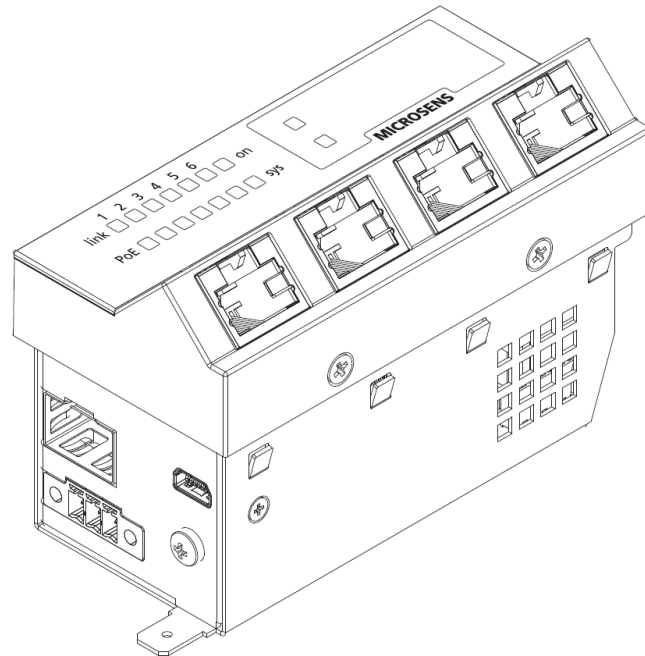


## Data Sheet

### Micro Switch Gigabit Ethernet Generation 6



**Made**  
**in**  
**Germany**

## Overview

The 6 port GBE Micro Switch Generation 6 is a further milestone in the MICROSENS Fiber-To-The-Office (FTTO) concept. The use of latest technologies guarantees our customers a new and future-oriented, highly flexible platform.

The Micro Switch Generation 6 constitutes an extension of the Gigabit Ethernet Micro Switch. In addition to the 1000Base-X fiber optic uplink, for linking to the central distributor, this switch has an additional RJ-45 downlink 10/100/1000Base-T. This additional connection is positioned at the rear of the switch and is also covered after the installation. It can, amongst other things, be used for cascading other Micro Switches in order to obtain additional connection capacities. This interconnection offers to increase the reliability of the network. If one fiber connection is interrupted the neighboring switch handles the data traffic via RSTP.

The powerful Linux-OS offers additional services and features for future use. The whole configuration of the Micro Switch can be moved to another system, just by changing the SD-card. A fault-tolerant journaling file-system is used. An encryption of the SD-Card is as option available.

The switch is available in DC version (with PoE+ function) that can be powered by any external 54 VDC power supply or in AC version (without PoE functionality) which is powered by an external 230 VAC power supply. In DC version all five RJ-45 ports (4 user ports and 1 downlink) support the complete Power-over-Ethernet functionality according to IEEE Std. 802.3af and 802.3at (min. 54 VDC needed). Intelligent power management monitors the active current consumption of connected end-equipment.

## 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
- Max. 8.192 MAC-addresses, automatic Learning and aging
- Jumbo-Frames (max. 10,240 Bytes)

### Energy-Efficient Ethernet

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

### Network Management

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- Supports all common management standards
- High Performance 800 MHz ARM CPU
- Linux operating system with fast system boot (approx. 30 seconds)
- Web Manager (HTTP/HTTPS)
- Telnet/SSH/Console, incl. standard-commands (ping, traceroute, etc.)
- SNMP v1/v2c/v3 with View-based Access Control Model (VACM) and User-based Security Model (USM)
- Central management platform (NMP Professional / NMP Server)
- IPv4/IPv6 Dual Stack
- Integrated CLI scripting for the automation of routine processes
- Firmware-, Script- and configuration files can be loaded, stored and executed direct from the switch
- Incremental firmware updates possible
- Modular MicroSD memory card for configuration, CLI scripts, firmware, encrypted data and MAC address (optional for G6+ versions)

### Power-over-Ethernet PoE+ (optional)

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

### Connectors

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#### Uplink

- 1x 1000Base-SX/-LX (SC, ST, LC, MT-RJ, EM-RJ, E-2000)
- optional SFP slot 100/1000Base-X

#### Local / Downlink

- 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 litz wires
- Additional grounding (PE) with 6,3 mm flat-pin plug

#### Extension Port

- RS-232 Console port
- For optional accessories

### Mounting

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- Snap-In-Mounting 45 mm (screw less)
- Compatible to all popular installation systems due to circumferential installation face
- Bevelled edge allows mounting in double mounting plates
- Wide range of mounting accessories available

### Compatibility

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- Compatibility to standard CISCO Switches approved

## Network management - Feature overview

### IP Stack

|                   |   |
|-------------------|---|
| <b>Dual Stack</b> | Parallel handling of IPv4 and IPv6 protocol.  |
| <b>IPv4 Stack</b> | Internet Protocol v4 handling with support of IPv4, ARP, DHCP, ICMP.<br>RFC 791 (IPv4), RFC 826 (ARP), RFC 792 (ICMP), RFC 2131 (DHCP)  |
| <b>IPv6 Stack</b> | Internet Protocol v6 handling with support of IPv6, DHCPv6, ICMPv6, NDP.<br>RFC 2460/2464/3484/3513 (IPv6), RFC 2462 (Address Configuration), RFC 2463 (ICMPv6), RFC 2461 (Neighbour Discovery Protocol), RFC 3315 (DHCPv6) |

