BELDEN
SENDING ALL THE RIGHT SIGNALS

Industrial Wire and Cable Solutions
Line Card

Be certain.
Belden.

A Strong Tradition of Excellence

With a combined history of over 100 years, Belden has established a strong reputation for quality, setting, maintaining and exceeding new standards of performance and reliability. The combination of proven experience and innovation behind our brands has made Belden the largest provider of an integrated range of wired and wireless systems. Therefore we are able to provide complete signal transmission solutions from a single source with worldwide market access and delivery.

Belden signal transmission solutions are used by customers around the globe for mission-critical applications. They trust our ability to understand their needs and meet their expectations. Time after time we are able to deliver tailor-made integrated solutions. We have a very successful trackrecord reducing complexity, improving overall performance and maximizing return on investment.
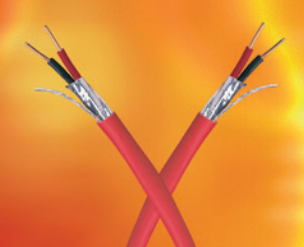
Content

Building Management Systems

Belden's comprehensive building management product line-up includes the following: **Communication and Control Cables** – suitable for a wide range of applications, including security systems, pro audio, sound and intercom systems, annunciators, power-limited controls, and more. **Audio Cables** – suitable for commercial sound/audio systems, such as intercom and public address systems and fire alarm systems (Red only). **Security and Alarm Cables** – suitable for a wide range of applications, including security systems, sound and intercom systems, power-limited controls, fire and burglar alarm systems, single-line telephones, and more. **Fire Alarm Cables** – approved by NEC/CEC and California State Fire Marshall for commercial fire alarms, monitoring and detection systems, audio and control and notification circuits.

Building Management Systems										
	Product Family	**Insulation Material**	**Typical Wires**	**Jacket Material**	**Shielding**	**Armor**	**Style**	**Operating Temp.**	**Approvals**	**Special Features**
	Circuit Integrity	Silicon Rubber	2, 4	Flame retardant polyethylene	Foil	–	Multi-Conductor	-20 °C up to +105 °C	BS 6387 CWZ EN 50200 IEC 60331-23	EN50200: PH120 (2 hour) BS 6387 CWZ (highest standard) - C: Resistance to fire alone 3 hour/950 °C - W: Resistance to fire with water spray 15 min/650 °C - Z: Resistance to fire with mechanical shock 15 min/950 °C
	Fire Alarm	PVC FEP	2, 4	PVC FEP	Foil 82% TC braid	–	–	-40 °C up to +105 °C	FPLR/CMG FT4, FPL, NPLF, FPLP, NEC: MPR, FPLR CEC: FAS 105 FT4	Approved by NEC/CEC, plenum rated
	BMS Control	PVC PE	–	PVC FRNC	Foil	Steel Wire	Multi-Conductor Pairs	-20 °C up to +80 °C	UL	Cables for EIA RS-485 applications able to support data transmission for up to 4,000 ft/1,219 m distance, bundle and flame propagation tests

Fiber

From buffered fiber cables right through to central and multi loose tube variations: Belden's fiber cabling range is the culmination of our experience and expertise in a variety of applications, including data centers, premise and campus network backbone infrastructures, fiber-to-the-desk (FTTD) applications, horizontal and centralized cabling systems, underground and industrial.
- Designed to offer **reduced complexity and increased flexibility**
- **Secure connection:** rodent protection, flame retardant, outdoor, watertight
- **High bandwidth and transmission speed**, the potential for network growth, extended reach, fault tolerance, greater data security and support for Gigabit and multi-Gigabit protocols and networked applications

Fiber						
	Product Family	**Type**	**Fiber Type**	**Wave-Length (nm)**	**Temperature Range (F1)**	**Special Features**
	Central Loose Tube Cables	Rodent Protection Cables Corrugated Steel Tape Cables Steel Wire Braid Cables Steel Wire Armored Cables Fiber Reinforced Plastic Armored Cables	9/125 G.652D OS2	1310, 1550	Transport/storage: -30 °C to +70 °C	Halogen-free Flame retardent Non corrosive Low smoke density Watertight Direct burial Outdoor
			9/125 G.655 C & D	1550	Installation: -5 °C to +50 °C	
			62.5/125 OM1	850, 1300	Operation: -30 °C to +70 °C	
	Multi Loose Tube Cables	Rodent Protected Cables Corrugated Steel Tape Cables Steel Wire Armored Cables All Dielectric Self Supporting Cable	50/125 OM2	850, 1300		
			50/125 OM3	850, 1300		
			50/125 OM4	850, 1300		

Industrial Wire and Cable – Automation and Process
Industrial Ethernet and PROFINET

The comprehensive DataTuff Industrial Ethernet cable and connectivity range ensures the highest level of reliability, quality and performance. Specifiers can choose from products suitable for indoor and outdoor applications, for use underground, and for other harsh conditions. Cordsets come in RJ45 with IP20 and IP68 protection.

