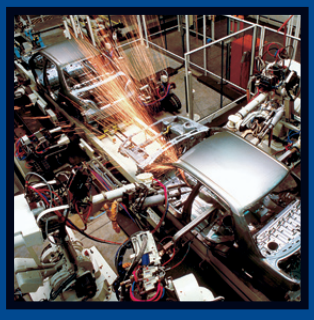
HIRSCHMANN
A BELDEN BRAND

Ruggedized Solutions



When the going gets rough:
You are ready for everything with the RSR and MACH1000 ruggedized solutions from Hirschmann™.

Extreme conditions require extremely robust network solutions: RSR and MACH1000 from Hirschmann™.

The harsher the ambient and operating conditions, the greater is the need for extremely robust network components. With its RSR and MACH1000 Ruggedized Rail Switches, Hirschmann™ offers a highly flexible, long-lived product family that has been designed specifically for use under extreme conditions. Whether high temperature, shock, vibration or EMC concerns – you are equipped with the best when you have switches from Hirschmann™. This ruggedized family will win you over based on its performance in network solutions in the energy sector as well as in transport automation.

The Hirschmann™ brand from Belden is the right partner for the future – and offers convincing solutions throughout the product line when it comes to ruggedized equipment: with a wide and flexible product spectrum up to a 10 port full fiber rail switch and which can be expanded to a complete solution through use of the MACH1000 devices.

RSR
Robust Fast/Gigabit Ethernet Switches for DIN rail in the high quality that you have come to expect from Hirschmann™.

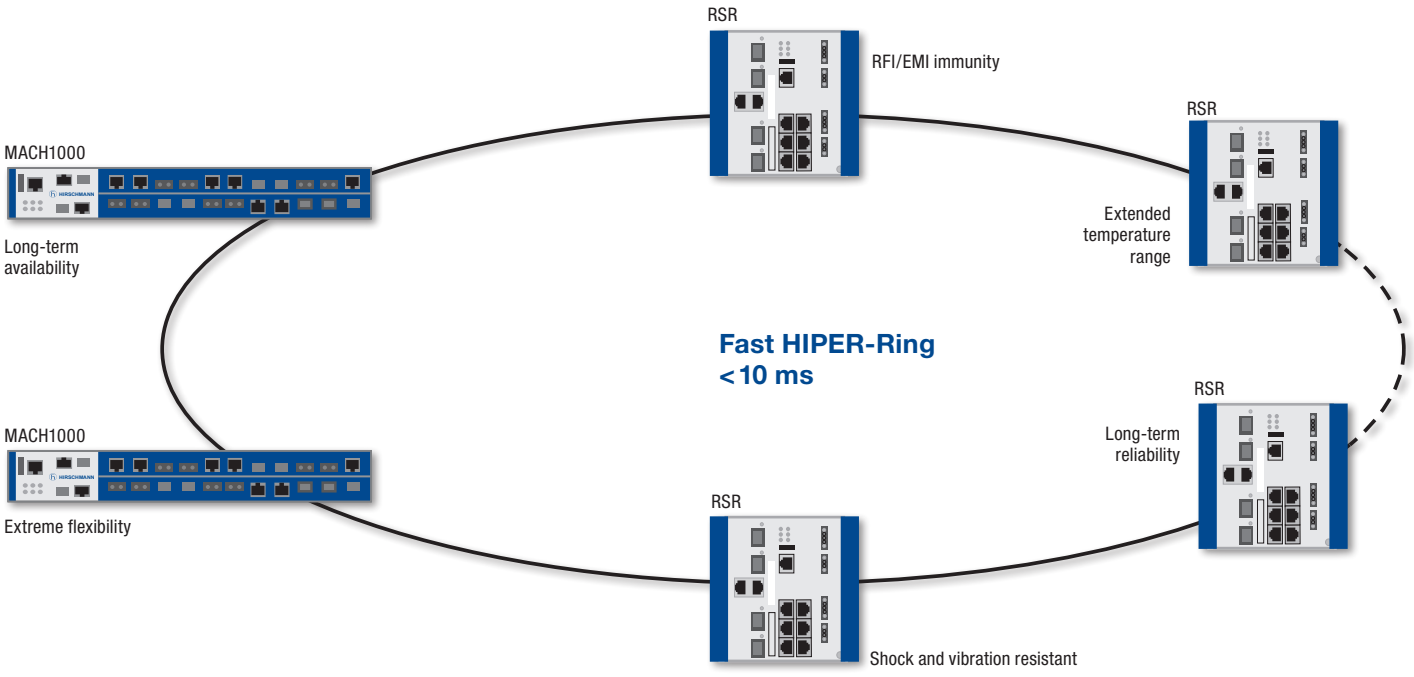
MACH1000
19" Switches for Fast/Gigabit Ethernet applications and installation in control cabinets.

