HIRSCHMANN IT

A BELDEN BRAND

User Manual

Installation
MAMMUTHUS CORE LAYER SWITCH – MTS2948X-6Q-A
MAMMUTHUS POWER MODULE– MTM290-PSU250
MAMMUTHUS FAN MODULE – MTM2900-FAN

Contents

Important information

Note: Read these instructions carefully, and familiarize yourself with the device before trying to install, operate, or maintain it. The following notes may appear throughout this documentation or on the device. These notes warn of potential hazards or call attention to information that clarifies or simplifies a procedure.

Symbol explanation

This is a general warning symbol. This symbol alerts you to potential personal injury hazards. Observe all safety notes that follow this symbol to avoid possible injury or death.

If this symbol is displayed in addition to a safety instruction of the type “Danger” or “Warning”, it means that there is a danger of electric shock and failure to observe the instructions will inevitably result in injury.

This symbol indicates the danger of hot surfaces on the device. In connection with safety instructions, non-observance of the instructions will inevitably result in injuries.

⚠ DANGER

DANGER draws attention to an immediately dangerous situation, which will **inevitably** result in a serious or fatal accident if not observed.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.

⚠ CAUTION

CAUTION indicates a possible danger which, if not avoided, **may** result in minor injuries.

NOTICE
NOTICE provides information about procedures that do not involve the risk of injury.

Safety instructions

⚠ WARNING

UNCONTROLLED MACHINE ACTIONS

To avoid uncontrolled machine actions caused by data loss, configure all the data transmission devices individually.

Before you start any machine which is controlled via data transmission, be sure to complete the configuration of all data transmission devices.

Failure to follow this instruction can result in death, serious injury, or device damage.

General safety instructions

You operate this device with electricity. Improper usage of the device entails the risk of physical injury or significant property damage. The proper and safe operation of this device depends on proper handling during transportation, proper storage and installation, and careful operation and maintenance procedures.

- ☐ Before connecting any cable, read this document, and the safety instructions and warnings.
- ☐ Operate the device with undamaged components exclusively.
- ☐ The device is free of any service components. In case of a damaged or malfunctioning device, turn off the supply voltage and return the device to Hirschmann IT for inspection.

Qualification requirements for personnel

- ☐ Only allow qualified personnel to work on the device.
  Qualified personnel have the following characteristics:
  - ▶ Qualified personnel are properly trained. Training as well as practical knowledge and experience make up their qualifications. This is the prerequisite for grounding and labeling circuits, devices, and systems in accordance with current standards in safety technology.
  - ▶ Qualified personnel are aware of the dangers that exist in their work.
  - ▶ Qualified personnel are familiar with appropriate measures against these hazards in order to reduce the risk for themselves and others.

- Qualified personnel receive training on a regular basis.

Certified usage

Only use the device for those purposes specified in the catalog and in the technical description. Only operate the device with external devices and components that are recommended and permitted by the manufacturer. The proper and safe operation of this product depends on proper handling during transport, proper storage, assembly and installation, and conscientious operation and maintenance procedures.

National and international safety regulations

Verify that the electrical installation meets local or nationally applicable safety regulations.

Ensure the integrity and consistency

☐ Check the bond on the packaging to assure it is sealed and not tampered by unauthorized party.

☐ Verify serial number of delivered products to make sure it is unified with a hardcopy serial number list provided by the manufacturer. If it is necessary, please contact Belden representative to obtain a softcopy serial number list from the manufacturer for double check.

Requirements for connecting electrical wires

Before connecting the electrical wires, **always** verify that the requirements listed are complied with.

The following requirements apply without restrictions:
▶ The electrical wires are voltage-free.
▶ The cables used are permitted for the temperature range of the application case.
▶ Connect the ground screw on the back of the device to the protective conductor before setting up other connections. When to remove connections, the protective conductor is the last to be removed.
▶ Exclusively switch on the device when it is installed.
▶ Relevant for North America: Only use 60 °C / 75 °C (140 °F / 167 °F) or 75 °C (167 °F) copper (Cu) wire.

Requirements for connecting the supply voltage

Before connecting the supply voltage, **always** verify that the requirements listed are complied with.

The following requirements apply without restrictions:	
All variants	All of the following requirements are complied with: ▶ The supply voltage corresponds to the voltage specified on the type plate of the device. ▶ The power supply conforms to overvoltage category I or II. ▶ The power supply has an easily accessible disconnecting device (for example a switch or a plug). This disconnecting device is clearly identified. So in the case of an emergency, it is clear which disconnecting device belongs to which power supply cable. ▶ When to connect a power supply voltage with a protective conductor: first connect the protective conductor, and then the power supply voltage. If the device contains such a second power supply voltage connection module: first connect the protective conductor, and then the power supply voltage. ▶ Supply with DC voltage: The wire diameter of the power supply cable is at least 1 mm² (North America: AWG16) on the supply voltage input. ▶ Supply with AC voltage: The wire diameter of the power supply cable is at least 0.75 mm² (North America: AWG18) on the supply voltage input. ▶ The cross-section of the ground conductor is the same size as or bigger than the cross-section of the power supply cables. ▶ The power supply cable is suitable for the voltage, the current and the physical load.

Special conditions for safe use

- ☐ Install the basic device and modules in a suitable enclosure based on specific environmental conditions to provide at least IP54 protection according to the requirements of EN 60529.
- ☐ Take measures to prevent instantaneous interference from exceeding 140% of the rated voltage at the voltage input.

Shielding ground

The shielding ground of the connectable twisted pair cables is connected to the ground connection as a conductor.
Beware of possible short circuits when connecting a cable section with conductive shielding braiding.

ESD guide

The modules are equipped with electrostatic sensitive components.
If the connection is touched, these sensitive components can be damaged or their service life shortened due to electric field or charge balance effects.
You may find information about electrostatic hazard components in DIN EN 61340-5-1 (2007-08) and DIN EN 61340-5-2 (2007-08).

Device casing

Only technicians authorized by the manufacturer are permitted to open the casing.

- ☐ Keep the cooling fins free to ensure good air circulation.
- ☐ Verify that there is at least 10 cm (3.94 in) of space around the cooling fins of the casing.
- ☐ Do not touch the housing during operation or shortly after switching off the device. Hot surfaces can cause injury.
- ☐ Install the device horizontally in the cabinet or vertically on a flat surface. Operating the device as a table unit is inadmissible.
  See “Installing and grounding the device” on page 32.
- ☐ Operate the device at the maximum ambient air temperature and in stacking: when to install the device, confirm that there is at least one available rack space (approximately 5 cm) above the device to allow heat to escape through the enclosure of the device.
- ☐ If you operate the device in 19” switch cabinet: install the slide / rails to support the weight of the device.

Installation site requirements

Operate the device at the specified ambient temperature (temperature of the ambient air at a distance of 5 cm (2 in) from the device) and at the Specified relative humidity exclusively.

- ☐ When you are selecting the installation location, confirm that you observe the climatic threshold values specified in the technical data.
- ☐ Use the device in an environment with a maximum pollution degree that complies with the specifications in the technical data.
- ☐ Increased ambient temperature: When you are operating the device in a closed switch cabinet or together with other devices in a switch cabinet, the ambient temperature in the switch cabinet can be higher than the ambient temperature in the room. Only install the device in an ambient temperature in line with the maximum ambient temperature specified by the manufacturer.
- ☐ Mechanical stress: Install the device in a switch cabinet in such a way that rules out hazardous conditions due to severe mechanical stress.

CE marking

The labeled devices comply with the regulations contained in the following European directive(s):

- 2011/65/EU and 2015/863/EU (RoHS)
  Directive of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
- 2014/30/EU (EMC)
  Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.
- 2014/35/EU
  Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.

In accordance with the above-named EU directive(s), the EU conformity declaration will be available to the relevant authorities at the following address:

Hirschmann Automation and Control GmbH
Stuttgarter Str. 45-51
72654 Neckartenzlingen
Germany

You find the EU conformity declaration as PDF file for downloading on the Internet at: https://catalog.belden.com

Warning! This is a class A device. This device can cause interference in living areas, and in this case the operator may be required to take appropriate measures.

Warning! When Ethernet cables are used in industrial environments, confirm that they are shielded.

