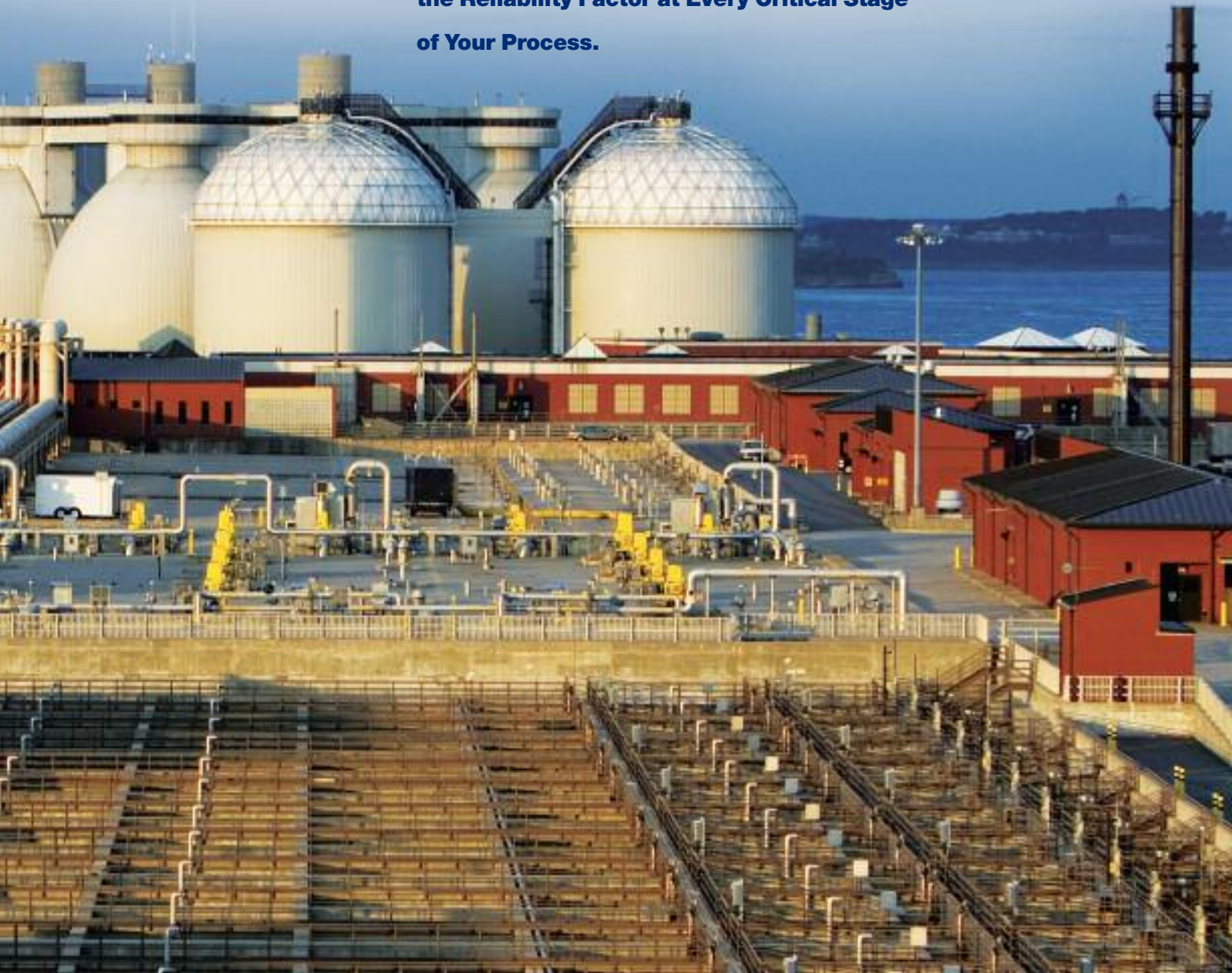**BELDEN**
SENDING ALL THE RIGHT SIGNALS

Solutions for the Water
and Wastewater Industries

**Meeting the Needs
of Harsh Industrial
and Mission-Critical
Environments**

BELDEN
SENDING ALL THE RIGHT SIGNALS

Belden® Products Have Been Designed To Meet the Specific Needs of Water and Wastewater Facilities. **Our Signal Transmission Solutions Increase the Reliability Factor at Every Critical Stage of Your Process.**

Belden 'Connects' with the Water and Wastewater Industries

Every industrial environment imposes its own kind of harsh conditions on the system components. In water and wastewater treatment plants, cabling, connectivity and networking devices must endure high levels of humidity, grit and sludge. Lime and a form of iron are also introduced into the process — and, in some cases, gases like methane, hydrogen sulfide and chlorine are present — all of which can contribute to corrosion.

