



**HIRSCHMANN**

A **BELDEN** BRAND

## Leading Networking Solutions for Industrial & Mission Critical Applications



**Be certain.  
Belden.**

**Hirschmann Networking Equipment  
Maximizes Throughput, Simplifies  
Installation, and Reduces Total Cost  
of Ownership**



**HIRSCHMANN**

A **BELDEN** BRAND

## **Belden Solutions**

Belden combines the strength of Hirschmann switches and Belden Ethernet cables for a complete end-to-end connectivity solution.

You can depend on us to keep your mission-critical systems up and running.

**Be certain.  
Belden.**





## More Convenience and More Solutions for Networks in Harsh Environments and Large-scale Infrastructures

### Belden Industrial Solutions

Belden has brought together a comprehensive line of industrial cabling, connectivity and networking devices, offering the most reliable communications solutions for your application. Whether you are networking your devices to the controllers, connecting the controllers to the control room, relaying data between the control room, the engineering department, and remote manufacturing sites – or all of the above – Belden has the products you need to seamlessly connect your communications.

From the petrochemical, automotive, pharmaceutical, power generation, pulp and paper, metals, food and beverage, or general manufacturing plant to the corporate headquarters – and everywhere in between – Belden has your signal transmission solution. Belden offers the most dependable network and communications system performance in tough and mission-critical environments.

### Our Synergy Ensures Continuous Performance

With the Hirschman and Tofino Security product line additions to the Belden offering, our line of Complete Industrial Solutions is uniquely positioned to provide the best network and communications infrastructure possible. Belden products and systems expertise mean that you can maintain ongoing operations without interruption and costly downtime – in any environment. Here are a few more good reasons why Belden is your best choice for industrial networking, communications and control:

- We have the expertise to integrate your industrial and commercial networks.
- Our products are engineered to perform in the harshest and most demanding environments.
- We offer the broadest selection of products, for a complete, end-to-end Ethernet solution.

- Our sales and engineering professionals can audit, recommend/design, configure and assemble the products and systems to your specific requirements.
- Our global manufacturing, distribution and support network makes our products and services available to you globally.

### Offering Comprehensive Service & Support

Belden recognizes that comprehensive know-how is necessary to ensure an optimized, homogenous solution. We also know that consultation, support and training requires more than just a general understanding of the products, technologies and market trends. It requires a solid understanding of the application and the ability to provide the type of support that is needed – when and where it is needed. It requires the four key service and support areas that are critical to success:

- Network design
- Training
- Technical support
- System performance

### Network Design

Belden eliminates your design challenges because we understand the issues surrounding the design and operation of networks in industrial and mission-critical environments. Our engineers are available to work with you to deliver high-availability networks that meet your enterprise-wide IT needs. Whether it's designing systems for Greenfield facilities, or integrating into existing IT environments, our highly-trained staff lifts the design burden from your shoulders to ours.

We will consult with you to develop a strategy – or we will develop and implement your full design – either way our staff is available to you.

### Training

Backed by years of meeting and exceeding the needs of a broad range of end-user applications, Belden is ideally suited to offer beginners and networking experts alike the opportunity to expand their understanding of mission-critical networks.

Belden has developed a series of training programs that are given by Belden-certified individuals – all experts in industrial networking and cabling.

### Technical Support

At Belden, our personnel are poised to assist our customers – ensuring maximum uptime and reliability. And with offices in North America, Asia and Europe, Belden can respond globally.

### System Performance

If Belden designs it, we guarantee performance – period. We are committed to ensuring world-class signal connectivity and to significantly improve your operational up-time. All Belden components are “designed” to deliver optimum performance: from cable, to connectors, to switches and routers. Based on this comprehensive product portfolio, we have the necessary industrial solutions DNA to deliver reliability.

For more information on our service and support offering, including our warranties, please go to the Belden web site at [www.beldensolutions.com](http://www.beldensolutions.com) to locate a Belden sales representative near you.



# HIRSCHMANN

A BELDEN BRAND

## The Hirschmann Brand of Ethernet Switches, Wireless LAN, Security and Connectivity Products Sets the Standard for Quality, Reliability and Service



Hirschmann Switches maximize throughput, simplify installation, and reduce overall costs.

Hirschmann, a Belden brand provides the industry with leading Ethernet networking technology and sets the standards for quality, reliability and service.

### Robust

Hirschmann's years as a networking leader and pioneer, the use of premium electronic components and effective (fan-less) thermal management translates to superior performance and the highest MTBF (mean time between failure) values possible – even at operational temperatures as high as +85 °C.

### Easy to Configure

Our managed switches are easy to configure with an integrated password controlled web interface, via SNMP or CLI (command line interface), providing secure remote configuration through the network. Configuration data and device Operating System can be saved and stored on an external flash-based configuration storage device, simplifying and automating commissioning and device replacement.

### Assured Enterprise Interoperability

All switches have IT-compatible managed-switch functionality with SNMP and RMON and are compatible with industry standard network management tools and other name brand switches.

### Media Redundancy Options

Technologies like PRP and HSR provides zero packet loss redundancy and RSTP and MSTP

offer office network interoperability. By using the standardized MRP, redundant network topologies are simplified – resulting in recovery from media failure within 500 ms down to 10 ms (FastMRP).

### Sustainable Security Solutions

Comprehensive security features in switches, routers and firewalls according to latest standards like IEC62443 and best practices offers all around protection in mission critical networks. Regular updates of the device software enable customer's networks to be compliant to today's and future regulations.

### Broad Product Line

The breadth of our product line is unmatched and includes serial to fiber optic converters, fieldbus repeaters for all major fieldbus protocols, managed and unmanaged Ethernet switches (3-51 ports) with an almost limitless mix of copper/fiber ports, Layer 3 switches, media converters, wireless Access Points/ Clients/Bridges, firewalls with VPN tunneling and deep packet inspection and network management software (SNMP and OPC).

### Network Software

Monitoring and visualizing your network is made easy with the use of our Industrial HiVision network management software. Requiring little or no IT knowledge, Industrial HiVision allows users to monitor alarms, bandwidth utilization, and availability of networked devices – not just switches. Industrial HiVision allows the user to configure a single switch or multiple switches at the same time, significantly simplifying commissioning.

### Design Innovation

Continuous product innovations to meet expanding customer needs. This includes Gigabit (even 10 Gigabit speeds) industrial profiles, software tools, various form factors, e.g. IP67 industrial watertight switches, and the integration of a USB port to facilitate quick recovery of a switch and the network.



## Technologies

### Technology Topics to Industrial Networking

Hirschmann is one of the most highly experienced manufacturers of industrial network solutions based on Industrial Ethernet. As an expert in system components, accessories and unified management software with a global presence, we make available our comprehensive expertise to our clients.

#### Parallel Redundancy Protocol (PRP)



The International Standard IEC 62439-3 describes the Parallel Redundancy Protocol (PRP). PRP uses 2 separate LANs for uninterrupted availability. On the path from the sender to the receiver, PRP sends 2 data packets in parallel via the 2 mutually independent LANs with arbitrary ring, mesh, star, and bus topologies. The receiver processes the first data packet received and discards the second data packet of the pair.

#### Precision Time Protokoll (PTPv2)



PTP (Precision Time Protocol) is a procedure described in the IEEE 1588-2008 standard that provides hardware supported precise time synchronization across the devices in the network. The procedure offers a synchronization of the clocks to a degree of precision of just a few 100 ns.

#### High-availability Seamless Redundancy (HSR)



High-availability Seamless Redundancy (HSR) is like PRP described in the IEC 62439-3 Standard providing zero packet loss in case of a link failure. HSR functions primarily as a protocol for creating media redundancy based on a ring topology while PRP creates complete network redundancy.

#### Power over Ethernet (PoE)



PoE allows you to supply current to a powered device (PD) such as an IP camera via the twisted pair cable that is at the same time used for Ethernet communications. The PoE ports support Power over Ethernet according to IEEE 802.3at delivering in maximum 15.4 Watt per twisted pair port.

#### Media Redundancy Protocol



The MRP (Media Redundancy Protocol) is a protocol that allows you to set up high-availability, ring-shaped network structures with recovery times of 500 ms, 200 ms, 30 ms or 10 ms. An MRP ring with Hirschmann devices is made up of up to 100 devices that support the MRP protocol according to IEC 62439-2.

#### Power over Ethernet Plus (PoE+)



PoE+ is the further development of PoE according to the standard IEEE 802.3at supporting up to 30 Watt. While PoE requires two pairs of the twisted pair cables, PoE+ uses all 4 pairs to power end devices which require power above 15.4 Watts.

#### Device Level Ring



The Device Level Ring was introduced by the ODVA in 2009 providing high available networks in a ring topology. With a maximum of 50 nodes it is possible to achieve a worst case recovery time of 3 ms.

#### PoE Powered Device (PD)



A Power over Ethernet PD (powered device) is a device which receives the required power for their operation via PoE or PoE+.

## Technologies (continued)

### Layer 3 – Wire-Speed Routing with standardized Routing Protocols



The Layer-3 routing functionality in Hirschmann switches focusing on maximum performance and lowest latency. Due to the hardware support of the routing functionality wire speed IP communication is provided between different IP networks offering the same delays like switched data packets. Standard Routing protocols, router redundancy mechanism as well as multicast routing protocols are part of the Layer 3 functions.

### IPv6



Although the next generation of the Internet Protocol, version 6, is rarely deployed in industrial environments, the latest generation of Hirschmann devices is able to server future customer demands for IPv6 in the same way like it is required today with IPv4.

### PROFINET



PROFINET is an industrial communication standard based on Ethernet technology. It is standardized in IEC 61158 and IEC 61784. Devices with this logo are certified by the PROFIBUS & PROFINET International (PI) according to the Conformance Class B (CC-B). Therefore several requirements need to be fulfilled like the implementation of a PROFINET IO Stack.

### PROFINET CC-A



PROFINET is an industrial communication standard based on Ethernet technology. It is standardized in IEC 61158 and IEC 61784. The supported functions of PROFINET IO are divided into Conformance Classes (CC). Device of the Conformance Class A (CC-A) provides basic function for PROFINET IO with Real Time (RT) communication.

### EtherNet/IP – Conformance tested



EtherNet/IP is an industrial communication protocol standardized by the Open DeviceNet Vendor Association (ODVA) on the basis of Ethernet. It is based on the widely used transport protocols TCP/IP and UDP/IP (standard). EtherNet/IP thus provides a wide basis, supported by leading manufacturers, for effective data communication in the industry sector.

### Clear Space Wireless



Clear Space, OpenBAT offers stable wireless LAN connections, because this technology reliably eliminates interfering frequencies. This markedly reduces the noise level and therefore largely prevents packet losses. The integrated ESD protection withstands electrostatic discharges while increasing the lifespan of the hardware.



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## Switch Software

### HiOS – Hirschmann Operating System

HiOS is the latest operating system for the new generation of Industrial Ethernet devices, combining high performance with robust security. It provides the user with precise time synchronization, extensive redundancy mechanisms and diagnostic tools. With zero switch-over time, the PRP (Parallel Redundancy Protocol) and HSR (High-Availability Seamless Redundancy) redundancy methods ensure smooth production processes. Comprehensive security mechanisms protect networks against attacks and operating errors.

- Layer 2 Embedded (L2E): Suitable for EES
- Layer 2 Standard (L2S): Suitable for RED, RSP, RSPS, RSPL, RSPE, Greyhound and OCTOPUS II
- Layer 2 Advanced (L2A): Suitable for MSP, RSP, RSPE and OCTOPUS II
- Layer 3 Standard (L3S): Suitable for RSP, RSPE and OCTOPUS II
- Layer 3 Advanced (L3A): Suitable for MSP



### Classic Switch Software

The Classic Switch Software provides a range of functions normally found in backbone systems used in office networks. This includes comprehensive management, diagnostics and filter functions, various redundancy features, security mechanisms and real-time applications.

- Layer 2 Basic (L2B): Suitable for RSB20, OCTOPUS
- Layer 2 Enhanced (L2E): Suitable for RS20/RS30/RS40, MS20/MS30
- Layer 2 Professional (L2P): Suitable for RS20/RS30/RS40, MS20/MS30, OCTOPUS, PowerMICE, RSR20/RSR30, MACH100, MACH1000, MACH4000
- Layer 3 Enhanced (L3E): Suitable for PowerMICE, MACH4000
- Layer 3 Professional (L3P): Suitable for PowerMICE, MACH104, MACH1040, MACH4000



**NOTE:** For the latest software functionality overview please visit our website at:  
[www.hirschmann.com/en/Software](http://www.hirschmann.com/en/Software)







## Software Functionality (continued)

Security	Classic Switch Software v9.0					HiOS Hirschmann Operating System v5.0				
	L2B	L2E	L2P	L3E	L3P	L2E	L2S	L2A	L3S	L3A
IP-based Port Security		●	●	●	●			●	●	●
MAC-based Port Security		●	●	●	●	●	●	●	●	●
Port-based Access Control with 802.1X			●	●	●	●	●	●	●	●
RADIUS VLAN Assignment			●	●	●	●	●	●	●	●
Guest/Unauthenticated VLAN			●	●	●	●	●	●	●	●
RADIUS Policy Assignment								●	●	●
MAC Authentication Bypass			●	●	●			●	●	●
Multi-Client Authentication per Port			●	●	●			●	●	●
Integrated Authentication Server (IAS)			●	●	●	●	●	●	●	●
Remote Authentication via RADIUS		●	●	●	●	●	●	●	●	●
LDAP								●	●	●
Basic ACL							●*			
Ingress MAC-based ACL				●	●			●	●	●
Ingress IPv4-based ACL				●	●			●	●	●
Ingress VLAN-based ACL				●	●			●	●	●
Egress MAC-based ACL								●*		●
Egress IPv4-based ACL								●*		●
Egress VLAN-based ACL								●*		●
Time-based ACL								●	●	●
VLAN-based ACL							●*	●	●	●
ACL Flow-based Limiting								●	●	●
DHCP Snooping								●	●	●
IP Source Guard								●*		●
Dynamic ARP Inspection								●	●	●
Automatic Denial-of-Service Prevention							●	●	●	●
Device Security Indication							●	●	●	●
Audit Trail							●	●	●	●
CLI Logging							●	●	●	●
HTTPS Certificate Management	●	●	●	●	●	●	●	●	●	●
Access to Management restricted by VLAN		●	●	●	●	●	●	●	●	●
Restricted Management Access			●	●	●	●	●	●	●	●
Appropriate Use Banner			●	●	●	●	●	●	●	●
SNMP Logging	●	●	●	●	●	●	●	●	●	●
Multiple Privilege Levels						●	●	●	●	●
Local User Management	●	●	●	●	●	●	●	●	●	●
Configurable Password Policy						●	●	●	●	●
Configurable Number of Login Attempts						●	●	●	●	●
User Account Locking						●	●	●	●	●

Time Synchronization	Classic Switch Software v9.0					HiOS Hirschmann Operating System v5.0				
	L2B	L2E	L2P	L3E	L3P	L2E	L2S	L2A	L3S	L3A
SNTP Client	●	●	●	●	●	●	●	●	●	●
SNTP Server	●	●	●	●	●	●	●	●	●	●
Buffered Real Time Clock			●	●	●	●*	●	●	●	●
PTPv2 Transparent Clock Two-step*			●	●	●	●*	●*	●	●	●
PTPv2 Boundary Clock*		●	●	●	●	●*	●*	●	●	●

Industrial Profiles	Classic Switch Software v9.0					HiOS Hirschmann Operating System v5.0				
	L2B	L2E	L2P	L3E	L3P	L2E	L2S	L2A	L3S	L3A
PROFINET IO Protocol		●	●	●	●	●*	●*	●	●	●
EtherNet/IP Protocol		●	●	●	●	●*	●*	●	●	●
ModbusTCP						●	●	●	●	●
IEC61850 Protocol (MMS Server, Switch Model)			●	●	●	●	●	●	●	●

\* Hardware dependent





## Software Tools



### Industrial HiVision

Since its first release, Industrial HiVision has undergone continual development, with a focus on the functionality required in an automation environment. As a result, the current release offers a rich feature set and is available for Windows and Linux operating systems. For example, it can be used for reliable and convenient management of industrial networks, from configuring network nodes and visualizing network topologies, to detailed status displays. Therefore, the network administrator has access at all times to the information needed for efficient network management, accurate fault location and maintenance work. In short, Industrial HiVision is a core component for enhancing the availability of data communication.

Industrial HiVision can be used wherever networks have to meet the highest requirements in terms of availability and security, whether in the automotive industry or in the energy or transport sectors. Industrial networks are becoming increasingly complex, so to ensure efficient administration, Industrial HiVision allows distributed management with hierarchical master/slave stations. Most importantly, this software requires no special IT knowledge. The wizard guides you easily and systematically through the network management setup process.

Everybody knows, seeing is believing. Words alone cannot do justice to network management software. Download Industrial HiVision, and test it free of charge for 30 days at your convenience. An additional free of charge 30 day evaluation period is available by registering the software after the trial period has expired. You can download Industrial HiVision free of charge from [www.hivision.de](http://www.hivision.de).

Industrial HiVision	
Part No.	Order No.
943 156-016	Industrial HiVision, 16 nodes
943 156-032	Industrial HiVision, 32 nodes
943 156-064	Industrial HiVision, 64 nodes
943 156-128	Industrial HiVision, 128 nodes
943 156-256	Industrial HiVision, 256 nodes
943 156-512	Industrial HiVision, 512 nodes
943 156-1024	Industrial HiVision, 1024 nodes
943 156-2048	Industrial HiVision, 2048 nodes
943 156-4096	Industrial HiVision, 4096 nodes



The HiFusion tool in Industrial HiVision enables the integration of SNMP-enabled devices from different manufacturers into a single network management application: switches, PLCs, I/O modules and HMI panels. Therefore, this software offers maximum network visibility. Using MultiConfig™, hundreds of devices can be configured simultaneously, even while they are in operation. This not only saves time, but also ensures consistent configuration of the network infrastructure. Since the network topology is recognized automatically, all the network nodes and links are accurately displayed on-screen, including any unmanaged switches and hubs. This means that the display always shows the exact network status, and faults can be located quickly. Industrial HiVision also facilitates cost-effective solutions, because clients are made available free of charge and license fees are payable only for the server.





### HiView

HiView allows users to benefit from Hirschmann products' web interface, without any browser or Java library installed on their PCs. In addition, HiView is a portable application. It does not require any installation and does not alter any PC registry entries. It even works directly from removable media such as USB drives and SD cards, for ultimate portability. But HiView is not just a replacement for a web browser. The comfortable Selection screen shows which Hirschmann devices have been accessed recently, with the most popular listed at the top. A single click connects to the required device. For added security, it is simple and convenient to view the security certificates of both the products and the Java library. And HiView will automatically use the most secure communication method.



### HiDiscovery

Hirschmann products are delivered without a default IP address. This ensures that there is no chance of an IP address conflict, which could have a negative impact on a network. The traditional method for configuring an IP address on a device is to use the serial port. But there will almost certainly be occasions when the correct serial cable is not available. This is where HiDiscovery comes into play. HiDiscovery will discover all Hirschmann devices on a LAN, even if they do not have an IP address. The "Signal" button will activate a device's LEDs, so you can see which device you are communicating with. You can then assign IP address information to the device, directly over the Ethernet connection. HiDiscovery even assists with fault finding, by highlighting devices with duplicate IP addresses.



### HiFusion

Manufacturers have defined various MIB variables for their devices that are not covered by standard MIBs. HiFusion allows you to integrate manufacturer-specific MIB variables for third-party devices into the Industrial HiVision network management software. To achieve this you create Product-specific Modules (PSM).

When creating a PSM you name the device, define a list of variables and assign an image to the device. The execution of the remaining processes is largely automated. Afterwards you incorporate the completed PSM into Industrial HiVision. Your third-party device will then be assigned the correct icon, and the values of the MIB variables will be displayed. HiFusion operates as a stand-alone application. It does not require Industrial HiVision to create or test the new PSM. You do not require a license for the program. The device for which you are creating the PSM must support version 1 or version 3 of the Simple Network Management Protocol (SNMP).



### HiMobile

The HiMobile app, together with Industrial HiVision network management software from Hirschmann, is the perfect client/server solution for mobile monitoring of network nodes using smartphones or tablets – for higher network availability. HiMobile allows direct and convenient access to status information on network devices from almost anywhere. The HiMobile app runs on mobile devices and supports Apple and Android operating systems as well as Windows Phone.





## Software Tools (*continued*)



### Secure Remote Access Solution

The Secure Remote Access Solution provides a protected cloud system that can be configured with minimal IT knowledge or assistance. Permanent internet protocol (IP) addresses are not required, and there is no need to reconfigure corporate firewalls. Thus, the system enables secure access for remote programming and diagnostics with no disruptions to existing systems.

The Secure Remote Access Solution allows customers to remotely access their sites in order to troubleshoot and fix problems. This reduces the need for travel and allows staff to work more efficiently by handling multiple systems simultaneously.

This product also helps companies embrace the Industrial Internet of Things movement by enabling a secure way for many devices to connect together and communicate.

At the core of the Secure Remote Access Solution is a cloud service to which customers can connect their remote network devices. Multiple versions of software and hardware are available to complete the system, including the ability to manage the network from personal computers (PCs) or mobile devices.

The Secure Remote Access Solution supports Ethernet communication through a three-component system, including the:

- **GateManager** – operates as a cloud service
- **SiteManager** – hardware or software-based, making it possible to connect remote devices to the GateManager cloud; on the hardware version, the GECKO SiteManager software runs inside the Hirschmann GECKO switch
- **LinkManager** – provides secure, on-demand access to remote devices via the cloud

The network system is not only designed to be easy to install, but also provides firewall-friendly, state-of-the-art security features.

Belden and Hirschmann offer an initial Starter Package, limited to one per company, which includes:

- One SiteManager (GECKO 4TX switch hardware with integrated software or SiteManager Embedded software for Windows PCs)
- One LinkManager floating software license
- LinkManager mobile software
- GateManager Free Cloud Service

This Starter Package includes everything you need to get started and test the solution. Once you are satisfied, you can upgrade your cloud service and number of licenses to reflect your corporate requirements.



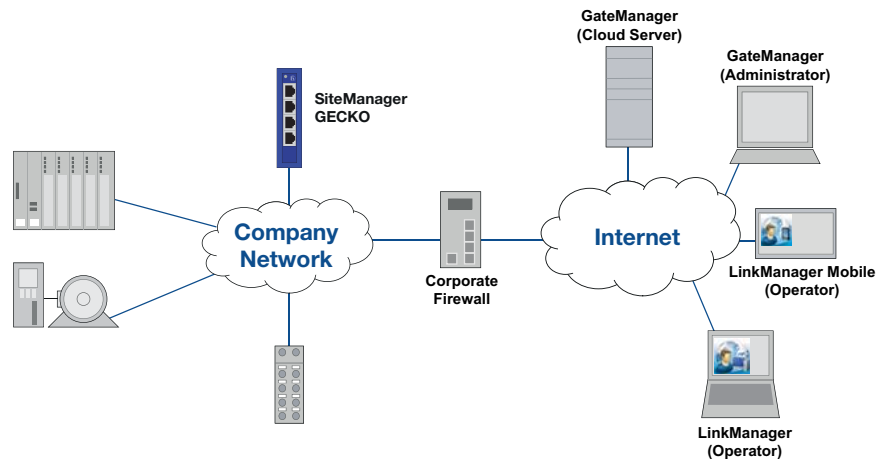
## Technical Information

**SiteManager** Embedded for Windows supports Windows XP, 7 and 8. This makes it ideal for installing on Windows based HMI panels and IPCs. It installs as a Windows Service and runs in the background. It requires only 10 Mbyte RAM and 5 Mbyte HDD.

**LinkManager** installs a virtual adapter and thus requires running on Windows. But it works fine alongside VPN clients and is designed for both 32 and 64 bit windows, and even runs inside a virtual machine such as VMWare, ESXi or HyperV.

**LinkManager Mobile** supports iPhone, iPad and Android OS.

### Hirschmann Secure Remote Access Solution



### GateManager

Product Description	Max. Number of LinkManager Licenses	Max. Number of LinkManager Mobile Licenses	Max. Number of SiteManagers	Max. Number of Administrator Accounts
GateManager Free	2	8	100	2
GateManager Bronze	4	50	300	3
GateManager Silver	6	100	500	5
GateManager Gold	8	250	Unlimited	Unlimited
GateManager Platinum	Unlimited	Unlimited	Unlimited	Unlimited

### SiteManager – LinkManager – GateManager – Starter Package SiteManager

Product Description	Order No.
SiteManager GECKO 5 Agents License *	942 144 - 001
SiteManager GECKO 10 Agents License *	942 144 - 002
SiteManager Embedded for Windows Basic	942 144 - 101
SiteManager Embedded for Windows 5 Agents	942 144 - 102
SiteManager Embedded for Windows 10 Agents	942 144 - 103
LinkManager	942 144 - 201
LinkManager Mobile	942 144 - 202
GateManager Free	N/A
GateManager Bronze	942 144 - 301
GateManager Silver	942 144 - 302
GateManager Gold	942 144 - 303
GateManager Platinum	942 144 - 304
Starter Package SiteManager GECKO 5 Agents **	942 144 - 401
Starter Package SiteManager GECKO 10 Agents **	942 144 - 402
Starter Package SiteManager Embedded for Windows 5 Agents	942 144 - 403
Starter Package SiteManager Embedded for Windows 10 Agents	942 144 - 404

\* Does not include GECKO hardware

\*\* Includes GECKO hardware

## SPIDER Series Unmanaged DIN Rail Mount Ethernet Switches



### Entry-level Industrial Unmanaged Switches

The SPIDER family of switches provides users with an economical, yet highly reliable hardened Ethernet switch. Models are available with Fast Ethernet, Gigabit Ethernet and PoE ports.

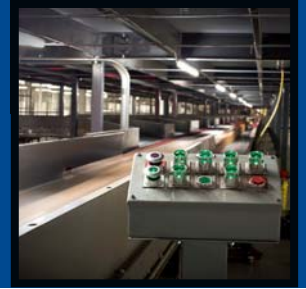
All copper/RJ45 ports are auto-negotiating and auto-crossing – the SPIDERS will work with either patch or cross-over cables. The fiber ports are available in multimode (MM), singlemode (SM) with either SC or ST sockets or via SFP transceiver (see page 96). All SPIDER switches are extremely compact and have LED indicators that provide information on power status, link status, and data rate. Additional to that all "PRO" Variants fulfill the requirements of PROFINET Conformance Class A.



### Technical Information

Product Description									
Type	SPIDER 1TX/1FX-x	SPIDER xTX-x	SPIDER II 8TX/x	SPIDER II Giga 5TX/x	SPIDER II 16TX/x	SPIDER Giga 2TX PoE EEC	SPIDER II 8TX PoE	SPIDER xTX-x PD EEC	
Switching/Routing	Unmanaged								
Available Ports	2	3, 5, 8	8, 9, 10	5, 7	16, 18	2	8	2, 5	
Construction									
Mounting	DIN Rail								
Protection Class	IP30								
Dimensions (WxHxD)	25 x 114 x 79 mm 25 x 126 x 79 mm for ST fiber models		35 x 154 x 121 mm 35 x 168 x 121 mm for ST fiber models		30 x 140 x 95 mm	35 x 154 x 121 mm	25 x 114 x 79 mm		
Weight	177 g		270 g		730 g	420 g	560 g	198 g	
Ambient Conditions									
Operating Temperature	0 °C to +60 °C, -40 °C to +70 °C for EEC models					-40 °C to +70 °C	-10 °C to +60 °C	-40 °C to +70 °C	
Storage/Transport Temperature	-40 °C to +70 °C, -40 °C to +85 °C for EEC models					-40 °C to +85 °C	-20 °C to +70 °C	-40 °C to +85 °C	
Relative Humidity (non-condensing)	0% to 95%								
Conformal Coating	n/a								
Interfaces									
V.24 Interface	n/a								
USB Interface	n/a								
Power Requirements									
Operating Voltage	9.6 to 32 V DC				18 to 32 V DC	21 to 53 V DC	18 to 32 V DC	36 to 57 V DC	
PoE (802.3af) Ports Supported	n/a						4	n/a	
PoE Plus (802.3at) Ports	n/a					1	n/a		
Powered Device (PD)	no							yes	
Regulatory Approvals									
Safety of Industrial Control Equipment	cUL508				cUL508, cUL60950-1	cUL508			
Hazardous Locations	n/a				ISA 12.12.01 C1D2, ATEX Zone 2	n/a			
Reliability									
MTBF Range	138 to 265 years	129 to 360 years	88 to 185 years	114 years	37 years	162 years	55 years	46 to 55 years	
Warranty	5 years standard								

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



All Copper/RJ45		
Part No.	Order No.	Ports
SPIDER 3TX-TAP	943 899-001	3 x 10/100 Mbit/s RJ45
SPIDER 5TX	943 824-002	5 x 10/100 Mbit/s RJ45
SPIDER 5TX EEC	943 824-102	5 x 10/100 Mbit/s RJ45
SPIDER 8TX	943 376-001	8 x 10/100 Mbit/s RJ45
SPIDER 8TX EEC	943 376-201	8 x 10/100 Mbit/s RJ45
SPIDER II 8TX	943 957-001	8 x 10/100 Mbit/s RJ45
SPIDER II 8TX EEC	943 958-001	8 x 10/100 Mbit/s RJ45
SPIDER II 16TX EEC	942 120-001	16 x 10/100 Mbit/s RJ45
SPIDER II Giga 5T EEC	943 962-002	5 x 10/100/1000 Mbit/s RJ45
SPIDER II Giga 5T EEC Pro	943 962-102	5 x 10/100/1000 Mbit/s RJ45, QoS according to IEEE 802.1D
SPIDER II Giga 5T EEC Jumbo	943 962-202	5 x 10/100/1000 Mbit/s RJ45, Jumbo Frames with up to 9014 Bytes user data

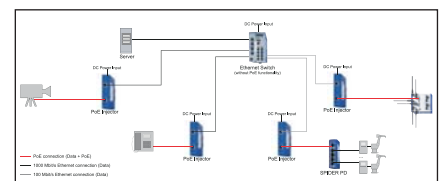


Copper/RJ45 and Fiber		
Part No.	Order No.	Ports
SPIDER 1TX/1FX	943 890-001	1 x 10/100 Mbit/s RJ45, 1 x 100 Mbit/s MM SC
SPIDER 1TX/1FX EEC	943 927-101	1 x 10/100 Mbit/s RJ45, 1 x 100 Mbit/s MM SC
SPIDER 1TX/1FX-SM	943 891-001	1 x 10/100 Mbit/s RJ45, 1 x 100 Mbit/s SM SC
SPIDER 1TX/1FX SM EEC	943 928-001	1 x 10/100 Mbit/s RJ45, 1 x 100 Mbit/s SM SC
SPIDER 4TX/1FX	943 221-001	4 x 10/100 Mbit/s RJ45, 1 x 100 Mbit/s MM SC
SPIDER 4TX/1FX EEC	943 221-101	4 x 10/100 Mbit/s RJ45, 1 x 100 Mbit/s MM SC
SPIDER 4TX/1FX-ST EEC	943 914-001	4 x 10/100 Mbit/s RJ45, 1 x 100 Mbit/s MM ST
SPIDER 4TX/1FX SM EEC	943 880-001	4 x 10/100 Mbit/s RJ45, 1 x 100 Mbit/s SM SC
SPIDER II 8TX/1FX EEC	943 958-111	8 x 10/100 Mbit/s RJ45, 1 x 100 Mbit/s MM SC
SPIDER II 8TX/1FX-ST EEC	943 958-121	8 x 10/100 Mbit/s RJ45, 1 x 100 Mbit/s MM ST
SPIDER II 8TX/2FX EEC	943 958-211	8 x 10/100 Mbit/s RJ45, 2 x 100 Mbit/s MM SC
SPIDER II 8TX/2FX-ST EEC	943 958-221	8 x 10/100 Mbit/s RJ45, 2 x 100 Mbit/s MM ST
SPIDER II 8TX/1FX-SM EEC	943 958-131	8 x 10/100 Mbit/s RJ45, 1 x 100 Mbit/s SM SC
SPIDER II 8TX/2FX-SM EEC	943 958-231	8 x 10/100 Mbit/s RJ45, 2 x 100 Mbit/s SM SC
SPIDER II 16TX/2DS-S EEC	942 121-001	16 x 10/100 Mbit/s RJ45, 2 x 100/1000 Mbit/s SFP
SPIDER II Giga 5T/2S EEC	943 963-002	5 x 10/100/1000 Mbit/s RJ45, 2 x 1000 Mbit/s SFP
SPIDER II Giga 5T/2S EEC Pro	943 963-102	5 x 10/100/1000 Mbit/s RJ45, 2 x 1000 Mbit/s SFP, QoS according to IEEE 802.1D
SPIDER II Giga 5T/2S EEC Jumbo	943 963-202	5 x 10/100/1000 Mbit/s RJ45, 2 x 1000 Mbit/s SFP, Jumbo Frames with up to 9014 Bytes user data

Ethernet Switches powered via PoE		
Part No.	Order No.	Ports
SPIDER 5TX PD EEC	942 051-001	5 x 10/100 Mbit/S RJ45, 1 x PoE PD according to IEEE 802.3af
SPIDER 1TX/1FX-MM PD EEC	942 051-002	1x 10/100 Mbit/S RJ45, 1 x PoE PD according to IEEE 802.3af, 1 x 100 Mbit/s MM SC
SPIDER 1TX/1FX-SM PD EEC	942 051-003 1	1x 10/100 Mbit/S RJ45, 1 x PoE PD according to IEEE 802.3af, 1 x 100 Mbit/s SM SC

PoE Ethernet Switch/Injector		
Part No.	Order No.	Ports
SPIDER II 8TX PoE	942 008-001	8 x 10/100 Mbit/s RJ45, 4 x PoE according to IEEE802.3af
SPIDER GIGA 2TX PoE EEC	942 059-001	2 x 10/100/1000 Mbit/s RJ45, 1 x PoE+ according to IEEE802.3at

**NOTE:** EEC stands for extended environmental conditions (-40 °C to +70 °C).



Example of PoE Injector Installation Illustrating the use of PoE.



## RS2 Unmanaged DIN Rail Mount Ethernet Switches



### Configurable Unmanaged Ethernet-Switches with Tailor-made Configurations

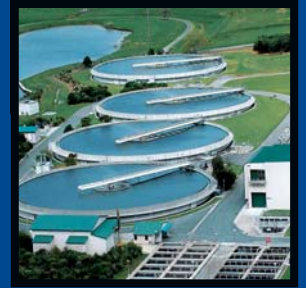
The RS2 Series of switches offer advanced features such as redundant power inputs and most offer fault relay (triggerable by loss of power and/or port-link).

Standard features include 10/100 auto-negotiating and auto-crossing (either patch or cross-over cables will work in the ports), a 0 °C to +60 °C operating range (-40 °C to +70 °C available), a 24 V DC power input and an average MTBF exceeding 100 years.

All of the multimode (MM) and singlemode (SM) fiber optic ports are 100 Mbit/s and are available in a variety of connector options.

All Copper/RJ45 – RS2		
Part No.	Order No.	Ports/Features
RS2-4TX EEC	943 819-001	4 x 10/100 Mbit/s RJ45, link loss alarm, power loss alarm, fault relay output, ext. temp. -40 °C to +70 °C
RS2-5TX	943 732-003	5 x 10/100 Mbit/s RJ45, rugged die-cast metal housing offering wall-mount option
RS2-TX	943 686-003	8 x 10/100 Mbit/s RJ45, link loss alarm, power loss alarm, fault relay output

Copper/RJ45 and Fiber Mix		
Part No.	Order No.	Ports/Features
RS2-3TX/2FX EEC	943 771-001	3 x 10/100 Mbit/s RJ45 and 2 x 100 Mbit/s MM SC, link loss alarm, power loss alarm, fault relay output, ext. temp. -40 °C to +70 °C
RS2-3TX/2FX-SM EEC	943 772-001	3 x 10/100 Mbit/s RJ45 and 2 x 100 Mbit/s SM SC, link loss alarm, power loss alarm, fault relay output, ext. temp. -40 °C to +70 °C
RS 2-5TX/FX	943 732-103	4 x 10/100 Mbit/s RJ45 and 1 x 100 Mbit/s MM MTRJ, rugged die-cast metal housing offering wall-mount option
RS 2-4TX/1FX EEC	943 773-001	4 x 10/100 Mbit/s RJ45 and 1 x 100 Mbit/s MM SC, link loss alarm, power loss alarm, fault relay output, ext. temp. -40 °C to +70 °C
RS 2-4TX/1FX-ST EEC	943 119-002	4 x 10/100 Mbit/s RJ45 and 1 x 100 Mbit/s MM ST, link loss alarm, power loss alarm, fault relay output, ext. temp. -40 °C to +70 °C
RS 2-4TX/1FX-SM EEC	943 774-001	4 x 10/100 Mbit/s RJ45 and 1 x 100 Mbit/s SM SC, link loss alarm, power loss alarm, fault relay output, ext. temp. -40 °C to +70 °C



## RS20 and RS30 Unmanaged DIN Rail Mount Ethernet Switches

### Tailor-made Configurable Unmanaged Ethernet-Switches

The RS20/30 Unmanaged Ethernet switches are ideal for applications that are less dependent upon the features of switch management while maintaining the highest feature-set for an unmanaged switch.

