

Workgroup Rack-mount Switches



Industrial Workgroup Switches MACH100 Switches



Hirschmann has expanded its 19" rack switch product portfolio with the release of the MACH100 family, allowing workgroups to be networked by either copper and/or fiberoptic cable. The switches are offered in versions with 8 or 24 permanently installed 10/100 Mbps RJ45 Ethernet ports, or as modular devices with 8 permanent ports and slots for 2 additional 8 port media modules. Both versions offer two RJ45/SFP Gigabit Combo ports for connection to the network backbone. An all-Gigabit version with 24 10/100/1000 ports is also available. The switches are designed for a temperature range of 0° C to +50° C and support a large range of management and redundancy modes, as well as several functions for configuration and diagnostics. Further features are fanless cooling as well as an optional power supply. As a result the devices of the MACH100 family offer a high level of security and flexibility for Ethernet network design or upgrade in production-related areas.

Features and Benefits

- Fanless design
- Hot-swappable modules
- Optional redundant power inputs
- ACA 21 USB configuration backup
- CLI and WEB management interface
- L2P firmware - DHCP Option 82, HiDiscovery, HIPER-Ring, MRP, RSTP, disable learning, STNP, Industrial Profiles (EtherNet/IP, PROFINET)
- Fully integrated in Industrial HiVision
- Temperature range: 0° C to +50° C

NOTE: *SFPs need to be purchased separately (see accessories on page 23 for SFPs).

MACH100 MODULAR		
Part No.	Order No.	Ports
MACH102-8TP	943 969-001	8 x 10/100BASE-TX RJ45 ports, 2 x GE combo ports (100 or 1000 MBps SFPs) and 2 x 8 port media module slots
MACH102-8TP-R	943 969-101	Same as -001 above, but w/ redundant 110/220 VAC power supply
FIXED PORTS		
Part No.	Order No.	Ports
MACH102-8TP-F	943 969-201	8 x 10/100BASE-TX RJ45 ports and 2 x GE combo ports (100 or 1000 MBps SFPs)
MACH102-8TP-FR	943 969-301	Same as -201, but w/ redundant 110/220 VAC power supply
MACH102-24TP-F	943 969-401	24 x 10/100BASE-TX RJ45 ports and 2 x GE combo ports (100 or 1000 MBps SFPs)
MACH102-24TP-FR	943 969-501	Same as -401, but w/ redundant 110/220 VAC power supply
MACH104-20TX-F	942 003-001	20 x GE TX Ports, 4 x GE RJ45/SFP combo ports
MACH104-20TX-F-4PoE	942 003-201	Same as MACH104-20TX-F, 4 of the 20 10/100/1000 ports are 802.11af PoE
MACH104-20TX-FR	942 003-101	Same as MACH104-20TX-F, redundant power supply
MEDIA MODULES (2 Max. per Modular MACH 100)		
Part No.	Order No.	Ports
M1-8TP-RJ45	943 970-001	8 x 10/100BASE-TX, RJ45 media module
M1-8MM-SC	943 970-101	8 x 100BASE-FX MM, SC media module
M1-8SM-SC	943 970-201	8 x 100BASE-FX SM, SC media module
M1-8SFP	943 970-301	8 x 100BASE-X SFP media module

Über-Rugged™ Rack-mount Switches



Über-Rugged™ Switches MACH1000 - 19" Rack-mount Switches



Why Über-Rugged™?

This is the only way to describe a switch that goes above and beyond the already rugged capabilities of Hirschmann's switches by being extremely immune to noise and able to provide maximum uptime in extreme environmental conditions. The MACH1000 is available in a 24-port custom configurable design with two or four additional Gigabit uplink (RJ45 and/or SFP for fiber) and PoE ports. The MACH1000 is also available in an all-Gigabit version, offering 16 10/100/1000 RJ45/SFP combo ports to provide countless copper/fiber combinations.

