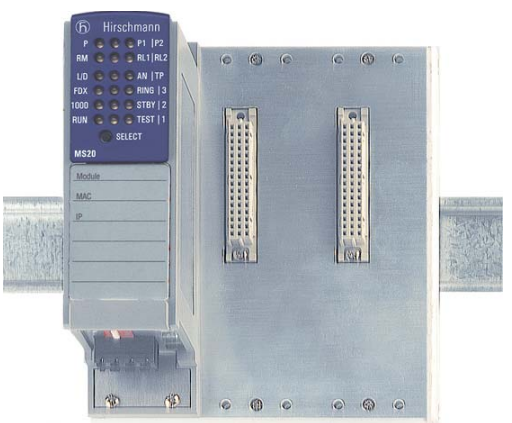
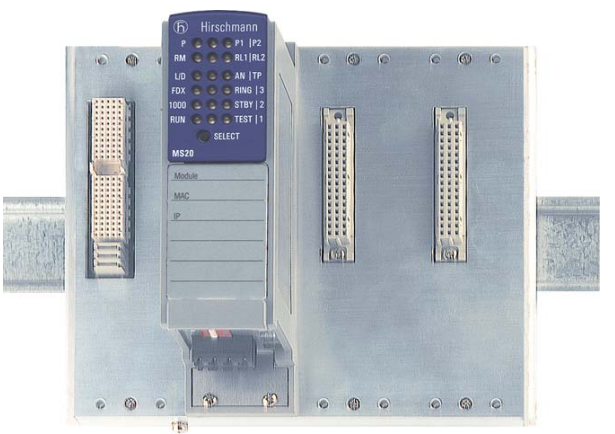
HIRSCHMANN
A BELDEN BRAND

User Manual

Installation
Industrial ETHERNET Switch MICE
MS20/MS30



MICE MS20



MICE MS30

03530001110713000

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You can get the latest version of this manual on the Internet at the Hirschmann product site (www.hirschmann.com).

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Contents

Safety instructions

Certified usage

Only use the device for application cases that are described in the Hirschmann product information, including this manual. Only operate the device according to the technical specifications.

Supply voltage

For safety reasons the devices have been designed to operate at low voltages. Thus, they may only be connected to the supply voltage connections and to the signal contact with SELV circuits with the voltage restrictions in accordance with IEC/EN 60950-1.
The supply voltage is electrically isolated from the housing.

☐ Use undamaged parts.

☐ 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).

☐ 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.

☐ Relevant for Europe
for devices installed in explosive gas atmospheres according to ATEX directive 94/9 EC:
Make sure that the device has the following label:
⟨Ex⟩ II 3G (... followed by additional specifications).

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

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

Zone 2: Explosive Atmosphere
or 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 VDC;
4.0 – 1.2 A; max. 72 W

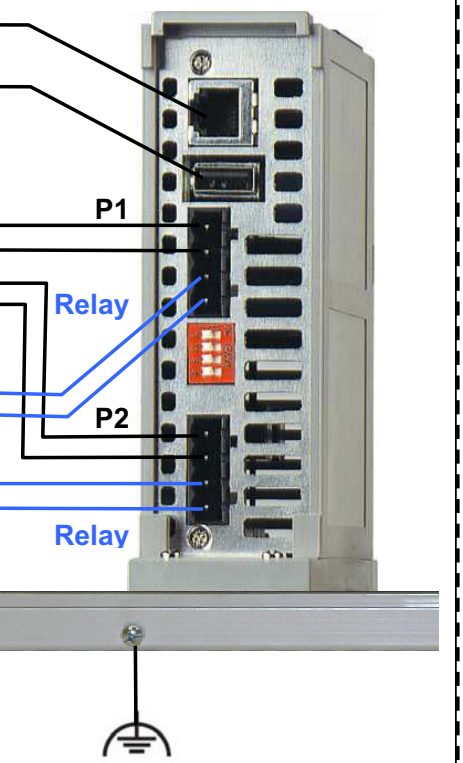
Relay contacts:
Equipment with nonincendive field wiring parameters.
Polarity is not relevant.
THE RELAY TERMINALS ARE DEPENDENT UPON THE FOLLOWING ENTITY PARAMETERS: [1] [2]

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 earth conductor 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 the directive 94/9/EC or Class I Division 2 Hazardous Locations		HIRSCHMANN A BELDEN BRAND
Version: 2	Document No.: 000160011DNR	Page 1/4

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

Zone 2: Explosive Atmosphere
or Class I Division 2 Groups A, B, C, D Hazardous Location

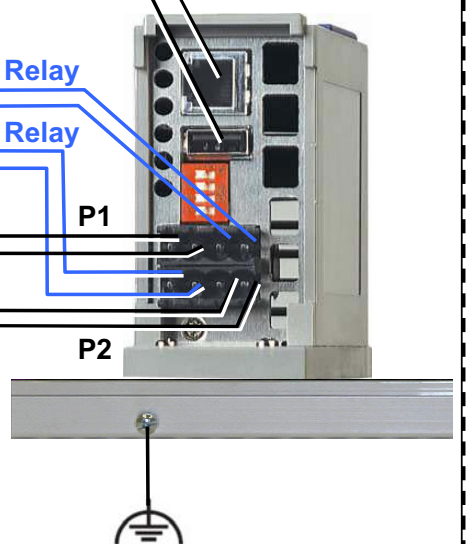
WARNING! The USB connection and the V.24 Interface connection are for temporary connection only, for maintenance use. Do not use, connect or disconnect unless the area is known to be non-hazardous. Connection or disconnection in an explosive atmosphere could result in an explosion!

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

Relay contacts:
Equipment with nonincendive 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 VDC;
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 earth conductor must be at least the same wire size (mm² or AWG) as the supply conductors.

For Use in explosive atmospheres under the European directive 94/9/EC:

Applied Standards: **EN60079-0, 2009**
EN60079-15, 2010
EN60079-11, 2012

The Use in Hazardous Locations with explosive atmospheres is only allowed for MS20 or MS30 model No´s. which are individually labelled

"8 II 3G" and "Ex nA ic IIC T4 Gc" and "DEKRA 13 ATEX 0019X" for MSxx devices,
"8 II 3G" and "Ex nA IIC T4 Gc" and "DEKRA 13 ATEX 0019X" for MB20 devices.

Special conditions for safe use

1. **The modules shall be installed in a suitable enclosure in accordance with EN60079-15, taking into account the environmental conditions under which the equipment will be used.**

2. **Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 119 V.**

3. **When the temperature under rated conditions exceeds 70 °C at the cable or conduit entry point, or 80 °C at the branching point of the conductors, the temperature specification of the selected cable shall be in compliance with the actual measured temperature values.**

Note [1]):
The nonincendive field wiring circuit concept allows interconnection of nonincendive field wiring apparatus and associated nonincendive 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.

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).

For Use in Hazardous Locations Class I Division 2 Groups A, B, C, D:
Applied standard: ANSI/ISA 12.12.01-2011.

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

"FOR USE IN HAZARDOUS LOCATIONS"

Nonincendive 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 or 75 °C copper (CU) wire only.

Only for connection to a Class 2 power supply.

Note [2]):
The nonincendive field wiring circuit concept allows interconnection of nonincendive field wiring apparatus and associated nonincendive 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).

Shielded ground

The shielded ground wire of the twisted pairs lines is connected to the front panel as a conductor.

☐ Beware of possible short circuits when connecting a cable section with conductive shield braiding.

Housing

⚠ WARNING

ELECTRIC SHOCK

Never insert sharp objects (small screwdrivers, wires, etc.) into the inside of the device.

Never insert sharp objects (small screwdrivers, wires, etc.) into the connection terminals for the supply voltage or the signal contact, and do not touch the terminals!

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

⚠ CAUTION

OVERHEATING OF THE DEVICE

When installing the device, ensure that the ventilation slots are not covered. Make sure there is at least 10 cm (3.94 in) of space.

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

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

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 10 cm of space in front of the ventilation slits of the housing.

☐ The device has to be mounted in an upright position (see figure 18).

☐ If you are operating the device in a living area or office environment, only operate it in switch cabinets with fire protection characteristics in accordance with EN 60950-1.

Environment

- ☐ Only operate the device at the specified ambient temperature (temperature of the ambient air at a distance of up to 5 cm from the device) and at the specified relative humidity.
  See “General technical data” on page 52.
- ☐ When you are selecting the installation location, make sure you observe the climatic threshold values specified in the technical data.
- ☐ Only to be used in an environment with the pollution degree specified in the technical data.

Qualification requirements for personnel

Qualified personnel as understood in this manual and the warning signs, are persons who are familiar with the setup, assembly, startup, and operation of this product and are appropriately qualified for their job. This includes, for example, those persons who have been:

- ▶ trained or directed or authorized to switch on and off, to ground and to label power circuits and devices or systems in accordance with current safety engineering standards;
- ▶ trained or directed in the care and use of appropriate safety equipment in accordance with the current standards of safety engineering;
- ▶ trained in providing first aid.

General safety instructions

This device is operated by electricity. You must follow precisely the prescribed safety requirements for the voltage connections in this document.
See “Supply voltage” on page 5.

Non-observance of these safety instructions can cause material damage and/or injuries.

- ▶ Only appropriately qualified personnel should work on this device or in its vicinity. The personnel must be thoroughly familiar with all the warnings and maintenance procedures outlined in this operating manual.
- ▶ The proper and safe operation of this device depends on proper handling during transportation, proper storage and assembly, and conscientious operation and maintenance procedures.
- ▶ Never start operation with damaged components.
- ▶ Only use the devices in accordance with this manual. In particular, observe all warnings and safety-related information.
- ▶ Any work that may be required on the electrical installation may only be carried out by personnel trained for this purpose.

Note: LED or LASER components in compliance with IEC 60825-1 (2007):
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

- ☐ Make sure that the electrical installation meets local or nationally applicable safety regulations.

CE marking

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

2011/65/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.

2004/108/EC (EMC)
Directive of the European Parliament and the council for standardizing the regulations of member states with regard to electromagnetic compatibility.

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

The product can be used in living areas (living area, place of business, small business) and in industrial areas.

