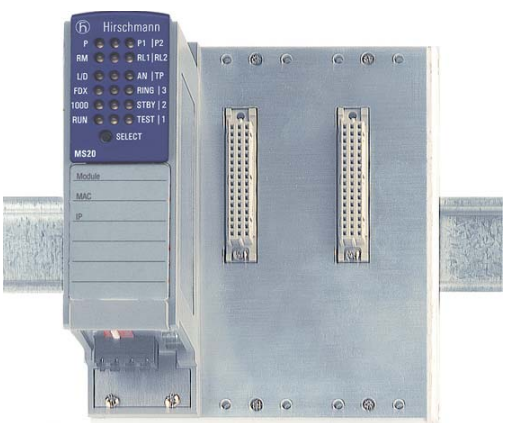
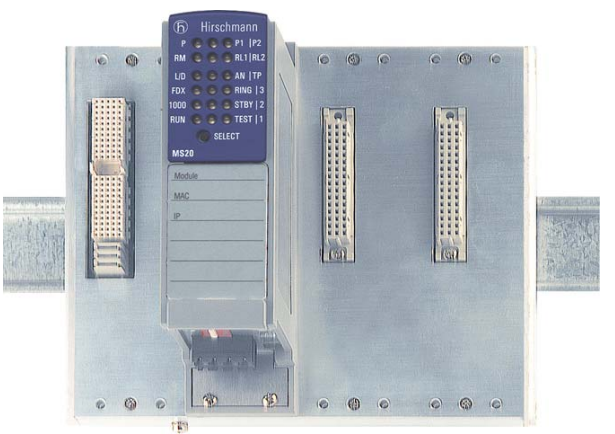
User Manual

Installation
Industrial ETHERNET Switch MICE
MS20/MS30



MICE MS20



MICE MS30

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You can get the latest version of this manual on the Internet at:
https://www.doc.hirschmann.com

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

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 these instructions can result in death, serious injury, or equipment damage.

Certified usage

Use the device solely for the application cases described in the Hirschmann product information, including this manual.
Operate the device solely according to the technical specifications.

Supply voltage

The devices are designed for operation with Safety Extra-low Voltage (SELV). Connect only SELV circuits with voltage restrictions according to IEC 60950-1 or ES1 according to IEC/EN 62368-1 to the supply voltage connections and to the signal contacts.
The supply voltage is electrically isolated from the housing.

- ☐ Use undamaged parts.
- ☐ For power supply via DC voltage: **All** following prerequisites are fulfilled:
  - ▶ There are fuses suitable for DC voltage in the positive conductors of the supply lines, or the voltage sources are appropriately current-limited. Regarding the properties of this fuse: See “General technical data” on page 67.
  - ▶ The negative conductors of the voltage inputs are on ground potential.
- ☐ For power supply via AC voltage: **All** following prerequisites are fulfilled:
  - ▶ There are fuses in the supply lines, or the voltage sources are appropriately current-limited. Regarding the properties of this fuse: See “General technical data” on page 67.
  - ▶ The power sources are electrically isolated from the ground potential.

☐ Relevant for North America:
The device may only be connected to a Class 2 supply voltage that fulfills the requirements of the National Electrical Code, Table 11(b). If the voltage is being supplied redundantly (two different voltage sources), the combined supply voltages must fulfill the requirements of the National Electrical Code, Table 11(b).

☐ Relevant for North America: For use in Class 2 circuits.
Only use copper wire/conductors of class 1, 75 °C (167 °F).

Start connecting the electrical wires only if **all** the above safety requirements are fulfilled.

Use in Hazardous Locations

Relevant for North America for modules certified for Hazardous Locations:
This equipment is suitable for use in Class 1, Division 2, Groups A, B, C and D or Non-Hazardous (unclassified) locations only.
Make sure that peripheral devices are suitable for the application environment. The wiring for the voltage supply and for the inputs and outputs (I/O) must adhere to the wiring regulations for Class 1, Division 2 [article 501(b) of the National Electrical Code (USA), NFPA 70] and to the applicable statutory regulations.

Note: Observe the control drawing (document number 000160011DNR) on the following pages.

Avertissement - Risque d'explosion - Ne pas débrancher tant que le circuit est sous tension à moins que l'emplacement soit connu pour ne contenir aucune concentration de gaz inflammable.

Avertissement - Risque d'explosion - La substitution de tout composant peut rendre ce matériel incompatible pour une utilisation en classe I, division 2.

Ordinary Location,
Non-Hazardous Area,
non-explosive atmosphere

⇔

Class I, Division 2,
Groups A, B, C, D
Hazardous Location

WARNING! The USB connection and the V.24 Interface connection are for temporary connection only, for maintenance use. Do not use, connect or disconnect unless the area is known to be non-hazardous. Connection or disconnection in an explosive atmosphere could result in an explosion!

Power Supply range “C” (P1, P2 Redundant)
18 – 60 V DC;
4.0 – 1.2 A; max. 72 W

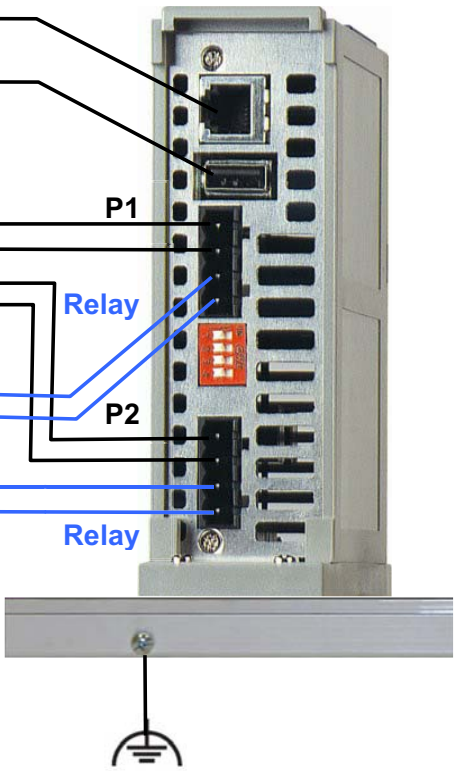
Relay contacts:
Equipment with non-incendive field wiring parameters.
Polarity is not relevant.
THE RELAY TERMINALS ARE DEPENDENT UPON THE FOLLOWING ENTITY PARAMETERS: 1) 2)

U_i	I_i	C_i	L_i
30 V	90 mA	2 nF	1 µH

Temperature Code: T4

Ambient Temperature rating:
Ta: 0 °C to +60 °C for “S” types
Ta: -40 °C to +70 °C for “T” or “E” types
– refer to the type designation on the device (Position 10 of nomenclature: “Temperature range”).

MS20/30 switch basic module with voltage range type “C”



The ground connector must be at least the same wire size (mm² or AWG) as the supply conductors.

CONTROL DRAWING **for Industrial ETHERNET Rail Switch MS20 and MS30 devices 943-435-999** according to Class I Division 2 Hazardous Locations		HIRSCHMANN A BELDEN BRAND
Version: 4	Document No.: 000160011DNR	Page 1/3

Ordinary Location,
Non-Hazardous Area,
non-explosive atmosphere

Class I Division 2
Groups A, B, C, D
Hazardous Location

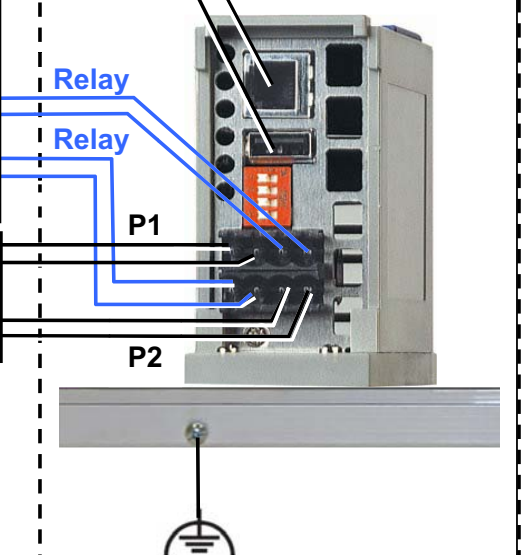
WARNING! The USB connection and the V.24 Interface connection are for temporary connection only, for maintenance use. Do not use, connect or disconnect unless the area is known to be non-hazardous. Connection or disconnection in an explosive atmosphere could result in an explosion!

MS20/30 switch basic module with voltage range type "A"

Relay contacts:
Equipment with non-incendive field wiring parameters.
Polarity is not relevant.
THE RELAY TERMINALS ARE DEPENDENT UPON THE FOLLOWING ENTITY PARAMETERS: [1] [2]

U_i	I_i	C_i	L_i
30 V	90 mA	2 nF	1 µH

Power Supply range "A" (P1, P2 Redundant)
18 – 32 V DC;
4.0 – 2.25 A; max. 72 W



Temperature Code: T4

Ambient Temperature rating:
Ta: 0 °C to +60 °C for "S" types
Ta: -40 °C to +70 °C for "T" or "E" types
– refer to the type designation on the device (Position 10 of nomenclature: "Temperature range").

The ground connector must be at least the same wire size (mm² or AWG) as the supply conductors.

CONTROL DRAWING **for Industrial ETHERNET Rail Switch MS20 and MS30 devices 943-435-999** according to Class I Division 2 Hazardous Locations	HIRSCHMANN A BELDEN BRAND	
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For use in Hazardous Locations Class I, Division 2, Groups A, B, C, D:
Applied standard: ANSI/ISA 12.12.01-2012
CSA C22.2 No. 213-M1987

Only allowed for MS20 or MS30 model No´s. which are individually labelled

"FOR USE IN HAZARDOUS LOCATIONS"

Non-incendive field wiring circuits must be wired in accordance with the National Electrical Code (NEC), NFPA 70, article 501.

WARNING – EXPLOSION HAZARD – SUBSTITUTION OF ANY COMPONENTS MAY IMPAIR SUITABILITY FOR HAZARDOUS LOCATIONS OR EXPLOSIVE ATMOSPHERES.

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

Use + 60/75 °C or +75 °C copper (CU) wire only.

Only for connection to a Class 2 power supply.

Note [1]):
The non-incendive field wiring circuit concept allows interconnection of non-incendive field wiring apparatus and associated non-incendive field wiring apparatus using any of the wiring methods permitted for unclassified locations when certain parametric conditions are met.
Capacity: $C_0 \geq C_i + C_{Cable}$; **Inductivity:** $L_0 \geq L_i + L_{Cable}$

The maximum cable length has to be determined as follows:
(a) max. Cable Length < $(L_0 - L_i)$ / Cable $_L$
("Cable $_L$" denotes the inductance per unit length of used cable) **and**
(b) max. Cable Length < $(C_0 - C_i)$ / Cable $_C$
("Cable $_C$" denotes the capacitance per unit length of used cable).

The lower value of (a) and (b) is to apply.

Note [2]):
The non-incendive field wiring circuit concept allows interconnection of non-incendive field wiring apparatus and associated non-incendive field wiring apparatus using any of the wiring methods permitted for unclassified locations when certain parametric conditions are met.
Capacity: $C_a \geq C_i + C_{Cable}$; **Inductivity:** $L_a \geq L_i + L_{Cable}$

The maximum cable length has to be determined as follows:
(a) max. Cable Length < $(L_a - L_i)$ / Cable $_L$
("Cable $_L$" denotes the inductance per unit length of used cable) **and**
(b) max. Cable Length < $(C_a - C_i)$ / Cable $_C$
("Cable $_C$" denotes the capacitance per unit length of used cable).

The lower value of (a) and (b) is to apply.

Manufactured in 72654 Neckartenzlingen / Germany by Hirschmann Automation and Control GmbH.
DOM: ww/yyyy (Date of manufactur: w - week, y - year. Refer to the device label).

CONTROL DRAWING **for Industrial ETHERNET Rail Switch MS20 and MS30 devices 943-435-999** according to the Directive 2014/34/EU or Class I Division 2 Hazardous Locations	HIRSCHMANN A BELDEN BRAND	
Version: 4	Document No.: 000160011DNR	Page 3/3

ATEX directive 2014/34/EU – specific regulations for safe operation

The following applies to MICE devices and modules for use in hazardous locations:

- ☐ List of standards:
  EN IEC 60079-0:2018
  EN 60079-7:2015 + A1:2018
  EN IEC 60079-15:2019
- ☐ Make sure that the device has the following label:
  For device type MSxx:
  
  II 3G Ex ec nC IIC T4 Gc DEKRA 13ATEX0019 X

  0 °C ≤ Ta ≤ +45 °C for device types “S”
  (Position 10 of the product code) or
  -40 °C ≤ Ta ≤ +45 °C for device types “T” or “E”
  (Position 10 of the product code)

  For device type MB20:
  
  II 3G Ex ec IIC T4 Gc DEKRA 13ATEX0019 X

  0 °C ≤ Ta ≤ +60 °C for device types “S”
  (Position 10 of the product code) or
  -40 °C ≤ Ta ≤ +70 °C for device types “T” or “E”
  (Position 10 of the product code)
- ☐ The equipment is suitable for use in an area with maximum pollution degree 2, as defined in IEC 60664-1.
- ☐ Install the modules in a suitable enclosure according to EN IEC 60079-0 providing a degree of protection of at least IP54 according to EN 60529, taking into account the environmental conditions under which the equipment will be used.
- ☐ Make provisions to prevent transient disturbances from exceeding 119 V at the voltage inputs.
- ☐ In potentially explosive atmospheres, only use MSxx units that have not previously been operated in other applications at ambient temperatures higher than +45 °C (+113 °F).
- ☐ Make sure that the temperature specification of the selected cable and cable entries is in compliance with the actual measured temperature values.
- ☐ Connectors shall be connected or disconnected exclusively in dead-voltage state.
- ☐ If a relay output (signal contact) is used, the current must be limited to 100 mA resistive load.

WARNING! The USB connection and the V.24 interface connection are for temporary connection only during maintenance. Do NOT use, connect or disconnect unless the area is known to be non-hazardous. Connection or disconnection in an explosive atmosphere could result in an explosion.

UK regulation S.I. 2016 No. 1107 (as amended by S.I. 2019 No. 696) - Schedule 3A, Part 6

The following applies to MICE devices and modules for use in hazardous locations:

- ☐ List of standards:
  EN IEC 60079-0:2018
  EN 60079-7:2015 + A1:2018
  EN IEC 60079-15:2019
- ☐ Make sure that the device has the following label:
  For device type MSxx:
  II 3G Ex ec nC IIC T4 Gc DEKRA 21UKEX0068 X

  0 °C ≤ Ta ≤ +45 °C for device types “S”
  (Position 10 of the product code) or
  -40 °C ≤ Ta ≤ +45 °C for device types “T” or “E”
  (Position 10 of the product code)

  For device type MB20:
  II 3G Ex ec IIC T4 Gc DEKRA 21UKEX0068 X

  0 °C ≤ Ta ≤ +60 °C for device types “S”
  (Position 10 of the product code) or
  -40 °C ≤ Ta ≤ +70 °C for device types “T” or “E”
  (Position 10 of the product code)
- ☐ The equipment is suitable for use in an area with maximum pollution degree 2, as defined in IEC 60664-1.
- ☐ Install the modules in a suitable enclosure according to EN IEC 60079-0 providing a degree of protection of at least IP54 according to EN 60529, taking into account the environmental conditions under which the equipment will be used.
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WARNING! The USB connection and the V.24 interface connection are for temporary connection only during maintenance. Do NOT use, connect or disconnect unless the area is known to be non-hazardous. Connection or disconnection in an explosive atmosphere could result in an explosion.

IECEx – Certification Scheme for Explosive Atmospheres

The following applies to MICE devices and modules for use in hazardous locations:

☐ List of standards:
IEC 60079-0:2017
IEC 60079-7:2017
IEC 60079-15:2017
☐ Make sure that the device has the following label:
For device type MSxx:

II 3G Ex ec nC IIC T4 Gc IECEx DEK 14.0078 X

0 °C ≤ Ta ≤ +45 °C for device types “S”
(Position 10 of the product code) or
-40 °C ≤ Ta ≤ +45 °C for device types “T” or “E”
(Position 10 of the product code)

For device type MB20:

II 3G Ex ec IIC T4 Gc IECEx DEK 14.0078 X

0 °C ≤ Ta ≤ +60 °C for device types “S”
(Position 10 of the product code) or
-40 °C ≤ Ta ≤ +70 °C for device types “T” or “E”
(Position 10 of the product code)

☐ The equipment is suitable for use in an area with maximum pollution degree 2, as defined in IEC 60664-1.
☐ Install the modules in a suitable enclosure according to IEC 60079-0 providing a degree of protection of at least IP54 according to IEC 60529, taking into account the environmental conditions under which the equipment will be used.