In a new rugged design for DIN rail mounting: The RSR family.

The Rail Switches for Fast and Gigabit Ethernet are now available in a newly designed metal housing. They are therefore now even more rugged and better suited for use under extreme ambient conditions. All components have been designed for an operating temperature range of –40°C up to +85°C. The modular principle offers this same high flexibility that characterizes the OpenRail switches.

The RSR family guarantees maximum resistance to EMI vibrations in all situations. Not only in substations, but also in all applications where maximum ruggedness is required on the DIN rail.

For instance, in optical networks used in rail transportation, in passenger information systems, in conveyor belts or in runway illumination. Also when used for monitoring traffic on highways and bridges or in passenger ships for video-on-demand systems as well as for air-conditioning systems on ships. And even in the military sector where Industrial Ethernet is rapidly becoming the standard, the Ruggedized Rail Switches from Hirschmann™ provide exceptional service.

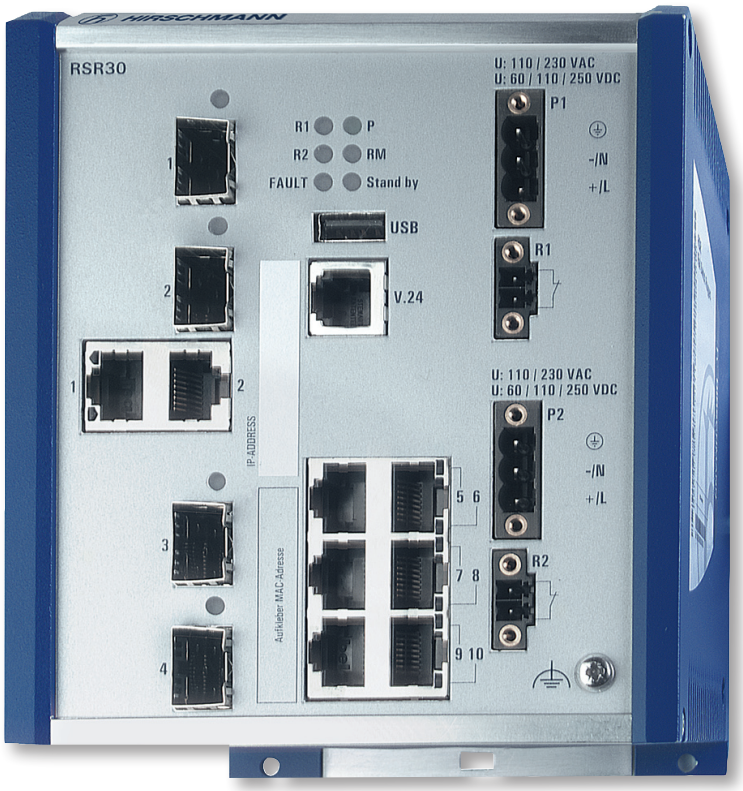


Configuration

Web interface, Command Line Interface (CLI), TELNET, BootP, DHCP, DHCP option 82, HiDiscovery, auto configuration adapter (ACA 21-USB), integrated DHCP Server

Software

OpenRail Layer 2 Professional, a powerful software platform with identical functionality for all products



Ambient conditions

- Temperature –40°C up to +85°C
- Optional conformal coating
- Extreme EMI resistance

