SIEMENS

SIMATIC NET

Network components
Transceiver SFP/SFP+/SCP/STP

Operating Instructions

11/2015

A5E02630804-08

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

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Purpose of the compact operating instructions

Based on the compact operating instructions, you will be able to install the SFP, SFP+, SCP and STP transceivers. The configuration and the integration of the devices in a network are not described in these instructions.

Validity of these compact operating instructions

These compact operating instructions apply to the SFP, SFP+, SCP and STP product group.

Further documentation

In the system manuals "Industrial Ethernet / PROFINET Industrial Ethernet" and "Industrial Ethernet / PROFINET passive network components", you will find information on other SIMATIC NET products that you can operate along with the devices of this product line in an Industrial Ethernet network.

There, you will find among other things optical performance data of the communications partner that you require for the installation.

You will find the system manuals here:

- On the data medium that ships with some products:
  - Product CD / product DVD
  - SIMATIC NET Manual Collection
- On the Internet pages of Siemens Industry Online Support under the following entry IDs:
  - 27069465 (http://support.automation.siemens.com/WW/view/en/27069465)
    Industrial Ethernet / PROFINET Industrial Ethernet System Manual
  - 84922825 (http://support.automation.siemens.com/WW/view/en/84922825)
    Industrial Ethernet / PROFINET - Passive network components System Manual

SIMATIC NET manuals

You will find the SIMATIC NET manuals here:

- On the data medium that ships with some products:
  - Product CD / product DVD
  - SIMATIC NET Manual Collection
- On the Internet pages of Siemens Industry Online Support (http://support.automation.siemens.com/WW/view/en/10805878/130000).

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 entry ID:

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

Unpacking and 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
- Damage to the device and other components

Use only undamaged parts.

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

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.

Safety notes

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Safety notices on the use of the devices

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 devices or opening the device.

General notices regarding 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 for use in hazardous areas according to ATEX

⚠ WARNING

Requirements for the cabinet/enclosure

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

⚠ 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, 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.

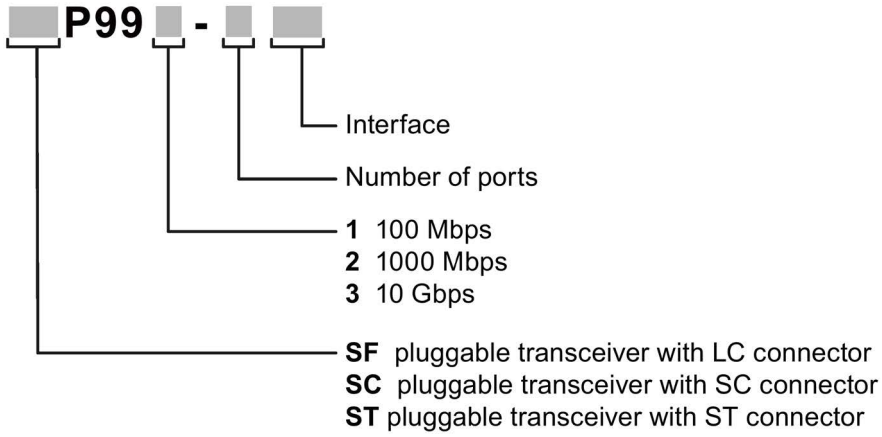
Description

3

3.1 Type designation

Structure of the type designation

The type designation of an pluggable transceiver is made up of several parts that have the following meaning:



Interface *)	Property
[-]	100 Mbps LC port optical, multimode, up to max. 5 km.
	1000 Mbps LC port optical, multimode, up to max. 750 m.
LD	100 Mbps LC port optical, single mode fiber-optic cables, up to max. 26 km.
	1000 Mbps LC port optical, single mode fiber-optic cables, up to max. 10 km.
LH	1000 Mbps LC port optical, single mode, up to max. 40 km.
LH+	100 Mbps LC port optical, single mode, up to max. 70 km.
	1000 Mbps LC port optical, single mode, up to max. 70 km.
ELH200	100 Mbps LC port optical, single mode, up to max. 200 km.
ELH	1000 Mbps LC port optical, single mode, up to max. 120 km.

*) LD (Long Distance), LH (Long Haul), LH+ (Long Haul +), ELH (Extreme Long Haul)

3.2 Product overview

Note

Fiber monitoring

All pluggable transceivers are capable of diagnostics and support fiber monitoring.

SFP transceiver

Type	Properties	Article number
SFP991-1 *	1 x 100 Mbps, LC port optical for glass FO cable (multimode), up to max. 5 km	6GK5 991-1AD00-8AA0
SFP991-1LD *	1 x 100 Mbps LC port optical for glass FO cable (single mode) up to max. 26 km	6GK5 991-1AF00-8AA0
SFP991-1LH+ *	1 x 100 Mbps LC port optical for glass FO cable (single mode) up to max. 70 km	6GK5 991-1AE00-8AA0
SFP991-1ELH200 *	1 x 100 Mbps LC port optical for glass FO cable (single mode) up to max. 200 km	6GK5 991-1AE30-8AA0
SFP992-1	1 x 1000 Mbps, LC port optical for glass FO cable (multimode), up to max. 750 m	6GK5 992-1AL00-8AA0
SFP992-1LD	1 x 1000 Mbps LC port optical for glass FO cable (single mode) up to max. 10 km	6GK5 992-1AM00-8AA0
SFP992-1LH	1 x 1000 Mbps LC port optical for glass FO cable (single mode) up to max. 40 km	6GK5 992-1AN00-8AA0
SFP992-1LH+	1 x 1000 Mbps LC port optical for glass FO cable (single mode) up to max. 70 km	6GK5 992-1AP00-8AA0
SFP992-1ELH	1 x 1000 Mbps LC port optical for glass FO cable (single mode) up to max. 120 km	6GK5 992-1AQ00-8AA0

* Cannot be operated in SFP+ slots.

