



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

### Advantages

- Transmission of Fast Ethernet 100Base-T acc. to IEEE 802.3
- Suitable for data cabling between coaches and in rail vehicles
- Fire protection acc. EN 45545-1, -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 the cabling connection between coaches but also 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\*. 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-Quintax® and Han® M12 Crimp contact ranges which can be used for data cabling connections between coaches.

#### Description

Ha-VIS EtherRail® ultra flexible data cable. star quad  
1x4xAWG 22/19, category 5 / 5e

Sheath material: Elastomer, electron beam cross-linked  
Colour: black

Cable sheath diameter:  
(7.4 +/- 0.1) mm

Transmission performance:  
Categorie 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

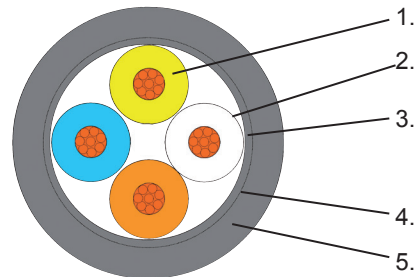
Cable weight: 77 kg/km

#### Order information:

10 m ring	09 45 600 0188
100 m ring	09 45 600 0138
500 m drum	09 45 600 0148
1000 m drum	09 45 600 0158

#### Part number

#### Drawing



- 1. Conductor**  
4 x stranded copper wire. tin-plated  
AWG 22/19 x 0.16 mm  
Insulation PE. Comp.655, Ø 1.98 mm  
colours: blue, yellow, white, orange
- 2. Interlayer**  
Aluminium foil-clad polyester
- 3. Screening**  
Tin-plated. copper braid and foil
- 4. Banding**  
Vylene ribbon
- 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 attenuation at 100 MHz	< 13 mOhm/m
Conductor resistance	max. 54.4 Ohm/km
Insulation resistance	min. 500 MOhm x km
Signal run time	5.4 ns/m
Characteristic 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
<b>Flammability, smoke and toxicity (FST)</b>		
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
<b>Fire protection in railway vehicles</b>	EN 50264-1	
Halogen free	EN 50267-2-1	HCl and HBr < 0.5 %
	EN 50684-2	HF < 0.1 %
Corrosiveness of brand gases	EN 50267-2-2	pH > 4.3 conductivity < 10 µs / mm

### Material characteristics

Ozone resistance	EN 50264-3-1	72 h/40 °C, Procedere B Volume concentration 200x10 <sup>-6</sup>
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 4xAWG22/19  
“Part-Number” “Chargecode” “Meter”

### Weight

77 kg/km

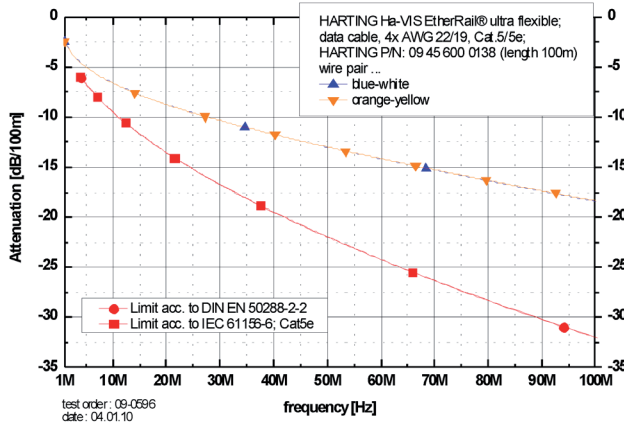
### Copper number

3.267 kg/100 m

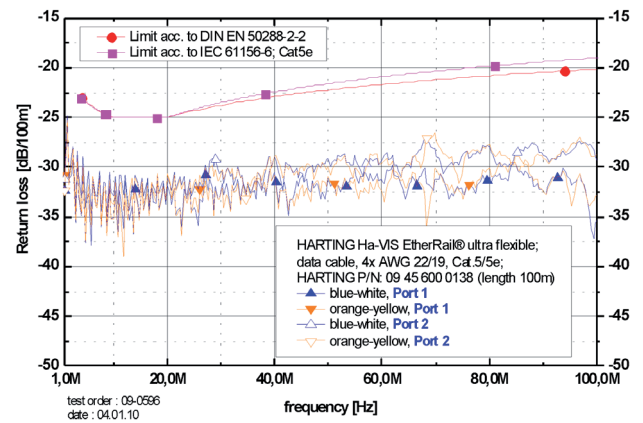
## Technical characteristics, Transmission performance

