



## Data Networking Solutions for Power Transmission & Distribution

**Substation Hardened  
Solutions from the  
Global Leader in Mission-  
critical Applications**



## Proven Technology for Mission-critical Communications

Belden is a trusted power transmission & distribution partner. Its data networking solutions provide:

- High signal availability for maximum uptime
- Secure communications for trusted signal integrity
- Leading-edge, standards-based products for optimal signal performance when and where you need it

Scheduling power output from generating plants used to be relatively easy with little need for real-time information. Today, Independent Power Producers (IPPs) need to run their facilities at maximum efficiency to lower generation costs and increase profits. However, 'green' energy sources, generate power in a somewhat unpredictable fashion, upsetting the balance of power supplied to the grid. These factors, along with an increased interest in efficient energy usage overall, have necessitated the utilities' need to continually adjust generation, demand or both – all on a real-time basis. A smarter grid that enables two-way communication is required to make this a reality.

### Belden Ensures Reliable Data Flow

To meet the need for a high speed, seamless data flow and the accurate monitoring and control of power flowing in and out of the grid, Belden provides field proven, leading-edge products for the EMI-stressed substation environment:

- Hirschmann™ Ethernet switches, security/firewall devices and networking software
- Hirschmann wireless LAN(WLAN) systems
- Hirschmann factory terminated fiber optic and unshielded twisted pair (UTP) media
- Belden TrayOptic® fiber optic cables and connectivity

- Belden DataTuff® Category 6 and 5e Ethernet cables and connectivity
- Belden instrumentation and control cables

Belden leading edge, substation-grade industrial Ethernet products enable the convergence of SCADA, protection signaling, remote engineering access/diagnostics, metering and physical security applications at both the substation LAN and/or WAN.

All products meet applicable industry standards:

- IEC 61850-3
- IEEE 1613 Class 2 performance (KEMA tested)
- UL, cUL and ISO/IEC 24702



Belden-Hirschmann substation hardened products are designed to meet the mission-critical needs of the power transmission and distribution industry.



## Be Certain with Belden Solutions

Belden is a global leader in signal transmission technologies – supplying time-proven, end-to-end communication systems and products that extend across office and industrial environments to provide unmatched reliability and peace of mind.

Belden's dominance in the industrial arena relates to a number of factors, principally:

- Decades of experience in the design and implementation of industrial products for all types of environments, using all media types
- Development of extremely robust, ruggedized products and systems for mission-critical and harsh environments
- Products that are fully compliant to all relevant IEC, IEEE and UL standards
- 99.999% communications reliability – in even the most harsh or extreme environments

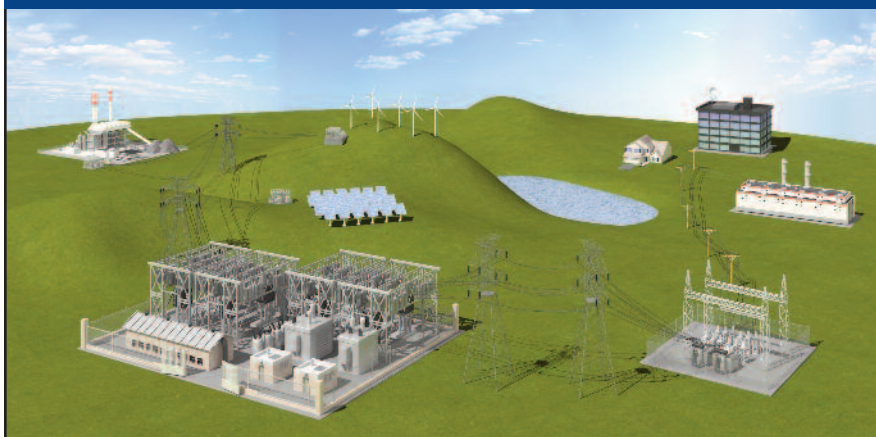
- Unequalled service and support, including network design, training and technical support
- An experienced, global distribution network
- Extended product and system warranties

Today, Belden provides continuous network availability for a broad range of discrete manufacturing and process industries around the globe – and a whole host of infrastructure applications, including traditional and alternative energy power generation facilities.

In the global, mission-critical power transmission & distribution industry, Belden's Hirschmann brand of Ethernet networking devices is the brand of choice. Extremely rugged Hirschmann devices provide the industry with 99.999% signal transmission reliability.



### From Power Generation to Delivery



This illustration depicts how power is typically distributed by a utility from generating stations to customers. Real-time power monitoring is performed at the substations, where Belden substation hardened switches and cabling systems are utilized.

