

# Network cable - NBC-MSX/ 2,0-94S/MSX SCO RAIL - 1415595

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Network cable, Ethernet CAT6<sub>A</sub> (10 Gbps), 8-position, PE-X halogen-free, black, shielded, Plug straight M12 SPEEDCON / IP67, coding: X, on Plug straight M12 SPEEDCON / IP67, coding: X, 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



## Key Commercial Data

Packing unit	1 pc
GTIN	 4 055626 047645
GTIN	4055626047645

## Technical data

### Dimensions

Length of cable	2 m
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### 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

# Network cable - NBC-MSX/ 2,0-94S/MSX SCO RAIL - 1415595

## Technical data

### General data

Number of positions	8
Signal type/category	Ethernet CAT6 <sub>A</sub> , 10 Gbps
Standards/regulations	M12 connector IEC 61076-2-109
	Shock, vibration EN 50155

### 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	≥ 100 MΩ
Insertion/withdrawal cycles	≥ 100
Torque	0.4 Nm
Ambient temperature (operation)	-25 °C ... 90 °C

### Characteristics head 2

Head type	Plug straight M12 SPEEDCON / IP67
No. of positions (pin connector pattern)	8
Coding	X (Data)
Color	black
	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	≥ 100 MΩ
Insertion/withdrawal cycles	≥ 100
Torque	0.4 Nm
Ambient temperature (operation)	-25 °C ... 90 °C

### Standards and Regulations

Standard designation	M12 connector
Standards/regulations	IEC 61076-2-109

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## Technical data

### Standards and Regulations

Standard designation	Shock, vibration
Standards/regulations	EN 50155

### Cable

Cable type	Ethernet for rail applications
Cable type (abbreviation)	94S
Signal type/category	Ethernet CAT7, 10 Gbps
Cable structure	4x2xAWG26/7; S/FTP
Conductor cross section	4x 2x 0.14 mm <sup>2</sup>
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	≤ 60 N (temporary) ≤ 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	≥ 5 GΩ*km
Conductor resistance	≤ 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)

## Network cable - NBC-MSX/ 2,0-94S/MSX SCO RAIL - 1415595

### Technical data

#### Cable

	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)
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)

## Network cable - NBC-MSX/ 2,0-94S/MSX SCO RAIL - 1415595

### Technical data

#### Cable

	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)
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 (U <sub>0</sub> )
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

# Network cable - NBC-MSX/ 2,0-94S/MSX SCO RAIL - 1415595

## Technical data

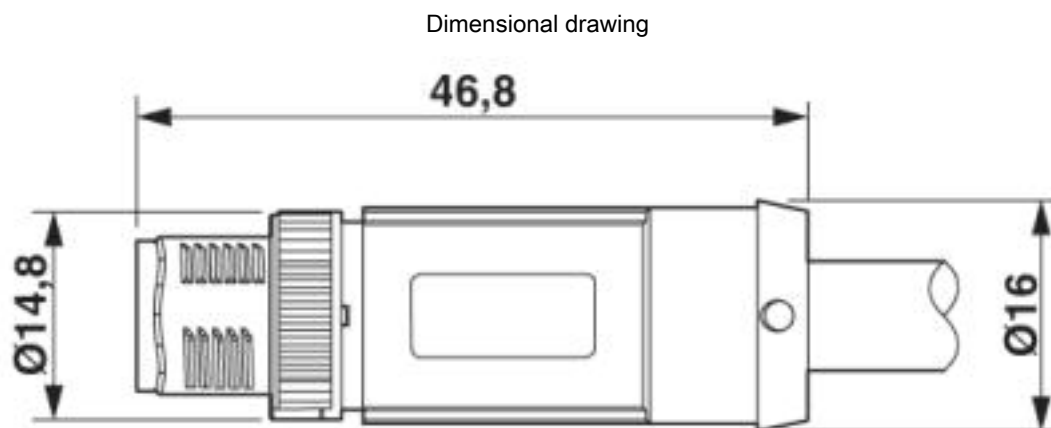
### Cable

	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)
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 x 10 <sup>-6</sup>
Concentration of fumes	EN 61034-2
Ambient temperature (operation)	-40 °C ... 80 °C (cable, fixed installation)