- Interference immunity: EN 61000-6-2
- Emitted interference: EN 55022

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

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; (2) this device must accept any interference received, including interference that may cause undesired operation.
Appropriate testing has established that this device fulfills the requirements of a class A digital device in line with part 15 of the FCC regulations.
These requirements are designed to provide sufficient protection against interference when the device is being used in a business environment. The device creates and uses high frequencies and can also radiate high frequencies, and if it is not installed and used in accordance with this operating manual, it can cause radio transmission interference. The use of this device in a living area can also cause interference, and in this case the user is obliged to cover the costs of removing the interference.

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 on the CD/DVD supplied:

- Installation user manual
- Basic Configuration user manual
- Redundancy Configuration user manual
- Reference manual for the graphical user interface
- Command Line Interface user manual

The Industrial HiVision Network Management Software provides you with additional options for smooth configuration and monitoring:

- Simultaneous configuration of multiple devices
- Graphical user interface with network layout
- Auto-topology discovery
- Event log
- Event handling
- Client/server structure
- Browser interface
- ActiveX control for SCADA integration
- SNMP/OPC gateway.

Legend

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 between 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
- Voltage range
- Certifications
- Software variant

The MS20/MS30 devices are designed for the special requirements of industrial automation. They meet the relevant industry standards, provide very high operational reliability, even under extreme conditions, and also provide long-term reliability and flexibility.
The devices allow you to set up switched industrial Ethernet networks that conform to the IEEE 802.3 standard.

The devices work without a fan.

The following installation options are available:

- simply snapping them onto a DIN rail

The redundancy concept allows the network to be reconfigured quickly.

There are convenient options for managing the device. Administer your devices via:

- a Web browser
- Telnet

- management software (such as Industrial HiVision)
- a V.24 interface (locally on the device)

The devices provide you with a large range of functions, which the manuals for the operating software inform you about. You will find these manuals as PDF files on the enclosed CD/DVD, or you can download them from the Internet on the Hirschmann product pages (www.hirschmann.com).

The addition, to the MS20/MS30 MICE range, of the RS20/RS30 Open Rail range of switches, the MACH range of backbone switches, the BAT wireless transmission system, the EAGLE security system, and products for the LION control room, provides 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.

Position	Attribute	Ident.	Feature
1 to 4	Product	MS20	Modular Switch without gigabit ports
		MS30	Modular Switch with gigabit ports
5	- (hyphen)	-	
6 to 7	Number of 10/100 Mbit ports	08	8 × 10/100 Mbit Ethernet
		16	16 × 10/100 Mbit Ethernet
		24	24 × 10/100 Mbit Ethernet
8 to 9	Number of 1000 Mbit ports	00	0 × 1000 Mbit Ethernet
		02	2 × 1000 Mbit Ethernet
10	Temperature range	S	Standard 0 °C ... +60 °C
		T	Extended −40 °C ... +70 °C
		E	Extended −40 °C ... +70 °C, Conformal Coating
11	Voltage range	A	18 VDC ... 32 VDC
		C	18 VDC ... 60 VDC
		E	18 VDC ... 60 VDC / 6-pin

Table 1: Combination options of the MS20/MS30 device versions

Position	Attribute	Ident.	Feature
12	Specifications	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 100a 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
13	Software variant	E	Enhanced
		P	Professional

Table 1: Combination options of the MS20/MS30 device versions

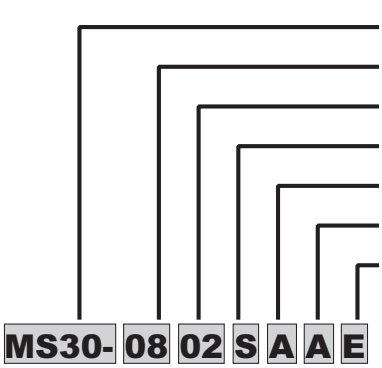
Product code			Product features
			Modular switch with gigabit ports
			8 × 100 Mbit Ethernet ports
			2 × 1000 Mbit Ethernet ports
			Temperature range standard (0 °C to 60 °C)
			Voltage range 18 VDC to 32 VDC
			Specifications CE, UL 508, ISA 12.12.01 Class I Division 2
			Software version enhanced

Table 2: Example for product code: MS30-0802SAAE

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, number of 100 Mbit ports desired, temperature range, voltage range, certificates and software variant can be selected.
MS30	Larger numbers of ports and larger bandwidth requirement, number of 100/1000 Mbit ports desired, 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

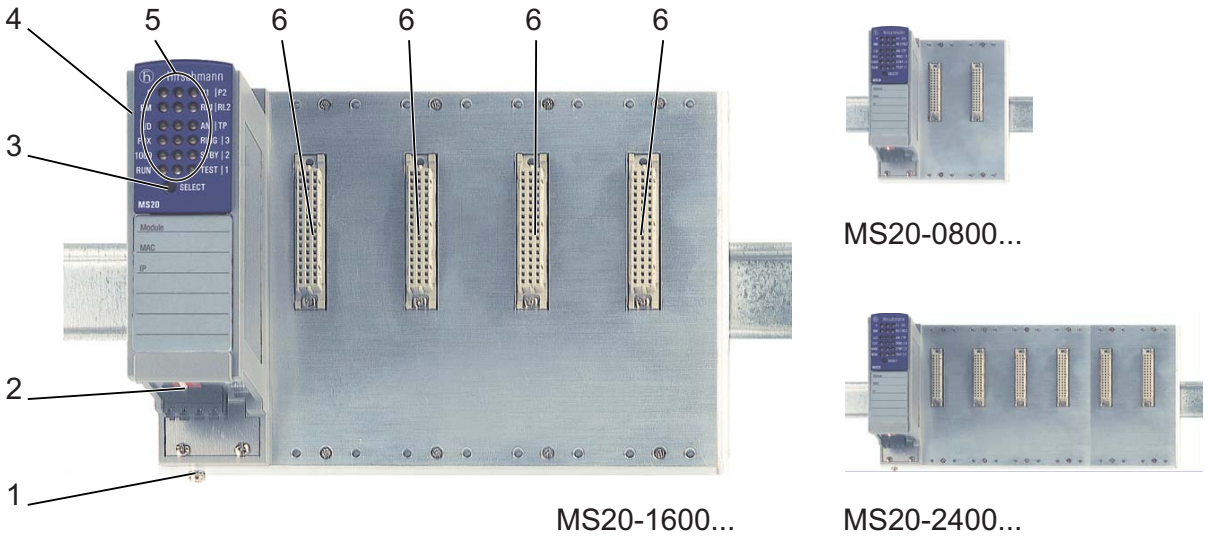


Figure 2: Overview interfaces, display elements and controls of the MS20 -...
1 - Grounding screw
2 - Terminal block, V.24 port, USB port, DIP switch
3 - Key for display status
4 - Switch basic module MS20-...
5 - LEDs for device status, display status
6 - 4 slots for media modules MM2-... or MM3-...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

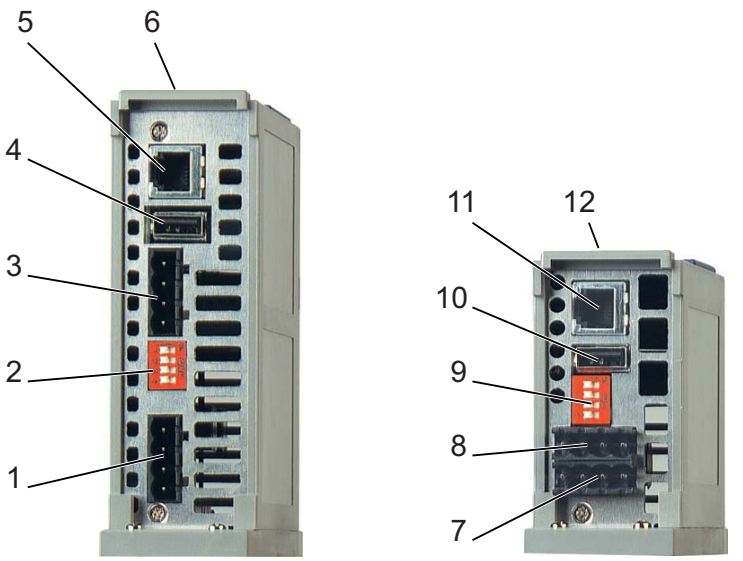


Figure 3: Interfaces of the MS20-... and MS30-... on the bottom of the device
1 - Terminal block (power 2)
2 - DIP switch
3 - Terminal block (power 1)
4 - USB port
5 - V.24 port
6 - MICE MS20/30 switch basic module with 18 to 60 VDC voltage range
7 - Terminal block (power 2)

8 - Terminal block (power 1)
9 - DIP switch
10 - USB port
11 - V.24 port
12 - MICE MS20/30 switch basic module with 18 to 32 VDC voltage range

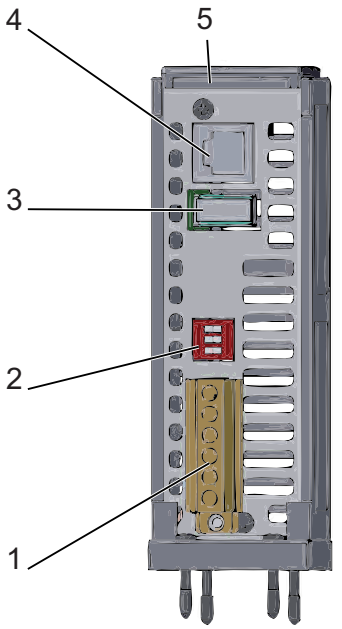


Figure 4: Connections of the MS20-.../MS30-...E on the bottom of the device
1 - Terminal block 6-pin for power and signal contact
2 - DIP switch
3 - USB port
4 - V.24 port
5 - MICE MS20/30-...E... switch basic module with 18 to 60 VDC voltage range / 6-pin