Note

Only the following transceivers are permitted for the SCALANCE W786-2 SFP:

- SFP992-1
- SFP992-1LD
- SFP992-1LH
- SFP992-1LH+
- SFP992-1ELH

SFP+ transceiver

Type	Properties	Article number
SFP993-1	1 x 10 Gbps, LC port optical for glass FO cable (multimode), up to max. 300 m	6GK5 993-1AT00-8AA0 1)
	1 x 10 Gbps, LC port optical for glass FO cable (multimode), up to max. 300 m	6GK5 993-1AT10-8AA0 2)
SFP993-1LD	1 x 10 Gbps, LC port optical for glass FO cable (single mode), up to max. 10 km	6GK5 993-1AU00-8AA0 1)
	1 x 10 Gbps, LC port optical for glass FO cable (single mode), up to max. 10 km	6GK5 993-1AU10-8AA0 2)
SFP993-1LH	1 x 10 Gbps, LC port optical for glass FO cable (single mode), up to max. 40 km	6GK5 993-1AV00-8AA0 1)

Can only be operated in SFP+ slots.

Note

1)Restriction with SFP+ transceivers for SCALANCE XR526-8C

If you use SFP+ transceivers identified with 1) with the SCALANCE XR526-8C, the maximum ambient temperature is reduced to 50 °C.

Note

2)Restriction for DFP+ transceivers for SCALANCE XR526-8C (2 x 24 VDC)

If you use SFP+ transceivers identified with 2) with the SCALANCE XR526-8C (2 x 24 VDC), the maximum ambient temperature is reduced to 60 °C.

SCP / STP transceiver

Type	Properties	Article number
SCP992-1	1 x 1000 Mbps SC port optical for glass FO cable (multimode) up to max. 750 m	6GK5 992-1AJ00-8AA0
SCP992-1LD	1 x 1000 Mbps SC port optical for glass FO cable (single mode) up to max. 10 km	6GK5 992-1AK00-8AA0
STP991-1	1 x 100 Mbps ST port optical for glass FO cable (multimode) up to max. 5 km	6GK5 991-1AB00-8AA0
STP991-1LD	1 x 100 Mbps ST port optical for glass FO cable (single mode) up to max. 26 km	6GK5 991-1AC00-8AA0

Can only be operated in SCP and STP slots.

Media modules

Note

The SFP media modules MM992-2SFP may only be fitted with approved transceivers. The media module can be fitted with up to two pluggable transceivers.

The SFP media modules MM992-4SFP may only be fitted with approved transceivers. The media module can be fitted with up to four pluggable transceivers.

Type	Properties	Article number	Labeling on the device
MM992-2SFP	2 x 100 / 1000 Mbps, SFP media module	6GK5 992-2AS00-8AA0	9922AS
MM992-4SFP	4 x 100 / 1000 Mbps, SFP media module	6GK5 992-4AS00-8AA0	9924AS

3.3 Components of the product

- Transceiver
- Information sheet

Assembling

4

4.1 Notes on installation of SFP / SFP+ transceivers

General notes on media modules and pluggable 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 1.
- The second MM900 media module installed in slot 2 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 + pluggable 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

Use only approved pluggable transceivers

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

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

Shipbuilding approval

The shipbuilding approval applies to all SFP pluggable transceivers.

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.

Note

Different colors of the clip

An SFP with multimode has a black clip and an SFP with single mode has a blue clip. To protect the pins, these are fitted with a dummy plug.

Note

Plugging and pulling during operation

With SCALANCE X, the pluggable transceivers can be plugged and pulled during operation. If you have questions on the use of SIMATIC NET products, please contact your Siemens sales partner.

Notes on SCALANCE X-300

Note

Pluggable 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 pluggable transceivers may be used:
  - SFP991-1
  - SFP991-1LD
  - SFP992-1
  - SFP992-1LD

Notes on SCALANCE XR-500

Note

Fixed slots of the SCALANCE XR-500

The SFP+ transceivers are not suitable for media modules. The SCALANCE- XR500 has four fixed slots for SFP+.

It is, however, possible to operate SFP transceivers in the fixed SFP+ slots of the device. Note that the SFP+ slots only support SFP transceivers with a transmission rate of 1000 Mbps.

Notes on SCALANCE W:

Note

With a SCALANCE W786-2, do not plug or pull an SFP transceiver during operation!

If you have questions on the use of SIMATIC NET products, please contact your Siemens sales partner.

4.2 Inserting an SFP / SFP+ transceiver

Figure 4-1 Inserting an SFP / SFP+ transceiver

Follow the steps below to insert an SFP / SFP+ transceiver:

1. Remove the sealing plug of the SFP / SFP+ transceiver.
2. Close the clip of the SFP / SFP+ transceiver.
3. Insert the SFP / SFP+ transceiver in the SFP / SFP+ slot until you hear it engage, see figure.

