Belden Industrial Infrastructure Solutions

End-to-end portfolio of ruggedized hardware/ software solutions for demanding industrial environments
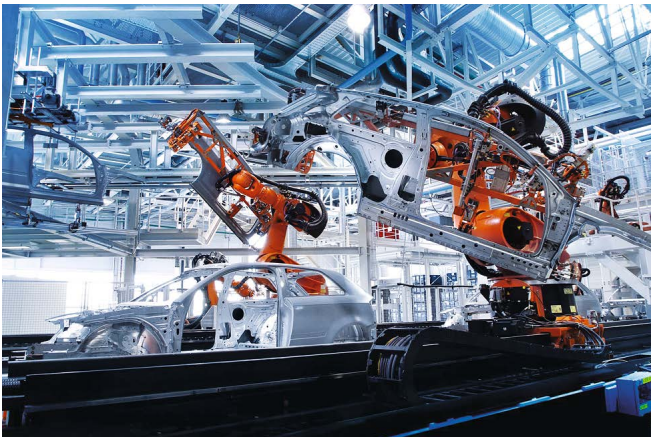
BELDEN

GarrettCom®
A **BELDEN** BRAND

HIRSCHMANN
A **BELDEN** BRAND

lumbergautomation
A **BELDEN** BRAND

TOFINO SECURITY
A **BELDEN** BRAND

tripwire®

**Be certain.
Belden.**

![Belden logo - SENDING ALL THE RIGHT SIGNALS]

Because Uptime Matters to You

From simple cable runs to complex, integrated communication networks, you need a vendor who goes beyond offering just good products. You need a partner who brings you the total package:

- Premium quality industrial products with unmatched warranties

- Custom design options for both products and network topologies

- Proven industry experience and expertise—more than 115 years in business

- Cutting-edge, comprehensive security solutions based on 20+ years of cyber security experience

- Expert troubleshooting and technical support

- Training opportunities to stay on top of quickly changing technologies

With Belden, you can be certain. You'll find exactly what you need to design, build, manage and protect your industrial infrastructure.

Expertise Across the Industrial Spectrum

No matter whether you are producing things, processing raw materials, moving people and cargo or generating energy, Belden understands. You'll find expertise – and proven solutions – in a variety of industrial settings.

- Discrete Automation (automotive, food & beverage, intralogistics, packaging)

- Process Automation (water/wastewater, oil & gas, mining, petrochemicals)

- Transportation (intelligent traffic systems, rail transport, mass transit)

- Energy (electrical substations, power grids, wind power, solar power)

EMEA +49 (0) 7127/14-1809 | beldensolutions.com ■ US 1-800-BELDEN-1 | belden.com

Explore the Industry's Broadest Portfolio
INDUSTRIAL CABLE

Industrial Ethernet Cable

Diversity for any need: Cat 5e, Cat 6, Cat 6A, Cat7, PROFINET

- Superior reliability
- Long-term performance from Belden's patented bonded-pair design
- 100% shield coverage for improved protection over a wide frequency range
- RailTuff range with EN 45545-2 certification

Serial Fieldbus Cable

Wide range of superior quality and reliability cable for

- All key protocols in the market (Foundation fieldbus, Profibus DP and PA, DeviceBus, controlNet, controlBus, Lonworks, KNX…)
- UL, IEC, NFPA approvals

Flex Cable

For control, power, sensor actuator or data applications with a small bend radius and high flex life

- Reduces total cost of ownership through reduced maintenance
- Superior performance for motion applications
- Eliminates common failure modes: cable fatigue, torque, cable memory

SpaceMaker Cable

Low-voltage electronic cables for control, instrumentation, power

- Reduced size – up to 52% reduced cable area
- Increased flexibility – up to 74% tighter bend radius

TC & TC-ER Instrumentation Cable

Superior electrical performance and longer runs in dozens of different environments

- Rated for exposed runs — no need for conduit
- Assured, flexible installation connections with all the necessary ratings

INDUSTRIAL CONNECTIVITY

Power Connectors

Ranging from design diversity to specific standards and high-voltage versions, the Belden Power portfolio offers a broad, practical selection to fulfill your individual application objectives.

