CALEDONIAN

Caledonian bus cables

Addison

Company Profile

Caledonian, established in 1978,offers one of the most complete lines of fiber and copper cabling system solutions with over hundreds of different cabling system products, . Our superior products provide leading edge within every cable series and for every application.

Among the national and international standards with which our cables could comply are: BS - British Standard; LPCB Fire Performance Standard, ISO Standard etc. Caledonian Cables offers a comprehensive stock of cables and cabling products through its nationwide network of resellers and distributors. Caledonian Cables has continually expanded its global presence in Europe and Asia.

Caledonian & Addison, produces a wide range of cables for communication, power and electronics in its primary plants in UK, Italy and Spain. To stay in front, we continually keep expanding our manufacturing capabilities in more low cost region such as Romania, Taiwan, Malaysia etc. This low-cost manufacturing facilities enable us provide a flexible, scalable global system that delivers superior operational performance and optimal results for our customers.

Our extensive global network of manufacturing facilities gives us significant scale and the flexibility to fulfill our customer requirements. This global presence provides design and consultancy solutions that are combined with core cable manufacturing, logistic services, and vertically integrated with our E commerce technologies, to optimize customer operations by lowering costs and reducing time to market.

Caledonian & Addison has been respected for its high standards of quality, excellent service level, competitive pricing and a unique and innovative spirit. With our latest technologies, we are both inspired and well-positioned to meet the changing needs of our customers. We have the resources to diversify and to enhance our product lines and services. We understand the need for change and with our accurate planning, we are ready for the future and the promise of new marketing opportunities. Our tradition of growth through excellence is assured.

Our Design Centers work closely with customers to constantly improve its standard range of products and technologies and to develop customized, country and industry-specific solutions. Caledonian & Addison has established an extensive network of design, manufacturing, and logistics facilities in the world's major markets to serve the growing outsourcing needs of both multinational and regional customers.

Our Certificate

INTERNATIONAL FIRST CERTIFICATION

INTERNATIONAL FIRST CERTIFICATION

CERTIFICATE

Caledonian Cables Limited

20-22 Wenlock Road London N1 7GU England

Novus Seahami Spectrum 7 Spectrum Business Park Seaham Sr7 7tt, England

IFC Global Certification confirms that the above-named organization's management system has been assessed and complies with the requirements of the following standard.

Standard:

ISO 9001:2015

Scope:

Manufacture, design, supply, installation, assembly, commissioning, testing and maintenance of LV/MV/HV energy cables, data cables,instrumentation cables, telecommunication cables,fibre optic cables,railway cables, rolling stock cables, photovoltaic cables, marine cables, cabling system, cable accessories, ABC,AAC, ACSR, AAAC, power and distribution transformers, switchgears, communication systems, IT systems

Initial Date	: 7.02.2022
Issue Date	: 2.02.2023
Date of Validity	: 1.02.2024
Expiry Date	: 6.02.2025
Certificate No	: IFC-Q-2-24-10478

Approval

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Profibus L2

Profibus DP

Profibus PA

Profibus SK

Foundation Fieldbus

EtherNet ProfiNet

Profibus L2 Indoor

Application:

This system cable is used to interconnect L2-BUS components. This cable is an economical solution for the cell and field area. For the information exchange between different automation systems as well as for communication with the connected decentralized field units, serial fieldbus systems are used. The types mentioned here are suitable for indoor laying and are equipped with a special PVC jacket.

Construction:

Type/Area of Application	Fixed Installation, Indoor
Cable Construction	1x2x0.64 mm
Inner Conductor Diameter	Copper, bare (AWG 22/1)
Conductor Insulation	Foam-skin-PE
Conductor Colors	Red, green
Stranding Element	2 conductors + 2 fillers stranded together
Shielding	Polyester foil, aluminum-lined
Total Shielding	Cu braid, tinned
Outer Jacket Material	PVC
Outer Diameter	7.8 mm ± 0.4 mm
Outer Jacket Color	Grey/Violet

Electrical Data:

CharacteristicImpedance@3-20Hz	150 Ω ± 10 Ω				
Conductor Resistance	55.0 Ohm/km max.				
Insulation Resistance	1.00 GOhm x km min.				
Mutual Capacitance@1 KHz	30.0 nF/km nom.				
Working Voltage	Max: 250 V				
Test Voltage	1.5 KV				
Attenuation	9.6	kHz	<	2.5	dB/km
	38.4	kHz	<	4	dB/km
	4	MHz	<	22	dB/km
	16	MHz	<	42	dB/km

Technical Data:

Weight	approximately 69.0 kg/km
Min. Bending Radius (Laying)	15 x OD mm
Operating Temp.Range, min.	-40 °C
Operating Temp.Range, max.	+70 °C

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Profibus L2 UL FT4

Application:

This system cable is used to interconnect L2-BUS components. This cable is an economical solution for the cell and field area. For the information exchange between different automation systems as well as for communication with the connected decentralized field units, serial field bus systems are used. The type described here is suitable for the installation in areas where the FT4 standard (special fire standard “vertical tray”) according to UL/CSA applies. For this purpose the line was equipped with a special outer PVC jacket.

Construction:

Type/Area of Application	Fixed Installation,Indoor
Cable Construction	1x2x0.64 mm
Inner Conductor Diameter	Copper, bare (AWG 22/1)
Conductor Insulation	Foam-Skin-PE
Conductor Colors	Red, green
Stranding Element	2 conductors + 2 fillers stranded together
Shielding	Polyester foil, aluminum lined
Total Shielding	Copper braid, tinned
Drain wire	Yes
Outer Jacket Material	PVC
Outer Diameter	8.0 mm ± 0.4 mm
Outer Jacket Color	Violet

Electrical Data:

Characteristic Impedance@ -20Hz	150 Ω ± 10 Ω				
Conductor Resistance	55.0 Ohm/km max.				
Insulation Resistance	1.00 GOhm x km min.				
Mutual Capacitance@1KHz	30.0 nF/km nom.				
Working Voltage	Max: 250 V				
Test Voltage	1.5 KV				
Attenuation	9.6	kHz	<	2.5	dB/km
	38.4	kHz	<	4.0	dB/km
	4.0	MHz	<	22.0	dB/km
	16.0	MHz	<	45.0	dB/km

Technical Data:

Weight	approximately 66.0 kg/km
Min. Bending Radius for Laying	15 x OD mm
Operating Temperature Range, min.	-40 °C
Operating Temperature Range, max.	+70 °C

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Profibus L2 Outdoor + Industry

Application:

This system cable is used to interconnect L2-BUS components. This cable is an economical solution for the cell and field area. For the information exchange between different automation systems as well as for communication with the connected decentralized field units, serial field bus systems are used. The types mentioned here are suitable for outdoor laying (PE jacket) and industry laying (PUR jacket).

Construction:

Type/Area of Application	Fixed Installation, Outdoor /Heavy Duty
Cable Construction	1x2x0.64 mm
Inner Conductor Diameter	Copper, bare (AWG 22/1)
Conductor Insulation	Foam-skin-PE
Conductor Colors	Red, green
Stranding Element	2 conductors + 2 fillers stranded together
Shielding	Polyester foil, aluminum-lined
Total Shielding	Cu braid, tinned
Outer Jacket Material	PE/PUR
Outer Diameter	8.0 mm ± 0.4 mm
Outer Jacket Color	Black

Electrical Data:

Characteristic Impedance @ 3-20Hz	150 Ω ± 10 Ω				
Conductor Resistance	55.0 Ohm/km max.				
Insulation Resistance	1.00 GOhm x km min.				
Mutual Capacitance @ 1 KHz	30.0 nF/km nom.				
Working Voltage	Max: 250 V				
Test Voltage	1.5 kV				
Attenuation	9.6	kHz	<	2.5	dB/km
	38.4	kHz	<	4.0	dB/km
	4.0	MHz	<	22.0	dB/km
	16.0	MHz	<	42.0	dB/km

Technical Data:

Weight:	approximately 66.0 kg/km
Min. Bending Radius (Laying)	15 x OD mm
Operating Temp.Range, min.	-40 °C
Operating Temp.Range, max.	+70 °C

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Profibus L2 Direct Burial

Application:

This system cable is used to interconnect L2-BUS components. This cable is an economical solution for the cell and field area. For the information exchange between different automation systems as well as for communication with the connected decentralized field units, serial field bus systems are used. The above mentioned type is suitable for underground installation and is equipped with a special PVC/PE jacket.