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 MB2-T expansion module

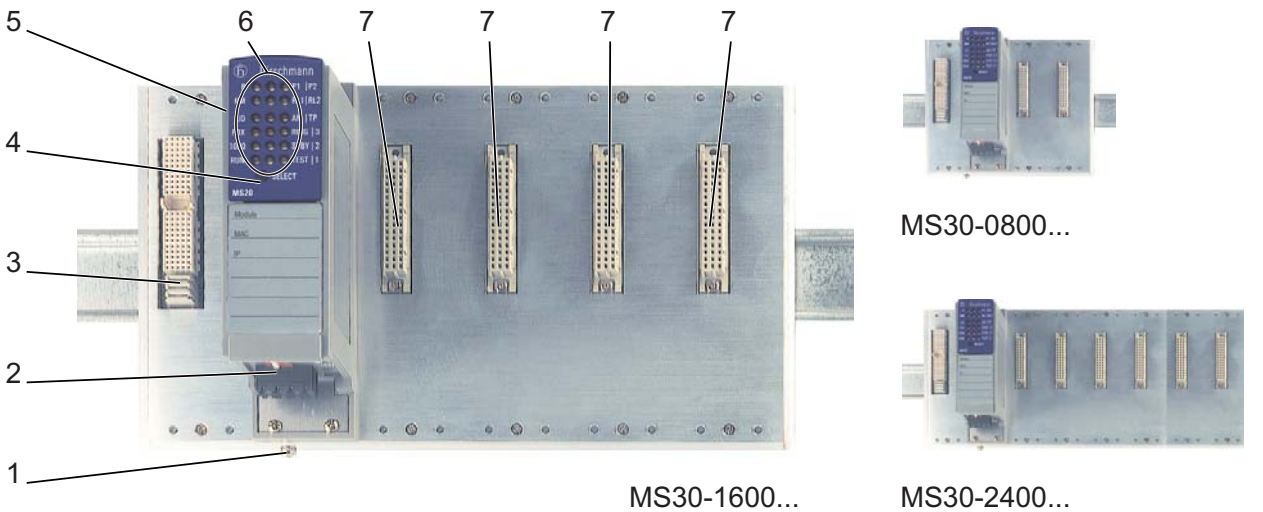


Figure 5: Overview of interfaces, display and operating elements on the MS30
1 - Grounding screw
2 - Terminal block, V.24 port, USB port, DIP switch
3 - Slot for SFP module MM4-TX/SFP
4 - Key for display status
5 - Switch basic module MS30-...
6 - LEDs device status, display status
7 - 4 slots for media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

The figure 3 shows the connections 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 in the

- 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 3: Media connections per MM2 media modules (number and type)

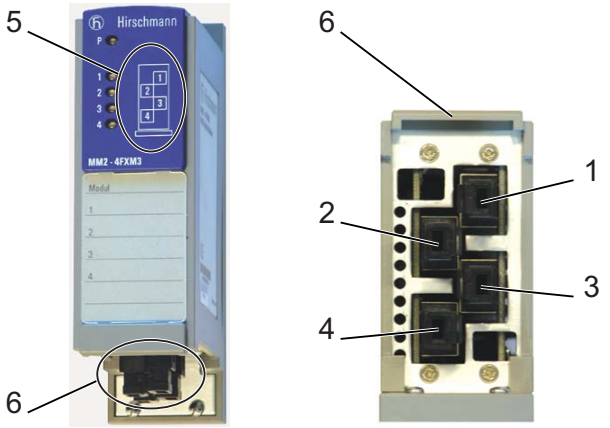


Figure 6: Port assignment
1 - Port 1
2 - Port 2
3 - Port 3
4 - Port 4
5 - Illustration of the port numbers
6 - Bottom side of the device

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

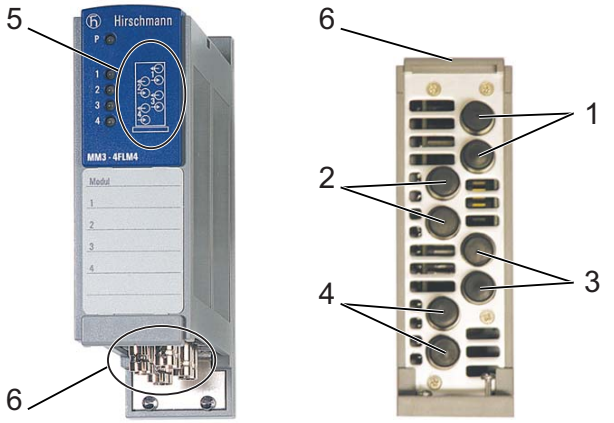


Figure 7: Port assignment
1 - Port 1
2 - Port 2
3 - Port 3
4 - Port 4
5 - Illustration of the port numbers
6 - Bottom side of the device

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 (slot on the left side next to the switch basic module) supports two Gigabit ports.
When you are using an SFP transceiver, you get an optical interface. You thus deactivate the corresponding TP interface.

Note: Only use Hirschmann SFP transceivers.
See “Media modules: power, temperature, order numbers” on page 63.

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

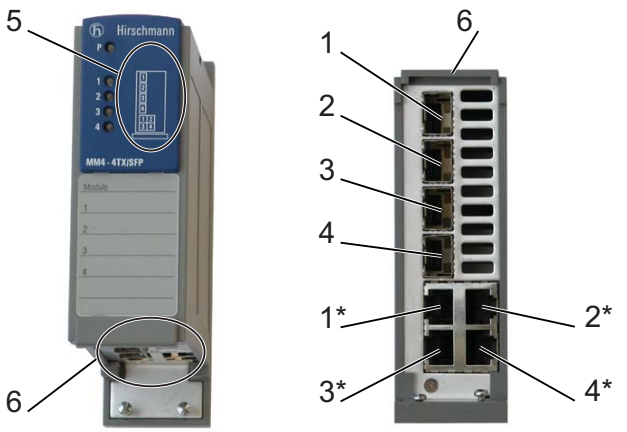


Figure 8: Port assignment
1 - Port 1 (twisted pair)
2 - Port 2 (twisted pair)
3 - Port 3 (twisted pair)
4 - Port 4 (twisted pair)
1 - Port 1* (SFP slot, can be used as alternative to port 1)*
2 - Port 2* (SFP slot, can be used as alternative to port 2)*
3 - Port 3* (SFP slot, can be used as alternative to port 3)*
4 - Port 4* (SFP slot, can be used as alternative to port 4)*
5 - Representation of port numbers
6 - Bottom of 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.

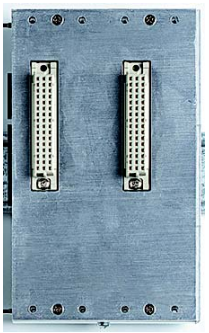


Figure 9: MB20 extender module

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 66.
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 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 10: Display elements on MS20/MS30

1 - Device status

2 - Display status

3 - Port status

1.4.1 Device status

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

P – Power (green LED)	
Glowing green	Internal supply voltage present.
Not glowing	Internal supply voltage is too low.
P1 – Power 1 (green LED)	
Glowing green	Supply voltage 1 is present.
Not glowing	Supply voltage 1 is less than 18 V.
P2 – Power 2 (green LED)	
Glowing green	Supply voltage 2 is present.
Not glowing	Supply voltage 2 is less than 18 V.
RM – Redundancy Manager (green/yellow LED)	
Glowing green	RM function activeredundant port disabled.
Glowing yellow	RM function active, redundant port enabled.
Not glowing	RM function not enabled.
Flashing green	Incorrect configuration of the HIPER-Ring (e.g. the ring is not connected to the ring port).
RUN – BOOT/RUN (green LED)	
Glowing green	System is ready for operation.
Flashing green	System is booting.
Not glowing	System is in reset mode.
RL1 – Relay 1, signal contact (red/yellow LED)	
Glowing red	Signal contact 1 is open, i.e. it is reporting an error.
Glowing yellow	Signal contact 1 is open, the "Manual Setting" is active.
Not glowing	Signal contact 1 is closed, i.e. it is not reporting an error.
RL2 – Relay 2, signal contact (red/yellow LED)	
Glowing red	Signal contact 2 is open, i.e. it is reporting an error.
Glowing yellow	Signal contact 2 is open, the "Manual Setting" is active.
Not glowing	Signal contact 2 is closed, i.e. it is not reporting an error.
RUN, 1 – display saving processes of the AutoConfiguration Adapter (ACA)	
Flashing alternately	Error during saving process.
LED's flash synchronously 2× a second	Loading configuration from the ACA.
LED's flash synchronously 1× a second	Saving the configuration in the ACA.

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

1.4.2 Display status

Every media module has one 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 approx. 2 seconds to switch the meaning of the display. If the button is not pressed for approx. 20 seconds, the the display status changes back to "L/D".

L/D – data, link status (green LED)	
Glowing green	The port LEDs of the media modules display the connection status.
FDX – full duplex (green LED)	
Glowing 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)	
Glowing green	The port LEDs of the media modules display the set transmission speed.
AN – autonegotiation (green LED)	
Glowing green	The port LEDs of the media modules display the port configuration type.
RING – ring port (green LED)	
Glowing green	The port LEDs of the media modules display HIPER-Ring assignment.
STBY – stand-by (green LED)	
Glowing green	The port LEDs of the media modules display the assignment to a redundant coupling of network segments.
TEST – LED test (green LED)	
Glowing green	The status, display status and port status LED test is active. The P1/P2 LEDs glow 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)	
Glowing 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)	
Glowing green	The port LEDs of the media modules display the Power over ETHERNET status.
Not glowing	- No PoE port or PoE disabled. - PoE status "fault".
3 (green LED)	
	Service LED

1.4.3 Port status

These LED's display port-related information. You set the content of the information with the button on the basic module (see on page 29 “Display status”).

1 to 4 – data, link status (green/yellow LED)	
Not glowing	For MM20-A8A89999SAHH (AUI): No valid connection. No DTE voltage at the port.
Glowing 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 to 4 – FDX (green/yellow LED)	
Not glowing	Half-duplex is active.
Glowing green	Full-duplex is active.
1 to 4 – 1000 (green/yellow LED)	
Not glowing	10 Mbit/s is active.
Glowing green	100 Mbit/s is active.
Glowing yellow	1000 Mbit/s is active.
1 to 4 – AUTONEG (green/yellow LED)	
Glowing green	Autonegotiation is active.
1 to 4 – RING PORT (green/yellow LED)	
Glowing green	This port is assigned to the HIPER-Ring.
1 to 4 – STAND-BY (green/yellow LED)	
Glowing green	Connection port for the data line.
Glowing yellow	Connection port for the control line.
Flashing green/yellow	No stand-by partner available.
TP/FO – twisted pair / fiber optic (green/yellow LED)	
Glowing green	The port LEDs of the media modules display the twisted pair ports.
Glowing yellow	The port LEDs of the media modules display the F/O ports.
PoE status (green/yellow LED)	
Not glowing	No PoE port or PoE disabled; PoE status "fault".
Glowing yellow	PoE port searching for terminal device (PD); PoE status "searching".
Glowing green	PoE port supplying terminal device (PD); PoE status "Delivering Power".
1 to 4 – LED TEST (green/yellow LED)	
Not glowing	LED defective.
Flashing green/yellow	LED test is active.

