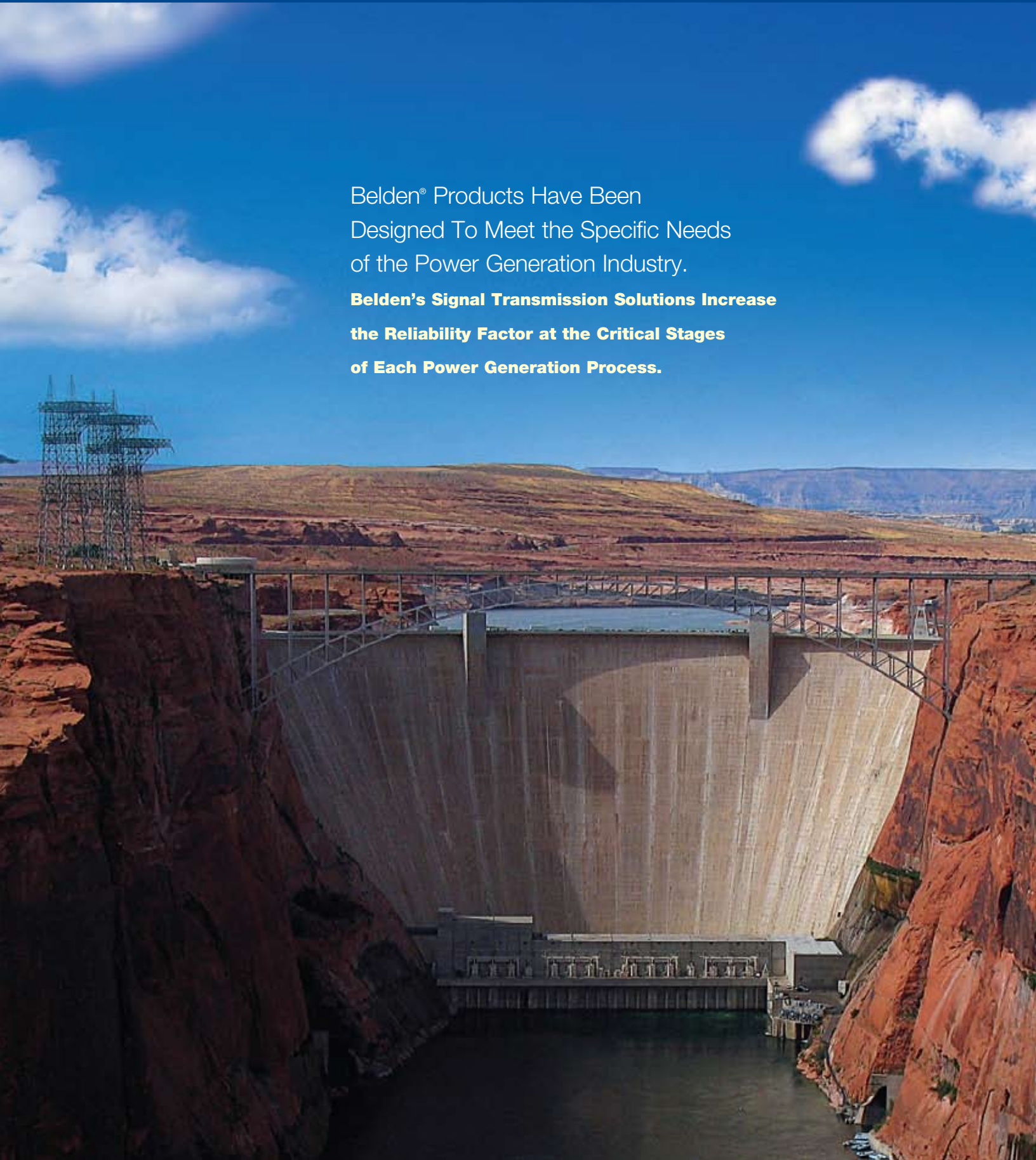# BELDEN
SENDING ALL THE RIGHT SIGNALS®

Solutions for the
Power Generation Industry

**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 the Power Generation Industry.

**Belden's Signal Transmission Solutions Increase
the Reliability Factor at the Critical Stages
of Each Power Generation Process.**

