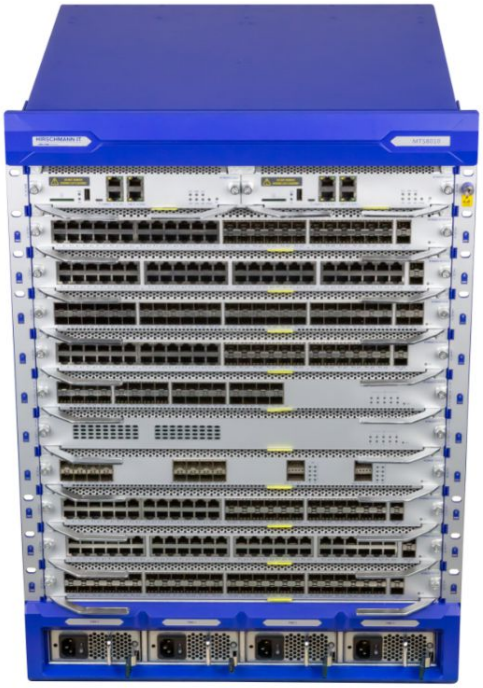
HIRSCHMANN IT

A BELDEN BRAND

# User Manual

## Installation

MAMMUTHUS Core-layer Switch – **MTS8010-Chassis**
MAMMUTHUS Power Module – **MTM8000-PSU800**
MAMMUTHUS Engine Module – **MTM8000-Engine**
MAMMUTHUS Fan Module – **MTM8010-FAN**
MAMMUTHUS Medium Module – **MTM8000-XXXX**
MAMMUTHUS Blank cover – **MTM8000-XXXXCover**



Install MAMMUTHUS switch
Issued in December, 2020

Technical support
https://hirschmann-it.support.belden.com

Even without specific notice, the trademark name protected by copyright in this manual shall not be considered as being free for use by any person from the aspect of protection law for trademark and trade name.



The performance characteristics described herein shall be binding only upon the express consent of the parties at the time of signing the contract. This paper is produced by Belden within its capacity. Belden reserves the right to change the contents of this manual without prior notice. Belden does not guarantee the correctness or accuracy of the information in this manual.

Belden shall not be liable for damages caused by the use of network components or related operating software. And the conditions of use specified in the license contract are referred to in this manual.

You may access the latest version of this manual at the product website of Hirschmann IT: Hirschmann-it.support.belden.com.

# Contents

# Safety Guideline

## Warning

Uncontrolled machine action

To avoid uncontrolled machine action due to data loss, configure all data transfer devices separately.

Before starting any machine controlled by data transfer, be sure to complete the configuration of all data transfer devices.

Failure to comply with these guidelines may result in death, serious injury or equipment damage.

- **General Safety Guideline**
  This device shall be operated with electricity. Improper use of the device will result in personal injury or significant property loss. Whether this device can be properly and safely operated depends on whether the handling process is proper, whether the storage and installation operation are reasonable, and whether the operation and maintenance procedures are firmly developed and strictly observed.
- Before connecting any cable, read this article, safety guideline and warning.
- Only operate the device without any damaged component.
- Confirm that there is no component to be repaired in the device. In case of the device damage or fault, it is required to cut off the power supply and return the device to Belden for inspection.

- **Qualification requirements for the operators**
- Only the qualified person can operate this device.
  The qualified personnel shall have the following features:
  - The qualified personnel shall receive proper training. Training and related practical knowledge and experience is the prerequisite for obtaining the product operation qualification. Only when these prerequisites are met, can the operator implement the earthing and labeling on the circuit, device and system according to the current safety technical standard.
  - The qualified personnel shall know the danger in their work.
  - The qualified personnel shall be familiar with how to handle these

hazards, so as to reduce the risks on themselves and other persons.

- ☐ The qualified personnel shall receive regular training.

### ☐ Correct use

The device is only used for the intended use in the catalog and technical description. It is only allowed to use external units and components as recommended and allowed by the manufacturer, to operate the device. Correct and safe operation of this product depends on correct operation, storage, assembly and installation during the transportation, as well as careful operation and maintenance procedures.

### ☐ National and international safety regulations

Carry out the verification, to ensure that electrical installation complies with the local or national safety regulations.

### ☐ Requirements for the connection of electric wire

Before connecting the electric wire, make sure to **always** confirm compliance with all listed requirements.

| |
|---|
| **The following requirements apply, and no limitation is set:** |
| The electric wire is voltage-free. |
| All cables meet the requirements for temperature range in specific application. |
| First, before setting other connections, connect the earthing screw on the back of the device with the protective conductor. During the dismantling of the connection, the protective conductor shall be finally dismantled. |
| During the installation, do not supply electricity to the device. |
| Related requirements in North American region: |
| Only use 60/75°C (140/167°F) or 75°C (167 °F) copper (Cu) wire. |

*Table 1: Requirements for the connection of electric wire*

### ☐ Requirements for connection of power voltage

| Device model | Prerequisite: |
|---|---|
| **All models** | Comply with **all** of the following requirements:<br>The power voltage shall be consistent with the voltage specified on the device nameplate.<br>The power supply conforms to overvoltage category I or II.<br>The power supply is equipped with the easily operable shutoff devices (such as switch or plug).<br>This shutoff device has the clear mark. In case of emergency, the operator will be easy to know the shutoff device which corresponds to the related power cable.<br>When connecting the power voltage with the protective conductor: firstly, connect the protective conductor, then connect the power voltage.<br>If the device contains the second voltage connecting module of this category: firstly, connect the protective conductor, then connect the power voltage.<br>DC voltage is used for power supply:<br>The diameter of the power line in the voltage input end of the power supply must be at least 1mm$^2$ (North America: AWG16).<br>AC voltage is used for power supply: |

| | |
|---|---|
| | The diameter of the power line in the voltage input end of the power supply must be at least 0.75 $mm^2$ (North America: AWG18).<br>The cross section area of the earthing conductor is equal to or more than the cross section area of the power line.<br>The power cable applicable for voltage, current and physical load shall be used.<br>The external fuse is installed in the conductor other than on the ground location. |

*Table 2: Requirements for connection of power voltage*

### ⚠Special conditions for safe use

Measures will be taken to prevent the instantaneous interference exceeding 140% of the rated voltage in the voltage input end.

### ☐ Shielded earthing

The shielded earthing module of the twisted-pair cables is used as the conductor for connection to the front panel.

When connecting the cable segment with the conductive shielding braided layer, attention shall be paid to the possible short-circuiting.

### ☐ ESD guideline

These modules are equipped with the electrostatic sensitive components.

In case that the connection is touched, these sensitive components are damaged or their service life is shortened due to the electric field or load balance effect.

You may check the information on the components with electrostatic danger in DIN EN 61340-5-1 (2007-08) and DIN EN 61340-5-2 (2007-08).

☐ **Device enclosure**

Only the technician authorized by the manufacturer can be allowed to open the enclosure.

- ☐ Keep the air vent unblocked, to ensure good air circulation.
- ☐ Ensure that there will be he space of at least 3.94-inch (10cm) in front of the air vent of the enclosure.
- ☐ During the operation or shortly after the shutdown of the device, do not touch the enclosure. Hot surface will cause any possible damage. Install the device horizontally in the machine cabinet or vertically on the flat surface.

  Do not place the device on the tabletop for operation. Refer to "Device Installation and Earthing" on Page 38.
- ☐ Operate the device in the maximum ambient air temperature and stacking device: when installing the device, ensure that there is at least the space available for the machine frame (about 5cm) above the device, to facilitate smooth discharge of heat out of the device enclosure.
- ☐ If you operate the device in the 19" switch cabinet: install the slide/install guide rail to support the weight of the device.

☐ **Requirements for the installation station**

This device can only be operated at the specified ambient temperature-ambient air temperature at 2 inch (5cm) away from the device- and at relative humidity.

- ☐ When choosing the installation position, ensure the compliance with climatic threshold as stipulated in the technical data.
- ☐ This device is used in the environment that the maximum pollution class conforms to the technical data code.

## ☐ CE Mark

The marked devices comply with the regulations in the European Directive:

| Device model | Directive |
|---|---|
| **All models** | 2011/65/EU and 2015/863/EU (RoHS)<br>The directives of European Parliament and the Council on restricting the use of some hazardous substances in the electrical and electronic devices. |
| **All models** | 2014/30/EU (EMC)<br>The directives of European Parliament and the Council on standardizing the regulations of the member countries regarding electromagnetic compatibility. |

Observe the above EU directives and submit of EU Declaration of Conformity to the related institution with the following address:

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

**Warning!** This is Category A device, which might interfere with the living area. In this case, the operator might be required to take proper measures.

**Warning!** When Ethernet cable is used in the industrial environment, it must be shielded.

**Note:** it is required to strictly follow the assembly rules provided in these guidelines, so as to observe the EMC threshold.

☐ **LED or laser component**

LED or laser component conforming to IEC 60825-1 (2014):
Category 1 laser product
Category 1 LED product

☐ **FCC notes:**

This device conforms to Part 15 of FCC Rules. When operating the device, it is required to meet the following two conditions: (1) this device will not have any harmful interference; (2) this device must accept any received interference, including the interference with the possibility to result in accidental operation. Proper test has proven that the device conforms to the requirements for Category A digital device in FCC Rules Part 15.

These requirements aim to provide sufficient protection, and prevent the device from being disturbed during the use in the commercial environment. This device creates and uses high frequencies, and might radiate these frequencies. If the device is not installed and used according to this operation manual, it might result in the radio transmission interference. If the device is used in the residential area, it might result in interference, and in this case, the user shall be obliged to eliminate the interference at their own cost.

☐ **Recycling note**

After the use, you must properly dispose of this device as the electronic waste according to the current disposal regulations in the related county, state and country.

# About this manual

This "installation" user manual consists of device description, safety guideline, display description and other information required for device installation.

