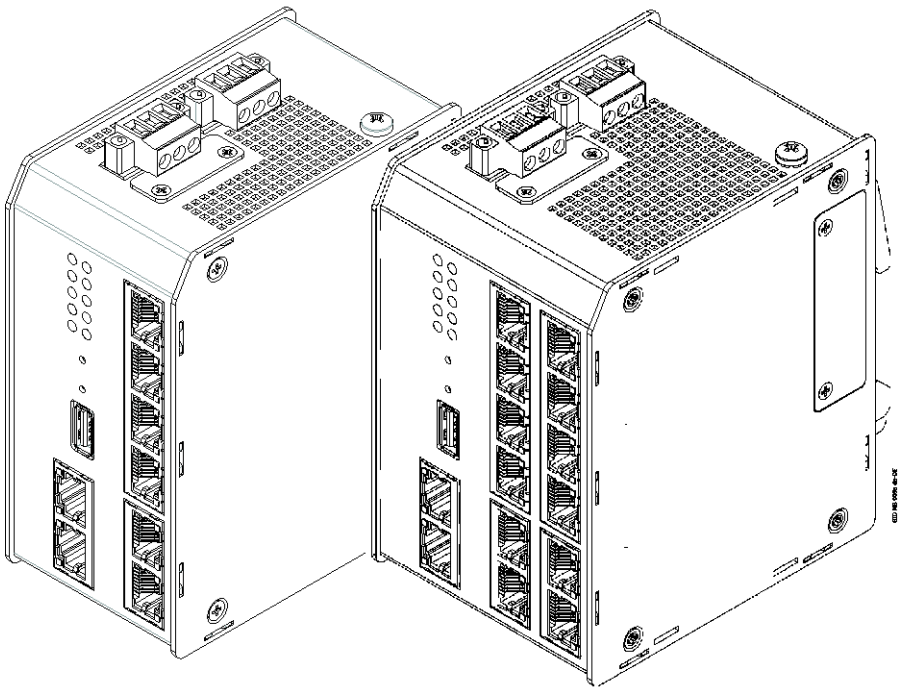
MICROSENS

Quick Start Guide
Commissioning
Gigabit Ethernet industrial switch
Profi Line Modular/Profi Line+
Generation 6

V.2.0.11



MICROSENS GmbH & Co. KG, Küferstraße 16, 59067 Hamm, Germany

0 Aim of the Quick Start Guide

This quick start guide will help you with

- the mechanical handling of the switch,
- changing the memory card,
- connecting the power supply and commissioning the device,
- understanding the status LEDs,
- operating the keys,
- connecting the signal cables (inputs and outputs),
- setting up access to the network management,
- and configuring the ring protocol (media redundancy)

For further documentation see the Web Manager or visit the MICROSENS website (see section 10).

1 Mechanical Handling

◇ Attaching an expansion module

Note: Install the expansion module before you mount the switch on the hat rail.
When combined, the switch and expansion modules support up to 25 ports.

- Place the switch on a steady surface, such as a table
- Unscrew the cover of the expansion interface
  - Retain the cover and screws in case of later use
- Match up the expansion module carefully with the chassis (see Fig. 1) so that the alignment pins engage
- Lay the combination of switch and expansion module onto its left-hand side
- Turn the combination until you have easy access to the locking mechanism of the expansion module
- Place a screwdriver on the locking mechanism (see Fig. 2) and press on it firmly
- Use your other hand to press against the expansion module (see Fig. 3)
  - The locking mechanism moves the catches of the expansion module
  - This presses the catches into the slots of the chassis
- Ensure that all of the expansion module catches are properly engaged

