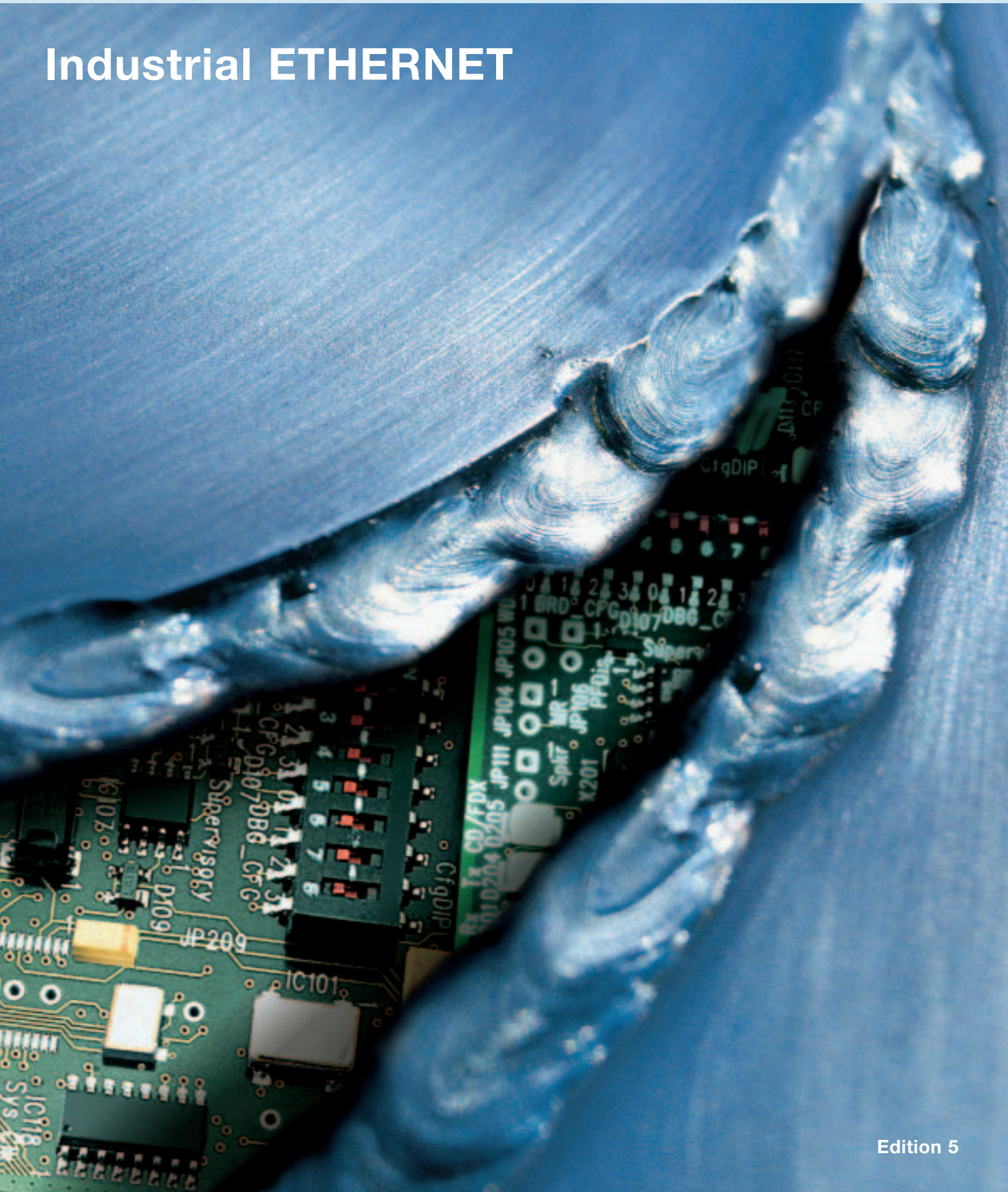
HIRSCHMANN
A Belden Company

Hirschmann. Simply a good Connection.

Industrial ETHERNET



Edition 5

Some errors can be really expensive.

What good are the greatest technical inventions if you are going to save on the smallest details later?

That man today is capable of great technical development is a sufficiently proven fact. Regardless of whether in production, process and traffic control technology or in building automation: from the packing industry and logistics through conveyor and robot technology, assembly machines and machine tools, presses and punching machines right up to machine and system control.

When it's a question of reliability, operating safety and availability, the slightest errors count. And these can be very expensive in the worst case. Because, especially in economically difficult times, a trouble-free automation contributes considerably to productivity and competitiveness – and protects jobs in the long term.

Therefore it is becoming increasingly important nowadays to ensure the greatest possible safety and reliability for even the smallest system components.

From the product quality through engineering and the associated service. Hirschmann offers a comprehensive package: with a high degree of intelligence, they not only set the latest technical standards but, with their high flexibility, ensure individual and absolutely reliable solutions at the heart of the automation – in computer and measuring technology. This minimizes risks in the system and a high system availability is built in from the start.

Safety at the press of button for us means leaving nothing to chance. Therefore every Hirschmann switch is rigorously tested before leaving the factory. After all, constantly rising transmission speed

with high clock frequencies demand appropriate designed high-performance switches which are not easily sidetracked. Just like our engineers who, with their long years of experience in the field of industrial automation and as the inventors of the banana plug, detect interface problems before they even occur and cause expensive faults.

The result is extremely reliable and efficient Industrial ETHERNET solutions which ensure reliable data transfer even under the harshest ambient conditions. In automation technology and mechanical engineering as well as in process and traffic automation, the shipping industry, offshore and in control rooms. The reliable and robust Industry Switches from Hirschmann will certainly increase the availability of your networks and guarantee your competitiveness.

Don't miss your connection: Hirschmann offers you flexible, highly available and future-safe network technology solutions in the usual high quality from simple switches through field bus systems to high-performance ETHERNET components. Plus a comprehensive and highly qualified maintenance and service program – all under one roof.

The specialists from Hirschmann are always on hand to answer your questions and our worldwide distribution network guarantees you an optimum supply – so that you have not only the latest technology but also time on your side.

In this modern industrial age, one can no longer afford failures. Smaller interfaces such as Rail Switches or MICEs may be what decide standstill or progress, waste or competitiveness. It's a good idea to install future safety from the start with Hirschmann Industrial ETHERNET components.

New standards in terms of individuality.

Flexible special solutions from Hirschmann.

Hirschmann exhibits the same maximum flexibility in Industrial ETHERNET components as in switches of the Rail and MICE series. With the OpenRail and MICE enhanced module program we offer tailor-made series individuality. According to the modular principle and with a whole range of possibilities: from the Entry Level Switch without any great management functions via the Managed Switches to the highly flexible, modularly built switches. The whole thing with the high security and fail safety level you are used to from Hirschmann. We offer the most economical solution for every requirements – plus extra service.

OpenRail

MICE enhanced

Regardless of which configuration you need, you will find the tailor-made product in the extensive Hirschmann standard and special solution program.

Just a few mouse clicks away from the right product.

The electronic consultant asks for your individual requirements.

The electronic consultant under **www.hirschmann.com/xpert/** takes you to our product recommendation in four fast, simple steps. It makes no difference whether it's a matter of connectors, Industrial ETHERNET components or FiberINTERFACES. You select area of application, product category, criteria and requirements – and immediately receive our individual product recommendation.

The Electronic Consultant is also available on the CD-ROM catalog.

www.hirschmann.com/xpert/

The best connections – in all areas.

Hirschmann productions are convincing all down the line.

Industrial Connectors

As the inventor of the banana plug, Hirschmann stands for the best and extremely reliable connections with constant new generations of connectors. Thanks to our wide performance range we offer the right connector solution in every case: whether with our standard products, the OpenConnector kit, bus connectors or Connectors Unlimited. Ask for information about Industrial Connectors today and have a word with us about your individual requirements.

General catalog
Industrial Connectors

Product overview
Industrial Connectors

FiberINTERFACES

Also where optical transmission technology and fiberoptics are concerned, Hirschmann convinces with its high transfer speeds and absolute interference immunity. With a wide selection of FiberINTERFACES for the process, transport and factory automation. Ask for information about INET now.

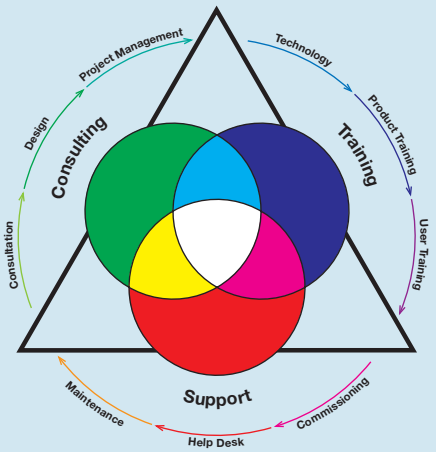
General catalog
FiberINTERFACES

Product overview
FiberINTERFACES/
Field bus components

From the quality product to the top solution.

The Hirschmann Competence Center will help you.

In addition to prime connectors and network components, Hirschmann also offers the appropriate consulting, service, support and training know-how with the Competence Center to support you in the realization of your total solution without manufacturer dependence. Talk to us about your individual requirements.



Under www.hicomcenter.com you will find our extensive maintenance and service offer which ranges from pre-sales consulting to after-sales support.

www.hicomcenter.com

Connecting to the system.

We rarely bring out good products in isolation, instead they are issued as a part of a large family.

Company-wide universal networks suitable for industrial applications with high levels of accessibility – that is what the product families Rail, MICE and MACH 3000 have in common. Because they all support the Hirschmann redundancy concept HIPER-Ring. As a result, the reconfiguration of the network is done in only fractions of seconds.

Rail Transceivers and Hubs for Industry **Page 16**

Rail Transceivers and Hubs

No other Hirschmann product has proven itself better under the great demands of industrial automation technology than the sturdy and perfectly matched members of the Rail Family. Simply snap our standard products made especially for industrial applications with a 24-V power supply onto a DIN rail and you're ready to go. As a result, these products have provided exceptional performance for many years in numerous company-wide networks. Transceivers and hubs of the Rail Family also connect you to the ETHERNET future of automation, as you adapt the network optimally to the needs of your system – whenever you want.

- **The special industrial design without fans extends your range of applications.**
- **Plug-in connections and extensive status displays save time during commissioning.**
- **Rail products allow for data connections between individual components over distances up to 20 km.**

RT2 TX/FX

RH1 CX+ (NAVY)

Rail Switches unmanaged and managed **Page 20**

Rail Switches

Different requirements require different solutions: high port densities, high cascading depth or high operating temperatures? No problem for the world's most complete rail product portfolio! Hirschmann Rail Switches with or without management functionality and high-temperature ranges come ready to handle every requirement. The modular platform "OpenRail" enables individual customer-specific configuration of the products. Expect no less from an industrial switch.

- **Excellent price per port ratio and feature set.**
- **High-operating reliability and zero compromise industrial suitability make Hirschmann the obvious choice.**
- **With autonegotiation, autopolarity, autocrossing and clear diagnosis displays, the commissioning of a managed Rail Switch can be achieved at exceptionally high speed.**

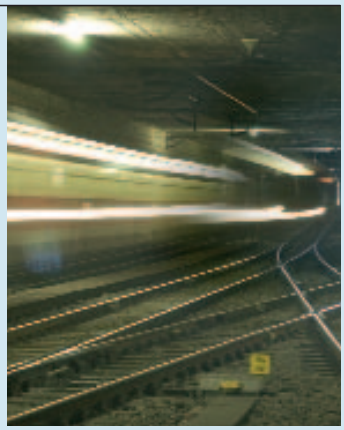
SPIDER 8TX

RS20-1600M2M2

Compact rail switches for harsh environmental conditions

Page 68

RSR



When the going gets tough for DIN rail switches (i. e. shock, vibration and temperatures fluctuating between – 40° C and + 85° C), the rugged new Hirschmann rail switches deliver the performance you need. Hirschmann rail switches are built to take the punishment in marine, rail, road and other transportation automation applications including fiberoptic rail networks, train station passenger information systems, conveyors and airport runway lights.

- **The rugged new rail switches offer maximum reliability in mission-critical applications**
- **Uplink Ports can be configured separately**
- **Wide input range (18V DC up to 300V AC/DC)**

RSR

Modular Industrial Switches

Page 74

MICE

Modular **I**ndustrial **C**ommunication **E**quipment or MICE, provides total freedom in the network. Irrespective of whether you want to use the intelligent product family centrally in the control cabinet or in a decentralized manner in the distribution cabinet, MICE Switches and media modules are, quite simply, capable of handling every requirement in the Industrial ETHERNET Network.

- **Due to the modular construction and integration in the "OpenRail" concept, you can individually assemble functions and connections.**
- **Long-term accessibility and maximum flexibility mean a high level of investment protection.**
- **The label fields make commissioning easier and save time during service actions.**

The use of our extremely flexible MICE Family gives you a double benefit: you profit from the high accessibility of the network and simultaneously optimize inventory.

MS20

MS30

Security System for Industry

Page 114

The EAGLE System

Conscious or accidental data manipulation causes damages to company networks in millions every year. But there is a way to protect yourself: the state-of-the-art security system EAGLE mGuard guarantees protection of your data and availability of communication in your production networks with its Firewall and Virtual Private Network (VPN) technology.

Take cover:

- **The Firewall and VPN system can be integrated in existing networks without changing the IP addresses.**
- **Communication can be protected as required with the scalable security functionality.**
- **Industrially compatible design with redundant 24-V power supply, DIN rail mounting and IP 20, no fan.**

EAGLE mGuard

Wireless ETHERNET AP/AC

Page 122

BAT

Hirschmann takes the next step towards a wireless future and, with the BAT54 Family, offers everything you need for a safe WLAN communication in the industrial environment. Mobile applications are now supported with higher performance and maximum security. A stable hardware and efficient software join forces in a powerful package.

- **WLAN with high performance up to 108 Mbit/s for high performance indoor and outdoor connections.**
- **Networks are built up quickly and stably with the support of a suitable antenna portfolio.**
- **Redundancy in the power supply, the WLAN connection and the firmware management are examples of particularly high operating safety.**
- **Fast roaming, an integrated Firewall, WLAN encryption with IEEE 802.11i and authentication are keywords for maximum connection security.**

BAT54-Rail

BAT54-F

Standardized M12 Technology

Page 134

OCTOPUS IP 67 System

The onslaught of Industrial ETHERNET at field level is unstoppable in many places – and with the IP 67 technology on M 12 basis, Hirschmann has set the points in the direction of future technology. We offer you the possibility to implement an open system for the first time on the factory floor. OCTOPUS in protection type IP 67 can stand a lot more – even directly on the machine.

- **In sensor and actuator applications, OCTOPUS takes over tasks which often used to be done by field buses.**
- **OCTOPUS can be implemented directly in the field without a protective housing to save space and costs.**
- **The 4-pin M 12-D technology is recognized by the industry and relevant user organizations as a standard.**

OCTOPUS 16 M

MM3-4TX5

Switches for harsh environmental conditions

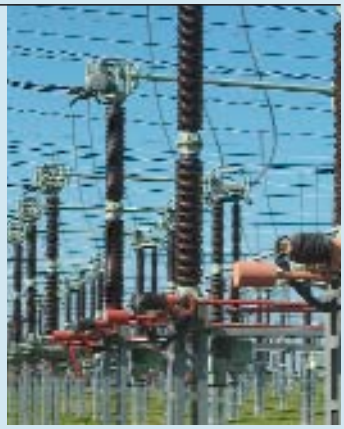
Page 144

MACH1000

The ruggedized Hirschmann substation switches have been specially designed to handle demanding electrical power generation and distribution applications. The switches are ideal for new installations and retrofit of existing substations where ambient temperatures can be extremely high.

- **Gigabit- and Fast-ETHERNET switches**
- **High port density, up to 26 ports**
- **User-selectable port assignment**
- **Temperature range: -40°C up to +85°C**

MACH1000



Modular Industrial Backbone Switches and Routers

Page 148

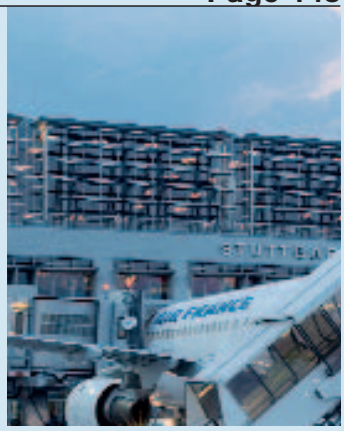
MACH 4000

Today, devices need to convince in a wide range of applications with high performance, very high flexibility and extraordinary intelligence. The redundancy concept is consistent from the Gigabit-Backbone to the machine for industry. The new MACH 4000 Switches and routers in the backbone area, where many networks converge, enable a maximum transmission performance with up to 10 Gigabit- ETHERNET. This is not only demanded in factory and traffic automation but also increasingly on ships where the ETHERNET will be the standard in future. By the way: because of the high modularity of Hirschmann switches, you only pay for the hardware you really need.

- **The redundancy concept encompasses the complete range, from the Gigabit-Backbone to the industrial devices.**
- **User specific security functions prevent communication by unknown devices.**

MACH4002 48G+3X

MACH4002 24G+3X



Workgroup Switches

Page 166

LION

In this way, you benefit from the enormous know-how lead of a Hirschmann solution in your new and extended near-office installations: our high performance workgroup switches are first choice wherever work teams with variable numbers of users have to be networked or an optimum connection to the backbone is being sought.

- **Hirschmann Workgroup Switches offer various uplink modules and flexible extension possibilities.**
- **State-of-the-art technology: Port-based Network Access Control and Backdoor Interface for troubleshooting.**

PowerLION-24 TP

GigaLION-24 TP

Page 178

Industrial HiVision

Exact knowledge of the network topology is essential to be able to monitor industrial networks reliably. The administrator has to know how and where which components and devices are connected in order to be able to manage complex networks with a single software and intervene or maintain if necessary.

Industrial HiVision projects your network with its hierarchical structure and topology – regardless of which manufacturer has provided the terminating equipment such as PLC controllers, I/O components or PCs. The user-friendly software therefore remains open for all programmable logic controllers and distributed I/O components up to the switch, router, etc. The network data can be fully integrated in SCADA systems via the OPC and ActiveX interfaces.

The new standard IEEE 802.1AB now enables device data to be exchanged in the network via the defined LLDP protocol (Link Layer Discovery Protocol). The switches adopt a key role – providing they support LLDP, which is the case with all Industrial ETHERNET switches from Hirschmann.

- **The display of the network topology enables you to find errors and “bottlenecks”, for example, or to increase the network security.**
- **By specialization of the products in network monitoring (Industrial HiVision), device configuration (HiVision) and SCADA linking, the network management can be adapted to individual requirements.**
- **By linking the costs to the number of users (Industrial HiVision) the investment already pays off for smaller networks.**

Industrial HiVision

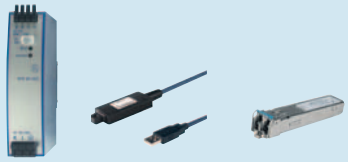
Page 194

Transceiver and System Accessories

For convenience, functionality and the highest possible level of security for your equipment, it is the small things that make the biggest difference. That is why the right accessories really round off each product family.

Yet more good reasons for you to trust accessories exclusively from Hirschmann.

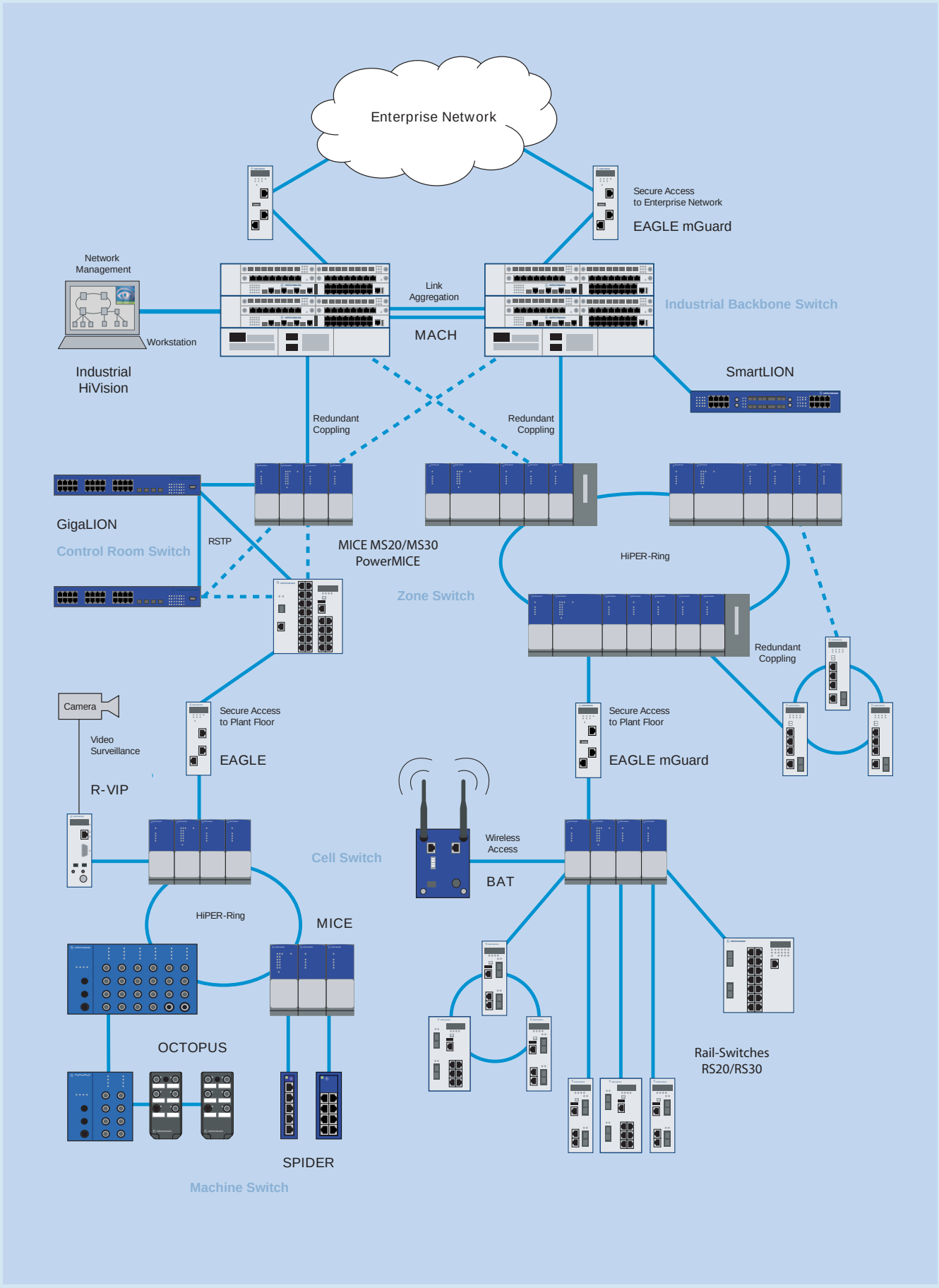
- **Each and every accessory offers a reasonable solution in practice.**
- **All our accessories are perfectly adapted to each product family.**
- **Like all Hirschmann products, the system accessories satisfy the high demands of our clients with regards to quality, reliability and longevity.**



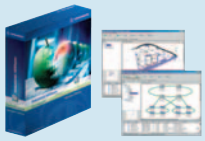
RPS 80 EEC **ACA 21-USB** **M-SFP Transceiver**

Hirschmann Industrial ETHERNET Solutions.

Product Portfolio



	 Transceiver, Hubs and Entry Level Switches **Rail-Family** Page 16-19	 Compact Industrial Switches **OpenRail-System** Page 42-67	 Modular Industrial Switches **OpenRail-System** Page 74-113	 Security System for Industry **EAGLE mGuard** Page144-121
Functions				
Product families				
Transceivers	•			
Hubs	•			
Unmanaged Switches	•	•		
Managed Switches		•	•	
Modulare Switches			•	
Workgroup Switches				
Routers			•	•
Security (Firewall/VPN)				•
Diagnosis and configuration software				
Product Characteristics				
Installation and Supply				
DIN Rail 35 mm	•	•	•	•
19"-Rack				
24V DC	•	•	•	•
48V DC		•	•	•
230V AC				
Ambient conditions				
Operating temperature: 0 °C to 50 °C				
Operating temperature: 0 °C to > 50 °C	•	•	•	•
Operating temperature: -40 °C to 70 °C	•	•	•	
Operating temperature: -40 °C to 85 °C				
Protection type: IP20/30	•	•	•	•
Protection type: IP65/67				
Port count (Hubs or Switches)				
< 8	•	•	•	•
8 to 24		•	•	
> 24		•	•	
Standard				
ETHERNET (10 Mbit/s)	•	•	•	•
Fast-ETHERNET (100 Mbit/s)	•	•	•	•
Gigabit-ETHERNET (1000 Mbit/s)		•	•	
10 Gigabit-ETHERNET (10000 Mbit/s)				
Redundancy				
Ring structure (HIPER-Ring)		•	•	
Redundant coupling		•	•	
Spanning Tree/Rapid Spanning Tree		– / •	– / •	
Link Aggregation		•	•	
Service				
Web-based Managem./SNMP Support		•	•	•
Port mirroring		•	•	
RMON		•	•	
VLAN		•	•	
IP-Multicast control (IGMP, GMRP)		•	•	
Access control (Port Security)		•	•	•
Password control		•	•	•
Auto-configuration adapter		•	•	•
Signal contact/Fault relais	•	•	•	•
Approvals				
UL/CSA	•	•	•	•
Germanischer Lloyd		•	•	•
Field of Application				
Machines (Printing machines machine tools, generators, etc.)	•	•	•	•
Installations (Manufa. cells, sewage treatment plants, windparks, etc.)	•	•	•	•
Offices (Production planning MIS, ERP, MES, etc.)				•
Buildings (Production halls, adm. buildings, process control, etc.)		•	•	•
Locations/Backbone (Factories, power stations etc.)			•	•
Roads/Transport media (Motorways,, metros, tunnels, pipelines, shipping, etc.)	•	•	•	•

 Wireless ETHERNET AP/AC **BAT** Page 122-133	 Standardized M12 Technology **OCTOPUS IP 67** Page 134-143	 Modularer industrial Backbone Switch/Router **MACH 4000** Page 148-165	 Ruggedized Switches **RSR/MACH1000** Page 68-73/144-147	 Workgroup-Switch **LION** Page 166-177	 Network management **Industrial HiVision** Page 178-193
	•				
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Contents

Always one step ahead.

All our experience goes into the Rail Transceivers and Hubs.

Individual devices may have to be connected to ETHERNET at low costs over a distance of 20 kilometers. No problem for the rail transceivers from Hirschmann which are also way ahead in terms of convenience. Because, like all representatives of the Rail Family, rail transceivers can be snapped to the DIN rail in no time. An additional contact offers you the possibility of acquiring device status messages directly as process data. Rail transceivers and hubs from Hirschmann are specially designed for no-compromise use in industrial automation – and therefore all representatives of the Rail Family have something in common: the indestructible robustness and easily pluggable connections which save a lot of time in commissioning. To ensure you stay more than a little ahead in global competition.

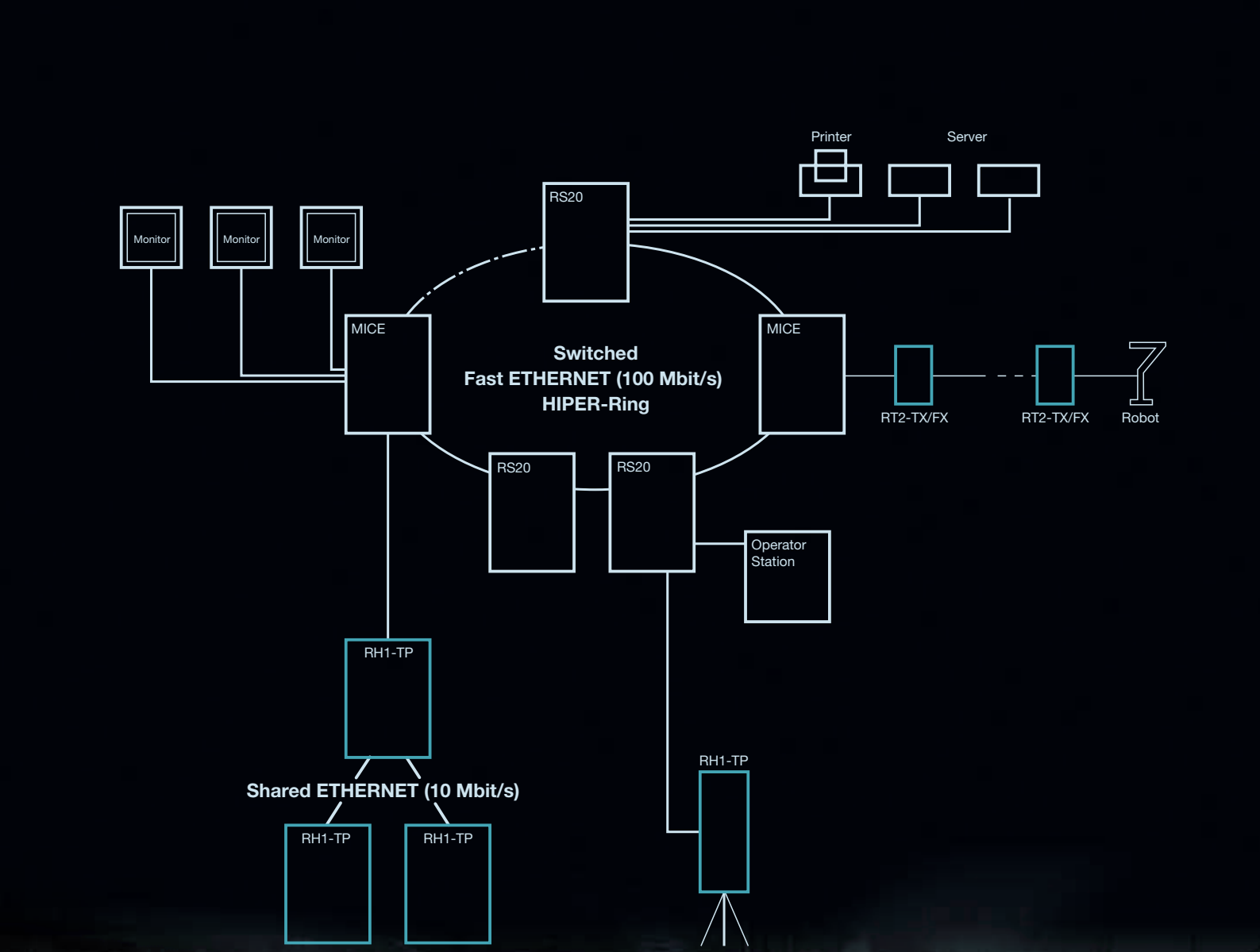
- ***Rail Transceivers and Hubs allow an optimum adaptation of industrial networks to the requirements of a system at any time.***
- ***Long distance connection of remote devices: Rail transceiver (100BASE-TX) with twisted pair and optical port.***
- ***Smaller networks: Rail hub RH1-TP (10Mbit/s) with four twisted pair ports.***
- ***Different technologies: Rail hub RH1-CX+ with two twisted pair ports as well as fiberoptic port and coaxial connection.***

RT2-TX/FX

RH1-TP

RH1-CX+

Accessories
for this family you can find on the following pages:
System Accessories Page 202



Hirschmann Competence Center

Because innovative **Rail Switches** also require an appropriate service program, the Hirschmann Competence Center also offers suitable consulting services in the network planning: **Network optimization check, risk reduction consulting, network technology evaluation and network baselining consulting.** Plus the following trainings: CP1d Rail Family in theory and practice, IRd overview of the Hirschmann Rail Family, CPUd Update Rail Family and CB1e Industrial ETHERNET/basic technical principles. In addition, we provide support with certification testing, installation and configuration as well as our service hotline and later offer Advance Hardware Replacement and warranty extensions.

www.hicomcenter.com

Industrial ETHERNET

Rail Family > **Rail Hubs**

Type	RH1-CX+ (NAVY)	RH1-TP
Order No.	943 701-002	943 639-002
		
	Industrial ETHERNET Rail Hub, Ethernet (10 Mbit/s)	Industrial ETHERNET Rail Hub, Ethernet (10 Mbit/s)
Product description Port type and quantity	1 x 10BASE2, CX cable, BNC socket, 1 x 10BASE-FL, MM cable, ST (BFOC) sockets, 2 x 10BASE-T, TP cable, RJ45 sockets	4 x 10BASE-T, TP cable, RJ45 sockets
More Interfaces Power supply/signaling contact	1 plug-in terminal block, 5-pin	1 plug-in terminal block, 5-pin
Network size - length of cable Twisted pair (TP) Multimode fiber (MM) 50/125 µm Multimode fiber (MM) 62.5/125 µm Coaxial (CX)	0 - 100 m 0 - 2300 m, 10 dB link budget at 850 nm, A = 3 dB/km, 3 dB reserve, B = 400 MHz x km 0 - 3100 m, 13 dB link budget at 850 nm, A = 3.2 dB/km, 3 dB reserve, B = 200 MHz x km 0 -185 m	0 - 100 m
Network size - cascadibility Propagation equivalent Path variability value Path delay value	port <-> port: 240 m port <-> port: 3BT	TP port <-> TP port: 190 m TP port <-> TP port: 4 BT
Power requirements Operating voltage Current consumption at 24 V DC	24 V DC (-25% to +30%) max. 300 mA	24 V DC (-25% to +30%) max. 130 mA
Service Diagnostics	LEDs (power, data, link status, error), signal contact/fault relais (24 V DC / 1 A)	LEDs (power, data, link status), signal contact/Fault relais (24 V DC / 1 A)
Redundancy Redundancy functions	redundant 24 V power supply	redundant 24 V power supply
Ambient conditions Operating temperature Storage/transport temperature Relative humidity (non-condensing) MTBF	0 °C to +60 °C -25 °C to +70 °C 10% to 95% 78.1 years; MIL-HDBK 217F: Gb 25 °C	0 °C to +60 °C -25 °C to +70 °C 10% to 95% 159.7 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction Dimensions (W x H x D) Mounting Weight Protection class	47 mm x 135 mm x 129 mm DIN Rail 35 mm 340 g IP 20	40 mm x 125 mm x 80 mm DIN Rail 35 mm 530 g IP 30
Mechanical stability IEC 60068-2-27 shock IEC 60068-2-6 vibration	15g, 11ms duration, 18 shocks 1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	15 g, 11 ms duration, 18 shocks 1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz,
10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity EN 61000-4-2 electrostatic discharge (ESD) EN 61000-4-3 electromagnetic field EN 61000-4-4 fast transients (burst) EN 61000-4-5 surge voltage EN 61000-4-6 conducted immunity	6 kV contact discharge, 8 kV air discharge 10 V/m (80 - 1000 MHz) 2 kV power line, 1 kV data line power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line 3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)	6 kV contact discharge, 8 kV air discharge 10 V/m (80 - 1000 MHz) 2 kV power line, 1 kV data line power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line 3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity FCC CFR47 Part 15 EN 55022	FCC CFR47 Part 15 Class A EN 55022 Class A	FCC CFR47 Part 15 Class A EN 55022 Class A
Approvals Safety of industrial control equipment Hazardous locations Safety of information technology equipment FM 3611 Class 1 Div 2 FM 3810 Germanischer Lloyd	Germanischer Lloyd (15 662 - 00 HH)	cUL 508 (E175531) cUL 1604 Class 1 Div 2 (E203960) cUL 60950 (E168643) FM 3611 Class 1 Div 2 (3012523) FM 3810 (3012523) Germanischer Lloyd (15 662 - 00 HH)
Scope of delivery and accessories Scope of delivery Accessories to order separately	device, terminal block, operating manual rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame	device, terminal block, operating manual rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame

Industrial ETHERNET

Rail Family > **Rail Transceiver**

Type	RT2-TX/FX	RT2-TX/FX-SM
Order No.	943 658-002	943-658-032
		
	Industrial ETHERNET media converter, 100BASE-FX-Multimode and 100BASE-TX	Industrial ETHERNET media converter 100BASE-FX-single mode and 100BASE-TX
Product description		
Port type and quantity	1 x 100BASE-FX, MM cables, SC sockets, 1 x 100BASE-TX, TP cable, RJ45 socket	1 x 100BASE-FX, SM cables, SC sockets, 1 x 100BASE-TX, TP cable, RJ45 socket
More Interfaces		
Power supply/signaling contact	1 plug-in terminal block, 5-pin	1 plug-in terminal block, 5-pin
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	0 - 100 m
Multimode fiber (MM) 50/125 µm	0 - 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 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	
Single mode fiber (SM) 9/125 µm		0 - 32.5 km, 16 dB link budget at 1300 nm, A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)
Network size - cascadibility		
Propagation equivalent		
Path variability value		
Path delay value	84 BT (Class 2 Repeater)	84 BT (Class 2 Repeater)
Power requirements		
Operating voltage	24 V DC (-25% to +30%)	24 V DC (-25% to +30%)
Current consumption at 24 V DC	max. 240 mA	max. 240 mA
Service		
Diagnostics	LEDs (power, data, link status), signal contact (24 V DC / 1 A)	LEDs (power, data, link status), signal contact (24 V DC / 1 A)
Redundancy		
Redundancy functions	redundant 24 V power supply	redundant 24 V power supply
Mechanical construction		
Dimensions (W x H x D)	47 mm x 135 mm x 111 mm	47 mm x 135 mm x 111 mm
Mounting	DIN Rail 35 mm	DIN Rail 35 mm
Weight	230 g	230 g
Protection class	IP 20	IP 20
Ambient conditions		
Operating temperature	0 °C to +60 °C	0 °C to +60 °C
Storage/transport temperature	-25 °C to +75 °C	-25 °C to +75 °C
Relative humidity (non-condensing)	10% to 95%	10% to 95%
MTBF	137 years; MIL-HDBK 217F: Gb 25 °C	137 years; MIL-HDBK 217F: Gb 25 °C
Mechanical stability		
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity		
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge	4 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line	power line: 1 kV (line/earth), 0.5 kV (line/line), 1 kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)	10 V (150 kHz - 80 MHz)
EMC emitted immunity		
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A	EN 55022 Class A
Approvals		
Safety of industrial control equipment	cUL 508 (E175531)	cUL 508 (E175531)
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)	cUL 1604 Class 1 Div 2 (E203960)
Safety of information technology equipment	cUL 60950 (E168643)	cUL 60950 (E168643)
FM 3611 Class 1 Div 2		
ATEX 100a	EEx nL IIC T4	EEx nL IIC T4
Germanischer Lloyd	Germanischer Lloyd (15662-00HH)	
Scope of delivery and accessories		
Scope of delivery	device, terminal block, operating manual	device, terminal block, operating manual
Accessories to order separately	rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19" installation frame	rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19" installation frame

So good yet so, favorably priced.

Unmanaged and EEC Rail Switches are convincing in their variety and attractive price.

Our unmanaged Rail Switches are efficient all rounders which make much possible at a favorable port price: for example, the flexible planning and optimum adaptation to the geographic conditions of an automation solution or simple commissioning on site. And, because critical conditions should not be an issue, EEC rail switches as specialists ensure an extended operating range with temperatures of –40 °C to +70 °C. Without setting anything aside: fast DIN rail mounting, high network and system availability and redundant 24 V power supply, a signal contact for telediagnosis – it's all there. From simple applications to applications with high port densities, with the Rail Family we have a switch tailor-made for all demands which is designed mission-critical from the start. This guarantees a reassuringly high operating reliability because not even electromagnetic interference fields or mechanical stress can bother a real Hirschmann switch.

- ***Rail Switches without management function with favorable price per port ratio.***
- ***EEC switches extend the application range with operating temperatures of –40 °C to +70 °C.***
- ***SPIDER Switches with low weight, compact dimensions and easy handling for plug&play with autonegotiation, autocrossing and autopolarity.***
- ***Licensed for use in vehicles (e1).***
- ***High industrial compatibility, DIN rail or wall mounting.***

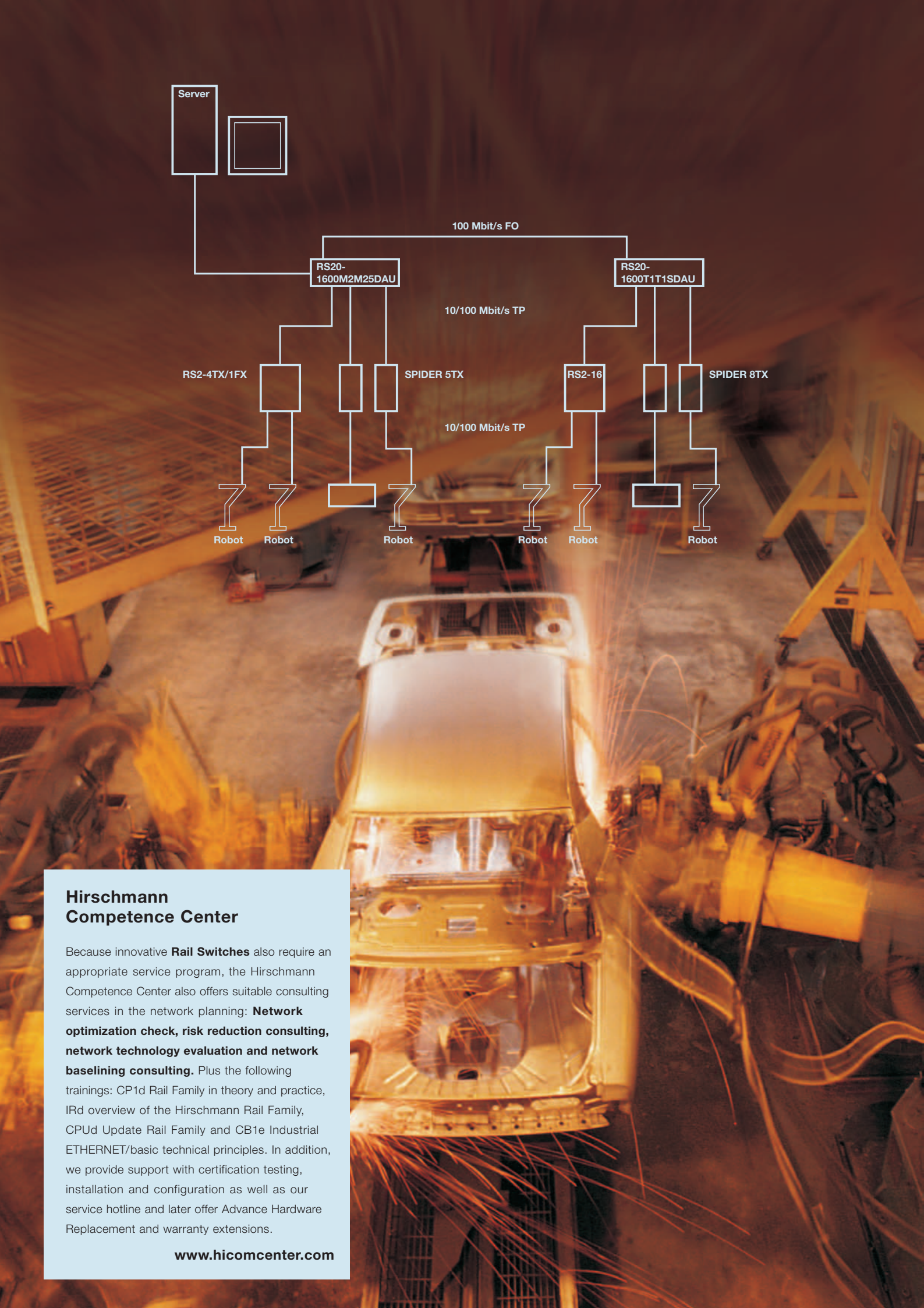
RS2-4TX EEC

RS2-TX

SPIDER 8TX

Accessories
for this family you can find on the following pages:

Transceiver Page 194
System Accessories Page 202



Hirschmann Competence Center

Because innovative **Rail Switches** also require an appropriate service program, the Hirschmann Competence Center also offers suitable consulting services in the network planning: **Network optimization check, risk reduction consulting, network technology evaluation and network baselining consulting.** Plus the following trainings: CP1d Rail Family in theory and practice, IRd overview of the Hirschmann Rail Family, CPUd Update Rail Family and CB1e Industrial ETHERNET/basic technical principles. In addition, we provide support with certification testing, installation and configuration as well as our service hotline and later offer Advance Hardware Replacement and warranty extensions.

www.hicomcenter.com

Industrial ETHERNET

Rail Family > Unmanaged Rail-Switches

Type	SPIDER 1TX/1FX
Order No.	943 890-001
	
	Entry Level Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet and Fast-Ethernet (10/100 Mbit/s)
Product description	
Port type and quantity	1 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity 1 x 100BASE-FX, MM cable, SC sockets
More Interfaces	
Power supply/signaling contact	1 plug-in terminal block, 3-pin, no signal contact
Network size - length of cable	
Twisted pair (TP)	0 - 100m
Multimode fiber (MM) 50/125 µm	0 - 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 - 4000 m, 11 dB Link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	Any
Power requirements	
Operating voltage	9,6 V DC - 32 V DC
Current consumption at 24 V DC	Max. 130 mA
Power consumption	Max. 3,0 W 10,2 Btu (IT)/h at 24 V DC
Service	
Diagnostics	LEDs (power, link status, data, data rate)
Redundancy	
Redundancy functions	
Ambient conditions	
Operating temperature	0 °C to +60 °C
Storage/transport temperature	-40 °C to +70 °C
Relative humidity (non-condensing)	10% to 95%
MTBF	128.1 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction	
Dimensions (W x H x D)	25 mm x 114 mm x 79 mm
Mounting	DIN Rail 35 mm
Weight	105 g
Protection class	IP 30
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 4 kV data line
EN 61000-4-5 surge voltage	Power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line
EN 61000-4-6 conducted immunity	10 V (150 kHz - 80 kHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (E175531)
EMV regulations for assembly in vehicles	
Hazardous locations	
Employment in vehicles	
Safety of information technology equipment	
Germanischer Lloyd	
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame

Type	SPIDER 1TX/1FX EEC	SPIDER 1TX/1FX-SM
Order No.	943 927-001	943 891-001
		
	Entry Level Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet and Fast-Ethernet (10/100 Mbit/s)	Entry Level Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet and Fast-Ethernet (10/100 Mbit/s)
Product description		
Port type and quantity	1 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity 1 x 100BASE-FX, MM cable, SC sockets	1 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity 1 x 100BASE-FX, SM cable, SC sockets
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	0 - 100 m
Multimode fiber (MM) 50/125 µm	0 - 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 - 4000 m, 11 dB Link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	
Single mode fiber (SM) 9/125 µm		0 - 32,5 km, 16 dB link budget at 1300 nm, A = 0,4 dB/km, 3 dB reserve, D = 3,5 ps/(nm x km)
Power requirements		
Current consumption at 24 V DC	Max. 130 mA	Max. 130 mA
Power consumption	Max. 3,0 W 10,2 Btu (IT)/h at 24 V DC	Max. 3,0 W 10,2 Btu (IT)/h at 24 V DC
Ambient conditions		
Operating temperature	-40 °C to +70 °C	0 °C to +60 °C
MTBF	128.1 years; MIL-HDBK 217F: Gb 25 °C	101.5 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	25 mm x 114 mm x 79 mm	25 mm x 114 mm x 79 mm
Weight	105 g	105 g

Type	SPIDER 1TX/1FX-SM EEC	SPIDER 3TX-TAP
Order No.	943 928-001	943 899-001
		
	Entry Level Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet and Fast-Ethernet (10/100 Mbit/s)	Entry Level Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet and Fast-Ethernet (10/100 Mbit/s)
Product description		
Port type and quantity	1 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity 1 x 100BASE-FX, SM cable, SC sockets	3 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	0 - 100 m
Single mode fiber (SM) 9/125 µm	0 - 32,5 km, 16 dB link budget at 1300 nm, A = 0,4 dB/km, 3 dB reserve, D = 3,5 ps/(nm x km)	
Power requirements		
Current consumption at 24 V DC	Max. 130 mA	Max. 100 mA
Power consumption	Max. 3,0 W 10,2 Btu (IT)/h at 24 V DC	Max. 2,2 W 7,5 Btu (IT)/h bei 24 V DC
Ambient conditions		
Operating temperature	-40 °C to +70 °C	0 °C to +60 °C
MTBF	101.5 years; MIL-HDBK 217F: Gb 25 °C	138.5 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	25 mm x 114 mm x 79 mm	25 mm x 114 mm x 79 mm
Weight	105 g	113 g

Industrial ETHERNET

Unmanaged Rail-Switches > Versions

Type	SPIDER 4TX/1FX	SPIDER 4TX/1FX EEC
Order No.	943 221-001	943 221-101
		
	Entry Level Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet and Fast-Ethernet (10/100 Mbit/s)	Entry Level Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet and Fast-Ethernet (10/100 Mbit/s)
Product description		
Port type and quantity	4 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity 1 x 100BASE-FX, MM cable, SC sockets	4 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity 1 x 100BASE-FX, MM cable, SC sockets
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	0 - 100 m
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 800 MHz x km	0 - 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 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Power requirements		
Current consumption at 24 V DC	Max. 150 mA	Max. 150 mA
Power consumption	Max. 3,9 W 13,3 Btu (IT)/h at 24 V DC	Max. 3,9 W 13,3 Btu (IT)/h at 24 V DC
Ambient conditions		
Operating temperature	0 °C to +60 °C	-40 °C to +70 °C
MTBF	112.0 years; MIL-HDBK 217F: Gb 25 °C	112.0 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	25 mm x 114 mm x 79 mm	25 mm x 114 mm x 79 mm
Weight	120 g	120 g

Type	SPIDER 4TX/1FX-SM EEC	SPIDER 4TX/1FX-ST EEC
Order No.	943 880-001	943 914-001
		
	Entry Level Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet and Fast-Ethernet (10/100 Mbit/s)	Entry Level Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet and Fast-Ethernet (10/100 Mbit/s)
Product description		
Port type and quantity	4 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity 1 x 100BASE-FX, SM cable, SC sockets	4 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity 1 x 100BASE-FX, MM cable, ST sockets
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	0 - 100 m
Multimode fiber (MM) 50/125 µm		0 - 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 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm	0 - 32,5 km, 16 dB Link Budget at 1300 nm, A = 0,4 dB/km, 3 dB Reserve, D = 3,5 ps/(nm x km)	
Power requirements		
Current consumption at 24 V DC	Max. 150 mA	Max. 150 mA
Power consumption	Max. 3,9 W 13,3 Btu (IT)/h at 24 V DC	Max. 3,9 W 13,3 Btu (IT)/h at 24 V DC
Ambient conditions		
Operating temperature	-40 °C to +70 °C	-40 °C to +70 °C
MTBF	93,9 years; MIL-HDBK 217F: Gb 25 °C	112.0 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	25 mm x 114 mm x 79 mm	25 mm x 114 mm x 79 mm
Weight	120 g	120 g

Type	SPIDER 5TX	SPIDER 5TX EEC
Order No.	943 824-002	943 824-102
		
	Entry Level Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet and Fast-Ethernet (10/100 Mbit/s)	Entry Level Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet and Fast-Ethernet (10/100 Mbit/s)
Product description		
Port type and quantity	5 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity	5 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	0 - 100 m
Power requirements		
Current consumption at 24 V DC	Max. 100 mA	Max. 100 mA
Power consumption	Max. 2,2 W 7,5 Btu (IT)/h at 24 V DC	Max. 2,2 W 7,5 Btu (IT)/h at 24 V DC
Ambient conditions		
Operating temperature	0 °C to +60 °C	-40 °C to +70 °C
MTBF	123.7 years; MIL-HDBK 217F: Gb 25 °C	123.7 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	25 mm x 114 mm x 79 mm	25 mm x 114 mm x 79 mm
Weight	113 g	113 g
Approvals		
EMV regulations for assembly in vehicles		approval according to motor vehicle directive 2005/83/EG (e1)
Employment in vehicles		E1

Type	SPIDER 8TX	SPIDER 8TX EEC
Order No.	943 376-001	943 376-201
		
	Entry Level Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet and Fast-Ethernet (10/100 Mbit/s)	Entry Level Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet and Fast-Ethernet (10/100 Mbit/s)
Product description		
Port type and quantity	8 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity	8 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	0 - 100 m
Power requirements		
Current consumption at 24 V DC	Max. 160 mA	Max. 160 mA
Power consumption	Max. 3,9 W 13,3 Btu (IT)/h at 24 V DC	Max. 3,9 W 13,3 Btu (IT)/h at 24 V DC
Ambient conditions		
Operating temperature	0 °C to +60 °C	-40 °C bis +70 °C
MTBF	105.7 years; MIL-HDBK 217F: Gb 25 °C	105.7 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	40 mm x 114 mm x 79 mm	40 mm x 114 mm x 79 mm
Weight	177 g	177 g

Industrial ETHERNET

Rail Family > **Unmanaged Rail-Switches**

Type	RS2-TX	RS2-3TX/2FX EEC
Order No.	943 686-003	943 771-001
		
	Unmanaged Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet (10 Mbit/s) and Fast-Ethernet (100 Mbit/s)	Unmanaged Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet (10 Mbit/s) and Fast-Ethernet (100 Mbit/s)
Product description Port type and quantity	8 x 10/100Base-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity	3 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity, 2 x 100BASE-FX, MM cables, SC sockets
More Interfaces Power supply/signaling contact	1 plug-in terminal block, 5-pin	1 plug-in terminal block, 5-pin
Network size - length of cable Twisted pair (TP) Multimode fiber (MM) 50/125 µm Multimode fiber (MM) 62.5/125 µm Single mode fiber (SM) 9/125 µm Single mode fiber (LH) 9/125 µm (long haul transceiver)	0 - 100 m	0 - 100 m 0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 800 MHz x km 0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Network size - cascadibility Line - / star topology	any	any
Power requirements Operating voltage Current consumption at 24 V DC Power consumption	24 V DC (-25% to +30%) max. 290 mA max. 7,0 W at 24 V DC	24 V DC (-25% to +30%) max. 230 mA max. 5,9 at 24 V DC
Service Diagnostics	LEDs (power, link status, data, error), signal contact / fault relais (24 V DC / 1 A)	LEDs (power, link status, data, error), signal contact / fault relais (24 V DC / 1 A)
Redundancy Redundancy functions	redundant 24 V power supply	redundant 24 V power supply
Ambient conditions Operating temperature Storage/transport temperature Relative humidity (non-condensing) MTBF	0°C to +60°C -25 °C to +70 °C 10% to 95% 61 years; MIL-HDBK 217F: Gb 25 °C	-40 °C to +70 °C -40 °C to +85 °C 10% to 95% 43.4 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction Dimensions (W x H x D) Mounting Weight Protection class	47 mm x 135 mm x 111 mm DIN Rail 35 mm 230 g IP20	47 mm x 135 mm x 111 mm DIN Rail 35 mm 320 g IP 20
Mechanical stability IEC 60068-2-27 shock IEC 60068-2-6 vibration	15 g, 11 ms duration, 18 shocks 1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	15 g, 11 ms duration, 18 shocks 1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity EN 61000-4-2 electrostatic discharge (ESD) EN 61000-4-3 electromagnetic field EN 61000-4-4 fast transients (burst) EN 61000-4-5 surge voltage EN 61000-4-6 conducted immunity	6 kV contact discharge, 8 kV air discharge 10 V/m (80 - 1000 MHz) 2 kV power line, 1 kV data line power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line 3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)	6 kV contact discharge, 8 kV air discharge 10 V/m (80 - 1000 MHz) 2 kV power line, 1 kV data line power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line 3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity FCC CFR47 Part 15 EN 55022	FCC CFR47 Part 15 Class A EN 55022 Class A	FCC CFR47 Part 15 Class A EN 55022 Class A
Approvals Safety of industrial control equipment EMV regulations for assembly in vehicles Hazardous locations Employment in vehicles Safety of information technology equipment Germanischer Lloyd	cUL 508 (E175531) cUL 1604 Class 1 Div 2 (E203960) cUL 60950 (E168643) Germanischer Lloyd (15 662 - 00 HH)	cUL 508 (E175531) cUL 1604 Class 1 Div 2 (E203960) cUL 60950 (E168643) Germanischer Lloyd (15 662 - 00 HH)
Scope of delivery and accessories Scope of delivery Accessories to order separately	device, terminal block, operating manual rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame	device, terminal block, operating manual rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame

RS2-3TX/2FX-SM EEC	RS2-4TX EEC	RS2-4TX/1FX EEC
943 772-001	943 819-001	943 773-001
		
Unmanaged Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet (10 Mbit/s) and Fast-Ethernet (100 Mbit/s)	Unmanaged Industrial ETHERNET Rail-Switch, store and forward switching mode, Ethernet (10 Mbit/s) and Fast-Ethernet (100 Mbit/s)	Unmanaged Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet (10 Mbit/s) and Fast-Ethernet (100 Mbit/s)
3 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity, 2 x 100BASE-FX, SM cables, SC sockets	4 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity	4 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity, 1 x 100BASE-FX, MM cable, SC sockets
1 plug-in terminal block, 5-pin	1 plug-in terminal block, 5-pin	1 plug-in terminal block, 5-pin
0 - 100 m 0 - 32.5 km, 16 dB link budget at 1300 nm, A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)	0 - 100 m	0 - 100 m 0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 800 MHz x km 0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
any	any	any
24 V DC (-25% to +30%) max. 230 mA max. 5,9 W at 24 V DC	24 V DC power supply (-25% to +30%) max. 180 mA max 4,8 W at 24 V DC	24 V DC (-25% to +30%) max. 220 mA max. 5,4 W at 24 DC
LEDs (power, link status, data, error), signal contact / fault relais (24 V DC / 1 A)	LEDs (power, link status, data, error), signal contact / fault relais (24 V DC / 1 A)	LEDs (power, link status, data, error), signal contact / fault relais (24 V DC / 1 A)
fedundant 24 V power supply	redundant 24 V power supply	redundant 24 V power supply
-40 °C to +70 °C -40 °C to +85 °C 10% to 95% 47.2 years; MIL-HDBK 217F: Gb 25 °C	-40 °C to +70 °C -40 °C to +85 °C 10% to 95% 68.5 years; MIL-HDBK 217F: Gb 25 °C	-40 °C to +70 °C -40 °C to +85 °C 10% to 95% 51.4 years; MIL-HDBK 217F: Gb 25 °C
47 mm x 135 mm x 111 mm DIN Rail 35 mm 320 g IP 20	47 mm x 135 mm x 111 mm DIN Rail 35 mm 300 g IP 20	47 mm x 135 mm x 111 mm DIN Rail 35 mm 320 g IP 20
15 g, 11 ms duration, 18 shocks 1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	15 g, 11 ms duration, 18 shocks 1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	15 g, 11 ms duration, 18 shocks 1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
6 kV contact discharge, 8 kV air discharge 10 V/m (80 - 1000 MHz) 2 kV power line, 1 kV data line power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line 3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)	6 kV contact discharge, 8 kV air discharge 10 V/m (80 - 1000 MHz) 2 kV power line, 1 kV data line power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line 3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)	6 kV contact discharge, 8 kV air discharge 10 V/m (80 - 1000 MHz) 2 kV power line, 1 kV data line power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line 3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
FCC CFR47 Part 15 Class A EN 55022 Class A	FCC CFR47 Part 15 Class A EN 55022 Class A	FCC CFR47 Part 15 Class A EN 55022 Class A
cUL 508 (E175531) cUL 1604 Class 1 Div 2 (E203960) cUL 60950 (E168643) Germanischer Lloyd (15 662 - 00 HH)	cUL 508 (E175531) cUL 1604 Class 1 Div 2 (E203960) cUL 60950 (E168643) Germanischer Lloyd (15 662 - 00 HH)	cUL 508 (E175531) cUL 1604 Class 1 Div 2 (E203960) cUL 60950 (E168643) Germanischer Lloyd (15 662 - 00 HH)
device, terminal block, operating manual rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame	device, terminal block, operating manual rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame	device, terminal block, operating manual rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame

Industrial ETHERNET

Rail Family > **Unmanaged Rail-Switches**

Type	RS2-4TX/1FX-SM EEC	RS2-5TX
Order No.	943 774-001	943 732-003
		
	Unmanaged Industrial ETHERNET Rail Switch Store and forward switching mode, Ethernet (10 Mbit/s) and Fast-Ethernet (100 Mbit/s)	Unmanaged Industrial ETHERNET Rail Switch, store and forward switching mode, Ethernet (10 Mbit/s) and Fast-Ethernet (100 Mbit/s)
Product description Port type and quantity	4 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity, 1 x 100BASE-FX, SM cable, SC sockets	5 x 10/100Base-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity
More Interfaces Power supply/signaling contact	1 plug-in terminal block, 5-pin	1 plug-in terminal block, 5-pin / no signal contact
Network size - length of cable Twisted pair (TP) Multimode fiber (MM) 50/125 µm Multimode fiber (MM) 62.5/125 µm Single mode fiber (SM) 9/125 µm Single mode fiber (LH) 9/125 µm (long haul transceiver)	0 - 100 m 0 - 32.5 km, 16 dB link budget at 1300 nm, A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)	0 - 100 m
Network size - cascadibility Line - / star topology	any	any
Power requirements Operating voltage Current consumption at 24 V DC Power consumption	24 V DC (-25% to +30%) Max. 220 mA max 5,4 W at 24 V DC	24 V DC (-25% to +30%) max. 130 mA max. 2,6 W at 24 V DC
Service Diagnostics	LEDs (power, link status, data, error), signal contact / fault relais (24 V DC / 1 A)	LEDs (power, link status, data, error)
Redundancy Redundancy functions	redundant 24 V power supply	redundant 24 V power supply
Ambient conditions Operating temperature Storage/transport temperature Relative humidity (non-condensing) MTBF	-40 °C to +70 °C -40 °C to +85 °C 10% to 95% 54 years; MIL-HDBK 217F: Gb 25 °C	0 °C to +60 °C -25 °C to +70 °C 10% to 95% 116.3 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction Dimensions (W x H x D) Mounting Weight Protection class	47 mm x 135 mm x 111 mm DIN Rail 35 mm 320 g IP 20	40 mm x 145 mm x 80 mm DIN Rail 35 mm 520 g IP 20
Mechanical stability IEC 60068-2-27 shock IEC 60068-2-6 vibration	15 g, 11 ms duration, 18 shocks 1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	15 g, 11 ms duration, 18 shocks 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity EN 61000-4-2 electrostatic discharge (ESD) EN 61000-4-3 electromagnetic field EN 61000-4-4 fast transients (burst) EN 61000-4-5 surge voltage EN 61000-4-6 conducted immunity	6 kV contact discharge, 8 kV air discharge 10 V/m (80 - 1000 MHz) 2 kV power line, 1 kV data line power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line 3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)	4 kV contact discharge, 8 kV air discharge 10 V/m (80 - 1000 MHz) 2 kV power line, 1 kV data line power line: 1 kV (line/earth), 0.5 kV (line/line), 1 kV data line 10 V (150 kHz - 80 MHz)
EMC emitted immunity FCC CFR47 Part 15 EN 55022	FCC CFR47 Part 15 Class A EN 55022 Class A	FCC CFR47 Part 15 Class A EN 55022 Class A
Approvals Safety of industrial control equipment EMV regulations for assembly in vehicles Hazardous locations Employment in vehicles Safety of information technology equipment Germanischer Lloyd	cUL 508 (E175531) cUL 1604 Class 1 Div 2 (E203960) cUL 60950 (E168643) Germanischer Lloyd (15 662 - 00 HH)	cUL 508 (E175531) cUL 1604 Class 1 Div 2 (E203960) cUL 60950 (E168643)
Scope of delivery and accessories Scope of delivery Accessories to order separately	device, terminal block, operating manual rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame	device, terminal block, operating manual rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame

RS2-5TX/FX

943 732-102

Unmanaged Industrial ETHERNET Rail-Switch, store and forward switching mode, Ethernet (10 Mbit/s) and Fast-Ethernet (100 Mbit/s)

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4 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity, 1 x 100BASE-FX, MM cable, MTRJ socket

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1 plug-in terminal block, 5-pin / no signal contact

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0 - 100 m
0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 800 MHz x km

0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km

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any

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24 V DC (-25% to +30%)
max. 180 mA
max. 4,0 W at 24 V DC

LEDs (power, link status, data, error)

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redundant 24 V power supply

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0 °C to +60 °C
-25 °C to +70 °C
10% to 95%
74,4 years; MIL-HDBK 217F: Gb 25 °C

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40 mm x 145 mm x 80 mm
DIN Rail 35 mm
520 g
IP 20

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15 g, 11 ms duration, 18 shocks
3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.;
1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.