# Legend

The symbols used in this Manual have the following meanings:

- Itemized list

1. Work steps

Subtitle

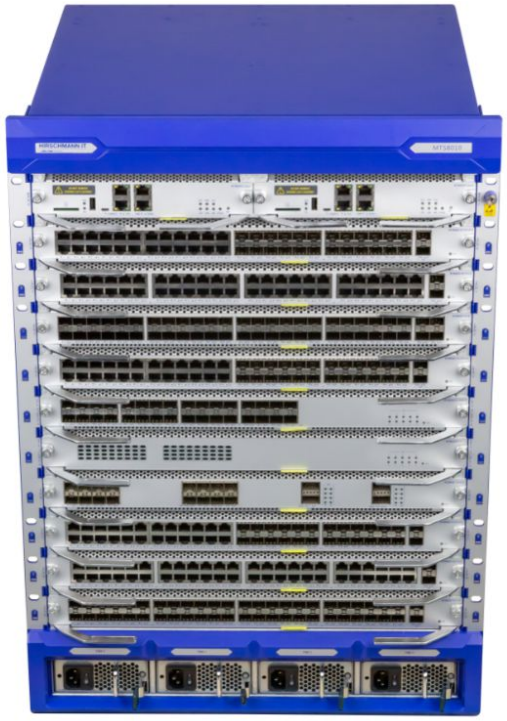
# 1 Description

## 1.1 General device description

MTS8010 switch uses the main control and exchange separation technology leading in the industry. The whole machine can provide the deployment capability of at most 448 10G interfaces or 128 40G high-density ports. Provide multiple physical resource virtualization technologies, such as 1:N, N:1, raise the SDN compatible machine concept for the first time, and realize the integration of SDN deployment with the functions of common switch.

MTS8010 switch can meet the demand for the deployment scenario with high throughput, and high-density and high-speed interface in the building of new-generation data center, and in combination with MTS2900 series switches, can provide comprehensive solution on high-guarantee and integrated and new-generation data centers in series for the building of the data center in the financial sector, government, operator and energy industries.

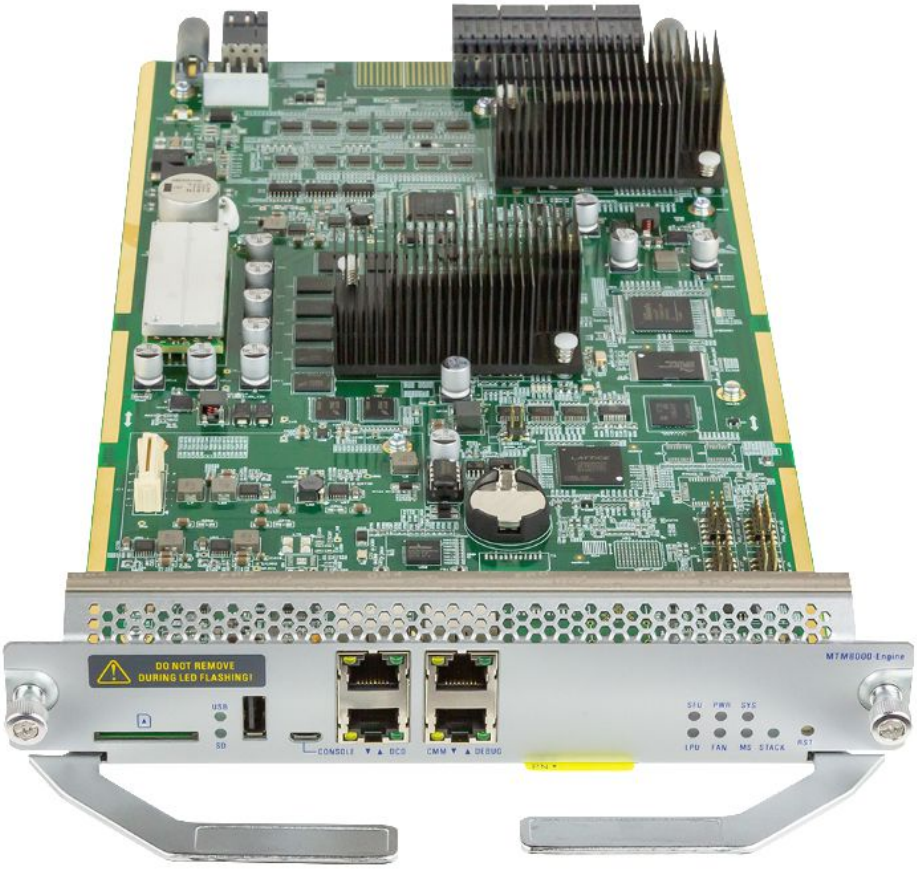
☐ **Basic devices**



☐ **Power module**

You can choose 1 to 4 power modules with the same input voltage: Power module is supplied as the accessory. Refer to "Order Number" on Page 21.

☐ **Engine module**



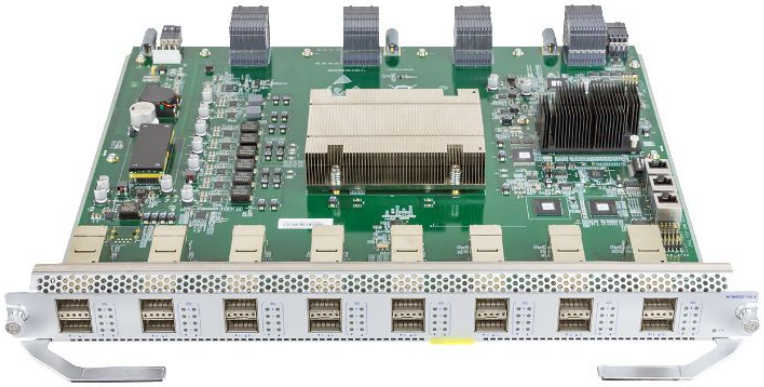

Engine module is the most important and necessary board card in MTS8010 switch, and serves as the control center of the device. Every machine frame shall be used with one engine module, and two modules can be supported at the same time, thus realizing the working mode of

1:1 backup. Engine module is supplied as the accessory. Refer to "Order Number" on Page 21.

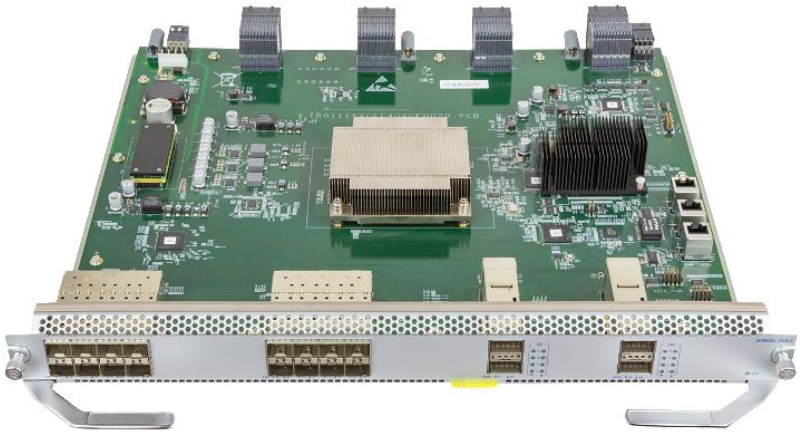
### ☐ Fan module

Provide 2 fan slots for the rear panel of the switch and use at least 2 fan modules.
Fan module is supplied as the accessory. Refer to "Order Number" on Page 21.

