Data Sheet
Ruggedized Gigabit Ethernet Micro Switch
with extended temperature range

made in Germany

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

- 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)
- 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

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

- 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

- 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/.
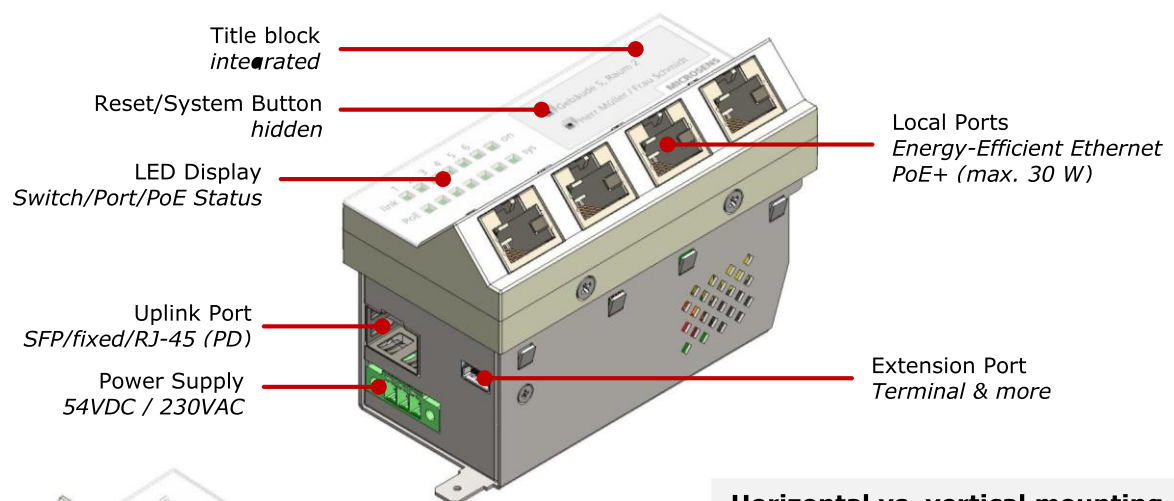
RFC / IEEE Standards

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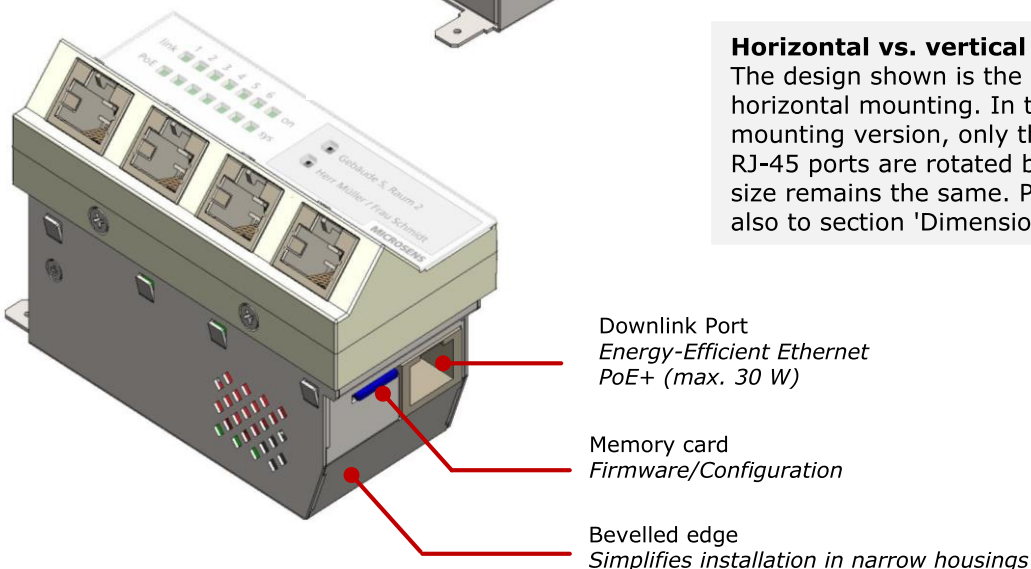
Quality – Made in Germany

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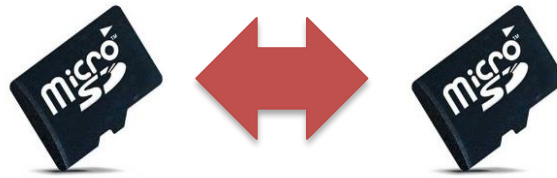
Interfaces

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
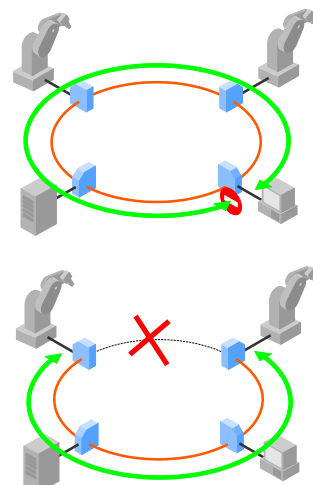
Technical Specifications

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	5 (optionally 4 or 6)
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	Power Sourcing Equipment (PSE) IEEE 802.3af/at Class 0, max. 30 W Forced-mode (Legacy Devices)

Fiber Port

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

Power Supply (DC)