- **Widest choice for best fit** – From the cabinet to the machine
- **Robust** enough to guarantee the highest levels of reliability and performance

- **Meets all data rate requirements**, ranging from 100 Mb/s, through 1 Gb/s, to 10 Gb/s
- **Railway approved range (RailTuff)** for use in on-board communications (e.g., Ethernet backbone and VLAN segments, passenger information and enterteinment, multimedia services, security, etc.) and trackside

Industrial Ethernet and PROFINET

Product Family	Protocol	Insulation Material	Data Rates	Jacket Material	Shielding	Armor	Style	Operating Temp.	Approvals	Connector & IP Rating	Body Type	Special Features
Cables	Industrial Ethernet	Polypro-pylene	100 Mb/s 1 Gb/s 10 Gb/s	PVC FRNC/LSNH PUR (halogen-free) TPE Premium FRNC, Insulation and jacket cross-linked (by e-beam) for RailTuff	Foil & Braid >65%, 80%, 85% No shielding	Aluminium interlock armor	Twisted Pair Bonded Pair	-40 °C up to +80 °C Plenum: -70 °C up to +150 °C	DataTuff: UL/AWM IEC RailTuff: EN 50155:2007, Class TX (-40 °C to +85 °C) EN/TS 45545-2:2009 DIN 5510-2 ISO/IEC 11801 2nd edition IEC 61156-6	–	–	Torsion resistent >2 million cycles guaranteed, +/- 360° per 1 m length Trailing resistant/Drag chain suitability >2 million to 10 million bending cycles Oil resistant Abrasion resistant LSNH Sunlight Resistant Plenum/High Temp
	PROFINET	Polyolefin	100 Mb/s	PVC FRNC/LSNH PUR (halogen-free) FRNC, Insulation and jacket cross-linked (by e-beam) for RailTuff	Foil & Braid >85%	–	Quad	-40 °C up to +80 °C	DataTuff: IEC RailTuff: EN 50155:2007, Class TX (-40 °C to +85 °C) EN/TS 45545-2:2009 DIN 5510-2 ISO/IEC 11801 2nd edition IEC 61156-6	–	–	Torsion resistent >2 million cycles guaranteed, +/- 360° per 1 m length Trailing resistant/Drag chain suitability >2 million to 10 million bending cycles Fast-Connect Oil resistant Abrasion resistant LSNH
Patch Cords	Industrial Ethernet	Polypro-pylene	100 Mb/s 1 Gb/s 10 Gb/s	PVC FRNC/LSNH PUR (halogen-free) TPE	Foil & Braid >65%, 80%, 85% No shielding	–	Twisted Pair Bonded Pair	-10 °C up to +60 °C -40 °C up to +75 °C	UL/AWM	RJ45 with IP20 and IP68	Over Mold Sliding Booth	Torsion Trailing Oil resistant Abrasion resistant LSNH
	PROFINET	Polyolefin	100 Mb/s	PVC FRNC/LSNH PUR (halogen-free)	Foil & Braid >85%	–	Quad	-10 °C up to +60 °C	–	RJ45 with IP20	Over Mold	Oil resistant Abrasion resistant LSNH

Industrial Wire and Cable – Automation and Process
Serial Fieldbus

Belden's Serial Fieldbus range covers all key protocols in the market: Foundation Fieldbus (type A, type B, high speed), Profibus DP and PA, CanOpen RS-485, DeviceBus (for ODVA DeviceNet™, Honeywell Smart Distributed System, Square D/Seriplex® and Phoenix Contact INTERBUS®-S), ControlNet, ControlBus, MODBUS and Lonworks. The products are **approved for the main PCL/DCS manufacturers in the market,** such as: ABB, Siemens, Rockwell Automation, Honeywell, Emerson, Yokogawa, Mitsubishi, Schneider Electric, Omron, etc.