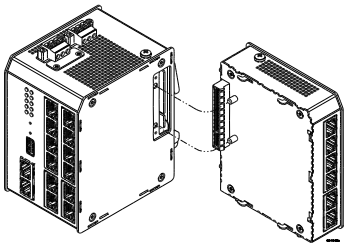


Fig. 1

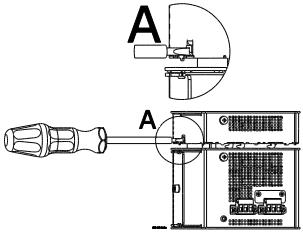


Fig. 2

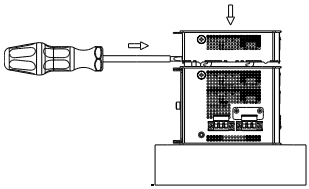


Fig. 3

◇ Removing an expansion module

- Disconnect the switch from the power supply and network and remove it from the hat rail
- Place the switch with the front panel (LEDs) on a steady surface, such as a table
- Place a screwdriver on the locking mechanism of the expansion module (see Fig. 4)
- Press down firmly on the locking mechanism and gently lever the expansion module off the chassis (see Fig. 5)
  - The locking mechanism releases the catches of the expansion module
  - Levering in this way pulls the catches out of the slots in the chassis
- Reattach the cover for the expansion interface and screw it on to the chassis

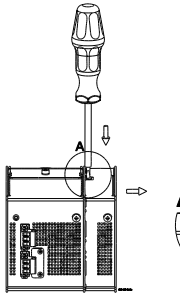


Fig. 4

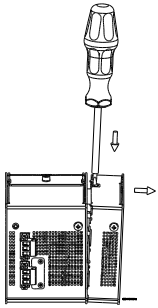


Fig. 5

◇ Mounting on the hat rail

- Place the switch firmly onto the top of the hat rail (DIN EN 60715, 35x15)
- Rotate the chassis downwards until the hat-rail latch clicks into place

◇ Removal from the hat rail

- Insert a flat screwdriver into the opening in the metal tab on the underside of the chassis
- Pull the tab downwards until the hat-rail latch is released
- Rotate the switch upwards and lift it off the top of the rail

2 Connecting the Power Supply

The switch is powered by a 24…57 VDC supply (see fig. 6, ①). In the interests of redundancy or load sharing, depending on the switch model it is also possible to connect a second source of the same voltage (see fig. 6, ②). If one source fails, the alternative source takes over the power supply without interruption.

If there is no valid input voltage available to the power connectors, the switch can optionally be supplied via Power-over-Ethernet via Port 1/1 ("PoE+ PD" feature, see section "Power supply over Ethernet").

The change from "PoE+ PD" supply to the normal supply takes place without interruption. The switch restarts when switching from the normal supply to the "PoE+ PD" supply.

If the switch is used to power further equipment (role 'Power Sourcing Equipment' – 'PSE'), it requires a minimum input voltage:

- Input voltage < 44 VDC: PSE feature disabled (neither PoE nor PoE+)
- Input voltage 44 – 54 VDC: PoE possible
- Input voltage ≥ 50 VDC: PoE and PoE+ possible

Note:
Depending on the switch model the following device designs are available:

- Max. 30 W or 60 W output rating per PoE/PoE+ port.
- One or two power supply ports (see fig. 6, ① and ②)

◇ **Grounding**
Make sure that you earth the switch before connecting it to any other cables (power supply, network, etc.) The groundingscrew is located on the top of the chassis and is marked with the grounding symbol (see Fig. 6, ③). The expansion modules also require grounding.

◇ **24...57 VDC supply**
The connectors are labelled 'Power 1' and 'Power 2' (see Fig. 6, ①, ②) and are equipped with 3-pin plug connectors. Please observe the polarity (terminal labelling +/-).

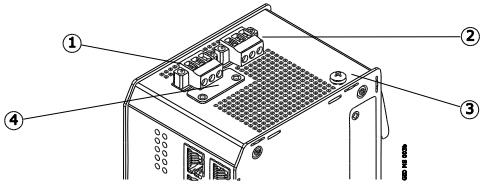


Fig. 6

◇ **Power supply over Ethernet**
The use of Power-over-Ethernet (PoE) offers an alternative or supplement to supplying power via the 'Power 1' and 'Power 2' connectors. Port 1/1 on the switch is used for this. This is also referred to as "PD" (role 'Powered Device', see Fig. 8).

Using PoE for the power supply provides additional redundancy in case of power-supply failure.

◇ **Starting up**
After connection to the power supply, the switch starts automatically and is ready for operation after approx. 45 s. Connect the switch to your local network segment using a suitable connector cable.