Features include: from 8 up to 25 ports Fast Ethernet with options for up to 3x fiber ports or up to 24 fast Ethernet and option for 2 Gigabit Ethernet uplink ports SFP or RJ45 redundant power inputs via dual 24 V DC, fault relay (triggerable by loss of one power input and/or the loss of the link(s) specified), auto-negotiating and auto crossing, variety of connector options for Multimode (MM) and Singlemode (SM) fiber optic ports, choice of operating temperatures and conformal coating (standard is 0 °C to +60 °C, with -40 °C to +70 °C also available), and variety of approvals including IEC 61850-3, IEEE 1613, EN 50121-4 and ATEX 100a Zone 2.



### Standard Variants RS20

All Copper/RJ45		
Part No.	Order No.	Ports/Features
RS20-1600T1T1SDAU	943 434-047	16 x 10/100 Mbit/s RJ45

Multimode (MM)		
Part No.	Order No.	Ports/Features
RS20-0900NM4TDAU	943 434-058	3 x 100 Mbit/s MM ST and 6 x 10/100 Mbit/s RJ45
RS20-0900MMM2TDAU	943 434-059	3 x 100 Mbit/s MM SC and 6 x 10/100 Mbit/s RJ45
RS20-1600M2T1SDAU	943 434-049	1 x 100 Mbit/s MM SC and 15 x 10/100 Mbit/s RJ45
RS20-1600M2M2SDAU	943 434-048	2 x 100 Mbit/s MM SC and 14 x 10/100 Mbit/s RJ45
RS20-1600S2M2SDAU	943 434-052	1 x 100 Mbit/s MM SC, 1 x 100 Mbit/s SM SC and 14 x 10/100 Mbit/s RJ45
RS20-1600L2M2SDAU	943 434-055	1 x 100 Mbit/s MM SC, 1 x 100 Mbit/s Long Haul SM SC and 14 x 10/100 Mbit/s RJ45

Singlemode (SM)		
Part No.	Order No.	Ports/Features
RS20-0900VVM2TDAU	943 434-060	3 x 100 Mbit/s SM SC and 6 x 10/100 Mbit/s RJ45
RS20-1600S2T1SDAU	943 434-051	1 x 100 Mbit/s SM SC and 15 x 10/100 Mbit/s RJ45
RS20-1600S2S2SDAU	943 434-053	2 x 100 Mbit/s SM SC and 14 x 10/100 Mbit/s RJ45
RS20-1600L2T1SDAU	943 434-054	1 x 100 Mbit/s Long Haul SM SC and 15 x 10/100 Mbit/s RJ45
RS20-1600L2S2SDAU	943 434-056	1 x 100 Mbit/s Long Haul SM SC, 1 x 100 Mbit/s SM SC and 14 x 10/100 Mbit/s RJ45
RS20-1600L2L2SDAU	943 434-057	2 x 100 Mbit/s Long Haul SM SC and 14 x 10/100 Mbit/s RJ45
RS20-1600S2M2SDAU	943 434-052	1 x 100 Mbit/s MM SC, 1 x 100 Mbit/s SM SC and 14 x 10/100 Mbit/s RJ45
RS20-1600L2M2SDAU	943 434-055	1 x 100 Mbit/s MM SC, 1 x 100 Mbit/s Long Haul SM SC and 14 x 10/100 Mbit/s RJ45

**NOTE:** For further combinations for RS20 and RS30 unmanaged switches please visit: [www.hirschmann.com](http://www.hirschmann.com)



## Lite Managed Industrial Ethernet Switch – GECKO 4TX



### Lite Managed Industrial Ethernet Rail-Switch

The GECKO 4TX industrial Ethernet switch provides diagnostic, redundancy and security functions at an outstanding price-performance ratio. Although this "lightly" managed switch stands out with its simplicity, it also offers functionalities that enable more advanced capabilities than available with unmanaged devices. These include redundancy functionality for a high reliability of the network, and fast and simple error diagnosis for higher machine uptime and smooth production workflows. Furthermore, it is possible to turn off unused ports to prevent unwanted connections that may cause harm to your network. Finally, the GECKO helps you to get more status information from your network.



### Technical Information

Product Description	
Type	GECKO 4TX
Description	Lite Managed Industrial ETHERNET Rail-Switch, Store and Forward Switching Mode, fanless design
Switching/Routing	Lite managed Layer 2
Available Ports	4 x 10/100BASE-TX, TP-cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity
Order No.	942 104-001
Construction	
Mounting	DIN-Rail
Protection Class	IP30
Dimensions (WxHxD)	25 x 114 x 79 mm
Weight	100g
Ambient Conditions	
Operating Temperature	0 °C to +60 °C
Storage/Transport Temperature	-40 °C to +85 °C
Relative Humidity (non-condensing)	5% to 95%
Interfaces	
V.24 Interface	n/a
USB Interface	n/a
Power Requirements	
Operating Voltage	9.6 to 32 V DC
PoE (802.3af/at) Ports Supported	n/a
Software	
Management	SNMP v1, v2c, v3, Web based management
Diagnostic	Device status indication (LEDs), RMON (1) statistics, Simple interface statistics (MIB-2), Local Log-Files, LLDP
Configuration	BOOTP/DHCP
Security	Possibility to disable each port
Redundancy	RSTP
Filter	Store and Forward switching, QoS, TOS/DSCP prioritization, Static unicast/multicast address entries
Regulatory Approvals	
Safety of Industrial Control Equipment	cUL61010-1/-2-201
Reliability	
MTBF Range	56.6 years
Warranty	5 years standard

NOTE: These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)





## RSB20 Series Basic Managed DIN Rail Mount Switches

### Fast Ethernet Uplink Ports

The RSB20 series of managed switches consists of 8 core models, each of which are optionally available in high temperature configurations and/or preconfigured with IGMP Snooping initially active (multicast filtering) for EtherNet/IP use. These switches offer redundant DC power inputs and a variety of multimode (SC), singlemode (SC), and SFP socket options.

The RSB20 portfolio offers users a quality, hardened, reliable communications solution that provides an economically attractive entry into the segment of managed switches.



### Technical Information

Product Description	
Type	RSB20 Series
Available Ports	8 to 9
Construction	
Mounting	DIN Rail
Protection Class	IP20
Dimensions (WxHxD)	47 x 131 x 111 mm
Weight	400 g
Ambient Conditions	
Operating Temperature	0 °C to +60 °C, -40 °C to +70 °C
Storage/Transport Temperature	-40 °C to +85 °C
Relative Humidity (non-condensing)	10% to 95%
Conformal Coating	No
Interfaces	
V.24 Interface	1 x RJ11 socket
USB Interface	n/a
Software	
Supported Classic Software Levels	Layer 2 Basic (L2B)
Power Requirements	
Operating Voltage	24 V DC (18 to 32 V)
PoE (802.3af) Ports Supported	n/a
PoE Plus (802.3at) Ports Supported	n/a
Regulatory Approvals	
Safety of Industrial Control Equipment	cUL508
Hazardous Locations	ISA12.12.01 Class 1 Div 2
Ship	n/a
Transportation	n/a
Railway (norm)	n/a
Substation	n/a
Reliability	
MTBF Range	58.8 to 88 years
Warranty	5 years standard

NOTE: These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



## RSB20 Series Basic Managed DIN Rail Mount Switch Configurations

### Fast Ethernet Uplink Ports



All Copper/RJ45		
Part No.	Order No.	Ports/Features
RSB20-0800T1T1SAAB	942 014-001	8TX
RSB20-0800T1T1SAABE	942 014-017	8TX E, pre-configured MC filtering for EtherNet/IP
RSB20-0800T1T1TAABE	942 014-025	8TX EEC E, pre-configured MC filtering for EtherNet/IP
RSB20-0800T1T1TAAB	942 014-009	8TX EEC

Multimode (MM)		
Part No.	Order No.	Ports/Features
RSB20-0800M2M2SAAB	942 014-002	6TX/2FX MM
RSB20-0800M2M2SAABE	942 014-018	6TX/2FX MM E, pre-configured MC filtering for EtherNet/IP
RSB20-0800M2M2TAABE	942 014-026	6TX/2FX MM EEC E, pre-configured MC filtering for EtherNet/IP
RSB20-0800M2M2TAAB	942 014-010	6TX/2FX MM EEC
RSB20-0900M2TTSAAAB	942 014-005	8TX/1FX MM
RSB20-0900M2TTSAAABE	942 014-021	8TX/1FX MM E, pre-configured MC filtering for EtherNet/IP
RSB20-0900M2TTTAAABE	942 014-029	8TX/1FX MM EEC E, pre-configured MC filtering for EtherNet/IP
RSB20-0900M2TTTAAAB	942 014-013	8TX/1FX MM EEC
RSB20-0900MMM2SAAB	942 014-007	6TX/3FX MM
RSB20-0900MMM2SAABE	942 014-023	6TX/3FX MM E, pre-configured MC filtering for EtherNet/IP
RSB20-0900MMM2TAABE	942 014-031	6TX/3FX MM EEC E, pre-configured MC filtering for EtherNet/IP
RSB20-0900MMM2TAAB	942 014-015	6TX/3FX MM EEC

Singlemode (SM) Fiber and Copper		
Part No.	Order No.	Ports/Features
RSB20-0800S2S2SAAB	942 014-003	6TX/2FX SM
RSB20-0800S2S2SAABE	942 014-019	6TX/2FX SM E, pre-configured MC filtering for EtherNet/IP
RSB20-0800S2S2TAABE	942 014-027	6TX/2FX SM EEC E, pre-configured MC filtering for EtherNet/IP
RSB20-0800S2S2TAAB	942 014-011	6TX/2FX SM EEC
RSB20-0900S2TTSAAAB	942 014-006	8TX/1FX SM
RSB20-0900S2TTSAAABE	942 014-022	8TX/1FX SM E, pre-configured MC filtering for EtherNet/IP
RSB20-0900S2TTTAAABE	942 014-030	8TX/1FX SM EEC E, pre-configured MC filtering for EtherNet/IP
RSB20-0900S2TTTAAAB	942 014-014	8TX/1FX SM EEC

Singlemode (SM)/Multimode (MM) Fiber and Copper		
Part No.	Order No.	Ports/Features
RSB20-0900VVM2SAAB	942 014-008	6TX/2FX SM/1 FX MM
RSB20-0900VVM2SAABE	942 014-024	6TX/2FX SM/1 FX MM E, pre-configured MC filtering for EtherNet/IP
RSB20-0900VVM2TAABE	942 014-032	6TX/2FX SM/1 FX MM EEC E, pre-configured MC filtering for EtherNet/IP
RSB20-0900VVM2TAAB	942 014-016	6TX/2FX SM/1 FX MM EEC

SFP		
Part No.	Order No.	Ports/Features
RSB20-0900ZZZ6SAAB	942 014-004	6TX/3SFP
RSB20-0900ZZZ6SAABE	942 014-020	6TX/3SFP E, pre-configured MC filtering for EtherNet/IP
RSB20-0900ZZZ6TAABE	942 014-028	6TX/3SFP EEC E, pre-configured MC filtering for EtherNet/IP
RSB20-0900ZZZ6TAAB	942 014-012	6TX/3SFP EEC



## RS20/RS30 Compact OpenRail Managed Ethernet Switches

### Fast Ethernet Ports with/without PoE

The RS20 compact OpenRail managed Ethernet switches can accommodate from 4 to 25 port densities and are available with different Fast Ethernet uplink ports – all copper, or 1, 2 or 3 fiber ports. The fiber ports are available in multimode and/or singlemode.

### Gigabit Ethernet Ports with/without PoE

The RS30 compact OpenRail managed Ethernet switches can accommodate from 8 to 24 port densities with 2 Gigabit ports and 8, 16 or 24 Fast Ethernet ports. The configuration includes 2 Gigabit ports with TX or SFP slots.



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### Technical Information

Product Description					
Type	RS20 Series 4 Ports	RS20 Series 8 and 9 Ports	RS20 Series 16, 17, 24 and 25 Ports	RS30 Series 8 Ports	RS30 Series 16 and 24 Ports
Available Ports	4 to 25				
Construction					
Mounting	DIN Rail				
Protection Class	IP20				
Dimensions (WxHxD)	47 x 131 x 111 mm	74 x 131 x 111 mm	110 x 131 x 111 mm	74 x 131 x 111 mm	110 x 131 x 111 mm
Weight	400 g	410 g	630 g	410 g	630 g
Ambient Conditions					
Operating Temperature	0 °C to +60 °C, -40 °C to +70 °C, or -40 °C to +70 °C (optional Conformal Coating)				
Storage/Transport Temperature	-40 °C to +70 °C				
Relative Humidity (non-condensing)	10% to 95%				
Conformal Coating	Yes (variant dependent)				
Interfaces					
V.24 Interface	1 x RJ11 socket				
USB Interface	1 x USB (ACA21-USB adapter)				
Software					
Supported Classic Software Levels	Layer 2 Enhanced (L2E), Layer 2 Professional (L2P)				
Power Requirements					
Operating Voltage	12/24/48 V DC (9.6 to 60 V) and 24 V AC (18 to 30 V) (redundant)				
Regulatory Approvals					
Safety of Industrial Control Equipment	cUL508				
Hazardous Locations	ISA12.12.01 Class 1 Div 2, ATEX 100a, Zone 2				
Ship	Germanischer Lloyd				
Transportation	NEMA TS2				
Railway (track)	EN 50121-4				
Substation	IEC 61850-3, IEEE 1613				
Reliability					
MTBF Range	65.5 to 74.9 years	43.9 to 62.5 years	22.1 to 44.8 years	30.6 to 51.9 years	22.9 to 39.1 years
Warranty	5 years standard				

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)

Configurator



## RS20/RS22/RS30/RS32 Compact OpenRail Ethernet Switch Configurations

Fast Ethernet Uplink Ports/Fast Ethernet Uplink Ports with PoE  
 Gigabit Ethernet Uplink Ports/Gigabit Ethernet Uplink Ports with PoE

RS32-16 02 OO ZZ SP APH FXX.X

### Design/Models

RS20 = Fast-Ethernet Uplink Ports      RS22 = Fast-Ethernet Uplink Ports with PoE  
 RS30 = Gigabit Ethernet Uplink Ports      **RS32** = Gigabit Ethernet Ports with PoE

### Fast Ethernet Ports

04 = 4 x 10/100 Mbit/s      17 = 17 x 10/100 Mbit/s  
 08 = 8 x 10/100 Mbit/s      24 = 24 x 10/100 Mbit/s  
 09 = 9 x 10/100 Mbit/s      25 = 25 x 10/100 Mbit/s  
**16** = 16 x 10/100 Mbit/s

### Gigabit Ethernet Ports

00 = None (not present)  
**02** = 2 x 1000 Mbit/s

### Type 1 Uplink Port

T1 = 1 x Twisted-Pair RJ45	L2 = 1 x Long Haul SC	<b>OO</b> = 2 x SFP Slots GE
M2 = 1 x Multimode SC	G2 = 1 x Long Haul + SC	MM = 2 x Multimode SC
M4 = 1 x Multimode ST	E2 = 1 x Singlemode + SC	NN = 2 x Multimode ST
S2 = 1 x Singlemode SC	EE = 2 x Singlemode + SC	VV = 2 x Singlemode S
S4 = 1 x Singlemode ST	O6 = 1 x SFP Slot GE	UU = 2 x Singlemode ST

### Type 2 Uplink Port

T1 = 1 x Twisted-Pair RJ45	S2 = 1 x Singlemode SC	O6 = SFP slot (only 1000 Mbit/s)
M2 = 1 x Multimode SC	S4 = 1 x Singlemode ST	<b>ZZ</b> = 2 x SFP Slots FE
M4 = 1 x Multimode ST	L2 = Singlemode Long Haul FX DSC (only 100 Mbit/s)	
E2 = 1 x Singlemode+ SC	G2 = Singlemode Long Haul FX DSC 200 km (only 100 Mbit/s)	

### Temperature Range

**S** = 0 °C to +60 °C      **E** = -40 °C to +70 °C (+60 °C PoE)  
**T** = -40 °C to +70 °C (+60 °C PoE)      inclusive Conformal Coating

### Power Supply

**D** = 9.6 to 60 V DC and 18 to 30 V AC  
**P** = 47 to 52 V DC (PoE)

### Approvals

**A** = cUL508, cUL1604 Class 1 Div 2  
**H** = cUL508, cUL1604, Class 1 Div 2, Germanischer Lloyd, IEC 61850-3: Substation, IEEE 1613: Substation - EN 50121-4: Railway (track)  
**B** = cUL508, cUL1604, Class 1 Div 2, Germanischer Lloyd, IEC 61850-3: Substation, IEEE 1613: Substation - EN 50121-4: Railway (track)/ATEX 100a, Zone 2: Hazardous Location

### Software Version (see page 12-15 for additional Management Software Functionality details)

**E** = Enhanced, additional filters and redundancy  
**P** = Professional, DHCP server, additional security and diagnostics, advanced filtering and redundancy  
**U** = Unmanaged

### Configuration

**H** = Standard  
**E** = EtherNet/IP Pre Settings  
**P** = PROFINET Pre Settings

### OEM Type

**H** = Standard  
**F** = Steel Cabinet (PoE)

### Software Release

**XX.X** = Current Software Release

**NOTE:** The last three part number categories (**Configuration, OEM Type and Software Release**) are optional.



## RS40 Compact OpenRail Managed Ethernet Switches

### All Ports are Gigabit

The RS40 compact OpenRail managed Ethernet switch has 9 Gigabit ports. The switch offers 5 x 10/100/1000 RJ45 and 4 x 100/1000 RJ45/SFP combo ports (function of one RJ45 combo port is lost for each SFP utilized). Fiber uplink ports are available in multimode and/or single-mode by using Gigabit or 100 Mbit/s SFP transceivers.



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### Technical Information

Product Description		
Type	RS40 Series Standard Temperature	RS40 Series Extended Temperature
Available Ports	9	
Construction		
Mounting	DIN Rail	
Protection Class	IP20	
Dimensions (WxHxD)	74 x 131 x 111 mm	110 x 131 x 111 mm
Weight	530 g	600 g
Ambient Conditions		
Operating Temperature	0 °C to +60 °C, -40 °C to +70 °C	-40 °C to +70 °C (optional Conformal Coating)
Storage/Transport Temperature	-40 °C to +70 °C	
Relative Humidity (non-condensing)	10% to 95%	
Conformal Coating	Yes (variant dependent)	
Interfaces		
V.24 Interface	1 x RJ11 socket	
USB Interface	1 x USB (ACA21-USB adapter)	
Software		
Supported Classic Software Levels	Layer 2 Enhanced (L2E), Layer 2 Professional (L2P)	
Power Requirements		
Operating Voltage	12/24/48 V DC (9.6 to 60 V) and 24 V AC (18 to 30 V) (redundant)	
Regulatory Approvals		
Safety of Industrial Control Equipment	cUL508	
Hazardous Locations	ISA12.12.01 Class 1 Div 2, ATEX 100a, Zone 2	
Ship	Germanischer Lloyd	
Transportation	NEMA TS2	
Railway (track)	EN 50121-4	
Substation	IEC 61850-3, IEEE 1613	
Reliability		
MTBF Range	25.8 to 27.1 years	
Warranty	5 years standard	

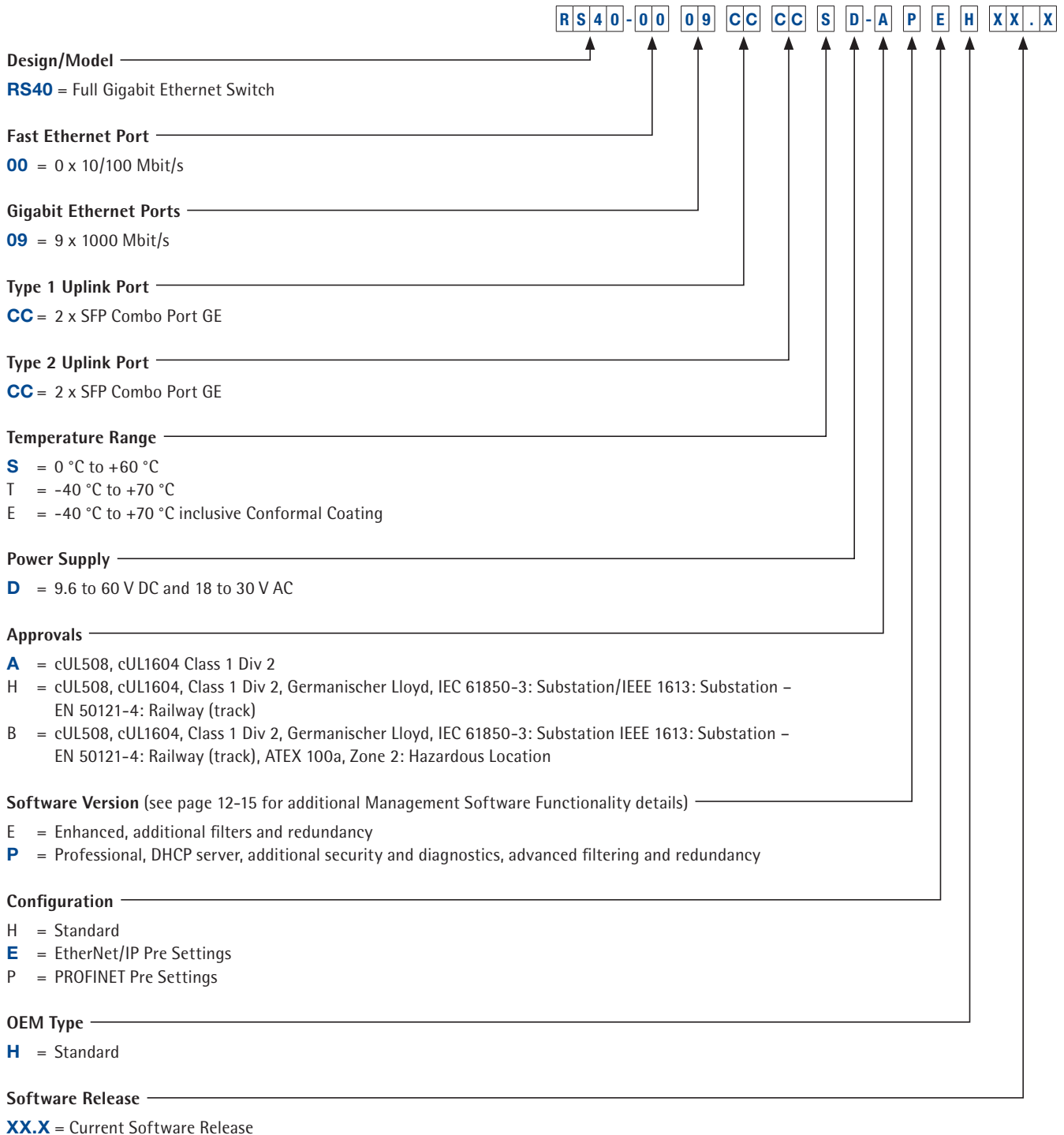
**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)

Configurator



## RS40 Compact OpenRail Managed Ethernet Switch Configurations

### Full Gigabit Ethernet Switches RS40



**NOTE:** The last three part number categories (**Configuration, OEM Type and Software Release**) are optional.



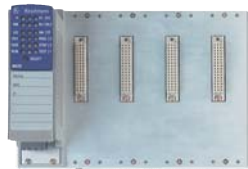
## MS20 Managed Modular DIN Rail Mount Ethernet Switches

The MS20 series of Ethernet switches have eight to twenty-four 100 Mbit/s max ports. Fully managed (web, SNMP and CLI) IGMP snooping (multicast filtering), VLAN, port mirroring, port control, port security, link alarms, broadcast limiter, traffic diagnostics, HIPER-Ring redundancy, RSTP, etc.

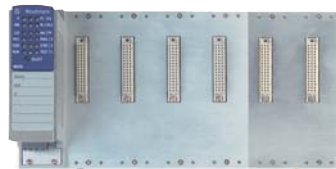
Features include: available in a 2 and 4 slot version (4 slot can be expanded to a 6 slot using MB-2T), requires the use of hot-swappable media modules for any combination of copper/fiber ports, dual power inputs and dual fault relay outputs, USB configuration backup/restore and fast device replacement, standard 0 °C to +60 °C (-40 °C to +70 °C and conformal coating available), differentiator between similar switches listed is the firmware level/features (E = Enhanced, P = Professional). Last digit in part number category software version (see page 12-15 for additional Management Software Functionality details).



MS20-08



MS20-16



MS20-16  
(including backplane extension MB-2T)

All Ports are 10/100 Mbit/s		
Part No.	Order No.	Ports/Features
MS20-0800SAAE	943 435-001	2 x any MM2/MM3 (2 slots, max. 8 x 10/100 Mbit/s ports)
MS20-0800SAAP	943 435-002	2 x any MM2/MM3 (2 slots, max. 8 x 10/100 Mbit/s ports)
MS20-0800ECCP	943 956-001	2 x any MM2/MM3 (2 slots, max. 8 x 10/100 Mbit/s ports), -40 °C to +70 °C, conformal coated, 24/48 V DC, EN 50155
MS20-1600SAAE	943 435-003	4 x any MM2/MM3 (6 slots max. 16 x 10/100 Mbit/s ports/24 ports w/ MB-2T)
MS20-1600SAAP	943 435-004	4 x any MM2/MM3 (6 slots max. 16 x 10/100 Mbit/s ports/24 ports w/ MB-2T)
MS20-1600ECCP	943 956-002	4 x any MM2/MM3 (6 slots max. 16 x 10/100 Mbit/s ports/24 ports w/ MB-2T), -40 °C to +70 °C, conformal coated, 24/48 V DC, EN 50155



## MS30 Managed Modular DIN Rail Mount Ethernet Switches



MS30-08

The MS30 series of Ethernet switches have the same functionality and features as the MS20 series, with the exception of an added slot for a Gigabit Media Module (for 2 x 10/100/1000 RJ45/Gigabit SFP combo ports).

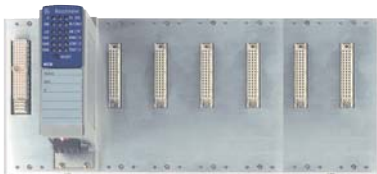
Features include: uplink ports are 10/100/1000 Mbit/s, all other ports are 10/100 Mbit/s, MS30-08 can have a max of 8 x 10/100 Mbit/s ports and 2 x 10/100 RJ45/Gigabit SFP combo ports. Ports can be any combination of copper and/or fiber, and Gigabit RJ45/SFP combo ports compatible with Gigabit SFPs.



MS30-16



All Ports are 10/100 Mbit/s		
Part No.	Order No.	Ports/Features
MS30-0802SAAE	943 435-005	2 x any MM2/MM3 and 1 x MM4-2TX/SFP (max 10 ports)
MS30-0802SAAP	943 435-006	2 x any MM2/MM3 and 1 x MM4-2TX/SFP (max 10 ports)
MS30-1602SAAE	943 435-007	4 x any MM2/MM3 (6 x w/MB-2T) and 1 x MM4-2TX/SFP (max 26 ports)



MS30-16 (including backplane extension MB-2T)

### MS Backplane Extensions

MICE 2-slot backplane extensions are used for MS20-16, MS30-16 and MS4128. Only one per switch may be used for a maximum of six total slots.



Backplane Extensions		
Part No.	Order No.	Ports/Features
MB-2T	943 733-102	MS20-16, MS30-16, and MS4128
MB20-2TAHH	943 435-002	Same as above but with -40 °C to +70 °C





## Managed Modular DIN Rail Mount Switches

Any combination of the following hot-swappable media modules may be used to attain the desired port density/type on a MS switch. The only restriction is the number of slots that the MS backplane has (one media module per slot).

Modules: All Copper		
Part No.	Order No.	Ports/Features
MM2-4TX1	943 722-101	4 x 10/100 Mbit/s RJ45
MM2-4TX1-EEC	943 722-151	4 x 10/100 Mbit/s RJ45, extended temperature range



Modules: Multimode			
Type	Part No.	Order No.	Ports/Features
MM	MM2-2FXM2	943 718-101	2 x 100 Mbit/s MM SC
MM	MM3-4FXM2	943 764-101	4 x 100 Mbit/s MM SC
MM	MM3-4FXM4	943 835-101	4 x 100 Mbit/s MM ST
MM	MM3-1FXM2/3TX1	943 839-101	1 x 100 Mbit/s MM SC, 3 x RJ45
MM	MM3-2FXM2/2TX1	943 837-101	2 x 100 Mbit/s MM ST, 2 x RJ45
MM	MM3-4FLM4	943 760-101	4 x 10 Mbit/s MM ST
MM	MM3-2FXM2/2TX1	943 761-101	2 x 100 Mbit/s MM SC, 2 x RJ45
MM	MM3-2FXM2/2TX1-EEC	943 761-151	2 x 100 Mbit/s MM SC, 2 x RJ45, ext. temperature range
MM	MM3-1FXM2/1FXS2/2TX1	943 929-101	2 x 100 Mbit/s SC (1 x MM and 1 x SM), 2 x RJ45
MM	MM2-4FXM3	943 721-101	4 x 100 Mbit/s MM MTRJ
MM	MM2-2FXM3/2TX1	943 720-101	2 x 100 Mbit/s MM MTRJ, 2 x RJ45
SFP	MM20-Z6Z6Z6Z6SAHH	943 938-001	4 x 100 Mbit/s SFP sockets (SFPs are sold separately), for MS20, MS30 and MS4128



Modules: Singlemode			
Type	Part No.	Order No.	Ports/Features
SM	MM2-2FXS2	943 719-101	2 x 100 Mbit/s SM SC
SM	MM3-2FXS2/2TX1	943 762-101	2 x 100 Mbit/s SM SC, 2 x RJ45
SM	MM3-2FXS2/2TX1-EEC	943 762-151	2 x 100 Mbit/s SM SC, 2 x RJ45, ext. temperature range
SM	MM3-1FXS2/3TX1	943 838-101	1 x 100 Mbit/s SM SC, 3 x RJ45
SM	MM3-4FXS2	943 836-101	4 x 100 Mbit/s SM SC
SM	MM3-1FXL2/3TX1	943 763-101	1 x 100 Mbit/s SM SC Long Haul, 3 x RJ45
SM	MM3-1FXLH/3TX1	943 930-101	1 x 100 Mbit/s SM SC Long Haul+, 3 x RJ45
SM	MM3-1FXS2/3TX1-EEC	943 838-151	1 x 100 Mbit/s SM SC, 3 x RJ45, ext. temperature range
SFP	MM20-Z6Z6Z6Z6SAHH	943 938-001	4 x 100 Mbit/s SFP sockets (SFPs are sold separately), for MS20, MS30 and MS4128



Modules: Gigabit			
Type	Part No.	Order No.	Ports/Features
Gigabit	MM4-2TX/SFP	943 622-001	2 x Gigabit RJ45/SFP combo ports for use with MS30 and MS4128
Gigabit	MM4-4TX/SFP	943 010-001	4 x Gigabit RJ45/SFP combo ports for use with MS4128 only



## Managed Modular DIN Rail Mount Switches (continued)



Modules: Special Purpose			
Type	Part No.	Order No.	Ports/Features
Realtime	MM23-T1T1T1T1SAAH PTPv2	–	IEEE 1588 Version 2 PTP module, 4 x 10/100 RJ45, replacement for 943 117-001
Realtime	MM23-M2M2T1T1SAAH PTPv2	–	IEEE 1588 Version 2 PTP module, 2 x multimode, SC sockets, replacement for 943 117-002
Realtime	MM23-S2S2T1T1SAAH PTPv2	–	IEEE 1588 Version 2 PTP module, 2 x singlemode, SC sockets, replacement for 943 117-003
Realtime	MM23-F4F4T1T1SAAH PTPv2	–	IEEE 1588 Version 2 PTP module, 2 x multimode, ST sockets, replacement for 943 117-004
Realtime	MM33-07079999SA PTPv2	–	IEEE 1588 Version 2 PTP module, SFP sockets
Realtime	MM3-4TX1-RT-EEC	943 955-001	4 x RJ45, railway certifications EN 50155, EN 50121-4, IEEE 1588 Version 1
Realtime	MM3-2FXM2/2TX1-RT-EEC	943 955-002	2 x 100 Mbit/s MM SC, 2 x RJ45, IEEE 1588 Version 1, railway certifications EN 50155, EN 50121-4
Realtime	MM3-2FXS2/2TX1-RT-EEC	943 955-003	2 x 100 Mbit/s SM SC, 2 x RJ 45, IEEE 1588 Version 1, railway certifications EN 50155, EN 50121-4
AUI	MM20-A8A89999SAHH	943 840-101	2 x AUI SUB-D 15-pin male D-sub
M12	MM3-4TX5	943 841-101	4 x M12 sockets (D-code), for connectors see OCTOPUS family
PoE	MM22-T1T1T1T1SAHH	943 938-002	4 x RJ45 PoE (external PoE power supply)
SFP	MM20-Z6Z6Z6Z6SAHH	943 938-001	4 x 100 Mbit/s SFP sockets (SFPs are sold separately), for MS20, MS30 and MS4128

Fast Ethernet MICE Media Modules, Digital I/O		
Part No.	Order No.	Ports/Features
MM24-IOIOIOIOSZHH	MM24-IOIOIOIOSZHH	Port 1: 1 x digital input, 1 x digital output Port 2: 1 x digital input, 1 x digital output Port 3: 1 x digital input, 1 x digital output Port 4: 1 x digital input, 1 x digital output
MM24-IOIOIOIOTZHH	MM24-IOIOIOIOTZHH	Same as above, except with extended temperature range -40 °C to +70 °C
MM24-IOIOIOIOEZHH	MM24-IOIOIOIOEZHH	Same as above, except with extended temperature range and conformal coating



## MSP30/MSP32 Managed Modular DIN Rail Mount Switches

### MSP30/MSP32 MICE Switch Power

The Hirschmann MSP30 Layer 3 switch extends the unique security functions of the MSP30 family to include high-performance routing. This functionality is offered in a variety of hardware packages. Unicast dynamic routing (UR) and multicast dynamic routing (MR) offer customers an attractive cost benefit – “Just pay for what you need.” With its existing modular IPv6-ready hardware, the MSP30 Layer 3 switch enables complete solutions that meet all network requirements.



