SIEMENS

SIMATIC NET

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Compact operating instructions

SCALANCE XR-500M

English

A5E03275845A-01

Table of contents

Legal information

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.

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

with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION

without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE

indicates that an unintended result or situation can occur if the relevant information is not taken into account.

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.

Introduction

Purpose of the compact operating instructions

These compact operating instructions contain information with which you will be able to install and connect up a device of the SCALANCE X-500 product line. The configuration and the integration of the device in a network are not described in these instructions.

Validity of these compact operating instructions

These compact operating instructions apply to the product group SCALANCE XR-500M as of firmware version 1.0.

Names of the devices in these compact operating instructions

Classification	Description	Terms used
Product line	For all devices and variants of all product groups within the SCALANCE X-500 product line, the term IE switches X-500 is used.	IE switches X-500
Product group	For all devices and variants of a product group, only the product group is used.	XR-500M
Device	For a device, only the device name is used.	XR522-12M
Variant	For a variant of the device, the device name has the appropriate variant added to it in brackets (2 x 24 V).	(-)
All variants of a device	For all variants of the device, the device name has (all) added to it.	(-)

Documentation on the accompanying CD

You will find detailed information on configuration in the Configuration Manual SCALANCE X-500 WBM on the accompanying CD under file name "PH_SCALANCE-X-500_0.pdf "

Safety notes

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 work relating to it such as installation, connecting up, replacing devices or opening the device.

General notices

⚠ WARNING

Restricted use of the device

Devices of the product group XR-500M must not be put into operation in nuclear power plants or other nuclear facilities.

⚠ WARNING

The operating temperature of a device in the product group XR-500M depends on the ambient temperature that must not exceed 60 °C.

⚠ WARNING

The installation location of a device of the XR-500M product group must be selected so that only qualified service personnel or trained users have access to it.

Operation of a device of the XR-500M product group is permitted only when these requirements are met.

⚠ WARNING

Safety extra low voltage

The device is designed for operation with a directly connectable safety extra-low voltage (SELV). (This does not apply to 100 to 240 V devices).

This means that only safety extra-low voltages (SELV) complying with IEC 60950-1 / EN 60950-1 / VDE 0805-1 may be connected.

There is an additional requirement if devices are operated with a redundant power supply:

If the equipment is connected to a redundant power supply (two separate power supplies), both must meet these requirements.

⚠ WARNING

Opening the device

Do not open when energized. Note that this does not apply to opening the service panel in the housing.

CAUTION

The current on the terminal may not exceed 25 A. Use a fuse, that protects against currents > 25 A. The fuse must meet the following requirements:

In areas according to NEC or CEC:

- Suitable for DC (min. 60 V / 25 A)
- Breaking current at least 10 kA
- Approval according to ANSI/UL 248-1
- Suitable for the protection of DC power supply circuits

In other areas:

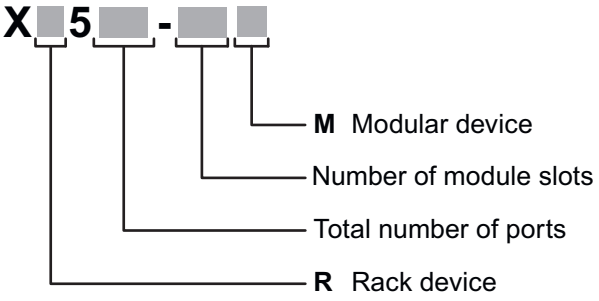
- Suitable for DC (min. 60 V / 25 A)
- Breaking current at least 10 kA
- Approval in compliance with IEC 60127-1 / EN 601127-1
- Breaking characteristics: B or C for circuit breakers and fuses
- Suitable for the protection of DC power supply circuits

Description

Type designations

Structure of the type designation

The type designation of an IE Switch X-500 is made up of several parts that have the following meaning:



Product characteristics

Interfaces

Type	Number of slots for media modules	Number of slots for SFP+	Number of ports	Modular ports via module slots
XR552-12M	12	4	52	48

Components of the product

Note

When you receive the shipment, note the following:

- When the modules ship, the media module slots are fitted with dummy covers.
- Labels with the slot numbers to identify the installed MM900 media modules are supplied with the modular devices.

The following components ship with a SCALANCE XR-500:

- Device with exchangeable medium C-PLUG
- FAN597-1 fan unit
- Filter frame with filter pad
- 4 covers for the interfaces of the SFP+
- 12 dummy covers for the interfaces of the media module slots
- 4 adhesive feet for desktop operation
- 2 mounting brackets
- 8 screws (M3 x 6 countersunk, drive: Torx) for mounting the fixing brackets for 19" rack installation
- 4-pin terminal block for the 24 VDC power supply
- 2-pin terminal block for the signaling contact
- Connecting cable for the console port
- 2 mounting plates and 24 screws (M3 x 6 countersunk, drive: Torx) for installing the power supplies
- Compact operating instructions
- Product CD with documentation and software

Order numbers

Type	Order number
XR552-12M	6GK5 552-0AA00-2AR2

Unpacking and checking

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

⚠ WARNING
Do not use any parts that show evidence of damage!

If the consignment is incomplete or if there is damage to the exterior, contact your supplier or your local Siemens office.

Accessories for SCALANCE XR-500M

Note

Detailed information

You will find detailed information on these products in the compact operating instructions on the product CD.

The following accessories are available for SCALANCE XR-500M:

Power supply units

For the devices of the XR-500M product group, there are power supply units available that allow operation with input voltages of 100 to 240 VAC.

Type	Order number
PS598-1 (100 to 240 VAC / 300 W)	6GK5 598-1AA00-3AA0

Fan unit

CAUTION
Operation of a device of the XR-500M product group only with fan unit Use a device of the XR-500M product group only with a correctly mounted fan unit. Operation without the fan is not possible and would damage the device.

Type	Order number
FAN597-1	6GK5 597-1AA00-8AA0

Media modules

Type	Order number
MM992-4CU	6GK5 992-4SA00-8AA0
MM992-4CUC	6GK5 992-4GA00-8AA0
MM992-4SFP	6GK5 992-4AS00-8AA0
MM991-4	6GK5 991-4AB00-8AA0
MM991-4LD	6GK5 991-4AC00-8AA0
MM992-4	6GK5 992-4AL00-8AA0
MM992-4LD	6GK5 992-4AM00-8AA0

SFP+ transceiver

Type	Order number
SFP993-1	6GK5 993-1AT00-8AA0
SFP993-1LD	6GK5 993-1AU00-8AA0
SFP993-1LH	6GK5 993-1AV00-8AA0

SFP transceiver

Type	Order number
*SFP991-1	6GK5 991-1AD00-8AA0
*SFP991-LD	6GK5 991-1AF00-8AA0
*SFP991-LH+	6GK5 991-1AE00-8AA0
*SFP991-1ELH200	6GK5 991-1AE30-8AA0
SFP992-1	6GK5 992-1AL00-8AA0
SFP992-1LD	6GK5 992-1AM00-8AA0
SFP992-1LH	6GK5 992-1AN00-8AA0
SFP992-1LH+	6GK5 992-1AP00-8AA0
SFP992-1ELH	6GK5 992-1AQ00-8AA0

*Cannot be operated in the SFP+ slots.