Note: The assembly guidelines provided in these instructions must be strictly adhered to observe the EMC threshold values.

LED or laser components

LED or LASER components according to IEC 60825-1 (2014):
CLASS 1 LASER PRODUCTS
CLASS 1 LED PRODUCTS

FCC note

Supplier's Declaration of Conformity
47 CFR § 2.1077 Compliance Information

MAMMUTHUS

U.S. Contact Information

Belden – St. Louis
1 N. Brentwood Blvd. 15th Floor
St. Louis, Missouri 63105, United States
Phone: 314.854.8000

This device complies with part 15 of the FCC rules.
Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

Note: This device has been tested and found to comply with the limits for a Class A digital devie, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to pay to correct the interference at his own expense.

Recycling note

After usage, this device must be disposed of properly as electronic waste, in accordance with the current disposal regulations of your county, state, and country.

About this manual

The “Installation” user manual contains a device description, safety instructions, a description of the display, and the other information that you need to install the device.
Documentation mentioned in the “User Manual Installation” that is not supplied with your device as a printout can be found as PDF files for downloading on the Internet at: https://catalog.belden.com

Key

The symbols used in this manual have the following meanings:

▶	Listing
☐	Work step
■	Subheading

1 Description

1.1 General device description

MTS2900 switch provides excellent port density and switching performance, with enhanced L2 / L3 feature set. It can support data center level network and provides high flexibility configuration options and Open Flow support. It can be used as a core switch, combined with MTS2600\MTS2700\MTS2800 to form a compact data network solution. It can be also used as a convergence switch, combined with MTS8003 to form a large network solution.

Basic device

Power module

You can choose 1 or 2 power modules with the same input voltage.
Power modules are provided as accessories.
See “Order number” on page 57.

Fan module

The rear panel of the switch provides 4 fan slots, equipped with standard 4 fan modules.
Fan modules are provided as accessories.
See “Order number” on page 57.

1.2 Device name and product code

The device name corresponds to the product code.

1.2.1 Basic device

Order number	Product code	Description
942999824	MTS2948X-6Q-A	1 × rack-mounted 10 Gbit/s core layer switch; 48 × 1/10 Gbit/s SFP+ slot; 6 × 40 Gbit/s QSFP+ slot; 2 × modular PSU slot; 4 × fan slot; advanced software.

1.2.2 Power module

Order number	Product code	Description
942999822	MTM2900-PSU250	AC/DC 250 W power module; AC input 100 V AC - 240 V AC; DC input 192 V DC - 288 V DC, 3.5 A; output 12 V DC, 20.8 A, 5-Volt Standby 5 VSB / 2A; hot-pluggable.

1.2.3 Fan module

Order number	Product code	Description
942999823	MTM2900-FAN	It is a modular fan, hot-pluggable. MTS2948 is forcedly equipped with 4 fan units.

1.3 Device views

1.3.1 MTS2948X-6Q-A

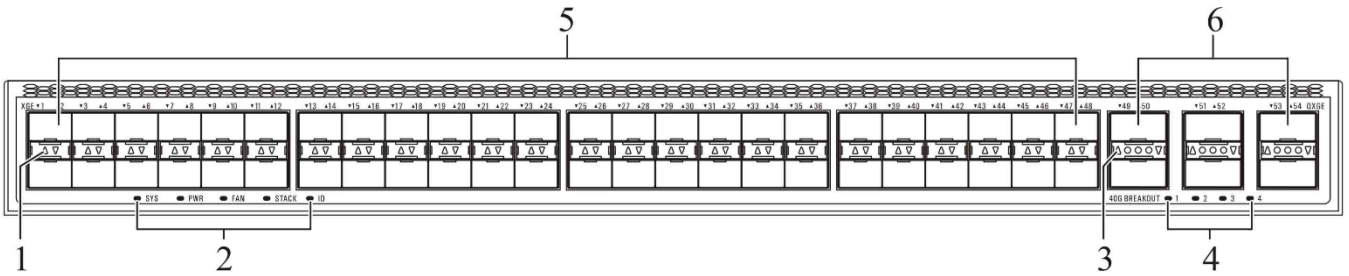


Figure 1: Front view of the Basic Device

1	Port Status LED (1/10 Gbit/s optical port)
2	The device status LEDs from left to right are as follows: SYS: System indicator PWR: Power indicator FAN: Fan indicator STACK: Stack indicator ID: ID indicator
3	Port status LED (40 Gbit/s optical port)
4	BREAK OUT indicator
5	10 Gbit/s optical port (configurable to 1000 BASE-X)
6	40 Gbit/s optical port (breakable out into 4 X 10 Gbit/s optical port)

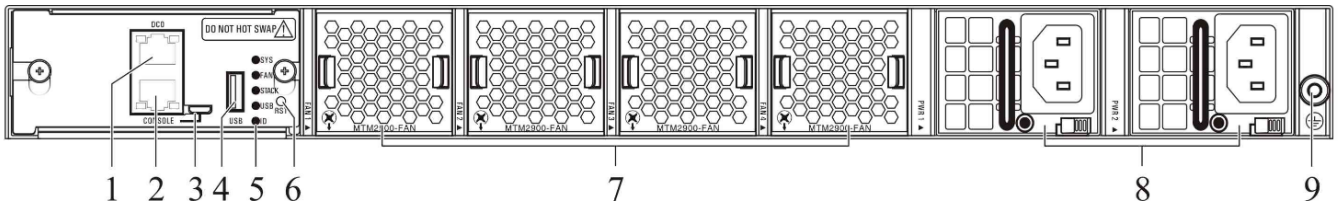


Figure 2: Rear view of the Basic Device

1	DC0 interface
2	CONSOLE port
3	Micro USB (CONSOLE port) CONSOLE port
4	USB interface
5	The device status LEDs from top to bottom are as follows: SYS: System indicator FAN: Fan indicator STACK: Stack indicator USB: USB indicator ID: ID indicator
6	Reset button (press and hold for 5 seconds to restart the machine)
7	Fan module slot (FAN1 - FAN4)
8	Modular power supply slot (PWR1, PWR2)
9	Grounding Screw

1.3.2 Power module

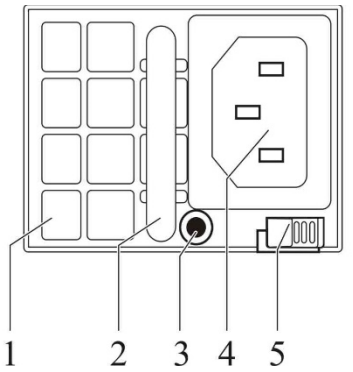


Figure 3：Rear View of the Power Module

1	Air outlet of the Power Module
2	Handle
3	Power status LED
4	AC power socket
5	Fixed card buckle

1.3.3 Fan module

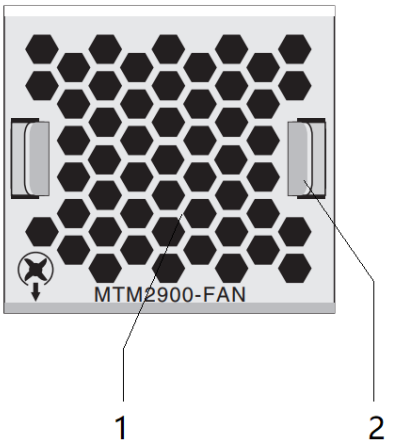


Figure 4: Rear View of the Fan Module

1	Air outlet of the Fan Module
2	Fixed card buckle

1.4 Power supply

You may use the power module to supply voltage to the device.

For information about connecting supply voltage,
see “Power module” on page 18.

1.5 Ethernet ports

You can use fiber optic (F/O) to connect end devices and other network segments to the device and the media module ports.

1.5.1 1/10 Gbit/s F/O port

This port is an SFP+ slot.
The port allows you to connect network components according to IEEE 802.3.
This port supports:

- Full duplex
- Delivery status
  1/10 Gbit/s full duplex when 1/10 Gbit Ethernet SFP+ transceiver is used.

