SIEMENS

SIMATIC NET

Industrial Ethernet switches SCALANCE MM900

Compact Operating Instructions

05/2016

A5E02630805-12

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Introduction 1

1.1 Introduction to MM900

Purpose of the Operating Instructions (compact)

These operating instructions (compact) contain information with which you will be able to install and connect up a device of the SCALANCE X-300 product line.

Validity of these Operating Instructions (compact)

These Operating Instructions (compact) are valid for the product group MM900 of the SCALANCE X-300 product line (see product overview).

Names of the devices in these operating instructions (compact)

Classification	Description	Terms used
Product line	For all devices and variants of all product groups within the SCALANCE X-300 product line, the term IE switches X-300 is used.	IE switches X-300
Product group	For all devices and variants of a product group, only the product group is used.	MM900
Device	For a device, only the device name is used.	MM992-2SFP
Variant	For a variant of the device, the device name has the appropriate variant added to it in brackets (2x24V).	(-)
All variants of a device	For all variants of the device, the device name has (all) added to it.	(-)

Where can I find more detailed information on the product?

A CD is supplied with the IE Switches X-300 on which you will find a detailed description of the products in PDF format in the relevant subfolder.

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, solutions, machines, equipment and/or networks. They are important components in a holistic industrial security concept. With this in mind, Siemens' products and solutions undergo continuous development. Siemens recommends strongly that you regularly check for product updates.

For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action (e.g. cell protection concept) and integrate each component into a holistic, state-of-the-art industrial security concept. Third-party products that may be in use should

also be considered. For more information about industrial security, visit http://www.siemens.com/industrialsecurity.

To stay informed about product updates as they occur, sign up for a product-specific newsletter. For more information, visit http://support.automation.siemens.com.

SIMATIC NET glossary

Explanations of many of the specialist terms used in this documentation can be found in the SIMATIC NET glossary.

You will find the SIMATIC NET glossary here:

- SIMATIC NET Manual Collection or product DVD

  The DVD ships with certain SIMATIC NET products.

- On the Internet under the following address:

  50305045 (http://support.automation.siemens.com/WW/view/en/50305045)

1.2 MM900 media modules

Note

Type designation and labeling of a media module differ

Example: The device with order number 6GK5 992-2AS00-8AA0 is called "MM992-2SFP", the labeling on the device is "9922AS".

The labeling on the devices is shown in bold face in the following table following the [order numbers].

Note

Media modules for SFP transceivers

Only the media modules MM992-2SFP andMM992-2SFP (C) may be fitted with approved SFP transceivers. These SFP media modules can be fitted with up to two SFPs.

Note

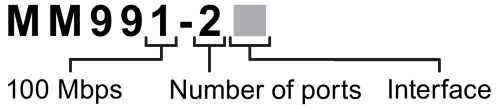
Supplement (C) in the type name

Media modules with the supplement (C) in the type name have varnished printed circuit boards (conformal coating).

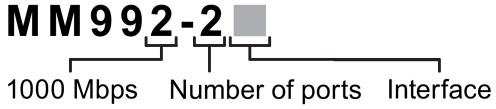
Media module	Properties	Order number Labeling on the device
MM992-2CUC	2 x 10/100/1000 Mbps, RJ-45 ports electrical with securing collar	6GK5 992-2GA00-8AA0 **9922GA**
MM992-2CUC (C)	2 x 10/100/1000 Mbps, RJ-45 ports electrical with securing collar, varnished	6GK5 992-2GA00-8FA0 **9922GA**
MM992-2CU	2 x 10/100/1000 Mbps, RJ-45 port electrical without securing collar	6GK5 992-2SA00-8AA0 **9922SA**
MM992-2M12 (C)	2 x 10/100/1000 Mbps, GE M12 connector electrical, varnished	6GK5 992-2HA00-0AA0 **9922HA**
MM992-2VD	2 x 10/100/1000 Mbps, RJ-45 ports electrical with securing collar, variable distance	6GK5 992-2VA00-8AA0 **9922VA**
MM992-2SFP	2 x 100/1000 Mbps, SFP media module	6GK5 992-2AS00-8AA0 **9922AS**
MM992-2SFP (C)	2 x 100/1000 Mbps, SFP media module, varnished	6GK5 992-2AS00-8FA0 **9922AS**
MM991-2	2 x 100 Mbps, BFOC port optical, for glass FO cable (multimode), up to max. 5 km	6GK5 991-2AB00-8AA0 **9912AB**
MM991-2FM	2 x 100 Mbps, BFOC port optical, for glass FO cable (multimode) with diagnostics up to max. 5 km	6GK5 991-2AB01-8AA0 **9912AB**
MM991-2LD	2 x 100 Mbps, BFOC port optical, for glass FO cable (single mode), up to max. 26 km	6GK5 991-2AC00-8AA0 **9912AC**
MM991-2 (SC)	2 x 100 Mbps, SC ports optical, for glass FO cable (multimode), up to max. 5 km	6GK5 991-2AD00-8AA0 **9912AD**
MM991-2LD (SC)	2 x 100 Mbps, SC ports optical, for glass FO cable (single mode), up to max. 26 km	6GK5 991-2AF00-8AA0 **9912AF**
MM991-2LH+ (SC)	2 x 100 Mbps, SC ports optical, for glass FO cable (single mode), up to max. 70 km	6GK5 991-2AE00-8AA0 **9912AE**
MM991-2P	2 x 100 Mbps SC RJ ports optical for Plastic Optical Fiber (POF) up to max. 50 m or Polymer Cladded Fiber (PCF) up to max. 100 m	6GK5 991-2AH00-8AA0 **9912AH**
MM992-2	2 x 1000 Mbps, SC ports optical, for glass FO cable (multimode), up to max. 750 m	6GK5 992-2AL00-8AA0 **9922AL**
MM992-2 (C)	2 x 1000 Mbps, SC ports optical, for glass FO cable (multimode), up to max. 750 m, varnished	6GK5 992-2AL00-8FA0 **9922AL**
MM992-2LD	2 x 1000 Mbps, SC ports optical, for glass FO cable (single mode), up to max. 10 km	6GK5 992-2AM00-8AA0 **9922AM**
MM992-2LH	2 x 1000 Mbps, SC ports optical, for glass FO cable (single mode), up to max. 40 km	6GK5 992-2AN00-8AA0 **9922AN**
MM992-2LH+	2 x 1000 Mbps, SC ports optical, for glass FO cable (single mode), up to max. 70 km	6GK5 992-2AP00-8AA0 **9922AP**
MM992-2ELH	2 x 1000 Mbps, SC ports optical, for glass FO cable (single mode), up to max. 120 km	6GK5 992-2AQ00-8AA0 **9922AQ**

Type key for the MM900 media modules

The type designation of an MM900 media module is made up of several parts that have the following meaning:



Interface	Property
[-]	BFOC port 100 Mbps multimode FO cable
LD	BFOC port 100 Mbps single mode FO cable
(SC)	SC port 100 Mbps multimode FO cable (up to max. 5 km)
LD (SC)	SC port 100 Mbps single mode FO cable (up to max. 26 km)
LH+ (SC)	SC port 100 Mbps single mode FO cable (up to max. 70 km)
P	SC RJ port 100 Mbps POF or PCF
FM	BFOC port 100 Mbps multimode FO cable with diagnostics



Interface	Property
CU	RJ-45 port electrical 10/100/1000 Mbps without securing collar
CUC	RJ-45 port electrical 10/100/1000 Mbps with securing collar
M12	M12 connection electrical 10/100/1000 Mbps
VD	RJ-45 port electrical 10/100/1000 Mbps with securing collar (up to max. 1000 m)
[-]	SC port 1000 Mbps multimode FO cable (up to max. 750 m)
LD	SC port 1000 Mbps single mode FO cable (up to max. 10km)
LH	SC port 1000 Mbps single mode FO cable (up to max. 40 km)
LH+	SC port 1000 Mbps single mode FO cable (up to max. 70 km)
ELH	SC port 1000 Mbps single mode FO cable (up to max. 120 km)
SFP	SFP media module

Safety notes 2

2.1 General safety notices for the SCALANCE MM900 media modules

Safety notices on the use of the device

The following safety notices must be adhered to when setting up and operating the device and during all associated work such as installation, connecting up, replacing or opening the device.

⚠ WARNING

Opening the device

DO NOT OPEN WHEN ENERGIZED.

General notices about use in hazardous areas

⚠ WARNING

Risk of explosion when connecting or disconnecting the device

EXPLOSION HAZARD

DO NOT CONNECT OR DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

⚠ WARNING

Replacing components

EXPLOSION HAZARD

SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2 OR ZONE 2.

⚠ WARNING

Requirements for the cabinet/enclosure

When used in hazardous environments corresponding to Class I, Division 2 or Class I, Zone 2, the device must be installed in a cabinet or a suitable enclosure.