- ☐ In potentially explosive atmospheres, only use MSxx units that have not previously been operated in other applications at ambient temperatures higher than +45 °C (+113 °F).
- ☐ Make provisions to prevent transient disturbances from exceeding 119 V at the voltage inputs.
- ☐ Make sure that the temperature specification of the selected cable and cable entries is in compliance with the actual measured temperature values.
- ☐ Connectors shall be connected or disconnected exclusively in dead-voltage state.
- ☐ If a relay output (signal contact) is used, the current must be limited to 100 mA resistive load.

WARNING! The USB connection and the V.24 interface connection are for temporary connection only during maintenance. Do NOT use, connect or disconnect unless the area is known to be non-hazardous. Connection or disconnection in an explosive atmosphere could result in an explosion.

Shielded ground

The shielded ground wire of the twisted pairs cables is connected to the front panel as a conductor.
Beware of possible short circuits when connecting a cable section with conductive shield braiding.

Device casing

⚠ WARNING

ELECTRIC SHOCK

Never insert pointed objects (narrow screwdrivers, wires, etc.) into the device or into the connection terminals for electric conductors.
Do not touch the connection terminals.

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

⚠ CAUTION

OVERHEATING OF THE DEVICE

Verify that all ventilation slots are clear when installing the device. Avoid touching the device while it is operating.

Failure to follow these instructions can result in minor injury or equipment damage.

Only technicians authorized by the manufacturer are permitted to open the casing.
The lower panel of the device is grounded by means of the DIN rail and optionally by means of the separate ground screw.

- ☐ The switch basic module is an inseparable unit. The switch basic module may be damaged by detachment of the display and connection part.
- ☐ Verify that the electrical installation meets locally or nationally applicable safety regulations.
- ☐ Keep the ventilation slits free to ensure good air circulation.
- ☐ Make sure there is at least 3.94 in (10 cm) of space in front of the ventilation slits of the casing.
- ☐ The device has to be mounted in an upright position (see figure 1).

Installation site requirements

⚠ WARNING

FIRE HAZARD

If you connect the device to a power supply that does **NOT** meet the requirements for Limited Power Source, NEC Class 2 or PS2 according to IEC/EN 62368-1 and is **NOT** limited to 100 W output power, the device must be installed in either a switch cabinet or other fire enclosure.

The fire enclosure can be made of metal or plastic with fire-protection properties of at least V-1 according to IEC 60695-11-10. Bottom openings of the fire enclosure must **NOT** exceed 2 mm in diameter.

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

- ☐ Only operate the device at the specified ambient temperature (temperature of the ambient air at a distance of up to 2 inches (5 cm) from the device) and at the specified relative humidity.
  See “General technical data” on page 67.
- ☐ When you are selecting the installation location, make sure 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.

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.

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 for inspection.

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

Note: You will find additional warning information and security instructions for the MICE media modules in the “Description and Operating Instructions” supplied with every module.

National and international safety regulations

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

Strain relief

Note: If the strain relief is insufficient, there is a potential risk of torsion, contact problems and creeping interruptions.

- ☐ Relieve the connection points of cables and lines from mechanical stress.
- ☐ Design strain reliefs in such a way that they help prevent any mechanical damage to cables, wires or conductors caused by external influences or their own weight.
- ☐ To help prevent damage to device connections, connectors and cables, follow the instructions for proper installation in accordance with DIN VDE 0100-520:2013-06, sections 522.6, 522.7 and 522.13.

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.

2014/34/EU (ATEX)
Directive of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres.

The ATEX Directive applies exclusively to the device variants labeled with an ATEX certificate number:
See “ATEX directive 2014/34/EU – specific regulations for safe operation” on page 12.

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://www.doc.hirschmann.com/certificates.html

The product can be used in residential areas (residential, commercial and light-industrial environments) and in industrial areas.

- Interference immunity: EN 61000-6-2
- Emitted interference: EN 55032

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.

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

UKCA marking

The labeled devices comply with the following UK regulations:

- **S.I. 2012 No. 3032**
  Restriction of the Use of Certain Hazardous Substances in Electrical and Electronical Equipment Regulations
- **S.I. 2016 No. 1091**
  Electromagnetic Compatibility Regulations 2016
- **S.I. 2016 No. 1107**
  Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016
  Note: The regulation applies exclusively to the device variants labeled with a UKEX certificate number: See “UK regulation S.I. 2016 No. 1107 (as amended by S.I. 2019 No. 696) - Schedule 3A, Part 6” on page 13.

UK
CA

The UKCA conformity declaration will be available to the relevant authorities at the following address:

Belden UK Ltd.
1 The Technology Centre, Station Road
Framlingham, IP13 9EZ, United Kingdom

You find the UKCA conformity declaration as PDF file for downloading on the Internet at: https://www.doc.hirschmann.com/certificates.html

The product can be used in residential areas (residential, commercial and light-industrial environments) and in industrial areas.

- Interference immunity: EN 61000-6-2
- Emitted interference: EN 55032

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.

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

FCC note

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

MS20/MS30
MMxx, MB20

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: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, 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 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.
The following manuals are available as PDF files for download on the Internet at https://www.doc.hirschmann.com/ :

- User Manual Installation
- User Manual Basic Configuration
- User Manual Redundancy Configuration
- Reference Manual Graphical User Interface
- Reference Manual Command Line Interface

The Network Management Software Industrial HiVision provides you with options for smooth configuration and monitoring. You find further information on the Internet at the Hirschmann product pages:
http://www.hirschmann.com/en/QR/INET-Industrial-HiVision

Key

The symbols used in this manual have the following meanings:

▶	Listing
☐	Work step
■	Subheading

1 Description

1.1 General device description

Figure 1: MICE basic module equipped with media modules
1 - basic module
2 - media module
3 - slot for media module

You can choose from a wide range of variants. You have the option to set up your device individually based on different criteria:
- Number of ports
- Transmission speed
- Temperature range
- Supply voltage range
- Certifications
- Software variant

The device is designed for the special requirements of industrial automation. The device meets the relevant industry standards, provides very high operational reliability, even under extreme conditions, and also long-term reliability and flexibility.
The device allows you to set up switched Industrial Ethernet networks according to standard IEEE 802.3.
The device works without a fan.

The following installation options are available:
- Mounting on the DIN rail

The redundancy concept allows the network to be reconfigured quickly.

There are convenient options for managing the device. Manage your devices via:
- Web browser
- Telnet

- Network management software (for example Industrial HiVision)
- V.24 interface (locally on the device)

The device provides you with a large range of functions, which the manuals for the operating software inform you about. You can download these manuals as PDF files from the Internet at: https://www.doc.hirschmann.com
The Hirschmann network components help you ensure continuous communication across all levels of the company.

1.2 Device name and product code

The device name corresponds to the product code. The product code is made up of characteristics with defined positions. The characteristic values stand for specific product properties.
You have numerous options of combining the device characteristics. You can determine the possible combinations using the configurator which is available in the Belden Online Catalog https://catalog.belden.com on the web page of the device.

Position	Characteristic	Characteristic value	Property
1 ... 4	Product	MS20	Modular switch without Gigabit ports
		MS30	Modular switch with Gigabit ports
5	- (hyphen)	-	
6 ... 7	Number of 10/100 Mbit/s ports	08	8 × 10/100 Mbit/s Ethernet
		16	16 × 10/100 Mbit/s Ethernet
		24	24 × 10/100 Mbit/s Ethernet
8 ... 9	Number of 10/ 1000 Mbit/s ports	00	0 × 1000 Mbit/s Ethernet
		02	2 × 1000 Mbit/s Ethernet
10	Temperature range	S	Standard: 0 °C ... +60 °C (+32 °F ... +140 °F)
		T	Extended -40 °C ... +70 °C (-40 °F ... +158 °F)
		E	Extended: -40 °C ... +70 °C (-40 °F ... +158 °F), Conformal Coating
11	Voltage range	A	18 V DC … 32 V DC
		C	18 V DC ... 60 V DC
		E	18 V DC ... 60 V DC / 6-pin
12	Approval	A	CE, UL 508, ISA 12.12.01 Class I Division 2
		B	CE, UL 508, ISA 12.12.01 Class I Division 2, GL, ATEX Zone 2
		H	CE, UL 508, ISA 12.12.01 Class I Division 2, GL, IEC 61850-3, IEEE 1613,EN 50121-4
		S	CE, UL 508, GL, IEC 61850-3, IEEE 1613, EN 50121-4
		Y	CE, UL 508
		Z	CE
13	Software variant	E	Enhanced
		P	Professional

Table 1: Device name and product code

1.3 Description of the device variants

The industrial ETHERNET series MICE (Modular Industrial Communication Equipment) consists of a basic switch module and the media modules. These devices can be managed. A basic module contains all the functions of this industrial Switch, with the exception of the interfaces to the LAN that is connected. Pluggable media modules provide these interfaces. They differ with regard to the number of interfaces and the media type for connecting segments. An expansion module enables you to add 2 slots for media modules to the basic module.

For the sake of simplicity, the basic switch module with various plugged in media modules will be referred to as MICE in this document.

- The MS20-... device variants are modular switches with up to 8 ×, 16 × or 24 × 10/100 Mbit/s Ethernet ports. You can choose the media for the ports via the media modules.
- The MS30-... device variants are modular switches with up to 8 ×, 16 × or 24 × 10/100 Mbit/s Ethernet ports and up to 2 × additional Gigabit ports (1000 Mbit/s Ethernet). You can choose the media for the ports via the media modules.

The basic module of the MS20/MS30 contains all the function units, such as: switch function, management function, redundancy function, display control, voltage connection, management connection, adjustable controls, slots for media modules.

Family	Designed for:
MS20	Larger numbers of ports, preferred number of 100 Mbit/s ports, temperature range, voltage range, certificates and software variant can be selected.
MS30	Larger numbers of ports and larger bandwidth requirement, preferred number of 100 /1000 Mbit/s ports, temperature range, voltage range, certificates and software variant can be selected.

1.3.1 Number of ports and connections

Device versions with 10/100 Mbit/s ports MS20-0800..., MS20-1600..., MS20-2400...

Depending on the variant, the MS20 basic modules provide you with the following number of slots for media modules and the following maximum number of connectable network segments:

Basic module	Number of slots for 10/100 Mbit/s media modules	Max. possible number of connectible 10/100 Mbit/s network segments when connecting 4-port media modules
MS20-0800...	2	8
MS20-1600...	4	16 [a]
MS20-2400...	6	24

a. Can be expanded to 24 ports with the MB20 extender module

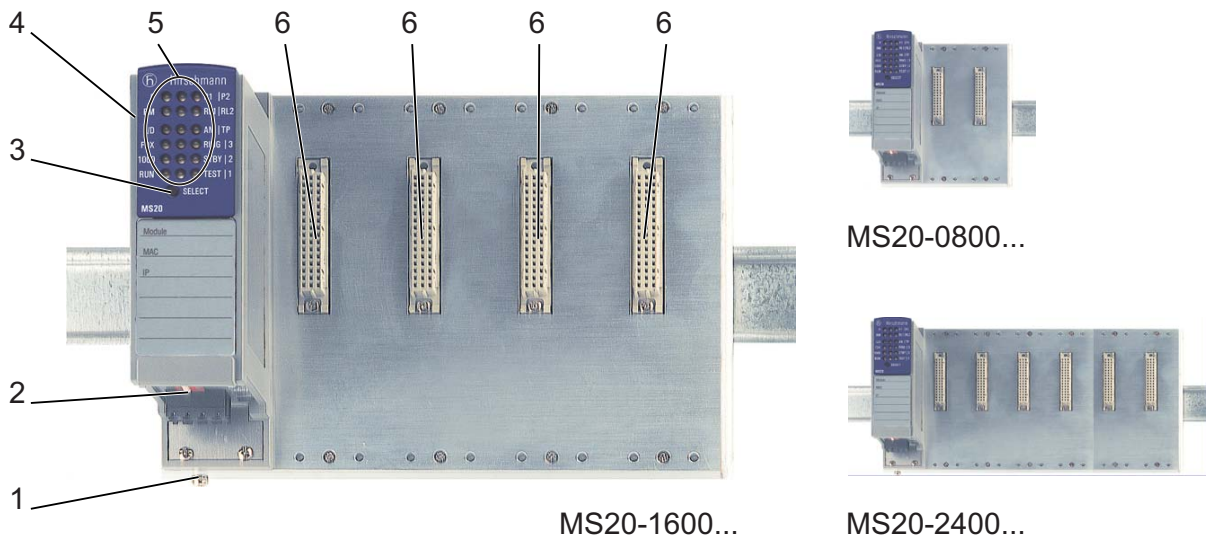


Figure 2: Overview interfaces, display elements and controls of the MS20 -...
1 - Grounding screw
2 - Terminal block, V.24 port, USB port, DIP switch
3 - Key for display status
4 - Switch basic module MS20-...
5 - LEDs for device status, display status
6 - 4 slots for media modules MM2-... or MM3-... with 2 ... 4 ports each

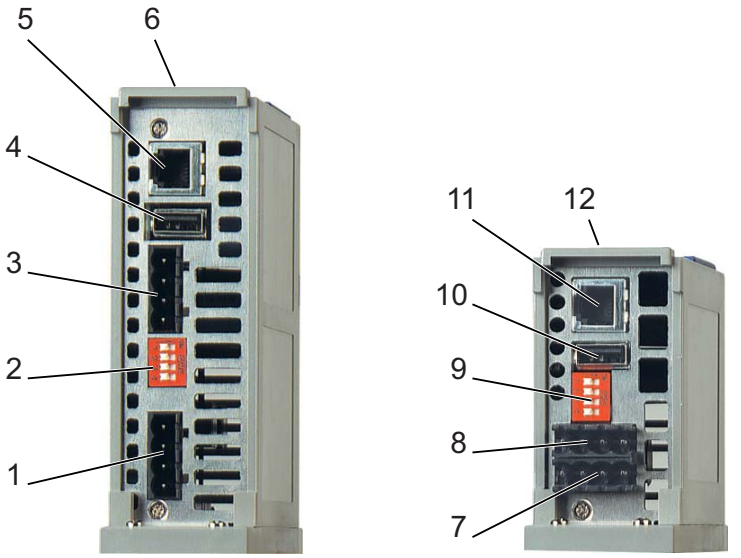


Figure 3: Interfaces of the MS20-... and MS30-... on the bottom side of the device
1 - Terminal block (Power 2)
2 - DIP switch
3 - Terminal block(Power 1)
4 - USB port
5 - V.24 port
6 - MICE MS20/30 switch basic module with 18 V DC ... 60 V DC voltage range
7 - Terminal block(Power 2)
8 - Terminal block(Power 1)
9 - DIP switch
10 - USB port
11 - V.24 port
12 - MICE MS20/30 switch basic module with 18 V DC ... 32 V DC voltage range

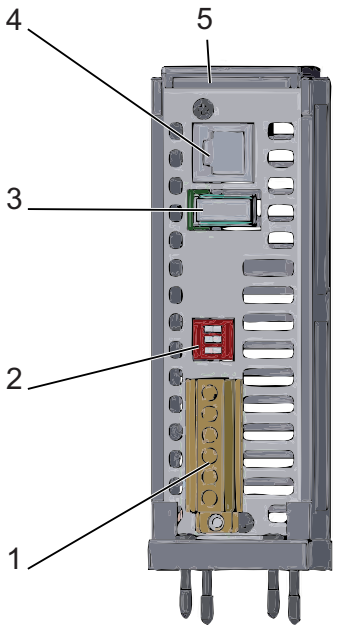


Figure 4: Interfaces of the MS20-.../MS30-...E... on the bottom side of the device
1 - Terminal block, 6-Pin, for power and signal contact
2 - DIP switch
3 - USB port
4 - V.24 port
5 - MICE MS20/30-...E... switch basic module with 18 V DC ... 60 V DC voltage range / 6-pin

Device variants with 1000 Mbit/s and 10/100 Mbit/s ports MS30-0802..., MS30-1602..., MS30-2402...