Operating voltage

Wide-voltage power supplies from 16.8 – 60 VDC or 48 – 320 VDC and 90 – 265 VAC

Ports

- Up to 3 Gigabit Ethernet ports
- Individually configurable uplink ports

Redundancy functions

HIPER-Ring, RSTP, redundant ring/network coupling, link aggregation

Approvals

IEC 61850-3, IEEE 1613, NEMA TS2, EN 50121-4

Security

Port security (MAC and IP based) SNMP v3, authentication (802.1x), SSH, VLAN

Diagnostic tools

LEDs, log file, syslog, RMON, port mirroring, cable diagnostics (TX), LLDP, address conflict and network fault detection, SFP diagnostics (temperature, optical input and output performance)

RSR family data and facts		
Product name	**RSR20-xx**	**RSR30-xx**
		
Description	Ethernet/Fast Ethernet switches	Ethernet/Fast Ethernet/Gigabit Ethernet switches
	Managed, Industrial Switch for DIN rail, store and forward switching, fanless design, Software Layer 2 Professional	
Port type and quantity	Fast Ethernet ports in total: up to 9	Gigabit Ethernet ports in total: up to 3; Fast Ethernet ports in total: up to 8
More Interfaces		
V.24 interface	1 x RJ11 socket	
USB interface	1 x to connect auto configuration adapter ACA 21-USB	
Gigabit-Ethernet		
Twisted Pair (TP)	–	0 – 100 m
Multimode fiber (MM) 50/125 µm	–	0 – 550 m, 7.5 dB link budget (with M-SFP-SX/LC)
Multimode fiber (MM) 62.5/125 µm	–	0 – 275 m, 7.5 dB link budget (with M-SFP-SX/LC)
Singlemode fiber (SM) 9/125 µm	–	0 – 20 km, 11 dB link budget (with M-SFP-LX/LC)
Singlemode fiber (LH) 9/125 µm		16 – 80 km, 6 – 22 dB link budget (with M-SFP-LH/LC); 44 – 120 km, 13 – 32 dB link budget (with M-SFP-LH+/LC)
Fast-Ethernet		
Twisted Pair (TP)	0 – 100 m	
Multimode fiber (MM) 50/125 µm	0 – 5000 m, 8 dB link budget	
Multimode fiber (MM) 62.5/125 µm	0 – 4000 m, 11 dB link budget	
Singlemode fiber (SM) 9/125 µm	0 – 32.5 km, 16 dB link budget	
Singlemode fiber (LH) 9/125 µm	24 – 87 km, 7 – 29 dB link budget	
Network size – cascadability		
Line/star topology	Any	
Ring structure (Fast HIPER-Ring)	10/100/200 switches	
Fault recovery time	< 10 ms / < 40 ms / < 60 ms	
Power requirements		
Operating voltage	24/36/48 VDC (16.8 – 60 V) or 60/120/250 VDC (48 – 320 V) and 110/230 VAC (90 – 265 V)	
Current consumption at 24 VDC	appr. 160 – 400 mA	appr. 200 – 500 mA
Current consumption at 48 VDC	appr. 80 – 200 mA	appr. 100 – 250 mA
Current consumption at 230 VAC	appr. 15 – 45 mA (appr. 4 – 10 W)	appr. 20 – 50 mA (appr. 5 – 12 W)
Power output	appr. 17 – 36 Btu (IT) h	appr. 18 – 40 Btu (IT) h
Software		
Management	Serial interface, web interface, SNMP v1/v2, HiVision, file transfer via HTTP/TFTP	
Diagnostics	LEDs, log file, syslog, relay contact, RMON, port mirroring, topology discovery 802.1AB, cable tester (TX), address conflict detection, network error detection, SFP diagnostics (temperature, optical input and output power)	
Configuration	Command Line Interface (CLI), TELNET, BootP, DHCP, DHCP Option 82, HiDiscovery, auto configuration adapter (ACA 21-USB)	
Security	Port security multiple addresses (IP and MAC), SNMP v3, SSH, VLAN, authentication (802.1x)	
Redundancy functions	Fast HIPER-Ring, RSTP 802.1w, redundant network/ring coupling, link aggregation, redundant power supplies	
Filter	QoS 4 classes, port priority (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), unknown multicast detection, broadcast-, unicast-, multicast limiter, fast aging, GMRP IEEE 802.1D, flow control 802.3x	
Realtime	SNTP server, PTP/IEEE 1588	
Ambient conditions		
Operating/storage/transport temperature	– 40° C up to + 85° C, optional conformal coating	
Relative humidity	10 % up to 95 % (non-condensing)	
Mechanical construction		
Dimensions (W x H x D)	appr. 125 mm x 140 mm x 120 mm	
Weight	appr. 1 kg	
Protection class	IP30	
Mechanical stability		
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks	
IEC 60068-2-6 vibration	1 mm, (2 – 13.2 Hz), 90 min.; 0.7 g, (13.2 – 100 Hz), 90 min.; 3.5 mm, (3 – 9 Hz), 10 cycles, 1 octave/min.; 1 g, (9 – 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 Vpp/m (80 – 2700 MHz); 1 lHz, 80 % AM	
EN 61000-4-4 fast transients (burst)	4 kV power line, 4 kV signal and data line	
EN 61000-4-5 surge voltage	Power line: 2 kV (line/earth), 1 kV (line/line)	
EN 61000-4-12 damped oscillatory wave	2.5 kV line/earth, 1 kV line/line (1 MHz)	
EN 61000-4-16 mains frequency voltage	30 V; 50 Hz continuous; 300 V, 50 Hz 1 s	
Approvals		
Approvals	cUL 508 (pending), German Lloyd GL (pending), IEC61850-3, IEEE 1613, NEMA TS2 (pending), EN 50121-4	

