

## Data Sheet

### Ruggedized Gigabit Ethernet Micro Switch with extended temperature range



#### Overview

The Ruggedized Micro Switch is part of the successful MICROSENS Fiber-To-The-Office (FTTO) series. This model comes with an extended temperature range (-25°C up to +65°C) and includes a mounted holder for 35 mm DIN-rails.

Ruggedized Micro Switches are available in various variants:

Horizontal mounting with 1x SFP Uplink and RJ-45 Downlink	Vertical mounting with 1x SFP Uplink and RJ-45 Downlink
Horizontal mounting with 2x SFP Uplink	Vertical mounting with 2x SFP Uplink (shown in picture above)
Horizontal mounting with 2x RJ-45 Uplink	Vertical mounting with 2x RJ-45 Uplink

In general, the MICROSENS Ruggedized Micro Switch can be supplied via different ways. Depending on the product variants the switch can be supplied via Power-over-Ethernet (PoE PD), 54 VDC (PoE Version), 230 VAC, 24 VDC or 12 VDC.

The very compact switches excel with extremely low space requirements and are used in switching cabinets with special environmental conditions. The monolithic design paired with highest robustness and reliability ensures short deployment cycles.

The versions with 2 SFP uplinks are intended to be used in ring topologies. Their ring functionality is equivalent and therefore compatible to the MICROSENS industry switches of the Profi Line, Profi Line+ and Profi Line Modular series.

The whole configuration of the Micro Switch can be transferred to another system, just by changing the SD-Card which comprises a fault-tolerant journaling file-system.

## Features

### Gigabit Ethernet Switch

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- 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

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

### Network Management

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- 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.)

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- IEEE 802.3at PoE+ (max. 30 W/Port)
- 5x 10/100/1000Base-T, PoE+ (RJ-45)
- 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

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#### Uplink

- 1x or 2x 1000Base-X SFP slot or 1000Base-T (RJ-45)

#### Local / Downlink

- 4x or 5x 10/100/1000Base-T (RJ-45) Auto-Negotiation, PoE (PSE) (PoE variant)
- 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

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- Installed holder for DIN-rails (DIN EN 50022)
- 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

### Compatibility

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- 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/>.

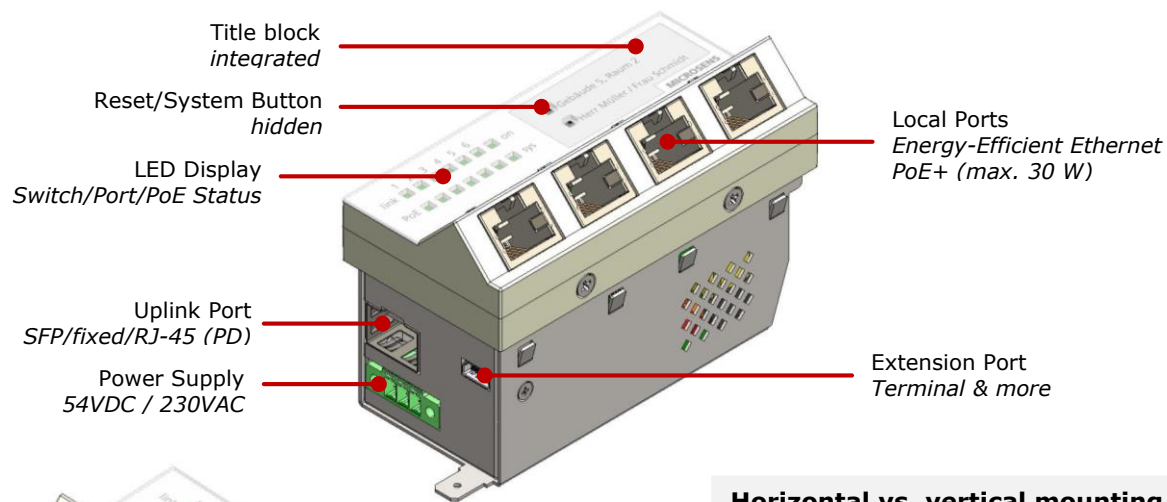
## RFC / IEEE Standards

The IEEE standards and RFCs supported by the Micro Switch G6 can also be found in the document "[Firmware Features G6](#)"