Construction:

Type/Area of Application	Underground Laying
Cable Construction	1x2x0.64 mm
Inner Conductor Diameter	Copper, bare (AWG 22/1)
Conductor Insulation	Foam-Skin-PE
Conductor Colors	Red, green
Stranding Element	2 conductors + 2 fillers stranded together
Shielding	Polyester foil, aluminum lined
Total Shielding	Copper braid, tinned
Inner Jacket Material	PVC
Outer Jacket Material	PE
Outer Diameter	10.0 mm ± 0.2 mm
Outer Jacket Color	Black

Electrical Data:

Characteristic Impedance @3-20Hz	150 Ω ± 10 Ω				
Conductor Resistance	57.1 Ohm/km max.				
Insulation Resistance	1.00 GOhm x km min.				
Mutual Capacitance @1KHz	30.0 nF/km nom.				
Working Voltage	Max: 250 V				
Test Voltage	1.5 kV				
Attenuation	9.6	kHz	<	2.1	dB/km
	38.4	kHz	<	3.1	dB/km
	3.0	MHz	<	18.2	dB/km
	20.0	MHz	<	47.0	dB/km

Technical Data:

Weight	approximately 92.0 kg/km
Min. Bending Radius for Laying	18 x OD mm
Operating Temperature Range, min.	-40 °C
Operating Temperature Range, max.	+70 °C

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Profibus L2, 7-wire

Application:

This system cable is used to interconnect L2-BUS components. This cable is an economical solution for the cell and field area. For the information exchange between different automation systems as well as for communication with the connected decentralized field units, serial field bus systems are used. With this cord design, the type mentioned here is suitable for laying in regular mobile applications and is equipped with a special PVC jacket

Construction:

Type/Area of Application	Mobile Use
Cable Construction	1x2x0.64 mm (stranded)
Inner Conductor Diameter	Copper, bare (AWG 24/7)
Conductor Insulation:	Foam-Skin-PE
Conductor Colors 1	Red, green
Stranding Element	2 conductors + 2 fillers stranded together
Shielding	Polyester foil, aluminum lined
Total Shielding	Copper braid, tinned
Outer Jacket Material	PVC
Outer Diameter	7.8 mm ± 0.3 mm
Outer Jacket Color	Violet

Electrical Data:

Characteristic Impedance@3-20Hz	150 Ω ± 10 Ω				
Conductor Resistance	86.7 Ohm/km max.				
Insulation Resistance	1.00 GOhm x km min.				
Mutual Capacitance@1KHz	30.0 nF/km nom.				
Working Voltage	Max: 250 V				
Test Voltage:	1.5 kV				
Attenuation	9.6	kHz	<	3.0	dB/km
	38.4	kHz	<	5.0	dB/km
	4.0	MHz	<	26.0	dB/km
	16.0	MHz	<	55.0	dB/km

Technical Data:

Weight	approximately 75.0 kg/km
Min. Bending Radius for Laying	10 x OD mm
Operating Temperature Range, min.	-20 °C
Operating Temperature Range, max.	+70 °C

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Profibus L2 Drag Chain (Track)

Application:

This system cable is used to interconnect L2-BUS components. This cable is an economical solution for the cell and field area. For the information exchange between different automation systems as well as for communication with the connected decentralized field units, serial field bus systems are used. The above mentioned types are suitable for drag chains (stranded).

Construction:

Type/Area of Application	Drag Chain Applications
Cable Construction	1x2x0.64 mm (stranded)
Inner Conductor Diameter	Copper, bare (AWG 24/19)
Conductor Insulation	Foam-skin-PE
Conductor Colors	Red, green
Stranding Element	2 conductors + 2 fillers stranded together
Shielding	Polyester foil, aluminum-lined
Total Shielding	Cu braid, tinned
Outer Jacket Material	PUR
Outer Diameter	8.0 mm ± 0.4 mm
Outer Jacket Color	Violet

Electrical Data:

Characteristic Impedance@3-20Hz	150 Ω ± 10 Ω				
Conductor Resistance	82.0 Ohm/km max.				
Insulation Resistance	1.00 GOhm x km min.				
Mutual Capacitance@1KHz	30.0 nF/km nom.				
Working Voltage	Max: 250 V				
Test Voltage	1.5 kV				
Attenuation	9.6	kHz	<	3.0	dB/km
	38.4	kHz	<	5.0	dB/km
	4.0	MHz	<	25.0	dB/km
	16.0	MHz	<	52.0	dB/km

Technical Data:

Weight	approximately 65.0 kg/km
Min. Bending Radius (Laying)	7.5 x OD mm
Operating Temp.Range, min.	-40 °C
Operating Temp.Range, max.	+70 °C

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Profibus ET200X + ECOFAST

Application:

The Profibus-ET200X and Profibus ECOFAST lines used in the area of process automation. These BUS systems are a very economical solution for the cell and field area. For the information exchange between different automation systems as well as for communication with the connected decentralized field units, serial field bus systems are used. The series hybrid are characterized by a special construction with data and power supply in one cable. These types are suited for the application in drag chains and similar mobile applications.

Construction:

Type/Area of Application	Drag Chain Applications	Mobile Use
Cable Construction	1x2x0.65 mm + 3x1x0.75 mm^2 (stranded)	1x2x0.65 mm + 4x1x1.5 mm^2(stranded)
Inner Conductor Diameter 1	Copper, bare (AWG 22/19)	Copper, bare (AWG 24/19)
Inner Conductor Diameter 2	Copper, bare (AWG 18/24)	Copper, bare (AWG 18/84)
Conductor Insulation 1	Foam-skin-PE	Foam-skin-PE
Conductor Insulation 2	PVC	TPM
Conductor Colors 1	red, green	red, green
Conductor Colors 2	black, blue, green-yellow	back, back, back, back
Stranding Element	Double Conductor	2 conductors + 2 fillers stranded together
Wrapping	Polyester foil over stranded bundle	Polyester foil over stranded bundle
Shielding	Foil + Braid	Foil + Braid
Overall wrapping	Polyester foil	-
Outer Jacket Material	PUR	TPU
Outer Diameter	9.5 mm ± 0.5 mm	11.0 mm ± 0.3 mm
Outer Jacket Color	Green	Violet

Electrical Data:

CharacteristicImpedance@3-20Hz	150 Ω ± 10 Ω					150 Ω ± 10 Ω				
Conductor Resistance	84.0 Ohm/km max.					89.9 Ohm/km max.				
Insulation Resistance	1.00 GOhm x km min.					1.00 GOhm x km min.				
Mutual Capacitance@1KHz	30.0 nF/km nom.					30.0 nF/km nom.				
Working Voltage	Max: 250 V									
Test Voltage	1.5 kV					1.5 kV				
Attenuation	9.6	kHz	<	3.0	dB/km	9.6	kHz	<	3.0	dB/km
	38.4	kHz	<	5.0	dB/km	38.4	kHz	<	5.0	dB/km
	4.0	MHz	<	25.0	dB/km	4.0	MHz	<	30.0	dB/km
	16.0	MHz	<	52.0	dB/km	16.0	MHz	<	60.0	dB/km

Technical Data:

Weight	approximately 105.0kg/km	approximately 159.0kg/km
Min. Bending Radius (Laying)	14 x OD mm	15 x OD mm
Operating Temp.Range, min.	- 5 °C	-20 °C
Operating Temp.Range, max.	+60 °C	+60 °C

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Profibus L2 Torsion + Festoon

Application:

The series TORSION and FESTOON are used to interconnect Profibus BUS components. This BUS system is a very economical solution for the field area. For the information exchange between different automation systems as well as for communication with the connected decentralized field units, serial field bus systems are used. The lines described here are designed torsionable or hanging movable construction. Areas such as robot applications and/or garland suspension are easily realized.

Construction:

Type/Area of Application	Torsion Applications	Mobile Use
Cable Construction	1x2x0.64 mm (stranded)	1x2x0.65 mm (stranded)
Inner Conductor Diameter	Copper, bare (AWG 23/19)	Copper, bare (AWG 24/19)
Conductor Insulation	Foam-skin-PE	Cell PE
Conductor Colors	red, green	red, green
Stranding Element	2 conductors + 2 fillers stranded together	2 conductors + 2 fillers stranded together
Wrapping	Polyester foil over stranded bundle	Polyester foil over stranded bundle
Shielding	Polyester foil, Copper bare	Polyester foil, aluminum-lined
Total Shielding	Copper shifting, tinned	Copper braid, tinned
Outer Jacket Material	PUR	PVC
Outer Diameter	8.0 mm ± 0.3 mm	8.0 mm ± 0.3 mm
Outer Jacket Color	Violet	Green

Electrical Data:

CharacteristicImpedance@3-20Hz	150 Ω ± 10 Ω				
Conductor Resistance	66.5 Ohm/km max.				
Insulation Resistance	1.00 GOhm x km min.				
Mutual Capacitance@1KHz	30.0 nF/km nom.				
Working Voltage	Max: 250 V				
Test Voltage	1.5 KV				
Attenuation	9.6	kHz	<	3.0	dB/km
	38.4	kHz	<	5.0	dB/km
	4.0	MHz	<	25.0	dB/km
	16.0	MHz	<	51.0	dB/km

Technical Data:

Weight	approximately 91.0 kg/km	approximately 64.0 kg/km
Min. Bending Radius (Laying)	12.5 x OD mm	5 x OD mm
Operating Temp.Range, min.	- 5 °C	-40 °C
Operating Temp.Range, max.	+60 °C	+60 °C

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Profibus DP IEC 61158 / EN 50170 SINEC L2 (Siemens Profibus)

Application:

Profibus DP cables are designed for field networks requiring fast, cyclic data exchange between controllers and field devices. This cable is usually reffered as siemens profibus. This Profibus modification optimized with respect to velocity and low installation cost, Profibus DP is used as a replacement for conventional parallel data transmission with 24 V or 0 - 20 mA.