1.5.2 40 Gbit/s F/O port

This port is a QSFP+ slot.
The port allows you to connect network components according to IEEE 802.3.
This port supports:

- Full duplex
- Delivery status
  40 Gbit/s full duplex when 10 Gbit/s Ethernet QSFP+ transceiver is used

1.5.3 10/100/1000 Mbit/s twisted pair port

This port is an RJ45 socket.
The 10/100/1000 Mbit/s twisted pair port allows you to connect network components according to the IEEE 802.3 10BASE-T/100BASE-TX/ 1000BASE-T standard.
This port supports:

- Autonegotiation
- Autopolarity
- Autocrossing (if autonegotiation is activated)
- 1000 Mbit/s full duplex
- 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode
- Delivery state: Autonegotiation activated

1.5.4 Out-of-band management port

This port is an RJ45 socket.
The port allows you to connect network components according to IEEE 802.3 10BASE-T/100BASE-TX.
This port supports:

- Autonegotiation
- 100 Mbit/s half-duplex, 100 Mbit/s full duplex, 10 Mbit/s half-duplex, 10 Mbit/s full duplex

The port allows you to manage the device and upload configuration through the following protocols:

- SNMP
- SSH
- Telnet
- FTP

See “Command line interface user manual” for more information. The manual is available for download on the Internet: https://catalog.belden.com

1.6 Display elements

After the supply voltage is set up, the Software starts and initializes the device. Afterwards, the device performs a self-test. During this process, various LEDs light up.

1.6.1 Device state

These LEDs provide information about the conditions which affect the operation of the whole device.

LEDs on the front panel of the device

Indicator type	Indicator name	Indicator color	Status
System Status LED	SYS	Green	Quick flashing (flashing 5 times per second): indicating hardware starts to work after power on. Slow flashing (flashing 1 time per 2 seconds): indicating the system is working normally. On / off: indicating an exception to the system running.
Power indicator	PWR	Green	ON: indicating all in-place power modules are working normally. OFF: indicating an exception to the in-place power modules.
Fan indicator	FAN	Green	ON: indicating all fan modules on the device are working normally. OFF: indicating an exception to at least 1 fan module on the device.
STACK indicator	STACK	Green	Flashing: indicating stacking function is enabled, and the device is the main unit of the stacking system. ON: indicating stacking function is enabled, and the device is not the main unit of the stacking system. OFF: indicating stacking function is not enabled.
ID indicator	ID	Blue	Quick flashing (flashing 5 times per second): used for site positioning, and for the operation and maintenance personnel to remotely control the ID light on and off. OFF: indicating ID light is not enabled by default.

LEDs on the rear panel of the device

Indicator type	Indicator name	Indicator color	Status
System Status LED	SYS	Green	Quick flashing (flashing 5 times per second): indicating hardware starts to work after power on. Slow flashing (flashing 1 time per 2 seconds): indicating the system is working normally. On / off: indicating an exception to the system running.
USB indicator	USB	Green	ON: indicating U disk is in place. Flashing: indicating data reading and writing. OFF: indicating U disk is not in place.
Fan indicator	FAN	Green	ON: indicating all fan modules on the device are working normally. OFF: indicating an exception to at least 1 fan module on the device.
STACK indicator	STACK	Green	Flashing: indicating stacking function is enabled, and the device is the main unit of the stacking system. ON: indicating stacking function is enabled, and the device is not the main unit of the stacking system. OFF: indicating stacking function is not enabled.
ID indicator	ID	Blue	Quick flashing (flashing 5 times per second): used for site positioning, and for the operation and maintenance personnel to remotely control the ID light on and off. OFF: indicating ID light is not enabled by default.

1.6.2 Port Status

These LEDs provides port information.

Indicator type	Indicator name	Indicator color	Status
Serial port indicator	TXD	RJ45 self-contained yellow LED	Flashing: indicating data sending in serial port. OFF: indicating no data sending in serial port.
	RXD	RJ45 build-in green LED	Flashing: indicating data receiving in serial port. OFF: indicating no data receiving in serial port.
DC0 interface indicator	1000 Mbit/s	RJ45 self-contained yellow LED	OFF: indicating DC0 works at 10/100 Mbit/s or is unlinked. ON: indicating DC0 works at 1000 Mbit/s.
	ACT	RJ45 build-in green LED	OFF: indicating DC0 interface is unlinked. ON: indicating DC0 interface is linked with no data sending and receiving. Flashing: indicating DC0 interface is linked with data sending and receiving.
Port Status LED	LINK/ ACT	Green	ON: indicating successful connection establishment in Ethernet port. Flashing: indicating data sending and receiving in Ethernet port. OFF: indicating no connection establishment in Ethernet port.
40 Gbit/s port BREAK OUT indicator Light	40 Gbit/s BREAKOUT	Green	ON: indicating at least one 40 Gbit/s interface works in 10 Gbit/s mode and is broken out into 4 x 10 Gbit/s interfaces. When any one or more 40 Gbit/s interfaces are configured as four 10 Gbit/s interfaces, BREAKOUT light is enabled and works with 40 Gbit/s interface indicator to distinguish the serial number of 10 Gbit/s interface: When the Port LED 1 is on, each interface indicator indicates the status of the first 10 Gbit/s interface in the interface. When the Port LED 2 is on, each interface indicator indicates the status of the second 10 Gbit/s interface in the interface. When the Port LED 3 is on, each interface indicator indicates the status of the third 10 Gbit/s interface in the interface. When the Port LED 4 is on, each interface indicator indicates the status of the fourth 10 Gbit/s interface in the interface. OFF: indicating 40 Gbit/s interface works in 40 Gbit/s mode and is not broken out into 4 x 10 Gbit/s interfaces.

1.7 Management interfaces

1.7.1 DC0 interface (external management)

The serial interface is provided on RJ45 socket (DC0 interface), which can realize the local connection of external management station (VT100 terminal or PC with corresponding terminal emulation). This enables you to set up a connection to the CLI (Command Line Interface) and to the System Monitor.

1.7.2 USB interface

The switch provides 2 serial ports (EIA/TIA-232 and Micro USB 2.0). These serial ports allow the users to configure the switch using the PC (or laptop) equipped with RS-232 serial port (or USB interface).

2 Installation

These devices have been developed for practical application in a harsh industrial environments.
On delivery, the equipment is ready for operation.

Perform the following work steps to install and configure the device:

- ☐ Checking the package contents
- ☐ Installing the power module (optional)
- ☐ Installing and grounding the device
- ☐ Installing an SFP transceiver (optional)
- ☐ Operating the device
- ☐ Connecting data cables
- ☐ Filling out the inscription Label

2.1 Checking the package contents

- ☐ Check whether the package includes all the items specified in the section “Delivery items” on page 57.
- ☐ Check the individual parts for transport damage.

2.2 Installing the power module (optional)

Note: Hirschmann IT provides ready-to-run power modules. You can choose to install the power module while the device is running.

2.2.1 Installing the power module

Perform the following work steps:

- ☐ Remove the cover plate from the power module slot of the device.
- ☐ Put the power module into the power module slot of the device. See Figure 5.