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4 kV contact discharge, 8 kV air discharge
10 V/m
2 kV power line, 1 kV data line
power line: 1 kV (line/earth), 0.5 kV (line/line), 1 kV data line
10 V (150 kHz - 80 MHz)

FCC CFR47 Part 15 Class A
EN 55022 Class A

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cUL 508 (E175531)

cUL 1604 Class 1 Div 2 (E203960)

cUL 60950 (E168643)

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device, terminal block, operating manual
rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame

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Compact > Unmanaged Switches

Type	RS20-0800T1T1SDAUHH
Order No.	RS20-0800T1T1SDAUHH
	
	Fast ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 8 x FE
Product description	
Port type and quantity	8 ports in total; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 6 x standard 10/100 BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	221mA
Current consumption at 48 V DC	111mA
Power output in Btu (IT) h	18.1
Service	
Diagnostics	LEDs (power, link status, data, error
Redundancy functions	redundant 24 V power supply
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	63.3 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	74 x 131 x 111
Mounting	DIN Rail
Weight	410 g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame

Type	RS20-0800M2M2SDAUHH	RS20-0800S2S2SDAUHH
Order No.	RS20-0800M2M2SDAUHH	RS20-0800S2S2SDAUHH
		
	Fast ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 8 x FE	Fast ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 8 x FE
Product description		
Port type and quantity	8 ports in total; 1. Uplink Port: 100BASE-FX, MM-SC; 2. Uplink Port: 100BASE-FX, MM-SC, 6 x standard 10/100 BASE TX, RJ45	8 ports in total; 1. Uplink Port: 100BASE-FX, SM-SC; 2. Uplink Port: 100BASE-FX, SM-SC, 6 x standard 10/100 BASE TX, RJ45
Network size - length of cable		
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km	
Multimode fiber (MM) 62.5/125 µm	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	
Single mode fiber (SM) 9/125 µm		0 - 32,5 km, 16 dB link budget at 1300 nm, A = 0,4 dB/km, 3 dB reserve, D = 3,5 ps/(nm x km)
Power requirements		
Current consumption at 24 V DC	321mA	321mA
Current consumption at 48 V DC	161mA	161mA
Power output in Btu (IT) h	26.3	26.3
Ambient conditions		
MTBF	53.4 years (MIL-HDBK-217F)	33.5 years (MIL-HDBK-217F)

Industrial ETHERNET

Compact > Unmanaged Switches

Type	RS20-1600T1T1SDAUHH
Order No.	943 434-047
	
	Fast ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 16 x FE
Product description	
Port type and quantity	16 ports in total; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 14 x standard 10/100 BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	392mA
Current consumption at 48 V DC	196mA
Power output in Btu (IT) h	32.1
Service	
Diagnostics	LEDs (power, link status, data, error
Redundancy functions	redundant 24 V power supply
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	45.4 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	110 x 131 x 111
Mounting	DIN Rail
Weight	600 g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame

Type	RS20-1600M2M2SDAUHH	RS20-1600S2S2SDAUHH
Order No.	943 434-048	943 434-053
		
	Fast ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 16 x FE	Fast ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 16 x FE
Product description		
Port type and quantity	16 ports in total; 1. Uplink Port: 100BASE-FX, MM-SC; 2. Uplink Port: 100BASE-FX, MM-SC, 14 x standard 10/100 BASE TX, RJ45	16 ports in total; 1. Uplink Port: 100BASE-FX, SM-SC; 2. Uplink Port: 100BASE-FX, SM-SC, 14 x standard 10/100 BASE TX, RJ45
Network size - length of cable		
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km	
Multimode fiber (MM) 62.5/125 µm	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	
Single mode fiber (SM) 9/125 µm		0 - 32,5 km, 16 dB link budget at 1300 nm, A = 0,4 dB/km, 3 dB reserve, D = 3,5 ps/(nm x km)
Power requirements		
Current consumption at 24 V DC	492mA	492mA
Current consumption at 48 V DC	246mA	246mA
Power output in Btu (IT) h	40.3	40.3
Ambient conditions		
MTBF	40.1 years (MIL-HDBK-217F)	27.8 years (MIL-HDBK-217F)

Industrial ETHERNET

Compact > Unmanaged Switches

Type	RS20-2400T1T1SDAUHH
Order No.	RS20-2400T1T1SDAUHH
	
	Fast ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 24 x FE
Product description	
Port type and quantity	24 ports in total; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 22 x standard 10/100 BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	563mA
Current consumption at 48 V DC	282mA
Power output in Btu (IT) h	46.1
Service	
Diagnostics	LEDs (power, link status, data, error
Redundancy functions	redundant 24 V power supply
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	37.5 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	110 x 131 x 111
Mounting	DIN Rail
Weight	650 g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame

Type	RS20-2400M2M2SDAUHH	RS20-2400S2S2SDAUHH
Order No.	RS20-2400M2M2SDAUHH	RS20-2400S2S2SDAUHH
		
	Fast ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 24 x FE	Fast ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 24 x FE
Product description		
Port type and quantity	24 ports in total; 1. Uplink Port: 100BASE-FX, MM-SC; 2. Uplink Port: 100BASE-FX, MM-SC, 22 x standard 10/100 BASE TX, RJ45	24 ports in total; 1. Uplink Port: 100BASE-FX, SM-SC; 2. Uplink Port: 100BASE-FX, SM-SC, 22 x standard 10/100 BASE TX, RJ45
Network size - length of cable		
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km	
Multimode fiber (MM) 62.5/125 µm	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	
Single mode fiber (SM) 9/125 µm		0 - 32,5 km, 16 dB link budget at 1300 nm, A = 0,4 dB/km, 3 dB reserve, D = 3,5 ps/(nm x km)
Power requirements		
Current consumption at 24 V DC	663mA	663mA
Current consumption at 48 V DC	332mA	332mA
Power output in Btu (IT) h	54.3	54.3
Ambient conditions		
MTBF	33.8 years (MIL-HDBK-217F)	24.6 years (MIL-HDBK-217F)

Industrial ETHERNET

Compact > Unmanaged Switches

Type	RS30-0802T1T1SDAUHH
Order No.	RS30-0802T1T1SDAUHH
	
	Fast ETHERNET/Gigabit-ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 8 x FE, 2 x GE
Product description	
Port type and quantity	8 ports in total, 2 Gigabit Ethernet Ports; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 8 x standard 10/100 BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	346mA
Current consumption at 48 V DC	186mA
Power output in Btu (IT) h	28.3
Service	
Diagnostics	LEDs (power, link status, data, error
Redundancy functions	redundant 24 V power supply
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	52.6 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	74 x 131 x 111
Mounting	DIN Rail
Weight	410 g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame

Type	RS30-0802O6O6SDAUHH
Order No.	RS30-0802O6O6SDAUHH
	
	Fast ETHERNET/Gigabit-ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 8 x FE, 2 x GE
Product description	
Port type and quantity	8 ports in total, 2 Gigabit Ethernet Ports; 1. Uplink Port: Gigabit SFP-Slot; 2. Uplink Port: Gigabit SFP-Slot, 8 x standard 10/100 BASE TX, RJ45
Network size - length of cable	
Multimode fiber (MM) 50/125 µm	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC
Multimode fiber (MM) 62.5/125 µm	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC
Single mode fiber (SM) 9/125 µm	cf. SFP module M-SFP-LX/LC
Single mode fiber (LH) 9/125 µm (long haul transceiver)	cf. SFP module M-SFP-LH/LC and M-SFP-LX+/LC
Power requirements	
Current consumption at 24 V DC	320mA
Current consumption at 48 V DC	172mA
Power output in Btu (IT) h	26.3

Compact > Unmanaged Switches

Type	RS30-1602T1T1SDAUHH
Order No.	RS30-1602T1T1SDAUHH
	
	Fast ETHERNET/Gigabit-ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 16 x FE, 2 x GE
Product description	
Port type and quantity	16 ports in total, 2 Gigabit Ethernet Ports; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 16 x standard 10/100 BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	542mA
Current consumption at 48 V DC	271mA
Power output in Btu (IT) h	44.4
Service	
Diagnostics	LEDs (power, link status, data, error
Redundancy functions	redundant 24 V power supply
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	39.6 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	110 x 131 x 111
Mounting	DIN Rail
Weight	600 g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame

Type	RS30-1602O6O6SDAUHH
Order No.	RS30-1602O6O6SDAUHH
	
	Fast ETHERNET/Gigabit-ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 16 x FE, 2 x GE
Product description	
Port type and quantity	16 ports in total, 2 Gigabit Ethernet Ports; 1. Uplink Port: Gigabit SFP-Slot; 2. Uplink Port: Gigabit SFP-Slot, 16 x standard 10/100 BASE TX, RJ45
Network size - length of cable	
Multimode fiber (MM) 50/125 µm	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC
Multimode fiber (MM) 62.5/125 µm	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC
Single mode fiber (SM) 9/125 µm	cf. SFP module M-SFP-LX/LC
Single mode fiber (LH) 9/125 µm (long haul transceiver)	cf. SFP module M-SFP-LH/LC and M-SFP-LX+/LC
Power requirements	
Current consumption at 24 V DC	516mA
Current consumption at 48 V DC	257mA
Power output in Btu (IT) h	42.4

Industrial ETHERNET

Compact > Unmanaged Switches

Type	RS30-2402T1T1SDAUHH
Order No.	RS30-2402T1T1SDAUHH
	
	Fast ETHERNET/Gigabit-ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 24 x FE, 2 x GE
Product description	
Port type and quantity	24 ports in total, 2 Gigabit Ethernet Ports; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 24 x standard 10/100 BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	654mA
Current consumption at 48 V DC	327mA
Power output in Btu (IT) h	53.6
Service	
Diagnostics	LEDs (power, link status, data, error
Redundancy functions	redundant 24 V power supply
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	33.5 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	110 x 131 x 111
Mounting	DIN Rail
Weight	650 g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, 19” installation frame

Type	RS30-2402O6O6SDAUHH
Order No.	RS30-2402O6O6SDAUHH
	
	Fast ETHERNET/Gigabit-ETHERNET-switch according to IEEE 802.3 compact, unmanaged, Industrial switch for DIN rail store-and-forward-switching, fanless design, ports: 24 x FE, 2 x GE
Product description	
Port type and quantity	24 ports in total, 2 Gigabit Ethernet Ports; 1. Uplink Port: Gigabit SFP-Slot; 2. Uplink Port: Gigabit SFP-Slot, 24 x standard 10/100 BASE TX, RJ45
Network size - length of cable	
Multimode fiber (MM) 50/125 µm	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC
Multimode fiber (MM) 62.5/125 µm	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC
Single mode fiber (SM) 9/125 µm	cf. SFP module M-SFP-LX/LC
Single mode fiber (LH) 9/125 µm (long haul transceiver)	cf. SFP module M-SFP-LH/LC and M-SFP-LX+/LC
Power requirements	
Current consumption at 24 V DC	628mA
Current consumption at 48 V DC	313mA
Power output in Btu (IT) h	51.6

Welcome to high-level management.

Managed Rail Switches with unsurpassed feature sets.

For some applications, a fast, industrially compatible, user-friendly switch has to be a lot smarter – for example, in medium-sized and large Fast-ETHERNET and Gigabit-ETHERNET applications or highly available networks with fast media redundancy function. Here, the managed 4-, 8-, 16- and 24-port Rail Switches from Hirschmann offer you high port densities. All the better when you also have a free choice of media. And the best thing is: the optimum price per port ratio. You benefit especially from the management function, for example, in a networking of management and control level in industry and process automation. Because there is obviously no substitute here for fail safety – and a high port density is a must. Managed rail switches also provide valuable services in railway traffic and stations, e. g. the compact RS30-2402T1T1SDAE. Finally, ETHERNET data networks have to cover distances of more than 120 kilometers between the individual stations with long-haul connections and redundant structures by the HIPER-Ring.

- ***Because of the segmentation within our managed rail switches, exactly the right switch is available for every application.***
- ***The "OpenRail" concept offers tailor-made products for every application.***
- ***Networks with optimum price per port ratio: 4-, 8-, 9-, 16-, 17-, 24- and 25-port switches.***
- ***Versions with additional 2 Gigabit ETHERNET ports.***
- ***Management functions support Web and SNMP-based tools.***
- ***Selectable redundancy mechanisms: efficient, industrially compatible HIPER-Ring.***

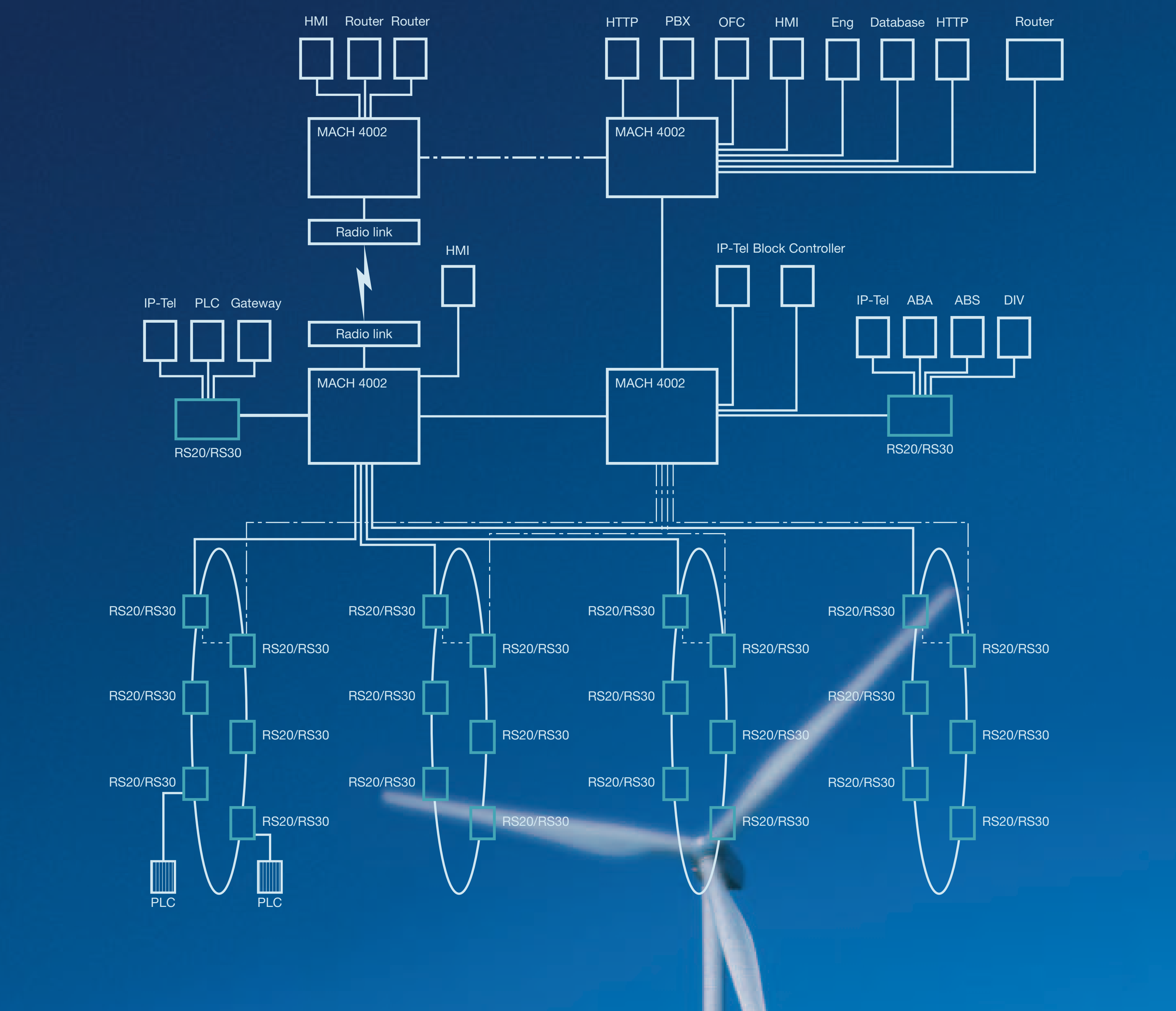
RS20

RS30

RS30

Accessories
for this family you can find on the following pages:

Transceiver Page 194
System Accessories Page 202



Hirschmann Competence Center

Because innovative **Rail Switches** also require an appropriate service program, the Hirschmann Competence Center also offers suitable consulting services in the network planning: **Network optimization check, risk reduction consulting, network technology evaluation and network baselining consulting.** Plus the following trainings: CP1d Rail Family in theory and practice, IRd overview of the Hirschmann Rail Family, CPUd Update Rail Family and CB1e Industrial ETHERNET/basic technical principles. In addition, we provide support with certification testing, installation and configuration as well as our service hotline and later offer Advance Hardware Replacement and warranty extensions.

www.hicomcenter.com

OpenRail: A made-to-measure switch.

In practice there are very many different requirements for Industrial ETHERNET: From the economical, small, integrated ETHERNET solution up to complex Fast-ETHERNET solutions with management functions, high availability, Gigabit capability and many more functions. Here most standard switches do not offer suitable features and thus cause unnecessary costs. Therefore tailor-made solutions are required, in other words, individually designed, configured switches that comply exactly with the customer's requirements.

With OpenRail Hirschmann has now started to offer Rail and MICE series switches manufactured to the customer's specifications and suitable for almost any application.These can have specific parameters set quickly and easily by a web configurator and can be ordered more than 1000 different versions. All this is available at the same price and delivery conditions as series products – and with the customary high Hirschmann quality.

Ordering with the OpenRail system

OpenRail – is an ordering system that can cope with any customer requirement and offers a simple, transparent ordering option. It doesn't matter which of the 1000 versions you or your customers opt for. Step by step you are asked for the parameters by means of which an order code with all the required information is generated. After we have received your order, your individual switches are manufactured in our specific customer requirement production unit.
There is no simpler and more economical solution.

Use the Hirschmann OpenRail system to configure your substation switch. **RS20-0800S2S4TDHEHH04.0.**

RS20

Design

RS20	Fast-ETHERNET Uplinks
RS30	Gigabit-ETHERNET Uplinks
RS40	Full-Gigabit

08

Fast-ETHERNET ports

04 (only RS20)	00, 04, 08, 16, 24: number of 100 Mbit/s ports (00 for RS40)
08	
09	09, 17, 25: number of 100 Mbit/s ports (RS20 > 2 fiber ports)
16	
17 (RS20, RS30)	
24 (RS20, RS30)	
25 (RS20, RS30)	

00

Gigabit-ETHERNET ports

00	00, 02: number of 1000 Mbit ports (00 – RS20 and 02 – RS40)
02	
09	09: number of 1000 Mbit ports (RS40)

S2

Uplink Port 1

T1	1 x Twisted pair RJ45	O6	1 x SFP slot GE
M2	1 x Multimode SC	MM	2 x Multimode SC
M4	1 x Multimode ST	NN	2 x Multimode ST
S2	1 x Singlemode SC	VV	2 x Singlemode SC
S4	1 x Singlemode ST	UU	2 x Singlemode ST
L2	1 x Long Haul SC	OO	2 x SFP slot GE
G2	1 x Long Haul+ SC	CC	2 x SFP combo GE

S4

Uplink Port 2

T1	1 x Twisted pair RJ45	L2	1 x long haul SC
M2	1 x Multimode SC	G2	1 x long haul+ SC
M4	1 x Multimode ST	O6	1 x SFP slot GE
S2	1 x Singlemode SC	ZZ	2 x SFP slot FE
S4	1 x Singlemode ST	CC	2 x SFP combo GE

T

Temperature range

S	0° C up to + 60° C
T	– 40° C up to + 70° C
E	– 40° C up to + 70° C inclusive conformal coating

D

Power supply

D	Rail 12/24 V/48 V DC (9.6 – 60 V) and 24 V AC (18 – 30 V)

H

Approvals

A	cUL508 · cUL1604 · Class1 Div.2
H	cUL508 · cUL1604 · Class1 Div.2 GL: German Lloyd · IEC 61850-3: Substation IEEE1613: Substation · EN50121-4: Railway (along track)
B	cUL508 · cUL1604 · Class1 Div.2 GL: German Lloyd · IEC 61850-3: Substation IEEE1613: Substation · EN50121-4: Railway (along track) ATEX100a, Zone2: Hazardous Location

E

Software version

U	Unmanaged
B	Basic, diagnostic, HIPER-Ring
E	Enhanced, additional filter and redundancy
P	Professional, additional security and advanced redundancy

H

Configuration

H	Standard	P	PROFINET pre-settings
X	Customer specific	E	EtherNet/IP pre-settings

H

OEM type

H	Standard
X	Customer specific

04.0.

Software release

04.0.	Software release 4.0.

Compulsory field Optional

Enjoy the benefits of direct, hassle-free configuration with our online tool at configurator.hirschmann.com

Industrial ETHERNET

Compact > Switches Software Release 4.0

Type	RS20-0400T1T1SDAEHH04.0.
Order No.	943 434-007
	
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 4 x FE
Product description	
Port type and quantity	4 ports in total; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 2 x standard 10/100 BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	221mA
Current consumption at 48 V DC	111mA
Power output in Btu (IT) h	18.1
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply
Filter	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server
Flow control	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)
Presettings	Standard
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	75.9 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	47 x 131 x 111
Mounting	DIN Rail
Weight	400 g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19” installation frame

Type	RS20-0400M2T1SDAEHH04.0.	RS20-0400M2M2SDAEHH04.0.
Order No.	943 434-009	943 434-001
		
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 4 x FE	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 4 x FE
Product description		
Port type and quantity	4 ports in total; 1. Uplink Port: 100BASE-FX, MM-SC; 2. Uplink Port: 10/100BASE-TX, RJ45, 2 x standard 10/100 BASE TX, RJ45	4 ports in total; 1. Uplink Port: 100BASE-FX, MM-SC; 2. Uplink Port: 100BASE-FX, MM-SC, 2 x standard 10/100 BASE TX, RJ45
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km
Multimode fiber (MM) 62.5/125 µm	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Power requirements		
Current consumption at 24 V DC	271mA	321mA
Current consumption at 48 V DC	136mA	161mA
Power output in Btu (IT) h	22.2	26.3
Software		
Diagnostics	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)
Security	Port security (IP and MAC), SNMP V3 (no encryption)	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply
Filter	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server	SNTP server
Flow control	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)
Ambient conditions		
MTBF	68.3 years (MIL-HDBK-217F)	62.1 years (MIL-HDBK-217F)

Type	RS20-0400S2S2SDAEHH04.0.	RS20-0400S2T1SDAEHH04.0.
Order No.	943 434-013	943 434-011
		
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 4 x FE	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 4 x FE
Product description		
Port type and quantity	4 ports in total; 1. Uplink Port: 100BASE-FX, SM-SC; 2. Uplink Port: 100BASE-FX, SM-SC, 2 x standard 10/100 BASE TX, RJ45	4 ports in total; 1. Uplink Port: 100BASE-FX, SM-SC; 2. Uplink Port: 10/100BASE-TX, RJ45, 2 x standard 10/100 BASE TX, RJ45
Network size - length of cable		
Twisted pair (TP)		0 - 100 m
Single mode fiber (SM) 9/125 µm	0 - 32,5 km, 16 dB link budget at 1300 nm, A = 0,4 dB/km, 3 dB reserve, D = 3,5 ps/(nm x km)	0 - 32,5 km, 16 dB link budget at 1300 nm, A = 0,4 dB/km, 3 dB reserve, D = 3,5 ps/(nm x km)
Power requirements		
Current consumption at 24 V DC	321mA	271mA
Current consumption at 48 V DC	161mA	136mA
Power output in Btu (IT) h	26.3	22.2
Software		
Diagnostics	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)
Security	Port security (IP and MAC), SNMP V3 (no encryption)	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply
Filter	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server	SNTP server
Flow control	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)
Ambient conditions		
MTBF	36.8 years (MIL-HDBK-217F)	49.5 years (MIL-HDBK-217F)

Type	RS20-0400T1T1SDABHH04.0.	RS20-0400M2M2SDABHH04.0.
Order No.	943 434-061	943 434-062
		
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Basic, ports: 4 x FE	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Basic, ports: 4 x FE
Product description		
Port type and quantity	4 ports in total; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 2 x standard 10/100 BASE TX, RJ45	4 ports in total; 1. Uplink Port: 100BASE-FX, MM-SC; 2. Uplink Port: 100BASE-FX, MM-SC, 2 x standard 10/100 BASE TX, RJ45
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	
Multimode fiber (MM) 50/125 µm		0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km
Multimode fiber (MM) 62.5/125 µm		0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Power requirements		
Current consumption at 24 V DC	221mA	321mA
Current consumption at 48 V DC	111mA	161mA
Power output in Btu (IT) h	18.1	26.3
Software		
Diagnostics	LEDs, log-File, signal contact, RMON (statistic, history, alarms, events), port mirroring, topology discovery 802.1AB	LEDs, log-File, signal contact, RMON (statistic, history, alarms, events), port mirroring, topology discovery 802.1AB
Configuration	Comand Line Interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11)	Comand Line Interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11)
Security	SNMP V3 (no encryption)	SNMP V3 (no encryption)
Redundancy functions	HIPER-Ring (no redundancy manager), MRP (IEC-ring functionality), redundant 24 V power supply	HIPER-Ring (no redundancy manager), MRP (IEC-ring functionality), redundant 24 V power supply
Filter	QoS 4 classes, port priorisation(IEEE 802.1D/p), multicast IGMP snooping, fast aging	QoS 4 classes, port priorisation(IEEE 802.1D/p), multicast IGMP snooping, fast aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel	EtherNet/IP and PROFINET compatibel
Realtime	SNTP Client	SNTP Client

Industrial ETHERNET

Compact > Switches Software Release 4.0

Type	RS20-0800T1T1SDAEHH04.0.
Order No.	RS20-0800T1T1SDAEHH04.0.
	
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 8 x FE
Product description	
Port type and quantity	8 ports in total; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 6 x standard 10/100 BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	221mA
Current consumption at 48 V DC	111mA
Power output in Btu (IT) h	18.1
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply
Filter	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server
Flow control	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)
Presettings	Standard
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	63.3 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	74 x 131 x 111
Mounting	DIN Rail
Weight	410 g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19” installation frame

Type	RS20-0800M2T1SDAEHH04.0.	RS20-0800M2M2SDAEHH04.0.
Order No.	943-434-003	RS20-0800M2M2SDAEHH04.0.
		
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 8 x FE	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 8 x FE
Product description		
Port type and quantity	8 ports in total; 1. Uplink Port: 100BASE-FX, MM-SC; 2. Uplink Port: 10/100BASE-TX, RJ45, 6 x standard 10/100 BASE TX, RJ45	8 ports in total; 1. Uplink Port: 100BASE-FX, MM-SC; 2. Uplink Port: 100BASE-FX, MM-SC, 6 x standard 10/100 BASE TX, RJ45
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km
Multimode fiber (MM) 62.5/125 µm	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Power requirements		
Current consumption at 24 V DC	271mA	321mA
Current consumption at 48 V DC	136mA	161mA
Power output in Btu (IT) h	22.2	26.3
Software		
Diagnostics	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)
Security	Port security (IP and MAC), SNMP V3 (no encryption)	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply
Filter	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server	SNTP server
Flow control	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)
Ambient conditions		
MTBF	58 years (MIL-HDBK-217F)	53.4 years (MIL-HDBK-217F)

Industrial ETHERNET

Switches Software Release 4.0 > Versions

Type	RS20-0800S2S2SDAEHH04.0.	RS20-0800M4M4SDAEHH04.0.
Order No.	943 434-019	943 434-017
		
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 8 x FE	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 8 x FE
Product description		
Port type and quantity	8 ports in total; 1. Uplink Port: 100BASE-FX, SM-SC; 2. Uplink Port: 100BASE-FX, SM-SC, 6 x standard 10/100 BASE TX, RJ45	8 ports in total; 1. Uplink Port: 100BASE-FX, MM-ST; 2. Uplink Port: 100BASE-FX, MM-ST, 6 x standard 10/100 BASE TX, RJ45
Network size - length of cable		
Multimode fiber (MM) 50/125 µm		0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km
Multimode fiber (MM) 62.5/125 µm		0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm	0 - 32,5 km, 16 dB link budget at 1300 nm, A = 0,4 dB/km, 3 dB reserve, D = 3,5 ps/(nm x km)	
Power requirements		
Current consumption at 24 V DC	321mA	321mA
Current consumption at 48 V DC	161mA	161mA
Power output in Btu (IT) h	26.3	26.3
Software		
Diagnostics	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)
Security	Port security (IP and MAC), SNMP V3 (no encryption)	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply
Filter	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server	SNTP server
Flow control	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)
Ambient conditions		
MTBF	33.5 years (MIL-HDBK-217F)	53.4 years (MIL-HDBK-217F)

Type	RS20-0800M2M2SDABHH04.0.	RS20-0800T1T1SDABHH04.0.
Order No.	943 434-064	943 434-063
		
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Basic, ports: 8 x FE	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Basic, ports: 8 x FE
Product description		
Port type and quantity	8 ports in total; 1. Uplink Port: 100BASE-FX, MM-SC; 2. Uplink Port: 100BASE-FX, MM-SC, 6 x standard 10/100 BASE TX, RJ45	8 ports in total; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 6 x standard 10/100 BASE TX, RJ45
Network size - length of cable		
Twisted pair (TP)		0 - 100 m
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km	
Multimode fiber (MM) 62.5/125 µm	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	
Power requirements		
Current consumption at 24 V DC	321mA	221mA
Current consumption at 48 V DC	161mA	111mA
Power output in Btu (IT) h	26.3	18.1
Software		
Diagnostics	LEDs, log-File, signal contact, RMON (statistic, history, alarms, events), port mirroring, topology discovery 802.1AB	LEDs, log-File, signal contact, RMON (statistic, history, alarms, events), port mirroring, topology discovery 802.1AB
Configuration	Comand Line Interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11)	Comand Line Interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11)
Security	SNMP V3 (no encryption)	SNMP V3 (no encryption)
Redundancy functions	HIPER-Ring (no redundancy manager), MRP (IEC-ring functionality), redundant 24 V power supply	HIPER-Ring (no redundancy manager), MRP (IEC-ring functionality), redundant 24 V power supply
Filter	QoS 4 classes, port priorisation(IEEE 802.1D/p), multicast IGMP snooping, fast aging	QoS 4 classes, port priorisation(IEEE 802.1D/p), multicast IGMP snooping, fast aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel	EtherNet/IP and PROFINET compatibel
Realtime	SNTP Client	SNTP Client

Compact > Switches Software Release 4.0

Type	RS20-0900MMM2SDAEHH04.0.
Order No.	RS20-0900MMM2SDAEHH04.0.
	
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 9 x FE
Product description	
Port type and quantity	9 ports in total; 1. Uplink Port: 2 x 100BASE-FX, MM-SC; 2. Uplink Port: 100BASE-FX, MM-SC, 6 x standard 10/100 BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - length of cable	
Twisted pair (TP)	
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km
Multimode fiber (MM) 62.5/125 µm	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	496mA
Current consumption at 48 V DC	75mA
Power output in Btu (IT) h	40.6
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply
Filter	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server
Flow control	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)
Presettings	Standard
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	42.7 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	74 x 131 x 111
Mounting	DIN Rail
Weight	440 g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19” installation frame

Type	RS20-0900VVM2SDAEHH04.0.
Order No.	RS20-0900VVM2SDAEHH04.0.
	
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 9 x FE
Product description	
Port type and quantity	9 ports in total; 1. Uplink Port: 2 x 100BASE-FX, SM-SC; 2. Uplink Port: 100BASE-FX, MM-SC, 6 x standard 10/100 BASE TX, RJ45
Network size - length of cable	
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB link budget bei 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km
Single mode fiber (SM) 9/125 µm	0 - 32,5 km, 16 dB link budget at 1300 nm, A = 0,4 dB/km, 3 dB reserve, D = 3,5 ps/(nm x km)
Ambient conditions	
MTBF	29 years (MIL-HDBK-217F)

Industrial ETHERNET

Compact > Switches Software Release 4.0

Type	RS20-1600T1T1SDAEHH04.0.
Order No.	943 434-023
	
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 16 x FE
Product description	
Port type and quantity	16 ports in total; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 14 x standard 10/100 BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	392mA
Current consumption at 48 V DC	196mA
Power output in Btu (IT) h	32.1
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply
Filter	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server
Flow control	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)
Presettings	Standard
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	45.4 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	110 x 131 x 111
Mounting	DIN Rail
Weight	600 g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19” installation frame

Type	RS20-1600M2T1SDAEHH04.0.	RS20-1600M2M2SDAEHH04.0.
Order No.	943 434-025	943 434-005
		
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 16 x FE	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 16 x FE
Product description		
Port type and quantity	16 ports in total; 1. Uplink Port: 100BASE-FX, MM-SC; 2. Uplink Port: 10/100BASE-TX, RJ45, 14 x standard 10/100 BASE TX, RJ45	16 ports in total; 1. Uplink Port: 100BASE-FX, MM-SC; 2. Uplink Port: 100BASE-FX, MM-SC, 14 x standard 10/100 BASE TX, RJ45
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km
Multimode fiber (MM) 62.5/125 µm	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Power requirements		
Current consumption at 24 V DC	442mA	492mA
Current consumption at 48 V DC	221mA	246mA
Power output in Btu (IT) h	36.2	40.3
Ambient conditions		
MTBF	42.6 years (MIL-HDBK-217F)	40.1 years (MIL-HDBK-217F)

Type	RS20-1600S2S2SDAEHH04.0.
Order No.	943 434-027
	
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 16 x FE
Product description	
Port type and quantity	16 ports in total; 1. Uplink Port: 100BASE-FX, SM-SC; 2. Uplink Port: 100BASE-FX, SM-SC, 14 x standard 10/100 BASE TX, RJ45
Network size - length of cable	
Single mode fiber (SM) 9/125 µm	0 - 32,5 km, 16 dB link budget at 1300 nm, A = 0,4 dB/km, 3 dB reserve, D = 3,5 ps/(nm x km)
Power requirements	
Current consumption at 24 V DC	492mA
Current consumption at 48 V DC	246mA
Power output in Btu (IT) h	40.3
Ambient conditions	
MTBF	27.8 years (MIL-HDBK-217F)

Industrial ETHERNET

Compact > Switches Software Release 4.0

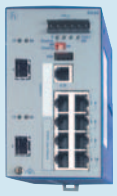
Type	RS20-2400T1T1SDAEHH04.0.
Order No.	943 434-041
	
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 24 x FE
Product description	
Port type and quantity	24 ports in total; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 22 x standard 10/100 BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	563mA
Current consumption at 48 V DC	282mA
Power output in Btu (IT) h	46.1
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply
Filter	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server
Flow control	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)
Presettings	Standard
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	37.5 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	110 x 131 x 111
Mounting	DIN Rail
Weight	650 g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19” installation frame

Type	RS20-2400M2M2SDAEHH04.0.	RS20-2400S2S2SDAEHH04.0.
Order No.	943 434-043	943 434-045
		
	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 24 x FE	Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 24 x FE
Product description		
Port type and quantity	24 ports in total; 1. Uplink Port: 100BASE-FX, MM-SC; 2. Uplink Port: 100BASE-FX, MM-SC, 22 x standard 10/100 BASE TX, RJ45	24 ports in total; 1. Uplink Port: 100BASE-FX, SM-SC; 2. Uplink Port: 100BASE-FX, SM-SC, 22 x standard 10/100 BASE TX, RJ45
Network size - length of cable		
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 d/km, 3 dB reserve, B = 800 MHz x km	
Multimode fiber (MM) 62.5/125 µm	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	
Single mode fiber (SM) 9/125 µm		0 - 32,5 km, 16 dB link budget at 1300 nm, A = 0,4 dB/km, 3 dB reserve, D = 3,5 ps/(nm x km)
Power requirements		
Current consumption at 24 V DC	663mA	663mA
Current consumption at 48 V DC	332mA	332mA
Power output in Btu (IT) h	54.3	54.3
Ambient conditions		
MTBF	33.8 years (MIL-HDBK-217F)	24.6 years (MIL-HDBK-217F)

Industrial ETHERNET

Compact > Switches Software Release 4.0

Type	RS30-0802T1T1SDAEHH04.0.
Order No.	943 434-029
	
	Fast ETHERNET/Gigabit-ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 8 x FE, 2 x GE
Product description	
Port type and quantity	8 ports in total, 2 Gigabit Ethernet Ports; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 8 standard 10/100 BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	346mA
Current consumption at 48 V DC	186mA
Power output in Btu (IT) h	28.3
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply
Filter	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server
Flow control	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)
Presettings	Standard
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	52.6 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	74 x 131 x 111
Mounting	DIN Rail
Weight	410 g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19” installation frame

Type	RS30-0802O6O6SDAEHH04.0.	RS30-0802OOZZSDAEHH04.0.
Order No.	943 434-031	RS30-0802OOZZSDAEHH04.0.
		
	Fast ETHERNET/Gigabit-ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 8 x FE, 2 x GE	Fast ETHERNET/Gigabit-ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 8 x FE, 2 x GE
Product description		
Port type and quantity	8 ports in total, 2 Gigabit Ethernet Ports; 1. Uplink Port: Gigabit SFP-Slot; 2. Uplink Port: Gigabit SFP-Slot, 8 standard 10/100 BASE TX, RJ45	8 ports in total, 2 Gigabit Ethernet Ports; 1. Uplink Port: 2 x Gigabit SFP-Slot; 2. Uplink Port: 2 x FE SFP-Slot, 8 standard 10/100 BASE TX, RJ45
Network size - length of cable		
Multimode fiber (MM) 50/125 µm	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC
Multimode fiber (MM) 62.5/125 µm	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC	cf. SFP LWL modul M-SFP-SX/LC and M-SFP-LX/LC
Single mode fiber (SM) 9/125 µm	cf. SFP module M-SFP-LX/LC	cf. SFP LWL modul M-SFP-LX/LC
Single mode fiber (LH) 9/125 µm (long haul transceiver)	cf. SFP module M-SFP-LH/LC and M-SFP-LX+/LC	cf. SFP LWL modul M-SFP-LH/LC and M-SFP-LH+/LC
Power requirements		
Current consumption at 24 V DC	320mA	294mA
Current consumption at 48 V DC	172mA	158mA
Power output in Btu (IT) h	26.3	24.3

Industrial ETHERNET

Compact > Switches Software Release 4.0

Type	RS30-1602T1T1SDAEHH04.0.
Order No.	943 434-033
	
	Fast ETHERNET/Gigabit-ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 8 x FE, 2 x GE
Product description	
Port type and quantity	16 ports in total, 2 Gigabit Ethernet Ports; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 16 standard 10/100 BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	542mA
Current consumption at 48 V DC	271mA
Power output in Btu (IT) h	44.4
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply
Filter	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server
Flow control	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)
Presettings	Standard
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	39.6 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	110 x 131 x 111
Mounting	DIN Rail
Weight	600 g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19” installation frame

Type	RS30-1602O6O6SDAEHH04.0.
Order No.	943 434-035
	
	Fast ETHERNET/Gigabit-ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 8 x FE, 2 x GE
Product description	
Port type and quantity	16 ports in total, 2 Gigabit Ethernet Ports; 1. Uplink Port: Gigabit SFP-Slot; 2. Uplink Port: Gigabit SFP-Slot, 16 standard 10/100 BASE TX, RJ45
Network size - length of cable	
Multimode fiber (MM) 50/125 µm	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC
Multimode fiber (MM) 62.5/125 µm	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC
Single mode fiber (SM) 9/125 µm	cf. SFP module M-SFP-LX/LC
Single mode fiber (LH) 9/125 µm (long haul transceiver)	cf. SFP module M-SFP-LH/LC and M-SFP-LX+/LC
Power requirements	
Current consumption at 24 V DC	516mA
Current consumption at 48 V DC	257mA
Power output in Btu (IT) h	42.4

Industrial ETHERNET

Compact > Switches Software Release 4.0

Type	RS30-2402T1T1SDAEHH04.0.
Order No.	943 434-037
	
	Fast ETHERNET/Gigabit-ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 24 x FE, 2 x GE
Product description	
Port type and quantity	24 ports in total, 2 Gigabit Ethernet Ports; 1. Uplink Port: 10/100BASE-TX, RJ45; 2. Uplink Port: 10/100BASE-TX, RJ45, 24 standard 10/100 BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	654mA
Current consumption at 48 V DC	327mA
Power output in Btu (IT) h	53.6
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, disable learning
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA21-USB, ACA11 read support)
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply
Filter	QoS 4 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), multicast detection unknown multicast, broadcast limiter, fast aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server
Flow control	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV)
Presettings	Standard
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	33.5 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	110 x 131 x 111
Mounting	DIN Rail
Weight	650 g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19” installation frame

Type	RS30-2402O6O6SDAEHH04.0.
Order No.	943 434-039
	
	Fast ETHERNET/Gigabit-ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced, ports: 24 x FE, 2 x GE
Product description	
Port type and quantity	24 ports in total, 2 Gigabit Ethernet Ports; 1. Uplink Port: Gigabit SFP-Slot; 2. Uplink Port: Gigabit SFP-Slot, 24 standard 10/100 BASE TX, RJ45
Network size - length of cable	
Multimode fiber (MM) 50/125 µm	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC
Multimode fiber (MM) 62.5/125 µm	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC
Single mode fiber (SM) 9/125 µm	cf. SFP module M-SFP-LX/LC
Single mode fiber (LH) 9/125 µm (long haul transceiver)	cf. SFP module M-SFP-LH/LC and M-SFP-LX+/LC
Power requirements	
Current consumption at 24 V DC	628mA
Current consumption at 48 V DC	313mA
Power output in Btu (IT) h	51.6

Industrial ETHERNET

RS40 Full Gigabit > Switches Release 4.0

Type	RS40-0009CCCCSDAEHH04.0.
Order No.	943-935-001
	
	ETHERNET/Fast ETHERNET/Gigabit Ethernet-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail, store-and-forward-switching, fanless design, Software Layer 2 Enhanced
Product description	
Port type and quantity	Gigabit ETHERNET ports in total: 9; 4 x Combo ports (10/100/1000BASE TX RJ45 plus related FE/GE-SFP slot); 5 x 10/100/1000BASE TX RJ45
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 6-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - length of cable	
Twisted pair (TP)	0 - 100m
Multimode fiber (MM) 50/125 µm	0 - 550m, 0 - 7,5 dB link budget (with M-SFP-SX/LC)
Multimode fiber (MM) 62.5/125 µm	0 - 275m, 0 - 7,5 dB link budget (with M-SFP-SX/LC)
Single mode fiber (SM) 9/125 µm	0 - 20km, 0 - 11 dB link budget (with M-SFP-LX/LC)
Single mode fiber (LH) 9/125 µm (long haul transceiver)	16 - 80km, 6 - 22 dB link budget (with M-SFP-LH/LC) 44 - 120km, 13 - 32 dB link budget (with M-SFP-LH+/LC)
Network size - cascadibility	
Line - / star topology	Any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	750 mA
Current consumption at 48 V DC	375 mA
Power output in Btu (IT) h	62
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB
Configuration	Comand Line Interface (CLI), TELNET, BootP, DHCP, DHCP Option 82, HIDiscovery, auto configuration adapter (ACA11, ACA21-USB), Watchdog configuration
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-Ring (ring structure), MRP (IEC-Ring functionality), RSTP 802.1w, redundant network/ring coupling, redundant 24 V power supply
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Filter	QoS 4 Klassen, Portpriorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging
Realtime	SNTP server, PTP / IEEE 1588
Flow control	Flow control 802.3x
Presettings	pre-configured for EtherNet/IP or PROFINET (optional)
Ambient conditions	
Operating temperature	0° up to +60°C, optional -40° up to +70°C (EEC)
Storage/transport temperature	-40° to +70°C
Protective paint on PCB	optional conformal coating
Relative humidity (non-condensing)	10% to 95%
MTBF	22 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	74 x 131 x 111 (EEC 110 x 131 x 111)
Mounting	DIN Rail
Weight	530 g (EEC 700g)
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 part 15 class A
EN 55022	EN 55022 class A
Approvals	
Safety of industrial control equipment	cUL 508 (pending)
Hazardous locations	cUL 1604 class1 div 2 (pending)
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	

Type	RS40-0009CCCCSDAPHH04.0.
Order No.	RS40-0009CCCCSDAPHH04.0.
	
	ETHERNET/Fast ETHERNET/Gigabit Ethernet-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail, store-and-forward-switching, fanless design, Software Layer 2 Professional
Power requirements	
Operating voltage	12/24/48 V DC (9,6-60) V and 24 V AC (18-30) V
Current consumption at 24 V DC	770 mA
Current consumption at 48 V DC	385 mA
Power output in Btu (IT) h	64
Software	
Diagnostics	LEDs, log-file, syslog, signal contact, RMON, port mirroring, topology discovery 802.1AB, cable tester
Security	Port security (IP and MAC), SNMP V3, SSH, authentication (802.1x)
Redundancy functions	HIPER-Ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, redundant 24 V power supply, link aggregation
Filter	QoS 4 Klassen, Portpriorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging, Multicast GMRP IEEE 802.1D
Realtime	SNTP server, PTP / IEEE 1589
Ambient conditions	
MTBF	21 years(MIL-HDBK-217F)

Built to take the punishment:

The rugged new rail switches.

The new Hirschmann rail switches deliver excellent performance in substations and any other applications and environments where there is a need for extremely rugged DIN rail switches. The new Hirschmann family is the solution of choice whenever rugged design, long-term reliability and very good EMI immunity are required to withstand extreme operating conditions such as temperature, shock and vibration. The range of applications includes marine systems, transportation automation and extremely harsh industrial environments. The new rugged rail switches cover the entire spectrum from stand-alone solutions, with models ranging from the 8-port TX to the 10-port full fiber switch, to complete ruggedized solutions.

- ***Extremely high EMV immunity***
- ***Shock and vibration protection***
- ***Modular design for maximum versatility***
- ***Extended temperature range: – 40° up to + 85° C***
- ***Compact design with metal housing***
- ***Simple, user-friendly ring configuration***

RSR

Accessories
for this family you can find on the following pages:

Transceiver Page 194
System Accessories Page 202

User configurable with the OpenRail System

RSR30-0902S2M2T1UCCHPHH04.0.

RSR30 — Model

RSR20	Rail Switch Rugged Fast-ETHERNET
RSR30	Rail Switch Rugged Gigabit-ETHERNET uplink ports

09 — Ports Fast-ETHERNET

06	6 x 100 Mbit ETHERNET
07	7 x 100 Mbit ETHERNET
08	8 x 100 Mbit ETHERNET
09	9 x 100 Mbit ETHERNET

02 — Ports Gigabit-ETHERNET

00	0 x 1000 Mbit ETHERNET
02	2 x 1000 Mbit ETHERNET
03	3 x 1000 Mbit ETHERNET

S2 — Ports Type 1. Uplink

CC	2 x Combo Port Gigabit-ETHERNET	O7	Combo Port Gigabit-ETHERNET
OO	2 x SFP Slot Gigabit-ETHERNET	O6	SFP Slot Gigabit-ETHERNET
TT	2 x Twisted Pair (Tx)/RJ 45	T1	Twisted Pair (Tx)/RJ 45
MM	2 x Multimode FX SC	M2	Multimode FX SC
JJ	2 x Multimode FX MTRJ	M3	Multimode FX MTRJ
NN	2 x Multimode FX ST	M4	Multimode FX ST
VV	2 x Singlemode FX SC	S2	Singlemode FX SC
UU	2 x Singlemode FX ST	S4	Singlemode FX ST
LL	2 x Singlemode Long Haul FX SC	L2	Singlemode Long Haul FX SC
GG	2 x Singlemode Long Haul+ FX SC (200 km)	G2	Singlemode Long Haul+ FX SC (200 km)
ZZ	2 x SFP Slot (100 Mbit)	Z6	SFP Slot (100 Mbit)

M2 — Ports Type 2. Uplink

ZZ	2 x SFP Slot (100 Mbit)	M4	Multimode FX ST
O7	Combo Port Gigabit-ETHERNET	S2	Singlemode FX SC
O6	SFP Slot Gigabit-ETHERNET	S4	Singlemode FX ST
T1	Twisted Pair (Tx)/RJ 45	L2	Singlemode Long Haul FX SC
M2	Multimode FX SC	G2	Singlemode Long Haul+ FX SC (200 km)
M3	Multimode FX MTRJ	Z6	SFP Slot (100 Mbit)

T1 — Remaining Ports

T1	Twisted Pair (Tx)/RJ 45
Z6	SFP Slot (100 Mbit)

U — Temperature range

S	Standard 0° C up to +60° C
U	Extended –40° C up to +85° C
F	Extended –40° C up to +85° C inclusive Conformal Coating

C — Voltage range 1

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

C — Voltage range 2

9	Not available
C	24/36/48 V DC
K	60/120/250 V DC and 110/230 V AC

H — Approvals

H	UL508; GL; IEC61850; IEEE 1613; EN 50121
C	UL508; GL; IEC61850; IEEE 1613; EN 50121-4; EN50155

P — Software version

P	Professional

H — Configuration

H	Hirschmann

H — OEM-Type

H	Hirschmann

04.0. — Software release

04.0.	Software release 4.0.
XX.X.	newest software release

Compulsory field Optional

Use our online tool to configure your rail switch at configurator.hirschmann.com. Avoid the hassle and the delay.

Industrial ETHERNET

RSR > **Switches Release 4.0**

Type	**RSR20-0800T1T1T1UK9HPHH04.0.**
Order No.	RSR20-0800T1T1T1UK9HPHH04.0.
	
	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial Switch für DIN rail store-and-forward-switching fanless design, ports: 8 x FE
Product description	
Port type and quantity	8 ports in total, 8 x FE; 1. Uplink-Port: 10/100BASE-TX, RJ45; 2. Uplink-Port: 10/100BASE-TX, RJ45; 6 x 10/100BASE TX, RJ45
More Interfaces	
Power supply/signaling contact	Power supply 1: 1 x plug-in terminal block 2-pin 1 x plug-in terminal block 2-pin;
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - length of cable	
Twisted pair (TP)	0 - 100m
Multimode fiber (MM) 50/125 µm	-
Multimode fiber (MM) 62.5/125 µm	-
Single mode fiber (SM) 9/125 µm	-
Single mode fiber (LH) 9/125 µm (long haul transceiver)	-
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	> 100
Rekonfiguration time	< 10ms
Power requirements	
Operating voltage	Power supply 1: 60/120/250 VDC (48-320)V and 110/230 VAC (90-265)V, Power supply 2: not assembled
Power output in Btu (IT) h	18.1
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-file, syslog, signal contact, RMON (statistic, history, alarms, events), port mirroring, topology discovery 802.1AB, cable diagnostic
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11, ACA21-USB), watchdog configuration
Security	Port Security (IP und MAC), SNMP V3, SSH, Authentication (802.1x)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, link aggregation, redundant 24 V power supply,
Filter	QoS 4 Klassen, Portpriorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging, Multicast GMRP IEEE 802.1D
Realtime	SNTP server, realtime clock with energy buffer
Flow control	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV), Prio (MAC/IP), Prio Mapping (TOS Layer2), Traffic Shaping (Unicast, Multicast, Broadcast) Ingress / Egress
Industrial Profiles	EtherNet/IP, PROFINET compatible, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Ambient conditions	
Operating temperature	-40° to +85°C
Storage/transport temperature	-40° to +85°C
Relative humidity (non-condensing)	10% to 95%
MTBF	
Mechanical construction	
Dimensions (W x H x D)	120 x 137 x 115
Mounting	DIN Rail
Weight	appr. 1kg
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms Dauer, 18 Schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13,2 Hz, 90 min.; 0,7g, 13,2 Hz - 100 Hz, 90 min.; 3,5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 Zyklen, 1 Oktave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	8 kV contact discharge, 15 kV air discharge
EN 61000-4-3 electromagnetic field	35 V/m (80 - 2700 MHz); 1kHz, 80% AM
EN 61000-4-4 fast transients (burst)	4 kV power line, 4 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line
EN 61000-4-16 mains frequency voltage	30V, 50Hz continous; 300V, 50Hz 1s
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (pending)
Hazardous locations	cUL 1604 Class1 Div 2 (pending)
Germanischer Lloyd	Germanischer Lloyd (pending)
Substation	IEC 61850-3, IEEE 1613
Railway norm	EN 50121-4
Transportation	NEMA TS2
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19" installation frame

Type	RSR20-0800M2M2T1UK9HPHH04.0.	RSR20-0900MMM2T1UK9HPHH04.0.
Order No.	RSR20-0800M2M2T1UK9HPHH04.0.	RSR20-0900MMM2T1UK9HPHH04.0.
		
	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial Switch für DIN rail store-and-forward-switching fanless design, ports: 8 x FE	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial Switch für DIN rail store-and-forward-switching fanless design, ports: 9 x FE
Product description		
Port type and quantity	8 ports in total, 8 x FE; 1. Uplink-Port: 100BASE-FX, MM-SC; 2. Uplink-Port: 100BASE-FX, MM-SC; 6 x 10/100BASE TX, RJ45	9 ports in total, 9 x FE; 1. Uplink-Port: 2 x 100BASE-FX, MM-SC; 2. Uplink-Port: 100BASE-FX, MM-SC; 6 x 10/100BASE TX, RJ45
Network size - length of cable		
Twisted pair (TP)	0 - 100m	0 - 100m
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 800 MHz x km	0 - 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 - 5000 m, 8 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 800 MHz x km	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 800 MHz x km
Single mode fiber (SM) 9/125 µm	-	-
Single mode fiber (LH) 9/125 µm (long haul transceiver)	-	-
Power requirements		
Power output in Btu (IT) h	26.3	40.6

Type	RSR30-0603CCO7T1UK9HPHH04.0.	RSR30-0703OOO6T1UK9HPHH04.0.
Order No.	RSR30-0603CCO7T1UK9HPHH04.0.	RSR30-0703OOO6T1UK9HPHH04.0.
		
	ETHERNET/Fast ETHERNET/Gigabit-switch according to IEEE 802.3 compact, managed, Industrial Switch für DIN rail store-and-forward-switching fanless design, ports: 3 x GE, 6 x FE	ETHERNET/Fast ETHERNET/Gigabit-switch according to IEEE 802.3 compact, managed, Industrial Switch für DIN rail store-and-forward-switching fanless design, ports: 3 x GE, 7 x FE
Product description		
Port type and quantity	9 ports in total, 3 x GE, 6 x FE; 1. Uplink-Port: 2 x Gigabit SFP-Combo Port; 2. Uplink-Port: Gigabit SFP-Combo Port; 6 x 10/100BASE TX, RJ45	10 ports in total, 3 x GE, 7 x FE; 1. Uplink-Port: 2 x Gigabit SFP-Slot; 2. Uplink-Port: Gigabit SFP-Slot; 6 x 10/100BASE TX, RJ45
Network size - length of cable		
Twisted pair (TP)	0 - 100m	0 - 100m
Multimode fiber (MM) 50/125 µm	cf. SFP LWL-Modul M-SFP-SX/LC and M-SFP-LX/LC	cf. SFP LWL-Modul M-SFP-SX/LC and M-SFP-LX/LC
Multimode fiber (MM) 62.5/125 µm	cf. SFP LWL-Modul M-SFP-SX/LC and M-SFP-LX/LC	cf. SFP LWL-Modul M-SFP-SX/LC and M-SFP-LX/LC
Single mode fiber (SM) 9/125 µm	cf. SFP LWL-Modul M-SFP-LX/LC	cf. SFP LWL-Modul M-SFP-LX/LC
Single mode fiber (LH) 9/125 µm (long haul transceiver)	cf. SFP LWL-Modul M-SFP-LH/LC and M-SFP-LH+/LC	cf. SFP LWL-Modul M-SFP-LH/LC and M-SFP-LH+/LC
Power requirements		
Power output in Btu (IT) h	15.1	25.3

Industrial ETHERNET

Switches Release 4.0 > Versions

Type	RSR30-0703OOO6Z6UK9HPHH04.0.
Order No.	RSR30-0703OOO6Z6UK9HPHH04.0.
	