### Port Control

|                           |   |
|---------------------------|---|
| <b>Administration</b>     | Port disable, Individual port alias   |
| <b>Ethernet Copper</b>    | Auto-Negotiation, speed, duplex mode, flow-control, Auto MDI/MDI-X                              |
| <b>Ethernet Fiber/SFP</b> | Speed, duplex mode, flow-control  |
| <b>Green IT</b>           | Latest chip technology supports Energy-Efficient Ethernet (EEE) according to IEEE Std. 802.3az. |

### Power-over-Ethernet (PoE)

|                         |   |
|-------------------------|---|
| <b>Function</b>         | Sourcing of power to connected devices via standard network Twisted-Pair cable  |
| <b>802.3at mode</b>     | PoE+ voltage is turned on only after powered device (PD) is detected and classified on port. Output voltage and power is monitored. Port power is shut down if limits are exceeded. |
| <b>802.3af mode</b>     | PoE voltage is turned on only after powered device (PD) is detected and classified on port. Output voltage and power is monitored. Port power is shut down if limits are exceeded.  |
| <b>Power Management</b> | Power limit can be defined per port and per total device. Additionally the class of the powered device (PD) can be limited per port.  |
| <b>Standards</b>        | IEEE Std. 802.3af (Data Terminal Equipment Power via Media Dependent Interface), IEEE Std. 802.3at (Data Terminal Equipment Power via Media Dependent Interface).                   |

### Switch Functions

|                      |  |
|----------------------|--|
| <b>Port Monitor</b>  | Monitor port for the connection of a network protocol analyzer. Traffic of the port to be analyzed is copied to the monitor port.    |
| <b>RMON counters</b> | 17 Integrated counters for detailed traffic analysis and network trouble shooting.   |
| <b>MAC Table</b>     | Access to table of MAC addresses learned by the switch. Can be filtered per port, VLAN address type and entry type (dynamic/static). |

### Virtual LANs (VLANs)

|                    |   |
|--------------------|---|
| <b>Function</b>    | Logical structuring of physical networks by adding a Virtual LAN ID (VID) to each Ethernet packet. Incoming packets are filtered and forwarded according to their VID. Each port can be configured for Access, Hybrid or Trunk VLAN processing mode. Independent VLANs out of the full range of 1 to 4095 can be filtered per device.           |
| <b>Access Mode</b> | For the connection of non-VLAN capable end devices (e.g. PCs). Outgoing packets are sent untagged. Incoming packets are tagged with the port default VLAN ID (PVID).  |
| <b>Trunk Mode</b>  | For the interconnection of VLAN capable switches. Outgoing packets are always sent tagged. Incoming packets are received tagged. Incoming packets without VLAN tag are tagged with the port default VLAN ID (PVID).   |
| <b>Hybrid Mode</b> | For the connection of VLAN capable and non-VLAN capable devices on the same port (e.g. VoIP-phone (tagged) and PC (untagged)). Outgoing packets are sent tagged, except packets for the port default VLAN ID (PVID), which are untagged. Incoming packets are received untagged for the port default VLAN (PVID), all other packets are tagged. |

|                          |   |
|--------------------------|---|
| <b>Priority Override</b> | VLAN priority code point of incoming packets can be overwritten with the VLAN specific priority defined in the VLAN filter. |
| <b>Voice VLAN</b>        | VLAN ID used by LLDP/CDP to assign VLAN to connected VoIP-phone.  |
| <b>RSTP VLAN</b>         | VLAN ID used by Spanning Tree instance for BPDU tagging.  |
| <b>Unauthorized VLAN</b> | VLAN ID assigned by Port Based Access Control to unauthorized ports (guest VLAN).   |
| <b>Management VLAN</b>   | VLAN ID used by the management agent (device internal port).  |
| <b>Standard</b>          | IEEE Std. 802.1D, IEEE Std. 802.1Q, IEEE Std. 802.1p  |

### Quality of Service (QoS)

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|                              |  |
|------------------------------|--|
| <b>Priority Queues</b>       | 4 priority queues per port.  |
| <b>Prioritization Scheme</b> | Strict priority (higher priority always first) or weighted fair queuing (8:4:2:1 highest to lowest).   |
| <b>Layer1 Priority</b>       | Static priority queue can be assigned for each port.   |
| <b>Layer2 Priority</b>       | Incoming packets are forwarded according to the priority code point in their VLAN tag. The 8 VLAN priority code points can be individually mapped on the 4 priority queues.  |
| <b>Layer3 Priority</b>       | Incoming packets are forwarded according to the value of the DiffServ Codepoint (IPv4) / TrafficClass (IPv6) in their IP header. Maximum 64 code points are supported. For each code point the corresponding priority queue can be mapped. |
| <b>Traffic shaping</b>       | 5 ingress rate shaping buckets per port. Supports rate and priority based rate shaping   |
| <b>Standard</b>              | IEEE Std. 802.1p (VLAN priority code point), RFC 2474/3260 (IPv4 DiffServ/IPv6 Traffic Class)  |