Free configuration with the Hirschmann™ OpenRail system

RSR30-0902M2T1UCCHPHH04.0.

RSR30- — Model

RSR20	Rail Switch Rugged Fast Ethernet
RSR30	Rail Switch Rugged Gigabit Ethernet uplink ports

09 — Ports Fast Ethernet

06	6 x 100 Mbps Ethernet	08	8 x 100 Mbps Ethernet
07	7 x 100 Mbps Ethernet	09	9 x 100 Mbps Ethernet

02 — Ports Gigabit Ethernet

00	0 x 1000 Mbps Ethernet	03	3 x 1000 Mbps Ethernet
02	2 x 100 Mbps 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) / RJ45	T1	Twisted Pair (Tx) / RJ45
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 Mbps)	Z6	SFP Slot (100 Mbps)

M2 — Ports type 2. uplink

ZZ	2 x SFP Slot (100 Mbps)	M4	Multimode FX ST
O7	Compo Port Gigabit Ethernet	S2	Singlemode FX SC
O6	SFP Slot Gigabit Ethernet	S4	Singlemode FX ST
T1	Twisted Pair (Tx) / RJ45	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 Mbps)

T1 — Remaining ports

T1	Twisted Pair (Tx) / RJ45	Z6	SFP Slot (100 Mbps)

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 VDC	K	60/120/250 VDC and 110/230 VAC

