MICROSENS

Data Sheet
6-Port Gigabit Ethernet Micro Switch
with Fiber-Uplink Port(s), opt. PoE+

■ made
■ in
■ Germany

Overview

The presented Micro Switch G6 is one more milestone in the Fiber-To-The-Office concept of MICROSENS. By using the latest technology, a new future-oriented and highly flexible platform has been realised.
Based on the proven principle of providing a high number of variants in a customer-oriented manner, MICROSENS supplies the Micro Switch G6 in various versions according to customer requirements.

The Micro Switch is always designed as a 6-port switch regardless of the port settings. The following basic variants of Micro Switch G6 are available*:

Micro Switch G6 PoE+

Horizontal mounting type	Vertical mounting type
1x Fiber-Uplink** 5x RJ-45 PoE+ PSE	1x Fiber-Uplink ** 5x RJ-45 PoE+ PSE
2x Fiber-Uplink 4x RJ-45 PoE+ PSE (corresponds to picture above)	2x Fiber-Uplink 4x RJ-45 PoE+ PSE

Micro Switch G6 230V (without PoE)

Horizontal mounting type	Vertical mounting type
1x Fiber-Uplink** 5x RJ-45	1x Fiber-Uplink** 5x RJ-45
2x Fiber-Uplink 4x RJ-45	2x Fiber-Uplink 4x RJ-45

The extremely compact switches are characterized by their very small space requirements and are used in parapet ducts, floor tanks and in individually planned environments such as surface-mounted enclosures. The device has a monolithic design, is fanless and offers shortest installation times with highest robustness and reliability.

* a 6 Port RJ-45 variant is also available and can be found in a separate data sheet
** Standard FO uplink variants: (SC duplex / ST with 1000Base-SX/-LX, SFP 100/1000Base-X)

Features

Gigabit Ethernet Switch

- Fanless Gigabit Ethernet Switch
- Low power consumption switch-chipset, Energy-Efficient Ethernet
- Layer-2+ store-and-forward, full wire-speed, non-blocking
- Max. 8,192 MAC addresses, automatic learning and aging
- Jumbo-Frames (max. 10,240 Bytes)

Energy-Efficient Ethernet

- IEEE 802.3az
- Optimised power consumption for each RJ-45 port depending on the actual requirement
- Up to 50% reduced power consumption

Network Management

- Support of common management standards
- 800 MHz ARM CPU
- Linux operating system with fast system boot
- Web Manager (HTTPS (default)/HTTP)
- Telnet/SSH/Console, incl. standard-commands (ping, traceroute, etc.)
- SNMP v1/v2c/v3
- Central management software as option (MICROSENS NMP)
- IPv4/IPv6 Dual Stack
- Integrated CLI scripting to automate routine processes
- Firmware, script and configuration files can be loaded, saved and executed directly on the "switch".
- Incremental firmware updates possible
- Exchangeable MicroSD memory card for configuration, CLI scripts, firmware, and MAC address (optional)

Power-over-Ethernet PoE+ (opt.)

- IEEE 802.3at PoE+ (max. 30 W/Port)
- 4 or 5x 10/100/1000Base-T, PoE+ (depending on equipment)
- Limitation of the total power consumption of the switch to max. 80 W (full power only under suitable installation conditions)
- Ext. Power supply with typ. 54 VDC

Connectors

Uplink variants
- 1x 1000Base-SX/-LX (SC, ST, LC, MT-RJ, EM-RJ, E-2000)
- 1x SFP-Slot 100/1000Base-X
- 2x SFP-Slots 100/1000Base-X
- 1x RJ-45 10/100/1000Base-T

Local
- 5x (4x) 10/100/1000Base-T (RJ-45) Auto-Negotiation, PoE (PSE) (opt.)
- Auto MDI/MDI-X function for the use of uniform patch cables

Extension Port
- RS-232 Console port (mini-USB)
- For optional accessories

Power Supply
- 3-pin screw pluggable connector for solid or stranded wires
- Additional grounding (PE) via 6.3 mm flat-pin plug

Mounting

- Snap-in mounting 45 mm (without screw mounting)
- Compatible with all common installation systems due to circumferential support edge
- Bevelled edge allows installation in 2-fold frames
- Extensive range of installation accessories available

Compatibility

- Compatibility to standard CISCO Switches verified (amongst others: IEEE 802.1X, QoS, VLAN, CDP, RSTP)

