	60 dB (at 1100 MHz)
	58 dB (at 1200 MHz)
Signal speed	0.78 c
Signal runtime	4.4 ns/m
Shield attenuation	60 dB (up to 1000 MHz)
Interference suppression	90 dB (up to 1000 MHz)
Coupling resistance	5.00 mΩ/m (at 10 MHz)
Nominal voltage, cable	125 V AC (Uo)
Test voltage Core/Core	1000 V AC (50 Hz, 1 min.)
Test voltage Core/Shield	1000 V AC (50 Hz, 1 min.)
Fire protection in rail vehicles	BS 6853 (Internal cable Ia, Ib, II/external cable Ia, Ib, II)
	DIN 5510-2 (Fire protection level 1, 2, 3, 4)
	EN 45545-2
	EN 50306-4
	NF F16-101 (Classification C/F1)
	NF F16-101 (Internal cable A1, A2, B/external cable A1, A2, B)
	NFPA 130
	PN-K-02511 (Class A)
	UIC 564-2 (Class A)
Flame resistance	according to EN 60332-1-2
	EN 60332-3-25
	according to ISO 14572 5.21 (UN ECE-R 118.01)

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Technical data

Cable

Halogen-free	According to EN 50267-2-1
	according to EN 60684-2
Resistance to oil	according to EN 60684-2, 72 h at 100 °C, IRM 902
Other resistance	Resistant to fuel according to EN 60684-2, 72 h at 100 °C, IRM 903
	Resistant to ozone according to EN 50306-4, 72 h at 40 °C, procedure B, volume concentration 200×10^{-6}
Concentration of fumes	EN 61034-2
Ambient temperature (operation)	-40 °C ... 80 °C (cable, fixed installation)

Environmental Product Compliance

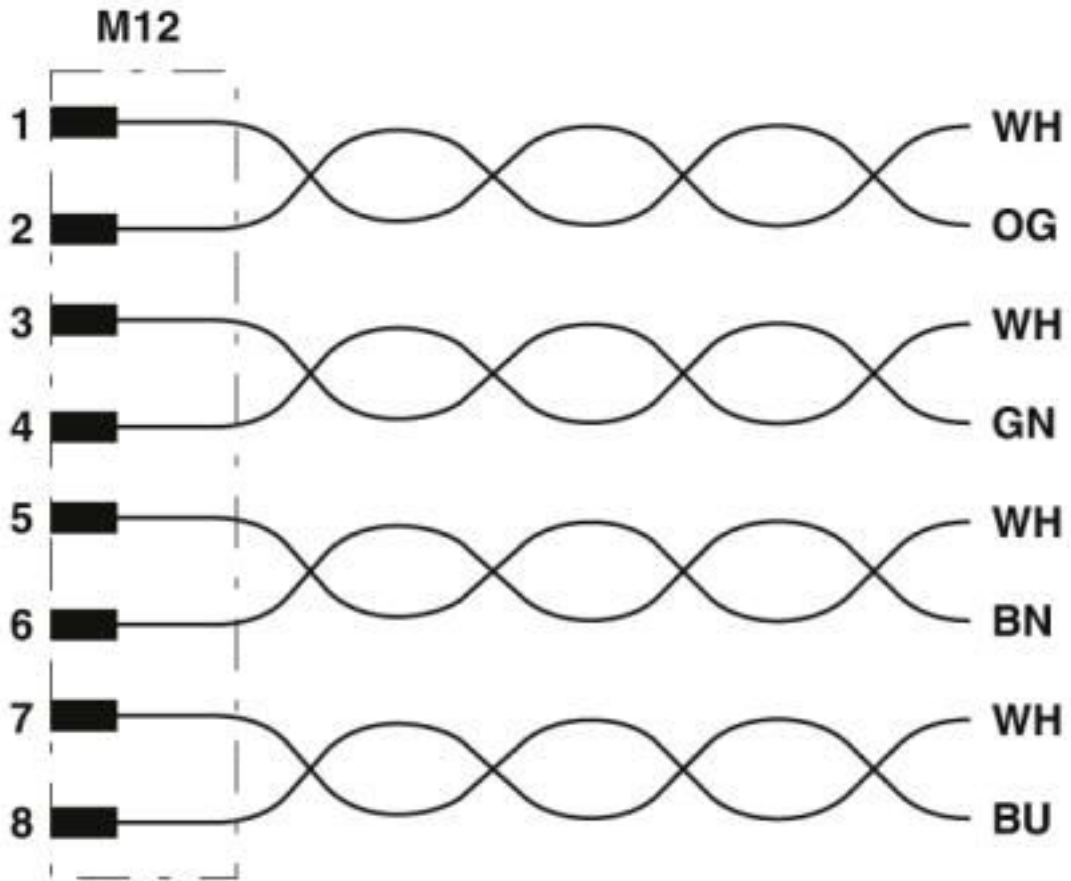| REACh SVHC	Lead 7439-92-1
China RoHS	Environmentally Friendly Use Period = 50 years
	For details about hazardous substances go to tab "Downloads", Category "Manufacturer's declaration"