Notices on use in hazardous areas according to ATEX and IECEx

⚠ WARNING

Requirements for the cabinet/enclosure

To comply with EC Directive 94/9 (ATEX95) or the conditions of IECEx, this enclosure must meet the requirements of at least IP54 in compliance with EN 60529.

The fiber-optic bus connections labeled SCALANCE MM900 (see type plate) may also be led through a hazardous area zone1 (see also Approvals (Page 47), section "Explosion Protection Directive (ATEX)").

⚠ WARNING

Suitable cables for temperatures in excess of 70 °C

If the cable or conduit entry point exceeds 70 °C or the branching point of conductors exceeds 80 °C, special precautions must be taken. If the equipment is operated in an air ambient in excess of 50 °C - 70 °C, only use cables with admitted maximum operating temperature of at least 80 °C.

⚠ WARNING

Protection against transient voltage surges

Provisions shall be made to prevent the rated voltage from being exceeded by transient voltage surges of more than 40%. This criterion is fulfilled, if supplies are derived from SELV (Safety Extra-Low Voltage) only.

2.2 Important notes on using the device in hazardous areas

⚠ WARNING

WARNING - EXPLOSION HAZARD -

DO NOT DISCONNECT WHILE CIRCUIT IS LIVE UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS.

⚠ WARNING

Restricted area of application

This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D or non-hazardous locations only.

⚠ WARNING

Restricted area of application

This equipment is suitable for use in Class I, Zone 2, Group IIC or non-hazardous locations only.

Description 3

3.1 Unpacking and checking

Unpacking, checking

⚠ WARNING

Do not use any parts that show evidence of damage

If you use damaged parts, there is no guarantee that the device will function according to the specification.

If you use damaged parts, this can lead to the following problems:

- Injury to persons
- Loss of the approvals
- Violation of the EMC regulations

Use only undamaged parts.

1. Make sure that the package is complete.
2. Check all the parts for transport damage.

3.2 Components shipped with the MM900 product

The following components are supplied with a SCALANCE MM900 media module:

- MM99x-2xx media module

Note

Identification labels

The location labels identify the media modules and ship with the SCALANCE device.

3.3 General notes on MM900

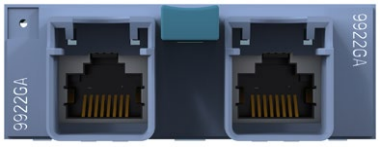
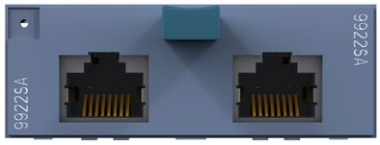
Note

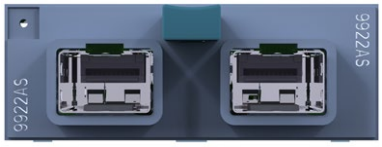
Use media modules only in an approved modular device ("M")

Use an MM900 media module only in a device equipped with suitable slots for such modules. Example: X308-2M.

The MM900 media module decides what can be connected

The connection of end devices or other network segments does not depend on the module slot, but rather on the selected MM900 media module.

Possible attachment	Figure
Electrical RJ-45 ports with securing collar	
Electrical RJ-45 ports without securing collar	
GE M12 connector electrical	
BFOC ports optical	
Optical SC ports	

Possible attachment	Figure
SFP transceivers Only the SFP media module MM992-2SFP may be fitted with approved SFP transceivers. The SFP media module can be fitted with up to two SFPs.	
SC RJ ports optical	

3.4 Product characteristics

3.4.1 MM992-2CUC product characteristics

Possible attachments

The MM992-2CUC media module has the following:

- 2 x 10/100/1000 Mbps, RJ-45 ports electrical with securing collar

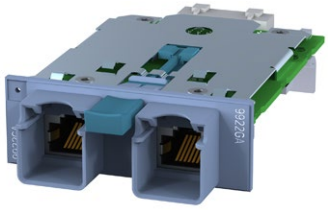


Image 3-1 MM992-2CUC [9922GA]

[Device labeling in square brackets]

Note

For connection to electrical networks note the information in Appendix A.1 and A.2.

3.4.2 MM992-2CU product characteristics

Possible attachments

The MM992-2CU media module has the following:

- 2 x 10/100/1000 Mbps, RJ-45 port electrical without securing collar

Image 3-2 MM992-2CU [9922SA]

[Device labeling in square brackets]

Note

For connection to electrical networks note the information in Appendix A.1 and A.2.

3.4.3 MM992-2M12 product characteristics

Possible attachments

The MM992-2M12 media module has the following:

- 2 x 10/100/1000 Mbps, GE M12 connector electrical

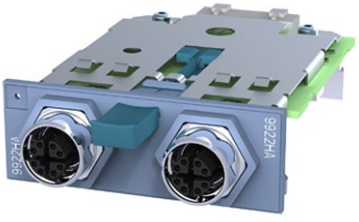


Image 3-3 MM992-2M12C [9922HA]

[Device labeling in square brackets]

Note

For connection to electrical networks note the information in Appendix (A.1, A.2 and A.3)

3.4.4 MM992-2VD product characteristics

Possible attachments

The MM992-2VD media module has the following:

- 2 x 10/100/1000 Mbps, RJ-45 ports electrical with securing collar
- Additional two-wire transfer function (variable distance) for establishing Ethernet connections even using cables that do not conform to Ethernet. Possible distance covered depends on the cable quality.

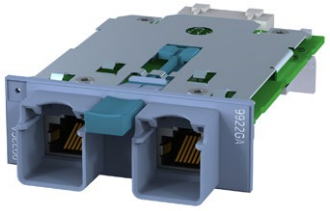


Image 3-4 MM992-2VD [9922VA]

[Device labeling in square brackets]

Note

For connection to electrical networks note the information in Appendix A.1 and A.2.

Pin assignment for the RJ-45 connector of a PROFIBUS cable

If you use a PROFIBUS cable along with an IE FC RJ-45 plug 4x2, note the following:

RJ-45 connectors		PROFIBUS cable
Pin assignment	Color	Wire color
1	Yellow	Green
2	Orange	Red
3	White	--
6	Blue	--

Note

Using PROFIBUS standard cable GP

If you use a PROFIBUS standard cable GP, the wires must be stripped before they are inserted in the FC connector.

Note

If you use cables with a length > 500 m, connection establishment can take up to 2 min.

Note

If you connect an MM992-2VD media module to existing PROFIBUS cabling, the same requirements relating to shield contact and the lightning protection concept apply as for PROFIBUS.

3.4.5 MM992-2SFP / MM992-2SFP (C) product properties

Note

Only the media modules MM992-2SFP / M992-2SFP (C) may be fitted with approved SFP transceivers. The SFP media modules can be fitted with up to two SFPs.

Possible attachments

The media modules MM992-2SFP / M992-2SFP (C) have:

- 2 x 100/1000 Mbps, SFP slot

Image 3-5 MM992-2SFP [9922AS]

[Device labeling in square brackets]

3.4.6 MM991-2 product characteristics

Possible attachments

The MM991-2 media module has the following:

- 2 x 100 Mbps, BFOC port optical (multimode, glass) up to max. 5 km

Image 3-6 MM991-2 [9912AB]

[Device labeling in square brackets]

3.4.7 MM991-2FM product characteristics

Possible attachments

The MM991-2FM media module has the following:

- 2 x 100 Mbps, BFOC port optical (multimode, glass) with diagnostics up to max. 5 km

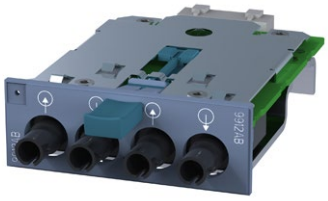


Image 3-7 MM991-2FM [9912AB]

[Device labeling in square brackets]

3.4.8 MM991-2LD product characteristics

Possible attachments

The MM991-2LD media module has the following:

- 2 x 100 Mbps, BFOC port optical, (single mode glass), up to max. 26 km

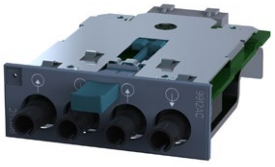


Image 3-8 MM991-2LD [9912AC]

[Device labeling in square brackets]

3.4.9 MM991-2 (SC) product characteristics

Possible attachments

The MM991-2 (SC) media module has the following:

- 2 x 100 Mbps, SC port optical, (multimode glass), up to max. 5 km

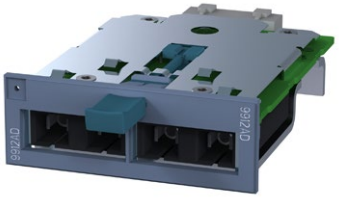


Image 3-9 MM991-2 (SC) [9912AD]