   The SFP / SFP+ transceiver is then firmly secured.
4. Insert the connecting cable into the SFP / SFP+ transceiver until you hear it engage.

   The connecting cable is then firmly secured.

4.3 Notes on installation of SCP / STP transceivers

General notes on pluggable transceivers

NOTICE

Use only approved pluggable transceivers

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

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

Shipbuilding approval

The shipbuilding approval applies to all SCP / STP transceivers.

Note

Plugging and pulling during operation

The pluggable transceivers can be plugged and pulled during operation. If you have questions on the use of SIMATIC NET products, please contact your Siemens sales partner.

Notes on SCALANCE XM-400

Note

SCP / STP transceivers can only be used in the SCP / STP slots of the SCALANCE XM408-4C.

Notes on SCALANCE W:

Note

With a SCALANCE W786-2, do not plug or pull an SFP transceiver during operation!

If you have questions on the use of SIMATIC NET products, please contact your Siemens sales partner.

4.4 Inserting an SCP / STP transceiver

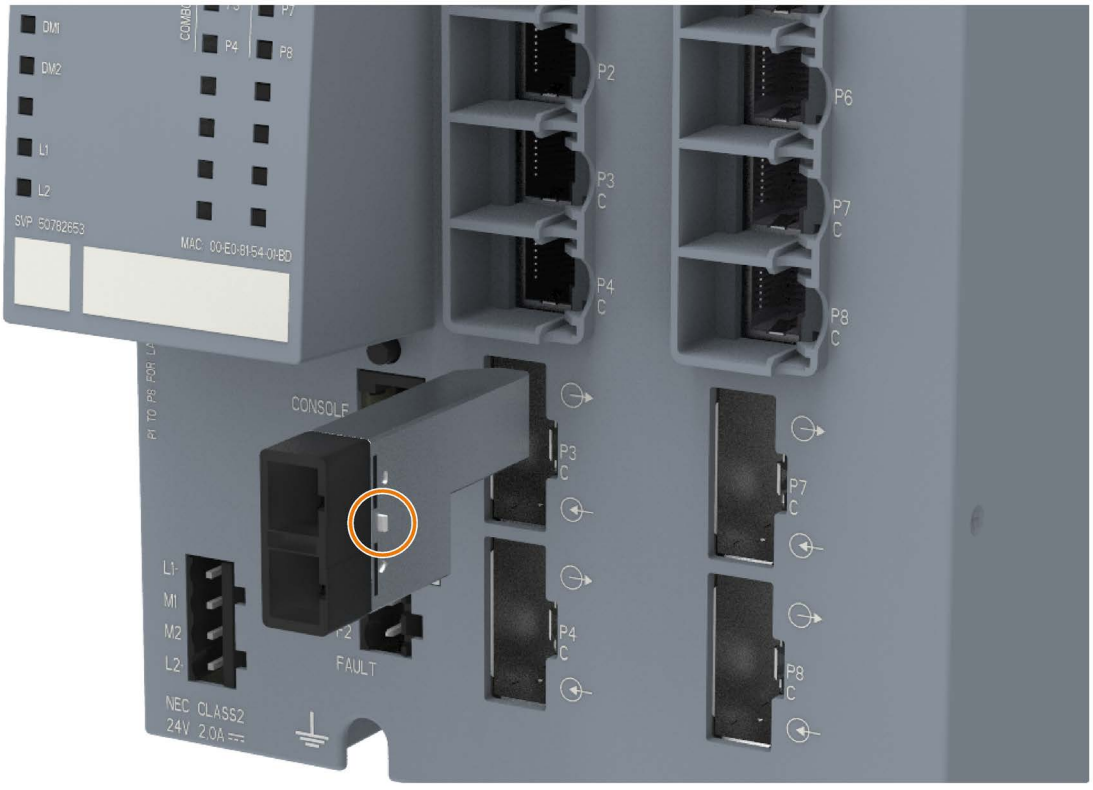


Figure 4-2 Inserting an SCP / STP transceiver

Follow the steps below to insert an SCP / STP transceiver:

1. Remove the sealing plug of the SCP / STP transceiver.
2. Hold the SCP / STP transceiver so that the slight protrusion is on the right, see figure.
3. Insert the SCP / STP transceiver in the SCP / STP slot in this position until you hear it engage, see figure.

   The SCP / STP transceiver is then firmly secured.
4. Insert the connecting cable into the SCP / STP transceiver until you hear it engage.

   The connecting cable is then firmly secured.

Uninstalling 5

5.1 Removing an SFP / SFP+ transceiver

Notes on deinstallation

⚠ CAUTION
Risk of burns due to the high temperatures of the pluggable transceiver The SFP / SFP+ transceivers can be plugged and pulled during operation. Leave the transceiver to cool down as much as possible.

Procedure

Follow the steps below to remove an SFP / SFP+ transceiver:

1. Remove the connecting cable of the SFP / SFP+ transceiver.
2. Open the clip of the SFP / SFP+ transceiver.
3. Remove the SFP / SFP+ transceiver from SFP / SFP+ slot.

