

## MACH100 19" Industrial Workgroup Rack-Mount Switches



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

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

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



### Technical Information

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

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



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

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

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



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



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

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

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

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

**NOTE:** For SFP transceiver see page 96.

## MACH1000 19" Ruggedized Rack-Mount Switches



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

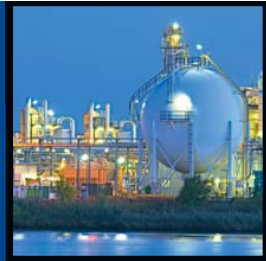
The MACH1000 is available in a 24 port custom configurable design with 2 or 4 additional Gigabit uplink (RJ45 and/or SFP for fiber) and PoE ports. The MACH1000 is also available in an all-Gigabit version, offering 16 10/100/1000 RJ45/SFP combo ports to provide countless copper/fiber combinations. These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



### Technical Information

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

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



Configurator



## MACH1000 19" Ruggedized Rack-Mount Switch Configurations

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

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

### Design/Models

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

### Gigabit Ethernet Ports

- 99** = None (not present)

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

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

### Temperature Range

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

### Power Supply 1 (options)

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

### Power Supply 2 (options)

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

### Approvals

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

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

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

### Configuration

- H** = Standard
- E** = EtherNet/IP (pre-setting)
- P** = PROFINET (pre-setting)

### OEM Type

- H** = Standard
- X** = Customer Specific

### Software Release

- XX.X** = Current Software Release

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



## MACH1000 19" Ruggedized Rack-Mount Switch Configurations

Gigabit Ethernet Uplink Ports: **MAR1030- | MAR1032- | MAR1130- | MAR1132**

**MAR1030-CCMMMMMVVZZTTTTTTTTTT99UCCCHPHHX.X**

### Design/Models

- MAR1030** = Gigabit Ethernet Uplink
- MAR1032** = Gigabit Ethernet Uplink with 4 Ports PoE
- MAR1130** = Gigabit Ethernet Uplink with Ports at the back (20 Ports max. 100 Mbit/s)
- MAR1132** = Gigabit Ethernet Uplink with Ports at the back and 4 Ports PoE (20 Ports max. 100 Mbit/s)

### Gigabit Ethernet Ports

- CC** = 2 Ports Combo (2 x 10/100/1000 TX or 2 x GE SFP)
- 40** = 4 Ports GE SFP
- 4T** = 4 Ports 10/100/1000TX
- 0T** = 2 Ports GE SFP and 2 Ports 10/100/1000 TX

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

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

### Temperature Range

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

### Power Supply 1 (options)

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

### Power Supply 2 (options)

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

### Approvals

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

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

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

### Configuration

- H** = Standard
- E** = EtherNet/IP (pre-setting)
- P** = PROFINET (pre-setting)

### OEM Type

- H** = Standard
- X** = Customer Specific

### Software Release

- XX.X** = Current Software Release

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



Configurator



## MACH1000 19" Ruggedized Rack-Mount Switch Configurations

Full Gigabit Ethernet Switches: [MAR1040](#) - | [MAR1042](#) - | [MAR1140](#) - | [MAR1142](#)

**MAR1040-4C4C4C4C999SMLHRHX.X**

### Design/Models

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

### Gigabit Ethernet Ports

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

### Temperature Range

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

### Power Supply 1

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

### Power Supply 2

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

### Approvals

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

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

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

### Configuration

- H** = Standard

### OEM Type

- H** = Standard

### Software Release

**XX.X** = Current Software Release

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

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



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

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

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



### Technical Information

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

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







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

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

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

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

## MACH4000 Media Modules

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

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






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## MACH4000 Power Supplies and Accessories


### MACH4000 Internal Power Supplies

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

### MACH4000 External Power Supplies

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

### MACH4000 Accessories

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