	ETHERNET/Fast ETHERNET/Gigabit-switch according to IEEE 802.3 compact, managed, Industrial Switch für DIN rail store-and-forward-switching fanless design, ports: 3 x GE, 7 x FE
Product description	
Port type and quantity	10 ports in total, 3 x GE, 7 x FE; 1. Uplink-Port: 2 x Gigabit SFP-Slot; 2. Uplink-Port: 1 x Gigabit SFP-Slot; 7 x FE-SFP Slot
Network size - length of cable	
Multimode fiber (MM) 50/125 µm	cf. SFP LWL-Modul M-SFP-SX/LC and M-SFP-LX/LC; cf. SFP LWL-Modul M-Fast SFP-MM/LC
Multimode fiber (MM) 62.5/125 µm	cf. SFP LWL-Modul M-SFP-SX/LC and M-SFP-LX/LC; cf. SFP LWL-Modul M-Fast SFP-MM/LC
Single mode fiber (SM) 9/125 µm	cf. SFP LWL-Modul M-SFP-LX/LC; cf. SFP LWL-Modul M-Fast SFP-SM+/LC
Single mode fiber (LH) 9/125 µm (long haul transceiver)	cf. SFP LWL-Modul M-SFP-LH/LC and M-SFP-LH+/LC; cf. SFP LWL-Modul M-Fast SFP-LH/LC
Power requirements	
Power output in Btu (IT) h	24.3

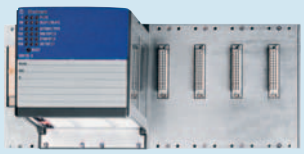
Modular, gigabit, managed, flexible, economical.

The MICE, all of our expertise in one switch.

Industrially compatible, flexible, economical and future-safe – you should never expect less from your ETHERNET switches today. But more would be overdoing things: you want to put together the functions and connections tailor-made to meet your individual application. No problem for the intelligent MICE module system! The modular structure pays off especially in the long term: MICE Switches and media modules offer you maximum flexibility and are therefore perfectly prepared for the growing network demands of the future. The MICE components are integrated in the “OpenRail” concept and therefore offer tailor-made solutions for all applications. The structure also guarantees long-term availability. Large labeling fields and smart functions such as autoconfiguration and autocrossing make commissioning a lot easier.

And like all Industrial ETHERNET products from the world market leader Hirschmann, the members of our MICE product family can be snapped onto the DIN rail at the drop of a hat, can be supplied redundantly and support the HIPER-Ring. Because only systems which run around the clock can guarantee your success.

MS20

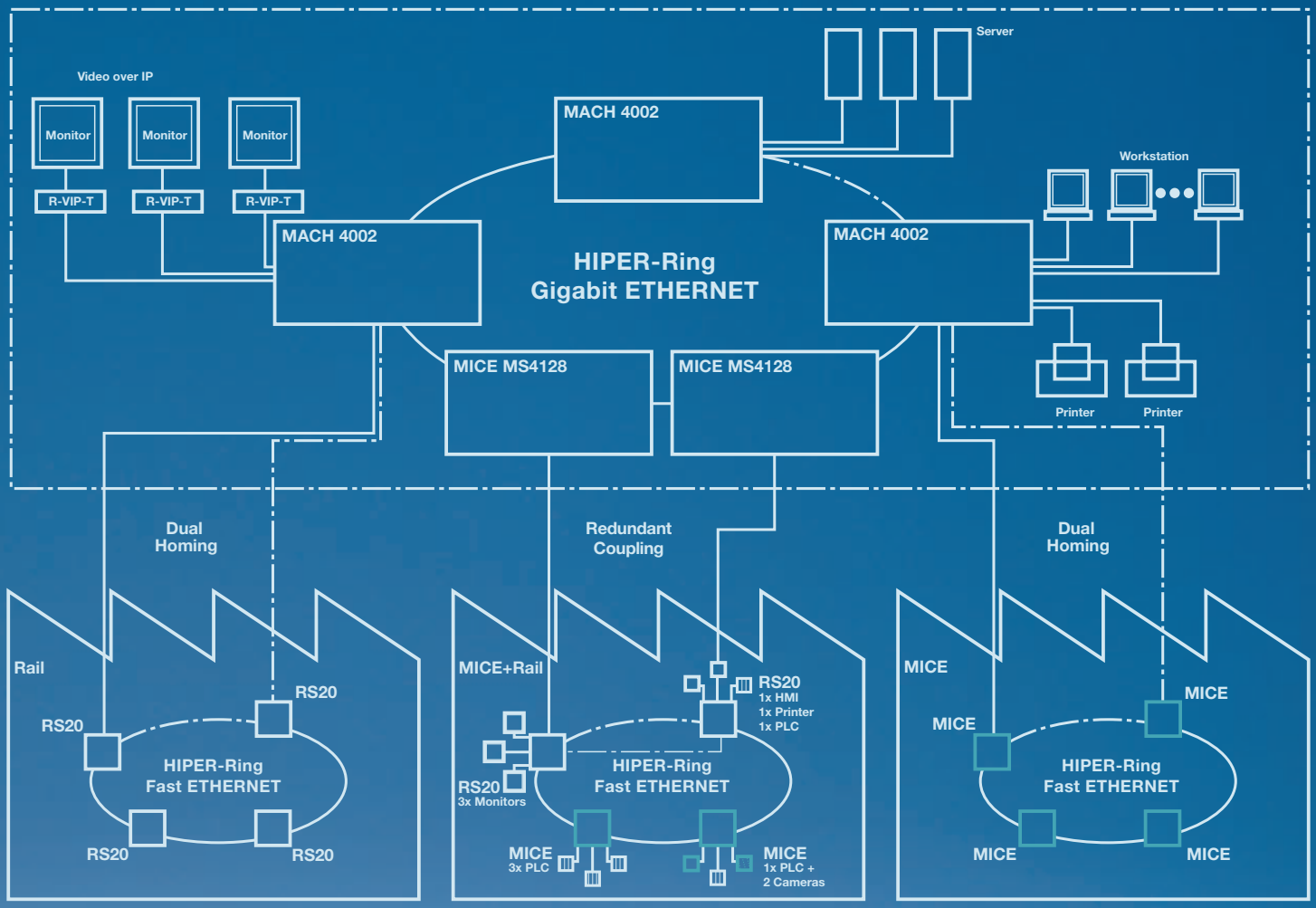


MS4128

Accessories
for this family you can find on the following pages:

Transceiver Page 194
System Accessories Page 202

- ***Modular from the 8-port Fast-ETHERNET Layer 2 switch to the Layer 3 and Gigabit-capable 28-port switch.***
- ***Future-safe extensions such as routing and security.***
- ***Maximum network redundancy with HIPER-Ring, RSTP, Dual Homing and Link Aggregation.***
- ***Maximum flexibility by Gigabit-SFP fiberoptic modules.***
- ***Extended temperature ranges from –40° to +70° C.***
- ***Very easy commissioning by HiDiscovery, autoconfiguration, autocrossing, VLAN, RSTP, SNTP and much more.***
- ***Power over ETHERNET (PoE) and IEEE1588 real time modules.***
- ***Supported standards: 10BASE-T/-FL, 100BASE-TX/-FX and 1000BASE-TX/-SX.***
- ***Connections for twisted pair, multimode or single mode LWL, PoF, HCS, AUI and M12 connectors.***
- ***Heat dissipation via integrated cooling units.***

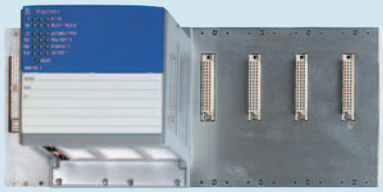


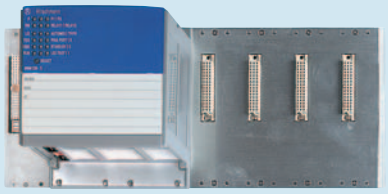
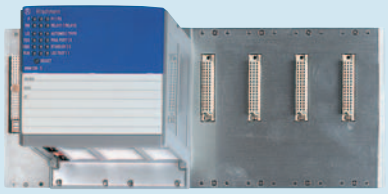
Hirschmann Competence Center

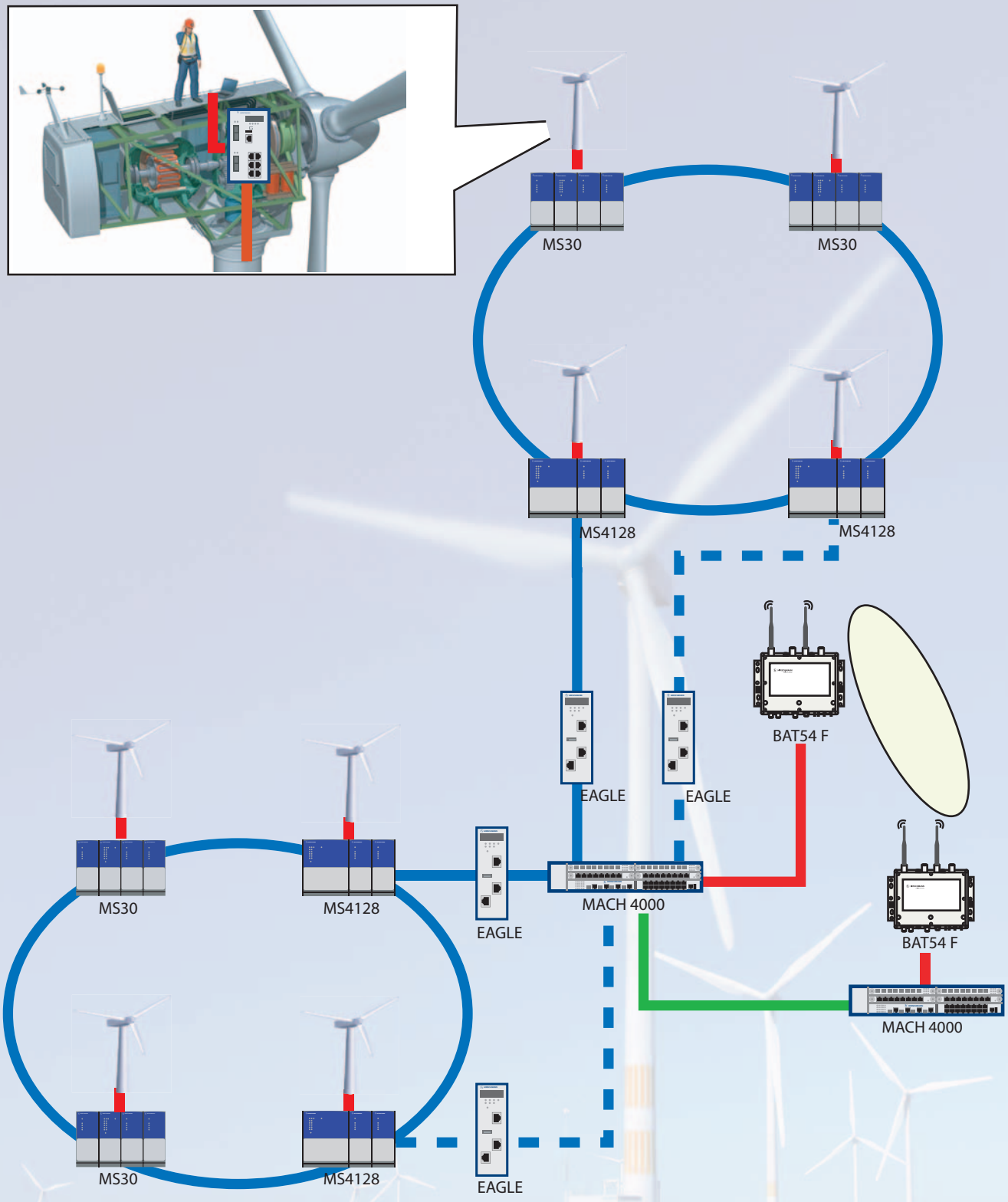
For **MICE products** too, the Hirschmann Competence Center offers the appropriate consulting services in the network planning: **Network optimization check, risk reduction consulting, network technology evaluation and network baselining consulting.** Plus the following trainings: CP3d Industrial Backbone components in theory and practice, IMd Hirschmann in overview, CPUd Update Rail family and CB2d Industrial ETHERNET II technology in detail. We also support you with certification testing, installation, configuration and pre-assembly as well as via our service hotline and later offer Advance Hardware Replacement and warranty extension.

www.hicomcenter.com

Industrial ETHERNET

Type	MS4128-L2P
Order No.	943 009-101
	
	Power MICE, modular, managed Industrial ETHERNET Switch, Layer 2 Switch with Software Professional. Ehternet (10 Mbit/s) and Fast-ETHERNET (100 Mbit/s) and Gigabit-ETHERNET (1000 Mbit/s)
Product description	
Port type and quantity	up to 28 ports above media modules practicable, 4 X 1000 BASE-SX with SFP modules or 4 x 10/100/1000 BASE-TX and 24 Fast ETHERNET (100 Mbit/s) ports (with MB-2T)
More Interfaces	
Power supply/signaling contact	2 plug-in terminal blocks, 4-pin
V.24 interface	1 x RJ11 socket
USB interface	1 USB interface to connect auto-configuration adapter (ACA21-USB)
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 switches (reconfiguration time < 50 ms typ. at LWL)
Power requirements	
Operating voltage	24 V DC (-25% to +30%)
Current consumption at 24 V DC	630 mA (without media modules)
Power consumption	15 W (without media modules)
Service	
Management	serial interface, web interface, SNMP V1/V2/V3, HiVision, file transfer SW HTTP/TFTP
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full-duplex, error, redundancy management, ring-port, LED-test), signal contact, syslog, logfile, RMON, port mirroring, Topology Discovery IEEE 802.1AB (LLDP)
Configuration	command line interface (CLI), TELNET, BootP, DHCP, DHCP Option 82, HiDiscovery, auto-configuration adapter (ACA21-USB)
Security	port-security (MAC- and IP-adresses), access control to agent (VLAN/IP) authentication 802.1x, SSH, SSL, SNMP V3
Other services	QoS 8 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), broadcastlimiter, flow control IEEE 802.3x, SNTP (Simple Network Time Protocol), TOS (Type of Service) Diff.-Serv (DSCP), TOS-Prio-Mapping, protocol based VLANs (IP, nonIP Traffic), Traffic Shaping
Prepared for	MSTP-802.1s
Routing	
Dynamic routing	
Multicast routing	
Redundancy	
Redundancy functions	HIPER-Ring (ring structure), RSTP IEEE 802.1w (rapid spanning tree protocol), redundant network/ring coupling (master/receiver functionality), dual homing (master/receiver functionality), redundant 24 V power supply
Ambient conditions	
Operating temperature	0 °C to +60 °C
Storage/transport temperature	-25 °C to +70 °C
Relative humidity (non-condensing)	10% to 95%
MTBF	24.2 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction	
Dimensions (W x H x D)	315 mm x 134 mm x 140 mm
Mounting	DIN Rail
Weight	2,2 kg
Protection class	IP 20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7 g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1 g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class 1 Div 2
Germanischer Lloyd	Germanischer Lloyd
Railway norm	EN50121-4
Scope of delivery and accessories	
Scope of delivery	device, 2 terminal blocks, operating manual
Accessories to order separately	rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, HiVision network management, auto-configuration adapter (ACA21-USB), 19” installation frame, labels ML-MS2/MM, additional backplane MB-2T

Type	MS4128-L3E	MS4128-L3P
Order No.	943 009-201	943 009-301
		
	Power MICE, modular, managed Industrial ETHERNET Switch, Layer 3 Switch with Software Enhanced. ETHERNET (10 Mbit/s) and Fast-ETHERNET (100 Mbit/s) and Gigabit-ETHERNET (1000 Mbit/s)	Power MICE, modular, managed Industrial ETHERNET Switch, Layer 3 Switch with Software Professional. Ehternet (10 Mbit/s) and Fast-ETHERNET (100 Mbit/s) and Gigabit-ETHERNET (1000 Mbit/s)
Service		
Routing	static routing, VRRP router redundancy; layer 3 - ACL, HiVRRP router redundancy < 500 ms	static routing, VRRP router redundancy; layer 3 - ACL, HiVRRP router redundancy < 500 ms
Dynamic routing	RIP V1/2	RIP V1/2, OSPF
Multicast routing		Multicast routing DVMRP/PIM DM


MS30
MS30
MS4128
MS4128
BAT54 F
EAGLE
EAGLE
MS30
MS4128
EAGLE
MACH 4000
BAT54 F
MACH 4000
MS30
MS4128
EAGLE
10Gbi/s FX
1Gbit/s FX
100Mbit/s TP
54Mbit/s WLAN

Free configuration with the OpenRail system from Hirschmann

MS 30-2402SAAPHH04.0.

MS 30- — **Model**

MS 20	Fast-ETHERNET Uplinks
MS 30	Gigabit-ETHERNET Uplinks

24 — **Ports FE**

04	4 x 100 Mbit
08	8 x 100 Mbit
16	16 x 100 Mbit
24	24 x 100 Mbit

02 — **Ports GE**

00	0 x 1000 Mbit
02	2 x 1000 Mbit

S — **Temperature range**

S	0° C up to + 60° C
T	– 40° C up to + 70° C
E	– 40° C up to + 70° C inclusive Conformal Coating

A — **Power supply**

A	24 V (18-32) V DC MICE
C	32-60 V DC MICE

A — **Approvals**

A	cUL508 · cUL1604 · Class 1 Div.2
H	cUL508 · cUL1604 · Class 1 Div.2 GL: German Lloyd · IEC 61850-3: Substation IEEE1613: Substation · EN50121-4: Railway (along track)
B	cUL508 · cUL1604 · Class 1 Div.2 GL: German Lloyd · IEC 61850-3: Substation IEEE1613: Substation · EN50121-4: Railway (along track) ATEX100a, Zone 2: Hazardous Location EN 50155: railway (train)
C	UL 508, cUL 1604 Class 1 Div. 2 GL, IEC 6180-3, IEEE 1613, EN 50121-4, EN 50155

P — **Software version**

E	Enhanced: Remote access, diagnostic, filters, redundancy
P	Professional: Enhanced software plus security, extended diagnostic and redundancy

H — **Configuration**

H	Standard
X	Customer specific
P	PROFINET pre-settings
E	EtherNet/IP pre-settings

H — **OEM type**

H	Standard
X	Customer specific

04.0. — **Software release**

04.0.	Software release 4.0

Compulsory field Optional

MS 30-	24	02	S	A	A	P	H	H	04.0.

Configure your Gigabit OpenRail Switch simply with our online tool.
configurator.hirschmann.com

Industrial ETHERNET

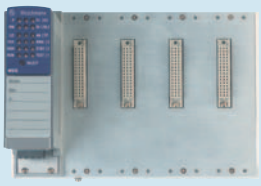
Modular > Switches Software Release 4.0

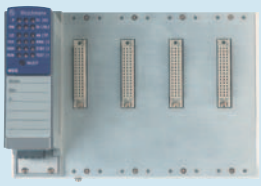
Type	MS20-0800SAAEHH04.0.
Order No.	MS20-0800SAAEHH04.0.
	
	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced
Product description	
Port type and quantity	Fast ethernet ports in total: 8; Gigabit Ethernet Ports: 0
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 4-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	24 V DC (18-32) V
Current consumption at 24 V DC	208 mA
Current consumption at 48 V DC	155 mA
Power output in Btu (IT) h	17.1
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-File, syslog, signal contact, RMON (Statistic, history, alarme, events), port mirroring, topology discovery 802.1AB
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11, ACA21-USB), watchdog configuration
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply, redundant signal contact
Filter	QoS 4 Klassen, Portpriorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server, PTP / IEEE 1588 support with media module
Flow control	Flow control 802.3x, port priority 802.1D/p, priority (TOS/DIFFSERV)
Presettings	Standard
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	54.7 years
Mechanical construction	
Dimensions (W x H x D)	125 x 133 x 100 (140 at 48 V module)
Mounting	DIN Rail
Weight	610 g (700 g at 48 V module)g
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19 installation frame"

Type	MS20-0800SAAPHH04.0.
Order No.	MS20-0800SAAPHH04.0.
	
	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Professional
Software	
Diagnostics	LEDs, log-File, syslog, signal contact, RMON (statistic, history, alarme, events), port mirroring, topology discovery 802.1AB, cable tester
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11, ACA21-USB), watchdog konfiguration
Security	Port security (IP und MAC), SNMP V3, SSH, authentication (802.1x)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, link aggregation, redundant 24 V power supply, redundant signal contact
Filter	QoS 4 classes, port priorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging, Multicast GMRP IEEE 802.1D
Industrial Profiles	EtherNet/IP, PROFINET, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server, PTP / IEEE 1588 support with media module, realtime clock with energy buffer
Flow control	Flow control 802.3x, port priority 802.1D/p, priority (TOS/DIFFSERV), prio (MAC/IP), prio mapping (TOS Layer2), traffic shaping (unicast, multicast, broadcast) ingress / egress
Ambient conditions	
MTBF	49.6 years

Industrial ETHERNET

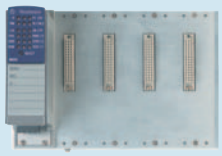
Modular > Switches Software Release 4.0

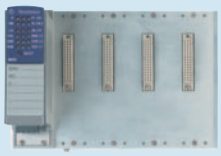
Type	MS20-1600SAAEHH04.0.
Order No.	MS20-1600SAAEHH04.0.
	
	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced
Product description	
Port type and quantity	Fast ethernet ports in total: 16; Gigabit Ethernet Ports: 0
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 4-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	24 V DC (18-32) V
Current consumption at 24 V DC	500 mA
Current consumption at 48 V DC	325 mA
Power output in Btu (IT) h	41
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-File, syslog, signal contact, RMON (Statistic, history, alarme, events), port mirroring, topology discovery 802.1AB
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11, ACA21-USB), watchdog configuration
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply, redundant signal contact
Filter	QoS 4 Klassen, Portpriorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server, PTP / IEEE 1588 support with media module
Flow control	Flow control 802.3x, port priority 802.1D/p, priority (TOS/DIFFSERV)
Presettings	Standard
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	36.5 years
Mechanical construction	
Dimensions (W x H x D)	202 x 133 x 100 (140 at 48 V module)
Mounting	DIN Rail
Weight	880 g (970 g at 48 V module)
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19 installation frame”

Type	MS20-1600SAAPHH04.0.
Order No.	MS20-1600SAAPHH04.0.
	
	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Professional
Software	
Diagnostics	LEDs, log-File, syslog, signal contact, RMON (statistic, history, alarme, events), port mirroring, topology discovery 802.1AB, cable tester
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11, ACA21-USB), watchdog konfiguration
Security	Port security (IP und MAC), SNMP V3, SSH, authentication (802.1x)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, link aggregation, redundant 24 V power supply, redundant signal contact
Filter	QoS 4 classes, port priorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging, Multicast GMRP IEEE 802.1D
Industrial Profiles	EtherNet/IP, PROFINET, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server, PTP / IEEE 1588 support with media module, realtime clock with energy buffer
Flow control	Flow control 802.3x, port priority 802.1D/p, priority (TOS/DIFFSERV), prio (MAC/IP), prio mapping (TOS Layer2), traffic shaping (unicast, multicast, broadcast) ingress / egress
Ambient conditions	
MTBF	34.2 years

Industrial ETHERNET

Modular > Switches Software Release 4.0

Type	MS20-2400SAAEHH04.0.
Order No.	MS20-2400SAAEHH04.0.
	
	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced
Product description	
Port type and quantity	Fast ethernet ports in total: 24; Gigabit Ethernet Ports: 0
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 4-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	24 V DC (18-32) V
Current consumption at 24 V DC	500 mA
Current consumption at 48 V DC	325 mA
Power output in Btu (IT) h	0
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-File, syslog, signal contact, RMON (Statistic, history, alarme, events), port mirroring, topology discovery 802.1AB
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11, ACA21-USB), watchdog configuration
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply, redundant signal contact
Filter	QoS 4 Klassen, Portpriorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server, PTP / IEEE 1588 support with media module
Flow control	Flow control 802.3x, port priority 802.1D/p, priority (TOS/DIFFSERV)
Presettings	Standard
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	36.1 years
Mechanical construction	
Dimensions (W x H x D)	278 x 133 x 100 (140 at 48 V module)
Mounting	DIN Rail
Weight	1030 g (1120 g at 48 V module)
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19 installation frame”

Type	MS20-2400SAAPHH04.0.
Order No.	MS20-2400SAAPHH04.0.
	
	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Professional
Software	
Diagnostics	LEDs, log-File, syslog, signal contact, RMON (statistic, history, alarme, events), port mirroring, topology discovery 802.1AB, cable tester
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11, ACA21-USB), watchdog konfiguration
Security	Port security (IP und MAC), SNMP V3, SSH, authentication (802.1x)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, link aggregation, redundant 24 V power supply, redundant signal contact
Filter	QoS 4 classes, port priorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging, Multicast GMRP IEEE 802.1D
Industrial Profiles	EtherNet/IP, PROFINET, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server, PTP / IEEE 1588 support with media module, realtime clock with energy buffer
Flow control	Flow control 802.3x, port priority 802.1D/p, priority (TOS/DIFFSERV), prio (MAC/IP), prio mapping (TOS Layer2), traffic shaping (unicast, multicast, broadcast) ingress / egress
Ambient conditions	
MTBF	33.8 years

Industrial ETHERNET

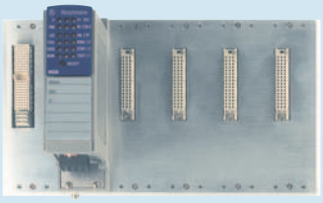
Modular > Switches Software Release 4.0

Type	MS30-0802SAAEHH04.0.
Order No.	MS30-0802SAAEHH04.0.
	
	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced
Product description	
Port type and quantity	Fast ethernet ports in total: 8; Gigabit Ethernet Ports: 2
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 4-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	24 V DC (18-32) V
Current consumption at 24 V DC	233 mA
Current consumption at 48 V DC	180 mA
Power output in Btu (IT) h	19.1
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-File, syslog, signal contact, RMON (Statistic, history, alarme, events), port mirroring, topology discovery 802.1AB
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11, ACA21-USB), watchdog configuration
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply, redundant signal contact
Filter	QoS 4 Klassen, Portpriorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server, PTP / IEEE 1588 support with media module
Flow control	Flow control 802.3x, port priority 802.1D/p, priority (TOS/DIFFSERV)
Presettings	Standard
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	46.1 years
Mechanical construction	
Dimensions (W x H x D)	163 x 133 x 100 (140 at 48 V module)
Mounting	DIN Rail
Weight	740 g (830 g at 48 V module)
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19 installation frame"

Type	MS30-0802SAAPHH04.0.
Order No.	MS30-0802SAAPHH04.0.
	
	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Professional
Software	
Diagnostics	LEDs, log-File, syslog, signal contact, RMON (statistic, history, alarme, events), port mirroring, topology discovery 802.1AB, cable tester
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11, ACA21-USB), watchdog konfiguration
Security	Port security (IP und MAC), SNMP V3, SSH, authentication (802.1x)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, link aggregation, redundant 24 V power supply, redundant signal contact
Filter	QoS 4 classes, port priorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging, Multicast GMRP IEEE 802.1D
Industrial Profiles	EtherNet/IP, PROFINET, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server, PTP / IEEE 1588 support with media module, realtime clock with energy buffer
Flow control	Flow control 802.3x, port priority 802.1D/p, priority (TOS/DIFFSERV), prio (MAC/IP), prio mapping (TOS Layer2), traffic shaping (unicast, multicast, broadcast) ingress / egress
Ambient conditions	
MTBF	42.4 years

Industrial ETHERNET

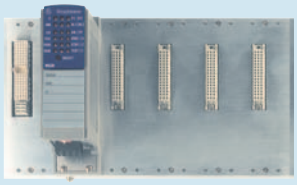
Modular > Switches Software Release 4.0

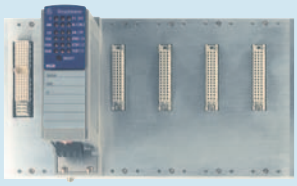
Type	MS30-1602SAAEHH04.0.
Order No.	MS30-1602SAAEHH04.0.
	
	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced
Product description	
Port type and quantity	Fast ethernet ports in total: 16; Gigabit Ethernet Ports: 2
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 4-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	24 V DC (18-32) V
Current consumption at 24 V DC	525 mA
Current consumption at 48 V DC	350 mA
Power output in Btu (IT) h	43
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-File, syslog, signal contact, RMON (Statistic, history, alarme, events), port mirroring, topology discovery 802.1AB
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11, ACA21-USB), watchdog configuration
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply, redundant signal contact
Filter	QoS 4 Klassen, Portpriorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server, PTP / IEEE 1588 support with media module
Flow control	Flow control 802.3x, port priority 802.1D/p, priority (TOS/DIFFSERV)
Presettings	Standard
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	32.5 years
Mechanical construction	
Dimensions (W x H x D)	240 x 133 x 100 (140 at 48 V module)
Mounting	DIN Rail
Weight	1010 g (1100 g at 48 V module)
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19 installation frame”

Type	MS30-1602SAAPHH04.0.
Order No.	MS30-1602SAAPHH04.0.
	
	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Professional
Software	
Diagnostics	LEDs, log-File, syslog, signal contact, RMON (statistic, history, alarme, events), port mirroring, topology discovery 802.1AB, cable tester
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11, ACA21-USB), watchdog konfiguration
Security	Port security (IP und MAC), SNMP V3, SSH, authentication (802.1x)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, link aggregation, redundant 24 V power supply, redundant signal contact
Filter	QoS 4 classes, port priorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging, Multicast GMRP IEEE 802.1D
Industrial Profiles	EtherNet/IP, PROFINET, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server, PTP / IEEE 1588 support with media module, realtime clock with energy buffer
Flow control	Flow control 802.3x, port priority 802.1D/p, priority (TOS/DIFFSERV), prio (MAC/IP), prio mapping (TOS Layer2), traffic shaping (unicast, multicast, broadcast) ingress / egress
Ambient conditions	
MTBF	30.6 years

Industrial ETHERNET

Modular > Switches Software Release 4.0

Type	MS30-2402SAAEHH04.0.
Order No.	MS30-2402SAAEHH04.0.
	
	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Enhanced
Product description	
Port type and quantity	Fast ethernet ports in total: 24; Gigabit Ethernet Ports: 2
More Interfaces	
Power supply/signaling contact	1 x plug-in terminal block, 4-pin
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	50 (reconfiguration time < 0.3 sec.)
Power requirements	
Operating voltage	24 V DC (18-32) V
Current consumption at 24 V DC	525 mA
Current consumption at 48 V DC	350 mA
Power output in Btu (IT) h	0
Software	
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log-File, syslog, signal contact, RMON (Statistic, history, alarme, events), port mirroring, topology discovery 802.1AB
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11, ACA21-USB), watchdog configuration
Security	Port security (IP and MAC), SNMP V3 (no encryption)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, redundant 24 V power supply, redundant signal contact
Filter	QoS 4 Klassen, Portpriorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging
Industrial Profiles	EtherNet/IP and PROFINET compatibel, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server, PTP / IEEE 1588 support with media module
Flow control	Flow control 802.3x, port priority 802.1D/p, priority (TOS/DIFFSERV)
Presettings	Standard
Ambient conditions	
Operating temperature	0° to +60°C
Storage/transport temperature	-40° to +70°C
Relative humidity (non-condensing)	10% to 95%
MTBF	32.2 years
Mechanical construction	
Dimensions (W x H x D)	316 x 133 x 100 (140 at 48 V module)
Mounting	DIN Rail
Weight	1160 g (1250 g at 48 V module)
Protection class	IP20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (line/earth), 1kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	Device, terminal block, operating manual
Accessories to order separately	Rail power supply RPS 30, RPS 80 EEC or RPS 120 EEC, terminal cable, network management HiVision, auto-configuration adapter (ACA21-USB), 19 installation frame"

Type	MS30-2402SAAPHH04.0.
Order No.	MS30-2402SAAPHH04.0.
	
	ETHERNET/Fast ETHERNET-switch according to IEEE 802.3 compact, managed, Industrial switch for DIN rail store-and-forward-switching, fanless design, Software Layer 2 Professional
Software	
Diagnostics	LEDs, log-File, syslog, signal contact, RMON (statistic, history, alarme, events), port mirroring, topology discovery 802.1AB, cable tester
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11, ACA21-USB), watchdog konfiguration
Security	Port security (IP und MAC), SNMP V3, SSH, authentication (802.1x)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, link aggregation, redundant 24 V power supply, redundant signal contact
Filter	QoS 4 classes, port priorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging, Multicast GMRP IEEE 802.1D
Industrial Profiles	EtherNet/IP, PROFINET, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server, PTP / IEEE 1588 support with media module, realtime clock with energy buffer
Flow control	Flow control 802.3x, port priority 802.1D/p, priority (TOS/DIFFSERV), prio (MAC/IP), prio mapping (TOS Layer2), traffic shaping (unicast, multicast, broadcast) ingress / egress
Ambient conditions	
MTBF	30.3 years

Type	MB-2T
Order No.	943 733-102
	
	Expansion backplane with 2 slots for MS20/30-16 and MS4128 MICE switches
Product description	
Port type and quantity	2 slots integrated on backplane (8 ports possible via media modules)
Power requirements	
Power consumption	0 W
Ambient conditions	
Operating temperature	0 °C bis +60 °C standart (optional -40°C to +70°C)
Storage/transport temperature	-25 °C to +70 °C
Relative humidity (non-condensing)	10% to 95%
MTBF	1146.1 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction	
Dimensions (W x H x D)	79 mm x 134 mm x 22 mm
Mounting	DIN Rail 35 mm
Weight	150 g
Protection class	IP 20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	Power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (E175531)
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional

User configurable with the OpenRail System

MM20-T1M4S4G2EBHH

MM2

Model

MM2	Fast Ethernet 10/100
MM3	Gigabit Ethernet

0

Technology

0	Standard
1	Realtime
2	Power over Ethernet

T1

M4

S4

G2

Ports

Z6	SFP Fiber/SFP/SFP Slot (100 Mbit)
O7	SFP Fiber/SFP/SFP Slot (1000 Mbit)
G2	Singlemode FIber Long Haul+/SMULH+/SC (100 Mbit)
L2	Singlemode Fiber Long Haul/SMULH/SC (100 Mbit)
S2	Singlemode Fiber/SM/SC (100 Mbit)
S4	Singlemode Fiber/SM/ST (100 Mbit)
M2	Multimode Fiber/MM/SC (100 Mbit)
M3	Multimode Fiber/MM/MTRJ (100 Mbit)
M4	Multimode Fiber/MM/ST (100 Mbit)
F4	Multimdoe Fiber/ST (10 Mbit)
P4	Multmode POF/ST (100 Mbit)
T1	Twisted-Pair/TX/RJ45 (10/100 Mbit)
T5	Twisted-Pair/TX/M12 (10/100 Mbit)
A8	AUI DSUB

E

Temperature

S	Standard 0°C bis +60°C
T	Extended -40°C bis +70°C
E	Extended -40°C bis +70°C with Conformal Coating

B

Approvals

A	cUL 508, cUL 1604 Class 1 Div. 2
H	cUL 508, cUL 1604 Class 1 Div. 2 GL, IEC 61850-3, IEEE 1613, EN 50121-4
B	cUL 508, cUL 1604 Class 1 Div. 2 GL, IEC 6180-3, IEEE 1613, EN 50121-4, Atex 100 a, Zone 2
C	UL 508, cUL 1604 Class 1 Div. 2 GL, IEC 6180-3, IEEE 1613, EN 50121-4, EN 50155

H

Configuration

H	Optional customer specific

H

OEM-type

H	Optional customer specific

Compulsory field Optional

MM2 **0-** **T1** **M4** **S4** **G2** **E** **B** **H** **H**

Use our online tool to configure your rail switch at configurator.hirschmann.com. Avoid hassle and the delay

MICE > Gigabit ETHERNET Media Modules

Type	MM4-2TX/SFP
Order No.	943 622-001
	
	Media module for MICE Switch MS4128, MS30xx, 10/100/1000BASE-TX und 1000BASE-SX/LX
Product description	
Port type and quantity	2 x 1000BASE-fiber with SFP modules, or 2 x 10/100/1000BASE-TX, TP cable, RJ45-sockets, autocrossing, autoneg., autopolarity any combination TX or SFP, 1 SFP deactivates 1TX, up to 2 ports
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber HCS (MM) 200/230 µm	
Multimode fiber POF (MM) 980/1000 µm	
Multimode fiber (MM) 50/125 µm	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC
Multimode fiber (MM) 62.5/125 µm	cf. SFP module M-SFP-SX/LC and M-SFP-LX/LC
Single mode fiber (SM) 9/125 µm	cf. SFP module M-SFP-LX/LC
Single mode fiber (LH) 9/125 µm (long haul transceiver)	cf. SFP FO module M-SFP-LH/LC and M-SFP-LH+/LC
Power requirements	
Operating voltage	power supply via the backplane of the MICE switch
Power consumption	2 W
PoE voltage	
Service	
Diagnostics	LEDs (power, link status, data, 1000 Mbit/s, auto-negotiation, full duplex, ring port, LED test)
Other services	
Ambient conditions	
Operating temperature	0 °C bis +60 °C standart (optional -40°C to +70°C)
Storage/transport temperature	-40 °C to +70 °C
Protective paint on PCB	optional
Relative humidity (non-condensing)	10% to 95%
MTBF	163 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction	
Dimensions (W x H x D)	38 mm x 134 mm x 77 mm
Mounting	Backplane
Weight	160 g
Protection class	IP 20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (E175531)
Hazardous locations	cUL 1604 class1 div 2
Germanischer Lloyd	optional
Railway norm	optional
Substation	optional
Scope of delivery and accessories	
Scope of delivery	module, operating manual
Accessories to order separately	ML-MS2/MM labels

Type	MM4-4TX/SFP
Order No.	943 010-001
	
	Media module for MICE Switch MS4128, 10/100/1000BASE-TX und 1000BASE-SX/LX
Product description	
Port type and quantity	4 x 1000BASE-fiber with SFP modules, or 4 x 10/100/1000BASE-TX, TP cable, RJ45-sokkets, autocrossing, autoneg., autopolarity, any combination TX or SFP, 1 SFP deactivates 1TX, up to 4 ports
Mechanical construction	
Dimensions (W x H x D)	38 mm x 134 mm x 118 mm
Weight	180 g
Mechanical stability	
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
Approvals	
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)

Industrial ETHERNET

MICE > ETHERNET / Fast-ETHERNET Media Modules

Type	MM20-Z6Z6Z6Z6SAHH
Order No.	943 938-001
	
	Media module for MICE-Switch (MS…), 10/100BASE-TX and 100BASE-SX/LX
Product description	
Port type and quantity	4 x 100BASE-FX MM, with SFP modules or 4 x 100BASE-FX SM, with SFP modules, any combination with SFPs
Network size - length of cable	
Twisted pair (TP)	
Multimode fiber HCS (MM) 200/230 µm	
Multimode fiber POF (MM) 980/1000 µm	
Multimode fiber (MM) 50/125 µm	see SFP LWL-Module M-FAST SFP-MM/LC
Multimode fiber (MM) 62.5/125 µm	see SFP LWL-Module M-FAST SFP-MM/LC
Single mode fiber (SM) 9/125 µm	see SFP LWL-Module M-FAST SFP-SM/LC and M-FAST SFP-SM+/LC
Single mode fiber (LH) 9/125 µm (long haul transceiver)	see SFP LWL-Module M-FAST SFP-LH/LC
Power requirements	
Operating voltage	power supply via the backplane of the MICE switch
Power consumption	4W without SFP's / max. 8W with4 SFP's
PoE voltage	
Service	
Diagnostics	LEDs (Power, Link Status, Daten, 100 Mbit/s, Autonegotiation, Full Duplex, Ring-Port, LED Test)
Other services	
Ambient conditions	
Operating temperature	0 °C to +60 °C standard (optional -40°C to +70°C)
Storage/transport temperature	-40°C to +70 °C
Protective paint on PCB	optional
Relative humidity (non-condensing)	10% to 95%
MTBF	
Mechanical construction	
Dimensions (W x H x D)	38 mm x 134 mm x 118 mm
Mounting	Backplane
Weight	225 g
Protection class	IP 20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13,2 Hz, 90 min.; 0,7g, 13,2 Hz - 100 Hz, 90 min.; 3,5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (E175531)
Hazardous locations	cUL1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional
Railway norm	optional
Substation	optional
Scope of delivery and accessories	
Scope of delivery	Module, instruction manual
Accessories to order separately	Labels ML-MS2/MM, diverse SFP's cf. accessories

Type	MM22-T1T1T1T1SAHH	MM2-4TX1
Order No.	943 938-002	943 722-101
		
	Media module for MICE Switches (MS...), 10BASE-T and 100BASE-TX, PoE, Power Sourcing Equipment	Media module for MICE Switches (MS...), 10BASE-T and 100BASE-TX
Product description		
Port type and quantity	4 x 10/100BASE-TX PoE, TP cable, RJ45 sokkets, auto-crossing, auto-negotiation, auto-polarity, Power over Ethernet	4 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)	0 -100 m	0 -100 m
Power requirements		
Power consumption	0.8 W	0.8 W
PoE voltage	max 60W external 48VDC Power Supply (RPS60/48V EEC)	
Service		
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)
Ambient conditions		
Operating temperature	0 °C to +60 °C standard (optional -40°C to +70°C)	0 °C to +60 °C standard (optional -40°C to +70°C)
Storage/transport temperature	-40 °C to +70 °C	-40 °C to +70 °C
Protective paint on PCB	optional	optional
MTBF	88.3 years; MIL-HDBK 217F: Gb 25 °C	432.8 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	38 mm x 124 mm x 120 mm	38 mm x 134 mm x 77 mm
Weight	252 g	170 g
Protection class	IP 20	IP 20
Mechanical stability		
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity		
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)	10 V/m (80 - 1000 MHz)
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
Approvals		
Hazardous locations	cUL1604 Class 1 Div 2 (E203960)	cUL 1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional	optional
Scope of delivery and accessories		
Scope of delivery	module, operating manual	module, operating manual
Accessories to order separately	ML-MS2/MM labels, 48VDC Power supply: RPS60/48V EEC	ML-MS2/MM labels

Industrial ETHERNET

ETHERNET / Fast-ETHERNET Media Modules > Versions

Type	MM2-4TX1-EEC	MM3-4TX5
Order No.	943 722-151	943 841-101
		
	Media module for MICE Switches (MS...), 10BASE-T and 100BASE-TX	Media module for MICE Switches (MS...), OCTOPUS-Switches 10/100BASE-TX
Product description		
Port type and quantity	4 x 10/100BASE-TX, TP cable, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity	4 x 10/100BASE-TX, TP cables, M12 sockets (D code), auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)	0 -100 m	0 -100 m
Power requirements		
Power consumption	0.8 W	0,8 W
Service		
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)
Ambient conditions		
Operating temperature	-40 °C to +70 °C	0 °C to +60 °C standart (optional -40°C to +70°C)
Storage/transport temperature	-40 °C to +70 °C	-40 °C to +70 °C
Protective paint on PCB	optional	optional
MTBF	432.8 years; MIL-HDBK 217F: Gb 25 °C	432.9 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	38 mm x 134 mm x 77 mm	38 mm x 134 mm x 118 mm
Weight	170 g	180 g
Protection class	IP 20	IP20
Mechanical stability		
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity		
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)	10 V/m (80 - 1000 MHz)
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
Approvals		
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)	cUL 1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional	optional
Scope of delivery and accessories		
Scope of delivery	module, operating manual	module, operating manual
Accessories to order separately	ML-MS2/MM labels	ML-MS2/MM labels, order no.: 943 767-101

Type	MM2-2FXM2	MM2-2FXM3/2TX1
Order No.	943 718-101	943 720-101
		
	Media module for MICE Switches (MS...), 100BASE-FX multi-mode F/O	Media module for MICE Switches (MS...), 100BASE-TX and 100BASE-FX multi-mode F/O
Product description		
Port type and quantity	2 x 100BASE-FX, MM cable, SC sockets	2 x 100BASE-FX, MM cables, MTRJ sockets, 2 x 10/100BASE-TX, TP cables, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)		0 -100 m
Multimode fiber (MM) 50/125 µm	0 - 5000 m 8 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 800 MHz x km	0 - 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 - 4000 m 11 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Power requirements		
Power consumption	3,4 W	3,4 W
Service		
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, full duplex, ring port, LED test)	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)
Ambient conditions		
Operating temperature	0 °C to +60 °C standard (optional -40°C to +70°C)	0 °C to +60 °C standard (optional -40°C to +70°C)
Storage/transport temperature	-40 °C bis +70 °C	-40 °C to +70 °C
Protective paint on PCB	optional	optional
MTBF	83.5 years; MIL-HDBK 217F: Gb 25 °C	48.7 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	38 mm x 134 mm x 77 mm	38 mm x 134 mm x 77 mm
Weight	170 g	170 g
Protection class	IP 20	IP 20
Mechanical stability		
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	1 mm, 2 Hz - 13,2 Hz, 90 min.; 0,7g, 13,2 Hz - 100 Hz, 90 min.; 3,5 mm, 3 Hz - 9 Hz, 10 Zyklen, 1 Oktave/min.; 1g, 9 Hz - 150 Hz, 10 Zyklen, 1 Oktave/min.
EMC interference immunity		
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)	10 V/m (80 - 1000 MHz)
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line	power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line
Approvals		
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)	cUL 1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional	optional
Scope of delivery and accessories		
Scope of delivery	module, operating manual	Module, operating manual
Accessories to order separately	ML-MS2/MM labels	ML-MS2/MM labels

Industrial ETHERNET

ETHERNET / Fast-ETHERNET Media Modules > Versions

Type	MM2-4FXM3	MM3-1FXLH+/3TX1
Order No.	943 721-101	943 930-101
		
	Media module for MICE Switches (MS...), 100BASE-FX multi-mode F/O	Media module for MICE-Switch (MS...), 10/100BASE-TX and 100BASE-LH+
Product description		
Port type and quantity	4 x 100BASE-FX, MM cable, MTRJ sockets	3 x 10/100BASE-TX, 1 x 100BASE-LH+
Network size - length of cable		
Twisted pair (TP)		0 - 100 m
Multimode fiber (MM) 50/125 µm	0 - 5000 m 8 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 800 MHz x m	
Multimode fiber (MM) 62.5/125 µm	0 - 4000 m 11 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 500 MHz x m	
Single mode fiber (LH) 9/125 µm (long haul transceiver)		78 - 240 km 14 - 47 dB link budget bei 1550 nm A = 0,18 dB/km, 3 dB Reserve, D = 18 ps/(nm x km)
Power requirements		
Power consumption	7 W	3.4W
Service		
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, full duplex, ring port, LED test)	LEDs (Power, Link Status, Daten, 100 Mbit/s, Autonegotiation, Full Duplex, Ring-Port, LED Test)
Ambient conditions		
Operating temperature	0 °C to +60 °C standard (optional -40°C to +70°C)	0 °C to +60 °C standart (optional -40°C to +70°C)
Storage/transport temperature	-40 °C to +70 °C	-40°C to +70 °C
Protective paint on PCB	optional	optional
MTBF	30.2 years; MIL-HDBK 217F: Gb 25 °C	76,6 Jahre; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	38 mm x 134 mm x 77 mm	38 mm x 124 mm x 118 mm
Weight	170 g	240 g
Protection class	IP 20	IP 20
Mechanical stability		
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity		
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)	10 V/m (80 - 1000 MHz)
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
Approvals		
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)	cUL1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional	optional
Scope of delivery and accessories		
Scope of delivery	module, operating manual	module, operating manual
Accessories to order separately	ML-MS2/MM labels	ML-MS2/MM labels

Type	MM3-1FXL2/3TX1	MM3-1FXM2/3TX1
Order No.	943 763-101	943 839-101
		
	Media module for MICE Switches (MS...), 100BASE-TX and 100BASE-FX single mode F/O	Media module for MICE Switches (MS...), 100BASE-TX and 100BASE-FX multi-mode F/O
Product description		
Port type and quantity	1 x 100BASE-FX, SM cables, 1550 nm, SC sokkets 3 x 10/100BASE-TX, TP cables, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity	1 x 100BASE-FX, MM cables, SC sockets 3 x 10/100BASE-TX, TP cables, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)	0 -100 m	0 -100 m
Multimode fiber (MM) 50/125 µm		0 - 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 - 4000 m 11 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Single mode fiber (LH) 9/125 µm (long haul transceiver)	24 -86.6 km 7 - 29 dB link budget at 1550 nm A = 0.3 dB/km, 3 dB reserve, D = 19 ps/(nm x km)	
Power requirements		
Power consumption	3.4 W	3,4 W
Service		
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)
Ambient conditions		
Operating temperature	0 °C to +60 °C standard (optional -40°C to +70°C)	0 °C to +60 °C standard (optional -40°C to +70°C)
Storage/transport temperature	-40 °C to +70 °C	-40 °C to +70 °C
Protective paint on PCB	optional	optional
MTBF	76.6 years; MIL-HDBK 217F: Gb 25 °C	88.2 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	38 mm x 134 mm x 118 mm	38 mm x 134 mm x 118 mm
Weight	180 g	180 g
Protection class	IP 20	IP 20
Mechanical stability		
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity		
EN 61000-4-3 electromagnetic field	10 V/m	10 V/m (80 - 1000 MHz)
EN 61000-4-5 surge voltage	Power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
Approvals		
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)	cUL 1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional	optional
Scope of delivery and accessories		
Scope of delivery	module, operating manual	module, operating manual
Accessories to order separately	ML-MS2/MM labels	ML-MS2/MM labels

Industrial ETHERNET

ETHERNET / Fast-ETHERNET Media Modules > Versions

Type	MM3-1FXS2/1FXM2/2TX1	MM3-1FXS2/3TX1
Order No.	943 929-101	943 838-101
		
	Media module for MICE Switches (MS...), 100BASE-TX and 100BASE-FX multi- single mode F/O	Media module for MICE Switches (MS...), 100BASE-TX and 100BASE-FX single mode F/O
Product description		
Port type and quantity	1 x 100BASE-FX, MM, 1 x 100BASE-FX, SM, SC sockets 2 x 10/100BASE-TX, TP cables, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity	1 x 100BASE-FX, SM cables, SC sockets 3 x 10/100BASE-TX, TP cables, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)	0 -100 m	0 -100 m
Multimode fiber (MM) 50/125 µm	0 - 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 - 4000 m 11 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	
Single mode fiber (SM) 9/125 µm	0 -32.5 km 16 dB link budget at 1300 nm A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)	0 -32.5 km 16 dB link budget at 1300 nm A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)
Power requirements		
Power consumption	3,4 W	3,4 W
Service		
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)
Ambient conditions		
Operating temperature	0 °C to +60 °C standard (optional -40°C to +70°C)	0 °C to +60 °C standard (optional -40°C to +70°C)
Storage/transport temperature	-40 °C to +70 °C	-40 °C to +70 °C
Protective paint on PCB	optional	optional
MTBF	88.2 years; MIL-HDBK 217F: Gb 25 °C	74.9 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	38 mm x 134 mm x 118 mm	38 mm x 134 mm x 118 mm
Weight	180 g	180 g
Protection class	IP 20	IP 20
Mechanical stability		
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity		
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)	10 V/m (80 - 1000 MHz)
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line	Power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
Approvals		
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)	cUL 1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional	optional
Scope of delivery and accessories		
Scope of delivery	module, operating manual	module, operating manual
Accessories to order separately	ML-MS2/MM labels	ML-MS2/MM labels

Type	MM3-1FXS2/3TX1-EEC	MM3-2FXM2/2TX1-EEC
Order No.	943 838-151	943 761-151
		
	Media module for MICE Switches (MS...), 100BASE-TX and 100BASE-FX single mode F/O	Media module for MICE Switches (MS...), 100BASE-TX and 100BASE-FX multi-mode F/O
Product description		
Port type and quantity	1 x 100BASE-FX, SM cables, SC sockets 3 x 10/100BASE-TX, TP cables, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity	2 x 100BASE-FX, MM cables, SC sockets 2 x 10/100BASE-TX, TP cables, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)	0 -100 m	0 -100 m
Multimode fiber (MM) 50/125 µm		0 - 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 - 4000 m 11 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm	0 -32.5 km 16 dB link budget at 1300 nm A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)	
Power requirements		
Power consumption	3,4 W	3,4 W
Service		
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)
Ambient conditions		
Operating temperature	-40 °C to +70 °C	-40 °C to +70 °C
Storage/transport temperature	-40 °C to +70 °C	-40 °C to +70 °C
Protective paint on PCB	optional	optional
MTBF	74.9 years; MIL-HDBK 217F: Gb 25 °C	79.9 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	38 mm x 134 mm x 118 mm	38 mm x 134 mm x 118 mm
Weight	180 g	180 g
Protection class	IP 20	IP20
Mechanical stability		
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity		
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)	10 V/m (80 - 1000 MHz)
EN 61000-4-5 surge voltage	Power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
Approvals		
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)	cUL 1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional	optional
Scope of delivery and accessories		
Scope of delivery	module, operating manual	module, operating manual
Accessories to order separately	ML-MS2/MM labels	ML-MS2/MM labels

ETHERNET / Fast-ETHERNET Media Modules > Versions

Type	MM3-2FXM4/2TX1	MM3-2FXS2/2TX1
Order No.	943 837-101	943 762-101
		
	Media module for MICE Switches (MS...), 100BASE-TX and 100BASE-FX multi-mode F/O	Media module for MICE Switches (MS...), 100BASE-TX and 100BASE-FX single mode F/O
Product description		
Port type and quantity	2 x 100BASE-FX, MM cables, ST sockets 2 x 10/100BASE-TX, TP cables, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity	2 x 100BASE-FX, SM cables, SC sockets 2 x 10/100BASE-TX, TP cables, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)	0 -100 m	0 -100 m
Multimode fiber (MM) 50/125 µm	0 - 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 - 4000 m 11 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	
Single mode fiber (SM) 9/125 µm		0 -32.5 km 16 dB link budget at 1300 nm A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)
Power requirements		
Power consumption	3,4 W	3,4 W
Service		
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)
Ambient conditions		
Operating temperature	0 °C to +60 °C standard (optional -40°C to +70°C)	0 °C to +60 °C standard (optional -40°C to +70°C)
Storage/transport temperature	-40 °C to +70 °C	-40 °C to +70 °C
Protective paint on PCB	optional	optional
MTBF	80.5 years; MIL-HDBK 217F: Gb 25 °C	64.9 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	38 mm x 134 mm x 118 mm	38 mm x 134 mm x 118 mm
Weight	180 g	180 g
Protection class	IP20	IP 20
Mechanical stability		
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity		
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)	10 V/m (80 - 1000 MHz)
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line	Power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
Approvals		
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)	cUL 1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional	optional
Scope of delivery and accessories		
Scope of delivery	module, operating manual	module, operating manual
Accessories to order separately	ML-MS2/MM labels	ML-MS2/MM labels

Type	MM3-2FXS2/2TX1-EEC	MM3-4FLM4
Order No.	943 762-151	943 760-101
		
	Media module for MICE Switches (MS...), 100BASE-TX and 100BASE-FX single mode F/O	Media module for MICE Switches (MS...), 10BASE-FL multi-mode F/O
Product description		
Port type and quantity	2 x 100BASE-FX, SM cables, SC sockets 2 x 10/100BASE-TX, TP cables, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity	4 x 10BASE-FL, MM cables, ST (BFOC/) sokkets
Network size - length of cable		
Twisted pair (TP)	0 -100 m	
Multimode fiber (MM) 50/125 µm		0 - 2300 m 10 dB link budget at 850 nm A = 3 dB/km, 3 dB reserve, B = 400 MHz x km
Multimode fiber (MM) 62.5/125 µm		0 - 3100 m 13 dB link budget at 850 nm A = 3.2 dB/km, 3 dB reserve, B = 200 MHz x km
Single mode fiber (SM) 9/125 µm	0 -32.5 km 16 dB link budget at 1300 nm A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)	
Power requirements		
Power consumption	3,4 W	7 W
Service		
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)	LEDs (power, link status, data, 100 Mbit/s, full duplex, ring port, LED test)
Ambient conditions		
Operating temperature	-40 °C to +70 °C	0 °C to +60 °C
Storage/transport temperature	-40 °C to +70 °C	-25 °C to +70 °C
Protective paint on PCB	optional	
MTBF	64.9 years; MIL-HDBK 217F: Gb 25 °C	49.8 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	38 mm x 134 mm x 118 mm	38 mm x 134 mm x 118 mm
Weight	180 g	180 g
Protection class	IP 20	IP 20
Mechanical stability		
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity		
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)	10 V/m (80 - 1000 MHz)
EN 61000-4-5 surge voltage	Power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line	Power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
Approvals		
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)	cUL 1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional	optional
Scope of delivery and accessories		
Scope of delivery	module, operating manual	module, operating manual
Accessories to order separately	ML-MS2/MM labels	ML-MS2/MM labels

Industrial ETHERNET

ETHERNET / Fast-ETHERNET Media Modules > Versions

Type	MM3-4FXM2	MM3-4FXM4
Order No.	943 764-101	943 835-101
		
	Media module for MICE Switches (MS...), 100Base-FX multi-mode F/O	Media module for MICE Switches (MS...), 100BASE-FX multi-mode F/O
Product description		
Port type and quantity	4 x 100Base-FX, MM cable, SC sockets	4 x 100BASE-FX, MM cables, ST sockets
Network size - length of cable		
Multimode fiber (MM) 50/125 µm	0 - 5000 m 8 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 800 MHz x km	0 - 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 - 4000 m 11 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	0 - 4000 m 11 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Power requirements		
Power consumption	7 W	7 W
Service		
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, full duplex, ring port, LED test)	LEDs (power, link status, data, 100 Mbit/s, full duplex, ring port, LED test)
Ambient conditions		
Operating temperature	0 °C to +60 °C standard (optional -40°C to +70°C)	0 °C to +60 °C standard (optional -40°C to +70°C)
Storage/transport temperature	-40 °C to +70 °C	-40 °C to +70 °C
Protective paint on PCB	optional	optional
MTBF	59.5 years; MIL-HDBK 217F: Gb 25 °C	40 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	38 mm x 134 mm x 118 mm	38 mm x 134 mm x 118 mm
Weight	180 g	180 g
Protection class	IP 20	IP20
Mechanical stability		
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity		
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)	10 V/m (80 - 1000 MHz)
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
Approvals		
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)	cUL 1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional	optional
Scope of delivery and accessories		
Scope of delivery	module, operating manual	module, operating manual
Accessories to order separately	ML-MS2/MM labels	ML-MS2/MM labels