Belden 'Connects' with the Power Generation Industry

If a cabling system component or Ethernet switch fails in a power generation facility, the repair/labor costs alone could be 15-20 times the cost of the component itself. But even more importantly, disruptions in the flow of information or control signals in any type of power generation plant could lead to power outages. And, outages already cost the power generation industry overall as much as $150 billion per year.

The use of Belden switches, connectivity and cabling products in your coal, natural gas, petroleum, nuclear, hydroelectric, solar, wind, or geothermal plant can help ensure that component failure and downtime problems *do not* occur.

Belden products have a proven reliability factor of 99.999% in all types of industrial settings.

Belden Means Maximum Uptime, Peace of Mind

At one time or another, many switches and cabling systems in power generation installations may have to withstand the potentially destructive effects of extreme temperatures, humidity or moisture, dust, mud, oil and solvents, corrosive chemicals, abrasion, vibration and ultraviolet radiation from strong sunlight. These stressors can wreak havoc on the mission-critical networks tasked with conveying signals between measuring instruments and control devices.

To provide complete peace of mind, you need the type of reliability that only Belden can provide. Belden products are designed, manufactured and tested for especially harsh or mission-critical environments. They are designed to give you maximum uptime and maximum peace of mind.

Belden provides reliability – even in the most harsh and mission-critical environments.

Belden Provides End-to-end Ethernet

Challenges to plant operations can come from areas outside of the environment, as well. For example, power generation plants are faced with

increasing demand for electrical power; as much as 40% over the next two decades. To upgrade their legacy infrastructure to meet the potentially greater demand, while at the same time setting up a data collection and management infrastructure that supports expansion, operators of older fossil fuel-based plants could implement Belden high-performance, end-to-end Ethernet system, called *Complete Industrial Solutions*.

Belden's *Complete Industrial Solutions*, consisting of Ethernet active devices, connectivity and cabling is also backed by Belden's considerable Ethernet expertise and an extensive array of services related to system design, verification and technical support – in addition to extended product warranties.

Belden Means Reliability

In the power generation industry, Belden's highly reliable industrial-grade solutions serve:

- Energy management systems and plant control rooms for burners, boilers, turbines and air quality control systems
- Plant level PLCs, motors, variable frequency drives, water treatment systems, conveyors and crushers, to name a few
- Networks that ensure the dependable, uninterrupted operation of distribution and transmission substations, as well as dispatch centers

