

Ha-VIS EtherRail® flexible data cable, 4-wire, Cat. 5 / 5e



Advantages

- Transmission of Fast Ethernet 100Base-T acc. to IEEE 802.3
- Suitable for data cabling in rail vehicles and buses
- Fire protection acc. EN 45 545-1, -2 and -5, flame retardant and heat resistant acc. to DIN 5510 (1-4) and EN 50 264-1
- Temperature range: -40 °C ... +90 °C
- UV resistant
- RoHS conform, halogen free LSZH
- Additionally certified acc. to DIN, NFF, BS and ASTM

Application

This data cable was especially designed for installation within rail vehicles and buses. The cable fulfils the fire protection requirements according to the international standards for railway vehicles and buses and is suitable for operation over a wide temperature range. Cable design, material and compounds as well as processing (electron beam cross-linking) follow the basic requirements of the European standardisation for railway applications EN 45545-1, -2 and -5* (Railway applications - Fire protection on railway vehicles). The robust star quad cable construction guarantees a reliable data transmission up to 100 Mbit/sec. The cable has been designed to be compatible with products from HARTING Han® M12 Crimp, RJ Industrial RJ45 (IP 20 and IP 65 / IP 67) PushPull and Han® 3 A ranges.

Description

Ha-VIS EtherRail® flexible
data cable. star quad
1x4xAWG 22/7, Category 5 / 5e

Sheath material: Elastomer. elec-
tron beam cross-linked
Colour: black

Cable sheath diameter:
(6.6 +/- 0.2) mm

Transmission performance:
Cat. 5 / 5e / transmission class D
up to 100 MHz according
ISO/IEC 11 801 and EN 50 173-1

Transmission rate: 10/100 Mbit/s

Operating temperature range:
-40 °C ... +90 °C

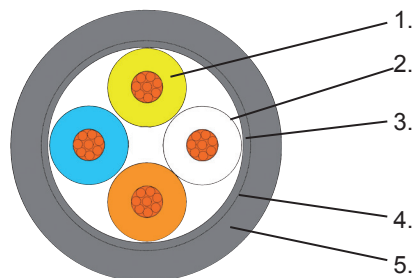
Cable weight: 71 kg/km

Order information:

10 m ring	09 45 600 0168
100 m ring	09 45 600 0108
500 m drum	09 45 600 0118
1000 m drum	09 45 600 0128

Order number

Drawing



1. Conductor

4 x stranded copper wire. tin-plated
AWG 22/7 x 0.25 mm
Insulation PE. Comp. 655, Ø 1.5 mm
colours: blue, yellow, white, orange

2. Interlayer

Polyester ribbon

3. Interlayer

Aluminium foil-clad polyester

4. Screening

tin-plated copper braid

5. Jacket

Elastomer electron beam cross-linked Comp 603

Technical characteristics

Mechanical features

minimum bending radius	Repeated bending: 12 x cable diameter Singular bending: 6 x cable diameter
Tensile strength	max. 100 N

Electrical characteristics at 20 °C

Coupling attanuation at 100 MHz	< 13 mOhm/m
Conductor resistance	max. 54.4 Ohm/km
Insulation resistance	min. 500 MOhm x km
Signal run time	5.3 ns/m
Characterisic impedance at 100 MHz	100 Ohm +/- 5 Ohm
Test voltage (wire/wire/screen rms 50 Hz for 1 min)	2000 V
Operating voltage	300 V

Chemical characteristics

Fire protection for railway vehicles

DIN 5510	Level 1 ... 4
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Flammability, smoke and toxicity (FST)

Vertical flame propagation on single cables	EN 60332-1-2	Carbonisation > 50 and ≤ 540 mm
Smoke density	EN 61034-2	transparency > 70 %
Toxicity of brand gases	EN 50305	ITC ≤ 3

Fire protection in railway vehicles

Halogen free	EN 50264-1	HCl and HBr < 0.5 %
	EN 50267-2-1	HF < 0.1 %
	EN 50684-2	pH > 4.3
Corrosiveness of brand gases	EN 50267-2-2	conductivity < 10 µs / mm