These factors can wreak havoc on the mission-critical networks tasked with conveying signals between measuring instruments such as thermocouples, strain gauges, load cells, and flow meters and the programmable logic controllers (PLCs) that interpret the signals. The latter have to be able to continuously and dependably monitor and control process parameters like tank fill levels, water flow rates, water temperature, oxygen level, pH, and others.

Often a company in these industries has multiple plant sites and remote pumping stations, so the breadth of the information monitoring problem can be rather extensive and complicated.

The remote pumping stations are also frequently unstaffed and housed in underground concrete enclosures that are subject to temperature extremes, potentially making the proper selection of control, monitoring — and in some cases — telemetry components, even more critical.

And, like plants in any industry, facilities here are constantly under pressure to work toward ever higher levels of operational efficiency to remain profitable. All of these tasks and needs are difficult to deal with without reliable signal transmission components.

Belden Means Top Performance, High Reliability and Redundancy

Belden understands these problems—and to offset any potential reliability problems we offer a well-integrated line of cabling, connectivity and active devices that have been designed and manufactured specifically to meet the hazards of harsh and severe environments like those found in the water/wastewater industry.

We understand that modern water treatment plants typically require a high degree of automation to improve efficiency. Implementing it involves computer-controlled devices and remote monitoring over fast and reliable networks, usually relying on Industrial Ethernet in a high-speed fiber backbone. This allows the collection of data from numerous locations within several plants and makes that data accessible to any device or person on the network that requires it.

Industrial Ethernet affords older plants in the water and wastewater industries an efficient scheme for upgrading their legacy infrastructure, setting up a data collection and management infrastructure that will support future expansion. No industry can ignore the needs of the future.

But what's required to actually build those connectivity systems of the future are reliable, hardened network switches and cabling/connectivity components whose high bandwidths can support multiple streams of data. Belden products are well-qualified for that role.

Belden Also Plays a Role in Plant Security

Another factor to consider is the security of a plant in the water and wastewater industries, a factor of growing importance these days. In the past, such plants were only required to build in security for emergencies like floods, leaks, tornadoes, fires and so on. Today, however, we must also be on the lookout for malicious acts like sabotage, theft and vandalism that can shut down operations abruptly.