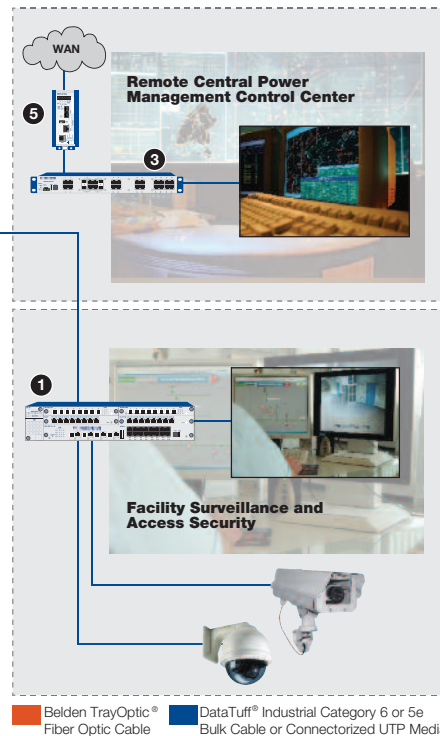
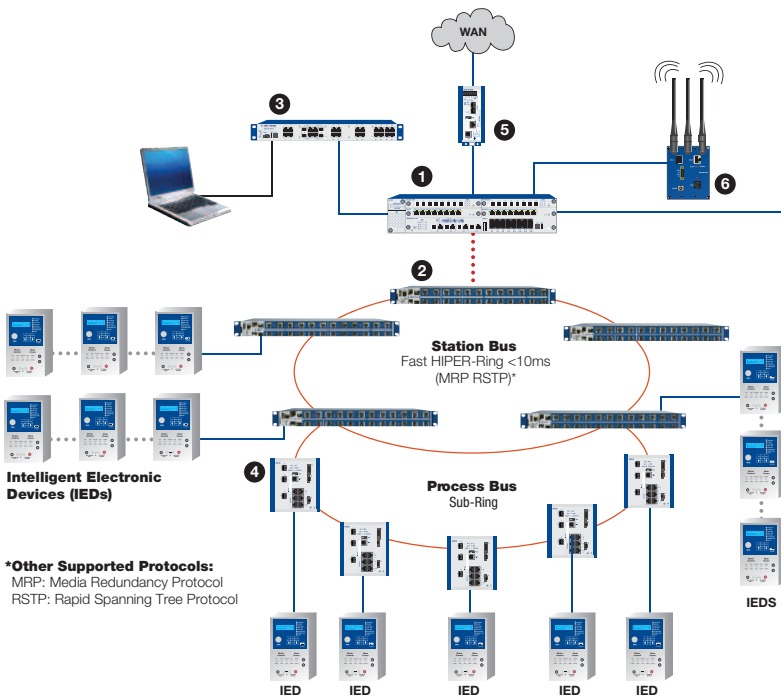
### Belden/Hirschmann at a Glance

- Global leader in high availability Ethernet technology
- Early pioneer in fiber communications
- Designed first modular and IP67 switches
- Invented first industrial fiber optic ring topology
- Leader in patented and industry-leading cable constructions (Bonded-Pairs, Beldfoil® shields)
- First in 802.11n wireless technology
- First hardened 10 Gigabit switch (MACH4000)
- Hirschmann Switches:
  - 99.999% reliability
  - MTBF of 40+ years (based upon MIL-Spec accelerated destruction testing spec)
  - Temperature performance: 0°C to +60°C; 32°F to +140°F (Extendable to -40°C to +85°C; -40°F to +185°F)
  - IEC 61850-3/IEEE 1613 compliant
- Belden Cables:
  - Temperature performance: -40°C to +85°C; -40°F to +185°F
  - All cables UL and cUL listed
  - ISO/IEC 24702 certified



## Providing Substations with 99.999% Power Monitoring Reliability

### Belden-Hirschmann Substation Ethernet Solutions



#### Substation Ethernet Solutions (pictured)

- Hirschmann MACH4000 Switches**  
Modular rack-mount 10 Gigabit backbone switches for control rooms
- Hirschmann MACH1000 Über-Rugged Switches**  
Modular rack-mount Gigabit Ethernet switches for extreme environments/high temperatures, up to 28 ports
- Hirschmann MACH100 Switches**  
Modular rack-mount Gigabit Ethernet switches for control rooms with a fixed port number or used as a modular workgroup
- Hirschmann RSR Über-Rugged Switches**  
DIN rail-mount switches for fast-Ethernet (8-9 ports) or Gigabit Ethernet (9-10 ports)
- Hirschmann Eagle Tofino Firewall/VPN-Routers**  
Firewall and VPN appliances
- Hirschmann BAT300 Wireless Solution**  
Single band 2.4 GHz Wireless LAN access point/client with 802.11n

#### Additional Data Networking Solutions

- Hirschmann Compact Rail (RS20/30) Switches**  
Hardened DIN rail-mount compact Gigabit switches, 4 to 26 ports, ring redundancy
- Hirschmann MICE Series Switches**  
Intelligent Gigabit and fast-Ethernet systems, hot-swap and modular, 4-26 ports
- Hirschmann Factory Terminated Fiber Optic and UTP Media**  
Rugged with RJ45 or M12 connectors, UTP cables utilize Belden's patented Bonded-Pair technology
- Hirschmann HiVision Network Management Software**  
System software to map, commission, manage and maintain the network; OPC and ActiveX for SCADA integration
- Belden TrayOptic Fiber Optic Cables**  
Indoor/outdoor cables with a water-blocking agent for best protection

#### Belden DataTuff Industrial Ethernet Category 6 or 5e Cables

Unshielded and shielded Bonded-Pair cables with heavy-duty oil- and UV-resistant jackets; upjacketed and armored versions available

#### Belden Instrumentation Cables

Type PLTC or TC, shielded or unshielded with various insulations and jackets

#### Belden Control Cables

Type TC copper tape shielded with various insulations, jackets and armoring options; Type 20-10 cables, copper tape shielded

For more information about Belden Industrial Ethernet solutions visit Belden's Website at [www.belden.com/industrial](http://www.belden.com/industrial).