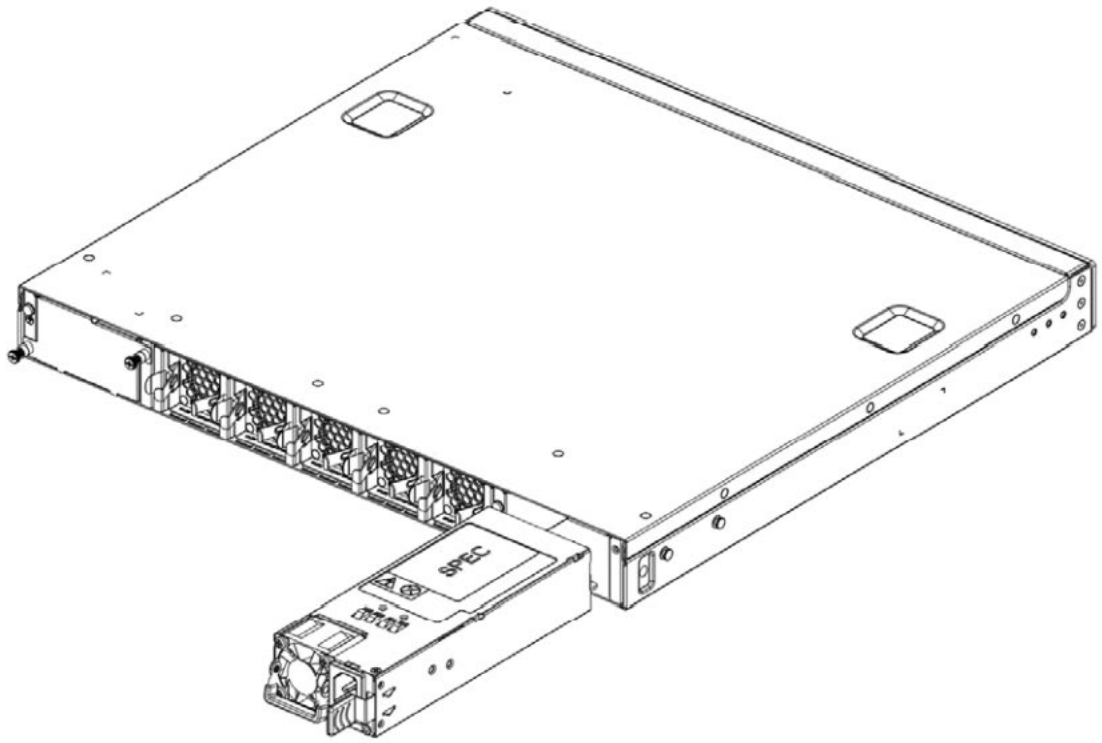


Figure 5: Installing the power module

2.3 Installing and grounding the device

Perform the following work steps:

☐ Installing the device
This device offers the following two installation options:
Option 1: Installing the device in the switch cabinet. In this way, the device is placed horizontally. Refer to 2.3.1 Installing the device in the switch cabinet.
Option 2: Installing the device on a vertical flat surface. In this way, the device is placed vertically. Refer to 2.3.2 Installing the device on a vertical flat surface.

☐ Grounding the device

2.3.1 Installing the device in the switch cabinet

Use the slide or mounting rails to install the device in a 19" switch cabinet, or a cabinet with a depth of no more than 380 mm.
If there are no slide or mounting rails available in the cabinet, use the rear support brackets to install the device in the cabinet.

⚠ WARNING

ELECTRIC SHOCK

Install this device solely in a switch cabinet or in an operating site with restricted access, to which maintenance staff have exclusive access.

Failure to follow this instruction can result in death, serious injury, or device damage.

Installing the device with the slide or mounting rails in a 19" switch cabinet

Note: When the device is operated in an environment with continuous vibration load greater than 0.7 g, it must be fixed to the switch cabinet with the 2 fixed rack ears at the front and rear of the device.
Additional rack ears are provided as accessories.
See “Accessories” on the page 57.

Prerequisites:

☐ Install the device in a 19" switch cabinet by means of the slide or mounting rails. It improves the stability of the device in an environment affected by vibrations. For more information about the slide or mounting rails and how to install them, please contact the switch cabinet manufacturer.

☐ The device is designed to be installed in a 19" switch cabinet. At the time of delivery, 2 preinstalled fixed rack ears come with the device on the side.

☐ Make sure the device is well ventilated. If necessary, install a fan to prevent overheating.

☐ Measure the depth of the 19" cabinet for easy connection.

Perform the following work steps:

☐ Install the sliding or mounting rails in a 19" switch cabinet as specified by the manufacturer.

☐ Place the device on the rail in the switch cabinet.

☐ Attach the rack ears to the switch cabinet. See Figure 6.

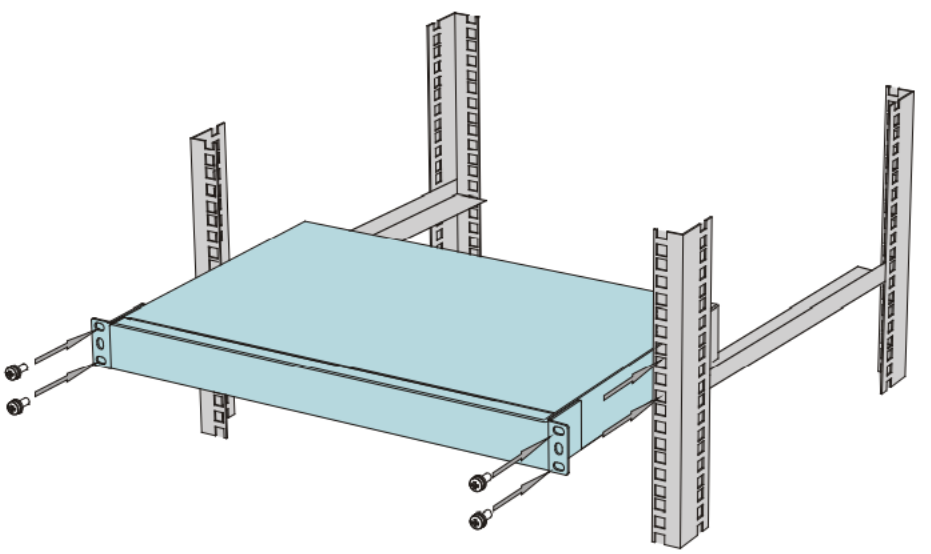


Figure 6: Installing the device on a switch cabinet

Installing the device with the rear support brackets in a 19" switch cabinet

Prerequisite:

☐ Before installing, check that the set of rear support brackets includes the following items:

- 2 Rear support brackets
- 4 Cage nuts
- 4 Mounting screws

Rear support brackets are provided as delivery items with the device.
See “Delivery items” on the page 57.

☐ You can choose to install the brackets either on the rear posts or on the front posts based on the installation environment, such as the depth of the cabinet.

Perform the following work steps:

☐ Anchor 2 cage nuts at each outer face of the posts of the switch cabinet.
☐ Align the 4 cage nuts for the brackets at the same elevation as the cage nuts on the longitudinally opposite posts for the preinstalled fixed rack ears.
☐ Attach the 2 rear support brackets to the cage nuts using the 4 mounting screws. See Figure 7 and Figure 8, they refer to the different mounting options.

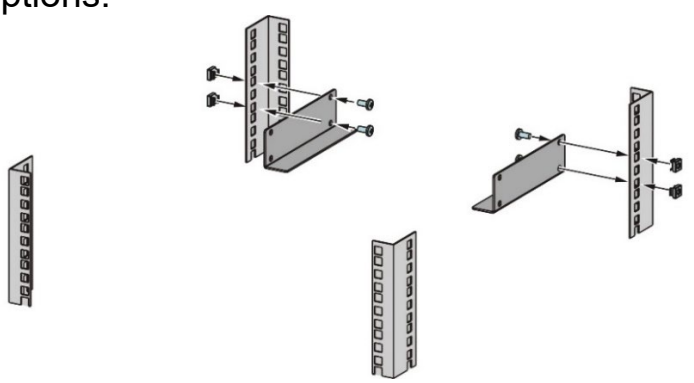


Figure 7: Installing the rear support brackets at the rear posts of the switch cabinet

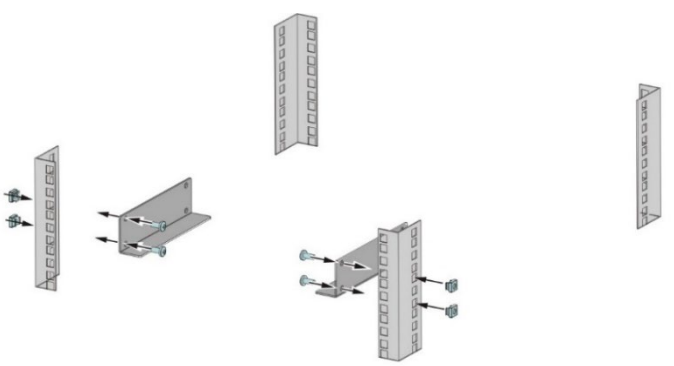


Figure 8: Installing the rear support brackets at the front posts of the switch cabinet

☐ By holding the device at the front, place the rear part of the device on the rear support brackets.

Note:

- Ensure that the device is properly placed on the rear support brackets.
- Continue holding the front of the device until the rack ears are also attached to the posts.

☐ Attach the 2 rack ears at the front of the device to the posts of the switch cabinet using 4 mounting screws.