C — Voltage range 2

9	Not available	K	60/120/250 VDC and 110/230 VAC
C	24/36/48 VDC		

H — Approvals

H	UL508, GL, IEC 61850; IEEE 1613; EN 50121

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

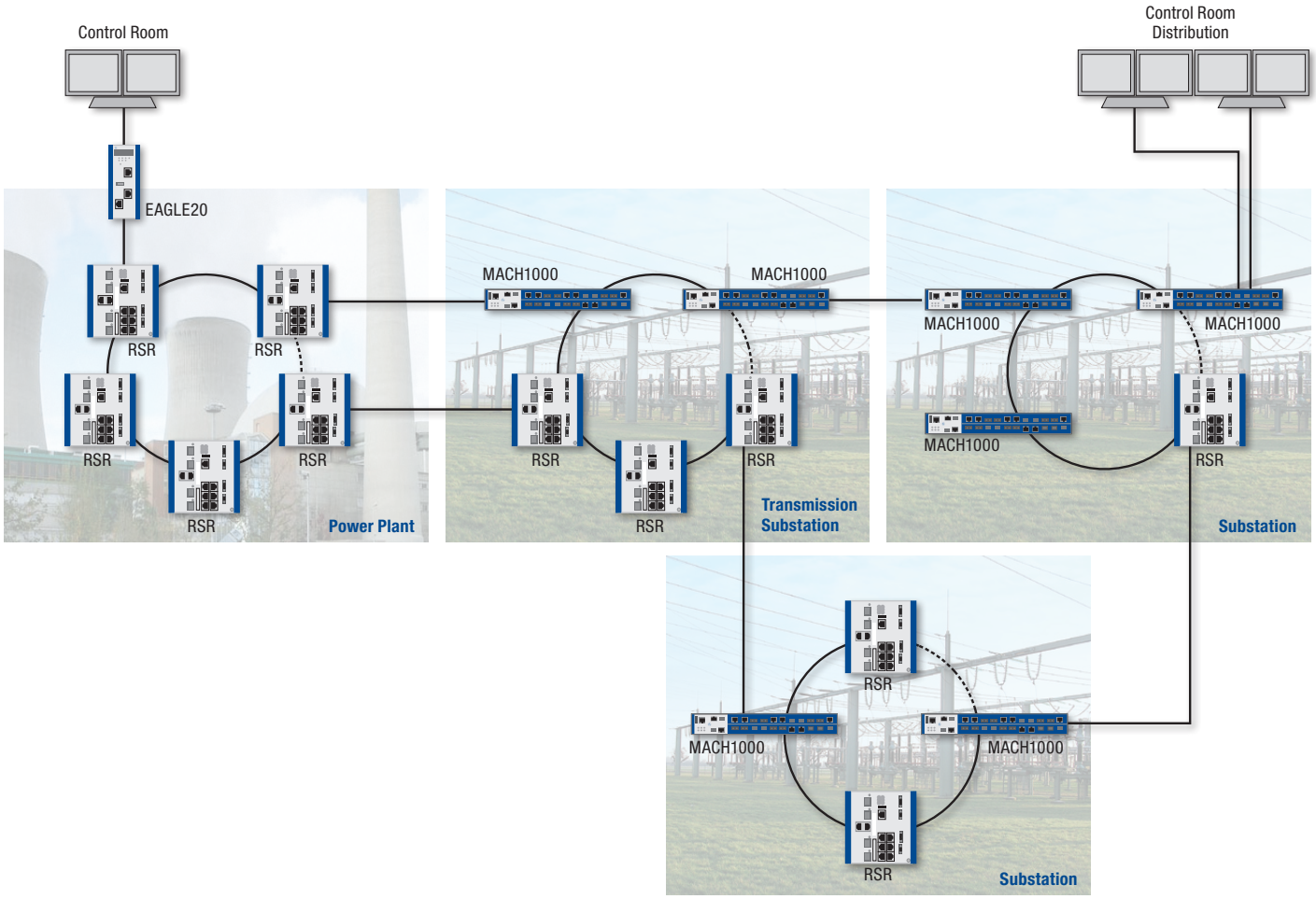
Use our online tool to configure your rail switch at configurator.hirschmann.com

Strong not only in the power zone: The MACH1000 family.

The robust MACH1000 devices – proven as Substation switches – have been designed specifically for the requirements of the power generation and distribution sectors. However, their exceptional performance is not limited only to these – they perform exceptionally well under extreme ambient conditions and at high temperatures also in transport automation, in the military sector and in industrial automation.

The MACH1000 high-performance switches for Gigabit Ethernet applications are based on a comprehensive system with complete modularity, and integration into the OpenRail concept ensures maximum flexibility and variability. With their compact design in a 19" housing, a high port density of up to 28 ports and simple and convenient ring configuration, these devices exhibit their strengths to the fullest extent in ruggedized applications. Here, the extended temperature range of –40°C up to +85°C, the extreme EMI characteristics as well as the shock and vibration resistance represent additional benefits.

With the new MACH1000 variants, Hirschmann™ now also offers expansion from two to four Gigabit Ethernet ports and therefore new opportunities. Also new is the rugged M12 plug-in connector, which is intended specifically for use in harsh operating environments. Power over Ethernet and the MACH1000 variant with rear-facing, protected ports, which leave an uncluttered front panel are optional.