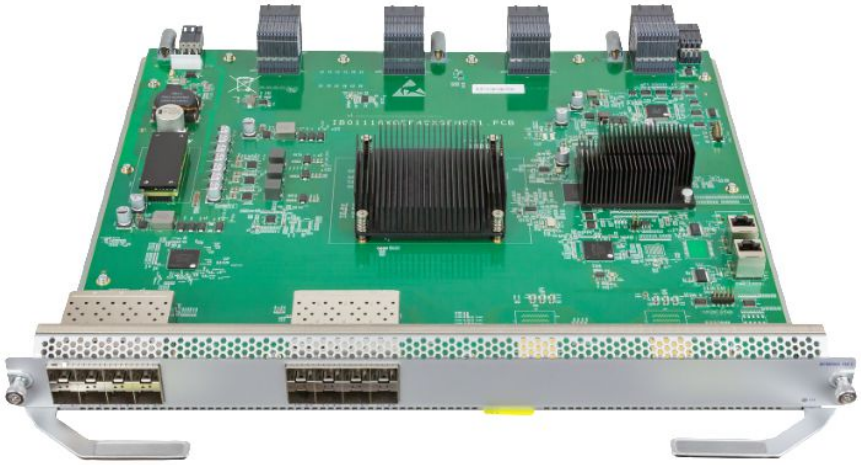
### ☐ Medium module



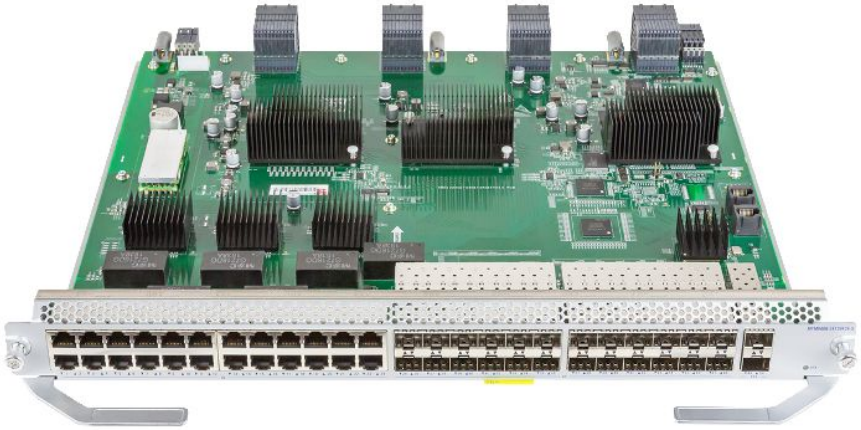
**MTM8000-16Q-A**



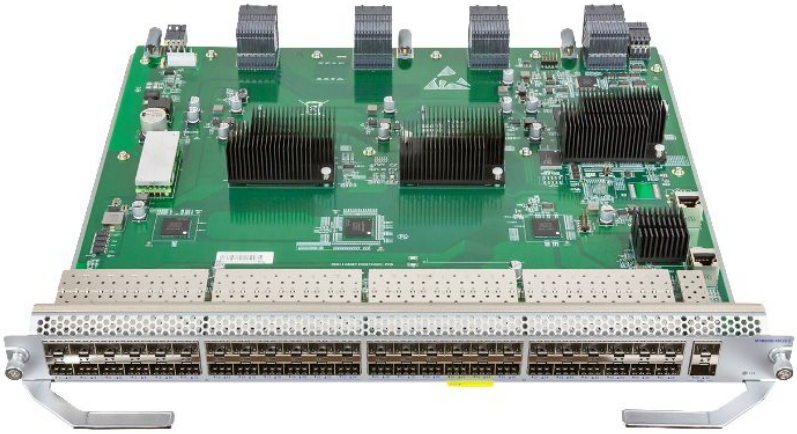
**MTM8000-16X4Q-S**



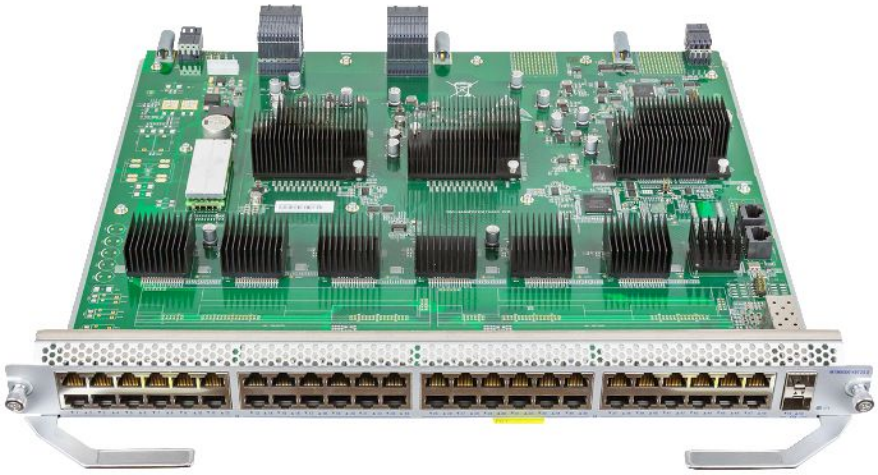
**MTM8000-16X-S**



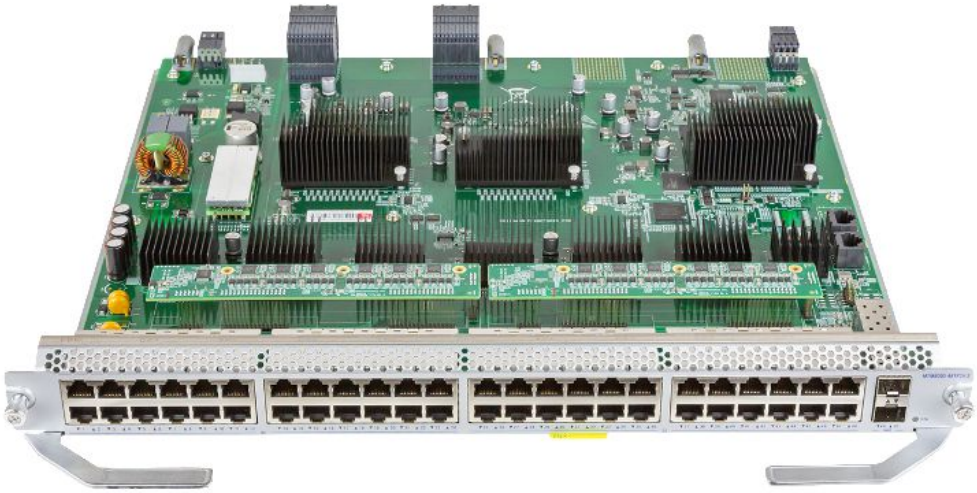
**MTM8000-24T24F2X-S**



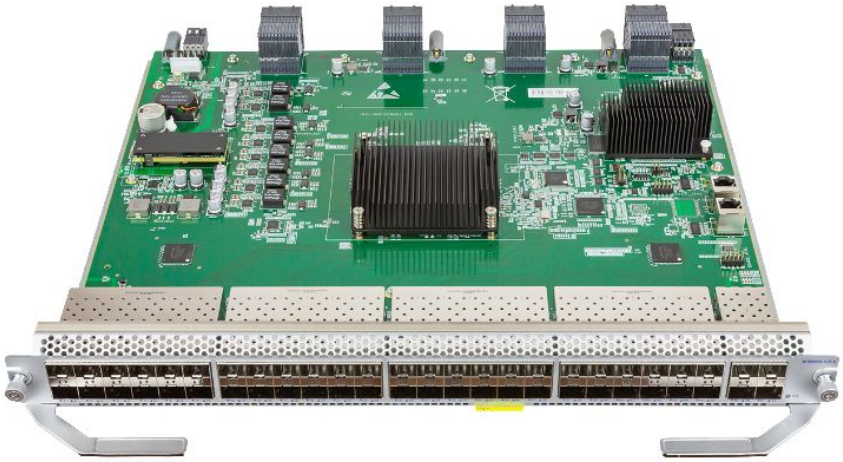
**MTM8000-48F2X-S**



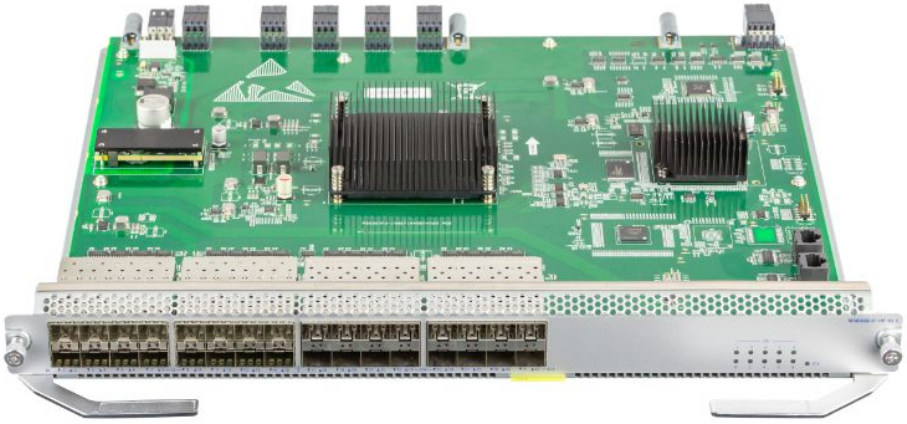
**MTM8000-48T2X-S**



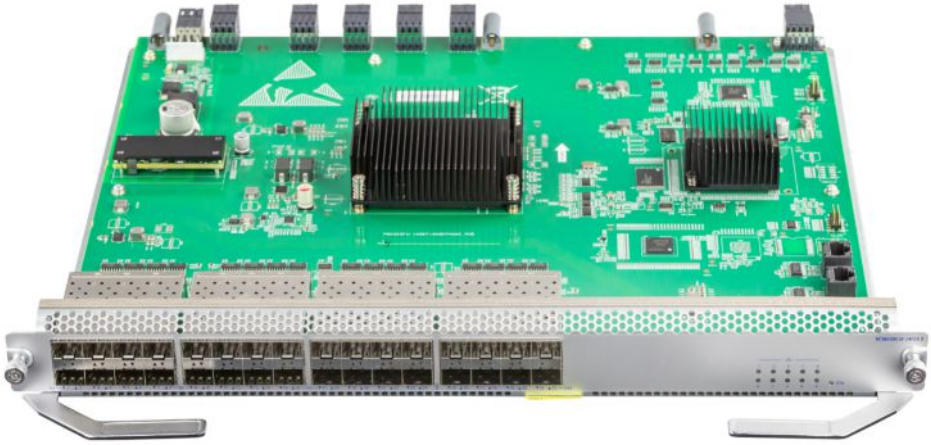
**MTM8000-48TP2X-S**



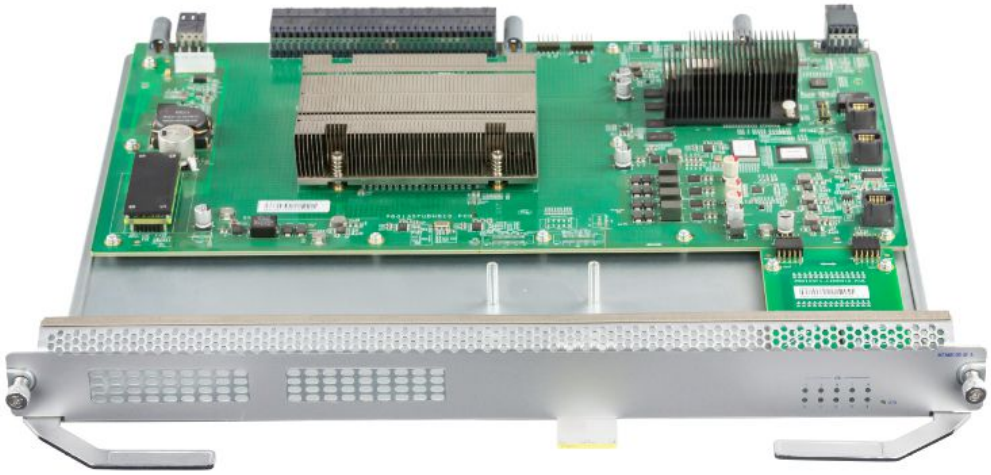
**MTM8000-52X-A**



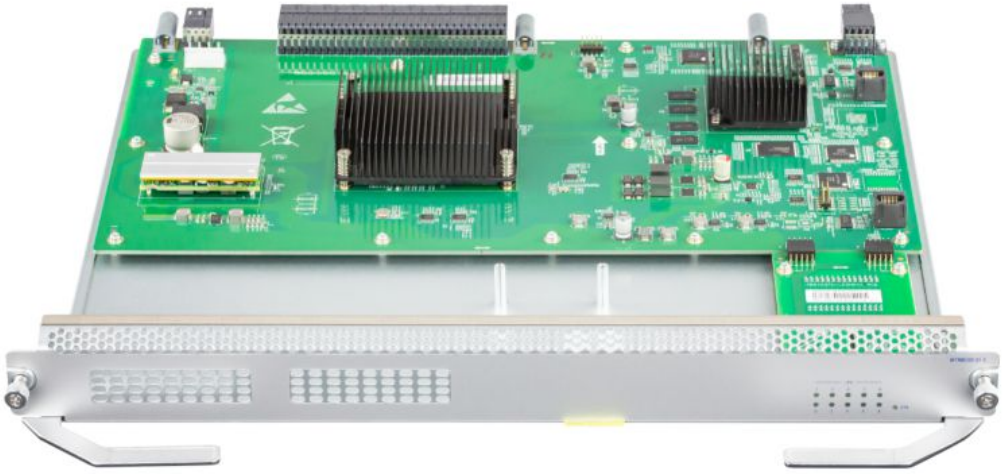
**MTM8000-SF-16F16X-S**



**MTM8000-SF-24F8X-S**



**MTM8000-SF-A**



**MTM8000-SF-S**

The front panel of the switch has provided multiple types of different interface patterns available for the user choice, to meet the demands in various application scenarios. Medium module is supplied as the accessory. Refer to "Order Number" on Page 21.