Features and Benefits

- 19" rack-mount, fanless design
- -40° C to +85° C operating temperature (conformal coating available)
- Exceeds IEC 61850-3 and IEEE 1613 standards for electric power substation communication equipment
- Exceeds NEMA TS-2 standard for traffic control equipment
- Redundant 24/36/48 VDC or 120/250 VDC and 110/230 VAC
- Extremely efficient components for minimal heat generation and high MTBF (mean time between failure)
- Ultra-fast ring recovery time < 10 ms



Über-Rugged™ Rack-mount Switches - Configurations

MAR1030-CCMMMMMMVVZZTTTTTTTTTTTT99UGCHPHH04.0. / MACH1000 19" Switch			
MAR1030-		Design/Model	
		MAR1020	Fast Ethernet uplink
		MAR1030	Gigabit Ethernet uplink
		MAR1022	Fast Ethernet uplink with 4 ports PoE
		MAR1032	Gigabit Ethernet uplink with 4 ports PoE
		MAR1120	Fast Ethernet uplink with ports at the back
		MAR1130	Gigabit Ethernet uplink with ports at the back
		MAR1122	Fast Ethernet uplink with ports at the back and 4 ports PoE
		MAR1132	Gigabit Ethernet uplink with ports at the back and 4 ports PoE
		MAR1040	Full GE-Switch
		MAR1042	Full GE-Switch, PoE
		MAR1140	Full GE-Switch, ports on rear
		MAR1142	Full GE-Switch, ports on rear, PoE
CC		Gigabit Ethernet Ports	
		99	Not present
		CC	2 ports combo (2 x 10/100/1000TX or 2 x GE SFP)
		40	4 ports GE SFP
		4T	4 ports 10/100/1000TX
		OT	2 ports GE SFP and 2 ports 10/100/1000TX
		4C4C4C4C9999	16 RJ45/SFP combo ports (supports 100 and 1000 Mbps SFPs) - only for use with full GE switch
MM	1 + 2	Fast Ethernet Ports - Ports 1 to 24 (not applicable for MAR1040)	
MM	3 + 4	TT	2x Twisted Pair (TX) 10/100 Mbps RJ45
MM	5 + 6	RR	2x Twisted Pair (TX) 10/100 Mbps M12
VV	7 + 8	FF	2x Multimode 10 Mbps ST
ZZ	9 + 10	MM	2x Multimode 100 Mbps SC
TT	11 + 12	JJ	2x Multimode 100 Mbps MTRJ
TT	13 + 14	NN	2x Multimode 100 Mbps ST
TT	15 + 16	VV	2x Singlemode 100 Mbps SC
TT	17 + 18	UU	2 x Singlemode 100 Mbps ST
TT	19 + 20	LL	2x Singlemode LH 100 Mbps SC
TT	21 + 22	GG	2x Singlemode LH+ 100 Mbps SC
99	23 + 24	ZZ	2x SFP Slot 100 Mbps SFP
		99	Not present
U		Temperature Range	
		S	Standard 0° C up to + 60° C
		U	Extended - 40° C up to + 85° C, not MAR1040
		F	Extended - 40° C up to + 85° C inclusive Conformal Coating, not MAR1040
		T	Extended (default temp range) -40° up to +70° C (only MAR1040)
		E	Extended -40° up to +70° C with conformal coating (only MAR1040)
C		Power Supply 1	
		C	24/36/48 VDC (spring clip, not MAR1040) G 110/250 VDC/110/230 VAC (spring clip, not MAR1040)
		L	24/36/48 VDC (plug-in connector) M 110/250 VDC/110/230 VAC (plug-in connector)
C		Power Supply 2	
		C	24/36/48 VDC (spring clip, not MAR1040)) G 110/250 VDC/110/230 VAC (spring clip, not MAR1040)
		L	24/36/48 VDC (plug-in connector) M 110/250 VDC/110/230 VAC (plug-in connector)
		9	not present
H		Approvals	
		H	cUL508, cUL1604 Class1 Div2, German Lloyd, IEC 61850-3, IEEE 1613, EN 50121
P		Software Version	
		P	Layer 2 Professional: extended diagnostics, redundancy and security features
		R	Layer 3 Professional: Routing capabilities
H		Configuration	
		H	Standard P Pre-setting/pre-configure E Ethernet/IP pre-setting
H		OEM-Type	
		H	Standard X Customer specific
04.0.		Software Release	
		X	Current software release 04.0 example: former software release
Required Field	Optional	NOTE: Use the Hirschmann OpenRail system to configure your substation switch: www.beldensolutions.com	

Über-Rugged™ Rack-mount Switches



Industrial Workgroup All Gigabit Switches MACH1040 - 19" Rack-mount



The new MACH 1040 Full Gigabit Ethernet Switch is an IP30 Layer-2 switch with 16 Gigabit Ethernet combo ports (10/100/1000 TX (RJ45) or 100/1000 FX (SFP)). All ports support version 2 of Precision Time Protocol in accordance with IEEE 1588 V2 and has support for an optional 4 ports of PoE (IEEE 802.3af). Layer 3 functionality is available with the R software option.

