



## Description and Operating Instructions Modular Industrial Communication Equipment

## MICE Media modules



MM2-2FXM3/2TX1    MM2-4TX1    MM4-4TX/SFP    MM2-2FLM4    MM3-4TX5    MM2-2FXM2  
MM2-2FXS2



MM3-2AU1    MM3-2FXM4/2TX1    MM3-1FXM2/3TX1    MM2-4FXM3    MM2-4FXM3    MM3-4FXM4  
MM3-2FXS2/2TX1    MM3-1FXL2/3TX1    MM3-4FXM2    MM3-4FXS2  
MM3-2FXM2/2TX1    MM3-1FXS2/3TX1    MM3-4FLM4

The **Modular Industrial Communication Equipment, MICE**, is a modular network component. It was developed particularly for use in an industrial environment.

The media modules described in this instructions are the interface of the device to the LAN and can be plugged onto the following basic modules of the MICE switch:

- MS2108-2 (MICE 2000)
- MS3124-4 (MICE 3000)
- MS4128-5 (MICE 4000 / Power MICE)
- MS20-... and MS30-...

The MB20 expansion module allows you to add 2 slots to the MS20-1600, MS30-1602, MS3124-4, MS4128-5 MICE switch basic module for installing media modules.

The media modules are exclusively intended for use with Hirschmann MS... modular switches.

MICE allows you to construct switched Industrial ETHERNET networks that conform to the IEEE 802. and 802.3u standard using copper wires or optical fibers in a bus or ring topology.

In the

- User manual "Installation"
- User manual "Basic configuration"
- User manual "Redundancy configuration"
- Reference manual "Web-based Interface"
- Reference manual "Command Line Interface"

you will find a detailed description of the MICE and further information.



MB20 (old designation: MB-2T) expansion module



039695001100212000

The performance features described here are binding only if they have been expressly guaranteed in the contract. We have checked that the contents of the technical publication agree with the hardware and software described. However, it is not possible to rule out deviations completely, so we are unable to guarantee complete agreement. However, the details in the technical publication are checked regularly. Any corrections which prove necessary are contained in subsequent editions. We are grateful for suggestions for improvement.

We reserve the right to make technical modifications.


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## Safety instructions


### Certified usage


Please observe the following:

 **Warning!**  
The device may only be employed for the purposes described in the catalog and technical description, and only in conjunction with external devices and components recommended or approved by Hirschmann. The product can only be operated correctly and safely if it is transported, stored, installed and assembled properly and correctly. Furthermore, it must be operated and serviced carefully.

### Use in Hazardous Locations - Relevant for North America

This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D hazardous locations - only for devices labeled accordingly - OR non-hazardous locations. The temperature code is T4 (135 °C).

 **Warning!**  
EXPLOSION HAZARD - Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous.

 **Warning!**  
EXPLOSION HAZARD - Substitution of any components may impair suitability for Class I, Division 2.

### Supply voltage

To be supplied by a NEC Class 2 power supply via MICE switch module.  
For Power over Ethernet modules: Connect a NEC Class 2 power supply only.


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

### Shielding Ground


**Note:** The shielding ground of the connectable twisted pairs lines is connected to the front panel as a conductor.

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

## Housing

 **Warning!**  
Only technicians authorized by Hirschmann are permitted to open the housing.


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

 **Warning!**  
Never insert pointed objects (thin screwdrivers, wires, etc.) into the inside of the subrack! This especially applies to the area behind the socket connectors. Failure to observe this point may result in injuries caused by electric shocks.

## General Safety Instructions

Particular attention is to be paid to all warnings and items of information relating to safety.

Peripheral equipment must be suitable for the location in which it is used.

 **Warning!**  
Any work that may have to be performed on the electrical installation should be performed by fully qualified technicians only.

**Note:** LED or LASER components in compliance with IEC 60825-1 (2007): CLASS 1 LASER PRODUCT for Cat. No. having the following fiber optic modules (identified by module code) incorporated: S2, S4, E2, L2, G2, Z6, O7. CLASS 1 LED PRODUCT for Cat. No. having the following fiber optic modules (identified by module code) incorporated: M2, M3, M4, F4. Refer to the product code description in chapter 8.

## ESD guidelines

The media modules contain components highly sensitive to electrostatic fields. These components can be easily destroyed or have their lives shortened by an electrical field or by a discharge caused by touching the contacts. You can find more information on about devices vulnerable to electrostatic fields in IEC/TR 61340-5-2 (2007-08)

## CE marking

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

2004/108/EG


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:

Hirschmann Automation and Control GmbH  
Stuttgarter Str. 45-51  
72654 Neckartenzlingen  
Tel.: +49 1805 141538

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

– Interference immunity: EN 61000-6-2:2005  
– Emitted interference: EN 55022:2006 + A1:2007 Class A

 **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. 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, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

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 radiate same, 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 its use, this product has to be processed as electronic scrap and disposed of according to the prevailing waste disposal regulations of your community / district / country / state.

Only intended for devices labeled accordingly  
 - refer to the device label (Fig. 0 - 2)

**Conditions for safe use:**

Must be mounted into a suitable certified IP 54 enclosure with tool removable cover.