Ports

- Up to 28 ports
- Up to 4 Gigabit ports

Approvals

- IEEE 1613
- IEC 61850-3
- EN 50121-4

Security

Port security (MAC and IP based), SNMP v3, authentication (802.1x), SSH

Modular ordering concept

- Multimode, Singlemode, Long-Haul, GE-SFP
- Freely selectable port assignment

Redundancy functions

Fast HIPER-Ring, RSTP, redundant network/ring coupling, link aggregation

Diagnostic tools

LEDs, log file, syslog, port mirroring, cable diagnostics (TX), address conflict and network fault detection, SFP diagnostics (temperature, optical input and output performance)

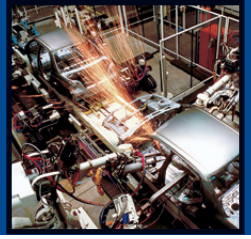
Ambient conditions

- Temperature –40°C up to +85°C
- Optional conformal coating
- Extreme EMI resistance

Software

OpenRail Layer 2 Professional, a software platform with consistent functionality for all products

MACH1000 family Data and Facts		
Product description	**MAR1020-xx**	**MAR1030-xx**
		
Description	Ethernet/Fast Ethernet switches	Ethernet/Fast Ethernet/Gigabit Ethernet switches
	Managed, Industrial switch for 19" cabinet, store and forward-switching, fanless design, Software Layer 2 Professional	
Port type and quantity	Fast Ethernet ports in total: up to 24 24 x FE modular order system, granularity 2	Gigabit Ethernet ports in total: up to 4; 2 x Combo, or 4 TX, or 4 SFP Slots, or 2 TX / 2 SFP Slots Fast Ethernet ports in total: up to 24 24 x FE modular order system, granularity 2
More Interfaces		
V.24 interface	1 x RJ11 socket	
USB interface	1 x to connect auto configuration adapter ACA 21-USB	
Gigabit Ethernet		
Twisted Pair (TP)	–	0 – 100 m
Multimode fiber (MM) 50/125 µm	–	0 – 550 m, 7.5 dB link budget (with M-SFP-SX/LC)
Multimode fiber (MM) 62.5/125 µm	–	0 – 275 m, 7.5 dB link budget (with M-SFP-SX/LC)
Single mode fiber (SM) 9/125 µm	–	0 – 20 km, 11 dB link budget (with M-SFP-LX/LC)
Single mode fiber (LH) 9/125 µm		16 – 80 km, 6 – 22 dB link budget (with M-SFP-LH/LC); 44 – 120 km, 13 – 32 dB link budget (with M-SFP-LH+/LC)
Fast Ethernet		
Twisted Pair (TP)	0 – 100 m	
Multimode fiber (MM) 50/125 µm	0 – 5000 m, 8 dB link budget	
Multimode fiber (MM) 62.5/125 µm	0 – 4000 m, 11 dB link budget	
Singlemode fiber (SM) 9/125 µm	0 – 32.5 km, 16 dB link budget	
Singlemode fiber (LH) 9/125 µm	24 – 87 km, 7 – 29 dB link budget	
Network size – cascadability		
Line/star topology	Any	
Ring structure (Fast HIPER-Ring)	10/100/200 switches	
Fault recovery time	< 10 ms / < 40 ms / < 60 ms	
Power requirements		
Operating voltage	24/36/48 VDC (18 – 60 V) or 120/250 VDC (77 – 320 V) and 110/230 VAC (90 – 265 V)	
Current consumption at 24 VDC	1250 mA max, if all ports are equipped with fiber	1400 mA max, if all ports are equipped with fiber
Current consumption at 230 VAC	140 mA (32 W) max, if all ports are equipped with fiber	150 mA (35 W) max, if all ports are equipped with fiber
Power output	max. 110 Btu (IT) h	max. 120 Btu (IT) h
Software		
Management	Serial interface, web interface, SNMP v1/v2, HiVision, file transfer via HTTP/TFTP	
Diagnostics	LEDs, log file, syslog, relay contact, RMON, port mirroring, topology discovery 802.1AB, cable tester (TX), address conflict detection, network error detection, SFP diagnostics (temperature, optical input and output power)	
Configuration	Comand line interface (CLI), TELNET, BootP, DHCP, DHCP Option 82, HiDiscovery, auto configuration adapter (ACA 21-USB), integrated DHCP server, automatic invalid configuration undo	
Security	Port security multiple addresses (IP and MAC), SNMP v3, SSH, VLAN, authentication (802.1x)	
Redundancy functions	Fast HIPER-Ring, RSTP 802.1w, redundant network/ring coupling, link aggregation, redundant power supplies	
Filter	QoS 4 classes, port priority (IEEE 802.1D/p), VLAN (IEEE 802.1Q), multicast (IGMP snooping/querier), unknown multicast detection, broadcast/ unicast/multicast limiter, fast aging, GMRP IEEE 802.1D, flow control 802.3x	
Realtime	SNTP Server, PTP/IEEE 1588	
Ambient conditions		
Operating/storage/transport temperature	– 40° C up to + 85° C, optional conformal coating	
Relative humidity	10 % up to 95 % (non-condensing)	
Mechanical construction		
Dimensions (W x H x D))	445 mm x 44 mm x 308 mm (345 mm)	
Weight	appr. 5 kg	
Protection class	IP30	
Mechanical stability		
IEC 60068-2-27 shock	15 g, 11 ms duration, 18 shocks	
IEC 60068-2-6 vibration	1 mm, (2 – 13.2 Hz), 90 min.; 0.7 g, (13.2 – 100 Hz), 90 min.; 3.5 mm, (3 – 9 Hz), 10 cycles, 1 octave/min.; 1 g, (9 – 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 Vpp/m (80 – 2700 MHz); 1 kHz, 80 % AM	
EN 61000-4-4 fast transients (burst)	4 kV power line, 4 kV signal and data line	
EN 61000-4-5 surge voltage	Power line: 2 kV (line/earth), 1 kV (line/line)	
EN 61000-4-12 damped oscillatory wave	2.5 kV line/earth, 1 kV line/line (1MHz)	
EN 61000-4-16 mains frequency voltage	30 V; 50 Hz continous; 300 V, 50 Hz 1 s	
Approvals		
Approvals	cUL 508 (pending), German Lloyd optional (pending), IEC 61850-3, IEEE 1613, NEMA TS2 (pending), EN 50121-4, EN 50155 (pending)	



