MICROSENS

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 Donwlink	Vertical mounting with 1x SFP Uplink and RJ-45 Donwlink
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 is supplied via Power-over-Ethernet (PoE PD). Some variants are available for supply via 230 VAC, 24 VDC, or 12 VDC.

The very compact switches excel with extremely low space requirements and are used in switching cabinets without defined 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

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

Network Management

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

Power-over-Ethernet PoE+

- 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 with suitable installation conditions)
- Ext. power supply with typ. 54 VDC

Connectors

Uplink
- 1x or 2x 1000Base-X SFP slot

Local / Downlink
- 4x or 5x 10/100/1000Base-T (RJ-45) Auto-Negotiation
- Auto MDI/MDI-X function for the use of uniform patch cables

Power Supply
- 3-pin screw pluggable connector for solid or stranded wires
- Additional grounding (PE) with 6,3 mm flat-pin plug

Extension Port
- RS-232 Console port
- For optional accessories

Mounting

- Installed holder for DIN-rails (DIN EN 50022)
- Horizontal version fits in panels of switching cabinets
- Compatible to all popular installation systems due to supporting edge

Compatibility

- Compatibility to standard CISCO Switches verified
- Amongst others: QoS, VLANs, 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 www.microsens.de**.**

RFC / IEEE Standards

RFC Standards

RFC 791	IPv4
RFC 792	ICMP
RFC 826	ARP
RFC 1155	SNMPv1
RFC 1156	SNMPv1
RFC 1157	SNMPv1
RFC 1901	SNMPv2c
RFC 1905	SNMPv2
RFC 1906	SNMPv2
RFC 2131	DHCP
RFC 2460	IPv6
RFC 2461	IPv6 Neighbour Discovery
RFC 2462	IPv6 Auto Configuration
RFC 2463	ICMPv6
RFC 2464	IPv6
RFC 2474	IPv4 DiffServ
RFC 2574	USM
RFC 2575	VACM
RFC 2865	RADIUS
RFC 2866	Accounting
RFC 2868	Tunnel Attributes
RFC 3260	IPv6 DiffServ
RFC 3315	DHCPv6
RFC 3411	SNMPv3
RFC 3412	SNMPv3
RFC 3414	USM
RFC 3415	VACM
RFC 3484	IPv6
RFC 3513	IPv6
RFC 3584	SNMPv3
RFC 3810	MLD
RFC 4330	NTP
RFC 4541	IGMP Snooping
RFC 4604	MLD
RFC 5424	Syslog

IEEE Standards

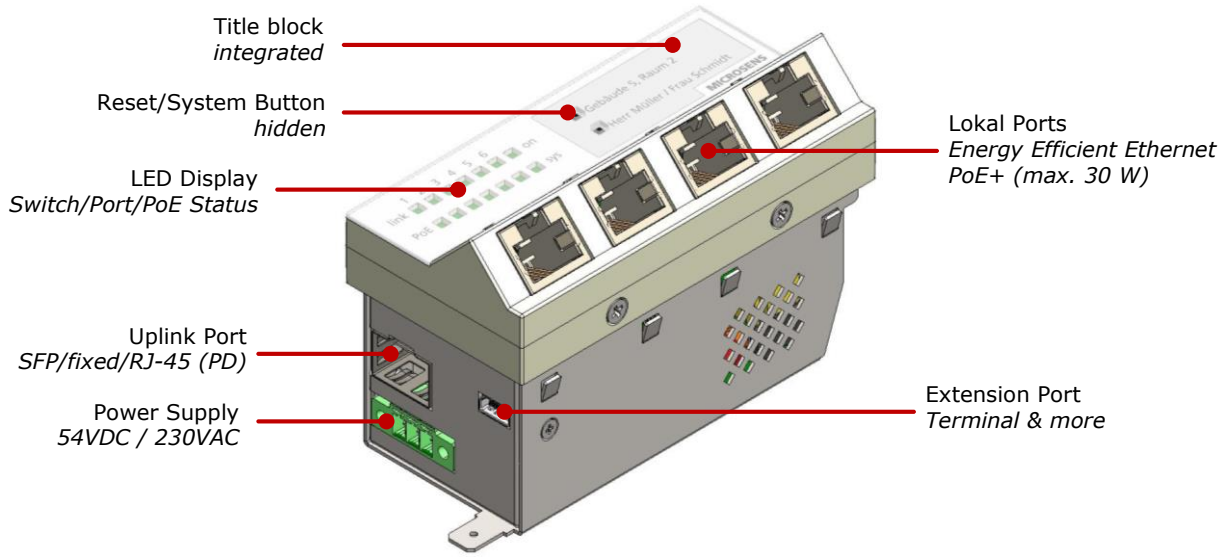
802.1D-2004	(Rapid) Spanning Tree
802.1Q-2005	Multiple Spanning Tree
802.1p	QoS
802.1Q	VLAN
802.1X	Network Access Control
802.1AB	LLDP
802.3i	10Base-T
802.3u	100Base-TX
802.3x	Full duplex and flow control
802.3z	1000Base-X
802.3ab	1000Base-T
802.3af	Power-over-Ethernet
802.3at	Power-over-Ethernet (PoE+)
802.3az	Energy-Efficient Ethernet