Designed for assembly in 19" cabinets, the fan-less MACH1040 uses the latest energy-saving chip technology. Its rugged metal housing measures 448 by 44 by 310 mm in width, height and depth. Rapid deployment is ensured through the 10-second boot time and the compatibility with the ACA 21-USB - a configuration storage device that provides multi-device configuration and device replacement ease for the lowest possible MTTR (Mean Time To Replace).

In addition, an SNMP interface permits users to manage the switch over any web browser, while the use of network management software, such as HiVision and Industrial HiVision, provides multi-device management - an optimal solution for networks requiring the management of a higher number of switches.

Media redundancy mechanisms procedures, e.g. HIPER Ring, MRP, Trunking, Link Aggregation and Rapid Spanning Tree (RSTP), dual power inputs and quality components provide for high network availability. Security mechanisms include access control according to IEEE 802.1x, IP and MAC port security as well as SNMP V3 and SSH.

An operating temperature range of -40°C to +70°C and its high resistance to jarring, and extensive tolerance to electrical discharge and magnetic fields makes the MACH1040

an excellent fit for power transmission and distribution systems. Passive cooling (no fans) and a redundant power supply are added to ensure high operational safety while meeting the standards and approval requirements of IEC 61850, IEEE 1613, EN 50121-4, EN 50155, cUL 508, cUL 1604 and GL.

Product Features

- 16 GE ports with non-blocking architecture
- Available with Layer 3 capabilities
- PTP IEEE 1588v2 on board, precision 30 ns
- Highest flexibility through 16 Gigabit RJ45/SFP combo ports
- Extensive software features
- Fastest media ring recovery times
- Optional 4 PoE ports
- Sub-10 second boot time
- High operational safety through:
 - High vibration resistance
 - Immunity to RFI and EMI
 - Fanless cooling
 - Redundant power supply

Part Number Configurations

1. Design	
MAR1040	Full GE-Switch
MAR1042	Full GE-Switch, PoE
MAR1140	Full GE-Switch, backside ports
MAR1142	Full GE-Switch, backside ports, PoE
2. Gigabit Ports	
4C4C4C9999	16 GE RJ45/SFP combo ports
3. Temperature range	
S	0°C to +60°C
T	-40°C to +70°C
E	-40°C to +70°C with conformal coating
4. Power supply 1	
L	24/36/48 V/DC
M	110/250 VDC / 110/230 VAC
5. Power supply 2	
9	Empty
L	24/36/48 V/DC
M	110/250 VDC / 110/230 VAC
6. Approvals	
H	cUL508, cUL/1604 class 1 Div 2, GL, IEC 61850, IEEE1613, NEMA TS
7. Software	
P	Layer 2 Professional
R	Layer 3 Professional

Example

MAR1042	4C4C4C9999	E	L	M	H	P
1.	2.	3.	4.	5.	6.	7.



Gigabit Backbone Layer 2/3 Rack-mount Switches



High Density Layer 2/3 Gigabit Backbone Switch MACH4000 Switch



Capable of providing as many as 48 Gigabit ports and three 10Gigabit ports, the MACH4000 is the ultimate high-density Layer 2/3 Gigabit backbone switch for mission-critical applications requiring high-availability and high port densities.

The MACH4000 comes standard with up to 16 + ports and can be configured with as many as 32 additional ports (via hot-plug copper/fiber modules).

Standard features include:

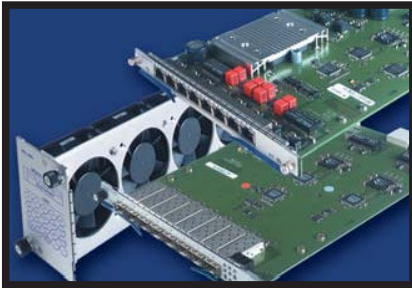
- 19" rack-mount
- Two user-definable fault relays
- Hot-swappable media modules for continuous operation – up to 4 Media Modules (8 ports max. each)
- HIPER-Ring, redundant coupling and link aggregation capable
- Flexible power options: 100 – 240 VAC, 24 VDC and 48 VDC
- 0° C to + 60° C operating temperature