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

Power Supply (AC)

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

Displays

Type	14 LEDs, detachable	
Link	Twisted pair ports 1..4 and 6	
	green	Link at port Flashing at data traffic
	orange	Port blocked (via protocol)
	red	Port Access Control rejected
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)

Environmental Conditions

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

Mechanical Dimensions

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

Technical Specifications (continued)

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 90 mm x 65 mm
Weight	400 g
Contents	1x Micro Switch
	1x Power supply plug
	1x Quick Start Guide
	1x DIN-rail holder (mounted)

Dimensions
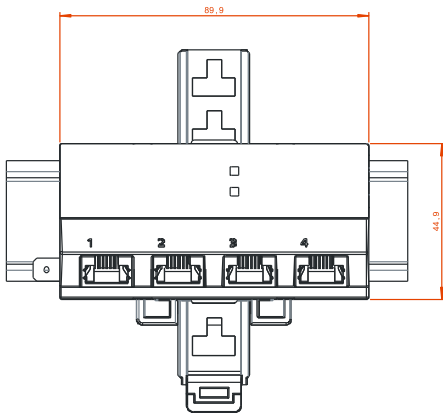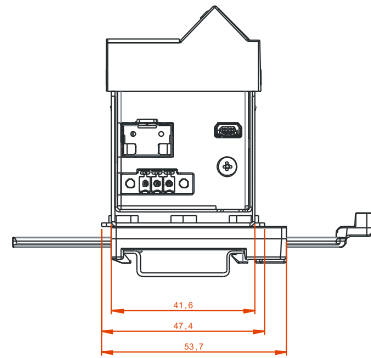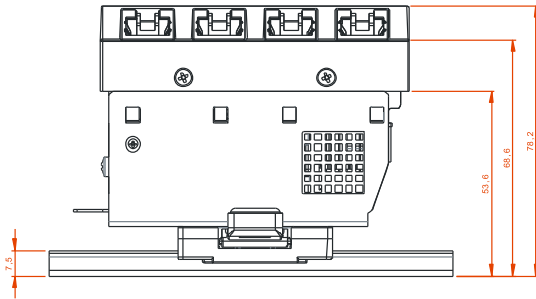
Vertical Mounting

Horizontal Mounting
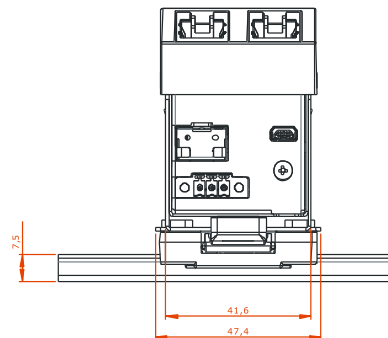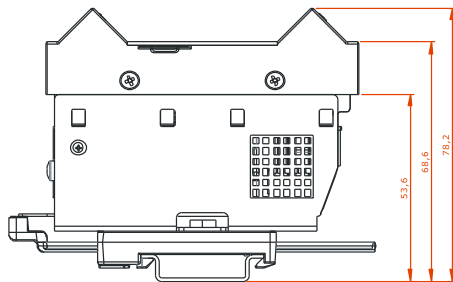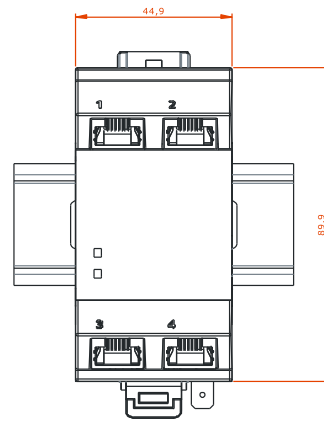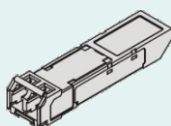
Order Information

Ruggedized Micro Switch G6
(Variants not listed here may be available on request)

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

Accessories

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

	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	**MS140005**	
	Memory cards for ruggedized Micro Switch G6 (ext. temperature range -25 °C up to +85 °C)		
	MicroSD Memory card 4 GB for MICROSENS G6-Switches,	**MS140894X-4G**	
	MicroSD Memory card 4 GB for MICROSENS G6-Switches, with individual switch configuration according to customer specifications and own MAC address	**MS140894X-4G-MC**	
	NMP 2.x Network Management****		
	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	**MS200100**	
	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	**MS200102**	
	NMP 2.x Enterprise Expansion Pack, SW usage right for adding 200 NMP Enterprise Managed Objects,	**MS200110**	
	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	**MS200070**	
	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	**MS200072**	
	NMP 2.x Professional Expansion Pack, SW usage right for adding 25 NMP Professional Managed Objects, 1 year download of updates	**MS200080**	
	External Power Supplies for industrial use		
	DIN Rail Power Supply 60 Watt 48 VDC / 1.25 A, Adjustment range 48..56VDC, Wide input range 85-264 VAC	**MS700430**	
(MS700456)	DIN Rail Power Supply 45..55 VDC / 2.5 A (120 W), Wide input range 90..132/180..264 VAC **For extended temperature range -35..+70°C**	**MS700456**	
	DIN Rail Power Supply 24 VDC / 1.0 A (24 W), Wide input range 85..264 VAC, 85..375 VDC	**MS700420**	

** 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.

Conectar

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