Depending on the variant, the MS30 basic modules provide you with the following number of slots for media modules and the following maximum number of connectable network segments:

Basic module	Number of slots for 10/100 Mbit/S media modules	Number of slots for 1000 Mbit/S media modules	Max. possible number of connectable 10/100 Mbit/S network segments when connecting 4-port media modules	Max. possible number of connectable 1000 Mbit/s network segments
MS30-0802...	2	1	8	2
MS30-1602...	4	1	16 [a]	2
MS30-2402...	6	1	24	2

a. Can be expanded to 24 ports with the MB20 expansion module

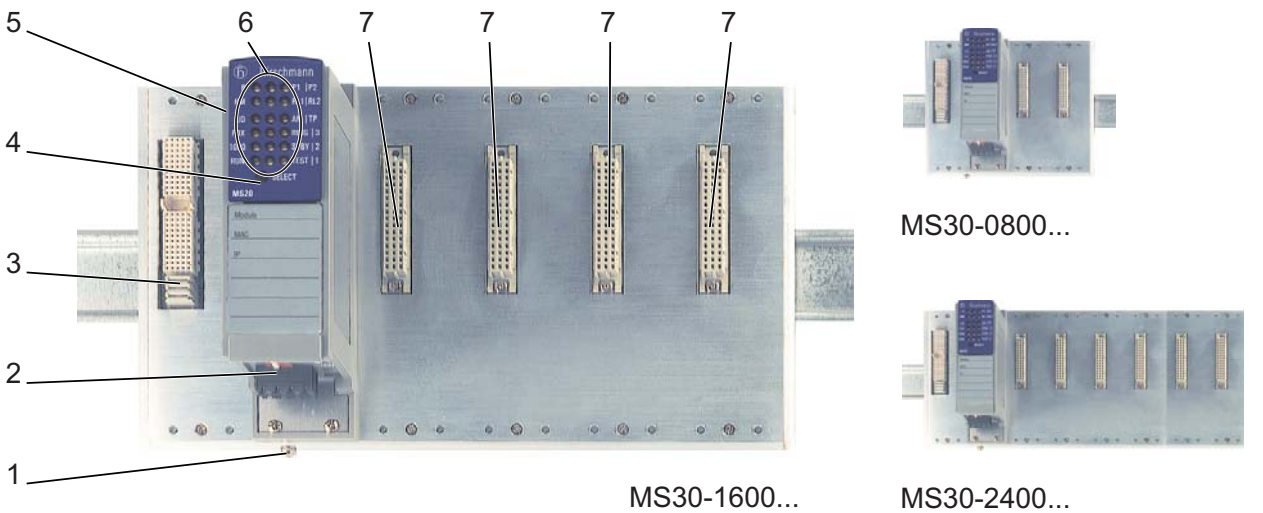


Figure 5: Overview interfaces, display elements and controls of the MS30 -...
1 - Grounding screw
2 - Terminal block, V.24 port, USB port, DIP switch
3 - Slot for SFP module MM4-TX/SFP
4 - Key for display status
5 - Switch basic module MS20-...
6 - LEDs for device status, display status
7 - 4 slots for media modules MM2-... or MM3-... with 2 ... 4 ports each

Figure figure 3 displays the interfaces on the bottom side of the MS30.

1.3.2 Media modules

The MICE media modules form the interface of the device to the LAN. They can be attached to

- Basic module MS20-...
- Basic module MS30-...

They differ with regard to the number of interfaces and the media type. The different interfaces of the media modules provide you with the following interface-specific functions:

- Specific functions of TP/TX interface
  - Link Control
  - Auto Polarity Exchange
  - Autonegotiation
  - Autocrossing (device may be connected with a crossed-over or an un-crossed cable)
- Specific functions of F/O interface
  - Link Down monitoring
- Transceiver-specific (AUI-specific) functions
  - Collision recognition
  - Collision test (SQE)
  - Protection from permanent network connection (Jabber Control)
  - DTE Power Monitor

MM2 media modules

MM2 media modules Module type	TP ports 10/100 Mbit/s	F/O port multi-mode 10 Mbit/s	F/O port multi-mode 100 Mbit/s	F/O port single-mode 1300 nm, 100 Mbit/s	F/O port single-mode 1550 nm, 100 Mbit/s
MM2 - 4TX1 (- EEC)	4, RJ45	–	–	–	–
MM2 - 2FLM4	–	2, ST	–	–	–
MM2 - 4FXM3	–	–	4, MTRJ	–	–
MM2 - 2FXM3 / 2TX1	2, RJ45	–	2, MTRJ	–	–
MM2 - 2FXM2	–	–	2, DSC	–	–
MM2 - 2FXS2	–	–	–	2, DSC	–

Table 2: Media connections per MM2 media modules (number and type)

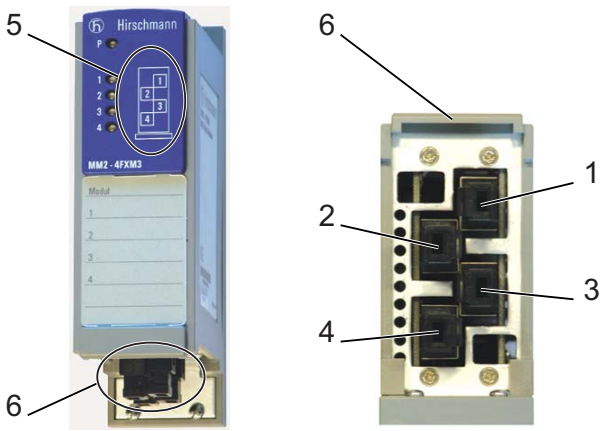


Figure 6: Port assignment
1 - Port 1
2 - Port 2
3 - Port 3
4 - Port 4
5 - Illustration of the port numbers
6 - Bottom side of the device

MM3 media modules

MM3 media modules Module type	TP ports 10/ 100 Mbit/s	F/O port multi-mode 10 Mbit/s	F/O port multi-mode 100 Mbit/s	F/O port single- mode 1300 nm, 100 Mbit/s	F/O port single- mode 1550 nm, 100 Mbit/s
MM3-4TX5	4, M12	–	–	–	–
MM3-4FLM4	–	4, ST	–	–	–
MM3-1FXM2/3TX1	3, RJ45	–	1, DSC	–	–
MM3-2FXM2/2TX1(-EEC)	2, RJ45	–	2, DSC	–	–
MM3-2FXM4/2TX1	2, RJ45	–	2, ST	–	–
MM3-4FXM2	–	–	4, DSC	–	–
MM3-4FXM4	–	–	4, ST	–	–
MM3-1FXS2/3TX1(-EEC)	3, RJ45	–	–	1, DSC	–
MM3-2FXS2/2TX1	2, RJ45	–	–	2, DSC	–
MM3-4FXS2	–	–	–	4, DSC	–
MM3-1FXL2/3TX1	3, RJ45	–	–	–	1, DSC

Table 3: Media connections per MM3 media modules (number and type)

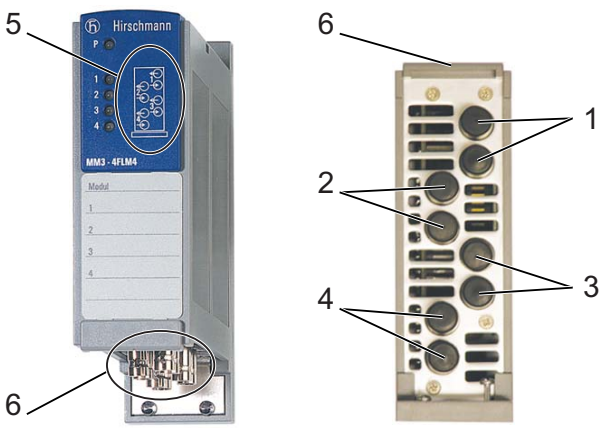


Figure 7: Port assignment
1 - Port 1
2 - Port 2
3 - Port 3
4 - Port 4
5 - Illustration of the port numbers
6 - Bottom side of the device

MM22-T1T1T1T1 PoE media module

The MM22-T1T1T1T1 PoE media module (deeper module design) supports Power over ETHERNET (PoE) according to IEEE 802.3af. It allows the connection and remote supply of IP telephones (Voice over IP), webcams, sensors, printer servers and WLAN access points via 10BASE-T/100BASE-TX, for example. With PoE, these terminal devices are powered by the twisted-pair cable.

The MM22-T1T1T1T1 media module has four 10BASE-T/100BASE-TX ports (RJ45 connections) for connecting network segments or PoE terminal devices (PD, Powered Device) up to class 0 (or respectively class 3).

The current is supplied on the free line pair (spare pairs); the individual ports are not electrically insulated from each other.
The following conditions are met in accordance with IEEE 802.3af:

- Endpoint PSE
- Alternative B.

MM4 media modules

The 4-port MM4-4TX/SFP media module has 4 TP interfaces and 4 sockets for SFP transceivers from Hirschmann.

The 2-port MM4-2TX/SFP media module has 2 TP interfaces and 2 sockets for SFP transceivers from Hirschmann.

The Gigabit slot of the MS30 device (slot on the left side next to the switch basic module) supports 2 Gigabit ports.

By inserting a SFP transceiver, you deactivate automatically the corresponding twisted pair interface.

Note: Only use Hirschmann SFP transceivers.
See “Accessories” on page 86.

MM4 media modules Module type	TP ports 10/100/1000	SFP ports as alternatives to TP ports
MM4 - 2TX/SFP	2, RJ45	2
MM4 - 4TX/SFP	4, RJ45	4

Table 4: Media connections per MM4 media module (number and type)

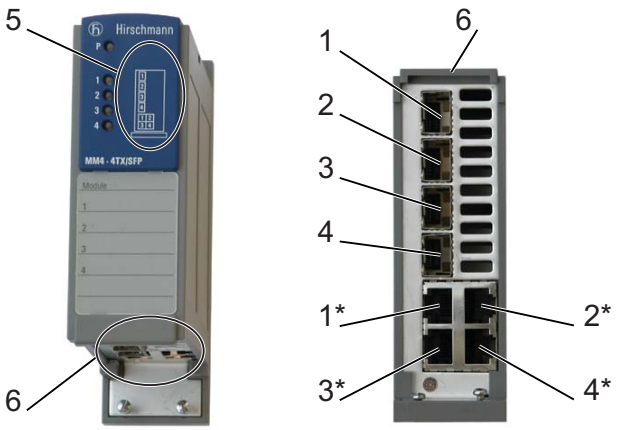


Figure 8: Port assignment
1 - Port 1 (Twisted pair)
2 - Port 2 (Twisted pair)
3 - Port 3 (Twisted pair)
4 - Port 4 (Twisted pair)
1 - Port 1* (SFP slot, can be used as alternative to Port 1)*
2 - Port 2* (SFP slot, can be used as alternative to Port 2)*
3 - Port 3* (SFP slot, can be used as alternative to Port 3)*
4 - Port 4* (SFP slot, can be used as alternative to Port 4)*
5 - Illustration of the port
6 - Bottom side of the device

1.3.3 Digital I/O Module MM24

The Digital I/O Module MM24 allows the control of different actuators of the system via 4 digital inputs and outputs.
For further information, see the user manual MICE digital I/O module MM24.

1.3.4 MB20 extender module

The MB20 extender module allows you to add 2 slots for media modules to the MS20-1600/MS30-1602 basic modules.

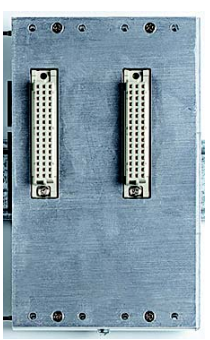


Figure 9: MB20 extender module

1.3.5 SFP Transceiver

With the insertion of the SFP transceivers into the SFP slots, F/O ports are available to you.
SFP transceivers allow you to use optical interfaces on your device (Fast Ethernet and Gigabit Ethernet SFP transceivers).
See “Accessories” on page 86.
SFP stands for Small Form-factor Pluggable and is also referred to as mini-GBIC (GigaBit Interface Converter).
The Fast Ethernet media module MM20-Z6Z6Z6Z6 has 4 SFP slots (100 Mbit/s).
The Gigabit Ethernet media modules MM4-4TX/SFP and MM4-2TX/SFP have 4 or 2 TP interfaces and 4 or 2 slots (1000 Mbit/s).
By inserting the SFP transceivers, you deactivate the corresponding TP interface.

1.4 Ethernet ports

You can connect end devices and other segments to the device ports using twisted pair cables or optical fibers (F/O).
You find information on the pin assignments for making patch cables here:
“Pin assignments” on page 39

1.4.1 10/100/1000 Mbit/s twisted pair port

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

State on delivery: autonegotiation.
The port casing is electrically connected to the front panel.

1.4.2 10/100 Mbit/s twisted pair port

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

This port supports:
- Autonegotiation
- Autopolarity
- Autocrossing (if autonegotiation is activated)
- 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode

Default setting: Autonegotiation activated except for the HIPER-Ring ports: 100 Mbit/s, full duplex.
The port housing is electrically connected to the bottom panel.

1.4.3 10/100 Mbit/s PoE port

The 10/100 Mbit/s PoE port allows you to connect network components as a PoE voltage sink according to the standard IEEE 802.3 10BASE-T/ 100BASE-TX and IEEE 802.3af.
This port supports:
- Autonegotiation
- Autopolarity
- Autocrossing (if autonegotiation is activated)
- 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode

Default setting: Autonegotiation activated except for the ring ports: 100 Mbit/s, full duplex.
The port casing is electrically connected to the front panel.
The PoE voltage is supplied via the free wire pairs (spare-pair powering).

1.4.4 1000 Mbit/s F/O port

This port is an LC socket.
The 1000 Mbit/s F/O port offers you the ability to connect network components according to the IEEE 802.3 1000BASE-SX/1000BASE-LX standard.
This port supports:
- Autonegotiation
- Full duplex mode

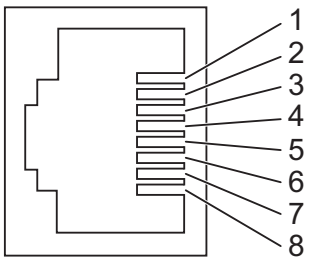
Delivery state: Autonegotiation activated

1.4.5 100 Mbit/s F/O port

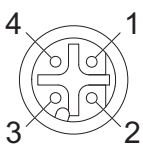
This port is an MTRJ, DST, or DSC socket.
The 100 Mbit/s F/O port allows you to connect network components according to the IEEE 802.3 100BASE-FX standard.
This port supports:
- Full or half duplex mode

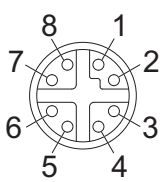
Default setting: Full duplex

1.4.6 Pin assignments

RJ45	Pin	10/100 Mbit/s	1000 Mbit/s	PoE
	**MDI mode**			
	1	TX+	BI_DA+	Positive V_{PSE} [a]
	2	TX−	BI_DA−	Positive V_{PSE} [a]
	3	RX+	BI_DB+	Negative V_{PSE} [a]
	4	—	BI_DC+	Positive V_{PSE} [b]
	5	—	BI_DC−	Positive V_{PSE} [b]
	6	RX−	BI_DB−	Negative V_{PSE} [a]
	7	—	BI_DD+	Negative V_{PSE} [b]
	8	—	BI_DD−	Negative V_{PSE} [b]
	MDI-X mode			
	1	RX+	BI_DB+	Negative V_{PSE} [a]
	2	RX−	BI_DB−	Negative V_{PSE} [a]
	3	TX+	BI_DA+	Positive V_{PSE} [a]
	4	—	BI_DD+	Positive V_{PSE} [b]
	5	—	BI_DD−	Positive V_{PSE} [b]
	6	TX−	BI_DA−	Positive V_{PSE} [a]
	7	—	BI_DC+	Negative V_{PSE} [b]
	8	—	BI_DC−	Negative V_{PSE} [b]

a. Phantom supply
b. Spare pair supply

M12 4-pin (“D”-coded)	Pin	Data	PoE
	1	TX+	Positive V_{PSE}
	2	RX+	Negative V_{PSE}
	3	TX−	Positive V_{PSE}
	4	RX−	Negative V_{PSE}

M12 8-pin (“X”-coded)	Pin	10/100 Mbit/s	1000 Mbit/s	PoE
	1	RX+	BI_DB+	Negative V_{PSE}
	2	RX−	BI_DB−	Negative V_{PSE}
	3	TX+	BI_DA+	Positive V_{PSE}
	4	TX−	BI_DA−	Positive V_{PSE}
	5	—	BI_DC+	—
	6	—	BI_DC−	—
	7	—	BI_DD−	—
	8	—	BI_DD+	—

1.5 AUI port

The housing of the Sub-D plug is electrically isolated from the lower panel of the device.
The AUI (Attachment Unit Interface) port offers you the opportunity to connect a device via an AUI cable according to IEEE 802.3.
This port supports:

- SQE test
- DTE Power Monitor

Default setting: SQE test function and DTEPower monitor function is not active.