[Device labeling in square brackets]

3.4.10 MM991-2LD (SC) product characteristics

Possible attachments

The MM991-2LD (SC) media module has the following:

- 2 x 100 Mbps, SC port optical, (single mode glass), up to max. 26 km

Image 3-10 MM991-2LD (SC) [9912AF]

[Device labeling in square brackets]

3.4.11 MM991-2LH+ (SC) product characteristics

Possible attachments

The MM991-2LH+ (SC) media module has the following:

- 2 x 100 Mbps, SC port optical, (single mode glass), up to max. 70 km

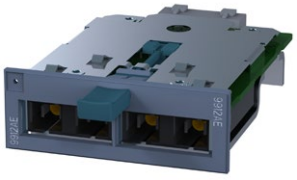


Image 3-11 MM991-2LH+ (SC) [9912AE]

[Device labeling in square brackets]

3.4.12 MM991-2P product characteristics

Possible attachments

The MM991-2P media module has the following:

- 2 x 100 Mbps SC RJ ports optical for Plastic Optical Fiber (POF) up to max. 50 m or Polymer Cladded Fiber (PCF) up to max. 100 m

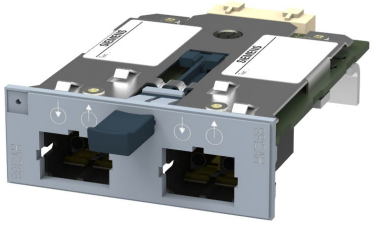


Image 3-12 MM991-2P [9912AH]

[Device labeling in square brackets]

Note

Installation of the XR-300M, XR-300M PoE and XR-300M EEC

Only the lower slots may be equipped with the MM991-2P.

- XR-300M: Maximum 6 modules in slots 7 to 12
- XR-300M PoE, XR-300M EEC: Maximum 2 modules in slots 3 and 4

The slot above an MM991-2P may only be used as follows:

- Without media module
- With media module MM992-2CUC or MM992-2CU

Example XR-300M: If the MM991-2P is plugged into slot 8, an MM992-2CUC may be used in slot 2.

See also table: "Operating temperature with media module MM991-2P (Page 33)"

3.4.13 MM992-2 product characteristics

Possible attachments

The MM992-2 media module has the following:

- 2 x 1000 Mbps, SC port optical, (multimode glass), up to max. 750 m

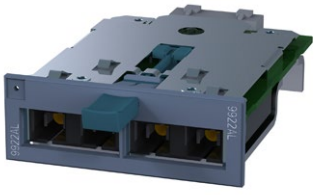


Image 3-13 MM992-2 [9922AL]

[Device labeling in square brackets]

3.4.14 MM992-2LD product characteristics

Possible attachments

The MM992-2LD media module has the following:

- 2 x 1000 Mbps, SC port optical, (single mode glass), up to max. 10 km

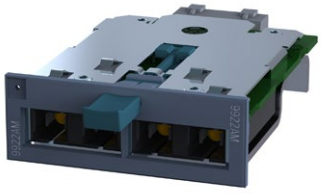


Image 3-14 MM992-2LD [9922AM]

[Device labeling in square brackets]

3.4.15 MM992-2LH product characteristics

Possible attachments

The MM992-2LH media module has the following:

- 2 x 1000 Mbps, SC port optical, (single mode glass), up to max. 40 km

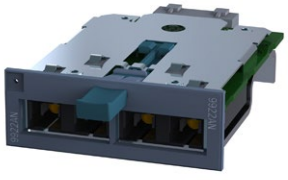


Image 3-15 MM992-2LH [9922AN]

[Device labeling in square brackets]

3.4.16 MM992-2LH+ product characteristics

Possible attachments

The MM992-2LH+ media module has the following:

- 2 x 1000 Mbps, SC port optical, (single mode glass), up to max. 70 km

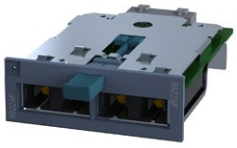


Image 3-16 MM992-2LH+ [9922AP]

[Device labeling in square brackets]

3.4.17 MM992-2ELH product characteristics

Possible attachments

The MM992-2ELH media module has the following:

- 2 x 1000 Mbps, SC port optical, (single mode glass), up to max. 120 km

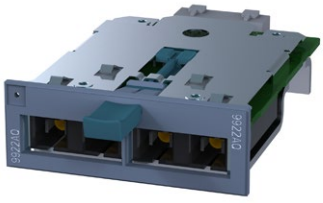


Image 3-17 MM992-2ELH [9922AQ]

[Device labeling in square brackets]

Assembling

4

4.1 Installation and removal of media modules

Connecting media modules and SFP transceivers

WARNING

Install and remove media modules only when the power is off

Media modules may only be inserted in or removed from a SCALANCE device when the power supply to the device has been turned off.

Use only approved media modules

Use only "MM900" media modules in the module slots of SCALANCE devices.

⚠ CAUTION

Remember the orientation of media modules.

On modular devices, there are always two module slots arranged opposite each other. Remember the correct orientation when installing MM900 media modules.
Example:

- The first MM900 media module is installed in slot 3.
- The second MM900 media module installed in slot 4 must be turned through 180 degrees.

On modular devices for rack mounting, pairs of module slots are located one above the other in which modules can be inserted in a specific order:

Example of a rack device:

- The first MM900 media module is installed in slot 1.
- The second MM900 media module installed in slot 7 must be turned through 180 degrees.

Other modules are then inserted in slots 2 and 8 or 3 and 9 etc.

The permitted operating temperature is decided by the fully equipped device (switch + media module + SFP transceiver).

With modular devices, it is not only the switch that decides the permitted operating temperature of the overall device but also the temperature ranges of the MM900 media modules and the SFP transceivers. You will find details in the technical specifications of the relevant components.

The following aspects can restrict the maximum permitted operating temperature:

- The orientation of the carrier device.
- The use of SFP transceivers.
- The use of transceivers of the types LH, LH+ or ELH.

NOTICE

Failure of the data traffic due to contamination of optical plug-in connections

Optical sockets and plugs are sensitive to contamination of the end face. Contamination can lead to the failure of the optical transmission network.

Close unused optical sockets and plugs as well as pluggable transceivers and slots with the supplied protective caps.

Remove the protective caps only immediately before you use the plug-in connection.

NOTICE

Use only approved SFPs

If you use components not approved by Siemens AG, in particular SFPs, Siemens cannot accept any responsibility for the correct functioning of the "Ethernet switch system" according to the specification.

Moreover, if components are used that have not been Siemens approved, Siemens cannot vouch for their compatibility or for risk-free use of these components.

Note

Use media modules only in an approved modular device

Use an MM900 media module only for a device equipped with suitable slots for such modules. Example: X308-2M.

The names and labeling of the media modules differ

- Example: The device is called, for example, MM992-2SFP" [6GK5 992-2AS00-8AA0], the labeling on the device is “9922AS”. You will find detailed information on the labeling of the media modules in the "MM900 media modules" compact operating instructions.

Note

SFP transceivers with the SCALANCE XR324-4M EEC

In contrast to the information in the product documentation for the SCALANCE MM900, MM992-2SFP media modules can be operated in the SCALANCE XR324-4M EEC at ambient temperatures up to a maximum of 70 °C if the following requirements are met:

- MM992-2SFP media modules as of hardware product version 02 are suitable. The hardware product version can be found on the device. You can also read out this information with the WBM or the CLI.
- Only the following SFP transceivers may be used:
  - SFP991-1
  - SFP991-1LD
  - SFP992-1
  - SFP992-1LD

Note

Slot number

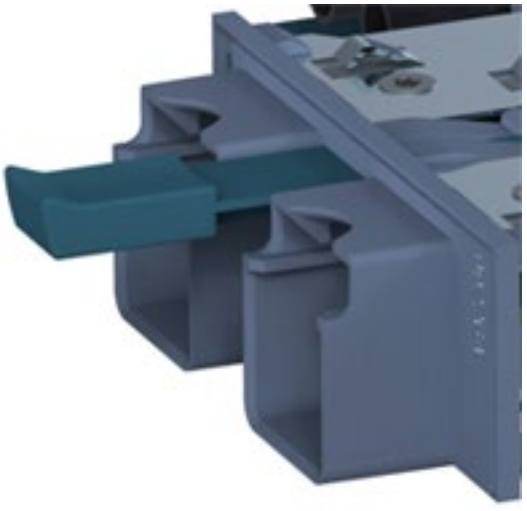
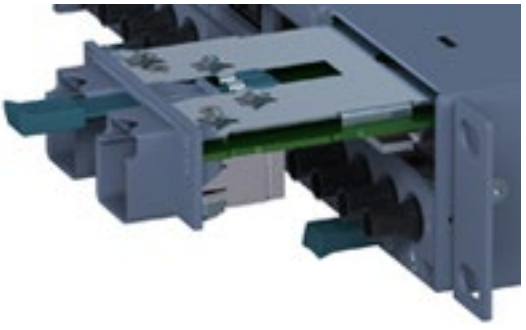
With modular devices, the MM900 media modules must be given a slot number.
The slot number labels are supplied with the modular devices.