## 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 |
|---|---|---|
| 942999791 | MTS8010-Chassis | The rack-type 40G core-layer switch, 4 × power module slots, 2 × engine module slots, 10 × medium module slots, 2 × fan slots, and upgraded software. |

### 1.2.2 Power module

| Order number | Product code | Description |
|---|---|---|
| 942999803 | MTM8000-PSU800 | AC/DC 800W power module; rated input voltage range 100-240V AC 50/60Hz, maximum input voltage range 90-264V AC 47~63Hz; output voltage 54V/12V DC; supporting hot plugging. |

### 1.2.3 Engine module

| Order number | Product code | Description |
|---|---|---|
| 942999802 | MTM8000-Engine | Engine module is the most important and necessary board card in MTS8010 switch, and serves as the control center of the device. Every machine frame shall be used with one engine module, and two modules can be supported at the same time, thus realizing the working mode of 1:1 backup. |

### 1.2.4 Fan module

| Order number | Product code | Description |
|---|---|---|

| | | |
|---|---|---|
| 942999797 | MTM8010-FAN | Fan module is mandatory for MTS8010 switch, and supports hot plugging. Each MTS8010 switch has 2 fan slots, and two 2 fan modules must be installed to guarantee normal operation of the system. |

### 1.2.5 Medium module

| Order number | Product code | Description |
|---|---|---|
| 942999806 | MTM8000-48F2X-S | MTS8010 medium module; 48 × 100M/1000M SFP slots, 2 × 1/10G SFP+ slot |
| 942999807 | MTM8000-48T2X-S | MTS8010 medium module; 48 × FE/GE TX ports, 2 × 1/10G SFP+ slot |
| 942999808 | MTM8000-48TP2X-S | MTS8010 medium module; 48 × FE/GE TX PoE ports, 2 × 1/10G SFP+ slot |
| 942999809 | MTM8000-24T24F2X-S | MTS8010 medium module; 24 × FE/GE TX ports, 24 × 100M/1000M SFP slots, 2 × 1/10G SFP+ slot |
| 942999810 | MTM8000-16X-S | MTS8010 medium module; 16 × 1/10G SFP+ slot |
| 942999811 | MTM8000-16X4Q-S | MTS8010 medium module; 16 × 1/10G SFP+ slot, 4 × 40G QSFP+ slot |
| 942999812 | MTM8000-16Q-A | MTS8010 medium module; 16 × 40G QSFP+ slot, with high performance |
| 942999814 | MTM8000-52X-A | MTS8010 medium module; 52 × 1/10G SFP+ slot, with high performance |
| 942999793 | MTM8000-SF-A | High performance switch fabric for MTS8000 |
| 942999794 | MTM8000-SF-S | Standard performance switch fabric for MTS8000 |
| 942999795 | MTM8000-SF-24F8X-S | Hybrid card, standard switch fabric with 24 × 100M/1000M SFP slots, 8 × 1/10G SFP+ slots |

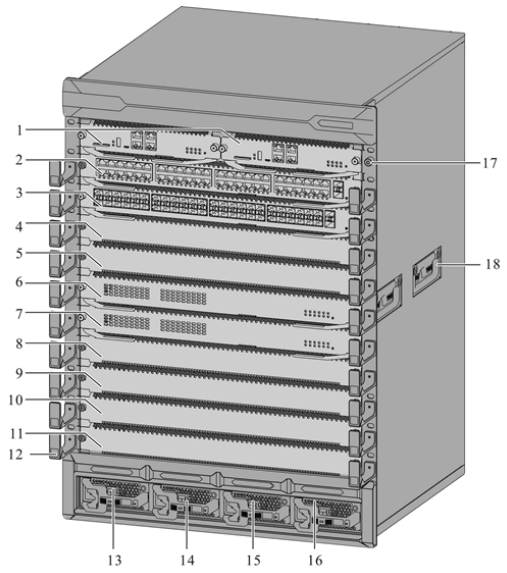
| | | |
|---|---|---|
| 942999796 | MTM8000-SF-16F16X-S | Hybrid card, standard switch fabric with 16 × 100M/1000M SFP slots, 16 × 1/10G SFP+ slots |

### 1.2.6 Blank cover

| Order number | Product code | Description |
|---|---|---|
| 942999815 | MTM8000-ModuleCover | Blank cover of the medium module of the switch |
| 942999816 | MTM8000-EngineCover | Blank cover of the engine module of the switch |
| 942999817 | MTM8000-PSUCover | Blank cover of the power module of the switch |

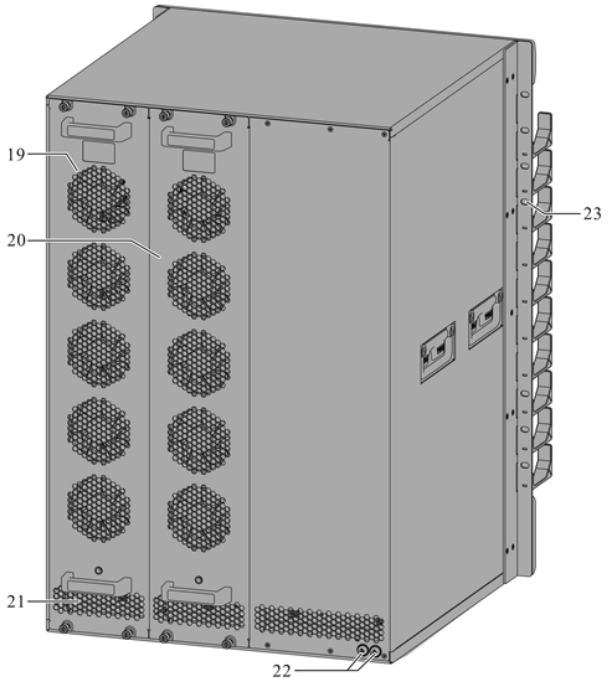
## 1.3 Device view

### 1.3.1 MTS8010-Chassis



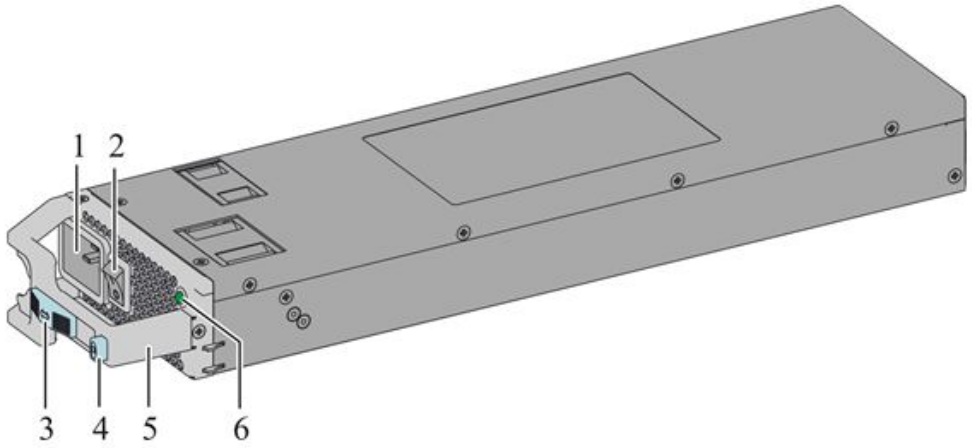

| Front view | |
|---|---|
| 1 | Slot 0 and 1 of engine module |
| 2 | Slot 0 of medium module |
| 3 | Slot 1 of medium module |
| 4 | Slot 2 of medium module |
| 5 | Slot 3 of medium module |
| 6 | Slot 4 of medium module |
| 7 | Slot 5 of medium module |
| 8 | Slot 6 of medium module |
| 9 | Slot 7 of medium module |
| 10 | Slot 8 of medium module |
| 11 | Slot 9 of medium module |
| 12 | Wire rack |
| 13 | Slot 0 of power module |
| 14 | Slot 1 of power module |
| 15 | Slot 2 of power module |
| 16 | Slot 3 of power module |

| | |
|---|---|
| 17 | Anti-static bracelet socket |
| 18 | Handle of the machine case |



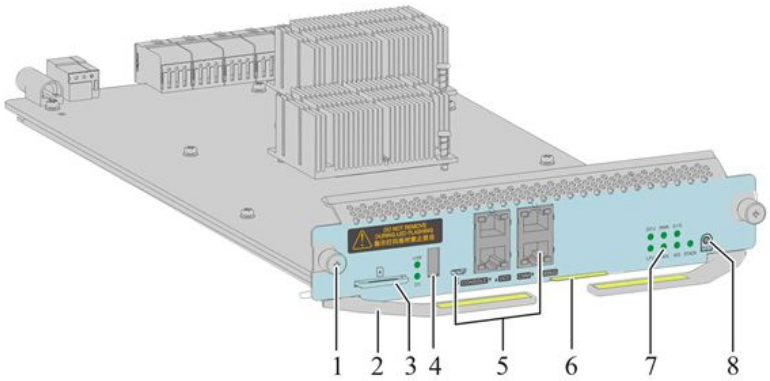

| **Rear view** | |
|---|---|
| 19 | Slot 0 of fan module |
| 20 | Slot 1 of fan module |
| 21 | Air outlet |
| 22 | Grounding stud |
| 23 | Upper cabinet screw hole |

### 1.3.2 Power module




| | |
|---|---|
| 1 | AC power socket |
| 2 | Power switch |
| 3 | Anti-stripping slider for power line |
| 4 | Power module unlocking button |
| 5 | Power handle |
| 6 | Power status indicator |

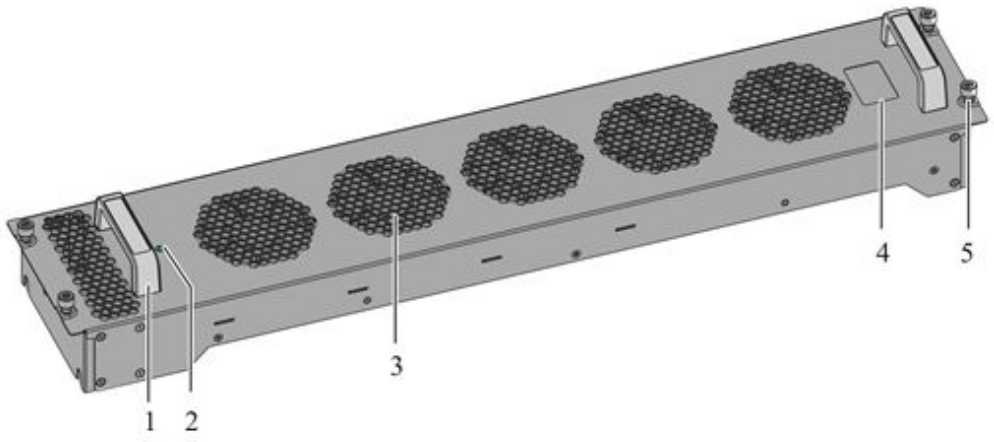
### 1.3.3 Engine module




| | |
|---|---|
| 1 | Anti-loosening screw |
| 2 | Board card puller |
| 3 | SD card slot |