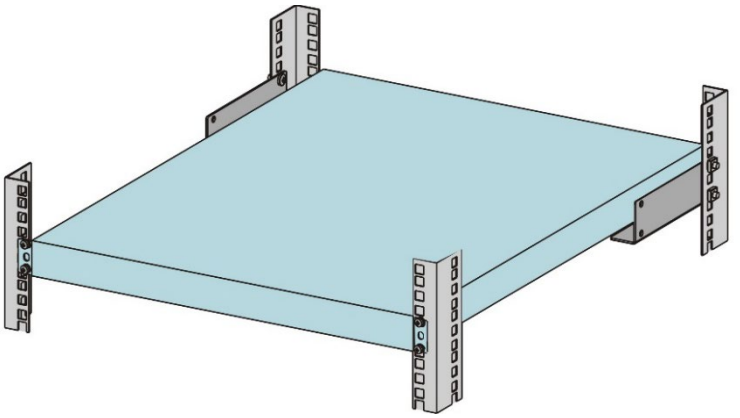


Figure 9: Installed device on a 19" switch cabinet with the rear support brackets installed on the rear post

2.3.2 Installing the device on a vertical flat surface

WARNING

FIRE RISK

In case of vertical installation, install the device in the fireproof enclosure.

Failure to follow this instruction can result in death, serious injury, or device damage.

Perform the following work steps:

- ☐ Attach 2 rack ears to the rear of the device.
- ☐ Install the 2 screws to attach the rack ears to the wall. See Figure 10.
- ☐ Tighten the 2 screws with the tightening specified in chapter “General technical data” on page 47.

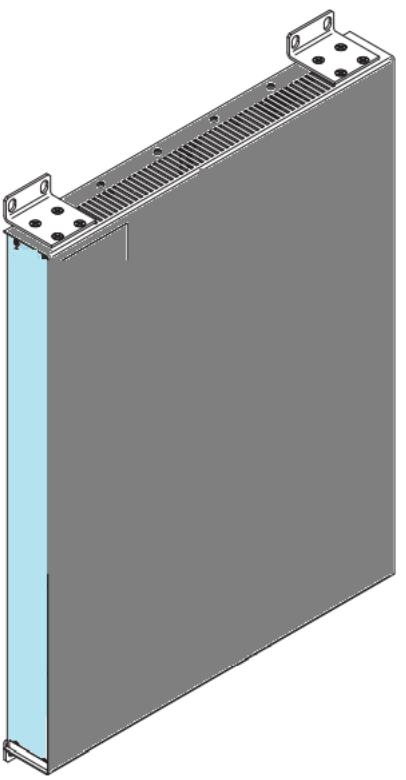


Figure 10: Installing the device on a vertical flat surface

2.3.3 Grounding the device

⚠ WARNING

ELECTRIC SHOCK

Ground the device before connecting any other cables.

Failure to follow this instruction can result in death, serious injury, or device damage.

The device has the connection of the protective grounding wire.
The device is grounded by the grounding screw and the power socket.
Perform the following work steps:

☐ Install the grounding screw at the rear of the device to the protective conductor, see Figure 11.

☐ Tighten the grounding screw with the tightening torque specified in chapter “General technical data” on page 47.

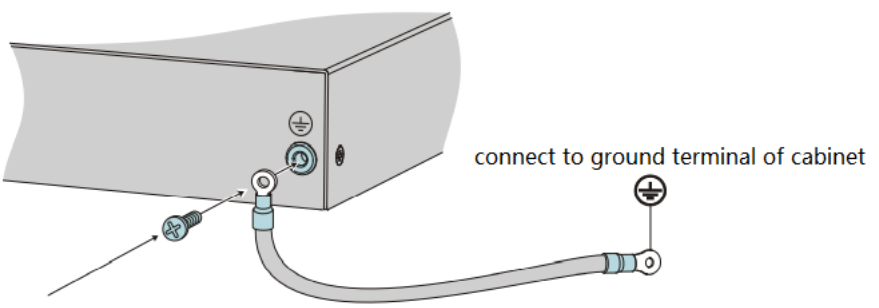


Figure 11: Grounding the device

2.4 Installing an SFP transceiver (optional)

Prerequisite:

Exclusively use Hirschmann IT SFP transceivers.

See “Accessories” on the page 57.

Perform the following work steps:

- ☐ Take the SFP transceiver out of the transport packaging, refer to Figure 12 below.
- ☐ Remove the protection cap from the SFP transceiver, refer to Figure 13 below.

Push the SFP transceiver with the lock closed into the slot until it latches in, refer to Figure 14 below.

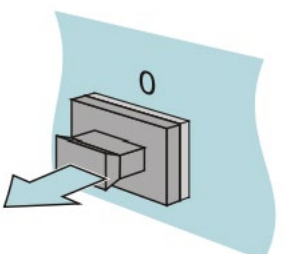


Figure 12: Take out the SFP transceiver

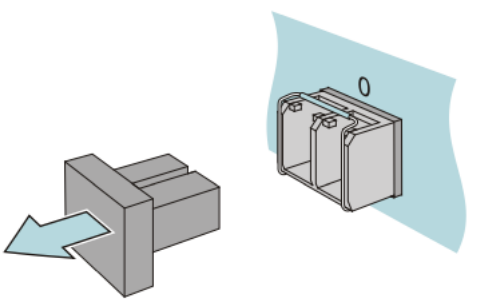


Figure 13: Remove the protective cap

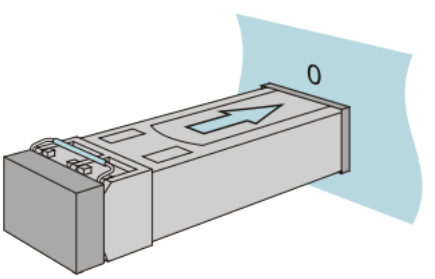


Figure 14: Install the SFP transceiver

2.5 Operating the device

Perform the following work step:

- ☐ Connect the power supply cable, refer to Figure 15 below.
- ☐ Enable the power supply.

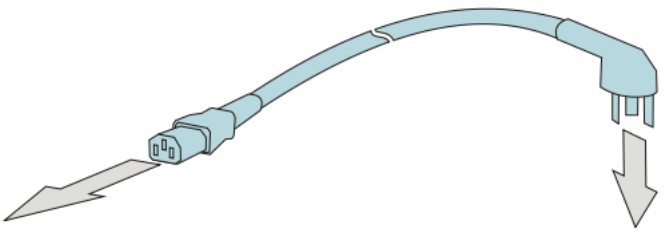


Figure 15: Connect the power supply

2.6 Connecting data cables

Note the following general recommendations for data cable connections in environments with high electrical interference levels:

- ☐ Keep the length of the data cables as short as possible.
- ☐ Use optical data cables for the data transmission between the buildings.
- ☐ When using copper cables, provide a sufficient separation between the power supply cables and the data cables. Ideally, install the cables in separate cable channels.
- ☐ Verify that power supply cables and data cables do not run parallel over longer distances. If reducing the inductive coupling is necessary, verify that the power supply cables and data cables cross at a 90° angle. Use SF/UTP cables according to ISO/IEC 11801:2002.
- ☐ Connect the data cable according to your requirements.

See “Device name and product code” on the page 18.

2.7 Filling out the inscription label

The information field for the MAC address helps you identify your device.

3 Making basic settings

Note: 2 or more devices configured with the same IP address can cause the network's failure to function as expected.

Install and maintain a process that assigns a unique IP address to each device in the network.

The IP parameters must be entered when the device is installed for the first time.

4 Monitoring the ambient air temperature

Operate the device below the specified maximum ambient air temperature exclusively.
See “General technical data” on page 47.

The ambient air temperature is the temperature of the air at a distance of 5 cm (2 in) from the device. It depends on the installation conditions of the device, e.g. the distance from other devices or other objects, and the output of neighboring devices.

The temperature displayed in the CLI (Command Line Interface) and the GUI (Graphical User Interface) is the internal temperature of the device. It is higher than the ambient air temperature. The maximum internal temperature of the device named in the technical data is a guideline that indicates to you that the maximum ambient air temperature has possibly been exceeded.

If the ambient temperature exceeds the normal operating range of the device, additional protective measures are recommended.