2 Assembly and start-up

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

The following steps should be performed to install and configure a device:

- Unpacking and checking
- Installing the media modules
- Filling out and attaching labels
- Installing the SFP transceivers (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 the device on the DIN rail, grounding
- Connecting the data lines
- Assembly of the MB20 extender module
- Defining the meaning of the display LEDs

2.1 Unpacking and checking

☐ Check whether the package includes all items named in section “Scope of delivery” on page 66.
☐ Check the individual parts for transport damage.

2.2 Installing the 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 11: Attaching the labels

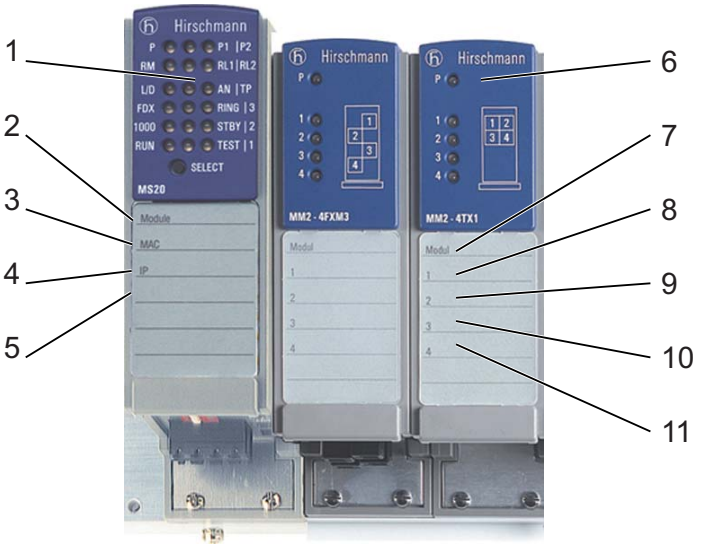


Figure 12: Labels for basic modules and media modules

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

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

2.4 Installing the SFP transceivers (optional)

☐ To attach an SFP transceiver, first remove the protective cap over the socket.
☐ Push the SFP transceiver with the lock closed into the socket until it latches audibly in place.

Note: Only use Hirschmann SFP transceivers.

Figure 13: Installing an SFP transceiver

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 gives you the following options:

DIP switch	Function	State on delivery
RM (redundancy manager) [a]	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]	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]	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)
SW Configuration / DIP Configuration	OFF: Give the software configuration precedence over of the DIP switch position. In this case, the other switch positions are meaningless.	OFF position (SW configuration has precedence)

a. You can use the "RM" and "Stand-by" switches on the 4-pin DIP switch to switch the following functions on and off (see table 7)
b. The "Ringport" switch on the 4-pin DIP switch enables you to select the ring ports for the HIPER-Ring (see table 6)

Switch "Ring port" 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 6: Selecting ring ports for the HIPER-Ring

RM switch position	Stand-by switch position	Ring redundancy	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 7: Switching redundancy mode and stand-by on/off

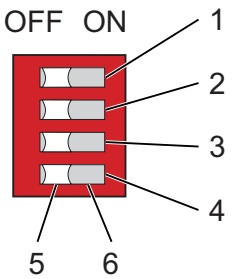


Figure 14: 4-pin DIP switch on the MICE basic module MS20-.../MS30-...
1 - Switch 1, Function: Redundancy Manager (RM)
2 - Switch 2, Function: Ring port
3 - Switch 3, Function: Stand-by
4 - Switch 4, Function: Configuration
5 - Switch position OFF
6 - Switch position ON

☐ 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 7)
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 6)

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 8: 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 9: Switching redundancy mode and stand-by on/off

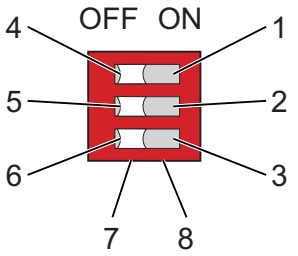


Figure 15: 3-pin DIP switch on the MICE basic module MS20/MS30-...E...
1 - Switch 1, position ON, Function: Redundancy Manager (RM)
2 - Switch 2, position ON, Function: Mod. 1 Port 1 & Mod. 2 Port 1
3 - Switch 3, position ON, Function: Stand-by
4 - Switch 1, position OFF, Function: -
5 - Switch 2, position 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.

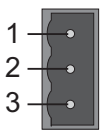
Figure	Pin	Assignment
	1	+ 48 V
	2	—
	3	0 V

Table 10: 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.

2.9.1 Supply voltage

Redundant power supplies can be used. Both inputs are uncoupled. There is no distributed load. With redundant supply, the power supply unit supplies the device only with the higher output voltage. 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.

A break in contact is used to report the following conditions via the potential-free signal contact (relay contact, closed circuit):

- The detected inoperability of at least one of the two voltage supplies (voltage supply 1 or 2 is below the threshold value).
- A continuous detected error in the device (internal supply voltage).
- The detected error of the link status of at least one port. The report of the link status can be masked by the Management for each port. In the default state, link status monitoring is deactivated.
- The temperature of the device is outside the range specified in the threshold values.
- The removal of the ACA.

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 block 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.

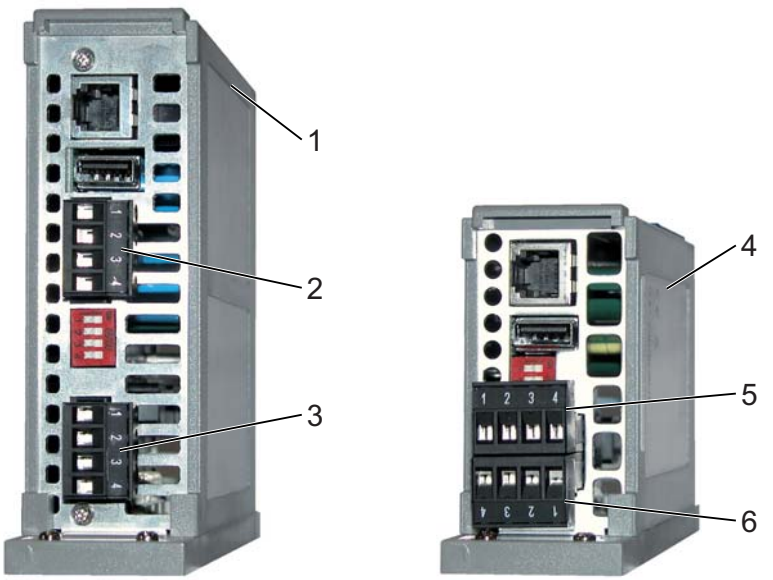


Figure 16: Pin assignment of the 4-pin terminal blocks

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)) have one 6-pin terminal block.

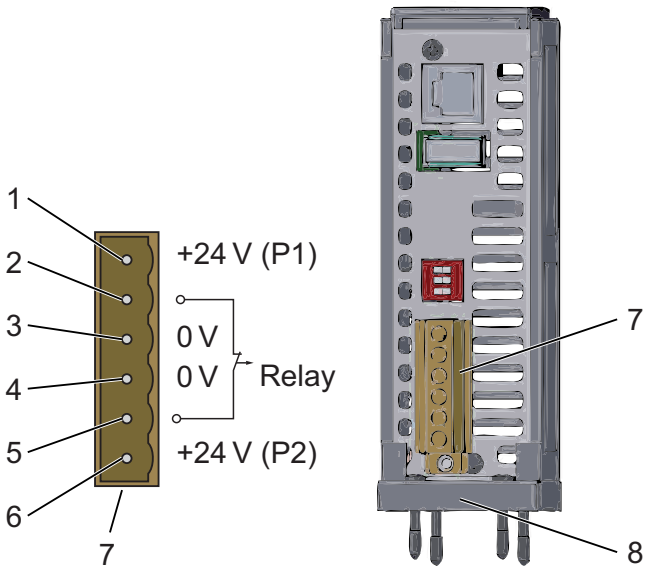


Figure 17: Pin assignment of the 6-pin terminal block

1 - Pin 1 = +24V (P1)
2 - Pin 2 = Relay
3 - Pin 3 = 0 V
4 - Pin 4 = 0 V
5 - Pin 5 = Relay
6 - Pin 6 = +24V (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 Startup procedure

☐ Mount the terminal blocks for the voltage supply and signal contact on the bottom 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 the device on the DIN rail, grounding

2.11.1 Mounting on the DIN rail

☐ Mount the device on a 35 mm DIN rail in accordance with DIN EN 60175.
☐ Attach the upper snap-in guide of the device into the DIN rail and press the device down against the DIN rail until it snaps into place.

Note: The shielding ground of the industrial connectable twisted pair lines is connected to the lower panel as a conductor.

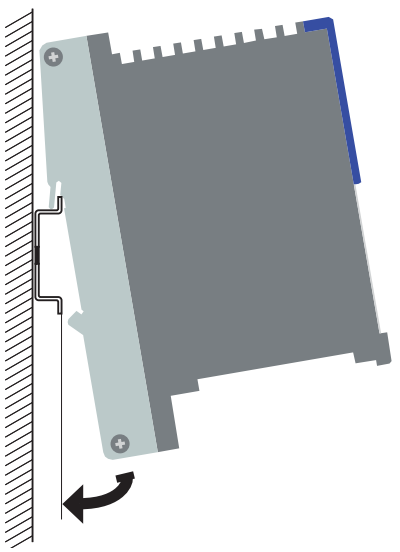


Figure 18: Assembly

2.11.2 Grounding

The lower panel of the device housing is grounded by means of the DIN rail and optionally by means of the separate ground screw (see figure 2).