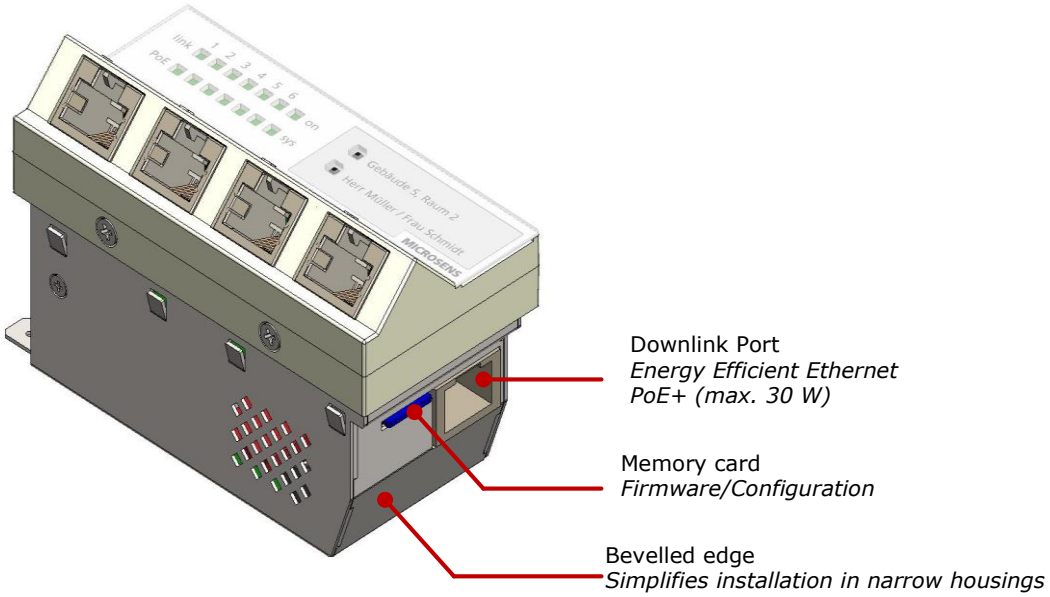
Quality – Made in Germany

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

Each device has to pass a full load performance test on all network-ports without any transmission error. Devices of each batch have to undergo an extended (48h) burn-in-test, in which they are functionally tested at high load. Therefore, early failures could be detected before delivery.

Interfaces


Title block
integrated
Reset/System Button
hidden
LED Display
Switch/Port/PoE Status
Uplink Port
SFP/fixed/RJ-45 (PD)
Power Supply
54VDC / 230VAC
Lokal Ports
Energy Efficient Ethernet
PoE+ (max. 30 W)
Extension Port
Terminal & more


Downlink Port
Energy Efficient Ethernet
PoE+ (max. 30 W)
Memory card
Firmware/Configuration
Bevelled edge
Simplifies installation in narrow housings

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

Control Panel

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

Mechanical Dimensions

Dimensions	90 x 78,2 x 53,7 mm² (w x d x h, without connectors)
Mounting depth	34 mm
Weight	350 g

Displays

Type	14 LEDs, detachable	
Link	Twisted pair ports 1..4 and 6	
	green	Link at port. Flashing at data traffic
	oange	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 Firm-ware 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

Power Supply

Input	44..57 VDC (54 VDC typ.)
Power Consumption	Typ. 4,5 W (without PoE) max. 80 W (incl. PoE) (full power only with suitable installation conditions)
Connectors	3 pin screw connector, PE/-/+
Grounding (PE)	6,3 mm flat-pin plug
Optional input variants for supply	▪ PoE+ (PD) (TP Variants only) ▪ 230 VDC ▪ 24 VDC ▪ 12 VDC

Environmental Conditions

Temperature	Operation	-25..+65 °C
	Storage	-25..+85 °C
Humidity	10..90%, non condensing	

Technical Specifications (continued)

Standards

CE	2014/30/EU (EMC) 2015/35/EU (Low voltage)
Safety	EN 60950-1
Emitted interference	EN 55022
Immunity	EN 55024

Reliability

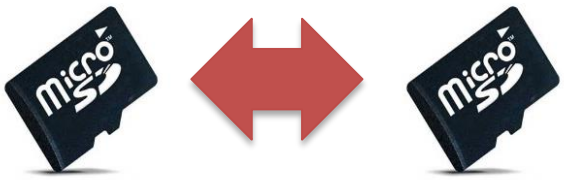
MTBF	100.000 h

Delivery / Contents

Standard Packaging

Package unit	1 pcs.
Dimensions	158 x 90 x 65 mm
Weight	400 g
Contents	1x Micro Switch 1x Micro-SD memory card (2xSFP variants only) 1x Power supply plug 1x Quick Start Guide 1x DIN-rail holder (mounted)