Belden Offers Peace of Mind to the Always-on Power Generation Industry.
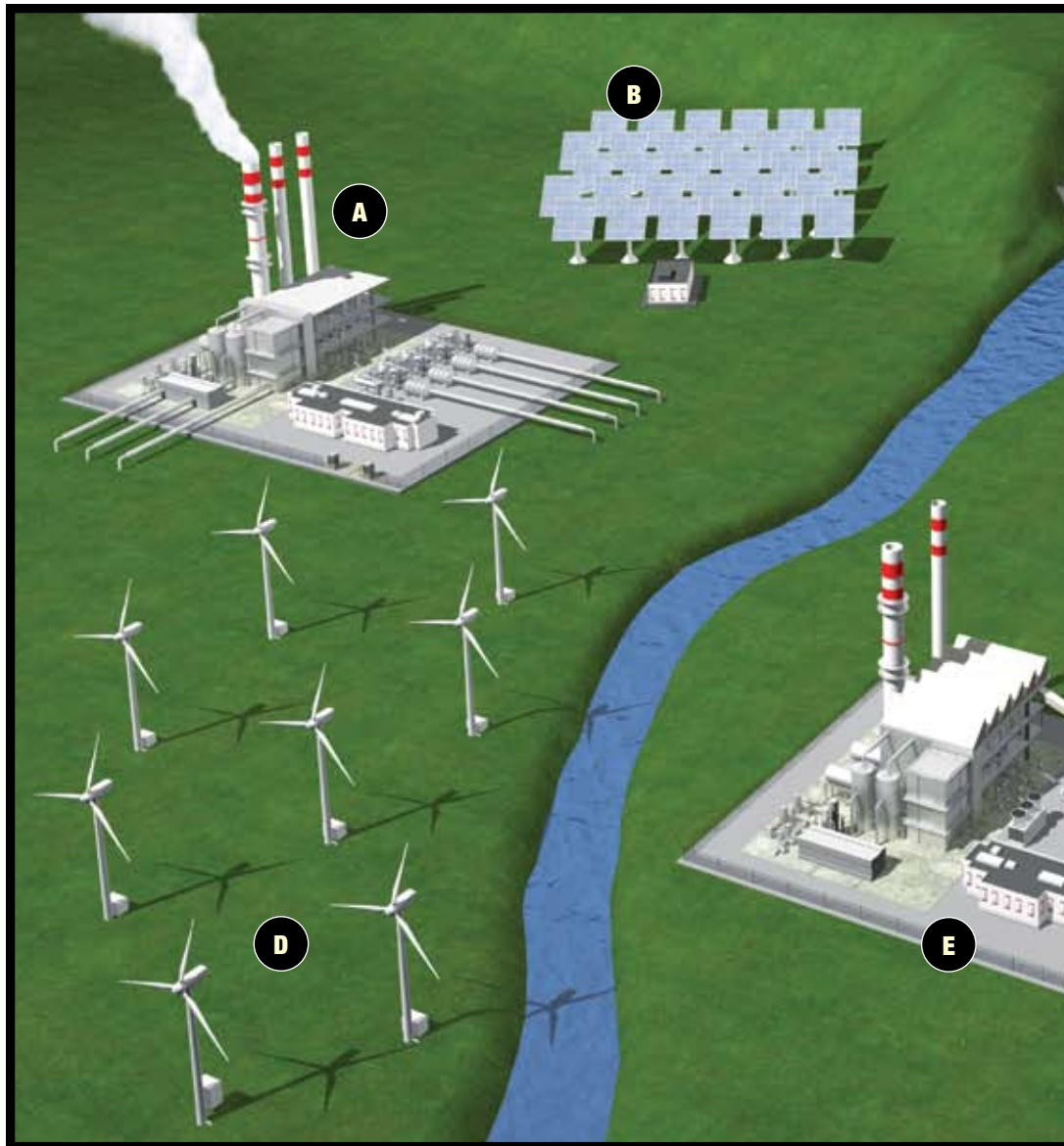
Belden meets these needs with switches, connectivity and cabling products that are manufactured under strict statistical process control methods