



Welcome to the Hirschmann Power Zone:
**The new MACH1000 Substation
Switches.**

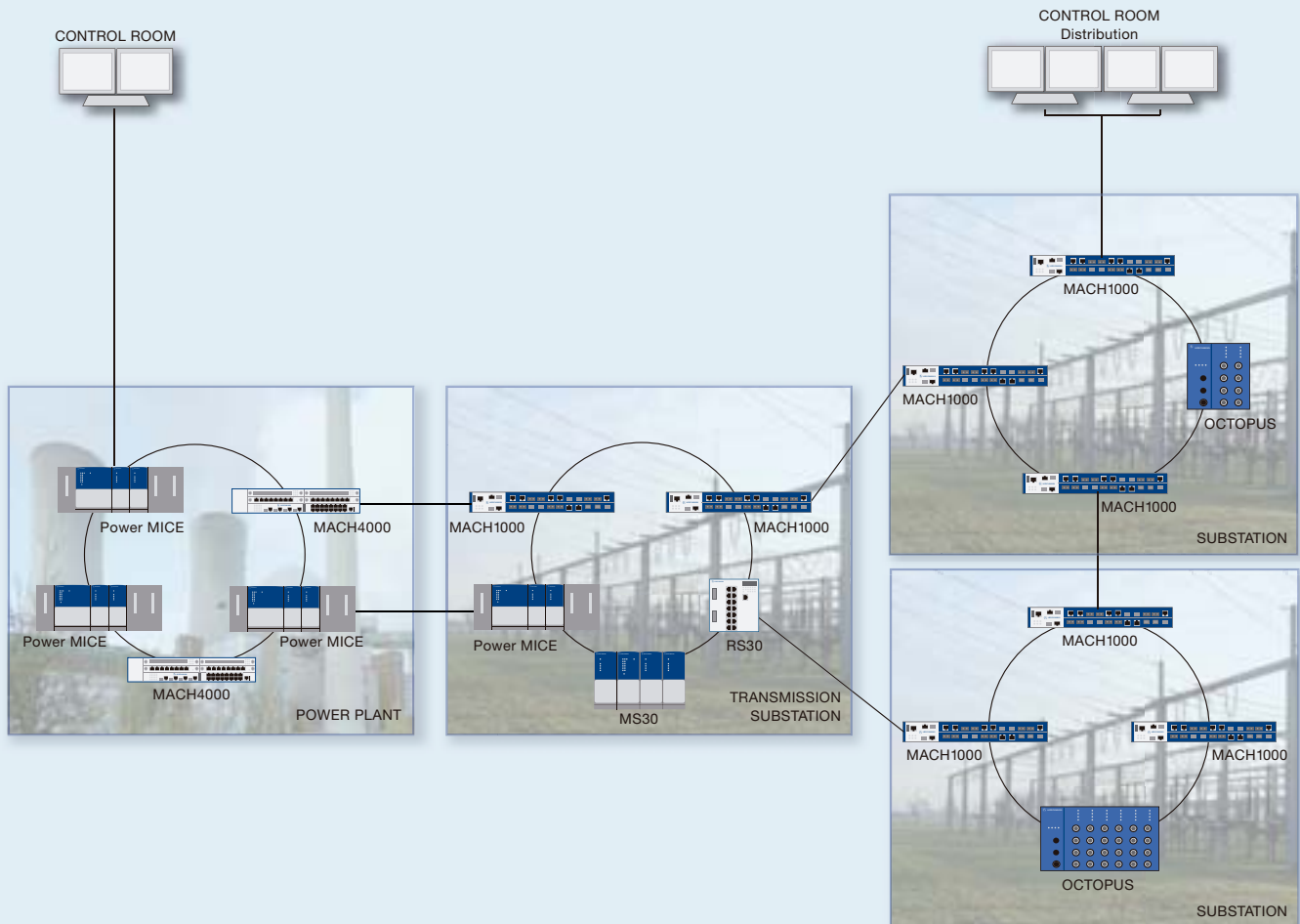
- Ruggedized Gigabit-ETHERNET switches
- Total connectivity, uncompromising modular design
- Extended temperature range: -40°C up to $+85^{\circ}\text{C}$
- Extremely high RFI/EMI immunity
- High port density, up to 26 ports
- High-performance switches in a compact 19" housing



HIRSCHMANN

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Holistic solutions from Hirschmann: Now available in ruggedized versions.