   Note
   Do not use force

   It must be possible to remove the SFP / SFP+ transceiver easily and without applying any force.

4. Close the SFP / SFP+ slot with a sealing plug.

5.2 Removing an SCP / STP transceiver

Notes on deinstallation

⚠ CAUTION
Risk of burns due to the high temperatures of the pluggable transceiver The SCP / STP transceivers can be plugged and pulled during operation. Leave the transceiver to cool down as much as possible.

Procedure

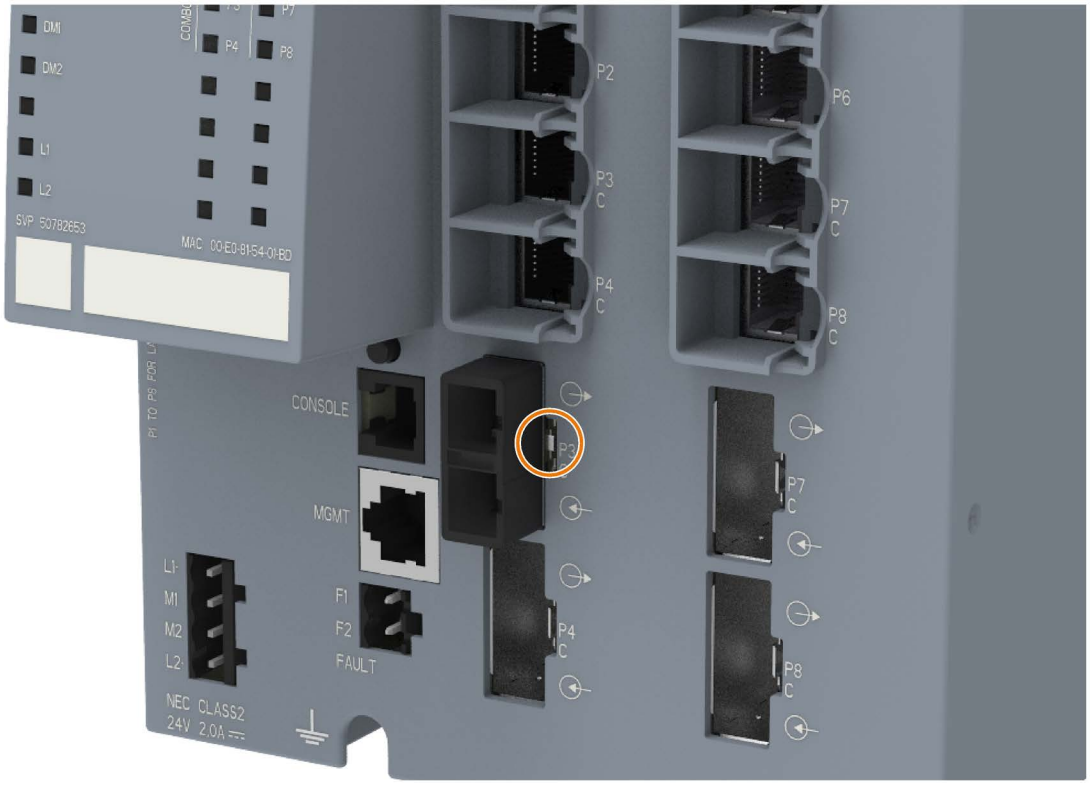


Figure 5-1 Removing an SCP / STP transceiver

Follow the steps below to remove an SCP / STP transceiver:

1. Remove the connecting cable of the SCP / STP transceiver.
2. Press the spring in the SCP / STP slot to the right using a screwdriver, see figure.

   The SCP / STP transceiver is pushed part of the way out of the SCP / STP slot.
3. Remove the SCP / STP transceiver from the SCP / STP slot.

Note

Do not use force

It must be possible to remove the SCP / STP transceiver easily and without applying any force.

4. Close the SCP / STP transceiver with a sealing plug.

Connecting up

6

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.

6.1 Notes on commissioning

Note

Commissioning devices with redundancy mechanisms

If you use redundancy mechanisms ("HRP" media redundancy or "MRP" and/or redundant linking of rings via standby link), open the redundant path before you insert a new or replacement device in an operational network. A bad configuration or attachment of the Ethernet cables to incorrectly configured ports causes overload in the network and a breakdown in communication.

A device may only be inserted in a network and connected in the following situations:

- HRP/MRP:
  The ring ports of the device being inserted in the ring were configured as ring ports. The required redundancy mode is also enabled. If the device is intended to operate as the redundancy manager, "Redundancy manager enabled" must also be set.
- Standby connection:
  "Standby connection" must be "enabled" and the "Standby connection name" must match the name of the partner device. You also configure the port with "Enable Standby Port Monitoring".

6.2 Power supply

The pluggable transceivers are supplied with power via the SFP media modules in the modular devices or via the SFP/SFP+/SCP/STP slots.

