

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



1415599

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Network cable, Ethernet CAT6_A (10 Gbps), 8-position halogen-free, shielded, Plug straight M12 SPEEDCON, coding: X / IP65, on free cable end, cable length: 2 m

Your advantages

- Easy and safe: 100 % electrically tested plug-in components
- 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

Commercial data

Item number	1415599
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	BF1
Product key	BF1CMJ
Catalog page	Page 404 (C-2-2019)
GTIN	4055626047669
Weight per piece (including packing)	142.16 g
Weight per piece (excluding packing)	134.76 g
Customs tariff number	85444210
Country of origin	PL

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Technical data

Product properties

Product type	Data cable preassembled
Sensor type	Ethernet
Number of positions	8
Application	Railway applications
No. of cable outlets	1
Shielded	yes
Coding	X

Interfaces

Bus system	Ethernet
Signal type/category	Ethernet CAT6 _A , 10 Gbps

Signaling

Status display	No
Status display present	No

Electrical properties

Nominal voltage U_N	48 V AC
	60 V DC
Nominal current I_N	0.5 A
Transmission medium	Copper

Connector

Connection 1

Type	Plug straight M12 SPEEDCON / IP65
Number of positions	8
Locking type	SPEEDCON
Coding type	X (Data)
Handle color	black
Material	CuZn (Contact)
	Ni/Au (Contact surface)
	TPU (Contact carriers)
	PA 6.6 (Grip)
	Zinc die-cast, nickel-plated (Screw connection)
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)
Insertion/withdrawal cycles	≥ 100
Contact resistance	≤ 5 mΩ
Insulation resistance	≥ 100 MΩ
Tightening torque	0.4 Nm

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

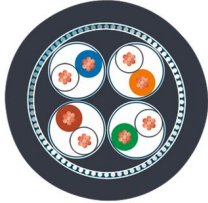
Connection 2

Type	free cable end
Stripping length of the sheath (free conductor end)	0.5 mm

Cable/line

Cable length	2 m
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Ethernet BETAtrans[®] railway application CAT7 [94S]

Dimensional drawing	
Cable weight	59 kg/km
Copper weight	28 kg/km
Number of positions	8
Shielded	yes
Cable type	Ethernet BETAtrans [®] railway application CAT7 [94S]
Conductor structure	4x2xAWG26/7; S/FTP
Signal runtime	4.4 ns/m
Signal speed	0.78 c
Conductor structure signal line	7x 0.16 mm
AWG signal line	26
Conductor cross section	4x 2x 0.14 mm ²
Wire diameter incl. insulation	1.05 mm ±0.1 mm
External cable diameter	6.6 mm ±0.2 mm
Outer sheath, material	PE-X
External sheath, color	black
Conductor material	Tin-plated Cu litz wires
Material wire insulation	Cell PE
Single wire, color	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
Max. conductor resistance	≤ 145 Ω/km
Insulation resistance	≥ 5 GΩ*km
Coupling resistance	5.00 mΩ/m (at 10 MHz)
Wave impedance	100 Ω ±5 Ω (at 100 MHz)

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Working capacitance	44 nF (per kilometer)
Nominal voltage, cable	125 V AC (U ₀)
Test voltage Core/Core	1000 V AC (50 Hz, 1 min.)
Test voltage Core/Shield	1000 V AC (50 Hz, 1 min.)
Minimum bending radius, fixed installation	6 x D
Smallest bending radius, fixed installation	40 mm
Tensile strength	≤ 60 N (temporary) ≤ 15 N (Permanent)
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) 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)
Return attenuation (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)

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	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)
	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)
Shield 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)
60 dB (up to 1000 MHz)	
Halogen-free	in accordance with EN 50267-2-1

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	in accordance with EN 60684-2
Flame resistance	in accordance with EN 60332-1-2
	EN 60332-3-25
	in accordance with ISO 14572 5.21 (UN ECE-R 118.01)
Concentration of fumes	EN 61034-2
Resistance to oil	in accordance with EN 50306-4, 72 hours at 100°C, IRM 902
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
Other resistance	PN-K-02511 (Class A)
	UIC 564-2 (Class A)
	Resistant to fuel (in accordance with EN 50306-4, 168 hours at 70°C, IRM 903)
	Resistant to ozone (in accordance with EN 50306-4, 72 hours at 40°C, method B, volumetric concentration of 200 x 10 ⁻⁶)
Special properties	HL1-HL3
Ambient temperature (operation)	-40 °C ... 80 °C (cable, fixed installation)