### Spanning Tree Protocol / Ring Protocol

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|                                   |   |
|-----------------------------------|---|
| <b>Rapid Spanning Tree (RSTP)</b> | Automatic detection of loops and redundant network paths. Single STP instance running in configurable VLAN. Rapid Spanning Tree Protocol (RSTP) backwards compatible to Spanning Tree standard (STP). |
| <b>MSTP</b>                       | Separate STP instances running in configurable VLAN groups.   |
| <b>PVST</b>                       | RSTP per VLAN for one VLAN  |
| <b>MICROSENS Ring Protocol</b>    | MICROSENS Redundant Ring Protocol with ultra-fast recovery time <20 ms within MICROSENS Ring topologies.  |

### Multicast Forwarding

---

|                      |   |
|----------------------|---|
| <b>IGMP Snooping</b> | Snooping of Internet Group Management Protocol (IGMPv1/v2/v3) for IPv4. Automatic detection and forwarding of IPv4 multicast-streams. Unregistered packets can be flooded or blocked. Multicast routers can be detected by discovery or by query message. |
| <b>Standard</b>      | RFC 4541 (IGMP)   |

### Link Layer Discovery Protocol (LLDP)

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|                 |  |
|-----------------|--|
| <b>Function</b> | Advertising identity, capabilities, and neighbours on a connected network segment. |
| <b>LLDP-MED</b> | Media Endpoint Discovery for the auto-discovery of LAN policies.                   |
| <b>Standard</b> | IEEE Std. 802.1AB (LLDP), ANSI/TIA-1057 (LLDP-MED)                                 |

### Cisco Discovery Protocol (CDP)

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|                   |  |
|-------------------|--|
| <b>Function</b>   | CDP v1, v2 for automatic detection of capabilities of neighbour CDP enabled devices. |
| <b>Voice VLAN</b> | Support of Voice VLAN for configuration of connected Cisco VoIP-phone.               |

### Real Time Clock (RTC)

---

|                 |   |
|-----------------|---|
| <b>Function</b> | Internal device clock can be synchronized with external NTP server. |
| <b>Protocol</b> | Simple Network Time Protocol (NTP)                                  |
| <b>Standard</b> | RFC 4330 (NTP)  |

### Port Access Control

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|                                   |  |
|-----------------------------------|--|
| <b>Function</b>                   | Port-Based Network Access Control with dynamic port VLAN support and fallback to MAC based authentication methods. Network access is controlled at the port level. Supports IEEE Std. 802.1X Authentication, RADIUS MAC Authentication, MAC Locking and forced authorized/unauthorized mode. |
| <b>Communication</b>              | EAPOL, RADIUS  |
| <b>Authentication Protocols</b>   | EAP-MD5, EAP-PEAP (inner protocol: MSCHAPv2), EAP-TLS, EAP-TTLS (inner protocols: EAP-MD5, EAP-TLS, PAP)   |
| <b>IEEE 802.1X Authentication</b> | Multiple users can be authenticated using central RADIUS server based on username/password or certificate.   |
| <b>RADIUS MAC Authentication</b>  | Multiple users can be authenticated using central RADIUS server based on their MAC addresses.  |
| <b>MAC locking</b>                | Multiple users can be authenticated based on their MAC addresses. Authorized MAC addresses are stored permanently in the device. They can be configured manually or automatically by locking the first MAC addresses learned on the port.  |
| <b>Dynamic VLAN</b>               | RADIUS server can provide user specific VLAN ID using tunnel-attribute in accept message. Port VLAN is dynamically set accordingly. Unauthorized users may be placed in an unauthorized VLAN ('guest VLAN') or blocked completely.   |
| <b>IP Address Detection</b>       | The IP address of the connected user is detected via ARP snooping. User IP address information can be logged using RADIUS accounting function.   |
| <b>Standard</b>                   | IEEE 802.1X-2004 (Port-Based Network Access Control).  |

### User Login

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|                 |   |
|-----------------|---|
| <b>Function</b> | Implements user based and view based authentication and scope limiting. Supports unlimited number of user/groups and views (limited by system memory constrains only). Offers ultimate flexibility with precise access control. |
|-----------------|---|

### Command Line Interface (CLI)

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|                           |  |
|---------------------------|--|
| <b>Function</b>           | Intuitive command-set with auto-complete and redo-buffer. Individual console prompt string, Console inactivity timeout. Supports full scripting and editing of script files. Supports colour displays. Permits offline configuration as well as management of an unlimited number of user configuration sets (limited by system memory constrains only). |
| <b>Telnet</b>             | Telnet via TCP/IP port 23.   |
| <b>Secure Shell (SSH)</b> | SSH via TCP/IP port 22. Authentication methods RSA, Diffie-Hellman Key Exchange. Encryption protocols 3DES-CBC, HMAC-SHA1.   |