Network management - Feature overview

For the latest functional firmware features, please refer to the document "Firmware_Features_G6" which can be downloaded from the download center of the particular device home pages at http://www.microsens.com/.
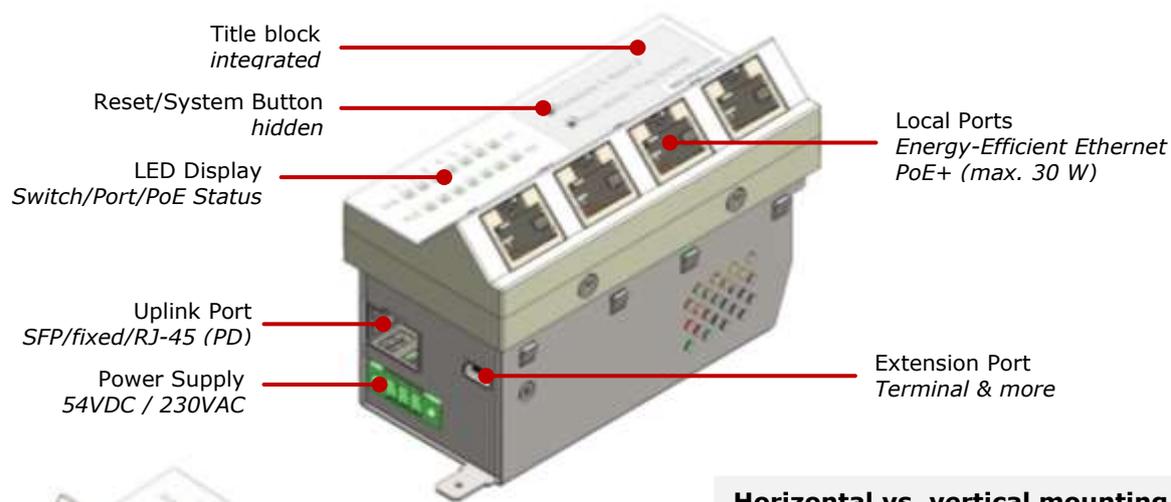
RFC / IEEE Standards

The IEEE standards and RFCs supported by the Micro Switch G6 can also be found in the document "Firmware_Features_G6"
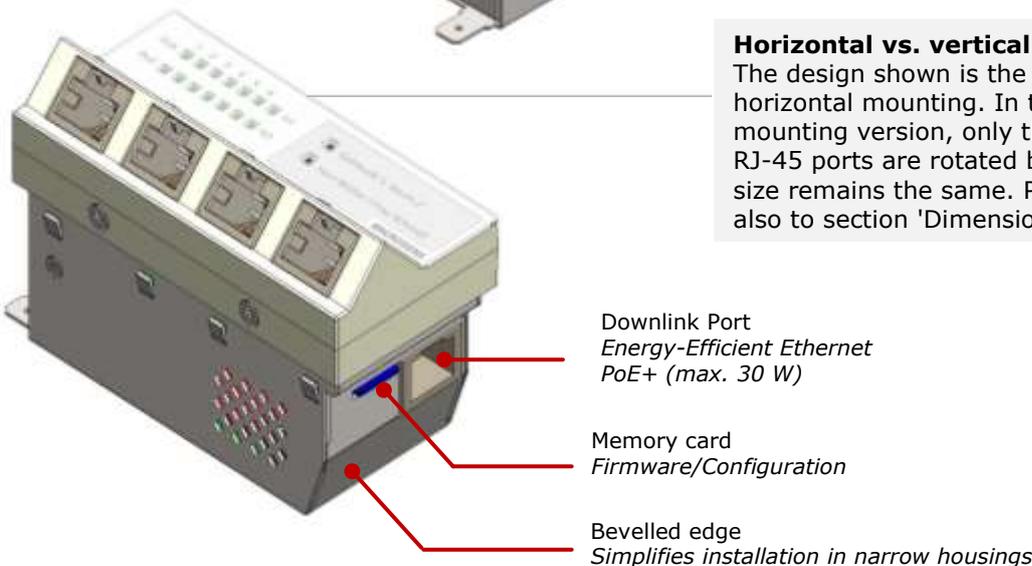
Quality – Made in Germany

To constantly guarantee a high quality of the Micro Switch Generation 6 all models and versions are manufactured in Hamm, Germany.
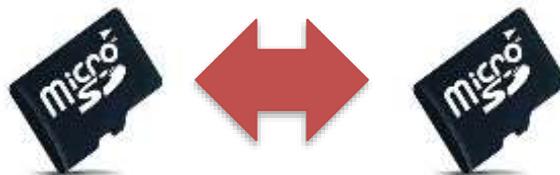
Interfaces