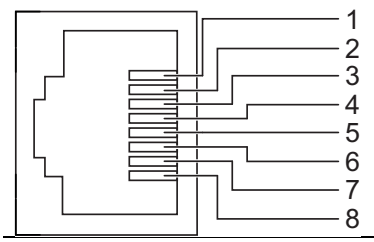
2.12 Connecting the data lines

2.12.1 10/100 Mbit/s twisted pair port

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

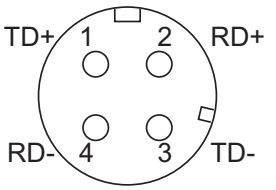
- Autonegotiation
- Autopolarity
- Autocrossing (if autonegotiation is activated)
- 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode

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.



Pin	Function	
1	RD+	Receive path
2	RD−	Receive path
3	TD+	Transmission path
6	TD−	Transmission path
4,5,7,8	—	

Table 11: Pin assignment of the 10/100 Mbit/s twisted pair port, RJ45 socket, MDI-X mode



Pin	Function	
1	TD+	Transmission path
2	RD+	Receive path
3	TD−	Transmission path
4	RD−	Receive path

Table 12: Pin assignment of the 10/100 Mbit/s twisted pair port, M12 socket

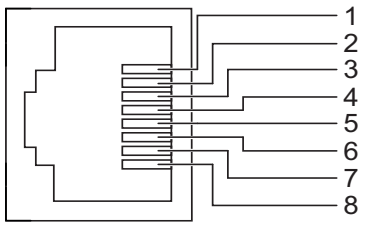
2.12.2 10/100 Mbit/s PoE/PSE port

The 10/100 Mbit/s PoE/PSE port offers you the ability to connect network components 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 socket housing is electrically connected with the front panel.
The PoE voltage is supplied via the free wire pairs (spare-pair powering).



Pin	Function		PoE/PSE voltage
1	RD+	Receive path	—
2	RD−	Receive path	—
3	TD+	Transmission path	—
4	—	—	Plus terminal
5	—	—	Plus terminal
6	TD-	Transmission path	—
7	—	—	Minus terminal
8	—	—	Minus terminal

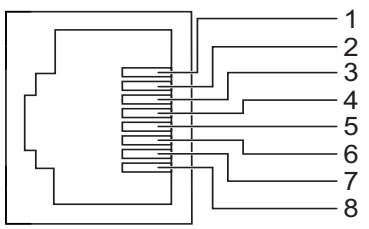
Table 13: Pin assignment of the 10/100 Mbit/s PoE/PSE port, RJ45 socket, MDI-X mode, spare-pair powering

2.12.3 10/100/1000 Mbit/s twisted pair port

The 10/100/1000 Mbit/s twisted pair port offers you the ability 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 socket housing is electrically connected with the front panel.



Pin	Function
1	BI_DB+
2	BI_DB−
3	BI_DA+
4	BI_DD+
5	BI_DD−
6	BI_DA−
7	BI_DC+
8	BI_DC−

Table 14: Pin assignment of the 10/100/1000 Mbit/s twisted pair port, RJ45 socket, MDI-X mode

2.12.4 100 Mbit/s F/O port

This port is an MTRJ, ST, or DSC socket.
The 100 Mbit/s F/O port offers you the ability 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

Note: Make sure that the LH ports are connected exclusively with LH ports, SM ports exclusively with SM ports, and MM ports exclusively with MM ports.

2.12.5 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 100BASE-SX/1000BASE-LX standard.
This port supports:
- Autonegotiation
- Full duplex mode

Delivery state: autonegotiation activated

Note: Make sure that you connect LH ports exclusively with LH ports, SX ports exclusively with SX ports, and LX ports exclusively with LX ports.

1000 Mbit/s F/O ports (LC sockets) enable the connection of terminal devices or independent network segments in compliance with the IEEE 802.3-2000 (ISO/IEC 8802-3:2000) 1000BASE-SX or 1000BASE-LX standards.

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

☐ Install the data lines according to your requirements.

2.12.6 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.

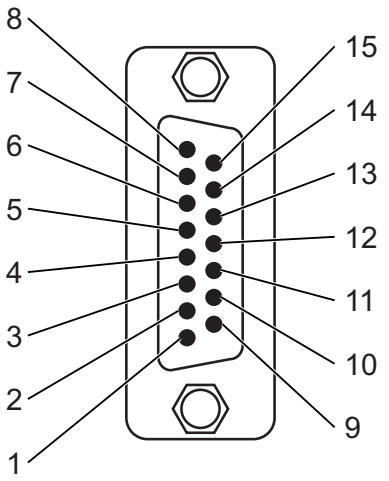


Figure 19: Pin assignment of an AUI interface

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 module as required in order to set up your industrial Ethernet or expand your existing network.

☐ Install the data lines 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

You use the "SELECT" button on the basic module to define the meaning of the LEDs of the media modules. You 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 26.

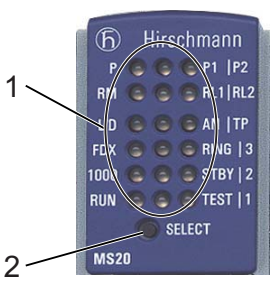


Figure 20: "SELECT" button on the MICE basic modules
1 - Display LEDs
2 - “SELECT” key

3 Basic set-up

The IP parameters must be entered when the device is installed for the first time. The device provides 6 options for configuring IP addresses:

- Entry via V.24 connection
- Entry using the HiDiscovery protocol via the application HiDiscovery or Industrial HiVision
- Configuration via BOOTP
- Configuration via DHCP
- Configuration via DHCP Option 82
- Auto Configuration Adapter

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

Default settings

- IP address: 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: 9,600 Baud
- Ring redundancy: off
- Ethernet ports: link status is not evaluated (signal contact)
- Optical 100 Mbit/s ports: 100 Mbit/s full duplex
  All other ports: autonegotiation
- Redundancy manager switched off
  (DIP switch RM and Stand-by: ON)
- Stand-by coupling switched off
  (DIP switch RM and Stand-by: ON)
  Port 3 = control port, port 4 = coupling port for redundant ring coupling
- Rapid Spanning Tree: on

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 appropriate terminal emulation) or an AutoConfiguration Adapter ACA 11. This enables a connection to the Command Line Interface (CLI) and the system monitor to be made.

VT 100 terminal settings	
Speed	9,600 Baud
Data	8 bit
Stopbit	1 bit
Handshake	off
Parity	none

The socket housing is electrically connected to the front panel of the device. The V24 interface is not electrically isolated from the supply voltage.

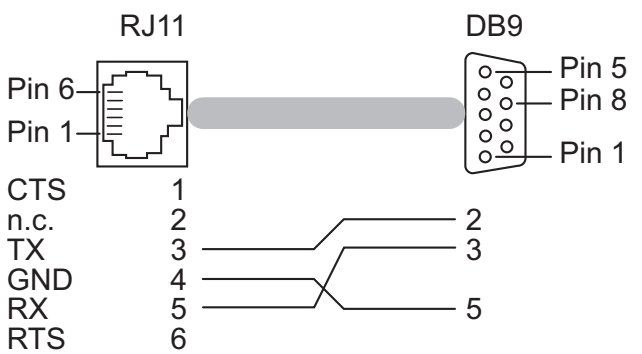


Figure 21: Pin assignment of the V24 interface

Note: You will find the order number for the terminal cable, which is ordered separately, in the Technical Data chapter (see on page 52 “Technical data”).

Monitoring the ambient air temperature

Only operate the device up to the specified maximum ambient air temperature.
See “General technical data” on page 52.

The ambient air temperature is the temperature of the air at a distance of 5 cm from the device. It depends on the installation conditions of the device, e.g. the distance from other devices or other objects, and the output of neighboring devices.
The temperature displayed in the CLI and the GUI is the inner temperature of the device. It is up to 20 °C higher than the ambient temperature. This depends on the configuration of your device.

4 Maintenance and service

- ☐ When designing this device, Hirschmann was largely able to forego using parts that are subject to wear and tear. The parts subject to wear are designed to last longer than the lifetime of the product when it is operated properly. Operate this device according to the specifications (see “Technical data”).
- ☐ 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 to improve and develop our software. You should regularly check whether there is a new version of the software that provides you with additional benefits. You will find software information and downloads on the product pages of the Hirschmann website.

Note: You will find information about the complaints and returns procedures in the Internet under
http://www.beldensolutions.com/en/Service/Repairs/index.phtml .

5 Deinstallation

5.0.1 Disassembling the device

☐ To remove the device from the hat rail, press the device downwards and pull it out from under the hat rail.

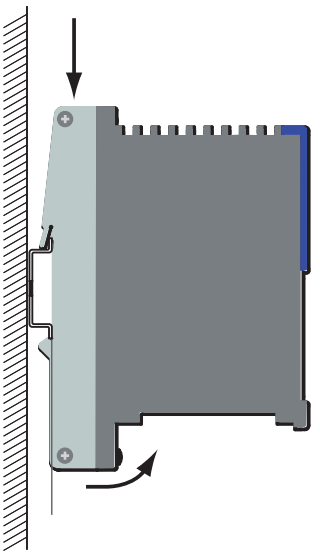


Figure 22: Disassembly

5.0.2 Removing the SFP transceivers

☐ Pull the SFP transceiver out of the socket by means of the opened lock.
☐ Close the socket with the protective cap.

Figure 23: Deinstalling an SFP transceiver

6 Technical data

General technical data

Dimensions W × H × D	MS20-0800...	125 mm × 133 mm × 100 mm (140 mm[a])
	MS30-0802...	163 mm × 133 mm × 100 mm (140 mm[a])
	MS20-1600...	202 mm × 133 mm × 100 mm (140 mm[a])
	MS30-1602...	240 mm × 133 mm × 100 mm (140 mm[a])
	MS20-2400...	278 mm × 133 mm × 100 mm (140 mm[a])
	MS30-2402...	316 mm × 133 mm × 100 mm (140 mm[a])
Weight	MS20-0800...	610 g (700 g[a])
	MS30-0802...	740 g (830 g[a])
	MS20-1600...	880 g (970 g[a])
	MS30-1602...	1010 g (1100 g[a])
	MS20-2400...	1030 g (1120 g[a])
	MS30-2402...	1160 g (1250 g[a])

a. At 48 V DC voltage supply (voltage range C (18 V DC ... 60 V DC). See table 1 on page 16.