Material charateristics

Ozone resistance	EN 50264-3-1	72 h/40 °C, Procedere B Volume concentration 200x10 ⁻⁶
Oil resistance	EN 50264-3-1	72 h/100 °C, IRM 902
Fuel resistance	EN 50264-3-1	168 h/70 °C, IRM 903
Marginal fire load	DIN 51900	

Thermic features

Maximum conductor temperature	+90 °C
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Printing

“HARTING” Ha-VIS EtherRail® CAT 5 LSZH 4xAWG22/7
“Part-Number” “Chargecode” “Meter”

Weight

71 kg/km

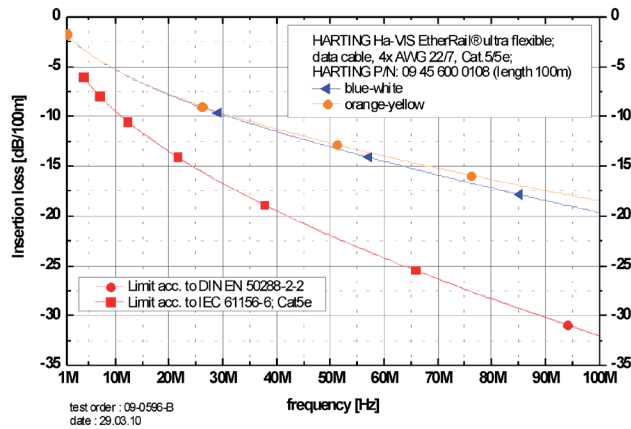
Copper number

3 kg/100 m

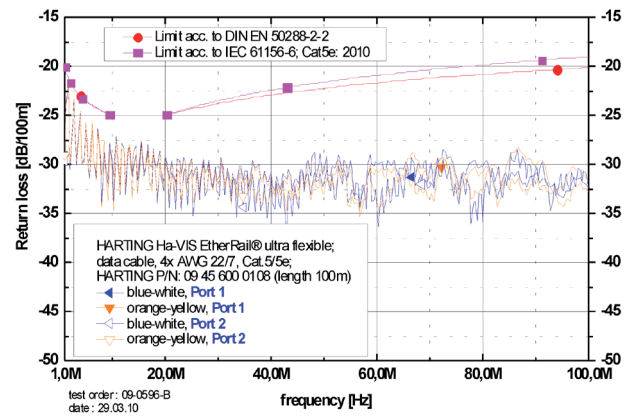
Technical characteristics, Transmission performance

Diagrams:

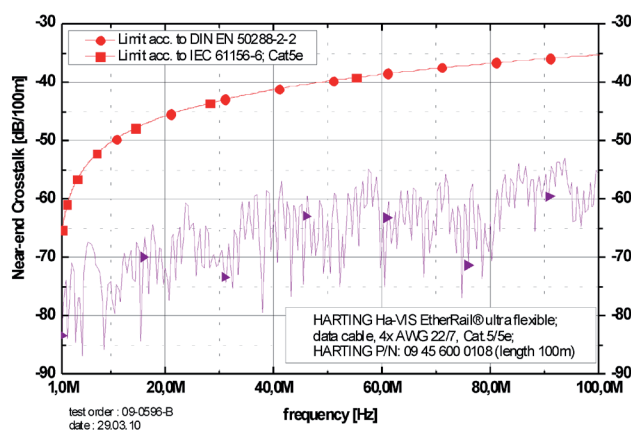
Attenuation:



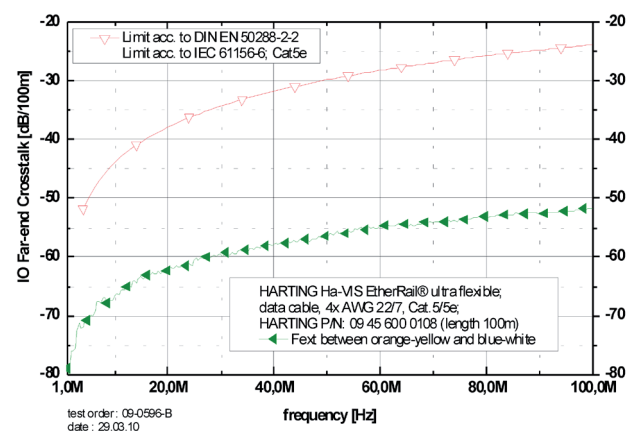
Return loss



Next



EL Fext



Additional Certifications

Transmission performance

Category 5 / 5e acc. to EN 50 288-2-1, IEC 61 156-6
acc. to ISO/IEC 11 801 and EN 50 173

Additionally acceptance tests / certificates

HARTING's Declaration of Conformity No.: EL ICPN 0004

Tested by MPA Dresden / Germany

- DIN EN 60 332-1: 2005-06

Vertical flame propagation on separated wires under defined conditions

Test Report No. 2011-B-1906/06.1

- DIN EN 60 332-3-25: 2010-08

Vertical flame propagation on bundles of cables burning under defined conditions

Test Report No. 2011-B-1909/07.1

- DIN EN 61 034-2: 2006-03

Smoke density of cables burning under defined conditions

Test Report No. 2011-B-1909/08.1

HARTING's Declaration of Conformity No.: EL ICPN 0003

Tested by ISSeP Liège / Belgium

- NF C 32-070: 2001-01

Cables of category C1 NF C 32,070

Test Report No. 2130-1/2011

- NF F 16-101: 1988-10

Reaction to fire - Cable classification

Test Report No. 2130-2/2011

- NF X 10-702: 1994

Smoke density testing

Test Report No. 2130-3/2011

- NF X 70-100: 2006-04

Analysis of pyrolysis and combustion gases

Test Report No. 2130-4/2011

- NF X 16-101: 1988-10

Smoke index - F classification

Test Report No. 2130-5/2011

HARTING's Declaration of Conformity No.: EL ICPN 0006

Tested by MPA Dresden / Germany

- BS 6853: 1999 Table 13, Annex D

Measurement of smoke density

Test Report No. 2011-B-1909/09.1

- BS 6853: 1999 Table 13, Annex D

Measurement under fire conditions, Flammability

Test Report No. 2011-B-1909/10.1

HARTING's Declaration of Conformity No.: EL ICPN 0006

Tested by Govmark Inc. New York / USA

- ASTM E 162

Surface flammability

Test Report No. 2-87105-0-

- ASTM E 662

Specific optical density and Smoke density

Test Report No. 2-87105-1-

- BSS 7239

Toxicity of gases FL & NF (ASTM F814)

Test Report No. 2-87105-2



HARTING RJ Industrial® RJ45 plug connector overmoulded



General Information

Design	RJ45 acc. to IEC 60 603-7
No. of contacts	4
Transmission performance	Category 5 acc. to ISO/IEC 11 801:2002 , performance class D
Transmission rate	10/100 Mbit/s
Nominal voltage	125 V AC
Rated impulse voltage	1.5kV
Rated current	4A@ 40 °C / every contact
Contact resistance	< 20 mOhm
Insulation resistance	>500 Mohm
Protection	IP 20
Mating cycles	> 750
Termination technology	isolation displacement connection (IDC)

Shock resistance (no contact disturbance > 1µs) 30g/11ms, 3 shocks/axis + direction; 5g/30ms 3 shocks/axis+ direction

Vibration resistance - sinus vibration 5-500Hz, 2g, 0.75mm, 2h/axis
(no contact disturbance > 1µs) - random vibration DIN EN 61 373 class 1 cat B 7.9m/s²

Temperature range -40 °C...+70 °C (temperature class Tx acc. EN 50 155)

RoHS - compliant Yes

Leadfree Yes

Insulator material Polyamide, UL 94 V-0

Color black

Material group acc. IEC 60112 CTI 600

Contact material

Contact material Copper alloy

Plating contact zone Ni/ Au

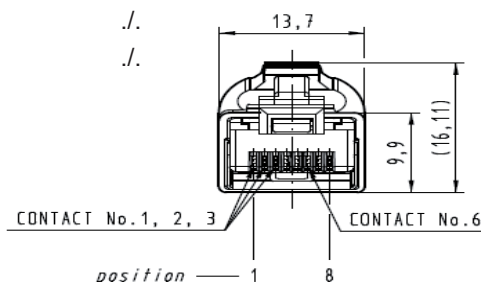
Assembly instructions

recommended tightening torque ./.

for screw/ nut ./.

width across flats ./.