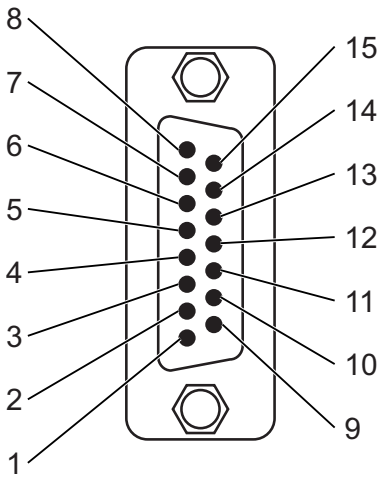


Figure 10: Pin assignment of an AUI interface

1 - Pin 1: Shielding CI
2 - Pin 2: Output CI-A
3 - Pin 3: Input DO-A
4 - Pin 4: Shielding DI
5 - Pin 5: Output DI-A
6 - Pin 6: GND
7 - Pin 7: Not contacted
8 - Pin 8: Shielding CO
9 - Pin 9: Output CI-B
10 - Pin 10: Input DO-B
11 - Pin 11: Shielding DO
12 - Pin 12: Output DI-B
13 - Pin 13: Voltage 12 V
14 - Pin 14: Shielding 12 V
15 - Pin 15: Not contacted

Connect the ports of the media modules plugged into the basic device as required in order to set up your industrial Ethernet or expand your existing network.

☐ Install the data lines according to your requirements.

1.6 Display elements

After establishing the operating voltage, the software starts and initializes itself. Afterwards, the device performs a self-test. During this process, various LEDs light up. The process lasts around 60 seconds.

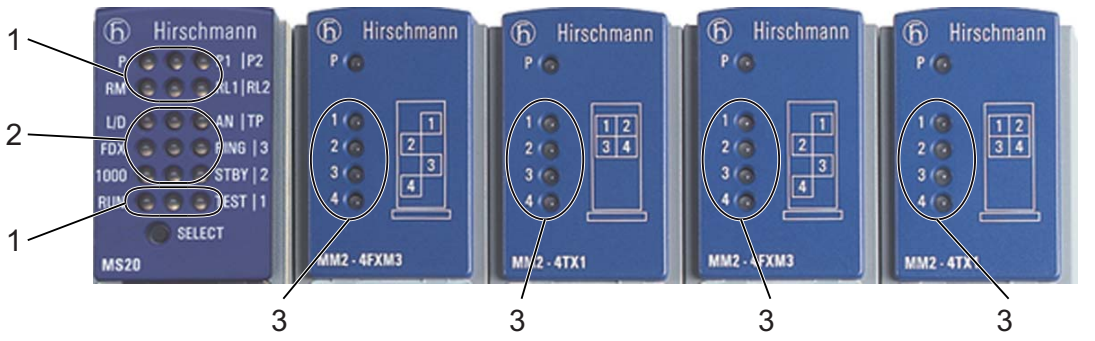


Figure 11: Display elements on MS20/MS30

1 - Device status
2 - Display status
3 - Port status

1.6.1 Device Status

This LEDs provide information about conditions that affect the operation of the whole device.

P – Power (green LED)	
Lights up green	Internal supply voltage is on.
None	Internal supply voltage is too low.

P1 – Power 1 (green LED)	
Lights up green	Supply voltage 1 is on.
None	Supply voltage 1 >18 V.

P2 – Power 2 (green LED)	
Lights up green	Supply voltage 2 is on.
None	Supply voltage 2 >18 V.

RM - Redundancy Manager (green/yellow LED)	
Lights up green	RM function active. Redundant port not active.
Lights up yellow	RM function active, redundant port active.
None	RM function not active.
Flashing green	Incorrect configuration of the HIPER-Ring (for example: the ring is not connected to the ring port).

RUN – BOOT/RUN (green LED)	
Lights up green	System is ready for operation.
Flashing green	System is booting.
None	System is in reset mode.

RL1 – Relay 1, signal contact (red/yellow LED)	
Glowing red	Signal contact 1 is open, that means it is reporting an error.
Lights up yellow	Signal contact 1 is open, the “Manual Setting” is active.
None	Signal contact 1 is closed, that means it is not reporting an error.

RL2 – Relay 2, signal contact (red/yellow LED)	
Glowing red	Signal contact 2 is open, that means it is reporting an error.
Lights up yellow	Signal contact 2 is open, the “Manual Setting” is active.
None	Signal contact 2 is closed, that means it is not reporting an error.

RUN, 1 – display saving processes of the AutoConfiguration Adapter ACA	
Flashing alternatingly	Error during saving process.
LEDs flash synchronously 2 × per second	Loading configuration from the ACA.
LEDs flash synchronously 1 × per second	Saving the configuration in the ACA.

If the manual setting is active on the signal contact, then the error display is independent of the setting of the signal contact.

1.6.2 Display status

Every media module has 1 LED per port. The meaning of this port status LED depends on the setting on the basic module. You define the display meaning with the “SELECT” button on the basic module.

☐ Press the button for approximately 2 seconds to switch the meaning of the display
over. If the button is not pressed for approximately 20 seconds, the display status changes back to “L/D”.

L/D – data, link status (green LED)	
Lights up green	The port LEDs of the media modules display the connection status.

FDX – Full duplex (green LED)	
Lights up green	The port LEDs of the media modules display the half-duplex or full duplex connection status.

1000 – 10/100/1000 Mbit/s (green LED)	
Lights up green	The port LEDs of the media modules display the set transmission speed.

AN – Autonegotiation (green LED)	
Lights up green	The port LEDs of the media modules display the port configuration type.

RING – ring port (green LED)	
Lights up green	The port LEDs of the media modules display HIPER-Ring assignment.

STBY – stand-by (green LED)	
Lights up green	The port LEDs of the media modules display the assignment to a redundant coupling of network segments.

TEST – LED test (green LED)	
Lights up green	The status, display status, and port status LED test is active. The P1/P2 LEDs light up green. The “RM” LED status flashes green/yellow. The RELAY1/RELAY2 status LEDs flash yellow/red. The display status LEDs flash green. The port status LEDs of the media modules flash green/yellow.

TP – twisted pair / fiber optic (green LED)	
Lights up green	The port LEDs of the media modules display the media type.

All display status LEDs (green LEDs)	
Flashing in sequence	Initialization phase after restart.

2 – PoE status (green/yellow LED)	
Lights up green	The port LEDs of the media modules display the Power over ETHERNET status.
None	- No PoE port or PoE disabled (PoE status “disabled”). - PoE status “fault”.

3 (green LED)	
	Service LED

1.6.3 Port status

These LEDs display port-related information. You set the content of the information with the button on the basic module (see on page 43 “Display status”).

1 ... 4 – data, link status (green/yellow LED)	
None	For MM20-A8A89999SAHH (AUI): No valid connection. No DTE voltage at the port.
Lights up green	For MM20-A8A89999SAHH (AUI): Valid connection. DTE voltage present at the port.
Flashing green (1 × a period)	Port is switched to stand-by (Port 1).
Flashing green (3 × a period)	Port is switched off
Flashing yellow	Data reception.

1 ... 4 – FDX (green/yellow LED)	
None	Half duplex active.
Lights up green	Full duplex active.

1 ... 4 – 1000 (green/yellow LED)	
None	10 Mbit/s is active.
Lights up green	100 Mbit/s is active.
Lights up yellow	1000 Mbit/s is active.

1 ... 4 – AUTONEG (green/yellow LED)	
Lights up green	Autonegotiation is active.

1 ... 4 – RING PORT (green/yellow LED)	
Lights up green	This port is assigned to the HIPER-Ring.

1 ... 4 – STAND-BY (green/yellow LED)	
Lights up green	Connection port for the data line.
Lights up yellow	Connection port for the control line.
Flashing green/yellow	No stand-by partner present.

TP / F/O – twisted pair / fiber optic (green/yellow LED)	
Lights up green	The port LEDs of the media modules display the twisted pair ports.
Lights up yellow	The port LEDs of the media modules display the F/O ports.

PoE status (green/yellow LED)	
None	No PoE port or PoE disabled; PoE status “fault”.
Lights up yellow	PoE port searching for terminal device (PD); PoE status “searching”.
Lights up	PoE port supplying terminal device (PD); PoE status “Delivering Power”.

1 ... 4 – LED TEST (green/yellow LED)	
None	LED defective
Flashing green/yellow	LED test active.

2 Installation

The devices have been developed for practical application in a harsh industrial environment.
Hirschmann supplies the device ready for operation.

Perform the following steps to install and configure the device:

- Checking the package contents
- Installing media modules
- Filling out and attaching labels
- Installing an SFP transceiver (optional)
- Adjusting the DIP switch settings on the basic module (4-pin DIP switch)
- Adjusting the DIP switch settings on the MS20/MS30-...E... basic module (3-pin DIP switch)
- Adjusting the DIP switch settings on the MM20-A8A89999SAHH media module
- Connecting the MM22-T1T1T1T1 PoE media module
- Terminal block for supply voltage and signal contact
- Connecting the terminal blocks, start-up procedure
- Installing and grounding the device
- Connecting data cables
- Assembly of the MB20 extender module
- Defining the meaning of the display LEDs

2.1 Checking the package contents

☐ Check whether the package includes all items named in the section “Scope of delivery” on page 85.
☐ Check the individual parts for transport damage.

2.2 Installing media modules

On delivery, the device is ready for operation.
You can install and remove media modules during running operation.

- ☐ To attach a media module, first remove the protective cap on the plug.
- ☐ Plug the media module onto the plug.
- ☐ Fasten the 4 screws at the corners of the media module.
- ☐ Fit the media modules in sequence from left to right.
- ☐ Check whether the switch default settings match your requirements.

2.3 Filling out and attaching labels

The labels included in the scope of delivery help you to organize your network installation clearly.

The large label areas enable you to designate the modules and uniquely assign the devices to be connected. You can print them, write on them and exchange them at any time.

Figure 12: Attaching the labels

Figure 13: Labels for basic modules and media modules

1 - MICE basic module
2 - Label for the name of the module
3 - Label for MAC address of the device
4 - Label for IP address of the device
5 - Label for other entries on your demand
6 - MICE media module
7 - Label for the name of the media module
8 - Label for the port assignment of the media module (Port 1)
9 - Label for the port assignment of the media module (Port 2)
10 - Label for the port assignment of the media module (Port 3)
11 - Label for the port assignment of the media module (Port 4)

☐ Attach the labels included in the delivery to the basic module and the media modules as required.

2.4 Installing an SFP transceiver (optional)

Prerequisites:
Exclusively use Hirschmann SFP transceivers.
See “Accessories” on page 86.

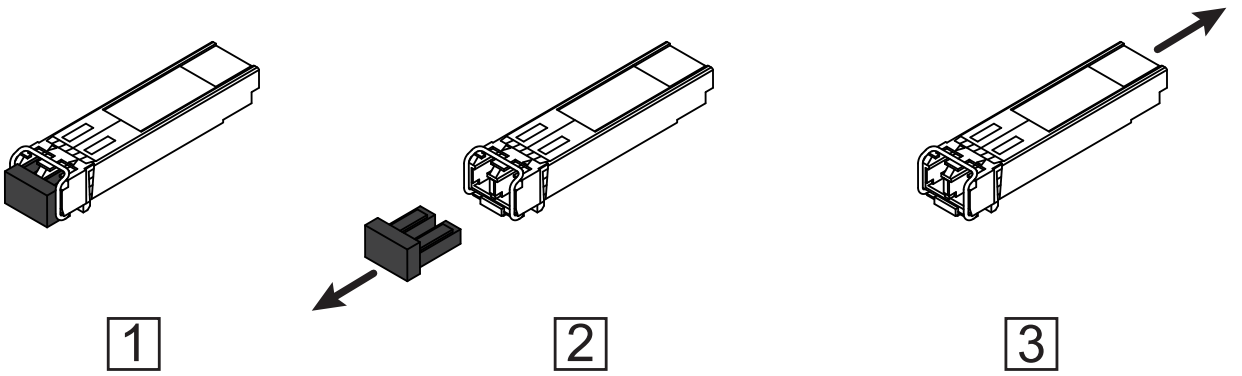


Figure 14: Installing SFP transceivers: Installation sequence

Perform the following work steps:
- ☐ Take the SFP transceiver out of the transport packaging (1).
- ☐ Remove the protection cap from the SFP transceiver (2).
- ☐ Push the SFP transceiver with the lock closed into the slot until it latches in (3).

2.5 Adjusting the DIP switch settings on the basic module (4-pin DIP switch)

The 4-pin DIP switch on the bottom panel of the basic module provides you with the following options:

DIP switch	Function	Delivery state
RM (redundancy manager) [a]	With the HIPER-Ring function switched on, switch the RM (Redundancy Manager) function on and off (see “User Manual Redundancy Configuration”).	OFF position (RM function deactivated)
Ring port [b]	Selection of the ports for the HIPER-Ring MS30: In the ON position, ports 1 and 2 in module 2 are for connecting the HIPER-Ring. MS20: In the ON position, port 1 from modules 1 and 2 are for connecting the HIPER-Ring.	OFF position (ports 1 and 2 in module 1 form the connection for the HIPER-Ring).
Stand-by [a]	With the redundant coupling of rings, you assign the redundancy function to the MICE in the redundant line (see “User Manual Redundancy Configuration”).	OFF position (normal function)

DIP switch	Function	Delivery state
SW Configuration / DIP Configuration	OFF: Give the software configuration precedence over the DIP switch position. In this case, the other switch positions are meaningless.	OFF position (SW configuration has precedence)

a. You use the “RM” and “Stand-by” switches on the 4-pin DIP switch to switch the following functions on and off (see table 6)
b. Using the “Ring port” switch on the 4-pin DIP switch you select the ring ports for the HIPER-Ring (see table 5)

“Ring-Port” switch Position	MICE device	Ring ports for the HIPER-Ring
OFF	MS20	Module 1/Port 1 and Module 1/Port 2
ON	MS20	Module 1/Port 1 and Module 2/Port 1
OFF	MS30	Module 1/Port 1 and Module 1/Port 2
ON	MS30	Module 2/Port 1 and Module 2/Port 2

Table 5: Selecting ring ports for the HIPER-Ring

Switch RM Position	Switch Stand-by Position	Ring re-dundancy	Coupling switch	Ring Manager	Coupling Manager	Ring port	Control port	Coupling port
OFF	OFF	on	on	off	off	see above		
ON	OFF	on	on	on	off	see above		
OFF	ON	on	on	off	on	see above	Module 1/ port 3 (MS20) module 2/ port 3 (MS30)	Module 1/ Port 4 (MS20) Module 2/ port 4 (MS30)
ON	ON	off	off	off	off			

Table 6: Switching redundancy mode and stand-by on/off

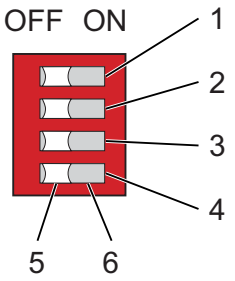


Figure 15: 4-pin DIP switch on the MICE basic module MS20-.../MS30-...
1 – Switch 1, function: Redundancy Manager (RM)
2 – Switch 2, function: ring port
3 – Switch 3, function: stand-by
4 – Switch 4, function: Configuration
5 – Switch position OFF
6 – Switch position ON

☐ Before starting operation of the device, check whether the default settings of the DIP switch correspond to your requirements.

2.6 Adjusting the DIP switch settings on the MS20/MS30-...E... basic module (3-pin DIP switch)

The 3-pin DIP switch on the bottom panel of the basic module gives you the following options:

DIP switch	Function	State on delivery
RM (redundancy manager) [a,b]	When the HIPER-Ring function is switched on, you can switch the RM (Redundancy Manager) function on and off (see "User Manual - Redundancy Configuration").	OFF position (RM function deactivated)
Ring port [b,c]	Selecting the ports for the HIPER-Ring MS30: In the ON position, ports 1 and 2 in module 2 form the connection for the HIPER-Ring. MS20: In the ON position, port 1 from modules 1 and 2 form the connection for the HIPER-Ring.	OFF position (ports 1 and 2 in module 1 form the connection for the HIPER-Ring).
Stand-by [a,b]	With the redundant coupling of rings, you assign the redundancy function to the MICE in the redundant line (see "User Manual - Redundancy Configuration").	OFF position (normal function)

a. You can use the "RM" and "Stand-by" switches on the 3-pin DIP switch to switch the following functions on and off (see table 6)
b. All three DIP switches ON: Software configuration

c. The "Ringport" switch on the 3-pin DIP switch enables you to select the ring ports for the HIPER-Ring (see table 5)

Switch "Ring port"	MICE device	Ring ports for the HIPER-Ring
OFF	MS20	Module 1/ port 1 and module 1/ port 2
ON	MS20	Module 1/ port 1 and module 2 / port 1
OFF	MS30	Module 1/ port 1 and module 1 / port 2

Table 7: Selecting ring ports for the HIPER-Ring

RM switch position	Stand-by switch position	Ring redundancy	Coup-ling switch	Ring manager	Coupling manager	Ring port	Control port	Coup-ling port
OFF	OFF	on	on	off	off	see above		
ON	OFF	on	on	on	off	see above		
OFF	ON	on	on	off	on	see above	Module 1/ port 3 (MS20) module 2/ port 3 (MS30)	Module 1/ port 4 (MS20) module 2/ port 4 (MS30)

Table 8: Switching redundancy mode and stand-by on/off

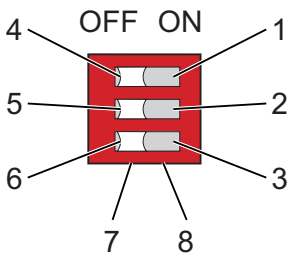


Figure 16: 3-pin DIP switch on the MICE basic module MS20/MS30-...E...
1 - Switch 1, position ON, Function: Redundancy Manager (RM)
2 - Switch 2, position ON, Function: Mod. 1 Port 1 & Mod. 2 Port 1
3 - Switch 3, position ON, Function: Stand-by
4 - Switch 1, position OFF, Function: -
5 - Switch 2, position OFF, Function: Ring Port: Mod. 1 Port 1 & 2
6 - Switch 3, position OFF, Function: -
7 - Switch position OFF
8 - Switch position ON

☐ Before starting operation of the device, check whether the default settings of the DIP switch correspond to your requirements.