The installer is to provide a transient protection device to be set at a level not exceeding 40% of the rated voltage at the power supply terminals of the apparatus.

For ambient temperatures below -10 °C and above +60 °C use wiring suitable for both minimum and maximum ambient temperature.

**Underlying norms and standards**

EN 60079-0: 2006 Explosive atmospheres - Part 0: Equipment-General Requirements

EN 60079-15: 2005 Electrical equipment for Explosive atmospheres - Part 15: Equipment protection by type of protection "n"

**HIRSCHMANN**  
**MM21**  
**MICE Media Module**

INDUSTRIAL CONTROL EQUIPMENT Accessory  
 FOR USE IN HAZARDOUS LOCATIONS

CLASS I; DIV. 2  
 GROUPS A; B; C AND D

TEMPERATURE CODE T4  
 Ta: xx°C ... xx°C

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

AVERTISSEMENT - RISQUE D'EXPLOSION.  
 NE PAS DEBRANCHER TANT QUE LE  
 CIRCUIT EST SOUS TENSION,  
 A MOINS QU'IL NE S'AGISSE D'UN  
 EMPLACEMENT NON DANGEREUX.

WARNING - EXPLOSION HAZARD  
 SUBSTITUTION OF COMPONENTS  
 MAY IMPAIR SUITABILITY FOR  
 CLASS I; DIVISION 2.

AVERTISSEMENT - RISQUE D'EXPLOSION -  
 LA SUBSTITUTION DES COMPOSANTS  
 PEUT RENDRE CE MATERIEL  
 INACCEPTABLE POUR LES  
 EMPLACEMENTS DE CLASSE I, DIVISION 2

TO BE SUPPLIED BY  
 A CLASS 2 POWER SUPPLY  
 OR ISOLATED LOW VOLTAGE  
 LIMITED ENERGY (LVLE).

DO NOT OPEN WHEN ENERGIZED

Max. surrounding air temperature 60 °C for parameter S  
 Max. surrounding air temperature 70 °C for parameter T or E

Product code - pos. 14:  
 temperature parameter: S or T or E

Temperature code T4 for parameter S or T or E

Ta: 0 °C ... +60 °C for parameter S  
 Ta: -40 °C ... +70 °C for parameter T or E

Restriction to „MM30“ MICE Media Modules:  
 Ta: 0 °C ... +60 °C for parameter S or T or E

Temperature code T4 for parameter S or T or E

DOM: WWYYYY  
 W: week  
 Y: year

DOM - Date Of Manufacture  
 W: week  
 Y: year

Fig. 0: Equipment Label Markings (MICE Media Module)

**HIRSCHMANN**  
**MB20**  
**MICE Backplane Extension**

CE

Product code - pos. 7: temperature parameter: S or T or E

DOM: WWYYYY  
 W: week  
 Y: year

DOM - Date Of Manufacture  
 W: week  
 Y: year

Temperature code T4 for parameter S or T or E

Fig. 1: Equipment Label Markings (MB20)

INDUSTRIAL CONTROL EQUIPMENT  
 FOR USE IN HAZARDOUS LOCATIONS

CLASS I; DIV. 2  
 GROUP A; B; C AND D

TEMPERATURE CODE T4  
 Ta: x°C ... xx°C

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

AVERTISSEMENT - RISQUE D'EXPLOSION. NE PAS DEBRANCHER  
 TANT QUE LE CIRCUIT EST SOUS TENSION, A MOINS QU'IL NE  
 S'AGISSE D'UN EMPLACEMENT NON DANGEREUX.

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF  
 COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I; DIVISION 2.

AVERTISSEMENT - RISQUE D'EXPLOSION - LA SUBSTITUTION DES  
 COMPOSANTS PEUT RENDRE CE MATERIEL INACCEPTABLE  
 POUR LES EMPLACEMENTS DE CLASSE I, DIVISION 2

Temperature code T4 for parameter S or T or E

Ta: 0 °C ... +60 °C for parameter S  
 Ta: -40 °C ... +70 °C for parameter T or E

Temperature code T4 for parameter S or T or E

Fig. 2: Equipment Label Markings

## 1. MICE Hardware

### 1.1 SWITCH BASIC MODULES

The documentation enclosed to the switch basic module gives you a detailed description of the switch basic modules:

- „User Manual Installation Industrial ETHERNET Switch MICE MS20/MS30“ for MS20-... and MS30-...
- „User Manual Installation Industrial ETHERNET Switch Power MICE“
- “Description and Operating Instructions Industrial ETHERNET Modular Industrial Communication Equipment MICE/Power MICE” for
  - MS2108-2 (MICE 2000)
  - MS3124-4 (MICE 3000)

### 1.2 MEDIA MODULES

- MICE 2000: See Table 1.
- MICE 3000: See Table 2.
- MICE 4000: See Table 3.
- MICE media modules open variant: See Table 4.

### 1.3 MB20 (OLD DESIGNATION: MB-2T) EXPANSION MODULE

The MB20 expansion module allows you to add 2 slots to the MS20-1600, MS30-1602, MS3124-4, MS4128-5 MICE switch basic module for installing media modules.