Technical data

7

7.1 Mechanical and electrical data

Technical specifications		
Pluggable transceiver		**Property**
SFP	SFP991-1	1 x 100 Mbps, LC port optical, multimode glass, up to max. 5 km
	SFP991-1LD	1 x 100 Mbps, LC port optical, single mode glass, up to max. 26 km
	SFP991-1LH+	1 x 100 Mbps, LC port optical, single mode glass, up to max. 70 km
	SFP991-1ELH200	1 x 100 Mbps, LC port optical, single mode glass, up to max. 200 km
	SFP992-1	1 x 1000 Mbps, LC port optical, multimode glass, up to max. 750 m
	SFP992-1LD	1 x 1000 Mbps, LC port optical, single mode glass, up to max. 10 km
	SFP992-1LH	1 x 1000 Mbps, LC port optical, single mode glass, up to max. 40 km
	SFP992-1LH+	1 x 1000 Mbps, LC port optical, single mode glass, up to max. 70 km
	SFP992-1ELH	1 x 1000 Mbps, LC port optical, single mode glass, up to max. 120 km
SFP+	SFP993-1	1 x 10 Gbps, LC port optical, multimode glass, up to max. 300 m
	SFP993-1LD	1 x 10 Gbps, LC port optical, single mode glass, up to max. 10 km
	SFP993-1LH	1 x 10 Gbps, LC port optical, single mode glass, up to max. 40 km
SCP	SCP992-1	1 x 1000 Mbps, SC port optical, multimode glass, up to max. 750 m
	SCP992-1LD	1 x 1000 Mbps, SC port optical, single mode glass, up to max. 10 km
STP	STP991-1	1 x 100 Mbps, ST port optical, multimode glass, up to max. 5 km
	STP991-1LD	1 x 100 Mbps, ST port optical, single mode glass, up to max. 26 km
Construction		
SFP/SFP+	Dimensions (W x H x D)	14 x 9 x 57 mm
	Weight	20 g
SCP/STP	Dimensions (W x H x D)	28 x 9 x 57 mm
	Weight	60 g
Environmental conditions		
Transportation/storage temperature		-40 to +85 °C
Ambient temperature *)		
Maximum relative humidity in operation at 25 °C		< 95 % no condensation

Technical specifications	
Operating altitude above sea level depending on ambient temperature	• 2000 m at max. 60 °C • 3000 m at max. 50 °C

*) The ambient temperature depends on the selected device. You will find detailed information on the ambient temperatures in the operating instructions of the devices, see section “Introduction (Page 5)“.

Electrical data			
Power supply, current consumption and power loss at 25 °C ambient temperature			
SFP	SFP991-1		0.36 W
	SFP991-1LD		0.39 W
	SFP991-1LH+		0.47 W
	SFP991-1ELH200		0.63 W
	SFP992-1		0.33 W
	SFP992-1LD		0.41 W
	SFP992-1LH		0.45 W
	SFP992-LH+		0.50 W
	SFP992-1ELH		0.63 W
SFP+	SFP993-1	6GK5 993-1AT00-8AA0	0.67 W
		6GK5 993-1AT10-8AA0	0.53 W
	SFP993-1LD	6GK5 993-1AU00-8AA0	0.85 W
		6GK5 993-1AU10-8AA0	0.69 W
	SFP993-1LH		1.4 W
SCP	SCP992-1		0.33 W
	SCP992-1LD		0.41 W
STP	STP991-1		0.36 W
	STP991-1LD		0.39 W
Transmitter output optical and receiver input			

Electrical data					
Pluggable transceiver		**Transmitter output optical**		**Receiver input**	
		min. [dBm]	**max. [dBm]**	**Sensitivity min. [dBm]**	**max. input power [dBm]**
SFP	SFP991-1	-19	-14	-32	-3
	SFP991-1LD	-15	-8	-34	-3
	SFP991-1LH+	-5	0	-34	-3
	SFP991-1ELH200	1	5	-42	-9
	SFP992-1	-9.5	-4	-17	-3
	SFP992-1LD	-9.5	-3	-21	-3
	SFP992-1LH	-6	0	-23	-3
	SFP992-1LH+	0	5	-23	-3
	SFP992-1ELH	0	5	-32	-8
SFP+	SFP993-1	-5	-1	-11	-1
	SFP993-1LD	-8.2	0.5	-12.6	0.5
	SFP993-1LH	-4.7	4	-14.1	0.5
SCP	SCP992-1	-9.5	-4	-17	-3
	SCP992-1LD	-9.5	-3	-21	-3
STP	STP991-1	-19	-14	-32	-3
	STP991-1LD	-15	-8	-34	-3

Note

Fusing of transceivers

The pluggable transceivers (SFP/SFP+/SCP/STP) do not have fuses. The fuse is in the modular device.

Note

Signaling contact and media modules

The SFP transceivers do not have a signaling contact. The signaling contact is on the modular device.

7.2 Cable lengths

SFP transceiver

Table 7- 1 Permitted cable lengths (fiber-optic) Fast Ethernet

Type	Fiber	FO cable lengths
SFP991-1	50/125 µm multimode fiber	**0-5 km** (1 dB/km at 1310 nm; 1200 MHz*km)
	62.5/125 µm multimode fiber	**0-5 km** (≤1 dB/km at 1310 nm; 1200 MHz*km)
SFP991-1LD	9/125 µm single mode fiber	**0-26 km** (0.5 dB/km at 1300 nm)
SFP991-1LH+	9/125 µm single mode fiber	***) -70 km** (0.28 dB/km at 1550 nm; *) minimum cable attenuation 3 dB)
SFP991-1ELH200	9/125 µm single mode fiber	***) -200 km** (0.23 dB/km at 1550 nm; *) Minimum cable attenuation 14 dB)