3 Factory settings

The switch starts with its factory settings:

- User level: as per the "Preset user levels for management access" (see section 7)
- IP configuration: DHCP
- PoE functions: PSE (ports 2/1...2/4, 3/1...3/4): switched off
  PD (port 1/1): switched on
- SFP ports: (Ports 2/5, 2/6, 3/5, 3/6)
  MICROSENS SFP inserted: SFP specific
  - SFP slot empty: 1000Base-X
  - Third-party SFP: 1000Base-X
- Ring function: Turned off
- VLAN filter: Turned off

Please note that the factory settings may change with future firmware versions (see section 10). For this reason we recommend that you check the release notes for information about any changes to the factory settings before carrying out a firmware update.

4 Notifications

◇ **Status LEDs (see Fig. 7)**

- Power 1/2: Off – Switch unpowered or monitoring disabled
  Green – Power supply 1/2 functional
  Orange – Power supply 1/2 missing or failed
  'Power 2' is signalled only after a voltage is connected.
- System 1: Off – Normal operation
  Other notific. – See section 'Factory' key
- System 2: Off (not used)
- Ring 1/2: Off – Ring 1/2 disabled
  Green – Ring 1/2 enabled and closed
  Red *blinking* – Ring 1/2 enabled but interrupted
- Signal In 1/2: Off Monitoring of 'Signal In 1/2' disabled
  Green – Monitoring enabled, normal state detected (see section 6)
  Red – Monitoring enabled, alarm state detected (see section 6)
- Signal Out 1/2: Off – Function of 'Signal Out 1/2' disabled
  Green – 'Signal Out 1/2' disabled (see section 6)
  Red – 'Signal Out 1/2' enabled (see section 6)

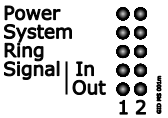


Fig. 7

◇ **Port status LEDs (see Fig. 8)**

Serial port:

- TxD: Off (not used)
- RxD: Off (not used)

All Ethernet ports:

- lnk (link): Off – Link down: no connection
  Green – Link up, port open (able to send and receive data)
  Orange – Link up, port blocked: Port Access Control (PAC), Spanning Tree (STP), MICROSENS Ring Protocol or Local Loop Protection have rejected the user
  Green blinking – Port sending or receiving data
- PoE: Off – PoE (Power over Ethernet, PSE role) disabled
  Orange – PoE or PoE+ enabled, port not supplying power
  Green – PoE or PoE+ enabled, port supplying power (PSE role active)
  Red – PoE error: Switch has rejected PoE request

  For dual-media ports, this LED is marked with "M" and indicates SFP or TP operation.

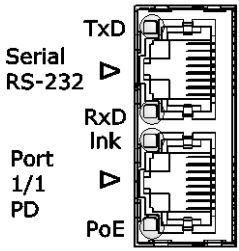


Fig. 8

5 Operating elements

There are two keys on the front. These can be activated with a thin object.

◇ **Restarting the switch (hardware reset): 'Reset' key**
By briefly pressing the reset button (see Fig. 9, ①) the memory and the MAC table are erased and all connections are reinitialised. The current configuration (switch and management) remains unchanged.

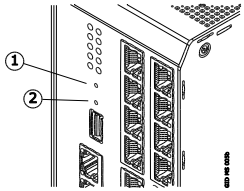


Fig. 9

◇ **Restoring the factory default settings: 'Factory' key**
By pressing the 'Factory' key (see Fig. 9, ②) the following actions commence when released:

- 2 s press: System 1 LED lights up orange – Switch requesting IP address from the Switch IP Configuration Tool or NMP
- 10 s press: System 1 LED *blinks* orange – Switch is resetting to factory defaults, the IP configuration remains unchanged
- 20 s press: System 1 LED *blinks* red – Switch is resetting to factory defaults, and IP configuration is also reset
- 30 s press: System 1 LED lights up green – Switch cancelling function, configuration remains unchanged

6 Connecting the signal lines (outputs and inputs, optional)

The outputs and inputs (see Fig. 10) are located on the underside of the chassis.

◇ **Outputs:**
Labelled 'Signal Out', these have a 6-pin plug connector. The outputs are enabled in the software configuration.

- The outputs 'Out 1' and 'Out 2' are potential-free (relay, change-over contacts)
- The output capacity is max. 60 V/0.5 A (DC)

◇ **Inputs:**
Labelled 'Signal In', these have a 4-pin plug connector.