### Technical Information

Product Description		
Type	MSP30-Series	MSP32-Series
Available Ports	12, 20, 28 four of which can be Gigabit (variant dependent)	
Enhanced Redundancy Functions	MRP	
Construction		
Mounting	DIN Rail	
Protection Class	IP30	
Dimensions (WxHxD)	236.6/313.8/391 x 147.2 x 141.75 mm (variant dependent)	
Weight	2100/2400/2650 g (variant dependent)	2200/2500/2750 g (variant dependent)
Ambient Conditions		
Operating Temperature	0 °C to +60 °C, -40 °C to +70 °C or -40 °C to +70 °C (inclusive Conformal Coating), IEC 60068-2-2 Dry Heat Test	
Storage/Transport Temperature	-40 °C to +85 °C	
Relative Humidity (non-condensing)	5% to 95%	
Conformal Coating	Yes (variant dependent)	
Interfaces		
V.24 Interface	1 x RJ45 socket	
USB Interface	1 x USB socket (to connect auto-configuration adapter ACA21-USB)	
SD Interface	1 x SD socket (to connect auto-configuration adapter ACA31-SD)	
Software		
Supported HiOS Software Levels	Layer 2 Advanced (L2A), Layer 3 Advanced (L3A)	
Power Requirements		
Operating Voltage	24/36/48 V DC redundant	
PoE (802.3af) Ports Supported	n/a	integrated PoE Plus function with up to 120 W
PoE Plus (802.3at) Ports Supported	n/a	integrated PoE Plus function with up to 120 W
Regulatory Approvals		
Safety of Industrial Control Equipment	cUL508	
Hazardous Locations	ISA-12.12.-01 Class 1 Div. 2 Group A, B, C, D – Haz. Loc (pending), ATEX-95 Approval, Category 3G (Zone 2), Group IIC, T4, “nA” (pending)	
Ship	Germanischer Lloyd (pending)	
Transportation	NEMA TS2 (pending)	
Railway (norm)	EN 50121-4 (pending)	
Substation	IEC 61850-3, IEEE 1613 (pending)	
Reliability		
MTBF Range	<a href="http://www.hirschmann.com">www.hirschmann.com</a>	
Warranty	5 years standard	

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)

## MSP MICE Switch Power Configurations

### Gigabit Ethernet Uplink Ports, Gigabit Ethernet Uplink Ports with PoE+ Capability

MSP30-08040SCZ999HHE3A.XX.X

#### Design

**MSP30** = Gigabit Ethernet Uplink Ports  
 MSP32 = Gigabit Ethernet Uplink Ports with PoE(+) Capability

#### Number of Fast Ethernet Ports

**08** = 08 x 10/100 Mbit/s  
 16 = 16 x 10/100 Mbit/s  
 24 = 24 x 10/100 Mbit/s

#### Number of Gigabit Ethernet Ports

**04** = 4 x 10/100/1000 Mbit/s

#### Number of 10 Gigabit Ethernet Ports

**0** = 10/100/1000/10000 Mbit/s

#### Temperature Range

**S** = Standard 0 °C to +60 °C  
**T** = Extended -40 °C to +70 °C  
**E** = Extended -40 °C to +70 °C with conformal coating

#### Power Supply

**C** = 24/36/48 V DC (18 to 60 V DC)  
**P** = 47 to 57 V DC (PoE), 53 to 57 V DC (PoE+)

#### Approvals

<b>Z9</b> = CE, FCC, EN 61131 (EN 60950)	<b>VT</b> = VY + EN50121-4
<b>Y9</b> = Z9 + cUL508 (UL60950)	<b>T9</b> = Z9 + EN50121-4
<b>W9</b> = Z9 + ATEX Zone 2	<b>TY</b> = T9 + cUL508 (UL60950)
<b>WY</b> = Y9 + ATEX Zone 2	<b>U9</b> = Z9 + GL (ABS, BV, DNS, LR)
<b>X9</b> = Y9 + ISA 12.12.01 Class 1 Div. 2	<b>UY</b> = U9 + cUL508 (UL60950)
<b>V9</b> = Z9 + IEC 61850, IEEE 1613	<b>UW</b> = UY + ATEX Zone 2
<b>VY</b> = V9 + cUL508 (UL60950)	<b>UX</b> = UY + ISA 12.12.01 Class 1 Div. 2
<b>VU</b> = VY + GL (ABS, BV, DNS, LR)	

#### Software Packages

**99** = Reserved  
**UR** = Unicast Routing  
**MR** = Multicast Routing

#### Customization

**HH** = Hirschmann Standard  
**HX** = Hirschmann Extreme

#### Software Configuration

**E** = Entry (Hirschmann Standard Configuration)

#### Software Level

**3A** = HiOS Layer 3 Advanced  
**2A** = HiOS Layer 2 Advanced

#### Software Release

**XX.X** = Current Software Release  
**03.0** = Software Version 03.0  
**02.0** = Software Version 02.0

**NOTE:** The last four categories (**Customization, Software Configuration, Software Level** and **Software Release**) are optional.



## Managed Modular MICE Switch Power Media Modules

### MSM20/MSM24/MSM40/MSM42 Managed Modular MICE Switch Power Media Modules

The variety of transmission media and range of connector versions ensure an optimum degree of flexibility and application coverage.

#### Transmission media

- Copper
- Multimode Fiber
- Singlemode Fiber
- Long Haul Fiber
- Long Haul+

#### Connector versions

- RJ45
- SC
- ST
- LC via SFP (small form-factor pluggable)



Any combination of the hot-swappable media modules may be used to attain the desired port density/type on a MICE Switch Power switch. The sole limitation is the number of media module slots on a switch (one media module per slot).

Media modules are available as Fast Ethernet and Gigabit variants and their uniform design allows the customer to place them on any module slot of MSP. Additionally PoE+ variant of the Gigabit module ensure integration of PoE based end devices into the network.

Modules: Copper		
Part No.	Order No.	Ports/Features
MSM40-T1T1T1T1SZ9HH 9E99.9.99	942 077-999	4 x Gigabit Ethernet Ports RJ45, Standard Temperature Range 0 °C to +60 °C, Basic Approvals
MSM40-T1T1T1T1TZ9HH 9E99.9.99	942 077-999	4 x Gigabit Ethernet Ports RJ45, Extended Temperature Range -40 °C to +70 °C, Basic Approvals
MSM40-C1C1C1C1SZ9HH 9E99.9.99	942 077-999	4 x Gigabit Ethernet Combo Ports RJ45/SFP, Standard Temperature Range 0 °C to +60 °C, Basic Approvals
MSM40-C1C1C1C1TZ9HH 9E99.9.99	942 077-999	4 x Gigabit Ethernet Combo Ports RJ45/SFP, Extended Temperature Range -40 °C to +70 °C, Basic Approvals

Modules: Multimode		
Part No.	Order No.	Ports/Features
MSM20-M2M2T1T1SZ9HH 9E99.9.99	942 077-999	1 x Fast Ethernet Multimode Fiber Port, 3 x Fast Ethernet Ports RJ45, Standard Temperature Range 0 °C to +60 °C, Basic Approvals
MSM20-M2M2T1T1SZ9HH 9E99.9.99	942 077-999	2 x Fast Ethernet Multimode Fiber Ports, 2 x Fast Ethernet Ports RJ45, Standard Temperature Range 0 °C to +60 °C, Basic Approvals
MSM20-M2M2M2M2SZ9HH 9E99.9.99	942 077-999	4 x Fast Ethernet Multimode Fiber Ports, Standard Temperature Range 0 °C to +60 °C, Basic Approvals
MSM20-M2M2M2M2TZ9HH 9E99.9.99	942 077-999	4 x Fast Ethernet Multimode Fiber Ports, Extended Temperature Range -40 °C to +70 °C, Basic Approvals

**NOTE:** For further combinations and options such as Conformal Coating, please visit our website at: [www.hirschmann.com](http://www.hirschmann.com)



## Managed Modular MICE Switch Power Media Modules (continued)

### Managed Modular MSM20/MSM24/MSM40/MSM42 MICE Switch Power Media Modules



Modules: Singlemode		
Part No.	Order No.	Ports/Features
MSM20-S2T1T1T1SZ9HH9E99.9.99	942 077-999	1 x Fast Ethernet Singlemode Fiber Port, 3 x Fast Ethernet Ports RJ45, Standard Temperature Range 0 °C to +60 °C, Basic Approvals
MSM20-S2S2T1T1SZ9HH9E99.9.99	942 077-999	2 x Fast Ethernet Singlemode Fiber Ports, 2 x Fast Ethernet Ports RJ45, Standard Temperature Range 0 °C to +60 °C, Basic Approvals
MSM20-S2S2S2S2SZ9HH9E99.9.99	942 077-999	4 x Fast Ethernet Singlemode Fiber Ports, Standard Temperature Range 0 °C to +60 °C, Basic Approvals
MSM20-S2S2S2S2TZ9HH9E99.9.99	942 077-999	4 x Fast Ethernet Singlemode Fiber Ports, Extended Temperature Range -40 °C to +70 °C, Basic Approvals

Modules: Long Haul		
Part No.	Order No.	Ports/Features
MSM20-G2T1T1T1SZ9HH9E99.9.99	942 077-999	1 x Fast Ethernet Long Haul Fiber Port, 3 x Fast Ethernet Ports RJ45, Standard Temperature Range 0 °C to +60 °C, Basic Approvals
MSM20-G2G2T1T1SZ9HH9E99.9.99	942 077-999	2 x Fast Ethernet Long Haul Fiber Ports, 2 x Fast Ethernet Ports RJ45, Standard Temperature Range 0 °C to +60 °C, Basic Approvals
MSM20-G2G2G2S2SZ9HH9E99.9.99	942 077-999	4 x Fast Ethernet Long Haul Fiber Ports, Standard Temperature Range 0 °C to +60 °C, Basic Approvals
MSM40-C1C1C1C1TZ9HH9E99.9.99	942 077-999	4 x Fast Ethernet Long Haul Fiber Ports, Extended Temperature Range -40 °C to +70 °C, Basic Approvals

Modules: Power over Ethernet		
Part No.	Order No.	Ports/Features
MSM42-T1T1T1T1SZ9HH9E99.9.99	942 077-999	4 x Gigabit Ethernet PoE+ Ports RJ45, Standard Temperature Range 0 °C to +60 °C, Basic Approvals
MSM42-T1T1T1T1TZ9HH9E99.9.99	942 077-999	4 x Gigabit Ethernet PoE+ Ports RJ45, Extended Temperature Range -40 °C to +70 °C, Basic Approvals

Modules: Digital I/O		
Part No.	Order No.	Ports/Features
MSM24-IOIOIOIOSZ9HH9E99.9.99	942 077-999	4 x Digital I/O Interface, Standard Temperature Range 0 °C to +60 °C, Basic Approvals
MSM24-IOIOIOIOTZ9HH9E99.9.99	942 077-999	4 x Digital I/O Interface, Extended Temperature Range -40 °C to +70 °C, Basic Approvals

**NOTE:** For further combinations and options such as Conformal Coating, please visit our website at: [www.hirschmann.com](http://www.hirschmann.com)



## MICE Switch Power Media Module Configurations

Fast Ethernet Ports, Fast Ethernet/Gigabit Ethernet Ports, Fast Ethernet/Gigabit Ethernet Ports with PoE+ Capability, Fast Ethernet/Gigabit Ethernet Ports with Enhanced Redundancy and PTP

**M S M 4 0 - T 1 T 1 T 1 T 1 S Z 9 H H 9 E 9 9 . 9 9 9**

### Design

MSM20 = Fast Ethernet Ports  
 MSM24 = Fast Ethernet Digital Input/Output  
**MSM40** = Fast Ethernet/Gigabit Ethernet Ports  
 MSM42 = Fast Ethernet/Gigabit Ethernet Ports with PoE(+) Capability

### Port Type 1. Uplink

**T1** = Twisted Pair (TX)/RJ45 (10/100/1000 Mbit/s)  
 T5 = Twisted Pair (TX)/M12 (10/100 Mbit/s)  
 C1 = Combo Port Twisted Pair (TX)/RJ45 (10/100/1000 Mbit/s) & - Fiber Optic SFP Cage (100/1000 Mbit/s)  
 G2 = Singlemode Long Haul FX DSC 200 km (100 Mbit/s)  
 L2 = Singlemode Long Haul FX DSC (100 Mbit/s)  
 S4 = Singlemode FX ST (100 Mbit/s)

M2 = Multimode FX DSC (100 Mbit/s)  
 M4 = Multimode FX ST (100 Mbit/s)  
 I/O = Digital Input/Output  
 S2 = Singlemode FX DSC (100 Mbit/s)

### Port Type 2. Uplink

(see port type 1. Uplink)

### Port Type 3. Uplink

(see port type 1. Uplink)

### Port Type 4. Uplink

(see port type 1. Uplink)

### Temperature Range

**S** = 0 °C to +60 °C  
**T** = -40 °C to +70 °C  
**P** = -40 °C to +70 °C inclusive conformal coating

### Approvals

**Z9** = CE, FCC, EN 61131 (EN 60950)  
**Y9** = Z9 + cUL508 (UL60950)  
**W9** = Z9 + ATEX Zone 2  
**WY** = Y9 + ATEX Zone 2  
**X9** = Y9 + ISA 12.12.01 Class 1 Div. 2  
**V9** = Z9 + IEC 61850, IEEE 1613  
**VY** = V9 + cUL508 (UL60950)  
**VU** = VY + GL (ABS, BV, DNS, LR)

**VT** = VY + EN50121-4  
**T9** = Z9 + EN50121-4  
**TY** = T9 + cUL508 (UL60950)  
**U9** = Z9 + GL (ABS, BV, DNS, LR)  
**UY** = U9 + cUL508 (UL60950)  
**UW** = UY + ATEX Zone 2  
**UX** = UY + ISA 12.12.01 Class 1 Div. 2

### Customization

**HH** = Hirschmann Standard  
**HX** = Hirschmann Extreme

### Hardware Configuration

**9** = No FPGA

### Software Configuration

**E** = Entry (without configuration)

### Software Release

**99.9** = No Software

### Maintenance

**99** = No Maintenance Version

**NOTE:** The categories (Customization, Hardware Configuration, Software Configuration and Software Release) are optional.

## Entry-level Redundancy Switch



### RED25

The RED25 family of switches offers maximum flexibility and a future-proof network design. This is an affordable solution for industrial network engineers, system integrators and machine builders working on entry-level applications.

Based on Hirschmann Operating System (HiOS) software, RED25 supports several redundancy technologies, while offering a comprehensive range of security features.

This Fast Ethernet (FE) switch is offered in two, four-port versions:

- Four FE TX ports
- Two FE TX ports, plus two FE small form-factor pluggable (SFP) ports

The SFP-based fiber support enables a flexible network structure by allowing to change fiber ports in the field. A comprehensive set of security features also offers all-around network protection. The RED25 switches guarantee a reliable network of applications with rigorous real-time requirements in accordance with IEEE 1588 v2. Further features include an extended operating temperature range from -40 °C to +70 °C, broad immunity to electrostatic discharges and high-vibration resistance.

### Technical Information

Product Description	
Type	RED25-xx
Description	Managed, Industrial Switch DIN Rail, fanless Design
Port Type and Quantity	Ports in total: 4, 4 x 10/100 TX, or 2 x 10/100 TX/2 x FE SFP
Additional Interfaces	
V.24 Interface	1x RJ11 socket
USB	1x to connect auto-configuration adapter ACA22 USB
Fast ETHERNET Network Size	
Twisted Pair	0 to 100 m
Multimode Fiber (MM) 50/125 µm	50/125 µm, 0 to 5000 m, 8 dB link budget; 62.5/125 µm, 0 to 4000 m, 11 dB link budget (with M-Fast SFP-MM/LC)
Singlemode Fiber (SM) 9/125 µm	0 to 25 km, 13 dB link budget (with M-Fast SFP-SM/LC); 25 to 65 km, 10 to 29 dB link budget (with M-Fast SFP-SM+/LC)
Singlemode Fiber (LH) 9/125 µm	40 to 104 km, 10 to 29 dB link budget (with M-Fast SFP-LH/LC)
Network Size - Cascadability	
Line -/Star Topology	any
Ring Structure	>200 Switches
Fault Recovery Time	0 ms with PRP or HSR
Power Requirements	
Operating Voltage	12 to 48 V DC redundant, or 24 V AC
Software	
Supported HiOS Software Levels	Layer 2 Standard (LS2)
Ambient Conditions	
Operating Temperature	0 °C to +60 °C or -40 °C to +70 °C, optional conformal coating
Relative Humidity (non-condensing)	10% to 95%
Mechanical Construction	
Dimensions (W x H x D)	46 x 130 x 105 mm
Weight	320 g
Protection Class	IP20
Approvals	
Safety of Industrial Control Equipment	EN 60950, UL 61010-1/-2-210 (pending)
Reliability	
MTBF Range	<a href="http://www.hirschmann.com">www.hirschmann.com</a>
Warranty	5 years standard

NOTE: These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)





## Entry-level Redundancy Switch Configurations



EtherNet/IP™  
conformance tested



RED25-04 00 2Z6 TT S DD Z9 HM E 2S 04.1.

### Design

**RED25** = Redundancy Switch

### Number of Fast Ethernet Ports

**04** = 4 Fast Ethernet TX Ports

### Number of Gigabit Ethernet Ports

**00** = not supported

### Uplink Port Configuration

**2T1** = 2 x Twisted Pair TX, RJ45, 100 Mbit/s

**2Z6** = 2 x SFP Slots, 100 Mbit/s

### Port Configuration

**TT** = 2 x Twisted Pair TX, RJ45, 100 Mbit/s

### Temperature Range

**S** = 0 °C to + 60 °C

**T** = - 40 °C to + 70 °C

**E** = - 40 °C to + 70 °C Conformal Coating

### Power Supply

**DD** = 2 x 12 to 48 V DC, 24 V AC

### Approvals

**Z9** = CE, FCC, EN 61131, EN 60950

**Y9** = CE, FCC, EN 61131, EN 60950, UL 61010-1/-2-210

### Pre-Configuration

**HM** = Fast MRP

**HP** = PRP

**HH** = HSR

**HD** = DLR

### Software Configuration

**E** = Standard

### Software Level

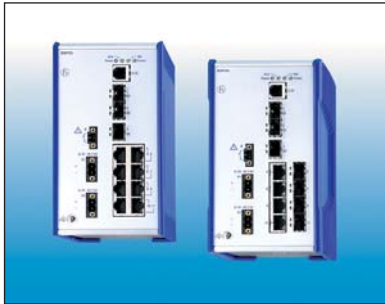
**2S** = HiOS Layer 2 Standard

### Software Version

**04.1.** = Software Version 04.1.

**XX.X** = Current Software Release

## RSP Managed Industrial Ethernet Switch with Fanless Design



### Fast and Gigabit Ethernet Networks

The new RSP family of switches with robust hardware and a powerful operating system, are able to withstand extremely harsh environmental conditions. For the first time, the integration of new redundancy protocols allows uninterrupted data communication. These new techniques, PRP (Parallel Redundancy Protocol) and HSR (High-availability Seamless Redundancy), are based on the international IEC 62439 standard and therefore guarantee future security and interoperability. Precision time synchronization in accordance with IEEE 1588v2, synchronizes sensors, drives, and measuring equipment. Gigabit Ethernet provides for a fast connection to the backbone, while connections to terminal equipment use 100Base-TX – either alone or in combination with 100Base-FX.



### Technical Information

Product Description		
Type	RSP Series Standard Temperature	RSP Series Extended Temperature
Available Ports	11	
Enhanced Redundancy Functions	Fast MRP, HSR, PRP (variant dependent)	
Construction		
Mounting	DIN Rail	
Protection Class	IP30	
Dimensions (W x H x D)	90 x 164 x 120 mm	98 x 164 x 120 mm
Weight	1.2 kg	1.5 kg
Ambient Conditions		
Operating Temperature	0 °C to +60 °C, -40 °C to +70 °C, or -40 °C to +70 °C (inclusive Conformal Coating), IEC 60068-2-2 Dry Heat Test +85°C 16 Hours	
Storage/Transport Temperature	-40 °C to +85 °C	
Relative Humidity (non-condensing)	10% to 95%	
Conformal Coating	Yes (variant dependent)	
Interfaces		
V.24 Interface	1 x RJ11 socket	
USB Interface	1 x to connect auto-configuration adapter ACA31 (SD-card)	
Software		
Supported HiOS Software Levels	Layer 2 Standard (L2S), Layer 2 Advanced (L2A), Layer 3 Advanced (L3A)	
Power Requirements		
Operating Voltage	24/36/48 V DC redundant, or 60/120/250 V DC and 110/230 V AC	
PoE (802.3af) Ports Supported	n/a	
PoE Plus (802.3at) Ports Supported	n/a	
Regulatory Approvals		
Safety of Industrial Control Equipment	cUL508	
Hazardous Locations	IECEX, ISA12.12.01 Class 1 Div. 2 Group A, B, C, D, ATEX 100a Zone 2	
Ship	German Lloyd GL (pending)	
Transportation	NEMA TS2	
Railway (norm)	EN 50121-4	
Substation	IEC 61850-3, IEEE 1613	
Reliability		
MTBF Range	<a href="http://www.hirschmann.com">www.hirschmann.com</a>	
Warranty	5 years standard	

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



Configurator



## RSP Series Managed Industrial DIN Rail Switch Configurations

### Fast and Gigabit Ethernet Networks

**R S P - 3 5 0 8 0 3 3 0 6 T T E K 9 Y 9 H P E 2 S X X . X**

#### Design/Model

**RSP** = Rail Switch Power

#### Data Rates

**2** = 10/100 Mbit/s Ports

**3** = 10/100 Mbit/s and 10/100/1000 Mbit/s Ports

#### Hardware Type

**0** = Standard

**5** = Enhanced Redundancy (PRP, Fast MRP, HSR), Hardware IEEE 1588 v2

#### Fast Ethernet Ports

**08** = 8 x 10/100 Mbit/s

**11** = 11 x 10/100 Mbit/s

#### Gigabit Ethernet Ports

**00** = None

**03** = 3 x 10/100/1000 Mbit/s

#### Uplink Ports

**3Z6** = 3 x SFP Slots (100 Mbit/s)

**306** = 3 x SFP Slots (1000 Mbit/s)

#### Port Configuration

**TT** = All Twisted Pair/RJ45

**ZT** = 4 x SFP Slots (100 Mbit/s), 4 x (100 Mbit/s) Twisted Pair/RJ45

#### Temperature Range

**S** = Standard 0 °C to +60 °C

**T** = Extended -40 °C to +70 °C

**E** = Extended -40 °C to +70 °C inclusive Conformal Coating

#### Voltage Range

**CC** = 2 x 24/36/48 V DC (18 to 60 V DC)

**K9** = 1 x 60/110/125/220/250 V DC (48 V to 320 V DC) and 110/120/220/230 V AC (88 to 265 V AC)

**KK** = 2 x 60/110/125/220/250 V DC (48 V to 320 V DC) and 110/120/220/230 V AC (88 to 265 V AC)

#### Approvals

**Z9** = CE, FCC, EN 61131

**Y9** = CE, FCC, EN 61131, cUL508

**V9** = CE, FCC, EN 61131, IEC 61850, IEEE 1613

**VY** = CE, FCC, EN 61131, IEC 61850, IEEE 1613, cUL508

#### Customization

**HS** = Standard

**HH** = HSR

**HM** = Fast MRP

**HD** = DLR

**HP** = PRP

#### Software Configuration

**E** = Enhanced Encryption

#### Software Level

**2S** = HiOS Layer 2 Standard

**2A** = HiOS Layer 2 Advanced

**3S** = HiOS Layer 3 Standard

#### Software Release

**XX.X** = Current Software Release

**NOTE:** The part number categories (**Configuration** and **Software Release**) are optional.

## RSPS-Smart Managed Industrial DIN Rail Switch with Fanless Design



### Fast and Gigabit Ethernet Networks

The RSP-Smart features six Fast Ethernet ports designed for twisted-pair cables (100 BASE-TX), which can also be equipped with two/four SFP transceivers (100 BASE-FX). All ports support precise time synchronization compliant with IEEE 1588v2. Security mechanisms such as role based access protect against unauthorized access. MRP (Media Redundancy Protocol) and RSTP (Rapid Spanning Tree) redundancy methods ensure high network availability. Switch versions also available provide support for the PRP (Parallel Redundancy Protocol) and HSR (High-Availability Seamless Redundancy) redundancy methods, ensuring zero switchover times. Power can be supplied via 24/36/48 V DC or alternatively via 110/250 V DC and 110/230 V AC. Other features of the RSP-Smart include IP30 protection rating, an extended operating temperature range from -40 °C to +70 °C, compact stainless steel housing and user-friendly configuration and diagnostics.



### Technical Information

Product Description		
Type	RSPS20-xx Series	RSPS25-xx Series
Available Ports	Ports in total: 6; 6 x 10/100 TX, or 4 x 10/100 TX/2 x FE SFP, or 2 x 10/100 TX/4 x FE SFP Ports	
Enhanced Redundancy Functions	–	PRP, HSR
Construction		
Mounting	DIN Rail	
Protection Class	IP30	
Dimensions (WxHxD)	90 x 164 x 120 mm	
Weight	1.2 kg	
Ambient Conditions		
Operating Temperature	0 °C to +60 °C, or -40 °C to +70 °C, IEC 60068-2-2 Dry Heat Test +85°C 16 Hours	
Storage/Transport Temperature	-40 °C to +85 °C	
Relative Humidity (non-condensing)	10% to 95%	
Conformal Coating	Yes (variant dependent)	
Interfaces		
V.24 Interface	1 x RJ11 socket	
SD Interface	1 x to connect auto-configuration adapter ACA31 (SD-card)	
Software		
Supported HiOS Software Levels	Layer 2 Standard (L2S)	
Power Requirements		
Operating Voltage	24 to 48 V DC redundant, or 60 to 250 V DC and 110 to 230 V AC	
PoE (802.3af) Ports Supported	n/a	
PoE Plus (802.3at) Ports Supported	n/a	
Regulatory Approvals		
Safety	EN 60950-1, cUL508	
Hazardous Locations	n/a	
Ship	n/a	
Transportation	NEMA TS2	
Railway (norm)	EN 50121-4	
Substation	IEC 61850-3, IEEE 1613	
Reliability		
MTBF Range	www.hirschmann.com	
Warranty	5 years standard	

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



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## RSPS-Smart Managed Industrial DIN Rail Switch Configurations

### Fast Ethernet Networks

**R S P S - 2 5 0 6 0 0 2 Z 6 T T E M 9 Y 9 H P E 2 S X X . X**

#### Design/Model

**RSPS** = Rail Switch Power

#### Data Rates

**2** = 10/100 Mbit/s Ports

#### Hardware Type

**0** = Standard

**5** = Enhanced Redundancy (PRP, Fast MRP, HSR), Hardware IEEE 1588 v2

#### Fast Ethernet Ports

**06** = 6 x 10/100 Mbit/s

#### Gigabit Ethernet Ports

**00** = None

#### Uplink Ports

**2T1** = 2 x Twisted Pair 10/100 Mbit/s Ethernet Ports

**2Z6** = 2 x SFP Slots (100 Mbit/s)

#### Port Configuration

**TT** = All Twisted Pair/RJ45

**YT** = 2 x SFP Slots (100 Mbit/s), remaining Ports (100 Mbit/s) Twisted Pair/RJ45

#### Temperature Range

**S** = Standard 0 °C to +60 °C

**T** = Extended -40 °C to +70 °C

**E** = Extended -40 °C to +70 °C inclusive Conformal Coating

#### Voltage Range

**CC** = 2 x 24/36/48 V DC (18 to 60 V DC)

**M9** = 1 x 110 to 250 V DC (88 to 320 V DC) and 110 to 230 V AC (88 to 265 V AC)

**K9** = 1 x 60 to 250 V DC (48 to 320 V DC) and 110 to 230 V AC (88 to 265 V AC)

#### Approvals

**Z9** = CE, FCC, EN 61131

**Y9** = CE, FCC, EN 61131, cUL508

**V9** = CE, FCC, EN 61131, IEC 61850, IEEE 1613

**VY** = CE, FCC, EN 61131, IEC 61850, IEEE 1613, cUL508

#### Customization

**HS** = Standard

**HH** = HSR

**HM** = Fast MRP

**HD** = DLR

**HP** = PRP

#### Software Configuration

**E** = Enhanced Encryption

#### Software Level

**2S** = HiOS Layer 2 Standard

#### Software Release

**XX.X** = Current Software Release

**NOTE:** The part number categories (**Configuration** and **Software Release**) are optional.

## RSPL-Lite Managed Industrial Ethernet Switch with Fanless Design



### Fast and Gigabit Ethernet Networks

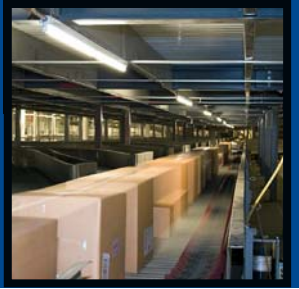
RSPL-Lite switches from Hirschmann offer eight Fast Ethernet ports and optionally, 2 Gigabit Combo Ports. The FE ports can be configured either with two SFP slots and six 100 BASE-TX or a combination of four SFP transceivers and four TX ports. The RSPL-Lite switches offer all-round carefree package for the highest level of security while insuring increased productivity and profitability. The switches feature comprehensive security functions like MAC based port security, Authentication (IEEE 802.1x), different privilege levels, management authentication via RADIUS, account locking, configurable password policy, audit trail, configurable login attempts, HTTPS certificate management, DoS prevention to provide all-round protection against network attacks.



### Technical Information

Product Description		
Type	RSPL20-xx Series	RSPL30-xx Series
Available Ports	Ports in total: 8; 4 x 10/100 TX/4 x FE SFP, or 6 x 10/100 TX/2 x FE SFP ports	Ports in total: 10; 2 x GE Combo ports and 4 x 10/100 TX/4 x FE SFP, or 2 x GE Combo ports und 6 x 10/100 TX/2 x FE SFP ports
Construction		
Mounting	DIN Rail	
Protection Class	IP30	
Dimensions (WxHxD)	90 x 164 x 120 mm	118 x 164 x 120 mm
Weight	1.0 kg	1.2 kg
Ambient Conditions		
Operating Temperature	0 °C to +60 °C, or -40 °C to +70 °C, IEC 60068-2-2 Dry Heat Test +85°C 16 Hours	
Storage/Transport Temperature	-40 °C to +85 °C	
Relative Humidity (non-condensing)	10% to 95%	
Conformal Coating	Yes (variant dependent)	
Interfaces		
V.24 Interface	1 x RJ11 socket	
SD Interface	1 x to connect auto-configuration adapter ACA31 (SD-card)	
Software		
Supported HiOS Software Levels	Layer 2 Standard (L2S)	
Power Requirements		
Operating Voltage	24 to 48 V DC redundant, or 110 to 250 V DC and 110 to 230 V AC	
PoE (802.3af) Ports Supported	n/a	
PoE Plus (802.3at) Ports Supported	n/a	
Regulatory Approvals		
Safety	EN 60950-1, cUL508	
Hazardous Locations	n/a	
Ship	n/a	
Transportation	NEMA TS2	
Railway (norm)	EN 50121-4	
Substation	IEC 61850-3, IEEE 1613	
Reliability		
MTBF Range	<a href="http://www.hirschmann.com">www.hirschmann.com</a>	
Warranty	5 years standard	

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



Configurator



## RSPL-Lite Managed Industrial Ethernet Switch Configurations

### Fast and Gigabit Ethernet Networks

RSPL-300802207TTE M9Y9HS E2SXX.X

#### Design/Model

**RSPL** = Rail Switch Power

#### Data Rates

**2** = 10/100 Mbit/s Ports

**3** = 10/100 Mbit/s and 10/100/1000 Mbit/s Ports

#### Hardware Type

**0** = Standard

#### Fast Ethernet Ports

**08** = 8 x 10/100 Mbit/s

#### Gigabit Ethernet Ports

**00** = None

**02** = 2 x 10/100/1000 Mbit/s

#### Uplink Ports

**2Z6** = 2 x SFP Slots (100 Mbit/s)

**207** = 2 x SFP Combo Ports (100/1000 Mbit/s)

#### Port Configuration

**TT** = All Twisted Pair/RJ45

**YT** = 2 x SFP Slots (100 Mbit/s), 6 x (100 Mbit/s) Twisted Pair/RJ45

**ZT** = 4 x SFP Slots (100 Mbit/s), 4 x (100 Mbit/s) Twisted Pair/RJ45

#### Temperature Range

**S** = Standard 0 °C to +60 °C

**T** = Extended -40 °C to +70 °C

**E** = Extended -40 °C to +70 °C inclusive Conformal Coating

#### Voltage Range

**CC** = 2 x 24 to 48 V DC (18 to 60 V DC)

**M9** = 1 x 110 to 250 V DC (88 to 320 V DC) and 110 to 230 V AC (88 to 265 V AC)

#### Approvals

**Z9** = CE, FCC, EN 61131

**Y9** = CE, FCC, EN 61131, cUL508

**V9** = CE, FCC, EN 61131, IEC 61850, IEEE 1613

**VY** = CE, FCC, EN 61131, IEC 61850, IEEE 1613, cUL508

#### Customization

**HS** = Standard

#### Software Configuration

**E** = Enhanced Encryption

#### Software Level

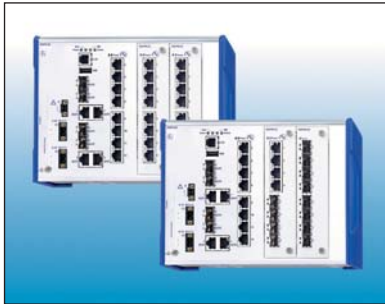
**2S** = HiOS Layer 2 Standard

#### Software Release

**XX.X** = Current Software Release

**NOTE:** The part number categories (**Configuration** and **Software Release**) are optional.

## RSPE – Expandable Managed Industrial DIN Rail Switch with Fanless Design



### Fast and Gigabit Ethernet Networks

The compact and extremely robust RSPE switches comprise a basic device with eight twisted pair ports and four combination ports that support Fast Ethernet or Gigabit Ethernet. The basic device – optionally available with the HSR (High-Availability Seamless Redundancy) and PRP (Parallel Redundancy Protocol) uninterruptible redundancy protocols, plus precise time synchronization in accordance with IEEE 1588 v2 – can be extended to provide up to 28 ports by adding two media modules. Different combinations of copper or fiber ports (plus PoE/PoE+) can be selected depending on the module type.

The RSPE switches also provide comprehensive management, diagnostic and filtering features, as well as numerous redundancy methods, bringing all-around security to your network. The Layer 3 version offers full wired speed IPv4 routing with lowest latency.

Further features include an extended operating temperature range from -40 °C to +70 °C, high vibration resistance and broad immunity to electrostatic discharges.



