

## Network cable - NBC-MSD/ 9,5-937/FSD SCO - 1423134

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Network cable, PROFINET CAT5 (100 Mbps), 4-position, PE-X halogen-free, black, shielded, cable length: 9.5 m, Product tested according to customer specification/rail application



### Key Commercial Data

|              |                                                                                                         |
|--------------|---------------------------------------------------------------------------------------------------------|
| Packing unit | 1 pc                                                                                                    |
| GTIN         | <br>4 055626 326146 |
| GTIN         | 4055626326146                                                                                           |

### Technical data

#### Dimensions

|                 |       |
|-----------------|-------|
| Length of cable | 9.5 m |
|-----------------|-------|

#### General data

|                       |                                     |
|-----------------------|-------------------------------------|
| Rated current at 40°C | 4 A                                 |
| Rated voltage         | 48 V AC<br>60 V DC                  |
| Number of positions   | 4                                   |
| Signal type/category  | PROFINET CAT5 (IEC 11801), 100 Mbps |
| Standards/regulations | M12 connector IEC 61076-2-101       |
| Overvoltage category  | II                                  |
| Degree of pollution   | 3                                   |

#### Standards and Regulations

|                                        |                 |
|----------------------------------------|-----------------|
| Standard designation                   | M12 connector   |
| Standards/regulations                  | IEC 61076-2-101 |
| Flammability rating according to UL 94 | V0              |

#### Cable

|            |                               |
|------------|-------------------------------|
| Cable type | PROFINET railway applications |
|------------|-------------------------------|

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## Technical data

### Cable

|                                                      |                                                             |
|------------------------------------------------------|-------------------------------------------------------------|
| Cable type (abbreviation)                            | 939                                                         |
| Signal type/category                                 | PROFINET CAT5 (IEC 11801), 100 Mbps                         |
| Cable structure                                      | 1x4xAWG22/7; SF/TQ                                          |
| Conductor cross section                              | 4x 0.34 mm <sup>2</sup>                                     |
| AWG signal line                                      | 22                                                          |
| Conductor structure signal line                      | 7x 0.25 mm                                                  |
| Core diameter including insulation                   | 1.4 mm ±0.1 mm                                              |
| Wire colors                                          | white-blue, orange-yellow                                   |
| Overall twist                                        | Star quad                                                   |
| Shielding                                            | Aluminum-lined polyester foil, tinned copper braided shield |
| External sheath, color                               | black                                                       |
| Outer sheath thickness                               | 1 mm                                                        |
| External cable diameter D                            | 6.6 mm ±0.2 mm                                              |
| Minimum bending radius, fixed installation           | 5 x D                                                       |
| Minimum bending radius, flexible installation        | 6 x D                                                       |
| Tensile strength GRP                                 | ≤ 60 N (temporary)                                          |
|                                                      | ≤ 15 N (Permanent)                                          |
| Cable weight                                         | 71 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                                 | ≤ 54.4 Ω/km                                                 |
| Cable capacity                                       | 44 nF/km (core-core)                                        |
| Wave impedance                                       | 100 Ω ±5 Ω (f = 100 MHz)                                    |
| Near end crosstalk attenuation (NEXT)                | 76 dB (with 1 MHz)                                          |
|                                                      | 71 dB (at 4 MHz)                                            |
|                                                      | 64 dB (at 10 MHz)                                           |
|                                                      | 60 dB (at 16 MHz)                                           |
|                                                      | 56 dB (at 31.25 MHz)                                        |
|                                                      | 52 dB (at 62.5 MHz)                                         |
|                                                      | 48 dB (at 100 MHz)                                          |
|                                                      | 45 dB (at 155 MHz)                                          |
|                                                      | 42 dB (at 200 MHz)                                          |
| Power-summed near end crosstalk attenuation (PSNEXT) | 73 dB (with 1 MHz)                                          |
|                                                      | 68 dB (at 4 MHz)                                            |
|                                                      | 61 dB (at 10 MHz)                                           |
|                                                      | 57 dB (at 16 MHz)                                           |
|                                                      | 53 dB (at 31.25 MHz)                                        |
|                                                      | 49 dB (at 62.5 MHz)                                         |