- M12 Power Series - Miniaturized power connector
- ST Series - Long-term proven and developed
- G/GO Series - for extraordinary harsh and dusty applications
- M23 Series - perfect choice to interconnect machines and controls
- Mini Power Series – Power distribution for control cabinets and machines

Valve Connectors

When it comes to hydraulic, pneumatic and electro-magnetic actuators and sensors, a reliable valve connector solution with high protection against dust, water and vibrations is required.

- Protection circuit and/or function indicator
- Extremely robust design
- Available with protection circuitry

I/O Systems

Ranging from passive distribution boxes to high performance fieldbus-independent modules, the Lumberg Automation I/O systems portfolio offers a broad variety of solutions to meet your individual needs.

- Future-proof and space saving design with the new M12 L-coded power connection.
- Flexible and higly customizable due to Industrial Etherent multiprotocol modules
- Withstand harshest conditions with its IP65, IP67 or IP69K protection
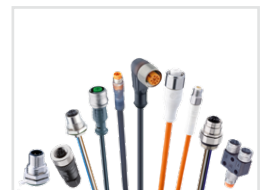
Data Connectors

With our Lumberg Automation data connectors, we are offering you an extensive connectivity portfolio for Ethernet-based and Fieldbus protocols.

- Reliable transmission of analog and digital data
- Receptacle, field attachable connectors, single and double ended cordsets available
- Withstand extreme temperatures, vibrations, electromagnetic interference (EMI)
- Exposure to various aggressive chemical substances

Sensor/Actuator Connectors

Extensive portfolio including M8 and M12 connectors and cordsets – the industry-proven market standard for decades.

- Extensive portfolio from field-attachable to double ended
- Various standardized A-, B-, D-, U- or X-coded connectors
- Robust and space saving design as well as mechanical and chemical resilience

INDUSTRIAL NETWORKING

Unmanaged Switches

SPIDER Switches

- DIN Rail Fast/Gigabit Ethernet switches – many different variants to meet your specific needs
- Standard and Premium line variations for transmitting large amounts of data across any distance
- Power over Ethernet (PoE) Injector for powering networked terminal devices
- Plug & Play -- no need for additional documentation, standard procedures or operator training

Magnum ES42/PES42 Switches

- Port Flexibility – offers 6 switch ports, 1 or 2 of which may be 100 Mb fiber, others are 10/100 copper
- Hardened – models available for both industrial (factory floor) and outdoor (temperature-uncontrolled environments)
- Power Flexibility – available with 12, 24, -48V DC as well as AC Power
- Link-Loss-Learn (LLL) –for use in self-healing LAN structures.
- PoE Capabilities

OCTOPUS Unmanaged IP65/IP67 Switches

- Waterproof and dust-tight unmanaged switches for fail-safe operation in any harsh environment
- Meet application-specific regulations, including approvals for use onboard road and rail vehicles
- Versions with Power over Ethernet (PoE+) eliminating the need for an external PoE power supply
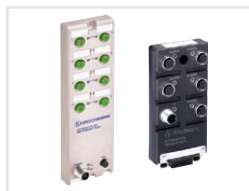
Managed Switches

GECKO Switches (4TX, 5TX)

- Cost-effective way of entering the world of managed switches
- Centralized configuration of network parameters from a web interface
- Redundancy and diagnostic functions ensure high network availability
- Easy commissioning (compared to fully managed switches)

OCTOPUS Managed IP65/IP67 Switches

- Waterproof and dust-tight switches & routers for fail-safe operation in any harsh environment
- Meet application-specific regulations, including EN 50155, EN 50121-4 & EN 45545 for rail transportation
- From fast Ethernet to all Gigabit versions, TSN and Power over Ethernet (PoE) options