Drawings

Dimensional drawing

M12 SPEEDCON plug, straight, shielded

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Circuit diagram

M12

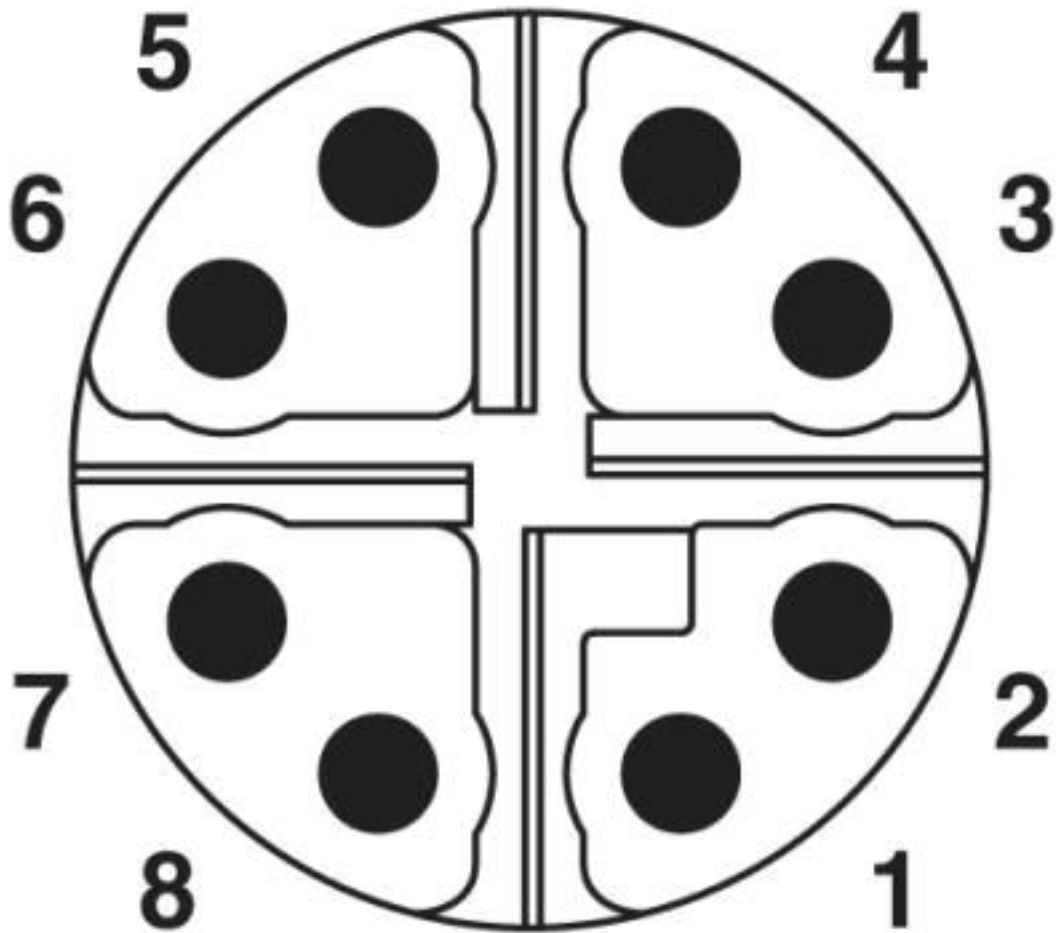| Pin	Wire
1	WH
2	OG
3	WH
4	GN
5	WH
6	BN
7	WH
8	BU