Type	MM3-4FXS2	MM3-2AUI
Order No.	943 836-101	943 840-101
		
	Media module for MICE Switches (MS...), 100BASE-FX single mode F/O	Media module for MICE Switches (MS...), 10 Mbit/s HDX in accordance AUI
Product description		
Port type and quantity	4 x 100BASE-FX, SM cables, SC sockets	2 x AUI SUB-D 15 poles, male
Network size - length of cable		
Twisted pair (TP)		50 m
Single mode fiber (SM) 9/125 µm	0 -32.5 km 16 dB link budget at 1300 nm A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)	
Power requirements		
Power consumption	7 W	3,5 W
Service		
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)	SQE and DTE Power via Management LEDs (power, data, LED test)
Ambient conditions		
Operating temperature	0 °C to +60 °C standard (optional -40°C to +70°C)	0 °C to +60 °C
Storage/transport temperature	-40 °C to +70 °C	-25 °C to +70 °C
Protective paint on PCB	optional	
MTBF	59.5 years; MIL-HDBK 217F: Gb 25 °C	70.7 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Dimensions (W x H x D)	38 mm x 134 mm x 118 mm	38 mm x 134 mm x 118 mm
Weight	180 g	180 g
Protection class	IP 20	IP20
Mechanical stability		
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity		
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)	10 V/m (80 - 1000 MHz)
EN 61000-4-5 surge voltage	Power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
Approvals		
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)	optional
Germanischer Lloyd	optional	optional
Scope of delivery and accessories		
Scope of delivery	module, operating manual	module, operating manual
Accessories to order separately	ML-MS2/MM labels	ML-MS2/MM labels

MICE > Realtime Modules

Type	MM3-2FLM4/2TX1-RT
Order No.	943 117-004
	
	Media module for MICE Switches (MS...), 100BASE-TX und 10BASE-FL multi-mode F/O, support of PTP (IEEE1588)
Product description	
Port type and quantity	2 x 10BASE-FL, MM cables, ST (BFOC/) sockets 2 x 10/100BASE-TX, TP cables, RJ45-Buchsen, auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable	
Twisted pair (TP)	
Multimode fiber HCS (MM) 200/230 µm	
Multimode fiber POF (MM) 980/1000 µm	
Multimode fiber (MM) 50/125 µm	0 - 2300 m 10 dB link budget at 850 nm A = 3 dB/km, 3 dB reserve, B = 400 MHz x km
Multimode fiber (MM) 62.5/125 µm	0 - 3100 m 13 dB link budget at 850 nm A = 3.2 dB/km, 3 dB reserve, B = 200 MHz x km
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Power requirements	
Operating voltage	power supply via the backplane of the MICE switch
Power consumption	5 W
PoE voltage	
Service	
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full duplex, ring port, LED test)
Other services	support of PTP (IEEE1588) precision between 2 modules <80ns
Ambient conditions	
Operating temperature	0 °C bis +60 °C standart
Storage/transport temperature	-25 °C to +70 °C
Protective paint on PCB	optional
Relative humidity (non-condensing)	10% to 95%
MTBF	30,5 Jahre; MIL-HDBK 217F: Gb 25 °C
Mechanical construction	
Dimensions (W x H x D)	38 mm x 134 mm x 118 mm
Mounting	Backplane
Weight	180 g
Protection class	IP 20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	Power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (E175531)
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional
Railway norm	optional
Substation	optional
Scope of delivery and accessories	
Scope of delivery	module, operating manual
Accessories to order separately	ML-MS2/MM labels

Type	MM3-2FXM2/2TX1-RT	MM3-2FXS2/2TX1-RT
Order No.	943 117-002	943 117-003
		
	Media module for MICE Switches (MS...), 100BASE-TX and 100BASE-FX multi-mode F/O, support of PTP (IEEE1588)	Media module for MICE Switches (MS...), 100BASE-TX and 100BASE-FX single mode F/O, support of PTP (IEEE1588)
Product description		
Port type and quantity	2 x 100BASE-FX, MM cables, SC sockets 2 x 10/100BASE-TX, TP cables, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity	2 x 100BASE-FX, SM cables, SC sockets 2 x 10/100BASE-TX, TP cables, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)	0 -100 m	0 -100 m
Multimode fiber (MM) 50/125 µm	0 - 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 - 4000 m 11 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	
Single mode fiber (SM) 9/125 µm		0 -32.5 km 16 dB link budget at 1300 nm A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)
Power requirements		
Power consumption	3.4 W	3.4 W
Ambient conditions		
Operating temperature	0 °C bis +60 °C standart (optional -40°C to +70°C)	0 °C bis +60 °C standart (optional -40°C to +70°C)
Storage/transport temperature	-40 °C to +70 °C	-40 °C to +70 °C
MTBF	39,3 Jahre; MIL-HDBK 217F: Gb 25 °C	33,9 Jahre; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Protection class	IP20	IP 20
EMC interference immunity		
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line	Power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
Approvals		
Hazardous locations	cUL1604 Class 1 Div 2 (E203960)	cUL1604 Class 1 Div 2 (E203960)
Railway norm	optional	optional

Realtime Modules > Versions

Type	MM3-4TX1-RT	MM3-4TX1-RT-EEC
Order No.	943 117-001	943 955-001
		
	Media module for MICE Switches (MS...), 100BASE-TX, support of PTP (IEEE1588)	Media module for MICE Switches (MS...), 100BASE-TX, support of PTP (IEEE1588)
Product description		
Port type and quantity	4 x 10/100BASE-TX, TP cables, auto-crossing, auto-negotiation, auto-polarity	4 x 10/100BASE-TX, TP cables, auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)	0 -100 m	0 -100 m
Power requirements		
Power consumption	1 W	1 W
Ambient conditions		
Operating temperature	0 °C bis +60 °C standart (optional -40°C to +70°C)	-40 °C to +70 °C
Storage/transport temperature	-40 °C to +70 °C	-40 °C to +70 °C
MTBF	43,2 Jahre; MIL-HDBK 217F: Gb 25 °C	43,2 Jahre; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Protection class	IP20	IP20
EMC interference immunity		
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
Approvals		
Hazardous locations	cUL1604 Class 1 Div 2 (E203960)	cUL 1604 Class 1 Div 2 (E203960)
Railway norm	optional	EN50155, EN50121-4

Type	MM3-2FXM2/2TX1-RT-EEC	MM3-2FXS2/2TX1-RT-EEC
Order No.	943 955-002	943 955-003
		
	Media module for MICE Switches (MS...), 100BASE-TX and 100BASE-FX multi-mode F/O, support of PTP (IEEE1588)	Media module for MICE Switches (MS...), 100BASE-TX and 100BASE-FX single mode F/O, support of PTP (IEEE1588)
Product description		
Port type and quantity	2 x 100BASE-FX, MM cables, SC sockets 2 x 10/100BASE-TX, TP cables, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity	2 x 100BASE-FX, SM cables, SC sockets 2 x 10/100BASE-TX, TP cables, RJ45 sockets, auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)	0 -100 m	0 -100 m
Multimode fiber (MM) 50/125 µm	0 - 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 - 4000 m 11 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	
Single mode fiber (SM) 9/125 µm		0 -32.5 km 16 dB link budget at 1300 nm A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)
Power requirements		
Power consumption	3.4 W	3.4 W
Ambient conditions		
Operating temperature	-40°C to +70°C	-40 °C to +70 °C
Storage/transport temperature	-40 °C to +70 °C	-40 °C to +70 °C
MTBF	39,3 Jahre; MIL-HDBK 217F: Gb 25 °C	33,9 Jahre; MIL-HDBK 217F: Gb 25 °C
Mechanical construction		
Protection class	IP20	IP 20
EMC interference immunity		
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line	Power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
Approvals		
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)	cUL 1604 Class 1 Div 2 (E203960)
Railway norm	EN50155, EN50121-4	EN50155, EN50121-4

Industrial ETHERNET

MICE > ETHERNET / Fast-ETHERNET POF media modules

Type	MM2-2FXP4
Order No.	943 842-101
	 Media module for MICE Switches (MS...), 100BASE-FX multi-mode F/O, POF and HCS
Product description	
Port type and quantity	2 x 100BASE-FX, MM cables, ST sockets
Network size - length of cable	
Twisted pair (TP)	
Multimode fiber HCS (MM) 200/230 µm	0 - 140 m 9 dB link budget at 650 nm A = 10 dB/km, 3 dB reserve, B = 17 MHz x km
Multimode fiber POF (MM) 980/1000 µm	0 - 65 m 14 dB link budget at 650 nm A = 160 dB/km, 3 dB reserve, B = >10 MHz x km, low-NA-POF
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Power requirements	
Operating voltage	power supply via the backplane of the MICE switch
Power consumption	3,4 W
PoE voltage	
Service	
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, full duplex, ring port, LED test)
Other services	
Ambient conditions	
Operating temperature	0 °C bis +60 °C standart (optional -40°C to +70°C)
Storage/transport temperature	-40 °C to +70 °C
Relative humidity (non-condensing)	10% to 95%
MTBF	15,5 Jahre; MIL-HDBK 217F: Gb 25 °C
Mechanical construction	
Dimensions (W x H x D)	38 mm x 134 mm x 77 mm
Mounting	Backplane
Weight	193 g
Protection class	IP 20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	4 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line,
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line),
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (E175531)
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional
Substation	optional
Railway norm	optional
Scope of delivery and accessories	
Scope of delivery	module, operating manual
Accessories to order separately	ML-MS2/MM labels

ETHERNET / Fast-ETHERNET POF media modules > Versions

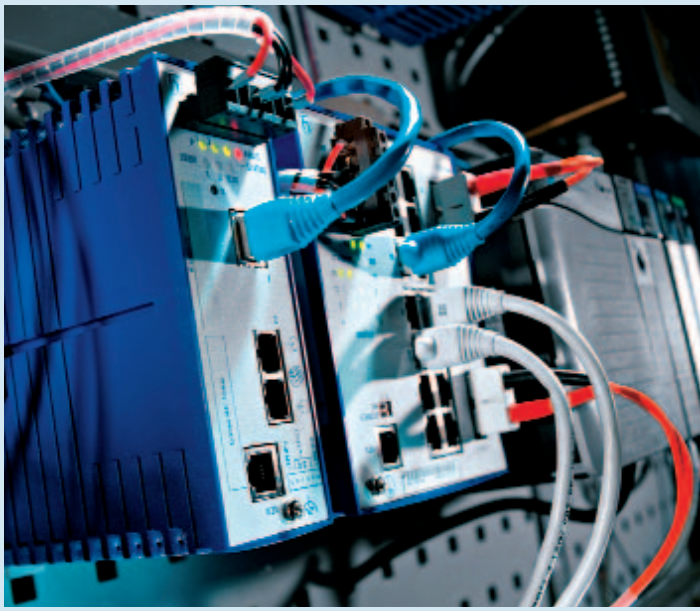
Type	MM3-4FXP4
Order No.	943 843-101
	 Media module for MICE Switches (MS...), 100BASE-FX multi-mode F/O, POF and HCS
Product description	
Port type and quantity	4 x 100BASE-FX, MM cables, ST sockets
Ambient conditions	
MTBF	48,8 Jahre; MIL-HDBK 217F: Gb 25 °C
Mechanical construction	
Weight	324 g
Approvals	
Hazardous locations	cUL1604 Class 1 Div 2 (E203960)
Germanischer Lloyd	optional

MICE > **Labelling sheet**

Type	ML-MS2/MM	ML-MS3
Order No.	943 767-001	943 768-001
		
	Labels for MICE switches (MS2...) and MICE media modules (MM)	Labels for MICE switches (MS3...)
Number of labels Labels per DIN A 4 sheet	per DIN A 4 sheet: 4 labels for 2000-series switches, 12 labels for 2000/3000-series media modules	per DIN A 4 sheet: 4 labels for 3000-series switches
Scope of delivery and accessories Scope of delivery	10 DIN A4 sheets with labels	10 DIN A4 sheets with labels

A closed society.

The industrial Firewall and VPN system EAGLE mGuard.



Security is crucial to a company's future today. Because there is a risk wherever process and production data flow into interdepartmental data acquisition systems or systems adjust each other in the automation network. Not only from hackers
or willful intent but also accidentally. The merging of the office and production network makes things easy for viruses, worms and Trojan Horses. Even accidental actions such as programming errors can paralyze whole machines and production cells – with one mouse click.

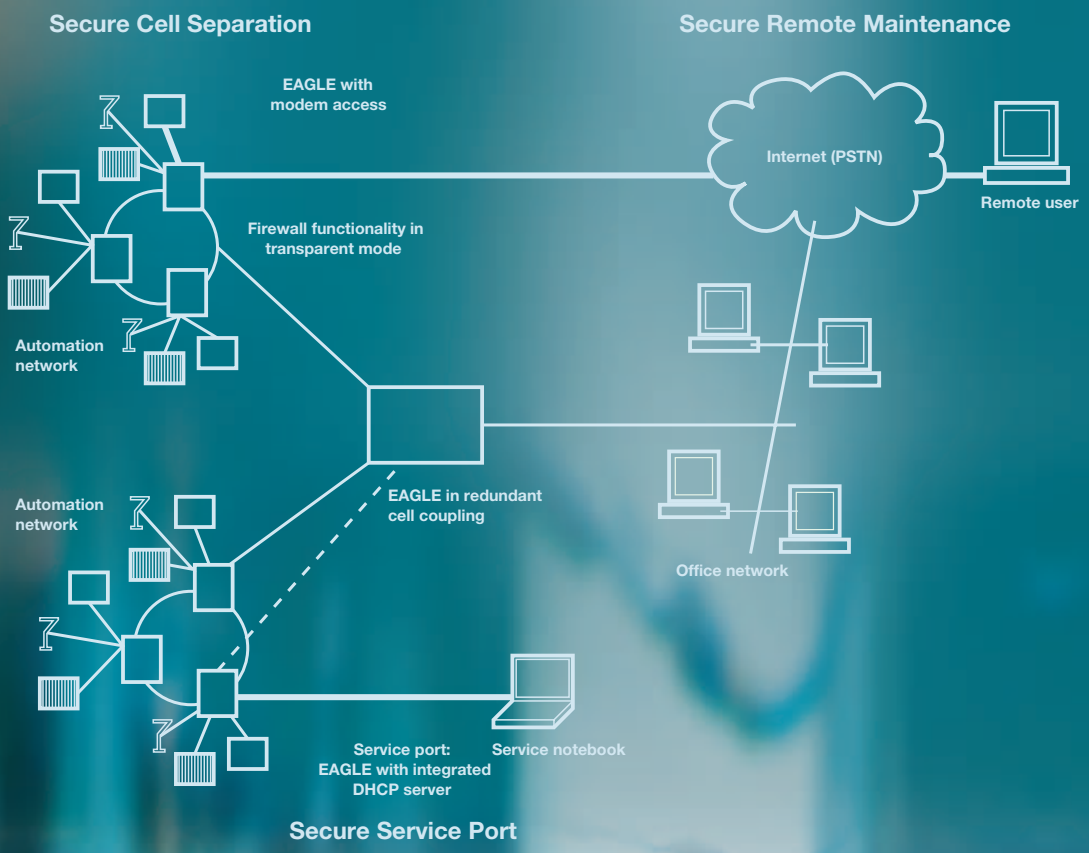
Good to know that a no-compromise state-of-the-art security system guarantees the confidentiality of your data and
the availability of communication in your production network: with a distributed and scalable security architecture,
the EAGLE system, now in its second generation, guarantees maximum protection of industrial cells and rules out accidental and unauthorized data manipulations.

As co-founder and member of **United NetworX,** a union of the leading manufacturers of hardware and software components for industrial applications, Hirschmann makes a major contribution with its products and services to increasing the security and reliability of data transmission worldwide.

- ***Scalable security functionality: pure Firewall or Firewall/VPN bundle.***
- ***Integration made easy: integration in the existing network without changing IP addresses, independent learning of the necessary Firewall settings (learning mode).***
- ***Simple commissioning: HiDiscovery support and support for the USB auto-configuration adapter. Integrated in the mGuard Device Manager.***
- ***Extensive diagnostic facilities: web-based management, status LEDs, signal contact, logging on SysLog server, integration in HiVision***
- ***Support of redundancy scenarios: Firewall redundancy, redundant Ring Coupling and Dual Homing.***
- ***Separation of subnets (router mode).***

EAGLE mGuard

Accessories
for this family you can find on the following pages:
System Accessories Page 202



Hirschmann Competence Center

When it's a question of **security** in the **industrial network** reliable products are no longer enough. Therefore the Hirschmann Competence Center also offers extensive services all to do with network security. In the area of **consulting** with an **industrial network security audit, security consulting, risk reduction consulting, external penetration test, internal security evaluation** and, of course, **network planning.** In the area of training we offer the following programs: PSd Security with EAGLE, NESd Network Security, FIVd Firewall and VPN technology, HS1d hacker capabilities for system administrators, WSSd practical knowledge Network Security and WITF IT Forensics Workshop. In addition: EAGLE AntiVirus licenses, service contract for EAGLE VPN and support with the installation and configuration, via service hotline and then later Advance Hardware Replacement and warranty extensions.

www.hicomcenter.com

EAGLE System > EAGLE mGuard Firewall

Type	EAGLE mGuard TX/TX
Order No.	943 011-311
	
	Industrial Firewall
Product description	
Modi	Router, Single Client Transparent (SCT) and Multi Client Transparent (MCT), PPPoE, PPTP
Port type and quantity	Trusted Port: 1 x 10/100BASE-TX, TP-cable, RJ45-socket, autocrossing, autonegotiation, autopolarity Untrusted Port: 1 x 10/100BASE-TX, TP-cable, RJ45-socket, autocrossing, autonegotiation, autopolarity
More Interfaces	
Power supply/signaling contact	1 plug-in terminal block, 6-pin
V.24 interface	1 x RJ11 socket
USB interface	1x USB socket
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	-
Multimode fiber (MM) 62.5/125 µm	-
Single mode fiber (SM) 9/125 µm	-
Single mode fiber (LH) 9/125 µm (long haul transceiver)	-
Security	
Stateful inspection firewall	firewall rules (incoming/outgoing, modem access, management), IP masquerading, 1-to-1 NAT, ARP limiter, MAC filter
Multipoint VPN	-
Antivirus protection	optional: ClamAV-Anti-Virus-Engine (HTTP, FTP, POP3, SMTP)
Power requirements	
Operating voltage	9.6 to 60V DC, 18V to 32V AC
Current consumption at 24 V DC	max. 300 mA
Service	
Diagnostics	LEDs (power, link status, data, error, ACA) signaling contact (24 V DC / 1 A), logfile
Management	Command Line Interface (CLI), Web-Interface, auto-configuration adapter (ACA21-USB), DHCP, HiDiscovery, Industrial HiVision
Protocols	serial, HTTPS, SSH, SNMP V1/V2/V3, LLDP
Other services	DHCP server/client, DHCP Relay/Option 82, DynDNS, firewall access via V.24 (PPP), NTP, VLAN support (IEEE 802.3pQ), port forwarding
Redundancy	
Redundancy functions	use in redundant net-/ringcoupling, dual homing, firewall redundancy (layer 4), redundant 24 V power supply
Ambient conditions	
Operating temperature	0 °C to +60 °C
Storage/transport temperature	-40 °C to +80 °C
Relative humidity (non-condensing)	10% to 95%
MTBF	27.37 years (MIL-HDBK-217F)
Mechanical construction	
Dimensions (W x H x D)	47 mm x 131 mm x 111 mm
Mounting	DIN Rail 35 mm
Weight	340 g
Protection class	IP 20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13,2 Hz, 90 min.; 0,7g, 13,2 Hz - 100 Hz, 90 min.; 3,5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharche
EN 61000-4-3 electromagnetic field	10 V/m (80 - 2000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (linie/earth), 1 kV (linie/line), 1 kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2 pending
Germanischer Lloyd	Germanischer Lloyd
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 or RPS 120 EEC, terminal cable, modem cable, HiVision network management, auto-configuration adapter (ACA 21-USB), 19” installation frame

Type	EAGLE mGuard TX/MM SC	EAGLE mGuard TX/SM SC
Order No.	943 011-312	943 011-313
		
	Industrial Firewall	Industrial Firewall
Product description		
Port type and quantity	Trusted Port: 1 x 10/100BASE-TX, TP-cable, RJ45-socket, autocrossing, autonegotiation, autopolarity Untrusted Port: 1 x 100BASE-FX, MM-cable, SC-socket	Trusted Port: 1 x 10/100BASE-TX, TP-cable, RJ45-socket, autocrossing, autonegotiation, autopolarity Untrusted Port: 1 x 100BASE-FX, SM-cable, SC-socket
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	0 - 100 m
Multimode fiber (MM) 50/125 µm	0 - 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 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	-
Single mode fiber (SM) 9/125 µm	-	0 - 32.5 km, 16 dB link budget at 1300 nm, A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)
Single mode fiber (LH) 9/125 µm (long haul transceiver)	-	-
Power requirements		
Current consumption at 24 V DC	max. 335 mA	max. 350 mA
Ambient conditions		
MTBF	26.54 years (MIL-HDBK-217F)	25.18 years (MIL-HDBK-217F)

Type	EAGLE mGuard TX/LH SC	EAGLE mGuard MM SC/TX
Order No.	943 011-314	943 011-315
		
	Industrial Firewall	Industrial Firewall
Product description		
Port type and quantity	Trusted Port: 1 x 10/100BASE-TX, TP-cable, RJ45-socket, autocrossing, autonegotiation, autopolarity Untrusted Port: 1 x 100BASE-FX, SM-cable, 1550 nm, SC-socket	Trusted Port: 1 x 100BASE-FX, MM-cable, SC-socket Untrusted Port: 1 x 10/100BASE-TX, TP-cable, RJ45-socket, autocrossing, autonegotiation, autopolarity
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	0 - 100 m
Multimode fiber (MM) 50/125 µm	-	0 - 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 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm	-	-
Single mode fiber (LH) 9/125 µm (long haul transceiver)	24 - 86.6 km, 7 - 29 dB link budget at 1550 nm A = 0.3 dB/km, 3 dB reserve, D = 19 ps/(nm x km)	-
Power requirements		
Current consumption at 24 V DC	max. 350 mA	max. 350 mA
Ambient conditions		
MTBF	25.37 years	26.54 years (MIL-HDBK-217F)

EAGLE mGuard Firewall > Versions

Type	EAGLE mGuard MM SC/MM SC	EAGLE mGuard MM SC/SM SC
Order No.	943 011-316	943 011-317
		
	Industrial Firewall	Industrial Firewall
Product description		
Port type and quantity	Trusted Port: 1 x 100BASE-FX, MM-cable, SC-socket Untrusted Port: 1 x 100BASE-FX, MM-cable, SC-socket	Trusted Port: 1 x 100BASE-FX, MM-cable, SC-socket Untrusted Port: 1 x 100BASE-FX, SM-cable, SC-socket
Network size - length of cable		
Twisted pair (TP)	-	-
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 800 MHz x km	0 - 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 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm	-	0 - 32.5 km, 16 dB link budget at 1300 nm, A = 0,4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)
Single mode fiber (LH) 9/125 µm (long haul transceiver)	-	-
Power requirements		
Current consumption at 24 V DC	max. 400 mA	max. 400 mA
Ambient conditions		
MTBF	25.76 years (MIL-HDBK-217F)	24.47 years

Type	EAGLE mGuard MM SC/LH SC
Order No.	943 011-318
	
	Industrial Firewall
Product description	
Port type and quantity	Trusted Port: 1 x 100BASE-FX, MM-cable, SC-socket Untrusted Port: 1 x 100BASE-FX, SM-cable, 1550 nm, SC-sok-ket
Network size - length of cable	
Twisted pair (TP)	-
Multimode fiber (MM) 50/125 µm	0 - 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 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm	-
Single mode fiber (LH) 9/125 µm (long haul transceiver)	24 - 86,6 km, 7 - 29 dB link budget at 1550 nm A = 0,3 dB/km, 3 dB reserve, D = 19 ps/(nm x km)
Power requirements	
Current consumption at 24 V DC	max. 400 mA
Ambient conditions	
MTBF	24.65 years

EAGLE System > EAGLE mGuard Firewall with VPN

Type	EAGLE mGuard VPN TX/TX
Order No.	943 011-301
	
	Industrial Firewall/VPN-Bundle
Product description	
Modi	Router, Single Client Transparent (SCT) and Multi Client Transparent (MCT), PPPoE, PPTP
Port type and quantity	Trusted Port: 1 x 10/100BASE-TX, TP-cable, RJ45-socket, autocrossing, autonegotiation, autopolarity Untrusted Port: 1 x 10/100BASE-TX, TP-cable, RJ45-socket, autocrossing, autonegotiation, autopolarity
More Interfaces	
Power supply/signaling contact	1 plug-in terminal block, 6-pin
V.24 interface	1 x RJ11 socket
USB interface	1x USB socket
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	-
Multimode fiber (MM) 62.5/125 µm	-
Single mode fiber (SM) 9/125 µm	-
Single mode fiber (LH) 9/125 µm (long haul transceiver)	-
Security	
Stateful inspection firewall	firewallrules (incoming/outgoing, modem access, management), IP masquerading, 1-to-1 NAT, ARP limiter, MAC filter
Multipoint VPN	IPSec, L2TP, DES, 3DES, AES (-128, -192, -256), Pre-Shared Key, X.509v3 certificates, MD5, SHA-1, NAT-T, Firewall rules for every VPN connection
Antivirus protection	optional: ClamAV-Anti-Virus-Engine (HTTP, FTP, POP3, SMTP)
Power requirements	
Operating voltage	DC 9.6 to 60 V, AC 18 to 32 V
Current consumption at 24 V DC	max. 335 mA
Service	
Diagnostics	LEDs (power, link status, data, error, ACA) signaling contact (24 V DC / 1 A), logfile
Management	Command Line Interface (CLI), Web-Interface, auto-configuration adapter (ACA21-USB), DHCP, HiDiscovery, Industrial HiVision
Protocols	serial, HTTPS, SSH, SNMP V1/V2/V3, LLDP
Other services	DHCP server/client, DHCP Relay/Option 82, DynDNS, firewall access via V.24 (PPP), NTP, VLAN support (IEEE 802.3pQ), port forwarding
Redundancy	
Redundancy functions	use in redundant net-/ringcoupling, dual homing, firewall redundancy (layer 4), redundant 24 V power supply
Ambient conditions	
Operating temperature	0 °C to +60°C
Storage/transport temperature	-40 °C to +80 °C
Relative humidity (non-condensing)	10% to 95%
MTBF	27.4 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction	
Dimensions (W x H x D)	47 mm x 131 mm x 111 mm
Mounting	DIN Rail 35 mm
Weight	340 g
Protection class	IP 20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13,2 Hz, 90 min.; 0,7g, 13,2 Hz - 100 Hz, 90 min.; 3,5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharche
EN 61000-4-3 electromagnetic field	10 V/m (80 - 2000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (linie/earth), 1 kV (linie/line), 1 kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 part 15 class A
EN 55022	EN 55022 class A
Approvals	
Safety of industrial control equipment	cUL 508
Hazardous locations	cUL 1604 Class1 Div 2 pending
Germanischer Lloyd	Germanischer Lloyd
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 or RPS 120 EEC, terminal cable, modem cable, HiVision network management, auto-configuration adapter (ACA 21-USB), 19” installation frame

EAGLE mGuard Firewall with VPN > Versions

Type	EAGLE mGuard VPN TX/MM SC	EAGLE mGuard VPN TX/SM SC
Order No.	943 011-302	943 011-303
		
	Industrial Firewall/VPN-Bundle	Industrial Firewall/VPN-Bundle
Product description		
Port type and quantity	Trusted Port: 1 x 10/100BASE-TX, TP-cable, RJ45-socket, autocrossing, autonegotiation, autopolarity Untrusted Port: 1 x 100BASE-FX, MM-cable, SC-socket	Trusted Port: 1 x 10/100BASE-TX, TP-cable, RJ45-socket, autocrossing, autonegotiation, autopolarity Untrusted Port: 1 x 100BASE-FX, SM-cable, SC-socket
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	0 - 100 m
Multimode fiber (MM) 50/125 µm	0 - 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 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	-
Single mode fiber (SM) 9/125 µm	-	0 - 32.5 km, 16 dB link budget at 1300 nm, A = 0,4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)
Single mode fiber (LH) 9/125 µm (long haul transceiver)	-	-
Power requirements		
Operating voltage	DC 9.6 to 60 V, AC 18 to 32 V	DC 9.6 to 60 V, AC 18 to 32 V
Ambient conditions		
MTBF	26.5 years; MIL-HDBK 217F: Gb 25 °C	25.2 years; MIL-HDBK 217F: Gb 25 °C

Type	EAGLE mGuard VPN TX/LH SC	EAGLE mGuard VPN MM SC/TX
Order No.	943 011-304	943 011-305
		
	Industrial Firewall/VPN-Bundle	Industrial Firewall/VPN-Bundle
Product description		
Port type and quantity	Trusted Port: 1 x 10/100BASE-TX, TP-cable, RJ45-socket, autocrossing, autonegotiation, autopolarity Untrusted Port: 1 x 100BASE-FX, SM-cable, 1550 nm, SC-sok-ket	Trusted Port: 1 x 100BASE-FX, MM-cable, SC-socket Untrusted Port: 1 x 10/100BASE-TX, TP-cable, RJ45-socket, autocrossing, autonegotiation, autopolarity
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	0 - 100 m
Multimode fiber (MM) 50/125 µm	-	0 - 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 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm	-	-
Single mode fiber (LH) 9/125 µm (long haul transceiver)	24 - 86.6 km, 7 - 29 dB link budget at 1550 nm A = 0.3 dB/km, 3 dB reserve, D = 19 ps/(nm x km)	-
Power requirements		
Operating voltage	DC 9.6 to 60 V, AC 18 to 32 V	9.6 to 60V DC, 18V to 32V AC
Ambient conditions		
MTBF	25.4 years; MIL-HDBK 217F: Gb 25 °C	26.5 years; MIL-HDBK 217F: Gb 25 °C

Type	EAGLE mGuard VPN MM SC/MM SC	EAGLE mGuard VPN MM SC/SM SC
Order No.	943 011-306	943 011-307
		
	Industrial Firewall/VPN-Bundle	Industrial Firewall/VPN-Bundle
Product description		
Port type and quantity	Trusted Port: 1 x 100BASE-FX, MM-cable, SC-socket Untrusted Port: 1 x 100BASE-FX, MM-cable, SC-socket	Trusted Port: 1 x 100BASE-FX, MM-cable, SC-socket Untrusted Port: 1 x 100BASE-FX, SM-cable, SC-socket
Network size - length of cable		
Twisted pair (TP)	-	-
Multimode fiber (MM) 50/125 µm	0 - 5000 m, 8 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 800 MHz x km	0 - 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 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	0 - 4000 m, 11 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm	-	0 - 32.5 km, 16 dB link budget at 1300 nm, A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)
Single mode fiber (LH) 9/125 µm (long haul transceiver)	-	-
Power requirements		
Operating voltage	DC 9.6 to 60 V, AC 18 to 32 V	DC 9.6 to 60 V, AC 18 to 32 V
Ambient conditions		
MTBF	25,8 years; MIL-HDBK 217F: Gb 25 °C	24.5 years; MIL-HDBK 217F: Gb 25 °C

Type	EAGLE mGuard VPN MM SC/LH SC
Order No.	943 011-308
	
	Industrial Firewall/VPN-Bundle
Product description	
Port type and quantity	Trusted Port: 1 x 100BASE-FX, MM-cable, SC-socket Untrusted Port: 1 x 100BASE-FX, SM-cable, 1550 nm, SC-sok-ket
Network size - length of cable	
Twisted pair (TP)	-
Multimode fiber (MM) 50/125 µm	0 - 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 - 4000 m, 11 dB Link Budget bei 1300 nm, A = 1 dB/km, 3 dB Reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm	-
Single mode fiber (LH) 9/125 µm (long haul transceiver)	24 - 86.6 km, 7 - 29 dB link budget at 1550 nm A = 0.3 dB/km, 3 dB reserve, D = 19 ps/(nm x km)
Power requirements	
Operating voltage	DC 9.6 to 60 V, AC 18 V to 32 V
Ambient conditions	
MTBF	27.4 years; MIL-HDBK 217F: Gb 25 °C

Cables are out of a job.

We are against slow connections in industry:
BAT 54/54M and BAT 54 Rail Wireless ETHERNET AP/AC's.

Good advice was expensive till now, when in vehicle testing, mobile service applications or in logistics, workplaces were located outside cable-bound networks. Breakages in connections, variations in transmission quality and the absence of standards were good arguments against the use of Wireless LAN in industry. Wireless technology was not even considered in remote monitoring of tanks and pump stations, as a "flexible control room" on site, or in semiconductor production, where even a little freedom of movement would be welcome as a supplement to the existing LAN systems.

With its competence in the field of networks and antennas, Hirschmann offers you a secure as well as systematic solution: BAT Wireless ETHERNET AP/AC is a reliable comprehensive package with proven technology, tested by us and installed for our customers at site. While we cannot be completely free of cables, we do offer you unprecedented mobility. Because Wireless LAN AP/AC technology will take your employees way beyond the point where cables have long bitten the dust.

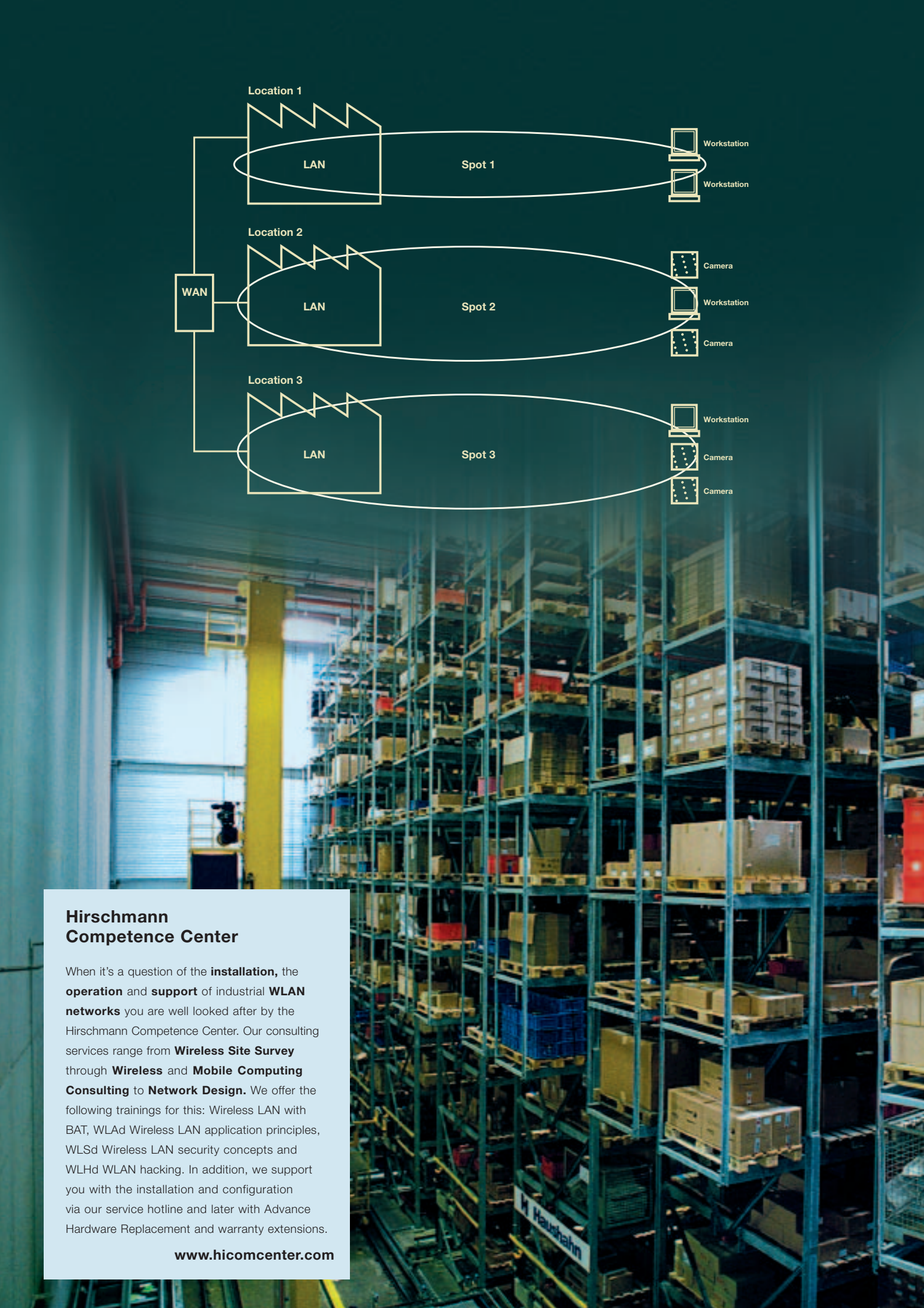
Future-safe radio technology:

- ***Dual band outdoor access point/bridge optionally with an integrated 5 GHz antenna and two external N-antenna connections and integrated lightning protection (only BAT 54/BAT 54 M).***
- ***Dual band access point/access client/bridge in compact form factor for DIN rail assembly (only BAT 54 Rail).***
- ***Simple system integration of proven standards IEE 802.11 a, b, g, h.***
- ***Data rate up to max. 108 Mbit/s.***
- ***Secure encryption: IEEE 802.11i/WPA2 with passphrase or 802.1x and hardware-accelerated AES, LEPS, Closed Network, WEP64, WEP128, WEP152.***
- ***Industrially compatible versions for indoor and outdoor applications up to IP 65.***
- ***Power-over ETHERNET power supply.***

BAT54-Rail

BAT54-F

Accessories
for this family you can find on the following pages:
System Accessories Page 202



Hirschmann Competence Center

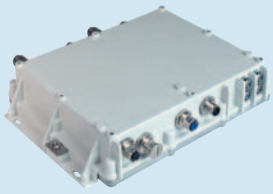
When it's a question of the **installation,** the **operation** and **support** of industrial **WLAN networks** you are well looked after by the Hirschmann Competence Center. Our consulting services range from **Wireless Site Survey** through **Wireless** and **Mobile Computing Consulting** to **Network Design.** We offer the following trainings for this: Wireless LAN with BAT, WLAd Wireless LAN application principles, WLSd Wireless LAN security concepts and WLHd WLAN hacking. In addition, we support you with the installation and configuration via our service hotline and later with Advance Hardware Replacement and warranty extensions.

www.hicomcenter.com

Industrial ETHERNET

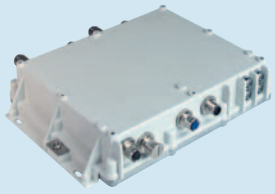
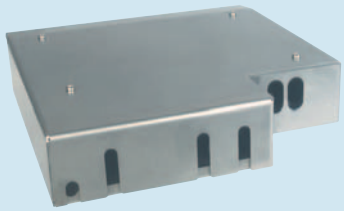
Wireless LAN > Chassis

Type	BAT54-Rail
Order No.	943 926-001
	
	Dualband Industrial Wireless LAN Access Point/Client with two independent radio modules with IEEE 802.11a/b/g/h/i
Product description	
Port type and quantity	Two WLAN interfaces, up to 8 SSIDs per WLAN interface, two LAN ports 10/100BASE-TX, autosensing, Power over Ethernet according to IEEE 802.3af, IP40-housing
Radio technology	
Antenna connector	four RP-SMA jack antenna connectors
Range	Up to 20km with external antenna (depending on type of antenna, frequency range and data rate)
Data rate	54 Mbps according to IEEE 802.11g (Fallback to 48, 36 , 24, 18, 12, 9, 6 Mbps, Automatic Rate Selection), compatible to IEEE 802.11b (11, 5,5, 2, 1 Mbps, Automatic Rate Selection), 802.11 b/g compatability mode or pure g or pure b selectable. 54 Mbps according to IEEE 802.11a/h (fallback to 48, 36 , 24, 18, 12, 9, 6 Mbpss, Automatic Rate Selection), Super A/G with Turbo Mode (108 MBps), Bursting, Compression, fully compliant to ETSI requirements with TPC and DFS
Encryption	IEEE 802.11i / WPA2 with passphrase or 802.1x and hardware-accelerated AES, user authentication by 802.1x /EAP or LEPS, IEEE 802.1x Supplicant in Client Mode, WPA/TKIP, WEP, access-control lists, WLAN port and protocol filter, RADIUS client and server, Built-in Firewall with QoS, port filter, protocol filter, IDS and DoS protection, PMK-Caching and Preauthentication for fast roaming with IEEE 802.1x
Frequency band	two independent radio modules, each 2.4GHz and 5GHz: 2400-2483,5 MHz (ISM) and 5150-5850 MHz
Modulation	22M0F7D(DSSS/OFDM) at 2.4 GHz 20M0G7D (OFDM) at 5 GHz
Receiver sensitivity	2.4GHz 802.11b: -87dBm @ 11Mbit/s, -94dBm @ 1Mbit/s 2.4GHz 802.11g: -87dBm @ 6Mbit/s, -70dBm @ 54Mbit/s 5GHz 802.11a/h: -87dBm @ 6Mbit/s, -67dBm @ 54Mbit/s
Radio topology	WLAN Access Point, Bridge, Router, Point-to-Point, Client, Client-Bridge Mode, fixed mesh with RSTP
Roaming	Seamless handover between radio cells, IAPP support, IEEE 802.11d support, Background scanning for rogue AP detection and fast roaming, Support of IEEE 802.11e (WME), preauthentication and PMK caching with IEEE 802.1x
Radio Power	2.4 GHz 802.11b: +19dBm @1 and 2 Mbps, +19dBm @ 5.5 and 11Mbps, 2,4 GHz 802.11g: +19dBm @ 6Mbps, +14dBm @ 54 Mbps, 5GHz 802.11a/h: +18dBm @ 6Mbps, +12 dBm @ 54 Mbps with TPC and DFS, Power Reduction in 1dB steps down to 0.5dBm minimum
Power requirements	
Operating voltage	2 * 24V DC; 12V DC external Power Supply (230V) 2x Power-over-Ethernet according to IEEE802.3af; all power supllies redundant to each other
Current consumption at 24 V DC	417mA
Current consumption	12V DC: 625mA; 24V DC: 417 mA; PoE (48V DC): 167 mA
Service	
Diagnostics	Extensive LOG and TRACE options, PING and TRACEROUTE for checking connections, LANmonitor status display, internal logging buffer for SYSLOG and firewall events, monitor mode for Ethernet ports, WLANmonitor for WLAN network overview and Rogue AP detection
Management	SNMP management via SNMP V2, private MIB exportable by WEBconfig, MIB II Remote configuration with Telnet/SSL, SSH, browser (HTTP/HTTPS), TFTP or SNMP, firmware upload via HTTP/HTTPS or TFTP Support of up to 4094 VLAN IDs for WLAN connections, 256 simultaneously usable VLAN tags for 802.11 clients
Other services	Warning via e-mail, SNMP-Traps and SYSLOG; Remote management and configuration by modem support via LAN (DSL) or serial port
Ambient conditions	
Operation temperature	-20° up to +50° (temporarily up to +70°C according to EN50155)
Storage/transport temperature	-20°C to 70°C
Relative humidity (non-condensing)	max. 95%
MTBF	43.3 years
Mechanical construction	
Dimensions (W x H x D)	80mm x 100mm x 135mm
Mounting	for wall and Din Rail mounting
Approvals	
Safety of information technology equipment	EN 60950
Radio	EN 300328, EN 301893, notified in all countries of EU. For other notifications or certifications please refer to INET-Sales@hirschmann.de
Environmental	EN 61131 for operation in automation environment EN 50155 for operation in vehicles EMC approval for E1 certification (cars and vehicles) available
Scope of delivery and accessories	
Scope of delivery	device, CD, serial cable, Ethernet cable 3m, two 3-dBi-Dipol - Dualband antennas, two 50Ohm terminators, Rail mount material
Accessories to order separately	external antennas for 802.11b/g and 802.11a/h operation adapter cable and surge arrestor

Type	BAT54-Rail FCC	BAT54-F
Order No.	943 926-002	943 959-111 available Q1-2008
		
	Dualband Industrial Wireless LAN Access Point/Client with two independent radio modules with IEEE 802.11a/b/g/h/i. With FCC-approval for USA and Canada.	Dualband Ruggedized Industrial Wireless LAN Access Point/Client with two independent radio modules with IEEE 802.11a/b/g/h/i for installation in harsh environment, IP67 protection class, M12 connectors and waterproof
Product description		
Port type and quantity	Two WLAN interfaces, up to 8 SSIDs per WLAN interface, two LAN ports 10/100BASE-TX, autosensing, Power over Ethernet according to IEEE 802.3af, IP40-housing	Two WLAN interfaces, up to 8 SSIDs per WLAN interface, one LAN port 10/100BASE-TX, autosensing, Power over Ethernet according to IEEE 802.3af
Radio technology		
Antenna connector	four RP-SMA jack antenna connectors	four N-type jack antenna connectors
Frequency band	two independent radio modules, each 2.4GHz and 5GHz: 2400-2483,5 MHz (ISM) and 5170-5810 MHz	two independent radio modules, each 2.4GHz and 5GHz: 2400-2483,5 MHz (ISM) and 5170-5810 MHz
Power requirements		
Operating voltage	2 * 24V DC; 12V DC external Power Supply (230V) 2x Power-over-Ethernet according to IEEE802.3af; all power supllies redundant to each other	2x 24V DC; 1x Power-over-Ethernet according to IEEE802.3af; all power supplies redundant to each other
Current consumption	12V DC: 625mA; 24V DC: 417 mA; PoE (48V DC): 167 mA	24V DC: 417 mA; PoE (48V DC): 167 mA
Ambient conditions		
Operation temperature	-20°C up to +50°C (-40° up to +70°C according to EN50155)	-20°C up to +60°C (-40° up to +70°C according to EN50155)
Storage/transport temperature	-40°C up to 70°C	-40°C up to 70°C
Mechanical construction		
Dimensions (W x H x D)	80mm x 100mm x 135mm	261 mm x 189 mm x 55 mm
Mounting	for wall and Din Rail mounting	for wall and mast mounting
Approvals		
Radio	FCC IDENTIFIER: U99BAT54RAIL IC Certification Number: 4019A-BAT54R For other notifications or certifications please refer to INET-Sales@hirschmann.de	EN 300328, EN 301893, notified in all countries of EU. For other notifications or certifications please refer to INET-Sales@hirschmann.de
Environmental	EN 61131 for operation in automation environment EN 50155 for operation in vehicles EMC approval for E1 certification (cars and vehicles) available	in preparation
Scope of delivery and accessories		
Scope of delivery	device, CD, serial cable, Ethernet cable 3m, two 3-dBi-Dipol - Dualband antennas, two 50Ohm terminators, Rail mount material	device, CD, M12 connector, two 50Ohm terminators, mounting material
Accessories to order separately	external antennas for 802.11b/g and 802.11a/h operation adapter cable and surge arrestor	external antennas for 802.11b/g and 802.11a/h operation adapter cable and surge arrestor, mast mount material

Industrial ETHERNET

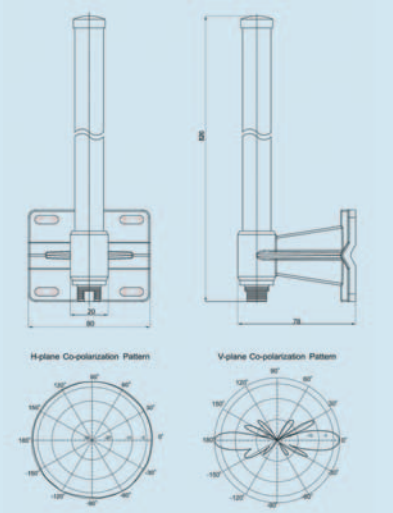
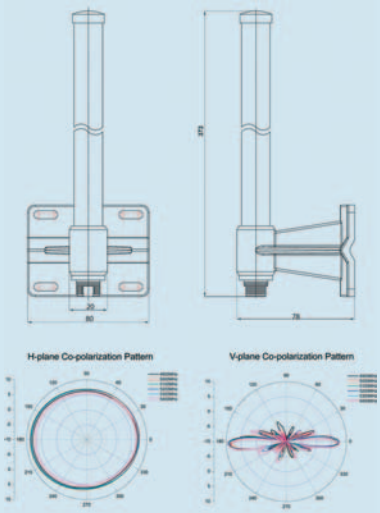
Chassis > Versions

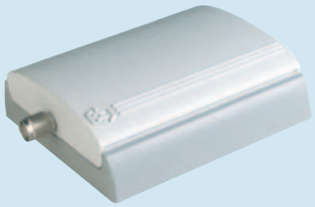
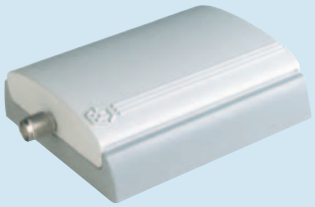
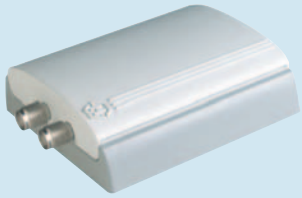
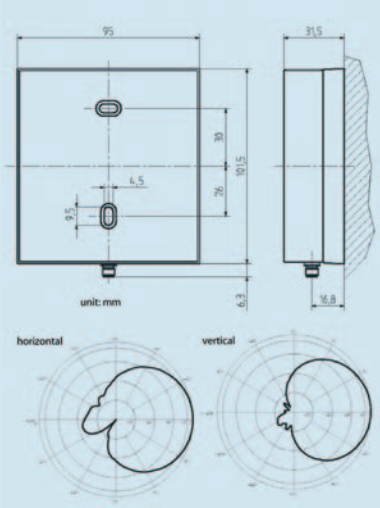
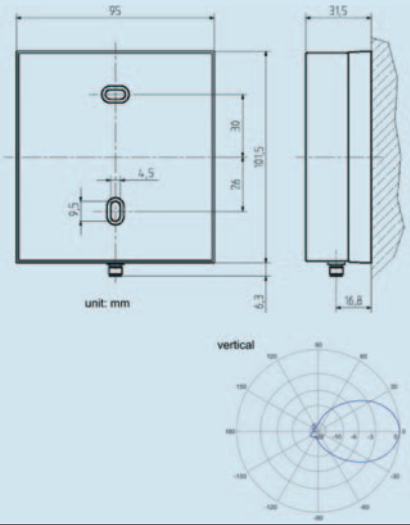
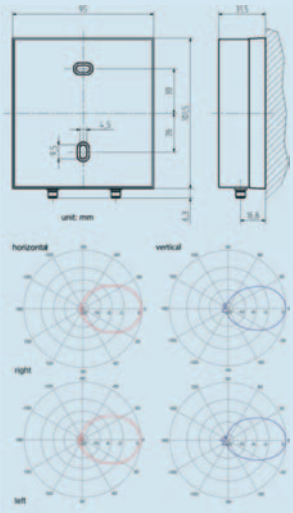
Type	BAT54-F FCC	BAT54-F X2
Order No.	943 959-011 available Q1-2008	943 959-101 available Q1-2008
		
	Dualband Ruggedized Industrial Wireless LAN Access Point/Client with two independent radio modules with IEEE 802.11a/b/g/h/i for installation in harsh environment, IP67 protection class and waterproof, M12 connectors, with FCC-approval for USA and Canada.	Dualband Ruggedized Industrial Wireless LAN Access Point/Client with two independent radio modules with IEEE 802.11a/b/g/h/i for installation in hazardous environment, IP67 protection class, M12 connectors and waterproof
Product description		
Port type and quantity	Two WLAN interfaces, up to 8 SSIDs per WLAN interface, one LAN port 10/100BASE-TX, auto-sensing, Power over Ethernet according to IEEE 802.3af	Two WLAN interfaces, up to 8 SSIDs per WLAN interface, one LAN port 10/100BASE-TX, auto-sensing, Power over Ethernet according to IEEE 802.3af
Radio technology		
Antenna connector	four N-type jack antenna connectors	four N-type jack antenna connectors
Frequency band	two independent radio modules, each 2.4GHz and 5GHz: 2400-2483,5 MHz (ISM) and 5170-5810 MHz	two independent radio modules, each 2.4GHz and 5GHz: 2400-2483,5 MHz (ISM) and 5170-5810 MHz
Power requirements		
Operating voltage	2x 24V DC; 1x Power-over-Ethernet according to IEEE802.3af; all power supplies redundant to each other	2x 24V DC; 1x Power-over-Ethernet according to IEEE802.3af; all power supplies redundant to each other
Current consumption	24V DC: 417 mA; PoE (48V DC): 167 mA	24V DC: 417 mA; PoE (48V DC): 167 mA
Ambient conditions		
Operation temperature	-20°C up to +60°C (-40° up to +70°C according to EN50155)	-20°C up to +60°C (-40° up to +70°C according to EN50155)
Storage/transport temperature	-40°C up to 70°C	-40°C up to 70°C
Mechanical construction		
Dimensions (W x H x D)	261 mm x 189 mm x 55 mm	307 mm x 270 mm x 60 mm
Mounting	for wall and mast mounting	for wall and mast mounting
Approvals		
Radio	EN 300328, EN 301893, Certifications for FCC and Singapore	EN 300328, EN 301893, notified in all countries of EU. For other notifications or certifications please refer to INET-Sales@hirschmann.de
Environmental	in preparation	IEC-60079 ZONE 2, GAS GROUP IIC, TEMPERATURE CLASS T4 for hazardous environment, IP67 protection class
Scope of delivery and accessories		
Scope of delivery	device, CD, M12 connector, two 50Ohm terminators, mounting material	device, CD, M12 connector, two 50Ohm terminators, mounting material
Accessories to order separately	external antennas for 802.11b/g and 802.11a/h operation adapter cable and surge arrestor, mast mount material	external antennas for 802.11b/g and 802.11a/h operation adapter cable and surge arrestor, mast mount material

Type	BAT54-F X2 FCC
Order No.	943 959-001 available Q1-2008
	
	Dualband Ruggedized Industrial Wireless LAN Access Point/Client with two independent radio modules with IEEE 802.11a/b/g/h/i for installation in hazardous environment, IP67 protection class and waterproof, M12 connectors, with FCC-approval for USA and Canada.
Product description	
Port type and quantity	Two WLAN interfaces, up to 8 SSIDs per WLAN interface, one LAN port 10/100BASE-TX, auto-sensing, Power over Ethernet according to IEEE 802.3af
Radio technology	
Antenna connector	four N-type jack antenna connectors
Frequency band	two independent radio modules, each 2.4GHz and 5GHz: 2400-2483,5 MHz (ISM) and 5170-5810 MHz
Power requirements	
Operating voltage	2x 24V DC; 1x Power-over-Ethernet according to IEEE802.3af; all power supplies redundant to each other
Current consumption	24V DC: 417 mA; PoE (48V DC): 167 mA
Ambient conditions	
Operation temperature	-20°C up to +60°C (-40° up to +70°C according to EN50155)
Storage/transport temperature	-40°C up to 70°C
Mechanical construction	
Dimensions (W x H x D)	307 mm x 270 mm x 60 mm
Mounting	for wall and mast mounting
Approvals	
Radio	EN 300328, EN 301893, Certifications for FCC and Singapore
Environmental	IEC-60079 ZONE 2, GAS GROUP IIC, TEMPERATURE CLASS T4 for hazardous environment, IP67 protection class
Scope of delivery and accessories	
Scope of delivery	device, CD, M12 connector, two 50Ohm terminators, mounting material
Accessories to order separately	external antennas for 802.11b/g and 802.11a/h operation adapter cable and surge arrestor, mast mount material

Industrial ETHERNET

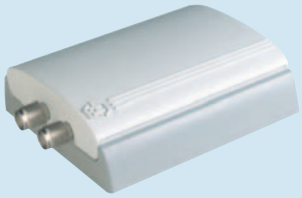
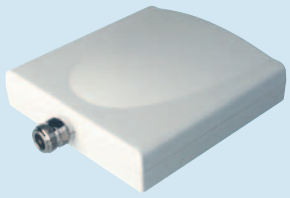
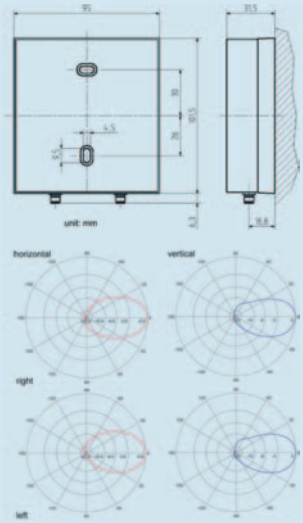
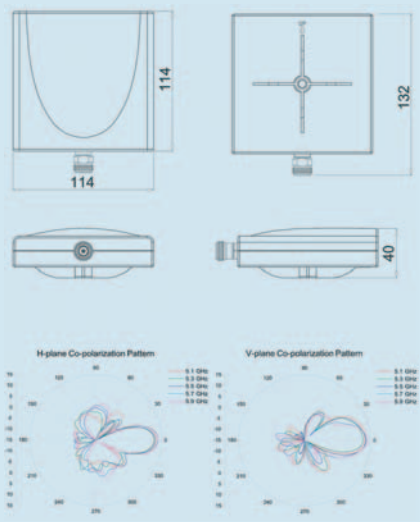
Accessories > Antenna

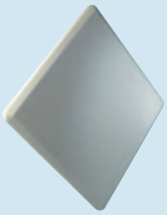
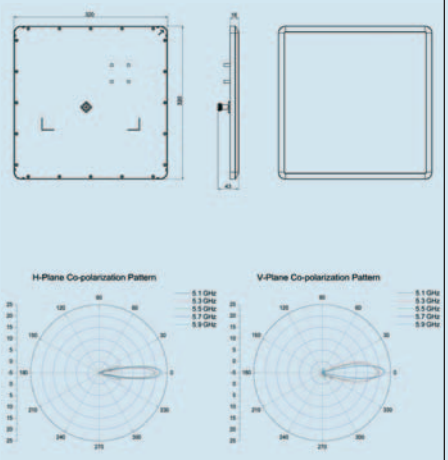
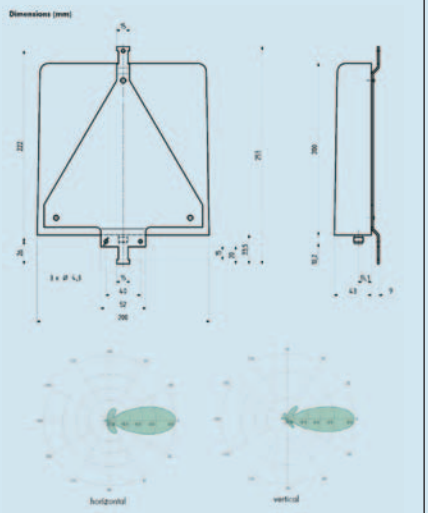
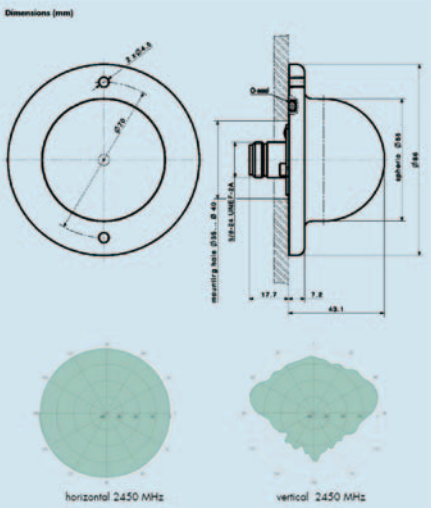
Type	BAT-ANT-8G	BAT-ANT-8A
Order No.	943 903-401	943 903-301
		
	omni-directional Antenna for 2.4 GHz	omni-directional antenna for 5 GHz
Product description		
Cable length	1 m	1 m
Cable specification	2 N male connectors; 0.7 dB at 2.4 GHz	2 N male connectors; 1.0 dB at 5 GHz
Colour	white	white
Radio technology		
Range		
Frequency band	2400 MHz - 2500 MHz	5150 MHz - 5350 MHz 5350 MHz - 5875 MHz
Polarisation	linear, vertical	linear, vertical
Elevation, Azimuth	15° / 360°	15° / 360°
VSWR	2.0: 1 Max.	2.0: 1 Max.
Gain	8 dBi	5 dBi at 5150 MHz - 5350 MHz, 8 dBi at 5350 MHz - 5875 MHz
Antenna connector	N female	N female
Drawing		
Ambient conditions		
Operating temperature	-40 °C to +80 °C	-40 °C to +80 °C
Storage/transport temperature	-40 °C to +80 °C	-40 °C to +80 °C
Wind load	216 km/h	216 km/h
Mechanical construction		
Dimensions (W x H x D)	78 mm x 80 mm x 520 mm	78 mm x 80 mm x 373 mm
Mounting	wall, mast	wall, mast
Protection class	IP65	IP65
Material	fiber glass	fiber glass
Weight	0.34 kg	0.227 kg
Scope of delivery and accessories		
Scope of delivery	antenna, cable 1 m, pigtail RP-SMA to N, installation material, sealing tape	antenna, cable 1 m, pigtail RP-SMA to N, installation material, sealing tape

BAT-ANT-TNC-B-D-085-01	BAT-ANT-TNC-B-D-085-02	BAT-ANT-TNC-8b/g DS
943 056-111	943 903-411	943 903-310
		
circular polarized antenna for 2.4 GHz	directional antenna linear for 2.4 GHz	directional diversity antenna linear for 2.4 GHz
2 m RP-SMA plug to TNC plug, 1.5 dB at 2.4 GHz black	2 m RP-SMA plug to TNC plug, 1.5 dB at 2.4 GHz black	2 m RP-SMA plug to TNC plug, 1.5 dB at 2.4 GHz black
2300 MHz - 2500 MHz circular, left or right 3 dB beam width 65°/70° 1.5 8.5 dBi TNC female	2300 MHz - 2500 MHz linear, vertical 3 dB beam width 60° / 75° 1.5 8.5 dBi TNC female	2300 MHz - 2500 MHz dual linear, +/- 45° slant 3 dB beam width 70° / 80° 1.5 8.5 dBi TNC female
		
-40 °C to +80 °C -40 °C to +80 °C 15 N at 160 km/h	-40 °C to +80 °C -40 °C to +80 °C 15 N at 160 km/h	-40 °C to +80 °C -40 °C to +80 °C 15 N at 160 km/h
101 mm x 95 mm x 32 mm wall, mast IP55 ASA 0.11 kg	101 mm x 95 mm x 32 mm wall, mast IP55 ASA 0.11 kg	101 mm x 95 mm x 32 mm wall, mast IP55 ASA 0.11 kg
antenna, 2 m cable, mounting material	antenna, 2 m cable, mounting material	antenna, 2 x 2 m cable, installation material

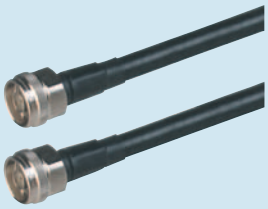
Industrial ETHERNET

Accessories > Antenna

Type	BAT-ANT-TNC-10A DS	BAT-ANT-N-12A
Order No.	943 903-330	943 903-320
		
	directional diversity antenna linear for 5 GHz	directional antenna linear for 5 GHz
Product description		
Cable length	2 m	1 m
Cable specification	RP-SMA plug to TNC plug, 2.0 dB at 5 GHz	2 N male connectors; 1.0 dB at 5 GHz
Colour	black	white
Radio technology		
Range		
Frequency band	5150 MHz - 5875 MHz	5150 MHz - 5350 MHz 5350 MHz - 5875 MHz
Polarisation	dual linear, +/- 45° slant	linear, vertical
Elevation, Azimuth	3 dB beam width 60° / 60°	30° / 25° at 5150 MHz - 5350 MHz, 25° / 25° at 5350 MHz - 5875 MHz
VSWR	1.6	2.0: 1 Max.
Gain	10 dBi	12 dBi at 5150 MHz - 5350 MHz, 14 dBi at 5350 MHz - 5875 MHz
Antenna connector	TNC female	N female
Drawing		
Ambient conditions		
Operating temperature	-40 °C to +80 °C	-40 °C to +80 °C
Storage/transport temperature	-40 °C to +80 °C	-40 °C to +80 °C
Wind load	15 N at 160 km/h	216 km/h
Mechanical construction		
Dimensions (W x H x D)	101 mm x 95 mm x 32 mm	114 mm x 114 mm x 40 mm
Mounting	wall, mast	wall, mast
Protection class	IP55	IP65
Material	ASA	ABS, UV resistant
Weight	0.11 kg	0.107 kg
Scope of delivery and accessories		
Scope of delivery	antenna, 2 x 2 m cable, installation material	antenna, cable 1 m, pigtail RP-SMA to N, installation material, sealing tape

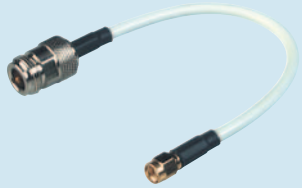
BAT-ANT-N-23/9A	BAT-ANT-N-14G	BAT-ANT-N-6ABG
943 903-340	943 903 380	943 903 421
		
directional Antenna linear for 5.8 GHz	drectional antenna for 2.4 GHz	vehicle omni antenna for 2.4 GHz and 5 GHz
1 m 2 N male connectors; 1.0 dB at 5 GHz white	1 m 2 N male connectors; 1.0 dB at 2.4 GHz Black	2 m N Plug to RP-SMA plug, 1.5 dB at 2.4 GHz, 2.0 dB at 5.4 GHz black
5150 MHz - 5850 MHz linear 9° / 9° 2.0: 1 Max. 23 dBi N female	2300 MHz - 2500 MHz linear, vertical 30° 1.5 14 dBi N female	2400 MHz - 6000 MHz linear, vertical 360° 2 2.4 GHz: 6.0 dBi; 5 GHz: 8.0 dBi N female
		
-40 °C to +80 °C -40 °C to +80 °C 216 km/h	-40 °C to +80 °C -40 °C to +80 °C 57 N at 160 km/h	-40 °C to +80 °C -40 °C to +80 °C 10 N at 160 km/h
320 mm x 320 mm x 18 mm wall, mast IP65 ABS, UV resistant 1.2 kg	200 mm x 200 mm x 43 mm wall, mast IP55 ASA 0.5 kg	Ø 86 mm x 43 mm ceiling, cabinet IP67, with sealing ring ASA 0.3 kg
antenna, cable 1 m, pigtail RP-SMA to N, installation material, sealing tape	antenna, cable 1 m, pigtail RP-SMA to N, installation material, sealing tape	antenna, 2m cable; sealing ring

Accessories > **Adapters and Cables**

Type	BAT-CLB-7-TNC	BAT-CLB-7-N
Order No.	943 903-501	943 903-350
		
	Antenna cable 7m, TNC plug to N plug, ULA 400, attenuation 2 dB at 2.4GHz, 3dB at 5GHz	Antenna cable 7m, N plug to N plug, ULA 400, Attenuation 2 dB at 2,4GHz, 3dB at 5GHz

BAT-Pigtail

943 903-360



Adapter cable (N female/RP-SMA-Plug), attenuation 0.5 dB at 2.4GHz, 1dB at 5GHz

BAT Surge Arrestor

943 903-370

Surge arrestor N jack to N jack

The die is cast.