- The inputs 'In 1' and 'In 2' are potential-free (optocoupler inputs)
- Please observe the polarity. The input does not react to polarity reversal.
- An input voltage < 3 VDC is recognized as a "Low" state, ≥ 3 VDC as "High"
- Voltage capacity:
  - 3 – 12 VDC: No series resistor
  - 12 – 24 VDC: Series resistor: 1,2 kΩ
  - 24 – 48 VDC: Series resistor: 2,6 kΩ
  - ◦ With polarity reversal: max. -12 VDC
- Note on the software configuration:
  - ◦ You can configure the "Low" or "High" state as an alarm state
  - ◦ In case of alarm the 'Signal In' status LED lights up red, or green in the normal state

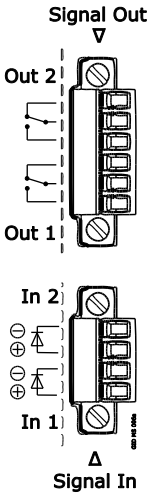


Fig. 10

7 Network management access

◇ **IP address assignment**
In order for management over the network to function, the switch requires valid IP parameters (IP address, subnet mask, and default gateway). These are obtained automatically via DHCP (factorysetting). As an alternative you can manually assign the IP parameters with the software 'Switch IP Configuration Tool' or the software Network Management Platform (NMP).

Using the 'Switch IP Config Tool' software
The software 'Switch IP Config Tool' is available on our website as a ZIP archive for download:

- www.microsens.com > Support > Software tools

The ZIP archive contains the documentation in English and the software offers an English user interface.

- Install and launch the software (prerequisite for installation: Java Runtime Environment)
- On your PC, select the network interface to be used for configuring the switches
- Click the button 'MAC-based Device Discovery' (please consider your firewall configuration)
  - ◦ The software lists all MICROSENS switches within a subnet by their MAC addresses.
- Use the list to assign the IP parameters to the switch. Clicking the 'Send' button stores the information to the non-volatile memory in the switch

Using the NMP software for IP configuration
If you use the management software NMP, you can optionally use the 'Switch IP Config Tool' integrated into it. The user interface is available in a number of languages. The 'Switch IP Config Tool' (see Using the 'Switch IP Config Tool' software) does not need to be downloaded separately.

◇ **User interfaces to the switch**
Once the IP configuration is ready, you are able to manage the switch. The switch has the following user interfaces:

- https – Web Manager (graphical interface, encrypted, access: https://<IP address of switch>, User documentation is available via the link '*Documentation*' in the navigation bar)
  - – Also for the Network Management Platform (NMP) (see below)
- http – Web Manager, unencrypted (disabled by default, can be enabled instead of https)
- ssh – Encrypted text-based interface (CLI)
- telnet – Unencrypted text-based interface (CLI)
- snmp – For third-party management software SNMPv1, SNMPv2c, SNMPv3 are supported.

◇ **Preset user levels for management access**
The following user levels (roles with specific access rights) are preset:

User	Password	Access	Comments
public	microsens	Read only	This user cannot make any changes.
user	microsens	Limited write	This user has write access to selected parameters such as aliases, time, test functions, etc.
admin	administrator	Full rights	This user can adjust all settings.

◇ **Web browser**
When accessing the Web Manager, use an operating system with the latest patches, e.g. Windows 7 (64-bit SP1) or later, and a current browser with JavaScript enabled, for example:
- Firefox 37 or later
- MSIE 11 or later
- Google Chrome 42 or later
- Opera 29 or later
- Safari 5.1.7 or later

◇ **Management software NMP**
With the Network Management Platform (NMP) MICROSENS offers a universal management software for the central configuration and administration of all MICROSENS devices. The clearly structured graphical user interface and intelligent mechanisms greatly simplify the tasks for the administrator.
The software interface offers a number of languages. The 'Switch IP Config Tool' is integrated.
The latest version is available for download from our website:
- www.microsens.com > Support > Software tools

A license key is required to operate this software. A test licence is available either from your MICROSENS products sales partner or directly from MICROSENS Sales (sales@microsens.de).