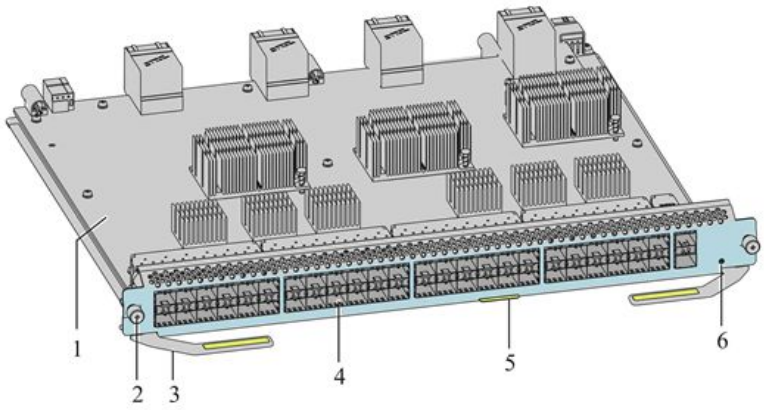
| | |
|---|---|
| 4 | USB interface |
| 5 | Function port |
| 6 | Board card label slot |
| 7 | Function status indicator |
| 8 | Reset button |

### 1.3.4 Fan module




| | |
|---|---|
| 1 | Install the handle |
| 2 | Fan status indicator |
| 3 | Air outlet of the fan |
| 4 | Fan label |
| 5 | Anti-loosening screw |

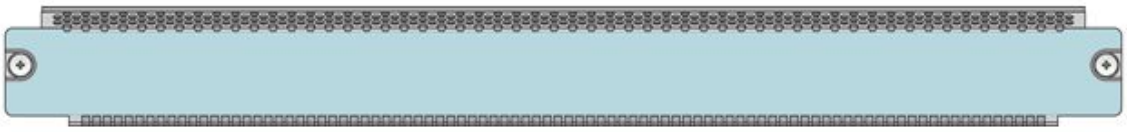
### 1.3.5 Medium module



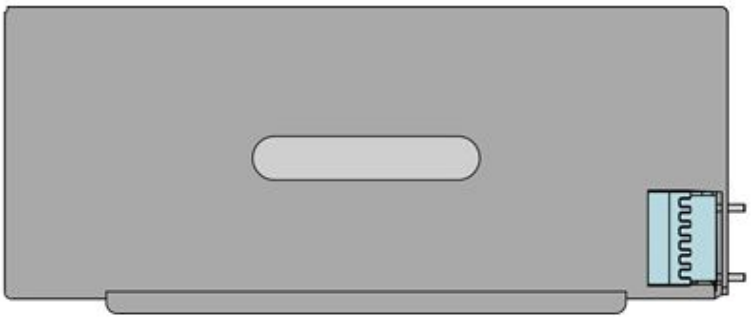

| | |
|---|---|
| 1 | Printed circuit board |
| 2 | Anti-loosening screw |
| 3 | Board card puller |
| 4 | Function port |
| 5 | Board card label slot |
| 6 | Status indicator |

### 1.3.6 Blank cover

**Schematics of Blank cover of the engine module**



**Schematics of the Blank cover of the medium module**



**Schematics of Blank cover of the power module**

## 1.4 Power supply

You may use the power module to supply voltage for the device:

See "Power Module" on Page 21 for the information related to the connecting power voltage.

## 1.5 Device port attribute

You may use twisted-pair cable or optical fiber (F/O) to connect the terminal devices and other network segments to this device and medium module port.

### 1.5.1 Console port attribute

| Attribute | Description |
|---|---|
| Interface standard | Asynchronous EIA/TIA-232 |
| Connector type | RJ45 |
| Baud rate | 9600- 115200 (default as 9600) |
| Supported service | Connect with the serial port of local terminal (such as PC), and run the terminal simulation program on the terminal |

### 1.5.2 USB Console port attribute

| Attribute | Description |
|---|---|
| Interface standard | USB2.0 |
| Connector type | Micro USB |
| Interface rate | 12Mbps |
| Supported service | Connect with the USB of local terminal (such as PC), and run the terminal simulation program on the terminal (baud rate setting range is 9600bit/s-115200bit/s (default as 9600bit/s)) |

### 1.5.3 10Base-T/100Base-TX/1000Base-T RJ45 electric interface attribute

| Attribute | Description |
|---|---|
| Interface standard | IEEE 802.3、IEEE802.3u、IEEE802.3ab、IEEE802.3az |
| Connector type | RJ45 |
| Working mode | 10Mbps/100Mbps/1000Mbps Half duplex/full duplex/auto-negotiation |
| Maximum transmission distance | 100m |
| Connected cable | Cat. 5 and 5e twisted pairs |

### 1.5.4 10GBase-T RJ45 electric interface attribute

| Attribute | Description |
|---|---|
| Interface standard | IEEE 802.3an、IEEE802.3ab、IEEE802.3u |
| Connector type | RJ45 |
| Working mode | 10Gbps (full duplex)<br>1000Mbps (half duplex/full duplex)<br>Auto-negotiation |
| Maximum transmission distance | 100m |
| Connected cable | Cat. 6e and above shielded twisted pairs (S/FTP) |

### 1.5.5 1000Base-X SFP optical interface attribute

| Attribute | Description |
|---|---|
| Interface standard | IEEE 802.3z |
| Connector type | SFP |
| Working mode | 1000Mbps full duplex/1000Mbps auto-negotiation |
| Support SFP interface | Support 1000Base-X |
| Connected cable | Single mode optical fiber of multimode optical fiber |

### 1.5.6 10GBase-SR/LR/ER SFP+ optical interface attribute

| Attribute | Description |
|---|---|
| Interface standard | Conform to the standard IEEE 802.3ae |
| Connector type | SFP+ |
| Working mode | 10Gbps/1000Mbps full duplex |
| Support SFP+ interface | Support 10GBase-SR<br>Support 10GBase-LR<br>Support 10GBase-ER |
| Connected cable | Single mode optical fiber of multimode optical fiber |

### 1.5.7 40GBase-SR4/LR4 QSFP+ optical interface attribute

| Attribute | Description |
|---|---|
| Interface standard | Conform to the standard IEEE 802.3ba |
| Connector type | QSFP+ |

| Attribute | Description |
|---|---|
| Working mode | 40Gbps full duplex |
| Support QSFP+ interface | Support 40GBase-SR4/LR4 |
| Connected cable | Single mode optical fiber of multimode optical fiber |

### 1.5.8 USB interface attribute

| Attribute | Description |
|---|---|
| Interface standard | USB2.0 |
| Interface type | USB Type A |
| Working mode | 1.5Mbps, 12Mbps and 480Mbps Host, supporting hot plugging and controlled (command mode) hot plugging. (Hot plugging operation is not allowed in the data transmission) |
| Cable | No |

### 1.5.9 SD interface attribute

| Attribute | Description |
|---|---|
| Interface standard | SD Host Controller Standard Specification, Version 2.0 |
| Interface type | SD |
| Working mode | Support hot plugging and controlled (command mode) hot plugging. (Hot plugging operation is not allowed in the data transmission) |
| Cable | No |

### 1.5.10 POE interface attribute

| Attribute | Description |
|---|---|
| Interface standard | IEEE 802.3af<br>IEEE 802.3at |
| Interface type | RJ45 |
| Working mode | Alternative A: 1, 2 being negative, and 3, 6 being positive for MDIX. Support |

| Attribute | Description |
| --- | --- |
| | 1000base-T. |
| Cable | No |

For more information, see **"User Manual for Command Line Interface"**. You can download this manual from Hirschmann IT product page: https://hirschmann-it.support.belden.com .

## 1.6 Display unit

After the setting of the power voltage, the software will automatically start and be initialized. Then the device will start the self-check. During this course, the LED indicator will be ON.

### 1.6.1 Device status

These LEDs provide the condition information influencing the operation of the whole device.

| Category of the indicator | Name of the indicator | Color of indicator | Status |
|---|---|---|---|
| System status indicator | SYS | Green | Fast flashing (5Hz flashing frequency): indicates that the hardware starts working since the power is supplied<br>Slow flashing (0.5Hz flashing frequency): indicates that the system is in normal operation<br>Normally ON/OFF: indicates that the system is in abnormal operation |
| Power indicator | PWR | Green | Normally ON: indicates that all power modules in place are in normal operation<br>OFF: indicates that the power modules in place are in abnormal status |
| Fan indicator | FAN | Green | Normally ON: indicates that all fan modules on the device are in normal operation<br>OFF: indicates that at least one (1) fan module on the device is in abnormal status |
| STACK indicator | STACK | Green | Flash: indicates that the stacking function is enabled, and this is the main device for the stacking system<br>Normally ON: indicates that the stacking function is enabled, and this is not the main device for the stacking system<br>Normally OFF: indicates that the stacking function is not enabled |
| ID indicator | ID | Blue | Fast flashing (5Hz flashing frequency): for the field operation, and remote control of the ON and OFF status of ID LED by the operation and maintenance personnel<br>OFF: ID LED is not enabled, default status |

### 1.6.2 Port status

These LEDs provide the related information of the ports.

| Category of the indicator | Name of the indicator | Color of indicator | Status |
|---|---|---|---|
| Serial port indicator | TXD | RJ45 self-supplied with yellow LED | Flash: indicates that there is data sent out of the serial port<br>OFF: indicates that there is no data sent out of the serial port |
| | RXD | RJ45 self-supplied with green LED | Flash: indicates that there is data received in the serial port<br>OFF: indicates that there is no data received in the serial port |
| DC0 interface indicator | 1000M | RJ45 self-supplied with yellow LED | OFF: DC0 interface works in 10/100M or stays in the un-linked status<br>ON: DC0 interface works in 1000M |
| | ACT | RJ45 self-supplied with green LED | OFF: DC0 interface is not Linked<br>Normally ON: DC0 interface is Linked, but without data transmission and receiving<br>Flash: DC0 interface is Linked, and with data transmission and receiving |
| Port status indicator | LINK/ACT | Green | Normally ON: Ethernet interface is linked<br>Flash: there is data transmission and receiving in the Ethernet interface<br>OFF: Ethernet interface is not linked |
| 40G port BREAK OUT indicator | 40G BREAKOUT | Green | Normally ON: at least one 40GE interface works in 10GE mode, and is split into four (4) 10GE interfaces.<br>When any one or more 40GE interfaces are configured as four (4) 10GE interfaces, BREAKOUT LED is invalid and it is required to use 40G interface indicator to distinguish the 10GE interfaces:<br>If the port LED indicator 1 is ON, then every interface indicator indicates that the status of the first (1st) 10GE interface in this interface.<br>If the port LED indicator 2 is ON, then every interface indicator indicates that the status of the second (2nd) 10GE interface in this interface. |

| Category of the indicator | Name of the indicator | Color of indicator | Status |
|---|---|---|---|
| | | | If the port LED indicator 3 is ON, then every interface indicator indicates that the status of the third (3rd) 10GE interface in this interface.<br><br>If the port LED indicator 4 is ON, then every interface indicator indicates that the status of the fourth (4th) 10GE interface in this interface.<br><br>OFF: the 40GE interface works in 40GE mode, and is not split into four (4) 10GE interfaces |

## 1.7 Management interface

### 1.7.1 DC0 interface (external management)

The serial interface is provided on RJ45 socket (DC0 interface), to realize the local connection of external management station (VT100 terminal or PC with corresponding terminal simulation), thus allowing you to build the connection with the command line interface CLI and system monitor.