Environmental and real-life conditions

Ambient conditions

Degree of protection	IP65/IP67
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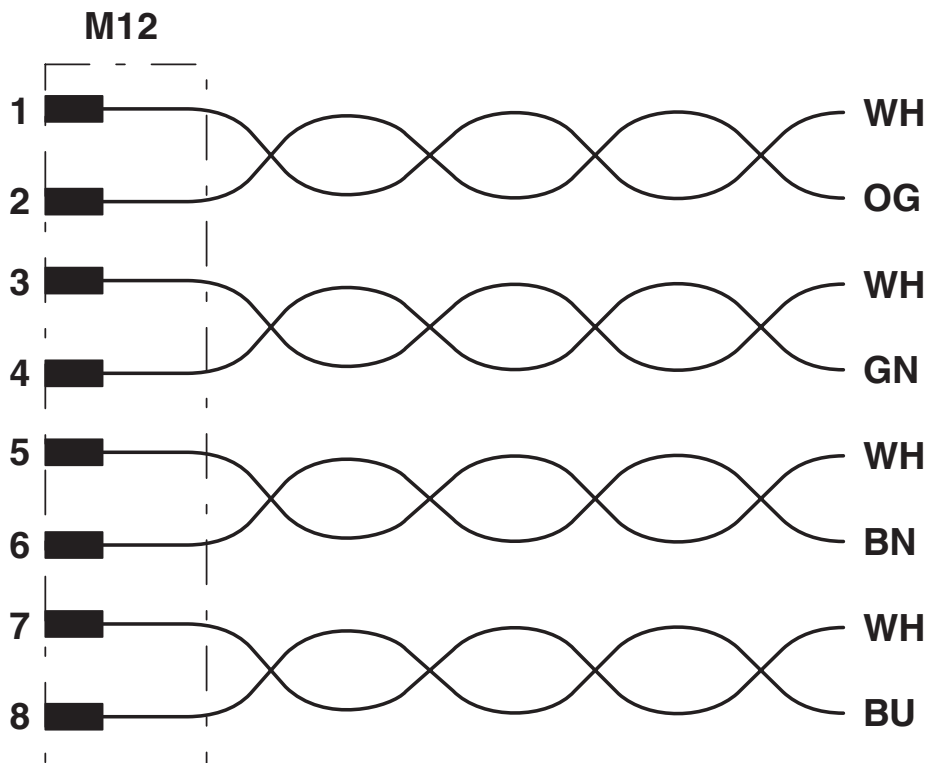
Standards and regulations

M12

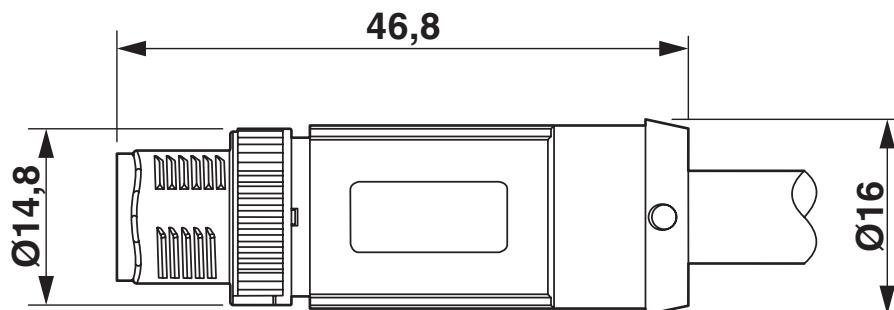
Standard designation	M12 connector
Standards/specifications	IEC 61076-2-109
Standard designation	Shock, vibration
Standards/specifications	EN 50155

Drawings

Circuit diagram



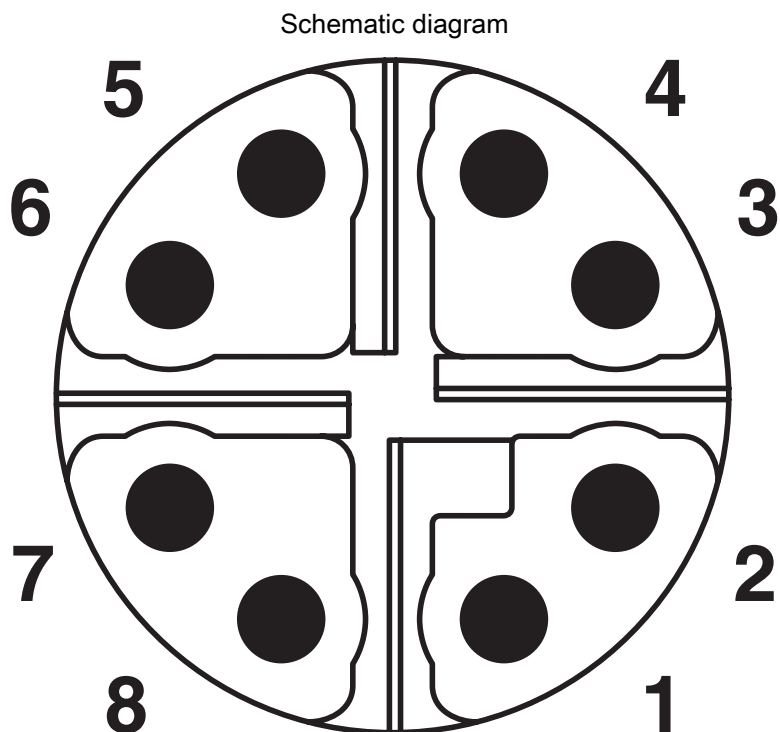
Dimensional drawing



M12 SPEEDCON plug, straight, shielded

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

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Classifications

ECLASS

ECLASS-11.0	27060307
ECLASS-12.0	27060307
ECLASS-13.0	27060307

ETIM

ETIM 9.0	EC001855
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UNSPSC

UNSPSC 21.0	26121600
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Environmental product compliance