Power supply	Operating voltage		18 to 32 V DC (voltage range A) or 18 to 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. 5A.
Overload current protection at input			Non-replaceable fuse
Insulation voltage between operating voltage connections and housing	Devices with input voltage range: 18 V DC to 32 V DC 18 V DC to 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, SELV
	Switching voltage		max. 60 V DC or max. 30 V AC, SELV
Environment	Storage temperature (ambient air temperature) Humidity Atmospheric pressure		Standard: -40 °C to +70 °C Extended: -40 °C to +85 °C 10% to 95% (non condensing) Up to 2000 m (795 hPa), higher altitudes on request
Operating temperature	Product code	S T E	Standard: 0 °C to +60 °C Extended: -40 °C to +70 °C Extended: -40 °C to +70 °C with Conformal Coating
Pollution degree			2
Protection classes	Laser protection Level of protection		Class 1 according to EN 60825-1 (2001) IP20

Dimension drawings

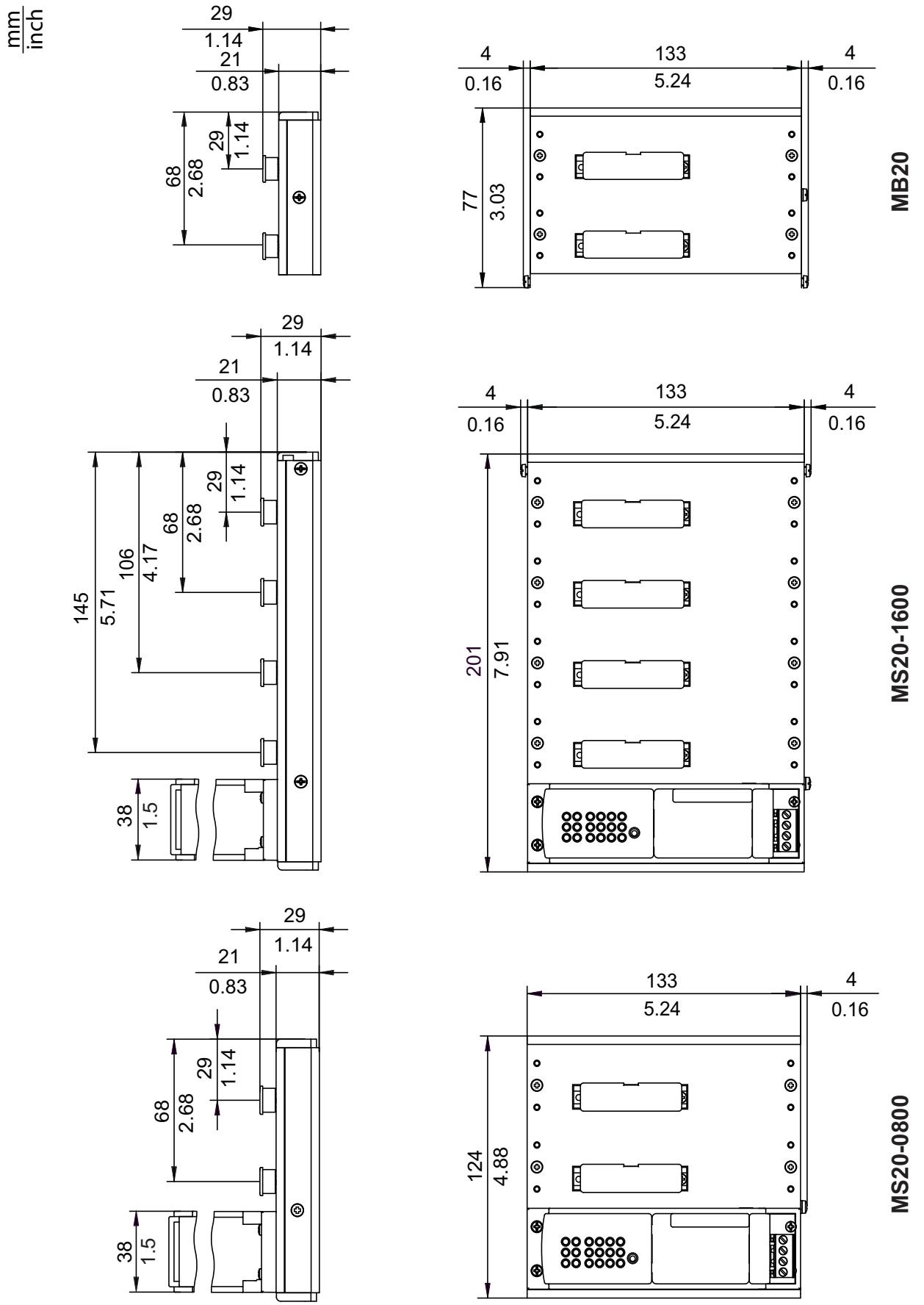


Figure 24: Dimensions of base module MS20 variants and extender module

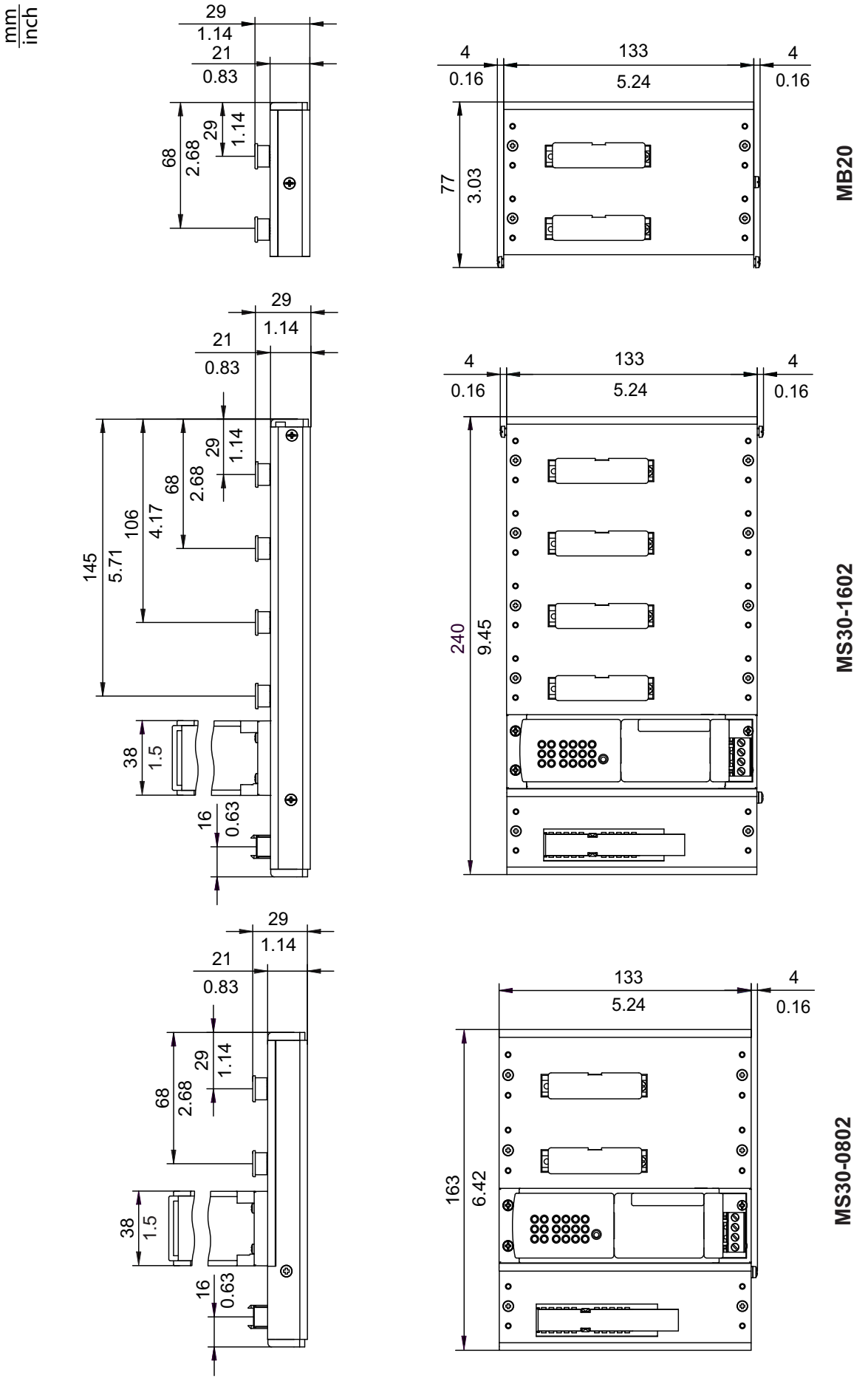


Figure 25: Dimensions of base module MS30 variants and extender module

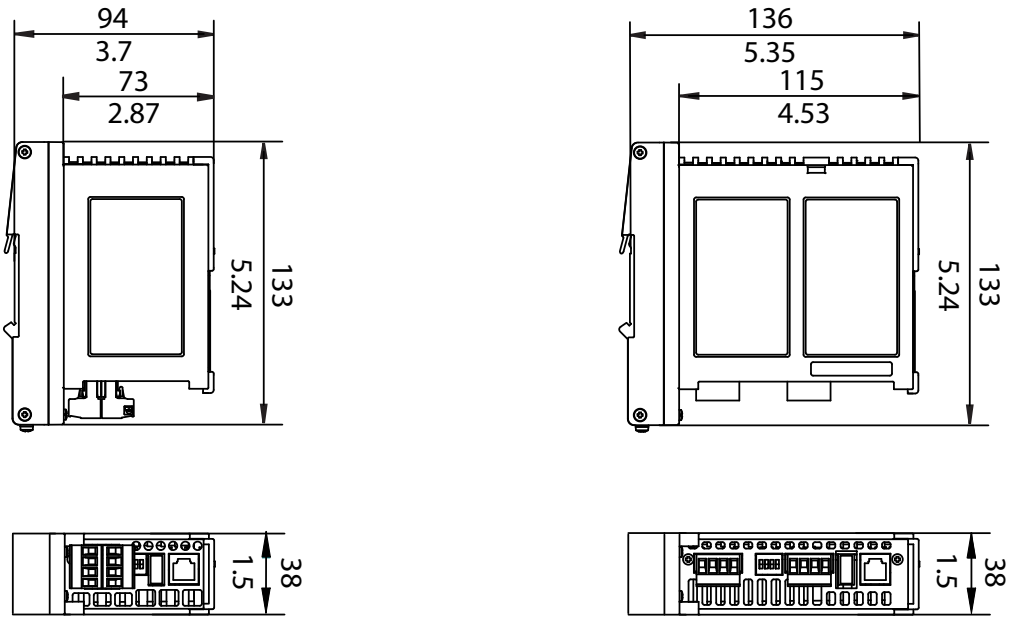


Figure 26: Dimensions of media modules

EMC and immunity

EMC emitted interference		Standard applications [a]	Marine applications [b]	Railway applications (trackside) [c]	Sub-station applications [d]
Emitted interference					
EN 55022		Class A	Class A	Class A	Class A
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 interference					
EN 55022	DC supply connection	Class A	Class A	Class A	Class A
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 55022	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, BV, 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					
EN 61000-4-3	80 MHz ... 3000 MHz	10 V/m	10 V/m	20 V/m	10 V/m
IEEE 1613	80 MHz ... 1000 MHz	—	—	—	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
Line-conducted interference voltages					
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 vibration - 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 vibration - data line					
EN 61000-4-12 IEEE C37.90.1	line/ground	—	—	—	2.5 kV
EN 61000-4-12	line/line	—	—	—	± 1 kV
Impulse-shaped magnetic fields					
EN 61000-4-9		—	—	300 A/m	—

a. EN 61131-2, CE, FCC – applies to all devices
b. Merchant Navy (GL, ABS, BV, 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

Stability		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 amplitude	—	2 Hz ... 9 Hz with 3 mm amplitude
		5 Hz ... 8.4 Hz with 3.5 mm amplitude	—	5 Hz ... 8.4 Hz with 3.5 mm amplitude	5 Hz ... 8.4 Hz with 3.5 mm amplitude
		—	—	—	1 Hz ... 200 Hz with 1 g
		8.4 Hz ... 150 Hz with 1 g	8.4 Hz ... 150 Hz with 1 g	8.4 Hz ... 150 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, BV, 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 BLP/dispersion).

AU port	
Length of an AUI cable	max. 50 m

Table 15: AUI port

TP port	
Length of a twisted pair segment	max. 100 m/328 ft (for cat5e cable)

Table 16: TP port 10BASE-T / 100BASE-TX / 1000BASE-T

Product code		Wave length	Fiber	System attenuation	Example for F/O line length [a]	Fiber attenuation	BLP/ dispersion
-F4	MM	820 nm	50/125 µm	0-9.5 dB	0-2.1 km	3.0 dB/km	400 MHz*km
-F4	MM	820 nm	62.5/125 µm	0-12.5 dB	0-3.0 km	3.2 dB/km	200 MHz*km

Table 17: 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 line length [a]	Fiber attenuation	BLP/ dispersion
-M2, -M4	MM	1300 nm	50/125 µm	0-8 dB	0-5 km	1.0 dB/km	800 MHz*km