NOTICE

No far-end fault detection for an SFP transceiver in the SFP+ slot

If you use an SFP transceiver in an SFP+ slot, no far-end fault detection is possible for this interface.

SET/SELECT button

With a SCALANCE X-500, the SET/SELECT button is on the front of the housing beside the LED display. The SET/SELECT button has several functions that are described below.

Change the display mode

By pressing the button briefly, you change to the display mode of the LED display. For more detailed information on this topic, refer to the section LED display (Page 17).

Resetting the device to the factory defaults

If you reset, all the changes you have made will be overwritten by factory defaults. Follow the steps outlined below:

1. Turn on display mode A. Display mode A is active, if the LEDS "DM1" and "DM2" are unlit. If these LEDs are lit or flashing, you will need to press the SET/SELECT briefly (possibly several times) until the "DM1" and "DM2" LEDs go off. If the SELECT/SET button is not pressed for longer than a minute, the device also turns on display mode A.
2. Hold down the SELECT/SET button for 12 seconds. If you release the button before the 12 seconds have elapsed, the reset is canceled.

Definition of the fault mask

Using the fault mask, you specify an individual "good status" for the connected ports and the power supply. Deviations from this status are then displayed as errors/faults.

1. Turn on display mode A or D. Display mode A is active, if the LEDS "DM1" and "DM2" are unlit. The display mode D is active when the "DM1" and "DM2" LEDs are lit green. When a different display mode is active, press the SET/SELECT button briefly, if necessary more than once, until the required display mode is active.
2. Hold down the SET/SELECT button for five seconds. After three seconds, the "DM1" and "DM2" LEDs start to flash. If you release the button before the five seconds have elapsed, the previous fault mask will be retained.

Enable/disable the redundancy manager

1. Turn on display mode B. Display mode B is active when the "DM1" LED is lit green and "DM2" is unlit. When a different display mode is active, press the SET/SELECT button briefly, if necessary more than once, until the required display mode is active.
2. Hold down the SET/SELECT button for five seconds. After three seconds,the "DM1", "DM2" and "RM" LEDs start to flash. If you release the button before the five seconds have elapsed, the action is aborted.
3. The result of the action depends on the initial situation:
   - If the redundancy manager and media redundancy were disabled, media redundancy is also enabled after enabling the redundancy manager.
   - If you disable the redundancy manager, media redundancy remains enabled.

LED display

The "RM" LED for the "redundancy manager" function

The "RM" LED indicates whether or not the device is operating in the role of redundancy manager and whether or not the ring is working free of error.

LED color	LED status	Meaning
-	off	The device is not operating in the role of "redundancy manager".
green	on	The device is operating in the role of redundancy manager. The ring is working without problems, monitoring is activated.
green	flashes	The device is operating in the role of redundancy manager. An interruption has been detected on the ring and the device has switched through.

The "SB" LED for the standby function

This LED shows the status of the standby function.

LED color	LED status	Meaning
-	off	The standby function is disabled.
green	on	The standby function is enabled. The standby section is passive.
green	flashes	The standby function is enabled. The standby section is active.

The "F" LED for the fault status

The "F" LED (fault) provides information on the error status of the device. While the device is starting up, this LED has the following meaning:

LED color	LED status	Meaning during the device startup
-	off	Device startup successful.
red	on	Device startup not yet completed or a fault/error has occurred.
red	flashes	Bad firmware image.

During normal operation, the "F" LED provides the following information:

LED color	LED status	Meaning during operation
-	off	No operating problems
red	on	The device has detected an error. The signaling contact opens.

"DM1" and "DM2" LEDs for the display mode

The "DM1" and "DM2" LEDs (Display Mode) indicate which of the four display modes A, B, C or D is currently active. The meaning of the L1, L2 and P1, P2, ... LEDs depends on the display mode.

LED color	LED status		Meaning
	DM1	DM2	
-	off		Display mode **A**
green	on	off	Display mode **B**
green	off	on	Display mode **C**
green	on		Display mode **D**

Selecting the display mode

Press the SELECT/SET button to set the required display mode. If the SELECT/SET button is not pressed for longer than a minute, the device automatically changes to display mode A.

Pressing SELECT/SET button starting at display mode A	LED status		Display mode
	DM1	DM2	
-	off		Display mode **A** (default mode)
Press once	on	off	Display mode **B**
Press twice	off	on	Display mode **C**
Press three times	on		Display mode **D**

The "L1" and "L2" LEDs for the power supply

Meaning in display mode A, B or C

LED	Color	Status	Meaning
L1 / L2	_	off	Power supply L1 / L2 lower than 17 V
	green	on	Power supply L1 / L2 higher than 17 V

Meaning in display mode D

LED	Color	Status	Meaning
L1 / L2	_	off	Power supply L1 / L2 is not monitored. If L1 / L2 falls below 17 V, the signaling contact does not respond.
	green	on	Power supply L1 / L2 is monitored. If L1 / L2 falls below 17 V, the signaling contact responds.

The P1, P2, ... LEDs for the port status

The P1, P2, ... LEDs show information on the status of their respective ports (transmission rate, mode, port monitoring). The meaning of these LEDS depends on the display mode ("DM1" and "DM2" LEDs).

Meaning in display mode A

LED color	LED status	Meaning
-	off	No valid link to the port (for example station turned off or cable not connected).
green	on	Link exists and port in normal status. In this status, the port can receive and send data.
	flashes once per period*	Link exists and port in "blocking" status. In this status, the port only receives management data (no user data).
	flashes three times per period*	Link exists and port turned off by management. In this status, no data is sent or received over the port.
	flashes four times per period*	Port exists and is in the "monitor port" status. In this status, the data traffic of another port is mirrored to this port.
yellow	flashes / lit	Receiving data at port.

* 1 period = 1.25 seconds

Note

LEDS for the SFP+ slots of the SCALANCE X-500

If SFP+ slots of the SCALANCE X-500 have SFP transceivers plugged into them, the LEDs of these slots do not indicate any data transfer.

Meaning in display mode B

LED color	LED status	Meaning
-	off	Port operating at 10 Mbps.
green	on	Port operating at 100 Mbps.
orange	on	Port operating at 1000 Mbps.
green	flashes	Port operating at 10 Gbps

If there is a link fault and the type of transmission is fixed (autonegotiation off), the desired status, in other words the set transmission rate (1000 Mbps, 100 Mbps, 10 Mbps) continues to be displayed. If there is a link fault and autonegotiation is active, the port LED goes off.

Meaning in display mode C

LED color	LED status	Meaning
-	off	Port operating in half duplex.
green	on	Port operating in full duplex.