2.7 Adjusting the DIP switch settings on the MM20-A8A89999SAHH media module

With the 3-pin DIP switch in the bottom panel of the MM20-A8A89999SAHH media module, you enter settings for the SQE test function and for monitoring the DTE voltage.

Note: Before starting operation, check whether the device in question operates the transceiver with or without an SQE test.

☐ Before starting operation of the device, check whether the default settings of the DIP switch correspond to your requirements.

2.8 Connecting the MM22-T1T1T1T1 PoE media module

The MM22-T1T1T1T1 PoE media module with PoE voltage (48 V DC safety extra-low voltage) is supplied with power via an external power supply unit. The PoE voltage is fed into the 3-pin terminal block of the PoE media module. The twisted-pair cables at ports 1 to 4 are supplied with PoE voltage via the spare pairs (pins 4 & 5 and 7 & 8 of the RJ45 sockets).

Note: Only use the Hirschmann RPS60/48V EEC power supply unit to supply the PoE voltage.

☐ Make sure that the external power supply unit you use to provide the PoE voltage fulfills the following basic prerequisites:
- Insulation requirements according to IEEE 802.3af (insulation resistance 48 V output to “rest of the world” 2250 V DC for 1 min.).
- Output power < 100 W.
- Current limitation < 2 A.
- The power supply unit and the PoE media module form a limited power source according to IEC60950-1.
- The external PoE power supply unit must be able to provide the power for the connected PDs.

Power supply unit RPS60/48V EEC fulfills these requirements.

Note: The RPS60/48V EEC power supply unit does not fulfill the requirements according to Germanischer Lloyd, criterion EMC1, relating to conducted emissions on the 230 V AC side. If this requirement must be fulfilled, connect a corresponding power supply unit that fulfills both this requirement **and** the basic requirements.

☐ Connect the PoE voltage to the 3-pin terminal block included in the scope of delivery, as shown in the following diagram.
Make sure the following requirements are met:
- Supply line length < 3 m.
- Supply line cross section is suitable for 1.5 A.

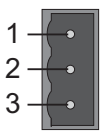
Figure	Pin	Assignment
	1	+ 48 V
	2	—
	3	0 V

Table 9: Pin assignment of the 3-pin terminal block

☐ Mount the terminal block for the PoE supply voltage on the bottom of the PoE module using the snap lock. Make sure it latches securely in place.

Note: Use 4-pair twisted pair cables to connect the terminal devices. Only connect terminal devices that conform to IEEE 802.3af.

2.9 Terminal block for supply voltage and signal contact

The supply voltage and the signal contacts are connected via a 4-pin terminal block and a redundant 4-pin terminal block with a snap lock.

⚠ WARNING

FIRE HAZARD

When supplying with direct current (DC), exclusively ground the negative conductors of the voltage inputs.

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

For more information on the supply with DC voltage power, refer to chapter “Supply voltage” on page 7.

2.9.1 Supply voltage

The supply voltage can be connected redundantly. Both inputs are uncoupled. There is no distributed load. With redundant supply, the power supply unit with the higher output voltage supplies the device on its own. The supply voltage is electrically isolated from the housing.

Note: With non-redundant supply of the mains voltage, the device reports a power failure. You can prevent this message by applying the supply voltage via both inputs, or by changing the configuration in the Management.

2.9.2 Signal contacts

The signal contact is a potential-free relay contact.
The device allows you to perform remote diagnosis via the signal contact. In the process, the device signals events such as a line interruption. When an event occurs, the device opens the relay contact and interrupts the closed circuit. The management setting specifies which events switch a contact. You can also use the management to switch the signal contact manually and thus control external devices.

The potential-free signal contact (relay contact, closed circuit) reports through a break in contact:

- The detected failure of at least one of the two supply voltages (supply voltage 1 or 2 is below the threshold value).
- A detected continuous malfunction in the device.
- The detected defective link status of at least one port. The link state can be masked for each port in the graphic user interface. In delivery state,. link monitoring is inactive.
- Exceeding or falling below the set temperature threshold values.
- Removal of the ACA22.

The following condition is also reported in RM mode:

- Ring redundancy guaranteed. By default, there is no ring redundancy monitoring

2.10 Connecting the terminal blocks, start-up procedure

☐ Pull the terminal blocks off the device and connect the voltage supply lines and the signal lines.

2.10.1 Terminal blocks on MS20/MS30-...A... and MS20/ MS30-...C...

Products with voltage range A or C (product code position 15—see table 1) have two 4-pin terminal blocks.

Note: The maximum accaptable wire size for the terminal blocks is 2.5 mm^2 (0.004 in^2) or AWG 12.

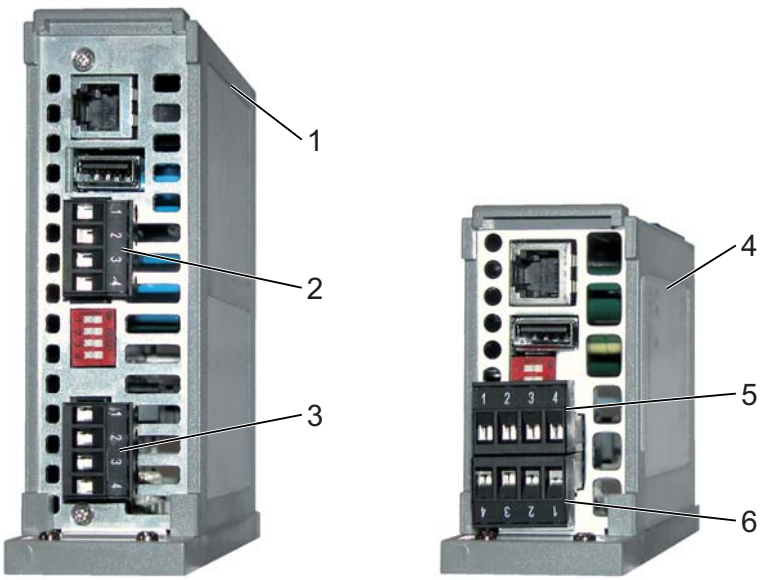


Figure 17: Pin assignment of the 4-pin terminal blocks

1 - MS20/30 switch basic module with 18 V DC ... 60 VDC voltage range
2 - Power/signal contact 1:
Pin 1 =+24 V (P1), Pin 2 =0 V, Pin 3, 4 =Relay 1
3 - Power/signal contact 2:
Pin 1 =+24 V (P2), Pin 2 =0 V, Pin 3, 4 =Relay 2
4 - MS20/30 switch basic module with 18 to 32 VDC voltage range
5 - Power/signal contact 1:
Pin 1 =+24 V (P1), Pin 2 =0 V, Pin 3, 4 =Relay 1
6 - Power/signal contact 2:
Pin 1 =+24 V (P2), Pin 2 =0 V, Pin 3, 4 =Relay 2

2.10.2 Terminal block on MS20/MS30-...E...

Products with voltage range E (product code position 15 – see table 1 on page 26) have one 6-pin terminal block.

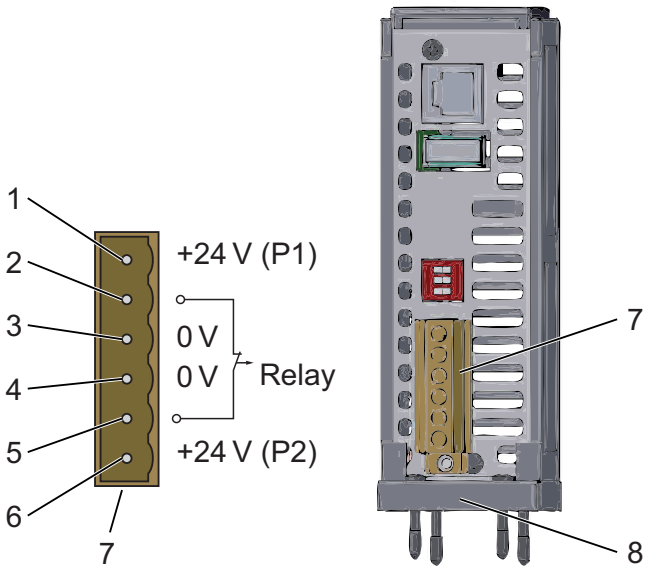


Figure 18: Pin assignment of the 6-pin terminal block

1 - Pin 1 = +24 V (P1)
2 - Pin 2 = Relay
3 - Pin 3 = 0 V
4 - Pin 4 = 0 V
5 - Pin 5 = Relay
6 - Pin 6 = +24 V (P2)
7 - Terminal block for power and signal contact
8 - MICE MS20/30-...E... switch basic module with 18 V DC ... 60 V DC voltage range / 6-pin

2.10.3 Operating the device

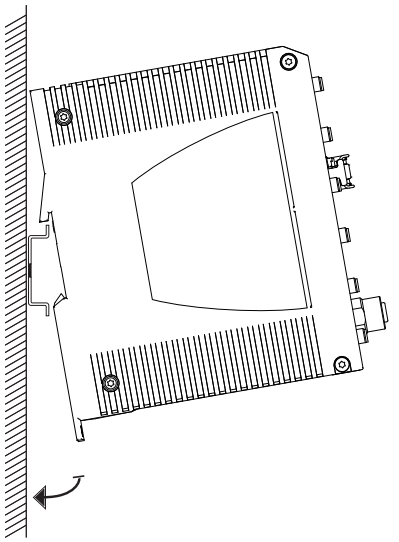
☐ Mount the terminal blocks for the voltage supply and signal contact on the bottom side of the device using the snap locks. Make sure that the snap lock snaps into place.

By connecting the voltage supply via the terminal blocks, you start the operation of the device.

2.11 Installing and grounding the device

2.11.1 Installing the device onto the DIN rail

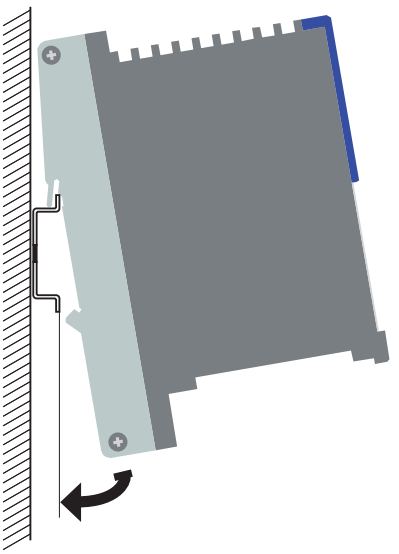
Verify that there is at least 4 in (10 cm) of space above and below the device. The overall shield of a connected shielded twisted pair cable is connected to the grounding connector on the front panel as a conductor.



To mount the device onto a horizontally mounted 35 mm DIN rail according to DIN EN 60715, proceed as follows:

☐ Slide the upper snap-in guide of the device into the DIN rail.
☐ Pull the rail lock slide down using a screwdriver, and press the lower part of the device against the DIN rail.
☐ Snap in the device by releasing the rail lock slide.

2.11.2 Grounding the device



The lower panel of the device casing is grounded via the DIN rail and optionally by means of the separate ground screw.
See figure 2 on page 28.

2.12 Connecting data cables

2.12.1 Twisted Pair ports

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. To reduce inductive coupling, verify that the power supply cables and data cables cross at a 90 ° angle.
- ☐ Use shielded data cables for gigabit transmission via copper cables, for example SF/UTP cables according to ISO/IEC 11801. To meet EN 50121-4 and marine application requirements, use shielded data cables at all transmission rates.
- ☐ Connect the data cables according to your requirements.
  See “Ethernet ports” on page 37.
- ☐ Connect the data cables according to your requirements.

2.12.2 Optical fiber ports

Verify that you connect LH ports only with LH ports, SX ports only with SX ports, and LX ports only with LX ports.

☐ Connect the data cables according to your requirements.

2.13 Assembly of the MB20 extender module

The MB20 extender module allows you to expand the MS20-1600 and MS30-1602 basic module with two sockets for media modules. You can install the MB20 extender module in running operation.

☐ On the right side of the basic module, loosen the screws at the top and bottom (1-3 revolutions).
☐ Take off the side panel.
☐ If you have not already done so, mount the basic module on the DIN rail.
☐ Push the MB20 extender module on the DIN rail to the basic module until the modules are plugged together.
☐ Tighten the screws on the top and bottom of the basic module again.

2.14 Defining the meaning of the display LEDs

Use the “SELECT” button on the basic module to define the meaning of the LEDs of the media modules. Press the button to switch to the next display meaning. The display status LEDs of the basic module show the current meaning of the port LEDs of the media modules.

See “Display elements” on page 41.

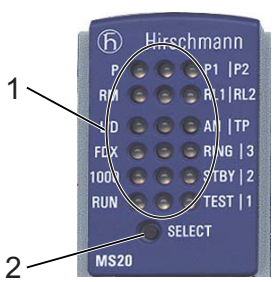


Figure 19: “SELECT” button on the MICE basic modules
1 - Display LEDs
2 - “SELECT” button

3 Making basic settings

The IP parameters must be entered when the device is installed for the first time. The device provides the following options for configuring the IP addresses:

- V.24 interface (Command Line Interface)
- BOOTP
- DHCP
- DHCP Option 82
- AutoConfiguration Adapter
- Input via the HiView or Industrial HiVision application. You find further information about the applications HiView or Industrial HiVision on theInternet at the Hirschmann product pages:
  HiView
  http://www.hirschmann.com/en/QR/INET-HiView
  Industrial HiVision
  http://www.hirschmann.com/en/QR/INET-Industrial-HiVision

Further information on the basic settings of the device can be found in the “Basic Configuration” user manual.

Default settings

- The device looks for the IP address using DHCP
- Management password:
  user, password: public (read only)
  admin, password: private (read and write)
- V.24 data rate: 9600 Baud
- Ring redundancy disabled
- Ethernet ports: link status is not evaluated (signal contact)
- Optical 100 Mbit/s ports: 100 Mbit/s full duplex
  Other ports: Autonegotiation
- Redundancy manager disabled
  (DIP switch RM and Standby: ON)
- Standby coupling disabled
  (DIP switch RM and Standby: ON)
  Port 3 = control port, Port 4 = coupling port for redundant ring coupling
- Rapid Spanning Tree enabled

USB interface

The USB socket has an interface for the local connection of an AutoConfiguration AdapterACA 21-USB. It is used for saving/loading the configuration and for updating the software.

Contact number	Signal name
1	VCC
2	- Data
3	+ Data
4	Ground

V.24 interface (external management)

A serial interface is provided on the RJ11 socket (V.24 interface) for the local connection of an external management station (VT100 terminal or PC with corresponding terminal emulation). This enables you to set up a connection to the Command Line Interface (CLI) and to the system monitor.

VT 100 terminal settings	
Speed	9600 Baud
Data	8 bit
Stopbit	1 bit
Handshake	off
Parity	none

The socket casing is electrically connected to the front panel of the device. The V.24 interface is not electrically isolated from the supply voltage.

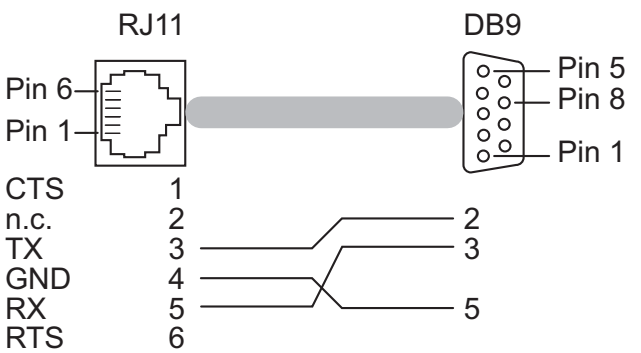


Figure 20: Pin assignment of the V24 interface

Note: You find the order number for the terminal cable, which can be ordered separately, here: See “Accessories” on page 86.