### Web Manager

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|                              |  |
|------------------------------|--|
| <b>Function</b>              | Integrated Web Manager with graphical user interface (GUI) for device configuration and administration using standard web browser. |
| <b>Protocol</b>              | HTML v4.01, HTTP, HTTPS, Java Script   |
| <b>Browser compatibility</b> | Firefox 4.x, IE 8.x, JavaScript support required.  |

## Simple Network Management Protocol (SNMP)

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|                           |   |
|---------------------------|---|
| <b>SNMPv1/v2c</b>         | Simple Network Management Protocol v1, v2c (SNMPv1, v2c) to access device information stored in Management Information Base (MIB). Security provided by community strings for Set/Get commands and optionally by G6 login scheme.   |
| <b>Traps (SNMPv1/v2c)</b> | Traps, Notifications sent to unlimited number of independently configurable receiver destinations (limited by system memory constrains only). Sending of message is triggered by internal device status change events. Event triggers can be configured individually per destination. Test function to trigger Trap/Notification for simplified configuration check (Web Manager and CLI only). |
| <b>SNMPv3</b>             | Simple Network Management Protocol v3 (SNMPv3) for secure access to device information stored in Management Information Base (MIB). SNMPv3 supports data encryption, User-based Security Model (USM) and View-based Access Control Model (VACM).  |
| <b>Traps (SNMPv3)</b>     | Trap/Notification, InformRequest, Response sent to independently configurable receivers. Sending of message is triggered by internal device status change events. Informs provide secured messaging by requiring response message Event triggers can be configured individually per receiver.   |
| <b>MIBs</b>               | MIB-2, Enterprise-MIB (MICROSENS G6 MIB). File can be downloaded from the integrated Web Manager.   |
| <b>Standard</b>           | RFC 1155/1156/1157 (SNMPv1), RFC 1901/1905/1906 (SNMPv2), RFC 3411/3412/3584 (SNMPv3), RFC 2574/3414 (USM), RFC 2575/3415 (VACM)  |

## RADIUS Client

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|                   |  |
|-------------------|--|
| <b>Function</b>   | RADIUS client via UDP/IP ports 1812 (access), 1813 (accounting) for Remote Authentication Dial In User Service (RADIUS) server for authorizing user access and logging of user accounting information. |
| <b>Redundancy</b> | In case of a response timeout, the next RADIUS server is requested.  |
| <b>Standard</b>   | RFC 2865 (RADIUS), RFC 2866 (Accounting), RFC 2868 (Tunnel Attributes)   |

## Files

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|                        |   |
|------------------------|---|
| <b>Configuration</b>   | File transfers may be used to upgrade the software or to load configuration files. The unit supports TFTP, FTP, SFTP, HTTP, HTTPS transfer protocols. Additionally files may be loaded via DHCP directives. |
| <b>Firmware Update</b> | Software download can be complete or incremental. Individual modules may be upgraded, normally without influencing service. Flexible system permits customized upgrade files if required.                   |

## Syslog Client

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|                 |  |
|-----------------|--|
| <b>Function</b> | Syslog messages are triggered by system events and can be send to unlimited number of Syslog servers (limited by system memory constrains only). |
| <b>Standard</b> | RFC 5424   |

## Event Manager

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|                            |  |
|----------------------------|--|
| <b>Function</b>            | Mapping of device status changes (Triggers) to actions e.g. sending out SNMP trap, Syslog message etc.                             |
| <b>Customizable events</b> | Event severity and alert level freely configurable. Event text strings may be customized via user interface with developer rights. |
| <b>Traps and Syslog</b>    | Unlimited number of trap and/or Syslog receivers. Event may be filtered individually on a group level.                             |

## IEEE / RFC Standards

### RFC Standards

|                 |                          |
|-----------------|--------------------------|
| <b>RFC 791</b>  | IPv4                     |
| <b>RFC 792</b>  | ICMP                     |
| <b>RFC 826</b>  | ARP                      |
| <b>RFC 1155</b> | SNMPv1                   |
| <b>RFC 1156</b> | SNMPv1                   |
| <b>RFC 1157</b> | SNMPv1                   |
| <b>RFC 1901</b> | SNMPv2c                  |
| <b>RFC 1905</b> | SNMPv2                   |
| <b>RFC 1906</b> | SNMPv2                   |
| <b>RFC 2131</b> | DHCP                     |
| <b>RFC 2460</b> | IPv6                     |
| <b>RFC 2461</b> | IPv6 Neighbour Discovery |
| <b>RFC 2462</b> | IPv6 Auto Configuration  |
| <b>RFC 2463</b> | ICMPv6                   |
| <b>RFC 2464</b> | IPv6                     |
| <b>RFC 2474</b> | IPv4 DiffServ            |
| <b>RFC 2574</b> | USM                      |
| <b>RFC 2575</b> | VACM                     |
| <b>RFC 2865</b> | RADIUS                   |
| <b>RFC 2866</b> | Accounting               |
| <b>RFC 2868</b> | Tunnel Attributes        |
| <b>RFC 3260</b> | IPv6 DiffServ            |
| <b>RFC 3315</b> | DHCPv6                   |
| <b>RFC 3411</b> | SNMPv3                   |
| <b>RFC 3412</b> | SNMPv3                   |
| <b>RFC 3414</b> | USM                      |

|                 |               |
|-----------------|---------------|
| <b>RFC 3415</b> | VACM          |
| <b>RFC 3484</b> | IPv6          |
| <b>RFC 3513</b> | IPv6          |
| <b>RFC 3584</b> | SNMPv3        |
| <b>RFC 3810</b> | MLD           |
| <b>RFC 4330</b> | NTP           |
| <b>RFC 4541</b> | IGMP Snooping |
| <b>RFC 4604</b> | MLD           |
| <b>RFC 5424</b> | Syslog        |