### Technical Information




Product Description		
Type	RSPE30-xx, RSPE32-xx	RSPE35-xx, RSPE37-xx
Description	Modular Managed Industrial Switch DIN Rail, fanless design	
Port Type and Quantity	Ports in total up to 28, Basic unit: 4 x FE/GE Combo ports plus 8 FE TX ports, expandable with two slots for media modules with 8 FE ports each	
Number of Fiber Ports	16 fiber ports: 4 GE/FE basic unit plus 12 FE with media modules	
Power over Ethernet (PoE)	PoE, PoE+ option with up to 24 Ports and 120 Watt	
Construction		
Mounting	DIN Rail	
Protection Class	IP30	
Dimensions (WxHxD)	209 (217) x 164 x 120 mm (EEC)	
Weight	2.2 kg; 2.5 kg EEC, plus media modules	
Power Requirements		
Operating Voltage	24 to 48 V DC redundant, or 60 to 250 V DC and 110 to 230 V AC optional redundant, PoE/PoE+ with 48/54 V DC	
Power Consumption	maximum 34 W plus PoE	maximum 36 W plus PoE
Interfaces		
V.24 Interface	1 x RJ11 socket	
USB and SD Card Slot	1 x to connect auto-configuration adapter ACA22 (USB) or ACA31 (SD-card)	
Software		
Supported HiOS Software Levels	Layer 2 Standard (L2S), Layer 2 Advanced (L2A) or Layer 3 Standard (L3S)	

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)





## Technical Information

Product Description Media Modules for RSPE			
Type	RSPM20-4Z64Z6xx	RSPM20-4T14Z6xx RSPM22-4T14Z6xx (PoE type)	RSPM20-4T14T1xx RSPM22-4T14T1xx (PoE type)
			
Port Type and Quantity	8 FE SFP slots	4 FE SFP slots / 4 FE TX ports (PoE option)	8 FE TX ports (PoE option)
Weight	290 g	220 g	130 g

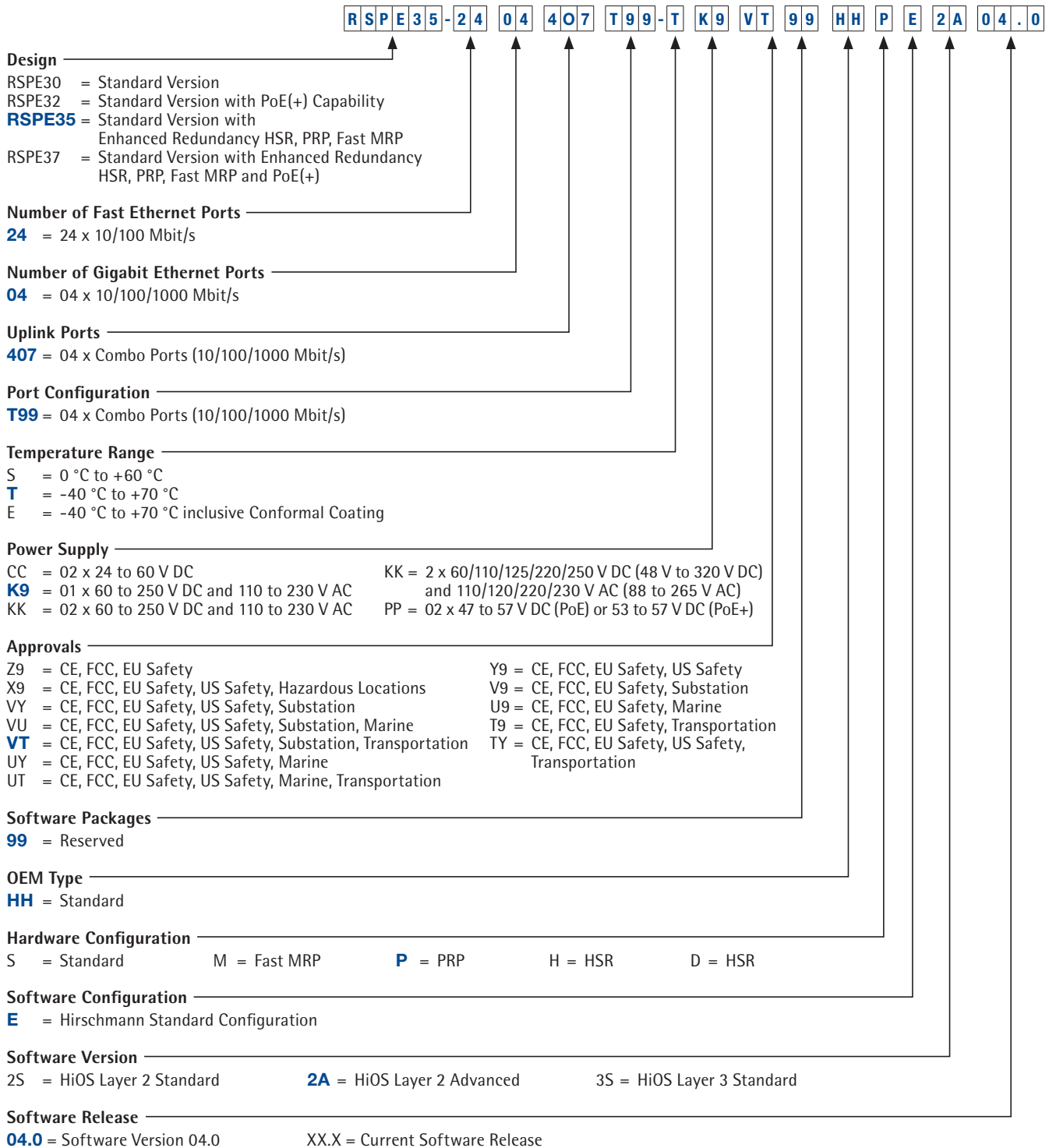
Common Technical Data Basic Units and Media Modules	
Type	RSPE30, RSPE32, RSPE35, RSPE37, RSPM20, RSPM22
<b>Gigabit ETHERNET Network Size</b>	
Twisted Pair (TP)	0 to 100 m
Multimode Fiber (MM) 50/125 µm	0 to 550 m, 7.5 dB link budget; 62.5/125 µm 0 to 275 m, 7.5 dB link budget (with M-SFP-SX/LC)
Singlemode Fiber (SM) 9/125 µm	0 to 20 km, 11 dB link budget (with M-SFP-LX/LC); 14 to 42 km, 5 to 20 dB link budget (with M-SFP-LX+/LC)
Singlemode Fiber (LH) 9/125 µm	23 to 80 km, 5 to 22 dB link budget (with M-SFP-LH/LC); 71 to 128 km, 15 to 30 dB link budget (with M-SFP-LH+/LC)
<b>Fast ETHERNET Network Size</b>	
Twisted Pair (TP)	0 to 100 m
Multimode Fiber (MM) 50/125 µm	0 to 5000 m, 8 dB link budget; 62.5/125 µm, 0 to 4000 m, 11 dB link budget (with M-Fast SFP-MM/LC)
Singlemode Fiber (SM) 9/125 µm	0 to 25 km, 13 dB link budget (with M-Fast SFP-SM/LC); 25 to 65 km, 10 to 29 dB link budget (with M-Fast SFP-SM+/LC)
Singlemode Fiber (LH) 9/125 µm	47 to 104 km, 10 to 29 dB link budget (with M-Fast SFP-LH/LC)
<b>Network Size – Cascadability</b>	
Line-/star Topology	Any
Ring Structure	>200 switches MRP
Fault Recovery Time	0ms with PRP or HSR
<b>Ambient Conditions</b>	
Operating Temperature	0 °C to +60 °C, or -40 °C to +70 °C, IEC 60068-2-2 Dry Heat Test +85 °C 16 Hours, optional Conformal Coating
Storage/Transport Temperature	-40 °C to +85 °C
Relative Humidity (non-condensing)	5% to 95%
<b>Approvals Configurable</b>	
Safety of Industrial Control Equipment	EN 60950-1, EN 61131-2, UL61010-1/-2-201
Substation	IEC 61850-3, IEEE 1613
Ship	GL – Germanischer Lloyd (pending)
Hazardous Locations	IECEX, ISA12.12.01 Class 1 Div. 2 Group A, B, C, D, ATEX 100a Zone 2
Transportation	NEMA TS2, EN 50121-4
<b>Scope of Delivery and Accessories</b>	
Device Replacement and Logging	ACA31 (SD card) 942 074-001, ACA22-USB EEC 942 124-001
Empty Module Slot Cover	RSPM-cover: Order No. 942 131-001
<b>Reliability</b>	
Warranty	5 years (standard)

NOTE: These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)

Configurator



## RSPE Switch Configurations



**NOTE:** The last four categories (**OEM type**, **configurations**, **software version** and **software release**) are optional.



Configurator



## RSPM Media Module Configurations

R S P M 2 2 - 4 T 1 4 T 1 - T Z 9 H H S E X X . X

### Design

RSPM20 = Standard Version

**RSPM22** = Standard Version with PoE(+) Capability

### Port Configuration A

4Z6 = 4 x SFP Slot (100 Mbit/s)

**4T1** = 4 x (100 Mbit/s) Twisted Pair (TX)/RJ45

### Port Configuration B

4Z6 = 4 x SFP Slot (100 Mbit/s)

**4T1** = 4 x (100 Mbit/s) Twisted Pair (TX)/RJ45

### Temperature Range

**S** = 0 °C to +60 °C

**T** = -40 °C to +70 °C

**E** = -40 °C to +70 °C inclusive Conformal Coating

### Approvals

**Z9** = CE, FCC, EU Safety

**Y9** = CE, FCC, EU Safety, US Safety

**X9** = CE, FCC, EU Safety, US Safety, Hazardous Locations

**V9** = CE, FCC, EU Safety, Substation

**VY** = CE, FCC, EU Safety, US Safety, Substation

**VU** = CE, FCC, EU Safety, US Safety, Substation, Marine

**VT** = CE, FCC, EU Safety, US Safety, Substation, Transportation

**U9** = CE, FCC, EU Safety, Marine

**UY** = CE, FCC, EU Safety, US Safety, Marine

**UT** = CE, FCC, EU Safety, US Safety, Marine, Transportation

**T9** = CE, FCC, EU Safety, Transportation

**TY** = CE, FCC, EU Safety, US Safety, Transportation

### OEM Type

**HH** = Customization

### Hardware Configuration

**S** = Standard

### Software Configuration

**E** = Entry (without configuration)

### Software Release

**XX.X** = Current Software Release

99.9 = No Software Release

**NOTE:** The last four categories (OEM type, hardware configuration, software configuration and software release) are optional.



## RSR Series Über-Rugged™ Managed DIN Rail Mount Ethernet Switches



### Fast Ethernet Uplink Ports and Gigabit Ethernet Uplink Ports

RSR series switches are available with optional gigabit ports and an extended temperature range of -40 °C to +85 °C. Ultra-fast ring recovery times under 10 ms are possible using HIPER-Ring redundancy protocol and the switch's robust metal housing offers extended RFI/EMI and vibration immunity.

The term "Über-Rugged" is the only way to describe a switch that goes above and beyond the already rugged capabilities of Hirschmann switches by being able to provide maximum uptime in extreme environmental conditions.



### Technical Information

Product Description		
Type	RSR20 Series	RSR30 Series
Available Ports	8 to 9	9 to 10
Construction		
Mounting	DIN Rail	
Protection Class	IP30	
Dimensions (WxHxD)	120 x 145 x 115 mm	
Weight	appr. 1 kg	
Ambient Conditions		
Operating Temperature	0 °C to +60 °C, -40 °C to +85 °C, or -40 °C to +85 °C (optional Conformal Coating)	
Storage/Transport Temperature	-40 °C to +85 °C	
Relative Humidity (non-condensing)	10% to 95%	
Conformal Coating	Yes (variant dependent)	
Interfaces		
V.24 Interface	1 x RJ11 socket	
USB Interface	1 x USB (ACA21-USB adapter)	
Software		
Supported Classic Software Levels	Layer 2 Professional (L2P)	
Power Requirements		
Operating Voltage	24/36/48 V DC or 60/120/250 V DC, 110/230 V AC	
PoE (802.3af) Ports Supported	n/a	
PoE Plus (802.3at) Ports Supported	n/a	
Regulatory Approvals		
Safety of Industrial Control Equipment	cUL508	
Hazardous Locations	Class 1 Div 2 (cUL1604)	
Ship	Germanischer Lloyd	
Transportation	NEMA TS2	
Railway (norm)	EN 50121-4	
Substation	IEC 61850-3, IEEE 1613	
Reliability		
MTBF Range	45.6 to 61.8 years	49.2 to 57.9 years
Warranty	5 years standard	

NOTE: These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



Configurator



## RSR Über-Rugged™ Managed DIN Rail Mount Ethernet Switch Configurations

### Fast Ethernet Switch RSR20 and Gigabit Ethernet Switch RSR30

**R S 3 0 - 0 6 0 2 T 1 Z Z Z 6 S C C H P H H X X . X**

#### Design/Models

RSR20 = Rail Switch Rugged Fast Ethernet  
**RSR30** = Rail Switch Rugged Gigabit Ethernet

#### Fast Ethernet Ports

**06** = 6 x 10/100 Mbit/s                      08 = 8 x 10/100 Mbit/s  
 07 = 7 x 10/100 Mbit/s                      09 = 9 x 10/100 Mbit/s

#### Gigabit Ethernet Ports

00 = 0 x 1000 Mbit/s                      03 = 3 x 1000 Mbit/s  
**02** = 2 x 1000 Mbit/s (only RSR30-08)

#### Type 1 Uplink Port

<b>T1</b> = 1 x Twisted-Pair RJ45	06 = SFP Slot Gigabit
M2 = 1 x Multimode SC	07 = Combo Port Gigabit
M4 = 1 x Multimode ST	MM = 2 x Multimode SC
S2 = 1 x Singlemode SC	JJ = 2 x Multimode MTRJ
S4 = 1 x Singlemode ST	NN = 2 x Multimode ST
L2 = 1 x Long Haul SC	UU = 2 x Singlemode SC
G2 = 1 x Long Haul + SC	VV = 2 x Singlemode ST
CC = 2 x Combo Port Gigabit	LL = 2 x Singlemode Long Haul SC
OO = 2 x SFP Slots Gigabit	GG = 2 x Singlemode Long Haul+ SC (200 km)

#### Type 2 Uplink Port

T1 = 1 x Twisted-Pair RJ45 (only if T1 is selected for Type 1 Uplink Port)	S2 = 1 x Singlemode SC
M2 = 1 x Multimode SC	S4 = 1 x Singlemode ST
M3 = 1 x Multimode MTRJ (only if JJ selected above)	L2 = 1 x Singlemode Long Haul SC
M4 = 1 x Multimode ST	G2 = 1 x Singlemode Long Haul+ SC (200 km)
	06 = SFP Slot Gigabit
	07 = Combo Port Gigabit
	<b>ZZ</b> = 2 x SFP Slots Gigabit (only RSR30-08)

#### Remaining Ports

T1 = 1 x Twisted-Pair RJ45                      **Z6** = SFP Slot (100 Mbit/s) (only RSR30-07)

#### Temperature Range

**S** = 0 °C to +60 °C                      **F** = -40 °C to +85 °C  
**U** = -40 °C to +85 °C                      inclusive Conformal Coating

#### Voltage Range 1

**C** = 24/36/48 V DC                      **K** = 60/120/250 V DV and 110/230 V AC

#### Voltage Range 2

**C** = 24/36/48 V DC                      **K** = 60/120/250 V DC and 110/230 V AC  
 9 = None (only if K is selected above)                      (only if K is selected for Voltage Range 1)

#### Approvals

**H** = cUL508, Germanischer Lloyd, IEC 61850, IEEE 1613, EN 50121

#### Software Version (see page 12-15 for additional Management Software Functionality details)

**P** = Professional

#### Configuration

**H** = Standard

#### OEM Type

**H** = Standard

#### Software Release

**XX.X** = Current Software Release

**NOTE:** The last three part number categories (**Configuration**, **OEM Type** and **Software Release**) are optional.





## OCTOPUS IP67/IP65/IP54 Industrial Ethernet Switches



Specially designed for use at the field level with automation networks, the switches in the OCTOPUS family ensure the highest industrial protection ratings (IP67, IP65 or IP54) regarding mechanical stress, humidity, dirt, dust, shock and vibrations. They are also capable of withstanding heat and cold, while fulfilling the strictest fire prevention requirements. The rugged design of the OCTOPUS switches are ideal for installing directly on machinery, outside of control cabinets and distribution boxes. The switches can be cascaded as often as required – permitting implementation of decentralized networks with short paths to the respective devices to considerably reducing costs for cabling.

The OCTOPUS family includes switches with 5 up to 28 ports. Gigabit versions are also available which, just like the Fast Ethernet models, feature vibration-resistant M12 connectors for twisted pair cables or fiber-optic ports according to IEC 63076-3-106 v1/v4. The software comes in Basic and Professional versions, providing management, diagnostic and filtering features, as well as redundancy methods and security mechanisms to varying degrees. All switches feature compact water- and dust-resistant housings and have an operating temperature range of -40 °C to +70 °C.

### OCTOPUS Fast Ethernet Unmanaged Waterproof IP67/IP54 Switches

Product	Part No.	Order No.	Ports/Features
	OCTOPUS 5TX EEC	943 892-001	5 x 10/100 Mbit/s M12-coding, Unmanaged
	OCTOPUS OS20-001000T5T5TAFUHB	942 025-001	10 x 10/100Base-TX, M12 D coding, 4-pole (24 V version)
	OCTOPUS OS20-001000T5T5TNEUHB	942 025-002	10 x 10/100Base-TX, M12 D coding, 4-pole (110 V version)








### OCTOPUS PoE Fast Ethernet Unmanaged Waterproof IP54 Switches

Product	Part No.	Order No.	Ports/Features
	OCTOPUS OS24-081000T5T5TFFUHB	942 025-003	8 x 10/100Base-TX PoE (Phantom Power) and 2 x 10/100Base-TX (24 V version)
	OCTOPUS OS24-081000T5T5TNEUHB	942 025-004	8 x 10/100Base-TX PoE (Phantom Power) and 2 x 10/100Base-TX (110 V version)




**EtherNet/IP™**  
conformance tested

**OCTOPUS Fast Ethernet Managed Waterproof IP67/IP65/IP54 Switches**

Product	Part No.	Order No.	Ports/Features
	OCTOPUS 8M	943 931-001	8 x 10/100Base-TX, M12 D-coding, 4-pole
	OCTOPUS 8M-Train	943 983-001	8 x 10/100Base-TX, M12 D-coding, 4-pole (EN 50155)
	OCTOPUS 8M-Train-BP	942 091-001	8 x 10/100Base-TX, M12 D-coding, 4-pole (EN 50155), Bypass-Relay
	OCTOPUS OS20-000900T5T5TAFBHH	942 025-005	9 x 10/100Base-TX, M12 D-coding, 4-pole (24 V version)
	OCTOPUS OS20-000900T5T5TNEBHH	942 025-006	9 x 10/100Base-TX, M12 D-coding, 4-pole (110 V version)
	OCTOPUS OS20-0010001M1MTREPHH	943 988-001	8 x 10/100Base-TX, M12 D coding, 4-pole, 2 x 100Base-FX Multimode Ports IAW IEC 61076-3-106, Version 1
	OCTOPUS OS20-0010004M4MTREPHH	943 988-003	8 x 10/100Base-TX, M12 D coding, 4-pole, 2 x 100Base-FX Multimode Ports IAW IEC 61076-3-106, Version 4
	OCTOPUS OS20-0010001S1STREPHH	943 988-002	8 x 10/100Base-TX, M12 D coding, 4-pole, 2 x 100Base-FX Singlemode Ports IAW IEC 61076-3-106, Version 1
	OCTOPUS OS20-0010004S4STREPHH	943 988-004	8 x 10/100Base-TX, M12 D coding, 4-pole, 2 x 100Base-FX Singlemode Ports IAW IEC 61076-3-106, Version 4
	OCTOPUS 16M	943 912-001	16 x 10/100Base-TX, M12 D-coding, 4-pole
	OCTOPUS 16M-Train	943 984-001	16 x 10/100Base-TX, M12 D-coding, 4-pole (EN 50155)
	OCTOPUS 16M-Train-BP	942 092-001	16 x 10/100Base-TX, M12 D-coding, 4-pole (EN 50155), Bypass-Relay
	OCTOPUS 24M	943 923-001	24 x 10/100Base-TX, M12 D coding, 4-pole
	OCTOPUS 24M-Train	943 985-001	24 x 10/100Base-TX, M12 D coding, 4-pole (EN 50155)
	OCTOPUS 24M-Train-BP	942 093-001	24 x 10/100Base-TX, M12 D-coding, 4-pole (EN 50155), Bypass-Relay



**OCTOPUS PoE Fast Ethernet Managed Waterproof IP67/IP65 Switches**

Product	Part No.	Order No.	Ports/Features
	OCTOPUS 8M-6PoE	943 967-101	6 x 10/100Base-TX PoE (phantom power) and 2 x 10/100Base-TX, M12 D coding, 4-pole
	OCTOPUS 8M-8PoE	943 967-001	8 x 10/100Base-TX PoE (phantom power), M12 D coding, 4-pole



## OCTOPUS IP67/IP65/IP54 Industrial Ethernet Switches (continued)

### OCTOPUS PoE Fast Ethernet Managed Waterproof IP67/IP65/IP54 Switches

Product	Part No.	Order No.	Ports/Features
	OCTOPUS OS24-080900T5T5TFFBHH	942 025-007	8 x 10/100Base-TX PoE-Plus (Phantom Power) and 1 x 10/100Base-TX (24 V version)
	OCTOPUS OS24-080900T5T5TNEBHH	942 025-008	8 x 10/100Base-TX PoE-Plus (Phantom Power) and 1 x 10/100Base-TX (110 V version)
	OCTOPUS 16M-8PoE	943 960-001	8 x 10/100Base-TX PoE (phantom power) and 8 x 10/100Base-TX, M12 D coding, 4-pole
	OCTOPUS 24M-8 PoE	942 063-001	8 x 10/100Base-TX PoE (phantom power) and 16 x 10/100Base-TX, M12 D-coding, 4 pole



### OCTOPUS Gigabit Ethernet Managed Waterproof IP67/IP65 Switches

	OCTOPUS OS30-0008021A1ATREPHH	943 988-005	8 x 10/100Base-TX, 2 x Gigabit Multimode Ports IAW IEC 61076-3-106, Version 1
	OCTOPUS OS30-0008024A4ATREPHH	943 988-007	8 x 10/100Base-TX, 2 x Gigabit Multimode Ports IAW IEC 61076-3-106, Version 4
	OCTOPUS OS30-0008021B1BTREPHH	943 988-006	8 x 10/100Base-TX, 2 x Gigabit Singlemode Ports IAW IEC 61076-3-106, Version 1
	OCTOPUS OS30-0008024B4BTREPHH	943 988-008	8 x 10/100Base-TX, 2 x Gigabit Singlemode Ports IAW IEC 61076-3-106, Version 4

### OCTOPUS PoE Gigabit Ethernet Managed Waterproof IP67/IP65 Switches

	OCTOPUS OS32-080802T6T6TPEPHH	942 069-002	8 x 10/100Base-TX PoE (phantom power) and 2 x 1000BaseT
	OCTOPUS OS32-081602T6T6TPEPHH	942 069-001	8 x 10/100Base-TX PoE (phantom power) and 8 x 10/100Base-TX, 2 x 1000Base
	OCTOPUS OS32-0808020606TPEPHH	942 069-004	8 x 10/100Base-TX PoE (phantom power) and 2 x SFP-sockets for 10/100Base-FX and 1000Base-X housing IEC 61076-3-106, Version 1
	OCTOPUS OS32-0816020606TPEPHH	942 069-003	8 x 10/100Base-TX PoE (phantom power) and 8 x 10/100Base-TX and 2 x SFP-sockets for 10/100Base-FX and 1000Base-X housing IEC 61076-3-106, Version 1

### OCTOPUS Gigabit Ethernet Managed Layer 3 Waterproof IP67/IP65 Switches

	OCTOPUS OS3x-xx16xxx	942 133-999	Up to 20 ports, thereof max. 4 GE TX or FX, up to 15 PoE Layer2 and Layer 3 Software Various power supplies
	OCTOPUS OS3x-xx24xxx	942 133-999	Up to 28 ports, thereof max. 4 GE TX or FX, up to 15 PoE Layer 2 and Layer 3 software Various power supplies





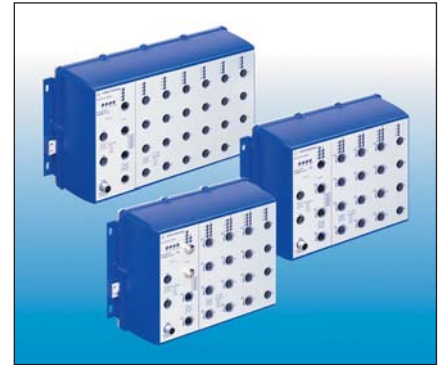
## OCTOPUS IP67/IP65 Industrial Ethernet Switches

### OCTOPUS OS30/OS34

The OCTOPUS OS30/34, with Gigabit Ethernet (GE) ports available for either fiber or copper cabling with PoE, allows customers to choose a switch that meets specific needs:

- The smaller housing allows for a maximum of 20 ports, including four Gigabit ports and up to 15 PoE ports.
- The full-sized OCTOPUS adds eight additional Fast Ethernet ports for a total of 28 ports per OCTOPUS.
- The OCTOPUS OS30/34 is available either with Layer 3 routing software or with Layer 2 switching software.

The switch meets market specific regulations, including EN 50155 for operating conditions in railway vehicles, EN 50121-4 for use on railway lines, EN 45545 for fire protection in trains, GL for ships and e1 for use in road vehicles.



### Technical Information

Product Description	
Type	OCTOPUS
Description	Managed or unmanaged IP 67 / IP 67 / IP54 switches in accordance with IEEE 802.3, store-and-forward-switching and routing, electrical and optical Fast-Ethernet (10/100 MBit/s) and Gigabit-Ethernet (10/100/1000MBit/s), electrical M12 ports (TX) or optical IEC ports (FX), PoE Power-Sourcing Equipment
Port Type and Quantity	Up to 28 ports, thereof max. 4 GE TX or FX, up to 15 PoE
Network Size – Length of Cable	
Twisted Pair (TP)	0 to 100 m
Fibre (FX)	0 to 116 km
Power Requirements	
Operating Voltage	24 to 110 VDC, 110 to 230 VAC
Ambient Conditions	
Operating Temperature	-40 °C up to +70 °C
Relative Humidity (also condensing)	10% up to 100%
Mechanical Construction	
Protection Class	IP54, IP65 and IP67
Software	
Supported HiOS Software Levels	Layer 2 Standard (L2S), Layer 2 Advanced (L2A) or Layer 3 Standard (L3S)
Approvals	
Safety of Industrial Control Equipment	cUL 60950-1
Road Vehicles	E1, GL
Along Track and Onboard Train	EN 50155, EN 50121-4, EN 45545

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)

## OCTOPUS Configurations

OS34-15 16 04 T6 T6 T5 T BB Z9 99 HH S E 3S XX.X

### Design

OS20 = Fast Ethernet Ports  
 OS30 = FE and GE Ports  
 OS24 = Fast Ethernet Ports with PoE  
**OS34** = FE and GE Ports with PoE

### PoE Ports

00 = no PoE Ports  
 10 = 10 x Fast Ethernet PoE Ports  
 12 = 12 x Fast Ethernet PoE Ports  
**15** = 15 x Fast Ethernet PoE Ports  
 08 = 8 x Fast Ethernet PoE Ports  
 11 = 11 x Fast Ethernet PoE Ports  
 14 = 14 x Fast Ethernet PoE Ports

### Fast Ethernet Ports

08 = 8 x Fast Ethernet Ports  
**16** = 16 x Fast Ethernet Ports  
 24 = 24 x Fast Ethernet Ports  
 12 = 12 x Fast Ethernet Ports  
 20 = 20 x Fast Ethernet Ports  
 28 = 28 x Fast Ethernet Ports

### Gigabit Ethernet Ports

00 = 0 x Gigabit Ethernet Ports  
**04** = 4 x Gigabit Ethernet Ports  
 02 = 2 x Gigabit Ethernet Ports

### Type 1 Uplink Port

T5 = M12 D-coded  
**T6** = M12 X-coded  
 1M = FE, 4 km@50 µm, 4 km@62.5 µm, 1310 nm, IEC 61076-3-106 V1  
 1L = FE, 40-100 km@9 µm, 1550 nm, IEC 61076-3-106 V1  
 1B = GE, 17.5 km, 1310 nm, IEC 61076-3-106 V1  
 4M = FE, 4 km@50 µm, 4 km@62.5 µm, 1310nm, IEC 61076-3-106 V4  
 4L = FE, 40-100 km@9 µm, 1550 nm, IEC 61076-3-106 V4  
 4B = GE, 17.5 km, 1310 nm, IEC 61076-3-106 V4  
 R5 = M12 D-coded with bypass relay  
 R6 = M12 X-coded with bypass relay  
 1S = FE, 22.5 km@9 µm, 1310 nm, IEC 61076-3-106 V1  
 1P = FE, 25-62.5km@9µm, 1310 nm, IEC 61076-3-106 V1  
 1A = GE, 550 m@50 µm 275 m@62.5 µm, 850 nm, IEC 61076-3-106 V1  
 1C = GE, 24 to 68 km, 1550 nm, IEC 61076-3-106 V1  
 1D = GE, 60 to 116 km, 1550 nm, IEC 61076-3-106 V1  
 4S = FE, 22.5 km@9 µm, 1310 nm, IEC 61076-3-106 V4  
 4P = FE, 25-62.5km@9µm, 1310 nm, IEC 61076-3-106 V4  
 4A = GE, 550 m@50 µm 275 m@62,5 µm, 850 nm, IEC 61076-3-106 V4  
 4C = GE, 24 to 68 km, 1550 nm, IEC 61076-3-106 V4  
 4D = GE, 60 to 116 km, 1550 nm, IEC 61076-3-106 V4

### Type 2 Uplink Port

(see Type 1 Uplink Port)

### Kind of Local Ports

**T5** = M12 D-coded

### Temperature Range

**T** = -40 °C to +70 °C

### Power Supply and Connector Type

**BB** = 2 x 24 V DC (16.8 to 30 V DC), M12  
**HH** = 2 x 36/48 V DC (25.2 to 60 V DC), M12  
**FF** = 2 x 24/36/48 V DC (16.8 to 60 V DC), 7/8" 5 poles  
**N9** = 1 x 72/110 V DC (50.4 V to 138 V DC), 7/8" 4 poles  
**M9** = 1 x 110/120/220/230 V AC (88 to 265 V AC), 7/8" 3 poles

### Approvals

**Z9** = CE, FCC, EN 61131, EN 60950-1  
**U9** = CE, FCC, EN 61131, EN 60950-1, GL  
**UT** = CE, FCC, EN 61131, EN 60950-1, GL, UL60950-1, EN 50121-4  
**T9** = CE, FCC, EN 61131, EN 60950-1, EN 50121-4  
**S9** = CE, FCC, EN 61131, EN 60950-1, EN 50121-4, EN 50155, EN 45545  
**R9** = CE, FCC, EN 61131, EN 60950-1, E1  
**Y9** = CE, FCC, EN 61131, EN 60950-1, UL60950-1  
**UY** = CE, FCC, EN 61131, EN 60950-1, GL, UL60950-1  
**US** = CE, FCC, EN 61131, EN 60950-1, GL, UL60950-1, EN 50121-4, EN 50155  
**TY** = CE, FCC, EN 61131, EN 60950-1, EN 50121-4, UL60950-1  
**SY** = CE, FCC, EN 61131, EN 60950-1, EN 50121-4, EN 50155, EN 45545, UL60950-1

### Software Packages

**99** = Reserved

### OEM-Type

**HH** = Standard

### Hardware Configuration

**S** = Standard    **M** = Fast MRP (Port 1, 2)    **P** = PRP (Port 1, 2)    **H** = HSR (Port 1, 2)    **D** = HSR

### Software Configuration

**E** = Reserved

### Software Version

**2S** = HiOS Layer 2 Standard    **2A** = HiOS Layer 2 Advanced    **3S** = HiOS Layer 3 Standard

### Software Release

**XX.X** = Current Software Release

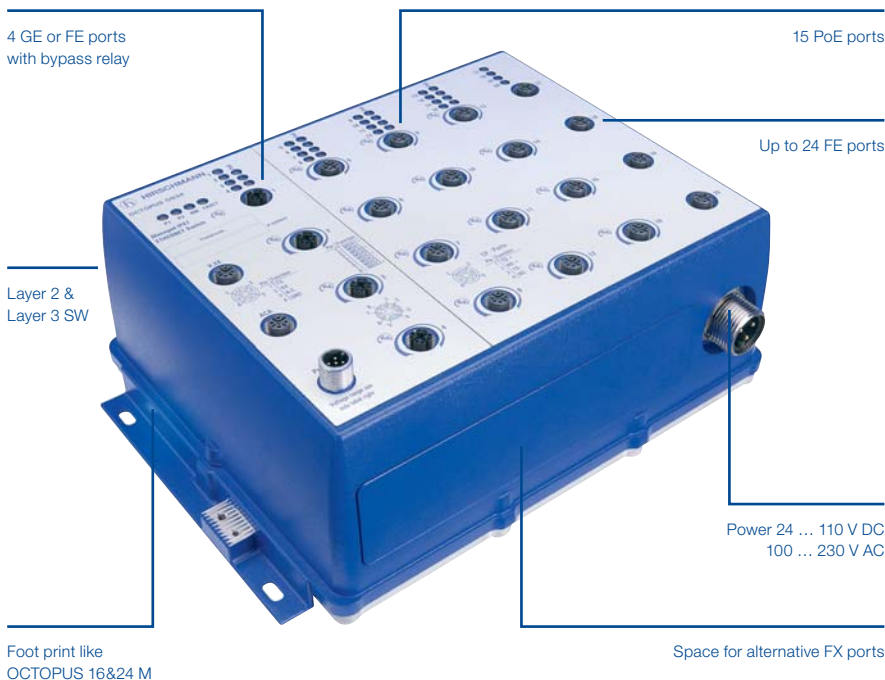


## OCTOPUS IP67/IP65/IP54 System Accessories

OCTOPUS IP67/IP65/IP54 Connectivity Solutions		
Part No.	Order No.	Description
EF12RJ45 OCTOPUS	934 498-001	Bulkhead M12 to RJ45
ACA21-M12 EEC	943 913-002	ACA21 auto configuration adapter for OCTOPUS managed switches
OCTOPUS Terminal Cable	943 902-001	M12 4-pin to Sub-D 9-pin terminal cable
EM12S 001L0200 OCTOPUS	934 578-001	2 m Fast Ethernet patch cord 2 x M12 D-code
EM12S 001L0500 OCTOPUS	934 578-002	5 m Fast Ethernet patch cord 2 x M12 D-code
EM12S 001L1000 OCTOPUS	934 578-003	10 m Fast Ethernet patch cord 2 x M12 D-code
EM12G 001L0100 OCTOPUS	942 081-001	1 m Gigabit Ethernet patch cord 2 x M12 X-code
EM12G 001L0200 OCTOPUS	942 081-002	2 m Gigabit Ethernet patch cord 2 x M12 X-code
EM12G 001L0500 OCTOPUS	942 081-003	5 m Gigabit Ethernet patch cord 2 x M12 X-code
EM12S OCTOPUS	934 445-001	Field attachable FE M12 connector D-code
EM12G OCTOPUS	942 083-001	Field attachable GE M12 connector X-code



Railway Approved Ethernet Data Cables		
Part No.	Order No.	Description
Ethernet Rail Transit Cable BE43769	942 037-001	500 m Railway Approved Ethernet Data Cable 100 Mbit/s, Cat 5e, AWG 22/19 Stranded
Ethernet Rail Gigabit Cable BE43800	942 075-500	500 m Railway Approved Ethernet Data Cable 1000 Mbit/s, Cat 5e, AWG 26/19 Stranded
Ethernet Rail 10Gb Cable BE43802	942 127-001	500 m Railway Approved Ethernet Data Cable 10 Gb/s, Cat 7, AWG 24/19 Stranded



## MACH100 19" Industrial Workgroup Rack-Mount Switches



### Fast Ethernet Uplink Ports, Gigabit Ethernet Uplink Ports, and 10 Gigabit Uplink Ports

The MACH100 series of switches are offered in versions with 8, 20, or 24 permanently installed 10/100 Mbit/s RJ45 Ethernet ports, or as modular switches with 8 permanent ports and slots for 2 additional 8 port media modules that are hot-swappable. All versions offer RJ45/SFP combo ports for connection to the network backbone. An all-Gigabit version with 24 10/100/1000 ports is also available.

The MACH104-16TX-PoEP models offer 16 TX ports that support PoE and PoE Plus. Versions of this switch are also available with two 10-Gigabit XFP uplinks or a redundant power supply as well as a fanless variant with an external power supply unit.



### Technical Information

Product Description					
Type	MACH102-8TP-x	MACH102-xTP-Fx	MACH104-20TX-Fx	MACH104-20TX-F-4PoE	MACH104-16TX-PoEP-x
Available Ports	10, 18, 26	10, 26	24	24	20, 22
Modularity	Yes	No			
Construction					
Mounting	19" Control Cabinet				
Protection Class	IP20				
Dimensions (WxHxD)	448 x 44 x 310 mm				448 x 44 x 345 mm
Weight	appr. 4 kg		appr. 4.4 kg		appr. 4.5 kg
Ambient Conditions					
Operating Temperature	0 °C to +50 °C				
Storage/Transport Temperature	-20 °C to +85 °C				
Relative Humidity (non-condensing)	10% to 95%				
Conformal Coating	n/a				
Interfaces					
V.24 Interface	1 x RJ11 socket				
USB Interface	1 x USB (ACA21-USB adapter)				
Software					
Supported Classic Software Levels	Layer 2 Professional (L2P)		Layer 2 Professional (L2P), Layer 3 Professional (L3P)		
Power Requirements					
Operating Voltage	110 to 240 V AC				110 to 240 V AC, 44 to 57 V DC (variant dependent)
PoE (802.3af) Ports Supported	8, 16	No	4		16 ports
PoE Plus (802.3at) Ports Supported	4, 8	No	No		8 ports
Regulatory Approvals					
Safety of Industrial Control Equipment	cUL508				
Hazardous Locations	n/a				
Ship	n/a				
Transportation	EN 50121-4				EN 50121-4 (variant dependent)
Railway (norm)	n/a				
Substation	n/a				
Reliability					
MTBF Range	19.1 to 26.5 years		14.9 to 17 years	13.7 years	14.6 to 21.4 years
Warranty	5 years standard				

NOTE: These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



## MACH100 19" Industrial Workgroup Rack-Mount Switch Configurations

### Fast Ethernet, Gigabit Ethernet and 10 Gigabit Uplink Ports, PoE and PoE+ Ports

Modular Fast Ethernet Switches with Gigabit Ethernet Uplink Ports		
Part No.	Order No.	Ports/Functions
MACH102-8TP	943 969-001	8 x 10/100 Mbit/s RJ45, 2 x FE/GE combo ports (Twisted Pair or SFP), 2 slots for 8 port media module
MACH102-8TP-R	943 969-101	Same as 943 969-001, but with redundant 110/220 V AC power supply

Media Modules		
Part No.	Order No.	Ports/Functions
M1-8TP-RJ45	943 970-001	8 x 10/100 Mbit/s RJ45 media module
M1-8TP-RJ45 PoE	942 028-001	8 x 10/100 Mbit/s RJ45 PoE+ according to IEEE 802.3at media module
M1-8MM-SC	943 970-101	8 x 10/100 Mbit/s MM SC media module
M1-8SM-SC	943 970-201	8 x 10/100 Mbit/s SM SC media module
M1-8SFP	943 970-301	8 x 100 Mbit/s SFP media module

Fast Ethernet Switches with Gigabit Ethernet Uplink Ports		
Part No.	Order No.	Ports/Functions
MACH102-8TP-F	943 969-201	8 x 10/100 Mbit/s RJ45, 2 x FE/GE combo ports (Twisted Pair or SFP)
MACH102-8TP-FR	943 969-301	Same as 943 969-201, but with redundant 110/220 V AC power supply
MACH102-24TP-F	943 969-401	24 x 10/100 Mbit/s RJ45, 2 x FE/GE combo ports (Twisted Pair or SFP)
MACH102-24TP-FR	943 969-501	Same as 943 969-401, but with redundant 110/220 V AC power supply

Gigabit Ethernet Switches		
Part No.	Order No.	Ports/Functions
MACH104-20TX-F	942 003-001	20 x 10/100/1000 Mbit/s RJ45, 4 x FE/GE combo ports (Twisted Pair or SFP)
MACH104-20TX-FR	942 003-101	Same as 942 003-001, but with redundant 110/220 V AC power supply
MACH104-20TX-F-L3P	942 003-002	Same as 942 003-001, but with Layer 3 Professional Software
MACH104-20TX-FR-L3P	942 003-102	Same as 942 003-101, but with Layer 3 Professional Software

Gigabit Ethernet Switches with PoE Ports		
Part No.	Order No.	Ports/Functions
MACH104-20TX-F-4PoE	942 003-201	Same as 942 003-001, 4 of the 20 ports are PoE Ports according to IEEE 802.3af
MACH104-20TX-F-4PoE-L3P	942 003-202	Same as 942 003-201, but with Layer 3 Professional Software

Gigabit Ethernet Switches with PoE+ Ports		
Part No.	Order No.	Ports/Features
MACH104-16TX-PoEP	942 030-001	16 x 10/100/1000 Mbit/s RJ45 PoE+ according to IEEE 802.3at (max. 240 W), 4 x FE/GE combo ports (Twisted Pair or SFP)
MACH104-16TX-PoEP-L3P	942 030-002	Same as 942 030-001, but with Layer 3 Professional Software
MACH104-16TX-PoEP -R	942 026-001	Same as 942 030-001 but with redundant power supply
MACH104-16TX-PoEP -R-L3P	942 026-002	Same as 942 026-001 but with Layer 3 Professional Software
MACH104-16TX-PoEP -E	942 027-001	Same as 942 030-001 but fanless with external PoE power supply
MACH104-16TX-PoEP -E-L3P	942 027-002	Same as 942 027-001 but with Layer 3 Professional Software
MACH104-16TX-PoEP +2X	942 031-001	Same as 942 030-001, but with additional 2 x 10GE XFP
MACH104-16TX-PoEP +2X-L3P	942 031-002	Same as 942 031-001 but with Layer 3 Professional Software
MACH104-16TX-PoEP +2X -R	942 033-001	Same as 942 031-001 but with redundant power supply
MACH104-16TX-PoEP +2X -R-L3P	942 033-002	Same as 942 033-001 but with Layer 3 Professional Software
MACH104-16TX-PoEP +2X -E	942 032-001	Same as 942 031-001 but fanless with external PoE power supply
MACH104-16TX-PoEP +2X -E-L3P	942 032-002	Same as 942 032-001 but with Layer 3 Professional Software

NOTE: For SFP transceiver see page 96.