Table 7- 2 Permitted cable lengths (fiber-optic) gigabit

Type	Fiber	FO cable lengths
SFP992-1	62.5/125 µm multimode fiber	**0-350 m** (3.1 dB/km at 850 nm; 2000 MHz*km)
	50/125 µm multimode fiber	**0-750 m** (2.5 dB/km at 850 nm; 1200 MHz*km)
SFP992-1LD	9/125 µm single mode fiber	**0-10 km** (0.5 dB/km at 1310 nm)
SFP992-1LH	9/125 µm single mode fiber	***) - 40 km** (0.4 dB/km at 1550 nm; *) minimum cable attenuation 3 dB)
SFP992-1LH+	9/125 µm single mode fiber	***) - 70 km** (0.28 dB/km at 1550 nm; *) minimum cable attenuation 8 dB)
SFP992-1ELH	9/125 µm single mode fiber	***) -120 km** (0.225 dB/km at 1550 nm; *) minimum cable attenuation 13 dB)

SFP+ transceiver

Table 7- 3 Permitted cable lengths (fiber-optic) gigabit

Type	Fiber	FO cable lengths
SFP993-1	50/125 µm multimode fiber	**0 - 300 m** (3.5 dB/km at 850 nm; 2000 MHz*km: OM3) **0 - 550 m** (3.5 dB/km at 850 nm; 4700 MHz*km: OM4)
SFP993-1LD	9/125 µm single mode fiber	**0 - 10 km** (0.28 dB/km at 1310 nm)
SFP993-1LH	9/125 µm single mode fiber	***) - 40 km** (0.225 dB/km at 1550 nm;) *) Minimum cable attenuation 3.5 dB)

SCP transceiver

Table 7- 4 Permitted cable lengths (fiber-optic) gigabit

Type	Fiber	FO cable lengths
SCP992-1	62.5/125 µm multimode fiber	**0-350 m** (3.1 dB/km at 850 nm; 2000 MHz*km)
	50/125 µm multimode fiber	**0-750 m** (2.5 dB/km at 850 nm; 1200 MHz*km)
SCP992-1LD	9/125 µm single mode fiber	**0-10 km** (0.5 dB/km at 1310 nm)

STP transceiver

Table 7- 5 Permitted cable lengths (fiber-optic) Fast Ethernet

Type	Fiber	FO cable lengths
STP991-1	50/125 µm multimode fiber	**0-5 km** (1 dB/km at 1310 nm; 1200 MHz*km)
	62.5/125 µm multimode fiber	**0-5 km** (≤1 dB/km at 1310 nm; 1200 MHz*km)
STP991-1LD	9/125 µm single mode fiber	**0-26 km** (0.5 dB/km at 1300 nm)

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.

7.3 Other properties

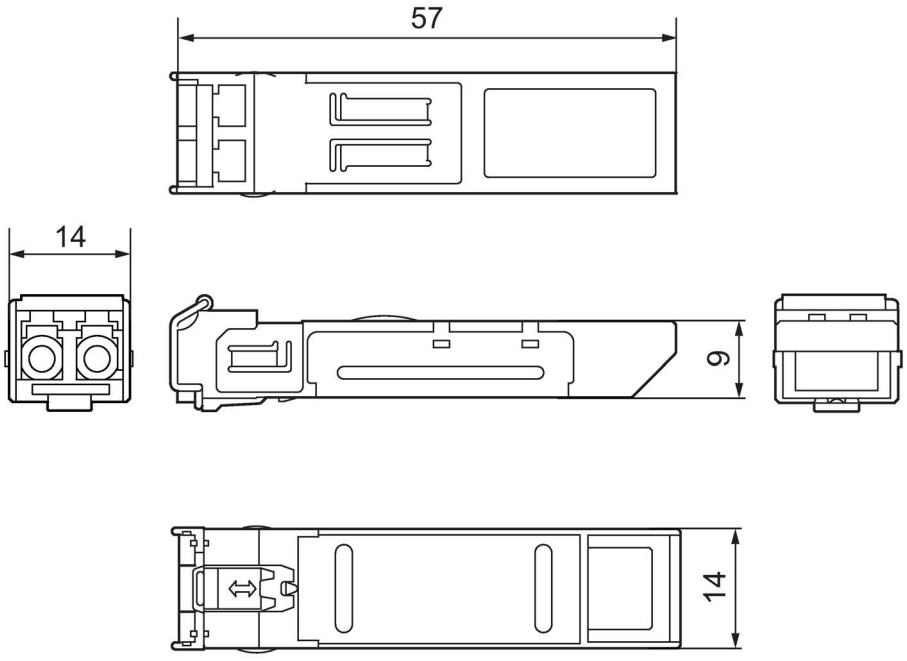
MTBF			
SFP	SFP991-1		> 490 years
	SFP991-1LD		> 490 years
	SFP991-1LH+		> 420 years
	SFP991-1ELH200		> 380 years
	SFP992-1		> 670 years
	SFP992-1LD		> 600 years
	SFP992-1LH		> 490 years
	SFP992-1LH+		> 490 years
	SFP992-1ELH		> 430 years
SFP+	SFP993-1	6GK5 993-1AT00-8AA0	> 1100 years
		6GK5 993-1AT10-8AA0	> 1277 years
	SFP993-1LD	6GK5 993-1AU00-8AA0	> 850 years
		6GK5 993-1AU10-8AA0	> 969 years
	SFP993-1LH		> 300 years
SCP	SCP992-1		> 670 years
	SCP992-1LD		> 600 years
STP	STP991-1		> 490 years
	STP991-1LD		> 490 years