Meaning in display mode D

LED color	LED status	Meaning
-	off	The port is not monitored; in other words, if a link is not established at the port, this does not trigger the signaling contact.
green	on	The port is monitored, in other words, if no connection was established at the port (for example no cable inserted), this triggers the signaling contact and an error state results.

Area of application and function of the C-PLUG

Area of application

The C-PLUG (configuration plug) that ships with the product is an exchangeable memory medium for storing the configuration data of the device. The device can also be operated without a C-PLUG.

This allows fast and uncomplicated replacement of a device. The C-PLUG is taken from the previous device and inserted in the new device. The first time it is started up, the replacement device has the same configuration as the previous device except for the MAC address set by the vendor.

Principle

The data remains stored on the C-PLUG even when power is turned off. In terms of using the C-PLUG, there are two ways of operating the device:

- With unwritten C-PLUG

  If an empty C-PLUG (factory settings or deleted with the Clean function) is inserted, all the configuration data of the device is saved to it automatically when the device starts up. Changes to the configuration during operation are saved without operator intervention on the C-PLUG if this is in the "ACCEPTED" status. This depends on how you configured your SCALANCE device. In this mode, the internal memory is neither read nor written. This mode is active when a C-PLUG is inserted.

- With written C-PLUG

  A device with an accepted C-PLUG inserted uses the configuration data of the C-PLUG automatically when it starts up. Acceptance is possible only when the data was written by a compatible device type.

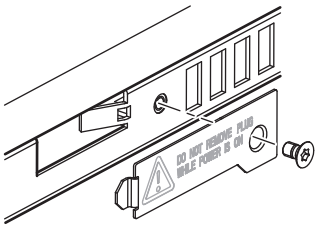
Response to errors

Inserting a C-PLUG that does not contain the configuration of a compatible device type, accidentally removing the C-PLUG or general malfunctions of the C-PLUG are signaled by the diagnostics mechanisms of the device (LEDs, Web-based management, SNMP, CLI and PROFINET diagnostics).

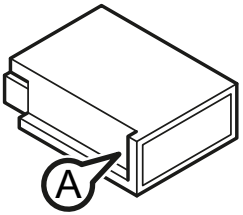
Removal and insertion of the C-PLUG (rack devices)

CAUTION
A C-PLUG may only be removed or inserted when the device is turned off.

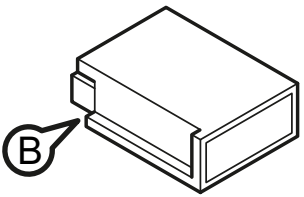
Position of the C-PLUG with rack devices

	With rack devices, the slot is below a cover on the right-hand side of the housing. After undoing the screw (screw head Torx T10), the cover plate can be removed and the slot is accessible.

Removing the C-PLUG

	1. Turn off the power to the device. 2. Remove the cover plate on the right-hand side of the device. 3. Insert a screwdriver between the front edge of the C-PLUG (position A) and the slot and release the C-PLUG. 4. Remove the C-PLUG and screw the cover plate firmly in place again.

Inserting the C-PLUG

	1. Turn off the power to the device. 2. Remove the cover plate on the right-hand side of the device. 3. The housing of the C-PLUG has a protruding ridge on the long side (position B). The slot has a groove at this position. Insert the C-PLUG correctly oriented into the slot. 4. Secure the cover plate again with the screws.

Assembling

Installation

⚠ WARNING

Use of approved components

- Use only approved components, for example supporting brackets, SFPs, 19" modules.
- Create any supports you require according the dimension drawing.

⚠ CAUTION

Provide suitable shade to protect the SCALANCE X-500 against direct sunlight. This avoids unwanted warming of the SCALANCE X-500 and prevents premature aging of the device and cabling.

NOTICE

When installing and operating the device, keep to the installation instructions and safety-related notices as described in this document and in the SIMATIC NET Industrial Ethernet network manual.

Overview of the methods of installation

Installing the switches

The following types of installation are possible with the XR-500M product group:

- Installation in a 19" rack,
- Desktop mounting,
- Secured at 4 points using special mounting brackets.

Installation of the modular devices

The following types of installation types are possible for modular devices:

- Installation of the media modules in the slots,
- Installation of the SFP in media modules for SFP or SFP+ slots,
- Installation of the SFP+ in SFP+ slots.

19" rack mounting of an XR-500M

Note

Installation with two mounting brackets

The device is installed using two mounting brackets on the front of the rack device.

After fitting the two mounting brackets, the rack device can then be installed in a 19" cabinet.

Note

Installation secured at 4 points

When used on a ship, the device must be secured at 4 points.

Example of a four-point mounting: Two mounting brackets on the front and rear of the device.

CAUTION

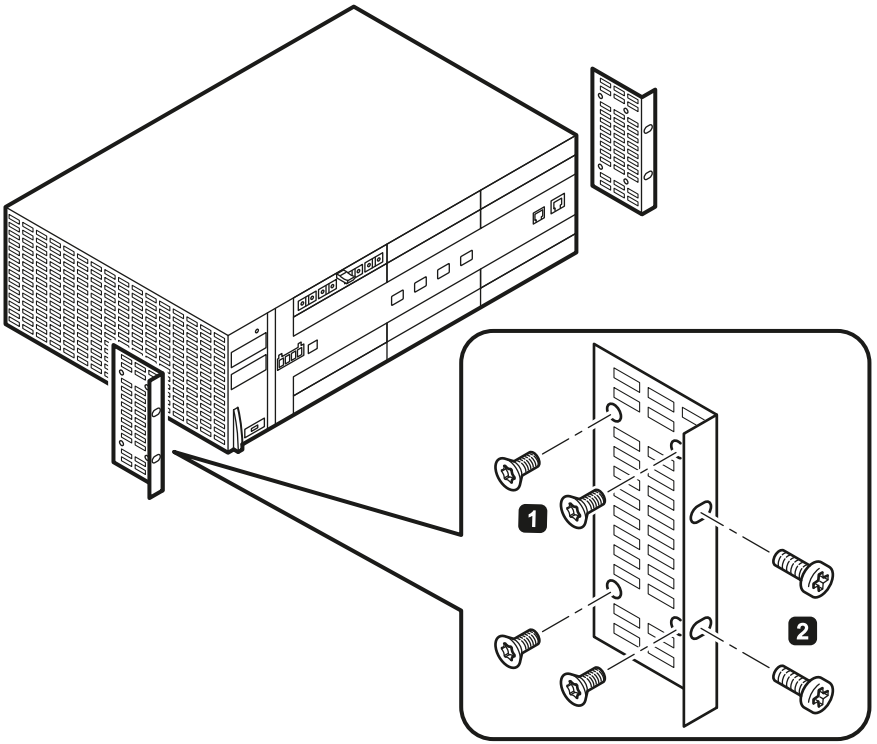
Damage to the device due to inadequate cooling

If the ventilation slits are fully or partly covered, the temperature inside the housing can rise and exceed the maximum permitted temperature causing damage to the device.