Monitoring the ambient air temperature

Operate the device below the specified maximum ambient air temperature exclusively.
See “General technical data” on page 67.

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, for example the distance from other devices or other objects, and the output of neighboring devices.
The temperature displayed in the CLI and the GUI is the internal temperature of the device. It is up to 68 °F (20 °C) higher than the ambient temperature. This depends on the configuration of your device.

3.1 First login (Password change)

To help prevent undesired access to the device, it is imperative that you change the default password during initial setup.

Perform the following steps:

☐ Open the Graphical User Interface, the Command Line Interface, or HiView the first time you log on to the device.
☐ Log on to the device with the default password “private”. The device prompts you to type in a new password.
☐ Type in your new password.
To help increase security, choose a password that contains at least 8 characters which includes upper-case characters, lower-case characters, numerical digits, and special characters.
☐ When you log on to the device with the Command Line Interface, then the device prompts you to confirm your new password.
☐ Log on to the device again with your new password.

Note: If you lost your password, then use the System Monitor to reset the password.

For further information see:
https://hirschmann-support.belden.com/en/kb/required-password-change-new-procedure-for-first-time-login

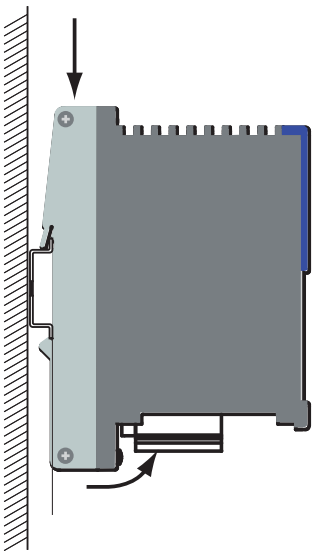
4 Maintenance and service

- ☐ 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.
- ☐ 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 product pages on the Internet (http://www.hirschmann.com).

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

5 Disassembly

5.1 Removing the device



Perform the following work steps:

- ☐ Disconnect the data cables.
- ☐ Disable the supply voltage.
- ☐ Disconnect the terminal blocks.
- ☐ Disconnect the grounding.
- ☐ To remove the device from the DIN rail, press the device downwards and pull it out from under the DIN rail.

5.2 Removing an SFP transceiver (optional)

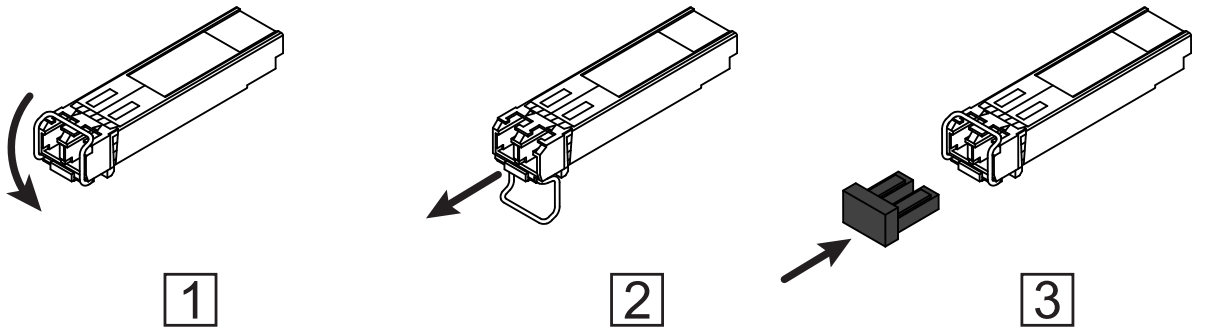


Figure 21: De-installing SFP transceivers: De-installation sequence

Perform the following work steps:

☐ Open the locking mechanism of the SFP transceiver (1).
☐ Pull the SFP transceiver out of the slot via the open locking mechanism (2).
☐ Close the SFP transceiver with the protection cap (3).

6 Technical data

General technical data

Dimensions W × H × D	MS20-0800...	125 mm × 133 mm × 100 mm (4.92 in × 5.24 in × 3.94 in) or 125 mm × 133 mm × 140 mm[a] (4.92 in × 5.24 in × 5.51 in[a])
	MS30-0802...	163 mm × 133 mm × 100 mm (6.41 in × 5.24 in × 3.94 in) or 163 mm × 133 mm × 140 mm[a] (6.41 in × 5.24 in × 5.51 in[a])
	MS20-1600...	202 mm × 133 mm × 100 mm (7.95 in × 5.24 in × 3.94 in) or 202 mm × 133 mm × 140 mm[a] (7.95 in × 5.24 in × 5.51 in[a])
	MS30-1602...	240 mm × 133 mm × 100 mm (9.45 in × 5.24 in × 3.94 in) or 240 mm × 133 mm × 140 mm[a] (9.45 in × 5.24 in × 5.51 in[a])
	MS20-2400...	278 mm × 133 mm × 100 mm (10.95 in × 5.24 in × 3.94 in) or 278 mm × 133 mm × 140 mm[a] (10.95 in × 5.24 in × 5.51 in[a])
	MS30-2402...	316 mm × 133 mm × 100 mm (12.44 in × 5.24 in × 3.94 in) or 316 mm × 133 mm × 140 mm[a] (12.44 in × 5.24 in × 5.51 in[a])

Weight	MS20-0800...	610 g (21.52 oz) (700 g (24.69 oz)[a])
	MS30-0802...	740 g (26.1 oz) (830 g (29.28 oz)[a])
	MS20-1600...	880 g (31.04 oz) (970 g (34.22 oz)[a])
	MS30-1602...	1010 g (35.63 oz) (1100 g (38.8 oz)[a])
	MS20-2400...	1030 g (36.33 oz) (1120 g (39.51 oz)[a])
	MS30-2402...	1160 g (40.92 oz) (1250 g (44.09 oz)[a])

a. With 48 V DC power supply (voltage range C (18 V DC ... 60 V DC). See table 1 on page 26.

Power supply	Supply voltage	18 V DC ... 32 V DC (voltage range A) or 18 V DC ... 60 V DC (voltage range C) Safety Extra Low Voltage (SELV/PELV), redundant inputs disconnected. Relevant for North America: NEC Class 2 power source max. 5 A.

Overload current protection at input	Non-replaceable fuse

Insulation voltage between supply voltage connections and casing	Devices with supply voltage input range: 18 V DC ... 32 V DC 18 V DC ... 60 V DC	800 V DC Protective elements limit the insulation voltage to: 45 V DC (1 mA). 90 V DC (1 mA).

Peak inrush current	<14 A for 1 ms

Signal contact	Switching current		max. 1 A (ambient air temperature ≤ +60 °C (+140 °F)) max. 100 mA (ambient air temperature +60 °C ... +70 °C (+140 °F ... +158 °F)) resistive load **as per ATEX, UKEX or IECEx:** See notes in chapter “ATEX directive 2014/34/EU – specific regulations for safe operation” on page 12 “UK regulation S.I. 2016 No. 1107 (as amended by S.I. 2019 No. 696) - Schedule 3A, Part 6” on page 13 “IECEx – Certification Scheme for Explosive Atmospheres” on page 14
	Switching voltage		max. 60 V DC or max. 30 V AC SELV according to IEC 60950-1 or ES1 according to IEC/ EN 62368-1
	as per ANSI/UL 121201: See control drawing in chapter “Use in Hazardous Locations” on page 8		
Environment	Storage temperature (ambient air temperature)		Standard: -40 °C ... +70 °C (-40 °F ... +158 °F) Extended: -40 °C ... +85 °C (-40 °F ... +185 °F)
	Humidity		10 % ... 95 % (non-condensing)
	Atmospheric pressure		up to +2000 m (+6562 ft): 795 hPa; higher altitudes on request
Operating temperature	Product code	S	Standard: 0 °C ... +60 °C (+32 °F ... +140 °F)
		T	Extended: -40 °C ... +70 °C (-40 °F ... +158 °F)
		E	Extended: -40 °C ... +70 °C (-40 °F ... +158 °F) with Conformal Coating
Pollution degree			2
Protection classes	Laser protection		Class 1 according to EN 60825-1 (2001)
	Degree of protection		IP20

Dimension drawings

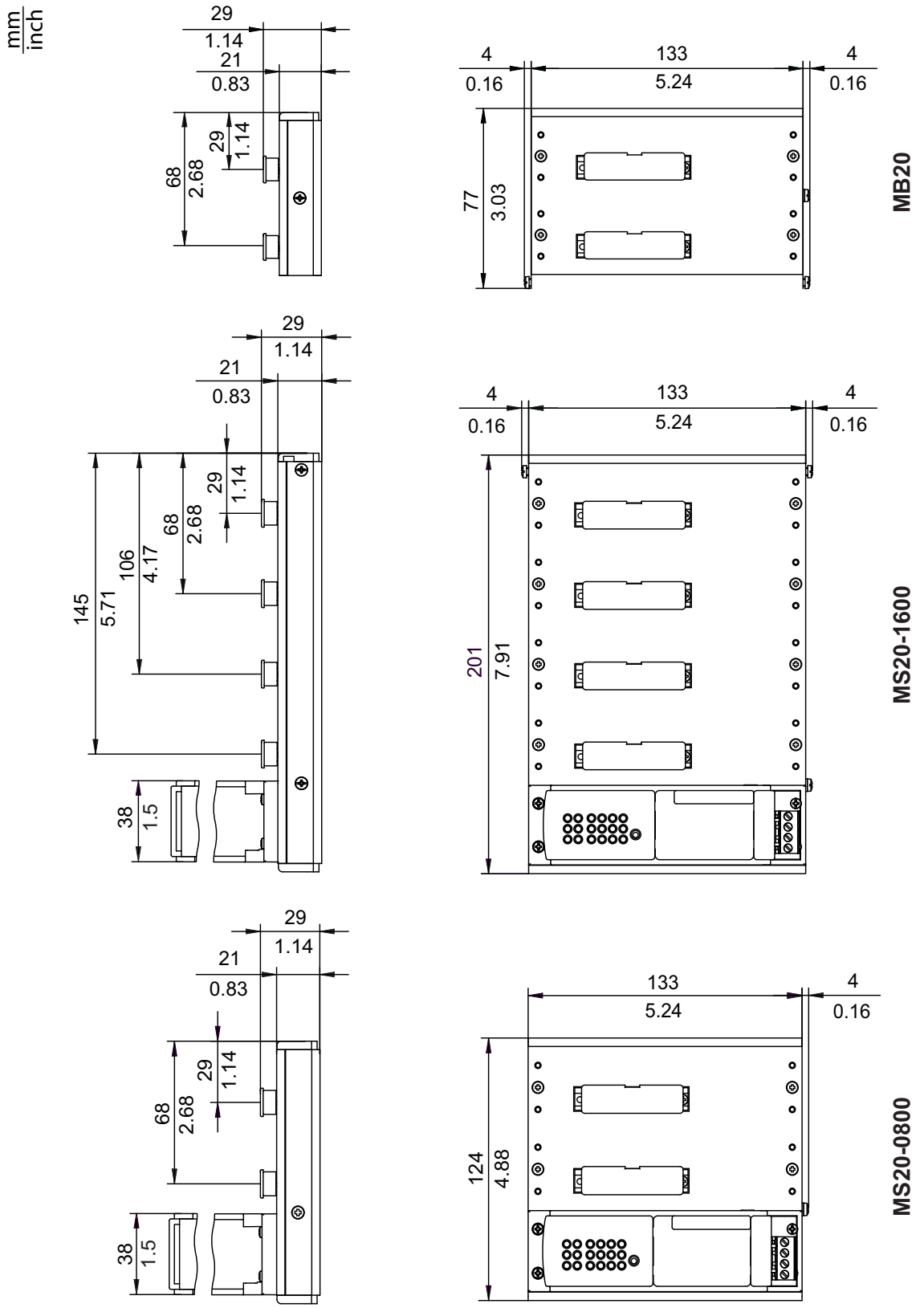


Figure 22: Dimensions of base module MS20 variants and extender module

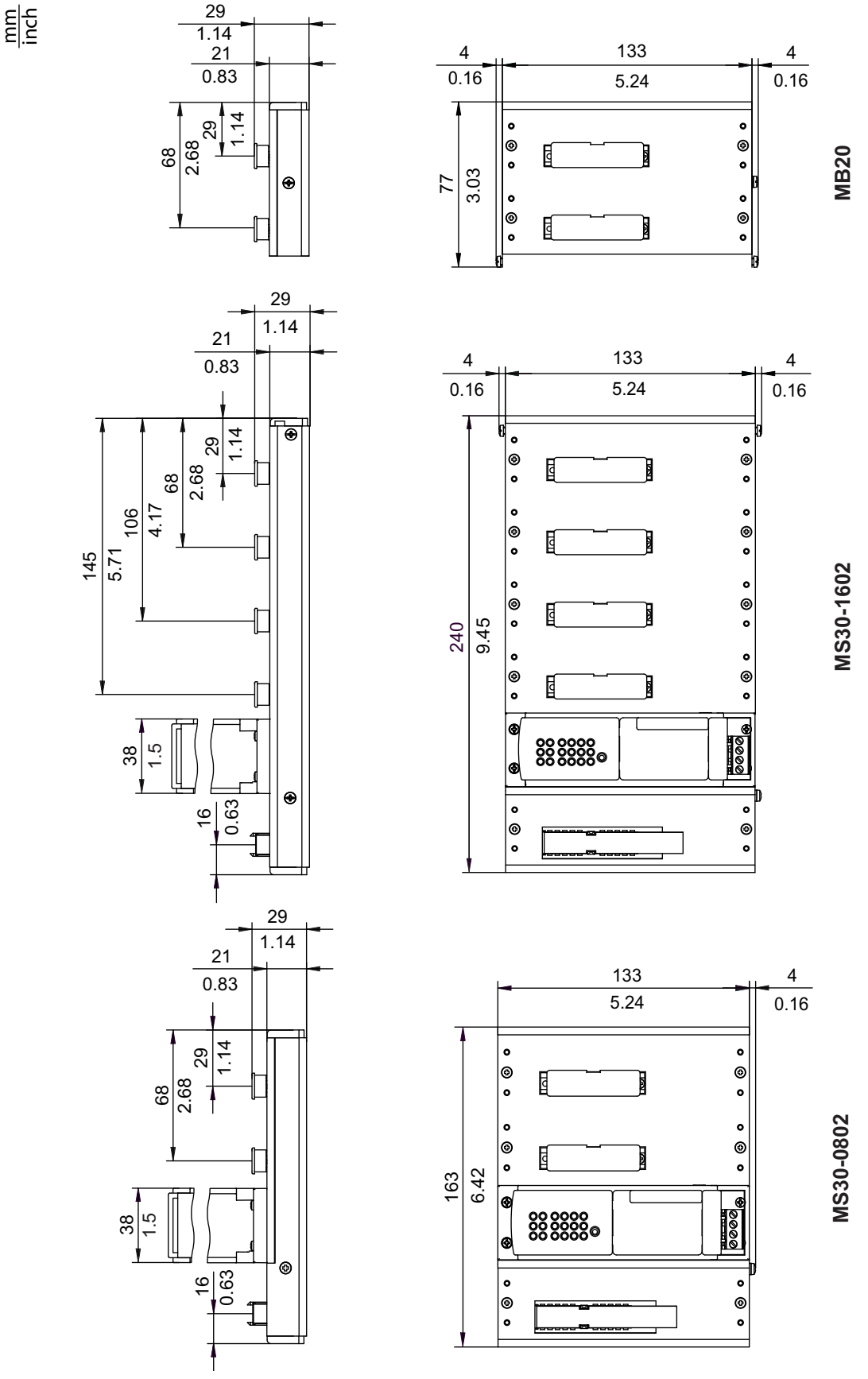


Figure 23: Dimensions of base module MS30 variants and extender module

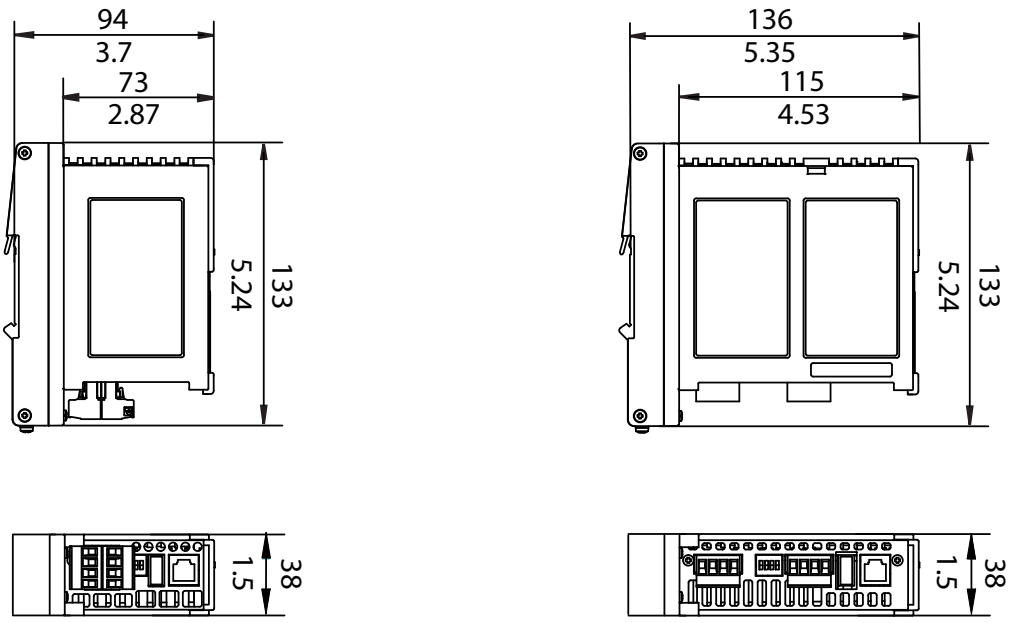


Figure 24: Dimensions of media modules

EMC and immunity

EMC interference emission		Standard applications[a]	Marine applications [b]	Railway applications (trackside) [c]	Sub-station applications [d]
Radiated emission					
EN 55032		Class A	Class A	Class A	Class A
DNV GL Guidelines		—	EMC 1	—	—
FCC 47 CFR Part 15		Class A	Class A	Class A	Class A
EN 61000-6-4		Fulfilled	Fulfilled	Fulfilled	Fulfilled
Conducted emission					
EN 55032	DC supply connection	Class A	Class A	Class A	Class A
DNV GL Guidelines	DC supply connection	—	EMC 1	—	—
FCC 47 CFR Part 15	DC supply connection	Class A	Class A	Class A	Class A
EN 61000-6-4	DC supply connection	Fulfilled	Fulfilled	Fulfilled	Fulfilled
EN 55032	Telecommunication connections	Class A	Class A	Class A	Class A
EN 61000-6-4	Telecommunication connections	Fulfilled	Fulfilled	Fulfilled	Fulfilled