While most water reservoirs are protected by some kind of physical barrier like fencing or retention walls, their critical nature also demands the presence of hardened networks for warning and alarm systems. Superior media and networking components from Belden will allow you to build those safe networks.
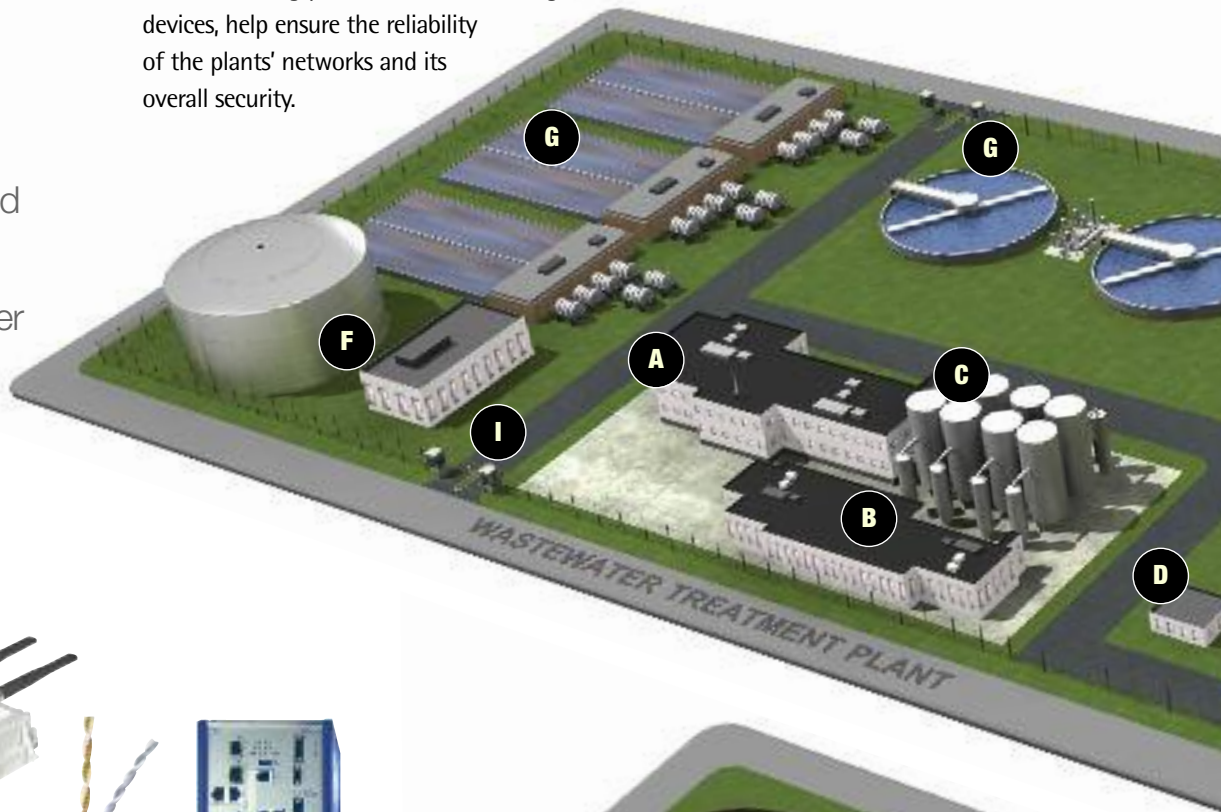
To ensure that the information in your networks flows reliably, when and where it should, Belden offers an impressive array of products for hardened networks. Our extensive range of cabling and networking products and accessories for control, data, instrumentation and power were engineered specifically for duty in harsh environments and industrial Ethernet applications. And Belden's demanding quality assurance program subjects all of its industrial-grade products to stringent tests to ensure their suitability for field applications.

Additionally, Belden offers decades of experience in sound and security cabling products for alarm, access control and CCTV cameras, lighting and HVAC/climate control cabling products, Category 6 and 5e networking products for your administration/ office environment, a broad range of free-standing and wall-mount enclosures, and a comprehensive line of cable management products.
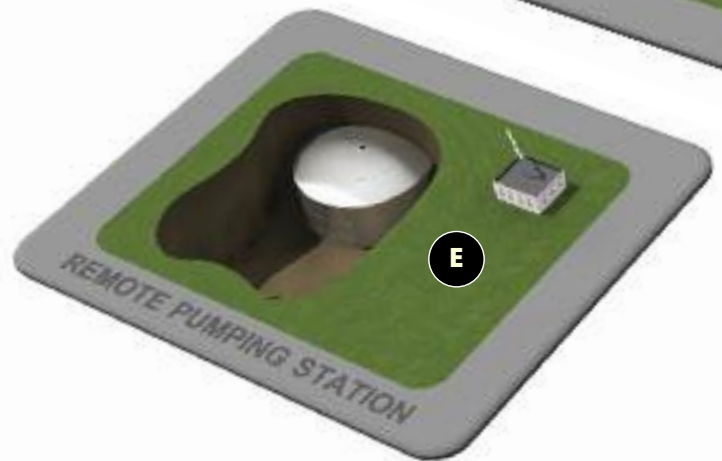
BELDEN
SENDING ALL THE RIGHT SIGNALS

From the Chemical Storage Tanks to the Filtration and Retention Ponds — and Everywhere In Between — Belden Sends All the Right Signals

Modern water treatment plants require a high degree of automation to improve their efficiency, typically involving computer-controlled devices and remote monitoring over especially fast, reliable networks. Belden's cabling products and networking devices, help ensure the reliability of the plants' networks and its overall security.

Belden's wide range of industrial-grade products were purposefully designed to stand up to the demands of the water and wastewater industry.