BOBCAT Compact Switches

- Real-time TSN Ethernet support for precise data transmission
- Advanced security features, including wire-speed access control lists (ACL) and automatic denial-ofservice (DoS) prevention
- Increased bandwidth capabilities, supporting tri-speed fiber SFP slots with 100MB/s, 1 Gig and 2.5 Gigabit speeds
- Additional interface options through digital input for more flexibility
- Robust industrial design reinforces the switch's resistance against harsh conditions

RSP Series Switches

- Built-in PRP and HSR based on international IEC 62439 standard for future-proof interoperability
- Uninterrupted data communication ensuring continuous access to machines & systems
- Comprehensive security functions for all-around protection against network attacks
- Rigorous real-time requirements thanks to precise time synchronization in accordance with IEEE 1588 v2

INDUSTRIAL NETWORKING

Managed Switches

RSPE Managed Switches and Routers

- Best-possible investment protection thanks to the maximum flexibility provided by the media modules
- 4 Gigabit Combo ports and up to 24 additional Fast Ethernet port
- Maximum productivity for systems and machines thanks to completely interruption-free data redundancy technologies
- Deterministic communication with TSN (Time Sensitive Networking)
- Cost-effective powering of devices via PoE/PoE+

Modular Rail Switches MSP30/40

- Flexible, economical and future-safe
- Modular constructions enable network growth over time
- Especially useful in highly complex networks that require high port density

MACH100 Rack Mount Switches

- Hardened Enterprise-grade switches
- Static, dynamic and multicast routing allow subnetworks to be set up and linked together
- Technologies such as PoE+ and PTPv2 facilitate a wide range of possible applications
- Various redundancy methods – like MRP, HIPER-Ring and RSTP – combined with a robust design ensure high network availability

Magnum 10KT Configurable Switches

- 36 port industrial switch with configurability and reliability
- Optional dual hot-swappable power supplies in a 1U or 1.5U rack-mount package
- Precision timing, full IEEE 1588v2 implementation
- Energy-efficient thermal design for maximum reliability
- Substation-Hardened, IEEE 1613 andIEC 61850-3 compliant

GREYHOUND1020/1030 Rack Mount Switches

- Fast/Gigabit Ethernet switches designed for use in harsh industrial environments
- Ports can be mounted on the front or rear of the device
- Customizable and interchangeable media modules to keep pace with evolving network needs
- Up to 24 Fast Ethernet ports
- Option to add four Gigabit Ethernet Combo ports

GREYHOUND1040 Rack Mount Switches

- Gigabit Ethernet switches and routers designed for use in harsh industrial environments
- High port count, with up to 28 GE ports total
- Deliver fast and reliable uplink speeds at a cost-effective price with 2.5 Gigabit Ethernet (GE) fiber port option
- Ports can be mounted on the front or rear of the device
- Two hot-swappable power supplies (low and high voltages) available
- Choose from copper and fiber media modules – easy to swap in the field

DRAGON MACH4x00 Layer 3 Backbone Switches

- High performance industrial switches and routers
- Enables easy, progressive transition from 1 GE to 2.5 GE to 10 GE speeds
- Helps you build a redundant backbone network for maximum availability
- Offers redundant and hot-swappable power supply for maximum device uptime

Routers, WAN, WiFi, Cellular and MPLS-TP

Magnum DX940e Router

- Obtain better connectivity with high speed 4G/LTE cellular interface for secure remote access
- Use high-end, robust cybersecurity mechanisms with advanced safety features, IP routing and guaranteed network protection with firewall layers
- Adhere to industry standards with NERC CIP compliant security elements

Magnum 10RX Router

- Multi-Protocol Support – enables protocol routing for legacy networks, as well as current IP routing technologies
- Cyber Security Capabilities – includes built-in firewall protection & virtual private network (VPN) security
- Reduce Network Downtime – replace failed power supplies in the field on a live network, while system continues operating on secondary power unit