Installing a media module

The media module is inserted with the handle pulled out. When the handle is inserted, the media module is locked in the device.

Note

The figures in the following installation instructions show the installation of a media module in a rack device. The procedure for installation is identical for rack or compact devices.

1.	Select the required slot on the device (for example, X308-2M). Remove the dummy cover.	
2.	Pull out the handle on the selected media module.	
3.	Place the media module in the guide rails of the device slot. The media module is correctly installed when it clips easily into the device.	

4.	Push the handle back into the media module. This locks the media module in the device.	
5.	Insert the connectors.	

Removing a media module

CAUTION

Risk of burns due to the high temperature of the module housing

Before removing an MM900 media module, turn the switch off and allow the device to cool down first.

1. Remove all connectors from the media module.
2. Pull out the handle of the media module and remove the media module from the device slot.
3. Secure the dummy cover.

4.2 SFP installation in SFP media module

NOTICE
Use only approved SFPs If you use SFPs that are not approved by Siemens AG, there is no guarantee that the device will function according to the specification. If you use unapproved SFPs, this can lead to the following problems: • Damage to the device • Loss of the approvals • Violation of the EMC regulations Use only approved SFPs.

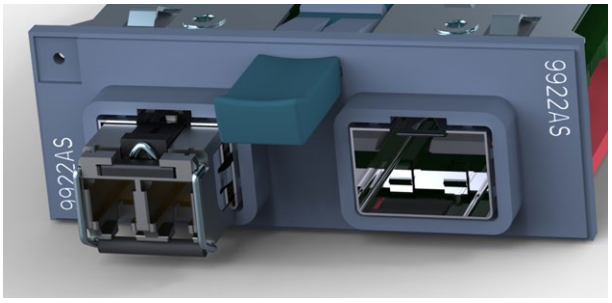
You can insert or remove the SFP during ongoing operation.

Inserting an SFP

Note

Only the media module MM992-2SFP may be fitted with approved SFPs. The SFP media module can be fitted with up to two SFPs.

Device: Media module	Variant	[Order number] Labeling on the device	Figure
MM992-2SFP (SFP media module)	2 x 100/1000 Mbps	[6GK5 992-2AS00-8AA0] 9922AS	

1.	Select the required SFP media module in the slot of the device. (Example: X-308-2M, slot 2)	
2.	Insert the SFP with the clip closed in the SFP media module. Notice: Closing the clip after insertion does not lock the device in the rack.	
3.	The SFP can be heard to lock in place and is therefore firmly secured.	
4.	Plug the connecting cable into the SFP. The connecting cable can be heard to lock in place and is then firmly secured.	

Removing an SFP

1. Remove the cable connected to the SFP.
2. Open the clip on the SFP and remove the SFP from the SFP media module.

   Notice: It must be possible to remove the SFP easy without using force.
3. Fit a blind plug to the SFP.

Technical data

5

Note

Validity of the technical specifications

All the technical specifications described in this section that are not specific to a product version, apply to the MM900 media module.

5.1 Construction, installation and environmental conditions

Table 5- 1 Construction

Dimensions (W x H x D)	60 × 22 × 100 mm
Weight	80 g

Table 5- 2 Operating temperature depending on the media modules used [1) 2)]

Type	Installation location	Without media module	MM992-2CUC MM992-2CUC (C) MM992-2CU MM992-2M12 (C) MM992-2VD MM991-2 MM991-2FM MM991-2LD MM991-2 (SC) MM991-2LD (SC) MM992-2 MM992-2 (C) MM992-2LD	MM991-2LH+ (SC) MM992-2LH MM992-2LH+ MM992-2ELH	Media module MM992-2SFP with SFP transceiver SFP991-1 SFP991-1LD SFP992-1 SFP992-1LD	Media module MM992-2SFP with SFP transceiver SFP991-1LH+ SFP992-1LH SFP992-1LH+ SFP992-1ELH SFP991-1ELH200
X-300M	Horizontal	-40 °C to +70 °C			-40 °C to +60 °C	
	Vertical	-40 °C to +50 °C				
X-300M PoE	Horizontal	-40 °C to +60 °C		-40 °C to +50 °C	-40 °C to +60 °C	-40 °C to +50 °C
	Vertical	-40 °C to +45 °C				

Type	Installation location	Without media module	MM992-2CUC MM992-2CUC (C) MM992-2CU MM992-2M12 (C) MM992-2VD MM991-2 MM991-2FM MM991-2LD MM991-2 (SC) MM991-2LD (SC) MM992-2 MM992-2 (C) MM992-2LD	MM991-2LH+ (SC) MM992-2LH MM992-2LH+ MM992-2ELH	Media module MM992-2SFP with SFP transceiver SFP991-1 SFP991-1LD SFP992-1 SFP992-1LD	Media module MM992-2SFP with SFP transceiver SFP991-1LH+ SFP992-1LH SFP992-1LH+ SFP992-1ELH SFP991-1ELH200
XR-300M	Horizontal	Not possible (fully modular device)	-40 °C to +70 °C	Maximum 2 modules in slots 11 and 12: -40 °C to +60 °C With more than 2 modules or other slot assignment: -40 °C to +50 °C	-40 °C to +60 °C	Maximum 2 modules in slots 11 and 12: -40 °C to +60 °C With more than 2 modules or other slot assignment: -40 °C to +50 °C
	Vertical	Not possible (fully modular device)	-40 °C to +50 °C			
XR-300M PoE	Horizontal	-40 °C to +60 °C		Maximum 2 modules in slots 3 and 4: -40 °C ... +60 °C With more than 2 modules or other slot assignment: -40 °C to +50 °C	-40 °C to +60 °C	Maximum 2 modules in slots 3 and 4: -40 °C to +60 °C With more than 2 modules or other slot assignment: -40 °C to +50 °C
	Vertical	-40 °C to +50 °C				
XR-300M EEC	Horizontal	-40 °C to +70 °C		Maximum 2 modules in slots 3 and 4: -40 °C ... +60 °C With more than 2 modules or other slot assignment: -40 °C to +50 °C	-40 °C to +70 °C SFP transceivers of this group can only be used in conjunction with media modules MM992-2CUC, MM992-2CUC (C) and MM992-2CU. When using other modules: -40 °C to +60 °C	Maximum 2 modules in slots 3 and 4: -40 °C to +60 °C With more than 2 modules or other slot assignment: -40 °C to +50 °C
	Vertical	-40 °C to +50 °C				

1) Only hardware product version 02 of the media modules is permitted.
The hardware product version is shown on the product. You can also read out this information from the device with the WBM or the CLI.

2) The permitted operating temperature depends on how the mounting device was installed. The installation is horizontal if the device labeling is from left to right. With a vertical installation, the device labeling is rotated through 90°.

Table 5- 3 **Operating temperature with media module MM991-2P**

Type	Operating temperature
X-300M X-300M PoE	• - 25 °C to + 40 °C
XR-300M XR-300M PoE XR-300M EEC	The slot above an MM991-2P may be used as follows: • Without media module: - 25 °C to + 50 °C) • With media module MM992-2CUC or MM992-2CU: - 25 °C to + 40 °C) Note the information under "MM991-2P product characteristics".

