

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



1415595

<https://www.phoenixcontact.com/us/products/1415595>

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Network cable, Ethernet CAT6<sub>A</sub> (10 Gbps), 8-position halogen-free, shielded, Plug straight M12, coding: X SPEEDCON / IP65, on Plug straight M12, coding: X SPEEDCON / IP65, 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	1415595
Packing unit	1 pc
Minimum order quantity	1 pc
Note	Made to order (non-returnable)
Sales key	BF04
Product key	BF1CMJ
Catalog page	Page 404 (C-2-2019)
GTIN	4055626047645
Weight per piece (including packing)	163 g
Weight per piece (excluding packing)	151.9 g
Customs tariff number	85444290
Country of origin	PL

## 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 <sub>A</sub> , 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
Transmission characteristics (category)	CAT6 <sub>A</sub>

### Connector

#### Connection 1

Type	Plug straight M12 SPEEDCON / IP65
Number of positions	8
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
Number of positions	8
Insertion/withdrawal cycles	100
Locking type	SPEEDCON

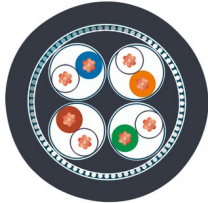
## Connection 2

Type	Plug straight M12 SPEEDCON / IP65
Number of positions	8
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
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	IP65
Locking type	SPEEDCON

## Cable/line

Cable length	2 m
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## Ethernet BETAtrans<sup>®</sup> railway application CAT7 [94S]

Dimensional drawing	
	
Cable weight	59 kg/km
Copper weight	28 kg/km
Number of positions	8
Shielded	yes

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Cable type	Ethernet BETrans <sup>®</sup> 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 <sup>2</sup>
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)
Working capacitance	44 nF (per kilometer)
Nominal voltage, cable	125 V AC (U <sub>o</sub> )
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
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-summed near end crosstalk attenuation (PSNEXT)	97 dB (with 1 MHz)
	96 dB (at 10 MHz)
	92 dB (at 100 MHz)

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	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 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)
Crosstalk attenuation (ACR)	27.5 dB (at 1000 MHz)
	26.9 dB (at 1100 MHz)
	26.3 dB (at 1200 MHz)
	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)
Power-summated crosstalk attenuation (PS-ACR)	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)
	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)

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	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
	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
	PN-K-02511 (Class A)
Other resistance	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 $200 \times 10^{-6}$
Special properties	HL1-HL3
Ambient temperature (operation)	-40 °C ... 80 °C (cable, fixed installation)

## Environmental and real-life conditions

### Ambient conditions

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Degree of protection	IP65/IP67
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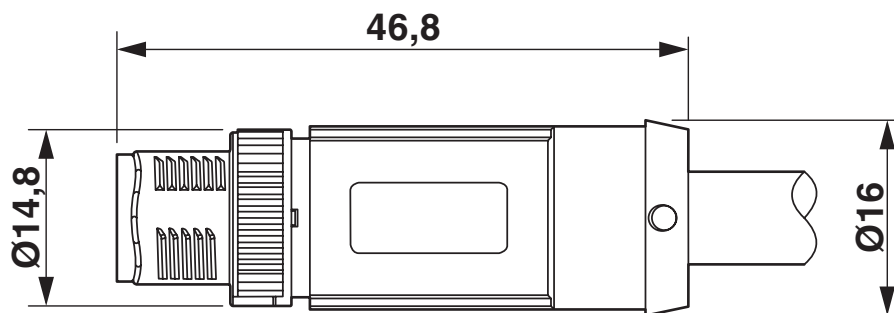
## Standards and regulations