The ventilation slits are located on the side panels of the housing. During installation, select a mounting position so that the ventilation slits are always free so that the air can circulate. The clearance to the ventilation slits of the housing must be at least 10 cm.

Close unused module slots with dummy covers. Open module slots impair the air circulation and can damage the device.

Procedure



Follow the steps below to install a SCALANCE XR-500M in a 19" rack:

1. Secure the two mounting brackets with four screws each (M3 x 6 supplied with the product) to the side panels of the SCALANCE XR-500M. The maximum tightening torque for these screws is 0.5 Nm.
2. Position the SCALANCE XR-500M at the required location and screw the device to the 19" rack.

Desktop operation with adhesive feet

⚠ CAUTION
Desktop operation is not permitted if the power is supplied via the front terminals
Desktop operation is permitted only when the power supply units are mounted.
The adhesive feet ship with the product.

CAUTION
Damage to the device due to inadequate cooling
If the ventilation slits are fully or partly covered, the temperature inside the housing can rise and exceed the maximum permitted temperature causing damage to the device.
Select the installation location so that the ventilation grilles are always free. The ventilation grilles are located on the side panels of the housing.

Note

When using the device in desktop mode, remember that the device may only be supplied via the front connector when it is located in a "restricted access location", for example the device is inside a cabinet and is only accessible to trained personnel.

If the device is not in a "restricted access location", the power supply units needed to be mounted. If the power supply units are mounted, there is no special restriction for the device.

Note

Strain relief for the cables

A cable duct or cable tray must be present at a suitable distance from the device to provide strain relief.

Procedure

1. Remove the foil from one side of the adhesive feet and place the adhesive feet on the bottom of the housing.
2. Remove the other foils from the adhesive feet and position the device at the required location.
3. Fix the device in position by applying light pressure to the side edges of the housing. Under no circumstances apply pressure to the center of the device housing, the housing could otherwise be damaged.

Use on ships

CAUTION
Damage to the device due to inadequate cooling If the ventilation slits are fully or partly covered, the temperature inside the housing can rise and exceed the maximum permitted temperature causing damage to the device. The ventilation slits are located on the side panels of the housing. During installation, select a mounting position so that the ventilation slits are always free so that the air can circulate. The clearance to the ventilation slits of the housing must be at least 10 cm.

Note

Installation secured at 4 points

For installation on a ship, the device must be secured at 4 points.

Example of a four-point mounting: Two mounting brackets on the front and rear of the device.

Requirement

To install the device on a ship, you require special mounting brackets. you will find the design drawings for making the mounting brackets in the section "Mounting brackets for use on ships (Page 64)".

Note

Different mounting brackets

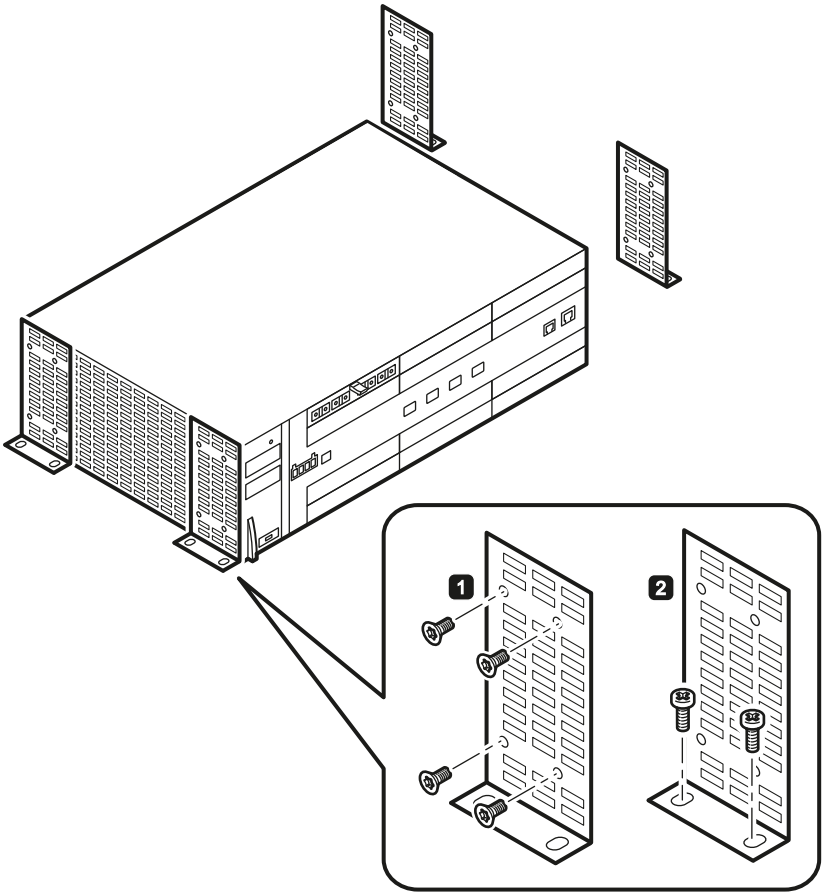
Note that if the device is installed on a ship, two different mounting brackets are used (right and left) and that these are not identical.

Two identical mounting brackets are fitted to each side (left and right).

To secure this mounting bracket to the SCALANCE XR-500M, you require four countersunk screws (M3 x 6) for each mounting bracket and two suitable round-head screws (6 mm diameter) for the base on which the SCALANCE XR-500M is mounted.

How to distinguish the mounting brackets is described in the section "Auto-Hotspot".

Procedure



Follow the steps below to install a SCALANCE XR-500M on a ship:

1. Secure the four mounting brackets with four countersunk screws each (M3 x 6 supplied with the product) to the side panels of the SCALANCE XR-500M. The maximum tightening torque for these screws is 0.5 Nm.
2. Position the SCALANCE XR-500M at the required location and secure the device with suitable round-head screws (6 mm diameter).

Plugging and pulling MM900 media modules

CAUTION

Use only approved media modules

In the module slots of SCALANCE XR-500M, use only approved media modules "MM900" of the X-500 IE switch product line.

Note

The names and labeling of the media modules differ

Example: The device is called, for example MM992-4SFP [6GK5 992-4AS00-8AA0], the labeling on the device is 9924AS.

NOTICE

Factory settings of the media modules

When inserting a media module, the parameters of the ports are set to the factory defaults. First plug a media module into the device, and then assign the parameters for the ports.