Free configuration with the Hirschmann™ OpenRail system

MAR1030-CCMMMMMMMVVZZTTTTTTTTTTTTTFFFF99UGCHPHH04.0.

MAR1030-

Model

MAR1020	Fast Ethernet
MAR1030	Gigabit Ethernet
MAR1022	FE with PoE
MAR1032	GE with PoE
MAR1120	FE ports on rear
MAR1130	GE ports on rear
MAR1122	FE PoE and ports on rear
MAR1132	GE PoE and ports on rear

CC

Ports GE

99	not present
CC	2 ports Combo (10/100/1000BASE TX RJ45 plus related FE/GE-SFP Slot)
4O	4 ports SFP 1000 Mbps
4T	4 ports 10/100/1000BASE TX RJ45
OT	2 ports SFP 1000 Mbps + 2 ports 10/100/1000BASE TX RJ45

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
FF	23 + 24
FF	25 + 26
99	27 + 28

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 · 25 + 26 · 27 + 28

99	not present	
TT	2 x Twisted Pair (Tx)	10/100 Mbps RJ45
MM	2 x Mulitmode	100 Mbps SC
JJ	2 x Mulitmode	100 Mbps MTRJ
NN	2 x Mulitmode	100 Mbps ST
VV	2 x Singlemode	100 Mbps SC
UU	2 x Singlemode	100 Mbps ST
LL	2 x Singlemode LH	100 Mbps SC
GG	2 x Singlemode LH+	100 Mbps SC
77	2 x SFP Slot	100 Mbps SFP
RR	2 x Twisted Pair (Tx)	10/100 Mbps M12
FF	2 x Mulitmode	10 Mbps ST

U

Temperature range

S	0° C up to + 60° C
U	– 40° C up to + 85° C
F	– 40° C up to + 85° C, including conformal coating

G

Power supply 1

C	24/36/48 VDC
G	110/250 VDC / 110/230 VAC
L	24/36/48 VDC connector
M	110/250 VDC / 110/230 VAC connector

C

Power supply 2

L	24/36/48 VDC connector
M	110/250 VDC / 110/230 VAC connector

H

Approvals

H	cUL508 (pending), GL, IEC 61850-3, IEEE 1613

P

Software version

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

H

Configuration

H	Standard
X	Customer specific

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 configuration with our online tool at configurator.hirschmann.com

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