OWL Cellular Routers

- LTE devices for fast vehicles like trains and modern IIoT applications
- Fully encrypted data streams with IPSec and OpenVPN
- Many protocols and media conversion modules: Azure, Modbus, Node-RED, Python, Serial, . . .
- GPS Dead Reckoning functionality for position data of fast moving vehicles inside tunnels

DRAGON PTN Backbone Switches

- MPLS-TP technology delivers dedicated bandwidth for different services and 50ms protection switching
- HiProvision software for easy configuration and management of large transmission networks
- Industrial HiVision integration for backbone and access network
- Variety of interface modules and port types to ensure flexibility and seamless integration of legacy systems
- Central switching modules and power supplies help you build a completely redundant device

BAT450-F Wireless LAN Access Points

- Proven Fast Roaming for critical Transportation projects
- Ruggedized, compact design meets IP65/67 protection class, with extended temperature range of -40°C to +70°C
- Runs on Hirschmann's HiLCOS software to ensure maximum network availability & data security

BAT867-R Industrial Wireless Access Points

- Fast data speeds enable transmissions up to 867 Mbps with IEEE 802.11ac radio module & backward compatible to a/b/g/n standards
- Proven Fast Roaming in Autonomous Guided Vehicle applications, cross-vendor compatibility
- Cost-effective solution with only the features required by typical industrial WLAN applications – one radio, one Ethernet port, one power supply + can be used as access point, client, router or bridge
- Reliable wireless connectivity even when monitoring and operating machines from wireless tablets or smartphones

Wireless LAN Controller

- Centralized management of wireless network components for secure operation
- Easily scalable for legacy devices and future growth
- Compliant with IEEE 802.1x, RADIUS and LEPS standards
- Guarantees high availability through redundancy and backup mechanisms

BAT-C2 WLAN Client and Access Point

- Compact ruggedized 802.11ac
- Client with fast roaming for Autonomous Guided Vehicles
- Access Point to easily integrate and control automatically
- Industrial Grade Security with IEEE 802.1x, RADIUS

INDUSTRIAL NETWORKING

Media Converters

Magnum CS14 Converter

- Provides one 10 Mb fiber port and two 10/100 copper switch ports
- Two RJ45 ports support IEEE 802.3u for attaching any 10 Mb or 100 Mb device
- Integral terminal blocks for 12V, 24V, 48V DC power input; external AC power supply optional
- Either DIN-Rail or Tray-Mountable

Magnum CSG14 Gigabit Converter Switches

- Provides one Gb fiber port and two 10/100/1000 copper switch ports
- Two RJ45 ports are triple-speed auto-negotiating to enable attaching any 10 Mb or 100 Mb or 1000 Mb (Gb) device; both multi-mode and single mode Gb Fiber ports available
- Integral terminal blocks for 12V, 24V, 48V DC power input; external AC power supply optional.
- Either DIN-Rail or Tray-Mountable

Magnum CSG14U Gigabit Converter Switch

- Provides two SFP open transceiver fiber switch ports & one 10/100/1000 copper switch port
- Each SFP port accepts either Gb or 100Mb fiber SFP transceivers
- Hardened for factory floor or premium-rated for -40°C to +85°C outdoor
- Integral terminal blocks for 12V, 24V, 48V DC power input; external AC power supply optional
- Either DIN-Rail or Tray-Mountable

Fiber Interface Repeater

- Electrical/optical Interface fieldbus converters for
  – PROFIBUS, Geniusbus, Modbus Plus and RS 232/485 networks
- Seamless integration with process control systems using signal strength outputs
- Fault signaling with built-in relay for an independent alarm line
- Variants for singlemode, multimode and plastic fiber