Belden's industrial-grade products are field-proven, rugged and reliable.

A **Master Control Center**

Cables: DataTuff® Industrial Ethernet, FOUNDATION Fieldbus, Profibus, RS-485, ControlNet and MODBUS.

Connectivity: DataTuff IP67/IP20 cord sets, modular jacks, plug kits, surface mount boxes and faceplates.

Ethernet Switches and Networking Devices: MACH4000 and MACH1000 backbone switches, OpenRail control level switches, EAGLE security firewall/VPN appliances. BAT wireless system.

B **Administration Office**

Cables: DataTuff Industrial Ethernet, Category 6 and 5e networking, sound and security, CCTV, access control.

Connectivity: DataTuff IP67/IP20 cord sets, modular jacks, plug kits, surface mount boxes and faceplates.

Ethernet Switches and Networking Devices: MACH4000 and MACH1000 backbone switches, OpenRail control level switches, EAGLE security firewall/VPN appliances. BAT wireless system.

C **Chemical Storage Tanks**

Cables: VFD, Instrumentation & Control.*

Ethernet Switches and Networking Devices: MACH1000, RSR, OpenRail and OCTOPUS control level switches, Fieldbus OZD fiber converters. BAT wireless system.

D **Motor Control Centers/Pumping Stations**

Cables: VFD, Instrumentation & Control, TrayOptic/Fiber*Express* Industrial Ethernet (fiber), Profibus, FOUNDATION Fieldbus.

Ethernet Switches and Networking Devices: MACH1000, RSR, OpenRail and OCTOPUS control level switches, Fieldbus OZD fiber converters. BAT wireless system.

E **Remote Pumping Stations**

Cables: VFD, Instrumentation & Control, TrayOptic/Fiber*Express* Industrial Ethernet (fiber), Profibus, FOUNDATION Fieldbus, RF Microwave.

Ethernet Switches and Networking Devices: MACH1000, RSR, OpenRail and OCTOPUS control level switches, Fieldbus OZD fiber converters. BAT wireless system.

F **Water Storage Tanks/Controls**

Cables: Instrumentation & Control, VFD, TrayOptic/Fiber*Express* Industrial Ethernet (fiber), Profibus, FOUNDATION Fieldbus.*

Ethernet Switches and Networking Devices: MACH1000, RSR, OpenRail and OCTOPUS control level switches, Fieldbus OZD fiber converters. BAT wireless system.

G **Filtration Ponds/Pads**

Cables: Instrumentation and Control, VFD, TrayOptic/Fiber*Express* Industrial Ethernet (fiber), Profibus, FOUNDATION Fieldbus.*

Ethernet Switches and Networking Devices: MACH1000, RSR, OpenRail and OCTOPUS control level switches, OZD fiber converters. BAT wireless system.