## GREYHOUND 19" Ruggedized Rack-Mount Switches and Media Modules





The GREYHOUND Gigabit Ethernet switches are offered in two basic versions. The configuration options include:

- 16 Fast Ethernet TX ports
- Eight Fast Ethernet TX ports, plus eight Fast Ethernet small form-factor pluggable (SFP) ports
- It is also possible to add four Gigabit Ethernet Combo ports

The basic units offer a media module slot that allows customers to add or change ports in the field, as their network design requirements change in the future. The modules can be ordered in versions from all-copper to all-fiber, depending on the individual need.



### Technical Information

Product Description Basic Units	
Type	GRS1020/1120-xx
	
	
Description	Modular Managed Industrial Switch, fanless design
Port Type and Quantity	Ports in total up to 24 Basic unit: 16 FE TX ports, or 8 FE TX ports/8 FE SFP slots expandable with one slot for media modules with 8 FE ports
Number of Fiber Ports	20 fiber ports: 4 GE/FE plus 8 FE basic unit plus 8 FE with media module
<b>Additional Interfaces</b>	
V.24 Interface	1 x RJ45 socket
USB and SD Interface	1 x to connect auto-configuration adapter ACA22 (USB)
<b>Power Requirements</b>	
Operating Voltage	24 to 48 V DC redundant, or 110 to 250 V DC and 110 to 240 V AC optional redundant
Power Consumption	7.5 to 18 W depending on the variant
<b>Mechanical Construction</b>	
Weight	3.55 to 3.8 kg depending on the variant
Protection Class	IP30
Dimensions (WxHxD)	448 x 44 x 315 mm
<b>Software</b>	
Supported HiOS Software Levels	Layer 2 Standard (L2S)

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



## Technical Information

Product Description Media Modules for GREYHOUND	
Type	GRM20-xx
Port Type and Quantity	up to 8 FE ports, more details in the configurator for ST, SC, RJ45, SFP slots
Power Consumption	2 to 9 W depending on the variant
Weight	450 to 650 g depending on the variant

NOTE: These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



## Common Technical Data Basic Units and Media Modules

Gigabit ETHERNET Network Size	
Twisted Pair (TP)	0 to 100 m
Multimode Fiber (MM) 50/125 $\mu\text{m}$	0 to 550 m, 7.5 dB link budget; 62.5/125 $\mu\text{m}$ 0 to 275 m, 7.5 dB link budget (with M-SFP-SX/LC)
Singlemode Fiber (SM) 9/125 $\mu\text{m}$	0 to 20 km, 11 dB link budget (with M-SFP-LX/LC); 14 to 42 km, 5 to 20 dB link budget (with M-SFP-LX+/LC)
Singlemode Fiber (LH) 9/125 $\mu\text{m}$	23 to 80 km, 5 to 22 dB link budget (with M-SFP-LH/LC); 71 to 128 km, 15 to 30 dB link budget (with M-SFP-LH+/LC)
Fast ETHERNET Network Size	
Twisted Pair (TP)	0 to 100 m
Multimode Fiber (MM) 50/125 $\mu\text{m}$	0 to 5000 m, 8 dB link budget; 62.5/125 $\mu\text{m}$ , 0 to 4000 m, 11 dB link budget (with M-Fast SFP-MM/LC)
Singlemode Fiber (SM) 9/125 $\mu\text{m}$	0 to 25 km, 13 dB link budget (with M-Fast SFP-SM/LC); 25 to 65 km, 10 to 29 dB link budget (with M-Fast SFP-SM+/LC)
Singlemode Fiber (LH) 9/125 $\mu\text{m}$	47 to 104 km, 10 to 29 dB link budget (with M-Fast SFP-LH/LC)
Network Size – Cascadability	
Line-/Star Topology	Any
Ring Structure	>200 switches MRP
Ambient Conditions	
Operating Temperature	0 °C to +60 °C, or -40 °C to +70 °C, IEC 60068-2-2 Dry Heat Test +85 °C 16 hours, optional conformal coating
Relative Humidity (non-condensing)	5% to 95%
Approvals Configurable	
Safety of Industrial Control Equipment	EN 60950-1, EN 61131-2, cUL60950-1
Substation	IEC 61850-3, IEEE 1613
Ship	GL – Germanischer Lloyd (pending)
Hazardous Locations	ISA-12.12.-01 Class 1 Div. 2 Group A, B, C, D (pending)
Transportation	NEMA TS2, EN 50121-4
Accessories	
Device Replacement and Logging	ACA22-USB EEC 942 124-001

NOTE: These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)

Configurator



## GREYHOUND GRS1020/GRS1120/GRS1030/GRS1130 Switch Configurations

**GRS1 0 30 - 16T9 S M M V9 H H S E 2S 04.1**

### Design

**GRS1** = GREYHOUND 19" Rugged Switch

### Port Position

**0** = Ethernet ports on front and power supply input on rear  
**1** = Ethernet ports and power supply input on rear (cabling side)

### Data Rate

**20** = FE-Switch  
**30** = FE-Switch with GE-Uplink Ports

### Number of Fast Ethernet Ports

**16T9** = 16 Fast Ethernet TX Ports  
**8T8F** = 8 Fast Ethernet TX Ports and 8 Fast Ethernet SFP Slots

### Temperature Range

**S** = 0 °C to +60 °C  
**T** = -40 °C to +70 °C  
**E** = -40 °C to +70 °C conformal coating

### Power Supply 1

**C** = 24 to 48 V DC  
**M** = 110 to 250 V DC and 110 to 240 V AC

### Power Supply 2

**C** = 24 to 48 V DC  
**M** = 110 to 250 V DC and 110 to 240 V AC  
**9** = No second power supply

### Approvals

Z9 = CE; FCC; EU Safety	Y9 = Z9, US Safety
X9 = Z9, US Safety, Hazardous Location	<b>V9</b> = Z9, Substation
VY = Z9, US Safety, Substation	VU = Z9, US Safety, Substation, Marine
VT = Z9, US Safety, Substation, Transportation	U9 = Z9, Marine
UY = Z9, US Safety, Marine	UT = Z9, US Safety, Marine, Transportation
UX = Z9, US Safety, Marine, Hazardous. Location	T9 = Z9, Transportation
TY = Z9, US Safety, Transportation	

### Customization

**HH** = Hirschmann Standard

### Hardware Configuration

**S** = Standard

### Software Configuration

**E** = Standard

### Software Level

**2S** = HiOS Layer 2 Standard

### Software Version

**04.1** = Software Version 04.1  
 XX.X = Current Software Release





Configurator



## GREYHOUND GRM20 Media Modules Configurations

**GRM20-MM MM TT TT S V9 HH S**

### Design

**GRM** = GREYHOUND Switch Media Modules

### Data Rate

**20** = 10/100 Mbit/s Ports

### Port Configuration 1 and 2

**TT** = 2 x Twisted Pair TX, RJ45, 100 Mbit/s  
**MM** = 2 x Multimode FX, DSC, 100 Mbit/s  
**VV** = 2 x Singlemode FX, DSC, 100 Mbit/s

**ZZ** = 2 x SFP Slots, 100 Mbit/s  
**NN** = 2 x Multimode FX, ST, 100 Mbit/s  
**UU** = 2 x Singlemode FX, ST, 100 Mbit/s

### Port Configuration 3 and 4

**TT** = 2 x Twisted Pair TX, RJ45, 100 Mbit/s  
**MM** = 2 x Multimode FX, DSC, 100 Mbit/s  
**VV** = 2 x Singlemode FX, DSC, 100 Mbit/s  
**99** = Not equipped

**ZZ** = 2 x SFP Slots, 100 Mbit/s  
**NN** = 2 x Multimode FX, ST, 100 Mbit/s  
**UU** = 2 x Singlemode FX, ST, 100 Mbit/s

### Port Configuration 5 and 6

**TT** = 2 x Twisted Pair TX, RJ45, 100 Mbit/s  
**MM** = 2 x Multimode FX, DSC, 100 Mbit/s  
**VV** = 2 x Singlemode FX, DSC, 100 Mbit/s  
**99** = Not equipped

**ZZ** = 2 x SFP Slots, 100 Mbit/s  
**NN** = 2 x Multimode FX, ST, 100 Mbit/s  
**UU** = 2 x Singlemode FX, ST, 100 Mbit/s

### Port Configuration 7 and 8

**TT** = 2 x Twisted Pair TX, RJ45, 100 Mbit/s  
**MM** = 2 x Multimode FX, DSC, 100 Mbit/s  
**VV** = 2 x Singlemode FX, DSC, 100 Mbit/s  
**99** = Not equipped

**ZZ** = 2 x SFP Slots, 100 Mbit/s  
**NN** = 2 x Multimode FX, ST, 100 Mbit/s  
**UU** = 2 x Singlemode FX, ST, 100 Mbit/s

### Temperature Range

**S** = 0 °C to +60 °C  
**T** = -40 °C to +70 °C  
**E** = -40 °C to +70 °C conformal coating

### Approvals

**Z9** = CE, FCC, EU Safety  
**X9** = Z9, US Safety, Hazardous Location  
**VY** = Z9, US Safety, Substation  
**VT** = Z9, US Safety, Substation, Transportation  
**UY** = Z9, US Safety, Marine  
**UX** = Z9, US Safety, Marine, Hazardous. Location  
**TY** = Z9, US Safety, Transportation

**Y9** = Z9, US Safety  
**V9** = Z9, Substation  
**VU** = Z9, US Safety, Substation, Marine  
**U9** = Z9, Marine  
**UT** = Z9, US Safety, Marine, Transportation  
**T9** = Z9, Transportation

### Customization

**HH** = Hirschmann Standard

### Hardware Configuration

**S** = Standard

## MACH1000 19" Ruggedized Rack-Mount Switches



### Fast Ethernet Uplink Ports, Gigabit Ethernet Uplink Ports, and Full Gigabit Ethernet Switches

The MACH1000 is available in a 24 port custom configurable design with 2 or 4 additional Gigabit uplink (RJ45 and/or SFP for fiber) and PoE ports. The MACH1000 is also available in an all-Gigabit version, offering 16 10/100/1000 RJ45/SFP combo ports to provide countless copper/fiber combinations. These Über-Rugged™ switches are available with Layer 2 or Layer 3 capabilities. The fanless design and extremely efficient components are optimized for minimal heat generation and high MTBF (mean time between failure). The 16 port GE switches offer sub-10 second boot times and offer time synchronization IEEE 1588v2, precision 30 ns.



#### Technical Information

Product Description			
Type	MAR1020 Series 1x2x	MAR1030 Series 1x3x	MAR1040 Series 1x4x
Available Ports	2 to 24	2 to 28	16 (Full Gigabit)
Construction			
Mounting	19" Control Cabinet		
Protection Class	IP30		
Dimensions (WxHxD)	445 x 44 x 308 mm		
Weight	appr. 5 kg		
Ambient Conditions			
Operating Temperature	0 °C to +60 °C, -40 °C to +85 °C, or -40 °C to +85 °C (inclusive Conformal Coating)		
Storage/Transport Temperature	-40 °C to +85 °C		
Relative Humidity (non-condensing)	10% to 95%		
Conformal Coating	Yes (variant dependent)		
Interfaces			
V.24 Interface	1 x RJ11 socket		
USB Interface	1 x USB (ACA21-USB adapter)		
Software			
Supported Classic Software Levels	Layer 2 Professional (L2P)		Layer 2 Professional (L2P), Layer 3 Professional (L3P)
Power Requirements			
Operating Voltage	24/36/49 V DC or 110/250 V DC, 110/230 V AC		
PoE (802.3af) Ports Supported	Yes (variant applicable)		
PoE Plus (802.3at) Ports Supported	n/a		
Regulatory Approvals			
Safety of Industrial Control Equipment	cUL508		
Hazardous Locations	cULus ISA12.12.01		
Ship	Germanischer Lloyd		
Transportation	NEMA TS2 (non-PoE models)		
Railway	EN 50121-4, EN 50155		
Substation	IEC 61850-3, IEEE 1613		
Reliability			
MTBF Range	21.5 to 38.9 years	20 to 47.6 years	27.1 to 27.8 years
Warranty	5 years standard		

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



Configurator



## MACH1000 19" Ruggedized Rack-Mount Switch Configurations

Fast Ethernet Uplink Ports: **MAR1020-** | **MAR1022-** | **MAR1120-** | **MAR1122**

**MAR1020-99** **MMMMMVVZZTTTTTTTTTT99** **U** **G** **C** **H** **P** **E** **H** **XX.X**

### Design/Models

- MAR1020** = Fast Ethernet Uplink
- MAR1022** = Fast Ethernet Uplink with 4 Ports PoE
- MAR1120** = Fast Ethernet Uplink with Ports at the back (20 Ports max. 100 Mbit/s)
- MAR1122** = Fast Ethernet Uplink with Ports at the back and 4 Ports PoE (20 Ports max. 100 Mbit/s)

### Gigabit Ethernet Ports

- 99** = None (not present)

### Fast Ethernet Ports (1 to 24 Ports)

- |  |   |
|--|---|
| <b>MM</b> = 2 x Multimode 100 Mbit/s SC              | <b>RR</b> = 2 x Twisted Pair (TX) 10/100 Mbit/s M12 |
| <b>VV</b> = 2 x Singlemode 100 Mbit/s SC             | <b>FF</b> = 2 x Multimode 10 Mbit/s ST              |
| <b>ZZ</b> = 2 x SFP Slots 100 Mbit/s SFP             | <b>JJ</b> = 2 x Multimode 100 Mbit/s MTRJ           |
| <b>TT</b> = 2 x Twisted Pair (TX) 10/100 Mbit/s RJ45 | <b>UU</b> = 2 x Singlemode 100 Mbit/s ST            |
| <b>99</b> = None (not present)                       | <b>LL</b> = 2 x Singlemode LH 100 Mbit/s SC         |
|  | <b>GG</b> = 2 x Singlemode LH+ 100 Mbit/s SC        |

### Temperature Range

- |                             |                             |
|-----------------------------|-----------------------------|
| <b>S</b> = 0 °C to +60 °C   | <b>F</b> = -40 °C to +85 °C |
| <b>U</b> = -40 °C to +85 °C | inclusive Conformal Coating |

### Power Supply 1 (options)

- |   |   |
|---|---|
| <b>C</b> = 24/36/48 V DC (spring clip)              | <b>L</b> = 24/36/48 V DC (plug-in connector)              |
| <b>G</b> = 110/250 V DC, 110/230 V AC (spring clip) | <b>M</b> = 110/250 V DC, 110/230 V AC (plug-in connector) |

### Power Supply 2 (options)

- C** = 24/36/48 V DC (spring clip)
- G** = 110/250 V DC, 110/230 V AC (spring clip)
- 9** = None (not present)

### Approvals

- H** = cUL508, cUL1604 Class 1 Div2, Germanischer Lloyd, IEC 61850-3, IEEE 1613, EN 50121

### Software Version (see page 12-15 for additional Management Software Functionality details)

- P** = Layer 2 Professional: extended diagnostics, redundancy and security features

### Configuration

- |                                      |                                   |
|--------------------------------------|-----------------------------------|
| <b>H</b> = Standard                  | <b>P</b> = PROFINET (pre-setting) |
| <b>E</b> = EtherNet/IP (pre-setting) |                                   |

### OEM Type

- |                     |                              |
|---------------------|------------------------------|
| <b>H</b> = Standard | <b>X</b> = Customer Specific |
|---------------------|------------------------------|

### Software Release

- XX.X** = Current Software Release

**NOTE:** The last three part number categories (**Configuration**, **OEM Type** and **Software Release**) are optional.





Configurator



## MACH1000 19" Ruggedized Rack-Mount Switch Configurations

Full Gigabit Ethernet Switches: **MAR1040**- | **MAR1042**- | **MAR1140**- | **MAR1142**

**MAR1040** - **4C4C4C4C999** **S** **M** **L** **H** **R** **H** **H** **XX.X**

### Design/Models

- MAR1040** = Full Gigabit Ethernet Switch
- MAR1042 = Full Gigabit Ethernet Switch with PoE
- MAR1140 = Full Gigabit Ethernet Switch with Ports on the rear
- MAR1142 = Full Gigabit Ethernet Switch with Ports on the rear, PoE

### Gigabit Ethernet Ports

**4C4C4C4C999** = 16 RJ45/SFP Combo Ports (support 100 and 1000 Mbit/s SFP)

### Temperature Range

- S** = Standard, 0 °C to +60 °C
- T** = Extended, -40 °C to +70 °C
- E** = Extended, -40 °C to +70 °C inclusive Conformal Coating

### Power Supply 1

- L** = 24/36/48 V DC (plug-in connector)
- M** = 110/250 V DC, 110/230 V AC (plug-in connector)

### Power Supply 2

- L** = 24/36/48 V DC (plug-in connector)
- M** = 110/250 V DC, 110/230 V AC (plug-in connector)
- 9** = None (not present)

### Approvals

- H** = cUL508 (pending), cUL1604 Class 1 Div 2 (pending), Germanischer Lloyd (pending), EN 50121-4, EN 50155 (pending), NEMA TS2, IEC 61850-3, IEEE 1613

### Software Version (see page 12-15 for additional Management Software Functionality details)

- P** = Layer 2 Professional: extended diagnostics, redundancy and security features
- R** = Layer 3 Professional: routing capabilities

### Configuration

- H** = Standard

### OEM Type

- H** = Standard

### Software Release

**XX.X** = Current Software Release

**NOTE:** The last three part number categories (**Configuration**, **OEM Type** and **Software Release**) are optional.

## MACH4000 Gigabit Backbone Layer 2/3 Rack-Mount Switches



### Fast Ethernet Uplink Ports, Gigabit Ethernet Uplink Ports, and 10 Gigabit Uplink Ports

The MACH4000 series of high density managed switches is capable of providing as many as 48 Gigabit ports and three 10-Gigabit ports. Each model comes standard with over 8 to 16 ports and can be configured with as many as 32 additional ports. Choose from five MACH4000 models that allow either two or four hot-swappable media modules.

NOTE: A fan module is included in each chassis. For a complete switch, please be sure to specify media modules and power supply separately.



### Technical Information

Product Description	
Type	MACH4000 Series
Available Ports	8 to 51
Construction	
Mounting	19" Control Cabinet
Protection Class	IP20
Dimensions (WxHxD)	480 x 88 x 435 mm
Weight	7.5 kg
Ambient Conditions	
Operating Temperature	0 °C to +60 °C
Storage/Transport Temperature	-25 °C to +70 °C
Relative Humidity (non-condensing)	10% to 95%
Conformal Coating	n/a
Interfaces	
V.24 Interface	1 x RJ11 socket
USB Interface	1 x USB (ACA21-USB adapter)
Software	
Supported Classic Software Levels	Layer 2 Professional (L2P), Layer 3 Enhanced (L3E), Layer 3 Professional (L3P)
Power Requirements	
Operating Voltage	24 V DC or 48 V DC or 110 to 240 V AC (variant applicable)
PoE (802.3af) Ports Supported	Yes (variant applicable)
PoE Plus (802.3at) Ports Supported	n/a
Regulatory Approvals	
Safety of Industrial Control Equipment	cUL508
Hazardous Locations	n/a
Ship	Germanischer Lloyd
Transportation	n/a
Railway (norm)	n/a
Substation	n/a
Reliability	
MTBF Range	11.1 to 18.9 years
Warranty	5 years standard

NOTE: These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



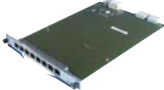



## MACH4000 Gigabit Backbone Layer 2/3 Rack-Mount Switch Configurations

### Fast Ethernet Uplink Ports, Gigabit Ethernet Uplink Ports, and 10 Gigabit Uplink Ports

MACH4000 – High Density Layer 2/3 Gigabit Backbone Switch Chassis			
Part No.	Order No.	Layer/Software	Description
MACH4002-24G-L2P	943 916-101	Layer 2, Professional Management	Fixed ports: 8 x Gigabit Ethernet combo ports* (SFP dual speed socket or TP 10/100/1000 Mbit/s)
MACH4002-24G-L3E	943 916-201	Layer 3, Enhanced Management	Media modules: 2 x sockets (8 ports max each) for total 16 ports 10/100/1000 Mbit/s (Media modules sold separately – see Media modules below. For software functionality – see page 12-15)
MACH4002-24G-L3P	943 916-301	Layer 3, Professional Management	
MACH4002-24G+3X-L2P	943 915-101	Layer 2, Professional Management	
MACH4002-24G+3X-L3E	943 915-201	Layer 3, Enhanced Management	Media modules: 2 x sockets (8 ports max each) for total 16 ports 10/100/1000 Mbit/s (Media modules sold separately – see Media modules below. For software functionality – see page 12-15)
MACH4002-24G+3X-L3P	943 915-301	Layer 3, Professional Management	
MACH4002-48G-L2P	943 911-101	Layer 2, Professional Management	
MACH4002-48G-L3E	943 911-201	Layer 3, Enhanced Management	Fixed ports: 16 Gigabit Ethernet (8 Gigabit Ethernet combo ports* 100/1000 Mbit/s, SFP dual speed socket or 10/100/1000 Mbit/s + 8 Gigabit 10/100/1000 Mbit/s RJ45)
MACH4002-48G-L3P	943 911-301	Layer 3, Professional Management	
MACH4002-48G+3X-L2P	943 878-101	Layer 2, Professional Management	
MACH4002-48G+3X-L3E	943 878-201	Layer 3, Enhanced Management	Media modules: 4 x sockets (8 ports max each) for total 32 ports 10/100/1000 Mbit/s (Media modules sold separately – see Media modules below. For software functionality – see page 12-15)
MACH4002-48G+3X-L3P	943 878-301	Layer 3, Professional Management	
MACH4002-48G+3X-L3P	943 878-301	Layer 3, Professional Management	

**NOTE:** \*Fan module is included in each chassis. Please purchase media modules and power supply separately. See accessories for SFPs + XFP. Configuration will dictate final port count and media type.


## MACH4000 Media Modules


MACH4000 Media Modules			
Product	Part No.	Order No.	Ports/Features
	M4-8TP-RJ45	943 863-001	8 x 10/100/1000 Mbit/s RJ45 (no 1000 Mbit/s with MACH4002 48+4G)
	M4-FAST 8-SFP	943 864-001	8 x 100 Mbit/s SFP sockets*
	M4-FAST 8TP-RJ45-PoE	943 873-001	8 x 10/100 Mbit/s RJ45 ports with Power over Ethernet
	M4-GIGA 8-SFP	943 879-001	8 x 100/1000 Mbit/s SFP sockets* (not for MACH4002 48+4G)


**NOTE:** \*SFP/XFP fiber optic transceivers sold separately (see accessories on page 96).



## MACH4000 Power Supplies and Accessories

MACH4000 Internal Power Supplies			
Product	Part No.	Order No.	Voltage
	M4-S-AC/DC 300W	943 870-001	110 – 240 V AC internal power module (redundancy in combination with M4-POWER chassis and power supply)
	M4-S-24VDC 300W	943 871-001	24 V DC internal power module (redundancy power input)
	M4-S-48VDC 300W	943 872-001	48 V DC internal power module (redundancy power input)

MACH4000 External Power Supplies			
Product	Part No.	Order No.	Voltage
	M4-POWER	943 874-001	Rack-mounted external power chassis. Requires at least one M4-P power supply (more for redundant power), with a maximum of 3 power supplies
	M4-P AC/DC 300W	943 875-001	110 – 240 V AC power module for use with external M4-POWER chassis
	M4-P DC 24V 300W	943 876-001	24 V DC power module for use with external M4-POWER chassis (redundant power input)
	M4-P DC 48V 300W	943 877-001	48 V DC power module for use with external M4-POWER chassis (redundant power input)
	M4-POWERCABLE II	943 922-001	Spare power cable to connect M4-POWER and MACH4002, 1 m

MACH4000 Accessories			
Product	Part No.	Order No.	Voltage
	M4-AIR	943 869-001	Fan module (included with chassis), has 4 redundant fans with fault notification
	M4-AIR-L	942 005-001	Fan module for MACH4002 chassis, 4 redundant fans with reduced speed, lower noise level, only for 0 °C to +40 °C
	M4-RACKMOUNT-50mm	943 951-001	19" fixing brackets offer 50 mm more space in the front of the switch for cables
	M4-RACKMOUNT	943 951-101	19" spare fixing brackets



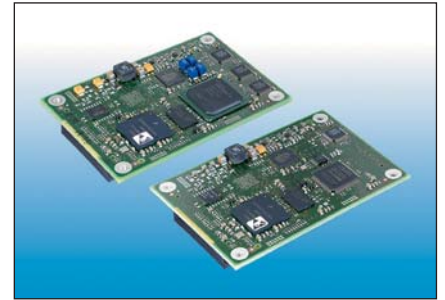


## Embedded Ethernet Switches

### Embedded Ethernet Switches EES20 and EES25

Embedded Ethernet from Hirschmann brings network connectivity right into the intelligent automation equipment itself, allowing manufacturers to focus on their own core business.

The Embedded Ethernet EES20 and EES25 switches each have six Fast Ethernet ports that can be configured for either 10/100 BASE TX or 100 BASE FX. They also offer extensive management and filter functions plus a variety of redundancy protocols and port security. In addition, the EES25 supports precise synchronization as per IEEE 1588v2, plus PRP (Parallel Redundancy Protocol) and HSR (High-availability Seamless Redundancy Protocol), which guarantee uninterrupted data communication. Both versions can be integrated into the Hirschmann network management software Industrial HiVision.



Example of Embedded Ethernet Switch EES25 on development kit

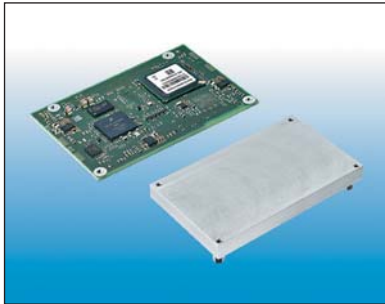


### Technical Information

Product Description			
Type: Embedded Ethernet Switch	EES20-0600UHIHSH2E	EES25-0600UHIHMH2E	EES25-0600UHIHPH2E
Description	Managed Fast Ethernet Switch nach IEEE 802.3, store-and-forward-switching		
Port Type and Quantity	6 x Fast Ethernet ports, configurable as 100BaseTX or 100BaseFX, RX+/RX-and TX+/TX- signals per port		
Order-No.	942 050-001	942 050-002	942 050-003
More Interfaces			
Control/Status	RS232 (Konfiguration), SPI (Status), SNMP traps (Alarme), SNMP		
Time Synchronization	–	PPS output (pulse-per-second), IRIG-B output, controlled by PTP ordinary clock	
Host Interface	2 x 50-pin male connectors		
Network			
Line-/Star Topology	any		
Redundancy	RSTP, Media Redundancy Protocol (MRP, IEC 62439-2), 200 ms recovery	RSTP, Media Redundancy Protocol (MRP, IEC 62439-2), 10 ms recovery	RSTP, Media Redundancy Protocol (MRP, IEC 62439-2), 200 ms recovery, Parallel Redundancy Protocol (PRP, IEC 62439-3) RedBox
Power Requirements			
Operating Voltage	+3.3 V DC +/- 5%		
Power Consumption	2.9 W	4.6 W	4.6 W
Software			
Supported HiOS Software Levels	Layer 2 Enhanced (L2E)		
Mechanical Construction			
Dimensions (WxHxD)	88 x 13 x 60 mm		
Weight	35 g		
Ambient Conditions			
Operating Temperature	-40 °C to +85 °C		
PCB Protection	optional: conformal coating		
Accessories			
Accessories to Order Separately	EES development kit – Order-No. 942 049-001		

NOTE: These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)

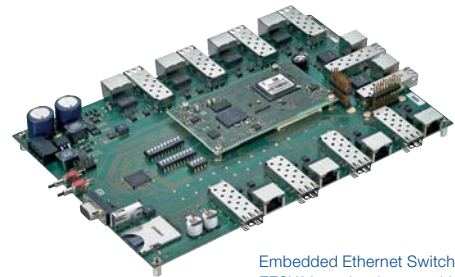
## Embedded Ethernet Switches



### Embedded Ethernet Switches EESX20 and EESX30

The Embedded Ethernet EESX20 switch has eight Fast Ethernet ports that can be configured for either 10/100BASE-TX or 100BASE-FX. The EESX30 version has an additional two gigabit ports, configurable as 10/100/1000BASE-TX or 100/1000BASEFX. Both variants offer extensive management and filter functions, plus a variety of redundancy protocols and port security.

The Embedded Ethernet EESX20 and EESX30 switches can be integrated into the Hirschmann network management software Industrial HiVision.



Embedded Ethernet Switch  
EESX30 on development kit



### Technical Information

Product Description		
Type: Embedded Ethernet Switch	EESX20-0800xxx	EESX30-0802xxx
Description	Managed Fast Ethernet Switch according to IEEE 802.3, store-and-forward-switching	
Port Type and Quantity	8 x 10/100 MBit/s ports	8 x 10/100 MBit/s + 2 x 10/100/1000 MBit/s ports
Order-No.	942 100-999 (configurable)	
More Interfaces		
Control/Status	RS232 (configuration), SPI (status), SNMP traps (alarms), SNMP	
Host Interface	120-pin and 80-pin male connectors	
Network		
Line-/Star Topology	Any	
Redundancy	RSTP, Media Redundancy Protocol (MRP, IEC 62439-2), 200 ms recovery	
Power Requirements		
Operating Voltage	+3.3 V +/- 5%	
Power Consumption	3 W	5 W
Software		
Supported HiOS Software Levels	Layer 2 Enhanced (L2E)	
Mechanical Construction		
Dimensions (WxHxD)	102 x 69 x 8 mm, with cooling adaptor 105 x 72 x 16 mm	
Weight	40 g	
Ambient Conditions		
Operating Temperature	-40 °C to +85 °C (16h) permanent +70 °C	
PCB Protection	Optional: conformal coating	
Accessories		
Accessories to Order Separately	EESX30-0802 development kit – Order-No. 942 099-001	

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



## Industrial Firewall/VPN Router System

### EAGLE One

EAGLE One is a powerful member of the EAGLE family, which has become the epitome of industry-standard firewall systems in recent years. This industrial security router, which ensures maximum data security for production networks, is a combination of the familiar proven EAGLE20 software with state-of-the-art hardware. Thanks to its reduced power consumption, it also offers significantly lower operating costs. In addition, the extended operating temperature range of the EAGLE One means that it can often be used without additional air-conditioning equipment. A further plus is its approval for use in potentially explosive environments. This means that even more industrial sectors, including oil and gas, can now benefit from EAGLE's proven security technology. Other features of this security router include extensive management facilities and diagnostic tools, a robust metal housing for DIN rail mounting, and a redundant power supply for both DC and AC.

The EAGLE One firewall comes with Classic Firewall Software which offers all the essential features of a security router and a large range of protection functionalities for virtually every design of network.