Title block
integrated

Reset/System Button
hidden

LED Display
Switch/Port/PoE Status

Local Ports
*Energy-Efficient Ethernet
PoE+ (max. 30 W)*

Uplink Port
SFP/fixed/RJ-45 (PD)

Power Supply
54VDC / 230VAC

Extension Port
Terminal & more

Horizontal vs. vertical mounting
The design shown is the variant for horizontal mounting. In the vertical mounting version, only the four local RJ-45 ports are rotated by 90°, the size remains the same. Please refer also to section 'Dimensions'.

Downlink Port
*Energy-Efficient Ethernet
PoE+ (max. 30 W)*

Memory card
Firmware/Configuration

Bevelled edge
Simplifies installation in narrow housings

Memory Card

- Use is optional
- Stores firmware and configuration
- Change of memory card transfers the **complete** device status
- Firmware update by memory card exchange is possible
- Fault tolerant journaling file system

The optional MicroSD memory card is used for the permanent storage of configuration, script and firmware files.

If no memory card is inserted, the system starts or boots from the internal memory of the device.

With this memory card it is possible to transfer a configuration to a new device in case of a device failure.

Optionally, an individual MAC address can be stored on the MicroSD memory card. This MAC address has priority over the switch's internal MAC address. This allows to provide an exact clone of the device by swapping the memory card.

Only MICROSENS memory cards have to be used. Only with this the long term stability over the complete temperature range can be guaranteed.

Ring-Topology

Normal operation

- All switches are configured for ring operation
- One switch is assigned as ring master
- Ring master cuts the ring logically

Ring error

- Switches signalize segment failure via Ethernet
- Master receives that information via Ethernet and closes the logical cut
- Switches relearn the actual network topology (MAC-addresses)

Configuration

- Switches can be configured for up to two independent rings
- Ring ports are freely selectable
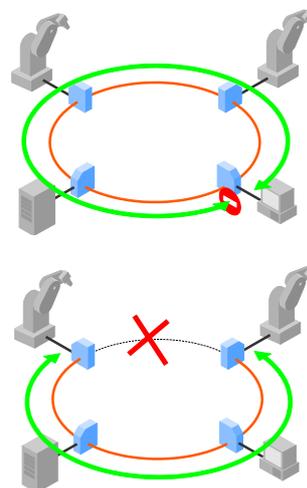
Technical Specifications

Switch

Type	Gigabit Ethernet Switch Layer 2+, IEEE 802.3 compliant
Performance	Store-and-forward; full wire-speed, non-blocking on all ports
MAC addresses	8,192 addresses, automatic learning and aging
Jumbo Frames	max. 10,240 Bytes

Twisted-Pair Ports

Number of ports	5 (4 for 2x SFP-Variant)
Type	Gigabit Ethernet, Triple Speed 10/100/1000Base-T
Connector	RJ-45 port, shielded
Cable type	Twisted-Pair cable, Category 5e, impedance 100 Ohm, length max. 100 m
Flow Control	Pause Frames (IEEE 802.3x), configurable
Pin out	Auto MDI/MDI-X, Auto Polarity
Power-over-Ethernet (opt.)	Power Sourcing Equipment (PSE) IEEE 802.3af/at Class 0, max. 30 W Forced-mode (Legacy Devices)

Optical fiber connection

Type	Gigabit Ethernet 1000Base-SX (Multimode) 1000Base-LX (Single Mode) optional SFP (Dual Speed) 100/1000Base-X, support of SFP diagnostic functions
Connector	optional SC-duplex, ST, LC, MT-RJ, EM-RJ, E-2000
Multimode	Multimode gradient fiber, 62.5/125 µm (280 m) or 50/125 µm (550 m) 850 nm wavelength -4...-9.5 dBm Transmitting power -18 dBm Sensitivity 0 dBm Saturation
Monomode	Single mode step index fiber, 9/125 µm (10 km) 1310 nm wavelength -3...-9.5 dBm Transmitting power -20 dBm Sensitivity -3 dBm Saturation
Flow Control	Pause Frames (IEEE 802.3x), configurable

Power Supply (DC)