### 1.4 SFP MODULES

SFP modules are optical transceivers (Fast ETHERNET and Gigabit ETHERNET SFP modules see chapter 7 Technical Data). The SFP modules are plugged into the SFP slots of the Fast ETHERNET media module MM3-4SFP (MM20-Z6Z6Z6Z6) or of the Gigabit ETHERNET media modules MM4-4TX/SFP / MM4-2TX/SFP to provide a F/O port.

The MM3-4SFP (MM20-Z6Z6Z6Z6) has four slots for SFP modules (100 Mbit/s).

The MM4-4TX/SFP / MM4-2TX/SFP has four/two TP interfaces and four/two slots for SFP modules (100/1000 Mbit/s). Inserting the SFP module deactivates the corresponding TP interface.

### 1.5 MM22-T1T1T1T1 POE MEDIA MODULE

The MM22-T1T1T1T1 PoE media module (deeper module style) supports Power over ETHERNET (PoE) in compliance with IEEE 802.3af. It enables the connection and the remote supply of e.g. IP telephones (voice over IP), webcams, sensors, print servers and WLAN access points via 10BASE-T/100BASE-TX. With PoE, the power supply of these data terminal equipments is served via the twisted pair cable.

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

The current is supplied on the idle wire pairs (spare pairs); the ports are not electrically isolated against each other.

In compliance with IEEE 802.3af, each port has the attributes:

- Endpoint PSE
- Alternative B.

## 2. Functional description

The ports of a MICE represent a terminal connection for the connected LAN segment. You can connect single devices or complete network segments.

### 2.1 INTERFACES

TP/TX/FL/FX terminal devices or other TP/TX/FL/FX segments can be connected to the 10/100/1000 Mbit/s ports of the media modules.

The MICE and MS20 supports both ETHERNET 10 Mbit/s and Fast ETHERNET 100 Mbit/s, the Power MICE and MS30 supports additionally Gigabit ETHERNET 1000 Mbit/s.

The TP/TX ports support autocrossing, autonegotiation and autopolarity.

### 2.2 DIP SWITCH (MM3-AUI)

With the 3-pin DIP switch on the MM3-2AUI module

- you can switch on or off the SQE test function at port 1 with the SQE-Test Port 1 switch.  
State of delivery: switch in position 0 (Off), i.e. SQE test function not active.
- you can switch on or off the SQE test function at port 2 with the SQE-Test Port 2 switch.  
State of delivery: switch in position 0 (Off), i.e. SQE test function not active.
- you can switch on or off the monitoring of the DTE voltage, for both ports together, with the DTEPower-Monitor switch.
  - ON: monitoring of the DTE voltage active, data transmission only possible if DTE voltage available.
  - OFF: no monitoring of the DTE voltage, data transmission always possible.
  - State of delivery: switch in position 0 (OFF), i.e. no monitoring of DTE voltage.

## 3. Assembly, startup procedure and dismantling

### 3.1 UNPACKING, CHECKING

- Check whether the package was delivered completely (see scope of delivery).
- Check the individual parts for transport damage.



#### Warning!

Use only undamaged parts!

### 3.2 ASSEMBLING MEDIA MODULES

Media modules can be assembled and disassembled during running operation.

- To fasten a media module, first remove the protective cap over the plug of the MICE.
- Plug the media module onto the plug.
- Tighten the 4 screws on the corners of the media module.
- Check whether the switch pre-setting suits your requirements.
- Fit the signal lines.

### 3.3 ASSEMBLING SFP MODULES

- To fasten a SFP module, first remove the protective cap over the socket.
- Insert the SFP module with the closed lock into the socket until you hear it snap in.

**Note:** Use only Hirschmann SFP modules.

### 3.4 ASSEMBLING THE MB20 EXPANSION MODULE

The MB20 expansion module can be installed while in running operation.

- On the right side of the switch basic module, loosen the screw at the top and at the bottom (1-3 revolutions).
- Remove the side cover.
- If you have not yet done so, mount the switch basic module onto the top-hat rail.
- Slide the MB20 expansion module on the top-hat rail toward the switch basic module until the modules plug into each other.
- On the switch basic module, tighten the screws at the top and at the bottom.

### 3.5 STARTUP PROCEDURE

You start up the MICE by connecting the supply voltage via the terminal block(s) on the MICE basic module. Lock the terminal block(s).

### 3.6 CONNECTING THE MM22-T1T1T1T1 POE MEDIA MODULE

The MM22-T1T1T1T1 PoE media module is supplied with the PoE voltage (48 V DC safety extra-low voltage) 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 are supplied with the PoE voltage on port 1 to 4 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 for providing the PoE voltage.

- Make sure that the external power supply unit being used for providing the PoE voltage meets, among other things, the following requirements:
  - Isolation requirements in compliance with IEEE 802.3af (electrical strength of the 48V output to “rest of the world” 2250 V DC for 1 min.)
  - Output power < 100 W.
  - Current limiting < 2 A.
  - Power supply unit and PoE media module form a “Limited Power Source” in compliance with IEC60950-1.
  - The external PoE power supply unit has to be able to provide the power for the PDs being connected.
- All these conditions are met by the RPS60/48V EEC power supply unit.
- Connect the PoE voltage to the 3-pin terminal block (included in the scope of delivery), as shown in the following figure. Make sure that your installation complies with the following conditions:
  - Length of the supply line < 3 m.
  - Cross-section of the supply lines is dimensioned for 1.5 A

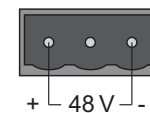


Fig. 3: 3-pin terminal block of the PoE media module

- Mount the terminal block for the PoE supply voltage on the bottom side of the PoE module via snap lock. Push it until it locks into position.