Static cables

Construction:

Type	1 pair static cables
Cable Construction	1x2x0.64mm
Inner Conductor	Plain copper
Inner Conductor Diameter	0.64mm (22AWG)
Conductor Insulation	Foamed PE with a hard skin
Conductor Colors	Red & green
Stranding Element	-
Wrapping	Synthetic bedding
Shielding 1	Aluminium foil
Shielding 2	Tinned copper wire braid – 60% optical coverage
Outer Jacket Material	PUR thermoplastic or thermosetting/ PVC/ PE/ LSHF
Outer Jacket Color	Violet/ Black

Electrical Data:

Characteristic Impedance @ 3-20MHz	150 Ω ± 10 Ω	
Conductor Resistance	57.1 Ohm/km max.	
Test Voltage	1.5KV	
Operate Voltage	Max: 350V	
Effective capacitance @ 1khz	28.5nF/km	
Data Rate	9.6 Kbit/s	1200m
	19.2 Kbit/s	1200m
	93.75 Kbit/s	1200m
	187.5 Kbit/s	1000m
	500 Kbit/s	400m
	1.5 Mbit/s	200m
	12.0 Mbit/s	100m
Attenuation	9.6KHz	2.5dB/km
	4MHz	22dB/km
	16MHz	42dB/km

Dynamic cables

Construction:

Type	1 pair dynamic cables
Cable Construction	1x2x0.25mm²
Inner Conductor:	Plain copper, 0.25mm²
Conductor Insulation	Foamed PE with a hard skin
Conductor Colors	Red & green
Stranding Element	Cores laid up with fillers
Core Wrapping	Polyester taped
Shielding 1	Aluminium foil
Shielding 2	Tinned copper wire braid – 60% optical coverage
Drain Wire	-
Outer Jacket Material	Polyurethane (PUR) sheath
Outer Jacket Color	Violet/ Black

Electrical Data:

Characteristic Impedance @ 3-20MHz	150 Ω ± 10 Ω	
Conductor Resistance	84.0 Ohm/km max.	
Test Voltage	1.5KV	
Working Voltage	Max: 350V	
Effective capacitance @ 1khz	28.5nF/km	
Data Rate	9.6 Kbit/s	1200m
	19.2 Kbit/s	1200m
	93.75 Kbit/s	1200m
	187.5 Kbit/s	1000m
	500 Kbit/s	400m
	1.5 Mbit/s	200m
	12.0 Mbit/s	100m
Attenuation	9.6KHz	3dB/km
	4MHz	25dB/km
	16MHz	53dB/km

Technical Data:

	Static	Dynamic
Min. Bending Radius (Laying)	12 x OD mm	12 x OD mm
Operating Temp.Range, min.	-30 °C	-5 °C
Operating Temp.Range, max.	+70 °C	+70 °C

* Simatic Net registered trademark of Siemens AG

Armored Profibus DP Cable:

2*0.64mm (22AWG) Cu/F-PE/Al-foil screen/TCWB/LSZH/ GSWA/LSZH, UV resistance, FR to IEC 60332-3-22 Cat.A

Construction:

Pair No.× Conductor Size	1Px22AWG 1/0.64 mm
Conductor	Solid plain copper 1/0.64 mm
Insulation	Foam PE
Shielding 1	Aluminium foil
Shielding 2	Tinned copper wire braid - 65% coverage
Inner Sheath	LZSH
Amour	Galvanised steel wire 0.9mm diameter
Outer Sheath	LSFRZH
Overall Diameter	13.9 +/-3mm
Approx.Weight	304KG/KM
Core Color	Red&Green
Sheath Color	Black or other upon request

Electrical Data:

Characteristic Impedance @ 3-20MHz	150 Ω ± 10 Ω	
Conductor Resistance	54.5 Ohm/km max.	
Test Voltage	1KV	
Operate Voltage	300V RMS	
Mutual capacitance	29.5pF/km nominal	
Max. Attenuation	0.2MHz	2 dB/100m
	4MHz	2.95 dB/100m
	16MHz	4.9 dB/100m

Technical Data:

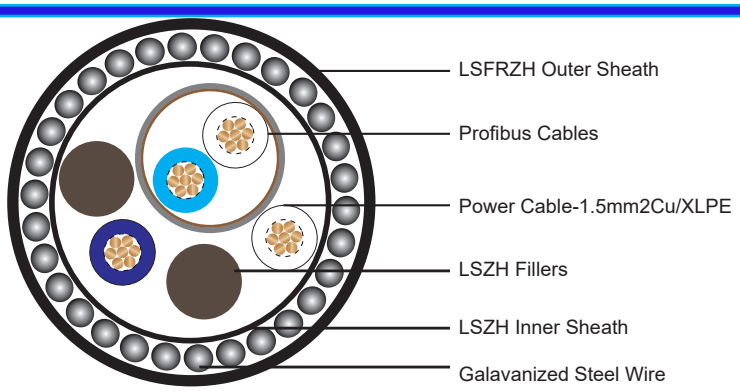
Min. Bending Radius (Laying)	6-8 x OD mm
Operating Temp.Range, min.	-30 °C
Operating Temp.Range, max.	+90 °C

Fire Performance:

Reduced Fire Propagation (Verically-Mouted Bundled Cables Test)	IEC 60332-3-22 CAT.A
Halogen Free	IEC 60754-1/-2
Low Smoke Capacity	IEC 61034-1
Flame Retardance	IEC 60332-1

ARMORED HYBRID PROFIBUS DP CABLE:

(2*0.64MM (22AWG) CU/F-PE/AL-FOIL SCREEN/TCWB+ POWER 2*1.5MM2 CLASS5 CU/XLPE) ASSEMBLY /LSZH/ GSWA/LSZH, UV RESISTANCE, FR TO IEC 60332-3-22 CAT.A



Construction:

Part A:Profibus DP

Pair No.× Conductor Size	1Px22AWG 1/0.64 mm
Conductor	Solid plain copper 1/0.64 mm
Insulation	Foam PE
Shielding 1	Aluminium foil
Shielding 2	Tinned copper wire braid - 65% coverage
Sheath	LZSH

Part B:Power Cable 0.6/1kV

Conductor	1.5mmsq flexible copper wire to IEC 60228 class5
Insulation	XLPE, nominal thickness 0.7mm
Insulation Color	Black,White or as per request

2 parts assembly with fillers

Amour	Galvanised steel wire 0.9mm diameter
Outer Sheath	LSFRZH
Overall Diameter	16.9 +/-3mm
Approx.Weight	375KG/KM
Core Color	Red&Green
Sheath Color	Black or other upon request

Electrical Data:

Characteristic Impedance @ 3-20MHz	150 Ω ± 15 Ω	
Conductor Resistance	54.5 Ohm/km max.	
Test Voltage	1KV	
Operate Voltage	300V RMS	
Mutual capacitance	29.5pF/km nominal	
Max. Attenuation	0.2MHz	2 dB/100m
	4MHz	2.95 dB/100m
	16MHz	4.9 dB/100m

Power Cable
Electrical Resistance: 12.1 ohm/km
Insulation Resistance: 1000M oh.km
Rated voltage: 0.6/1KV
Testing voltage:3500V

Technical Data:

Min. Bending Radius (Laying)	6-8 x OD mm
Operating Temp.Range, min.	-30 °C
Operating Temp.Range, max.	+90 °C

Fire Performance:

Reduced Fire Propagation (Verically-Mouted Bundled Cables Test)	IEC 60332-3-22 CAT.A
Halogen Free	IEC 60754-1/-2
Low Smoke Capacity	IEC 61034-1
Flame Retardance	IEC 60332-1

Profibus PA

Application:

This Profibus PA line is used in the area of process automation, among other things in the chemical industry. This cable is an economical solution for the cell and field area. For the information exchange between different automation systems as well as for communication with the connected decentralized field units, serial field bus systems are used. The above mentioned types are suitable for ex and not-ex installation and are equipped with a special PVC-jacket.Profibus PA is standardized as EN 50170 like Profibus DP and Profibus FMS.

Construction:

Type/Area of Application	Hazardous Areas /Non-Hazardous Areas
Cable Construction	1x2x1.0/2.55 mm
Inner Conductor Diameter	Copper, bare (AWG 18/1)
Conductor Insulation	PE
Conductor Colors	red, green
Stranding Element	2 conductors + 2 fillers stranded together
Shielding	Polyester foil, aluminum-lined
Total Shielding	Copper braid, tinned
Outer Jacket Material	PVC
Outer Diameter	7.6 mm ± 0.2 mm
Outer Jacket Color	Blue/Black

Electrical Data:

Characteristic Impedance @ 31.25 KHz	100 Ω ± 20 Ω				
Conductor Resistance	22.0 Ohm/km max.				
Insulation Resistance	1.00 GOhm x km min.				
Mutual Capacitance@1KHz	55.0 nF/km nom.				
Working Voltage	300 V				
Test Voltage	2.5 kV				
Attenuation	39	kHz	≤	3	dB/km

Technical Data:

Weight	approximately 76.0 kg/km
Min. Bending Radius (Laying)	18 x OD mm
Operating Temp.Range, min.	- 20 °C
Operating Temp.Range, max.	+70 °C

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Profibus PA Long Distance

Application:

This Profibus PA line is used in the area of process automation, among other things in the chemical industry. This cable is an economical solution for the cell and field area. For the information exchange between different automation systems as well as for communication with the connected decentralized field units, serial field bus systems are used. The types mentioned here are suitable for ex and not-ex installation and are equipped with a special PVC-jacket.