With the OCTOPUS IP 67 system, Industrial ETHERNET conquered the production arena.

Sensors and actuators used to be the preferred fields of operation of the field bus systems. In future, however, a large number of application areas will find its way directly into the ETHERNET network. Good when you can rely on a partner like Hirschmann as an innovative system provider who is at home in both worlds: Industrial ETHERNET and Industrial Connectors. Start with the OCTOPUS IP 67 system now.

Because the standardized M 12 technology also offers the certainty of using an open system for ETHERNET applications at machine level. The self-assemblable connector convinces in speed, reliability and pure simplicity. And because ETHERNET-based protocols already play a major role with the important automation manufacturers, the OCTOPUS IP 67 system from Hirschmann will very quickly gain ground on the factory floor in future. Naturally, the OCTOPUS Switches are also first choice when it comes to using ETHERNET under extreme conditions such as in trains or on ships.

- ***Complete OCTOPUS IP 67 system from the switch to the connecting cable for very harsh ambient conditions.***
- ***IP 67 solution and standardized M 12 technology for Industrial ETHERNET (IEC 61076-2-101 Amendment 1).***
- ***Quick connection by easy to assemble connector which adapts the system to all requirements.***
- ***Recognized by the most important user organizations: ProfiNet, ODVA.***
- ***Full management support incl. HIPER-Ring, SNMPv3 and LLDP.***

Note:
Please note that some recommended accessory parts only support a temperature range from -25ºC to +70ºC and might limit the possible operating conditions for the entire system. Specially designed connector types with protection class IP67 and extended temperature range are available on request. Furthermore unsealed accessories like RJ45 adapters or terminal access cables are certainly not suitable inside IP67 areas.

Accessories
for this family you can find on the following pages:

System Accessories Page 202

Hirschmann Competence Center

Because the innovative **OCTOPUS 8M** also includes the appropriate service program, the Hirschmann Competence Center offers suitable consulting services in the network planning: **network optimization check, risk reduction consulting, network technology evaluation and network baselining consulting.** Plus the following trainings: CP1d OCTOPUS Family in theory and practice, Ird overview of the Hirschmann OCTOPUS Family, CPUd Update OCTOPUS Family and CB1e Industrial ETHERNET/basic technical principles. In addition, we provide support with certification testing, installation and configuration as well as our service hotline and later offer Advance Hardware Replacement and warranty extensions.

www.hicomcenter.com

Industrial ETHERNET

OCTOPUS IP67 > Switch

Type	OCTOPUS 8M
Order No.	943 931-001
	
	Managed IP67 switch in accordance with IEEE 802.3, store-and-forward switching mode, Layer 2 Software Professional, ETHERNET (10 Mbit/s) and Fast-ETHERNET (100 Mbit/s)
Product description	
Port type and quantity	8 x 10/100 BASE-TX, M12 D coding, 4-pole, 2-pair TP cable auto-crossing, auto-negotiation, auto-polarity
More Interfaces	
Power supply/signaling contact	1 M12 A coding 5-pin connector
V.24 interface	1 M12 A coding 4-pin socket
USB interface	1 M12 A coding 5-pin socket
Network size - length of cable	
Twisted pair (TP)	0 - 100m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Network size - cascadibility	
Line - / star topology	Any
Ring structure (HIPER-Ring)	50 (reconfiguration time <0,3 sec.)
Power requirements	
Operating voltage	9.6 to 60 V DC
Power consumption	max. 6.2 W
Current consumption at 24 V DC	200 mA
Service	
Management	Serial interface, Web interface, SNMP V1/V2/V3 (HiVision/Industrial HiVision)
Diagnostics	LEDs (power 1, power 2, link status, data, redundancy manager, error) cable tester, signalling contact (24 V DC/ A), RMON (statistics, history, alarms, events), SysLog support, port mirroring
Configuration	Command Line Interface (CLI scripting), auto-configuration adapter (ACA21-M12), TELNET, BootP, DHCP Option 82, HiDiscovery
Security	Port security (MAC and IP address), SNMPv3, SSHv3, SNMP access settings (VLAN/IP), IEEE 802.1X authentication
Other services	4 QoS queues, user priority (IEEE 802.1D/p), VLAN (IEEE 802.1Q), unknown multicast filtering, multi-cast support (IGMP Snooping/Querier, GMRP), broadcast limiter per port, ingress and egress packet limiter, Flow Control IEEE 802.3x, LLDP (topology discovery IEEE 802.1AB), Link Aggregation (IEEE 802.3ad), buffered real-time clock, PTP support (Precision Time Protocol) (IEEE 1588 client for system clock only), SNTP support (Simple Network Time Protocol, client/server)
Redundancy	
Redundancy functions	HIPER-Ring (ring structure), RSTP (Rapid Spanning Tree Protocol, IEEE 802.1w), redundant net-work/ring coupling, redundant power supply
Ambient conditions	
Operating temperature	-40 °C to +70 °C
Storage/transport temperature	-40 °C to +85 °C
Mechanical construction	
Dimensions (W x H x D)	184 mm x 189 mm x 70 mm
Mounting	Wall mounting
Weight	1310 g
Protection class	IP 67
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0,7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	4 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (linie/earth), 1 kV (linie/line), 1 kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508
Germanischer Lloyd	GL
Employment in vehicles	E1
Electronic mechanisms on rail-mounted vehi-cles	EN 50155
Scope of delivery and accessories	
Scope of delivery	covers for sealing unused ports, description and operating instructions
Accessories to order separately	auto configuration adapter (ACA21-M12) order no. 943 931-001; modem cable, shielded M12 4-pins on Sub-D 9-pins order no. 943 902-001; field assembleable M12-connector EM12S OCTOPUS order no. 934 445-001; patchcords EM12S 001Lxxxx OCTOPUS order no. 934 578-xxx; crossing M12 to RJ45 EF12RJ45 OCTOPUS order no. 934 498-001

Type	OCTOPUS 8M-8POE	OCTOPUS 16M
Order No.	943 967-001	943 912-001
		
	Managed IP67 switch in accordance with IEEE 802.3, store and forward switching mode, Layer 2 Software Professional, ETHERNET (10 Mbit/s) and Fast-ETHERNET (100 Mbit/s), power soucing equipment according to IEEE 802.3af (inline power)	Managed IP67 switch in accordance with IEEE 802.3, store and forward switching mode, Layer 2 Software Professional, ETHERNET (10 Mbit/s) and Fast-ETHERNET (100 Mbit/s)
Product description		
Port type and quantity	8 x 10/100 BASE-TX PoE (phantom power), M12 D coding, 4-pole, 2-pair TP cable, auto-crossing, auto-negotiation, auto-polarity	16 x 10/100 BASE-TX, M12 D coding, 4-pole, 2-pair TP cable auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	0 - 100 m
Power requirements		
Operating voltage	46 V to 58 V DC	9.6 to 60 V DC
Power consumption	max. 142 W	max. 9.5 W
Current consumption at 24 V DC	3.1 A	380 mA
Mechanical construction		
Dimensions (W x H x D)	184 mm x 189 mm x 70 mm	261 mm x 189 mm x 70 mm
Weight	1310 g	1920 g

Type	OCTOPUS 16M-8POE	OCTOPUS 16M-2FX
Order No.	943 960-001	943 912-002
		
	Managed IP67 switch in accordance with IEEE 802.3, store and forward switching mode, Layer 2 Software Professional, ETHERNET (10 Mbit/s) and Fast-ETHERNET (100 Mbit/s), power soucing equipment according to IEEE 802.3af (inline power)	Managed IP67 switch in accordance with IEEE 802.3, store and forward switching mode, Layer 2 software professional, ETHERNET (10 Mbit/s) and Fast-ETHERNET (100 Mbit/s)
Product description		
Port type and quantity	8 x 10/100 BASE-TX PoE (phantom power) plus 8 x 10/100 BASE-TX, M12 D coding, 4-pole, 2-pair TP cable, auto-crossing, auto-negotiation, auto-polarity	14 x 10/100 BASE-TX, M12 D coding, 4-pole, 2-pair TP cable auto-crossing, auto-negotiation, auto-polarity 2 x 100Base-FX MM, microFX
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	0 - 100 m
Multimode fiber (MM) 50/125 µm		0-5000m, 8dB Link Budget at 1300 nm, A = 1dB/km, 3dB Reserve, B = 800 MHz x km
Multimode fiber (MM) 62.5/125 µm		0-4000m, 11dB Link Budget at 1300 nm, A = 1dB/km, 3dB Reserve, B = 500 MHz x km
Power requirements		
Operating voltage	46 V to 58 V DC	9.6 to 60 V DC
Power consumption	max. 146 W	max. 13.0 W
Current consumption at 24 V DC	3.2 A	480 mA
Mechanical construction		
Dimensions (W x H x D)	261 mm x 189 mm x 70 mm	261 mm x 189 mm x 70 mm
Weight	1920 g	1950 g

Industrial ETHERNET

Switch > Versions

Type	OCTOPUS 16M-8POE-2FX	OCTOPUS 24M
Order No.	943 960-101	943 923-001
		
	Managed IP67 switch in accordance with IEEE 802.3, store and forward switching mode, Layer 2 Software Professional, ETHERNET (10 Mbit/s) and Fast-ETHERNET (100 Mbit/s), power soucing equipment according to IEEE 802.3af (inline power)	Managed IP67 switch in accordance with IEEE 802.3, store and forward switching mode, Layer 2 Software Professional ETHERNET (10 Mbit/s) and Fast-ETHERNET (100 Mbit/s)
Product description		
Port type and quantity	8 x 10/100 BASE-TX PoE (phantom power) plus 6 x 10/100 BASE-TX, M12 D coding, 4-pole, 2-pair TP cable, auto-crossing, auto-negotiation, auto-polarity, 2 x 100Base-FX MM, microFX	24 x 10/100 BASE-TX, M12 D coding, 4-pole, 2-pair TP cable auto-crossing, auto-negotiation, auto-polarity
Network size - length of cable		
Twisted pair (TP)	0 - 100 m	0 - 100 m
Multimode fiber (MM) 50/125 µm	0-5000m, 8dB Link Budget at 1300 nm, A = 1dB/km, 3dB Reserve, B = 800 MHz x km	
Multimode fiber (MM) 62.5/125 µm	0-4000m, 11dB Link Budget at 1300 nm, A = 1dB/km, 3dB Reserve, B = 500 MHz x km	
Power requirements		
Operating voltage	46 V to 58 V DC	9.6 to 60 V DC
Power consumption	max. 150 W	max. 13.5 W
Current consumption at 24 V DC	3.3 A	500 mA
Mechanical construction		
Dimensions (W x H x D)	261 mm x 189 mm x 70 mm	338 mm x 189 mm x 70 mm
Weight	1950 g	2540 g

Type	OCTOPUS 24M-2FX
Order No.	943 923-002
	
	Managed IP67 switch in accordance with IEEE 802.3, store and forward switching mode, Layer 2 Software Professional ETHERNET (10 Mbit/s) and Fast-ETHERNET (100 Mbit/s)
Product description	
Port type and quantity	22 x 10/100 BASE-TX, M12 D coding, 4-pole, 2-pair TP cable auto-crossing, auto-negotiation, auto-polarity 2 x 100Base-FX MM, microFX
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	0-5000m, 8dB Link Budget at 1300 nm, A = 1dB/km, 3dB Reserve, B = 800 MHz x km
Multimode fiber (MM) 62.5/125 µm	0-4000m, 11dB Link Budget at 1300 nm, A = 1dB/km, 3dB Reserve, B = 500 MHz x km
Power requirements	
Operating voltage	9.6 to 60 V DC
Power consumption	max. 14.9 W
Current consumption at 24 V DC	550 mA
Mechanical construction	
Dimensions (W x H x D)	338 mm x 189 mm x 70 mm
Weight	2570 g

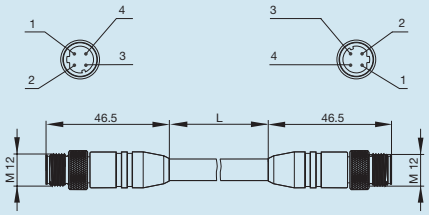
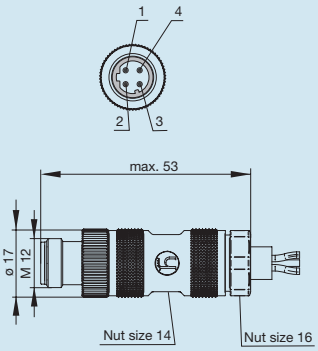
Industrial ETHERNET

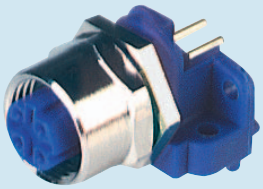
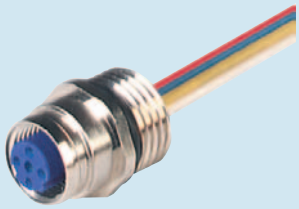
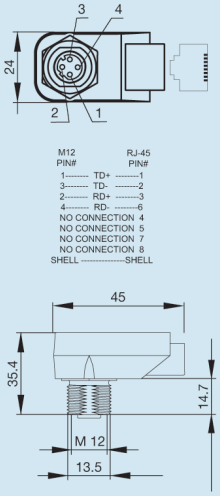
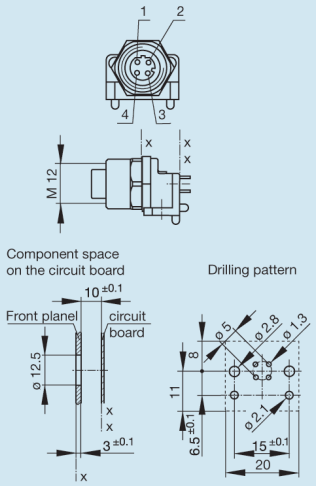
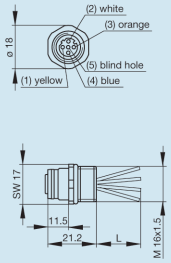
OCTOPUS IP67 > Switch

Type	OCTOPUS 5TX EEC
Order No.	943 892-001
	
	IP67 switch in accordance with IEEE 802.3, store and forward switching mode, ETHERNET (10 Mbit/s) and Fast-ETHERNET (100 Mbit/s)
Product description	
Port type and quantity	5 x 10/100 BASE-TX, M12 D coding, 4-pole, 2-pair TP cable auto-crossing, auto-negotiation, auto-polarity
More Interfaces	
Power supply/signaling contact	1 M12 A coding 5-pole / no signal contact (fault relais)
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Network size - cascadibility	
Line - / star topology	any
Power requirements	
Operating voltage	9.6 to 32 V DC
Power consumption	max. 2.4 W
Current consumption at 24 V DC	max. 100 mA
Service	
Diagnostics	LEDs (power, link status, data)
Ambient conditions	
Operating temperature	-40 °C to +70 °C
Storage/transport temperature	-40 °C to +85 °C
MTBF	143.6 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction	
Dimensions (W x H x D)	60 mm x 126 mm x 31 mm
Mounting	wall mounting
Weight	210 g
Protection class	IP 67
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	4 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2kV (linie/earth), 1 kV (linie/line), 1 kV data line
EN 61000-4-6 conducted immunity	10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (E175537) in preparation
Employment in vehicles	E1 (in preparation)
Electronic mechanisms on rail-mounted vehicles	EN 50155
Scope of delivery and accessories	
Scope of delivery	2x covers for unused ports, labels, description and operating instructions

Industrial ETHERNET

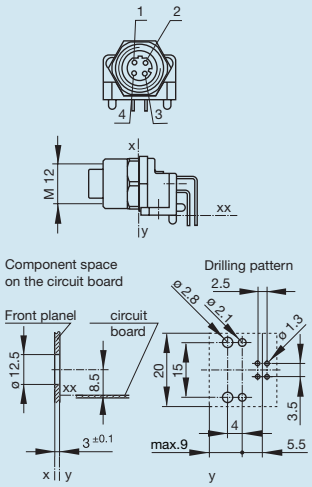
OCTOPUS IP67 > Connecting technology

Type	EM12S 001L0200 OCTOPUS	EM12S OCTOPUS
Order No.	934 578-001	934 445-001
		
	Industrial ETHERNET patch cords with 2 x M12 connector “D”-coded according IEC 61076-2-101.	Field attachable Industrial ETHERNET M12 connector “D”-coded according IEC 61076-2-101.
Product description		
Other standard types	cable length 5 m: order no. 934 578-002; cable length 10 m: order no. 934 578-003	
Type of contact	male	male
Number of contacts	4	4
Data rate	10BASE-T, 100BASE-TX	10BASE-T, 100BASE-TX
Cable gland		
Cable material	PUR	
Cable color		
Cable length	2 m	
Conductor size	AWG 22	AWG 24 - AWG 22
Cable specification	stranded wire	stranded wire/solid wire
Standard	IEC 61076-2-101	IEC 61076-2-101
Housing Color	metallic	metallic
Drawing		
Technical data		
Wire stranding		
Rated voltage	AC/DC 250 V	AC/DC 250 V
Rated current	4 A (Derating)	4 A (Derating)
Suitable cables		diameter 6.0 mm to 8.0 mm
Type of termination		IDC
Pin dimensions	1 mm	
Material		
Contact material	Cu Zn	Cu Zn
Contact surface material	Au	Au
Contact bearer material	PA	PA
Housing material	PUR	Cu Zn/Ni
Coupling nut material	Cu Zn/Ni	Zn
O-Ring		Vition
Environmental conditions		
Protection class (IEC 60529)	IP 67	IP 67
Pollution severity	3	3
Temperature range	-25 °C to +90 °C	-25 °C to +85 °C
Approvals		
UL	UL in pending	UL in pending
Packing unit		
Packaging unit	10	10
Scope of delivery and accessories		
Accessories to order separately	OCTOPUS 5TX EEC, order no. 943 892-001; MM3-4TX5 OCTOPUS, order no. 943 841-001; EF12RJ45 OCTOPUS, order no. 934 498-001; EF12M OCTOPUS, order no. 934 450-021; EF12L OCTOPUS, order no. 934 451-021; EF12LW OCTOPUS, order no. 934 451-521	OCTOPUS 5TX EEC, order no. 943 892-001; MM3-4TX5 OCTOPUS, order no. 943 841-001; EF12RJ45 OCTOPUS, order no. 934 498-001; EF12M OCTOPUS, order no. 934 450-021; EF12L OCTOPUS, order no. 934 451-021; EF12LW OCTOPUS, order no. 934 451-521

EF12RJ45 OCTOPUS	EF12L OCTOPUS	EF12M OCTOPUS
934 498-001	934 451-021	934 450-021
		
Bulkhead M12 connector “D”-coded according IEC 61076-2-101 Amendment 1 to RJ45.	Industrial ETHERNET M12 socket, “D”-coded according IEC 61076-2-101 for combined front panels and circuit board installation	Industrial ETHERNET M12 socket, “D”-coded according IEC 61076-2-101 mounting thread with connection leads.
4 10BASE-T, 100BASE-TX IEC 61076-2-101 Amendment 1 black	female 4 10BASE-T, 100BASE-TX IEC 61076-2-101 metallic	female 4 10BASE-T, 100BASE-TX M16 x 1,5 PVC 0,08 m 0,34 0m2 / AWG 22 7 x 0,25 mm IEC 61076-2-101 metallic
		
DC 60 V 1,5 A diameter 15,2 mm / PG 9	AC/DC 150 V 4 A (Derating) soldering, straight pins	4 wires per 0,34 mm2 AC/DC 250 V 4 A (Derating) connection leads, length max. 8 cm
Cu Zn Au PA Cu Zn/Ni Cu Zn/Ni Viton	Cu Zn Au PA Cu Zn/Ni Viton	Cu Zn Au PA Cu Zn / Ni Viton
IP 67 / IP65 3 0 °C to +70 °C	IP 67 / IP65 3 -25 °C to +90 °C	IP 67 / IP65 3 -25 °C to +90 °C
UL	UL	UL
10	25	25
OCTOPUS 5TX EEC, order no. 943 892-001; MM3-4TX5 OCTOPUS, order no. 943 841-001; EM12S 001Lxxxx OCTOPUS, order no. 934 497-xxx; EM12S OCTOPUS, order no. 934 44540-001	M 12 VS, order no. 734 209-100; EM12S OCTOPUS, order no. 934 445-001; EM12S 001Lxxxx OCTOPUS, order no. 934 497-xxx	M 12 VS, order no. 734 209-100; ELST M M16, order no. 735 413-002; EM12S OCTOPUS, order no. 934 445-001; EM12S 001Lxxxx OCTOPUS, order no. 934 497-xxx

Industrial ETHERNET

OCTOPUS IP67 > Connecting technology

Type	EF12LW OCTOPUS
Order No.	934 451-521
	
	Industrial ETHERNET M12 socket, “D”-coded according IEC 61076-2-101 for combined front panels and circuit board installation
Product description	
Other standard types	
Type of contact	female
Number of contacts	4
Data rate	10BASE-T, 100BASE-TX
Cable gland	
Cable material	
Cable color	
Cable length	
Conductor size	
Cable specification	
Standard	IEC 61076-2-101
Housing Color	metallic
Drawing	
Technical data	
Wire stranding	
Rated voltage	250 V
Rated current	4 A (Derating)
Suitable cables	
Type of termination	soldering, angled pins
Pin dimensions	
Material	
Contact material	Cu Zn
Contact surface material	Au
Contact bearer material	PA
Housing material	Cu Zn/Ni
Coupling nut material	
O-Ring	Vition
Environmental conditions	
Protection class (IEC 60529)	IP 67 / IP65
Pollution severity	3
Temperature range	-25 °C to +90 °C
Approvals	
UL	UL
Packing unit	
Packaging unit	25
Scope of delivery and accessories	
Accessories to order separately	M 12 VS, order no. 734 209-100; EM12S OCTOPUS, order no. 934 445-001; EM12S 001Lxxxx OCTOPUS, order no. 934 497-xxx

Welcome to the Hirschmann Power Zone

The new MACH1000 Substation Switches.

In the future, more and more users will be looking for total solutions which go beyond the substation – to include power generation and distribution. These end-to-end solutions cover the entire spectrum from the power station and management station to the distribution grid. The new indestructible Hirschmann substation switches for Fast-ETHERNET applications deliver excellent performance in a compact form factor. These switches offer high port density (up to 26 ports), excellent RFI/EMI shielding under extreme conditions and great flexibility. OpenRail design and the standardized OpenRail software platform provides true versatility. The switches are virtually indestructible and offer the same excellent quality which users have learned to expect from Hirschmann. This well-engineered, ruggedized product family enables Hirschmann to supply innovative solutions for power station and sub-station applications. You need products with excellent noise immunity and a wide operating temperate range to maintain communications in the presence of strong electromagnetic fields.

- ***Ruggedized Gigabit-ETHERNET switches***
- ***Total connectivity, uncompromising modular design***
- ***Extended temperature range: – 40° C up to + 85° C***
- ***Extremely high RFI/EMI immunity***
- ***High port density, up to 26 ports***
- ***High-performance switches in a compact 19" housing***

MACH1000

Accessories
for this family you can find on the following pages:

Transceiver Page 194
System Accessories Page 202

Use the Hirschmann MACH1000 system to configure your substation switch.

MAR1030-CCMMMMMMVVZZTTTTTTTTTTTT99UGCHPHH04.0.

MAR1030-

Model

MAR1020	Fast-ETHERNET Uplinks
MAR1030	Gigabit-ETHERNET Uplinks

CC

Ports GE

Gigabit-ETHERNET Ports 1 & 2		
99	not assembled	
CC	2 x SFP Combo Port	1000 Mbit RJ 45/SFP

MM 1+2

MM 3+4

MM 5+6

VV 7+8

ZZ 9+10

TT 11+12

TT 13+14

TT 15+16

TT 17+18

TT 19+20

TT 21+22

99 23+24

FE Dual port type

1+2 · 3+4 · 5+6 · 7+8 · 9+10 · 11+12 · 13+14 · 15+16 · 17+18 · 19+20 · 21+22 · 23+24

99	not assembled	
TT	2 x Twisted pair (TX)	10/100 Mbit RJ 45
MM	2 x Multimode	100 Mbit SC
JJ	2 x Multimode	100 Mbit MTRJ
NN	2 x Multimode	100 Mbit ST
VV	2 x Singlemode	100 Mbit SC
UU	2 x Singlemode	100 Mbit ST
LL	2 x Singlemode LH	100 Mbit SC
GG	2 x Singlemode LH+	100 Mbit SC
ZZ	2 x SFP Slot	100 Mbit SFP

U

Temperature range

S	0° C up to + 60° C
U	– 40° C up to + 85° C
F	– 40° C up to + 85° C with Conformal Coating

G

Power supply 1

C	24/36/48 V DC
G	110/250 V DC / 110/230 V AC

Power supply 2

C	24/36/48 V DC
G	110/250 V DC / 110/230 V AC
9	empty

C

Approvals

H	UL508, GL, IEC 61850-3, IEEE 1613

H

Software version

P	Professional: Enhanced software plus security, extended diagnostic and redundancy

P

Configuration

H	Standard
X	Customer specific

H

OEM-type

H	Standard
X	Customer specific

H

Software release

04.0.	Software release 4.0

04.0.

Compulsory field Optional

Enjoy the benefits of direct, hassle-free configuration with our online tool at configurator.hirschmann.com

Industrial ETHERNET

MACH1000 > Switches Software Release 4.0

Type	MAR1020-99TTTTTTTTTTTTTTTTTTTTTTTTTTUG9HPHH04.0.
Order No.	MAR1020-99TTTTTTTTTTTTTTTTTTTTTTTTTTUG9HPHH04.0.
	
	ETHERNET/Fast ETHERNET/-switch according to IEEE 802.3, managed, industrial switch 19" cabinet mount, store-and-forward-switching, fanless design, software layer 2 professional
Product description	
Port type and quantity	Fast-ETHERNET ports in total: 24; 24 x Twisted Pair (Tx) 10/100 Mbit RJ 45;
More Interfaces	
Power supply/signaling contact	Power supply 1: power supply 3-pin spring clip, signal contact 2-pin spring clip; Power supply 2: not assembled
V.24 interface	1 x RJ11 socket
USB interface	1 x to connect auto-configuration adapter ACA21-USB
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	
Multimode fiber (MM) 62.5/125 µm	
Single mode fiber (SM) 9/125 µm	
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	100 switches
Power requirements	
Operating voltage	Power supply 1: 77 - 300 VDC, 90 - 265 VA; Power supply 2: not assembled
Current consumption at 24 V DC	150mA (35W) max, if all ports are equipped with fiber
Current consumption at 230 V AC	150mA (35W) max, if all ports are equipped with fiber
Power output in Btu (IT) h	120 max
Software	
Management	Serial interface, Web interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP
Diagnostics	LEDs, log file, syslog, signal contact, RMON (statistic, history, alarme, event), portmirroring, topology discovery 802.1AB, cable diagnostic
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HIDiscovery, auto-configuration adapter (ACA11, ACA21-USB), watchdog configuration
Security	Port security (IP and MAC), SNMP V3, SSH, authentication (802.1x)
Redundancy functions	HIPER-ring (ring structure), MRP (IEC-ring functionality), RSTP 802.1w, redundant network/ring coupling, dual homing, link aggregation, redundant 24 V power supply
Filter	QoS 4 classes, port priorisierung (IEEE 802.1D/p), VLAN (IEEE 802.1Q), shared VLAN learning, Multicast (IGMP Snooping/Querier), Multicast Detection unknown Multicast, Broadcastlimiter, Fast Aging, Multicast GMRP IEEE 802.1D
Industrial Profiles	EtherNet/IP, PROFINET, configuration and diagnostic via automation software tools like e.g. STEP7, or Control Logix
Realtime	SNTP server, realtime clock with energy buffer
Flow control	Flow Control 802.3x, Port Priority 802.1D/p, Priority (TOS/DIFFSERV), Prio (MAC/IP), Prio Mapping (TOS Layer2), Traffic Shaping (Unicast, Multicast, Broadcast) Ingress / Egress
Ambient conditions	
Operating temperature	S = 0° to +60°C; U = -40° to +85°C; F = -40° to +85°C (conformal coating)
Storage/transport temperature	-40° to +85°C
Relative humidity (non-condensing)	10% to 95%
MTBF	
Mechanical construction	
Dimensions (W x H x D)	445 x 44 x 308
Mounting	19" cabinet
Weight	appr. 5 kg
Protection class	IP30
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 schocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13,2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	8 kV contact discharge, 15 kV air discharge
EN 61000-4-3 electromagnetic field	35 V/m (80 - 2700 MHz); 1kHz, 80% AM
EN 61000-4-4 fast transients (burst)	4 kV power line, 4 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line IEEE1613: power line 5kV (line/earth)
EN 61000-4-12 damped oscillatory wave	2,5 kV (line/earth), 1 kV (line/line) (1MHz)
EN 61000-4-16 mains frequency voltage	30V, 50Hz continous; 300V, 50Hz 1s
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (pending)
Hazardous locations	cUL 1604 Class1 Div 2 (pending)
Germanischer Lloyd	Germanischer Lloyd (in preparation)
Substation	IEC 61850-3; IEEE 1613
Transportation	
Scope of delivery and accessories	
Scope of delivery	device, operating manual
Accessories to order separately	Network management HiVision, auto-configuration adapter ACA21-USB

Type	MAR1020-99MM...UG9HPHH04.0.	MAR1030-CCTT...UG9HPHH04.0.
Order No.	MAR1020-99 MMMMMMMMMMMMMMMMMMMMM UG9HPHH04.0.	MAR1030-CC TTTTTTTTTTTTTTTTTTTTTTTTUG9HPHH04.0.
		
	ETHERNET/Fast ETHERNET/-switch according to IEEE 802.3, managed, industrial switch 19" cabinet mount, store-and-forward-switching, fanless design, software layer 2 professional	ETHERNET/Fast ETHERNET/Gigabit ETHERNET-Switch according to IEEE 802.3, managed, industrial switch 19" cabinet mount, store-and-forward-switching, fanless design, software layer 2 professional
Product description		
Port type and quantity	Fast-ETHERNET ports in total: 24; 24 x Multimode 100 Mbit SC;	Gigabit-ETHERNET ports in total:2; 2 x Combo ports (10/100/1000BASE-TX RJ 45 plus FE/GE-SFP-slot; Fast-ETHERNET ports in total: 24; 24 x Twisted Pair (Tx) 10/100 Mbit RJ 45;
Network size - length of cable		
Twisted pair (TP)		0 - 100 m
Multimode fiber (MM) 50/125 µm	Fast-ETHERNET ports: 0 - 5000 m, 8 dB Link Budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 800 MHz x km	Gigabit-ETHERNET ports: cf. SFP modules M-SFPxx
Multimode fiber (MM) 62.5/125 µm	Fast-ETHERNET ports: 0 - 4000 m, 11 dB Link Budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	Gigabit-ETHERNET ports: cf. SFP modules M-SFPxx
Single mode fiber (SM) 9/125 µm		Gigabit-ETHERNET ports: cf. SFP modules M-SFPxx
Single mode fiber (LH) 9/125 µm (long haul transceiver)		Gigabit-ETHERNET ports: cf. SFP modules M-SFPxx

Type	MAR1030-CCMM...UG9HPHH04.0.
Order No.	MAR1030-CC MMMMMMMMMMMMMMMMMMMMM UG9HPHH04.0.
	
	ETHERNET/Fast ETHERNET/Gigabit ETHERNET-Switch according to IEEE 802.3, managed, industrial switch 19" cabinet mount, store-and-forward-switching, fanless design, software layer 2 professional
Product description	
Port type and quantity	Gigabit-ETHERNET ports in total:2; 2 x Combo ports (10/100/1000BASE-TX RJ 45 plus FE/GE-SFP-slot; Fast-ETHERNET ports in total: 24; 24 x Multimode 100 Mbit SC;
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	Gigabit-ETHERNET ports: cf. SFP modules M-SFPxx; Fast-ETHERNET ports: 0 - 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	Gigabit-ETHERNET ports: cf. SFP modules M-SFPxx; Fast-ETHERNET ports: 0 - 4000 m, 11 dB Link Budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm	Gigabit-ETHERNET ports: cf. SFP modules M-SFPxx
Single mode fiber (LH) 9/125 µm (long haul transceiver)	Gigabit-ETHERNET ports: cf. SFP modules M-SFPxx

We do everything – except compromise.

The new MACH generation.

The new MACH 4002 Gigabit Switches and Routers provide a maximum transmission performance in the backbone area where many networks converge. This is not only demanded in factory and traffic automation but also increasingly on ships where the ETHERNET will be the standard in future. An extremely compact design of the switches is required in addition to flexibility, reliability and stability.

With its modular, cascadable system, the latest MACH generation in the industrial backbone area ensures a maximum performance: Up to 48 GB ports and 3x 10 GE ports speak for themselves – and for fast switching times in the Industrial ETHERNET. Packed in a compact chassis which offers a high port density and modularity within a small space and with extended functions for industry such as HIPER-Ring, redundant coupling or shock and vibration resistance (GL approval).

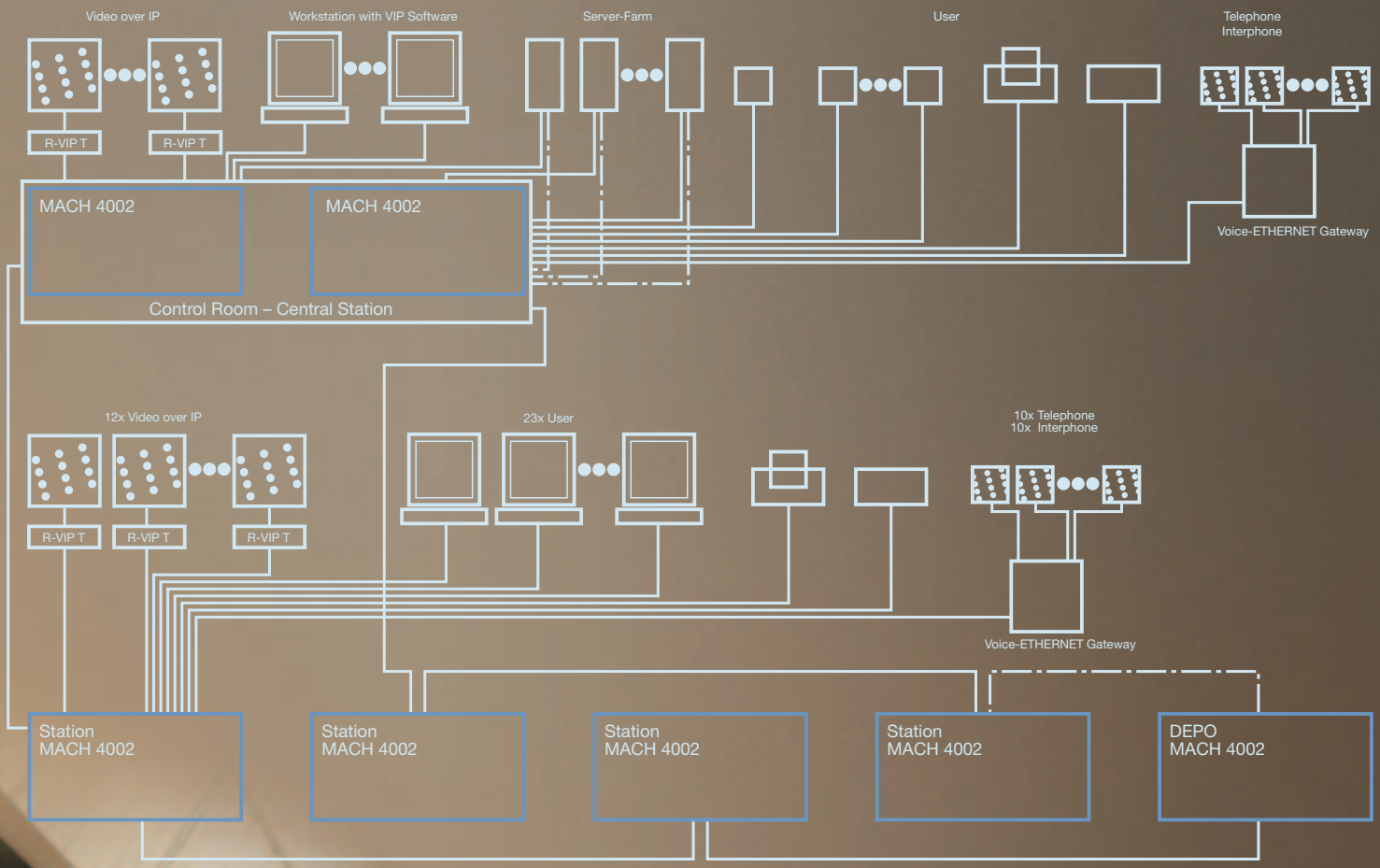
- ***High performance, modular industrial backbone switch and router.***
- ***Now also with 10 Gigabit ETHERNET.***
- ***Extended temperature range from 0° C to +50° C.***
- ***Extremely low height in the 19" housing.***
- ***GL marine approval.***
- ***Fast ring redundancy (HIPER-Ring).***

MACH4002 48G+3X

MACH4002 24G+3X

Accessories
for this family you can find on the following pages:

Transceiver Page 194
System Accessories Page 202



Hirschmann Competence Center

Also for **Gigabit Switches and Routers** the Hirschmann Competence Center offers suitable consulting services in the network planning: **Network optimization check, risk reduction consulting, network technology evaluation and network baselining consulting.** Plus the following trainings: CP3d Industrial Backbone components in theory and practice, IMd in overview, CPUd Update and CB2d Industrial ETHERNET II technology in detail. We also support you with certification testing, installation, configuration and pre-assembly as well as via our service hotline and later offer Advance Hardware Replacement and warranty extensions.

www.hicomcenter.com

MACH 4000 > Chassis

Type	MACH4002 24G-L2P
Order No.	943 916-101
	
	MACH 4000, modular, managed Industrial Backbone-Switch, Layer 2 Switch with Software Professional.
Product description	
Port type and quantity	up to 24 Gigabit-ETHERNET ports, thereof up to 16 Gigabit-ETHERNET ports via media modules practicable, 8 Gigabit combo ports SFP(100/1000MBit/s) or TP (10/100/1000Mbit/s) are integral installed
More Interfaces	
Power supply/signaling contact	1 plug-in terminal block, 4-pin, 2x egresses manual or automatic switchable (1A at 240 V DC)
V.24 interface	1 x RJ11 socket, serial interface to the configuration of devices
USB interface	1USB interface to connect auto-configuration adapter (ACA21-USB)
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	ring recovery time < 50 ms typ. at LWL
Power requirements	
Operating voltage	power supply unit M4-S-xx or M4-Power Chassis with power supply unit please order separately
Power consumption	70 W (without media modules)
Service	
Management	serial interface, web interface, SNMP V1/V2/V3, HiVision, file transfer SW HTTP/TFTP
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full-duplex, error, redundancy management, ring-port, LED-test), signal contact, syslog, logfile, RMON, port mirroring, Topology Discovery IEEE 802.1AB (LLDP)
Configuration	command line interface (CLI), TELNET, BootP, DHCP, DHCP Option 82, HiDiscovery, auto-configuration adapter (ACA21-USB)
Security	port-security (MAC- and IP-adresses), access control to agent (VLAN/IP) authentication 802.1x, SSH, SSL, SNMP V3
Other services	QoS 8 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), broadcastlimiter, flow control IEEE 802.3x, SNTP (Simple Network Time Protocol), TOS (Type of Service) Diff.-Serv (DSCP), TOS-Prio-Mapping, protocol based VLANs (IP, nonIP Traffic), Traffic Shaping
Prepared for	MSTP-802.1s
Routing	
Dynamic routing	
Multicast routing	
Redundancy	
Redundancy functions	HIPER-Ring (ring structure), RSTP IEEE 802.1D/w (rapid spanning tree protocol), redundant network/ring coupling (master/slave functionality), redundant 24 V power supply by M4-Power basic device, redundant signal contact, link aggregation dynamic and static (max. 7 trunks, 8 ports/trunk, LACP)
Ambient conditions	
Operating temperature	0 °C to +60 °C
Storage/transport temperature	-25 °C to +70 °C
Relative humidity (non-condensing)	10% to 95%
MTBF	
Mechanical construction	
Dimensions (W x H x D)	480 mm x 88 mm x 435 mm
Mounting	19” control cabinet
Weight	7.5 kg
Protection class	IP 20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7 g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1 g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (E175531) pending
Germanischer Lloyd	pending
Safety of information technology equipment	cUL 60950 (E168643) pending
Railway norm	EN 50121-4:2000, electromagnetic compatibility along the route (> 10m)
Scope of delivery and accessories	
Scope of delivery	device, terminal block, operating manual, fan M4-AIR installed
Accessories to order separately	SFP transceiver (100/1000MBit/s), Power supply unit, auto-configuration adapter (ACA21-USB), network management with Industrial HiVision

Type	MACH4002 24G-L3E	MACH4002 24G-L3P
Order No.	943 916-201	943 916-301
		
	MACH 4000, modular, managed Industrial Bakkbone-Router, Layer 3 Switch with Software Enhanced.	MACH 4000, modular, managed Industrial Bakkbone-Router, Layer 3 Switch with Software Professional.
Service		
Routing	static routing, VRRP router redundancy; layer 3 - ACL, HiVRRP router redundancy < 500 ms	static routing, VRRP router redundancy; layer 3 - ACL, HiVRRP router redundancy < 500 ms
Dynamic routing	RIP V1/2	RIP V1/2, OSPF
Multicast routing		Multicast routing DVMRP/PIM DM

Industrial ETHERNET

MACH 4000 > Chassis

Type	MACH4002-24G+3X-L2P
Order No.	943 915-101
	
	MACH 4000, modular, managed Industrial Backbone-Switch, Layer 2 Switch with Software Professional.
Product description	
Port type and quantity	up to 24 Gigabit-ETHERNET and 3x 10Gigabit-ETHERNET ports, thereof up to 16 Gigabit-ETHERNET ports via media modules practicable, 3x 10Gigabit XFP sockets and 8 Gigabit TP (10/100/1000Mbit/s) ports are integral installed
More Interfaces	
Power supply/signaling contact	1 plug-in terminal block, 4-pin, 2x egresses manual or automatic switchable (1A at 240 V DC)
V.24 interface	1 x RJ11 socket, serial interface to the configuration of devices
USB interface	1USB interface to connect auto-configuration adapter (ACA21-USB)
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	ring recovery time < 50 ms typ. at LWL
Power requirements	
Operating voltage	power supply unit M4-S-xx or M4-Power Chassis with power supply unit please order separately
Power consumption	70 W (without media modules)
Service	
Management	serial interface, web interface, SNMP V1/V2/V3, HiVision, file transfer SW HTTP/TFTP
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full-duplex, error, redundancy management, ring-port, LED-test), signal contact, syslog, logfile, RMON, port mirroring, Topology Discovery IEEE 802.1AB (LLDP)
Configuration	command line interface (CLI), TELNET, BootP, DHCP, DHCP Option 82, HiDiscovery, auto-configuration adapter (ACA21-USB)
Security	port-security (MAC- and IP-adresses), access control to agent (VLAN/IP) authentication 802.1x, SSH, SSL, SNMP V3
Other services	QoS 8 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), broadcastlimiter, flow control IEEE 802.3x, SNTP (Simple Network Time Protocol), TOS (Type of Service) Diff.-Serv (DSCP), TOS-Prio-Mapping, protocol based VLANs (IP, nonIP Traffic), Traffic Shaping
Prepared for	MSTP-802.1s
Routing	
Dynamic routing	
Multicast routing	
Redundancy	
Redundancy functions	HIPER-Ring (ring structure), RSTP IEEE 802.1D/w (rapid spanning tree protocol), redundant network/ring coupling (master/slave functionality), redundant 24 V power supply by M4-Power basic device, redundant signal contact, link aggregation dynamic and static (max. 7 trunks, 8 ports/trunk, LACP)
Ambient conditions	
Operating temperature	0 °C to +60 °C
Storage/transport temperature	-25 °C to +70 °C
Relative humidity (non-condensing)	10% to 95%
MTBF	
Mechanical construction	
Dimensions (W x H x D)	480 mm x 88 mm x 435 mm
Mounting	19” control cabinet
Weight	7.5 kg
Protection class	IP 20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7 g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1 g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (E175531) pending
Germanischer Lloyd	pending
Safety of information technology equipment	cUL 60950 (E168643) pending
Railway norm	EN 50121-4:2000, electromagnetic compatibility along the route (> 10m)
Scope of delivery and accessories	
Scope of delivery	device, terminal block, operating manual, fan M4-AIR installed
Accessories to order separately	SFP transceiver (100/1000MBit/s), Power supply unit, auto-configuration adapter (ACA21-USB), network management with Industrial HiVision

Type	MACH4002-24G+3X-L3E	MACH4002-24G+3X-L3P
Order No.	943 915-201	943 915-301
		
	MACH 4000, modular, managed Industrial Bakkbone-Router, Layer 3 Switch with Software Enhanced.	MACH 4000, modular, managed Industrial Bakkbone-Router, Layer 3 Switch with Software Professional.
Service		
Routing	static routing, VRRP router redundancy; layer 3 - ACL, HiVRRP router redundancy < 500 ms	static routing, VRRP router redundancy; layer 3 - ACL, HiVRRP router redundancy < 500 ms
Dynamic routing	RIP V1/2	RIP V1/2, OSPF
Multicast routing		Multicast routing DVMRP/PIM DM

MACH 4000 > Chassis

Type	MACH4002-48G-L2P
Order No.	943 911-101
	
	MACH 4000, modular, managed Industrial Backbone-Switch, Layer 2 Switch with Software Professional.
Product description	
Port type and quantity	up to 48 Gigabit-ETHERNET ports, thereof up to 32 Gigabit-ETHERNET ports via media modules practicable, 16 Gigabit TP (10/100/1000Mbit/s) therof 8 as combo SFP(100/1000MBit/s)/TP ports are integral installed
More Interfaces	
Power supply/signaling contact	1 plug-in terminal block, 4-pin, 2x egresses manual or automatic switchable (1A at 240 V DC)
V.24 interface	1 x RJ11 socket, serial interface to the configuration of devices
USB interface	1USB interface to connect auto-configuration adapter (ACA21-USB)
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	ring recovery time < 50 ms typ. at LWL
Power requirements	
Operating voltage	power supply unit M4-S-xx or M4-Power Chassis with power supply unit please order separately
Power consumption	70 W (without media modules)
Service	
Management	serial interface, web interface, SNMP V1/V2/V3, HiVision, file transfer SW HTTP/TFTP
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full-duplex, error, redundancy management, ring-port, LED-test), signal contact, syslog, logfile, RMON, port mirroring, Topology Discovery IEEE 802.1AB (LLDP)
Configuration	command line interface (CLI), TELNET, BootP, DHCP, DHCP Option 82, HiDiscovery, auto-configuration adapter (ACA21-USB)
Security	port-security (MAC- and IP-adresses), access control to agent (VLAN/IP) authentication 802.1x, SSH, SSL, SNMP V3
Other services	QoS 8 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), broadcastlimiter, flow control IEEE 802.3x, SNTP (Simple Network Time Protocol), TOS (Type of Service) Diff.-Serv (DSCP), TOS-Prio-Mapping, protocol based VLANs (IP, nonIP Traffic), Traffic Shaping
Prepared for	MSTP-802.1s
Routing	
Dynamic routing	
Multicast routing	
Redundancy	
Redundancy functions	HIPER-Ring (ring structure), RSTP IEEE 802.1D/w (rapid spanning tree protocol), redundant network/ring coupling (master/slave functionality), redundant 24 V power supply by M4-Power basic device, redundant signal contact, link aggregation dynamic and static (max. 7 trunks, 8 ports/trunk, LACP)
Ambient conditions	
Operating temperature	0 °C to +60 °C
Storage/transport temperature	-25 °C to +70 °C
Relative humidity (non-condensing)	10% to 95%
MTBF	
Mechanical construction	
Dimensions (W x H x D)	480 mm x 88 mm x 435 mm
Mounting	19” control cabinet
Weight	7.5 kg
Protection class	IP 20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7 g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1 g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (E175531) pending
Germanischer Lloyd	pending
Safety of information technology equipment	cUL 60950 (E168643) pending
Railway norm	EN 50121-4:2000, electromagnetic compatibility along the route (> 10m)
Scope of delivery and accessories	
Scope of delivery	device, terminal block, operating manual, fan M4-AIR installed
Accessories to order separately	SFP transceiver (100/1000MBit/s), Power supply unit, auto-configuration adapter (ACA21-USB), network management with Industrial HiVision

Type	MACH4002-48G-L3E	MACH4002-48G-L3P
Order No.	943 911-201	943 911-301
		
	MACH 4000, modular, managed Industrial Bakkbone-Router, Layer 3 Switch with Software Enhanced.	MACH 4000, modular, managed Industrial Bakkbone-Router, Layer 3 Switch with Software Professional.
Service		
Routing	static routing, VRRP router redundancy; layer 3 - ACL, HiVRRP router redundancy < 500 ms	static routing, VRRP router redundancy; layer 3 - ACL, HiVRRP router redundancy < 500 ms
Dynamic routing	RIP V1/2	RIP V1/2, OSPF
Multicast routing		Multicast routing DVMRP/PIM DM

MACH 4000 > Chassis

Type	MACH4002 48G+3X-L2P
Order No.	943 878-101
	
	MACH 4000, modular, managed Industrial Backbone-Switch, Layer 2 Switch with Software Professional.
Product description	
Port type and quantity	up to 48 Gigabit-ETHERNET and 3x 10Gigabit-ETHERNET ports, thereof up to 16 Gigabit-ETHERNET ports via media modules practicable, 3x 10Gigabit XFP sockets and 16 Gigabit TP (10/100/1000Mbit/s) ports are integral installed
More Interfaces	
Power supply/signaling contact	1 plug-in terminal block, 4-pin, 2x egresses manual or automatic switchable (1A at 240 V DC)
V.24 interface	1 x RJ11 socket, serial interface to the configuration of devices
USB interface	1USB interface to connect auto-configuration adapter (ACA21-USB)
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	ring-recovery time < 50 ms typ. at LWL
Power requirements	
Operating voltage	power supply unit M4-S-xx or M4-Power Chassis with power supply unit please order separately
Power consumption	70 W (without media modules)
Service	
Management	serial interface, web interface, SNMP V1/V2/V3, HiVision, file transfer SW HTTP/TFTP
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full-duplex, error, redundancy management, ring-port, LED-test), signal contact, syslog, logfile, RMON, port mirroring, Topology Discovery IEEE 802.1AB (LLDP)
Configuration	command line interface (CLI), TELNET, BootP, DHCP, DHCP Option 82, HiDiscovery, auto-configuration adapter (ACA21-USB)
Security	port-security (MAC- and IP-adresses), access control to agent (VLAN/IP) authentication 802.1x, SSH, SSL, SNMP V3
Other services	QoS 8 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), broadcastlimiter, flow control IEEE 802.3x, SNTP (Simple Network Time Protocol), TOS (Type of Service) Diff.-Serv (DSCP), TOS-Prio-Mapping, protocol based VLANs (IP, nonIP Traffic), Traffic Shaping
Prepared for	MSTP-802.1s
Routing	
Dynamic routing	
Multicast routing	
Redundancy	
Redundancy functions	HIPER-Ring (ring structure), RSTP IEEE 802.1D/w (rapid spanning tree protocol), redundant network/ring coupling (master/slavefunctionality), redundant 24 V power supply by M4-Power basic device, redundant signal contact, link aggregation dynamic and static (max. 7 trunks, 8 ports/trunk, LACP)
Ambient conditions	
Operating temperature	0 °C to +60 °C
Storage/transport temperature	-25 °C to +70 °C
Relative humidity (non-condensing)	10% to 95%
MTBF	
Mechanical construction	
Dimensions (W x H x D)	480 mm x 88 mm x 435 mm
Mounting	19” control cabinet
Weight	7.5 kg
Protection class	IP 20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7 g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1 g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (E175531) pending
Germanischer Lloyd	pending
Safety of information technology equipment	cUL 60950 (E168643) pending
Railway norm	EN 50121-4:2000, electromagnetic compatibility along the route (> 10m)
Scope of delivery and accessories	
Scope of delivery	device, terminal block, operating manual, fan M4-AIR installed
Accessories to order separately	SFP transceiver (100/1000MBit/s), Power supply unit, auto-configuration adapter (ACA21-USB), network management with Industrial HiVision

Type	MACH4002 48G+3X-L3E	MACH4002 48G+3X-L3P
Order No.	943 878-201	943 878-301
		
	MACH 4000, modular, managed Industrial Bakkbone-Router, Layer 3 Switch with Software Enhanced.	MACH 4000, modularer, managed Industrial Backbone-Router, Layer 3 Switch mit Software Professional .
Service		
Routing	static routing, VRRP router redundancy; layer 3 - ACL, HiVRRP router redundancy < 500 ms	static routing, VRRP router redundancy; layer 3 - ACL, HiVRRP router redundancy < 500 ms
Dynamic routing	RIP V1/2	RIP V1/2, OSPF
Multicast routing		Multicast routing DVMRP/PIM DM

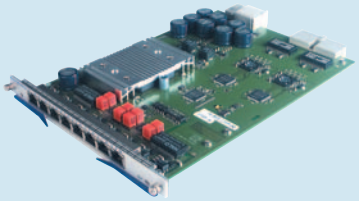
Type	MACH4002 48+4G-L3E
Order No.	943 859-201
	