**Note:** Use 4-pair twisted pair cables for connecting the data terminal equipments. Only connect data terminal equipments which are conform to IEEE 802.3af.

## 5. Technical data

Dimensions W x H x D	38 mm x 110 mm x 79 mm (MM2-...) 38 mm x 110 mm x 119 mm (MM3-..., MM4-...) 38 mm x 110 mm x 79 bzw. 119 mm (MM20-..., MM21-..., MM22-..., MM23-..., MM30-..., MM33-...)			
Humidity	10% to 95% (non condensing)			
Atmospheric pressure	up to 2000 m (795 hPa, higher altitudes on demand)			
Pollution degree	2			
Laser protection	Class 1 conforming to EN 60825-1: 2007			
Protection type	IP 20			
EMV interference proof		A <sup>1)</sup>	B <sup>1)</sup>	H <sup>1)</sup>
EN 61000-4-2, Discharge of static electricity	Contact discharge: test level 3	4 kV	8 kV	8 kV
	Air discharge: test level 3	8 kV	15 kV	15 kV
EN 61000-4-3, Electromagnetic fields	Test level 3 (80 - 2000 MHz)	10 V/m	20 V/m	20 V/m
EN 61000-4-4, Fast transients (burst), Test level 3, x	- Power line	2 kV	4 kV	4 kV
	- Data line	1 kV	4 kV	4 kV
EN 61000-4-5 Surge voltage	- Power line, line/line: test level 2	0,5 kV	1 kV	1 kV
	- Power line, line/earth: test level 3	1 kV	2 kV	2 kV
	- Data line: test level 3	1 kV	4 kV	4 kV
EN 61000-4-6 Cable-based RF faults, Test level 3	10 kHz - 150 kHz	3 V	3 V	3 V
	150 kHz - 80 MHz	10 V	10 V	10 V
EN 61000-4-9 Impulse shaped magnetic fields	Test level 4	-	300 A/m	300 A/m
EMV emitted immunity		A <sup>1)</sup>	B <sup>1)</sup>	H <sup>1)</sup>
EN 55022	Class A	Yes	Yes	Yes
FCC 47 CFR Part 15	Class A	Yes	Yes	Yes
German Lloyd	Rules for Classification and Construction VI-7-3 - Part 1 Ed. 2001	Yes	Yes	
Stability				
Vibration	IEC 60068-2-6	Test FC, test level in line with IEC 61131-2V	Yes	Yes
	German Lloyd	Guidelines for the Performance of Type Tests Part 1	-	Yes
	IEC 870-2-2 Table 3	Normal Installation in line with EN 61850-3	-	Yes
Shock	IEC 60068-2-27	Test Ea, test level in line with IEC 61131-2	Yes	Yes
	IEC 870-2-2 Table 3	Normal Installation in line with EN 61850-3	-	Yes

<sup>1)</sup> Product code A: Certification = CE, UL

Product code B: Certification = CE, UL, GL, Railway (along track), Substation, ATEX

Product code H: Certification = CE, UL, GL, Railway (along track), Substation

The media modules in Table 1 to 3 (see page 5) have the certification "A".

### Network size

#### AUI port

Length of a AUI cable 50 m max.

#### TP/TX port 10/100/1000BASE-T/TX

Length of a twisted pair segment 100 m (328 ft) max. (cat5e cable with 1000BASE-T)

#### F/O port 10BASE-FL

Product code	Wave length	Fiber	System attenuation	Expansion	Fiber data
-M4	MM 850 nm	50/125 µm	0-9.5 dB	0-2,000 m	3.0 dB/km; 400 MHz*km
-M4	MM 850 nm	62.5/125 µm	0-12.5 dB	0-3,000 m	3.2 dB/km; 200 MHz*km

#### F/O port 100BASE-FX

Product code	Wave length	Fiber	System attenuation	Expansion	Fiber data
-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)
-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)

#### F/O port 100BASE-FX (SFP Fiberoptic Fast ETHERNET Transceiver)

Product code	Wave length	Fiber	System attenuation	Expansion	Fiber data
M-FAST-SFP-...					
-MM/LC (EEC) MM	1310 nm	50/125 µm	0-11 dB	0-5 km	1.0 dB/km; 800 MHz*km
-MM/LC (EEC) MM	1310 nm	62.5/125 µm	0-8 dB	0-4 km	1.0 dB/km; 500 MHz*km
-SM/LC (EEC) SM	1310 nm	9/125 µm	0-13 dB	0-25 km	0.4 dB/km; 3.5 ps/(nm*km)
-SM+/LC (EEC)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	40-104 km	0.25 dB/km; 19 ps/(nm*km)