### Product Features

- All-round protection of automation networks with an optimal price-performance ratio
- Redundant backbone connections for production cells
- State-of-the-Art Statefull Inspection Firewall for bridged and routed traffic
- Router redundancy plus stateful firewall and 1:1 NAT in Layer 3 mode
- Text-based configuration file for automated pre-configuration
- Network Address Translation for every use case: 1:1 NAT, Double-NAT, Masquerading NAT, Destination NAT and Hairpin NAT
- User-friendly configuration and diagnostics via Industrial HiVision, HiView, HiDiscovery, offline configuration tool and web interface
- Wide range of transmission and encryption standards (PPPoE, PPP, IKEv1/v2, IPsec, NAT)
- A variety of security mechanisms (stateful packet inspection firewall, VPN)
- Digital input for controlling VPN connections
- Numerous management functions (SNMPv3, SSH2/SFTP, HTTPS, V.24 CLI, SSH1, SNMPv1/2)
- Optional extended operating temperature range from -40 °C to +70 °C (standard is 0 °C to +60 °C)
- Variants for twisted-pair cables (RJ45) and multimode fibers (SC)
- Robust metal housing for DIN rail mounting
- Meets principal standards and approvals:
  - Energy sector: IEC 61850-3, IEEE 1613
  - Hazardous areas: ATEX, ISA-12.12.01 Class 1 Div. 2
  - Transport sector: EN 50121-4
  - Shipping: Germanischer Lloyd
- Identical software to the EAGLE20, with identical housing dimensions



## Industrial Firewall/VPN Router System (continued)

### Technical Information

Product Description			
Type	EagleOne-0200T1T1	EagleOne-0200T1M2   EagleOne-0200M2T1	EagleOne-0200M2M2
Description	Industrial Security Router		
Port Type and Quantity	2 x FE		
Additional Interfaces			
V.24 Interface	1 x RJ11 socket serial interface for device configuration or modem attachment		
USB Interface	1 x USB socket to connect auto-configuration adapter ACA21-USB		
Digital Input	1 x plug-in terminal block, 2-pin		
Signaling Contact	1 x max. 60 V DC or max. 30 V AC, SELV, max. 1A		
Network Size			
Multimode Fiber (MM) 50/125 µm	–	0 to 5000 m, 8 dB Link Budget at 1300 nm, A = 1 dB/km, 3 dB Reserve, B = 800 MHz x km	
Multimode Fiber (MM) 62,5/125 µm	–	0 to 4000 m, 11 dB Link Budget at 1300 nm, A = 1 dB/km, 3 dB Reserve, B = 500 MHz x km	
Twisted Pair (TP)	0 to 100 m		n.v.
Power Requirements			
Operating Voltage	12 to 48 V DC, 24 V AC redundant power supply		
Power Consumption	5 W	6 W	7 W
Power Supply/Signaling Contact	1 x plug-in terminal block, 6-pin		
Software			
Management	SNMPv3, SSH2/SFTP, HTTPS, V.24 CLI, SSH1 and SNMPv1/2, HiDiscovery, Industrial HiVision, HiView		
Diagnostics	LLDP, LEDs (status, VPN, redundancy, link status, data, ACA), signal contact, logfile, syslog, configuration check		
Firewall	Firewall rules (incoming/outgoing, modem access, management), DoS prevention, MAC filter, user firewall for external activation of FW rules		
Routing and NAT	Static routing, multinetting, IP masquerading, 1-to-1 NAT, port forwarding		
VPN	Point to point, point to multipoint, remote enable/disable or via digital input, IPSec, IKEv1/v2, 3DES, AES (-128, -192, -256), Pre-Shared Key, X.509v3 certificates, MD5, SHA-1, NAT-T		
Redundancy Functions	Use in redundant networks/ring coupling, firewall redundancy (layer 4)		
Other Services	NTP, SNTP, DHCP Server/Client, DHCP Relay/Option 82, DynDNS, PPP, PPPoE, VLAN-Support		
Ambient Conditions			
Operating Temperature	0 °C to +60 °C, or -40 °C to +70 °C (IEC 60068-2-2 Dry Heat Test +85 °C 16 hours), dependent on device variant		
Storage/Transport Temperature	-40 °C to +85 °C		
Relative Humidity (non-condensing)	10% to 95%		
Conformal Coating	yes (dependent on device variant)		
Mechanical Construction			
Dimensions (WxHxD)	60 x 145 x 125 mm		
Weight	660 g		
Protection Class	IP20		
Mounting	DIN Rail 35 mm		
Approvals			
Declaration of Conformity	CE, FCC, EN 61131, C-TICK, EN 60950		
Safety of Industrial Control Equipment	cUL508 (pending, dependent on device variant)		
Hazardous Locations	ISA-12.12.-01 Class 1 Div. 2 – Haz. Loc, ATEX-95 Category 3G (Zone 2), (pending, dependent on device variant)		
Germanischer Lloyd	Pending, dependent on device variant		
Railway (norm)	EN 50121-4 (dependent on device variant)		
Substation	IEC 61850-3, IEEE 1613 (dependent on device variant)		
Reliability			
MTBF	74.5 years	69 years	64.2 years
Warranty	5 years (standard)		

NOTE: These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



Configurator



## EAGLE One Configurations

EagleOne-0200T1T1TDDZ90000HHEXX.XXX

Design/Model

**EagleOne** = Security Router

Fast Ethernet Ports

**02** = 2 x 10/100 Mbit/s

Gigabit Ethernet Ports

**00** = Not available

Type Port 1

**T1** = 1 x Twisted Pair RJ45

M2 = 1 x Multimode SC

Type Port 2

**T1** = 1 x Twisted Pair RJ45

M2 = 1 x Multimode SC

Temperature Range

**S** = 0 °C to +60 °C

**T** = -40 °C to +70 °C

**E** = -40 °C to +70 °C inclusive Conformal Coating

Voltage Range

**DD** = 9.6 to 60 V DC/18 to 30 V AC; 9.6 to 60 V DC/18 to 30 V AC

Approvals

**Z9** = CE, FCC, EN 61131, EN 60950

**Y9** = Z9 + cUL508

**X9** = Z9 + cUL508, ISA12.12

**W9** = Z9 + ATEX

**WX** = X9 + ATEX

**U9** = Z9 + GL

**UY** = U9 + cUL508

**UX** = U9 + cUL508, ISA12.12

**UT** = U9 + cUL508 + EN 50121-4

**T9** = Z9 + EN 50121-4

**TY** = T9 + cUL508

**V9** = Z9 + IEC 61850, IEEE 1613

**VY** = V9 + cUL508

**VU** = V9 + cUL508, GL

**VT** = V9 + cUL508, EN 50121

Software Packages

**0000** = Reserved

OEM Type

**HH** = Standard

Configuration

**E** = Hirschmann Standard Configuration

Software Release

**XX.X.XX** = Current Software Release

**NOTE:** The last four part number categories (**Software Packages**, **OEM Type**, **Configuration** and **Software Release**) are optional.



## Tofino Security Appliance



### Tofino Xenon

The Tofino Xenon security appliance is the ideal solution for segmenting a control network into security zones. It can be installed into an existing control system with no changes to the network, forming 'conduits' of communications between the zones. The control engineer defines rules that specify which network devices are allowed to communicate and what protocols they may use. Deep Packet Inspection (DPI) options allow detailed filters to enforce security policy such as only allowing read commands to be sent to a PLC. Any network traffic that does not fit the rules is automatically blocked by the Tofino Xenon and reported as a security alert.

The standard Tofino Xenon includes a stateful firewall with layer 2, 3 and 4 filtering. Adding Enforcer LSMs provides stateful DPI to manage traffic based on high level message content, such as the commands/services being used or the registers/objects being accessed. There are multiple Enforcers available – each one providing inspection for a different protocol. The LSMs can be pre-loaded onto the Tofino Xenon at the factory, or purchased and installed at a later date as your needs change.

Using the free Tofino Configurator Software customers can configure Tofino Xenon Appliances over the network or with ACA21-USB. Tofino Configurator software makes it easy for the control technician to define rules that specify exactly which devices are allowed to communicate, what protocols they may use, and what actions those protocols perform. The built-in Test Mode allows customers to verify firewall rules without putting any risk to business critical operation.

### Product Features

- All-around protection of automation networks with an optimal price-performance ratio
- Stateful firewall with Layer 2, 3 and 4 filtering for all Ethernet-based protocols
- Additional application layer filtering for SCADA and ICS protocols using flexible LSMs
- Prevention of Denial of Service (DoS) attacks with rate limit controls
- Simple configuration over the network or with security USB using the Tofino Configurator software
- Test mode for verifying firewall rules without risk to your operation
- LSMs pre-installed at factory or purchased separately
- Simultaneous event logging to remote syslog servers and local nonvolatile memory
- Audit capabilities for tracking configuration changes
- Safe installation in live networks without shutdown
- Tested for use with all major control system products
- Optional extended operating temperature range from -40 °C to +70 °C (standard is 0 °C to +60 °C)
- Variants for twisted-pair cables (RJ45) and multimode fibers (SC)
- Robust metal housing for DIN rail mounting
- Meets principal standards and approvals:
  - Energy sector: IEC 61850-3, IEEE 1613
  - Hazardous areas: ATEX, ISA-12.12.01 Class 1 Div. 2
  - Transport sector: EN 50121-4
  - Shipping: Germanischer Lloyd



## Technical Information

Product Description			
Type	TofinoXE-0200T1T1	TofinoXE-0200T1M2   TofinoXE-0200M2T1	TofinoXE-0200M2M2
Description	Industrial Security Firewall		
Port Type and Quantity	2 x 100BASE-TX	1 x 100BASE-FX   1 x 100BASE-TX	2 x 100BASE-FX
Additional Interfaces			
USB Interface	1 x USB socket to connect auto-configuration adapter ACA21-USB		
Digital Input	1 x plug-in terminal block, 2-pin		
Digital Output (Signaling Contact)	1 x max. 60 V DC or max. 30 V AC, SELV, max. 1A		
Network Size			
Multimode Fiber (MM) 50/125 $\mu$ m	–	0 to 5000 m, 8 dB Link Budget at 1300 nm, A = 1 dB/km, 3 dB Reserve, B = 800 MHz x km	
Multimode Fiber (MM) 62,5/125 $\mu$ m	–	0 to 4000 m, 11 dB Link Budget at 1300 nm, A = 1 dB/km, 3 dB Reserve, B = 500 MHz x km	
Twisted Pair (TP)	0 to 100 m	–	
Power Requirements			
Operating Voltage	12 to 48 V DC, 24 V AC redundant power supply		
Power Consumption	5 W	6 W	7 W
Power Supply/Signaling Contact	1 x plug-in terminal block, 6-pin		
Software			
Management	Tofino Configurator software		
Diagnostics	LEDs (power, mode, fault, save/load, reset, link status), signal contact, syslog, configuration verify		
Configuration	<b>Network:</b> Tofino Configurator uses secure communications to configure the Tofino Xenon security appliance <b>Manual:</b> Encrypted configuration files may be saved on an ACA21-USB device and loaded into the Tofino Xenon security appliance		
Operating Modes	<b>Test:</b> All traffic is allowed and alerts are generated as per user rules <b>Operational:</b> Traffic is filtered and alerts are generated as per user rules		
Firewall	Stateful layer 2, 3 and 4 filtering with optional deep packet inspection for ICS protocols (depending on purchased LSMs)		
System Requirements	Windows XP, Windows 7 (32- and 64-bit), or Windows Server 2003, 2008, or 2008 SR2		
Event Logging	Captured by a syslog server or locally into nonvolatile memory for later download via network or ACA21-USB		
Ambient Conditions			
Operating Temperature	0 °C to +60 °C, or -40 °C to +70 °C (IEC 60068-2-2 Dry Heat Test +85 °C 16 hours), dependent on device variant		
Storage/Transport Temperature	-40 °C to +85 °C		
Relative Humidity (non-condensing)	10% to 95%		
Conformal Coating	Yes (dependent on device variant)		
Mechanical Construction			
Dimensions (WxHxD)	60 x 145 x 125 mm		
Weight	660 g		
Protection Class	IP20		
Mounting	DIN Rail 35 mm		
Approvals			
Declaration of Conformity	CE, FCC, EN 61131, C-TICK, EN 60950		
Safety of Industrial Control Equipment	cUL508 (pending, dependent on device variant)		
Hazardous Locations	ISA-12.12.-01 Class 1 Div. 2 – Haz. Loc, ATEX-95 Category 3G (Zone 2), (pending, dependent on device variant)		
Germanischer Lloyd	Pending, dependent on device variant		
Railway (norm)	EN 50121-4 (dependent on device variant)		
Substation	IEC 61850-3, IEEE 1613 (dependent on device variant)		
Reliability			
MTBF	74.5 years	69 years	64.2 years
Warranty	5 years (standard)		

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)

Configurator



## Tofino Xenon Security Appliance Configurations

T o f i n o X e - 0 2 0 0 T 1 T 1 T D D Z 9 0 0 0 F T A T X X . X . X X

**Design/Model**  
TofinoXe = Security Appliance

**Fast Ethernet Ports**  
02 = 2 x 10/100 Mbit/s

**Gigabit Ethernet Ports**  
00 = Not available

**Type Port 1**  
T1 = 1 x Twisted Pair RJ45  
M2 = 1 x Multimode SC

**Type Port 2**  
T1 = 1 x Twisted Pair RJ45  
M2 = 1 x Multimode SC

**Temperature Range**  
S = 0 °C to +60 °C  
T = -40 °C to +70 °C  
E = -40 °C to +70 °C inclusive Conformal Coating

**Voltage Range**  
DD = 12 to 48 V DC/12 V AC

**Approvals**

Z9 = CE, FCC, EN 61131, EN 60950	UT = U9 + cUL508 + EN 50121-4
Y9 = Z9 + cUL508	T9 = Z9 + EN 50121-4
X9 = Z9 + cUL508, ISA12.12	TY = T9 + cUL508
W9 = Z9 + ATEX	V9 = Z9 + IEC 61850, IEEE 1613
WX = X9 + ATEX	VY = V9 + cUL508
U9 = Z9 + GL	VU = V9 + cUL508, GL
UY = U9 + cUL508	VT = V9 + cUL508, EN 50121
UX = U9 + cUL508, ISA12.12	

**Preloaded Software Modules**

0001 = FW (Event Logger LSM included)	000H = FW + EIP
0002 = NC	000K = FW + NC + EIP)
0003 = FW + NC	000N = FW + MB + EIP)
0005 = FW + MB	000Q = FW + NC + MB + EIP
0007 = FW + NC + MB	000S = FW + OPC + EIP
0009 = FW + OPC	000V = FW + NC + OPC + EIP
000B = FW + NC + OPC	000X = FW + MB + OPC + EIP
000D = FW + MB + OPC	000Z = FW + NC + MB + OPC + EIP
000F = FW + NC + MB + OPC	

NOTE: FW = Firewall LSM (includes Event Logger LSM), NC = NetConnect LSM,  
MB = Modbus TCP Enforcer LSM, OPC = OPC Enforcer LSM and EIP = EtherNet/IP Enforcer LSM

**OEM Type**  
TA = Standard

**Configuration**  
T = Tofino Standard Configuration

**Software Release**  
XX.X.XX = Current Software Release

NOTE: The last three part number categories (OEM Type, Configuration and Software Release) are optional.





## Multi-port Industrial Firewall System

### EAGLE20/30

The EAGLE20-0400 and EAGLE30-0402 are multi-port firewalls in convection cooled metal DIN Rail housings which support eight LAN ports – two of which are Gigabit and two SHDSL ports. Available in two versions, the EAGLE20-0400 firewall supports 4 x 100 Mb/s ports, while the EAGLE30-0402 firewall supports 4 x 100 Mb/s ports, 2 x SHDSL ports and 2x1 Gb/s ports; the Gigabit ports are SFP ports.

With many configuration options available, a single device can be deployed in many scenarios, eliminating the need for multiple routers, which significantly saves both space and costs. Link speeds greater than 100 Mb/s are also available through the EAGLE30-0402's gigabit ports, in order to deliver the highest level of network security. With optional SHDSL Interfaces LANs can be cost effective connected to each other using existing telephone copper lines. Replacement of devices can be configured using USB sticks and SD cards making it possible to exchange faulty devices.

Each of these multi-port firewalls comes with HiSecOS – Hirschmann Security Operating System, the latest operating system for Industrial Security Routers, combining performance with robust security. It provides the user with comprehensive security mechanisms to protect networks against attacks and operating errors.



### Product Features

- Availability of multiple ports offers cost savings and flexibility
- Ethernet in the First Mile (EFM) through newly added SHDSL-Interfaces
- Includes router redundancy for reduced downtime
- Increased router throughput performance
- Wirespeed packet filtering using Access Control List (ACL) rate limiters and Ingress Protection
- State-of-the-Art Statefull Inspection Firewall
- Network Address Translation for every use case: 1:1 NAT, Double-NAT, Masquerading NAT, Destination NAT and Hairpin NAT
- Simple intrusion detection
- Small form-factor pluggable (SFP) support for twisted-pair gigabit cables
- Ideal industrial firewall for networks with high-speed routing requirements
- Meets various standards and approvals



## Technical Information

Product Description		
Type	EAGLE20-0400	EAGLE30-0402
Stateful Inspection Firewall	Firewall rules (incoming/outgoing, management), IP masquerading, 1:1 NAT, Double-NAT, Masquerading NAT, Destination NAT, Hairpin NAT, DoS Protection, Access Control Lists (ACLs)	
Description	Industrial Firewall, Router, Transparent (Bridging)	
Port Type and Quantity	4 x 10/100BASE-TX, TP-cable, RJ45-socket, Autocrossing, Autonegotiation, Autopolarity	4 x 10/100BASE-TX, TP-cable, RJ45-socket, Autocrossing, Autonegotiation, Autopolarity; 2 x FE/GE SFP slot, optional 2 x SHDSL
Order-No.	see online configurator	see online configurator
Interfaces		
V.24 Interface	1 x RJ11 socket (serial interface for device configuration)	
USB Interface	1 x USB socket (to connect auto-configuration adapter ACA22-USB)	
SD Interface	1 x SD socket (to connect auto-configuration adapter ACA31)	
Power Requirements		
Power Supply/Signaling Contact	For CC Power Supply: 2 x plug-in terminal block 2-pin, for K9 Power Supply: 1 x plug-in terminal block 3-pin	
Power Consumption	max. 19 W	
Operating Voltage	2 x 24/36/48 V DC (18 to 60 V DC), or 1 x 60/110/125/220/250 V DC (48 V to 320 V DC) and 110/120/220/230 V AC (88 to 265 V AC)	
Software		
Software Version	HiSecOS 02.0	
Security	Firewall rules (incoming/outgoing, management), DoS prevention, IPSec VPN, Layer 3 and Layer 2 Access Control Lists (ACL), ACL flow based limiting, Audit trail, Management VLAN, Role based Access Control, IEEE 1686 compliant configuration possible, Ingress storm protection	
Routing	VLAN and port based routing, static routing, multinetting, IP masquerading, 1-to-1 NAT, port forwarding, Static and Dynamic ARP entries, OSPFv2	
Management	SNMPv3, SSH2/SFTP, HTTPS, V.24 CLI, SNMPv1/2, local and central User Management (RADIUS), HiDiscovery, Industrial HiVision, HiView	
Diagnostics	LEDs (Power, Link Status, Data, Status, ACA, RM), Signal Contact (24 V DC/1 A), Log File, Syslog, Configuration check RMON (Statistic), SFP diagnostics (temperature, optical transmit and receive power), trap for changes and configuration saves, Counter for ACL Rules	
Configuration	Command Line Interface (CLI), web interface, Auto Configuration Adapter (ACA22, ACA31), HiDiscovery, Industrial HiVision, HiView	
Other Services	NTP, VLAN support (IEEE 802.1Q), rate limiter	
Redundancy Functions	VRRP (Virtual Router Redundancy Protocol)	
Protocols	Serial, HTTPS, SSH, SNMP V1/V2/V3, LLDP	
Mechanical Stability		
IEC 60068-2-27 Shock	15 g, 11 ms duration, 18 shocks	
IEC 60068-2-6 Vibration	1 mm, 2 Hz to 13.2 Hz; 0.7 g, 13.2 Hz to 100 Hz	
Construction		
Weight	1.2 to 1.9 kg	
Mounting	DIN Rail 35 mm	
Protection Class	IP20	
Dimensions (W x H x D)	Temperature Standard (S): 90 x 164 x 120 mm (for WAN: 99); 108 x 164 x 120 mm (for WAN: H2) Temperature Extended (T, E): 98 x 164 x 120 mm (for WAN: 99); 116 x 164 x 120 mm (for WAN: H2)	
Ambient Conditions		
Operating Temperature	-40 °C to +70 °C	
Relative Humidity (non-condensing)	10% to 95%	
Storage/Transport Temperature	-40 °C to +85 °C	
Approvals		
Germanischer Lloyd	Germanischer Lloyd	
Manufacturer Declaration of Conformity	CE, C-Tick, FCC	
Safety of Industrial Control Equipment	cUL 508	
Hazardous Locations	cUL Approval according to ISA-12.12.-01 Class 1 Div. 2 Group A, B, C, D	
Substation	EN 61850-3, IEEE 1613	
Traffic Controller	NEMA TS 2	
Scope of Delivery and Accessories		
Scope of Delivery	Device, terminal block, operating instructions, CD-manual	
Accessories to Order Separately	Rail power supply RPS 30, RPS 80 EEC, RPS 120 EEC, terminal cable, network management Industrial HiVision, Auto-configuration adapter (ACA22-USB EEC or ACA31), 19" installation frame	
Reliability		
MTBF Range	46.3 to 67.1 years	
Warranty	5 years standard	

NOTE: These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



Configurator



## Multi-port Industrial Firewall Configurations

**EAGLE20-0400 and EAGLE30-0402**

E A G L E 3 0 - 0 4 0 2 2 0 6 T T 9 9 9 T C C Z 9 H S E 3 F X X . X . X X

### Design/Model

EAGLE20 = Security Router  
EAGLE30 = Security Router

### Fast Ethernet Ports

04 = 4 x 10/100 Mbit/s

### Gigabit Ethernet Ports

00 = 0 x 1000 Mbit/s  
02 = 2 x 1000 Mbit/s

### Type Uplink Ports

206 = All SFP slots  
999 = Not available

### Remaining Ports

TT = All Twisted Pair

### Cellular Ports

9 = Not available

### WAN Ports

99 = Not present  
H2 = 2 x SHDSL

### Temperature Range

S = 0 °C to + 60 °C  
T = -40 °C to +70 °C  
E = -40 °C to +70 °C inclusive Conformal Coating

### Voltage Range

CC = 2 x 24/36/48 V DC  
K9 = 1 x 60/110/125/220/250 V DC and 110/120/220/230 V AC

### Approvals

Z9 = CE, FCC, EN 61131, (EN 60950)	T9 = Z9 + EN50121-4
Y9 = Z9 + cUL508	TY = T9 + cUL508
X9 = Z9 + cUL508 + ISA 12.12	V9 = Z9 + IEC61850-3, IEEE1613
U9 = Z9 + GL (ABS, BV, DNV, LR)	VY = V9 + cUL508
UY = U9 + cUL508	VU = V9 + GL (ABS, BV, DNV, LR)
UX = U9 + cUL508 + ISA 12.12	VT = V9 + cUL508 + EN50121-4
UT = U9 + cUL508 + EN50121-4	

### OEM Type

HS = Hirschmann Standard

### Configuration

E = Standard Configuration

### Software Level

3F = Layer 3 Firewall Software

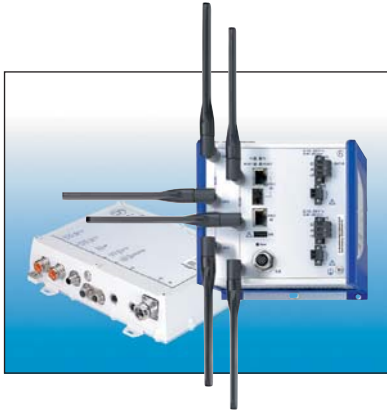
### Software Version

XX.X.XX = Current Software Release  
01.2.00 = Software Release 1.2

**NOTE:** The part number categories (OEM Type, Configuration and Software Version) are optional.



## Wireless LAN Access Point/Clients



### OpenBAT Series

The access points and clients in the OpenBAT family can be mounted on DIN rails (BAT-R) or installed on walls or masts in indoor and outdoor (BAT-F) areas. Available with or without conformal coating, the devices have an operating temperature range of 0 °C to +60 °C or -40 °C to +70 °C. All versions support the IEEE 802.11n transmission standard and have Public Spot and VPN Gateway as options. Each access point has one or two wireless modules and Gigabit Ethernet ports with tried and tested M12 connection technology (IP67 version), one of which is configurable as a combo port (fiber optic/twisted pair). A serial M12-RS232 interface and a USB port are also provided. For redundant power supply using potential-free relay contacts, a choice of freely combinable PoE power packs for IEEE 802.3af, 24/48 V DC, 60/120/250 V DC or 110/230 V AC is available.



### Clear Space Wireless

The application of bandpass filters helps to eliminate all interference caused by competing radio signals. The resulting Clear Space wireless delivers greater transmission stability over longer distances without interruptions. The highest performance speed of 450 Mbit/s facilitates new applications such as HD video streaming.

### Product Features



- Clear Space guarantees stable wireless connections
- ESD protection and robust hardware ensure access points with high reliability and long operational lifetimes
- High- and low-voltage power supply for AC/DC, plus PoE power pack
- Various industry certifications (e.g. Train on track and along the track EN 50155/50124, Fire protection EN45545, Vehicles E1/e1, Substation EN 61850/IEEE 1613, UL, FCC, NEMA and new: HazLoc ISA12.12. Class I Div II, ATEX Zone 2)
- Various country approvals for OpenBAT-F and OpenBAT-R (e.g. USA/Canada, Europe, China, Australia, Singapore and Brazil)
- Data rates of up to 450 Mbit/s in both 5 GHz and 2.4 GHz bands (IEEE 802.11n)
- Interference-proof MIMO antenna technology
- Mountable on DIN rails (BAT-R) or on walls or masts indoors or outdoors (BAT-F)
- Versions with an extended operating temperature range (-40 °C to +70 °C) and conformal coating
- Tried-and-tested M12 connection technology
- A platform concept with more than 8,000 variations – boasts maximum flexibility and cost effectiveness
- Ideal for use with all Industrial Ethernet switches, routers and Industrial HiVision from Hirschmann

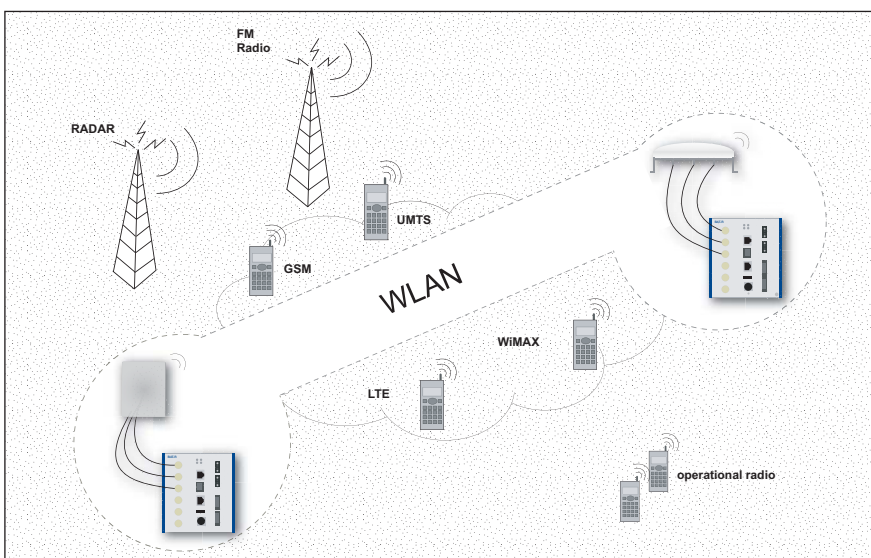


## WLAN-Software HiLCOS for Hirschmann OpenBAT

HiLCOS is the software version for Hirschmann's OpenBAT industrial WLAN devices. It can be used to set up Wide Area Network (WAN) connections and hardware-encrypted Virtual Private Network (VPN) tunnels. The software offers features well beyond basic WLAN functions, and the latest updates are based on more than 20 years of continuous development and improvement by Belden and Hirschmann experts.

For enhanced security, the firmware features PMF to secure sensitive management frames and protect the network from outside attacks. The WIDS quickly identifies unauthorized behavior, enabling a quick reaction to attacks and ensuring these attacks don't go undetected. The new Layer 2 firewall adds stateful packet inspection for bridged traffic to provide additional protection from inside attacks or mistakes. In addition, the Opportunistic Key Caching (OKC) for access point and client modes reduces transfer times for 802.1x-based authentication, allowing centralized management of WLAN client credentials.

- Simple deployment through Automatic Wireless Distribution System (AutoWDS)
- Enhanced security via Wireless Intrusion Detection System (WIDS), Protected Management Frames (PMF), Layer 2 firewall with stateful packet inspection and Wi-Fi Protected Access (WPA)
- Zero network failover with Parallel Redundancy Protocol (PRP)
- Opportunistic Key Caching (OKC) reduces roaming times with WPA2 Enterprise
- Extensive management functions via LANconfig, LANmonitor, WLANmonitor and Industrial HiVision
- Frequency analysis identifies potential disruptions in the 2.4 GHz and 5 GHz band
- Ideal for all access points and WLAN clients of the OpenBAT platform, as well as for BAT controllers
- Free download from [www.hirschmann.com](http://www.hirschmann.com)



Clear Space technology delivers reliable radio connections, even in locations such as ports, where many competing radio technologies are used. The new patented Hirschmann radios will not be affected, so that for instance a video transmission over WLAN supervising the building of a ship will remain stable and high quality. Overall, video installation costs are lower and less complex. This also applies to installations in trains. Hirschmann BAT devices can withstand electrical discharges.

**Wireless LAN Access Point/Clients (continued)****Technical Information**

<b>Product Description</b>	
<b>Type</b>	OpenBAT
<b>Description</b>	Rugged wireless LAN access point and/or client for use in industrial environments. Robust metal housing for mounting
<b>Available Ports</b>	1 or 2 WLAN interfaces, IEEE 802.11n/a/b/g/h/i, 1 or 2 Gigabit LAN ports, Power over Ethernet, Gigabit Combo Port
<b>Construction</b>	
<b>Mounting</b>	DIN Rail (BAT-R), Wall and Mast (BAT-F)
<b>Protection Class</b>	IP30, IP67
<b>Dimensions (WxHxD)</b>	120/150 x 136 x 120 mm (BAT-R), ~ 311 x 322 x 75 mm (BAT-F)
<b>Ambient Conditions</b>	
<b>Operating Temperature</b>	0 °C to +60 °C, -40 °C to +70 °C (with and without conformal coating) selectable
<b>Storage/Transport Temperature</b>	-40 °C to +85 °C
<b>Relative Humidity (non-condensing)</b>	10% to 95%
<b>Radio Technology</b>	
<b>Antenna Connector</b>	3 x MiMo antenna connectors per radio modul, reverse SMA socket (BAT-R), N-socket (BAT-F)
<b>Frequency Band</b>	Supports 2.4 GHz and 5 GHz: 2400 to 2483.5 MHz (ISM) and 5170 to 5850 MHz
<b>Power Requirements</b>	
<b>Operating Voltage</b>	Different types of power supplies selectable, 24 V DC, 48 V DC, 90 to 230 V AC, 48 to 320 V DC
<b>Current Consumption at 24 V DC</b>	up to 17 W, depending on number of radio modules and connections
<b>Regulatory Approvals</b>	
<b>Safety of Industrial Control Equipment</b>	BAT-F: EN 60950-1, EN 60950-22, UL 60950-1; BAT-R: EN 60950-1, UL 60950-1
<b>Radio/EMC</b>	EN 300 328 (2.4 GHz), EN 301 893 (5 GHz), EN 301 489-1, EN 301 489-17, EN 61000-6-2
<b>Environmental</b>	EN 50155, EN 50121-4, EN 45545, EN 61850-3, IEC 61613, Atex Zone II, Class 1 Div 2
<b>For Use in Vehicles and Cars</b>	E1/e1
<b>Reliability</b>	
<b>Warranty</b>	5 years standard

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



Configurator



## OpenBAT Configurations

### BAT-R DIN Rail Mountable/BAT-F IP65/67 Housing

**B A T - R - E U W 9 9 A W W 9 9 A O 7 T 1 T 9 9 9 H H X X . X X . X X X X**

#### Design/Models

**BAT-R** = DIN rail mountable  
**BAT-F** = IP65/67 housing

#### Country-Approval\*

**EU** = Europe (CE)  
**US** = USA/Canada (FCC/IC)  
 Many other country certifications available. Please refer to the online configurator at: [www.hirschmann.com](http://www.hirschmann.com)

#### Slot 1

**W** = WLAN module

#### Slot 2

**W** = WLAN module      **9** = Not mounted

#### Slot 3

**9** = Not mounted

#### Client/AP

**A** = Access Point      **C** = Client

#### Voltage Range 1

**C** = 18 to 60 V DC      **K** = 48 to 320 V DC, 90 to 265 V AC  
**W** = 24 V DC, PoE

#### Voltage Range 2

**C** = 18 to 60 V DC      **W** = 24 V DC, PoE  
**K** = 48 to 320 V DC, 90 to 265 V AC      **9** = Not assembled

#### Approvals 1

**F** = ANSI/ISA 61010-1 + Class 1 Div2      **K** = Train (EN 50155)  
**G** = ATEX Zone 2      **M** = Vehicles, E1  
**I** = Substation (EN 61850)      **9** = No additional approval

#### Approvals 2

**M** = Vehicles, E1      **9** = No additional approval

#### Montage

**A** = Operator access area indoors      **D** = Outdoors  
**B** = Service access area indoors      **E** = Sea water proof

#### Gigabit Ethernet 1

**O7** = Combo Gigabit Ethernet      **O5** = Combo Gigabit M12/SFP

#### Gigabit Ethernet 2

**T1** = Twisted Pair/RJ45      **99** = Not assembled  
**T6** = Twisted Pair/M12 x-coded

#### Temperature Range

**S** = 0 °C to + 60 °C      **E** = -40 °C to +70 °C, inclusive Conformal Coating  
**T** = -40 °C to +70 °C      **K** = -40 °C to +55 °C

#### SW-options 1

**A** = VPN-5      **9** = None      **B** = VPN-50      **C** = VPN-100

#### SW-options 2

**F** = PROFINET      **9** = None      **E** = EtherNet/IP

#### SW-options 3

**D** = Public Spot      **9** = None      **P** = PRP      **A** = AutoWDS

#### Configuration

**H** = Standard

#### OEM Type

**H** = Standard

#### Software Release

**XX.XX.XXXX** = SW Release XX.XX.XXXX



## Wireless LAN Controllers



Wireless Local Area Network (WLAN) applications are becoming more prevalent in the field of industrial automation. The new IEEE 802.11n standard enables data rates of up to 450 Mbit/s while simultaneously extending the range and stability of wireless transmissions. Centralized management guarantees secure operation in an network and provides the necessary overview. The new Hirschmann BAT-Controller Wireless LAN Controller (WLC) was especially developed for this purpose.

### Product Features

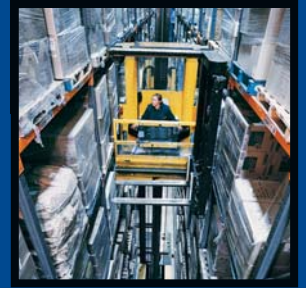
- Automatic configuration and central management of all the access points in the WLAN
- Compatible with all Hirschmann access points in the BAT families BAT-R and F
- Full throughput of payload data as per IEEE 802.11n for each access point
- Integrated IP router with firewall
- User authentication compliant with IEEE 802.1x, RADIUS and LEPS
- Roaming possible across a number of subnetworks
- Automatic frequency management in the 2.4 and 5 GHz waveband
- High availability achieved through redundancy and backup mechanisms
- A number of WLAN networks can be linked using the VPN gateway function
- 19" unit for use in control rooms

### Technical Information

Product Description						
<b>Type</b>	BAT-Controller WLC25	BAT-Controller WLC50	BAT-Controller WLC100	BAT-Controller WLC200	BAT-Controller WLC500	BAT-Controller WLC1000
<b>Order Number</b>	942 034-001	942 034-002	942 034-003	942 034-004	942 034-005	942 034-006
<b>Smart Controller Technology</b>	The WLAN Controller uses wireless cell or SSID to support a number of ways of transmitting user data: <ul style="list-style-type: none"> <li>• Bridged directly to the LAN (maximum performance e.g. for 802.11n-based access points)</li> <li>• Strictly separated from the LAN via VLAN (e.g. for WLAN guest access)</li> <li>• Tunneled centrally to the controller (layer 3 tunneling across IP networks)</li> </ul>					
<b>Supported Access Points</b>	BAT54, BAT300, and OpenBAT					
<b>Interfaces</b>	4 individual ports, 10/100/1000 Mbit/s Ethernet					
<b>USB 2.0 Host Port</b>	USB 2.0 high-speed host port for connecting USB printers (USB print server) or serial devices (COM port server) Bidirectional data exchange is also possible (max. 480 Mbit/s)					
<b>Serial Interface</b>	Serial configuration interface/COM port (8 pole mini-DIN): 9,600 to 115,000 Baud, can be used to connect an analog/GPRS modem					

Product Description	
<b>Type</b>	<b>Management Software Included</b>
<b>Physical Characteristics</b>	Serial configuration interface/COM port (8 pole mini-DIN): 9,600 to 115,000 Baud, can be used to connect an analog/GPRS modem
<b>LANconfig</b>	Configuration program for Microsoft Windows, including a convenient Setup Wizard. Possibilities for group configuration, simultaneous remote configuration and management of several devices via an IP connection (HTTPS, HTTP, TFTP). Project-related, user-related or global default settings for the configuration program. Automatic storage of the current configuration prior to every firmware update. Exchange of configuration files between similar devices, e.g. for migrating old configurations to new BAT products.
<b>LANmonitor</b>	Monitoring application for Microsoft Windows for (remote) monitoring and logging of equipment and connection status of BAT devices, including PING diagnostics and TRACE with filters and provision for storing the results in a file. Search and comparison functions for TRACE output. Wizards for standard diagnostics. Export of diagnostic files for support purposes (contain bootlog, system info and device configuration without passwords). Graphical representation of parameters (indicated by appropriate symbols in the LANmonitor view) plus chronological sequence and tabular comparison of minimum, maximum and average values in a separate window, e.g. for transmission and receiving speeds, CPU load, available memory.
<b>WLANmonitor</b>	Monitoring application for Microsoft Windows for visualizing and monitoring BAT WLAN installations, including Rogue AP and Rogue Client visualizations





## Wireless Software Tools

Comprehensive collection of software tools to facilitate the deployment and operation of the entire BAT family of WLAN devices.

### Wireless Monitoring Software – LANmonitor / WLANmonitor

#### LANmonitor

SNMP-Based monitoring tool for all BAT devices. It provides a real-time status overview for interface, network, connections, throughput, link quality etc.

- An additional trace tool offers a graphic surface for diagnosis and trouble shooting
- Real-time status of a BAT device
- Time based graphs for throughput and performance

#### WLANmonitor

Offers additional security for the wireless network: real-time status overview over AP – to – Client association, Rogue AP detection, Rogue Client detection, Support of BAT-Controller etc.