Applications

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.

The devices provide outstanding performance in transportation, industrial automation and military applications. Railroad optical networks, passenger

information systems in train stations and onboard trains, conveyor systems, runway lighting at airports, marine applications, traffic surveillance on superhighways, bridges and in tunnels are just a few examples.

Hirschmann's MACH1000 switches provide reliable service in military applications (e. g. on board naval vessels), where Industrial ETHERNET is now becoming the standard.

Faster, farther, more powerful: The new substation switches from Hirschmann.

Besides the MACH1000, Hirschmann's OpenRail series of compact switches is also a good choice for substation applications. Simply select the "H" approval rating when you configure your system.

A tool is available at configurator.hirschmann.com to help you configure your OpenRail Switches.



Requirements and solutions

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 substation applications. You need products with excellent noise immunity and a wide operating temperature range to maintain communications in the presence of strong electromagnetic fields.

However, the Hirschmann portfolio is by no means limited to special products which are designed for very extreme conditions. The company offers one-stop shopping by offering synergistic networking products such as the MACH4000 backbone switches, EAGLE security and BAT wireless applications which complement the OpenRail and IP 67 OCTOPUS switches.

Power and performance: The new ruggedized substation switches.



Use the Hirschmann OpenRail system to configure your substation switch.

MAR1030-CCMMMMMMVVZZTTTTTTTTTTTT99UGCHPHH03.0.

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	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	
MM 3+4		99	not assembled
MM 5+6		TT	2 x Twisted pair (TX) 10/100 Mbit RJ 45
VV 7+8		MM	2 x Multimode 100 Mbit SC
ZZ 9+10		JJ	2 x Multimode 100 Mbit MTRJ
TT 11+12		NN	2 x Multimode 100 Mbit ST
TT 13+14		VV	2 x Singlemode 100 Mbit SC
TT 15+16		UU	2 x Singlemode 100 Mbit ST
TT 17+18		LL	2 x Singlemode LH 100 Mbit SC
TT 19+20		GG	2 x Singlemode LH+ 100 Mbit SC
TT 21+22		ZZ	2 x SFP Slot 100 Mbit SFP
99 23+24	Temperature range	S 0° C up to +60° C	
U		U -40° C up to +85° C	
G		F -40° C up to +85° C with Conformal Coating	
C	Power supply 1	C 24/36/48 VDC	
H		G 110/250 V DC / 110/230 VAC	
P	Power supply 2	C 24/36/48 VDC	
H		G 110/250 V DC / 110/230 VAC	
H		9 empty	
03.3.	Approvals	H UL508, GL, IEC 61850-3, IEEE 1613	
	Software version	P Professional: Enhanced software plus security, extended diagnostic and redundancy	
	Configuration	H Standard	
		X Customer specific	
	OEM-type	H Standard	
		X Customer specific	
	Software release	03.0. Software release 3.0	

Compulsory field Optional

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

The new MACH1000 devices at a glance.