Input	44..57 VDC (54 VDC typ.)
Power Consumption	Typ. 4.5 W (without PoE (PSE)) max. 80 W (incl. PoE (PSE)) (full power only with suitable installation conditions)
Connector	3 pin screw connector, PE/-/+
Grounding (PE)	6.3 mm flat-pin plug

Power Supply (AC)

Input	230 V 50..60 Hz
Power Consumption	Typ. 4.5 W
Connector	3 pin screw connector, PE/N/L
Grounding (PE)	6.3 mm flat-pin plug

Displays

Type	14 LEDs, detachable	
Link	Twisted pair ports 1..6	
	green	Link at port Flashing at data traffic
	orange	Port blocked (via protocol)
	red	Port Access Control rejected (port 1..4 and 6 only)
PoE	Twisted pair ports 1..4 and 6	
	green	PoE supplying
	blue	PoE+ active
	orange	PoE standby
	red	PoE failure
On (switch status)	*green*	ready for operation
	flashing	starting sequence
Sys	*blue*	Factory reset without IP reset in progress
	violet	Factory reset including IP reset in progress
	green	Process completed
	orange	Flashing while Firmware update in progress
LED-modes	*Dynamic*	Standard-mode
	Static	Standard without flash
	Quiet	Only ON- and Sys-LED
	Dark	all LEDs off
	L-show	permanent LED test

Control Panel

Reset button	Reset of switch, new upload of latest stored configuration (direct hardware function)
System button	Request of IP configuration for management, reset back to factory default settings (can be switched off)

Technical Specifications (continued)

Environmental Conditions

Temperature	Operation	0..+40 °C
	Storage	-20..+85 °C
Humidity	10..90%, non condensing	

Mechanical Dimensions

Dimensions	90 mm x 45 mm x 59.7 mm (w x d x h, without connectors)
Mounting depth	35 mm
Weight	325 g

Standards

CE	2014/30/EU (EMC Directive) 2011/65/EU (RoHS Directive) 2015/35/EU (Low Voltage Directive)
Safety	EN 60950-1
Emitted interference	EN 55032
Immunity	EN 55024

Reliability

MTBF	100.000 h
Method	MIL-HDBK-217F

Delivery / Contents

Standard Packaging

|	
Package unit	1 pcs.
Dimensions	158 mm x 75 mm x 65 mm
Weight	380 g
Contents	1x Micro Switch 1x Power supply plug 1x Quick Start Guide 1x grounding cable (PE), 20 cm

Bulk Packaging

Package unit	20 pcs.
Dimensions	380 mm x 325 mm x 140 mm
Weight	7500 g
Contents	20x Micro Switch 20x Power supply plug 20x grounding cable PE, 20 cm 1x Quick Start Guide

Dimensions

Horizontal
mounting
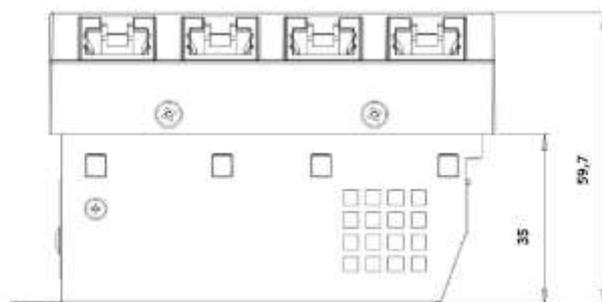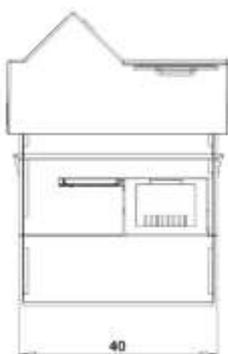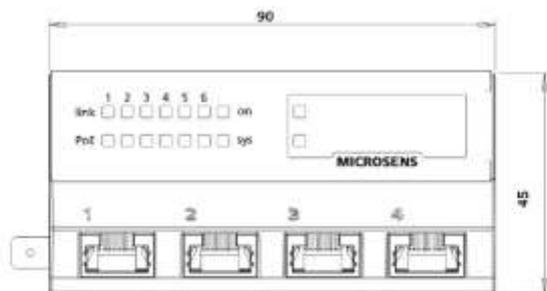
Vertical
mounting
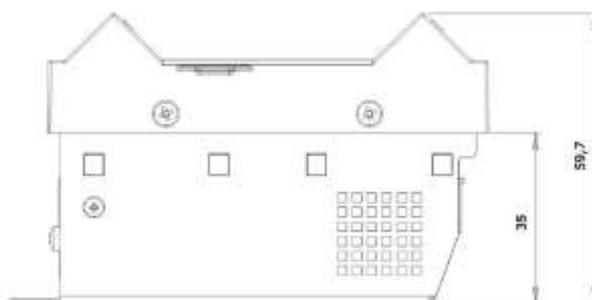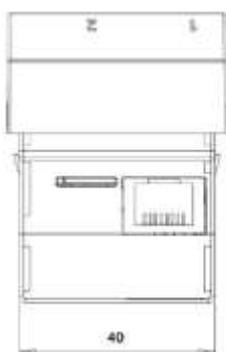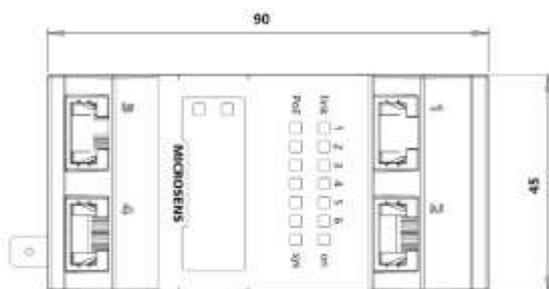
Order Information