	MACH 4000, modular, managed Industrial Bakkbone-Router, Layer 3 Switch with Software Enhanced.
Service	
Routing	static routing, VRRP router redundancy; layer 3 - ACL, HiVRRP router redundancy < 500 ms
Dynamic routing	RIP V1/2

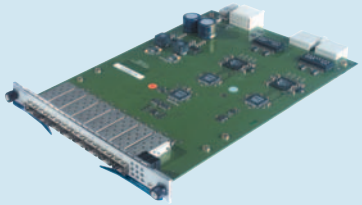
MACH 4000 > Chassis

Type	MACH4002 48+4G-L2P
Order No.	943 859-101
	
	MACH 4000, modular, managed Industrial Backbone-Switch, Layer 2 Switch with Software Professional.
Product description	
Port type and quantity	up to 48 Fast-ETHERNET and 4 Gigabit-ETHERNET ports, thereof up to 32 Fast-ETHERNET ports via media modules practicable, 4 Gigabit Combo ports and 16 x 10/100Mbit/s Fast-ETHERNET ports are integral installed
More Interfaces	
Power supply/signaling contact	1 plug-in terminal block, 4-pin, 2x egresses manual or automatic switchable (1A at 240 V DC)
V.24 interface	1 x RJ11 socket, serial interface to the configuration of devices
USB interface	1USB interface to connect auto-configuration adapter (ACA21-USB)
Network size - cascadibility	
Line - / star topology	any
Ring structure (HIPER-Ring)	ring recovery time < 50 ms typ. at LWL
Power requirements	
Operating voltage	power supply unit M4-S-xx or M4-Power Chassis with power supply unit please order separately
Power consumption	70 W (without media modules)
Service	
Management	serial interface, web interface, SNMP V1/V2/V3, HiVision, file transfer SW HTTP/TFTP
Diagnostics	LEDs (power, link status, data, 100 Mbit/s, auto-negotiation, full-duplex, error, redundancy management, ring-port, LED-test), signal contact, syslog, logfile, RMON, port mirroring, Topology Discovery IEEE 802.1AB (LLDP)
Configuration	comand line interface (CLI), TELNET, BootP, DHCP, DHCP Option 82, HiDiscovery, auto-configuration adapter (ACA21-USB)
Security	port-security (MAC- and IP-adresses), access control to agent (VLAN/IP) authentication 802.1x, SSH, SSL, SNMP V3
Other services	QoS 8 classes, priorisation (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), broadcastlimiter, flow control IEEE 802.3x, SNTP (Simple Network Time Protocol), TOS (Type of Service) Diff.-Serv (DSCP), TOS-Prio-Mapping, protocol based VLANs (IP, nonIP Traffic), Traffic Shaping
Prepared for	MSTP-802.1s
Routing	
Dynamic routing	
Multicast routing	
Redundancy	
Redundancy functions	HIPER-Ring (ring structure), RSTP IEEE 802.1D/w (rapid spanning tree protocol), redundant network/ring coupling (master/slave functionality), redundant 24 V power supply by M4-Power basic device, redundant signal contact, link aggregation dynamic and static (max. 7 trunks, 8 ports/trunk, LACP)
Ambient conditions	
Operating temperature	0 °C to +60 °C
Storage/transport temperature	-25 °C to +70 °C
Relative humidity (non-condensing)	10% to 95%
MTBF	28.6 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction	
Dimensions (W x H x D)	480 mm x 88 mm x 435 mm
Mounting	19” control cabinet
Weight	7.5 kg
Protection class	IP 20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7 g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1 g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1 kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (E175531) pending
Germanischer Lloyd	pending
Safety of information technology equipment	cUL 60950 (E168643) pending
Railway norm	EN 50121-4:2000, electromagnetic compatibility along the route (> 10m)
Scope of delivery and accessories	
Scope of delivery	device, terminal block, operating manual, fan M4-AIR installed
Accessories to order separately	SFP transceiver (100/1000MBit/s), Power supply unit, auto-configuration adapter (ACA21-USB), network management with Industrial HiVision

Type	MACH4002 48+4G-L3P
Order No.	943 859-301
	
	MACH 4000, modular, managed Industrial Bakkbone-Router, Layer 3 Switch with Software Professional.
Service	
Routing	static routing, VRRP router redundancy; layer 3 - ACL, HiVRRP router redundancy < 500 ms
Dynamic routing	RIP V1/2, OSPF
Multicast routing	Multicast routing DVMRP/PIM DM

MACH 4000 > Media modules

Type	M4-8TP-RJ45	M4-FAST 8TP-RJ45-PoE
Order No.	943 863-001	943 873-001
		
	Media module for MACH 4000 10/100/1000 BASE-TX	Media module for MACH 4000 10/100 BASE-TX mit power supply for terminals for IEEE 802.3af (Power over ETHERNET PoE via data lines), max 100W per MACH 42002
Product description		
Port type and quantity	8 x 10/100/1000 Mbit/s RJ45 sockets für TP cable, auto-crossing, auto-negotiation, auto-polarity	8 x 10/100 BASE-TX RJ45 sockets für TP cable, auto-crossing, auto-negotiation, auto-polarity
Service		
Diagnostics	LEDs (power, link status, data, auto-negotiation, full duplex, ring port, LED test)	LEDs (power, link status, data, auto-negotiation, full duplex, ring port, LED test)
Technical data		
Operating voltage	power supply via the backplane of the MACH 4000 switches	power supply via the backplane of the MACH 4000 switches
Operating temperature	0°C to +60°C	0°C to +60°C
Power consumption	2 W	2 W + max 100 W ext. user

M4-FAST 8-SFP	M4-GIGA 8-SFP
943 864-001	943 879-001
	
Media module for MACH 4000 10/100 BASE-FX with SFP sockets	Media module for MACH 4000 1000BASE-X with SFP sockets (nicht MACH4002-48+4G)
8 x 100 BASE-FX, with M-FAST SFP transceiver	8 x 100/1000 BASE-X using M-FAST SFP (100MBit/s) or M-SFP (1000MBit/s) transceiver
LEDs (power, link status, data, full duplex, ring port, LED test)	LEDs (power, link status, data, full duplex, ring port, LED test)
power supply via the backplane of the MACH 4000 switches 0°C to +60°C 15 W	power supply via the backplane of the MACH 4000 switches 0°C to +60°C 15 W

MACH 4000 > XFP 10Gigabit-ETHERNET Transceiver for media module

Type	M-XFP LR/LC
Order No.	943 919-001
	 XFP Fiberoptic 10Gigabit-ETHERNET Transceiver
Product description	
Port type and quantity	1 x 10GBASE with LC Connector
Network size - length of cable	
Multimode fiber (MM) 50/125 µm Single mode fiber (SM) 9/125 µm	2m - 10 km
Service	
Diagnostics	optical input- and output power, transceiver temperature
Technical data	
Operating voltage	power supply via media module
Operating temperature	0°C to +60°C
Power consumption	3 W

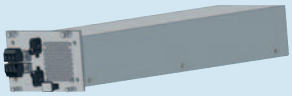
XFP 10Gigabit-ETHERNET Transceiver for media module > Versions

Type	M-XFP ER/LC	M-XFP SR/LC
Order No.	943 920-001	943 917-001
		
	XFP Fiberoptic 10Gigabit-ETHERNET Transceiver	XFP Fiberoptic 10Gigabit-ETHERNET Transceiver
Network size - length of cable		
Multimode fiber (MM) 50/125 µm		33m or 300m (with modal bandwidth 2000[MHz x km] fibre)
Single mode fiber (SM) 9/125 µm	10 - 40 km	

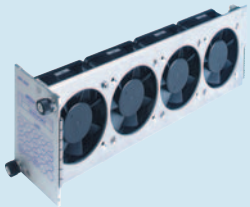
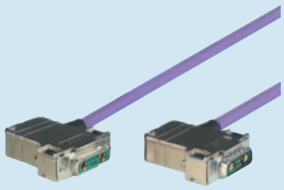
Type	M-XFP ZR/LC
Order No.	943 921-001
	
	XFP Fiberoptic 10Gigabit-ETHERNET Transceiver
Network size - length of cable	
Single mode fiber (SM) 9/125 µm	40 - 80 km

MACH 4000 > Accessories

Type	M4-S-AC/DC 300W	M4-S-24VDC 300W
Order No.	943 870-001	943 871-001
		
	Power supply for MACH 4002 switch chassis	Power supply for MACH 4002 chassis with two inputs for redundant power supply
Service		
Diagnostics	LEDs (P1) at basic device	LEDs (P1 und P2) at basic device
Mechanical construction		
Dimensions (W x H x D)		
Current consumption		
Activation current	typ. < 40 A at 265 V AC and cold start	
Technical data		
Operating voltage	100-240 V AC	24 V DC (19,2 V - 32 V)
Operating temperature	0°C to +60°C	0°C to +60°C
Input fequency	47-63 Hz	
Nominal power of voltage supply	350 W (230 V), 370 W (110 V)	380 W
Characteristics		
Power requirements		
Current consumption	1,8 A (230 V), 4,2 A (115V)	max. 21 A (24 V DC)
More Interfaces		
Voltage input	Non-heating appliance socket	plug-in terminal block
Scope of delivery and accessories		
Scope of delivery	device, manual	device, manual

Type	M4-P-48VDC 300 W	M4-POWER
Order No.	943 877-001	943 874-001
		
	Power supply for M4-Power chassis with two inputs for redundant power supply	M4-Power chassis for up to three power wup-plies M4-P-xx for power supply redundancy
Service		
Diagnostics	LEDs (P3 und P4) at basic device	
Mechanical construction		
Dimensions (W x H x D)		480 mm x 88 mm x 435 mm
Current consumption		
Activation current		
Technical data		
Operating voltage	48 V DC (38 V - 72 V)	
Operating temperature	0°C to +60°C	
Input fequency		
Nominal power of voltage supply	350 W	
Characteristics		see power supplies M4-P-AC/DC 300W, M4-P-24VDC 300 W, M4-P-48VDC 300W
Power requirements		
Current consumption	max. 10,1 A (48 V DC)	
More Interfaces		
Voltage input	plug-in terminal block	
Scope of delivery and accessories		
Scope of delivery	device, power-cable 1m (M4-POWER to Switch)	device, manual

M4-S-48VDC 300W	M4-P-AC/DC 300 W	M4-P-24VDC 300 W
943 872-001	943 875-001	943 876-001
		
Power supply for MACH 4002 chassis with two inputs for redundant power supply	Power supply for M4-Power chassis	Power supply for M4-Power chassis with two inputs for redundant power supply
LEDs (P1 und P2) at basic device	LEDs (P3) at basic device	LEDs (P3 und P4) at basic device
	typ. < 40 A at 265 V AC and cold start	
48 V DC (38,4 V - 60 V) 0°C to +60°C 350 W	100-240 V AC 0°C to +60°C 47-63 Hz 350 W (230 V), 370 W (110 V)	24 V DC (19,2 V - 32 V) 0°C to +60°C 380 W
max. 10,1 A (48 V DC)	max. 1,8 A (230 V), 4,2 A (110V)	max. 21 A (24 V DC)
plug-in terminal block	Non-heating appliance socket	plug-in terminal block
device, manual	device, power-cable 1m (M4-POWER to Switch)	device, power-cable 1m (M4-POWER to Switch)

M4-AIR	M4-POWERCABLE
943 869-001	943 922-001
	
Fan module for MACH 4002 chassis, four redundant fans	Spare power cable for use between M4-POWER chassis and MACH 4002 basic device, length 1m
LEDs (FAN) at basic device	
0°C to +60°C	
device	

Our contribution to reducing working time.

Working faster with the LION Workgroup Switches means getting home earlier.

Price-conscious automation in environments closely tied to the office setup place enormous demands on hardware. Because large amounts of data have to be processed quickly, safely and flexibly – after all, data has a short expiry period. A workgroup switch must therefore meet the requirements of the office environment and above all have one thing in particular: maximum performance. The Hirschmann LION Workgroup Switches show particular value especially where work teams with variable numbers of participants have to be networked together, or where a high-performance backbone connection is required.

Workgroup switches by Hirschmann distinguish themselves through versatile uplink modules and flexible extension possibilities. This product family makes its mark through state-of-the-art performance: the current LION Workgroup Switches, LION, SmartLION, GigaLION and PowerLION offer throughput, data prioritization and management features, the latest technology and are an ideal supplement to the industrial network infrastructure on ETHERNET basis. The LIONs are also convincing where it hurts most: in the price.

LION-24 TP

GigaLION-24 TP

Accessories
for this family you can find on the following pages:

Transceiver Page 194
System Accessories Page 202

- ***Control Room Switches.***
- ***24 Fast-ETHERNET ports, flexible equipping by 8-port modules RJ-45/optical as well as 2 Gigabit ports via uplink modules (only SmartLION).***
- ***24 Gigabit-ETHERNET ports 10/100/1000BASE-T (RJ-45) of which 4 Gigabit ETHERNET combo-ports (only power and GigaLION) 10 GE uplink modules (only PowerLION).***
- ***Redundancy: Link aggregation, RSTP, MSTP (only Power and GigaLION), VRRP (only PowerLION).***
- ***Routing: static and dynamic by means of RIP and OSPF, ACL, Multicast Routing (only PowerLION).***
- ***Diagnosis: Web-based management, LEDs.***
- ***Configuration: Command Line Interface (CLI), TELNET, DHCP Client.***
- ***Security and other services: Security 802.1x Port, Authentication, IGMP Snooping and Querier, Broadcast Limiter, QoS and port-based VLANs.***

Hirschmann Competence Center

Also in the **Control Room** the Hirschmann Competence Center ensures appropriate service and support for your industrial network. With **consulting offers** such as **network optimization check, network technology evaluation** or **network baselining consulting** and **trainings** such as **PEd-Control Room Switches** and XXd **PowerLION.** In addition, we support you with the installation and configuration, via our service hotline and later with Advance Hardware Replacement and warranty extensions.

www.hicomcenter.com

LION Control Room Switch > Chassis

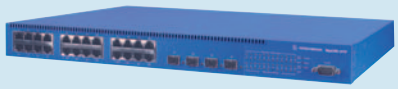
Type	LION-24 TP
Order No.	943 118-005
	
	Fast Ethernet managed switch, store-and-forward forwarding scheme
Product description	
Port type and quantity	24 x 10/100BASE-T ports (RJ-45 connectors) and another 2 expansion slots for Gigabit or 100BASE-FX fiber interface, Layer2
More Interfaces	
V.24 interface	outband management connection via V.24
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	see media modules and transceivers
Multimode fiber (MM) 62.5/125 µm	see media modules and transceivers
Single mode fiber (SM) 9/125 µm	see media modules and transceivers
Network size - cascadibility	
Line - / star topology	any
Power requirements	
Operating voltage	min. 100 V, max. 240 V, input frequency: 47 to 63 Hz
Current consumption	max. 80 W
Service	
Management	SNMP v1 and SNMP v2c management functions; RMON (groups 1,2,3 and 9); web-based management; TELNET console interface BOOTP and DHCP for IP address assignment; firmware upgraded by TFTP file transfer protocol through the Ethernet network dual firmware images; configuration file upload/download by TFTP protocol; two or more Configuration files SNMP access IP filtering configuration MAC based port security
VLAN	IEEE 802.1Q tagging VLAN, port-based VLAN; up to 255 active VLANs GVRP protocol for automatic VLAN registration and dynamic VLAN management; private VLAN
Security	RADIUS (Authentication); TACACS+; SSL; SSH (v1.5); Access Control IEEE 802.1x port based security
Quality of Service	L2/L3/L4Traffic Classification/Priority Management; CoS by IEEE 802.1p 4 priority queues control; Traffic Classification/Priority Management ; WRR for priority queues; Strict scheduling for priority queue; Rate Limiting; Random Early Detection (RED)
Other services	Auto MDI/MDIX on all 10/100Base-TX ports; up to 8 kByte memory for MAC address entries; 4 Mbit for packet buffer size flow control mechanism: backpressure for half duplex; IEEE802.3x; for full duplex operation; HOL (Head of Line) blocking prevention port mirroring; load balance for both unicast and multicast traffics IGMP (v1/v2) snooping and query function; broadcast storm control
Layer 3	
Redundancy	
Redundancy functions	IEEE 802.1D Spanning Tree Protocol; IEEE 802.1w Rapid Spanning Tree; link aggregation; up to 8 ports in one trunk; up to 4 trunk groups 802.3ad (LACP); Cisco Ether-channel (static truck)
Ambient conditions	
Operating temperature	0 °C to +50 °C
Storage/transport temperature	-40 °C to +70 °C
Relative humidity (non-condensing)	10% to 90%
MTBF	8.1 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction	
Dimensions (W x H x D)	440 mm x 43 mm x 324 mm
Mounting	19” cabinet or table unit
Protection class	IP 20
Scope of delivery and accessories	
Scope of delivery	device, AC power cord, serial cable, mounting brackets
Accessories to order separately	10/100 uplink module LION-01FX-MM (943 118 105); 100BASE-FX 10/100 uplink module LION-01FX-SM (943 118 205),100BASE-FX Gigabit uplink module LION-GIGA-1SX (943 118 305); 1000BASE-SX Gigabit uplink module LION-GIGA-1LX (943 118 405); 1000BASE-LX Gigabit uplink module LION-GIGA-1T (943 118 505); 1000BASE-T Gigabit uplink module LION-GBIC (943 118 605); Transceiver GBIC SX (943 411 100); Transceiver GBIC LX (943 411 200)

LION Control Room Switch > Chassis

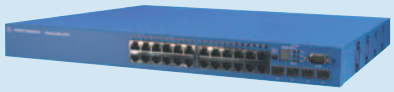
Type	SmartLION-TP/FX
Order No.	943 885-005
	
	Fast ETHERNET Switch with 4 intelligent slots, modular, store and forward business
Product description	
Port type and quantity	up to 24 x 10/100BASE-TX ports (RJ-45 connectors) or 24 x 100BASE-FX (SC connectors) or mixed configuration TX/FX via modules, and two additional GigabitEthernet ports via uplink module, Layer2
More Interfaces	
V.24 interface	outband management connection via V.24 (DB9 RS-232 console interface)
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	see media modules and transceivers
Multimode fiber (MM) 62.5/125 µm	see media modules and transceivers
Single mode fiber (SM) 9/125 µm	see media modules and transceivers
Network size - cascadibility	
Line - / star topology	any
Power requirements	
Operating voltage	min. 100 V, max. 240 V, input frequency: 50 /60 Hz, 0.8 A
Current consumption	max. 60 W
Service	
Management	SNMP v1 management functions, integration in HiVision RMON 1 web-based management TELNET console interface DHCP client function firmware upgraded by TFTP file transfer protocol through the Ethernet network
VLAN	IEEE 802.1Q tagging VLAN, port-based VLAN static VLAN groups up to 256 dynamic VLAN groups up to 2048 management VLAN ID from 0 to 4094
Security	IEEE 802.1x port based security RADIUS
Quality of Service	up to 8 priority levels ID for two priority queues
Other services	auto-negotiation on all 10/100BASE-TX ports 8K MAC address table with Auto learning function flow control mechanism: backpressure for half duplex; flow control for full duplex port mirroring IGMP (v1/v2) snooping and query function broadcast storm control stack grouping with up to 8 units
Layer 3	
Redundancy	
Redundancy functions	IEEE 802.1D Spanning Tree Protocol link aggregation: IEEE802.3ad with LACP function. up to 7 trunk groups, trunk member up to 4 ports and include 2 uplink ports
Ambient conditions	
Operating temperature	0 °C to +40 °C
Storage/transport temperature	-40 °C to +70 °C
Relative humidity (non-condensing)	10% to 95%
MTBF	11.1 years
Mechanical construction	
Dimensions (W x H x D)	440 mm x 44 mm x 280 mm
Mounting	19” cabinet or table unit
Protection class	IP 20
Scope of delivery and accessories	
Scope of delivery	device, AC power cord, serial cable, mounting brackets, manual on CD-ROM
Accessories to order separately	modules: SmartLion-XM-8TP (943 885 105), SmartLion-XM-8FX-MM (943 885 205), SmartLion-XM-8FX-SM (943 885 305), SmartLion-XM-2TP (943 885 405), SmartLion-XM-2SFP (943 885 505)

Industrial ETHERNET

LION Control Room Switch > Chassis

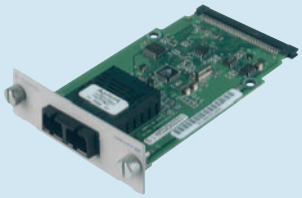
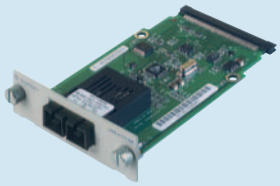
Type	GigaLION-24 TP
Order No.	943 860-001
	
	Gigabit ETHERNET managed switch, store-and-forward forwarding scheme
Product description	
Port type and quantity	24 x 10/100/1000BASE-T ports (RJ-45 connectors), 4 of which are Gigabit ETHERNET combo ports (RJ-45/SFP), Layer2
More Interfaces	
V.24 interface	outband management connection via V.24 (DB9 RS-232 console interface)
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	see media modules and transceivers
Multimode fiber (MM) 62.5/125 µm	see media modules and transceivers
Single mode fiber (SM) 9/125 µm	see media modules and transceivers
Network size - cascadibility	
Line - / star topology	any
Power requirements	
Operating voltage	min. 100 V, max. 240 V, input frequency: 47 to 63 Hz
Current consumption	max. 140 W
Service	
Management	SNMP v1 and SNMP v2 management functions RMON (groups 1,2,3 and 9) web-based management TELNET console interface BOOTP and DHCP for IP address assignment firmware upgraded by TFTP file transfer protocol through the Ethernet network dual firmware images configuration file upload/download by TFTP protocol two or more Configuration files sytem error log (syslog)
VLAN	IEEE 802.1Q tagging VLAN, port-based VLAN up to 255 active VLANs GVRP protocol for automatic VLAN registration and dynamic VLAN management private VLAN
Security	RADIUS (Authentication) TACACS+ SSL SSH (v1.5) Access Control IEEE 802.1x port based security
Quality of Service	L2/L3/L4Traffic Classification/Priority Management CoS by IEEE 802.1p 4 priority queues control Traffic Classification/Priority Management WRR for priority queues Strict scheduling for priority queue Rate Limiting Random Early Detection (RED)
Other services	auto-sensing, auto-negotiation on all 10/100/1000BASE-T ports up to 16 kByte memory for MAC address entries flow control mechanism: backpressure for half duplex; HOL (Head of Line) blocking prevention port mirroring load balance for both unicast and multicast traffics IGMP (v1/v2) snooping and query function broadcast storm control
Layer 3	
Redundancy	
Redundancy functions	IEEE 802.1D Spanning Tree Protocol IEEE 802.1w Rapid Spanning Tree IEEE 802.1s Multiple Spanning Tree link aggregation up to 8 ports in one trunk up to 4 trunk groups 802.3ad (LACP) Cisco Ether-channel (static truck)
Ambient conditions	
Operating temperature	0 °C to +40 °C
Storage/transport temperature	-40 °C to +70 °C
Relative humidity (non-condensing)	5% to 95%
MTBF	17.2 years
Mechanical construction	
Dimensions (W x H x D)	440 mm x 43 mm x 324 mm
Mounting	19” cabinet or table unit
Protection class	IP 20
Scope of delivery and accessories	
Scope of delivery	device, AC power cord, serial cable, mounting brackets, manual
Accessories to order separately	SFP transceivers: M-SFP-SX/LC (943 014-001), M-SFP-LX/LC (943 015-001), M-SFP-LH/LC (943 042-001) and M-SFP-LH+/LC (943 049-001)

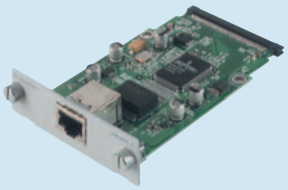
LION Control Room Switch > Chassis

Type	PowerLION-24 TP
Order No.	943 886-001
	
	Gigabit ETHERNET managed switch, store-and-forward forwarding scheme
Product description	
Port type and quantity	24 x 10/100/1000BASE-T ports (RJ-45 connectors), 4 of which are Gigabit ETHERNET combo ports (RJ-45/SFP), with one optional 10GE uplink module, Layer 3
More Interfaces	
V.24 interface	outband management connection via V.24 (DB9 RS-232 console interface)
Network size - length of cable	
Twisted pair (TP)	0 - 100 m
Multimode fiber (MM) 50/125 µm	see media modules and transceivers
Multimode fiber (MM) 62.5/125 µm	see media modules and transceivers
Single mode fiber (SM) 9/125 µm	see media modules and transceivers
Network size - cascadibility	
Line - / star topology	any
Power requirements	
Operating voltage	min. 100 V, max. 240 V, input frequency: 47 to 63 Hz
Current consumption	max. 140 W
Service	
Management	SNMP v1 and SNMP v2 management functions, integration in HiVision RMON (groups 1,2,3 and 9) web-based management TELNET console interface BOOTP and DHCP for IP address assignment firmware upgraded by TFTP file transfer protocol through the Ethernet network dual firmware images configuration file upload/download by TFTP protocol two or more Configuration files sytem error log (syslog)
VLAN	IEEE 802.1Q GVRP protocol for automatic VLAN registration and dynamic VLAN management
Security	RADIUS client TACACS+ client HTTPs/SSL Secure Shell (SSH, Secure Telnet) Access Control IEEE 802.1x port based security
Quality of Service	L2/L3/L4Traffic ClassIPv4 routing CoS by IEEE 802.1p 4 priority queues control WRR for priority queues Strict scheduling for priority queue Rate Limiting Random Early Detection (RED)
Other services	auto-sensing, auto-negotiation on all 10/100/1000BASE-T ports up to 16 kByte memory for MAC address entries flow control mechanism: backpressure for half duplex; full duplex mode port mirroring IGMP snooping broadcast storm control QoS: DiffServ, Traffic and Bandwidth Management, 8-level priority in switching stacking: stacks up to 10 units
Layer 3	IPv4 routing at wire speed Static IP routes RIP I and RIP II OSPF routing IP Multicast Routing: DVMRP, PIM-DM IP Redundancy - VRRP
Redundancy	
Redundancy functions	IEEE 802.1D Spanning Tree Protocol IEEE 802.1w Rapid Spanning Tree IEEE 802.1s Multiple Spanning Tree link aggregation: - up to 8 ports in one trunk - up to 4 trunk groups - 802.3ad (LACP) - Ether-channel (static truck)
Ambient conditions	
Operating temperature	0 °C to +40 °C
Storage/transport temperature	-40 °C to +70 °C
Relative humidity (non-condensing)	10% to 95%
MTBF	19.8 years
Mechanical construction	
Dimensions (W x H x D)	440 mm x 44 mm x 410 mm
Mounting	19” cabinet or table unit
Protection class	IP 20
Scope of delivery and accessories	
Scope of delivery	device, AC power cord, serial cable, mounting brackets, manual
Accessories to order separately	

Industrial ETHERNET

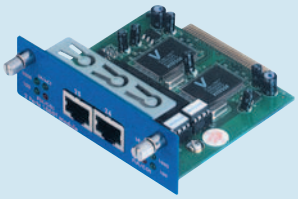
LION Control Room Switch > Module

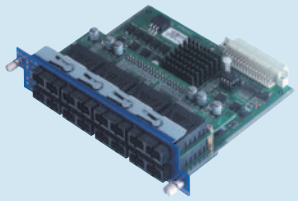
Type	LION-01FX-MM	LION-01FX-SM
Order No.	943 118-105	943 118-205
		
	Fast ETHERNET fiber uplink module for LION-24 TP, half duplex (HDX) and full duplex (FDX)	Fast ETHERNET fiber uplink module for LION-24 TP, half duplex (HDX) and full duplex (FDX)
Product description Port type and quantity	1 x 100BASE-FX, MM cable, SC socket	1 x 100BASE-FX, SM cable, SC socket
Network size - length of cable Twisted pair (TP) Multimode fiber (MM) 50/125 µm Multimode fiber (MM) 62.5/125 µm Single mode fiber (SM) 9/125 µm	 0 - 2000 m, 6 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 800 MHz x km 0 - 2000 m, 9 dB link budget at 1300 nm, A = 1 dB/km, 3 dB reserve, B = 500 MHz x km	 0 - 10 km, 11 dB Link Budget bei 1300 nm, A = 0,4 dB/km, 3 dB Reserve, D = 3,5 ps/(nm x km)
Power requirements Current consumption	max. 1.2 W	max. 1.4 W
Ambient conditions Operating temperature Storage/transport temperature Relative humidity (non-condensing) MTBF	 0 °C to +50 °C -40 °C to +70 °C 10% to 95% 229.3 years; MIL-HDBK 217F: Gb 25 °C	 0 °C to +50 °C -40 °C to +70 °C 10% to 95% 238.9 years; MIL-HDBK 217F: Gb 25 °C
Mechanical construction Dimensions (W x H x D) Mounting	 100 mm x 72 mm x 25 mm pug-in device	 100 mm x 72 mm x 25 mm pug-in device
Scope of delivery and accessories Scope of delivery	 module, quick installation guide	 module, quick installation guide

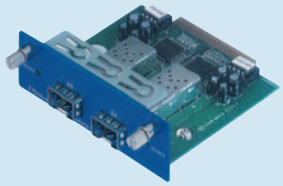
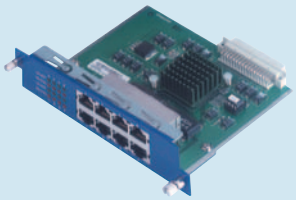
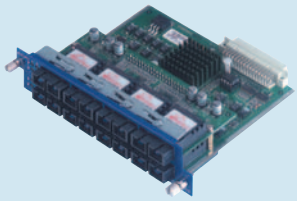
LION-GIGA-1SX	LION-GIGA-1LX	LION-GIGA-1T
943 118-305	943 118-405	943 118-505
		
Gigabit ETHERNET fiber uplink module for LION-24 TP, half duplex (HDX) and full duplex (FDX)	Gigabit ETHERNET fiber uplink module for LION-24 TP, half duplex (HDX) and full duplex (FDX)	Gigabit ETHERNET uplink module for LION-24 TP, half duplex (HDX) and full duplex (FDX)
1 x 1000BASE-SX, MM cable, SC socket	1 x 1000BASE-LX, SM cable, SC socket	1 x 10/100/1000BASE-T, TP cable, RJ-45 socket
2 - 550 m, 4 dB link budget at 850 nm, A = 3 dB/km, 2.5 dB reserve, B = 400 MHz x km 2 - 275 m, 3 dB link budget at 850 nm, A = 3.2 dB/km, 2 dB reserve, B = 200 MHz x km	2 - 5 km, 5 dB link budget at 1300 nm, A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)	0 - 100 m
max. 2.04 W	max. 2.2 W	max. 2.5 W
0 °C to +50 °C -40 °C to +70 °C 10% to 95% 747.1 years; MIL-HDBK 217F: Gb 25 °C	0 °C to +50 °C -40 °C to +70 °C 10% to 95% 450.1 years; MIL-HDBK 217F: Gb 25 °C	0 °C to +50 °C -40 °C to +70 °C 10% to 95% 190.4 years; MIL-HDBK 217F: Gb 25 °C
100 mm x 72 mm x 25 mm pug-in device	100 mm x 72 mm x 25 mm pug-in device	100 mm x 72 mm x 25 mm pug-in device
module, quick installation guide	module, quick installation guide	module, quick installation guide

Industrial ETHERNET

LION Control Room Switch > Module

Type	LION-GBIC	SmartLion-XM-2TP
Order No.	943 118-605	943 885-405
		
	Gigabit ETHERNET GBIC uplink module for LION-24 TP, half duplex (HDX) and full duplex (FDX)	Expansion uplink module with 2 ports TP, 10/100/1000BASE-T
Product description		
Port type and quantity	1 x 1000BASE-X, GBIC connector	2 x 10/100/1000BASE-T, RJ-45-connector
Network size - length of cable		
Twisted pair (TP)		0 - 100 m
Multimode fiber (MM) 50/125 µm		
Multimode fiber (MM) 62.5/125 µm	see GBIC-transceiver GBIC SX and GBIC LX	
Single mode fiber (SM) 9/125 µm	see GBIC-transceiver GBIC LX	
Power requirements		
Current consumption	max. 3.0 W	12 W
Ambient conditions		
Operating temperature	0 °C to +50 °C	0 °C to +50 °C
Storage/transport temperature	-40 °C to +70 °C	-20 °C to +70 °C
Relative humidity (non-condensing)	10% to 95%	10% to 95%
MTBF	316.1 years; MIL-HDBK 217F: Gb 25 °C	
Mechanical construction		
Dimensions (W x H x D)	100 mm x 72 mm x 25 mm	85 mm x 30 mm x 83 mm
Mounting	pug-in device	plug-in device
Scope of delivery and accessories		
Scope of delivery	module, quick installation guide	module, user guide

Type	SmartLion-XM-8FX-MM	PowerLION-XM-10G
Order No.	943 885-205	943 886-201
		
	Expansion module with 8 ports Fiber Optic multi mode 100BASE-FX	10 Gigabit ETHERNET uplink module for PowerLION
Product description		
Port type and quantity	8 x 100BASE-FX, SC connectors	1 X 10 GE, XENPAK Transceiver connector
Network size - length of cable		
Twisted pair (TP)		
Multimode fiber (MM) 50/125 µm	0 - 5000 m 8 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 800 MHz x m	
Multimode fiber (MM) 62.5/125 µm	0 - 4000 m 11 dB link budget at 1300 nm A = 1 dB/km, 3 dB reserve, B = 500 MHz x m	
Single mode fiber (SM) 9/125 µm		see 10 GE optical transceiver, XENPAK-10G-LR
Power requirements		
Current consumption	18 W	6 W
Ambient conditions		
Operating temperature	0 °C to +50 °C	0 °C to +40 °C
Storage/transport temperature	-20 °C to +70 °C	-40 °C to +70 °C
Relative humidity (non-condensing)	10 % to 95 %	10% to 95%
MTBF		
Mechanical construction		
Dimensions (W x H x D)	140 mm x 35 mm x 130 mm	180 mm x 40 mm x 200 mm
Mounting	plug-in device	plug-in device
Scope of delivery and accessories		
Scope of delivery	module, user guide	module

SmartLion-XM-2SFP	SmartLion-XM-8TP	SmartLion-XM-8FX-SM
943 885-505	943 885-105	943 885-305
		
Expansion uplink module with 2 empty slots for SFP tranceivers	Expansion module with 8 ports TP 10/100BASE-TX	Expansion module with 8 ports Fiber Optic single mode 100BASE-FX
option to use two standard SFP tranceivers	8 x 10/100BASE-TX, RJ-45 connector	8 x 100BASE-FX, SC connectors
cf. SFP optical modules M-SFP-SX/LC and M-SFP-LX/LC cf. SFP optical modules M-SFP-SX/LC and M-SFP-LX/LC cf. SFP optical module M-SFP-LX/LC	0-100m	0 - 32,5 km 16 dB link budget at 1300 nm A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)
4 W	12 W	18 W
0 °C to +50 °C -20 °C to +70 °C 10% to 95%	0 °C to +50 °C -20 °C to +70 °C 10 % to 95 %	0 °C to +50 °C -20 °C to +70 °C 10 % to 95 %
85 mm x 30 mm x 83 mm plug-in device	140 mm x 35 mm x 130 mm plug-in device	140 mm x 35 mm x 130 mm plug-in device
module, user guide	module, user guide	module, user guide

PowerLION-XM-C30	PowerLION-XM-C130	XENPAK-10G-LR
943 886-401	943 886-501	943 886-901
		
10 Gigabit ETHERNET stacking cable for PowerLION, 30cm	10 Gigabit ETHERNET stacking cable for PowerLION, 130cm	10 Gigabit ETHERNET optical transceiver for PowerLION
		1 X 10GBASE-LR, SC Duplex
		10 km
		6 W
0 °C to +40 °C -40 °C to +70 °C 10% to 95%	0 °C to +40 °C -40 °C to +70 °C 10% to 95%	0 °C to +70 °C -40 °C to +70 °C 10% to 95%
30cm	130cm	45 mm x 20 mm x 130 mm Transceiver for PowerLION-XM-10G uplink module
stacking cable, 30 cm	stacking cable, 130 cm	transceiver

Industrial ETHERNET

LION Control Room Switch > Fiberoptic Transceiver

Type	GBIC SX	GBIC LX
Order No.	943 411-100	943 411-200
		
	GBIC tranceiver for expansion module LION-GBIC 1000BASE-SX	GBIC tranceiver for expansion module LION-GBIC 1000BASE-LX
Product description Port type and quantity	 1 x 1000BASE-SX with duplex SC optical interface	 1 x 1000BASE-LX with duplex SC optical interface
Network size - length of cable Multimode fiber (MM) 50/125 µm Multimode fiber (MM) 62.5/125 µm Single mode fiber (SM) 9/125 µm	 500m 275m	 10km
Power requirements Operating voltage Power consumption	 via expansion module 5 W	 via expansion module 5 W
Ambient conditions Operating temperature Storage/transport temperature Relative humidity (non-condensing)	 0 °C to +50 °C -25 °C to +70 °C 10% to 95%	 0 °C to +50 °C -25 °C to +70 °C 10% to 95%
Mechanical construction Dimensions (W x H x D) Mounting Weight Protection class	 80 mm x 10 mm x 30 mm plug-in 40 g IP 20	 80 mm x 10 mm x 30 mm plug-in 40 g IP 20
EMC emitted immunity FCC CFR47 Part 15 EN 55022	 FCC CFR47 Part 15 Class A EN 55022 Class A	 FCC CFR47 Part 15 Class A EN 55022 Class A
Scope of delivery and accessories Scope of delivery Accessories to order separately	 transceiver	 transceiver expansion module, order number: 943 118-605

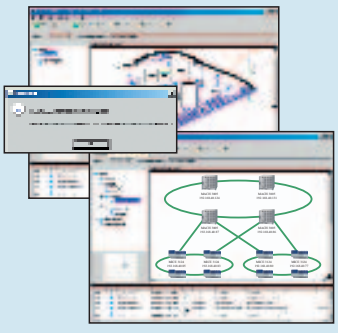
A continous stream of information.

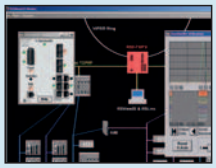
Network Management with HiVision: all at a glance, everything under control.

There are many reasons for a system failure in industrial networks: temperature fluctuations, cable breaks or interruptions in the power supply are just a few of the possible causes. The system breakdown costs time, money and nerves – wherever the functional capability of end devices and components of the infrastructure needs to be monitored quickly and reliably during operation. But the recipe for success in the future can be so simple: Industrial HiVision. Because, thanks to the intuitive user interface, this tells users the network status at a glance.

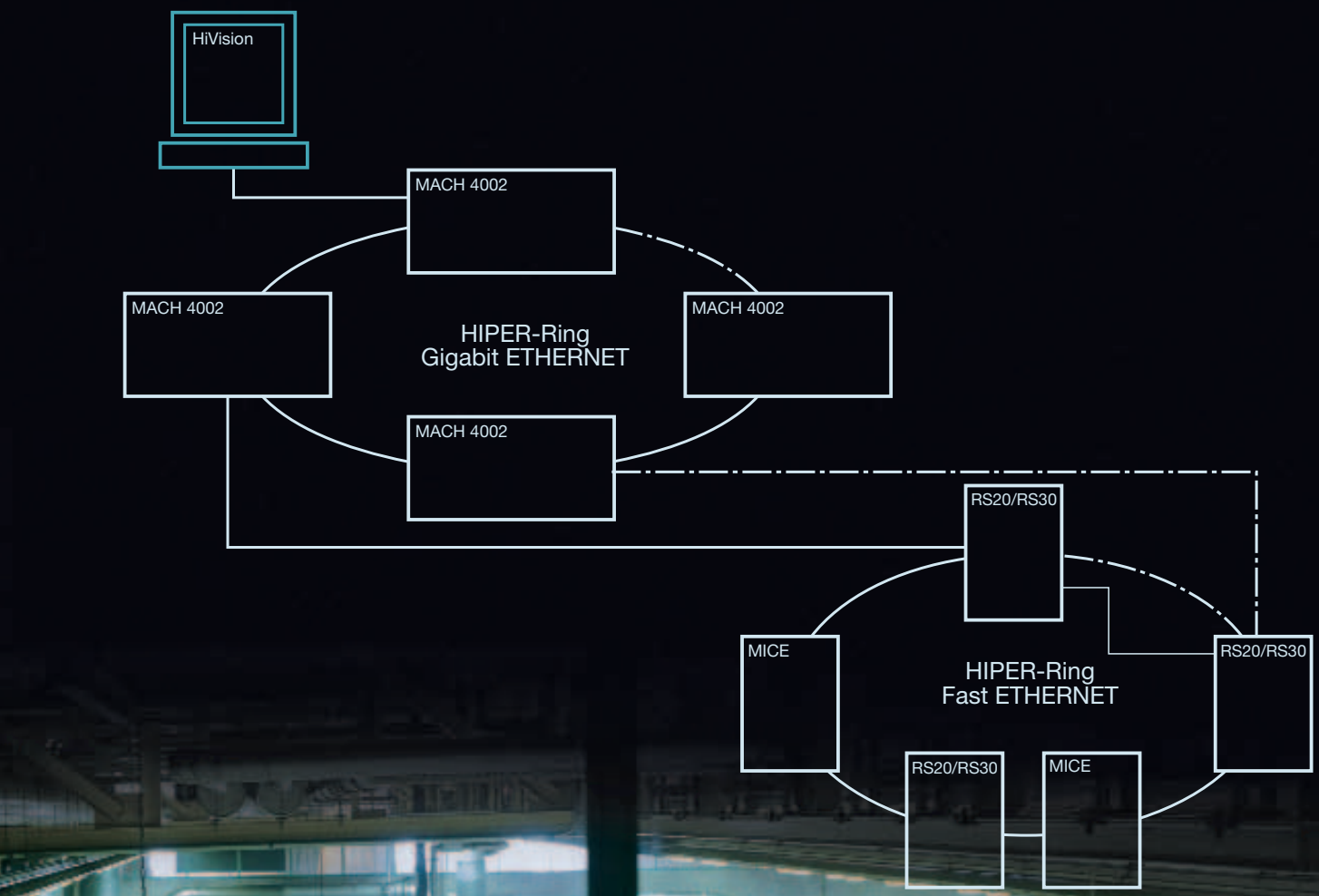
Industrial HiVision projects the network with its hierarchical structure and topology for devices of any manufacturers. This means that not only every source of error is discovered promptly – but the clever program also finds “bottlenecks”, optimizes networks or applications and reduces the costs. In addition, you can also easily integrate and provide all states in your network in SCADA systems with Industrial HiVision via the OPC server and the graphic image of your network via an ActiveX component.

- ***Operator Edition Network Management with 25/50/100/ 250/500 nodes (IP addresses) for Windows and Linux.***
- ***Monitoring of device status, link and connection status, power supply, fans etc.***
- ***Following components are supported: MACH, MICE, RS, LION, EAGLE, BAT, SNMP-capable switches and terminating equipment, ICMP (ping) capable devices.***
- ***OPC and ActiveX interface for linking to SCADA systems.***
- ***Alarm and event logging with definition of event actions, e. g. information window, e-mail, SMS and any program start.***
- ***Industrial HiVision can be used as a front end for device configuration with HiVision.***





Industrial HiVision



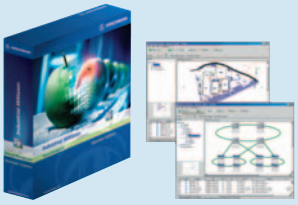
Hirschmann Competence Center

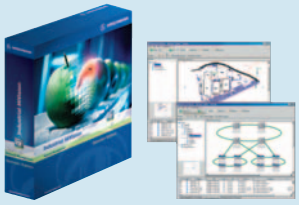
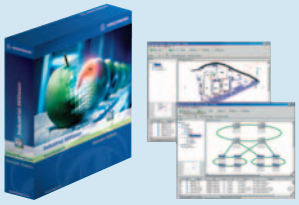
In the area of **Network Management** the Hirschmann Competence Center puts real professionals at your disposal. For example with **consulting services** in the **network planning** and the **network management consulting package** or with **trainings** such as **CP2d network management with HiVision, CPUd Update Rail Family** or **WSNMd practical knowledge network management.** In addition, we take over certification testing and support you with the installation and configuration as well as via our service hotline.

www.hicomcenter.com

Industrial ETHERNET

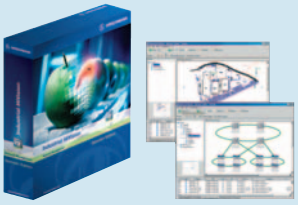
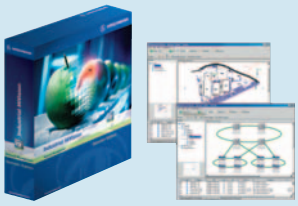
Network Management > Industrial HiVision

Type	Industrial HiVision - Operator Edition, 25 Nodes
Order No.	943 156-025
	 Network management for monitoring of industrial networks with up to 25 nodes (IP-addresses).
Product description	
License	license provides supervision of up to 25 nodes (IP-addresses)
Node extension	to increase the amount of supervised nodes, licenses can be combined. Additional licenses on request.
Diagnostics	
Topology recognition	Topology recognition is based on LLDP (Link Layer Discovery Protocol, IEEE802.1AB) provided by the switches, WLAN and end device discovery
Monitoring	map-representation, device state, link and connection state (cable break, utilization), powersupply and fan state, ..., ICMP (Ping) and SNMP availability MAC/IP address assignment
Modules and components	MACH, MICE, RS2, Foundry Networks FastIron Serie, EAGLE, RS20/30, MICE20/30, OCTOPUS 16/24, LION, GigaLION, BAT54 Rail, SNMP capable switches, any ICMP(Ping) capable device (PLC, decentral IO module, PCs, ...)
Event generation	polling and SNMPv1 trap support
Alarm and event actions	alarm and event logging, including alarm actions like message window, e-mail, SMS and program start
SCADA /Prozessvisualisation (from release 3.0)	
OPC Server	Map, device and connection states as well as device propertiescould be used inside SCADA systems via the OPC Data Access 2.0/3.0 interface
ActiveX Control	Map-representations could be reused inside SCADA systems via an ActiveX control
Protocols	
Supported protocols	HiDiscovery, ICMP (Ping), SNMPv1, SNMPv2c, SNMPv3, OPC DA 2.0/3.0
Configuration	
Configuration functions	configuration of IP parameters and trap target. HiVision provides port, device and VLAN manager functionality. The prefered config tool can be configured individually for any device or device family.
Dokumentation	
Dokumentation	documentation, export od maps and lists, inventory
Language Support	
Menus und dialogs	English, French, Spanish, Chinese, Japanese, Korean, German
Manual and helptexts	English, German
Software requirements	
Operating system	Windows 2000 / XP Linux (from kernel 2.2, glibc 2.0)
Browser	Internet Explorer 4.0 or higher, Java runtime environment 1.5.0 is also installed
Hardware requirements	
Processor	x86 compatible CPU, min. 1 GHz
RAM	512 MB, 1 GB (recommended)
Hard disk space	500 MB free
Network	ETHERNET network with TCP/IP protocol stack
Scope of delivery and accessories	
Scope of delivery	printed manual (German and English) CD-ROM with multilingual product version, manual and form for licensing additional software: Acrobat reader, HiVision
Product variants	
Version +N	full version - 25 nodes

Type	Industrial HiVision - Op. Ed., 50 Nodes	Industrial HiVision - Op. Ed., 100 Nodes
Order No.	943 156-050	943 156-100
		
	Network management for monitoring of industrial networks with up to 50 nodes (IP-addresses).	Network management for monitoring of industrial networks with up to 100 nodes (IP-addresses).
Product description		
License	license provides supervision of up to 50 nodes (IP-addresses)	license provides supervision of up to 100 nodes (IP-addresses)
Node extension	to increase the amount of supervised nodes, licenses can be combined. Additional licenses on request.	to increase the amount of supervised nodes, licenses can be combined. Additional licenses on request.
Diagnostics		
Topology recognition	Topology recognition is based on LLDP (Link Layer Discovery Protocol, IEEE802.1AB) provided by the switches, WLAN and end device discovery	Topology recognition is based on LLDP (Link Layer Discovery Protocol, IEEE802.1AB) provided by the switches,WLAN and end device discovery
Monitoring	map-representation, device state, link and connection state (cable break, utilization), power-supply and fan state, ..., ICMP (Ping) and SNMP availability MAC/IP adress assignment	map-representation, device state, link and connection state (cable break, utilization), power-supply and fan state, ..., ICMP (Ping) and SNMP availability MAC/IP adress assignment
Modules and components	MACH, MICE, RS2, Foundry Networks FastIron Serie, EAGLE, RS20/30, MICE20/30, OCTOPUS 16/24, LION, GigaLION, BAT54 Rail SNMP capable switches, any ICMP(Ping) capable device (PLC, decentral IO module, PCs, ...)	MACH, MICE, RS2, Foundry Networks FastIron Serie, EAGLE, RS20/30, MICE20/30, OCTOPUS 16/24, LION, GigaLION, BAT54 Rail, SNMP capable switches, any ICMP(Ping) capable device (PLC, decentral IO module, PCs, ...)
Configuration		
Configuration functions	configuration of IP parameters and trap target. HiVision provides port, device and VLAN manager functionality. The prefered config tool can be configured individually for any device or device family.	configuration of IP parameter and trap target. HiVision provides port, device and VLAN manager functionality. The prefered config tool can be configured individually for any device or device family.
Dokumentation		
Dokumentation	documentationn, export of maps and lists, inventory	documentation, export of maps and lists, inventory
Scope of delivery and accessories		
Scope of delivery	printed manual (German and English) CD-ROM with multilingual product version, manual and form for licensing additional software: Acrobat reader, HiVision	printed manual (German and English) CD-ROM with multilingual product version, manual and form for licensing, additional software: Acrobat reader, HiVision
Product variants		
Version +N	full version - 50 nodes	full version - 100 nodes

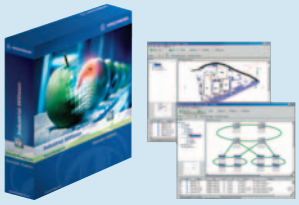
Industrial ETHERNET

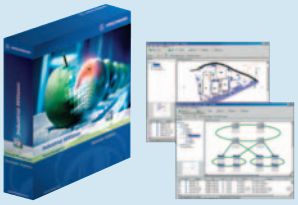
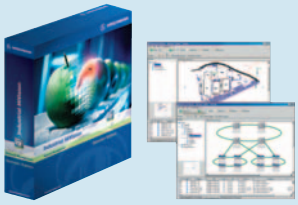
Industrial HiVision > Versions

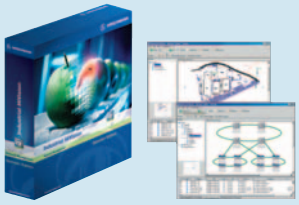
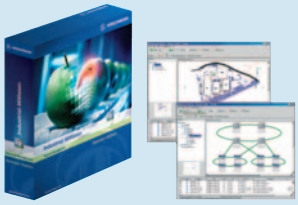
Type	Industrial HiVision - Op. Ed., 250 Nodes	Industrial HiVision - Op. Ed., 500 Nodes
Order No.	943 156-250	943 156 -500
		
	Network management for monitoring of industrial networks with up to 250 nodes (IP-addresses).	Network management for monitoring of industrial networks with up to 500 nodes (IP-addresses).
Product description		
License	license provides supervision of up to 250 nodes (IP-addresses)	license provides supervision of up to 500 nodes (IP-addresses)
Node extension	to increase the amount of supervised nodes, licenses can be combined. Additional licenses on request.	to increase the amount of supervised nodes, licenses can be combined. Additional licenses on request.
Diagnostics		
Topology recognition	Topology recognition is based on LLDP (Link Layer Discovery Protocol, IEEE802.1AB) provided by the switches WLAN and end device discovery	Topology recognition is based on LLDP (Link Layer Discovery Protocol, IEEE802.1AB) provided by the switches, WLAN and end device discovery
Monitoring	map-representation, device state, link and connection state (cable break, utilization), power-supply and fan state, ..., ICMP (Ping) and SNMP availability MAC/IP adress assignment	map-representation, device state, link and connection state (cable break, utilization), power-supply and fan state, ..., ICMP (Ping) and SNMP availability MAC/IP adress assignment
Modules and components	MACH, MICE, RS2, Foundry Networks FastIron Serie, EAGLE, RS20/30, MICE20/30, OCTOPUS 16/24, LION, GigaLION, BAT54 Rail SNMP capable switches, any ICMP(Ping) capable device (PLC, decentral IO module, PCs, ...)	MACH, MICE, RS2, Foundry Networks FastIron Serie, EAGLE, RS20/30, MICE20/30, OCTOPUS 16/24, LION, GigaLION, BAT54 Rail SNMP capable switches, any ICMP(Ping) capable device (PLC, decentral IO module, PCs, ...)
Configuration		
Configuration functions	configuration of IP parameters and trap target. HiVision provides port, device and VLAN manager functionality. The prefered config tool can be configured individually for any device or device family.	configuration of IP parameters and trap target. HiVision provides port, device and VLAN manager functionality. The prefered config tool can be configured individually for any device or device family.
Dokumentation		
Dokumentation	documentation, export of maps and lists	documentation, export of maps and lists, inventory
Scope of delivery and accessories		
Scope of delivery	printed manual (German and English) CD-ROM with multilingual product version, manual and form for licensing additional software: Acrobat reader, HiVision	printed manual (German and English) CD-ROM with multilingual product version, manual and form for licensing additional software: Acrobat reader, HiVision
Product variants		
Version +N	full version - 250 nodes	full version - 500 nodes

Industrial ETHERNET

Network Management > Industrial HiVision

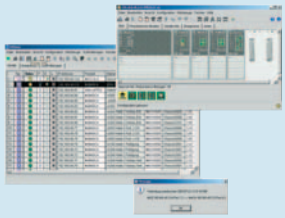
Type	Upgrade - Industrial HiVision - Operator Edition, 25 Nodes
Order No.	943 160-025
	 Network management for monitoring of industrial networks with up to 25 nodes (IP-addresses).
Product description	
License	license provides supervision of up to 25 nodes (IP-addresses). A full-license for 25 nodes is required for the upgrade.
Node extension	to increase the amount of supervised nodes, licenses can be combined. Additional licenses on request.
Diagnostics	
Topology recognition	Topology recognition is based on LLDP (Link Layer Discovery Protocol, IEEE802.1AB) provided by the switches, WLAN and end device discovery
Monitoring	map-representation, device state, link and connection state (cable break, utilization), powersupply and fan state, ..., ICMP (Ping) and SNMP availability MAC/IP adress assignment
Modules and components	MACH, MICE, RS2, Foundry Networks FastIron Serie, EAGLE, RS20/30, MICE20/30, OCTOPUS 16/24, LION, GigaLION, BAT54 Rail, SNMP capable switches, any ICMP(Ping) capable device (PLC, decentral IO module, PCs, ...)
Event generation	polling and SNMPv1 trap support
Alarm and event actions	alarm and event logging, including alarm actions like message window, e-mail, SMS and program start
SCADA /Prozessvisualisation (from release 3.0)	
OPC Server	Map, device and connection states as well as device propertiescould be used inside SCADA systems via the OPC Data Access 2.0/3.0 interface
ActiveX Control	Map-representations could be reused inside SCADA systems via an ActiveX control
Protocols	
Supported protocols	HiDiscovery, ICMP (Ping), SNMPv1, SNMPv2c, SNMPv3, OPC DA 2.0/3.0
Configuration	
Configuration functions	configuration of IP parameters and trap target. HiVision provides port, device and VLAN manager functionality. The prefered config tool can be configured individually for any device or device family.
Dokumentation	
Dokumentation	documentation, export of maps and lists, inventory
Language Support	
Menus und dialogs	English, French, Spanish, Chinese, Japanese, Korean, German
Manual and helptexts	English, German
Software requirements	
Operating system	Windows 2000 / XP Linux (from kernel 2.2, glibc 2.0)
Browser	Internet Explorer 4.0 or higher, Java runtime environment 1.5.0 is also installed
Hardware requirements	
Processor	x86 compatible CPU, min. 1 GHz
RAM	512 MB, 1 GB (recommended)
Hard disk space	500 MB free
Network	ETHERNET network with TCP/IP protocol stack
Scope of delivery and accessories	
Scope of delivery	printed manual (German and English) CD-ROM with multilingual product version, manual and form for licensing additional software: Acrobat reader, HiVision
Product variants	
Version +N	upgrade version - 25 nodes

Type	Upgrade - Industrial HiVision - Op. Ed., 50 Nodes	Upgrade - Industrial HiVision - Op. Ed. 100 Nodes
Order No.	943 160-050	943 160-100
	 Network management for monitoring of industrial networks with up to 50 nodes (IP-addresses).	 Network management for monitoring of industrial networks with up to 100 nodes (IP-addresses).
Product description		
License	license provides supervision of up to 50 nodes (IP-addresses). A full-license for 50 nodes is required for the upgrade.	license provides supervision of up to 100 nodes (IP-addresses). A full-license for 100 nodes is required for the upgrade.
Node extension	to increase the amount of supervised nodes, licenses can be combined. Additional licenses on request.	to increase the amount of supervised nodes, licenses can be combined. Additional licenses on request.
Diagnostics		
Monitoring	map-representation, device state, link and connection state (cable break, utilization), power-supply and fan state, ..., ICMP (Ping) and SNMP availability MAC/IP adress assignment	map-representation, device state, link and connection state (cable break, utilization), power-supply and fan state, ..., ICMP (Ping) and SNMP availability MAC/IP adress assignment
Configuration		
Configuration functions	configuration of IP parameters and trap target. HiVision provides port, device and VLAN manager functionality. The prefered config tool can be configured individually for any device or device family.	configuration of IP parameter and trap target. HiVision provides port, device and VLAN manager functionality. The prefered config tool can be configured individually for any device or device family.
Dokumentation		
Dokumentation	documentation, export of maps and lists, inventory	dokumentation, export of maps and lists, inventory
Scope of delivery and accessories		
Scope of delivery	printed manual (German and English) CD-ROM with multilingual product version, manual and form for licensing additional software: Acrobat reader, HiVision	printed manual (German and English) CD-ROM with multilingual product version, manual and form for licensing, additional software: Acrobat reader, HiVision
Product variants		
Version +N	upgrade version - 50 nodes	upgrade version - 100 nodes

Type	Upgrade - Industrial HiVision - Op. Ed., 250 Nodes	Upgrade - Industrial HiVision - Op. Ed., 500 Nodes
Order No.	943 160-250	943 160-500
	 Network management for monitoring of industrial networks with up to 250 nodes (IP-addresses).	 Network management for monitoring of industrial networks with up to 500 nodes (IP-addresses).
Product description		
License	license provides supervision of up to 250 nodes (IP-addresses). A full-license for 250 nodes is required for the upgrade.	license provides supervision of up to 500 nodes (IP-addresses). A full-license for 500 nodes is required for the upgrade.
Node extension	to increase the amount of supervised nodes, licenses can be combined. Additional licenses on request.	to increase the amount of supervised nodes, licenses can be combined. Additional licenses on request.
Diagnostics		
Monitoring	map-representation, device state, link and connection state (cable break, utilization), power-supply and fan state, ..., ICMP (Ping) and SNMP availability	map-representation, device state, link and connection state (cable break, utilization), power-supply and fan state, ..., ICMP (Ping) and SNMP availability MAC/IP adress assignment
Configuration		
Configuration functions	configuration of IP parameters and trap target. HiVision provides port, device and VLAN manager functionality. The prefered config tool can be configured individually for any device or device family.	configuration of IP parameters and trap target. HiVision provides port, device and VLAN manager functionality. The prefered config tool can be configured individually for any device or device family.
Dokumentation		
Dokumentation	documentation, export of maps and lists, inventory	documentation, export of maps and lists, inventory
Scope of delivery and accessories		
Scope of delivery	printed manual (German and English) CD-ROM with multilingual product version, manual and form for licensing additional software: Acrobat reader, HiVision	printed manual (German and English) CD-ROM with multilingual product version, manual and form for licensing additional software: Acrobat reader, HiVision
Product variants		
Version +N	upgrade version - 250 nodes	upgrade version - 500 nodes