Table 5- 4 Permitted ambient conditions

Storage/transport temperature	-40 °C to +85 °C
Max. relative humidity in operation at 25 °C	<= 95% (no condensation)
Max. ambient temperature at operating altitude	As of 2000 m: -5 °C of the max. operating temperature[1)] As of 3000 m: -10 °C of the max. operating temperature[1)]

[1)] See table: "Operating temperature depending on the media modules used"

5.2 Connectors and electrical data

Table 5- 5 Interfaces

Media module	Interfaces
MM992-2CUC	2 x 10/100/1000 Mbps, RJ-45 ports electrical with securing collar
MM992-2CUC (C)	2 x 10/100/1000 Mbps, RJ-45 ports electrical with securing collar, varnished
MM992-2CU	2 x 10/100/1000 Mbps, RJ-45 port electrical without securing collar
MM992-2M12 (C)	2 x 10/100/1000 Mbps, GE M12 connector electrical
MM992-2VD	2 x 10/100/1000 Mbps, RJ-45 ports electrical with securing collar
MM991-2	2 x 100 Mbps, BFOC ports optical, multimode FO cable, up to max. 5 km
MM991-2FM	2 x 100 Mbps, BFOC port optical, for glass FO cable (multimode) with diagnostics up to max. 5 km
MM991-2LD	2 x 100 Mbps, BFOC ports optical, single mode FO cable, up to max. 26 km
MM991-2 (SC)	2 x 100 Mbps, SC ports optical, multimode FO cable, up to max. 5 km
MM991-2LD (SC)	2 x 100 Mbps, SC ports optical, single mode FO cable, up to max. 26 km
MM991-2LH+ (SC)	2 x 100 Mbps, SC ports optical, single mode FO cable, up to max. 70 km

Media module	Interfaces
MM991-2P	2 x 100 Mbps SC RJ ports optical for Plastic Optical Fiber (POF) up to max. 50 m or Polymer Cladded Fiber (PCF) up to max. 100 m
MM992-2	2 x 1000 Mbps, SC ports optical, multimode FO cable, up to max. 750 m
MM992-2 (C)	2 x 1000 Mbps, SC ports optical, multimode FO cable, up to max. 750 m, varnished
MM992-2LD	2 x 1000 Mbps, SC ports optical, single mode FO cable, up to max. 10 km
MM992-2LH	2 x 1000 Mbps, SC ports optical, single mode FO cable, up to max. 40 km
MM992-2LH+	2 x 1000 Mbps, SC ports optical, single mode FO cable, up to max. 70 km
MM992-2ELH	2 x 1000 Mbps, SC ports optical, single mode FO cable, up to max. 120 km
MM992-2SFP[1)]	2 x 100/1000 Mbps, SFP media module, optical LC ports with corresponding SFP transceivers.

Table 5- 6 Power supply

Power supply	(24 VDC SELV) The media modules are supplied with power by the SCALANCE device. No other power supply is permitted.

Table 5- 7 Electrical data: Current consumption and power loss I

Media module	Current consumption	Effective power loss
MM992-2CUC	70 mA	1.65 W
MM992-2CUC (C)	70 mA	1.65 W
MM992-2CU	70 mA	1.65 W
MM992-2M12 (C)	70 mA	1.65 W
MM992-2VD	70 mA	1.65 W
MM991-2	100 mA	2.42 W
MM991-2FM	100 mA	2.42 W
MM991-2LD	80 mA	2.04 W
MM991-2 (SC)	100 mA	2.42 W
MM991-2LD (SC)	80 mA	2.04 W
MM991-2LH+ (SC)	80 mA	2.04 W
MM991-2P	140 mA	3.36 W
MM992-2	70 mA	1.76 W
MM992-2 (C)	70 mA	1.76 W
MM992-2LD	80 mA	1.95 W
MM992-2LH	90 mA	2.11 W
MM992-2LH+	100 mA	2.42 W
MM992-2ELH	110 mA	2.75 W

Table 5- 8 Electrical data: Current consumption and power loss II

MM992-2SFP with	Current consumption	Effective power loss
SFP991-1	60 mA	1.54 W
SFP991-1LD	60 mA	1.54 W
SFP991-1LH+	70 mA	1.65 W
SFP992-1	60 mA	1.38 W
SFP992-1LD	70 mA	1.60 W
SFP992-1LH	70 mA	1.71 W
SFP992-LH+	80 mA	1.93 W
SFP992-1ELH	100 mA	2.31 W
SFP991-1ELH200	100 mA	2.31 W

Note

Fusing and signal contacts with media modules

The MM900 media modules do not have their own fuses and have no signaling contacts. The fuses and the signaling contacts exist in the SCALANCE device.

Table 5- 9 Electrical data: Transmitter output (optical) and receiver input

Media module	Transmitter output (optical)		Receiver input	
	min. [dBm]	max. [dBm]	Sensitivity min. [dBm]	Input power max. [dBm]
MM992-2CUC	-	-	-	-
MM992-2CUC (C)	-	-	-	-
MM992-2CU	-	-	-	-
MM992-2M12 (C)[2)]	-	-	-	-
MM992-2VD	-	-	-	-
MM991-2	-19	-14	-32	-3
MM991-2FM	-19	-14	-32	-3
MM991-2LD	-15	-8	-34	-3
MM991-2 (SC)	-19	-14	-34	-3
MM991-2LD (SC)	-15	-8	-32	-3
MM991-2LH+ (SC)	-5	0	-34	-3
MM991-2P	-8	-2	-23	+1
MM992-2	-9.5	-4	-17	-3
MM992-2 (C)	-9.5	-4	-17	-3
MM992-2LD	-9.5	-3	-21	-3
MM992-2LH	-6	0	-23	-3
MM992-2LH+	0	5	-23	-3
MM992-2ELH	0	5	-30	-3
MM992-2SFP[1)]	-	-	-	-

[1] You will find further information in the compact operating instructions "Transceiver SFP/SFP+".

[2] The ports of the MM992-2M12 (C) only meet the requirements according to Environment A (IEEE 802.3), in other words, the electrical isolation of the ports is designed for 500 Vrms (1 minute).

5.3 Cable lengths

Copper cables

Table 5- 10 Permitted cable lengths (copper cable - Fast Ethernet)

Media module	Cable	Permitted cable length
MM992-2CUC MM992-2CUC (C) MM992-2CU MM992-2M12 (C) MM992-2VD (without VD)[1]	IE TP torsion cable with IE FC Outlet RJ-45 + 10 m TP cord	0 to 45 m + 10 m TP cord
	IE TP torsion cable with IE FC RJ-45 Plug 180	0 to 55 m
	IE FC TP marine/trailing/flexible cable with IE FC Outlet RJ-45 + 10 m TP cord	0 to 75 m + 10 m TP cord
	IE FC TP marine/trailing/ flexible cable with IE FC RJ-45 Plug 180	0 to 85 m
	IE FC TP standard cable with IE FC Outlet RJ-45 + 10 m TP cord	0 to 90 m + 10 m TP cord
	IE FC TP standard cable with IE FC RJ-45 plug 180	0 to 100 m
MM992-2VD (with VD)[2]	IE FC TP standard cable GP 4X2 (24 AWG) with IE FC RJ-45 plug 4x2	0 to 500 m at 100 Mbps
	IE FC TP standard cable GP 2x2 with IE FC RJ-45 plug 2x2	0 to 300 m at 100 Mbps.
	IE FC TP standard cable GP 2x2 with IE FC RJ-45 plug 2x2	300 to 500 m at 10 Mbps
	PROFIBUS FC standard cable GP with IE FC RJ-45 plug 4x2	100 to 1000 m at 10 Mbps
	PROFIBUS FC standard cable GP with IE FC RJ-45 plug 4x2	0 to 100 m at 100 Mbps.

[1] The VD mode (Variable Distance) is turned off.

[2] The VD mode (Variable Distance) is turned on.

Table 5- 11 Permitted cable lengths (copper cable - gigabit Ethernet)

Media module	Cable	Permitted cable length
MM992-2CUC MM992-2CUC (C) MM992-2CU MM992-2M12 (C) MM992-2VD (without VD)[1) 2)]	IE FC standard cable, 4×2, 24 AWG IE FC flexible cable, 4×2, 24 AWG with IE FC RJ-45 Plug 180, 4x2	0 to 90 m
	IE FC standard cable, 4×2, 22 AWG with IE FC Outlet RJ-45 + 10 m TP cord	0 to 60 m + 10 m TP cord
	IE FC flexible cable, 4×2, 22 AWG with IE FC Outlet RJ-45 + 10 m TP cord	0 to 90 m + 10 m TP cord

1) The VD mode (Variable Distance) is turned off.

2) If the VD mode is turned on, the speed is reduced to 100 Mbps. For permitted cable lengths, see table Fast Ethernet.