### IEEE Standards

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

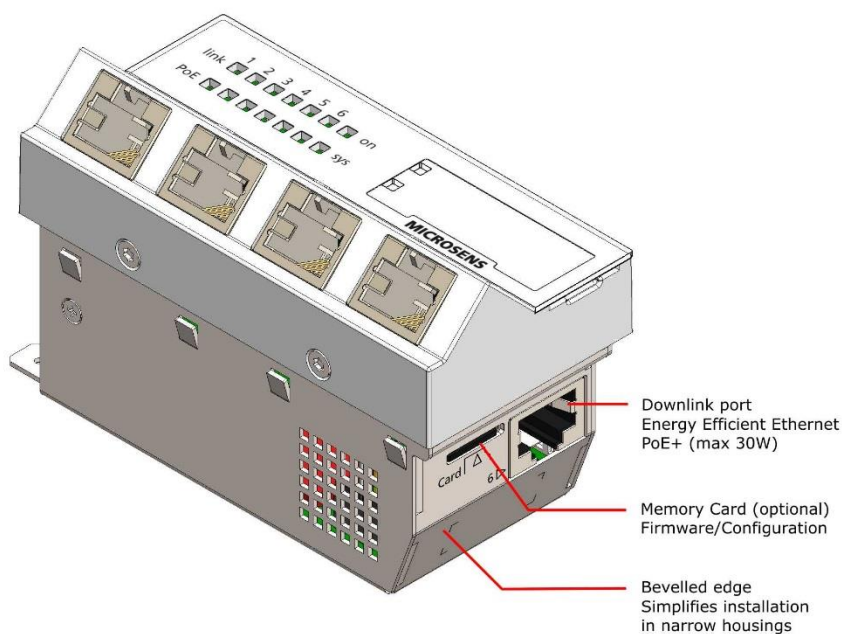
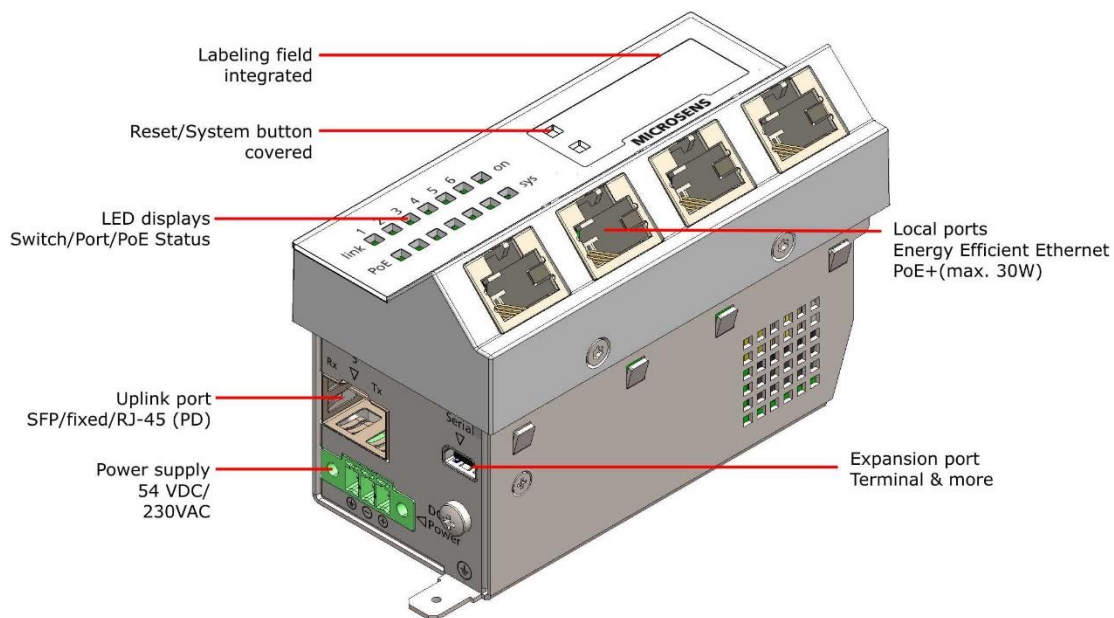
## Quality – Made in Germany

To guarantee constant high quality of the Micro Switch Gigabit Ethernet Generation 6 all models and versions are produced in Germany at our production site Hamm.

Concluding each device has to pass a full load performance test on all network-ports without any transmission error.