Construction:

Type/Area of Application	Hazardous Areas/Non-Hazardous Areas
Cable Construction	1x2x1.6/3.2 mm
Inner Conductor Diameter	Copper, bare (AWG 16/7)
Conductor Insulation	PE
Conductor Colors	red, green
Stranding Element	2 conductors + 2 fillers stranded together
Shielding	Polyester foil, aluminum-lined
Total Shielding	Copper braid, tinned
Outer Jacket Material	PVC
Outer Diameter	9.5 mm ± 0.5 mm
Outer Jacket Color	Blue

Electrical Data:

Characteristic Impedance@3-20Hz	100 Ω ± 20 Ω				
Conductor Resistance	24.0 Ohm/km max.				
Insulation Resistance	1.00 GOhm x km min.				
Mutual Capacitance@1KHz	60.0 nF/km nom.				
Working Voltage	300 V				
Test Voltage	1.0 KV				
Attenuation	39	kHz	≤	2.7	dB/km

Technical Data:

Weight	approximately 110.0 kg/km
Min. Bending Radius (Laying)	7.5 x OD mm
Operating Temp.Range, min.	- 40 °C
Operating Temp.Range, max.	+70 °C

* PROFIBUS is a registered trademark of PROFIBUS Nutzerorganisation (PNO)

Profibus SK Indoor + Outdoor

Application:

The application of these Profibus SK cables are in the cell and field area, just as for conventional types. The great advantage of this new system is the quick connection of the cable to the respective plugs. This type of processing also avoids errors. The above mentioned types are suitable for indoor- or outdoor installation and are equipped with a special PVC or PE jacket.

Construction:

Type/Area of Application	Fixed Installation, Indoor /Outdoor
Cable Construction	1x2x0.64 mm
Inner Conductor Diameter	Copper, bare (AWG 22/1)
Conductor Insulation	Foam-skin-PE
Conductor Colors	red, green
Stranding Element	2 conductors + filler
Wrapping	Polyester foil over stranded bundle
Shielding	Polyester foil, aluminum-lined
Total Shielding	Copper braid, tinned
Outer Jacket Material	PVC/PE
Outer Diameter	8.0 mm ± 0.4 mm
Outer Jacket Color	Violet /Black

Electrical Data:

CharacteristicImpedance@3-20Hz	150 Ω ± 10 Ω				
Conductor Resistance	57.1 Ohm/km max.				
Insulation Resistance	1.00 GOhm x km min.				
Mutual Capacitance@1KHz	35.0 nF/km nom.				
Working Voltage	300V				
Test Voltage	1.5 KV				
Attenuation	9.6	kHz	<	2.5	dB/km
	38.4	kHz	<	4.0	dB/km
	4.0	MHz	<	22.0	dB/km
	16.0	MHz	<	42.0	dB/km

Technical Data:

Weight:	approximately 75.0 kg/km	approximately 65.0 kg/km
Min. Bending Radius (Laying)	15 x OD mm	15 x OD mm
Operating Temp.Range, min.	- 40 °C	- 40 °C
Operating Temp.Range, max.	+70 °C	+70 °C

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Profibus SK FRNC + Industry

Application:

The application of these Profibus SK cables are in the cell and field area, just as for conventional types. The great advantage of this new system is the quick connection of the cable to the respective plugs. This type of processing also avoids errors. The types mentioned here are suitable for indoor laying (special FRNC jacket) and heavy industry laying (PUR jacket).

Construction:

Type/Area of Application	Fixed Installation, Indoor/Heavy Duty
Cable Construction	1x2x0.64 mm
Inner Conductor Diameter	Copper, bare (AWG 22/1)
Conductor Insulation	Foam-skin-PE
Conductor Colors	red, green
Stranding Element	2 conductors + filler
Wrapping	Polyester foil over stranded bundle
Shielding	Polyester foil, aluminum-lined
Total Shielding	Copper braid, tinned
Outer Jacket Material	FRNC/PUR
Outer Diameter	8.0 mm ± 0.4 mm
Outer Jacket Color	Violet

Electrical Data:

CharacteristicImpedance@3-20Hz	150 Ω ± 10 Ω				
Conductor Resistance	57.1 Ohm/km max.				
Insulation Resistance	1.00 GOhm x km min.				
Mutual Capacitance@1KHz	35.0 nF/km nom.				
Working Voltage	300V				
Test Voltage	1.5 KV				
Attenuation	9.6	kHz	<	2.5	dB/km
	38.4	kHz	<	4	dB/km
	4	MHz	<	22	dB/km
	16	MHz	<	42	dB/km

Technical Data:

Weight	approximately 73.0 kg/km	approximately 71.0 kg/km
Min. Bending Radius (Laying)	18 x OD mm	15 x OD mm
Operating Temp.Range, min.	- 25 °C	- 40 °C
Operating Temp.Range, max.	+60 °C	+70 °C

* PROFIBUS is a registered trademark of PROFIBUS Nutzerorganisation (PNO)

Profibus SK Drag Chain (Track)

Application:

The application of these Profibus SK cables are in the cell and field area, just as for conventional types. The great advantage of this new system is the quick connection of the cable to the respective plugs. This type of processing also avoids errors. The above mentioned types are suitable for drag chains (stranded).

Construction:

Type/Area of Application	Drag Chain Applications
Cable Construction	1x2x0.64 mm (stranded)
Inner Conductor Diameter	Copper, bare (AWG 24/19)
Conductor Insulation	Foam-skin-PE
Conductor Colors	red, green
Stranding Element	2 conductors + filler
Wrapping	Polyester foil over stranded bundle
Shielding	Polyester foil, aluminum-lined
Total Shielding	Copper braid, tinned
Outer Jacket Material	PUR
Outer Diameter	8.0 mm ± 0.4 mm
Outer Jacket Color	Violet

Electrical Data:

Characteristic Impedance@3-20Hz	150 Ω ± 10 Ω				
Conductor Resistance	84.0 Ohm/km max.				
Insulation Resistance	1.00 GOhm x km min.				
Mutual Capacitance@1KHz	35.0 nF/km nom.				
Working Voltage	300V				
Test Voltage	1.5 KV				
Attenuation	9.6	kHz	<	3	dB/km
	38.4	kHz	<	5	dB/km
	4	MHz	<	25	dB/km
	16	MHz	<	52	dB/km

Technical Data:

Weight	approximately 70.0 kg/km
Min. Bending Radius (Laying)	7.5 x OD mm
Operating Temp.Range, min.	- 40 °C
Operating Temp.Range, max.	+70 °C

* PROFIBUS is a registered trademark of PROFIBUS Nutzerorganisation (PNO)

Foundation Fieldbus
ISA/SP-50 Profibus PA Type A

Application:

Foundation™ Field bus is used in intrinsically area,especially in the field of Process Automation.A single pair 18AWG Bi-Directional digital Fieldbus cable for type A applications (31.25 KBits/sec) available in PVC, LSHF and SWA versions. Anti-termite and anti-vermin foundation fieldbus cable is also available.

Construction:

Type	Foundation Fieldbus ISA/SP-50 Profibus PA Type A
Inner Conductor	Tinned copper conductors 18(7)AWG 0.88mm²
Conductor Insulation	Polyolefin/Foamed PE with skin PE
Stranding Element	-
Shielding	Aluminium /polyester foil
Drain Wire	(20AWG) tinned copper
Outer Jacket Material	PVC
Core Identification	White & Black
Sheath Colour	Orange

Electrical Data:

Characteristic Impedance@31.25KHz	100 Ω±20 Ω	
Conductor resistance	24 Ohm/km @ 20°C	
Working Voltage	Max: 300V	
Test Voltage	1.5KV	
Nominal attenuation	39KHz	<3 dB/km

Technical Data:

Weight	approximately 85 kg/km/ 246 kg/km(SWA)
Min. Bending Radius (Laying)	15 x OD mm
Operating Temp.Range, min.	- 25 °C
Operating Temp.Range, max.	+80 °C

* FOUNDATION™ is a registered trademark of FOUNDATION Fieldbus

Foundation Fieldbus ISA/SP-50 Type B

Application:

Foundation™ Field bus is used in intrinsically area,especially in the field of Process Automation.A single pair 22AWG Bi-Directional digital Fieldbus cable for type B applications (31.25 KBits/sec) are available in PVC, LSHF and SWA versions. Anti-termite and anti-vermin foundation fieldbus cable is also available.

Construction:

Type	Foundation Fieldbus ISA/SP-50 Type B
Inner Conductor	Tinned copper conductors 22AWG(7) 0.34mm²
Conductor Insulation	Polyolefin/Foamed PE with skin PE
Stranding Element	-
Shielding	Aluminium /polyester foil
Drain Wire	(22AWG) tinned copper
Outer Jacket Material	PVC
Core Identification	White & Black
Sheath Colour	Orange

Technical Information:

Characteristic Impedance@31.25Hz	130 Ω±20 Ω	
Conductor resistance	56.0Ohm/km @ 20°C	
Working Voltage	300V	
Test Voltage	1.5KV	
Nominal attenuation	39KHz	<3 dB/km

Technical Data:

Weight:	approximately 53 kg/km/ 213 kg/km(SWA)
Min. Bending Radius (Laying)	15 x OD mm
Operating Temp.Range, min.	- 25 °C
Operating Temp.Range, max.	+80 °C

* FOUNDATION™ is a registered trademark of FOUNDATION Fieldbus

Foundation Fieldbus
ISA/SP-50 High Speed

Application:

Foundation™ Field bus is used in intrinsically area,especially in the field of Process Automation.A high speed single pair 22AWG Bi-Directional digital Fieldbus cable for 1.0 & 2.5MBit/sec applications available in PVC, LSHF and SWA versions. Anti-termite and anti-vermin foundation fieldbus cable is also available.