#### F/O port 1000BASE-FX (SFP Fiberoptic Gigabit ETHERNET Transceiver)

Product code	Wave length	Fiber	System attenuation	Expansion	Fiber data
M-SFP-...					
-SX/LC (EEC) MM	850 nm	50/125 µm	0-7.5 dB	0-550 m	3.0 dB/km; 400 MHz*km
-SX/LC (EEC) 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	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 (EEC) SM	1310 nm <sup>1)</sup>	50/125 µm	0-11 dB	0-550 m	1.0 dB/km; 800 MHz*km
-LX/LC (EEC) SM	1310 nm <sup>1)</sup>	62.5/125 µm	0-11 dB	0-550 m	1.0 dB/km; 500 MHz*km

-LX/LC (EEC) SM	1310 nm	9/125 μm	0-11 dB	0-20 km	0.4 dB/km; 3.5 ps/(nm*km)
-LX+LC (EEC) SM	1310 nm	9/125 μm	5-20 dB	14-42 km	0.4 dB/km; 3.5 ps/(nm*km)
-LH/LC (EEC) LH	1550 nm	9/125 μm	6-22 dB	24-72 km	0.25 dB/km; 19 ps/(nm*km)
-LH+LC LH	1550 nm	9/125 μm	15-32 dB	60-120 km	0.25 dB/km; 19 ps/(nm*km)

MM = multimode, SM = singlemode, LH = singlemode longhaul

<sup>1)</sup> with F/O adapter in line with IEEE802.3-2002 clause 38 (single-mode fiber offset-launch mode conditioning patch cord)

### Displays

Device status	1 x green LED	<b>P</b> – Power, internal supply voltage present
Port status	4 x green/yellow LED	<b>1 to 4</b> – The meaning depends on the setting of the display status.

### Controls (MM3-2AUI)

3-pole DIP switch	<b>1</b> – <b>SQE-Test Port 1</b> – ON = SQE test function on port 1 enabled
	<b>2</b> – <b>SQE-Test Port 2</b> – ON = SQE test function on port 2 enabled
	<b>3</b> – <b>DTEPower-Monitor</b> – ON = Monitoring of the DTE voltage active

### Scope of delivery

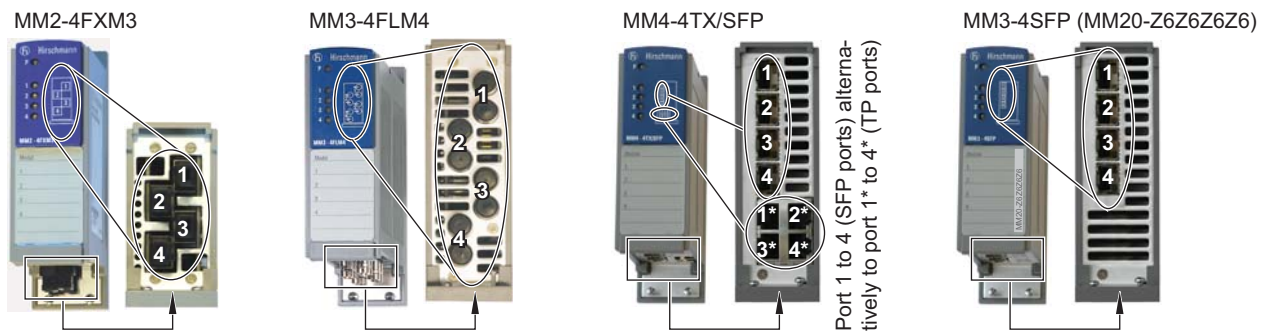
MICE media module incl.	Labels, description and operating instructions
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### Accessories

Pocket Guide	280 720-851
AutoConfigurationAdapter ACA 11	943 751-001
Terminal access cable	943 301-001
6-pin terminal block (50 pieces)	943 845-002
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 RPS60/48V EEC	943 952-001
Network Management Software HiVision	943 471-100
Network Management Software Industrial HiVision	943 156-xxx

## 6. MICE media modules

### 6.1 PORT ASSIGNMENT (EXAMPLES)



### 6.2 NUMBER AND KIND OF MEDIA CONNECTORS

#### MICE 2000 media modules

Module type	AUI port	TP ports 10/100	F/O port multimode 10 Mbit/s	F/O port multimode POF 100 Mbit/s	F/O port multimode 100 Mbit/s	F/O port singlemode 1300 nm, 100 Mbit/s	F/O port singlemode 1550 nm, 100 Mbit/s	Supported since		
								MICE	MICE	MS30
MM2-4TX1(-EEC)	–	4, RJ45	–	–	–	–	–	1.0	1.0	1.0
MM2-2FLM4	–	–	2, ST	–	–	–	–	1.0	1.0	1.0
MM2-4FXM3	–	–	–	–	4, MTRJ	–	–	1.0	1.0	1.0
MM2-2FXM3/2TX1	–	2, RJ45	–	–	2, MTRJ	–	–	1.0	1.0	1.0
MM2-2FXM2	–	–	–	–	2, DSC	–	–	1.0	1.0	1.0
MM2-2FXS2	–	–	–	–	–	2, DSC	–	2.0	1.0	1.0

Table 1: Number of media connectors each MICE 2000 media module, kind of connector and necessary software