Fiber-optic cables

Table 5- 12 Permitted cable lengths (fiber-optic cable - Fast Ethernet)

Media module	Fiber-optic cable type	Max. permitted cable length	Attenuation
MM991-2	50/125 µm multimode fiber	5 km	≤1 dB/km at 1310 nm; 1200 MHz×km; maximum insertion loss 0.5 dB; 9 dB max. permitted FO cable attenuation at 3 dB link power margin
	62.5/125 µm multi-mode fiber	5 km	≤1 dB/km at 1310 nm; 1200 MHz×km; maximum insertion loss 0.5 dB; 9 dB max. permitted FO cable attenuation at 3 dB link power margin
MM991-2FM	50/125 µm multimode fiber	5 km	≤1 dB/km at 1310 nm; 1200 MHz×km; maximum insertion loss 0.5 dB; 9 dB max. permitted FO cable attenuation at 3 dB link power margin
	62.5/125 µm multi-mode fiber	5 km	≤1 dB/km at 1310 nm; 1200 MHz×km; maximum insertion loss 0.5 dB; 9 dB max. permitted FO cable attenuation at 3 dB link power margin
MM991-2LD	9/125 µm single mode fiber	26 km	≤0.5 dB/km at 1310 nm; maximum insertion loss 0.5 dB; 14 dB max. permitted FO cable attenuation at 2 dB link power margin
MM991-2 (SC)	50/125 µm multimode fiber	5 km	≤1 dB/km at 1310 nm; 1200 MHz×km; maximum insertion loss 0.5 dB; 9 dB max. permitted FO cable attenuation at 3 dB link power margin
	62.5/125 µm multi-mode fiber	5 km	≤1 dB/km at 1310 nm; 1200 MHz×km; maximum insertion loss 0.5 dB; 9 dB max. permitted FO cable attenuation at 3 dB link power margin
MM991-2LD (SC)	9/125 µm single mode fiber	26 km	≤0.5 dB/km at 1310 nm; maximum insertion loss 0.5 dB; 14 dB max. permitted FO cable attenuation at 2 dB link power margin

Media module	Fiber-optic cable type	Max. permitted cable length	Attenuation
MM991-2LH+ (SC)	9/125 µm single mode fiber	70 km	≤0.28 dB/km at 1550 nm; maximum insertion loss 0.5 dB; 26 dB max. permitted FO cable attenuation at 2 dB link power margin, minimum cable attenuation 3 dB
MM991-2P	980/1000 plastic optical fiber	50 m	9 dB max. permitted FO cable attenuation with 3 dB link power margin
	200/230 polymer cladded fiber	100 m	6 dB max. permitted FO cable attenuation with 3 dB link power margin

Table 5- 13 Permitted cable lengths (fiber-optic cable - gigabit Ethernet)

Media module	Fiber-optic cable type	Max. permitted cable length	Attenuation
MM992-2 MM992-2 (C)	62.5/125 µm multimode fiber	350 m	≤3.1 dB/km at 850 nm; 1200 MHz×km; maximum insertion loss 0.5 dB; 4.5 dB max. permitted FO cable attenuation at 3 dB link power margin
	50/125 µm multimode fiber	750 m	≤2.5 dB/km at 850 nm; 1200 MHz×km; maximum insertion loss 0.5 dB; 4.5 dB max. permitted FO cable attenuation at 3 dB link power margin
MM992-2LD	9/125 µm single mode fiber	10 km	≤0.5 dB/km at 1310 nm; maximum insertion loss 0.5 dB; 6 dB max. permitted FO cable attenuation at 3 dB link power margin
MM992-2LH	9/125 µm single mode fiber	40 km	≤0.4 dB/km at 1550 nm; maximum insertion loss 0.5 dB; 18 dB max. permitted FO cable attenuation at 2 dB link power margin, minimum cable attenuation 3 dB
MM992-2LH+	9/125 µm single mode fiber	70 km	≤0.28 dB/km at 1550 nm; maximum insertion loss 0.5 dB; 21 dB max. permitted FO cable attenuation at 2 dB link power margin, minimum cable attenuation 8 dB
MM992-2ELH	9/125 µm single mode fiber	120 km	≤0.225 dB/km at 1550 nm; maximum insertion loss 0.5 dB; 27 dB max. permitted FO cable attenuation at 2 dB link power margin, minimum cable attenuation 8 dB

Copper / fiber-optic cables

Table 5- 14 Permitted cable lengths (copper cable/fiber-optic cable) for the SFP media module

Media module	Max. permitted cable length
MM992-2SFP*)	Depending on the SFP transceiver used.

*) You will find further information in the compact operating instructions "Transceiver SFP/SFP+".

Attenuators

Transceivers of the types LH, LH+, ELH and ELH200 are designed for long distances and therefore send more power than they can receive.

If you establish a connection between such transceivers with a short cable length, use attenuators. Attenuators increase the attenuation and therefore protect the receiving diode.

Select the attenuation so that the transmit power (transmitter output) behind the attenuator is lower than the maximum received power (input power):

Transmitter output max. [dBm] - attenuator [dB] < input power max. [dBm]

Recommendation for the attenuation of the attenuator on a connection with the same transceivers:

Transceiver type	Attenuator
LH	6 dB ... 12 dB
LH+	12 dB ... 20 dB
ELH, ELH200	16 dB ... 24 dB

If you have established a connection on a pluggable transceiver with a short cable length, it is possible that the transmitter will be turned off. In this case, pull the transceiver and plug it in again.

GI-PCF

For segment lengths longer than 100 m, you can use GI-PCF cables. Note the information of the manufacturer.

5.4 Other properties

Table 5- 15 Mean time between failure (MTBF)

Device version (power supply)	MTBF[1)]
MM992-2CUC, MM992-2CUC (C), MM992-2CU, MM992-2M12 (C)	> 250 years
MM991-2P	> 230 years
MM992-2VD	> 200 years
MM991-2, MM991-2 (SC)	> 140 years
MM991-2FM MM992-2 (C)	> 135 years
MM991-2LD, MM991-2LD (SC), MM992-2LD	> 115 years
MM991-2LH+, MM992-2LH. MM992-2LH+	> 105 years

Device version (power supply)	MTBF[1)]
MM992-2ELH	> 95 years
MM992-2SFP[2)]	> 250 years [3)]

1) These values apply at 40 °C

2) You will find further information in the compact operating instructions "Transceiver SFP/SFP+".

3) empty

5.5 MM900 dimension drawings

Note

The following dimension drawings are available for the **MM900** product group.

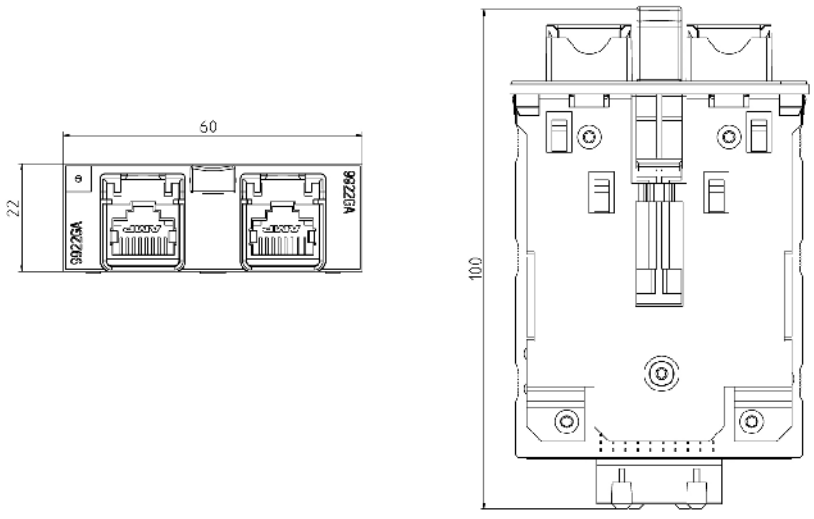


Image 5-1 MM900 dimension drawing 1: Electrical RJ-45 ports with securing collar

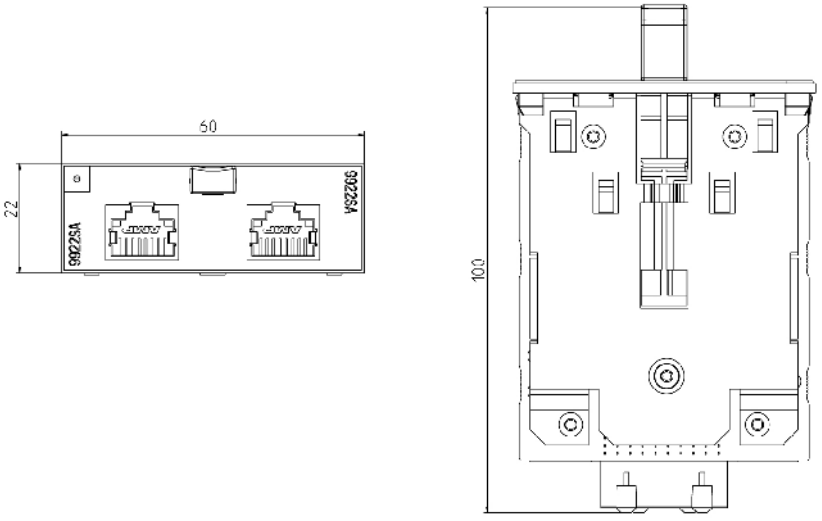


Image 5-2 MM900 dimension drawing 2: Electrical RJ-45 ports without securing collar