Designation	Article-No. Horizontal mounting	Article-No. Vertical mounting	
Micro Switch G6, PoE+, 54 VDC			
Uplink 1x 1000Base-SX ST, Multimode 850 nm	**MS440200PM-48G6+**	**MS440210PM-48G6+**	
Uplink 1x 1000Base-SX SC duplex, Multimode 850 nm	**MS440201PM-48G6+**	**MS440211PM-48G6+**	
Uplink 1x 1000Base-LX SC duplex, Monomode 1310 nm	**MS440202PM-48G6+**	**MS440212PM-48G6+**	
Uplink 1x 1000Base-LX ST, Monomode 1310 nm	**MS440203PM-48G6+**	**MS440213PM-48G6+**	
Uplink 2x 100/1000Base-X, 2x SFP-Slots	**MS440207PM-48G6+**	**MS440217PM-48G6+**	
Uplink 1x 100/1000Base-X, 1x SFP Slot	**MS440209PM-48G6+**	**MS440219PM-48G6+**	
Micro Switch G6, 230 VAC (without PoE)			
Uplink 1x 1000Base-SX ST, Multimode 850 nm	**MS440200M-G6+**	**MS440210M-G6+**	
Uplink 1x 1000Base-SX SC duplex, Multimode 850 nm	**MS440201M-G6+**	**MS440211M-G6+**	
Uplink 1x 1000Base-LX SC duplex, Monomode 1310 nm	**MS440202M-G6+**	**MS440212M-G6+**	
Uplink 1x 1000Base-LX ST, Monomode 1310 nm	**MS440203M-G6+**	**MS440213M-G6+**	
Uplink 2x 100/1000Base-X, 2x SFP-Slots	**MS440207M-G6+**	**MS440217M-G6+**	
Uplink 1x 100/1000Base-X, 1x SFP Slot	**MS440209M-G6+**	**MS440219M-G6+**	
Memory Cards for Micro Switch G6			
Micro Storage Media Card (microSD) for Micro Switches / MSP1000 agent, -40..+85 °C		**MS140895X**	
Micro Storage Media Card (microSD) for Micro Switches / MSP1000-Agent, -40..+85°C Variant with own MAC address		**MS140895X-M**	
Micro Storage Media Card (microSD) for Micro Switches / MSP1000-Agent, -40..+85°C Variant with defined preconfiguration		**MS140895X-C**	
Micro Storage Media Card (microSD) for Micro Switches / MSP1000-Agent, -40..+85°C Variant with defined preconfiguration and own MAC address		**MS140895X-MC**	