5 Maintenance and service

- When designing this device, Hirschmann largely avoided using high-wear parts. The parts subject to wear and tear are dimensioned to last longer than the lifetime of the product when it is operated normally. Operate this device according to the specifications.
- Relays are subject to natural wear. This wear depends on the frequency of the switching operations. Check the resistance of the closed relay contacts and the switching function depending on the frequency of the switching operations.
- The internal fuse triggers only when the device detects an error. In case of any damage or failure to the device, switch off the power and return the device to the plant for inspection. Hirschmann is continually working on improving and developing their software. Check regularly whether there is an updated version of the software that provides you with additional benefits. You find information and software downloads on the Hirschmann IT product pages on the
  Internet (https://catalog.belden.com/).
- Depending on the degree of pollution in the operating environment, check at regular intervals that the ventilation slots in the device are not obstructed.

Note: You find information on settling complaints on the Internet at http://www.beldensolutions.com/en/Service/Repairs/index.phtml.

6 Disassembly

6.1 Removing the power module

Perform the following work steps:

- ☐ Pull the power module out of the power module slot.
- ☐ Blank the power module slot on the device using the cover plate.

6.2 Removing the fan module

Perform the following work steps:

- ☐ Remove the 2 screws from the front panel of the fan module.
- ☐ Pull the locking lever outward to unlock the fan module.
- ☐ Pull the fan module out of the fan module slot.
- ☐ Use the cover plate blank the fan module slot on the device.
- ☐ Use the 2 screws to attach the cover plate on the device.

See “General technical data” on page 47.

6.3 Removing an SFP transceiver

Perform the following work steps:

☐ Release the lock and pull the SFP transceiver out of the device slot.

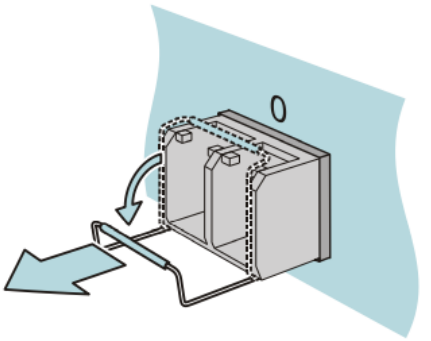


Figure 16: Releasing the lock

☐ Use a protective cover to blank the SFP transceiver.

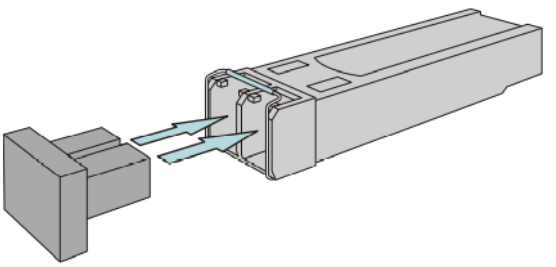


Figure 17: Installing the Protective Cover

6.4 Removing the device

⚠ WARNING

ELECTRIC SHOCK

Please disconnect all other cables before disconnecting the ground wire.

Failure to follow these instructions can result in death, serious injury, or device damage.

Perform the following work steps:
- ☐ Disconnect the data cables.
- ☐ Disable the supply voltage.
- ☐ Disconnect the power supply cable.
- ☐ Disconnect the grounding.

6.4.1 Removing the device from a vertical flat surface

Perform the following work steps:
- ☐ Remove the 2 screws that attach the rack ear to the vertical flat surface.
- ☐ Remove the 2 rack ears from the rear of the device.

6.4.2 Removing the device from the switch cabinet

If the device is installed on the switch cabinet by means of slide or mounting rails, perform the following work steps:
- ☐ Remove the screws that attach the rack ear to the switch cabinet.
- ☐ Take out the device from the rails on the switch cabinet.
- ☐ Uninstall the mounting rails from the 19" switch cabinet as specified by the manufacturer.

If the device is installed on the switch cabinet by means of rear support brackets, perform the following work steps:
- ☐ Remove the screws that attach the rack ear to the switch cabinet.
- ☐ Take out the device from the rear support brackets on the switch cabinet.
- ☐ Uninstall the rear support brackets from the 19" switch cabinet.

7 Technical data

7.1 General technical data

Basic device

Dimensions W × H × D		See “Dimension drawings” on the page 49.	
Weight		10.8 kg (23.8 lb)	
Power supply	Rated voltage range	192 V AC ... 240 V AC , 50 Hz … 60 Hz	
	Back-up fuse	Maximum conductor diameter	AWG12 (2.5 mm)
		Normal rating:	10 A
		Characteristic:	slow blow
Device grounding	Tightening torque Protective grounding	0.4 Nm … 0.7 Nm (3.5 lb-in … 6.1 lb-in)	
Climatic conditions during operation	Ambient air temperature	-10℃ … +75℃ (2000 m) Note: The altitude is 2000 m … 4000 m (6561.6 ft … 13123.3 ft), and the maximum working temperature decreases by 1℃ (33.8 °F) every 200 m (656.1 ft) above sea level.	
	Humidity	10%～90%/RH, non-condensing	
Climatic conditions during storage	Altitude	<5000 m (16404.2 ft)	
Pollution degree		2	
Protection classes	Laser protection	Class 1 according to IEC 60825-1	
	Degree of protection	IP20	

Power module

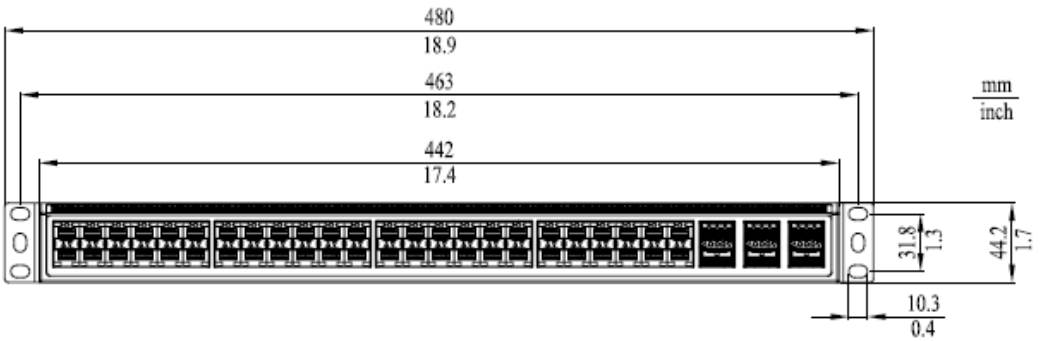
Size	See “Dimension drawings” on the page 50.	
Weight	MTM2900-PSU250	0.8 kg (1.7 lb)
Installation of the power module	Tightening torque	0.4 Nm … 0.6 Nm (3.5 lb-in … 5.2 lb-in)
Installation of the cover plate	Tightening torque	0.4 Nm … 0.6 Nm (3.5 lb-in … 5.2 lb-in)
Power module	Rated voltage range	192 V AC ... 240 V AC,
		50 Hz ... 60 Hz
DC output		+ 12 V DC，20.8A + 5 V SB DC，2A
Maximum tolerance		-10% ~ +5%