Industrial ETHERNET

Network Management > HiVision

Type	HiVision PC Based Industrial Line
Order No.	943 471-350
	
	Network management software license
Configuration	
Configuration functions	- autodiscovery of all ICMP and SNMP devices. - save devices in a devicelist - export of all tables to ASCII files - import of product-specific modules. Users can build their own modules for unknown devices. additional support: Competence Center value added products - multi-device-configuration: multiple configuration of devices, e.g. software update - multi-port-manager: multiple configuration of ports from different devices. - configuration of all Hirschmann components including network wide VLANs and user groups. - trap history for whole network and single devices. - satus propagation seperately configurable for device, card, port, power supplies, fans & chassis. - configuration of RMON alarms and events - integrated SNMP MIB browser - easy configuration of MACH 3000 router redundancy
Diagnostics	
Diagnostic functions	- monitoring of ICMP- and SNMP devices - detailled view of devices health - alarm and event protocol including definition of event-actions like messagebox, eMail, SMS or start of any program - configurable status configuration - multi-port-analyzer for network wide port diagnostic and utilization control - assignment of MAC-Address to IP-Address, to seek MAC - integrated OPC Server HiControl in Windows Version, thereby easy integration in SCADA applications of device status and the reason for status change - long-run monitoring with SNMP monitor include log function
Modules and supported components	
Modules and components	PowerMICE, MICE 20/30, RS 20/30/40, MICE, RS2, OCTOPUS M, EAGLE, BAT
Software requirements	
Operating system	Windows 2000 / 2003 Server / XP / Vista, Linux (with kernel 2.2 or higher, libc6.1)
Stand-alone / integrated HP OpenView - version	Stand-alone Windows and Linux Windows - HP OpenView 7.5
Minimum requirement for Hirschmann agents	RS20/30 release 1.1.1, MICE20/30 release 1.1.1, PowerMICE release. 1.0, Rail Switch RS2-../.. release 5.1, MICE release 2.0 MICE release 2.0, Rail Gateway RG2-1TX release 3.6.5
Browser	Internet Explorer 4.0 or higher, Java runtime environment is also installed
Supported SCADA systems	all OPC AE 1.0 clients (Alarm and Event) and OPC DA 2.0 clients (Data Access), e.g. OperateIT (ABB), PVSSII (ETM), iFix (Intellution), RS View (Rockwell), WinCC (Siemens), InTouch (Wonderware)
Hardware requirements	
Processor	x86 compatible CPU, recommended > 500 MHZ
RAM	Linux and Windows stand-alone: at least 64 MB, 128 MB (recommended) Windows - HP OpenView: at least 28 MB, 256 MB (recommended) HiVision requires approximately 50 MB free RAM. A further 200 kB of RAM are required for each detected agent. The network management unit also requires RAM for the operating system and any additional applications such as OpenView.
Hard disk space	80 MB free
Recommended resolution	1024 x 768
Network	ETHERNET network with TCP/IP protocol stack
Scope of delivery and accessories	
Scope of delivery	printed manual (German and English) printed registration code for online licensing CD-ROM with multilingual product version online documentation, testversion industrial HiVision java runtime environment
Product variants	
Version +N	full version

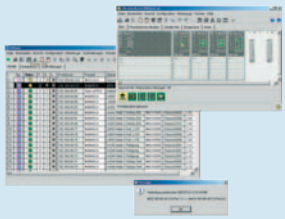
Industrial ETHERNET

Network Management > HiVision

Type	HiVision PC Based Industrial Line-Update
Order No.	943 471-355
	 Network management software license
Configuration	
Configuration functions	- autodiscovery of all ICMP and SNMP devices. - save devices in a devicelist - export of all tables to ASCII files - import of product-specific modules. Users can build their own modules for unknown devices. additional support: Competence Center value added products - multi-device-configuration: multiple configuration of devices, e.g. software update - multi-port-manager: multiple configuration of ports from different devices. - configuration of all Hirschmann components including network wide VLANs and user groups. - trap history for whole network and single devices. - satus propagation seperately configurable for device, card, port, power supplies, fans & chassis. - configuration of RMON alarms and events - integrated SNMP MIB browser - easy configuration of MACH 3000 router redundancy
Diagnostics	
Diagnostic functions	- monitoring of ICMP- and SNMP devices - detailled view of devices health - alarm and event protocol including definition of event-actions like messagebox, eMail, SMS or start of any program - configurable status configuration - multi-port-analyzer for network wide port diagnostic and utilization control - assignment of MAC-Address to IP-Address, to seek MAC - integrated OPC Server HiControl in Windows Version, thereby easy integration in SCADA applications of device status and the reason for status change - long-run monitoring with SNMP monitor include log function
Modules and supported components	
Modules and components	PowerMICE, MICE 20/30, RS 20/30/40, MICE, RS2, OCTOPUS M, EAGLE, BAT
Software requirements	
Operating system	Windows 2000 / 2003 Server / XP / Vista, Linux (with kernel 2.2 or higher, libc6.1)
Stand-alone / integrated HP OpenView - version	Stand-alone Windows and Linux Windows - HP OpenView 7.5
Minimum requirement for Hirschmann agents	RS20/30 release 1.1.1, MICE20/30 release 1.1.1, PowerMICE release. 1.0, Rail Switch RS2-../.. release 5.1, MICE release 2.0 MICE release 2.0, Rail Gateway RG2-1TX release 3.6.5
Browser	Internet Explorer 4.0 or higher, Java runtime environment is also installed
Supported SCADA systems	all OPC AE 1.0 clients (Alarm and Event) and OPC DA 2.0 clients (Data Access), e.g. OperateIT (ABB), PVSSII (ETM), iFix (Intellution), RS View (Rockwell), WinCC (Siemens), InTouch (Wonderware)
Hardware requirements	
Processor	x86 compatible CPU, recommended > 500 MHZ
RAM	Linux and Windows stand-alone: at least 64 MB, 128 MB (recommended) Windows - HP OpenView: at least 28 MB, 256 MB (recommended) HiVision requires approximately 50 MB free RAM. A further 200 kB of RAM are required for each detected agent. The network management unit also requires RAM for the operating system and any additional applications such as OpenView.
Hard disk space	80 MB free
Recommended resolution	1024 x 768
Network	ETHERNET network with TCP/IP protocol stack
Scope of delivery and accessories	
Scope of delivery	printed manual (German and English) printed registration code for online licensing CD-ROM with multilingual product version online documentation, testversion industrial HiVision, java runtime environment
Product variants	
Version +N	update

Industrial ETHERNET

Network Management > HiVision

Type	HiVision PC Based Enterprise
Order No.	943 471-300
	
	network management software license
Configuration	
Configuration functions	- autodiscovery of all ICMP and SNMP devices. - save devices in a devicelist - export of all tables to ASCII files - import of product-specific modules. Users can build their own modules for unknown devices. additional support: Competence Center value added products - multi-device-configuration: multiple configuration of devices, e.g. software update - multi-port-manager: multiple configuration of ports from different devices. - configuration of all Hirschmann components including network wide VLANs and user groups. - trap history for whole network and single devices. - satus propagation seperately configurable for device, card, port, power supplies, fans & chassis. - configuration of RMON alarms and events - integrated SNMP MIB browser - easy configuration of MACH 3000 router redundancy
Diagnostics	
Diagnostic functions	- monitoring of ICMP- and SNMP devices - detailled view of devices health - alarm and event protocol including definition of event-actions like messagebox, eMail, SMS or start of any program - configurable status configuration - multi-port-analyzer for network wide port diagnostic and utilization control - assignment of MAC-Address to IP-Address, to seek MAC - integrated OPC Server HiControl in Windows Version, thereby easy integration in SCADA applications of device status and the reason for status change - long-run monitoring with SNMP monitor include log function
Modules and supported components	
Modules and components	MACH 4000, MACH 3000, MACH 1000, LION, PowerLION, GigaLION, SmartLION, Foundry Networks FastIron series
Software requirements	
Operating system	Windows 2000 / 2003 Server / XP / Vista, Linux (with kernel 2.2 or higher, libc6.1)
Stand-alone / integrated HP OpenView - version	Stand-alone Windows and Linux Windows - HP OpenView 7.5
Minimum requirement for Hirschmann agents	MACH 4000 release 1.1.1, MACH 3000 release 3.02
Browser	Internet Explorer 4.0 or higher, Java runtime environment is also installed
Supported SCADA systems	all OPC AE 1.0 clients (Alarm and Event) and OPC DA 2.0 clients (Data Access), e.g. OperateIT (ABB), PVSSII (ETM), iFix (Intellution), RS View (Rockwell), WinCC (Siemens), InTouch (Wonderware)
Hardware requirements	
Processor	x86 compatible CPU, recommended > 500 MHZ
RAM	Linux and Windows stand-alone: at least 64 MB, 128 MB (recommended) Windows - HP OpenView: at least 128 MB, 256 MB (recommended) HiVision requires approximately 50 MB free RAM. A further 200 kB of RAM are required for each detected agent. The network management unit also requires RAM for the operating system and any additional applications such as OpenView.
Hard disk space	80 MB free
Recommended resolution	1024 x 768
Network	ETHERNET network with TCP/IP protocol stack
Scope of delivery and accessories	
Scope of delivery	printed manual (German and English) printed registration code for online licensing CD-ROM with multilingual product version online documentation, testversion industrial HiVision, java runtime environment
Product variants	
Version +N	full version

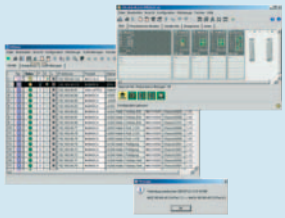
Industrial ETHERNET

Network Management > HiVision

Type	HiVision PC Based Enterprise-Update
Order No.	943 471-305
	
	Network management software license
Configuration	
Configuration functions	- autodiscovery of all ICMP and SNMP devices. - save devices in a devicelist - export of all tables to ASCII files - import of product-specific modules. Users can build their own modules for unknown devices. additional support: Competence Center value added products - multi-device-configuration: multiple configuration of devices, e.g. software update - multi-port-manager: multiple configuration of ports from different devices. - configuration of all Hirschmann components including network wide VLANs and user groups. - trap history for whole network and single devices. - satus propagation seperately configurable for device, card, port, power supplies, fans & chassis. - configuration of RMON alarms and events - integrated SNMP MIB browser - easy configuration of MACH 3000 router redundancy
Diagnostics	
Diagnostic functions	- monitoring of ICMP- and SNMP devices - detailled view of devices health - alarm and event protocol including definition of event-actions like messagebox, eMail, SMS or start of any program - configurable status configuration - multi-port-analyzer for network wide port diagnostic and utilization control - assignment of MAC-Address to IP-Address, to seek MAC - integrated OPC Server HiControl in Windows Version, thereby easy integration in SCADA applications of device status and the reason for status change - long-run monitoring with SNMP monitor include log function
Modules and supported components	
Modules and components	MACH 4000, MACH 3000, MACH 1000, LION, PowerLION, GigaLION, SmartLION, Foundry Networks FastIron series
Software requirements	
Operating system	Windows 2000 / 2003 Server / XP / Vista, Linux (with kernel 2.2 or higher, libc6.1)
Stand-alone / integrated HP OpenView - version	Stand-alone Windows and Linux Windows - HP OpenView 7.5
Minimum requirement for Hirschmann agents	MACH 4000 release 1.1.1, MACH 3000 release 3.02
Browser	Internet Explorer 4.0 or higher, Java runtime environment is also installed
Supported SCADA systems	all OPC AE 1.0 clients (Alarm and Event) and OPC DA 2.0 clients (Data Access), e.g. OperateIT (ABB), PVSSII (ETM), iFix (Intellution), RS View (Rockwell), WinCC (Siemens), InTouch (Wonderware)
Hardware requirements	
Processor	x86 compatible CPU, recommended > 500 MHZ
RAM	Linux and Windows stand-alone: at least 64 MB, 128 MB (recommended) Windows - HP OpenView: at least 28 MB, 256 MB (recommended) HiVision requires approximately 50 MB free RAM. A further 200 kB of RAM are required for each detected agent. The network management unit also requires RAM for the operating system and any additional applications such as OpenView.
Hard disk space	80 MB free
Recommended resolution	1024 x 768
Network	ETHERNET network with TCP/IP protocol stack
Scope of delivery and accessories	
Scope of delivery	printed manual (German and English) printed registration code for online licensing CD-ROM with multilingual product version online documentation, testversion industrial HiVision, java runtime environment
Product variants	
Version +N	update

Industrial ETHERNET

Network Management > HiVision

Type	HiVision HPUX Industrial Line
Order No.	943 471-450
	
	network management software license
Configuration	
Configuration functions	- autodiscovery of all ICMP and SNMP devices. - save devices in a devicelist - export of all tables to ASCII files - import of product-specific modules. Users can build their own modules for unknown devices. additional support: Competence Center value added products - multi-device-configuration: multiple configuration of devices, e.g. software update - multi-port-manager: multiple configuration of ports from different devices. - configuration of all Hirschmann components including network wide VLANs and user groups. - trap history for whole network and single devices. - satus propagation seperately configurable for device, card, port, power supplies, fans & chassis. - configuration of RMON alarms and events - integrated SNMP MIB browser - easy configuration of MACH 3000 router redundancy
Diagnostics	
Diagnostic functions	- monitoring of ICMP- and SNMP devices - detailled view of devices health - alarm and event protocol including definition of event-actions like messagebox, eMail, SMS or start of any program - configurable status configuration - multi-port-analyzer for network wide port diagnostic and utilization control - assignment of MAC-Address to IP-Address, to seek MAC - integrated OPC Server HiControl in Windows Version, thereby easy integration in SCADA applications of device status and the reason for status change - long-run monitoring with SNMP monitor include log function
Modules and supported components	
Modules and components	PowerMICE, MICE 20/30, RS 20/30/40, MICE, RS2, OCTOPUS M, EAGLE, BAT
Software requirements	
Operating system	HPUX 11.11
Stand-alone / integrated HP OpenView - version	only integrated in HPUX 11.11 - HP OpenView 7.5
Minimum requirement for Hirschmann agents	RS20/30 release 1.1.1, MICE20/30 release 1.1.1, PowerMICE release. 1.0, Rail Switch RS2-../.. release 5.1, MICE release 2.0
Browser	e.g. Netscape 4.7 or higher java runtime environment on CD
Supported SCADA systems	OPC is not supported by HPUX
Hardware requirements	
Processor	HP UX workstation
RAM	at least 128MB, 256 MB (recommended) HiVision requires approximately 50 MB free RAM. A further 200 kB of RAM are required for each detected agent. The network management unit also requires RAM for the operating system and any additional applications such as OpenView.
Hard disk space	80 MB free
Recommended resolution	1024 x 768
Network	ETHERNET network with TCP/IP protocol stack
Scope of delivery and accessories	
Scope of delivery	printed manual (German and English) printed registration code for online licensing CD-ROM with multilingual product version online documentation, testversion industrial HiVision, java runtime environment
Product variants	
Version +N	full version

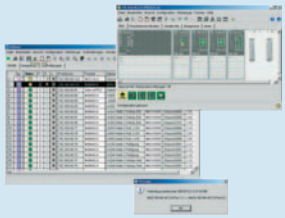
Industrial ETHERNET

Network Management > HiVision

Type	HiVision HPUX Industrial Line-Update
Order No.	943 471-455
	
	network management software license
Configuration	
Configuration functions	- autodiscovery of all ICMP and SNMP devices. - save devices in a devicelist - export of all tables to ASCII files - import of product-specific modules. Users can build their own modules for unknown devices. additional support: Competence Center value added products - multi-device-configuration: multiple configuration of devices, e.g. software update - multi-port-manager: multiple configuration of ports from different devices. - configuration of all Hirschmann components including network wide VLANs and user groups. - trap history for whole network and single devices. - satus propagation seperately configurable for device, card, port, power supplies, fans & chassis. - configuration of RMON alarms and events - integrated SNMP MIB browser - easy configuration of MACH 3000 router redundancy
Diagnostics	
Diagnostic functions	- monitoring of ICMP- and SNMP devices - detailled view of devices health - alarm and event protocol including definition of event-actions like messagebox, eMail, SMS or start of any program - configurable status configuration - multi-port-analyzer for network wide port diagnostic and utilization control - assignment of MAC-Address to IP-Address, to seek MAC - integrated OPC Server HiControl in Windows Version: easy integration in SCADA applications of device status and the reason for status change - long-run monitoring with SNMP monitor include log function
Modules and supported components	
Modules and components	PowerMICE, MICE 20/30, RS 20/30/40, MICE, RS2, OCTOPUS M, EAGLE, BAT
Software requirements	
Operating system	HPUX 11.11
Stand-alone / integrated HP OpenView - version	only integrated in HPUX 11.11 - HP OpenView 7.5
Minimum requirement for Hirschmann agents	RS20/30 release 1.1.1, MICE20/30 release 1.1.1, PowerMICE Rel. 1.0, Rail Switch RS2-../.. release 5.1, MICE release 2.0
Browser	e.g. Netscape 4.7 or higher java runtime environment on CD
Supported SCADA systems	OPC is not supported by HPUX
Hardware requirements	
Processor	HP UX workstation
RAM	at least 128MB, 256 MB (recommended) HiVision requires approximately 50 MB free RAM. A further 200 kB of RAM are required for each detected agent. The network management unit also requires RAM for the operating system and any additional applications such as OpenView.
Hard disk space	80 MB free
Recommended resolution	1024 x 768
Network	ETHERNET network with TCP/IP protocol stack
Scope of delivery and accessories	
Scope of delivery	printed manual (German and English) printed registration code for online licensing CD-ROM with multilingual product version online documentation, testversion industrial HiVision, java runtime environment
Product variants	
Version +N	update

Industrial ETHERNET

Network Management > HiVision

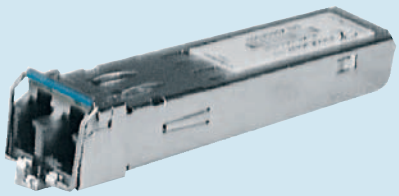
Type	HiVision HPUX Enterprise
Order No.	943 471-400
	
	Network management software license
Configuration	
Configuration functions	- autodiscovery of all ICMP and SNMP devices. - save devices in a devicelist - export of all tables to ASCII files - import of product-specific modules. Users can build their own modules for unknown devices. additional support: ANS Competence Center value added products - multi-device-configuration: multiple configuration of devices, e.g. software update - multi-port-manager: multiple configuration of ports from different devices. - configuration of all Hirschmann components including network wide VLANs and user groups. - trap history for whole network and single devices. - satus propagation seperately configurable for device, card, port, power supplies, fans & chassis. - configuration of RMON alarms and events - integrated SNMP MIB browser - easy configuration of MACH 3000 router redundancy
Diagnostics	
Diagnostic functions	- monitoring of ICMP- and SNMP devices - detailled view of devices health - alarm and event protocol including definition of event-actions like messagebox, eMail, SMS or start of any program - configurable status configuration - multi-port-analyzer for network wide port diagnostic and utilization control - assignment of MAC-Address to IP-Address - integrated OPC Server HiControl in Windows Version: easy integration in SCADA applications of device status and the reason for status change - long-run monitoring with SNMP monitor include log function
Modules and supported components	
Modules and components	MACH 4000, MACH 3000, MACH 1000, LION, PowerLION, GigaLION, SmartLION, Foundry Networks FastIron series
Software requirements	
Operating system	HPUX 11.11
Stand-alone / integrated HP OpenView - version	only integrated in HPUX 11.11 - HP OpenView 7.5
Minimum requirement for Hirschmann agents	MultiMIKE software release 1.5, FCMA software release 3.4, ETPS release 3.0, ETS 12/24 /12MM release 3.20, Advanced LAN Switch release 2.12, Gigabit LAN switch release 3.30, Gigabit routing switch release 3.2, HiWay workgroup switches FES-24TP Plus and GES-24TP/2SX release 2.0.0.2, GES-24TP Plus release 2.4.6, GES-24FX release 2.4.7.6, MACH 3000 release 3.02
Browser	e.g. Netscape 4.7 java runtime environment on CD
Supported SCADA systems	OPC is not supported by HPUX
Hardware requirements	
Processor	HP UX workstation
RAM	at least 128MB, 256 MB (recommended) HiVision requires approximately 50 MB free RAM. A further 200 kB of RAM are required for each detected agent. The network management unit also requires RAM for the operating system and any additional applications such as OpenView.
Hard disk space	80 MB free
Recommended resolution	1024 x 768
Network	ETHERNET network with TCP/IP protocol stack
Scope of delivery and accessories	
Scope of delivery	printed manual (German and English) printed registration code for online licensing CD-ROM with multilingual product version online documentation, testversion industrial HiVision, java runtime environment
Product variants	
Version +N	full version

Industrial ETHERNET

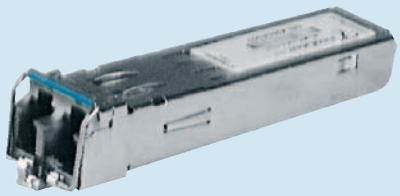
Network Management > HiVision

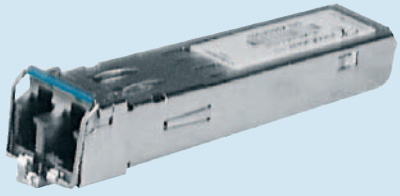
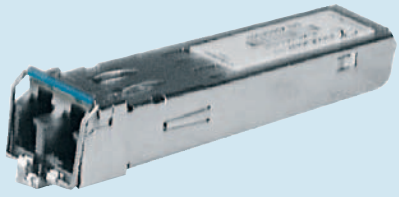
Type	HiVision HPUX Enterprise-Update
Order No.	943 471-405
	 Network management software license
Configuration	
Configuration functions	- autodiscovery of all ICMP and SNMP devices. - save devices in a devicelist - export of all tables to ASCII files - import of Product-Specific Modules. Users can build their own modules for unknown devices. additional support: Competence Center Value Added Products - multi-device-configuration: multiple configuration of devices, e.g. software update - multi-port-manager: multiple configuration of ports from different devices. - configuration of all Hirschmann components including network wide VLANs and user groups. - trap history for whole network and single devices. - satus propagation seperately configurable for device, card, port, power supplies, fans & chassis. - configuration of RMON Alarms and Events - integrated SNMP MIB Browser - easy Configuration of MACH 3000 Router Redundancy
Diagnostics	
Diagnostic functions	- monitoring of ICMP- and SNMP devices - detailled view of devices health - alarm and event protocol including definition of event-actions like messagebox, eMail, SMS or start of any program - configurable status configuration - multi-port-analyzer for network wide port diagnostic and utilization control - assignment of MAC-Address to IP-Address, to seek MAC - integrated OPC Server HiControl in Windows Version, thereby easy integration in SCADA applications of device status and the reason for status change - long-run monitoring with SNMP monitor include log function
Modules and supported components	
Modules and components	MACH 4000, MACH 3000, MACH 1000, LION, PowerLION, GigaLION, SmartLION, Foundry Networks FastIron series
Software requirements	
Operating system	HPUX 11.11
Stand-alone / integrated HP OpenView - version	only integrated in HPUX 11.11 - HP OpenView 7.5
Minimum requirement for Hirschmann agents	MACH 4000 release 1.1.1, MACH 3000 release 3.02
Browser	e.g. Netscape 4.7 or higher java runtime environment on CD
Supported SCADA systems	OPC is not supported by HPUX
Hardware requirements	
Processor	HP UX workstation
RAM	at least 128MB, 256 MB (recommended) HiVision requires approximately 50 MB free RAM. A further 200 kB of RAM are required for each detected agent. The network management unit also requires RAM for the operating system and any additional applications such as OpenView.
Hard disk space	80 MB free
Recommended resolution	1024 x 768
Network	ETHERNET network with TCP/IP protocol stack
Scope of delivery and accessories	
Scope of delivery	printed manual (German and English) printed registration code for online licensing CD-ROM with multilingual product version online documentation, testversion industrial HiVision, java runtime environment
Product variants	
Version +N	update

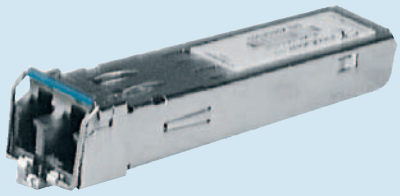
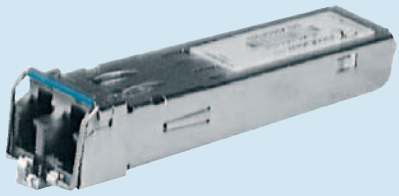
Accessories > SFP Fast-ETHERNET Transceiver for media module

Type	M-FAST SFP-MM/LC
Order No.	943 865-001
	 SFP Fiberoptic Fast-ETHERNET Transceiver
Product description Port type and quantity	 1 x 100 BASE-FX with LC connector
Network size - length of cable Multimode fiber (MM) 50/125 µm Single mode fiber (SM) 9/125 µm	 5 km (4 km at 62,5/12,5µm)
Power requirements Operating voltage Power consumption	 power supply via the switch 1 W
Service Diagnostics	
Ambient conditions Operating temperature Storage/transport temperature Relative humidity (non-condensing)	 0°C to +60°C -40°C to +85°C

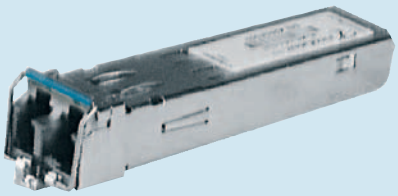
SFP Fast-ETHERNET Transceiver for media module > Versions

Type	M-FAST SFP-SM/LC	M-FAST SFP-SM+/LC
Order No.	943 866-001	943 867-001
	 SFP Fiberoptic Fast-ETHERNET Transceiver	 SFP Fiberoptic Fast-ETHERNET Transceiver
Network size - length of cable		
Single mode fiber (SM) 9/125 µm	25 km	25 - 65 km
Service		
Diagnostics	optical input- and output power, transceiver temperature	optical input- and output power, transceiver temperature
Ambient conditions		
Operating temperature	0°C to +60°C	0°C to +60°C

Type	M-FAST SFP-LH/LC	M-FAST SFP-MM/LC- EEC
Order No.	943 868-001	943-945-001
	 SFP Fiberoptic Fast-ETHERNET Transceiver	 SFP Fiberoptic Fast-ETHERNET Transceiver
Network size - length of cable		
Multimode fiber (MM) 50/125 µm		5 km (4 km at 62,5/12,5µm)
Single mode fiber (SM) 9/125 µm	40 - 100 km	
Service		
Diagnostics	optical input- and output power, transceiver temperature	
Ambient conditions		
Operating temperature	0°C to +60°C	-40 °C to +85 °C

Type	M-FAST SFP-SM/LC-EEC	M-FAST SFP-SM+/LC-EEC
Order No.	943-946-001	943-947-001
	 SFP Fiberoptic Fast-ETHERNET Transceiver	 SFP Fiberoptic Fast-ETHERNET Transceiver
Network size - length of cable		
Single mode fiber (SM) 9/125 µm	25 km	25 - 65 km
Service		
Diagnostics	optical input- and output power, transceiver temperature	optical input- and output power, transceiver temperature
Ambient conditions		
Operating temperature	-40 °C to +85 °C	-40 °C to +85 °C

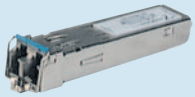
SFP Fast-ETHERNET Transceiver for media module > Versions

Type	M-FAST SFP-LH/LC-EEC
Order No.	943-948-001
	 SFP Fiberoptic Fast-ETHERNET Transceiver
Network size - length of cable Single mode fiber (SM) 9/125 µm	40 - 100 km
Service Diagnostics	optical input- and output power, transceiver temperature
Ambient conditions Operating temperature	-40 °C to +85 °C

Accessories > SFP Gigabit-ETHERNET Transceiver for media module

Type	M-SFP-LX/LC
Order No.	943 015-001
	
	SFP Fiberoptic Gigabit Ethernet Transceiver for: MICE media modules, MM4-4TX/SFP and MM4-2TX/SFP, OpenRail RS30-Switches, MACH 4000, SmartLION and GigaLION.
Product description	
Port type and quantity	1 x 1000BASE-LX with LC connector
Network size - length of cable	
Twisted pair (TP)	
Multimode fiber (MM) 50/125 µm	0 - 550 m, 0 - 11 dB link budget at 1310 nm A = 1 dB/km, 3 dB reserve, B = 800 MHz x km With f/o adapter in line with IEEE 802.3-2000 clause 38 (single-mode fiber offset-launch mode conditioning patch cord)
Multimode fiber (MM) 62.5/125 µm	0 - 550 m, 0 - 11 dB link budget at 1310 nm A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm	0 m - 20 km, 0 - 11 dB link budget at 1310 nm A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)
Single mode fiber (LH) 9/125 µm (long haul transceiver)	
Power requirements	
Operating voltage	power supply via the switch
Power consumption	1 W
Service	
Diagnostics	optical input and output power, transceiver temperature
Ambient conditions	
Operating temperature	0 °C to +60 °C
Storage/transport temperature	-40°C to +85°C
Relative humidity (non-condensing)	10% to 95%
MTBF	
Mechanical construction	
Dimensions (W x H x D)	20 mm x 18 mm x 50 mm
Mounting	SFP slot
Weight	40 g
Protection class	IP 20
Mechanical stability	
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
EMC interference immunity	
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m (80 - 1000 MHz)
EN 61000-4-4 fast transients (burst)	2 kV power line, 1 kV data line
EN 61000-4-5 surge voltage	power line: 2 kV (line/earth), 1 kV (line/line), 1kV data line
EN 61000-4-6 conducted immunity	3 V (10 kHz - 150 kHz), 10 V (150 kHz - 80 MHz)
EMC emitted immunity	
FCC CFR47 Part 15	FCC CFR47 Part 15 Class A
EN 55022	EN 55022 Class A
Approvals	
Safety of industrial control equipment	cUL 508 (E175531)
Hazardous locations	cUL 1604 Class 1 Div 2 (E203960)
Safety of information technology equipment	
Germanischer Lloyd	Germanischer Lloyd (43 109-02 HH)
Scope of delivery and accessories	
Scope of delivery	SFP module
Accessories to order separately	

SFP Gigabit-ETHERNET Transceiver for media module > Versions

Type	M-SFP-LH/LC	M-SFP-LH+/LC
Order No.	943 042-001	943 049-001
		
	SFP Fiberoptic Gigabit Ethernet Transceiver for: MICE media modules, MM4-4TX/SFP and MM4-2TX/SFP, OpenRail RS30-Switches, MACH 4000, SmartLION and GigaLION.	SFP Fiberoptic Gigabit Ethernet Transceiver for: MICE media modules, MM4-4TX/SFP and MM4-2TX/SFP, OpenRail RS30-Switches, MACH 4002 48+4G, SmartLION and GigaLION.
Product description		
Port type and quantity	1 x 1000BASE-LX with LC connector	1 x 1000BASE-LX with LC connector
Network size - length of cable		
Single mode fiber (LH) 9/125 µm (long haul transceiver)	16 -80 km 6 - 22 dB link budget at 1550 nm A = 0.25 dB/km, 2 dB reserve, D = 19 ps/(nm x km)	44 - 120 km 13 - 32 dB link budget at 1550 nm A = 0.25 dB/km, 2 dB reserve, D = 19 ps/(nm x km)
Ambient conditions		
Operating temperature	0 °C to +60 °C	0 °C to +60 °C
Storage/transport temperature	-25 °C to +70 °C	-40°C to +85°C

Type	M-SFP-SX/LC	M-SFP-LX/LC EEC
Order No.	943 014-001	943 897-001
		
	SFP Fiberoptic Gigabit Ethernet Transceiver for: MICE media modules, MM4-4TX/SFP and MM4-2TX/SFP, OpenRail RS30-Switches, MACH 4000, SmartLION and GigaLION.	SFP Fiberoptic Gigabit Ethernet Transceiver, extended temperature range
Product description		
Port type and quantity	1 x 1000BASE-SX with LC connector	1 x 1000BASE-LX with LC connector
Network size - length of cable		
Multimode fiber (MM) 50/125 µm	0 - 550 m 0 - 7,5 dB link budget at 850 nm A = 3 dB/km, 3 dB reserve, B = 400 MHz x km	0 - 550 m, 0 - 11 dB link budget at 1310 nm A = 1 dB/km, 3 dB reserve, B = 800 MHz x km With f/o adapter in line with IEEE 802.3-2000 clause 38 (single-mode fiber offset-launch mode conditioning patch cord)
Multimode fiber (MM) 62.5/125 µm	0 - 275 m 0 - 7,5 dB link budget at 850 nm A = 3,2 dB/km, 3 dB reserve, B = 200 MHz x km	0 - 550 m, 0 - 11 dB link budget at 1310 nm A = 1 dB/km, 3 dB reserve, B = 500 MHz x km
Single mode fiber (SM) 9/125 µm		0 m - 20 km, 0 - 11 dB link budget at 1310 nm A = 0.4 dB/km, 3 dB reserve, D = 3.5 ps/(nm x km)
Ambient conditions		
Operating temperature	0 °C to +60 °C	-40 °C to +85 °C
Storage/transport temperature	-40°C to +85°C	-40°C to +85°C

SFP Gigabit-ETHERNET Transceiver for media module > Versions

Type	M-SFP-LH/LC EEC	M-SFP-SX/LC EEC
Order No.	943 898-001	943 896-001
		
	SFP Fiberoptic Gigabit Ethernet Transceiver for: MICE media modules, MM4-4TX/SFP and MM4-2TX/SFP, OpenRail RS30-Switches, MACH 4000, SmartLION and GigaLION.	SFP Fiberoptic Gigabit Ethernet Transceiver, extended temperature range
Product description		
Port type and quantity	1 x 1000BASE-LX with LC connector	1 x 1000BASE-SX with LC connector
Network size - length of cable		
Multimode fiber (MM) 50/125 µm		0 - 550 m 0 - 7,5 dB link budget at 850 nm A = 3 dB/km, 3 dB reserve, B = 400 MHz x km
Multimode fiber (MM) 62.5/125 µm		0 - 275 m 0 - 7,5 dB link budget at 850 nm A = 3,2 dB/km, 3 dB reserve, B = 200 MHz x km
Single mode fiber (LH) 9/125 µm (long haul transceiver)	16 -80 km 6 - 22 dB link budget at 1550 nm A = 0.25 dB/km, 2 dB reserve, D = 19 ps/(nm x km)	
Ambient conditions		
Operating temperature	-40 °C to +85 °C	-40 °C to +85 °C
Storage/transport temperature	-40°C to +85°C	-40°C to +85°C

System Accessories > **Power supply**

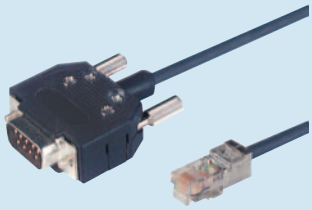
Type	RPS 30	RPS60/48V EEC
Order No.	943 662-003	943 952-001
		
	24 V DC DIN rail power supply unit	48 V DC rail power supply unit
More Interfaces		
Voltage input	1 terminal block, 3-pin	1 Federkraft-Klemmblock, 4-polig
Voltage output	1 terminal block, 5-pin	1 Federkraft-Klemmblock, 4-polig
Power requirements		
Operating voltage	230 V	230 V
Input data		
230 V	100 to 240 V AC; 47 to 63 Hz or 85 to 375 V DC	100 to 240 V AC; 50-60Hz or 85 to 264 V AC; 47-63Hz (DC 100 to 375V)
Current consumption		
230 V	max. 0,35 A at 296 V AC	Max. 0.7 A at 230 V max. 1.3 A at 100V
Activation current	< 36 A at 240 V AC and cold start	< 40 A at 264 V AC
Output data		
Output voltage	24 V DC (-0,5%, +0,5%)	47-52 V DC (typ. 48 V); externally adjustable
Output current		
230 V	1,3 A at 100 - 240 V AC	1,25 A static at 48 V nominal 1,88 A (150% of nominal load) for max. 2,5 seconds
Service		
Diagnostics	LED (power, DC ON)	LED (green)
Redundancy		
Redundancy functions	Power supply units can be connected in parallel	
Ambient conditions		
Operating temperature	-10 °C to +70 °C (from 60 °C derating)	-10 °C to +70 °C
Storage/transport temperature	-25 °C to +85 °C	-25 °C to +85 °C
Relative humidity (non-condensing)	max. 95% without condensation	max. 95 % without condensation
MTBF	74.2 years; Siemensnorm SN 29500 : 40 °C	
Mechanical construction		
Dimensions (W x H x D)	45 mm x 75 mm x 98 mm	44,8 mm x 75 mm x 104,5 mm
Mounting	DIN Rail 35 mm	DIN Rail 35 mm
Weight	230 g	245 g
Protection class	IP 20	IP 20
EMC interference immunity		
EN 50082-1	EN 61000-6-2 (includes EN 55024)	EN 61000-6-1
EN 50082-2	EN 61000-6-2 (includes EN 55024)	EN 61000-6-2
EMC emitted immunity		
EN 50081-1	EN 50081-1	61000-6-3, 61000-6-4, EN 55011, EN 55022 class A
EN 50081-2	EN 50081-2	hormonic input current, fulfills EN 61000-3-2
Approvals		
Safety of industrial control equipment	cUL 508 (E 198865)	UL 508
Safety of information technology equipment	cUL 60950 (E 137006)	cUL 60950
Hazardous locations	UL 1604 Class 1 Div. 2 (E246877)	Ex nA II T4 X
Scope of delivery and accessories		
Scope of delivery	Rail power supply, Description and operating manual	Rail power supply, ferrit with safety key, Description and operating manual

RPS 80 EEC	RPS 120 EEC
943 662-080	943 662-120
	
24 V DC DIN rail power supply unit	24 V DC DIN rail power supply unit
1 Bi-stable, quick-connect spring clamp terminals, 3-pin 1 Bi-stable, quick-connect spring clamp terminals, 4-pin	1 Bi-stable, quick-connect spring clamp terminals, 3-pin 1 Bi-stable, quick-connect spring clamp terminals, 6-pin
230 V	230 V
100-240 V AC (+/-15%); 50-60Hz or 110 to 300 V DC (-20/+25%)	100-240 V AC (-15/+10%); 50-60Hz or 110 to 300 V DC (+/-20%)
max. 1.8-1.0 A at 100-240 V AC max. 0.85 - 0.3 A at 110 - 300 V DC < 13 A at 230 V AC	max. 1,4-0,65 A at 100-240 V AC max. 1,2 - 0,45 A bei 120 - 300 V DC < 15 A at 100 and 230 V AC
24 - 28 V DC (typ. 24.1 V) external adjustable	24-28 V DC (typ. 24,1 V); externally adjustable
3,4-3,0 A continuous min 5,0-4,5 A for typ. 4 sec	min. 5 - 4,5 A continuous 7,5 - 6,7 A for typ. 4 sec
LED (DC OK, Overload)	LED (DC OK, Overload)
Power supply units can be connected in parallel	Power supply units can be connected in parallel
-25 °C to +70 °C (ab 60 °C Derating) -40 °C to +85 °C 5 to 95 % -	-25 °C to +70 °C (ab 60 °C Derating) -40 °C to +85 °C 5 to 95 % -
32 mm x 124 mm x 102 mm DIN Rail 35 mm 440 g IP 20	40 mm x 124 mm x 117 mm DIN Rail 35 mm 620 g IP 20
EN 61000-6-1 EN 61000-6-2 (includes EN 55024)	EN 61000-6-1 EN 61000-6-2 (includes EN 55024)
EN 61000-3-2, 61000-3-3, 61000-6-3, 61000-6-4	EN 61000-3-2, 61000-3-3, 61000-6-3, 61000-6-4 -
cUL 508 (E 198865) cUL 60950 (E 137006) UL 1604 Class 1 Div. 2 (E246877)	cUL 508 (E 198865) cUL 60950 (E 137006) UL 1604 Class 1 Div. 2 (E246877)
Rail power supply, Description and operating manual	Rail power supply, Description and operating manual

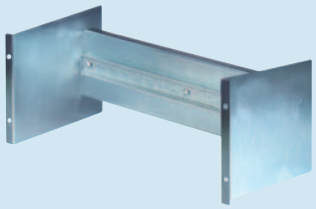
Industrial ETHERNET

System Accessories > Adapter cable

Type	ACA 21-USB	ACA 21-M12
Order No.	943 271-001	943 913-001
		
	The ACA 11 auto-configuration adapter saves two different version of configuration datas and operating software from the connected switch. It enables managed switched to be easily comissioned and quickly replaced.	The ACA 21-M12-configuration adapter saves two different version of configuration datas and operating software from the connected switch. It enables managed switched to be easily comissioned and quickly replaced.
More Interfaces		
To the RS232 interface on the switch	USB connection	
To the RS232 interface on the PC or notebook		
To the USB interface on the switch	USB connector	M12-connection
Power requirements		
Operating voltage	via the USB interface on the switch	via the USB interface on the switch
Service		
Diagnostics	writing to ACA, reading from ACA, writing/reading not OK; (display using LEDs on the switch)	writing to ACA, reading from ACA, writing/reading not OK; (display using LEDs on the switch)
Configuration	via USB interface of the switch and via SNMP/Web	via USB interface of the switch and via SNMP/Web
Ambient conditions		
Operating temperature	0 °C to +60 °C	-40 °C to +70 °C
Storage/transport temperature	-25 °C to +70 °C	-40 °C to +85 °C
Relative humidity (non-condensing)	10% to 95%	10% to 95%
MTBF	359 years (MIL-HDBK-217F)	359 years (MIL-HDBK-217F)
Mechanical construction		
Dimensions (W x H x D)	90 mm x 27 mm x 12 mm	90 mm x 27 mm x 12 mm
Mounting	plug-in module	plug-in module
Weight	25 g	25 g
Protection class	IP 20	IP 67
Cable length	20 cm	50 cm
Mechanical stability		
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks	15 g, 11 ms duration, 18 shocks
IEC 60068-2-6 vibration	1 g, 10 Hz - 150 Hz, 30 cycles	1 g, 10 Hz - 150 Hz, 30 cycles
EMC interference immunity		
EN 61000-4-2 electrostatic discharge (ESD)	6 kV contact discharge, 8 kV air discharge	6 kV contact discharge, 8 kV air discharge
EN 61000-4-3 electromagnetic field	10 V/m	10 V/m
EMC emitted immunity		
EN 55022	EN 55022	EN 55022
Approvals		
Safety of industrial control equipment	cUL 508	cUL 508
Hazardous locations	cUL 1604 Class 1 Div 2	cUL 1604 Class1 Div 2
Germanischer Lloyd	Germanischer Lloyd	Germanischer Lloyd in preparation
Employment in vehicles		E1 in preparation
Electronic mechanisms on rail-mounted vehicles		EN 50155 in preparation
Scope of delivery and accessories		
Scope of delivery	device, operating manual	device, operating manual

Terminal Cable	Modem-Cable	OCTOPUS Terminal Cable
943 301-001	943 222-001	943 902-001
		
Terminal cable for configuring managed rails, MICE and MACH switches via the RS232 interface of the switch in connection with terminal software.	Cable for connecting an analog-/ ISDN-modem to an Eagle system.	Terminal cable for configuring managed OCTOPUS switches via the RS232 interface of the switch in connection with terminal software.
RJ11 connector Sub-D connector, 9-pin	RJ11 connector Sub-D connector, 9-pin	M12 A Coding 4-pin connector Sub-D connector, 9-pin
dialog window on the PC or notebook		dialog window on the PC or notebook
0 °C to +60 °C -20 °C to +80 °C 10% to 95%	0 °C to +60 °C -20 °C to +80 °C 10% to 95%	0 °C to +60 °C -20 °C to +80 °C 10% to 95%
210 g 500 cm	210 g 500 cm	130 g 2 m
cable	Cable	cable

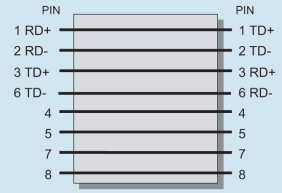
System Accessories > **Mounting accessories**

Type	19 Zoll DIN Rail Adapter.
Order No.	943 766-002
	 Installation rack for 19” cabinet, 8 units wide and 4 units high
Mechanical construction	
Dimensions (W x H x D)	481 mm (usable 435 mm) x 177 mm x 275 mm DIN Rail variable in height and depth adjustable (increment 10 mm)
Mounting	19” rack or cabinet
Weight	3 kg
Scope of delivery and accessories	
Scope of delivery	19” Installation rack

Industrial ETHERNET Lexicon

1:1 wire cable

1:1 wire cables or straight-through cables are required for connecting ETHERNET components over copper cable.
In general 1:1 wire cables are required for connections between terminal devices such as SPS, HMI, etc. and network components such as hubs, switches, etc. The pin allocation for RJ45 plugs in 1:1 cables is as follows:



3DES

See DES

10BASE2

Standard for data transmission of 10 Mbit/s ETHERNET on thin coaxial cables (thin wire, cheapernet). Segment length max. 185 m.

10BASE5

Standard for data transmission of 10 Mbit/s ETHERNET on coaxial cables (thick wire, yellow cable). Segment length max. 500 m.

10BASE-FL

Standard for data transmission of 10 Mbit/s ETHERNET on fiber optic cables. Each connection is created with 2 fibers, in each case, one fiber for “Transmit Data” and another one for “Receive Data”.

10BASE-T

Standard for data transmission of 10 Mbit/s ETHERNET on unshielded twisted pair cables (category 3, 4 or 5). Each connection is created with 2 wire pairs, in each case with one wire pair for “Transmit Data” and another one for “Receive Data”.

100BASE-FX

Standard for data transmission of 100 Mbit/s ETHERNET on fiber optic cables. Each connection is created with 2 fibers, in each case, one fiber for “Transmit Data” and another one for “Receive Data”.

100BASE-TX

Standard for data transmission of 100 Mbit/s ETHERNET on twisted pair cables (category 5). Each connection is created with 2 wire pairs, in each case with one wire pair for “Transmit Data” and another one for “Receive Data”.

1000BASE-LX

Standard for data transmission of 1000 Mbit/s ETHERNET on fiber optic cables for a wavelength of 1300 nm. Each connection is created with 2 fibers, in each case, one fiber for “Transmit Data” and another one for “Receive Data”.

1000BASE-SX

Standard for data transmission of 1000 Mbit/s ETHERNET on fiber optic cables for a wavelength of 850 nm. Each connection is created with 2 fibers, in each case, one fiber for “Transmit Data” and another one for “Receive Data”.

1000BASE-TX

Standard for data transmission of 1000 Mbit/s ETHERNET on twisted pair cables (category 5e). Each connection is created with 4 wire pairs, in each case with all 4 pairs being used for “Transmit Data” and “Receive Data” simultaneously.

AC

Access **C**lient.
Radio based communication unit, which must announce itself at the Access Point (AP). Only after successful authentication, the access client can send data to the network or receive and/or request data from the network. (Wireless LAN).

ACK

Acknowledge.
A name for a positive acknowledgment of receipt. The ACK is a part of the communication protocols and responsible for the acknowledgment of receipt of the transmission.

ADSL

Asymmetric **D**igital **S**ubscriber **L**ine.
Interface to Wide Area Network.

AES

Advanced **E**ncryption **S**tandard.
Encryption standard with 128-, 192- and 256-Bit-keys. This symmetrical encryption standard was developed to replace the earlier DES standard.

Aging

Process for the updating of data, especially of address tables. An address is marked as “old” after the expiry of the certain period of time and the it is deleted at the time of the next pass if it is not detected at a port once again.

AP

Access **P**oint.
In wireless networks the access point is the bridge to the wired networks. It can be attached directly to ethernet, token ring or atm. The access point is connected with all nodes "access clients" and takes over the central functions like roaming or security.
(Wireless LAN).

API

Application **P**rogramming **I**nterface.

ARP

Address **R**esolution **P**rotocol.
A protocol that asks for the relevant MAC address on the basis of an IP address. Each device manages its own dynamic ARP table. If the MAC address of a participant to whom a message is to be sent is not present in the table, the device first sends an ARP request. This message is read by all stations. The device whose IP address is contained in the request sends an ARP reply with its MAC address. The participant making the request completes his ARP table with this MAC address and is then able to transmit the message.

ARS

Automatic **R**ate **S**election.
Independent choice of transmission rate by the Access Point (AP) as a function of the connecting quality (distance).

AUI

Attachment **U**nit **I**nterface
Designation of an ETHERNET interface with a 15-pole Sub-D plug connector.

Autocrossing

A function that enables automatic crossing of transmission and reception lines on twisted pair interfaces. Switches that support this function can be connected to each other over a 1:1 wire cable instead of a crossover cable.

Autonegotiation

A protocol in Fast ETHERNET with which the participant devices agree a common transmission mode before the actual data transmission (100 Mbit/s or 10 Mbit/s, full duplex or half duplex).

Autopolarity

A function of devices with 10BASE-T or 100BASETX interface for automatic correction of wiring errors in twisted pair cables that lead to a polarity reversal of the data signals.

Autosensing

A function that enables a device to automatically detect the data rate (10 Mbit/s or 100 Mbit/s) and to transmit and receive at this data rate.

Auto-MDI/MDI-X

See Autocrossing.

Backpressure

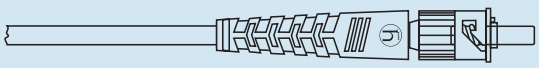
A function that simulates a collision in half duplex operation by generating a jam signal.

Bandwidth Length Product

A characteristic size for fiber optic cables. The bandwidth length product is a factor that decides the maximum length of multimode fibers.

BFOC

Bayonet **F**iber **O**ptic **C**onnector.
A widely used plug connector for fiber optic cables with bayonet locking.
It is also called ST plug. The only plug connector that is standardized in ETHERNET with a transmission speed of 10 Mbit/s. ST is a registered trademark of AT&T



BGNW

The BGNW (**B**enutzer**g**ruppe **N**etz**w**erke) is a German association of leading international users and manufacturers of network systems. It is a manufacturer-neutral and independent forum. The goal of this association is the advanced training and exchange of experience of the members, and the development of recommendations of networkplanning, networkinstallation and maintenance of networks.
More information: http://www.bgnw.de/

Industrial ETHERNET Lexicon

BGP
Border **G**ateway **P**rotocol. Interdomain routing protocol in WAN.

BLP
See **B**andwidth **L**ength **P**roduct.

BNC
Bayonet **N**eill **C**oncelman.
A widely used plug connector for connecting coaxial cables and transceivers as per 10BASE2; named after the developers.

BootP
Bootstrap **P**rotocol
A protocol that delivers a statically allocated IP address to a device connected to the ETHERNET on the basis of its MAC address.

BPDU
Bridge **P**rotocol **D**ata **U**nit.
A control frame between bridges, used by Spanning Tree.

Bridge
A device that works on Layer 2 of the OSI reference model and connects 2 similar networks to each other.
In this connection, data packets are transferred from one subnetwork to another subnetwork through the analysis of the MAC address.

Broadcast
Term for transmitting a message to a group of unspecified receivers.

Browser
Term for software that enables the viewing and processing of data in the Internet. The most well-known browsers are Microsoft Internet Explorer, Netscape, Mozilla and Opera.

BT
Bit Time. Duration of a bit.

Burst
Term for a short-term increase in load that occurs suddenly.

CCK
Complentary **C**ode **K**eying.
CCK is used with the 11 Mbps version of the 802.11-LAN (802.11b) and can pack several bits into a symbol. Thus a higher data transmission rate is possible.

CENELEC
Comité Européen de Normalisation Elektrotechnique (European Committee for Electrotechnical Standardization). Responsible for the harmonization of electrotechnical standards in the European Union (e.g. EN 50173, ...).

CHAP
Challenge **H**andshake **A**uthentication **P**rotocol. PPP authentication method. Passwords are transmitted after being encoded with a random number. Compare with PAP.

CLI
1. **C**ommand **L**ine **I**nterface.
2. **C**alling **L**ine **I**dendification.

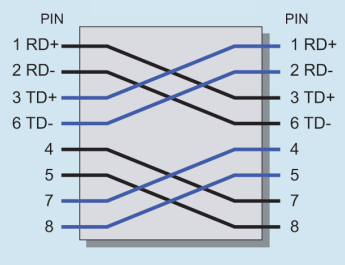
Collision Domain
The CSMA/CD access process limits the runtime of a data package from one participant to another. Depending on the data rate, what results is a spatially limited network, the so-termed collision domain. The maximum diameter of collision domain is 5120 m at 10 Mbit/s (ETHERNET) and 512 m at 100 Mbit/s (Fast ETHERNET). The full duplex operation of a connection enables expansion over this limit value since it precludes collisions. The precondition for this is the use of bridges or switches.

Concentrator
See Hub.

CoS
Class **o**f **S**ervice.

Connection Mirroring
A function that enables the copying of data transmission between 2 ports of a switch to other ports, in order to have the data analyzed by an analyzer.

Crossover Cable
For connecting ETHERNET components over copper cable, what are required are either 1:1 wire cables, or crossover cables. Crossover cables are required for direct cabling of terminal devices such as SPS, HMI, etc. or network components such as hubs, switches, etc. to each other. If the devices support autocrossing, one can also use 1:1 wire cables. Pin allocation of RJ45 plugs in a crossover cable:



CRC

Cyclic **R**edundancy **C**heck.
Term for algorithms that are used for error detection and correction of bit-oriented protocols.

CSA

www.csa.ca
Canadian **S**tandard **A**ssociation.

CSA-C22.2 No. 950

Canadian standard for the security of IT devices, including electrical office machines based on the IEC 950.

CSA-C22.2 No. 142

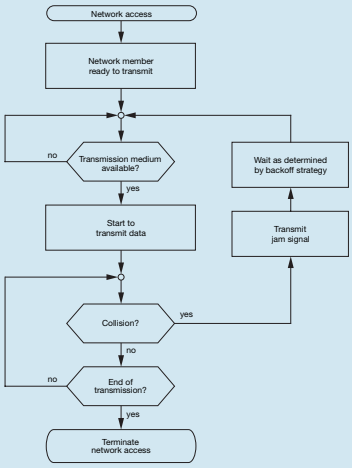
Canadian standard for the safety of industrial control equipment, based on UL 508.

CSA-C22.2 No. 213

Canadian standard for electrical operating equipment for explosion-endangered rooms of the Class I and II, Department 2, and Class III; based on UL 1604.

CSMA/CD

Carrier **S**ense **M**ultiple **A**ccess/ **C**ollision **D**etection.
Access process in ETHERNET as per IEEE 802.3. A station ready to transmit checks whether the transmission medium is free (carrier sense). It then starts transmitting while simultaneously checking whether other stations (multiple access) have also started to transmit data. If 2 or more stations transmit simultaneously, there is a collision. The stations stop transmission accordingly (collision detection) and attempt transmission later on. In the CSMA/CD process, the network expansion is determined by a maximum permissible runtime of data signals on the network that depend on the data rate.



cUL 508

US standard for the security of industrial control equipment.

cUL 1604

US standard for electrical operating equipment for explosion-endangered rooms of the Class I and II, Department 2, and Class III; based on UL 1604.

cUL 60950

US standard for the safety of IT equipments including electrical office machines; based on IEC 950.

Cut Through

Method of working of switches in which a data packet is immediately relayed further after detecting the target address. The delay time (latency time) is thereby small, but wrong packets are also transmitted onward. In this process, it is not possible to adjust the speed between the individual segments. The phenomenon is also called “On-the-Fly-Switching”.

DA

Destination **A**ddress.
Target address within a data telegram.

DBPSK

Differential **Q**uaternary **P**hase **S**hift **K**eying.
DBPSK is a modulation procedure of which is used with the DSSS transmission method according to standard 802.11 for systems with 1 Mps.

Industrial ETHERNET Lexicon

DCE

Data **C**ircuit-terminating **E**quipment.
Term for devices that are used for network termination and to which terminal equipments such as computers, control systems and printers are connected.

DES

Data **E**ncryption **S**tandard.
Symmetric encryption algorithm. For encryption and decryption the same secret key is used. Thus every station need to know this key in order to encrypt/decrypt . DES uses a 56 bit key. 3DES consists of three separate DES cryptographic operations, each performed with a different 56 bit key. The key length of 3DES is thus 168 bit.

Destination address

Used with ETHERNET, IP, etc. The address to which a data packet is sent.

DeviceNet

DeviceNet incorporates CAN technology and provides a lowcost industrial network used to connect industrial devices such as limit switches, photoelectric cells, valve manifolds, motor starters, drives, and operator displays to PLCs and PCs.

DHCP

Dynamic **H**ost **C**onfiguration **P**rotocol.
A protocol that temporarily allocates an IP address to ETHERNET participants from an established range of IP addresses.

Dispersion

Runtime differences in a LWL (fiber-optic cable). Through dispersion, a pulse transmitted in a fiber optic cable is extended. A distinction is made between mode, material and wave dispersion. Mode dispersion arises due to runtime difference between the individual modes. For this reason, this type of dispersion occurs only in multimode fiber optic cables. The material dispersion arises due to the wave length dependency of the refractive index. The fiber optic cable dispersion arises due to differing extension speeds in the energy transmitted in the core and in the jacket. This type of dispersion is of practical importance only for single mode fiber optic cables. The chromatic dispersion is a characteristic quantity for single mode fiber optic cables. It is the total of material and wave dispersion.

DNS

Domain **N**ame **S**ystem.
Term for a system which maps host names in plain text to IP addresses. The data source for the conversion are for example DNS servers or files with the designation “Hosts”.

Domain

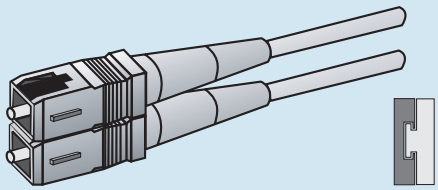
Broadcast domain: Network area which can only be bordered by a router, and through which a Broadcast can freely travel. Collision domain: Network area which is bordered by a switch or router, within which collisions can occur.

DQPSK

Differential **Q**uaternary **P**hase **S**hift **K**eying.
DDQPSK is a modulation procedure of which is used with the DSSS transmission method according to standard 802.11 for systems with
1 Mbit/s or 2 Mbit/s

DSC

Duplex **S**traight **C**onnector.
A widely used plug connector for fiber optic cables. Also see SC.



DSL

Digital **S**ubscriber **L**ine.
Provides a technologie, in order to use the internet with 1,5 MBit/s (via copper lines).

DSSS

Direct **S**equence **S**pread **S**pectrum.
DSSS is a transmission method according to standard 802.11. The procedure changes the narrow-band by coding to a wide-band signal. In this way the entire frequency band can be used. Thus a higher data transmission rate as well as a lower susceptibility to interference is possible.

DTE

Data **T**erminal **E**quipment.
Term for terminal equipment such as computers, control systems and printers that are connected to a network. In German, they are also referred to as Datenendeinrichtung (DEE).

Dual Homing

A term that was coined in connection with FDDI networks. Dual Homing is a technology in which a device is connected to a network through 2 independent connecting points. One connecting point is for the primary connection, the other is a standby connection. If the primary connection fails, the standby connection is automatically activated. With this technology, it is also possible to connect network segments redundantly.

DVMRP

Distance **V**ector **M**ulticast **R**outing **P**rotocol. Internetwork gateway protocol, largely based on RIP, that implements a typical dense mode IP multicast schme. DVMRP uses IGMP to exchange routing datagrams with its neighbors.

DWDM

Dense **W**avelength **D**ivision **M**ultiplex.

Dynamic DNS

Assigns always the same name also if the IP-address of one client changes. See also DNS.

EANTC

European **A**dvanced **N**etworking **T**est **C**enter.

EGP

Exterior **G**ateway **P**rotocol.
Classification of routing protocols for exchanging information between routers of independent networks.

EIA

www.eia.org
Electronic **I**ndustries **A**ssociation American industrial association of electrical industry active in the field of standardization. Standards of the EIA are designated with RS (related EIA standard). The well-known standards include the serial interfaces RS 232 C, RS 422 and RS 485.