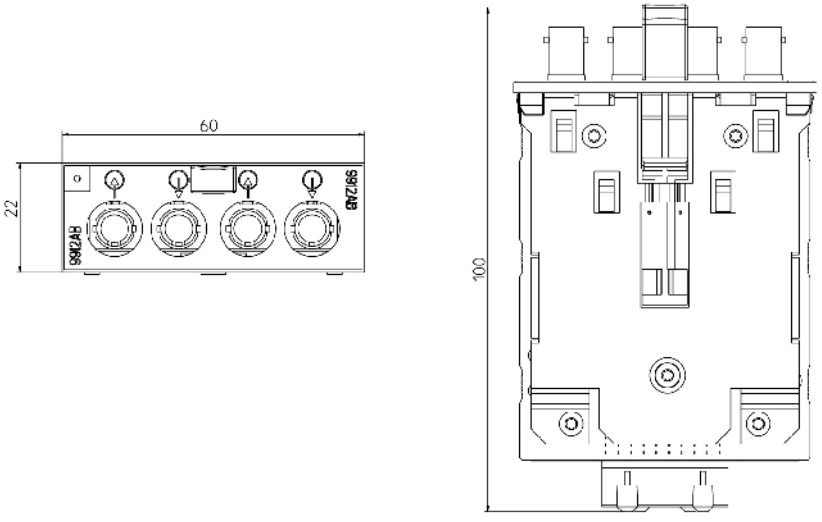


Image 5-3 MM900 dimension drawing 3: BFOC ports

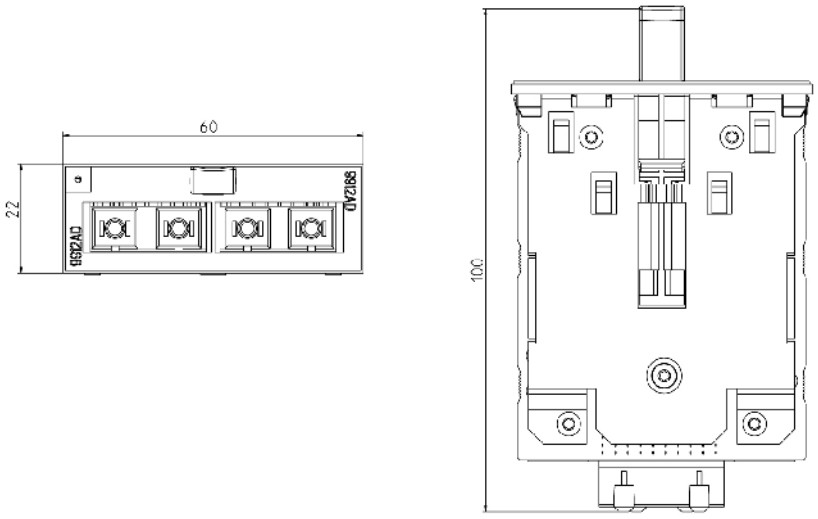


Image 5-4 MM900 dimension drawing 4: Optical SC ports

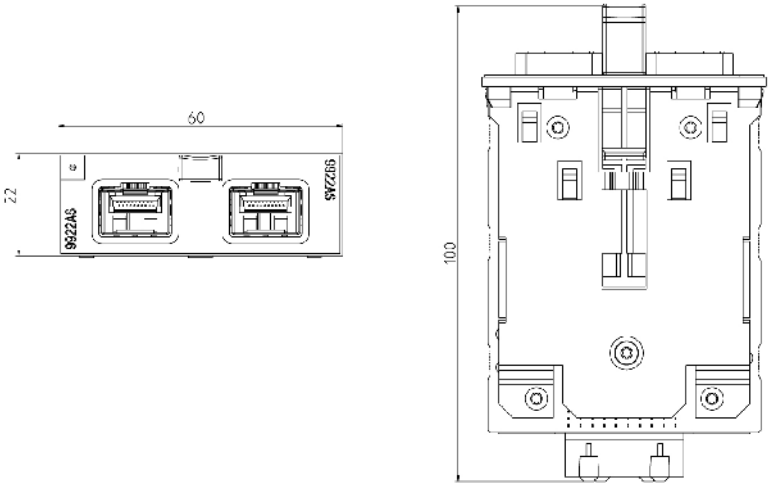


Image 5-5 MM900 dimension drawing 5: SFP media module

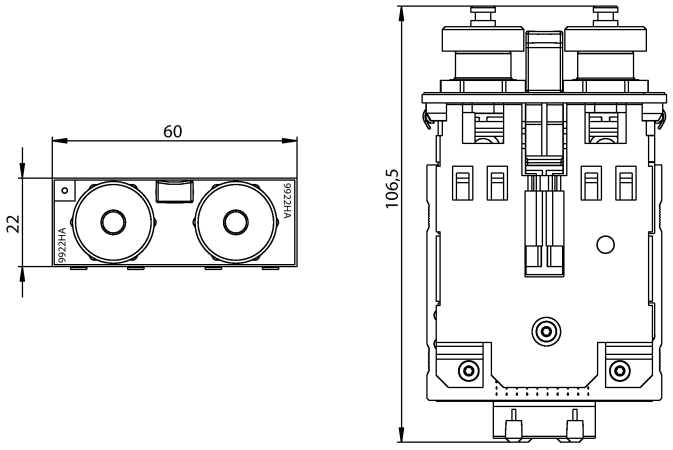


Image 5-6 MM900 dimension drawing 6: M12 ports electrical

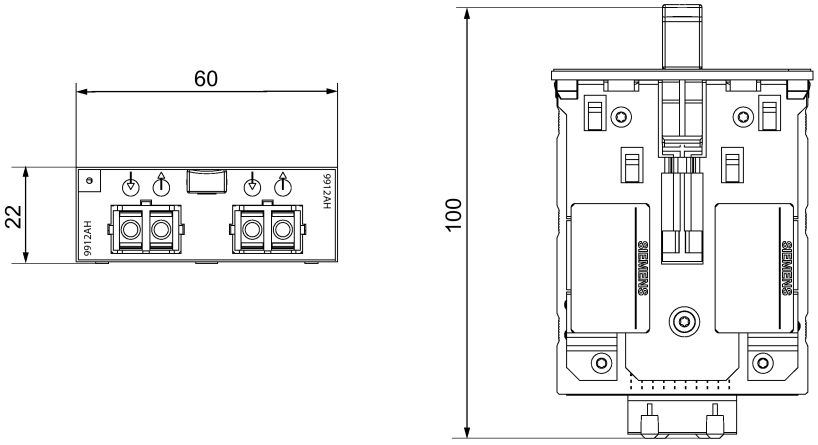


Image 5-7 MM900 dimension drawing 7: SC RJ ports optical

Approvals

6

6.1 MM900 approvals, certificates

Approvals issued

Note

Issued approvals on the type plate of the device

The specified approvals apply only when the corresponding mark is printed on the product. You can check which of the following approvals have been granted for your product by the markings on the type plate.

EC directives

SIMATIC NET products meet the requirements and aims of the following EC directives.

EMC directive (electromagnetic compatibility)

The SIMATIC NET products described in these operating instructions meet the requirements of EC directive 2004/108/EC "Electromagnetic Compatibility" for the following areas of application:

Field of application	Requirements	
	Emission	Immunity to interference
Industry	EN 61000-6-4 : 2007	EN 61000-6-2 : 2005

⚠ WARNING

Personal injury and property damage can occur

The installation of expansions that are not approved for SIMATIC NET products or their target systems may violate the requirements and regulations for safety and electromagnetic compatibility.

Only use expansions that are approved for the system.

- **Keep to the installation guidelines**
  The devices meet the requirements if you adhere to the installation and safety instructions contained in this documentation and in the following documentation when installing and operating the devices.
- **You can always find the latest documentation on the Internet**
  The current descriptions of the currently available products can always be found on the Internet under the specified entry IDs/Internet pages:
  - "Industrial Ethernet / PROFINET Industrial Ethernet" System Manual
  - "Industrial Ethernet / PROFINET - Passive network components" System Manual

    You will find information on the system manuals in the section "ID = 27069465 (http://support.automation.siemens.com/WW/view/en/27069465)", in "Further documentation".
  - "EMC Installation Guidelines" configuration manual

    ID = 60612658 (http://support.automation.siemens.com/WW/view/en/60612658)
- **Working on the device**
  To protect the device from electrostatic discharge, personnel must first discharge any electrostatic charge from their body before touching the device.

Note

The test was performed with a device and a connected communications partner that also meets the requirements of the standards listed above.

When operating the device with a communications partner that does not comply with these standards, adherence to the corresponding values cannot be guaranteed.

Machinery directive

The product is a component in compliance with the EC Machinery Directive 2006/42//EEC. According to the machinery directive, we are obliged to point out that the product described is intended solely for installation in a machine.

Before the final product can be put into operation, it must be tested to ensure that it conforms with the directive 2006/42/EEC.

Note

Note for the manufacturers of machines

This product is not a machine in the sense of the EC Machinery Directive. There is therefore no declaration of conformity relating to the EC Machinery Directive 2006/42/EEC for this product.

6.1.1 ATEX (KEMA 07 ATEX0145 X)

ATEX (explosion protection directive)

WARNING

When using SIMATIC NET products in hazardous area zone 2, make absolutely sure that the associated conditions in the following document are adhered to:

"SIMATIC NET Product Information Use of subasseblies/modules in a Zone 2 Hazardous Area".