### Environmental Product Compliance

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

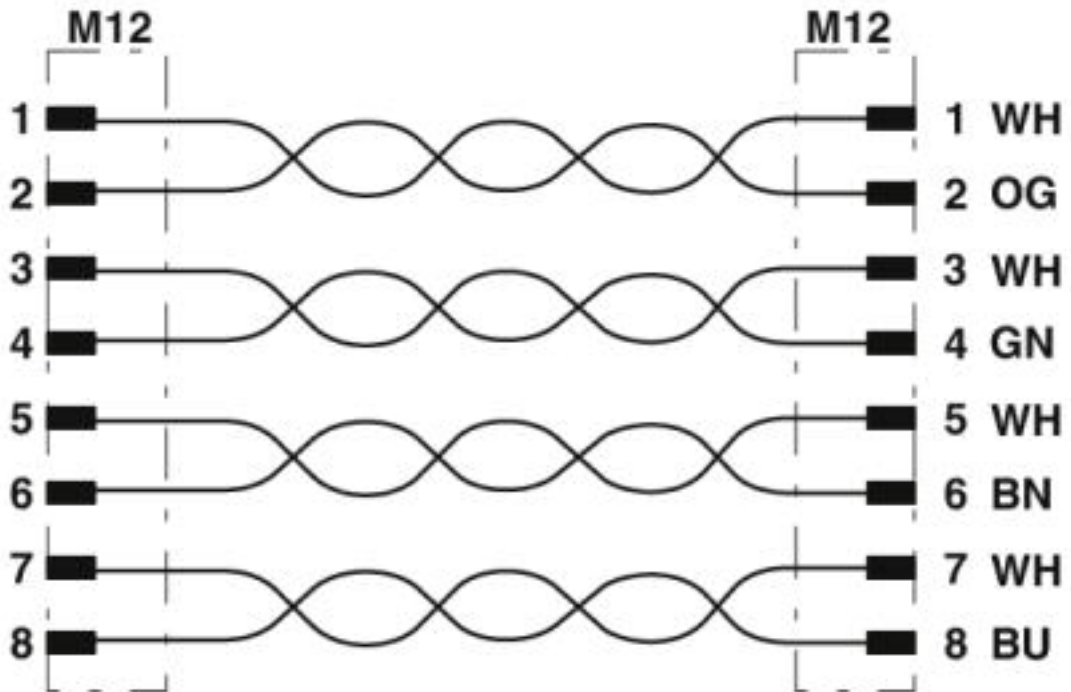
## Drawings



M12 SPEEDCON plug, straight, shielded

# Network cable - NBC-MSX/ 2,0-94S/MSX SCO RAIL - 1415595

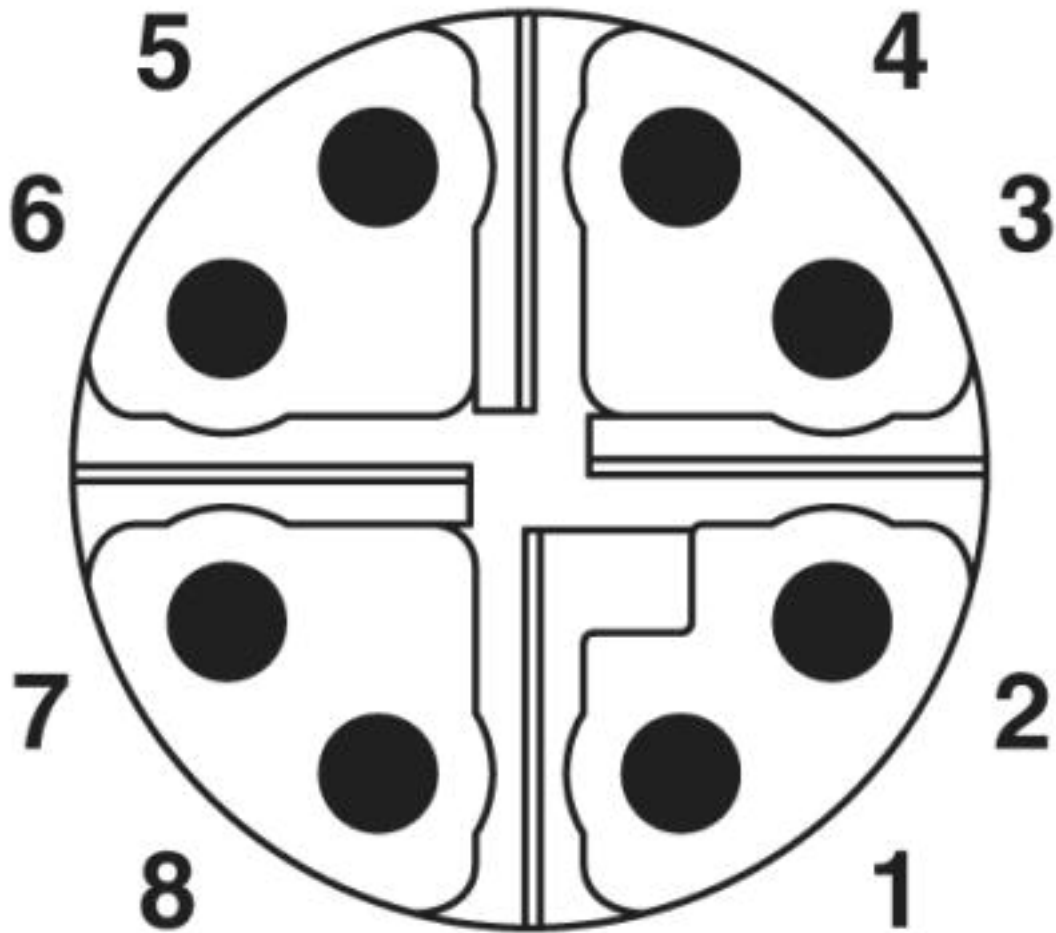
Circuit diagram



Contact assignment of the M12 plugs