Dimension drawings

8

8.1 SFP dimension drawing

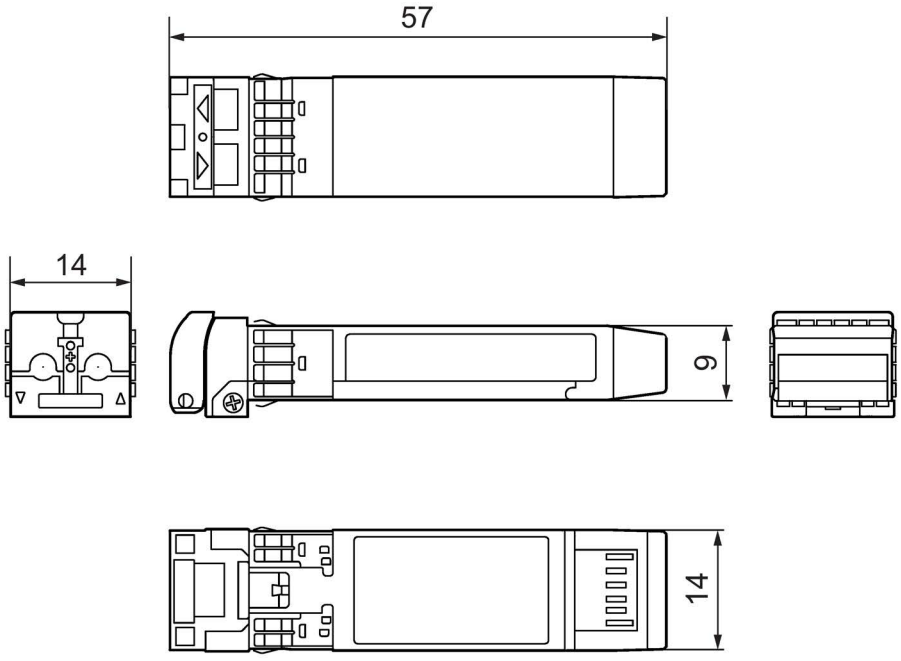
Front and top view, side view (left/right) and view from below



Dimensions are specified in mm.

8.2 SFP+ dimension drawing

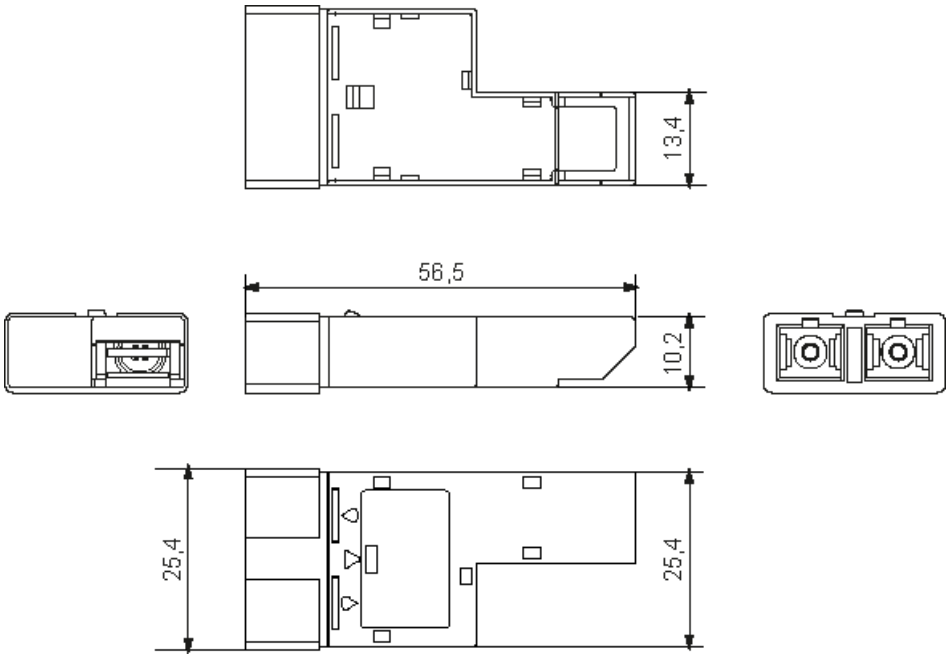
Front and top view, side view (left/right) and view from below



Dimensions are specified in mm.