and are designed to comply with pertinent standards of the power generation industry, including those issued by the ICEA (Insulated Cable Engineers Association), the IEEE and Underwriters Labs.
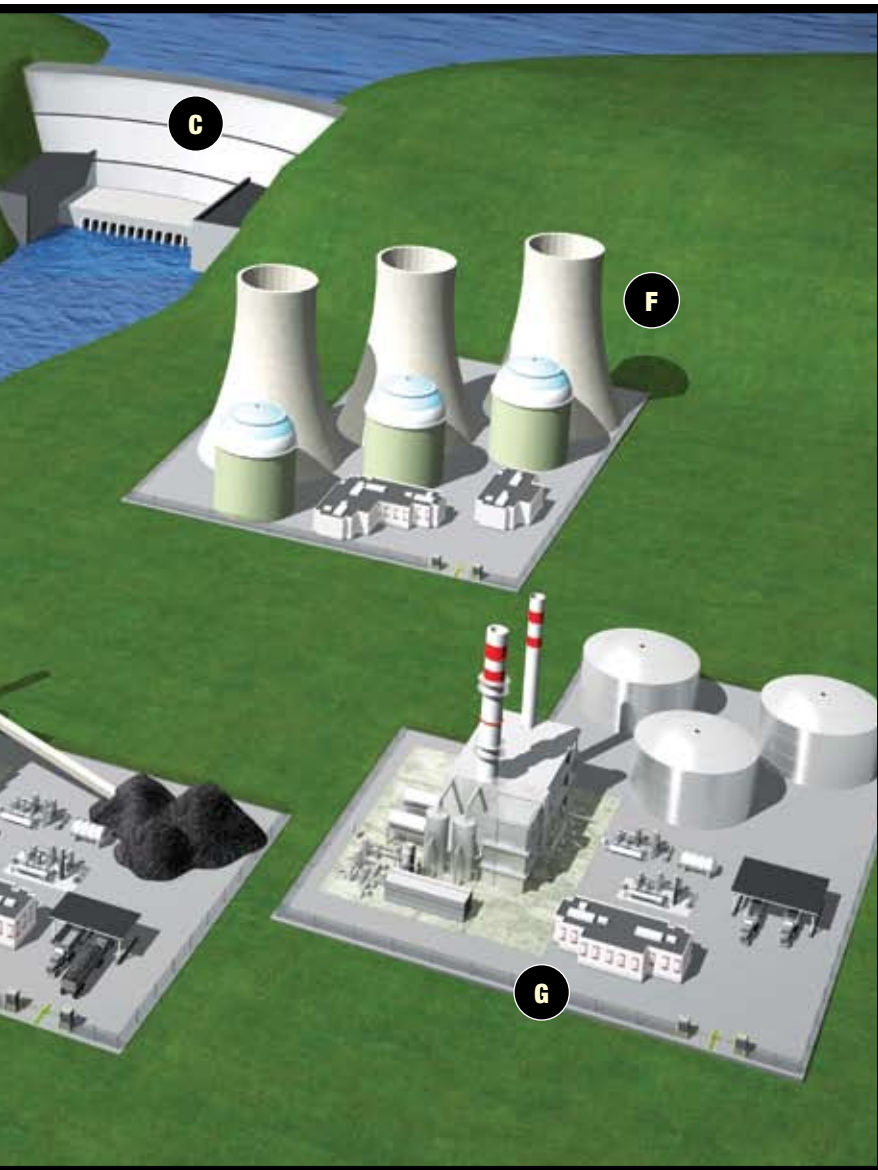
Belden Leads the Way