8 Operating in ring mode

The industrial switch Profi Line Modular/Profi Line+ features the high-performance MICROSENS Ring Protocol to support the operation of a ring topology (copper or fiber-optic ring). The Ring Protocol with its ultra-short switching times offers advantages over STP/RSTP/MSTP.

Device roles
One of the switches in a ring is the ring master. In normal operation (ring physically closed) it blocks one of its ring ports (known as the backup port), which prevents the formation of loops. In case of failure (ring interrupted), the ring master opens its backup port, which maintains network connectivity.

Factory settings
In the factory settings, ring mode is disabled and the status LEDs are off. This prevents a physical ring topology (risk of a loop).

Sequence of configuration steps
The first step is to configure all of the switches in a ring (via web, CLI, SNMP, or NMP) before you physically close the ring.

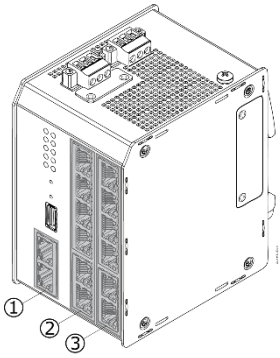


Fig. 11

Rings and switches
A ring may consist of any number of switches. For optimal performance, MICROSENS recommends that you plan for up to 25 switches per ring. A switch supports up to two rings simultaneously. The switch displays the enabled rings via the status LEDs 'Ring1' and 'Ring 2' (see section Status LEDs).

Ring ports
You have a free choice of which physical ports operate as ring ports A and B. MICROSENS recommends that you choose the same slot for the ports of a ring. **When operating two rings, always assign just one physical port to a ring port.** When operating glass fiber on all ports, MICROSENS recommends that you select different slots for the ports of the different rings (see Fig. 11, ②, ③).

Preparations
- Select the switches that are to form the ring.
- If these switches are already networked, **do not yet** physically close the ring.
- Select the ring master from the switches (in normal operation it blocks ring port B).
- Select a ring number (0...255) that is unique in your layer-2 network segment.
- Choose a meaningful ring name (optional).

Software configuration
- Configure *each* switch as a ring member:
  - Set the function to 'Ring enabled',
  - enter the ring name (optional),
  - enter the ring number,
  - choose the physical ports to operate as ring ports A and B (see section Ring ports),
- enable the 'Ring master' function for *just one* of the switches.

Note:
MICROSENS recommends that you use the management software NMP for the ring configuration. This offers the option to collect the switches into a group and configure them together. A prerequisite for using the NMP management software is that the correct gateway address needs to be entered into each of the switches.

Hardware configuration
- *Only after you have configured the software* should you physically close the ring (e.g. by plugging-in a network cable)

9 SD memory card

An SD memory card is required to operate the switch. This is already installed before delivery. The card slot cover on the top of the chassis is labelled 'Card' (see Fig. 6, ④).

Note:
The SD memory card that is supplied for your MICROSENS Switch is formatted in a non-Microsoft Windows® format. Do not reformat the SD card, otherwise the device will not be able to recognise it anymore.
If the SD card is defective, please contact your MICROSENS representative or the MICROSENS support (support@microsens.de) for a replacement.

◇ **Changing the SD memory card**
- Disconnect the switch from the power supply (24...57 V sources, as well as Port 1/1, see section 2)
- Unscrew the cover of the card slot
- Press the inserted card inward so that it releases, and pull it out
- Insert the card with the contacts first in the indicated orientation and press it gently until it locks into place
- Screw the cover of the card slot tight
- Reconnect the power supply

10 Firmware updates and further information

You have access to current firmware versions and further information once you have registered on our website:
- Register: www.microsens.com > Partner-Login > Please follow the link 'Please register here' > Fill out and submit the online User Registration form
  - MICROSENS will send you an e-mail containing a user name and password
- Login: www.microsens.com > Partner-Login > Enter your user name and password > Click the button 'Login'
  - Firmware images: Please navigate to your switch and select the tab 'Services'. To find your switch quickly, enter the item number of your switch into the search box on the website.
  - Further information is available by selecting the other tabs

For further questions please contact our support:
- By e-mail under support@microsens.de
- By phone under +49 (0)2381 9452-345 (Mo. – Fr., 7:30 AM – 4:00 PM CET)