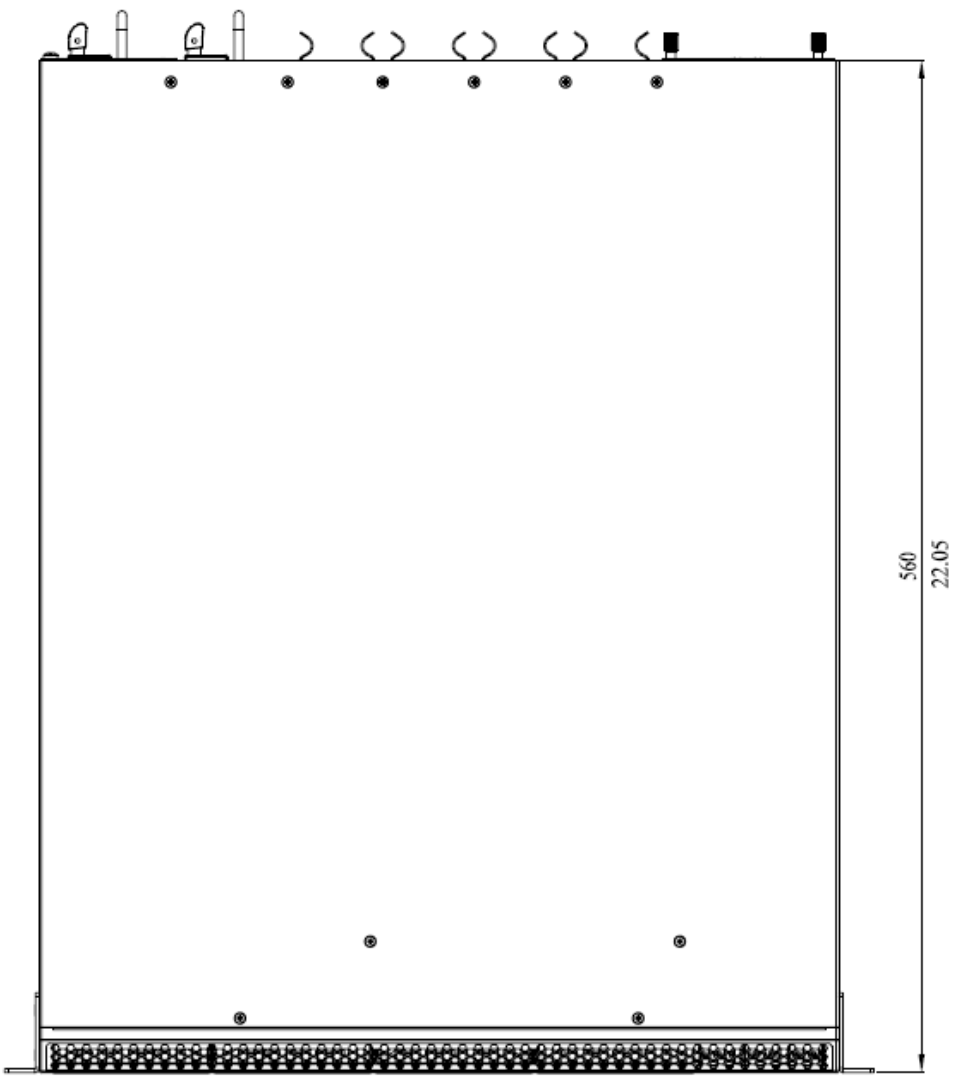
Fan module

Size	See “Dimension drawings” on page 51.	
Weight	MTM2900-FAN	0.2 kg (0.4 lb)
Install fan module	Tightening torque	0.2 Nm … 0.3 Nm (2.0 lb-in … 3.1 lb-in)
Mount cover plate	Tightening torque	0.2 … 0.3 Nm (2.0 lb-in … 3.1 lb-in)

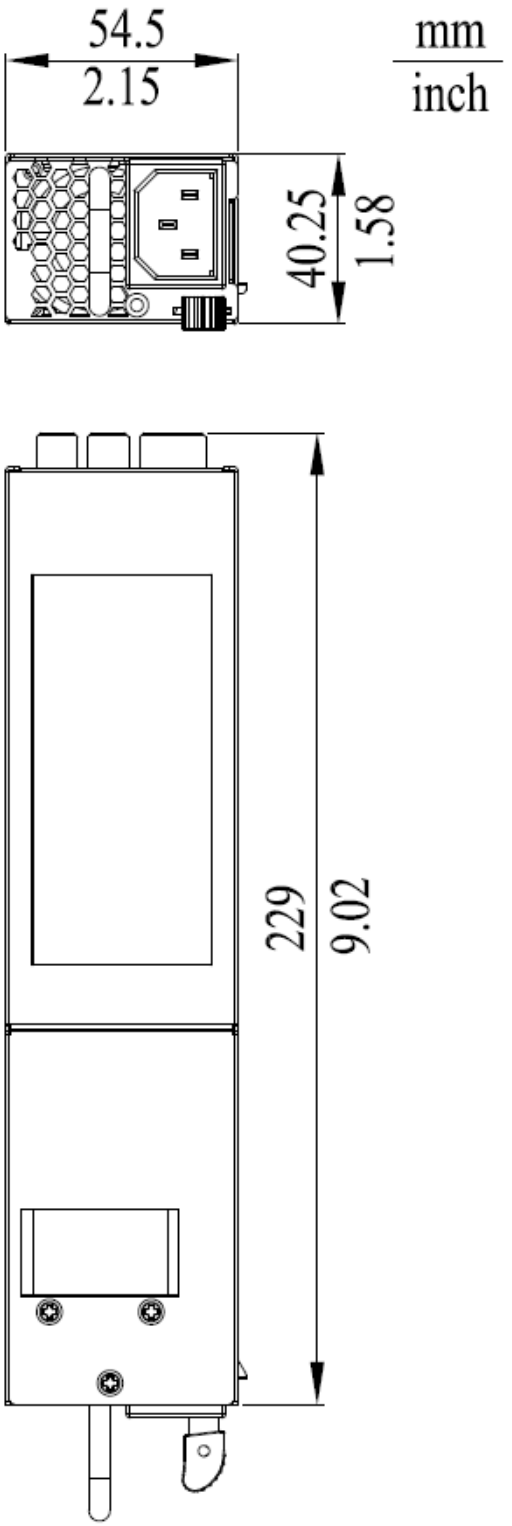
7.2 Dimension drawings

Basic Device

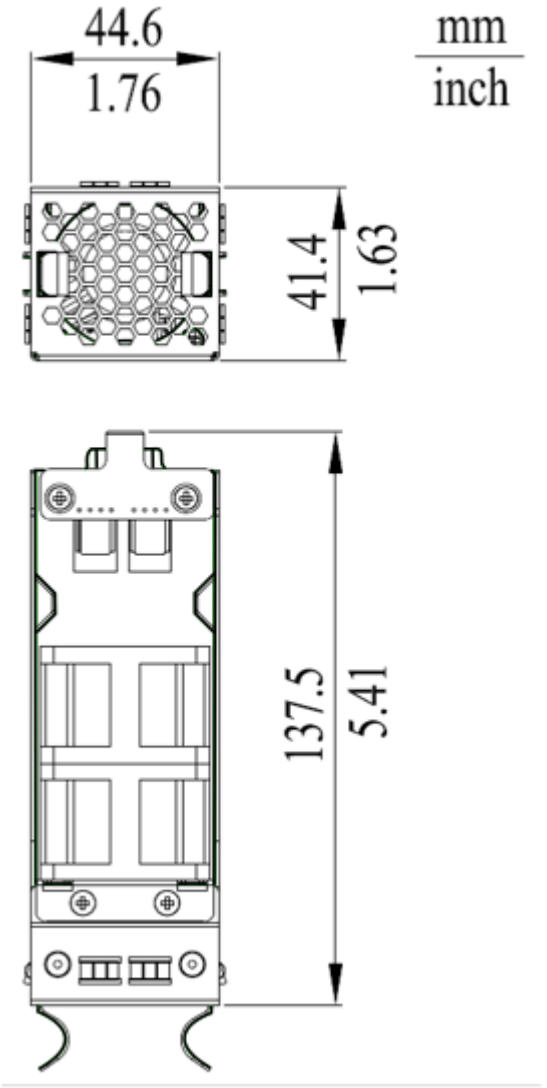




Power module



Fan module



7.3 EMC and immunity

EMC interference emission		Standard application
EN 55032		Class A
DNV GL Guide		—
FCC 47 CFR Part 15		Class A
EN 61000-6-4		Fulfilled
EN 55032	AC/DC Power Line	Class A
DNV GL Guide	AC/DC Power Line	—
FCC 47 CFR Part 15	AC/DC Power Line	Class A
EN 61000-6-4	AC/DC Power Line	Fulfilled
EN 55032	Signal Line	Class A
EN 61000-6-4	Signal Line	Fulfilled
Harmonic current		
EN 61000-3-2		Class A
Voltage flicker		
EN 61000-3-3		Fulfilled

EMC interference immunity		Standard application
Electrostatic discharge		
EN 61000-4-2 IEEE C37.90.3	Contact discharge	±4 kV
EN 61000-4-2 IEEE C37.90.3	Air discharge	±8 kV