Construction:

Type	Foundation Fieldbus ISA/SP-50 High Speed
Inner Conductor	Tinned copper conductors 22(7)AWG 0.34mm²
Conductor Insulation	Foamed polyolefin
Stranding Element	-
Shielding	Aluminium /polyester foil
Drain Wire	(22AWG) tinned copper
Outer Jacket Material	PVC
Core Identification	White & Black
Sheath Colour	Orange

Technical Information:

Characteristic Impedance@31.25Hz	150 Ω±10 Ω	
Conductor resistance	56.0 Ohm/km @ 20°C	
Working Voltage	300V	
Test Voltage	1.5KV	
Attenuation	39 KHz	<3 dB/km

Technical Data:

Weight	approximately 65 kg/km/ 287 kg/km(SWA)
Min. Bending Radius (Laying)	15 x OD mm
Operating Temp.Range, min.	- 25 °C
Operating Temp.Range, max.	+80 °C

* FOUNDATION™ is a registered trademark of FOUNDATION Fieldbus

ProfiNet Type A

Application:

Industrial Ethernet ProfiNet cables are designed to provide reliable network communications in the demanding Industrial and Process Control environment where difficult EMC conditions are pervasive. Conforming to the EIA/TIA-568 standard, These cables support half-duplex high speed communications.It ensures superior transmission properties and can be used even under most severe conditions.

Constructon:

Type/Area of Application	Fixed Installation, Indoor	Heavy Duty
Cable Construction	2x2x0.64 mm	2x2x0.64 mm
Inner Conductor Diameter	Copper, bare (AWG 22/1)	Copper, bare (AWG 22/1)
Conductor Insulation	PE	PE
Conductor Colors	white, yellow, blue, orange	white, yellow, blue, orange
Stranding Element	Star quad	Star quad
Wrapping	Polyester foil over stranded bundle	Polyester foil over stranded bundle
Shielding	Polyester foil, aluminum-lined	Polyester foil, aluminum-lined
Total Shielding	Cu braid, tinned	Cu braid, tinned
Inner Jacket Material	PVC	PVC
Outer Jacket Material	PVC	PUR
Outer Diameter	6.5 mm ± 0.2 mm	6.5 mm ± 0.2 mm
Outer Jacket Color	Green	Green

Electrical Data:

Characteristic Impedance@1-100 MHz	100 Ohm ± 15 Ohm	
Conductor Resistance	62.0 Ohm/km max.	
Insulation Resistance	0.50 GOhm x km min.	
Mutual Capacitance	50.0 nF/km nom.	
Working Voltage	300V	
Test Voltage	1.5 KV	
Attenuation	10 MHz	5.2 dB/100m
	16 MHz	6.9 dB/100m
	62.5 MHz	16.0 dB/100m
	100 MHz	19.5 dB/100m

Technical Data:

Weight	approximately 67.0 kg/km	approximately 64.0 kg/km
Min. Bending Radius (Laying)	5 x OD mm	10 x OD mm
Operating Temp. Range, min.	-40 °C	-40 °C
Operating Temp.Range, max.	+70 °C	+70 °C

ProfiNet Type A Radiation Resistant & Armored

Application:

Industrial Ethernet ProfiNet cables are designed to provide reliable network communications in the demanding Industrial and Process Control environment where difficult EMC conditions are pervasive. Conforming to the EIA/TIA-568 standard, These Cables support half-duplex high speed communications.It ensures superior transmission properties and can be used even under most severe conditions.

Constructon:

Type/Area of Application	Ray loaded areas	Fixed Installation, Outdoor
Cable Construction	2x2x0.64 mm	2x2x0.64 mm
Inner Conductor Diameter	Copper, bare (AWG 22/1)	Copper, bare (AWG 22/1)
Conductor Insulation	XLPE ray cross-linking	PE
Conductor Colors	white, yellow, blue, orange	white, yellow, blue, orange
Stranding Element	Star quad	Star quad
Wrapping	Polyester foil over stranded bundle	Polyester foil over stranded bundle
Shielding	Polyester foil, aluminum-lined	Polyester foil, aluminum-lined
Total Shielding	Cu braid, tinned	Cu braid, tinned
Armoring	-	Steel Rib
Inner Jacket Material	TPR cross-linking	PVC
Outer Jacket Material	PUR	PE
Outer Diameter	6.5 mm ± 0.2 mm	9.3 mm ± 0.5 mm
Outer Jacket Color	Green	Black

Electrical Data:

Characteristic Impedance@1-100 MHz	100 Ω ± 15 Ω	
Conductor Resistance	62.0 Ohm/km max.	
Insulation Resistance	0.50 GOhm x km min.	
Mutual Capacitance	50.0 nF/km nom.	
Working Voltage	300V	
Test Voltage	1.5 KV	
Attenuation	10 MHz	5.2 dB/100m
	16 MHz	6.9 dB/100m
	62.5 MHz	16.0 dB/100m
	100 MHz	19.5 dB/100m

Technical Data:

Weight	approximately 63.0 kg/km	approximately 124.0 kg/km
Min. Bending Radius (Laying)	46.0 mm	93.0 mm
Operating Temp. Range, min.	-40 °C	-40 °C
Operating Temp.Range, max.	+80 °C	+70 °C

ProfiNet Type B

Application:

Industrial Ethernet ProfiNet cables are designed to provide reliable network communications in the demanding Industrial and Process Control environment where difficult EMC conditions are pervasive. Conforming to the EIA/TIA-568 standard, These Cables support half-duplex high speed communications.It ensures superior transmission properties and can be used even under most severe conditions.

Constructon:

Type/Area of Application	Flex Use	Mobile Use
Cable Construction	2x2x0.64 mm (stranded)	2x2x0.64 mm (stranded) + 4x1.5 mm^2
Inner Conductor Diameter 1	Copper, tinned (AWG 22/7)	Copper, tinned (AWG 22/7)
Inner Conductor Diameter 2	/	Copper, bare (AWG 16/84)
Conductor Insulation 1	Foam-Skin-PE or PE or PP	Foam-Skin-PE or PE or PP
Conductor Insulation 2	/	Foam-Skin-PE or PE or PP
Conductor Colors 1	white, yellow, blue, orange	white, yellow, blue, orange
Conductor Colors 2	/	Black
Stranding Element	Double Conductor	Double Conductor
Wrapping	Polyester foil over stranded bundle	Polyester foil over stranded bundle
Total Shielding	copper braid and plastic-laminated aluminium foil	copper braid and plastic-laminated aluminium foil
Outer Jacket Material	PVC or FRNC	PVC or FRNC
Outer Diameter	6.5 mm ± 0.2 mm	10.3 mm ± 0.3 mm
Outer Jacket Color	Green	Green

Electrical Data:

Characteristic Impedance@1-100 MHz	100 Ω ± 15 Ω	
Conductor Resistance	60.0 Ohm/km max.	
Insulation Resistance	0.50 GOhm x km min.	
Mutual Capacitance	52.0 nF/km nom.	
Working Voltage	300V	
Test Voltage	1.5 KV	
Attenuation	10 MHz	6.3 dB/100m
	16 MHz	8.0 dB/100m
	62.5 MHz	16.5 dB/100m
	100 MHz	21.3 dB/100m

Technical Data:

Weight	approximately 153.0 kg/km
Min. Bending Radius for Laying	10 x OD mm
Operating Temperature Range, min.	-40 °C
Operating Temperature Range, max.	+70 °C

ProfiNet Type B+C

Application:

Industrial Ethernet ProfiNet cables are designed to provide reliable network communications in the demanding Industrial and Process Control environment where difficult EMC conditions are pervasive. Conforming to the EIA/TIA-568 standard, These Cables support half-duplex high speed communications.It ensures superior transmission properties and can be used even under most severe conditions.