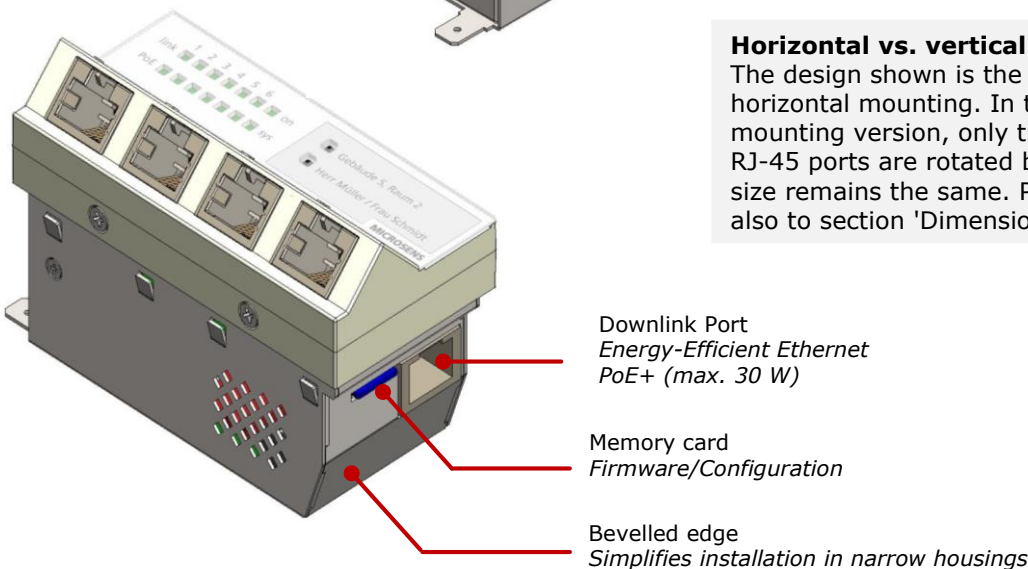
## Quality – Made in Germany

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

## Interfaces



**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'.



## 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

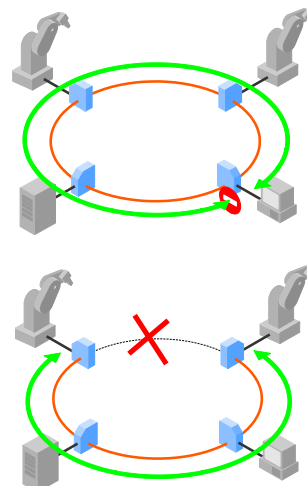
- All switches are configured for ring operation
- One switch is assigned as ring master
- Ring master cuts the ring logically

### 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

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

### Twisted-Pair Ports

<b>Number</b>	5 (optionally 4 or 6)
<b>Type</b>	Gigabit Ethernet, Triple Speed 10/100/1000Base-T
<b>Connector</b>	RJ-45 port, shielded
<b>Cable type</b>	Twisted-Pair cable, Category 5e, impedance 100 Ohm, length max. 100 m
<b>Flow Control</b>	Pause Frames (IEEE 802.3x), configurable
<b>Pin out</b>	Auto MDI/MDI-X, Auto Polarity
<b>Power-over-Ethernet</b>	Power Sourcing Equipment (PSE) IEEE 802.3af/at Class 0, max. 30 W Forced-mode (Legacy Devices)

### Fiber Port

<b>Type</b>	SFP (Dual Speed) 100/1000Base-X, support of SFP digital diagnostics function
	Optional 2x SFP slot (then only 4x TP)
<b>Connector</b>	LC typ. (depending on SFP)
<b>Flow Control</b>	Pause Frames (IEEE 802.3x), configurable

### Power Supply (DC)

<b>Input</b>	44..57 VDC (54 VDC typ.) (opt. 24 VDC, 12 VDC)
<b>Power Consumption</b>	Typ. 4,5 W (without PoE (PSE)) max. 80 W (incl. PoE (PSE)) (full power only with suitable installation conditions)
<b>Connector Grounding (PE)</b>	3 pin screw connector, PE/-/+ 6.3 mm flat-pin plug

### Power Supply (AC)

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

### Displays

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

### Control Panel

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

### Environmental Conditions

<b>Temperature</b>	Operation -25..+65 °C under full PoE load: max. 50 °C
	Storage -20..+85 °C
<b>Humidity</b>	10..90%, non condensing

### Mechanical Dimensions

<b>Dimensions</b>	90 mm x 45 mm x 58 mm (w x d x h, without connectors)
<b>Mounting depth</b>	34 mm
<b>Weight</b>	325 g

## Technical Specifications (continued)

### Standards

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

### Reliability

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<b>MTBF</b>	100.000 h
<b>Method</b>	MIL-HDBK-217F