You will find this document

- on the data medium that ships with some devices.
- on the Internet pages of Siemens Industry Online Support (http://support.automation.siemens.com/WW/view/en).

Enter the document identification number C234 as the search term.

SIMATIC NET products meet the requirements of the EC directive:94/9/EC "Equipment and Protective Devices for Use in Potentially Explosive Atmospheres".

ATEX classification:

II 3 G Ex nA IIC T4 Gc

KEMA 07ATEX0145 X

The products meet the requirements of the following standards:

- EN 60079-15: 2010 (electrical apparatus for potentially explosive atmospheres; Type of protection "n")
- EN 60079-0: 2009 (Explosive atmospheres - Part 0: Equipment - General requirements)

ATEX classification

II 3 (2) G Ex nA [op is Gb] IIC T4 Gc

DEKRA 11 ATEX 0060 X

These products meet the requirements of the standards

- EN 60079-15: 2010
- EN 60079-0:2009
- EN 60079-28: 2007

Note

Only the media modules MM991-2 meet the requirements of this approval.

IECEx

The SIMATIC NET products meet the requirements of explosion protection according to IECEx.

IECEx classification:

Ex nA IIC T4 Gc

DEK 14.0025X

The products meet the requirements of the following standards:

- IEC 60079-15 : 2010 (Explosive atmospheres - Part 15: Equipment protection by type of protection "n"
- IEC 60079-0 : 2011 (Explosive atmospheres - Part 0: Equipment - General requirements)

IECEx (optical radiation)

The SIMATIC NET products meet the requirements of explosion protection according to IECEx.

IECEx classification:

Ex nA [op is Gb] IIC T4 Gc

DEK 14.0026X

The products meet the requirements of the following standards:

- IEC 60079-15 (Explosive atmospheres - Part 15: Equipment protection by type of protection "n")
- IEC 60079-0 (Explosive atmospheres - Part 0: Equipment - General requirements)
- IEC 60079-28 (Explosive atmospheres - Part 28: Protection of equipment and transmission systems using with optical radiation)

You will find the current versions of the standards in the currently valid IECEx certificates.

Note

Only the media modules MM991-2 meet the requirements of this approval.

FM

The product meets the requirements of the standards:

- Factory Mutual Approval Standard Class Number 3611
- FM Hazardous (Classified) Location Electrical Equipment:
  Non Incendive / Class I / Division 2 / Groups A,B,C,D / T4 and
  Non Incendive / Class I / Zone 2 / Group IIC / T4

cULus Approval for Information Technology Equipment

cULus Listed I. T. E.

Underwriters Laboratories Inc. complying with

- UL 60950-1 (Information Technology Equipment)
- CSA C22.2 No. 60950-1-03

Report no. E115352

cULus approval for industrial control equipment

cULus Listed IND. CONT. EQ.

Underwriters Laboratories Inc. complying with

- UL 508
- CSA C22.2 No. 142-M1987

Report no. E85972

cULus Approval Hazardous Location

cULus Listed I. T. E. FOR HAZ. LOC.

Underwriters Laboratories Inc. complying with

- UL 60950-1 (Information Technology Equipment)
- ANSI/ISA 12.12.01-2007
- CSA C22.2 No. 213-M1987

Approved for use in
Cl. 1, Div. 2, GP A, B, C, D T4
Cl. 1, Zone 2, GP IIC T4

Report no. E240480

Railway approval

The following media modules meets the requirements of the Railway standard EN 50155:2007 "Railway Applications - Electronic equipment used on rolling stock".

- MM992-2 (C)
- MM992-2CUC (C)
- MM992-2 M12 (C)

Media modules with the supplement (C) in the type name have varnished printed circuit boards (conformal coating).

Note

When used on railway stock, a stabilized power supply must be used to comply with EN50155.

6.2 MM900 declaration of conformity

Declaration of conformity

You will find the EU declaration of conformity for these products on the Internet under the following entry ID: 67218486

http://support.automation.siemens.com/WW/view/en/67218486 (http://support.automation.siemens.com/WW/view/en/67218486)

6.3 MM900 FDA and IEC approvals

The following MM900 media modules meet the FDA and IEC requirements listed below:

Media module	Fulfills FDA and IEC requirements
MM992-2CUC	-
MM992-2CUC (C)	-
MM992-2CU	-
MM992-2M12 (C)	-
MM992-2VD	-
MM992-2SFP*)	-
MM991-2	CLASS 1 LED Product
MM991-2FM	CLASS 1 LED Product
MM991-2LD	CLASS 1 LASER Product
MM991-2 (SC)	CLASS 1 LED Product
MM991-2LD (SC)	CLASS 1 LASER Product
MM991-2LH+ (SC)	CLASS 1 LASER Product
MM992-2	CLASS 1 LASER Product
MM992-2 (C)	CLASS 1 LASER Product
MM992-2LD	CLASS 1 LASER Product
MM992-2LH	CLASS 1 LASER Product
MM992-2LH+	CLASS 1 LASER Product
MM992-2ELH	CLASS 1 LASER Product

*) You will find further information in the compact operating instructions "Transceiver SFP/SFP+".

Image 6-1 FDA and IEC approvals

Appendix A

A.1 EMC-compatible installation of electrical Industrial Ethernet or PROFIBUS cabling

The Industrial Ethernet / PROFINET system manual "Passive network components" prescribes the use of fiber-optic cables for cabling between buildings and/or external facilities because there may be large potential differences between nodes.

If IE FC or PROFIBUS FC cables are used for such applications, the same rules apply as when installing cables indoors.
The following also applies:

- Install cables on metal cable racks
- Electrically connect the cable racks where they join
- Ground the cable racks
- Connect the shields of the cables to the grounding network as close as possible to the point of entry into the building or facility.
- Electrical bus cables installed outside buildings must be included in the lightening protection and grounding concept of the entire system. Follow the instructions in Appendix B "Lightning and Surge Voltage Protection for LAN Cables Between Buildings" of the SIMATIC NET PROFIBUS Networks manual.
- All SIMATIC NET PROFIBUS cables can be used if they are installed in cable channels protected against dampness. The safety clearances specified in Appendix C.7 "Cable categories and clearances" of the SIMATIC NET PROFIBUS Network Manual must then be adhered to.

A.2 Equipotential bonding

When do potential differences occur?

Potential differences can, for example, be caused by different power supplies. Potential differences between separate parts of the plant can be damaging to the system in the following situations:

- Programmable controllers and peripheral devices are linked on grounded connections
- Cable shields are contacted at both ends and grounded to different parts of the plant.

How do you avoid potential differences?

Potential differences must be reduced by installing bonding conductors so that the functions of the electronic components used are guaranteed.

When and why is equipotential bonding necessary?

Several good reasons for equipotential bonding are listed below:

- Devices with a grounded interface can be damaged by potential differences.
- The shield of the PROFIBUS cable must not be used for equipotential bonding. This is, however, the case if parts of the system connected by the cable shield are connected to different grounding points.
- Equipotential bonding is a requirement for lightning protection.

Rule for equipotential bonding

Remember the following points about equipotential bonding systems:

- The lower the impedance of the equipotential bonding cable, the greater the effectiveness of the equipotential bonding.
- The impedance of the additional bonding conductor must not exceed 10% of the shield impedance of the bus cable.
- Make largearea contact between the bonding conductor and the PE conductor.
- Protect the bonding conductor from corrosion.
- Install the bonding conductor so that the area enclosed by the bonding conductor and signal cables is as small as possible.
- Use copper or galvanized steel for the bonding conductor
- Include metal, conductive cable channels/racks in the equipotential bonding of the building and between the individual parts of the system. The individual segments of the channels/racks must be connected together with low inductance and low resistance and connected to the building ground system as often as possible. Expansion joints and angled connections should be bridged by additional flexible grounding bands.
- The connections between the individual segments of channels must be protected from corrosion (longterm stability)
- If there are connections between sections of buildings (for example separated by expansion joints) with their own reference point for the building ground network, a bonding conductor (equivalent copper crosssectional area ≥10 mm^2) must be installed parallel to the cables. This bonding conductor is not necessary if metal, conducting cable channels/racks are used.

Note

Bonding conductors are unnecessary if the sections of a system are connected exclusively using fiberoptic cable (FO).

Notes on systems in which no equipotential bonding is possible

To ensure greater immunity to interference, cables for SIMATIC NET PROFINET and PROFIBUS are always shielded. Due to the defined shielding property, the shield needs to make contact at both ends.

In systems in which no equipotential bonding is possible, the current flow via the shield needs to be prevented. Despite this, to be able to use the shield properties of the cable note the following:

- Contact the shield at one end with low resistance.
- Connect the other end of the shield to the grounding system using capacitive coupling.

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