Software

Industrial HiVision Network Management Software

- Obtain instant visibility of key performance indicators with the Network Dashboard
- Find faults quickly & achieve timely remediation
- Easily identify, map & configure all network infrastructure, including SNMP-enabled devices from any manufacturer – even during live operation
- Download free version of the software for unlimited use before you buy

Secure Remote Access Solution

- Easy to implement, allowing those with limited technical knowledge to network devices together
- State-of-the-art security technology results in a secure system without reconfiguring corporate firewalls
- Immediate remote access & control of industrial networks to fix problems means more efficient, productive staff time & less network downtime

MIPP – Modular Industrial Patch Panel

- Maximum flexibility – combine up to 6 modules to create a single panel for both fiber & copper cables
- Quick, easy installation with greater efficiency & less maintenance
- Compact design for maximum use of space

Fiber Optic Transceiver

- A wide range of SFP/SFP+ and XFP transceivers that perfectly support Hirschmann's industrial Ethernet solutions
- Chose between a variety of fiber and copper SFP transceivers or bi-directional interfaces – both single and multi-mode SFP transceivers are available
- Select a Fast Ethernet, Gigabit Ethernet, 2.5 or 10 Gigabit Ethernet transceiver for your choice

CYBER SECURITY

Security Devices

EAGLE One Router

- Compliance with global standards and certifications, including approvals for hazardous locations and marine certifications
- Ease of integration through unique "firewall learning mode" that reduces traditional installation risks
- Advanced redundancy features for maximum security, including layer 2 & layer 3 functions that ensure switchover to a standby device in the event of a fault or failure

EAGLE20/30 Firewalls

- Customizable design with interface configuration options for Fast Ethernet, Gigabit Ethernet & Symmetrical High-speed Digital Subscriber Line (SHDSL)
- Advanced Graphical User Interface helps you create custom rules for fast, easy configuration
- Operating system HiSecOS 3.0 security features, including Deep Packet Inspection (DPI), ensure the highest level of security

Tofino Xenon Security Appliance

- Protect PLCs, RTUs and other control devices with this stealth industrial firewall that provides stateful and industrial protocol deep packet inspection at Layer 2 (data link)
- Simplify installation: Zero-impact Plug-n-Protect technology requires no pre-configuration, no network changes and no disruption to the control system
- Configure-Test-Deploy: Zero-day vulnerability protection with deep protocol awareness that is not dependent upon vulnerability updates

Rail Data Diode

- Reliably protects networks from external cyber threats through singular data flow
- Securely transfers Ethernet data to the public internet without putting the system at risk
- Easy-to-explain product functionality for governmental or regulatory approval processes

Software & Support

Tripwire Industrial Visibility (TIV)

- Completely passive solution that dissects industrial network traffic to perform industrial asset discovery, profile all industrial protocol communication, and provide threat detection from the DMZ down to the field I/O devices
- Understands over 40+ industrial protocols including EtherNet/IP, ModBus, DNP3, S7, PROFINET, IEC 101/104, GOOSE, and Bacnet
- Provides visibility into controller mode changes, configuration changes, and firmware uploads
- Diagrams network communication traffic patterns via Purdue model

Tripwire Enterprise (TE) Security Configuration Management Suite

- Featuring the Tripwire Data Collector, think of it like a "Security SCADA" that provides full network visibility & understands common Industrial protocols such as Modbus TCP and EtherNet/IP
- Agentless monitoring requires no software installation or changes
- Maximize uptime with real-time threat detection
- Gain deep visibility into your cyber security hygiene & monitor PCs, PLCs, & other network hardware for changes

Tripwire Log Center

- Think "Security Historian" with the ability to report all log data
- Purpose-built dashboard for out-of-the-box functionality with Tofino Xenon
- Log collection from a variety of sources to easily interpret & parse data for analysis and reporting
- Create your own correlation rules with simple, Visio-like interface

VALUE-ADDED BENEFITS

The Belden Solution brings breadth you won't find with any other vendor. Consider the reliability of a total infrastructure built to work seamlessly in the harshest operating conditions. Based on true industry knowledge built over time in field-proven applications, Belden networks work.