EMC interference immunity		Standard application
Electromagnetic field		
EN 61000-4-3	80 MHz ... 1000 MHz 1000 MHz ... 6000 MHz	10 V/m 3 V/m
IEEE 1613	80 MHz ... 1000 MHz	—
Fast transient (burst)		
EN 61000-4-4 IEEE C37.90.1	AC/DC Power Line	±2 kV
EN 61000-4-4 IEEE C37.90.1	Data cable	±1 kV
Voltage surge - power cable		
IEEE 1613	Line / ground	—
EN 61000-4-5	Line / Line	±1 kV
EN 61000-4-5	Line / ground	±2 kV
Voltage surge - data cable		
EN 61000-4-5	Line / ground	±1 kV
Conducted immunity		
EN 61000-4-6	150 kHz ... 80 MHz	10 V

EMC interference immunity		Standard application
Damped vibration - AC/DC Power Line		
EN 61000-4-12 IEEE C37.90.1	Line / ground	—
EN 61000-4-12 IEEE C37.90.1	Line / Line	—
Damped oscillation - data cable		
EN 61000-4-12 IEEE C37.90.1	Line / ground	—
EN 61000-4-12	Line / Line	—
Pulsed magnet field		
EN 61000-4-9		—
Power frequency magnetic field		
EN 61000-4-8		30 A/m
Voltage dips, short interruptions		
EN 61000-4-11	AC/DC Power Line	20 ms ΔU 100 % 200 ms ΔU 60 % 500 ms ΔU 30 % 5 s ΔU 100 %

Immunity		Standard application
IEC 60068-2-6, Test Fc	Vibration	5 Hz ... 8.4 Hz, amplitude 0.14 in. (3.5 mm)
		8.4 Hz ... 150 Hz / 1g
IEC 60068-2-27, Test Ea	Vibration	15 g / 11 ms

7.4 Network range

Note: The line lengths specified for the transceivers apply for the respective fiber data (fiber attenuation and Bandwidth Length Product (BLP)/Dispersion).

Product code MTS-SFP-10G-...	Mode [a]	Wave length	F/O cable length example [b]	Optical attenuation	BLPc/ dispersion
-SR/LC...	MM	850 nm	300 m (> 5.1 dB link budget at 850nm)	3.0 dB/km	-
-LR/LC...	SM	1310 nm	10 km (> 6.6 dB link budget at 1310 nm)	0.32 dB/km	-
-ER/LC…	SM	1550 nm	40 km (> 15 dB link budget at 1550 nm)	0.18 dB/km	18 ps/(nm×km)
-TX/RJ45…	TX/RJ45	Full Duplex Negotiation	30 m	-	-

Table 1: Fiber port 10G SFP module

a. MM =multi-module, SM =simple module
b. When compliance with the optical fiber data is observed, it includes 3dB system reserve

Product code MTS-SFP-40G-...	Mode [a]	Wave length	F/O cable length example [b]	Optical attenuation	BLP/dispersion
-SR/LC...	MM	850 nm	100 m (OM3), 150 m (OM4) > 3.5 dB link budget at 850 nm	3.0 dB/km	-
-LR/LC...	SM	1310 nm	10 km < 7.5 dB link budget at 1310 nm	0.32 dB/km	-

Table 2: Fiber port 10G SFP module

a. MM =multi-module, SM =simple module
b. When compliance with the optical fiber data is observed, it includes 3dB system reserve

7.5 Power consumption / power output

Name	Maximum power consumption	Power output
Basic device plus 2 power modules plus 4 fan modules plus 48x SFP+ plus 4 QSFP+		
MTS2948X-6Q-A	200 W	700 Btu (IT)/h

Name	Maximum power consumption	Power output
Fan module		
MTM2900-FAN	6.24 W	21.84 Btu (IT)/h

Name	Maximum power consumption	Power output
1G SFP+		
MTS-SFP-1G-BIDI-TypeA-LX/LC	＜1 W	＜3.5 Btu (IT)/h
MTS-SFP-1G-BIDI-TypeB-LX/LC	＜1 W	＜3.5 Btu (IT)/h
MTS-SFP-1G-LH+/LC	＜1 W	＜3.5 Btu (IT)/h
MTS-SFP-1G-LH/LC	＜1 W	＜3.5 Btu (IT)/h
MTS-SFP-1G-LX+/LC	＜1 W	＜3.5 Btu (IT)/h
MTS-SFP-1G-LX+/LC-1550	＜1 W	＜3.5 Btu (IT)/h
MTS-SFP-1G-LX/LC	＜1 W	＜3.5 Btu (IT)/h
MTS-SFP-1G-SX/LC	＜1 W	＜3.5 Btu (IT)/h
MTS-SFP-1G-TX/RJ45	＜1 W	＜3.5 Btu (IT)/h

Name	Maximum power consumption	Power output
10G SFP+		
MTS-SFP-10G-ER-LC	＜1 W	＜3.5 Btu (IT)/h
MTS-SFP-10G-LR/LC	＜1 W	＜3.5 Btu (IT)/h
MTS-SFP-10G-SR/LC	＜1 W	＜3.5 Btu (IT)/h
MTS-SFP-10G-TX/RJ45	＜1 W	＜3.5 Btu (IT)/h

Name	Maximum power consumption	Power output
40G QSFP+		
MTS-SFP-40G-LR/LC	＜1.5 W	＜5.25 Btu (IT)/h
MTS-SFP-40G-SR/LC	＜1.5 W	＜5.25 Btu (IT)/h

8 Scope of delivery, order number, and accessories

Delivery items

Quantity	Articles
1×	Device
1×	General safety guidelines
2×	Rack ear
2×	Rear support bracket

Order number

MAMMUTHUS SWITCH	942 999-824
MAMMUTHUS POWER MODULE	942 999-822
MAMMUTHUS FAN MODULE	942 999-823

Accessories

Note the fact that the products used as accessories may have different characteristics from the device itself limits the influence sphere of the whole system. For example, if you apply IP20 accessory to IP65 equipment, the entire system will be reduced to IP20.

1G SFP module	Order number
MTS-SFP-1G-BIDI-TypeA-LX/LC	942 999-860
MTS-SFP-1G-BIDI-TypeB-LX/LC	942 999-861
MTS-SFP-1G-LH+/LC	942 999-859
MTS-SFP-1G-LH/LC	942 999-858
MTS-SFP-1G-LX+/LC	942 999-857
MTS-SFP-1G-LX+/LC-1550	942 999-862
MTS-SFP-1G-LX/LC	942 999-856
MTS-SFP-1G-SX/LC	942 999-855
MTS-SFP-1G-TX/RJ45	942 999-854

10G SFP module	Order number
MTS-SFP-10G-SR/LC	942 999-851
MTS-SFP-10G-LR/LC	942 999-852
MTS-SFP-10G-ER/LC	942 999-853

MTS-SFP-10G-TX/RJ45	942 999-867

40G SFP module	Order number
MTS-SFP-40G-SR/LC	942 999-863
MTS-SFP-40G-LR/LC	942 999-864

You may access more information about certificates here:
https://catalog.belden.com/

9 Underlying technical standards

Name	Description
FCC 47CFR Part 15	Code of Federal Regulations
IEC 60825-1	Safety of Laser Products
EN 55032	Electromagnetic compatibility of multimedia equipment. Emission Requirements
EN 55035	Electromagnetic compatibility of multimedia equipment. Immunity Requirements
EN 62368-1	Information technology equipment - Safety - Part 1: General requirements
EN 61000-3-2	Electromagnetic compatibility (EMC) - Part 3-2: Threshold - Threshold for harmonic current (equipment input current ≤16 A per phase)
EN 61000-3-3	Electromagnetic compatibility (EMC) - Part 3-3: Threshold - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection
EN 61000-6-2	Electromagnetic compatibility (EMC)- Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
EN 61131-2	Programmable controllers - Part 2: Equipment requirements and tests

Table 3: List of technical standards

The device generally fulfills the technical standards named in their current versions.
Only when the device shell has the certification mark, it means that the device is certified to a specific standard.

A Further support

Technical questions

For technical questions, please contact any Hirschmann IT dealer in your area or Hirschmann IT directly

You find the addresses of our partners on the Internet at
https://catalog.belden.com/

A list of local telephone numbers and email addresses for technical support directly from Hirschmann IT is available at
https://catalog.belden.com/

This site also includes a free of charge knowledge base and a software download section.

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