#### MICE 3000 media modules

Module type	AUI port	TP ports 10/100	F/O port multimode 10 Mbit/s	F/O port multimode POF 100 Mbit/s	F/O port multimode 100 Mbit/s	F/O port singlemode 1300 nm, 100 Mbit/s	F/O port singlemode 1550 nm, 100 Mbit/s	Supported since		
								MICE	MICE	MS30
MM3-2AUI	2, Sub-D-St.	–	–	–	–	–	–	4.0	1.0	1.0
MM3-4TX5	–	4, M12	–	–	–	–	–	4.0	1.0	1.0

MM3-4TX1-RT <sup>1)</sup>	–	4, RJ45	–	–	–	–	–	5.0	2.0	1.0
MM3-2FLM4/2TX1-RT <sup>1)</sup>	–	2, RJ45	2, ST	–	–	–	–	5.0	2.0	1.0
MM3-4FLM4	–	–	4, ST	–	–	–	–	2.0	1.0	1.0
MM3-1FXM2/3TX1	–	3, RJ45	–	–	1, DSC	–	–	3.1	1.0	1.0
MM3-2FXM2/2TX1(-EEC)	–	2, RJ45	–	–	2, DSC	–	–	2.0	1.0	1.0
MM3-2FXM2/2TX1-RT <sup>1)</sup>	–	2, RJ45	–	–	2, DSC	–	–	5.0	2.0	1.0
MM3-2FXM4/2TX1	–	2, RJ45	–	–	2, ST	–	–	3.1	1.0	1.0
MM3-4FXM2	–	–	–	–	4, DSC	–	–	2.0	1.0	1.0
MM3-4FXM4	–	–	–	–	4, ST	–	–	3.1	1.0	1.0
MM3-1FXS2/3TX1(-EEC)	–	3, RJ45	–	–	–	1, DSC	–	3.1	1.0	1.0
MM3-2FXS2/2TX1	–	2, RJ45	–	–	–	2, DSC	–	2.0	1.0	1.0
MM3-2FXS2/2TX1-RT <sup>1)</sup>	–	2, RJ45	–	–	–	2, DSC	–	5.0	2.0	1.0
MM3-4FXS2	–	–	–	–	–	4, DSC	–	3.1	1.0	1.0
MM3-1FXL2/3TX1	–	3, RJ45	–	–	–	–	1, DSC	2.0	1.0	1.0

Table 2: Number of media connectors each MICE 3000 media module, kind of connector and necessary software

<sup>1)</sup> Realtime modules, in line with IEEE 1588 PTP (Precision Time Protocol Version 2)

### MICE 4000 media modules

Module type	TP ports 10/100/1000	SFP ports alternativ zu TP-Ports/ alternatively to TP ports	Supported since MICE SW release		
			MICE	Power MICE	MS20 MS30
MM4-2TX/SFP	2, RJ45	2	–	2.0	1.0
MM4-4TX/SFP	4, RJ45	4	–	1.0	1.0

Table 3: Number of media connectors each MICE 4000 media module, kind of connector and necessary software

### Open variant media modules

Module type	TP ports 10/100/1000	SFP ports alternativ zu TP-Ports/ alternatively to TP ports	Supported since MICE SW release		
			MICE	Power MICE	MS20 MS30
MM20..., MM21..., MM30...	0 to 4 ports (media and connector at your option, see chapter 8 "Open Variant")		–	–	2.0
MM22-T1T1T1T1	4 ports (twisted pair, RJ45 connector)		–	3.0	3.0
MM20-Z6Z6Z6Z6	4 ports (fiber optic, SFP slot, 100 Mbit/s)		–	4.0	4.0
MM20-P9P9P9P9	4 ports (fiber optic, SCRJ connector, 100 Mbit/s)		–	4.2	4.2
MM20-P9P9T1T1	4 ports (2 x fiber optic, SCRJ connector, 100 Mbit/s; 2 x twisted pair, RJ45 connector)		–	4.2	4.2
MM23-T1T1T1T1...SAHH <sup>1)</sup>	4 ports (twisted pair, RJ45 connector)		–	5.0	5.0
MM23-M2M2T1T1...SAHH <sup>1)</sup>	4 ports (2 x multimode FX, duplex SC connector, 100 Mbit/s; 2 x twisted pair, RJ45 connector)		–	5.0	5.0
MM23-S2S2T1T1...SAHH <sup>1)</sup>	4 ports (2 x singlemode FX, duplex SC connector, 100 Mbit/s; 2 x twisted pair, RJ45 connector)		–	5.0	5.0
MM23-F4F4T1T1...SAHH <sup>1)</sup>	4 ports (2 x multimode FL, ST connector, 10 Mbit/s; 2 x twisted pair, RJ45 connector)		–	5.0	5.0
MM33-O7O79999...SAHH <sup>1)</sup>	2 ports (2 x combo ports twisted pair RJ45 or alternatively SFP slot, 1000 Mbit/s)		–	5.0	5.0

Table 4: MICE open variant media module, necessary software

<sup>1)</sup> Realtime modules, in line with IEEE 1588 PTP (Precision Time Protocol Version 2)