H **Retention Pond**

Cables: Instrumentation and Control, VFD, TrayOptic/Fiber*Express* Industrial Ethernet (fiber), Profibus, FOUNDATION Fieldbus.
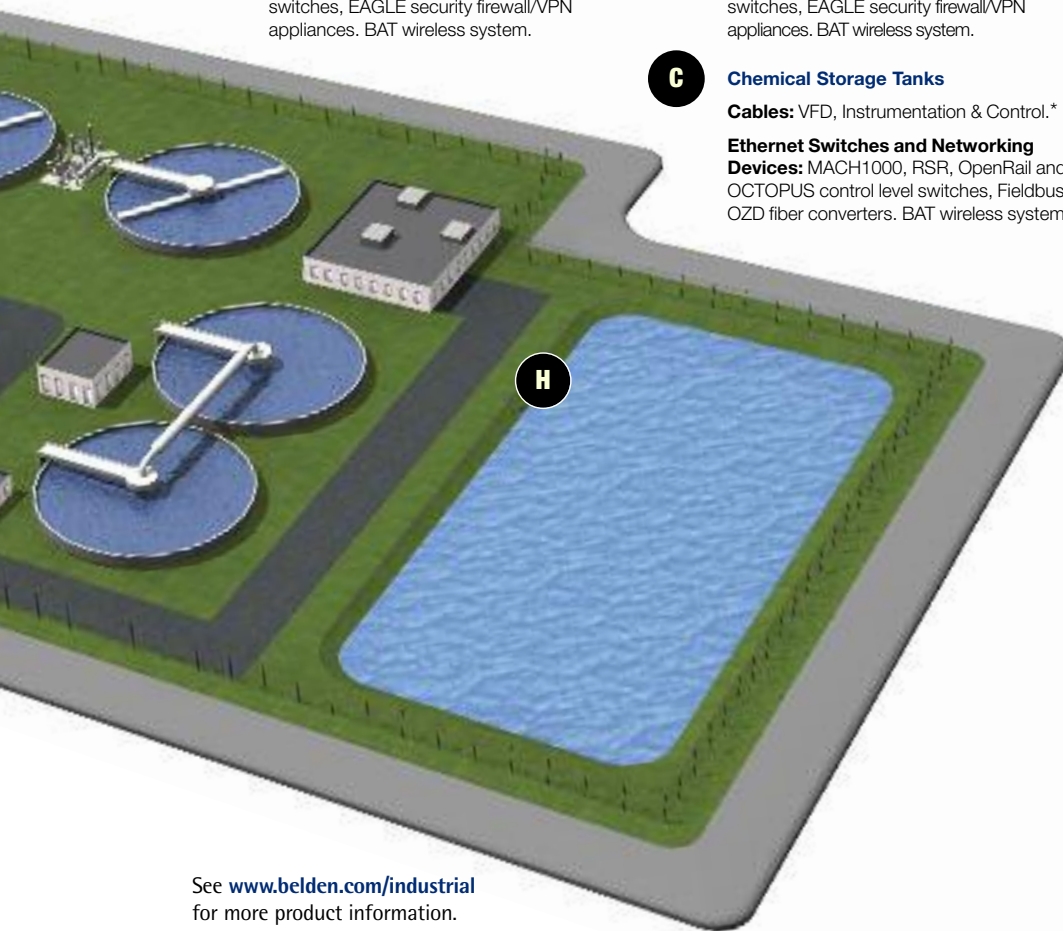
Ethernet Switches and Networking Devices: MACH1000, RSR, OpenRail and OCTOPUS control level switches, Fieldbus OZD fiber converters. BAT wireless system.

I **Security Gates/Monitoring Areas**

Cables: Access control, CCTV.

Ethernet Switches and Networking Devices: MACH1000, RSR, OpenRail and OCTOPUS control level switches. BAT wireless system.

See **www.belden.com/industrial** for more product information.

* CPE and FPE cable jackets are used extensively in these process areas due to the corrosive elements/chemicals that are integral to the water reclamation process.

BELDEN
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Belden Can Be Your Single Source for Industrial-grade Signal Transmission Solutions

Quality, reliability and interoperability are the hallmarks of the Belden Industrial Solutions line.

Built-to-perform Industrial Ethernet Switches and Networking Devices

The Hirschmann™ line of Industrial Ethernet Switches and network devices has earned a solid reputation in industry for ruggedness and reliability. Key product families for the water/wastewater industry are:

OpenRail DIN Rail Mounted Switches

- Broad line of Class 1 Div 2 rated, modular and compact switches with Ethernet port densities ranging from 4 to 28 ports; MS and RS series feature speeds up to 1 Gigabit and ring redundancy

MACH1000 and MACH4000 Switches

- Modular rack-mount switches for control room (MACH4000) and extreme environmental applications (MACH1000)

RSR Switches

- DIN rail-mount switches for extreme environmental applications (-40ºC to +85ºC)

BAT Wireless Access Points/Clients

- Complete line of 802.11 a/b/g access points, clients, related antennas and accessories

EAGLE Firewall and VPN Appliance

- Provides a firewall and VPN (virtual private network) to control access to the network, providing assurance protection of industrial data communications

OCTOPUS Family of IP67 Switches

- Broad line of IP67 managed or unmanaged switches with Ethernet port densities ranging from 5 to 24 ports

Ethernet and Fieldbus Media Converters

- Broad line of Ethernet, Profibus, MODBUS+, Genius and RS-485 media converters; Class 1 Div 2 rated

Outstanding Media Performance

To ensure optimum performance, the following families of field-proven cabling components are offered.