### Diagrams:

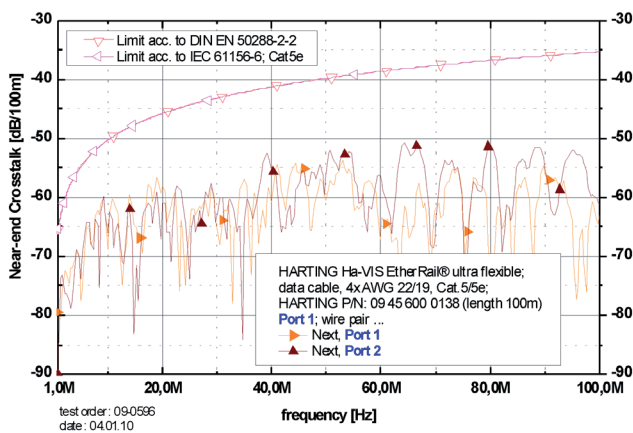
Attenuation:



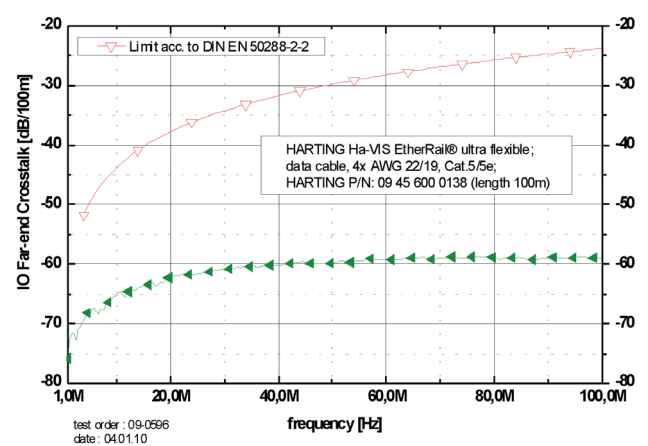
Return loss



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-1909/01.1
- DIN EN 60 332-3-25: 2010-08  
Vertical flame propagation on bundles of cables burning under defined conditions  
Test Report No. 2011-B-2727/01.1
- DIN EN 61 034-2: 2006-03  
Smoke density of cables burning under defined conditions  
Test Report No. 2011-B-1909/03.1

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. 2131-1/2011
- NF F 16-101: 1988-10  
Reaction to fire - Cable classification  
Test Report No. 2131-2/2011
- NF X 10-702: 1994  
Smoke density testing  
Test Report No. 2131-3/2011
- NF X 70-100: 2006-04  
Analysis of pyrolysis and combustion gases  
Test Report No. 2131-4/2011
- NF X 16-101: 1988-10  
Smoke index - F classification  
Test Report No. 2131-5/2011

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-2727/03.1
- BS 6853: 1999 Table 13, Annex D  
Measurement under fire conditions, Flammability  
Test Report No. 2011-B-2727/02.1

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

Tested by Govmark Inc. New York / USA

- AASTM E 162  
Surface flammability  
Test Report No. 2-87106-0-
- ASTM E 662  
Specific optical density and Smoke density  
Test Report No. 2-87106-1-
- BSS 7239  
Toxicity of gases FL & NF (ASTM F814)  
Test Report No. 2-87106-2

## 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

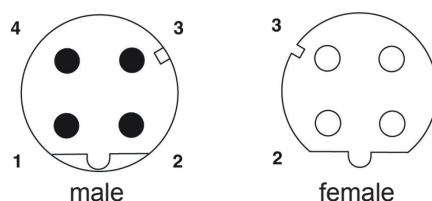
#### Contact material

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

<b>Cable type</b>	<b>1x4xAWG22/7</b>
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

<b>Cable type</b>	<b>1x4xAWG22/19</b>
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