EMC

Electro**m**agnetic **c**ompatibility.
In EMV, both the aspects of interference immunity as well as interference emission must be kept in mind. Electrical devices, installations and systems must have a specific immunity against normal interference effects that normally occur in the planned environment. In addition, devices should not emit any interference variables that may possibly disturb other devices in their environment.

EN

European **N**orm.
European standards relate to standards developed by CENELEC and CEN.

EN 61000-4-2

EMV Part 4: Measurement and Testing Processes, Main chapter 2: Testing interference immunity to the discharge of static electricity. Details in the catalog:
x kV Contact discharge
x kV Air discharge

EN 61000-4-3

EMV Part 4: Measurement and Testing Processes, Main chapter 3: Testing interference immunity to high-frequency electromagnetic fields.

EN 61000-4-4

EMV Part 4: Measurement and Testing Processes, Main chapter 4: Testing the Interference immunity to fast, short disturbance variables (Burst). Details in the catalog:
x kV DC Power lines
x kV Data lines

EN 61000-4-5

EMV Part 4: Measurement and Testing Processes, Main chapter 5: Testing interference immunity to surges. Details in the catalog:
x kV Power supply asymmetrical (power supply)
x kV Data lines

EN 61000-6-2

Generic standard Part 6-2: Interference immunity in industry.

EN 50081-1

Generic Standard Interference Emission, Part 1: Residential, business and trade sectors as well as small businesses.

EN 50081-2

Generic Standard Interference Emission, Part 2: Industry.

EN 50082-1

Generic Standard Interference Immunity, Part 1: Residential, business and trade sectors as well as small businesses.

EN 50082-2

Generic Standard Interference Immunity, Part 2: Industry – no longer valid since the 1.4.2002.

Industrial ETHERNET Lexicon

EN 55022
Product Group Standard Interference Emission for IT installations.

EN 55024
Product Group Standard Interference Immunity for IT installations.

EN 60950
Safety of IT installations including electrical office machines. European standard, based on the IEC 950.

EN 60825-1
Safety Of Laser Devices, Part 1: Classification of Installations, Requirements and User Guidelines.

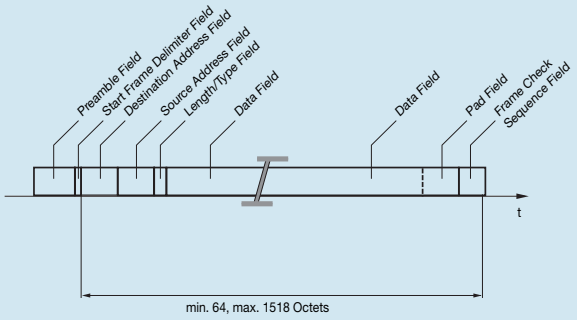
EN 61131-2
Product Group Standard Stored-Program Control Systems, Part 2: Requirements and Tests for Operating Materials.

Encapsulation
See Tunneling.

ETHERNET
Term for a data network that has been standardized since 1985 by the IEEE 802.3. The standard specifies the functions and the construction of the Levels 1 and 2 in accordance with the OSI reference model. ETHERNET is based on the access process CSMA/CD with a variable packet length of between 64 and 1518 bytes and transmission speeds of 10 Mbit/s (4 bytes TAG field optional). The concept of ETHERNET is often used as a general designation without making any distinction between the different variations (ETHERNET, Fast ETHERNET, etc.). In addition, the protocols of the Levels 3 and 4 are often included.

EtherNet/IP
www. ab. com/networks
ETHERNET/Industrial Protocol.
A standard for Industrial ETHERNET applications, based on TCP and UDP.

ETHERNET Packet
Term for an ETHERNET data packet. The packet size varies between 64 and 1522 bytes. It contains the destination and source address field (DA or SA) apart from the actual payload data, the TAG field as well as the length/type field.



ESD
Electro**s**tatic **D**ischarge.
Term for electrostatic discharges. Electrostatic discharges can cause short and irregular disturbances in electronic devices or they may destroy electronic components.

Ex
Independent designation of devices under DIN EN 50020 that can be used in accordance with the specifications even inside explosion-endangered areas.

Fast ETHERNET
Term for a fast data network that was standardized in 1995 by the IEEE 802.3. Based on a transmission speed of 100 Mbit/s with a variable packet length ranging from 64 to 1518 bytes (4 bytes TAG field optional).

FCC
www.fcc.gov
Federal **C**ommunications **C**ommission.
A US authority established in 1934, responsible for telecommunications. It administers the frequency spectrum and allocates it over local, regional and national levels.

FCC CFR47 Part 15
Federal **C**ommunications **C**ommission **C**ode of **F**ederal **R**egulations.
Standard for interference emission for IT installations.

FCS
Frame **C**heck **S**equence.
Term for a bit field for data security of payload data in bit-oriented protocols. The sender of a message determines a checksum according to an established algorithm, and this checksum is affixed to the end of the packet. In the receiver a checksum is also created according to the same algorithm, and this checksum

is compared to the checksum received. With this process, errors in the data transmission can be detected.

FDB

Forwarding **D**ata **B**ase. Address table of a switch for the decision at which port to transmit a frame. The table assigns MAC addresses to the port via which the respective device can be reached. The table is updated regularly (Aging).

FDX

See Full Duplex.

FDDI

Fiber **D**istributed **D**ata **I**nterface. A standard for data networks, that covers the Layers 1 and 2 of the OSI reference model. FDDI is originally based on a double ring topology with fiber optic cables as the transmission medium.

Fiber optic

In contrast to electrical transmission cable technology in which twisted pair cables are used for data transmission, glass or plastic is used as a transmission medium for optical transmission technology. Fiber optic cables come in the form of multimode and single-mode fibers (monomode fibers).

Firewall

Term for protective measures that partitions off a LAN from another network, for example the Internet.

Flow Control

A function that in case of overload at an output port, dumps packets at the input port or signals connected devices to stop transmission. The signal to stop transmission is sent in half duplex operation by simulating a collision or, in full duplex, by sending special “Pause” packets.

Flow Controls

See Flow Control.

FM 3611

US standard for electrical operating equipment for explosion-endangered rooms of the Classes I and II, Department 2, and Class III.

FM 3810

US standard for the Safety of Process Control Equipment.

Frame

Relay Modified version of the X.25 protocol used in WANs.

FTP

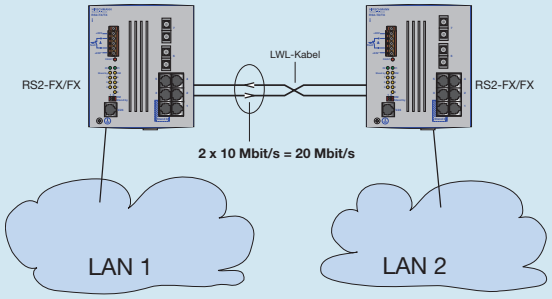
File **T**ransfer **P**rotocol. A protocol on Layer 5 of the OSI reference model for the transportation of files.

FTTD

Fiber **T**o **T**he **D**esk.

Full Duplex

A mode of operation in which a device can simultaneously transmit and receive data. If a transmission path is operated in full duplex in ETHERNET, the CSMA/CD bus access process does not apply and network diameter then depends solely on the performance limits of the transmission and reception components used.



F/O

Fiber **O**ptics. See Fiber Optic Cable.

GARP

Generic **A**ttribute **R**egistration **P**rotocol. Term for a protocol family that is used for exchanging parameters between switches and Layer 2 of the OSI reference model. At present there are the protocols GMRP and GVRP.

Gateway

A device that operates above the Layer 2 of the OSI reference model and converts protocols. At Layer 3, these devices are generally designated as routers.

Industrial ETHERNET Lexicon

Gbps

Giga**b**its **p**er **s**econd, Gbit/s.

Gbps

Giga**b**it **p**er **s**econd.

Gigabit ETHERNET

Term for an extremely fast data network that has been standardized by the IEEE 802.3 in 1999. Based on a transmission speed of 1000 Mbit/s with a variable packet length of 64 to 1518 bytes (4 bytes TAG field optional).

GL

Germanischer **L**loyd.
A company for the classification of seagoing ships, established 1867 in Hamburg.

GMRP

GARP **M**ulticast **R**egistration **P**rotocol.
A protocol standardized as per IEEE 802.1p that enables participants to log-on and log-off to/from multicast groups dynamically. Switches that support GMRP only switch multicasts to those ports at which participants of the respective multicast groups are registered.

GVRP

GARP **V**LAN **R**egistration **P**rotocol.
A protocol that can use switches to exchange information on VLANs.
If a VLAN is installed on a switch, the switch sends this information to all the other switches in the network.
In addition, the port at which the information was received can also be made a participant of this VLAN.

Half Duplex

A mode of operation in which a device can either send or receive data at any given point in time. In half duplex, collision detection is active in ETHERNET. Network expansion is limited by the runtime delay of the devices and transmission media.

HASH

Checksum, securing the integrity of information.

HCS

A name for a fiber optic cable, the optical core of which is made of silica glass and whose optical jacket is made of a special patented plastic layer (HCS is a registered trademark of Spectran Specialty Optics).

HDX

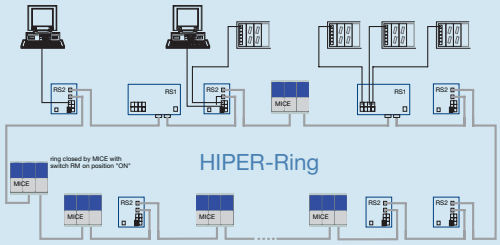
See **H**alf **D**uple**x**.

Header

Term for that part of a data packet that is located before the payload data and contains data such as addresses, packet numbers, etc.

HIPER-Ring

Term for a redundancy process based on the construction of ring-shaped network structures. In rings of these types, network components that support the HIPER-Ring are connected to each other over their backbone or ring ports. A redundancy manager carries out monitoring of the ring and prevents circulating telegrams.



HiRRP

Hirschmann **i**ndustrial **R**outer **R**edundancy **P**rotocol.
Allows you switch two routers in parallel. If one of the routers fails, the remaining router completely takes over the tasks of the other one.

HMI

Human **M**achine **I**nterface.
Devices for operating and observing machines and equipment.

Hops

Term for the routers that a data packet may pass through on its way through a network. The number of hops within a connection does not indicate anything about the quality of the connection. Thus for example a connection with eight hops may be faster than a connection with five or six hops.

HSRP

Hot **S**tandby **R**outing **P**rotocol.
A protocol for controlling redundant routers.

HTML

Hyper **T**ext **M**ark-up **L**anguage.
A format for displaying websites.

HTTP
Hyper **T**ext **T**ransfer **P**rotocol.
A protocol used by browsers and web-servers for transmitting websites.

HTTPS
Hyper**T**ext **T**ransfer **P**rotocol **S**ecure
HTTP Secure. Paketwise encrypted HTTP communication.

Hub
A device that works on Layer 1 of the OSI reference model and that regenerates incoming signals before distributing the same to all the other ports. Synonym: star coupler or repeater.

ICMP
Internet **C**ontrol **M**essage **P**rotocol.
A protocol that is used to signal failures and errors during transmission of IP packets. An extremely well-known command of this protocol is the “ping” command.

ID
Identifier

IDA
www.ida-group.org
Interface for **D**istributed **A**utomation
A standard in the field of Industrial ETHERNET developed by a group of companies using TCP and UDP.

IE
Industrial **E**THERNET.
Term for ETHERNET in automation technology. The enhanced requirements concern the accessibility and the security of the network and the environmental conditions to which ETHERNET components are exposed.

IEC
International **E**lectrotechnical **C**ommission
A commission set up in 1906 for the standardization of electrical components and modules.

IEC 60068-2-6
Environmental tests
Part 2: Fc test, sine-shaped vibrations.

IEC 60068-2-27
Environmental tests Part 2: Ea test, shock.

IEC 60068-2-32
Environmental tests Part 2: Ed test, free fall.

IEEE
www.ieee.org
Institute of **E**lectrical and **E**lectronics **E**ngineers.
An association of technicians and engineers having their headquarters in the USA that develops de facto standards, particularly in the field of data communication.

IEEE 802.3
A committee of the **I**nstitute of **E**lectrical and **E**lectronics **E**ngineers, that lays down standards for LANs.

IETF
www.ietf.org
Internet **E**ngineering **T**ask **F**orce.
A group that consists of several technical persons interested in the Internet, responsible for technical questions.

IFG
Inter **F**rame **G**ap.
A measure for the minimum distance between 2 data packets.

IGMP
Internet **G**roup **M**anagement **P**rotocol.
Term for a Layer 3 protocol that communicates the association of participants and routers to multicast groups to the adjacent routers.

IGMP Snooping
Internet **G**roup **M**anagement **P**rotocol Snooping
A function in which switches investigate IGMP packets and allocate membership of a participant to a multicast group to the respective port. Thereby muliticasts can also be switched specifically to those segments in which the participants of a group are located.

IGP
Interior **G**ateway **P**rotocol.
Classification of routing protocols for exchanging information between routers within an independent network. The protocols used include IGRP, RIP and OSPF.

IGRP
Interior **G**ateway **R**outing **P**rotocol.
Routing protocol developed by Cisco.

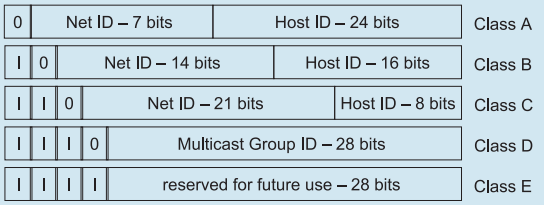
IP
Internet **P**rotocol.
A protocol on Layer 3 of the OSI reference

Industrial ETHERNET Lexicon

model. It is used for the connectionless transportation of data over several networks. Each telegram is allocated a clear IP address. The telegrams may arrive at the receiving end in a sequence different to the one in which they were sent. TCP is responsible for assembly in the correct sequence.

IP Address

The address of a participant on Layer 3 of the OSI reference model. In Version 4, an IP address consists of 4 bytes separated from each other by decimal points. These 4 bytes indicate the address for the network (Net ID) and the address area of the terminal devices (Host ID). The entire address range is classified into classes from A to E in accordance with the number of network addresses and host addresses, the number of host addresses becoming increasingly smaller from A to E. Since IP addresses must be unique on the Internet, the network addresses are managed by a central organization. The allocation of host addresses is done by the administrator of the respective local network. In order to split-up local networks into smaller subnetworks that are easier to manage, part of the host addresses is used. The network address is thereby increased with a subnetwork component. This extension is done using a subnetwork mask. The subnetwork mask marks all the bits of an IP address that identify the network and subnetwork. A device that wants to transmit, compares its IP address with the IP address of the receiver. If the addresses do not match within the framework of the network mask, it means that the receiver is in a different network. In such case the message is sent to a gateway or a router.



Class	Address range
A	1.0.0.0 to 126.255.255.255
B	128.0.0.0 to 191.255.255.255
C	192.0.0.0 to 223.255.255.255

IPv4

Internet **P**rotocol **v**ersion **4.**
The IPv4 has an address length of 4 bytes. Also see IP.

IPv6

Internet **P**rotocol **v**ersion **6.**
The IPv6 has an address length of 16 bytes. In addition, it is also differentiated by the structure of the header and the division of the networks into address types rather than classes.

IPsec

Internet **P**rotocol **Sec**urity.
Standard, which uses encryption to verify the authenticity of the sender and ensure the confidentiality and integrity of the data in IP. Layer 3 VPNs connections are configured with IPSec (using 3DES for instance).

IPX

Internetwork **P**acket E**x**change.
Term for a protocol by Novell that creates connections to Internet protocols.

ISDN

Integrated **S**ervices **D**igital **N**etwork.
WAN communication protocol.

ISO

www.iso.org
International **S**tandards **O**rganization.
An umbrella organization of national standardization committees that is also a member of the Deutsches Institut für Normung (DIN, German Standards Institute). More than 200 technical committees (TC) make up the various bodies of the ISO. The TCs may be subdivided if so required into subcommittees (SC). The SCs in turn may be split up into working groups (WG) and special task groups.

ISP

Internet **S**ervice **P**rovider.

IT

Information **T**echnology.

ITU-T

www.itu.int
International **T**elecommunications **U**nion-**T**elecommunication.
Standardization committee with its head office in Geneva.

Jabber

Term for an ETHERNET packet with more than 1522 bytes.

Jitter
Term for the oscillation of signal edge in time.

Kbps
Kilo**b**it **p**er **s**econd (kbit/s)

L2TP
Layer **2** **T**unneling **P**rotocol.
For configuration of VPNTunnels on layer 2. See also IPsec.

LACP
Link **A**ggregation **C**ontrol **P**rotocol.

LAN
Local **A**rea **N**etwork.
Term for local network which is typically no bigger than 10 km in diameter.

Latency Time
Term for the time difference between the receipt and the relaying of data. As a rule, the latency time is measured between the last bit received and first bit sent out.

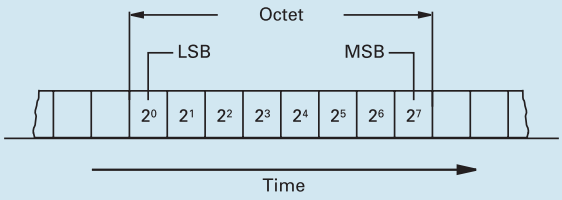
LAP
Link **A**ccess **P**rotocol.

LED
Light **E**mitting **D**iode.
An electronic component that emits light.

Link Aggregation
Term for a function that combines up to 4 ports with the same transmission speed to one virtual port. The result is redundancy in the case of failure of a connection. Also called trunking.

Long Haul
Term for optical transceivers with a very high link budget that is used in connection with single-mode fibers.

LSB
Least **S**ignificant **B**it.
Low-value bit within a bit sequence (ETHERNET)



LWL
See Fiber Optic Cable.

LX
Long Wavelength (Gbit-Ethernet).

MAC
Media **A**ccess **C**ontrol.
Term for a sublayer of Layer 2 of the OSI reference model. It controls access to the transmission medium. In this sublayer,processes may be used in which either several equally authorized participants are competing for access (for example CSMA/CA or CSMA/CD) or in which no collisions occurs, for example such as token ring.

MAC-Address
The address of a participant on Layer 2 of the OSI reference model.

MAN
Metropolitan **A**rea **N**etwork.
Term for a network within a city that connects various LANs to each other.

MAP
Manufacturing **A**utomotion **P**rotocol.
A protocol developed in the early 1980s on the initiative of General Motors. However in view of its complexity, it was hardly used commercially.

MAU
Medium **A**ttachment **U**nit.
A coupling module between an ETHERNET terminal device and the transmission medium. As a rule the terminal device is connected to an AUI interface. Also see Transceiver.

Mbps
Mega**b**it **p**er **s**econd (Mbit/s)

MD5
Message **D**igest **5.**
See also Hash-Algorithm.

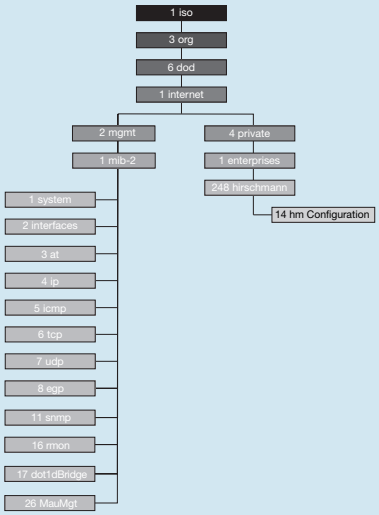
MDI
Medium **D**ependent **I**nterface.
Term for the physical (electrical, optical) and mechanical interface of a device for connection to the transmission medium.

MDI-X
MDI-Crossover
Term for a MDI interface with crossed connected signal lines.

MDI/MDI-X
See Autocrossing.

MIB
Management **I**nformation **B**ase.
A database for objects and functions which help network management systems manage individual objects using Simple Network Management Protocolb (SNMP).

Industrial ETHERNET Lexicon



MII

Media **I**ndependent **I**nterface.
Term for an interface as per the OSI reference model between the Physical Layer (1) and the Data Link Layer (2).

mini-GBIC

Mini **g**iga**b**it **i**nterface **c**onverter, see alsor SFP.

Media Converter

A device that operates on Layer 1 of the OSI reference model and converts signals between various media. For example optical signals into electrical signals.

MLPPP

Multi**l**ink **PPP**. See also PPP.

Monomode Fiber

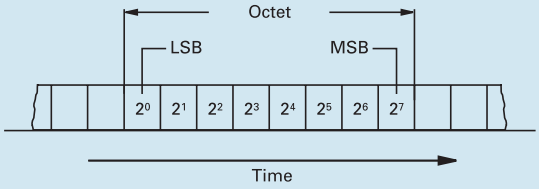
See Single-mode Fiber and Fiber Optic Cable.

MPLS

Multi**p**rotocol **L**abel **S**witching. Layer-3 protool.

MSB

Most **S**ignificant **B**it.
The most significant bit within a bit sequence. (ETHERNET)



MTBF

Mean **T**ime **B**etween **F**ailures.
Probability factor that indicates after how much time an error may be expected.

MTRJ

A widely used small sized plug connector for fiber optic cables.

MTTR

Max **T**ime **T**o **R**epair.

Multicast

Term for transmission of a message to a group of specific receivers. It is possible to contact this group using only one address.

Multicast Filtering

Term for processes that enable a switch to relay multicasts in a targeted manner.

Multimode Fiber

Multimode fibers are fiber optic cables that are distinguished through core diameters of comparable size. The typical core diameter for step-index fiber optic cables is 100 µm for glass fibers, 200 µm for PCS/HCS fibers and 980 µm for POF fibers.
The graded index fibers on the other hand have a typical core diameter 50 or 62.5 µm. Because of this relatively large core diameter, the light in multimode fibers spreads over several paths and modes.

The distance that can be covered by a multimode fiber depends on several factors: the characteristics of the fiber, the link budgets and the attenuation due to plug connectors, splices and other components.

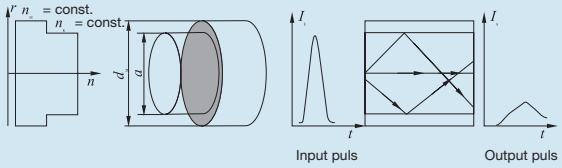
For example:
A 62.5/125 µm fiber with an attenuation of 1 dB/km and a bandwidth of 500 MHz x km should transmit data packets over Fast ETHERNET using light with a wavelength of 1300 nm. The link budget is 11 dB. A reserve of 3 dB should be taken into account. The attenuation of the plug connectors should be ignored.

Attenuation:
Lmax = (Link Budget Reserve)/
fiber attenuation
Lmax = (11 dB-3 dB)/1 dB/km
Lmax = 8 km

Bandwidth length product
Lmax = Bandwidth/Signal bandwidth
Lmax = (500 km x MHz)/125 MHz
Lmax = 4 km

In this example, the maximum distance to be covered is 4 km.

Signal bandwidths:
ETHERNET = 10 MHz, Fast ETHERNET = 125 MHz and Gigabit ETHERNET = 1.25 GHz



Multiplexer

Term for devices or function units that combine several channels of low capacity into one channel of high capacity.

Multiport Bridge

A bridge that connects not only 2 but several LANs together.
In ETHERNET LANs, multiport bridges are also designated as switches.

NAT

Network **A**ddress **T**ranslation.
Term for a protocol that is defined in RFC 1631 and RFC 1918.

NAT-T

NAT-Traversal.
NAT-Traversal. If there is a NAT-Gateway inbetween two IPsec end points IPsec does not work, as the IP-addresses of the end points are also encrypted. NAT-T solves this problem. NAT-T is enable automatically during the handshake if required (and supported).

NEXT

Near-**E**nd **X**ross **T**alk.
A form of crosstalk in which signals of participants that are located on the same side of a twisted pair cable get super-imposed.

NIC

Network **I**nterface **C**ard.
Term for PC insertion cards that enable connection to an ETHERNET network.

NetBEUI

NetBIOS **E**xtended **U**ser **I**nterface.
Enhanced version of the NetBIOS protocol used by network operating systems such as LAN Manager, LAN Server, Windows for Workgroups, and Windows NT.

Network Nodes

Term for network elements such as hubs, switches and routers on which different data transmission paths run together.

Network Management

A general concept for the management, configuration and monitoring of network nodes and the devices connected the same. The tasks of a network management system may be subdivided into error management, configuration management, safety management and performance management. To do this, the network management agent communicates with the network management station using the network management protocol SNMP.

Network Mask

The network mask marks all bits in an IP address for identifying the network and the subnetwork. Also see IP address.

Binary notation	
IP address	10010101.11011010.00010011.01011010
Network mask	11111111.11111111.11111111.00000000
->Subnetwork	10010101.11011010.00010011.00000000
Decimal notation	
IP address	149.218.19.90
Network mask	255.255.255.0
->Subnetwork	149.218.19.0
Available address range	
Host addresses	149.218.19.1 bis 149.218.19.254
Broadcast address	149.218.19.255

NMS

Network **M**anagement **S**tation.
See Network Management.

Node

Term for a participant in a network.

NRZ

Non-**R**eturn to **Z**ero.
Term for a coding process in which the electrical signals do not go back to zero even when there is a sequence of several logical ones.

NRZI

Non-**R**eturn-to-**Z**ero, **I**nvert on ones
Term for a coding process with inverted NRZ signals.

Industrial ETHERNET Lexicon

NVRAM

Non-**V**olatile **RAM**. RAM that retains its contents when a unit is powered off.

ODVA

ODVA (**O**pen **D**evice **V**endor **A**ssociation) is the organization that manages the DeviceNet and EtherNet/IP network technology and standards in addition to promoting their worldwide adoption in industrial automation.

OID

Object **Id**entification.

OLE

Object **L**ink and **E**mbedding.
Term for a central architecture principle in Windows.

On-the-Fly Switching

Working method of switches, see Cut Through.

OPC

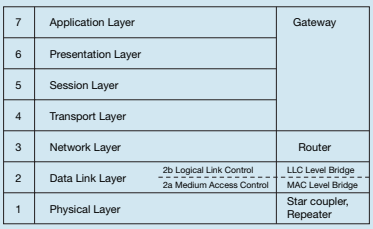
www.opcfoundation.org
OLE for **P**rocess **C**ontrol Standard interface for Windows applications for data exchange concerning process data and status information.

OSI

Open **S**ystems **I**nterconnection
An international standardization program that has been instituted by the ISO and the ITU. The objective is to lay down standards for data networks that ensure the compatibility of devices made by various manufacturers.

OSI Reference Model

Also termed ISO/OSI reference model. This model is divided into 7 Layers that describe the communication of open, distributed systems. The individual layers form a group, that are independent of each other, but each describes an area that is relevant for data transmission and processing. The layers are termed
the Physical Layer (1),
the Data Link Layer (2),
Network Layer (3),
the Transport Layer (4),
the Session Layer (5),
the Presentation Layer (6)
and the Application Layer (7).



OSPF

Open **S**hortest **P**ath **F**irst.
Term for a routing protocol. OSPF uses information given by the routers over the topology of the network in order to find the shortest path between the routers. The precondition for this is that each router creates a routing table in which the current topology of the network is fully displayed. Since each router immediately communicates changes in the topology to the adjacent routers, the routing tables in the routers get constantly updated. The advantage of OSPF over RIP consists in the speed and the better distribution of load.

OUI

Organizationally **U**nique **I**dentifier.
Term for the first 3 bytes of the MAC address.

Packet Size

See ETHERNET Packet.

PAP

Password **A**uthentication **P**rotocol. PPP authentication method. Passwords are transmitted unencoded. PAP is based on user names.

Parallel Detection

Part of the Autonegotiation function. This allows a device to configure itself correctly when attached to another device which does not support auto-negotiation. A port detects the line speed using FLP or NLP, and configures itself for 100 Mbps or 10 Mbps. For duplex mode, HDX is always used.

Patch Field

Term for a patching distribution frame.

Patch Cable

Term for cables that are used for connecting ETHERNET component within a room (19" rack, control cabinet, etc.). Patch cables are mostly used in connection with patch panels.

PCF

Term for a fiber optic cable, the optical core of which is made of silicon glass with an optical jacket consisting of a polymer layer.

PD

Powered **D**evice. Defines the end device (like a IP telephone) in the draft IEEE P802.3af standard (DTE Power via MDI) which defines how to support power over twisted pair cabel over ETHERNET.

PDU

Protocol **D**ata **U**nit.
Term for a data packet assembled on a layer of the OSI reference model that is relayed to the layer below it over a Service Access Point (SAP).

PHY

Physical sublayer. Physical level/ component (at layer 1b).

Ping

Packet **In**ternet **G**roper.
A program for testing connections between 2 IP addresses.

Private/ Public Key

In asymmetrical encryption algorithms, two keys are used: a Private Key and a Public Key. The public key is made available by the future recipient of the data to those who will later send encrypted data to him/her. The recipient is the only one who has the private key. It is used to decrypt the received data.

PLC

Programmable **L**ogic **C**ontrol.
Stored-program control systems.

POE

Power **o**ver **E**thernet.

POF

Plastic **O**ptical **F**iber.
Term for a fiber optic cable, the optical core and jacket of which is made of plastic. POF fibers have a typical core diameter of 0.98 mm.

POL

Power **o**ver **L**AN.

Port

General term for an interface to devices for transmission of data and control information in the transmission and reception direction.

Port Mirroring

A function that enables the copying of incoming and outgoing data at one port of a switch to another port, in order to be analyzed there with an analyzer for example.

Port Security

A function that offers protection against unauthorized access to the network. Switches that support this function offer the possibility of setting, for each port, the terminal device from which data can be transmitted or received. The checks are carried out on the basis of the MAC addresses of the devices connected. If the device is connected to a port, the MAC address of which is not registered, this port can be automatically switched off.

Port Trunking

See Link Aggregation.

PPP

Point-to-**P**oint **P**rotocol.
A protocol of the TCP/IP family for serial data transfer over dial-up connections such as the telephone. This is used for connecting computers that are not permanently connected over LANs to the Internet.

PPPoE

Point-to-**P**oint **P**rotocol.
over **E**THERNET

pps

Packets **p**er **s**econd.
Measurement unit for the switching speed.

PPTP

Point-to-**P**oint **T**unneling **P**rotocol.

Prioritization

In a prioritized data transmission, data packets are switched on the basis of the defined criteria. The tagging of such packets is done at Layer 2 of the OSI reference models in the TAG field and at Layer 3 in the TOS field.

Private Key

See Private/Public Key.

PROFInet

www.profibus.org
A concept that defines the communication from the field level to the conducting level with the integration of profibus and ETHERNET as well as a model for company-wide engineering.

Industrial ETHERNET Lexicon

PSU

Power **S**upply **U**nit. See also PS.

PTP

Precision **T**ime **P**rotocol. Protocol for time synchronisation acc. to IEEE 1588, with a precision of less than 1 µs.

Public Key

See Private/Public Key

QoS

Quality **o**f **S**ervice.
Term for a range of factors that have an effect on the quality of a network. These factors include network breakdown times, delay times, stability of connections and many more. For QoS, there is a series of different definitions.

RADIUS

Remote **A**uthentication **D**ial **I**n **U**ser **S**ervice. A RADIUS Server authenticates a client, who registers for access with a name and password. The password is transmitted encoded.

RAM

Random **A**ccess **M**emory.
Term for a volatile memory.

RARP

Reverse **A**ddress **R**esolution **P**rotocol.
A protocol that delivers statically allocated IP addresses to a MAC address.

RAS

Remote **A**ccess **S**ystem.

Redundancy Manager

Term for a switch or hub in a HIPER-Ring that monitors the ring and in case of an interruption in the ring structure, activates the connection that has been switched off upto that point. After the interruption has been removed, the redundancy manager again switches this connection off. The ring is thereby physically switched off, but from the point of view of communication, it is interrupted.

RFC xxx

Request **f**or **C**omments.
An abbreviation that was coined within the context of the Internet. It is closely linked to the publication of Internet standard.

RIP

Routing **I**nformation **P**rotocol.
A protocol for the cyclic exchange of routing tables between routers within independent networks per broadcast. RIP is one of the oldest, easiest and most widely used routing protocols. The successor of RIP is the more complex OSPF.

RJ45

A widely used plug connector in telephone technology and in LANs. It is also known as the Western plug with 8 poles.

RMON

Remote Network **MON**itoring.
A protocol for network management. RMON defines new classes of data that relate to and can be recorded on the lower layers of the OSI reference model. The data are then transmitted to a network management station using Simple Network Management Protocol (SNMP).

RMON 2

Remote Network **MON**itoring.
A protocol for network management. RMON 2 is an extension of RMON and extends to higher layers of the OSI reference model.

Router

A device that works at Layer 3 of the OSI reference model and connects different segments of the network to each other, or splits-up networks into subnetworks. A router transmits only data packets to other segments that are sent to its own MAC addresses. The router then sends the data packets onward on the basis of routing tables. In other words, the transmitting participant must know that the receiver is not located in the same network segment. The transmitting station obtains this information from the IP address of the recipient. Routing tables are either given as fixed tables or are given by the router itself using routing protocols.

Routing

A function of Layer 3 of the OSI reference model. A distinction is made between dynamic and static routing. In dynamic

routing, routers calculate rules and parameters for path selection through the network. This information is written to routing tables and exchanged using routing protocols between routers. This ensures that the path selection is adapted to the current topology and load distribution of network. In dynamic routing, each telegram is individually routed. As a result, telegrams may arrive at the receiving end in a sequence different to the one in which they were sent. In static routing, the paths for data transmission between the transmitters and receivers is fixed and a specific bandwidth is reserved for each connection. As a result, data packets take the same path between two terminal devices. It is therefore not possible to respond automatically to changes in the topology or in the case of overloads of connections. Since all changes in the network structure are entered into the routers by hand, routers do not have to support any routing protocols in this process. While dynamic routing supports the transmission of data in an optimized manner, in static routing, the transmission of data, speech and video are equally supported.

Routing Protocol

Term for protocols that routers use during dynamic routing in order to exchange information over connected networks amongst each other. This information is stored in routing tables in the routers.

RS 232 C

Recommended **S**tandard 232 C
A widely used serial interface for data transmission with data rates of up to 20 kbit/s and over distances up to 15 m. This interface was standardized by the EIA in 1969 as standard no. 232 in Version C. It is also often referred to as RS 232.

RS 422

Recommended **S**tandard 422
A serial interface for data transmission in full duplex operation. This interface was standardized in the 70s by the EIA as standard no. 422.

RS 485

Recommended **S**tandard 485
A serial interface for data transmission that enables a bus structure with several partici-pants. This interface was standardized by the EIA in the 70s by the EIA as standard no. 485.

RSVP

Resource **R**e**s**er**v**ation Setup **P**rotocol
A protocol that reserves resources for applications over the Internet. After a path has been established from the sender to the receiver, all the routers participating in this path are notified via RSVP that they should reserve specific resources for this connection.

RTCP

Realtime **T**ransport **C**ontrol **P**rotocol.

RTP

Real-**T**ime **P**rotocol.
A protocol that supports real-time applications such as video conferencing on the Internet. In this protocol, additional information such as the nature of the payload data transmitted (speech, video, etc.) or the time of generation of the payload data is transmitted.

Rx

Abbreviation for Receiver.
Term for the connection to a port at which data is received.

SA

Source **A**ddress.
Source address within a data telegram.

SAN

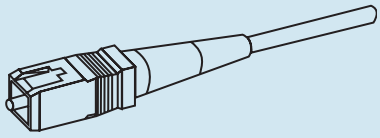
Storage **A**rea **N**etwork.
Network for connecting servers and storage sub-systems, such as disks, RAID and Tape Systems. Mostly based on Fibre Channel.

SAP

Service **A**ccess **P**oint.
Term for the interface between two layers of the OSI reference model where a layer that is placed at a higher level makes use of services in the layer below.

SC

Straight **C**onnector.
A widely used plug connector for fiber optic cables. Also see DSC.



Industrial ETHERNET Lexicon

SCADA

Supervisory **C**ontrol **a**nd **D**ata **A**cquisition.
Term for systems for control and visualization of processes. SCADA systems are based on Windows operating systems as a rule.

SDH

Synchronous **D**igital **H**ierarchy.
A European standard that defines several standards of transmission rates and transmission forms for optical fibers (fiber optic cable).

SFD

Start of **F**rame **D**elimiter.
Part of an ETHERNET telegram.

SFP

Small **f**orm-factor **p**luggable.
A transceiver for 1 Gbps networks that converts serial electric signals to serial optical signals and vice versa. see also GBIC.

SHA-1

Secure **H**ash **A**lgorithm **1**
See also Hash.

Shared Network

Term for an ETHERNET network in which participants share the available bandwidth. In these networks, the CSMA/CD process controls the access of the participants to the transmission medium.

Single-mode Fiber

A single-mode fiber is a fiber optic cable that is characterized by its extremely small core diameter (max. 10 µm). As a result, in this fiber, the light after the cutoff waveline can only get extended along one path – one mode.

The distance that is to be covered by a single-mode fiber depends on several factors: the characteristic data of the fiber, the link budget as well as the attenuation to plug connectors, splices and other components.

Example:
A 9/125 µm fiber with an attenuation (A) of 0.3 dB/km should transmit a wavelength of 1550 nm of Fast ETHERNET data packets. The link budget is 29 dB. A reserve of 3 dB is taken into account. The attenuation of the plug connector is to be ignored.

Attenuation:
Lmax = (Link Budget-Reserve)/ Fiber attenuation
Lmax = (29 dB-3 dB) /0.3 dB/km
Lmax = 86.6 km

In this example, the maximum distance to be covered is 86.6 km.

Signal bandwidths:
ETHERNET = 10 MHz, Fast ETHERNET = 125 MHz and Gigabit ETHERNET = 1.25 GHz

SLA

Service **L**evel **A**greement.

SLIP

Serial **L**ine **I**nternet **P**rotocol.
A protocol for serial data transfer over dialup connections such as the telephone. It is used for connecting computers that are not networked permanently over LANs to the Internet. In comparison to the more recent PPP, SLIP has the disadvantage that erroneous data is not recognized.

SMON

Switch **Mon**itoring.

SMTP

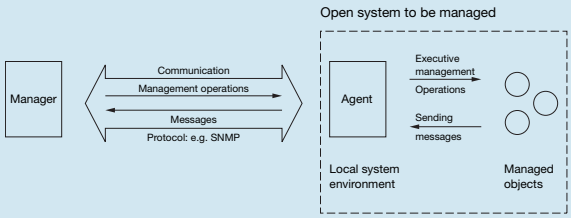
Simple **M**ail **T**ransfer **P**rotocol.
Term for a protocol for sending e-mail messages.

SNAP

Sub**n**etwork **A**ccess **P**rotocol.

SNMP

Simple **N**etwork **M**anagement **P**rotocol.
A protocol for network management. SNMP defines commands for the reading and writing of information, status and error messages as well as providing a structured model. This model consists of agents with their respective Management Information Base (MIB) and a Manager. The Manager is a program that runs on a network management station. Agents are mostly located within devices such as switches, routers and terminal devices that support the SNMP. The task of the agents consists in collecting and preparing data in the MIB. These data is requested at regular intervals by the Manager and displayed on the network management station. The devices are configured, for example, with the data that the Manager writes to the MIBs in question. In urgent cases, the agent can also send messages (traps) directly to the Manager.



SNTP

Simple **N**etwork **T**ime **P**rotocol.
Protocol for time synchronisation, based on NTP, with a precision of 1 to 50 ms. For higher precision PTP (Precision Time Protocol acc. to IEEE 1588) is used.

SOHO

Small **O**ffice **H**ome **O**ffice.
Network solutions and access technologies to the Internet for small offices and offices at home that are not directly connected to large company networks.

Spanning Tree

Term for a protocol that is used in ETHERNET networks for path determination. It is specified as standard IEEE 802.1 D. The spanning tree algorithm prevents the circulation of data packets in a LAN with several possible paths by switching-off individual connections or ports. In addition it determines the optimum path if there are several alternatives. If a path fails due to the fault or interruption, an alternative connection is searched for using the spanning tree protocol. The reconfiguration of a network of this type may takes 30 – 90 seconds.

SPS

Stored memory controlled system.

SQE

Signal **Q**uality **E**rror.
Transmission sent by a transceiver back to the LAN controller (processor) to let the controller know whether the collision circuitry is functional. Also called heartbeat.

SSH

Secure **SH**ell.
Allows an encrypted communication via unsecured networks with authentication of the communicaton partners, integrity and confidentialy of the exchanged data.

Star Coupler

See Hub.

ST

A widely used plug connector for fiber optic cable with bayonet locking. It is also known as BFOC plug. It is standardized as the only plug connector for ETHERNET (10 Mbit/s). ST is a registered trademark of AT&T.

Store-and-Forward

A method of working for switches in which a data packets is first read-in completely and checked for errors before the switch relays the same. This process enables the connection of segments with differing transmission rates.

STP

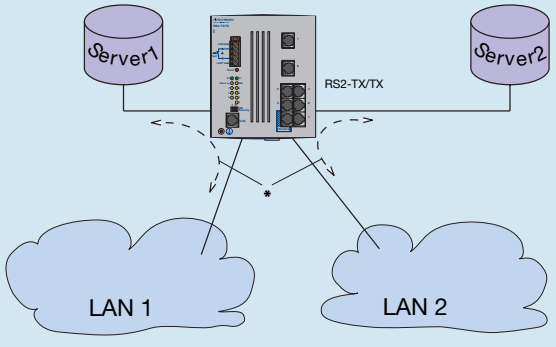
Shielded **T**wisted **P**air.
See Twisted Pair Cable.

Subnetwork Mask

Network mask or subnet mask.
The network mask marks all the bits of an IP address for the identification of the network and the subnetwork.
Also see IP address.

Switch

A device that works on Layer 2 of the OSI reference model. In contrast to hubs, switches analyze the incoming data packets and only relay them to ports at which the receiver is registered. Exceptions from such targeted switching are multicasts and broadcasts that are sent to all ports. The transmission of data packages can be done at several ports simultaneously and in full duplex operation. Thus switches optimize the available bandwidth of the LAN. Recently, Layer 3 and Layer 4 switches have been brought out, that have additionally implemented the partial function of these layers.



* **Simultaneous** transmission possible

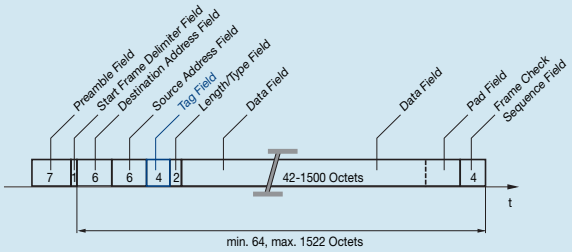
Industrial ETHERNET Lexicon

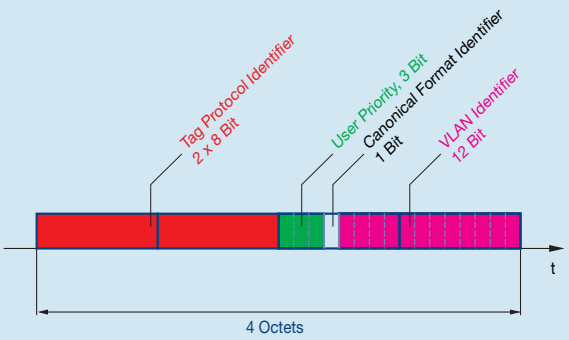
Switched Network
Term for an ETHERNET network that is made up of switches.

Switching Hub
See Switch.

SX
Short Wavelenth (Gigabit-Ethernet).

TAG Field
An optional field in the ETHERNET telegram that contains information about the priority and associated VLAN of the payload data.





TCP
Transmission **C**ontrol **P**rotocol.
A connection-oriented protocol at Layer 4 of the OSI reference model. It enables a full duplex point-to-point connection and extends the Internet protocol below it by functions for data security and connection control.

TCO
Total **C**ost of **O**wnership.

TCP/IP
Transmission **C**ontrol **P**rotocol/**I**nternet **P**rotocol. Most widely used protocol family from layer 3 upwards. Standardized by the IETF. Protocols included in this family are:
Layer 3: IP
Layer 4: TCP, UDP
Layer 5: TFTP, SMTP, FTP, ...
Layer 5 contains layers 5 to 7 of the OSI model.

TIA
Telecommunications **I**ndustry. **A**ssociation. Standardization body.

Telnet
An emulation program based on TCP/IP that executes processes or uses programs on a different device. The system resources of the other device are used. This distinguishes Telnet from FTP for example, which only searches for file systems.

TFTP
Trivial **F**ile **T**ransfer **P**rotocol.
A protocol based on Layer 5 of the OSI reference model and uses UDP for fast and uncomplicated transmission of files. TFTP is considerably quicker than FTP.

Thick Wire
See 10BASE5.

Thin Wire
See 10BASE2.

Topology
A description of the type of line routing. The essential basic forms are line topology, tree topology, ring topology and star topology.

TOS
Type **O**f **S**ervice.
A field in the Internet protocol for prioritizing data.

TP
Twisted **P**air.
See Twisted Pair Cables.

Transceiver
1. General term for a transmission/reception component.
2. Term for media converter within the Rail family.
In addition there are plug-on transceivers for fiber optic cables, twisted pair and coax cables. These transceivers are provided with power supply over the 15-pole AUI interface by the terminal device connected.

Trap
Term for the signaling of error signals to a network management station.

Trunking
See Link Aggregation.

TTL

Time **t**o **L**ive.
A field in the header of the Internet protocol that indicates for how long the packet is valid.

Tunneling

Term for the packaging of data in data packets of another protocol that operates on the same Layer of the OSI reference model. This process is also termed encapsulation.

Twisted Pair Cable

Term for 2 wires that are isolated from each other but are twisted together. A distinction is made in this connection between Unscreened (UTP) and Screened Twisted Pair cables (STP).

Tx

Abbreviation for transmitter. Term for the connection to a port to which data is sent.

Transmission Rate

Term for the speed at which data is transmitted. For ETHERNET: 10, 100, 1000 and 10000 Mbit/s.

UDP

User **D**atagram **P**rotocol.
A connectionless protocol at Layer 4 of the OSI reference model. In contrast to the Transport Control Protocol (TCP), UDP does not have any functions for data security and connection control. As a result it is considerably faster and more suitable for real-time applications such as speech and video transmissions as well as for the transmission of short messages that can be repeated in case of error.

UL

www.ul.com
Underwriters **L**aboratories.
Independent institution in the USA that lays down and executes safety tests for products.

Unicast

Term for sending a message to a specific receiver.

UPS

Uninterruptible **P**ower **S**upply.

URL

Uniform **R**esource **L**ocator.
A standardized scheme for access to hypertext documents and other services through a browser.

USB

Universal **S**erial **B**us.
Term for a serial bus for connection of modems, mice, keyboards, printers and other peripheral devices. A maximum of 127 devices can be connected to the bus. The cable length between two devices must not exceed 5 m.

UTP

Unshielded **T**wisted **P**air.
See Twisted Pair Cable.

VLAN

Virtual **LAN.**
Term for LANs that are logically configured independently of their real physical topology. A distinction is made between static and dynamic VLANs.
In static VLANs, the ports of a switch are permanently allocated to one or more VLANs. A subnetwork is therefore made up of a list of port numbers.
In the case of dynamic VLANs, the subnetworks are made up of MAC or IP addresses that are maintained in a database. The ports of the switches are automatically configured on the basis of this database.
VLANs are intended for making groups of participants who can only communicate with each other in accordance with predefined rules.
A further application of VLANs is the delimitation of broadcasts.

VPN

Virtual **P**rivate **N**etwork.
Virtual private networks are used in connection with public networks for secure data transmission, consequently the entire data traffic is transmitted in encoded form.

VRRP

Virtual **R**edundant **R**outer **P**rotocol.
A protocol for the control of redundant routers.

WAN

Wide **A**rea **N**etwork.
Term for private or public networks that frequently connect several LANs or MANs together.

WDM

Wavelength **D**ivision **M**ultiplex.

WEP

Wired **E**quivalent **P**rivacy.
WEP is a coding procedure in Wireless LANs according to 802.11 for the protection of the transferred data

Industrial ETHERNET Lexicon

Web Interface Term for the interface of a device that enables access to device data over browsers.

WFQ **W**eighted **F**air **Q**ueuing.
A process with which queues in a switch are processed when the data is prioritized. This process ensures that all the queues are serviced on the basis of the bandwidths that are allocated to the queues.

WiFi **W**ireless **F**idelity.
WiFi is a certifying of Wireless LANs (WLAN) according to standard 802.11which is accomplished by the WECA (Wireless Ethernet Compatibility Alliance). With this certifying interoperability of the wireless LAN products are confirmed.
http://www.wi fi.net

Wire Speed Term for the relaying of data with line speed.

WLAN **W**ireless **LAN.**
Wireless data transmission in local networks. Acc. IEEE 802.11, .15, .16 (Bluetooth).

WWDM With WWDM-system (**W**ide **W**avelength **D**ivision **M**ultiplex) networks with limited fiber can increase channel capacity of the fiber by between two locations. A optically multiplexes some single mode optical signals into one composite optical signal. Using the same fiber optic pair, multiple point-to-point applications can be satisfied. This greatly reduces the cost of intalling more fiber.

WWW **W**orld **W**ide **W**eb.
Term for an application in the Internet that enables access to database information through hyperlinks. There are software programs called browsers to view and further process data.

X.25 Data Packet Control Protokoll, used for example by Datex-P.

XML E**x**tended **M**arkup **L**anguage.

Yellow Cable See 10BASE5.

Index by type

Type	Order Number	Page
ML-MS3	943 768-001	113
MM2-2FXM2	943 718-101	99
MM2-2FXM3/2TX1	943 720-101	99
MM2-2FXP4	943 842-101	111
MM2-4FXM3	943 721-101	100
MM2-4TX1	943 722-101	97
MM2-4TX1-EEC	943 722-151	98
MM20-Z6Z6Z6Z6SAHH	943 938-001	96
MM22-T1T1T1T1SAHH	943 938-002	97
MM3-1FXL2/3TX1	943 763-101	101
MM3-1FXLH+/3TX1	943 930-101	100
MM3-1FXM2/3TX1	943 839-101	101
MM3-1FXS2/1FXM2/2TX1	943 929-101	102
MM3-1FXS2/3TX1	943 838-101	102
MM3-1FXS2/3TX1-EEC	943 838-151	103
MM3-2AUI	943 840-101	107
MM3-2FLM4/2TX1-RT	943 117-004	108
MM3-2FXM2/2TX1-EEC	943 761-151	103
MM3-2FXM2/2TX1-RT	943 117-002	109
MM3-2FXM2/2TX1-RT-EEC	943 955-002	110
MM3-2FXM4/2TX1	943 837-101	104
MM3-2FXS2/2TX1	943 762-101	104
MM3-2FXS2/2TX1-EEC	943 762-151	105
MM3-2FXS2/2TX1-RT	943 117-003	109
MM3-2FXS2/2TX1-RT-EEC	943 955-003	110
MM3-4FLM4	943 760-101	105
MM3-4FXM2	943 764-101	106
MM3-4FXM4	943 835-101	106
MM3-4FXP4	943 843-101	112
MM3-4FXS2	943 836-101	107
MM3-4TX1-RT	943 117-001	109
MM3-4TX1-RT-EEC	943 955-001	109
MM3-4TX5	943 841-101	98
MM4-2TX/SFP	943 622-001	94
MM4-4TX/SFP	943 010-001	95
Modem-Kabel	943 222-001	203
MS20-0800SAAEHH04.0.	MS20-0800SAAEHH04.0.	80
MS20-0800SAAPHH04.0.	MS20-0800SAAPHH04.0.	81
MS20-1600SAAEHH04.0.	MS20-1600SAAEHH04.0.	82
MS20-1600SAAPHH04.0.	MS20-1600SAAPHH04.0.	83
MS20-2400SAAEHH04.0.	MS20-2400SAAEHH04.0.	84
MS20-2400SAAPHH04.0.	MS20-2400SAAPHH04.0.	85
MS30-0802SAAEHH04.0.	MS30-0802SAAEHH04.0.	86
MS30-0802SAAPHH04.0.	MS30-0802SAAPHH04.0.	87
MS30-1602SAAEHH04.0.	MS30-1602SAAEHH04.0.	88
MS30-1602SAAPHH04.0.	MS30-1602SAAPHH04.0.	89
MS30-2402SAAEHH04.0.	MS30-2402SAAEHH04.0.	90
MS30-2402SAAPHH04.0.	MS30-2402SAAPHH04.0.	91
MS4128-L2P	943 009-101	76
MS4128-L3E	943 009-201	77
MS4128-L3P	943 009-301	77
OCTOPUS 16M	943 912-001	137
OCTOPUS 16M-2FX	943 912-002	137
OCTOPUS 16M-8POE	943 960-001	137
OCTOPUS 16M-8POE-2FX	943 960-101	138
OCTOPUS 24M	943 923-001	138
OCTOPUS 24M-2FX	943 923-002	138
OCTOPUS 5TX EEC	943 892-001	139
OCTOPUS 8M	943 931-001	136
OCTOPUS 8M-8POE	943 967-001	137
OCTOPUS Terminalkabel	943 902-001	203

Type	Order Number	Page
PowerLION-24 TP	943 886-001	171
PowerLION-XM-10G	943 886-201	174
PowerLION-XM-C130	943 886-501	175
PowerLION-XM-C30	943 886-401	175
RH1-CX+ (NAVY)	943 701-002	18
RH1-TP	943 639-002	18
RPS 120 EEC	943 662-120	201
RPS 30	943 662-003	200
RPS 80 EEC	943 662-080	201
RPS60/48V EEC	943 952-001	200
RS2-3TX/2FX EEC	943 771-001	26
RS2-3TX/2FX-SM EEC	943 772-001	27
RS2-4TX EEC	943 819-001	27
RS2-4TX/1FX EEC	943 773-001	27
RS2-4TX/1FX-SM EEC	943 774-001	28
RS2-5TX	943 732-003	28
RS2-5TX/FX	943 732-102	29
RS2-TX	943 686-003	26
RS20-0400M2M2SDABHH04.0.	943 434-062	49
RS20-0400M2M2SDAEHH04.0.	943 434-001	47
RS20-0400M2T1SDAEHH04.0.	943 434-009	47
RS20-0400S2S2SDAEHH04.0.	943 434-013	48
RS20-0400S2T1SDAEHH04.0.	943 434-011	48
RS20-0400T1T1SDABHH04.0.	943 434-061	49
RS20-0400T1T1SDAEHH04.0.	943 434-007	46
RS20-0800M2M2SDABHH04.0.	943 434-064	53
RS20-0800M2M2SDAEHH04.0.	RS20-0800M2M2SDAEHH04.0.	51
RS20-0800M2M2SDAUHH	RS20-0800M2M2SDAUHH	31
RS20-0800M2T1SDAEHH04.0.	943-434-003	51
RS20-0800M4M4SDAEHH04.0.	943 434-017	52
RS20-0800S2S2SDAEHH04.0.	943 434-019	52
RS20-0800S2S2SDAUHH	RS20-0800S2S2SDAUHH	31
RS20-0800T1T1SDABHH04.0.	943 434-063	53
RS20-0800T1T1SDAEHH04.0.	RS20-0800T1T1SDAEHH04.0.	50
RS20-0800T1T1SDAUHH	RS20-0800T1T1SDAUHH	30
RS20-0900MMM2SDAEHH04.0.	RS20-0900MMM2SDAEHH04.0.	54
RS20-0900VVM2SDAEHH04.0.	RS20-0900VVM2SDAEHH04.0.	55
RS20-1600M2M2SDAEHH04.0.	943 434-005	57
RS20-1600M2M2SDAUHH	943 434-048	33
RS20-1600M2T1SDAEHH04.0.	943 434-025	57
RS20-1600S2S2SDAEHH04.0.	943 434-027	57
RS20-1600S2S2SDAUHH	943 434-053	33
RS20-1600T1T1SDAEHH04.0.	943 434-023	56
RS20-1600T1T1SDAUHH	943 434-047	32
RS20-2400M2M2SDAEHH04.0.	943 434-043	59
RS20-2400M2M2SDAUHH	RS20-2400M2M2SDAUHH	35
RS20-2400S2S2SDAEHH04.0.	943 434-045	59
RS20-2400S2S2SDAUHH	RS20-2400S2S2SDAUHH	35
RS20-2400T1T1SDAEHH04.0.	943 434-041	58
RS20-2400T1T1SDAUHH	RS20-2400T1T1SDAUHH	34
RS30-0802O6O6SDAEHH04.0.	943 434-031	61
RS30-0802O6O6SDAUHH	RS30-0802O6O6SDAUHH	37
RS30-0802OOZZSDAEHH04.0.	RS30-0802OOZZSDAEHH04.0.	61
RS30-0802T1T1SDAEHH04.0.	943 434-029	60
RS30-0802T1T1SDAUHH	RS30-0802T1T1SDAUHH	36
RS30-1602O6O6SDAEHH04.0.	943 434-035	63
RS30-1602O6O6SDAUHH	RS30-1602O6O6SDAUHH	39
RS30-1602T1T1SDAEHH04.0.	943 434-033	62
RS30-1602T1T1SDAUHH	RS30-1602T1T1SDAUHH	38
RS30-2402O6O6SDAEHH04.0.	943 434-039	65
RS30-2402O6O6SDAUHH	RS30-2402O6O6SDAUHH	41

Type	Order Number	Page
RS30-2402T1T1SDAEHH04.0.	943 434-037	64
RS30-2402T1T1SDAUHH	RS30-2402T1T1SDAUHH	40
RS40-0009CCCCSDAEHH04.0.	943-935-001	66
RS40-0009CCCCSDAPHH04.0.	RS40-0009CCCCSDAPHH04.0.	67
RSR20-0800M2M2T1UK9HPHH04.0.	RSR20-0800M2M2T1UK9HPHH04.0.	71
RSR20-0800T1T1T1UK9HPHH04.0.	RSR20-0800T1T1T1UK9HPHH04.0.	70
RSR20-0900MMM2T1UK9HPHH04.0.	RSR20-0900MMM2T1UK9HPHH04.0.	71
RSR30-0603CCO7T1UK9HPHH04.0.	RSR30-0603CCO7T1UK9HPHH04.0.	71
RSR30-0703OOO6T1UK9HPHH04.0.	RSR30-0703OOO6T1UK9HPHH04.0.	71
RSR30-0703OOO6Z6UK9HPHH04.0.	RSR30-0703OOO6Z6UK9HPHH04.0.	72
RT2-TX/FX-SM	943-658-032	19
SmartLION-TP/FX	943 885-005	169
SmartLion-XM-2SFP	943 885-505	175
SmartLion-XM-2TP	943 885-405	174
SmartLion-XM-8FX-MM	943 885-205	174
SmartLion-XM-8FX-SM	943 885-305	175
SmartLion-XM-8TP	943 885-105	175
SPIDER 1TX/1FX	943 890-001	22
SPIDER 1TX/1FX EEC	943 927-001	23
SPIDER 1TX/1FX-SM	943 891-001	23
SPIDER 1TX/1FX-SM EEC	943 928-001	23
SPIDER 3TX-TAP	943 899-001	23
SPIDER 4TX/1FX	943 221-001	24
SPIDER 4TX/1FX EEC	943 221-101	24
SPIDER 4TX/1FX-SM EEC	943 880-001	24
SPIDER 4TX/1FX-ST EEC	943 914-001	24
SPIDER 5TX	943 824-002	25
SPIDER 5TX EEC	943 824-102	25
SPIDER 8TX	943 376-001	25
SPIDER 8TX EEC	943 376-201	25
Terminal-Kabel	943 301-001	203
Upgrade - Industrial HiVision - Op. Ed., 50 Nodes	943 160-050	184
Upgrade - Industrial HiVision - Op. Ed., 100 Nodes	943 160-100	184
Upgrade - Industrial HiVision - Op. Ed., 250 Nodes	943 160-250	185
Upgrade - Industrial HiVision - Op. Ed., 500 Nodes	943 160-500	185
Upgrade - Industrial HiVision - Op. Ed., 25 Nodes	943 160-100	183
XENPAK-10G-LR	943 886-901	175

Index by order number

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