8.3 SCP dimension drawing

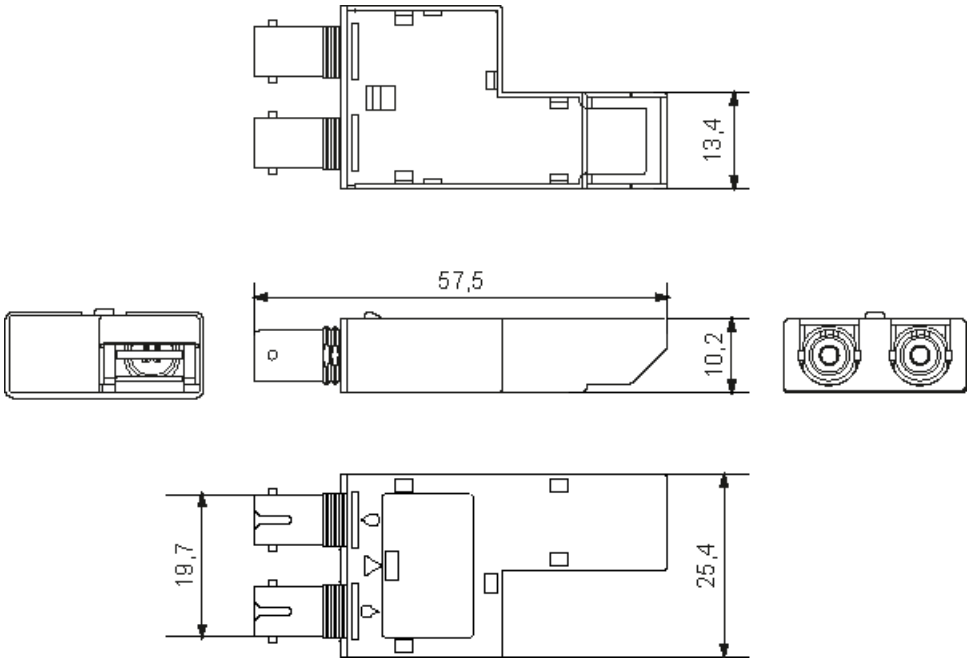
Front and top view, side view (left/right) and view from below



Dimensions are specified in mm.

8.4 STP dimension drawing

Front and top view, side view (left/right) and view from below



Dimensions are specified in mm.

Approvals

9

The SIMATIC NET products described in these Operating Instructions have the approvals listed below.

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

EU declaration of conformity

You will find EC declaration of conformity for these products on the Internet pages of Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/15273/cert).

⚠ 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 "Introduction (Page 5)", 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.

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

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

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

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

Note

The transceivers do not have a UL listing but a c-UR-us approval (component approval).

RCM

The product meets the requirements of the AS/NZS 2064 standard (Class A).

KC (Korean Standard)

The products meet the requirements of the "Korean Standard".

Marking for the customs union

EAC (Eurasian Conformity)

Customs union of Russia, Belarus and Kazakhstan

Declaration of the conformity according to the technical regulations of the customs union (TR CU)

FDA and IEC marks

The following devices meet the FDA and IEC requirements listed below:

Pluggable transceiver	Type	Fulfills FDA and IEC requirements
SFP	SFP991-1	CLASS 1 LASER PRODUCT
	SFP991-1LD	CLASS 1 LASER PRODUCT
	SFP991-1LH+	CLASS 1 LASER PRODUCT
	SFP991-1ELH200	CLASS 1 LASER PRODUCT
	SFP992-1	CLASS 1 LASER PRODUCT
	SFP992-1LD	CLASS 1 LASER PRODUCT
	SFP992-1LH	CLASS 1 LASER PRODUCT
	SFP992-1LH+	CLASS 1 LASER PRODUCT
	SFP992-1ELH	CLASS 1 LASER PRODUCT
SFP+	SFP993-1	CLASS 1 LASER PRODUCT
	SFP993-1LD	CLASS 1 LASER PRODUCT
	SFP993-1LH	CLASS 1 LASER PRODUCT
SCP	SCP992-1	CLASS 1 LASER PRODUCT
	SCP992-1LD	CLASS 1 LASER PRODUCT
STP	STP991-1	CLASS 1 LASER PRODUCT
	STP991-1LD	CLASS 1 LASER PRODUCT

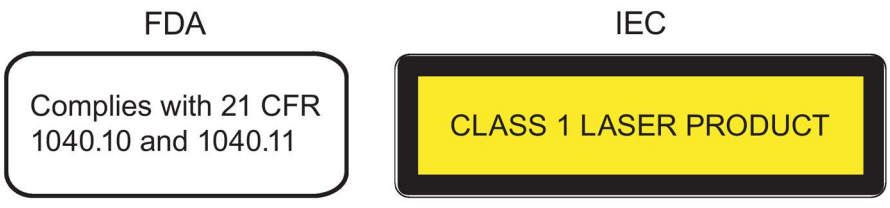


Figure 9-1 FDA and IEC approvals

Mechanical stability (in operation)

Pluggable transceiver	Type	IEC 60068-2-6 vibration	IEC 60068-2-27 shock
		5 – 9 Hz: 3.5 mm 9 – 150 Hz: 1 g 1 octave/min, 20 sweeps	15 g, 11 ms duration 6 shocks per axis
SFP	SFP991-1	●	●
	SFP991-1LD	●	●
	SFP991-1LH+	●	●
	SFP991-1ELH200	●	●
	SFP992-1	●	●
	SFP992-1LD	●	●
	SFP992-1LH	●	●
	SFP992-1LH+	●	●
	SFP992-1ELH	●	●
SFP+	SFP993-1	●	●
	SFP993-1LD	●	●
	SFP993-1LH	●	●
SCP	SCP992-1	●	●
	SCP992-1LD	●	●
STP	STP991-1	●	●
	STP991-1LD	●	●

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