Plus, you'll find Belden professionals actively engaged in the governance organizations and work groups exploring new technologies and setting standards for optimum performance.

Below are additional reasons you can be certain with Belden.

Economical connectivity solutions off the shelf and custom-made

The Connectivity Center

www.lumberg-automation.com/en/Lumberg_Automation/connectivity-center

As the only one of its kind in the market, the Belden Connectivity Center is your worldwide partner for implementing custom connectivity solutions for your application. From specialized connectors and cable assemblies to active and passive I/O modules for fieldbus or Ethernet networks, we quickly deliver the flexibility you need.

Require a specialized solution that does not yet exist or have a problem with your current solution?

Then you simply get in touch with our Connectivity Center: the platform for custom-made solutions developed specifically for your needs. By combining all of our knowledge and internal resources, we will deliver the exact solution you need to smooth out your production process, warrant continuity and reduce Total Cost of Ownership.

The Best Solutions . . . Fast!

With a dedicated team of experts, we can meet even the most demanding deadlines and technical challenges. Every month, the Connectivity Center delivers approximately 100 customized solutions for customers worldwide. Some within just two weeks, hardly ever longer than three months. All solutions are guaranteed to have outstanding compact design, chemical resistance as well as high mechanical and electrical loading capacity.

Max 3 months

Belden Connectivity Center

Belden Competence Center

**www.beldensolutions.com/en/Service/
competence-center**

As the complexity of communication and connectivity solutions has increased, so have the requirements for design, implementation and maintenance of these solutions. For users, acquiring and verifying the latest expert knowledge plays a decisive role in this. As a reliable partner for end-to-end solutions, Belden offers expert consulting, design, technical support, as well as technology and product training courses, from a single source: Belden Competence Center. In addition, we offer you the right qualification for every area of expertise through the world's first certification program for industrial networks. Up-to-date manufacturer's expertise, an international service network and access to external specialists guarantee you the best possible support for products. Irrespective of the technology you use, you can rely on our full support – from implementation to optimization of every aspect of daily operations.

Learning Opportunities

**www.beldensolutions.com/en/Service/
competence-center/training**

Keep pace with the latest trends and newest technologies through Belden.

- Formal certification courses
- Local roadshows
- Bi-weekly blogs and newsletters

What we can do for you – and how

	Optimal Network Solution	Know-how for Reliable Operation	Protection Against Downtimes	Lasting Cost Control
	• Individual consultation, design, project management • Network design and migration concepts • Compatibility testing • On-site wireless site survey	• Training plans • Documentation • Maintenance concepts • Security concepts (network security)	• Integration of redundancy • Spare parts store concept • Emergency concepts	• Service planning • Complete costing
	• Technology and product training courses for network designers • Introduction courses for decision makers	• Individual user training courses • Security training • Workshops	• Qualification/certification of your employees and external service providers	• Update training for technologies and product
	• Pre-configuration and pre-assembly of systems • On-site commissioning • Application tests	• Network monitoring and support by in-house experts or partners • Network security audit • Network baselining	• 24 x 7 support hotline • On-site support • Remote service • Replacement hardware services	• Warranty extension • Individual, product-related service packages

About Belden

Belden Inc., a global leader in high quality, end-to-end signal transmission solutions, delivers a comprehensive product portfolio designed to meet the mission-critical network infrastructure needs of industrial, enterprise and broadcast markets. With innovative solutions targeted at reliable and secure transmission of rapidly growing amounts of data, audio and video needed for today's applications, Belden is at the center of the global transformation to a connected world. Founded in 1902, the company is headquartered in St. Louis, USA, and has manufacturing capabilities in North and South America, Europe and Asia.

For more information, visit us at:
www.belden.com
www.beldensolutions.com
follow us on Twitter @BeldenIND

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