-M2, -M4	MM	1300 nm	62.5/125 µm	0-11 dB	0-4 km	1.0 dB/km	500 MHz*km
-S2	SM	1300 nm	9/125 µm	0-16 dB	0-30 km	0.4 dB/km	3.5 ps/(nm*km)
-L2	LH	1550 nm	9/125 µm	7-29 dB	24-86 km	0.3 dB/km	19 ps/(nm*km)
-P4	MM POF	650 nm	980/1000 µm	0-15.5 dB	0-65 m	200 dB/km	10 MHz*km
-P4	MM HCS	650nm	200/230 µm	0-7 dB	0-140 m	10 dB/km	17 MHz*km
-P9	MM POF	650 nm	980/1000 µm	0-14.0 dB	0-55 m	200 dB/km	10 MHz*km
-G2	LH+	1550 nm	9/125 µm	14-47 dB	67-176 km	0.25 dB/km	19 ps/(nm*km)

Table 18: 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 line length [a]	Fiber attenuation	BLP/ dispersion
-MM/LC...	MM	1310 nm	50/125 µm	0-8 dB	0-5 km	1.0 dB/km	800 MHz×km
-MM/LC...	MM	1310 nm	62.5/125 µm	0-11 dB	0-4 km	1.0 dB/km	500 MHz×km
-SM/LC...	SM	1310 nm	9/125 µm	0-13 dB	0-25 km	0.4 dB/km	3.5 ps/(nm×km)
-SM+/LC...	SM	1310 nm	9/125 µm	10-29 dB	25-65 km	0.4 dB/km	3.5 ps/(nm×km)
-LH/LC...	SM	1550 nm	9/125 µm	10-29 dB	47-104 km	0.25 dB/km	19 ps/(nm×km)
-LH/LC...	SM	1550 nm	9/125 µm	10-29 dB	55-140 km	0.18 dB/km[b]	18 ps/(nm×km)

Table 19: 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 line length [a]	Fiber attenuation	BLP[b]/ dispersion
-SX/LC...	MM	850 nm	50/125 µm	0-7.5 dB	0-550 m	3.0 dB/km	400 MHz×km
-SX/LC...	MM	850 nm	62.5/125 µm	0-7.5 dB	0-275 m	3.2 dB/km	200 MHz×km
-MX/LC	MM	1310 nm	50/125 µm	0-8 dB	2 km[c]	1.0 dB/km	500 MHz×km
-MX/LC	MM	1310 nm	62.5/125 µm	0-8 dB	1 km	1.0 dB/km	500 MHz×km
-LX/LC...	MM	1310 nm[d]	50/125 µm	0-10.5 dB	0-550 m	1.0 dB/km	800 MHz×km
-LX/LC...	MM	1310 nm [d]	62.5/125 µm	0-10.5 dB	0-550 m	1.0 dB/km	500 MHz×km
-LX/LC...	SM	1310 nm	9/125 µm	0-10.5 dB	0-20 km[e]	0.4 dB/km	3.5 ps/(nm×km)
-LX+/LC...	SM	1310 nm	9/125 µm	5-20 dB	14-42 km	0.4 dB/km	3.5 ps/(nm×km)
-LH/LC...	LH	1550 nm	9/125 µm	5-22 dB	23-80 km	0.25 dB/km	19 ps/(nm×km)
-LH+/LC	LH	1550 nm	9/125 µm	15-30 dB	71-108 km	0.25 dB/km	19 ps/(nm×km)
-LH+/LC	LH	1550 nm	9/125 µm	15-30 dB	71-128 km	0.21 dB/km (typically)	19 ps/(nm×km)

Table 20: Fiber port 1000BASE-FX (SFP fiber optic Gigabit Ethernet Transceiver)

a. including 3 dB system reserve when compliance with the fiber data is observed
b. The bandwidth length product cannot be used to calculate the expansion.
c. Distances of up to 3 km reachable, 1000 MHz*km (1300 nm)
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 line length [a]	Fiber attenuation	Dispersion
Type A LX/LC EEC	SM	1310 nm	1550 nm	9/125 µm	0-11 dB	0-20 km	0.4 dB/km	3.5 ps/(nm×km)
Type B LX/LC EEC	SM	1550 nm	1310 nm	9/125 µm	0-11 dB	0-20 km	0.25 dB/km	19 ps/(nm×km)
Type A LH/LC EEC	LH	1490 nm	1590 nm	9/125 µm	5-24 dB	23-80 km	0.25 dB/km	19 ps/(nm×km)
Type B LH/LC EEC	LH	1590 nm	1490 nm	9/125 µm	5-24 dB	23-80 km	0.25 dB/km	19 ps/(nm×km)

Table 21: 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, Operating 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	Operating voltage
MS20-0800...A...	5.0 W	17.1 Btu (IT)/h	18-32 V DC
MS20-0800...C... MS20-0800...E...	7.4 W	25.4 Btu (IT)/h	18-60 V DC
MS30-0802...A...	5.6 W	19.2 Btu (IT)/h	18-32 V DC
MS30-0802...C... MS20-0800...E...	8.6 W	29.6 Btu (IT)/h	18-60 V DC
MS20-1600...A...	12.0 W	40.0 Btu (IT)/h	18-32 V DC
MS20-1600...C... MS20-0800...E...	15.6 W	52.2 Btu (IT)/h	18-60 V DC
MS30-1602...A...	12.6 W	41.1 Btu (IT)/h	18-32 V DC
MS30-1602...C... MS20-0800...E...	16.8 W	56.7 Btu (IT)/h	18-60 V DC
MS20-2400...A...	12.0 W	40.0 Btu (IT)/h	18-32 V DC
MS20-2400...C... MS20-0800...E...	16.8 W	56.7 Btu (IT)/h	18-60 V DC
MS30-2402...A...	12.6 W	42.1 Btu (IT)/h	18-32 V DC
MS30-2402...C... MS20-0800...E...	18.0 W	60.9 Btu (IT)/h	18-60 V DC