- **Robustness** for full range of industrial applications: outdoors, trailing, oil contact
- **Reliability** through design robustness: steel wire armor, stranded conductors
- **Ease** of use through fast connect versions

Serial Fieldbus

Protocol	Jacket Material	Shielding	Armor	Style	Operating Temperature	Approvals	Special Features
Foundation Fieldbus Profibus DP and PA CANopen RS-485 DeviceBus for: ODVA DeviceNet, SDS, Seriplex ControlNet ControlBus MODBUS LonWorks	PVC FRNC/LSNH PUR CPE TPE HDPE	Foil & Braid >65%, 80%, 85% and 90% Duofoil Shielding Beldfoil No Shielding	Steel Wire Aluminium Interlock Steel Interlock Aluminium Belclad® Steel Belclad Copper Belclad Continuous Armor	Twisted Pair Bonded Pair Quad Single and Multi-Conductor	-40 °C up to +150 °C High temperature and plenum: -70 °C up to +200 °C	UL IEC NFPA	Plenum rated High Flex Low smoke, no halogen Thick/thin cables Sunlight resistent Oil resistent I & II Weldsplatter resistant Continuously flooded CMX/Outdoor and sunlight resistant FastConnect Trailing, Torsion MSHA

Industrial Wire and Cable – Control and Power
Variable Frequency Drive (VFD)

Belden offers the most extensive line of VFD cables, the cable performance supporting AC drives manufactured by the following companies: Rockwell Automation, AA Electric, ABB, Baldor, Cutler-Hammer, Emerson Process Management, Fivestar Electric Motors, General Electric, Hitachi, Magnetek, Mitsubishi Electric Automation, Motion Industries, Quality Drive Systems, Robicon, Siemens, Square D, Toshiba and TB Woods.

- **Thicker, industrial-grade XLPE insulations** provide low capacitance for extended motor life, reduced likelihood of corona discharge, reduced magnitude of standing waves, increased efficiency of power transfer

- **Robust ground and shielding system** to minimize radiated and conducted noise that can disrupt plant control and instrumentation systems
- **Reliably carry power from AC drive systems to AC motors**
- **Effectively handle the overall high power levels of pulse-width modulated (PWM) signals**

Variable Frequency Drive (VFD)

Protocol	Insulation Material	Jacket Material	Shielding	Armor	Style	Operating Temp.	Approvals	Special Features
Power	XLPE	PVC	Overall Duofoil shield 85% TC braid Two spiral copper tape shields (100% coverage)	Al interlocked Steel interlocked Spiral copper tape	Multi-Conductor	-40 °C up to +90 °C	UL 1277 TC-ER	90 °C wet dry suitable for class I, II & III, division 2 hazardous locations, MSHA, Sunlight & oil resistant, UL oil Res 2 & IEC 60811-2-1 hydrocarbon resistant, Direct burial, RW90 rated circuit conductors, IEC 60754-1, -2 (acid gas emissions), Marine approvals: ABS, UL 1309, IEEE 45, IEEE 1580 type P, XHHW-2, RHW-2 rated circuit conductors, 14 AWG and larger

Industrial Wire and Cable – Control and Power
Control, Hook-Up and Sensor/Actuator

Belden offers a wide range of control and power cables for all applicable UL and CSA specifications. The EMEA **control cable** portfolio is industry application specific.

The range covers 600 V and 1000 V TC/CIC Control Cables, 600 V Teck–Style Cables, 600 V Type MC Metal Clad Cables. Belden's **hook–up and lead wire** products can be used in a wealth of applications, including interconnection circuits, internal wiring of computer and data processing equipment, appliances, lighting, motor leads, heating and cooling equipment, harness fabrication, and automotive.

The **sensor/actuator** range is analog signal cables, connecting automation systems end points (e.g., sensors) to the next layer (e.g. I/O devices). These applications require cables with high flexibility and resistance to tough industrial environments (e.g., oil, temperature variation, chemicals), low data rates and reliable quality.