Belden has always been a leader in the industrial arena. Belden designs and manufactures robust products that will serve reliably in harsh and mission-critical industrial environments. Power generation plants need to be always-on, without service interruptions. That need demands industrial-grade products with a proven reputation for reliability – products from Belden.

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Every Type of Power Generation Facility Can Benefit from Belden Products and Systems – Belden Sends All the Right Signals

Both renewable and non-renewable energy sources use Belden products to help ensure the reliability of their facilities.

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

A Geothermal Plant

B Solar Energy Farm

C Hydroelectric Facility

D Wind Farm

E Coal-fired Power Plant

F Nuclear Plant

G Oil and Gas Processing

Belden Can Be Your Single Source for Industrial-grade and Mission-critical 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 networking devices has earned a solid reputation in industry for ruggedness and reliability. Key product families for the power generation industry are:

OpenRail DIN Rail Mounted Switches

- Broad line of hardened, DIN rail mount 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

MACH100, MACH1000 and MACH4000 Switches

- Modular rack-mount switches for control room (MACH100, MACH4000) and extreme environmental/high temperature applications (Über-Rugged™ MACH1000)

RSR Switches

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

BAT Wireless Access Points/Clients

- Complete line of 802.11 a/b/g/h/n 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.
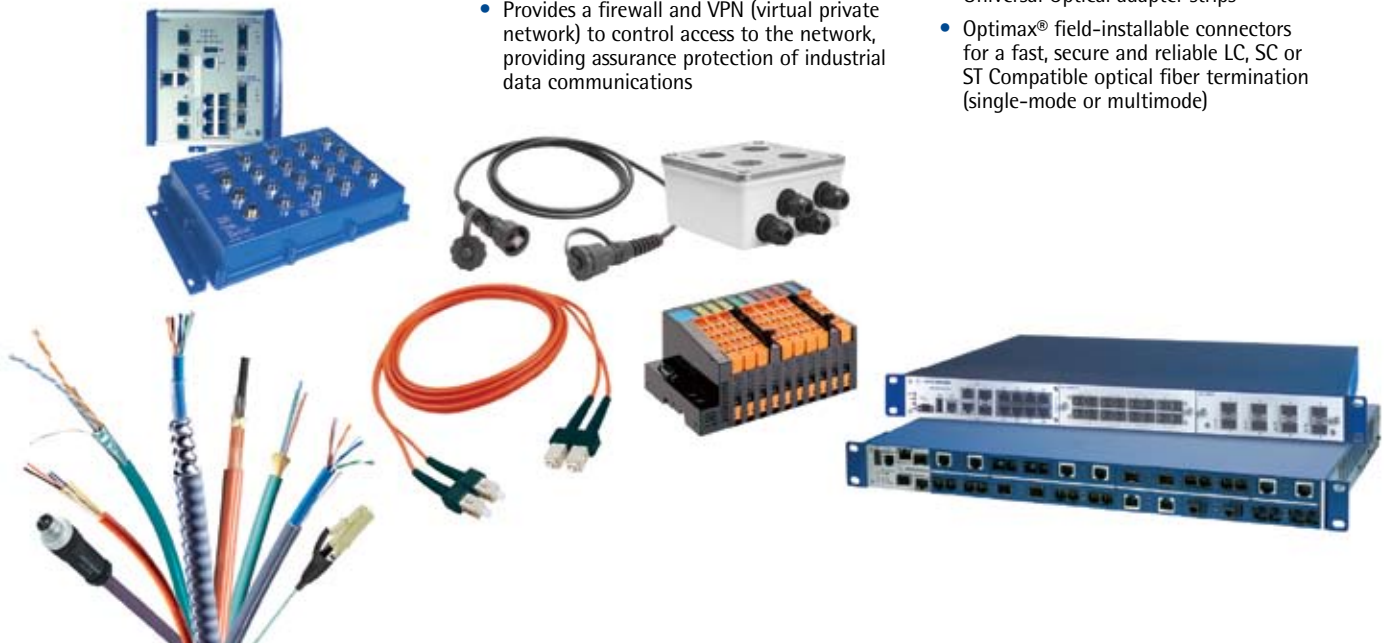
Outstanding Media Performance

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

TrayOptic/Fiber*Express* Optical Fiber Cables Components

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

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

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 EIA-485/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

VFD Cables

- 1000V UL flexible motor supply cables in gauge sizes from 16-4/0
- Interlocked Armor with aluminum or steel versions

Encoder and Signal Cables

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

RS–485 Cables

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

Instrumentation and Control Cables

- WTTC 1,000V approved products
- Hundreds of UL/CSA cables for every conceivable device/control application, including:
  - 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, TPE, PE, Fluorocopolymer, Oil Res II, Haloarrest® Low Smoke Zero Halogen, and Polyurethane
- Shielding: Overall Beldfoil®, Duofoil®, TC Braid, TC Double Braid, and Individual Beldfoil Copper Tape Shields
- Insulations: Datalene®, XLPE, FEP, Polypropylene, Foam FEP, HDPE, PVC, TPE, and PVC-Nylon
- Conductors: Solid and Stranded conductors, either tinned or bare copper

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, tested, proven and warranted to work together and they can be trusted to provide outstanding performance at every power generation facility. What's more Belden provides the four key service and support areas that are critical to your success: *Network design, training, technical support and system performance.*

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

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GLOBAL LOCATIONS

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

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info@belden.com
web: www.belden.com

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