Mating face acc. IEC 60603-7



Cable information

Cable type	1x4xAWG22/7
Cable sheath diameter	6.6 ±0,2 mm
Colour	black
Wire construction	4 x stranded copper wire, tin-plated, AWG 22/7 x 0.25mm
Wire insulation	Insulation PE. Comp. 655, Ø 1.5 mm
cable jacket material	Elastomer. electron beam cross-linked Comp 603
min. bending radius repating bending	12 x cable diameter
min. bending radius singlar bending	6 x cable diameter
Transmission performance	Category 5/5e acc. to EN 50 288-2-1, IEC 61 156-6 acc. to ISO/IEC 11 801 and EN 50 173
Transmission rate	10/100 Mbit/s

HARTING M12 circular connector, D-coded, overmoulded



HARTING M12 circular connector, D-coded, overmoulded



General Information

Nominal voltage	60 V DC
Design	IEC 61 076-2-101 D-coded
No. of contacts	4
Rated impulse voltage	2.5kV
Contact resistance	10 mOhm
Insulation resistance	>500 Mohm
Rated current	4A@ 40 °C / every contact
Temperature range moveable cable	-40 °C...+85 °C
Temperature range fixed cable	-40 °C...+85 °C
Pollution degree	3
Protection	IP 65/67
Insertion and withdrawal force 2 ... 4pol	insertion 10N max. withdrawal 15N max.
Mating cycles	100
Transmission performance	Category 5 acc. to ISO/IEC 11 801
Transmission rate	10/100 Mbit/s
RoHS - compliant	Yes
Leadfree	Yes

Insulator material

Color	black
Material group acc. IEC 60112	CTI 600

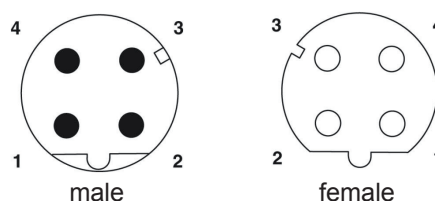
Contact material

Contact material	Copper alloy
Plating contact zone	Ni/ Au

Assembly instructions

recommended tightening torque	0.6 Nm
for screw/ nut	./.
width across flats	13 mm

Mating face acc. IEC 61076-2-101 D-coded



Cable information

Cable type	1x4xAWG22/7
Cable sheath diameter	6.6 ±0,2 mm
Colour	black
Wire construction	4 x stranded copper wire, tin-plated, AWG 22/7 x 0.25mm
Wire insulation	Insulation PE. Comp. 655, Ø 1.5 mm
cable jacket material	Elastomer. electron beam cross-linked Comp 603
min. bending radius repating bending	12 x cable diameter
min. bending radius singlar bending	6 x cable diameter
Transmission performance	Category 5/5e acc. to EN 50 288-2-1, IEC 61 156-6 acc. to ISO/IEC 11 801 and EN 50 173
Transmission rate	10/100 Mbit/s

Cable type	1x4xAWG22/19
Cable sheath diameter	7.4 ±0,1 mm
Colour	black
Wire construction	4 x stranded copper wire, tin-plated, AWG 22/19 x 0.16 mm
Wire insulation	Insulation PE. Comp. 655, Ø 1.98 mm
cable jacket material	Elastomer. electron beam cross-linked Comp 603
min. bending radius repating bending	12 x cable diameter
min. bending radius singlar bending	6 x cable diameter
Transmission performance	Category 5/5e acc. to EN 50 288-2-1, IEC 61 156-6 acc. to ISO/IEC 11 801 and EN 50 173
Transmission rate	10/100 Mbit/s