Control, Hook-Up and Sensor/Actuator

Product Family	Protocol	Typ. Cross Section	Insulation Material	Typ. Wires	Jacket Material	Shielding	Armor	Style	Operating Temp.	Approvals	Special Features
Control	Signal Distri-bution	0.5 mm² to 0.75 mm²	PVC PE PP XLPE optional	–	PVC FRNC/LSNH PUR (halogen-free)	Braid >85%	Steel Wire	Multi-Conductor	-40 °C to high temp. up to +80 °C PUR PVC: +105 °C	CSA Standard UL FT4 OEM design per request	Sunlight/UC resistant Direct burial Heat resistant Corrosion resistant High tensile strength Good low temp properties
Hook-up	–	0.5 mm² to 0.75 mm²	PVC, FEP, Teflon, EPDM, XL-DUR, CSPE, Neoprene, Silicone rubber	1	–	–	–	Single Wire	High temp. up to +200 °C silicon	UL	Heat resistant Color stability Fast stripping Oil resistant
Sensor/Actuator	Sensor Cables	0.25 mm² to 0.34 mm²	PP PVC	2, 3, 4, 5	PVC PUR (halogen-free, screened, screened & halogen-free) TPE	Braid >85%	–	Single- and Multi-Conductor	High temp. up to +80 °C PUR /+105 °C PVC	UL AWM	Trailing resistant/Drag chain suitability >2 million to 10 million bending cycles Torsion resistant Resistance to coolants and lubricants Free of halogen and substances detrimental to paint adhesion LABS free Phosphorus free Oil resistant Spark welding

![Belden - Sending all the right signals]

Industrial Wire and Cable – Instrumentation

The Belden Instrumentation product line consists of **300 V Power Limited Tray (PLTC) instrumentation cables, thermocouple instrumentation cables, thermocouple** **extension cables and wire,** and **600 V TC instrumentation cables**, which comply with ICEA standards, TC-ER and TC-LS ratings. To ensure top performance in even the harshest of environments, Belden cables are available with multiple armoring and jacketing options – making them ideal for all industries, including petrochemical, pharmaceutical, mining, power generation, wastewater treatment, pulp and paper, food processing, and transportation.

Instrumentation

Range	Insulation Material	Jacket Material	Shielding	Armor	Style	Operating Temp.	Approvals	Special Features
300 V PLTC Instrumentation cables 300 V Thermocouple Extension Cables and Thermocouple Wire 600 V TC Instrumentation	PVC XLPE TPE FEP PVC-Nylon PE/PVC	PVC TPE CPE FEP Haloarrest	Individually foil Overall foil Individually & overall foil Overall TC braided Copper tape	Optional: Standard aluminium or galvanized steel interlock	Pair, triad	-30 °C up to +90 °C	UL TC-ER TC-LS ICEA S-73-532 ICEA S-82-552 ICEA S-61-402 ICEA S-66-524 ICEA T-29-520	Direct burial MSHA WTTC Plenum rated Outdoor and sunlight resistant

MIPP – The Industrial Termination and Patching Solution

Belden's Modular Industrial Patch Panel (MIPP™) is a robust and versatile **termination and patching panel for copper and fiber cables** that need to be connected from operating environment to active equipment. Easily installed on any standard 35mm DIN rail, MIPP features high port density to meet expanding network connectivity needs within limited space.

- **Robustness:** die cast aluminium housing and durable UL certified (UL 1863)

- **Versatility:** suitable in nearly any industrial application where a single MIPP™ allows for termination and patching of:
  – up to 72 fiber cores: **MIPP™ Fiber Splice Box**
  – up to 24 copper cables: **MIPP™ Copper Patch Panel**
- **Ease of use:** mounted on a DIN rail or wall, any module can be individually extracted from the housing for maintenance actions and easy installation

MIPP

Range	Adapter/Keystone	Fiber Type/ Copper Category	IP Rating	Housing	Operating Temp.	Body Type	Approvals	Special Features
MIPP Fiber Splice Box	LC, SC, ST, ST metal and E-2000™ fiber duplex adapters	Multimode: OM1, OM2, OM3 and OM4 Singlemode: OS2, and APC	IP30	Robust aluminium housing	-20 °C to +70 °C	DIN Rail Wall mount	UL 1863	Robust housing IP30
MIPP Copper Panel	RJ45 copper keystone jacks (Shielded and Unshielded, Cat 5e, Cat 6, Cat 6A) RJ45 copper coupler (Shielded and Unshielded, Cat 6A)	Shielded and Unshielded: Cat 5e, Cat 6 and Cat 6A						
MIPP Mix	Mix	Mix						

BELDEN
SENDING ALL THE RIGHT SIGNALS

GLOBAL LOCATIONS

More information can be found at
www.beldensolutions.com

Be certain
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