The MACH1000 family

Product name	ETHERNET/Fast-ETHERNET switch	ETHERNET/Fast-/Gigabit-ETHERNET switch
Product description		
Description	modular, 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, granularity 2	Gigabit-ETHERNET ports in total: 2; 2 x combo ports (10/100/1000BASE TX RJ45 plus related FE/GE-SFP slot) Fast-ETHERNET ports in total: up to 24 24 x FE modular, granularity 2
Type	MAR1020-xx	MAR1030-xx
More interfaces		
V.24 interface	1 x RJ11 socket	
USB interface	1 x to connect autoconfiguration adapter ACA21-USB	
Gigabit-ETHERNET Network size – length of cable		
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 Network size – length of cable		
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 – cascadiability		
Line/star topology	any	
Ring structure (HIPER-Ring)	100 switches	
Fault recovery time	typ. 50 ms (fiber)	
Power requirements		
Operating voltage	24/36/48 V DC (9,6–60 V), or 120/250 V DC (77–320 V) and 110/230 V AC (90–265 V)	
Current consumption 24 VDC	1250 mA max, if all ports are equipped with fiber	1400 mA max, if all ports are equipped with fiber
Current consumption 48 VDC	625 mA max, if all ports are equipped with fiber	700 mA max, if all ports are equipped with fiber
Current consumption 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 in Btu (IT) h	110 max	120 max
Software		
Management	Serial interface, web-interface, SNMP V1/V2, HiVision file transfer SW HTTP/TFTP	
Diagnostics	LEDs, log-file, syslog, signal relay, RMON, port mirroring, topology discovery 802.1AB, cable tester (TX)	
Configuration	Command line interface (CLI), TelNet, BootP, DHCP, DHCP option 82, HIDiscovery, autoconfiguration adapter (ACA21-USB, ACA11 read support)	
Security	Port security (IP and MAC), SNMP V3, SSH, authentication (802.1x)	
Redundancy functions	HIPER-Ring (ring structure), 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	
Realtime	SNTP server, PTP/IEEE 1588	
Flow control	Flow control 802.3x	
Ambient conditions		
Operating temperature	–40° up to +85° C	
Storage/transport temperature	–40° up to +85° C	
Protective paint on PCB	optional conformal coating	
Relative humidity (non-condensing)	10 % up to 95 %	
Mechanical construction		
Dimensions (W x H x D)	445 mm x 44 mm x 308 mm	
Mounting	19" cabinet	
Weight	appr. 5 kg	
Protection class	IP 30	
Mechanical construction		
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) IEEE 1613: power line: 5 kV (line/earth)	
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	
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)	
German Lloyd	GL (pending)	
Substation	IEEE 61850-3, IEEE 1613	



Product features

The Hirschmann family of substation switches offers standardized connectivity solutions. These high-reliability switches reduce installation, configuration and maintenance costs to a minimum.

When they are used in combination with other Hirschmann network products, the switches provide a total solution extending from the backbone right down to the IP67 field level.

- IEC61850-3 and IEEE 1613 conformity
- Extended temperature range: – 40° C up to + 85° C
- User-selectable port assignment
- Extremely high RFI/EMI immunity
- Integration into redundant HIPER-Ring topology
- Fast switch-over/resiliency: < 50 ms
- OpenRail (MICE and Rail) are also substation approved – using H variation
- Fast-/Gigabit-ETHERNET technology
- Maximum efficiency

Hirschmann Competence Center

When you need highly efficient and complete substation solutions, while maintaining high quality and reliability, the Hirschmann Competence Center has the expertise you are looking for. You get professional advice, service and support from the pioneer in industrial

network technology. Why not contact us to discuss your individual needs. We are ready to take on your most demanding challenges, regardless as to where you may need them.

www.hicomcenter.com



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- Sales subsidiaries
- Selected distribution partners

Hirschmann Automation and Control GmbH

Industrial ETHERNET

FiberINTERFACES

Industrial Connectors

Electronic Control Systems

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"The information/details in this publication merely contain general descriptions or performance factors which, when applied in an actual situation, do not always correspond with the described form, and may be amended by way of the further development of products. The desired performance factors shall only be deemed binding if these are expressly agreed on conclusion of the contract.

Please note that some characteristics of the recommended accessory parts may differ from the appropriate product. This might limit the possible operating conditions for the entire system."