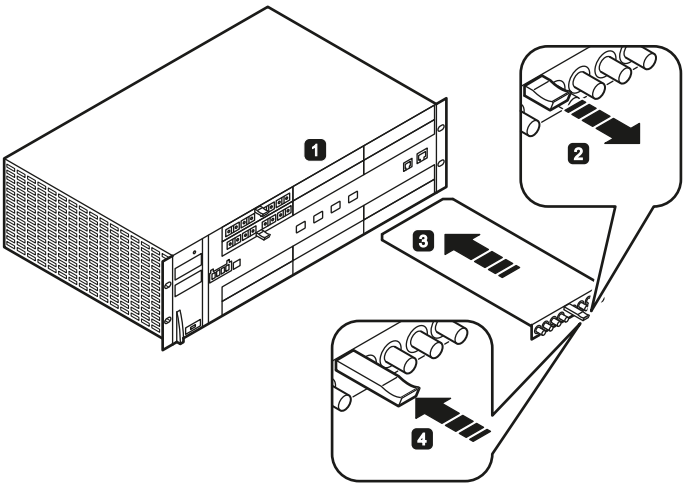
Identification of the media module slots and ports

The following table shows the arrangement of the slots and ports of a SCALANCE XR552-12M:

Slot	1				2				3			
Port	P1	P2	P3	P4	P1	P2	P3	P4	P1	P2	P3	P4
Slot	4				5				6			
Port	P1	P2	P3	P4	P1	P2	P3	P4	P1	P2	P3	P4
Port (SFP+)					P1	P2	P3	P4				
Slot	7				8				9			
Port	P1	P2	P3	P4	P1	P2	P3	P4	P1	P2	P3	P4
Slot	10				11				12			
Port	P1	P2	P3	P4	P1	P2	P3	P4	P1	P2	P3	P4

NOTICE
Slot number In modular devices, the MM900 media modules can be assigned a slot number to aid orientation. The slot number labels ship with the modular devices.

Plugging in media module



Follow the steps below to plug an MM900 media module into a SCALANCE XR-500M:

1. Remove the dummy covers of the device slot into which you want to insert a media module.
2. Pull the handle out of the media module. The media module cannot be installed unless the handle is pulled out.
3. Place the media module in the guide rails of the device slot. The media module is correctly installed when it locks easily into the device and the front panel of the module is flush with the front of the device.
4. Push the handle back into the module. The media module is then locked in place.

Pulling a media module

To pull a media module, follow the same steps as when plugging, but in the reverse order:

1. Pull out the handle of the media module.
2. Pull the media module out of the device slot.
3. Close the device slot with a dummy cover if you are not plugging in another module.

CAUTION
The device meets degree of protection IP20, if all the module slots have either media modules inserted or are closed by dummy covers. Do not start up the device with open module slots since the ingress of objects can lead to damage.

General notes on the SFP+/SFP transceivers

Note

Fixed slots of the SCALANCE XR-500M

The SFP+ transceivers are not suitable for media modules. The devices of the XR-500M product group have 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.

Note

The media module MM992-4SFP and the SFP+ slots may only be fitted with approved SFP or SFP+ transceivers. The SFP media module can be fitted with up to four SFPs.

⚠ WARNING

Use only approved SFP+ transceivers

If you use components not approved by Siemens AG, in particular 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

Plugging and pulling during operation

The 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.

Documentation on the accompanying CD or on the Internet

You will find detailed information on installation in the compact operating instructions on the accompanying CD or on the Internet under the file name "BAK_Stecktransceiver SFP/SFP+_0.pdf"

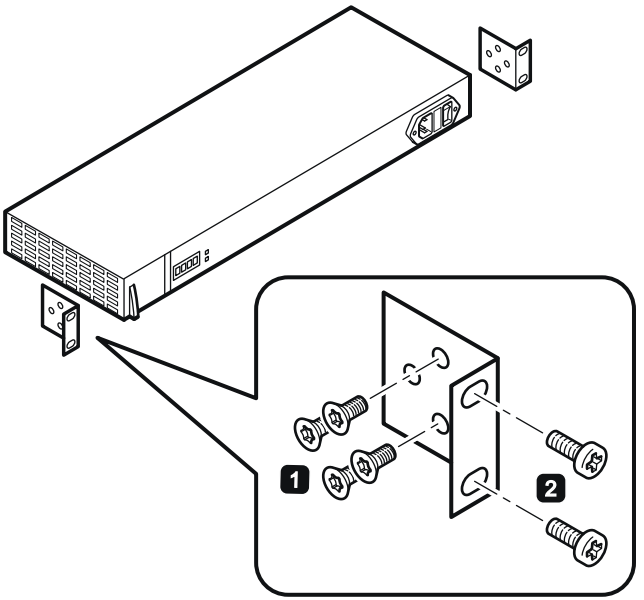
19" rack mounting of the PS598-1

Power supply unit for 19" rack installation

The PS598-1 was developed specifically for use with devices of the XR-500M product group. This power supply unit can be mounted directly above or below a SCALANCE XR-500M since the ventilation openings are on the sides of both the basic device and the power supply unit.

CAUTION
Damage to the device due to inadequate cooling If the ventilation grilles are fully or partly covered or the air filters are contaminated, the temperature inside the housing can rise and exceed the maximum permitted temperature and damage the device. During installation, select a mounting position so that the ventilation grilles are always free so that the air can circulate. The ventilation grilles are located on the side panels of the housing. You will find information about cleaning the air filter in the section "Upkeep and maintenance".

Procedure



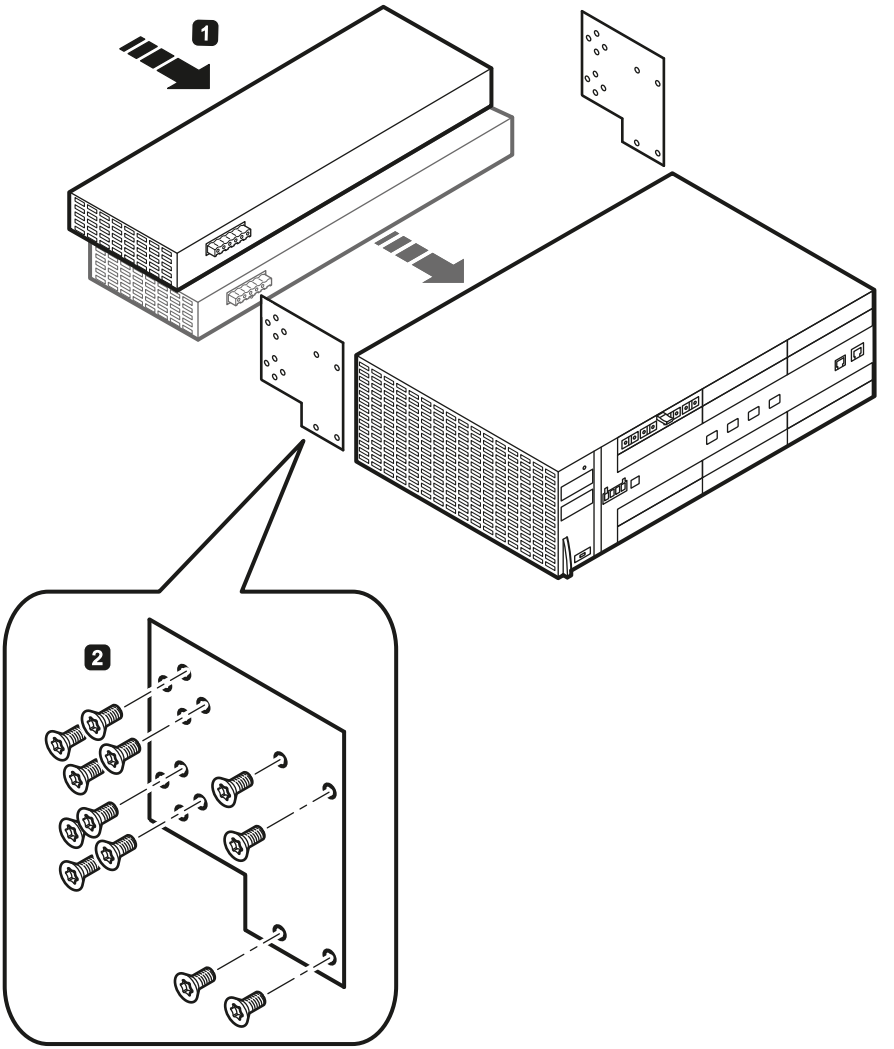
Follow the steps below to install the PS598-1 in a 19" rack:

1. Secure the two mounting brackets with four screws each (M3 x 6 supplied with the product) to the side panels of the power supply unit. The maximum tightening torque for these screws is 0.5 Nm.
2. Screw the PS598-1 to the 19" rack.

Mounting the PS598-1 on the rear panel of an XR-500M

CAUTION
Damage to the device due to inadequate cooling If the ventilation grilles are fully or partly covered or the air filters are contaminated, the temperature inside the housing can rise and exceed the maximum permitted temperature and damage the device. During installation, select a mounting position so that the ventilation grilles are always free so that the air can circulate. The ventilation grilles are located on the side panels of the housing. You will find information about cleaning the air filter in the section "Upkeep and maintenance".

Procedure



On the rear panel of a SCALANCE XR-500M, there are sockets for the direct connection of a maximum of two PS598-1 power supply units. On the rear of the PS598-1 there is a corresponding plug. Follow the steps below to install the PS598-1 on the rear panel of a SCALANCE XR-500M:

1. Fit the PS598-1 and the SCALANCE XR-500M together. The two devices are equipped with positioning elements that must engage during installation and protect the plug from excessive bending strain.
2. Screw the two devices to the mounting plates supplied with the main device. The maximum tightening torque of the screws is 0.5 Nm.

Connecting

Commissioning

⚠ WARNING

Commissioning devices and replacement devices

If you use redundancy mechanisms (HSR/MRP ring redundancy and/or redundant coupling of rings over standby), open the redundant path before you insert a new or replacement device in an operating 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:

- With HSR/MRP:

The ring ports of the device being inserted in the HSR/MRP ring were actually configured as ring ports and the mode ring redundancy was correctly selected and enabled.

- With standby link:

The standby connection must be "enabled" and the "Standby connection name" must match the name of the partner device. You also need to select the port in "Standby port". (Refer to the "Configuration Manual SCALANCE X-500 WBM")

Power supply 24 V DC

Protective measures against overvoltage

⚠ CAUTION

If SCALANCE XR-500Ms are supplied over long 24 V power supply lines or networks, measures are necessary to prevent interference by strong electromagnetic pulses on the supply lines. These can result, for example, due to lightning or switching of large inductive loads.

One of the tests used to attest the immunity of a SCALANCE XR-500M to electromagnetic interference is the "surge immunity test" according to EN61000-4-5. This test requires overvoltage protection for the power supply lines. The following type is, for example, suitable:

Dehn Blitzductor VT AD 24 V, order number 918 402

Vendor: DEHN + SÖHNE GmbH + Co.KG, Hans Dehn Str. 1, Postfach 1640, D-92306 Neumarkt, Germany

Information on the power supply

- The power supply is connected using a 4-pin plug-in terminal block.
- The power supply can be connected redundantly. Both inputs are isolated. There is no distribution of load. When a redundant power supply is used, the power supply unit with the higher output voltage supplies the SCALANCE XR-500M alone.
- The power supply is connected over a high resistance with the enclosure to allow an ungrounded set up. The two power inputs are non-floating.

Note

To wire up the power supply connector, use copper cable of the category 14 AWG - 10 AWG or cable with a cross-sectional area of 1.5 mm^2 to 4 mm^2.

WARNING

Note the following:

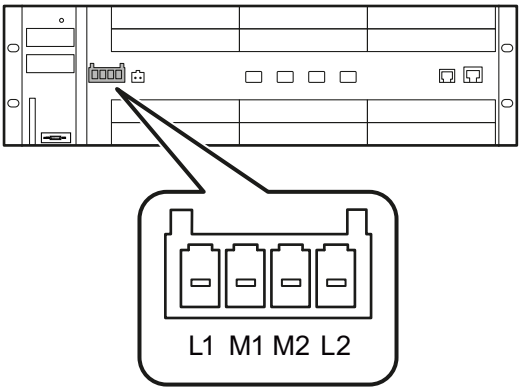
- The device is designed for operation with a directly connectable safety extra-low voltage (SELV). (This does not apply to 100 to 240 V devices). This means that only safety extra-low voltages (SELV) complying with IEC 60950-1 / EN 60950-1 / VDE 0805-1 may be connected.
- The signaling contact can be subjected to a maximum load of 100 mA (safety extra-low voltage (SELV), 24 VDC).

Note

The MM900 media modules are supplied with the required voltage via the modular devices.

The SFP transceivers are supplied with suitable voltage via the SFP media module in a modular device.

Pin assignment of the terminal block

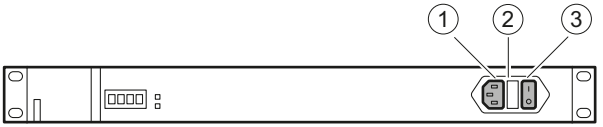


Contact	Assignment
L1	+24 VDC
M1	Ground
M2	Ground
L2	+24 VDC

Connecting devices with 100 to 240 VAC power supply

Switches for the input voltage

The socket X1 (position ①) and the switch S1 Power (position ③) for the input voltage are located on the right-hand side of the front panel of the housing:



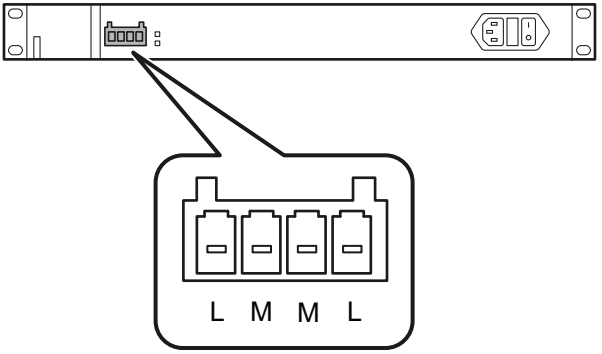
CAUTION
Connect and disconnect the power supply unit only when it is not energized! The PS598-1 is not capable of hot plugging. Connecting or disconnecting the PS598-1 when the 100 to 240 VAC power supply is on can damage the PS598-1 and the SCALANCE XR-500M. Before connecting or disconnecting the PS598-1, make sure that the switch for the input voltage is set to position "0".

