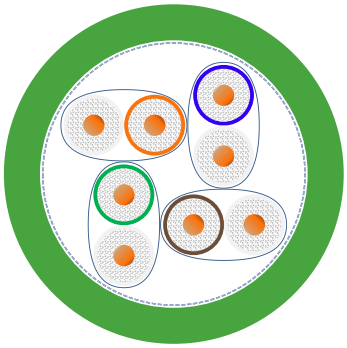
2170606	DATA SHEET	LAPP
valid from: 16.01.2024	ETHERLINE® PN Cat.7 FRNC A 4x2x23/1 AWG	

Application

Field of use:	Industrial Ethernet cable for generic cable system acc. to ISO/IEC 11801 and EN 50173. Suitable for fixed installation. Meeting the transmission requirements of IEC 61156-5, Category 7 and EN 50288-4-1. PROFINET® Type A acc. to the "PROFINET Cabling and Interconnection Technology" guideline.
Performance:	4-pair, overall braid screened, foil screened pair symmetrical cable (S/FTP), having a nominal impedance of 100 Ω, supporting a bandwidth of 10 Gbit/s (e.g. 100BASE-T, 1000BASE-T, 2.5GBASE-T, 5GBASE-T,10GBASE-T) over up to 100 m.
Characteristics:	flame retardant, no flame propagation, halogen-free, low-corrosivity of gases, low smoke density, UV resistant, PWIS-free
Applications:	PROFINET Type A stationary cable for applications without movement after installation, EtherCAT, EtherNet/IP, PoE (IEEE 802.3af), PoE+ (IEEE 802.3at), 4PPoE (IEEE 802.3bt) and other



Design

Certification	E63634 cRUus AWM Style 21286 AWM I/II A/B 80°C 300V FT1 acc. to. UL 758 and CSA C22.2 No. 210
Conductor	solid bare copper 23/1 AWG (0.25 mm²) conductor diameter: nom. 0.57 mm
Insulation	foam-skin PO (Polyolefine) core diameter: max. 1.5 mm
Core identification code	pair 1: white/blue; pair 2: white/orange; pair 3: white/green; pair 4: white/brown
Stranding	cores twisted to pairs four screened pairs stranded to bundle
Pair screen	plastic laminated aluminium foil
Screen	braid of tinned copper wires (coverage: nom. 85 %)
Outer sheath	HFFR (Halogen free, flame retardant) green, similar RAL 6018 outer diameter: 8.1 mm ± 0.3 mm

Electrical properties at 20 °C

Loop resistance	20 °C:	≤ 15 Ω/100 m
Conductor resistance	20 °C:	≤ 7.5 Ω/100 m
Test voltage	core/core: core/screen:	2000 V 2000 V
Rated voltage	UL:	300 V acc. to UL 758 & CSA C22.2 No. 210
Maximum operating voltage	IEC/EN:	125 V (not intended to be used in conjunction with low impedance sources, such as utility mains)
Insulation resistance	20 °C:	≥ 5 GΩxkm
Mutual capacitance	1 kHz:	nom. 44 nF/km
Capacitance unbalance	1 kHz:	≤ 1600 pF/km

Transfer impedance	Grade 1 acc. to IEC 61156-5	
	1 MHz:	≤ 15 mΩ/m
	10 MHz:	≤ 10 mΩ/m
	30 MHz:	≤ 30 mΩ/m
	100 MHz:	≤ 100 mΩ/m
Coupling attenuation	Type I acc. to IEC 61156-5	
	30 MHz:	≥ 85
	100 MHz:	≥ 85
	1000 MHz:	≥ 65
Velocity of propagation	100 MHz:	nom. 0.77 c

Transmission properties at 20°C

The transmission characteristics meet the requirements of IEC 61156-5 for category 7 and the requirements of the PROFINET Cabling and Interconnection Technology Guideline.

Frequency	(max.) Phase delay	(max.) Differential delay	(max.) Attenuation	(min.) TCL Level 1	(min.) EL TCTL Level 1	(min.) NEXT	(min.) PS NEXT	(min.) ACR-F	(min.) PS ACR-F	Char. Impedance	(min.) RL
f [MHz]	[ns/ 100 m]	[ns/ 100 m]	[dB/ 100 m]	[dB]	[dB]	[dB]	[dB]	[dB/ 100 m]	[dB/ 100 m]	[Ohm]	[dB]
4	552.0	20.0	3.7	34.0	23.0	78.0	75.0	78.0	75.0	—	23.0
10	545.4	20.0	5.9	30.0	15.0	78.0	75.0	79.0	76.0	—	25.0
20	542.0	20.0	8.3	27.0	9.0	78.0	75.0	74.5	71.5	—	25.0
62.5	538.6	20.0	14.9	22.0	—	75.5	72.5	67.1	64.1	—	21.5
100	537.6	20.0	19.0	20.0	—	72.4	69.4	64.0	61.0	100 ± 5	20.1
200	536.5	20.0	27.5	17.0	—	67.9	64.9	59.5	56.5	—	18.0
250	536.3	20.0	31.0	16.0	—	66.4	63.4	58.0	55.0	—	17.3
500	535.6	20.0	45.3	—	—	61.9	58.9	53.5	50.5	—	15.6
600	535.5	20.0	50.1	—	—	60.7	57.7	52.3	49.3	—	17.3

Mechanical and thermal properties

Minimum bending radius	fixed installation:	4× outer diameter
Temperature range	fixed installation:	-30 °C up to +80 °C
	UL:	80 °C acc. to UL 758 & CSA C22.2 No. 210
Flammability	flame retardant acc. to IEC 60332-1-2 resp. EN 60332-1-2 no flame propagation acc. to. IEC 60332-3-24 resp. EN 60332-3-24 FT1 acc. to UL 1581 §1060	
Halogen free	acc. to IEC 60754-1 resp. EN 60754-1	
Corrosivity of gases	acc. to IEC 60754-2 resp. EN 60754-2	
Smoke density	acc. to IEC 61034-2 resp. EN 61034-2	
UV resistance	acc. to ISO 4892-2, method A	

General requirements	These cables are conform to the LV-Directive 2014/35/EU (Low voltage Directive) and the EU-Directive 2011/65/EU (RoHS, Restriction of the use of certain hazardous substances).
Environmental information	These cables meet the substance-specific requirements of the EU Directive 2011/65/EU (RoHS).