## 6.3 PIN ASSIGNMENT OF THE INTERFACES

### 10/100 Mbit/s twisted pair connection

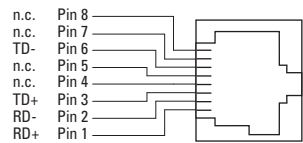


Fig. 4: Pin assignment of a TP/TX interface in MDI-X mode, RJ45 socket

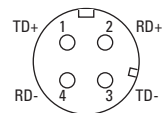


Fig. 5: Pin assignment of a TP/TX interface, M12 socket

### 10/100 Mbit/s twisted pair connection PoE (Power over Ethernet) at MM22-T1T1T1T1 PoE media module

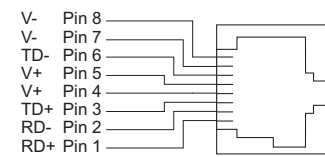


Fig. 6: Pin assignment of a TP/TX interface with PoE, for supply via the the idle wire pairs (spare pairs), RJ45 socket

### 3-pin terminal block (PoE module)

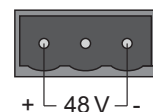


Fig. 7: 3-pin terminal block of the PoE media module

### 10/100/1000 Mbit/s twisted pair connection

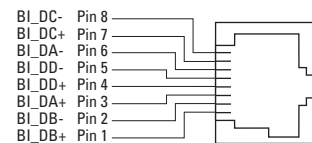


Fig. 8: Pin assignment of the 1000 Mbit/s twisted pair interface

### AUI connection

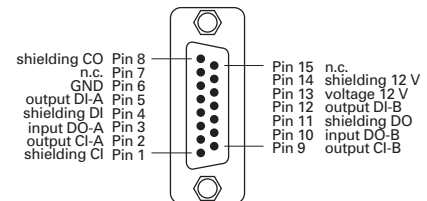


Fig. 9: Pin assignment of the AUI interface

## 7. General data

	Power consumption	Power output	Operating temp. surrounding air	Storage temperature	Order number
<b>MICE 2000 media modules:</b>					
MM2-4TX1	0.8 W	2.8 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 722-101
MM2-4TX1-EEC	0.8 W	2.8 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 722-151
MM2-4FXM3	6.8 W	23.2 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 721-101
MM2-2FXM3 / 2TX1	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 720-101
MM2-2FXM2	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 718-101
MM2-2FXS2	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 719-101
<b>MICE 3000 media modules:</b>					
MM3-2AUI	3.4 W	11.6 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 840-101
MM3-4FLM4	5.0 W	17.1 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 760-101
MM3-2FLM4 / 2TX1-RT	5.0 W	17.1 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 117-004
MM3-4TX5	0.8 W	2.8 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 841-101
MM3-4TX1-RT	0.8 W	2.8 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 117-001
MM3-1FXM2 / 3TX1	2.3 W	7.9 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 839-101
MM3-1FXM2 / 3TX1-EEC	2.3 W	7.9 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 839-151
MM3-2FXM2 / 2TX1	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 761-101
MM3-2FXM2 / 2TX1-EEC	3.8 W	13.0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 761-151
MM3-2FXM2 / 2TX1-RT	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 117-002
MM3-2FXM4 / 2TX1	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 837-101
MM3-4FXM2	6.8 W	23.2 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 764-101
MM3-4FXM4	6.8 W	23.2 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 835-101
MM3-1FXS2 / 3TX1	2.3 W	7.9 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 838-101
MM3-1FXS2 / 3TX1 EEC	2.3 W	7.9 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 838-151
MM3-2FXS2 / 2TX1	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 762-101
MM3-2FXS2 / 2TX1-EEC	3.8 W	13.0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 762-151
MM3-2FXS2 / 2TX1-RT	3.8 W	13.0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 117-003
MM3-4FXS2	6.8 W	23.2 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 836-101
MM3-1FXL2 / 3TX1	3.4 W	11.6 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 763-101
MM3-4SFP	8.0 W	27.3 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 938-001
<b>MICE 4000 media modules:</b>					
MM4-4TX / SFP	9.0 W	30.8 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 010-001
MM4-2TX / SFP	5.8 W	19.8 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 622-001
<b>Open variant media modules</b> (You will find further information on <a href="http://www.hirschmann.com">www.hirschmann.com</a> ):					
MM20-... 4 TX-/0 FX-Ports	0.8 W	2.8 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM20-... 3 TX-/1 FX-Ports	2.3 W	7.9 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM20-... 2 TX-/2 FX-Ports	3.8 W	13.0 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM20-... 0 TX-/2 FX-Ports	3.8 W	13.0 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM20-... 1 TX-/3 FX-Ports	5.3 W	18.1 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM20-... 0 TX-/4 FX-Ports	6.8 W	23.2 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM20-A8A89999	3.4 W	11.6 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM20-F4F4F4F4	5.0 W	17.1 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM20-Z6Z6Z6Z6	8.0 W	27.3 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM20-P9P9P9P9SAHH	8.0 W	27.3 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	product code; chap. 8
MM20-P9P9T1T1SAHH	5.2 W	17.8 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	product code; chap. 8
MM30-O7O7O7O7	9.0 W	30.8 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM30-O7O79999	5.8 W	19.8 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM21-T1T1T1T1	0.8 W	2.8 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM21-F4F4T1T1	5.0 W	17.1 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM21-M2M2T1T1	3.8 W	13.0 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM21-S2S2T1T1	3.8 W	13.0 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM22-T1T1T1T1	0.8 W	2.8 Btu (IT)/h	see chapter 8	see chapter 8	product code; chap. 8
MM23-T1T1T1T1...SAHH	4.5 W	15.4 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	product code; chap. 8
MM23-M2M2T1T1...SAHH	6.0 W	20.5 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	product code; chap. 8
MM23-S2S2T1T1...SAHH	5.5 W	18.8 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	product code; chap. 8
MM23-F4F4T1T1...SAHH	5.5 W	18.8 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	product code; chap. 8
MM33-O7O79999...SAHH	7.5 W	25.6 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	product code; chap. 8
<b>Expansion moduel</b>					
MB20	0 W	0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 733-002
<b>Fast ETHERNET SFP modules:</b>					
M-FAST SFP-MM / LC	0 W	0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 865-001
M-FAST SFP-MM / LC EEC	0 W	0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 945-001
M-FAST SFP-SM / LC	0 W	0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 866-001
M-FAST SFP-SM / LC EEC	0 W	0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 946-001
M-FAST SFP-SM+ / LC	0 W	0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 867-001
M-FAST SFP-SM+ / LC EEC	0 W	0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 947-001
M-FAST SFP-LH / LC	0 W	0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 868-001