Additionally devices of each batch have to complete an extended (48h) burn-in-test, in which they are functionally tested at high load, so early failures could be detected before delivery.

# Interfaces





## Technical Specifications

### Switch

|                      |  |
|----------------------|--|
| <b>Type</b>          | Gigabit Ethernet Switch<br>Layer 2+, IEEE 802.3 compliant          |
| <b>Performance</b>   | Store-and-forward<br>Full wire-speed, non-blocking<br>on all ports |
| <b>MAC addresses</b> | 8.192 addresses, automatic<br>learning and aging                   |
| <b>Jumbo Frames</b>  | max. 10.240 Bytes  |

### Twisted-Pair Ports

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

### Fiber Port

|                                 |   |
|---------------------------------|---|
| <b>Type</b>                     | Gigabit Ethernet<br>1000Base-SX (Multimode)<br>1000Base-LX (Single mode)<br><br>optional SFP (Dual Speed)<br>100/1000Base-X, support of<br>SFP digital diagnostics function |
| <b>Connector</b>                | Optionally: SC-duplex, ST, LC,<br>MT-RJ, EM-RJ, E-2000  |
| <b>Multimode (MS100200DX)</b>   | Multimode fiber, 62.5/125µm<br>(280 m) or 50/125 µm (550 m)<br>850nm wavelength<br>-4..-9.5 dBm output power<br>-18 dBm sensitivity<br>0 dBm saturation                     |
| <b>Single Mode (MS100210DX)</b> | Single Mode fiber, 9/125 µm<br>(10 km)<br>1310 nm wavelength<br>-3..-9,5 dBm output power<br>-20 dBm sensitivity<br>-3 dBm saturation                                       |
| <b>Flow Control</b>             | Pause Frames (IEEE 802.3x),<br>configurable   |

### Displays

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

### Control Panel

|                      |   |
|----------------------|---|
| <b>Reset button</b>  | Reset of the switch, new upload<br>of the latest stored configuration<br>(direct hardware function) |
| <b>System button</b> | Request of the IP configuration<br>for management, reset back to<br>factory default settings        |

### Power Supply (DC Voltage)

|                          |   |
|--------------------------|---|
| <b>Input</b>             | 44..57 V DC (54 V DC typ.)  |
| <b>Power Consumption</b> | Typ. 4,5 W (without PoE)<br>max. 80 W (incl. PoE)<br>(full power only with suitable<br>installation conditions) |
| <b>Connectors</b>        | 3 pin screw connector, PE/-/+   |
| <b>Grounding (PE)</b>    | 6,3 mm flat-pin plug  |

### Power Supply (AC Voltage)

|                       |   |
|-----------------------|---|
| <b>Input</b>          | 195..265 V AC (230 V AC typ.)<br>50..60 Hz (50 Hz typ.) |
| <b>Power cons.</b>    | Typ. 4,5 W  |
| <b>Connectors</b>     | 3 pin screw connector, PE/N/L                           |
| <b>Grounding (PE)</b> | 6,3 mm flat-pin plug                                    |

## Technical Specifications (continued)

### Environmental Conditions

|                    |                         |            |
|--------------------|-------------------------|------------|
| <b>Temperature</b> | Operation               | 0..40 °C   |
|                    | Storage                 | -20..85 °C |
| <b>Humidity</b>    | 10..90%, non condensing |            |

### Mechanical

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

### Standards

|                             |   |  |
|-----------------------------|---|--|
| <b>CE</b>                   | 2004/108/EC (EMV)<br>2006/95/EG (Low voltage) |  |
| <b>Safety</b>               | EN 60950-1:2011-01                            |  |
| <b>Emitted interference</b> | EN 55022:2011-12                              |  |
| <b>Immunity</b>             | EN 55024:2011-09                              |  |

### Reliability

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

### Delivery / Contents

#### Standard Packaging

|                     |   |
|---------------------|---|
| <b>Package unit</b> | 1 pcs.  |
| <b>Dimensions</b>   | 158 x 75 x 65 mm  |
| <b>Weight</b>       | 380 g   |
| <b>Contents</b>     | 1x Micro Switch<br>1x Micro-SD memory card<br>(separate article number)<br>1x Ground cable (PE), 20 cm<br>1x Power supply plug<br>1x Short manual<br>1x Set stickers with symbols |

#### Bulk Packaging

(MSV-Bulk-IK45-20)

|                     |   |
|---------------------|---|
| <b>Package unit</b> | 20 pcs.   |
| <b>Dimensions</b>   | 380 x 325 x 140 mm  |
| <b>Weight</b>       | 7,5 kg  |
| <b>Contents</b>     | 20x Micro Switch<br>20x Micro-SD memory card<br>(separate article number)<br>20x Ground cables (PE), 20 cm<br>20x Power supply plug<br>1x Short manual<br>20x Set stickers with symbols |