Contact assignment of the M12 plug
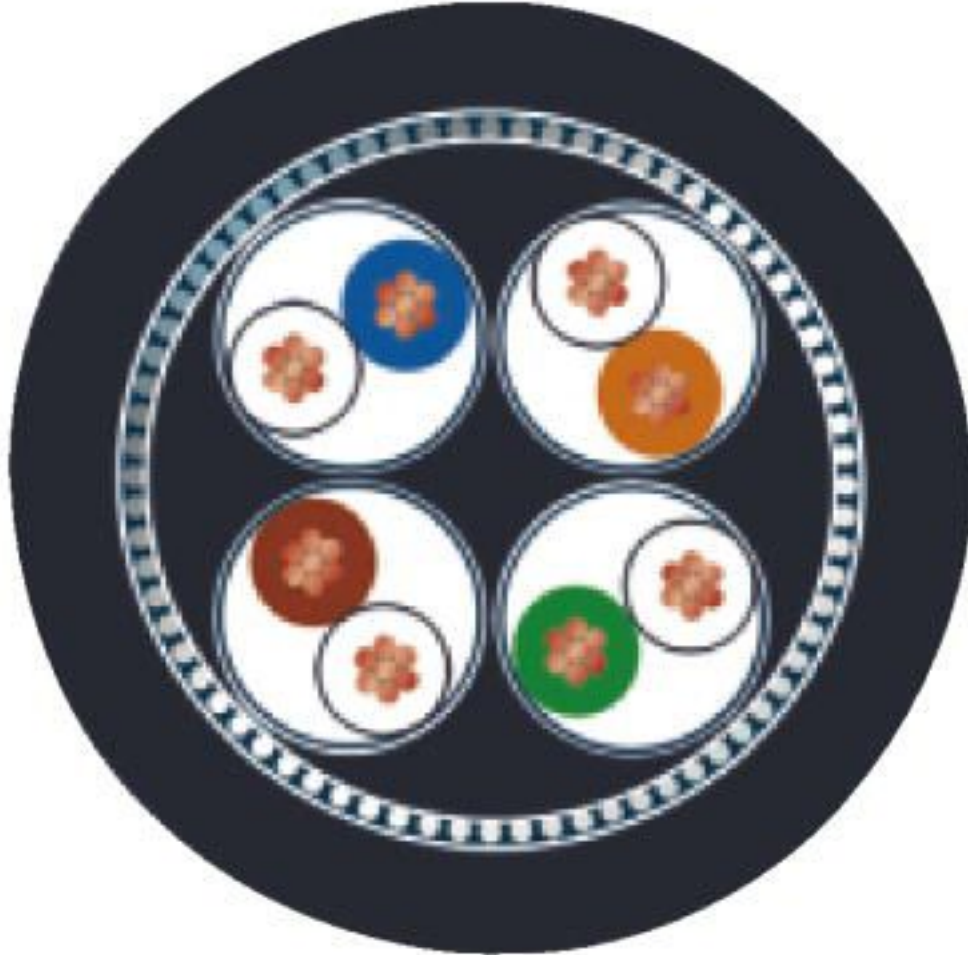
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Schematic diagram

Pin assignment of M12 plug, 8-pos., X-coded, pin side view

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Cable cross section

Ethernet BETAtrans® railway application CAT7 [94S]

Classifications

eCl@ss

eCl@ss 10.0.1	27060308
eCl@ss 4.0	24010400
eCl@ss 4.1	24010400
eCl@ss 5.0	19030300
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

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Classifications

ETIM

ETIM 4.0	EC000237
ETIM 5.0	EC002599
ETIM 6.0	EC001262
ETIM 7.0	EC001262

UNSPSC

UNSPSC 13.2	26121620
UNSPSC 18.0	26121604
UNSPSC 19.0	26121604
UNSPSC 20.0	26121604
UNSPSC 21.0	26121604

Accessories

Accessories

Cable connector

Conductor connectors - SACC-CC-8QO SH ETH - 1414412

Cable connector, Ethernet CAT6$_A$ (10 Gbps), 8-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)

Data connector - SACC-MSX-8QO SH ETH SCO - 1411043

Data connector, Ethernet CAT6$_A$ (10 Gbps), 8-position, halogen-free, shielded, Plug straight M12 SPEEDCON, Coding: X, Insulation displacement connection, knurl material: Zinc die-cast, nickel-plated, external cable diameter 5 mm ... 9.7 mm

Data connector - SACC-FSX-8QO SH ETH SCO - 1414586

Data connector, Ethernet CAT6$_A$ (10 Gbps), 8-position, halogen-free, shielded, Socket straight M12 SPEEDCON, Coding: X, Insulation displacement connection, knurl material: Zinc die-cast, nickel-plated, external cable diameter 5 mm ... 9.7 mm

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Accessories

Data connector - SACC-M12MSX-8CT-CL SH - 1422844

Data connector, Ethernet/PROFINET CAT6$_A$ (10 Gbps), 8-position, shielded, Plug straight M12, Coding: X, Crimp connection, knurl material: Zinc die-cast, nickel-plated, external cable diameter 6.5 mm ... 10 mm, without crimp contacts

Data connector - SACC-M12MRX-8CT-CL SH - 1422845

Data connector, Ethernet/PROFINET CAT6$_A$ (10 Gbps), 8-position, shielded, Plug angled M12, Coding: X, Crimp connection, knurl material: Zinc die-cast, nickel-plated, external cable diameter 6.5 mm ... 10 mm, without crimp contacts

Corrugated pipe

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

Polyamide protective hose, inflammability class V0, UV resistant

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

Polyamide protective hose, inflammability class HB, UV resistant

Cutting tools

Cable-cutting tool - CUTFOX 12 - 1212128

Cable cutter, for copper and aluminum up to 12 mm diameter (up to 35 mm²)

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Accessories

Diagonal cutter - CUTFOX-S VDE - 1212207

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

Data plug

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, color: green

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

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

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

Protective cap

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Accessories

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

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

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

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

Stripping tool

Stripping tool - WIREFOX-E 4 - 1212704

Stripping tool, for cables and conductors (especially for rubber and silicone insulations) from 0.1 - 4 mm², self-adjusting, stripping length of up to 18 mm, cutting capacity of up to 10 mm² stranded/1.5 mm² solid, replaceable stripping blade

Torque tool

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Accessories

Torque screwdriver - TSD 04 SAC - 1208429

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

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

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

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

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

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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