# Network cable - NBC-MSX/ 2,0-94S/MSX SCO RAIL - 1415595

Schematic diagram

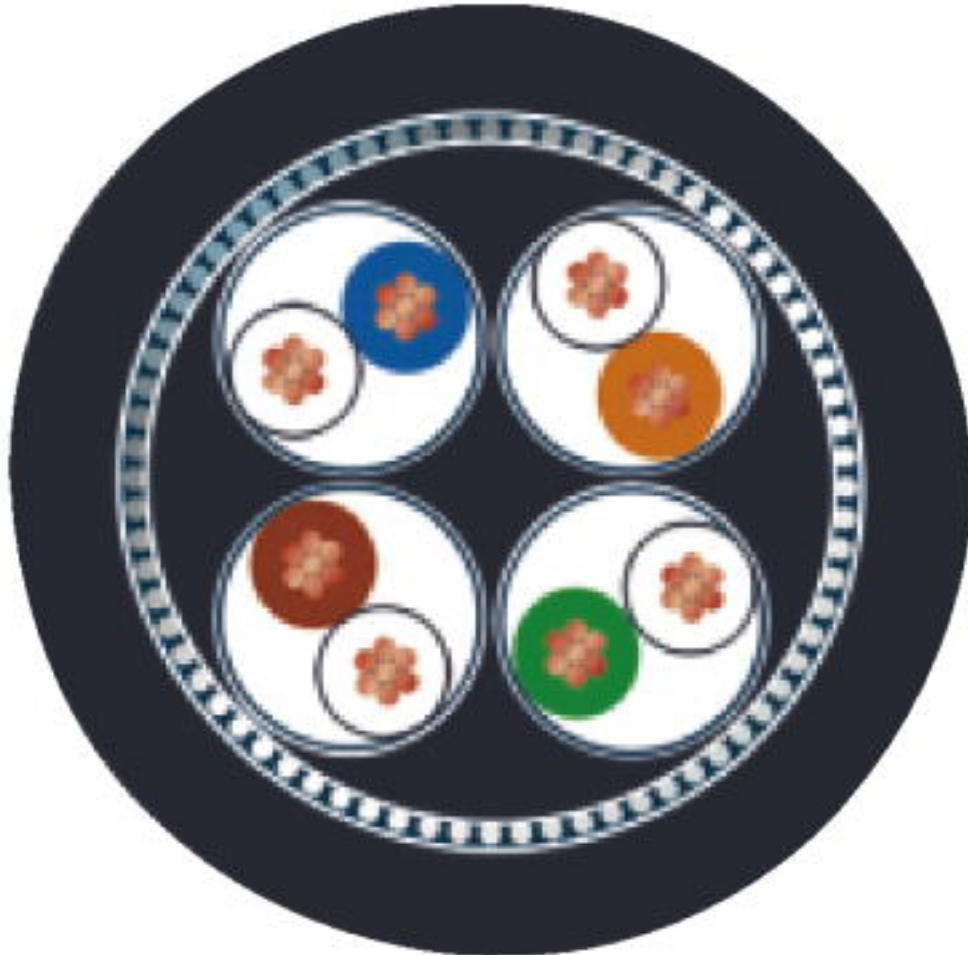


Pin assignment of M12 plug, 8-pos., X-coded, pin side view



## Network cable - NBC-MSX/ 2,0-94S/MSX SCO RAIL - 1415595

Cable cross section



Ethernet for rail applications [94S]

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