- Scalable overview on all channels scanned by the AP



### Wireless Management Software – LANconfig

#### Windows configuration tool

LANconfig offers more than just configuration of BAT devices:

- Support of BAT-Controller
- Group configuration of multiple devices
- Script up and download
- Scheduled updates
- Firmware management
- Wizard-based easy configuration





## Wireless LAN Access Client



### BAT-C

The BAT-C WLAN Client delivers a cost-effective practical wired to wireless solution for industrial applications. The client was designed for challenging environments and is able to operate within an extended temperature range. Its IP67 housing and 24 V power supply make it suitable for the most challenging industrial environments.

### Product Features

- Simple, secure, highly compact 802.11n client
- One integrated antenna
- Dual Band – 2.4 or 5 GHz
- One Button Smart Mode Configuration
- Integrated web interface for additional configurations
- Max. security level WPA2/PSK
- Data rates up to 54 Mbit/s

### Technical Information

Product Description	
Type	BAT-C
Description	Industrial Wireless LAN Client for 2.4 GHz and 5 GHz operation
Available Ports	1 x 802.11n/a/b/g/h/i, 1 x 24 V DC, 1 x 100 Mbit/s Ethernet (M12)
Order No.	942 072-001
Construction	
Mounting	Wall or table mounting
Protection Class	IP67
Dimensions (WxHxD)	approx. 11 x 6 x 5 cm
Ambient Conditions	
Operating Temperature	-40 °C to +70 °C
Storage/Transport Temperature	-40 °C to +85 °C
Relative Humidity (non-condensing)	5% to 90%
Radio Technology	
Antenna Connector	N-Type female
Frequency Band	2.4 GHz and 5 GHz
Power Requirements	
Operating Voltage	9 to 30 V
Current Consumption at 24 V DC	max. 81 mA
Regulatory Approvals	
Safety of Industrial Control Equipment	EN 60950-1:2006 and/or IEC 60950-1:2005 (2nd Edition), cUL508
Radio	R&TTE (Europe), FCC/CFR 47 part 15; IC (Industry Canada)
Environmental	R&TTE Directive 1999/5/EC • EN 300 328, EN 301 893 • EMC: EN 301 489-1 V1.8.1, EN 301 489-17, EN 61000-6-2
For Use in Vehicles and Cars	E1/e1
Reliability	
Warranty	5 years standard

NOTE: These are the prominent technical specifications. For complete technical specifications visit: [www.hirschmann.com](http://www.hirschmann.com)



## Wireless LAN Antennas

### BAT Series

BAT Series, Dual-Frequency Antennas/802.11a/b/g/n (2.4 GHz and 5 GHz)			
Part No.	Order No.	Type	Standards
BAT-ANT-N-6ABG-IP65	943 981-004	Dual Band Omni-Directional	802.11a/b/g
BAT-ANT-N-MiMoDB-5N-IP65	943 981-012	Dual Band Omni-Directional, 2.4 GHz 3.5 dBi, 5 GHz 5.5 dBi, MiMo	802.11a/b/g/n



BAT-ANT-N-6ABG-IP65

BAT Series, Antennas/802.11a/n (5 GHz)			
Part No.	Order No.	Type	Standards
BAT-ANT-N-5A-IP65	943 981-003	5 GHz Omni-Directional, 5 dBi gain	802.11a
BAT-ANT-N-9A-DS-IP65	943 981-010	5 GHz, Directional antenna, 8 dBi gain w/polarization diversity	802.11a/n
BAT-ANT-N-MiMo5-9N-IP65	943 981-013	5 GHz, Directional antenna, 9 dBi gain, MiMo	802.11a/n
BAT-ANT-N-18A-IP65	943 981-006	5 GHz, Directional antenna, 18 dBi gain	802.11a
BAT-ANT-N-23A-V-IP65	943 981-007	5 GHz, Directional antenna, 23 dBi gain	802.11a
BAT-ANT-N-23A-VH-IP65	943 981-008	5 GHz, Directional antenna, 23 dBi gain w/polarization diversity	802.11a/n



BAT-ANT-N-MiMoDB-5N-IP65

BAT Series, Antennas/802.11b/g/n (2.4 GHz)			
Part No.	Order No.	Type	Standards
BAT-ANT-N-6G-IP65	943 981-002	2.4 GHz Omni-Directional, 6 dBi gain	802.11b/g
BAT-ANT-N-8G-DS-IP65	943 981-009	2.4 GHz Directional, 8 dBi gain w/polarization diversity	802.11b/g/n
BAT-ANT-N-14G-IP23	943 981-005	2.4 GHz Directional, 14 dBi gain	802.11b/g
BAT-ANT-N-LC-G-50m-IP65	943 981-001	2.4 GHz Leaky Coax, 50 meter (1 x N connector)	802.11b/g
BAT-ANT-N-LC-G-100m-IP65	943 981-101	2.4 GHz Leaky Coax, 100 meter (2 x N connectors)	802.11b/g



BAT-ANT-N-MiMo5-9N-IP65

BAT Series, Accessories			
Part No.	Order No.	Type	Standards
BAT54-F MAST MOUNT	943 966-001	Mast Mounting Kit for BAT (IP67) products	-
BAT-CLB-2 N m-m	943 903-513	Antenna cable 2 m, N male to N male	802.11a/b/g/n
BAT-CLB-2 N m-f	943 903-514	Antenna cable 2 m, N male to N female	802.11a/b/g/n
BAT-CLB-5 N m-f	943 903-516	Antenna cable 5 m, N male to N female	802.11a/b/g/n
BAT-CLB-15 N m-f	943 903-515	Antenna cable 15 m, N male to N female	802.11a/b/g/n
BAT-PIGTAIL	943 903-360	Used to adapt BAT Rail products to N-style connector	802.11a/b/g/n
BAT-ANT Protector m-f	943 903-373	RF Surge Arrestor, N male to N female	802.11a/b/g/n
BAT-LAN Protector IP68	943 903-374	IP68 RF Surge arrestor, N male to N female	802.11a/b/g/n



BAT-ANT Protector

## IOLAN DS/SDS Ethernet Converters with Serial Interfaces



Easy and reliable connection of end devices with serial interfaces to Ethernet networks is now possible with the new series of IOLAN DC converters. Thanks to a variety of different serial interfaces, bandwidths, security functions, protection standards, temperature ranges and special approvals, the IOLAN DC converters provide ideal solutions for a variety of applications, including factory and process automation, building automation, and automation for new energy applications.

### Product Features

- Meets high security and EMC standards
- Approval for Ex Zone 2
- RS 232/422/485 interfaces selectable via software
- Fast or Gigabit Ethernet ports
- Redundant Ethernet connection
- V.92/V.90 modem for connection to wide area networks
- IP40 or IP30 protection standard
- Robust metal housing
- Fanless cooling

### Technical Information

Product Description				
Type	IOLAN DS1 T	IOLAN SDS3 M	IOLAN SDS4 HL	IOLAN SDS16C HV
Available Ports	1	3	4	16
Order No.	942 036-001	942 036-201	942 036-101	942 036-301
Ambient Conditions				
Operating Temperature	-40 °C to +70 °C	0 °C to +55 °C	-40 °C to +70 °C	-40 °C to +70 °C
Interfaces				
Serial Port Interface	Software selectable RS-232/422/485 on DB9M	Software selectable EIA-232/422/485 on RJ45	Software selectable EIA-232/422/485 on RJ45	Software selectable RS232/RS485/RS422 DTE on RJ45 – RS485: full and half duplex
Serial Port Speeds	50 bps to 230 Kbit/s with customizable baud rate support			
Data Bits	5, 6, 7, 8, 9-bit protocol support			
Parity	Odd, Even, Mark, Space, None			
Flow Control	Hardware, Software, Both			
Local Console Port	RS232 on Serial Port	RS232 on RJ45 with DB9 Adapter (provided)	RS232 on RJ45 with DB9 Adapter (provided)	RS232 on RJ45 with DB9 Adapter (provided)
Network	1 x 10/100Base-TX Ethernet RJ45			2 x 10/100/1000Base-TX Ethernet RJ45
Power Supply				
Input Voltage Range	9 to 30 V DC			88 to 300 V DC or 85 to 265 V AC (47 to 63 Hz)
Approvals				
FCC	FCC			
Safety Standard for IT Equipment	IEC 60950-1			
Substation	n/a			IEC 61850-3, IEEE 1613
Hazardous Locations	n/a		ATEX Class 1 Zone 2, ANSI/ISA – 12.12.01 – 2007 Class 1 Division 2	n/a



## IOLAN DS/SDS Ethernet Converters with Serial Interfaces

Adapter for IOLAN DS, SDS			
Type	Order No.	Description	Application
DBA0010	942 048-001	DB25F	–
DBA0011	942 048-002	DB25M	Cisco/HP/IBM/Sun
DBA0013	942 048-003	DB25M PC-Pinout	Modem
DBA0020	942 048-004	DB9F	APC/Checkpoint/Dell/Extreme Networks/F5/Juniper/Nortel/Sun/HP/IBM
DBA0021	942 048-005	DB9M	Sun/Zyxel
DBA0023	942 048-006	DB9M PC-Pinout	All manufacturers with provided cable for PC/notebook
DB9 to PRL/config connector	942 048-007	DB9F	Perle IOLAN and IOLAN C Console*
DBA0031	942 048-008	RJ45M-RJ45F Cisco/Sun	Cisco/Sun/Juniper

\* Included in delivery with all variants with RJ45 on serial side or RJ45 device console. Conform to DBA0020.

Adapter for IOLAN SDS C			
Type	Order No.	Description	Application
DBA0010C	942 048-009	DB25F	–
DBA0011C	942 048-010	DB25M	Cisco/HP/IBM/Sun
DBA0013C	942 048-011	DB25M PC-Pinout	Modem
DBA0020C	942 048-012	DB9F	APC/Checkpoint/Dell/Extreme Networks/F5/Juniper/Nortel/Sun/HP/IBM
DBA0021C	942 048-013	DB9M	Sun/Zyxel
DBA0023C	942 048-014	DB9M PC-Pinout	All manufacturers with provided cable for PC/notebook
DBA0031C	942 048-015	RJ45M-RJ45F Cisco/Sun	Cisco/Sun/Juniper

DIN Rail Adapter		
Type	Order No.	Application
DIN Rail Mount Kit 1	942 048-016	DIN Rail Mounting Kit for 1 port IOLAN DS
DIN Rail Mount Kit 2	942 048-017	DIN Rail Mounting Kit for 4 port IOLAN SDS wall mount models and Stand-Alone Media Converter





## Hardened Rail Transceivers, Hubs, and Fieldbus Transceivers/Modems



RS232 Media Converters		
Part No.	Order No.	Description
OZDV 2451P	943 316-021	1 electrical and 1 optical port, bus-powered, POF 0 to 60 m
OZDV 2451G	943 299-021	1 electrical and 1 optical port, bus-powered, multimode 0 to 2000 m
OZDV 2471P	943 340-021	1 electrical and 1 optical port, POF 0-100M, HCS 0 to 2100 m
OZDV 2471G	943 341-021	1 electrical and 1 optical port, multimode 0 to 6700 m
OZDV 2471G-1300	933 990-021	1 electrical and 1 optical port, singlemode 0 to 32 km

## Hardened Fiber Modems/Repeaters



RS485 Repeaters		
Part No.	Order No.	Description
OZD 485 G12 BASIC	943 893-321	1 electrical and 2 optical ports, multimode-line capable
OZD 485 G12 PRO	943 894-321	1 electrical and 2 optical ports, predictive maintenance, multimode, redundant ring capable
OZD 485 G12-1300 PRO	943 895-321	1 electrical and 2 optical ports, predictive maintenance, singlemode, redundant ring capable



PROFIBUS Repeaters		
Part No.	Order No.	Description
OZD PROFI 12M P11	943 728-221	For plastic fiber, 1 electrical, 1 optical port
OZD PROFI 12M P12	943 728-321	For plastic fiber, 1 electrical, 2 optical ports redundant ring capable
OZD PROFI 12M G11	943 727-221	1 electrical, 1 optical port, multimode
OZD PROFI 12M G12	943 727-321	1 electrical, 2 optical ports, multimode – redundant ring capable
OZD PROFI 12M G12 EEC	943 730-321	1 electrical, 2 optical ports, multimode – redundant ring capable, EEC*
OZD PROFI 12M G11 1300	943 729-221	1 electrical, 1 optical port, singlemode
OZD PROFI 12M G12 1300	943 729-321	1 electrical, 2 optical ports, singlemode – redundant ring capable
OZD PROFI 12M G12 1300 EEC	943 256-321	1 electrical, 2 optical ports, singlemode – redundant ring capable, EEC*
OZD PROFI 12M P11 PRO	943 904-221	1 electrical, 1 optical port, predictive maintenance, POF
OZD PROFI 12M P12 PRO	943 904-321	1 electrical, 2 optical ports, predictive maintenance, POF, redundant ring capable
OZD PROFI 12M G11 PRO	943 905-221	1 electrical, 1 optical port, predictive maintenance, multimode

**NOTE:** \*Devices showing EEC above can operate in extended environmental conditions: -20 °C to +60 °C, 100% humidity



## Hardened Fiber Modems/Repeaters

PROFIBUS Repeaters (continued)		
Part No.	Order No.	Description
OZD PROFIBUS 12M G12 PRO	943 905-321	1 electrical, 2 optical ports, predictive maintenance, multimode, redundant ring capable
OZD PROFIBUS 12M G12 EEC PRO	943 907-321	1 electrical, 2 optical ports, predictive maintenance, multimode, redundant ring capable, EEC*
OZD PROFIBUS 12M G11-1300 PRO	943 906-221	1 electrical, 1 optical port, predictive maintenance, singlemode
OZD PROFIBUS 12M G12-1300 PRO	943 906-321	1 electrical, 2 optical ports, predictive maintenance, singlemode, redundant ring capable
OZD PROFIBUS 12M G12-1300 EEC PRO	943 908-321	1 electrical, 2 optical ports, predictive maintenance, singlemode, redundant ring capable, EEC*

**NOTE:** \*Devices showing EEC above can operate in extended environmental conditions: -20 °C to +60 °C, 100% humidity



PROFIBUS ATEX Zone 1 Repeaters		
Part No.	Order No.	Description
OZD PROFIBUS G12DU ATEX 1	943 881-321	1 electrical, 2 optical ports, predictive maintenance, multimode, redundant ring capable, cabinet assembly
OZD PROFIBUS G12DK ATEX 1	943 882-321	1 electrical, 2 optical ports, predictive maintenance, multimode, redundant ring capable, plastic IP67 housing for mounting in ATEX-certified housing
OZD PROFIBUS G12DE ATEX 1	943 883-321	1 electrical, 2 optical ports, predictive maintenance, multimode, redundant ring capable, stainless steel IP67 housing



Geniusbus Repeaters		
Part No.	Order No.	Description
OZD GENIUS G12	933 989-021	1 electrical, 2 optical ports, redundant ring capable
OZD GENIUS G12 1300	934 233-021	1 electrical, 2 optical ports, singlemode, redundant ring capable



Modbus+ Repeaters		
Part No.	Order No.	Description
MODBUS PLUS G12	943 740-021	1 electrical, 2 optical ports, redundant ring capable
MODBUS PLUS G12 1300	943 821-021	1 electrical, 2 optical ports, singlemode, redundant ring capable



WorldFIP Repeaters		
Part No.	Order No.	Description
OZD FIP G3	933 847-321	1 electrical, 2 optical ports, multimode, redundant ring capable
OZD FIP G3 T	933 847-521	1 electrical, 2 optical ports, multimode, redundant ring capable, bus termination included





## SFP + XFP Transceiver Modules



Fast Ethernet Transceivers		
Part No.	Order No.	Description
M-Fast SFP-TX/RJ45	942 098-001	Fast Ethernet RJ45 SFP
M-Fast SFP-TX/RJ45 EEC	942 098-002	Fast Ethernet RJ45, -40 °C to +85 °C
M-FAST SFP-MM/LC	943 865-001	100Base-FX, 5 km 50/125 µm MM, 4 km 62.5/12.5 µm MM
M-FAST SFP-MM/LC EEC	943 945-001	100Base-FX, 5 km 50/125 µm MM, 4 km 62.5/12.5 µm MM
M-FAST SFP-SM/LC	943 866-001	100Base-FX, 25 km 9/125 µm SM
M-FAST SFP-SM/LC EEC	943 946-001	100Base-FX, 25 km 9/125 µm SM
M-FAST SFP-SM+/LC	943 867-001	100Base-FX, 25 to 65 km 9/125 µm SM
M-FAST SFP-SM+/LC EEC	943 947-001	100Base-FX, 25 to 65 km 9/125 µm SM
M-FAST SFP-LH/LC	943 868-001	100Base-FX, 55 to 140 km 9/125 µm SM
M-FAST SFP-LH/LC EEC	943 948-001	100Base-FX, 55 to 140 km 9/125 µm SM



Gigabit Ethernet Transceivers		
Part No.	Order No.	Description
M-SFP-SX/LC	943 014-001	1000Base-SX, 550 m 50/125 µm MM, 275 m 62.5/125 µm MM
M-SFP-SX/LC EEC	943 896-001	1000Base-SX, 550 m 50/125 µm MM, 275 m 62.5/125 µm MM
M-SFP-LX/LC	943 015-001	1000Base-LX, 550 m 50/125 µm MM, 550 m 62.5/125 µm MM, 20 km 9/125 µm SM
M-SFP-LX/LC EEC	943 897-001	1000Base-LX, 550 m 50/125 µm MM, 550 m 62.5/125 µm MM, 20 km 9/125 µm SM
M-SFP-MX/LC EEC	942 108-001	1.5 km 50/125, 500 m 62.5/125, -40 °C to +85 °C
M-SFP-LX+/LC	942 023-001	1000Base-LX, 40 km with 9/125u SM
M-SFP-LX+/LC EEC	942 024-001	1000Base-LX, 40 km with 9/125u SM, -40 °C to +85 °C
M-SFP-LH/LC	943 042-001	1000Base-LX, 16 to 80 km 9/125 µm SM-LH
M-SFP-LH/LC-EEC	943 898-001	1000Base-LX, 70 km with 9/125u SM, -40 °C to +85 °C
M-SFP-LH+/LC	943 049-001	1000Base-LX, 44 to 120 km 9/125 µm SM-LH
M-SFP-TX/RJ45	943 977-001	Gigabit RJ45 SFP



Gigabit Ethernet Bi-Directional Transceivers (Single Fiber Strand)		
Part No.	Order No.	Description
M-SFP-BIDI-Bundle LX/LC EEC	943 974-101	1000Base-LX, 20 km 9/125 µm SM
M-SFP-BIDI-Bundle LH/LC EEC	943 975-101	1000Base-LX, 23 to 80 km 9/125 µm SM-LH
M-SFP-BIDI Type A LH/LC EEC	943 975-001	1000Base-LX Type A with LC connector, extended temperature range, -40 °C to +85 °C
M-SFP-BIDI Type A LX/LC EEC	943 974-001	1000Base-LX Type A with LC connector, extended temperature range, -40 °C to +85 °C
M-SFP-BIDI Type B LH/LC EEC	943 975-002	1000Base-LX Type B with LC connector, extended temperature range, -40 °C to +85 °C
M-SFP-BIDI Type B LX/LC EEC	943 974-002	1000Base-LX Type B with LC connector, extended temperature range, -40 °C to +85 °C



10 Gigabit Ethernet Transceivers		
Part No.	Order No.	Description
M-XFP-ZR/LC	943 921-001	10GBase-SX, 40 to 80 km 9/125 µm SM
M-XFP-ER/LC	943 920-001	10GBase-SX, 10 to 40 km 9/125 µm SM
M-XFP-LR/LC	943 919-001	10GBase-SX, 2 to 10 km 9/125 µm SM
M-XFP-SR/LC	943 917-001	10GBase-SX, 33 m 50/125 µm MM or 300 m w/modal bandwidth 2000 (MHz x km) fiber





## Accessories

### Power Supplies and Programming/Configuration Tools

Power Supplies		
Part No.	Order No.	Description
RPS15	943 662-015	24 V DC rail power supply unit 1.3 A at 100 to 240 V AC
RPS30	943 662-003	24 V DC rail power supply unit 1.3 A
RPS80 EEC	943 662-080	24 V DC rail power supply unit 3.0 A, -25 °C up to +70 °C
RPS120 EEC (CC)	943 662-121	24 V DC rail power supply unit 4.5 A, -25 °C up to +70 °C with conformal coating
RPS60/48 V EEC	943 952-001	48 V DC rail power supply unit 1.25 A, -10 °C up to +70 °C
RPS90/48V HV, PoE	943 979-001	48 V DC PoE rail power supply unit 1.9 A, -40 °C up to +50 °C
RPS90/48V LV, PoE	943 980-001	48 V DC PoE rail power supply unit 1.9 A, -25 °C up to +60 °C
PSW 5-24	943 008-001	5 V DC Plug-in rail power supply 0 °C up to +40 °C
PC150/36V/48V-IP67	943 968-001	DC/DC converter with 36 V/48 V power output, IP67 rated 24 V/48 V input
PC150/72V/48V-IP67	943 968-001	DC/DC converter with 72 V/48 V power output, IP67 rated 72 V/110 V input
Power Cord	942 000-001	Power Cord for pluggable connection for the high voltage power supply of the MACH1000, RSPx, RSR and GREYHOUND families. Cable length 2 meters.



### ACA – Programming and Configuration Backup

Programming and Configuration Backup		
Part No.	Order No.	Description
ACA21-USB EEC	943 271-002	USB configuration adapter for storage/backup and device replacement of (managed) RS, MS and MACH switches as well as EAGLE firewalls
ACA21-M12 EEC	943 913-002	M12 configuration adapter for storage/backup and device replacement of (managed) OCTOPUS switch devices
ACA11 EEC	943 751-002	Similar to above ACA adapters, but communication via the device's RJ11 RS232 interface
ACA11-M12 (EEC)	943 972-001	M12 configuration adapter for storage/backup and device replacement of IP67 BAT (wireless) devices
ACA11-miniDIN (EEC)	943 973-001	Mini DIN configuration adapter for storage/backup and device replacement of DIN rail mounted BAT (wireless) devices
ACA31	942 074-001	Adapter for storage/backup and device replacement of switches and firewalls (RSP, MSP, EAGLE30)
ACA22-M12 EEC	942 125-001	Auto-configuration adapter 512 MB, with M12 (USB 2.0) connection and extended temperature range, saves two different versions of configuration data and operating software from the connected switch. It enables managed switched to be easily commissioned and quickly replaced.
ACA22-USB EEC	942 124-001	Auto-configuration adapter 512 MB, with USB 2.0 connection and extended temperature range, saves two different versions of configuration data and operating software from the connected switch. It enables managed switched to be easily commissioned and quickly replaced.
Serial/Terminal Cable	943 301-001	Terminal cable for managing and configuring managed switches via the RJ11 RS232 interface



ACA31 (EEC)



ACA11-miniDIN (EEC)



Serial/Terminal Cable



ACA21-USB EEC



ACA11 EEC



ACA11-M12 (EEC)



## MIPP – The Industrial-strength Patch Panel



5 reasons why MIPP is the dependable industrial termination and patching solution

- 1. Robustness:** durable UL certified (UL 1863) solution for linking Hirschmann switches to Belden cabling with a guaranteed lifetime of well over 10 years.
- 2. Versatility:** suitable in nearly any industrial application where fiber splicing, copper termination or both are required. A single MIPP allows for termination and patching of:
  - Up to 72 fiber cables:  
MIPP Fiber Splice Box
  - Up to 24 copper cables:  
MIPP Copper Patch Panel
- 3. Ease of use:** mounted on a DIN rail or wall, any module can be individually extracted from the housing for maintenance actions.
- 4. Future proof:** simply swap modules to meet new network demands or add blind modules at initial installation.
- 5. Save space and cost:** high port density and multiple cable entry points.

Belden's Modular Industrial Patch Panel (MIPP) is a robust and versatile termination panel for both fiber and copper 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. MIPP is Belden's high-quality solution for performance-critical Industrial Ethernet Applications.

### Robust Quality

The durable MIPP panels are constructed of lightweight, high strength aluminium, securely protecting copper and optical fiber connections under the harshest industrial conditions. The housing is able to withstand temperatures from -20 °C to +70 °C and is resistant to shocks and vibrations. The patch panel's industrial quality guarantees a secure termination point for reliable industrial Ethernet connectivity.

### Fiber, Copper, Both

MIPP comes as either a Fiber Splice Box, Copper Patch Panel, or a combination. Where both fiber and copper cables are needed together the design enables simply connecting both to a single panel. MIPP allows flexible network design for network engineers and flexible patching for system installers.

### Easy Installation and Maintenance

The smart housing design allows quick and flexible installation of the MIPP on a DIN rail or a wall. Maintenance is equally easy, since the modules can be individually removed without dismantling the MIPP from the DIN rail or wall mount. Just take out the modules that need work and save precious time.

### Future Proof

As network design may change over time, MIPP allows for modifications by simply swapping modules to meet the new design required. Installing a MIPP with blind\* modules readies the solution for any extensions or modifications to come. MIPP is the future proof termination and patching solution for dynamic industries.

### Save Space

Belden knows the importance of cabinet space in industrial sites. Continuous growth of system networks requires smart use of the existing space. MIPP is designed to fit. Thanks to its narrow housing design the required space is kept to a minimum. With three cable entry points (top and bottom) there is no need for special cabinet design or positioning.

### Best Fit

MIPP is the reliable solution for connecting Belden cables and Hirschmann switches.



## MIPP Fiber Splice Box

MIPP Fiber Splice Box guarantees efficient fiber termination and is designed for use in a wide range of industrial applications. MIPP Fiber Splice Box accommodates various fiber types and connectors: LC, SC, SC metal, ST, ST metal and E-2000 fiber duplex adapters.

### Type of Adapters

#### Single Fiber Modules

(up to 12 fiber connections)

- 6 x SC duplex adapters
- 6 x SC metal duplex adapters
- 6 x LC duplex adapters
- 6 x ST duplex adapters
- 6 x ST metal duplex adapters
- 6 x E-2000 duplex adapters

#### Double Fiber Modules

(up to 24 fiber connections)

- 12 x SC duplex adapters
- 12 x SC metal duplex adapters
- 12 x LC duplex adapters
- 12 x ST duplex adapters
- 12 x ST metal duplex adapters
- 12 x E-2000 duplex adapters



#### Fiber Applications

- Multimode: OM1, OM2, OM3 and OM4
- Singlemode: OS2 and OS2/APC

MIPP Fiber Splice Box is UL certified (UL 1863).

## MIPP Copper Patch Panel

MIPP Copper Patch Panel ensures maximum reliability for Industrial Ethernet and PROFINET networks. The MIPP Copper Patch Panel compliments the market leading Hirschmann switches and high performance Belden cabling solutions by enabling cables to be terminated and linked to active equipment using DataTuff patch cords, in an organised and structured manner.

### Type of Keystones

#### Single Copper Modules

- 2 or 4 x RJ45 keystone unshielded
- 2 or 4 x RJ45 keystone shielded
- 2 or 4 x RJ45 coupler unshielded
- 2 or 4 x RJ45 coupler shielded

#### Type of Cable Categories

- Cat 5e unshielded and shielded
- Cat 6 unshielded and shielded
- Cat 6A unshielded and shielded

MIPP Copper Patch Panel is UL certified (UL 1863).



## MIPP Mix

The market shows a clear trend in the growing use of both Industrial Ethernet and fiber infrastructures in industrial networks. MIPP addresses this by allowing the connection of both fiber and copper cables in a single solution\*. Specifically designed for industrial use, MIPP's functionality and reliability can make a significant contribution to the uptime and availability of performance-critical systems.

\* up to 6 single modules, 3 double modules or a combination can be used in one MIPP



## MIPP Product Configurator

Use the configured product code to order:

EXAMPLE MODULE 1: **M I P P / L D / 2 S 3 P /** EXAMPLE MODULE 2: **c u e 4 /** EXAMPLE MODULE 3: **1 N N N /** MODULE 4: **X X X X /** MODULE 5: **X X X X /** MODULE 6: **X X X X**

### Design/Model

**MIPP** = Modular Industrial Patch Panel

### Housing

- |                             |                                  |
|-----------------------------|----------------------------------|
| X = No Housing              | H = 2 x Double module fiber      |
| A = 1 x Single module       | I = 3 x Double module fiber      |
| B = 2 x Single module       | J = 1 x SM + 1 x DM fiber        |
| C = 3 x Single module       | K = 1 x SM + 2 x DM fiber        |
| D = 4 x Single module       | <b>L</b> = 2 x SM + 1 x DM fiber |
| E = 5 x Single module       | M = 2 x SM + 2 x DM fiber        |
| F = 6 x Single module       | N = 3 x SM + 1 x DM fiber        |
| G = 1 x Double module fiber | O = 4 x SM + 1 x DM fiber        |

Note: SM = Single module and DM = Double module

### Mounting

- D** = Standard DIN Rail
- W** = Wall Mount Plate included
- X** = No Housing

### Fiber Splice Box Module

#### Module

- 1** = Single module for 12 fibers
- 2** = Double module for 24 fibers

#### Adapter

- |   |   |
|---|---|
| <b>B</b> = ST-ST Duplex adapters in metal   | <b>S</b> = SC-SC Duplex adapters in plastic |
| <b>T</b> = ST-ST Duplex adapters in plastic | <b>L</b> = LC-LC Duplex adapters            |
| <b>M</b> = SC-SC Duplex adapters in metal   | <b>E</b> = E-2000™-E-2000™ adapters         |

#### Application

- |                               |                               |
|-------------------------------|-------------------------------|
| <b>1</b> = MM/OM1             | <b>6</b> = 6 x SM/OS2/6 x OM2 |
| <b>2</b> = MM/OM2             | <b>7</b> = 6 x SM/OS2/6 x OM3 |
| <b>3</b> = MM/OM3             | <b>8</b> = 6 x SM/OS2/6 x OM4 |
| <b>4</b> = MM/OM4             | <b>9</b> = SM/OS2 UPC         |
| <b>5</b> = 6 x SM/OS2/6 x OM1 | <b>A</b> = SM/OS2 APC         |

Note: 5- to 8 for double module only

#### Accessories

- P** = Pigtails
- B** = Brilliance Field Installable connectors
- N** = No accessories

### Blind Module

#### Two Options

- 1** = Single Blind Module
- 2** = Double Blind Module

### Copper Patch Panel Module

#### Number of Connections

- 2** = 2 keystones/couplers
- 4** = 4 keystones/couplers

#### Category

- d** = Cat. 5e
- e** = Cat. 6
- a** = Cat. 6A

#### Keystones/Couplers

- c** = Unshielded couplers
- d** = Shielded couplers
- u** = Unshielded keystones
- s** = Shielded keystones

#### Module

- c** = Single copper module



## MIPP Fiber Splice Box Accessories

Pigtails			
SC	LC	ST	E-2000
1 or 2 packs of 12 pigtails, 900 micron, 0.6 mtr in 12 different colours: <ul style="list-style-type: none"> <li>• SC/UPC SM 9/125, OS2</li> <li>• SC/APC SM 9/125, OS2</li> <li>• SC/PC MM 62.5/125, OM1</li> <li>• SC/PC MM 50/125, OM2</li> <li>• SC/PC MM 50/125, OM3</li> <li>• SC/PC MM 50/125, OM4</li> </ul>	1 or 2 packs of 12 pigtails, 900 micron, 0.6 mtr in 12 different colours: <ul style="list-style-type: none"> <li>• LC/UPC SM 9/125, OS2</li> <li>• LC/APC SM 9/125, OS2</li> <li>• LC/PC MM 62.5/125, OM1</li> <li>• LC/PC MM 50/125, OM2</li> <li>• LC/PC MM 50/125, OM3</li> <li>• LC/PC MM 50/125, OM4</li> </ul>	1 or 2 packs of 12 pigtails, 900 micron, 0.6 mtr in 12 different colours: <ul style="list-style-type: none"> <li>• ST/UPC SM 9/125, OS2</li> <li>• ST/PC MM 62.5/125, OM1</li> <li>• ST/PC MM 50/125, OM2</li> <li>• ST/PC MM 50/125, OM3</li> <li>• ST/PC MM 50/125, OM4</li> </ul>	1 or 2 packs of 12 pigtails, 900 micron, 0.6 mtr in 12 different colours: <ul style="list-style-type: none"> <li>• E-2000/UPC SM 9/125, OS2</li> <li>• E-2000/APC SM 9/125, OS2</li> <li>• E-2000/PC MM 62.5, OM1</li> <li>• E-2000/PC MM 50/125, OM2</li> <li>• E-2000/PC MM 50/125, OM3</li> <li>• E-2000/PC MM 50/125, OM4</li> </ul>
Brilliance Field Installable Connectors			
12 or 24 brilliance connectors SC, 900 micron: <ul style="list-style-type: none"> <li>• OS2 Blue – AX105208</li> <li>• OM1 Beige – AX105205</li> <li>• OM2 Black – AX105206</li> <li>• OM3/4 Aqua – AX105207</li> </ul>	12 or 24 brilliance connectors LC, 900 micron: <ul style="list-style-type: none"> <li>• OS2 Blue – AX105203</li> <li>• OM1 Beige – AX105200</li> <li>• OM2 Black – AX105201</li> <li>• OM3/4 Aqua – AX105202</li> </ul>	12 or 24 brilliance connectors ST, 900 micron: <ul style="list-style-type: none"> <li>• OS2 Blue – AX105213</li> <li>• OM1 Beige – AX105210</li> <li>• OM2 Black – AX105211</li> <li>• OM3/4 Aqua – AX105212</li> </ul>	–



## MIPP Copper Panel Accessories

Industrial Ethernet DataTuff Patch Cords
<b>SC</b> <ul style="list-style-type: none"> <li>• Cat 5e 2 or 4 pairs</li> <li>• Cat 6 2 or 4 pairs</li> <li>• Cat 6A 2 or 4 pairs</li> <li>• Shielded or Unshielded</li> <li>• Twisted Pair or Bonded-Pair</li> <li>• PVC, FRNC, TPE or PUR jackets</li> </ul>



## Industrial Ethernet Media Cord Sets



Prior to the advent of Industrial Ethernet (standardized Ethernet communications via hardened networking infrastructure), office grade Ethernet cabling and connectors were the only available options. Unfortunately, these traditional media solutions proved unable to withstand the harsh environment of the factory floor or other industrial applications.

The Hirschmann product family of Industrial Ethernet Media Solutions eliminates these issues by combining standard RJ45 connection technology with the proven industrial Micro (M12) connection technology typically found in sensor/actuator machine applications – also available on all OCTOPUS, MICE, and MACH1000 Switches.

With the integration of Bonded-Pair technology by Belden, these industrial Ethernet media cordsets have the highest level of signal quality making them one-of-a-kind.

### Industrial Ethernet Media Cord Sets – Bonded-Pair Cable

#### TPE – Bonded-Pair, CAT 5e, 24 AWG Shielded, 2-Pair

Part No.	Configuration	Description
J224TPETLJT...M	RJ45 to RJ45	Industrial Ethernet CAT 5E, TPE Shielded, 2-pair, 24 AWG cable, bonded-pairs, stranded (7 x 32) tinned copper conductors, polyolefin insulation, and industrial grade sunlight and oil-resistant, teal jacket.
M224TPETLJT...M	RJ45 to M12	
M224TPETLMT...M	M12 to M12	
J224TPETLPT...M	RJ45 to M12 (Panel Receptacle)	

Example of completed part number: **J224TPETLJT00.3M** is a 00.3 meter cable.

#### TPE High-Flex – Bonded-Pair, CAT 5e, 24 AWG Shielded, 2- and 4-Pair

Part No.	Order No.	Description
J424THFTLJT...M	RJ45 to RJ45	Industrial Ethernet CAT 5E, TPE, High-Flex shielded, 2- and 4-pair, 24 AWG cable, bonded-pairs, stranded (7 x 32) tinned copper conductors, polyolefin insulation, and industrial grade sunlight and oil-resistant, teal jacket.
M224THFTLJT...M	RJ45 to M12	
M224THFTLMT...M	M12 to M12	
J224THFTLPT...M	RJ45 to M12 (Panel Receptacle)	

Example of completed part number: **J424THFTLJT00.3M** is a 00.3 meter cable.