### 1.7.2 USB interface

The switch provides two serial interfaces (EIA/TIA-232 and Micro USB 2.0). With these two interfaces, the user can configure the switch by using the PC computer (or laptop computer) with RS-232 serial interface (or USB interface).

# 2 Installation

These devices are developed for the use in the commercial environment. At the time of delivery, the devices are ready for being put into operation.

Execute the following steps to install and configure the device:
- ☐ Unpacking and inspection
- ☐ Install the cover and power module (optional)
- ☐ Device installation and earthing
- ☐ Operate the device
- ☐ Install SFP transceiver (optional)
- ☐ Connect the data cable
- ☐ Fill in the label

## 2.1 Unpacking and inspection

- ☐ Check whether the packing box contains all articles specified in "Delivery Items" on Page 59.
- ☐ Check the transportation and damage of the parts and components one by one.

## 2.2 Install the power module (optional)

### 2.2.1 Install the power module

Hirschmann IT provides the power module for operation being ready. You may choose to install the power module during the device operation.

Operate in the following steps:
- ☐ Dismantle the cover plate (if installed) from the power module slot of the device.
- ☐ Insert the power module into the slot.

## 2.3 Device installation and earthing

You may use the following options to install the device:

☐ Installation in the switch cabinet
☐ Installation on the vertical and flat surface

| **⚠ Warning** |
| --- |
| **Electric shock**<br>Such devices are only installed in the switch cabinet or in the restricted operation field, and can be accessed only by the maintenance personnel.<br><br>**Failure to observe this guideline might result in severe injury or death or device damage.** |
| **⚠ Caution** |
| **Too Hot Device**<br>In the device installation, ensure that the ventilation duct is not covered.<br><br>**Failure to observe these guidelines might result in mild injury or device damage.** |

☐ **Installation in the switch cabinet**

**Note**: When the device is operated in the environment with continuous vibration load more than 0.7 g, the device must be additionally fixed on the switch cabinet by using two (2) mounting brackets on the front and back of the device.
The auxiliary bracket is supplied as the accessory. Refer to "Accessories" on Page 59.

Prerequisite:

☐ Install the device with the help of the sliding or mounting guide rail into 19" switch cabinet.
This can increase the stability of the device in the environment influenced by vibration.
For more information about the sliding/mounting guide rails and how to install them, contact the manufacturer of the switch cabinet.

☐ Such device is intended for installation in 19" switch cabinet.
At the time of delivery, there are two (2) pre-installed mounting brackets on the side of the device.

☐ Ensure good ventilation. If necessary, install the fan to prevent the device being too

hot.

- ☐ Measure the depth of 19" cabinet, to facilitate easy insertion of all connection circuits.

Operate in the following steps:

- ☐ Assemble the sliding or mounting guide rail into 19" switch cabinet according to the regulations of the manufacturer.
- ☐ The device is installed on the guide rail of the switch cabinet. Tighten the bracket onto the switch cabinet with the screws, to fix the device.

☐ • **Installation on the vertical and flat surface**

**⚠Warning**

**Fire hazard**

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

**Failure to observe this guideline might result in severe injury or death or device damage.**

Operate in the following steps:

- ☐ Use the pre-installed bracket, as shown in the figure below.
- ☐ In addition, connect two (2) brackets onto the back of the device.
- ☐ The auxiliary bracket is supplied as the accessory. Refer to "Accessories" on Page 59.
- ☐ Tighten the bracket onto the wall with the screws, to fix the device.

☐ **Device earthing**

The device has the connection with the protective earthing wire.

The device is earthed by the earthing screw and power socket.

Operate in the following steps:

- ☐ Earth the device with the earthing screws
  You may check the tightening torque stipulated in "General Technical Data" on Page 50.

## 2.4 Install SFP transceiver (optional)

Prerequisite:
Only Hirschmann IT SFP transceiver is used. Refer to "Accessories" on Page 59.

Operate in the following steps:

- ☐ Take off the protective cover from SFP transceiver.

☐ Insert SFP transceiver into the slot, till it is locked.

## 2.5 Operate the device

Operate in the following steps:

- ☐ Fix the connector on the device by the screws.
  You may check the tightening torque stipulated in "General Technical Data" on Page 50.
- ☐ Enable the power voltage.

## 2.6 Connecting the data cable

In the environment with high electrical interference, notice the following general suggestions related to the data cable connection:

- ☐ Shorten the length of the data cable as much as possible.
- ☐ Use optical fiber data cable for data transmission between the buildings.
- ☐ When using the copper cable, fully separate the power cable from the data cable. Preferably, install it in separate cable channel.
- ☐ Ensure that the power cable and data cable will not be arranged in parallel for long distance, preferably install them in different cable channels. If it is required to reduce the inductive coupling, it is required to ensure that the power cable and data cable are crossed at 90°.
- ☐ Use the SF/UTP cable conforming to the requirements of ISO/IEC 11801:2002.
- ☐ Connect the data cable according to your need.

For more information, consult "Device Name and Product Code" on Page 21.

## 2.7 Fill in the label

The MAC address information on the front of the device can help you to identify such device.

# 3 Carry out the basic setting

**Note:** Configuring two or more devices with the same PI address might cause the network to be incapable of expected operation.
Install and maintain one program to distribute a unique IP address for every device in the network.

When installing the device for the first time, input IP parameters.

# 4 Monitor the ambient air temperature

Operate this device below the designated maximum ambient air temperature.
Refer to "General Technical Data" in Page 50.

The ambient air temperature is the air temperature 2 inch (5cm) from the device, depending on the installation conditions of the device, for example, the distance between such device and other device or other object, and the output of the adjacent device and so on.

# 5 Repair and maintenance

- ☐ When designing this device, Hirschmann IT has made the greatest efforts to avoid the use of highly wearable components. In normal operation, the service life of the wearable parts is longer than that of the product itself. Make sure to operate this device according to the product instruction.
- ☐ The relay is susceptible to natural wearing. Such wear depends on the switching frequency. Check the resistance and switch functions of the contact point of the relay according to the switching frequency.
- ☐ Only when detecting the error, can the device trigger the internal fuse. In case of the device damage or fault, it is required to cut off the power supply and return the device to the factory for inspection.
- ☐ Hirschmann IT is devoted to improving and developing the software. You should browse our website occasionally, to check whether the update software version providing additional advantages has been put into the market. You can log in Hirschmann IT product page: https://hirschmann-it.support.belden.com to check the information and download the software.
- ☐ Regularly check whether the ventilation channel in the device is blocked according to the contamination degree in the operating environment.

You can log in
http://www.beldensolutions.com/en/Service/Repairs/index.phtml to check the complaint handling.

# 6 Remove

## 6.1 Remove the power module

Operate in the following steps:
- ☐ Wear the anti-static bracelet, and confirm that the anti-static bracelet can be reliably earthed.
- ☐ Turn off the power switch.
- ☐ Unlock the power cable, and unplug the power line.
- ☐ Unlock the power module, and pull it out.
- ☐ Use the cover plate to seal the slot of the medium module on the basic device.

## 6.2 Remove the fan module

Operate in the following steps:
- ☐ Wear the anti-static bracelet, untighten the two anti-loosening screws on the lower and upper parts of the fan module with Phillips screwdriver.
- ☐ Pull the handle of the fan module with one hand, hold the fan frame of the fan module with the other hand, pull out the fan module stably along the guide rail of the slot, and place the dismantled fan module onto the antistatic cushion or initial packing box.
- ☐ Use the cover plate to seal the slot of the medium module on the basic device.
- ☐ Fix the cover plate with two (2) screws on the basic device.
  You may check the tightening torque in "General Technical Data" on Page 50.

## 6.3 Remove SFP transceiver

Operate in the following steps:
- ☐ Unlock, and pull SFP transceiver out of the slot.

☐ Seal the SFP transceiver with protective cover.

## 6.4 Remove engine or medium module

Operate in the following steps:

☐ Untighten the screws on the front panel of the engine or medium module.
☐ Press the locking lever outward to release the locking of the engine or medium module (steps **1** and **2**).
☐ Pull the engine or medium module out of the slot (step **3**).
☐ Use the cover plate to seal the slot of the engine or medium module on the basic device.
☐ Fix the cover plate with two (2) screws on the basic device.

You may check the tightening torque in "General Technical Data" on Page 50

## 6.5 Remove the device

**⚠Warning**

**Electric shock**

Disconnect all other cables and then disconnect the earth wire.

**Failure to observe this guideline might result in severe injury or death or device damage.**

Operate in the following steps:

☐ Disconnect the data cable.
☐ Disable the power voltage.
☐ Disconnect the power line.
☐ Disconnect the earthing wire.
☐ To remove the device from the switch cabinet or wall, it is required to

untighten the screws on the bracket of the device.