Constructon:

Type/Area of Application	Mobile Use	Drag Chain Applications
Cable Construction	2x2x0.64 mm (stranded)	2x2x0.64 mm (stranded)
Inner Conductor Diamete	Copper, tinned (AWG 22/7)	Copper, tinned (AWG 22/7)
Conductor Insulation	PE	PE
Conductor Colors	white, yellow, blue, orange	white, yellow, blue, orange
Stranding Element	Star quad	Star quad
Wrapping	Polyester foil over stranded bundle	Polyester foil over stranded bundle
Shielding	Polyester foil, aluminum-lined	Polyester foil, aluminum-lined
Total Shielding	Cu braid, tinned	Cu braid, tinned
Inner Jacket Material	PVC	FRNC
Outer Jacket Material	PVC	PUR
Outer Diameter	6.5 mm ± 0.2 mm	6.5 mm ± 0.2 mm
Outer Jacket Color	Green	Green

Electrical Data:

Characteristic Impedance@1-100 MHz	100 Ω ± 15 Ω	
Conductor Resistance	60.0 Ohm/km max.	
Insulation Resistance	0.50 GOhm x km min.	
Mutual Capacitance	52.0 nF/km nom.	
Working Voltage	300V	
Test Voltage	1.5 KV	
Attenuation	10 MHz	6.0 dB/100m
	16 MHz	7.6 dB/100m
	62.5 MHz	16 dB/100m
	100 MHz	21 dB/100m

Technical Data:

Weight	approximately 63.0 kg/km
Min. Bending Radius (Laying)	5 x OD mm
Operating Temp.Range, min.	-40 °C
Operating Temp.Range, max.	+70 °C

CAN-Bus

Application:

CAN Bus are field bus cables that comform to international CAN standard ISO-11898, CAN Bus (Control Area Network) is a non addressable system which treats all devices as equal allowing fast transmission of data. Due to its robust nature it has been widely adopted in the automotive industry. Several versions of CAN Bus cables have been developed to meet the fast changing needs of the automation industry. The PVC jacket version is designed for stationary applications,while the Halogen free PUR version is for highly flexing application

Construction:

0.22 mm^2

Type/Area of Application	Fixed Installation, Indoor	Fixed Installation, Indoor
Cable Construction	1x2x0.22 mm^2 (stranded)	4x1x0.22 mm^2 (stranded)
		2x2x0.22 mm^2 (stranded)
Conductor Insulation	Cellular PE/ Foam skin PE	Cellular PE/ Foam skin PE
Conductor Colors	white, brown	white, brown, green, yellow
Stranding Element	Double conductor	Star quad/ 2 pairs
Wrapping	Polyester foil over stranded bundle	Polyester foil over stranded bundle
Total Shielding	Copper braid, tinned	Copper braid, tinned
Outer Jacket Material	PVC	PVC
Outer Diameter	5.4 mm ± 0.2 mm	6.9 mm ± 0.2 mm(quad) 7.5 mm ± 0.2 mm(pair)
Outer Jacket Color	Violet	Violet
Cable Weight	approximately 41.0 kg/km	approximately 60.0 kg/km

Electrical Data:

Characteristic Impedance@1MHz	120 Ω ± 10 Ω				120 Ω ± 10 Ω			
Insulation Resistance	1.00 GOhm x km min.				1.00 GOhm x km min.			
Loop Resistance	186 Ohm/km max.				186 Ohm/km max.			
Mutual Capacitance@800Hz	40.0 nF/km nom.				40.0 nF/km nom.			
Nonimal Voltage	30V				30V			
Test Voltage	1.5 kV				1.5 kV			
Attenuation	100	kHz	0.6	dB/100m	100	kHz	0.6	dB/100m
	1	MHz	1.7	dB/100m	1	MHz	1.7	dB/100m
	5	MHz	3.9	dB/100m	5	MHz	3.9	dB/100m
	10	MHz	5.6	dB/100m	10	MHz	5.6	dB/100m
	20	MHz	8.1	dB/100m	20	MHz	8.1	dB/100m

0.34 mm^2

Type/Area of Application	Fixed Installation, Indoor	Fixed Installation, Indoor
Cable Construction	1x2x0.34 mm^2 (stranded)	4x1x0.34 mm^2 (stranded)
		2x2x0.34 mm^2 (stranded)
Conductor Insulation	Cellular PE/ Foam skin PE	Cellular PE/ Foam skin PE
Conductor Colors	white, brown	white, brown, green, yellow
Stranding Element	Double conductor	Star quad/ 2 pairs
Wrapping	Polyester foil over stranded bundle	Polyester foil over stranded bundle
Total Shielding	Copper braid, tinned	Copper braid, tinned
Outer Jacket Material	PVC	PVC
Outer Diameter	6.5 mm ± 0.2 mm	8.0 mm ± 0.2 mm(quad) 8.5 mm ± 0.2 mm(pair)
Outer Jacket Color	Violet	Violet
Cable Weight	approximately 54.0 kg/km	approximately 77.0 kg/km(quad) approximately 85.0 kg/km(pair)

Electrical Data:

Characteristic Impedance@1MHz	120 Ω ± 10 Ω	120 Ω ± 10 Ω
Insulation Resistance	1.00 GOhm x km min.	1.00 GOhm x km min.
Loop Resistance	115 Ohm/km max.	115 Ohm/km max.
Mutual Capacitance@800Hz	40.0 nF/km nom.	40.0 nF/km nom.
Nonimal Voltage	30V	30V
Test Voltage	1.5 kV	1.5 kV

Attenuation	100	kHz	0.4	dB/100m	100	kHz	0.4	dB/100m
	1	MHz	1.3	dB/100m	1	MHz	1.3	dB/100m
	5	MHz	3.0	dB/100m	5	MHz	3.0	dB/100m
	10	MHz	4.3	dB/100m	10	MHz	4.3	dB/100m
	20	MHz	6.4	dB/100m	20	MHz	6.4	dB/100m

0.50 mm^2

Type/Area of Application	Fixed Installation, Indoor	Fixed Installation, Indoor
Cable Construction	1x2x0.50 mm^2 (stranded)	4x1x0.50 mm^2 (stranded)
		2x2x0.50 mm^2 (stranded)
Conductor Insulation	Cellular PE/ Foam skin PE	Cellular PE/ Foam skin PE
Conductor Colors	white, brown	white, brown, green, yellow
Stranding Element	Double conductor	Star quad/ 2 pairs
Wrapping	Polyester foil over stranded bundle	Polyester foil over stranded bundle
Total Shielding	Copper braid, tinned	Copper braid, tinned
Outer Jacket Material	PVC	PVC
Outer Diameter	7.0 mm ± 0.2 mm	8.5 mm ± 0.2 mm(quad) 9.6 mm ± 0.2 mm(pair)
Outer Jacket Color	Violet	Violet
Cable Weight	approximately 69.0 kg/km	approximately 100.0 kg/km(quad) approximately 116.0 kg/km(pair)

Electrical Data:

Characteristic Impedance@1MHz	120 Ω ± 10 Ω				120 Ω ± 10 Ω			
Insulation Resistance	1.00 GOhm x km min.				1.00 GOhm x km min.			
Loop Resistance	78 Ohm/km max.				78 Ohm/km max.			
Mutual Capacitance@800Hz	40.0 nF/km nom.				40.0 nF/km nom.			
Nonimal Voltage	30V				30V			
Test Voltage	1.5 kV				1.5 kV			
Attenuation	100	kHz	0.3	dB/100m	100	kHz	0.3	dB/100m
	1	MHz	1.1	dB/100m	1	MHz	1.1	dB/100m
	5	MHz	2.8	dB/100m	5	MHz	2.8	dB/100m
	10	MHz	3.9	dB/100m	10	MHz	3.9	dB/100m
	20	MHz	5.7	dB/100m	20	MHz	5.7	dB/100m

0.75 mm²

Type/Area of Application	Fixed Installation, Indoor	Fixed Installation, Indoor
Cable Construction	1x2x0.75 mm² (stranded)	4x1x0.75 mm² (stranded)
		2x2x0.75 mm² (stranded)
Conductor Insulation	Cellular PE/ Foam skin PE	Cellular PE/ Foam skin PE
Conductor Colors	white, brown	white, brown, green, yellow
Stranding Element	Double conductor	Star quad/ 2 pairs
Wrapping	Polyester foil over stranded bundle	Polyester foil over stranded bundle
Total Shielding	Copper braid, tinned	Copper braid, tinned
Outer Jacket Material	PVC	PVC
Outer Diameter	8.7 mm ± 0.2 mm	10.4 mm ± 0.2 mm(quad) 11.8 mm ± 0.2 mm(pair)
Outer Jacket Color	Violet	Violet
Cable Weight	approximately 101.0 kg/km	approximately 112.0 kg/km

Electrical Data:

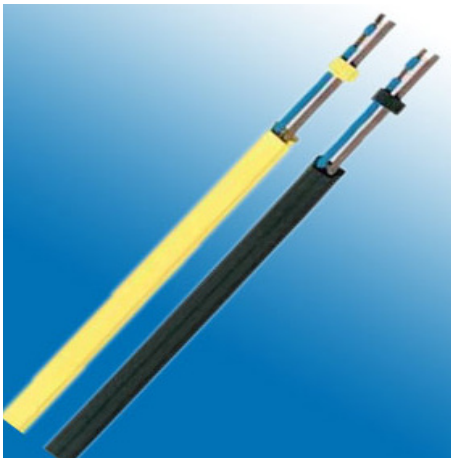
Characteristic Impedance@1MHz	120 Ω ± 10 Ω				120 Ω ± 10 Ω			
Insulation Resistance	1.00 GOhm x km min.				1.00 GOhm x km min.			
Loop Resistance	52 Ohm/km max.				52 Ohm/km max.			
Mutual Capacitance@800Hz	40.0 nF/km nom.				40.0 nF/km nom.			
Nonimal Voltage	30V				30V			
Test Voltage	1.5 kV				1.5 kV			
Attenuation	100	kHz	0.3	dB/100m	100	kHz	0.3	dB/100m
	1	MHz	0.9	dB/100m	1	MHz	0.9	dB/100m
	5	MHz	2.4	dB/100m	5	MHz	2.4	dB/100m
	10	MHz	3.5	dB/100m	10	MHz	3.5	dB/100m
	20	MHz	5.2	dB/100m	20	MHz	5.2	dB/100m

Technical Data:

Bending Radius (Approx.)	15 x OD mm	15 x OD mm
Operating Temp.Range, min.	- 30 °C	- 30 °C
Operating Temp.Range, max.	+70 °C	+70 °C

ASI-Bus

Application:



ASI is standardized Europe-wide in EN 50295 and internationally in IEC 62026-2.Network system for the lowest field level (binary sensors and actuators). Data and energy are transmitted between control unit and peripherals via an unscreened, geometrically coded two-core flat cable (pole safe). The conductor is contacted by piercing technology within the ASI-modules. The special outer jacket provides protection against bio-oil, grease, and refrigerant lubricants, and the cable is therefore even suitable for applications in wet surroundings, in machinery and plant construction, as well as in the machine tool and automotive industry.