## Industrial Ethernet Media Cord Sets – Twisted Pair Cable

PVC and FRNC, Cat 5e, 24 AWG, Foil and Braid, Solid Conductor, 2- and 4-Pair		
Part No.	Configuration	Description
CA00641.00...	RJ45 to RJ45	DataTuff Industrial Ethernet, Cat 5e, 2 pair, 100 Mb/s, PVC jacket, shielded
CA00642.00...	RJ45 to RJ45	DataTuff Industrial Ethernet, Cat 5e, 2 pair, 100 Mb/s, FRNC jacket, shielded
<b>CA00600.00...</b>	RJ45 to RJ45	DataTuff Industrial Ethernet, Cat 5e, 4 pair, 1 Gb/s, PVC jacket, shielded
CA00643.00...	RJ45 to RJ45	DataTuff Industrial Ethernet, Cat 5e, 4 pair, 1 Gb/s, FRNC jacket, shielded

PVC, FRNC and PUR, Cat 5e and Cat 6A, 26 AWG, Foil and Braid, Flexible, 2- and 4-Pair		
Part No.	Configuration	Description
CA00660.00...	RJ45 to RJ45	DataTuff Industrial Ethernet, Cat 5e, 2 pair, 100 Mb/s, PVC jacket, shielded
CA00661.00...	RJ45 to RJ45	DataTuff Industrial Ethernet, Cat 5e, 2 pair, 100 Mb/s, FRNC jacket, shielded
CA00613.00...	RJ45 to RJ45	DataTuff Industrial Ethernet, Cat 5e, 4 pair, 1 Gb/s, PVC jacket, shielded
CA00630.00...	RJ45 to RJ45	DataTuff Industrial Ethernet, Cat 5e, 4 pair, 1 Gb/s, FRNC jacket, shielded
CA00664.00...	RJ45 to RJ45	DataTuff Industrial Ethernet, Cat 6A, 4 pair, 10 Gb/s, PVC jacket, shielded
CA00665.00...	RJ45 to RJ45	DataTuff Industrial Ethernet, Cat 6A, 4 pair, 10 Gb/s, FRNC jacket, shielded
CA00652.00...	RJ45 to RJ45	DataTuff Industrial Ethernet, Cat 6A, 4 pair, 10 Gb/s, PUR jacket, shielded

Profinet, Cat 5e, 22 AWG, Quad, Foil and Braid, Solid and Flexible Conductor		
Part No.	Configuration	Description
CA00656.00...	RJ45 to RJ45	DataTuff Profinet, Cat 5e, quad, 100 Mb/s, PVC jacket, shielded, solid conductor
CA00658.00...	RJ45 to RJ45	DataTuff Profinet, Cat 5e, quad, 100 Mb/s, FRNC jacket, shielded, solid conductor
CA00730.00...	RJ45 to RJ45	DataTuff Profinet, Cat 5e, quad, 100 Mb/s, PVC jacket, shielded, flexible conductor
CA00735.00...	RJ45 to RJ45	DataTuff Profinet, Cat 5e, quad, 100 Mb/s, FRNC jacket, shielded, flexible conductor

Example of complete part number: **CA00600.00C01** is a 1 m cable.



## Industrial Ethernet Media Cord Set Configurator – Bonded-Pair Cable

**J 2 24 PVC ST J T 00.3M**

**Connector Type 1**

**J** = RJ45  
**M** = M12

**Number of Conductors (Pairs)**

**2** = 2 pair  
**4** = 4 pair

**Wire Gauge**

**24** = 24 AWG cable

**Cable Type**

**PVC** = PVC cable type, Bonded-Pair  
**TPE** = TPE cable type, Bonded-Pair  
**THF** = TPE High-Flex cable type, Bonded-Pair

**Stranding/Shielding**

**ST** = Stranded, unshielded  
**TL** = Stranded, shielded

**Connector Type 2**

**J** = RJ45  
**M** = M12  
**P** = M12 Panel Mount Receptacle

**Cable Jacket Color**

**T** = Teal  
**B** = Black\*  
**G** = Grey\*  
**R** = Red\*  
**U** = Blue\*  
**N** = Orange\*

**Cable Lengths**

<b>00.3M</b> = 0.3 meters	07.0M = 7 meters	40.0M = 40 meters
00.5M = 0.5 meters	10.0M = 10 meters	50.0M = 50 meters
01.0M = 1 meter	12.0M = 12 meters	55.0M = 55 meters
02.0M = 2 meters	15.0M = 15 meters	60.0M = 60 meters
03.0M = 3 meters	20.0M = 20 meters	65.0M = 65 meters
04.0M = 4 meters	25.0M = 25 meters	70.0M = 70 meters
05.0M = 5 meters	30.0M = 30 meters	75.0M = 75 meters
06.0M = 6 meters	40.0M = 40 meters	80.0M = 80 meters
		90.0M = 90 meters

\* Denotes special order. Minimum quantities apply.



RJ45 to RJ45



RJ45 to M12



M12 to M12



RJ45 to M12  
(Panel Receptacle)





## About Belden Bonded-Pair Cable

### Cable Designed for Maximum Durability

The cable itself is also designed for maximum durability. We chose the finest technology on the market for our products – Bonded-Pairs from Belden. This patented technology absolutely ensures that Hirschmann media is the most rugged and dependable product available. A wide variety of cable and jacket construction is also available, including:

- Copper 2- and 4-pair, 24 AWG Bonded-Pairs
- Stranded construction
- Polyolefin insulation
- PVC or ultra-rugged TPE jackets

### Non-Bonded-Pair versus Bonded-Pair Cable for Mission Critical Industrial Ethernet Applications

#### What is Bonded-Pair Technology?

Bonded-Pair technology was developed to ensure superior electrical performance in twisted pair Ethernet cable installations. This design physically bonds the individual insulated conductors together along their longitudinal axes which assure uniform conductor-to-conductor spacing and electrical integrity.

#### How Does Bonded-Pair Cable Help You?

##### 1) Bonded-Pairs are less susceptible to noise.

Cables with non-bonded-pairs tend to separate due to movement during installation, flexing or handling. Each pair can be pictured as an antenna that can receive or transmit signals. Variations in non-bonded conductor-to-conductor spacing are cumulative and result in susceptibility to EMI and RFI that degrades signal transmission and network performance. In addition, the cable will emit more noise that can adversely affect surrounding instrumentation. Bonded-Pairs lock conductor-to-conductor spacing in place. "Physicals Equals Electricals" is a statement that describes why Bonded-Pairs are critical.

##### 2) Bonded-Pairs improve impedance and return loss performance.

Impedance irregularities, due to non-bonded-pair separation, cause signal reflections (return loss). Any impedance variation is cumulative along the length of the cable. Bonded-Pairs maintain conductor-to-conductor spacing, thus improving impedance stability and return loss performance.

##### 3) Minimizes pair-to-pair crosstalk.

All twisted pair Ethernet cables have crosstalk or pair-to-pair coupling. Each pair has different twists/inch (lay length) to minimize crosstalk. Lay length variation can increase the crosstalk that is cumulative down the length of the cable. Bonded-Pairs reduce crosstalk by minimizing lay length variation.

##### 4) Improved termination quality.

Bonded-Pairs maintain the electrical characteristics all the way into the connector. Bonded-Pairs increase installation consistency and signal integrity while reducing maintenance calls.

##### 5) Superior mechanical robustness.

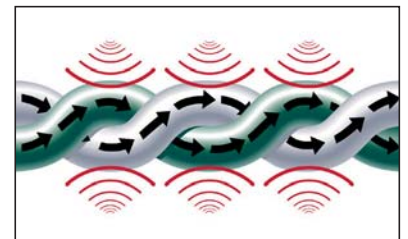
Bonded-Pairs improve the pulling strength of a cable by up to 60% over non-bonded designs by equalizing the tension on each conductor. This is especially critical during the installation process, flexing or handling where the conductors may be severed due to the pulling forces.

### TPE - High Flex (THF) Applications

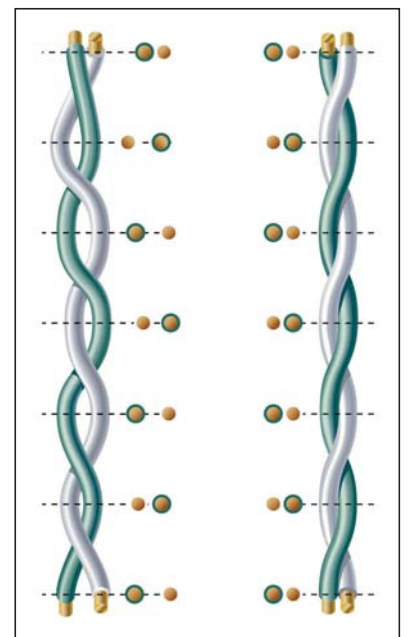
Hirschmann by Belden is the first to offer High Flex Industrial Ethernet Cordsets with bonded pairs. We warrantee these products (THF) to no less than 10 million flex cycles @ 20X OD and 1M flex cycles @ 10X OD.



**Illustration 1:** Example of Non-Bonded-Pair. As cable is stretched and pulled, pairs begin to separate, causing a degradation in signal quality.










**Illustration 2:** Example of Bonded-Pair. As cable is stretched and pulled, pairs stay intact.








**Illustration 3:** Side-by-side comparison. Non-Bonded-Pair versus Bonded-Pair cable.

## Bulk Industrial Ethernet Cable Options DataTuff Industrial Ethernet and Profinet Cables

### Permanent Installation

Product Image	Data Rates	Category	Conductor (Stranding)		No. of Pairs	Jacket				Shielding		Design		Part. No.
			Solid	Stranded		PVC	FRNC	TPE	PUR	Shielded	Unshielded	Twisted Pair	Bonded Pair	
<b>INDUSTRIAL ETHERNET</b>														
	100 Mb/s	Cat 5e	AWG 24 (1)	-	2	✓	-	-	-	Foil Braid >80%	-	✓	-	72001E
						-	✓	-	-	Foil Braid >80%	-	✓	-	72001NH
	100 Mb/s	Cat 5e	AWG 24 (1)	-	2	✓	-	-	-	-	✓	-	✓	7932A
	1 Gb/s	Cat 5e	AWG 24 (1)	-	4	✓	-	-	-	Foil Braid >80%	-	✓	-	74001E <i>EtherNet/IP</i>
						-	✓	-	-	Foil Braid >80%	-	✓	-	74001NH
	1 Gb/s	Cat 5e	AWG 24 (1)	-	4	✓	-	-	-	-	✓	-	✓	7923A
						-	✓	-	-	-	✓	-	✓	7935A <i>EtherNet/IP</i>
	1 Gb/s	Cat 5e	AWG 24 (1)	-	4	✓	-	-	-	✓	-	-	✓	7929A <i>EtherNet/IP</i>
						-	✓	-	-	-	✓	-	✓	74004E
	10 Gb/s	Cat 7	AWG 23 (1)	-	4	✓	-	-	-	Foil Braid >65%	-	✓	-	74004E
						-	✓	-	-	Foil Braid >65%	-	✓	-	74004NH
<b>PROFINET</b>														
	100 Mb/s	Cat 5e	AWG 22 (1)	-	Quad	✓	-	-	-	Foil Braid >85%	-	✓	-	70006E
						-	✓	-	-	Foil Braid >85%	-	✓	-	70006NH




### Moderate Flexing

Product Image	Data Rates	Category	Conductor (Stranding)		No. of Pairs	Jacket				Shielding		Design		Part. No.
			Solid	Stranded		PVC	FRNC	TPE	PUR	Shielded	Unshielded	Twisted Pair	Bonded Pair	
<b>INDUSTRIAL ETHERNET</b>														
	100 Mb/s	Cat 5e	-	AWG 26 (7)	2	✓	-	-	-	Foil Braid >80%	-	✓	-	72002E
						-	✓	-	-	Foil Braid >80%	-	✓	-	72002NH
						-	-	-	✓	Foil Braid >80%	-	✓	-	72002PU
	1 Gb/s	Cat 5e	-	AWG 26 (7)	4	✓	-	-	-	Foil Braid >80%	-	✓	-	74002E
						-	✓	-	-	Foil Braid >80%	-	✓	-	74002NH
						-	-	-	✓	Foil Braid >80%	-	✓	-	74002PU
	1 Gb/s	Cat 5e	-	AWG 24 (7)	4	✓	-	-	-	-	✓	-	✓	7924A
	10 Gb/s	Cat 7	-	AWG 26 (7)	4	-	-	-	✓	Foil Braid >65%	-	✓	-	74005PU
<b>PROFINET</b>														
	100 Mb/s	Cat 5e	-	AWG 22 (7)	Quad	✓	-	-	-	Foil Braid >85%	-	✓	-	70007E
						-	✓	-	-	Foil Braid >85%	-	✓	-	70007NH
						-	-	-	✓	Foil Braid >85%	-	✓	-	70007PU

Detailed specifications for each cable type reference the Belden Master Catalog or visit our website: [www.belden.com](http://www.belden.com)



## Continuous Flexing

Product Image	Data Rates	Category	Conductor (Stranding)		No. of Pairs	Jacket				Shielding		Design		Part. No.
			Solid	Stranded		PVC	FRNC	TPE	PUR	Shielded	Unshielded	Twisted Pair	Bonded Pair	
<b>INDUSTRIAL ETHERNET</b>														
	1 Gb/s	Cat 5e	-	AWG 24 (7) Trailing <sup>1</sup>	4	-	-	✓	-	Foil Braid >85%	-	-	✓	7938A
	1 Gb/s	Cat 5e	-	AWG 26 (19) Trailing <sup>2</sup>	4	-	-	-	✓	Foil Braid >80%	-	✓	-	74003PU
				AWG 26 (19) Torsion <sup>2</sup>	4	-	-	-	✓	Foil Braid >80%	-	✓	-	74009PU
<b>PROFINET</b>														
	100 Mb/s	Cat 5e	-	AWG 22 (19) Trailing <sup>2</sup>	Quad	-	-	-	✓	Foil Braid >85%	-	✓	-	70008PU
				AWG 22 (19) Torsion <sup>2</sup>	Quad	-	-	-	✓	Foil Braid >85%	-	✓	-	70009PU

1 = 10 million cycles  
2 = > than 2 million cycles

## DataTuff Specials

Data Rates	Category	Special Environmental Issues									Description*	Part. No.	
		Weld-Splatter Resistance	CMX/Outdoor	Underground (burial)	Gasoline Resistance	Oil Resistance I & II	MSHA	Hi/Lo Temp	600V UL AWM Rated	Armored			
<b>INDUSTRIAL ETHERNET</b>													
1 Gb/s	Cat 5e	✓	-	-	-	-	-	-	-	-	-	Weld-splatter resistant, Continuous Flex – 10 million cycles, TPE jacket	7938A
1 Gb/s	Cat 5e	-	✓	-	-	-	✓	-	-	-	-	Double PVC jacket	11700A <i>EtherNet/IP</i>
1 Gb/s	Cat 5e	-	-	-	-	✓	-	-	-	-	-	Double PVC jacket	11700A2
1 Gb/s	Cat 5e	-	-	-	-	-	-	-	-	-	✓	AL Interlocked Armor, PVC jacket	121700A
1 Gb/s	Cat 5e	-	✓	-	-	-	✓	-	-	-	-	PVC jacket	7923A <i>EtherNet/IP</i>
1 Gb/s	Cat 5e	-	-	-	✓	-	-	✓	-	-	-	Plenum Rated – High & Low Temp, FEP jacket	7928A <i>EtherNet/IP</i>
1 Gb/s	Cat 5e	-	-	✓	-	-	-	-	-	-	-	Halogen Free – Waterblocked Burial, Polyethylene jacket	7934A <i>EtherNet/IP</i>
1 Gb/s	Cat 5e	-	✓	-	-	-	✓	-	✓	-	-	600 V UL AWM, MSHA Approved, PVC jacket, Shielded	7958A <i>EtherNet/IP</i>
10 Gb/s	Cat 6	-	✓	-	-	-	-	-	-	✓	✓	Double PVC jacket, Shielded	7953A <i>EtherNet/IP</i>
10 Gb/s	Cat 6	-	-	-	✓	-	-	✓	-	-	-	Plenum Rated–High & Low Temp, FEP jacket	7931A
10 Gb/s	Cat 6	-	-	-	-	-	-	-	-	-	✓	AL Interlocked Armor, PVC jacket	121872A

\*All cables are Bonded Pair design, solid conductor, unshielded – unless specified differently

Detailed specifications for each cable type reference the Belden Master Catalog or visit our website: [www.belden.com](http://www.belden.com)

## TrayOptic Cable Options

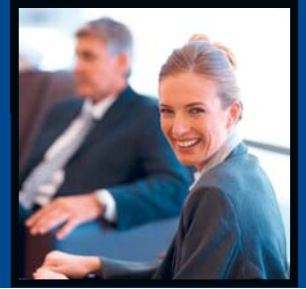
### TrayOptic Heavy-Duty, All-Dielectric Fiber Optic Cables

No. of Fibers	Belden Part Number					Outside Diameter		Weight		Max. Install Load	
	OM1 62.5/125 um Std./1 Gb	OM2 50/125 um Std./1 Gb	OM3 50/125 um 10 Gb-300 m	OM4 50/125 um 10 Gb-550 m	OS2 Single-mode Enhanced	Inch	mm	lb/1000 ft.	kg/km	lb	N

#### TrayOptic Series

Riser (NEC/CEC OFNR/OFN FT.4) PVC Jacket (Indoor/Outdoor)											
2	I100255	I1A0255	I1C0255	I1E0255	I1W0255	0.43	11.00	92	136	600	2700
4	I100455	I1A0455	I1C0455	I1E0455	I1W0455	0.43	11.00	92	136	600	2700
6	I100655	I1A0655	I1C0655	I1E0655	I1W0655	0.43	11.00	92	136	600	2700
8	I400855	I4A0855	I4C0855	I4E0855	I4W0855	0.43	11.00	92	136	600	2700
12	I601255	I6A1255	I6C1255	I6E1255	I6W1255	0.43	11.00	92	136	600	2700
18	I601855	I6A1855	I6C1855	I6E1855	I6W1855	0.43	11.00	92	136	600	2700
24	I602455	I6A2455	I6C2455	I6E2455	I6W2455	0.43	11.00	92	136	600	2700
36	I603655	I6A3655	I6C3655	I6E3655	I6W3655	0.43	11.00	92	136	600	2700
48	I604855	I6A4855	I6C4855	I6E4855	I6W4855	0.54	13.72	128	186	600	2700
60	I606055	I6A6055	I6C6055	I6E6055	I6W6055	0.54	13.72	128	186	600	2700
72	I607255	I6A7255	I6C7255	I6E7255	I6W7255	0.54	13.72	128	186	600	2700
Riser (NEC/CEC OFNR/OFN FT.4) CPE Jacket (Indoor/Outdoor)											
2	I100266	I1A0266	I1C0266	I1E0266	I1W0266	0.43	10.90	89	124	600	2700
4	I100466	I1A0466	I1C0466	I1E0466	I1W0466	0.43	10.90	89	124	600	2700
6	I100666	I1A0666	I1C0666	I1E0666	I1W0666	0.43	10.90	89	124	600	2700
8	I400866	I4A0866	I4C0866	I4E0866	I4W0866	0.43	10.90	89	124	600	2700
12	I601266	I6A1266	I6C1266	I6E1266	I6W1266	0.43	10.90	89	124	600	2700
18	I601866	I6A1866	I6C1866	I6E1866	I6W1866	0.43	10.90	89	124	600	2700
24	I602466	I6A2466	I6C2466	I6E2466	I6W2466	0.43	10.90	89	124	600	2700
36	I603666	I6A3666	I6C3666	I6E3666	I6W3666	0.43	10.90	89	124	600	2700
48	I604866	I6A4866	I6C4866	I6E4866	I6W4866	0.54	13.72	125	192	600	2700
60	I606066	I6A6066	I6C6066	I6E6066	I6W6066	0.54	13.72	125	192	600	2700
72	I607266	I6A7266	I6C7266	I6E7266	I6W7266	0.54	13.72	125	192	600	2700

Table 2: Fiber Optic Cable Guide



Competence Center

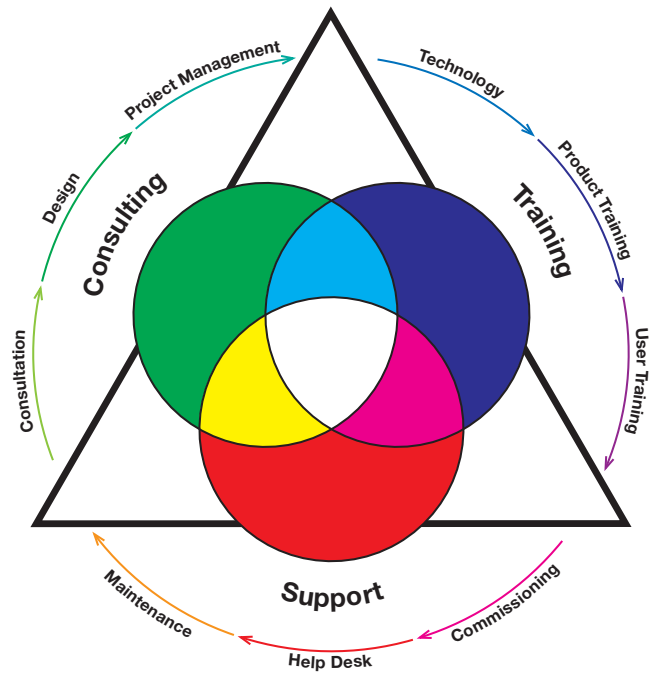


## The Belden Competence Center

As the use and complexity of connectivity solutions have increased, so has the pressures on users to design, implement and maintain them. From plant-level Ethernet networks to Building Management Systems and from Data Centers to Broadcast Studios – all installations and applications require highly sophisticated installation, as well as complex operations and processes.

The Belden Competence Center offers access to unrivalled experience and technical support. Our staff has extensive hands-on experience in designing, installing and using solutions created with our range of Belden, Hirschmann and Tofino Security products.

Each member of Belden's service team has their own field of technical expertise, ensuring that customers get the very best assistance and support.



### What we can do for you – and how

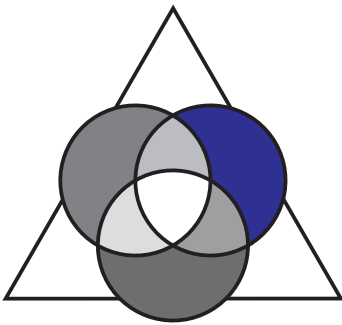
	Optimal Network Solution	Know-how for Reliable Operation	Protection Against Downtimes	Lasting Cost Control
	<ul style="list-style-type: none"> <li>Individual consultation, design, project management</li> <li>Network design and migration concepts</li> <li>Compatibility testing</li> <li>On-site wireless site survey</li> </ul>	<ul style="list-style-type: none"> <li>Training plans</li> <li>Documentation</li> <li>Maintenance concepts</li> <li>Security concepts (network security)</li> </ul>	<ul style="list-style-type: none"> <li>Integration of redundancy</li> <li>Spare parts store concept</li> <li>Emergency concepts</li> </ul>	<ul style="list-style-type: none"> <li>Service planning</li> <li>Complete costing</li> </ul>
	<ul style="list-style-type: none"> <li>Technology and product training courses for network designers</li> <li>Introduction courses for decision makers</li> </ul>	<ul style="list-style-type: none"> <li>Individual user training courses</li> <li>Security training</li> <li>Workshops</li> </ul>	<ul style="list-style-type: none"> <li>Qualification/certification of your employees and external service providers</li> </ul>	<ul style="list-style-type: none"> <li>Update training for technologies and product</li> </ul>
	<ul style="list-style-type: none"> <li>Pre-configuration and pre-assembly of systems</li> <li>On-site commissioning</li> <li>Application tests</li> </ul>	<ul style="list-style-type: none"> <li>Network monitoring and support by in-house experts or partners</li> <li>Network security audit</li> <li>Network baselining</li> </ul>	<ul style="list-style-type: none"> <li>24 x 7 support hotline</li> <li>On-site support</li> <li>Remote service</li> <li>Replacement hardware services</li> </ul>	<ul style="list-style-type: none"> <li>Warranty extension</li> <li>Individual, product-related service packages</li> </ul>



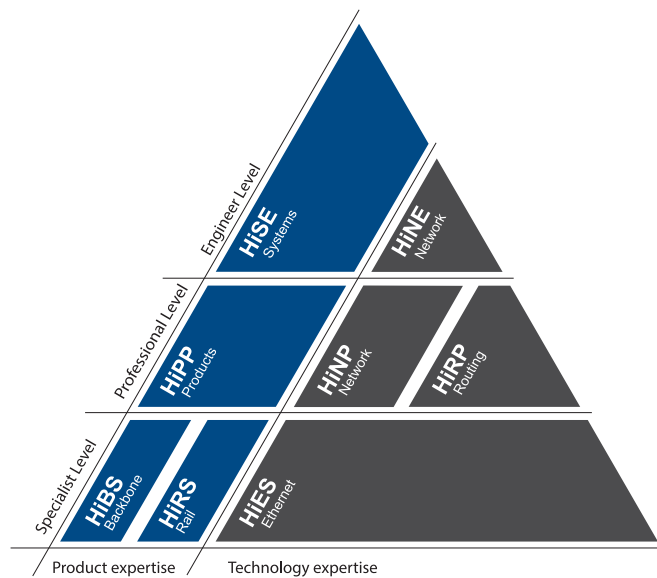
## The Hirschmann Certification Scheme – Unique Proof of Competence

### Why a Certification?

The best form of protection against expensive downtime in a modern industrial network is the assurance of on-site specialists and external service providers qualified to quickly rectify faults, or to prevent them from ever happening. Not every self-proclaimed "Expert" is up to the task. A certification from Hirschmann is confirmation of genuine, up to the minute expertise.



What qualifications would you like to demonstrate? At Hirschmann you can find the right certificate: for any field of expertise at any level.



### Certified Technology Know-how

Certificate	Prerequisite	Training (if required)
HiES – Hirschmann Industrial Ethernet Specialist	HiES Examination	Industrial Ethernet (CT1)
HiNP – Hirschmann Industrial Network Professional	HiES Certification + HiNP Examination	Industrial Networking (CT2)
HiRP – Hirschmann Industrial Routing Professional	HiES Certification + HiRP Examination	Industrial Routing (CT3)
HiNE – Hirschmann Industrial Network Engineer	HiES, HiNP and HiRP Certifications	Professionals certified to HiES, HiNP and HiRP automatically receive the HiNE certification, without sitting an additional exam.

### Certified Product Know-how

Certificate	Prerequisite	Training (if required)
HiRS – Hirschmann Industrial Rail Specialist	HiRS Examination	Rail Family (CP1)
HiBS – Hirschmann Industrial Backbone Specialist	HiBS Examination	Industrial Backbone Devices (CP3)
HiPP – Hirschmann Industrial Product Professional	HiRS Certifications + HiPP Examination	Network Management with Industrial HiVSION (CP2)
HiSE – Hirschmann Industrial Systems Engineer	HiPP, HiRS, HiBS and HiNE Certifications	Holders of these certificates automatically receive the HiSE certification, without sitting an additional exam.

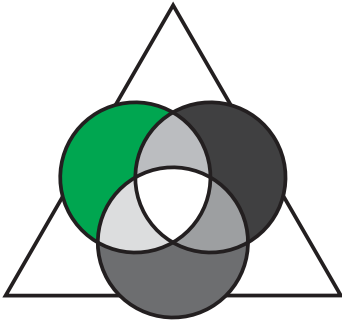


## The Hirschmann Training Program

Training Courses	Objective
Industrial Ethernet (CT1)	In this Industrial Ethernet course the participants will learn details of the technical fundamentals and deployment objectives of the world's most widely used LAN communication protocol. At the end of the course the participants will have a good understanding of Ethernet, as well as its role in industrial networking, both now and in the future.
Industrial Networking (CT2)	This course builds on the experience gained from "Industrial Ethernet" (CT1), providing network experts with intensive theoretical and practical knowledge about TCP/IP, IP communication and multicasting.
Industrial Routing (CT3)	This course builds on the experience gained from "Industrial Networking" (CT2), providing network experts with intensive theoretical and practical knowledge about unicast and multicast routing.
Rail Family – Theory and Practice (CP1)	In a professional environment the participants receive in-depth knowledge about the OpenRail, OpenMICE, MACH, and OCTOPUS Layer 2 functionality. This includes installation, commissioning, and supervision.
Industrial Backbone Components – Theory and Practice (CP3)	In a professional environment the participants receive in-depth knowledge about the MACH and PowerMICE Layer 3 functionality. This includes installation, commissioning, and supervision.
Network Management with Industrial HiVision (CP2)	The participants learn the functions of Industrial HiVision, and reinforce this knowledge with practical exercises.
Hirschmann Operating System – HiOS Layer 2 Software (HiOSL2)	In a professional environment the participants receive in-depth knowledge about the Hirschmann Operating System (HiOS) Layer 2 functionality of the the various RSP variants, MSP, GREYHOUND and EES devices. This includes installation, commissioning, and supervision.
Hirschmann Operating System – HiOS Layer 3 Software (HiOSL3)	In a professional environment the participants receive in-depth knowledge about the Hirschmann Operating System (HiOS) Layer 3 functionality of the the various RSP variants and MSP devices. This includes installation, commissioning, and supervision.
Wireless LAN Basic Application Principles (WLA)	Participants acquire familiarity with the underlying technology of wireless networks and their specific requirements as to range, EMC and security. They are also given an overview of the current state of WLAN technology.
Wireless LAN with BAT Family Workshop (WSWB)	In a professional environment the participants receive in-depth knowledge about the functionality of the Hirschmann BAT family. This includes installation, commissioning, and supervision as an Access Point, Client, or bridge.
Wireless LAN with BAT Family Advanced Workshop (WSWA)	In this workshop the participants learn the extended functionality with an emphasis on how to configure secure access to a network via WLAN. The objective is the successful deployment of complex wireless networks with the possibility to use a Wireless LAN Controller.
Network Security with EAGLE One (SP1)	In a professional environment the participants receive in-depth knowledge about the EAGLE One and its security functionality. This includes installation, commissioning, and supervision.
Network Security with Tofino (SP2)	In a professional environment the participants receive in-depth knowledge about the Tofino and its security functionality. This includes installation, commissioning, and supervision.
Network Security with Multi-Port EAGLE (SP3)	In a professional environment the participants receive in-depth knowledge about the multi-port EAGLE and its security functionality. This includes installation, commissioning, and supervision.



## Consulting



### Leverage our Experience

Whether it is network designing or network optimization – the result is what counts. We make sure our solution matches your ideas and your processes. Through the provision of customized services, we are with you from the initial consultation to the final system.

At every point in the process you receive exactly the amount of support you require. It makes sense to include Hirschmann in your plans right from the beginning. Good advice is only expensive when it comes too late.

### Consultation

Which network technology best suits your applications? Which communications media and products? We assist you during system appraisals and technology selection, prepare migration concepts, and advise you on the suitable deployment of management tools. An emphasis is also placed on the optimum network security solution.

### Design

Correctly designing or optimizing a network is more than just a question of technology. In addition to on-site network design, either cabled or wireless, we prepare an individual program for employee training and system maintenance. Right from the beginning you have comprehensive information about all stages of the process, presented in the way you want it.

### Project Management

Together with our regional partners we also provide specialized support during the implementation of your network projects. In the Hirschmann test laboratory we can verify the compatibility of system components you have chosen. Critical functions can be simulated in a test environment.

At the commissioning stage we will provide you with complete technical documentation, as well as product familiarization for your employees.





## Support

### On Demand and in Demand

Time is money. A lot of money, when a network is out of service. Therefore our internal and external support specialists make sure that from day one your system is functioning perfectly – and stays that way. Through long-term technical advice and if necessary, through short-term troubleshooting. Ask us about our services.

### Commissioning

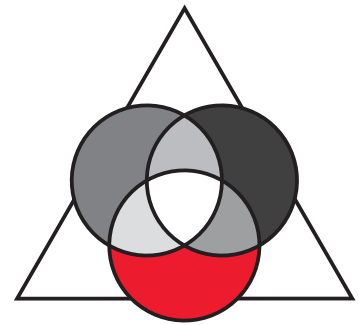
The Hirschmann Support Team is at your disposal at any time for professional installation and configuration of your equipment. We will support you and your employees during on-site commissioning – or undertake the complete installation. All Hirschmann components can of course be delivered pre-configured by us. Reliability right from the start – directly from the manufacturer.

### Help Desk

To bring your network back into operation again with the minimum of delay, contact our central Support Desk via the Hirschmann Service Hotline. Our experts are waiting for your call: for technical questions and problems, or if you need a replacement device. Subject to contract, direct problem diagnosis and rectification is available from our Help Desk around the clock.

### Maintenance

Mission critical networks cannot afford downtime. We can help you to maximize the availability and lifetime of your network. We can design a maintenance concept tailored exactly to your needs, and if required can implement the concept in cooperation with our specially trained and certified partners. This is where the network services cycle closes. Inevitably the time will come when it is once more necessary to optimize your network. No problem, when you can rely on the unparalleled consulting competence from Hirschmann.





**Three Leading Brands,  
One Reliable Partner**

Through ongoing research and development, we are committed to providing you with the best solutions.

Belden is a partner, that is committed to help you achieve your targets. By combining the strength of our powerful brands Belden, Hirschmann and Tofino Security, we are able to deliver the solutions you need.

**Belden**

Belden designs, manufactures and markets a comprehensive portfolio of high-speed electronic cables, connectivity products and related items for the specialty electronics and data networking markets. All products are designed to be used in the harshest environments and mission critical applications. We add value through design, engineering, excellence in manufacturing, product quality and customer service. [www.beldencables-emea.com](http://www.beldencables-emea.com)

**Hirschmann**

As the technology and market leader in industrial networking, Hirschmann develops innovative solutions, which are geared towards customers' requirements in terms of performance, safety, productivity, efficiency and investment reliability. Hirschmann offers a complete, integrated structure for data communication throughout. [www.hirschmann.com](http://www.hirschmann.com)

**Tofino Security**

Tofino Security provides practical and effective industrial network security products that are simple to implement and that do not require plant shutdowns. The Tofino Industrial Security Solution protects industrial networks from external cyber threats and internal network incidents. It facilitates the implementation of Plug-n-Protect zones of security for equipment with commons safety requirements, as recommended in ANSI/ISA-99 standards. Tofino Security products are used by the process control, SCADA, manufacturing and automation industries. [www.belden.com](http://www.belden.com)

Our global product brands enable us to provide complete network solutions from a single source, with worldwide market access and delivery.



**Customized Solutions**

We have a vast product portfolio for effective signal transmission solutions. If a standard design is insufficient for one of your applications, we develop a solution that will do the job. This is what we mean with "strategic partnership": being flexible and responsive, whilst using our expertise to develop a solution that meets your requirements. With the specific customization teams, R&D expertise and production technology in place, we can realize cost-effective customized solutions in very short time and to our usual high quality standard.



### Demand Driven Innovation

Your needs are our drivers of innovation. That's not merely a promise; our continuous investment in innovation is clearly demonstrated by our numerous patents. Through ongoing research and development, we are committed to providing you with the best solutions. As a market leader, we also play an active role in key industry associations around the world – thus helping to develop standardization for global applications and products. We are active in IEC, IEEE, ODVA, PNO, EPSG, as well as numerous manufacturer-independent organizations. All this with just one goal: being able to deliver you that specific solution you need; today as well as tomorrow.

### Durable Solution: GreenChoice

A perfect example of market driven innovation is GreenChoice; our answer to the increasing demand for greener and more sustainable solutions. Focusing on reducing the ecological impact of our products has led to our most durable product range ever. Numerous Belden products are now available as GreenChoice products, giving you the opportunity to make responsible choices.



### Partner Network

Working with us means working with our committed partner network, across all Belden brands. We combine our resources, intelligence and skills to take Belden products and solutions to the next level.

### Ten Clear Benefits and Promises

At Belden every new challenge is considered unique, whether a standard solution is sufficient or a customized solution is needed. Whenever necessary, we adapt our products and services to your requirements and demands. Although flexibility is key, there are always ten clear benefits that you can rely on. They underlie the way we work, regardless of a project's size or nature. These are our ten most important benefits to you:

- 1 A wide range of standard and tailored signal transmission solutions from one single source.
- 2 Hassle-free and secure signal transmissions under the toughest conditions.
- 3 Reducing total cost of ownership.
- 4 Best-in-class products with proven superior performance.
- 5 Reliability for maximum uptime and minimum maintenance.
- 6 Fast delivery of solutions and ease of installation.
- 7 Local technical support backed by extensive global resources.
- 8 Belden, Hirschmann und Tofino Security: brands with a long history and an excellent reputation.
- 9 Design support and innovation.
- 10 Continued analysis of market needs for continuous development of effective solutions.

### Get in Touch or Better Yet... Challenge Us

We invite you to put us to the test. Make your next challenge our success. We're looking forward to providing you with a superior solution that will open a whole new range of opportunities, both technological and business-wise.

Please call or mail your contact person at Belden and we'll be certain to make an appointment.

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