Note

Fuses in the fuse holder

The fuses FUSE1 and FUSE2 are in the fuse holder (position ②). The fuses are of the type F6.3A / 250 VAC.

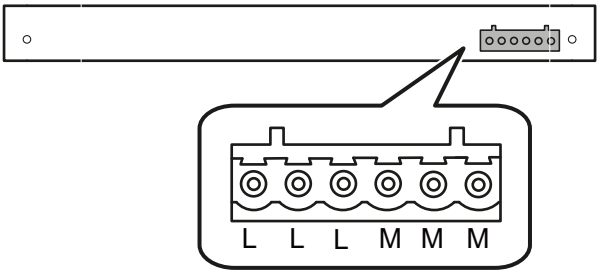
Pin assignment of the X2 socket on the front



Contact	Assignment
L	+24 VDC
M	Ground
M	Ground
L	+24 VDC

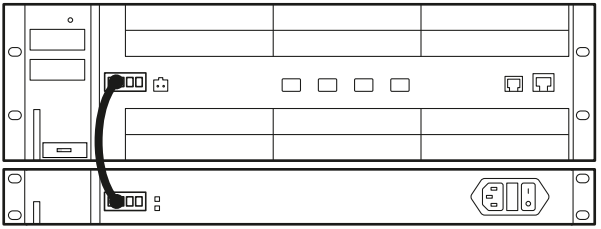
Pin assignment of the X3 plug on the rear

Connector X3 is located on the back of the PS598-1. Connector X3 is intended only to connect the PS598-1 directly to an XR-500M.



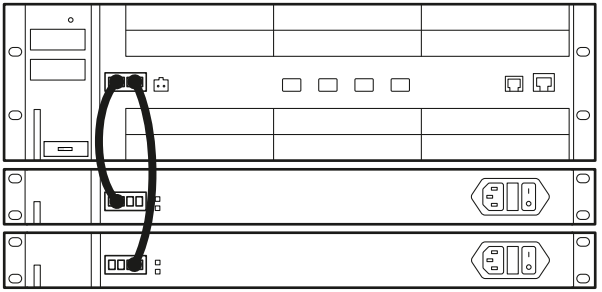
Contact	Assignment
L	+24 VDC
L	
L	
M	Ground
M	
M	

One PS598-1 per device, no redundancy



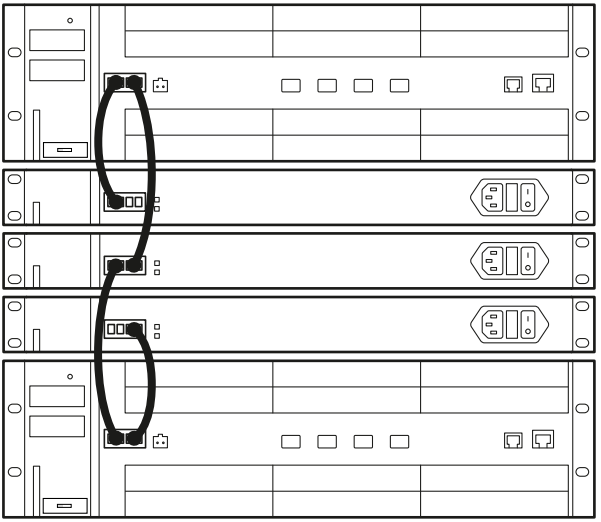
Connect the SCALANCE XR-500M and the PS598-1 with one cable for 24 VDC and a cable for ground. As an alternative, you can also mount the PS598-1 on the back of the SCALANCE XR-500M and secure it with screws. In this case, no extra cables are necessary. You will find detailed information in the section "Installation".

Two PS598-1 per device, 1-out-of-2 redundancy



Connect the SCALANCE XR-500M and the PS598-1 units with one cable for 24 VDC and a cable for ground. As an alternative, you can also mount the two PS598-1 units on the back of the SCALANCE XR-500M and secure them with screws. In this case, no extra cables are necessary. You will find detailed information in the section "Assembling (Page 24)". It is also possible to operate the SCALANCE XR-500M even after the failure of a PS598-1. The SCALANCE XR-500M detects the failure of a power source and signals the failure. The PS598-1 units share the applied load automatically and uniformly.

Three PS598-1 units for two devices - 2-out-of-3 redundancy



Connect each SCALANCE XR-500M to its own PS598-1. In addition to this, connect both SCALANCE XR-500M devices to the third PS598-1. Both SCALANCE XR-500M devices can now continue to operate after the failure of one PS598-1. The SCALANCE XR-500M detects the failure of a power source and signals the failure. The PS598-1 units share the applied load automatically and uniformly.

Note

Two connectors for the 24 VDC output voltage

The PS598-1 has two connectors with the output voltage 24 VDC. Note that you can only use the connector on the front or the connector on the rear of the PS598-1. You cannot operate the device with the connectors on the front and rear at the same time.

LED display

A PS598-1 has two LEDs each, one green and one red. If the green LEDs is lit (24V OK), the output voltage is correctly applied. If the red LED is lit (SHUT DOWN) an error has occurred.

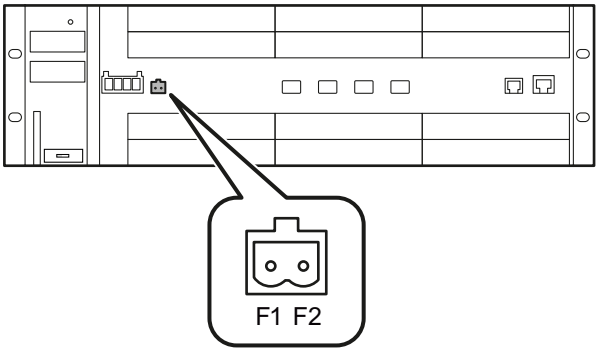
Possible errors/faults:

- The output voltage is not correct.
- Temperature of the PS598-1 is too high.

Signaling contact

Function

The signaling contact (relay contact) is a floating switch that signals faults by breaking the contact. The signaling contact is connected to a 2-pin plug-in terminal block.



CAUTION
Use a maximum load 24 VDC and 100 mA with the signaling contact. At higher voltages or currents the device may be damaged!