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

MACH4000 - High Density Layer 2/3 Gigabit Backbone Switch

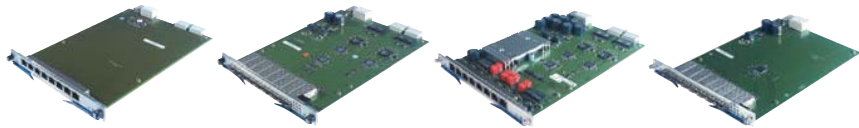
Part No.	Order No.	Ports
MACH4002 48+4G-L2P	943 859-101	Layer 2, Professional Management chassis
MACH4002 48+4G-L3E	943 859-201	Layer 3, Enhanced Management chassis
MACH4002 48+4G-L3P	943 859-301	Layer 3, Professional Management chassis
<ul style="list-style-type: none"> • Fixed ports: 4x Gigabit Ethernet combo ports* (1000 Mbps SFP socket or 10/100/1000 Mbps RJ45) and 16x RJ45 10/100 Mbps • Media modules: 4 sockets (8 ports max each) for total 32 ports 10/100 Mbps (Media modules sold separately – see page 21. For software functionality – see page 15) 		
MACH4002-24G-L2P	943 916-101	Layer 2, Professional Management chassis
MACH4002-24G-L3E	943 916-201	Layer 3, Enhanced Management chassis
MACH4002-24G-L3P	943 916-301	Layer 3, Professional Management chassis
<ul style="list-style-type: none"> • Fixed ports: 8x Gigabit Ethernet combo ports* (SFP dual speed socket or TP 10/100/1000 Mbps) • Media modules: 2x sockets (8 ports max each) for total 16 ports 10/100/1000 Mbps (Media modules sold separately – see page 21. For software functionality – see page 15) 		
MACH4002-24G+3X-L2P	943 915-101	Layer 2, Professional Management chassis
MACH4002-24G+3X-L3E	943 915-201	Layer 3, Enhanced Management chassis
MACH4002-24G+3X-L3P	943 915-301	Layer 3, Professional Management chassis
<ul style="list-style-type: none"> • Fixed ports: 3x 10Gigabit Ethernet XFP socket and 8 Gigabit Ethernet ports TP/RJ45 10/100/1000 Mbps • Media modules: 2x sockets (8 ports max each) for total 16 ports 10/100/1000 Mbps (Media modules sold separately – see page 21. For software functionality – see page 15) 		
MACH4002-48G-L2P	943 911-101	Layer 2, Professional Management chassis
MACH4002-48G-L3E	943 911-201	Layer 3, Enhanced Management chassis
MACH4002-48G-L3P	943 911-301	Layer 3, Professional Management chassis
<ul style="list-style-type: none"> • Fixed ports: 16 Gigabit Ethernet (8 Gigabit Ethernet combo ports* 100/1000 Mbps SFP dual speed socket or 10/100/1000 Mbps + 8 Gigabit 10/100/1000 Mbps RJ45) • Media modules: Four sockets (8 ports max each) for total 32 ports 10/100/1000 Mbps (Media modules sold separately – see page 21. For software functionality – see page 15) 		
MACH4002-48G+3X-L2P	943 878-101	Layer 2, Professional Management chassis
MACH4002-48G+3X-L3E	943 878-201	Layer 3, Enhanced Management chassis
MACH4002-48G+3X-L3P	943 878-301	Layer 3, Professional Management chassis
<ul style="list-style-type: none"> • Fixed ports: Three 10Gigabit Ethernet XFP sockets and 16 Gigabit Ethernet ports (100/1000 Mbps SFP dual speed socket or 10/100/1000 Mbps RJ45) • Media modules: Four sockets (8 ports max each) for total 32 ports 10/100/1000 Mbps (Media modules sold separately – see page 21. For software functionality – see page 15) 		

Gigabit Backbone Layer 2/3 Rack-mount Switches



MACH4000 Media Modules, Power Supplies and Accessories

The media modules provide maximum flexibility, with 10/100/1000 Mbps over Twisted Pair or 100/1000/10000 Mbps over optic fiber with data transmission ranges of more than 80 km.



M4-8TP-RJ45

M4-FAST 8-SFP

M4-FAST 8TP-RJ45-PoE

M4-GIGA 8-SFP

MACH4000 Media Modules

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

NOTE: *SFPs need to be purchased separately (see Accessories on page 31 for SFPs).

MACH4000 Internal Power Supplies

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

MACH4000 External Power Supplies

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

MACH4000 Accessories

Part No.	Order No.	Voltage
M4-AIR	943 869-001	Fan module (included with chassis), has 4 redundant fans with fault notification
M4-AIR-L	942 005-001	Fan module for MACH 4002 chassis, four redundant fans with reduced speed, lower noise level
M4-RACKMOUNT-50	943 951-001	19" fixing brackets offer 50 mm more space in the front of the switch for cables
M4-RACKMOUNT	943 951-101	19" spare fixing brackets



M4-AIR. Fan module (included with chassis), has 4 redundant fans with fault notification