Accessories

	Designation	Article No.:
	SFP Transceiver (other variants available on request)	
	SFP GbE Transceiver 1.25G SX Multimode 850nm, DDM, LC, -40..+85°C	**MS100200DX**
	SFP GbE Transceiver 1.25G LX SingleMode 1310nm, 10km, DDM, LC, -40..+85°C	**MS100210DX**
	SFP FE Transceiver 155M FX Multimode 1310nm, DDM, LC, -40..+85°C	**MS100190DX**
	SFP FE Transceiver 155M FX SingleMode 1310nm, 15km, DDM, LC, -40..+85°C	**MS100191DX**
	SFP GbE WDM-Transceiver 1.25G BX SingleMode TX1310nm / RX1550nm, 10km, DDM, LC simplex, -40..+85°C	**MS100221DXA**
	SFP GbE WDM-Transceiver 1.25G BX SingleMode TX1550nm / RX1310nm, 10km, DDM, LC simplex, -40..+85°C	**MS100221DXB**
	Labeling field	
	Labelling sheets Micro Switch G6 10 sheets, 80 labels per sheet	**MS140894X-4G**
	NMP 2.x Network Management	
	NMP Enterprise 1 x usage right for NMP Enterprise , 200 x usage rights f. NMP Enterprise Managed Objects, and SW Maintenance for 1 year (download of updates)	**to be announced soon**
	NMP Enterprise 1 x usage right for NMP Enterprise, 1000 x usage rights f. NMP Enterprise Managed Objects, and SW Maintenance for 1 year (download of updates)	**to be announced soon**
	Expansion packs for NMP Enterprise Managed Objects	**to be announced soon**
	NMP Professional 1 x usage right for NMP Professional, 50 x usage rights f. NMP Professional Managed Objects, and SW Maintenance for 1 year (download of updates)	**to be announced soon**
	NMP Professional 1 x usage right for NMP Professional, 100 x usage rights f. NMP Professional Managed Objects, and SW Maintenance for 1 year (download of updates)	**to be announced soon**
	Expansion packs for NMP Professional Managed Objects	**to be announced soon**
	Installation Accessories*	
	Universal M45 installation set for an E2 socket, consisting of an adapter plate and a cover frame, colour: pure white (RAL9010)	**MS140029**
	M45 installation set, consisting of a cover frame (168 x 85 mm), an adapter plate and 2x device brackets, pre-assembled, colour: pure white (RAL9010)	**MS140040BR2**

	DIN-Rail Adapter for Micro Switch G6 rotatable, screws included	**MS140805-G6**	
	Power supplies for PoE variants		
	PoE+ Installation power supply unit 54VDC/65W for PoE+ Micro-Switches, input 115-230VAC, 3x 1,5 mm, 1m feed line, Combicon connector	**MS700741**	
	PoE+ Installation power supply unit MS700741 (s.a.), mounted on adapter C-profile, 35 mm rail (Combi / DIN)	**MS700741-UNI**	

* More installation accessories for all installation situations can be found at [FTTO Installation Accessories]

Services

Designation	Article No.	
Warranty extension after 24-month manufacturer's warranty**		
Warranty extension by 1 year	**MSGV01**	
Warranty extension by 2 years	**MSGV02**	
Warranty extension by 3 years	**MSGV03**	
Custom colour for the port cover (standard colour for Micro-Switch port covers: RAL9010)		
Special colouring of the port cover according to customer specifications (RAL)	**MSSonderbau**	
Pre-configuration according to customer requirements		
Pre-configuration of the component according to customer specifications	**MSKonfig**	
Pre-configuration of the component according to customer specifications (configuration file already exists)	**MSKonfig-OK**	

More Microsens Micro Switches G6

Designation	Article-No. Horizontal mounting	Article-No. Vertical mounting
Micro Switch G6, PoE+, 54 VDC		
Uplink 1x 100/1000Base-X SFP Slot, 5x 10/100/1000Base-T RJ-45 (PSE)	**MS440209PM-48G6+**	**MS440219PM-48G6+**
Micro Switch G6, 230 VAC (no PoE)		
Uplink 1x 100/1000Base-X SFP Slot, 5x 10/100/1000Base-T RJ-45	**MS440209M-G6+**	**MS440219M-G6+**
Ruggedized Micro Switch G6 -25°..+65°C ready mounted with DIN rail mounting ***		
1x SFP-Uplink (100/1000Base-X) 5x TP-Ports (10/100/1000Base-T) with PoE+	**MS440209PMXH-48G6+**	**MS440219PMXH-48G6+**
2x SFP-Uplink (100/1000Base-X) 4x TP-Ports (10/100/1000Base-T) with PoE+	**MS440207PMXH-48G6+**	**MS440217PMXH-48G6+**
1x TP-Uplink (10/100/1000Base-T) with PD 5x TP-Ports (10/100/1000Base-T) with PoE+	**MS450186PMXH-48G6+**	**MS450187PMXH-48G6+**

**   The manufacturer's warranty is defined in the general terms and conditions AGB (§9) of
       MICROSENS GmbH & Co. KG.

***   Please refer to separate data sheets to obtain detailed information on the listed variants.