Memory Card



- Change of memory card transfers the **complete** device status
- Firmware update by memory card exchange possible
- Fault tolerant journaling file system
- Industrial grade – long term stability

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

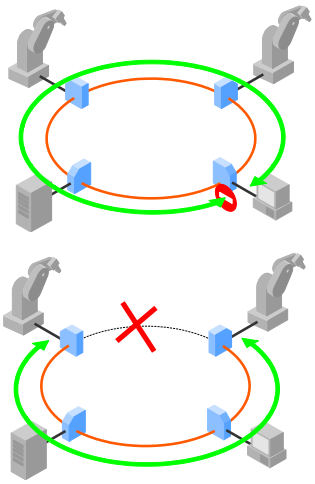
Ring-Topology (Dual Fiber-Uplink)

Normal operation

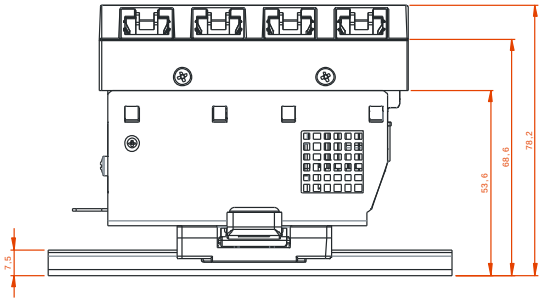
- All switches are configured for ring operation
- One switch is assigned as ring master
- Ring master cuts the ring logically

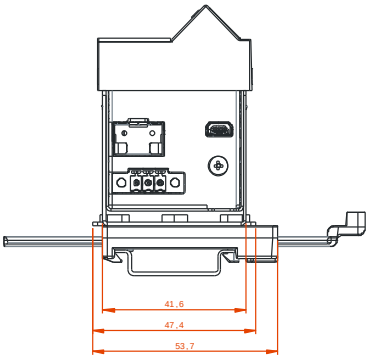
Ring error

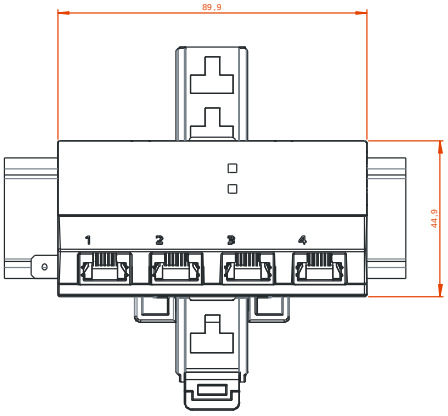
- Switches signalize segment failure via ethernet (fiber-uplink)
- Master gets that information via ethernet and closes the logical cut
- Switches relearn the actual network topology (MAC-addresses)



Dimensions

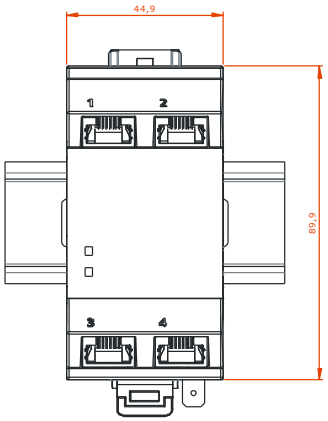


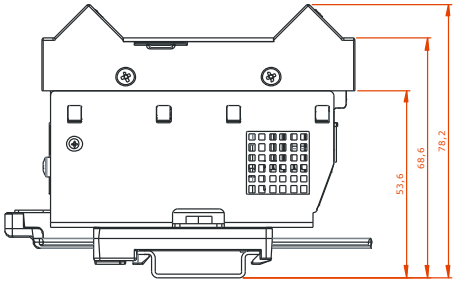


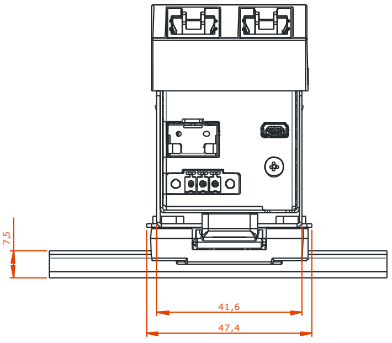


Horizontal Mounting

Vertical Mounting





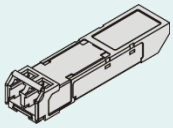


Order Information

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

Description	Article-No. Horizontal version	Article-No. Vertical version
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)	**MS450186MXH-G6+**	**On request**
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		
2x100/1000X SFP Uplink 4x10/100/1000TX	**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**
 	**Network Management**	
	NMP Professional – Network Management Platform Software incl. one year update license	**MS200160-1**
	NMP Professional – additional update license for n years	**MS200161-n**
	NMP Standard – Network Management Platform Software incl. one year update license	**MS200162-1**
	NMP Standard – additional update license for n years	**MS200163-n**
	NMP Server – Network Management Platform Software incl. one year update license and 5 clients	**MS200164-1**
	NMP Server – additional update license for n years	**MS200165-n**
 (MS700456)	**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**
	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**