Module	Power consumption	Power output	Operating temperature (ambient air temperature)	Order number
MM2 media modules:				
MM2-4TX1	0,8 W	2,8 Btu (IT)/h	0 °C ... +60 °C	943 722-101
MM2-4TX1-EEC	0,8 W	2,8 Btu (IT)/h	−40 °C ... +70 °C	943 722-151
MM2-4FXM3	6,8 W	23,2 Btu (IT)/h	0 °C ... +60 °C	943 721-101
MM2-2FXM3/2TX1	3,8 W	13,0 Btu (IT)/h	0 °C ... +60 °C	943 720-101
MM2-2FXM2	3,8 W	13,0 Btu (IT)/h	0 °C ... +60 °C	943 718-101
MM2-2FXS2	3,8 W	13,0 Btu (IT)/h	0 °C ... +60 °C	943 719-101
MM3 media modules:				
MM3-2AUI	3,4 W	11,6 Btu (IT)/h	0 °C … +60 °C	943 840-101
MM3-4FLM4	5,0 W	17,1 Btu (IT)/h	0 °C ... +60 °C	943 760-101
MM3-2FLM4 / 2TX1-RT	5,0 W	17,1 Btu (IT)/h	0 °C ... +60 °C	943 117-004
MM3-4TX5	0,8 W	2,8 Btu (IT)/h	0 °C ... +60 °C	943 841-101
MM3-4TX1-RT	0,8 W	2,8 Btu (IT)/h	0 °C ... +60 °C	943 117-001
MM3-1FXM2/3TX1	2,3 W	7,9 Btu (IT)/h	0 °C ... +60 °C	943 839-101
MM3-2FXM2/2TX1	3,8 W	13,0 Btu (IT)/h	0 °C ... +60 °C	943 761-101
MM3-2FXM2/2TX1-EEC	3,8 W	13,0 Btu (IT)/h	−40 °C ... +70 °C	943 761-151
MM3-2FXM2 / 2TX1-RT	3,8 W	13,0 Btu (IT)/h	0 °C ... +60 °C	943 117-002
MM3-2FXM4/2TX1	3,8 W	13,0 Btu (IT)/h	0 °C ... +60 °C	943 837-101
MM3-4FXM2	6,8 W	23,2 Btu (IT)/h	0 °C ... +60 °C	943 764-101
MM3-4FXM4	6,8 W	23,2 Btu (IT)/h	0 °C ... +60 °C	943 835-101
MM3-1FXS2/3TX1	2,3 W	7,9 Btu (IT)/h	0 °C ... +60 °C	943 838-101
MM3-1FXS2 / 3TX1 EEC	2,3 W	7,9 Btu (IT)/h	−40 °C ... +70 °C	943 838-151
MM3-2FXS2/2TX1	3,8 W	13,0 Btu (IT)/h	0 °C ... +60 °C	943 762-101
MM3-2FXS2/2TX1 EEC	3,8 W	13,0 Btu (IT)/h	−40 °C ... +70 °C	943 762-151
MM3-4FXS2	6,8 W	23,2 Btu (IT)/h	0 °C ... +60 °C	943 836-101
MM3-1FXL2/3TX1	3,4 W	11,6 Btu (IT)/h	0 °C ... +60 °C	943 763-101
MM4 media modules:				
MM4-4TX/SFP	9,0 W	30,8 Btu (IT)/h	0 °C ... +60 °C	943 010-001
MM4-2TX/SFP	5,8 W	19,8 Btu (IT)/h	0 °C ... +60 °C	943 622-001
Open variant media modules:				
MM20-... 4 TX-/0 FX-Ports	0,8 W	2,8 Btu (IT)/h	See table 23.	See table 23.
MM20-... 3 TX-/1 FX-Ports	2,3 W	7,9 Btu (IT)/h	- “ -	- “ -
MM20-... 2 TX-/2 FX-Ports	3,8 W	13,0 Btu (IT)/h	- “ -	- “ -
MM20-... 0 TX-/2 FX-Ports	3,8 W	13,0 Btu (IT)/h	- “ -	- “ -
MM20-... 1 TX-/3 FX-Ports	5,3 W	18,1 Btu (IT)/h	- “ -	- “ -
MM20-... 0 TX-/4 FX-Ports	6,8 W	23,2 Btu (IT)/h	- “ -	- “ -
MM20-A8A89999...	3,4 W	11,6 Btu (IT)/h	- “ -	- “ -
MM20-F4F4F4F4...	5,0 W	17,1 Btu (IT)/h	- “ -	- “ -
MM20-Z6Z6Z6Z6...	8,0 W	27,3 Btu (IT)/h	- “ -	- “ -
MM20-P9P9P9P9SAHH	8,0 W	27,3 Btu (IT)/h	0 °C ... +60 °C	- “ -
MM20-P9P9T1T1SAHH	5,2 W	17,8 Btu (IT)/h	0 °C ... +60 °C	- “ -

Table 22: Media modules: power, temperature, order numbers

Module	Power consumption	Power output	Operating temperature (ambient air temperature)	Order number
MM22-T1T1T1T1... - internal operating voltage - external PoE voltage - no PD - 4 x Class0-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	- “ -	- “ -
MM23-T1T1T1T1...SAHH	4,5 W	15,4 Btu (IT)/h	0 °C ... +60 °C	- “ -
MM23-M2M2T1T1...SAHH	6,0 W	20,5 Btu (IT)/h	0 °C ... +60 °C	- “ -
MM23-S2S2T1T1...SAHH	5,5 W	18,8 Btu (IT)/h	0 °C ... +60 °C	- “ -
MM23-F4F4T1T1...SAHH	5,5 W	18,8 Btu (IT)/h	0 °C ... +60 °C	- “ -
MM24-IOIOIOIO...	7,5 W	25,6 Btu (IT)/h	0°C ... +60 °C	- “ -
MM30-O7O7O7O7...	9,0 W	30,8 Btu (IT)/h	See table 23.	- “ -
MM30-O7O79999...	5,8 W	19,8 Btu (IT)/h	- “ -	- “ -
MM33-O7O79999...SAHH	7,5 W	25,6 Btu (IT)/h	0 °C ... +60 °C	- “ -
Extender module:				
MB20	0 W	0 Btu (IT)/h	0 °C to +60 °C	943 733-102

Table 22: Media modules: power, temperature, order numbers

Open variant product code

As an alternative to the order number (see in table 22, 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 made from combining the desired product characteristics in accordance with the following table. The short designation is in "Ident." column.

Example: Product code MM30-O7O7O7O7SA = media module 1000 Mbit/s with four Gigabit Ethernet combo ports (four SFP ports or alternatively TP ports RJ45). This example corresponds to the MM4-4TX/SFP module with the order number 943 010-001.

Item	Characteristic feature	Ident.	Property
1 to 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)
		MM30	Media module 1000 Mbit/s (standard)
		MM33	Media module 1000 Mbit/s (PTP version 2)
5	- (hyphen)	-	

Table 23: Combination possibilities of the MM20/MM30 media module variants

Item	Characteristic feature	Ident.	Property
6 to 7	1st port (medium/connector)	T1	Twisted pair (TX) / RJ45
		T5	Twisted pair (TX) / M12
		M2	Multi-mode FX DSC (100 Mbit/s)
		M3	Multi-mode FX MTRJ (100 Mbit/s)
		M4	Multi-mode FX ST (100 Mbit/s)
		S2	Single-mode FX DSC (100 Mbit/s)
		S4	Single-mode FX ST (100 Mbit/s)
		L2	Single-mode Long Haul FX DSC (100 Mbit/s)
		G2	Single-mode Long Haul FX DSC 200km (only 100 Mbit/s)
		F4	Multi-mode 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	Fiber optic / SFPslot (100 Mbit/s)
		IO	4 digital inputs, 4 digital outputs
8 to 9	2nd port (medium/connector)	...	See items 6 to 7
10 to 11	3rd port (medium/connector)	...	See items 6 to 7
		99	Empty
12 to 13	4th port (medium/connector)	...	See items 6 to 7
		99	Empty
14	Temperature range	S	Standard: operation 0 °C ... +60 °C; storage −40 °C to +70 °C
		T	Extended: operation −40 °C ... +70 °C; storage −40 °C to +85 °C
		E	Extended: operation −40 °C ... +70 °C; storage −40 °C to +85 °C, with Conformal Coating
15	Certifications	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 100a 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 23: Combination possibilities of the MM20/MM30 media module variants

Interfaces

MICE MS20-..., MS30-...	V.24 port: external management, AutoConfiguration Adapter ACA 11 2 terminal blocks 4-pin: 1 x indicator contact each, 1 A maximum, 24 V 1 x voltage supply each USB: ACA 21-USB
MICE MS20-...E..., MS30-...E...	V.24 port: external management, AutoConfiguration Adapter ACA 11 1 terminal block 6-pin: 1 x indicator contact each, 1 A maximum, 24 V 1 x voltage supply each USB: ACA 21-USB
MM2 media modules	see table “MM2 media modules” on page 22
MM3 media modules	see table “MM3 media modules” on page 23
MM4 media modules	see table “MM2 media modules” on page 22

Scope of delivery

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

Accessories

Note: Please note that products recommended as accessories may have characteristics that do not fully match those of the corresponding product. This may limit their possible usage in the overall system.

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

Designation	Order number
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 ACA 21-USB EEC	943 271-002
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	943 662-120
Rail Power Supply for Power over Ethernet RPS60/48V EEC	943 952-001
ML-MS2/MM labels	943 767-001
ML-MS3 labels	943 768-001
Network management software Industrial HiVision	943 156-xxx
OPC server software HiOPC	943 055-001

Underlying norms and standards

Name	
EN 50121-4	Railway applications – EMC – Emission and immunity of the signalling and telecommunications apparatus (Rail Trackside)
EN 50155	Declaration (Railway) [a] [b]
EN 55022	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
EN 60079-15	Explosive atmospheres – Part 15: Equipment protection by type of protection „n“
EN 60950-1	Information technology equipment – Safety – Part 1: General requirements
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments

Table 24: List of norms and standards

Name	
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
German Lloyd	Classification and Construction Guidelines VI-7-3 Part 1 Ed.2003
IEC/EN 61850-3	Communication networks and systems in substations – Part 3: General requirements
IEEE 802.1 D	Switching, GARP, GMRP, Spanning Tree
	Media access control (MAC) bridges (includes IEEE 802.1p Priority and Dynamic Multicast Filtering, GARP, GMRP)
IEEE 802.1 Q	Tagging
	Virtual Bridged Local Area Networks (VLAN Tagging, GVRP)
IEEE 802.1 w	Rapid Reconfiguration
IEEE 802.3	Ethernet
ISA 12.12.01, CSA C22.2 No. 213	Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations
Korean Register of Shipping	Rules for the Classification of Steel Ships – KR
UL 508	Safety for Industrial Control Equipment

Table 24: List of norms and 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 connec-tors and housing“ in chapter “Technical data” on page 52

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 25: List of RFCs

The device generally fulfills the norms and standards named in their current versions.

The device has a certification based on a specific standard only if the certification indicator appears on the housing.
If your device has a ship certification according to Germanischer Lloyd, the certification mark can be found printed on the device label. You can find out whether your device has other ship certifications 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.

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