### M12

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

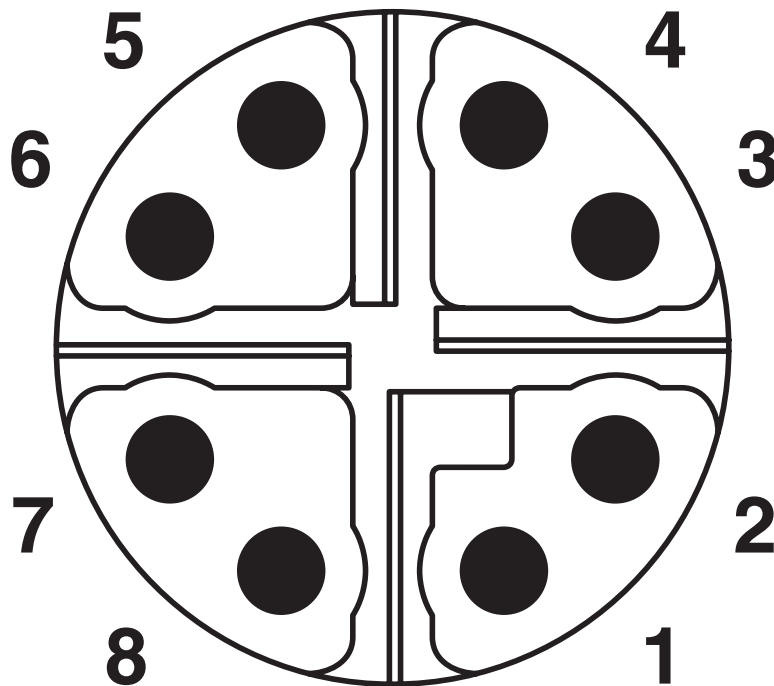
## Drawings

Dimensional drawing



M12 SPEEDCON plug, straight, shielded

Schematic diagram



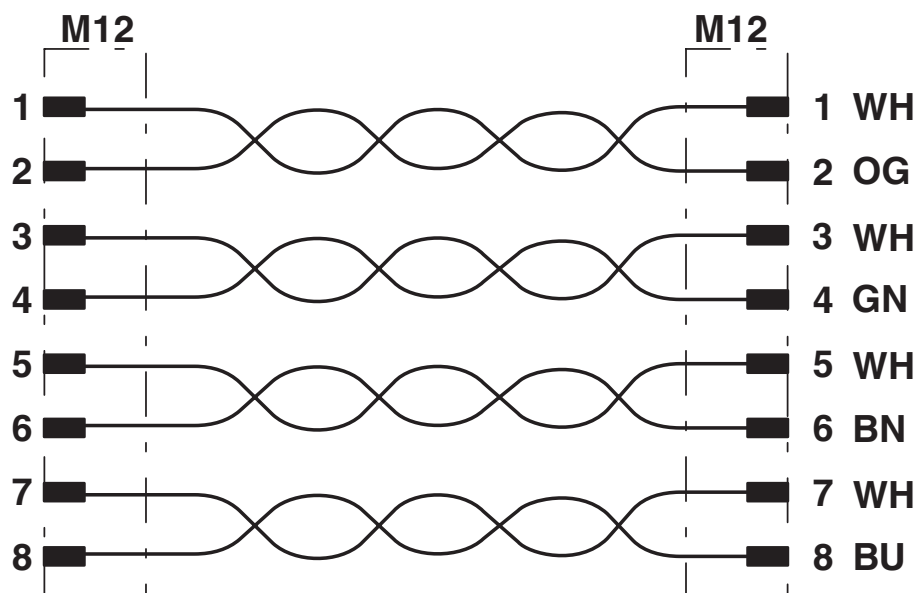
Pin assignment of M12 plug, 8-pos., X-coded, pin side view



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Circuit diagram



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## Approvals

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**EAC-RoHS**

Approval ID: RU D-DE.HB35.B.00387

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## Classifications

### ECLASS

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

### ETIM

ETIM 8.0	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

### TSD 04 SAC - Torque screwdriver

1208429

<https://www.phoenixcontact.com/us/products/1208429>



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

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

1212224

<https://www.phoenixcontact.com/us/products/1212224>



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/us/products/1212600>



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

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## SAC BIT M12-D15 - Tool

1208432

<https://www.phoenixcontact.com/us/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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## PROT-M12 FS-PA-CHAIN - Sealing cap

1430873

<https://www.phoenixcontact.com/us/products/1430873>

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/us/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



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