# 7 Technical data

## 7.1 General technical data

### ☐ Basic devices

| | | | |
|---|---|---|---|
| Size | Refer to "Dimensional Drawing" on Page 52 | | |
| Weight | | 32.48kg (machine frame) | |
| Power supply | Rated voltage range | 100 VAC ... 240 VAC | ,50 Hz ... 60 Hz |
| | | Maximum conductor diameter | AWG12 (2.5 $mm^2$) |
| Device earthing | Tightening torque Protective earthing | 3.5~6.1 lb-in (0.4~0.7 Nm) | |
| Climatic conditions in the operation | Ambient air temperature | -5℃~55℃（2000m） | |
| | Humidity | 10%-90%/RH, without condensation | |
| Climatic conditions in the storage period | Altitude | ＜2000m | |
| Contamination degree | | 2 | |
| Protective class | Laser protection | Conform to Class 1 in requirements of IEC 60825-1 | |
| | Protection level | IP20 | |

### ☐ Power module

| | | | |
|---|---|---|---|
| Size | Refer to "Dimensional Drawing" on Page 52 | | |
| Weigh | MTM8000-PSU800 | 1.98Kg | |
| Power module | Rated voltage range | 100 VAC ... 240 VAC | ,50 Hz ... 60 Hz |

## ☐ Engine module

| | | |
|---|---|---|
| Size | Refer to "Dimensional Drawing" on Page 52 | |
| Weight | MTM8000-Engine | 1.48Kg |
| Installation of power module | Tightening torque | 3.5~5.2 lb-in (0.4~0.6 Nm) |
| Installation of the cover plate | Tightening torque | 3.5~5.2 lb-in (0.4~0.6 Nm) |

## ☐ Fan module

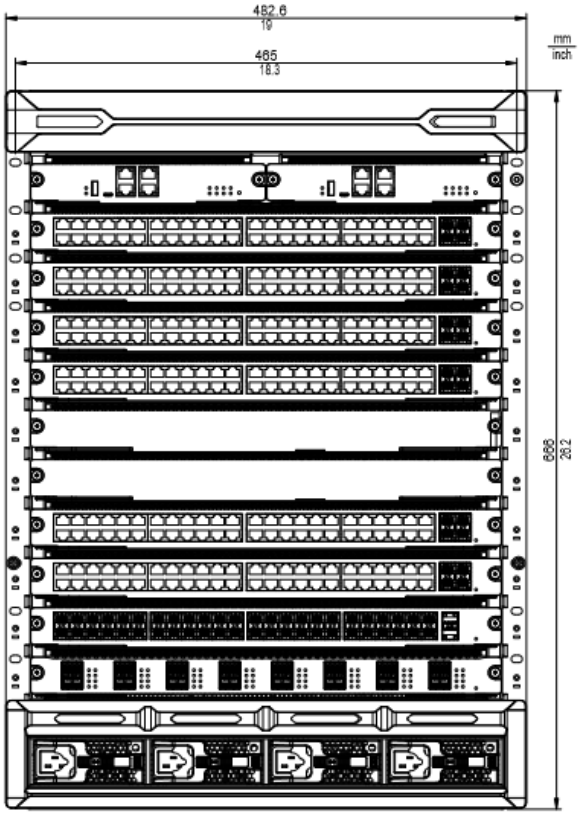
| | | |
|---|---|---|
| Size | Refer to "Dimensional Drawing" on Page 52 | |
| Weight | MTM8010-FAN | 2.60Kg |
| Install the fan module | Tightening torque | 3.5~5.2 lb-in (0.4~0.6 Nm) |
| Install the cover plate | Tightening torque | 3.5~5.2 lb-in (0.4~0.6 Nm) |

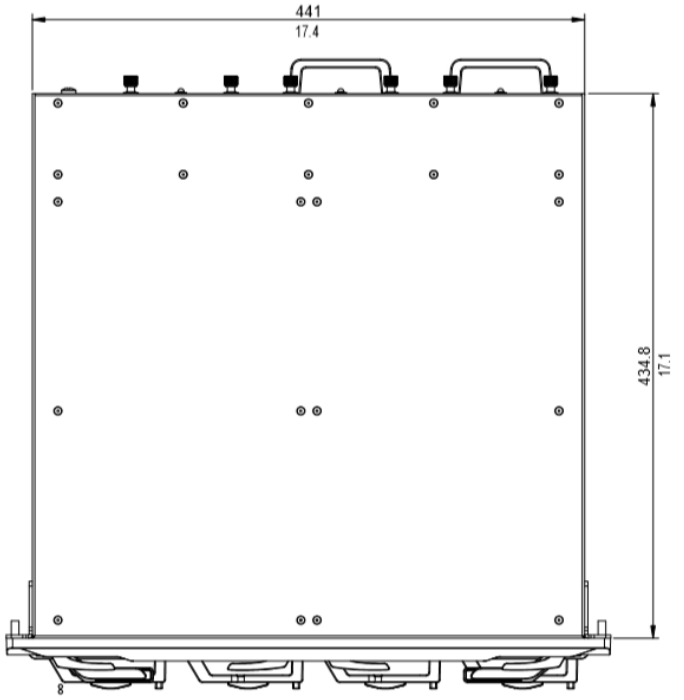
## ☐ Medium module

| | | |
|---|---|---|
| Size | Refer to "Dimensional Drawing" on Page 52 | |
| weight | MTM8000-48F2X-S | 3.44Kg |
| | MTM8000-48T2X-S | 3.32Kg |
| | MTM8000-48TP2X-S | 3.48Kg |
| | MTM8000-24T24F2X-S | 3.62Kg |
| | MTM8000-16X-S | 3.36Kg |
| | MTM8000-16X4Q-S | 3.32Kg |
| | MTM8000-16Q-A | 3.78Kg |
| | MTM8000-52X-A | 3.38Kg |
| | MTM8000-SF-A | 3.08Kg |
| | MTM8000-SF-S | 2.80Kg |
| | MTM8000-SF-24F8X-S | 3.34Kg |
| | MTM8000-SF-16F16X-S | 3.34Kg |
| Install the medium module | Tightening torque | 3.5~5.2 lb-in (0.4~0.6 Nm) |
| Install the cover plate | Tightening torque | 3.5~5.2 lb-in (0.4~0.6 Nm) |