Construction:

Type/Area of Application	Actuator Sensor Interface
Cable Construction	2x1.5 mm^2
Inner Conductor Diameter	Copper, tinned
Conductor Insulation	Rubber Compound /TPE
Conductor Colors	Blue, brown
Stranding Element	-
Shielding	-
Shielding 2	-
Total Shielding	-
Outer Jacket Material	PVC(static installation) EPDM/PUR(flexible installation) TPE(continuous flexible installation)
Outer Jacket Color	Yellow /Black

Electrical Data:

Conductor Resistance	13.7 Ohm/km max.
Insulation Resistance	1.00 GOhm x km min.
Working Voltage	Max: 300 V
Test Voltage	2KV core to core

Technical Data:

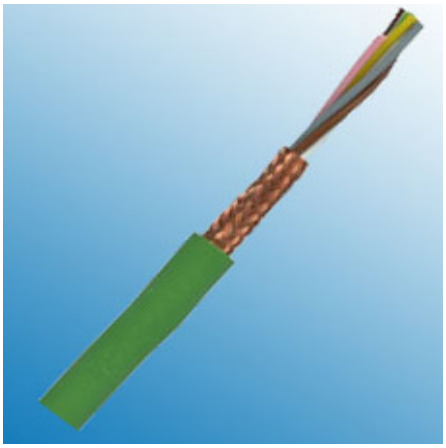
Weight	approximately 57.0 kg/km
Min. Bending Radius (Laying)	6 x OD mm
Operating Temp.Range	- 30 °C~ 90°C(PVC) - 40 °C~ 105°C(Other material)

* ASI is a registered trademark of AS-International Association

Interbus

Application:

INTERBUS (IBS) are bus cables designed for use in high speed control requirements. These cables deliver precise data transmissions. Interbus cables are available in for stationary, flexible and outdoor applications. All versions are constructed with a tinned copper braid and foil shield for optimum protection against electrical interferences and have excellent data transmission characteristics. The stationary and flexing versions have an oil-resistant and flame retardant violet jacket to INTERBUS conformance requirements. The outdoor version has a UV-resistant black PVC jacket for direct burial and outdoor use.



3 Pair Remote Bus

Construction:

Type	3 Pair Interbus cable
Inner Conductor:	Plain copper conductors 0.22mm²
Conductor Insulation	PE
Stranding Element	Cores twisted into pairs, pairs bunched
Core Wrapping	Polyester taped
Shielding	-
Total Shielding	Copper wire braid
Drain Wire:	-
Outer Jacket Material	PVC(static) /PUR(dynamic)
Conductor identification	Pairs: Brown/White, Green/Yellow, Pink/Grey.
	Cores: Red, Blue, Green.
Sheath colour	Green or Purple*

3 Pair + Power, Remote Installation cable

Construction:

Type	3 Pair Interbus cable
Inner Conductor, data	Plain copper, 0.22mm²
Inner Conductor, power	Plain copper, 1.0mm²
Conductor Insulation, data	PE
Conductor Insulation, power	PE
Stranding Element, data	Cores twisted into pairs
Stranding Element, power	-
Total stranding Element	Cores and pairs bunched together
Core Wrapping	Polyester taped
Shielding	-
Total Shielding	Copper wire braid
Drain Wire	-
Outer Jacket Material	PUR sheath
Conductor identification	Pairs: Brown/White, Green/Yellow, Pink/Grey.
	Cores: Red, Blue, Green.
Sheath colour	Green or Purple*

Electrical Data:

Characteristic Impedance@1Hz	120 Ω ± 20 Ω
Conductor resistance	96.0 Ohm/km
Insulation Resistance	1Gohm x km.min
Matual Capacitance@800Hz	Max: 60nF/km
Working Voltage	Max: 300V
Test Voltage	1.5KV

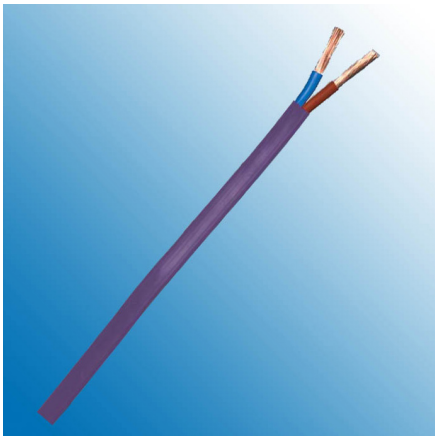
Technical Data:

Weight:	approximately 67.0 kg/km	approximately 96.0 kg/km
Min. Bending Radius	PUR:15 x OD mm / PVC:8 x OD mm	
Operating Temp.Range, min.	- 30 °C	
Operating Temp.Range, max.	+70 °C(flexing) / +80 °C(static)	

Interbus Loop Cable

Application:

The two-conductor Interbus-Loop cable is to be applied as a data transmission cable as well as for the supply of sensors. The three-conductor Interbus-Loop cables is applied for supply of actuators. These cables are also suitable for Interbus-Loop 2.



Construction:

Type	2 pairs/ 3 pairs interbus Loop cable
Inner Conductor	Bare copper conductors 1.5mm²
Conductor Insulation	PE
Stranding Element	Specially adjusted layering with netting tape and one additional non-woven tape over the outer layer
Core Wrapping	-
Shielding	-
Drain Wire:	-
Outer Jacket Material	PVC/ PUR/ FRNC
Conductor identification	Blue, red
Sheath colour	Purple

* INTERBUS is a registered trademark of Phoenix Contact GmbH & Co

Electrical Data:

Characteristic Impedance@250MHz - 10MHz	75 Ω ± 15 Ω
Radiation Resistance	5 x 107 cJ/kg
Weather Resistance	Very good
Working Voltage	Max: 350V
Test Voltage	1KV

Technical Data:

Weight:	approximately 78.0 kg/km	approximately 94.0 kg/km
Min. Bending Radius	15 x OD mm	
Operating Temp.Range, min.	- 40 °C(flexing)/ - 50 °C(static)	
Operating Temp.Range, max.	+90 °C	

* INTERBUS is a registered trademark of Phoenix Contact GmbH & Co

CC-Link 1.10 Cable

Application:

CC-Link® (Control & Communication Link) is a field network system that processes both control and information data at high speed, to provide efficient, integrated factory and process automation.
CC-Link is particularly popular in Asia and is used worldwide for time critical applications .
CC-Link is certified by CLPA and ensures product compatibility.

Construction:

Type	3 x 20AWG Cable
Inner Conductor	Plain copper conductors 20(7)AWG
Conductor Insulation	Foamed PE with a hard skin
Stranding Element	-
Core Wrapping	Polyester taped
Shielding	Aluminium foil
Total Shielding	Tinned copper wire braid – 78% optical coverage
Drain Wire	22(19)AWG tinned copper
Outer Jacket Material	PVC / PE
Core Identification	Yellow, White, Blue
Sheath colour	Red

Electrical Data:

CharacteristicImpedance@1MHz	110 Ω ± 10Ω	
Conductor Resistance	36.0 Ohm/km max.	
Insulation Resistance	10.0GOhm x km min.	
Mutual Capacitance@1 KHz	60.0 nF/km nom.	
Working Voltage	Max:300v	
Test Voltage	2 KV	
Data Rate	156 Kbit/s	1200m
	625 Kbit/s	600m
	2.5 Mbit/s	200m
	5.0 Mbit/s	110-150m
	10.0 Mbit/s	50-100m
Attenuation	1kHz	16dB/100m
	5kHz	35dB/100m

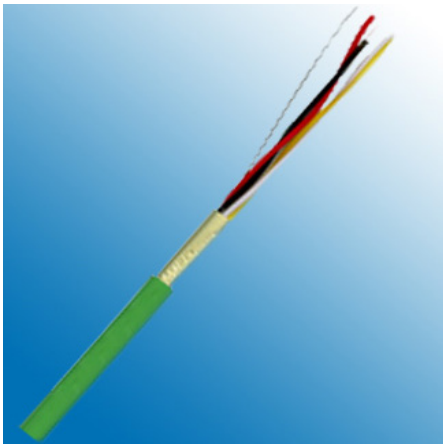
Technical Data:

Weight	approximately 76.0 kg/km
Min. Bending Radius (Laying)	15 x OD mm
Operating Temp.Range, min.	- 40 °C
Operating Temp.Range, max.	+70 °C

* CC-Link® is a registered trademark of CC-Link® Partner Association, Japan (CLPA).