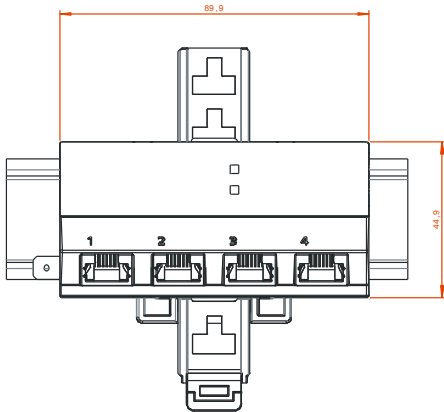
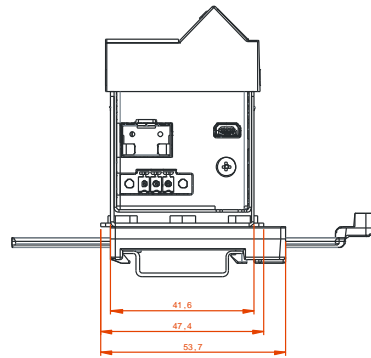
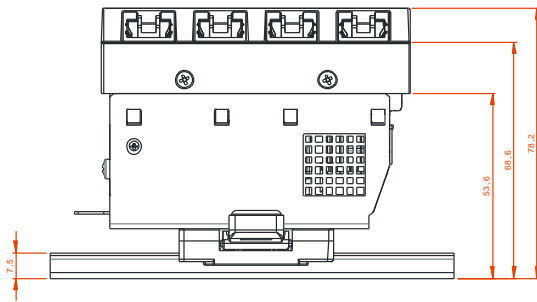
### Delivery / Contents

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#### *Standard Packaging*

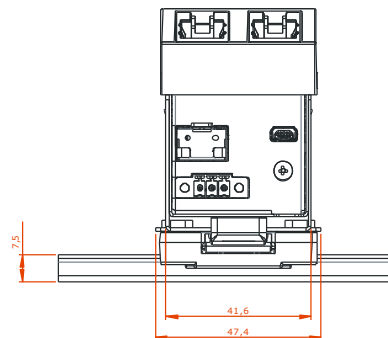
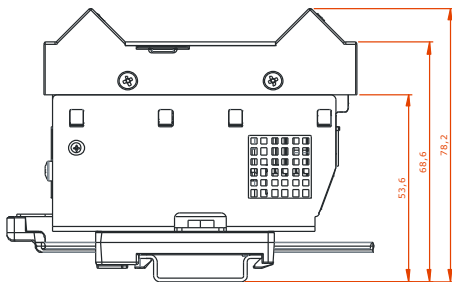
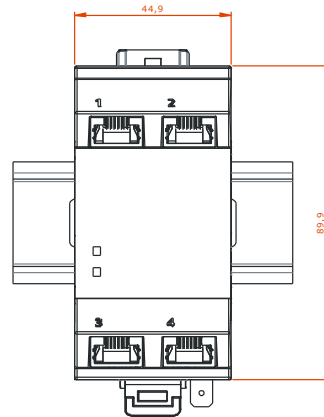
<b>Package unit</b>	1 pcs.
<b>Dimensions</b>	158 mm x 90 mm x 65 mm
<b>Weight</b>	400 g
<b>Contents</b>	1x Micro Switch 1x Power supply plug 1x Quick Start Guide 1x DIN-rail holder (mounted)

# Dimensions



Horizontal Mounting

Vertical Mounting



## Order Information

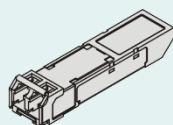
### Ruggedized Micro Switch G6

(Variants not listed here may be available on request)