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## Technical data

### Cable

|                                  |                                                                |
|----------------------------------|----------------------------------------------------------------|
|                                  | 45 dB (at 100 MHz)                                             |
|                                  | 42 dB (at 155 MHz)                                             |
|                                  | 39 dB (at 200 MHz)                                             |
| Attenuation                      | 1.5 dB (with 1 MHz)                                            |
|                                  | 3.3 dB (at 4 MHz)                                              |
|                                  | 5.3 dB (at 10 MHz)                                             |
|                                  | 6.9 dB (at 16 MHz)                                             |
|                                  | 9.9 dB (at 31.25 MHz)                                          |
|                                  | 14.5 dB (at 62.5 MHz)                                          |
|                                  | 18.8 dB (at 100 MHz)                                           |
|                                  | 23.6 dB (at 155 MHz)                                           |
|                                  | 27.3 dB (at 200 MHz)                                           |
| Return loss (RL)                 | 25 dB (with 1 MHz)                                             |
|                                  | 25 dB (at 4 MHz)                                               |
|                                  | 28 dB (at 10 MHz)                                              |
|                                  | 28 dB (at 16 MHz)                                              |
|                                  | 27 dB (at 31.25 MHz)                                           |
|                                  | 26 dB (at 62.5 MHz)                                            |
|                                  | 25 dB (at 100 MHz)                                             |
|                                  | 25 dB (at 155 MHz)                                             |
|                                  | 23 dB (at 200 MHz)                                             |
| Signal speed                     | 0.75 c                                                         |
| Signal runtime                   | 4.4 ns/m                                                       |
| Shield attenuation               | 60 dB (up to 1000 MHz)                                         |
| Coupling resistance              | < 13.00 mΩ/m (f = 1 MHz)                                       |
|                                  | < 8.00 mΩ/m (f = 10 MHz ... 100 MHz)                           |
| Cable impedance                  | 100 Ω ±15 Ω (f = 0.5 MHz ... 3 MHz)                            |
| Nominal voltage, cable           | 125 V                                                          |
| 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 (Risk level HL1 - HL3)                              |
|                                  | 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                                                     |
|                                  | UIC 564-2 (Class A)                                            |
| Flame resistance                 | according to EN 60332-1-2                                      |

Network cable - NBC-MSD/ 9,5-937/FSD SCO - 1423134

Technical data

Cable

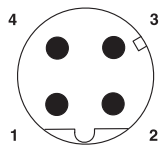
|                                 |                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------|
|                                 | according to EN 50266-2-5                                                                                           |
|                                 | 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 ... 85 °C (cable, fixed installation)                                                                        |
|                                 | -25 °C ... 70 °C (cable, flexible installation)                                                                     |

Environmental Product Compliance

|            |                                                         |
|------------|---------------------------------------------------------|
| China RoHS | Environmentally friendly use period: unlimited = EFUP-e |
|            | No hazardous substances above threshold values          |

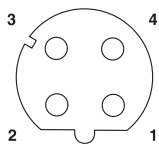
Drawings

Schematic diagram



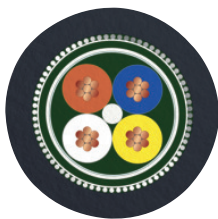
Pin assignment M12 male connector, 4-pos., D-coded, male side

Schematic diagram



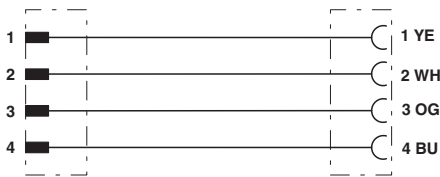
Pin assignment M12 socket, 4-pos., D-coded, female side

Cable cross section



PROFINET railway applications [939]

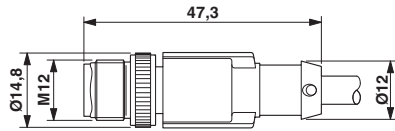
Circuit diagram



Contact assignment of the M12 connector and the M12 socket

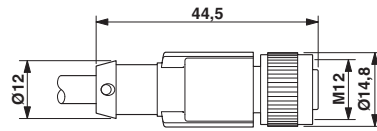
## Network cable - NBC-MSD/ 9,5-937/FSD SCO - 1423134

Dimensional drawing



M12 SPEEDCON plug, straight, shielded

Dimensional drawing



Socket M12-SPEEDCON, straight, shielded

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