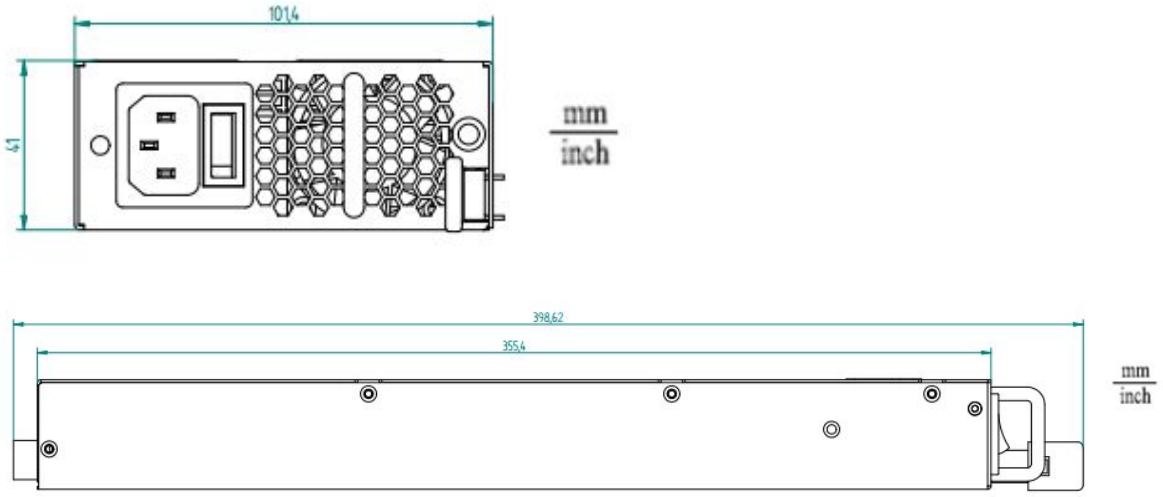
## 7.2 Dimensional Drawing

### ☐ Basic devices

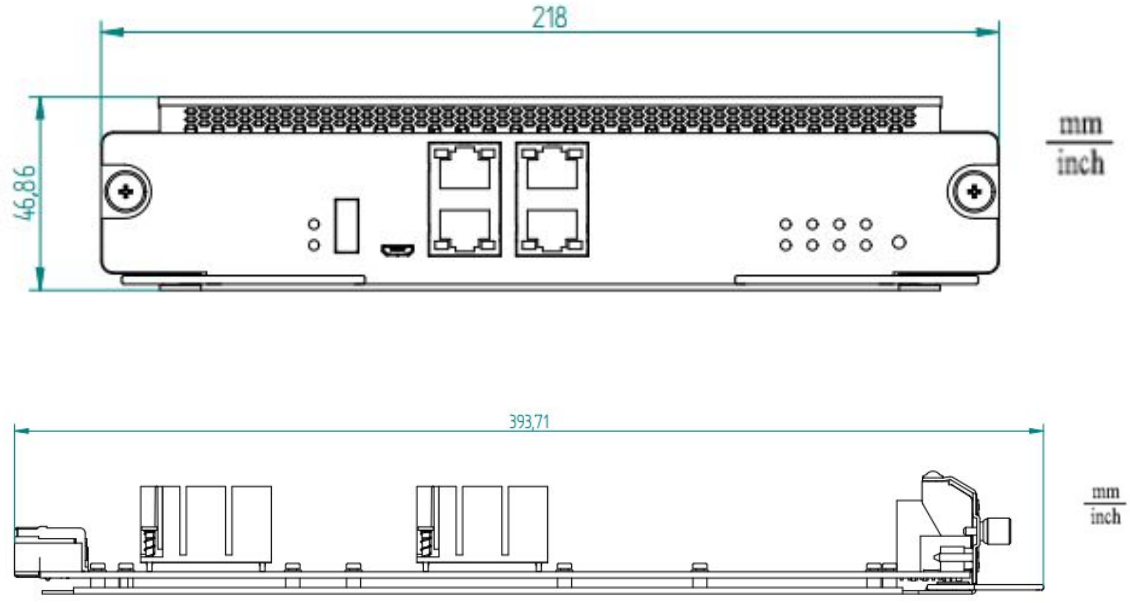


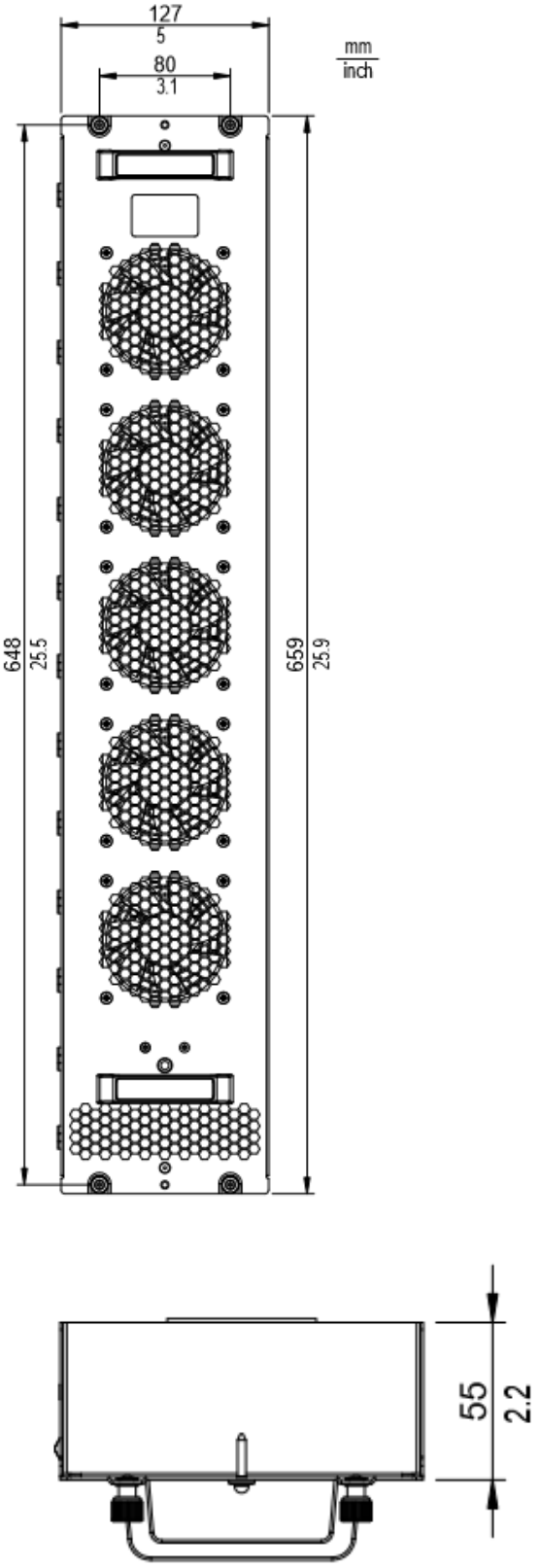
## ☐ Power module



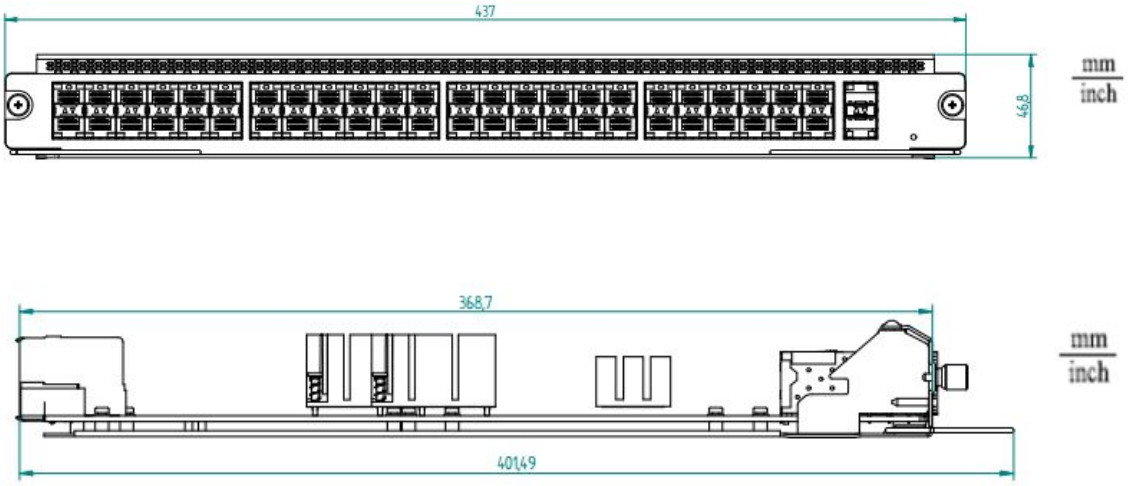

## ☐ Engine module



## ☐ Fan module



☐ **Medium module**




## 7.3 EMC and interference immunity

| EMC interference emission | | Standard application |
|---|---|---|
| EN 55032 | | Class A |
| DNV GL guideline | | — |
| FCC 47 CFR Part 15 | | Class A |
| EN 61000-6-4 | | Compliance |
| EN 55032 | AC/DC power line | Class A |
| DNV GL guideline | AC/DC power line | — |
| FCC 47 CFR Part 15 | AC/DC power line | Class A |
| EN 61000-6-4 | AC/DC power line | Compliance |
| EN 55032 | Signal wire | Class A |
| EN 61000-6-4 | Signal wire | Compliance |
| Harmonic current | | |
| EN 61000-3-2 | | Class A |
| Voltage flicker | | |
| EN 61000-3-3 | | |

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

| EMC interference immunity | | **Standard application** |
|---|---|---|
| **Electromagnetic field** | | |
| EN 61000-4-3 | 80 MHz ... 1000 MHz<br>1000 MHz ... 6000 MHz | 10 V/m<br>3 V/m |
| IEEE 1613 | 80 MHz ... 1000 MHz | — |
| **Fast transient (burst)** | | |
| EN 61000-4-4<br>IEEE C37.90.1 | AC/DC power line | ±2 kV |
| EN 61000-4-4<br>IEEE C37.90.1 | Data line | ±1 kV |
| **Voltage surge – Power line** | | |
| EN 61000-4-5 | Line/Earth | ±2 kV |
| EN 61000-4-5 | Line/Line | ±1 kV |
| **Voltage surge – data line** | | |
| EN 61000-4-5 | Line/Earth | ±1 kV |
| **Conductive 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<br>IEEE C37.90.1 | Line/Earth | — |
| EN 61000-4-12<br>IEEE C37.90.1 | Line/Line | — |
| **Damped vibration - Data line** | | |
| EN 61000-4-12<br>IEEE C37.90.1 | Line/Earth | — |
| EN 61000-4-12 | Line/Line | — |
| **Pulsed magnetic field** | | |
| EN 61000-4-9 | | — |
| **Power-frequency magnetic field** | | |
| EN 61000-4-8 | | 30A/m |
| **Voltage dip and short interruption** | | |
| EN 61000-4-11 | AC/DC power line | 20 ms ΔU 100 %<br>200ms ΔU 60 %<br>500ms ΔU 30 %<br>5s ΔU 100 % |

| **Stability** | | **Standard application** |
|---|---|---|
| IEC 60068-2-6, test Fc | Vibration | 5 Hz ... 8.4 Hz, vibrating 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 length specified for the transceiver applies to the related optical fiber data (optical fiber attenuation and BLP/dispersion).

| Product code MTS-SFP-10G-... | Mode [a] | Wavelength | F/O cable length example [b] | Optical fiber 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/(nmxkm) |
| -TX/RJ45… | TX/RJ45 | Full-duplex adaptive | 30 m | - | - |

*Table 3: 10G SFP module of optical fiber port*

a. MM = multimode, SM = single mode
b. When observing the optical fiber data, 3 dB system reserve is included

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

*Table 4: 40G SFP module of optical fiber port*

a. MM = multimode, SM = single mode
b. When observing the optical fiber data, 3 dB system reserve is included

## 7.5 Power consumption/power output

| **Name** | **Maximum power consumption** |
|---|---|
| MTM8010-FAN | 47W |
| MTM8000-Engine | 30W |
| MTM8000-48F2X-S | 77W |
| MTM8000-48T2X-S | 77W |
| MTM8000-48TP2X-S | 77W |
| MTM8000-24T24F2X-S | 92W |
| MTM8000-16X-S | 82W |
| MTM8000-16X4Q-S | 115W |
| MTM8000-16Q-A | 151W |
| MTM8000-52X-A | 166W |
| MTM8000-SF-A | 155W |
| MTM8000-SF-S | 52W |
| MTM8000-SF-24F8X-S | 112W |
| MTM8000-SF-16F16X-S | 112W |

# 8 Delivery item, order number and accessories

## ☐ Delivery item

| Quantity | Article |
|---|---|
| 1 | Device |
| 1 | General Safety Guideline |
| 2 | Bracket |

## ☐ Order number

| | | |
|---|---|---|
| MAMMUTHUS switch | MTS8010-Chassis | 942 999 791 |
| MAMMUTHUS power module | MTM8000-PSU800 | 942 999 803 |
| MAMMUTHUS fan module | MTM8010-FAN | 942 999 797 |
| MAMMUTHUS engine module | MTM8000-Engine | 942 999 802 |
| MAMMUTHUS medium module | MTM8000-48F2X-S | 942 999 806 |
| | MTM8000-48T2X-S | 942 999 807 |
| | MTM8000-48TP2X-S | 942 999 808 |
| | MTM8000-24T24F2X-S | 942 999 809 |
| | MTM8000-16X-S | 942 999 810 |
| | MTM8000-16X4Q-S | 942 999 811 |
| | MTM8000-16Q-A | 942 999 812 |
| | MTM8000-52X-A | 942 999 814 |
| | MTM8000-SF-A | 942 999 793 |
| | MTM8000-SF-S | 942 999 794 |
| | MTM8000-SF-24F8X-S | 942 999 795 |
| | MTM8000-SF-16F16X-S | 942 999 796 |
| MAMMUTHUS Blank cover | MTM8000-ModuleCover | 942 999 815 |
| | MTM8000-EngineCover | 942 999 816 |
| | MTM8000-PSUCover | 942 999 817 |

## ☐ Accessories

Note that, the product used as the accessory might have the characteristics different from that of the device itself, and thus limiting the scope of use for the whole system. For example, if you add IP20 accessory into IP 65 device, it will result in the degradation of the whole system to IP20.

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

| 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 | 942999863 |
| MTS-SFP-40G-LR/LC | 942999864 |

a. You may find more information about the certificate on the Hirschmann IT product webpage (https://hirschmann-it.support.belden.com).

# 9 Basic technical criteria

| Name | |
|---|---|
| FCC 47CFR Part 15 | Code of Federal Regulations |
| IEC 60825-1 | Laser product safety |
| EN 55032 | Electromagnetic compatibility of multimedia equipment - Emission requirements |
| EN 62368-1 | Information technology equipment - Safety - Part 1: General requirements |
| EN 61000-3-2 | Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) |
| EN 61000-3-3 | Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current Less than or equal to 16 A per phase and not subject to conditional connection |
| EN 61000-6-2 | Electromagnetic compatibility (EMC)- Part 6-2: Generic standards - Immunity standard 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 5: Technical Standard List*

The equipment usually meets the technical standard mentioned in the latest version.
Only when the device enclosure is attached with the certification mark, can it mean that the device has passed the specific standard certification.

# A More support

### Technical problems

In case of any technical problem, contact your local Hirschmann IT distributor or Belden.

You may search the addresses of our partners from the website: https://hirschmann-it.support.belden.com.

For the local telephone number and email list of Hirschmann IT direct technical support, visit:
https://hirschmann-it.support.belden.com。

This website also includes the knowledge base and software download section provided for free.