Description	Article-No. Horizontal version	Article-No. Vertical version
<b>Power Supply Input: 44..57 VDC, incl. mounted holder for DIN-rails</b>		
1x SFP uplink (100/1000Base-X) 5x TP-Ports (10/100/1000Base-T) with PoE+ (PSE)	<b>MS440209PMXH-48G6+</b>	<b>MS440219PMXH-48G6+</b>
2x SFP uplink (100/1000Base-X) 4x TP-Ports (10/100/1000Base-T) with PoE+ (PSE)	<b>MS440207PMXH-48G6</b>	<b>MS440217PMXH-48G6</b>
1x TP-Uplink (1000Base-T) with PoE (PD) 5x TP-Ports (10/100/1000Base-T) with PoE+ (PSE)	<b>MS450186PMXH-48G6+</b>	<b>MS450187PMXH-48G6+</b>
<b>Power Supply Input: 44..57 VDC, without holder for DIN-rails</b>		
1x SFP uplink (100/1000Base-X) 5x TP-Ports (10/100/1000Base-T) with PoE+ (PSE)	<b>MS440209PMX-48G6+</b>	<b>MS440219PMX-48G6+</b>
<b>Power Supply Input: 230 VAC, incl. mounted holder for DIN-rails</b>		
1x SFP-Uplink (100/1000Base-X) 5x TP-Ports (10/100/1000Base-T)	<b>On request</b>	<b>MS440219MXH-G6+</b>
2x SFP-Uplink (100/1000Base-X) 4x TP-Ports (10/100/1000Base-T)	<b>On request</b>	<b>MS440217MXH-G6</b>
1x TP-Uplink (1000Base-T) 5x TP-Ports (10/100/1000Base-T)	<b>On request</b>	<b>MS450187MXH-G6+</b>
<b>Power Supply Input: 24 VDC, incl. mounted holder for DIN-rails</b>		
1x SFP uplink (100/1000Base-X) 5x TP-Ports (10/100/1000Base-T)	<b>MS440209MXH-24G6+</b>	<b>MS440219MXH-24G6+</b>
2x SFP uplink (100/1000Base-X) 4x TP-Ports (10/100/1000Base-T)	<b>On request</b>	<b>MS440217MXH-24G6</b>
<b>Power Supply Input: 12 VDC, without holder for DIN-rails</b>		
2x 100/1000X SFP Uplink 4x 10/100/1000TX	<b>On request</b>	<b>MS440217MX-12G6</b>

## Accessories

Description	Article No.
<b>SFP Transceiver (extended temperature range -40 °C up to +85 °C)</b>	
SFP Transceiver, Gigabit Ethernet, Digital Diagnostic 850 nm Multimode, 1000Base-SX, LC duplex	<b>MS100200DX</b>
SFP Transceiver, Gigabit Ethernet, Digital Diagnostic 1310 nm Single Mode, 1000Base-LX, LC duplex	<b>MS100210DX</b>
SFP Transceiver, Fast Ethernet, Digital Diagnostic 1310 nm Multimode, 100Base-FX, LC duplex	<b>MS100190DX</b>
SFP Transceiver, Fast Ethernet, Digital Diagnostic 1310 nm Single Mode, 100Base-FX, LC duplex	<b>MS100191DX</b>





	Set of A4 sheets, each with 80 labels fitting for the Micro Switch G6 title block, 10 sheets/ per set, suitable for laser printers, perforated	<b>MS140005</b>
	<b>Memory cards for ruggedized Micro Switch G6 (ext. temperature range -25 °C up to +85 °C)</b>	
	MicroSD Memory card 4 GB for MICROSENS G6-Switches,	<b>MS140894X-4G</b>
	MicroSD Memory card 4 GB for MICROSENS G6-Switches, with individual switch configuration according to customer specifications and own MAC address	<b>MS140894X-4G-MC</b>
	<b>NMP 2.x Network Management****</b>	
	NMP 2.x Enterprise Basic package incl. 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), installation of server SW on max. 1 computer, electronic user manual included	<b>MS200100</b>
	NMP 2.x Enterprise Basic package incl. 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), installation of server SW on max. 1 computer, electronic user manual included	<b>MS200102</b>
	NMP 2.x Enterprise Expansion Pack, SW usage right for adding 200 NMP Enterprise Managed Objects,	<b>MS200110</b>
	NMP 2.x Professional Basic package incl. 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), installation of server SW on max. 1 computer, electronic user manual included	<b>MS200070</b>
	NMP 2.x Professional Basic package incl. 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), installation of server SW on max. 1 computer, electronic user manual included	<b>MS200072</b>
	NMP 2.x Professional Expansion Pack, SW usage right for adding 25 NMP Professional Managed Objects, 1 year download of updates	<b>MS200080</b>
 (MS700456)	<b>External Power Supplies for industrial use</b>	
	DIN Rail Power Supply 60 Watt 48 VDC / 1.25 A, Adjustment range 48..56VDC, Wide input range 85-264 VAC	<b>MS700430</b>
	DIN Rail Power Supply 45..55 VDC / 2.5 A (120 W), Wide input range 90..132/180..264 VAC <b>For extended temperature range -35..+70°C</b>	<b>MS700456</b>
	DIN Rail Power Supply 24 VDC / 1.0 A (24 W), Wide input range 85..264 VAC, 85..375 VDC	<b>MS700420</b>

\*\* 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.

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