a. EN 61131-2, CE, FCC – applies to all devices
b. Merchant Navy (GL, ABS, DNV, KR, LR, RINA) – applies to devices with the certification codes B, E, H, S
c. EN 50121-4 – applies to devices with the certification codes E, H, S
d. EN 61850-3, IEEE 1613 – applies to devices with the certification codes H, S

EMC interference immunity		Standard applications[a]	Marine applications [b]	Railway applications (trackside) [c]	Sub-station applications [d]
Electrostatic discharge					
EN 61000-4-2 IEEE C37.90.3	Contact discharge	±4 kV	±6 kV	±6 kV	±8 kV
EN 61000-4-2 IEEE C37.90.3	Air discharge	±8 kV	±8 kV	±8 kV	±15 kV
Electromagnetic field					

EMC interference immunity		Standard applications[a]	Marine applications [b]	Railway applications (trackside) [c]	Sub-station applications [d]
EN 61000-4-3	80 MHz ... 3000 MHz	max. 10 V/m	max. 10 V/m	max. 20 V/m	max. 10 V/m
IEEE 1613	80 MHz ... 1000 MHz	—	—	—	max. 35 V/m
Fast transients (burst)					
EN 61000-4-4 IEEE C37.90.1	DC supply connection	±2 kV	±2 kV	±2 kV	±4 kV
EN 61000-4-4 IEEE C37.90.1	Data line	±4 kV	±4 kV	±4 kV	±4 kV
Voltage surges - DC supply connection					
EN 61000-4-5	line/ground	±2 kV	±2 kV	±2 kV	±2 kV
IEEE 1613	line/ground	—	—	—	±5 kV
EN 61000-4-5	line/line	±1 kV	±1 kV	±1 kV	±1 kV
Voltage surges - data line					
EN 61000-4-5	line/ground	±1 kV	±1 kV	±2 kV	±4 kV
Conducted disturbances					
EN 61000-4-6	150 kHz ... 80 MHz	10 V	10 V	10 V	10 V

EMC interference immunity		Standard applications[a]	Marine applications [b]	Railway applications (trackside) [c]	Sub-station applications [d]
Damped oscillation – DC supply connection					
EN 61000-4-12 IEEE C37.90.1	line/ground	—	—	—	2.5 kV
EN 61000-4-12 IEEE C37.90.1	line/line	—	—	—	1 kV
Damped oscillation – data line					
EN 61000-4-12 IEEE C37.90.1	line/ground	—	—	—	2.5 kV
EN 61000-4-12	line/line	—	—	—	±1 kV
Pulse magnetic field					
EN 61000-4-9		—	—	300 A/m	—

a. EN 61131-2, CE, FCC – applies to all devices
b. Merchant Navy (GL, ABS, DNV, KR, LR, RINA) – applies to devices with the certification codes B, E, H, S
c. EN 50121-4 – applies to devices with the certification codes E, H, S
d. EN 61850-3, IEEE 1613 – applies to devices with the certification codes H, S

Immunity		Standard applications[a]	Marine applications [b]	Railway applications (trackside) [c]	Sub-station applications [d]
IEC 60068-2-6, test Fc	Vibration	—	2 Hz ... 13.2 Hz with 1 mm (0.04 in) amplitude	—	—
		—	—	—	2 Hz ... 9 Hz with 3 mm (0.11 in) amplitude
		5 Hz ... 8.4 Hz with 3.5 mm (0.14 in) amplitude	5 Hz ... 8.4 Hz with 3.5 mm (0.14 in) amplitude	5 Hz ... 8.4 Hz with 3.5 mm (0.14 in) amplitude	5 Hz ... 8.4 Hz with 3.5 mm (0.14 in) amplitude
		8.4 Hz ... 150 Hz with 1 g	8.4 Hz ... 150 Hz with 1 g	8.4 Hz ... 150 Hz with 1 g	9 Hz ... 200 Hz with 1 g
		—	—	—	200 Hz ... 500 Hz with 1.5 g
IEC 60068-2-27, test Ea	Shock	15 g at 11 ms	15 g at 11 ms	15 g at 11 ms	15 g at 11 ms

a. EN 61131-2, CE, FCC – applies to all devices
b. Merchant Navy (GL, ABS, DNV, KR, LR, RINA) – applies to devices with the certification codes B, E, H, S
c. EN 50121-4 – applies to devices with the certification codes E, H, S
d. EN 61850-3, IEEE 1613 – applies to devices with the certification codes H, S

Network range

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

AU port	
Length of an AUI cable	max. 50 m

Table 10: AUI port

10/100/1000 Mbit/s twisted pair port	
Length of a twisted pair segment	max. 100 m (328 ft) (for Cat5e cable)

Table 11: Network range: 10/100/1000 Mbit/s twisted pair port

Product code		Wave length	Fiber	System attenuation	Example for F/O cable length[a]	Fiber attenuation	BLP/Dispersion
-F4	MM	820 nm	50/125 µm	0 dB ... 9.5 dB	0 km ... 2.1 km (0 mi ... 1.31 mi)	3.0 dB/km	400 MHz×km
-F4	MM	820 nm	62.5/125 µm	0 dB ... 12.5 dB	0 km ... 3 km (0 mi ... 1.86 mi)	3.2 dB/km	200 MHz×km

Table 12: F/O port 10BASE-FL

a. Including 3 dB system reserve when compliance with the fiber data is observed.

Product code		Wave length	Fiber	System attenuation	Example for F/O cable length[a]	Fiber attenuation	BLP/Dispersion
-M2, -M4	MM	1300 nm	50/125 µm	0 dB ... 8 dB	0 km ... 5 km (0 mi ... 3.11 mi)	1.0 dB/km	800 MHz×km
-M2, -M4	MM	1300 nm	62.5/125 µm	0 dB ... 11 dB	0 km ... 4 km (0 mi ... 2.49 mi)	1.0 dB/km	500 MHz×km

Table 13: F/O port 100BASE-FX

Product code		Wave length	Fiber	System attenuation	Example for F/O cable length[a]	Fiber attenuation	BLP/Dispersion
-S2	SM	1300 nm	9/125 µm	0 dB ... 16 dB	0 km ... 30 km (0 mi ... 18.64 mi)	0.4 dB/km	3.5 ps/(nm×km)
-L2	LH	1550 nm	9/125 µm	7 dB ... 29 dB	24 km ... 86 km (14.91 mi ... 53.44 mi)	0.3 dB/km	19 ps/(nm×km)
-P4	MM POF	650 nm	980/1000 µm	0 dB ... 15.5 dB	0 km ... 0.065 km (0 mi ... 0.04 mi)	200 dB/km	10 MHz×km
-P4	MM HCS	650 nm	200/230 µm	0 dB ... 7 dB	0 km ... 0.14 km (0 mi ... 0.087 mi)	10 dB/km	17 MHz×km
-P9	MM POF	650 nm	980/1000 µm	0 dB ... 14.0 dB	0 km ... 0.055 km (0 mi ... 0.034 mi)	200 dB/km	10 MHz×km
-G2	LH+	1550 nm	9/125 µm	14 dB ... 47 dB	67 km ... 176 km (41.63 mi ... 109.36 mi)	0.25 dB/km	19 ps/(nm×km)

Table 13: F/O port 100BASE-FX

a. Including 3 dB system reserve when compliance with the fiber data is observed.

Product code M-FAST-SFP-...		Wave length	Fiber	System attenuation	Example for F/O cable length[a]	Fiber attenuation	BLP/Dispersion
-MM/LC...	MM	1310 nm	50/125 µm	0 dB ... 8 dB	0 km ... 5 km (0 mi ... 3.11 mi)	1.0 dB/km	800 MHz×km
-MM/LC...	MM	1310 nm	62.5/125 µm	0 dB ... 11 dB	0 km ... 4 km (0 mi ... 2.49 mi)	1.0 dB/km	500 MHz×km
-SM/LC...	SM	1310 nm	9/125 µm	0 dB ... 13 dB	0 km ... 25 km (0 mi ... 15.53 mi)	0.4 dB/km	3.5 ps/(nm×km)
-SM+/LC...	SM	1310 nm	9/125 µm	10 dB ... 29 dB	25 km ... 65 km (15.53 mi ... 40.39 mi)	0.4 dB/km	3.5 ps/(nm×km)

Table 14: Fiber port 100BASE-FX (SFP fiber optic Fast Ethernet Transceiver)

Product code M-FAST-SFP-...		Wave length	Fiber	System attenuation	Example for F/O cable length[a]	Fiber attenuation	BLP/Dispersion
-LH/LC...	SM	1550 nm	9/125 µm	10 dB ... 29 dB	47 km ... 104 km (29.20 mi ... 64.62 mi)	0.25 dB/km	19 ps/(nm×km)
-LH/LC...	SM	1550 nm	9/125 µm	10 dB ... 29 dB	55 km ... 140 km (14.29 mi ... 86.99 mi)	0.18 dB/km[b]	18 ps/(nm×km)

Table 14: Fiber port 100BASE-FX (SFP fiber optic Fast Ethernet Transceiver)

a. Including 3 dB system reserve when compliance with the fiber data is observed.
b. With ultra-low-loss optical fiber.

Product code M-SFP-...		Wave length	Fiber	System attenuation	Example for F/O cable length[a]	Fiber attenuation	BLP[b]/Dispersion
-SX/LC...	MM	850 nm	50/125 µm	0 dB ... 7.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	3.0 dB/km	400 MHz×km
-SX/LC...	MM	850 nm	62.5/125 µm	0 dB ... 7.5 dB	0 km ... 0.275 km (0 mi ... 0.17 mi)	3.2 dB/km	200 MHz×km
-MX/LC...	MM	1310 nm	50/125 µm	0 dB ... 12 dB	0 km ... 1.5 km (0 mi ... 0.93 mi)	1.0 dB/km	800 MHz×km
-MX/LC...	MM	1310 nm	62,5/125 µm	0 dB ... 12 dB	0 km ... 0.50 km (0 km ... 0.31 mi)	1,0 dB/km	500 MHz×km
-LX/LC...	MM	1310 nm[c]	50/125 µm	0 dB ... 10.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	800 MHz×km
-LX/LC...	MM	1310 nm[d]	62.5/125 µm	0 dB ... 10.5 dB	0 km ... 0.55 km (0 mi ... 0.34 mi)	1.0 dB/km	500 MHz×km
-LX/LC...	SM	1310 nm	9/125 µm	0 dB ... 10.5 dB	0 km ... 20 km (0 mi ... 12.43 mi)[e]	0.4 dB/km	3.5 ps/(nm×km)

Table 15: F/O port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

Product code M-SFP-...		Wave length	Fiber	System attenuation	Example for F/O cable length[a]	Fiber attenuation	BLP[b]/Dispersion
-LX+/LC...	SM	1310 nm	9/125 µm	5 dB ... 20 dB	14 km ... 42 km (8.70 mi ... 26.10 mi)	0.4 dB/km	3.5 ps/(nm×km)
-LH/LC...	LH	1550 nm	9/125 µm	5 dB ... 22 dB	23 km ... 80 km (14.29 mi ... 49.71 mi)	0.25 dB/km	19 ps/(nm×km)
-LH+/LC	LH	1550 nm	9/125 µm	15 dB ... 30 dB	71 km ... 108 km (44.12 mi ... 67.11 mi)	0.25 dB/km	19 ps/(nm×km)
-LH+/LC	LH	1550 nm	9/125 µm	15 dB ... 30 dB	71 km ... 128 km (44.12 mi ... 79.54 mi)	0.21 dB/km (typically)	19 ps/(nm×km)

Table 15: F/O port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

a. Including 3 dB system reserve when compliance with the fiber data is observed.
b. Using the bandwidth-length product is inappropriate for expansion calculations.
c. With F/O adapter compliant with IEEE 802.3-2002 Clause 38 (single-mode fiber offset-launch mode conditioning patch cord).
d. With F/O adapter compliant with IEEE 802.3-2002 Clause 38 (single-mode fiber offset-launch mode conditioning patch cord).
e. Including 2.5 dB system reserve when compliance with the fiber data is observed.

Product code M-SFP-BIDI...		Wave length TX	Wave length RX	Fiber	System attenuation	Example for F/O cable length[a]	Fiber attenuation	Dispersion
Type A LX/LC EEC	SM	1310 nm	1550 nm	9/125 µm	0 dB ... 11 dB	0 km ... 20 km (0 mi ... 12.43 mi)	0.4 dB/km	3.5 ps/(nm×km)
Type B LX/LC EEC	SM	1550 nm	1310 nm	9/125 µm	0 dB ... 11 dB	0 km ... 20 km (0 mi ... 12.43 mi)	0.25 dB/km	19 ps/(nm×km)

Table 16: F/O port (bidirectional Gigabit Ethernet SFP transceiver)

Product code M-SFP-BIDI...		Wave length TX	Wave length RX	Fiber	System attenuation	Example for F/O cable length[a]	Fiber attenuation	Dispersion
Type A LH/LC EEC	LH	1490 nm	1590 nm	9/125 µm	5 dB ... 24 dB	23 km ... 80 km (14.29 mi ... 49.71 mi)	0.25 dB/km	19 ps/(nm×km)
Type B LH/LC EEC	LH	1590 nm	1490 nm	9/125 µm	5 dB ... 24 dB	23 km ... 80 km (14.29 mi ... 49.71 mi)	0.25 dB/km	19 ps/(nm×km)

Table 16: F/O port (bidirectional Gigabit Ethernet SFP transceiver)

a. Including 3 dB system reserve when compliance with the fiber data is observed.

MM = Multimode, SM = Singlemode, LH = Singlemode Longhaul

Basic modules: Power consumption/power output, supply voltage

Note: For the extended temperature range, use suitable modules and transceivers. You will identify these components by the “EEC” name extension or the open variant product code “E” (postion 15).