**Gigabit ETHERNET SFP modules:**

M-SFP-SX / LC	0 W	0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 014-001
M-SFP-SX / LC EEC	0 W	0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 896-001
M-SFP-MX / LC	0 W	0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	942 035-001
M-SFP-LX / LC	0 W	0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 015-001
M-SFP-LX / LC EEC	0 W	0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 897-001
M-SFP-LH / LC	0 W	0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 042-001
M-SFP-LH / LC EEC	0 W	0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 898-001
M-SFP-LH+ / LC	0 W	0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	942 023-001
M-SFP-LH+ / LC EEC	0 W	0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	942 024-001
M-SFP-LH+ / LC	0 W	0 Btu (IT)/h	0 °C ... +60 °C	-40 °C ... +70 °C	943 049-001

**Bidirectional Gigabit ETHERNET SFP modules:**

M-SFP-BIDI Type A LX/LC EEC	0 W	0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 974-001
M-SFP-BIDI Type B LX/LC EEC	0 W	0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 974-002
M-SFP-BIDI Type A LX/LC EEC	0 W	0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 975-001
M-SFP-BIDI Type B LX/LC EEC	0 W	0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 975-002
M-SFP-BIDI Bundle LX/LC EEC (Type A + B)	0 W	0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 974-101
M-SFP-BIDI Bundle LX/LC EEC (Type A + B)	0 W	0 Btu (IT)/h	-40 °C ... +70 °C	-40 °C ... +85 °C	943 975-101

**8. Open variant product code**

Alternatively to the order number (ref. table in chapter 7, last column) you can use the product code. It offers you, tailored to your requirements, an additional variety of media module types.

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 column "Ident.".

Example:  
Product code MM30-07070707SA = media module 1000 Mbit/s with four combo ports gigabit Ethernet (four SFP ports or alternatively four TP ports RJ45). This example equals the module MM4-4TX/SFP with the order number 943 010-001.

Position	Attribute	Ident.	Feature
1 to 4	Product	MM20	Media module 10/100 Mbit/s (standard)
		MM21	Media module 10/100 Mbit/s (PTP Version 2)
		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)		
6 and 7	1st port (media/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 longhaul FX DSC (100 Mbit/s)
		G2	Singlemode longhaul FX DSC 200km (100 Mbit/s)
		F4	Multimode FL ST (10 Mbit/s)
		P9	POF FX SCRJ (100Mbit/s)
		O7	Combo port gigabit Ethernet (SFP 1000 Mbit/s)
		A8	AUI Sub-D
		Z6	Fiber optic / SFP slot (100 Mbit/s)
8 and 9	2nd port (media/connector)	...	See position 6 and 7
10 and 11	3rd port (media/connector)	...	See position 6 and 7
		99	Empty
12 and 13	4th port (media/connector)	...	See position 6 and 7
		99	Empty
14	Temperature range (Surrounding air)	S	Standard 0 °C to +60 °C
		T	Extended -40 °C to +70 °C
		E	Extended -40 °C to +70 °C & Conformal Coating
15	Specifications	A	CE, UL 508, ISA 12.12.01 (UL 1604)
		H	A plus GL, IEC 61850, IEEE 1613 substation, EN 50121-4 railway (along track)
		B	H plus ATEX directive 94/9/EC

Position	Attribute	Ident.	Feature
1 to 4	Product	MB20	Backplane expansion module Fast Ethernet 10/100
5	- (hyphen)		
6		2	numbers of media module slots
7	Temperature range (Surrounding air)	S T E	Standard 0 °C ... +60 °C Extended -40 °C ... +70 °C Extended -40 °C ... +70 °C & Conformal Coating
8	Specifications	A H B	UL508, ISA 12.12.01 A plus GL, IEC 61850, IEEE 1613 substation, EN 50121-4 railway (along track) H plus ATEX directive 94/9/EC

**NOTE:** Designation for MB-2T expansion module has now changed to MB20 expansion module.

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