## Memory Card



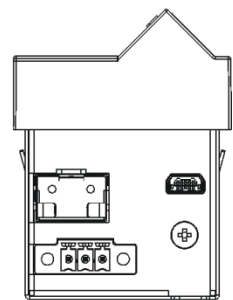
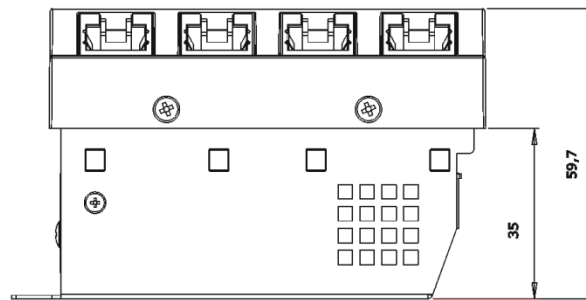
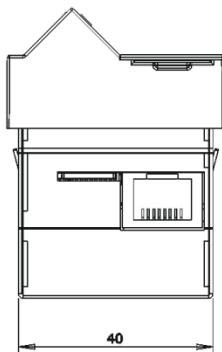
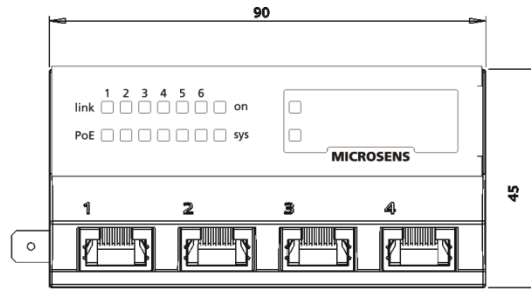
The MicroSD memory card is used for the permanent storage of configuration, script and firmware files. With this memory card it is possible to transfer a configuration to a new device in case of a device failure.

Optional it is possible to write an own MAC address to the MicroSD memory card. This MAC address has priority compared to the MAC address in the switch. This allows having an exact clone of the device by swapping the memory card.

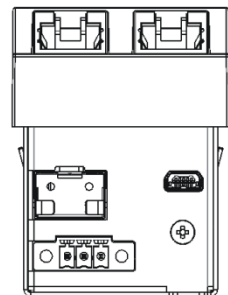
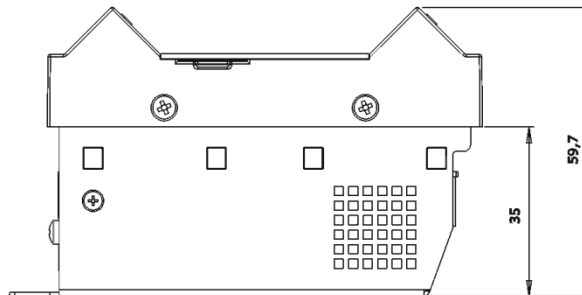
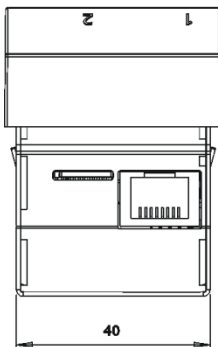
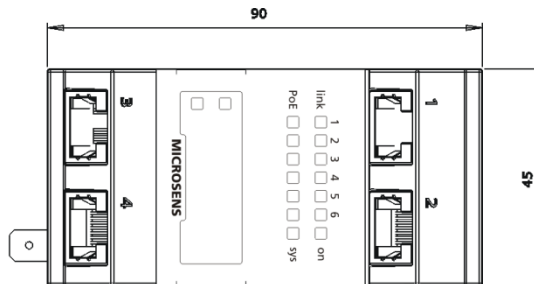
- Change of memory card transfers the **complete** device status
- Firmware update by memory card exchange possible
- Fault tolerant journaling file system
- Industrial grade – long term stability
- Encrypted system as security option
- Only MICROSENS memory cards have to be used. Only with this the long term stability over the complete temperature range can be guaranteed.
- Optional for G6+ versions