REACH SVHC	Dechlorane Plus
China RoHS	Environmentally friendly use period: unlimited = EFUP-e
	No hazardous substances above threshold values

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Accessories

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

1422884

<https://www.phoenixcontact.com/in/products/1422884>



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

WP-PA HF 13,0 BK - Protective hose

3240681

<https://www.phoenixcontact.com/in/products/3240681>



Protective hose, material: PA 6, UV-resistant: yes, flexible, degree of protection: IP68, color: black, flammability rating in acc. with UL 94: V0, inner diameter: 10 mm, Total length: 50 m

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

3240839

<https://www.phoenixcontact.com/in/products/3240839>



Protective hose, material: PA 6, UV-resistant: yes, flexible, degree of protection: IP68, color: black, flammability rating in acc. with UL 94: HB, inner diameter: 10 mm, Total length: 50 m

SACC-M12MSX-8QO SH ETH - Data connector

1411043

<https://www.phoenixcontact.com/in/products/1411043>



Data connector, Ethernet CAT6_A (10 Gbps), 8-position, halogen-free, shielded, Plug straight M12, coding: X, Insulation displacement connection, knurl material: Zinc die-cast, nickel-plated, external cable diameter 5 mm ... 9.7 mm

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SACC-M12FSX-8QO SH ETH - Data connector

1414586

<https://www.phoenixcontact.com/in/products/1414586>



Data connector, Ethernet CAT6_A (10 Gbps), 8-position, halogen-free, shielded, Socket straight M12, coding: X, Insulation displacement connection, knurl material: Zinc die-cast, nickel-plated, external cable diameter 5 mm ... 9.7 mm

SACC-CC-8QO SH ETH - Conductor connectors

1414412

<https://www.phoenixcontact.com/in/products/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

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

1422844

<https://www.phoenixcontact.com/in/products/1422844>



Data connector, Ethernet CAT6_A (10 Gbps), PROFINET CAT6_A (10 Gbps), 8-position, shielded, Plug straight M12, coding: X, Crimp connection, knurl material: Zinc die-cast, tin-plated, external cable diameter 6.5 mm ... 10 mm, without crimp contacts

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

1422845

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Data connector, Ethernet CAT6_A (10 Gbps), PROFINET CAT6_A (10 Gbps), 8-position, shielded, Plug angled M12, coding: X, Crimp connection, knurl material: Zinc die-cast, tin-plated, external cable diameter 6.5 mm ... 10 mm, without crimp contacts

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

1421607

<https://www.phoenixcontact.com/in/products/1421607>



RJ45 connector, design: RJ45, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5, material: Metal, connection method: Insulation displacement connection, connection cross section: AWG 26- 24, cable outlet: straight, color: green, Ethernet

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

1421877

<https://www.phoenixcontact.com/in/products/1421877>



RJ45 connector, design: RJ45, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5, material: Metal, connection method: Insulation displacement connection, connection cross section: AWG 26- 24, cable outlet: angled, Ethernet

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

1421876

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RJ45 connector, design: RJ45, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5, material: Metal, connection method: Insulation displacement connection, connection cross section: AWG 26- 24, cable outlet: angled, Ethernet

PROT-M12 FS-PA-CHAIN - Sealing cap

1430873

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

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SAC-M12-EXCLIP-M - Locking clip

1558988

<https://www.phoenixcontact.com/in/products/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

CUTFOX 12 - Cable-cutting tool

1212128

<https://www.phoenixcontact.com/in/products/1212128>



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

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CUTFOX-S VDE - Diagonal cutter

1212207

<https://www.phoenixcontact.com/in/products/1212207>



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

VS-CABLE-STRIP-VARIO - Stripping tool

1657407

<https://www.phoenixcontact.com/in/products/1657407>

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



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WIREFOX-E 4 - Stripping tool

1212704

<https://www.phoenixcontact.com/in/products/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

MICROFOX-SP-1 - Diagonal cutter

1212487

<https://www.phoenixcontact.com/in/products/1212487>



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

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TSD 04 SAC - Torque screwdriver

1208429

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

TSD-M 1,2NM - Torque screwdriver

1212224

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

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TSD-M SAC-BIT ADAPTER - Adapter insert

1212600

<https://www.phoenixcontact.com/in/products/1212600>



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

SAC BIT M12-D15 - Tool

1208432

<https://www.phoenixcontact.com/in/products/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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