Basic module	Power consumption	Power output	Supply voltage
MS20-0800...A...	5.0 W	17.1 Btu	18 V DC ... 32 V DC
MS20-0800...C... MS20-0800...E...	7.4 W	25.4 Btu (IT)/h	18 V DC ... 60 V DC
MS30-0802...A...	5.6 W	19.2 Btu (IT)/h	18 V DC ... 32 V DC
MS30-0802...C... MS30-0802...E...	8.6 W	29.6 Btu (IT)/h	18 V DC ... 60 V DC
MS20-1600...A...	12.0 W	40.0 Btu (IT)/h	18 V DC ... 32 V DC
MS20-1600...C... MS20-1600...E...	15.6 W	52.2 Btu (IT)/h	18 V DC ... 60 V DC
MS30-1602...A...	12.6 W	41.1 Btu (IT)/h	18 V DC ... 32 V DC
MS30-1602...C... MS30-1602...E...	16.8 W	56.7 Btu (IT)/h	18 V DC ... 60 V DC
MS20-2400...A...	12.0 W	40.0 Btu (IT)/h	18 V DC ... 32 V DC
MS20-2400...C... MS20-2400...E...	16.8 W	56.7 Btu (IT)/h	18 V DC ... 60 V DC
MS30-2402...A...	12.6 W	42.1 Btu (IT)/h	18 V DC ... 32 V DC
MS30-2402...C... MS30-2402...E...	18.0 W	60.9 Btu (IT)/h	18 V DC ... 60 V DC

Media modules: Power consumption, Power output, operating temperature surrounding air, order numbers

Module	Power consumption	Power output	Operating temperature of the ambient air	Order number
MM2 media modules:				
MM2-4TX1	0.8 W	2.8 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 722-101
MM2-4TX1-EEC	0.8 W	2.8 Btu (IT)/h	-40 °C ... +70 °C (+32 °F ... +140 °F)	943 722-151
MM2-4FXM3	6.8 W	23.2 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 721-101
MM2-2FXM3/2TX1	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 720-101
MM2-2FXM2	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 718-101
MM2-2FXS2	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 719-101
MM3 media modules:				

Table 17: Media modules: Power input/output, temperature, order numbers

Module	Power consumption	Power output	Operating temperature of the ambient air	Order number
MM3-2AUI	3.4 W	11.6 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 840-101
MM3-4FLM4	5.0 W	17.1 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 760-101
MM3-2FLM4 / 2TX1-RT	5.0 W	17.1 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 117-004
MM3-4TX5	0.8 W	2.8 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 841-101
MM3-4TX1-RT	0.8 W	2.8 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 117-001
MM3-1FXM2/3TX1	2.3 W	7.9 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 839-101
MM3-2FXM2/2TX1	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 761-101
MM3-2FXM2/2TX1-EEC	3.8 W	13.0 Btu (IT)/h	-40 °C ... +70 °C (+32 °F ... +140 °F)	943 761-151
MM3-2FXM2 / 2TX1-RT	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 117-002
MM3-2FXM4/2TX1	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 837-101
MM3-4FXM2	6.8 W	23.2 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 764-101
MM3-4FXM4	6.8 W	23.2 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 835-101
MM3-1FXS2/3TX1	2.3 W	7.9 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 838-101
MM3-1FXS2 / 3TX1 EEC	2.3 W	7.9 Btu (IT)/h	-40 °C ... +70 °C (+32 °F ... +140 °F)	943 838-151
MM3-2FXS2/2TX1	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 762-101
MM3-2FXS2/2TX1 EEC	3.8 W	13.0 Btu (IT)/h	-40 °C ... +70 °C (+32 °F ... +140 °F)	943 762-151
MM3-4FXS2	6.8 W	23.2 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 836-101
MM3-1FXL2/3TX1	3.4 W	11.6 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 763-101
MM4 media modules:				
MM4-4TX/SFP	9.0 W	30.8 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 010-001
MM4-2TX/SFP	5.8 W	19.8 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 622-001
Open variant media modules:				
MM20-... 4 TX-/0 FX ports	0.8 W	2.8 Btu (IT)/h	see table 18	see table 18
MM20-... 3 TX-/1 FX ports	2.3 W	7.9 Btu (IT)/h	see table 18	see table 18
MM20-... 2 TX-/2 FX ports	3.8 W	13.0 Btu (IT)/h	see table 18	see table 18
MM20-... 0 TX-/2 FX ports	3.8 W	13.0 Btu (IT)/h	see table 18	see table 18
MM20-... 1 TX-/3 FX ports	5.3 W	18.1 Btu (IT)/h	see table 18	see table 18

Table 17: Media modules: Power input/output, temperature, order numbers

Module	Power consumption	Power output	Operating temperature of the ambient air	Order number
MM20-... 0 TX-/4 FX ports	6.8 W	23.2 Btu (IT)/h	see table 18	see table 18
MM20-A8A89999...	3.4 W	11.6 Btu (IT)/h	see table 18	see table 18
MM20-F4F4F4F4...	5.0 W	17.1 Btu (IT)/h	see table 18	see table 18
MM20-Z6Z6Z6Z6...	8.0 W	27.3 Btu (IT)/h	see table 18	see table 18
MM20-P9P9P9P9SAHH	8.0 W	27.3 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	see table 18
MM20-P9P9T1T1SAHH	5.2 W	17.8 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	see table 18
MM21-T1T1T1T1...	0.8 W	2.8 Btu (IT)/h	see table 18	see table 18
MM21-F4F4T1T1...	5.0 W	17.1 Btu (IT)/h	see table 18	see table 18
MM21-M2M2T1T1...	3.8 W	13.0 Btu (IT)/h	see table 18	see table 18
MM21-S2S2T1T1...	3.8 W	13.0 Btu (IT)/h	see table 18	see table 18
MM22-T1T1T1T1... - internal operating voltage - external PoE voltage - no PD - 4 × Class 0 PD	 0.8 W 1.3 W 2 W + PDs	 2.8 Btu (IT)/h 4.3 Btu (IT)/h 6.9 Btu (IT)/h	see table 18	see table 18
MM23-T1T1T1T1...SAHH	4.5 W	15.4 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	see table 18
MM23-M2M2T1T1...SAHH	6.0 W	20.5 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	see table 18
MM23-S2S2T1T1...SAHH	5.5 W	18.8 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	see table 18
MM23-F4F4T1T1...SAHH	5.5 W	18.8 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	see table 18
MM24-IOIOIOIO...	7.5 W	25.6 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	see table 18
MM30-O7O7O7O7...	9.0 W	30.8 Btu (IT)/h	see table 18	see table 18
MM30-O7O79999...	5.8 W	19.8 Btu (IT)/h	see table 18	see table 18
MM33-O7O79999...SAHH	7.5 W	25.6 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	see table 18
Extender module:				
MB20	0 W	0 Btu (IT)/h	0 °C ... +60 °C (+32 °F ... +140 °F)	943 733-102

Table 17: Media modules: Power input/output, temperature, order numbers

Open variant product code

As an alternative to the order number (see table 17, last column) you can use the product code. This gives you a wider range of variants when selecting the media module that is specially tailored to your requirements. The product code of your media module is a combination of the desired product characteristics in accordance with the following table. You find the short designation in the “Characteristic value” column.

Example: Product code MM30-O7O7O7O7... = media module 1000 Mbit/s with four Gigabit Ethernet combo ports (4 SFP ports or alternatively 4 TP ports RJ45). This example corresponds to the MM4-4TX/SFP module with the order number 943 010-001.

Position	Characteristic	Characteristic value	Property
1 ... 4	Product	MM20	Media module 10/100 Mbit/s (Standard)
		MM22	Media module 10/100 Mbit/s (Power over Ethernet)
		MM23	Media module 10/100 Mbit/s (PTP version 2)
		MM24	MICE digital I/O module
		MM30	Media module 1000 Mbit/s (Standard)
		MM33	Media module 1000 Mbit/s (PTP version 2)
5	- (hyphen)	-	
6 ... 7	1. Port (Medium/ Connector)	T1	Twisted Pair (TX) / RJ45
		T5	Twisted Pair (TX) / M12
		M2	Multimode FX DSC (100 Mbit/s)
		M3	Multimode FX MTRJ (100 Mbit/s)
		M4	Multimode FX ST (100 Mbit/s)
		S2	Singlemode FX DSC (100 Mbit/s)
		S4	Singlemode FX ST (100 Mbit/s)
		L2	Singlemode Long Haul FX DSC (100 Mbit/s)
		G2	Singlemode Long Haul FX DSC 200 km (124.27 mi) (100 Mbit/s)
		F4	Multimode FL ST (10 Mbit/s)
		P9	POF FX SCRJ (100 Mbit/s)
		O7	Combo port Gigabit Ethernet (SFP 1000 Mbit/s)
		A8	AUI Sub-D
		Z6	F/O / SFP slot (100 Mbit/s)
		IO	4 digital inputs, 4 digital outputs
8 ... 9	2. Port (Medium/ Connector)	...	See items 6 ... 7
10 ... 11	3. Port (Medium/ Connector)	...	See items 6 ... 7
		99	Empty
12 ... 13	4. Port (Medium/ Connector)	...	See items 6 ... 7
		99	Empty
14	Temperature range	S	Standard: Operation 0 °C ... +60 °C (+32 °F ... +140 °F) Storage: -40 °C ... +70 °C (-40 °F ... +158 °F)
		T	Extended: Operation -40 °C ... +70 °C (-40 °F ... +158 °F) Storage: -40 °C ... +85 °C (-40 °F ... +185 °F)
		E	Extended: Operation -40 °C ... +70 °C (-40 °F ... +158 °F) Storage: -40 °C ... +85 °C (-40 °F ... +185 °F), with Conformal Coating

Table 18: Combination options of the MM20/MM30 media module variants

Position	Characteristic	Characteristic value	Property
15	Approvals	A	CE, UL 508, ISA 12.12.01 Class I Division 2
		B	CE, UL 508, ISA 12.12.01 Class I Division 2, GL, ATEX Zone 2
		E	CE, UL 508, GL, EN 50121-4
		H	CE, UL 508, ISA 12.12.01 Class I Division 2, GL, IEC 61850-3, IEEE 1613,EN 50121-4
		S	CE, UL 508, GL, IEC 61850-3, IEEE 1613, EN 50121-4
		Y	CE, UL 508
		Z	CE

Table 18: Combination options of the MM20/MM30 media module variants

Interfaces

MICE MS20-..., MS30-...	V.24 port: external management, AutoConfiguration Adapter ACA11 2 terminal blocks 4-pin: 1 × signal contact 1 × power supply USB: ACA21-USB or ACA22-USB (EEC)
MICE MS20-...E..., MS30-...E...	V.24 port: external management, AutoConfiguration Adapter ACA11 2 terminal blocks 4-pin: 1 × signal contact 1 × power supply USB: ACA21-USB or ACA22-USB (EEC)
MM2 media modules	See “MM2 media modules” on page 33.
MM3 media modules	See “MM3 media modules” on page 34.
MM4 media modules	See “MM4 media modules” on page 35.

Scope of delivery

Amount	Article
1 ×	Device
2 ×	4-pin terminal block for supply voltage (MS20-.../MS30-...)
1 ×	6-pin terminal block for the supply voltage (MS20-...E.../MS30-...E..)
1 ×	ML-MS2/MM labels
1 ×	Installation user manual

Accessories

Note that products recommended as accessories may have different characteristics to those of the device, which may limit the application range of the overall system. For example, if you add an accessory with IP20 to a device with IP65, the degree of protection of the overall system is reduced to IP20.

Designation	Order number
Fast Ethernet SFP transceiver	
M-FAST SFP-MM/LC	943 865-001
M-FAST SFP-MM/LC EEC	943 945-001
M-FAST SFP-SM/LC	943 866-001
M-FAST SFP-SM/LC EEC	943 946-001
M-FAST SFP-SM+/LC	943 867-001
M-FAST SFP-SM+/LC EEC	943 947-001
M-FAST SFP-LH/LC	943 868-001
M-FAST SFP-LH/LC EEC	943 948-001
Gigabit Ethernet SFP transceiver	
M-SFP-TX/RJ45	943 977-001
M-SFP-SX/LC	943 014-001
M-SFP-SX/LC-EEC	943 896-001
M-SFP-MX/LC	942 035-001
M-SFP-LX/LC	943 015-001
M-SFP-LX/LC-EEC	943 897-001
M-SFP-LX+/LC	942 023-001
M-SFP-LX+/ LC EEC	942 024-001
M-SFP-LH/LC	943 042-001
M-SFP-LH/LC-EEC	943 898-001
M-SFP-LH+/LC	943 049-001
Bidirectional Gigabit Ethernet SFP transceiver	
M-SFP-BIDI Type A LX/LC EEC	943 974-001
M-SFP-BIDI Type B LX/LC EEC	943 974-002
M-SFP-BIDI Type A LH/LC EEC	943 975-001
M-SFP-BIDI Type B LH/LC EEC	943 975-002
M-SFP-BIDI Bundle LX/LC EEC (Type A + B)	943 974-101
M-SFP-BIDI Bundle LH/LC EEC (Type A + B)	943 975-101

Other accessories	Order number
AutoConfiguration Adapter ACA11-EEC	943 751-002
AutoConfiguration Adapter ACA22-USB (EEC)	942 124-001
Terminal cable	943 301-001
4-pin terminal block (50 pcs.)	943 845-004
6-pin terminal block (50 pcs.)	943 845-006
Rail Power Supply RPS 30	943 662-003
Rail Power Supply RPS 80 EEC	943 662-080
Rail Power Supply RPS 120 EEC (CC)	943 662-121
Rail Power Supply RPS60/48V EEC	943 952-001
ML-MS2/MM labels	943 767-001

Other accessories	Order number
ML-MS3 labels	943 768-001
Network management software Industrial HiVision	943 156-xxx
OPC server software HiOPC	943 055-001

Underlying technical standards

Name	
EN 50121-4	Railway applications – EMC – Emission and immunity of the signaling and telecommunications apparatus (Rail Trackside)
EN 50155	Declaration (Railway)[ab]
EN 55032	Electromagnetic compatibility of multimedia equipment – Emission Requirements
IEC/EN IEC 60079-0 IEC/EN 60079-7 IEC/EN IEC 60079-15	Explosive atmosphere
IEC/EN 62368-1	Equipment for audio/video, information and communication technology - Part 1: safety requirements
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61131-2	Programmable controllers – Part 2: Equipment requirements and tests
FCC 47 CFR Part 15	Code of Federal Regulations
DNVGL-CG-0339	Environmental test specification for electrical, electronic and programmable equipment and systems.
IEC/EN 61850-3	Communication networks and systems for power utility automation - Part 3: General requirements.
IEEE 802.1D	Media access control (MAC) bridges (includes IEEE 802.1p Priority and Dynamic Multicast Filtering, GARP, GMRP)
IEEE 802.1D-1998, IEEE 802.1D-2004	Media access control (MAC) bridges (includes IEEE 802.1p Priority and Dynamic Multicast Filtering, GARP, GMRP)
IEEE 802.1Q	Virtual LANs (VLANs, MRP, Spanning Tree)
IEEE 802.1Q	Virtual Bridged Local Area Networks (VLAN Tagging, GVRP)
IEEE 802.1w	Rapid Reconfiguration
IEEE 802.3	Ethernet
IEEE 1613	IEEE Standard Environmental and Testing Requirements for Communication Networking Devices in Electric Power Substations
CSA C22.2 No. 213	Canadian National Standard(s) for Nonincendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations
UL 508	Safety for Industrial Control Equipment

Table 19: List of the technical standards

a. Devices with C specification (see product code position 16 in table 1)
(MS20-0800ECCP, MS20-1600ECCP)
b. Restriction: Electrical isolation on voltage input: see table entry „Isolating voltage between operating voltage connectors and casing“ in chapter “Technical data” on page 67

RFC 768	UDP	RFC 1769	SNTP
RFC 783	TFTP	RFC 1907	MIB2
RFC 791	IP	RFC 1945	HTTP/1.0
RFC 792	ICMP	RFC 2131	DHCP
RFC 793	TCP	RFC 2132	DHCP Options
RFC 826	ARP	RFC 2236	IGMPv2
RFC 951	BOOTP	RFC 2239	MAU-MIB
RFC 1112	IGMPv1	RFC 3411	SNMP Framework
RFC 1157	SNMPv3	RFC 3412	SNMP MDP
RFC 1155	SMIv1	RFC 3413	SNMP Applications
RFC 1213	MIB2	RFC 3414	SNMP USM
RFC 1493	Dot1d	RFC 3415	SNMP VACM
RFC 1542	BOOTP Extensions	RFC 2613	SMON
RFC 1757	RMON	RFC 2674	Dot1p/Q

Table 20: List of RFCs

The device generally fulfills the technical standards named in their current versions.
The device has an approval based on a specific standard exclusively if the approval indicator appears on the device casing.
If your device has a shipping approval according to DNV, you find the approval mark printed on the device label. You will find out whether your device has other shipping approvals on the Hirschmann website at www.hirschmann.com in the product information.

A Further support

Technical questions

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

You find the addresses of our partners on the Internet at http://www.hirschmann.com.

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