# Dimensions

## Horizontal Version



## Vertical Version



## Order Information

| Description   | Article-No.<br>Horizontal Version | Article-No.<br>Vertical Version |
|---|-----------------------------------|---------------------------------|
| <b>6 Port GBE Micro Switch G6, with PoE+, 54 VDC</b>  |                                   |                                 |
| Uplink 1x 1000Base-SX<br>ST, Multimode 850 nm   | <b>MS440200PM-48G6+</b>           | <b>MS440210PM-48G6+</b>         |
| Uplink 1x 1000Base-SX<br>SC duplex, Multimode 850 nm  | <b>MS440201PM-48G6+</b>           | <b>MS440211PM-48G6+</b>         |
| Uplink 1x 1000Base-LX<br>SC duplex, Single Mode 1310 nm   | <b>MS440202PM-48G6+</b>           | <b>MS440212PM-48G6+</b>         |
| Uplink 1x 1000Base-LX<br>ST, Single Mode 1310 nm  | <b>MS440203PM-48G6+</b>           | <b>MS440213PM-48G6+</b>         |
| Uplink 2x 100/1000Base-X,<br>2x SFP Slots   | <b>MS440207PM-48G6</b>            | <b>MS440217PM-48G6</b>          |
| Uplink 1x 100/1000Base-X,<br>SFP Slot   | <b>MS440209PM-48G6+</b>           | <b>MS440219PM-48G6+</b>         |
| <b>6 Port GBE Micro Switch G6, without PoE-Function, 230 VAC</b>  |                                   |                                 |
| Uplink 1x 1000Base-SX<br>ST, Multimode 850 nm   | <b>MS440200M-G6+</b>              | <b>MS440210M-G6+</b>            |
| Uplink 1x 1000Base-SX<br>SC duplex, Multimode 850 nm  | <b>MS440201M-G6+</b>              | <b>MS440211M-G6+</b>            |
| Uplink 1x 1000Base-LX<br>SC duplex, Single Mode 1310 nm   | <b>MS440202M-G6+</b>              | <b>MS440212M-G6+</b>            |
| Uplink 1x 1000Base-LX<br>ST, Single Mode 1310 nm  | <b>MS440203M-G6+</b>              | <b>MS440213M-G6+</b>            |
| Uplink 2x 100/1000Base-X,<br>2x SFP Slots   | <b>MS440207M-G6</b>               | <b>MS440217M-G6</b>             |
| Uplink 1x 100/1000Base-X,<br>SFP Slot   | <b>MS440209M-G6+</b>              | <b>MS440219M-G6+</b>            |
| <b>Memory cards for horizontal / vertical G6 Micro Switch</b>   |                                   |                                 |
| MicroSD Memory card 4 GB for MICROSENS G6-Switches,<br>Extended temperature range -25°C up to +85°C   |                                   | <b>MS140894X-4G</b>             |
| MicroSD Memory card 4 GB for MICROSENS G6-Switches,<br>Extended temperature range -25°C up to +85°C<br><b>With own MAC address</b>  |                                   | <b>MS140894X-4G-M</b>           |
| MicroSD Memory card 4 GB for MICROSENS G6-Switches,<br>Extended temperature range -25°C up to +85°C<br><b>With individual switch configuration according to customer specifications</b>                     |                                   | <b>MS140894X-4G-C</b>           |
| MicroSD Memory card 4 GB for MICROSENS G6-Switches,<br>Extended temperature range -25°C up to +85°C<br><b>With individual switch configuration according to customer specifications and own MAC address</b> |                                   | <b>MS140894X-4G-MC</b>          |

## Accessories

|   | Description   | Article No.          |
|---|---|----------------------|
|    | <b>SFP Transceiver</b>  |                      |
|   | SFP Transceiver, Gigabit Ethernet, Digital Diagnostic 850 nm Multimode, 1000Base-SX, LC duplex<br>Extended temperature range -40°C up to +85°C    | <b>MS100200DX</b>    |
|   | SFP Transceiver, Gigabit Ethernet, Digital Diagnostic 1310 nm Single Mode, 1000Base-LX, LC duplex<br>Extended temperature range -40°C up to +85°C | <b>MS100210DX</b>    |
|   | SFP Transceiver, Fast Ethernet, Digital Diagnostic 1310 nm Multimode, 100Base-FX, LC duplex<br>Extended temperature range -40°C up to +85°C       | <b>MS100190DX</b>    |
|   | SFP Transceiver, Fast Ethernet, Digital Diagnostic 1310 nm Single Mode, 100Base-FX, LC duplex<br>Extended temperature range -40°C up to +85°C     | <b>MS100191DX</b>    |
|    | <b>Title Block Sheets</b>   |                      |
|   | Set of A4 sheets, each with 80 labels fitting for the Micro Switch G6 title block<br>10 sheets per set, suitable for laser printers, perforated   | <b>MS140005</b>      |
| <br> | <b>Network Management</b>   |                      |
|   | NMP Professional – Network Management Platform Software incl. one year update license   | <b>MS200160-1</b>    |
|   | NMP Professional – additional update license for n years  | <b>MS200161-n</b>    |
|   | NMP Standard – Network Management Platform Software incl. one year update license   | <b>MS200162-1</b>    |
|   | NMP Standard – additional update license for n years  | <b>MS200163-n</b>    |
|   | NMP Server – Network Management Platform Software incl. one year update license and 5 clients   | <b>MS200164-1</b>    |
| NMP Server – additional update license for n years  | <b>MS200165-n</b>   |                      |
|    | <b>Mounting Sets</b>  |                      |
|   | Universal mounting kit for E2 device casing, plate and cover frame  | <b>MS140029</b>      |
|   | Universal mounting kit incl. cover frame for cable ducts with C-Profil  | <b>MS140040BR</b>    |
|    | <b>Power Supply</b>   |                      |
|   | Power Supply 100-230 VAC / 54 VDC, 1.2 A, 65 W for PoE+   | <b>MS700701</b>      |
|   | Mounting kit for Power Supply MS700701 to fit in Hager(tehalit) BR trunking channels with 80mm lid  | <b>MS700675-EKTH</b> |
|   | Power Supply 100-230 VAC / 54 VDC, 1.2 A, 65 W for PoE+ open wire ends, fixed cable, conducted grounding  | <b>MS700710</b>      |
|   | Medical Power Supply 110-230 V AC, 48 V DC, 1,25 A, 60 W  | <b>MS700680</b>      |

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