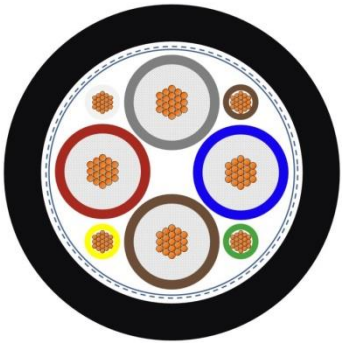
2173003	DATA SHEET	LAPP
valid from: 2025-11-27	UNITRONIC® TRAIN MVB 2x2x0.5mm² +4x0.25mm²	

Application

Field of use:	Bus cable for the Multifunction Vehicle Bus (MVB) for serial data communication in railway vehicles. MVB is a component of the Train Communication Network (TCN) and standardized in IEC 61375-3-1.
Performance:	Screened foiled star quad cable, having a nominal impedance of 120 Ω. Designed for transmission rates of 1.5 Mbit/s. The MVB transmits time-critical control signals in real time.
Characteristics:	flame retardant, no flame propagation, halogen free, low smoke density, ozone resistant, UV resistant, oil resistant, fuel resistant, resistant to acids and alkalis
Applications:	MVB, TCN, RS-485 and others



Design

Certification	EN 45545-2: Hazard Level HL1, HL2, HL3 fire prevention acc. to NF F 16-101 Internal: Vehicle Categories A1, A2, B External: Vehicle Categories A2, B Category D for flame propagation Category F0 for smoke density	
Conductor	Data pair: fine-wire stranded tinned copper 0.5 mm² (19 x 0.185 mm) conductor diameter: Control cores: fine-wire stranded tinned copper 0.25 mm² (19 x 0.127 mm) conductor diameter:	 ca. 0.92 mm ca. 0.61 mm
Insulation	Data pair: foamed polyolefine core diameter: Control cores: polyolefine core diameter:	 ca. 2.3 mm ca. 0.95 mm
Core identification code	Data pairs: red/blue, grey/brown Control cores: white/brown/green/yellow	
Stranding	data cores twisted to star quad, with control cores appplied to the interstices on top: plastic foil (overlapping)	
Screen	plastic laminated aluminium foil (overlapping) on top: braid of tinned copper wires (coverage 85 % ± 5 %) diameter over braid:	 ca. 6.1 mm
Taping	thin non-woven tape (optional)	
Outer sheath	cross-linked polymer compound, halogen free and flame retardant acc. to EN 50264-1, EM 104 black, similar RAL 9005 outer diameter:	 ca. 8.3 mm

Electrical properties at 20 °C

Conductor resistance	Data pair:	max. 40.1 Ω/km
	Control cores:	max. 79.9 Ω/km

Insulation resistance	min. 5 GΩ x km	
Mutual capacitance	Data pair:	max. 46 nF/km (1.5 MHz)
Capacitive coupling	Data pair:	max. 1500 pF/km (1.5 MHz)
Characteristic impedance	Data pair:	120 Ω ±10% (0.75 MHz - 3 MHz)
Attenuation	Data pair:	max. 15 dB/km (1.5 MHz) max. 20 dB/km (3 MHz)
Near-end cross-talk	Data pair:	min. 45.0 dB/km (0.75 MHz - 3 MHz)
Velocity of propagation	Data pair:	0.74 c
Transfer impedance	max. 20 mΩ/m (20 MHz)	
Maximum operating voltage	125 V (not for power applications)	
Test voltage	core/core: core/screen:	1000 V 1000 V

Mechanical and thermal properties

Minimum bending radius	fixed installation: occasional flexing:	3 x outer diameter 10 x outer diameter
Temperature range	fixed installation:	-40 °C up to +90 °C

Burning load	0.43 kWh/m (calculated value)
Flammability	flame retardant acc. to IEC 60332-1-2 resp. EN 60332-1-2 flame propagation acc. to IEC 60332-3-25 resp. EN IEC 60332-3-25
Halogen free	acc. to IEC 60754-1 resp. EN 60754-1 acc. to EN 50264-1 appendix B
Corrosivity of gases	acc. to IEC 60754-2 resp. EN 60754-2
Smoke density	acc. to IEC 61034-2 resp. EN 61034-2
Toxicity	acc. to EN 50305
Weather and UV resistance	acc. to EN 50289-4-17 cables with black sheath are suitable for permanent outdoor use
Ozone resistance	acc. to EN 50305
Oil resistance	acc. to EN 50264-1, EM 104
Fuel resistance	acc. to EN 50264-1, EM 104
Tests	Test procedures for electrical characteristics and transmission characteristics acc. to EN 50288-1.
General requirements	These cables are conform to the EU-Directive 2011/65/EU (RoHS, Restriction of the use of certain hazardous substances) and the LV-Directive 2014/35/EU (Low voltage Directive).
Environmental information	These cables meet the substance-specific requirements of the EU Directive 2011/65/EU (RoHS).