TrayOptic®/FiberExpress® Optical Fiber Cabling

- Heavy-duty TrayOptic Indoor/Outdoor laser-optimized cables: 2- to 72-fiber constructions
- Tight-buffered single-mode or multimode Fiber*Express* cables: 2- or 6-fiber constructions

Fiber*Express* Optical Fiber Connectivity Components

- Duplex Fiber*Express* single-mode and multimode patch cords
- Fiber*Express* Rack-mount and Wall-mount patch panels
- Fiber*Express* single-mode and multimode Universal Optical adapter strips
- Optimax® field-installable connectors for a fast, secure and reliable LC, SC or ST Compatible optical fiber termination (single-mode or multimode)

DataTuff® Category 6, Enhanced 5e and 5e Industrial Ethernet Copper Cables

- Unshielded and shielded Bonded-Pair cables with heavy-duty, oil- and UV-resistant jackets; many are Ethernet/IP compliant; upjacketed and armored versions are available for the most extreme areas

DataTuff Connectivity Components – as complements to UTP or FTP Cable Constructions

- Category 5e RJ45 cordsets for IP67 or IP20 installations
- Category 5e RJ45/IP67 jacks
- Category 5e RJ45/IP67 plug kits
- IP67 surface mount boxes with stainless steel covers
- IP67 stainless steel faceplates

VFD Cables

- 1000V UL flexible motor supply cables in gauge sizes from 16-4/0
- 600V Interlocked Aluminum or Steel Interlocked Armor versions

Encoder and Signal Cables

- 1-4 pairs for power supply, encoder and signal applications

DataBus Cables for PROFIBUS

- 150-ohm twisted pair cables, including high-flex and continuous armor versions for PROFIBUS DP/factory automation
- Twisted pair cable with an IS Blue PVC jacket for PROFIBUS PA/process automation

RS–485 Cables

- Twisted pair, PLTC cables for plenum and non-plenum installations

DataBus® Cables for FOUNDATION Fieldbus

- 1-pair and multi-pair Type A, Type B and High Speed cables

Instrumentation and Control Cables

- Hundreds of UL/CSA cables for every conceivable device/control application:
  - A broad range of 300V Instrumental Cables
  - 600V Instrumentation Tray Cables
  - Thermocouple Extension Wire and Cables
  - 600V Control Cables
  - 600V Teck-style Cables
  - 600V Type MC Metal Clad Cables
  - Custom-designed products

Additionally, Belden cables can be customized to meet your unique needs, utilizing any number of construction features, such as:

- Armoring: Aluminum Interlock, Steel Interlock, and Continuous Corrugated Aluminum
- Armor Tapes: Corrugated Copper, Aluminum, and Steel
- Jackets: PVC, CPE, LDPE, TPE, HDPE, Fluorocopolymer, Oil Res II, Low Smoke Zero Halogen (LSZH), Haloarrest®, and Polyurethane
- Shielding: Overall Beldfoil®, Duofoil®, TC Braid, TC Double Braid, Individual Beldfoil Copper Tape Shields, and "French Braid"
- Insulations: Datalene®, XLPE, FEP, Polypropylene, Foam FEP, HDPE, PVC, TPE, and PVC-Nylon
- Conductors: Solid BC, Stranded BC, Solid Bare Copper-covered Steel, and Stranded TC

Durable Connectivity Products

The Lumberg Automation™ connectivity line aptly complements Hirschman IP67 switches with cordsets that are extremely durable and able to withstand the harsh industrial environmental conditions of shock, vibration, dust and washdown.

- Double-ended Ethernet/IP and PROFINET (D-Coding), and MODBUS TCP RJ45 and M12 Cordsets with PVC High-flex Shielded or Unshielded Cables and Moderate-flex Shielded Cables.

These Belden products have been designed to work together and they can be trusted to provide outstanding performance at every level of the water/wastewater industry. What's more, Belden provides 'Competence' in the four key service and support areas that are critical to your success: *Network design, training, technical support and system performance (warranties).*

For more information go to: **www.belden.com/industrial** to see what we can do for you.

BELDEN
SENDING ALL THE RIGHT SIGNALS

GLOBAL LOCATIONS

For worldwide Industrial Sales and Technical Support, visit:
www.belden.com/industrial

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web: www.belden.com

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