E.I.B Cable
(European Installation Bus)

Application:



EIB installation consists of sensors and actuators. The E.I.B. concept allows intergration of Building Management Systems (B.M.S.) over one common system. Lighting, blinds, heating and ventilation can be automatically controlled through the E.I.B cable. This dramatically reduces the cabling required in a modern building. To meet European standards this cable is LSHF throughout. They can be installed over, in, or below the plaster, in pipes and pipe ducts, in dry, moist, and wet areas, as well as outside, provided they are protected against direct exposure to the sun.

Construction:

Type/Cable Construction	1 Quad	2 Pair
Inner Conductor	Plain copper conductors 0.8mm	Plain copper conductors 0.8mm
Conductor Insulation	Polyethylene	Polyethylene
Conductor Colors	White,yellow,red,black	White,yellow,red,black
Stranding Element	Cores twisted into a quad	Cores twisted into pairs, pairs laid up
Core Wrapping	-	-
Shielding	Aluminium/polyester foil screen	Aluminium/polyester foil screen
drain wire	Solid copper	Stranded tinned copper
Outer Jacket	Low Smoke Halogen Free	Low Smoke Halogen Free
Sheath Colour	Green	Green

Electrical Data:

Test Voltage	4KV
Working Voltage	Max.150V
Conductor resistance	37.0 Ohm/km @ 20°C
Insulation resistance	1000MΩhms*km @ 20°C
Mutual capacitance@800Hz	100nF/km max
Unbalanced capacitance	300pF/100m max

Technical Data:

Weight	approximately 62.0 kg/km	approximately 57.0 kg/km
Min. Bending Radius (Laying)	10 x OD mm	10 x OD mm
Operating temperature, min	-20°C(fixed)	-5°C (installation)
Operating temperature, max	+70°C(fixed)	+50°C(installation)

Safety Bus

Application:

Safety Bus is an open Fieldbus system based on well established CAN Bus technology. Safety Bus modules must be self monitoring, perform intelligent checks and reactions independently and therefore remain “safe”.Several versions of Safety Bus cables are available depending on the application and environmental conditions. The transnission rate is up to 500 Kbit/s

Construction:

Type/Area of Application	Fixed Installation, Indoor
Cable Construction	3x0.75 mm^2 (stranded)
Inner Conductor Diameter	Copper, bare (AWG 18/24)
Conductor Insulation	Foamed PP with a hard skin
Conductor Colors	white, brown, green
Stranding Element	Triple conductor
Wrapping	Polyester foil over stranded bundle
Total Shielding	Copper braid, tinned
Outer Jacket Material	FRNC/PUR/PVC/LSHF
Outer Diameter	7.5 mm ± 0.3 mm
Outer Jacket Color	Yellow

Electrical Data:

Characteristic Impedance@1MHz	120 Ω ± 10 Ω				
Conductor Resistance	52.0 Ohm/km max.				
Insulation Resistance	0.20 GOhm x km min.				
Mutual Capacitance@800Hz	45.0 nF/km nom.				
Working Voltage	Max: 250 V				
Test Voltage	3.0 KV				
Data Rate	500 Kbit/s			100m	
	250 Kbit/s			250m	
	125 Kbit/s			500m	
	50 Kbit/s			1000m	
Attenuation	1	MHz	<	1.6	dB/km
	5	MHz	<	3.4	dB/km
	10	MHz	<	5.6	dB/km
	16	MHz	<	7.5	dB/km

Technical Data:

Weight	approximately 68.0 kg/km
Min. Bending Radius (Laying)	10 x OD mm
Operating Temp.Range, min.	- 30 °C
Operating Temp.Range, max.	+80 °C

* SafetyBUS p® is a registered trademark of Pilz GmbH & Co., Ostfildern

DeviceNet™

Application:

DeviceNet™ communication link is based on proven CAN technology.DeviceNet™ is a bus system developed by Allen Bradley (Rockwell Automation). These cables are used to interconnect various industrial devices, such as SPS controls or limit switches. The special characteristic of this bus system is that a data pair and a power supply pair are integrated in one cable.

Construction:

Type/Area of Application	DeviceNet Trunk (Thick)	DeviceNet Drop (Thin)
Cable Construction	1x2x0.96mm^2 +1x2x1.53mm^2	1x2x 0.24mm^2+1x2x0.38mm^2
Inner Conductor Diameter (data pair)	Copper, tinned (AWG 18/19)	Copper, tinned (AWG 24/19)
Inner Conductor Diameter (power pair)	Copper, tinned (AWG 15/19)	Copper, tinned (AWG 22/19)
Conductor Insulation (data pair)	Foam-skin-PE/PE	Foam-skin-PE/PE
Conductor Insulation (power pair)	PVC/ PE	PVC/ PE
Conductor Colors 1	light blue, white	light blue, white
Conductor Colors 2	red, black	red, black
Stranding Element	Double conductor	Double conductor
Shielding	Polyester foil, aluminum-lined	Polyester foil, aluminum-lined
Drain Wire	yes	yes
Total Shielding	Copper braid, tinned	Copper braid, tinned
Outer Jacket Material	PVC/ PUR/ PE/ FRNC	PVC/ PUR/ PE/ FRNC
Outer Cable Diameter	12.0 mm ± 0.3 mm	7.0 mm ± 0.3 mm
Outer Jacket Color	Grey/ Violet/ Yellow	Grey/ Violet/ Yellow
For armored cable		
Inner Jacket Material	PVC/ PUR/ PE/ FRNC	PVC/ PUR/ PE/ FRNC
Armor	SWA / SWB	SWA / SWB
Outer Jacket Material	PVC/ PUR/ PE/ FRNC	PVC/ PUR/ PE/ FRNC
Outer Cable Diameter	Min. 16.0 mm	Min. 10.5mm
Outer Jacket Color	Grey/ Violet/ Yellow	Grey/ Violet/ Yellow

Fire resistant DeviceNet™ cables can also be provided upon request.

Electrical Data:

Characteristic Impedance@1MHz	120 Ω ± 10Ω					120 Ω ± 10Ω				
Conductor Resistance	22.6 Ohm/km max.					90.0 Ohm/km max.				
Insulation Resistance	0.20 GOhm x km min.					0.20 GOhm x km min.				
Mutual Capacitance@800MHz	39.8 nF/km nom.					39.8 nF/km nom.				
Working Voltage	Max: 300V					Max: 300V				
Test Voltage	2.0 KV					2.0 KV				
Data Rate	125 Kbit/s			500m		125 Kbit/s			100m	
	250 Kbit/s			250m		250 Kbit/s			100m	
	500 Kbit/s			100m		500 Kbit/s			100m	
Attenuation:	125	KHz	<	0.42	dB/100m	125	KHz	<	0.95	dB/100m
	500	KHz	<	0.81	dB/100m	500	KHz	<	1.64	dB/100m
	1	MHz	<	1.26	dB/100m	1	MHz	<	2.38	dB/100m

Technical Data:

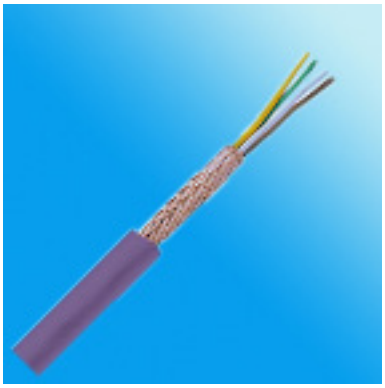
Weight	approximately 195.0 kg/km	approximately 69.0 kg/km
Min. Bending Radius (Laying)	10 x OD mm	10 x OD mm
Operating Temp.Range, min.	- 20 °C	- 20 °C
Operating Temp.Range, max.	+80 °C	+80 °C

* DeviceNet™ is a registered trademark of Open DeviceNet Vendor Association

Modbus

Application:

These cables can provide a master/slave communication between intelligent automation devices with electromagnetic screening. These cables with PVC jacket are designed for fixed installation, and suitable for multiple Bus systems based on RS485 / RS422, used for bus systems such as e.g. Modbus, SUCOnet P, Modulink P, VariNet-P



Construction:

Type/Area of Application	Multiple Bus systems based on RS485 / RS422
Inner Conductor	Stranded plain copper conductors 0.22mm²
Conductor Insulation	PE(polyethylene)
Stranding Element	Cores twisted into a pair
Core Wrapping	Polyester taped
Shielding	-
Total Shielding	Tinned copper wire braid – 90% optical coverage
Outer Jacket Material	PVC / LSOH
Core Identification	Coded to DIN 47100
Sheath Colour	Violet

Electrical Data:

Test Voltage	1500V
Working Voltage	Max.250V
Conductor resistance	186Ohm/km
Insulation resistance	1000MΩhms*km @ 20°C
Mutual capacitance@800Hz	60nF/km max
Characreristic impedance	100-120ohm

Technical Data:

Min. Bending Radius (Laying)	8 x OD mm	
Temperature, min	-40°C(fixed)	-5°C(flexible)
Temperature, max	+80°C(fixed)	+70°C(flexible)

Cable Perameters:

Number of pairs and mm²	Outer diameter (mm)	Cable Weight (kg/km)
1x2x0.22	5.7	37
2x2x0.22	7.1	45
3x2x0.22	7.2	72

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