Signaling faults

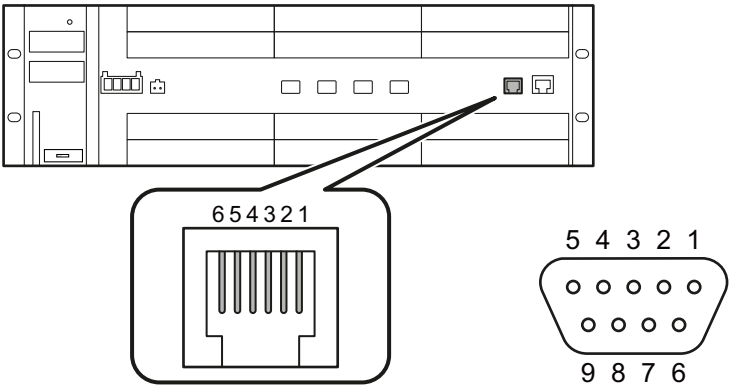
- The signaling by the signaling contact is synchronized with the fault LED, in other words, all errors displayed by this LED (freely configurable) are also signaled on the signaling contact.
- If an internal fault occurs, the fault LED lights up and the signaling contact opens.
- The connection or disconnection of a communication node on an unmonitored port does not lead to an error message.
- The signaling contact remains activated until the error/fault is eliminated or until the current status is entered in the fault mask as the new desired status.

Serial interface

Function

A device of the SCALANCE XR-500M product group has a serial interface (RJ-11 jack). This means that access to the device is also possible independent of the Ethernet ports. A cable with an RJ-11 plug and D-sub female connector for connection to the serial interface of the PC ships with the product.

Pin assignment of the RJ-11 plug and D-sub female connector

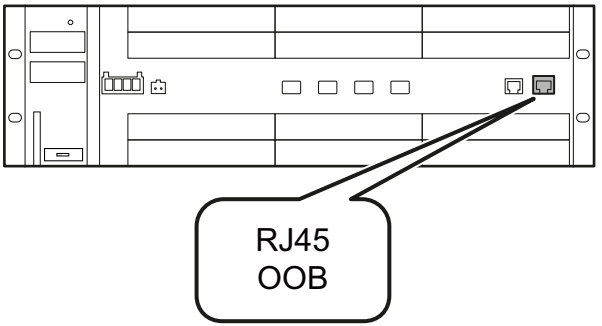


Contact	Pin assignment of the RJ-11 plug	Pin assignment of the D-sub female connector
1	-	-
2	-	RD (Receive Data)
3	TD (Transmit Data)	TD (Transmit Data)
4	SG (Signal Ground)	-
5	RD (Receive Data)	SG (Signal Ground)
6	-	-
7		-
8		-
9		-

Out-of-band interface

Function

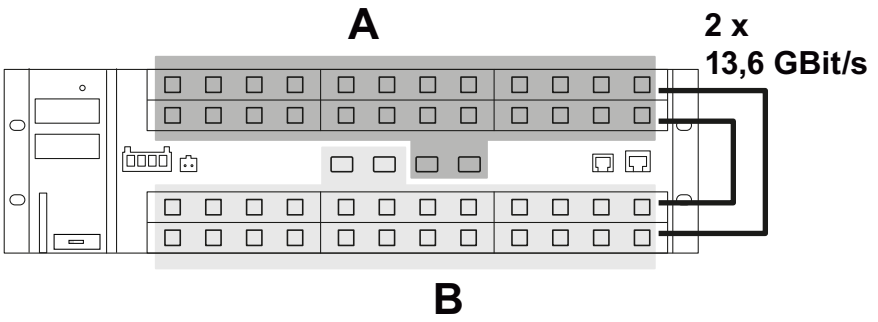
A device of the SCALANCE XR-500M product group is equipped with an out-of-band interface (Ethernet, RJ-45). This means that access to the device is also possible independent of the other Ethernet ports.



Block architecture of the XR552-12M

Special features of device-internal data transfer

The SCALANCE XR552-12M has two switch blocks. The assignment of the ports to the two blocks A and B is shown in the graphic below:

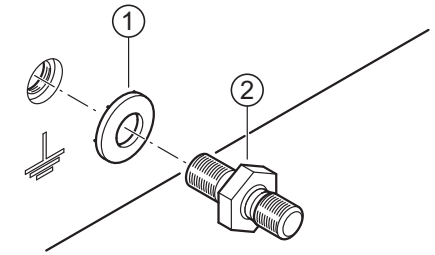


Communication between the switch blocks is via two connections each operating at 13.6 Gbps. This bandwidth must be shared by all ports for inter-block data transfer. For this reason, ports between which a lot of data is transferred should ideally belong to the same switch block.

Grounding

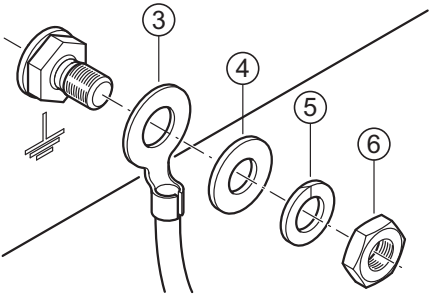
Optional grounding of the SCALANCE XR-500M

Grounding (functional ground) is via the mounting bracket on the device or via the screw-in bolts on the rear of the device. To ground the device from the back, follow the steps below:



1 toothed washer
2 grounding bolt

The connector for the grounding cable is in the center of the rear panel of the device. Fit the toothed washer and tighten the grounding bolt with a maximum torque of 2 Nm.



3 ground terminal with cable
4 washer
5 spring washer
6 nut

Fit parts 3, 4 and 5 as shown in drawing onto the grounding bolt and tighten the nut with a maximum torque of 1.5 Nm.

Uninstalling

Uninstalling from the rack

1. Remove all connectors.
2. Mount the power supply unit/units on the rear of the device.
3. When necessary release the locking mechanisms on the rack device (such as the handles on the media modules or the clip on the SFP/SFP+) to be able to remove the media modules (MM900) or the transceivers (SFP/SFP+).

Upkeep and maintenance

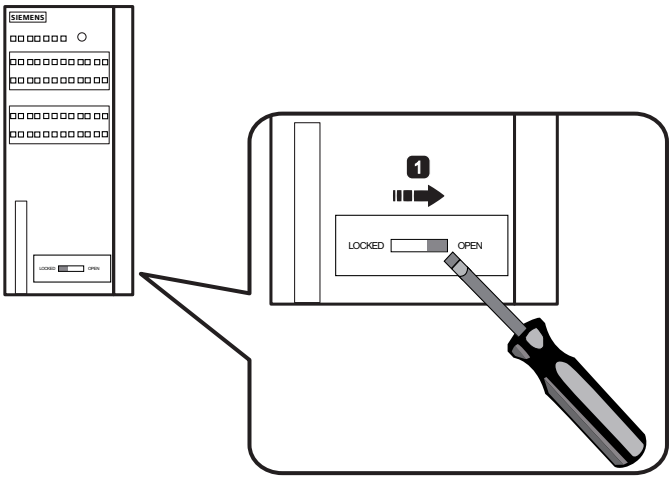
Changing the fan unit

CAUTION
Operation of the SCALANCE XR-500M only with fan unit Use a SCALANCE XR-500M only with a correctly fitted fan unit. Operating without the fan is not possible and would damage the device! You can, however, replace the fan unit during operation but you must make sure that the ventilation of the housing is only interrupted for a maximum of two minutes.

Procedure

Follow the steps below to replace the fan unit of a SCALANCE XR-500M:

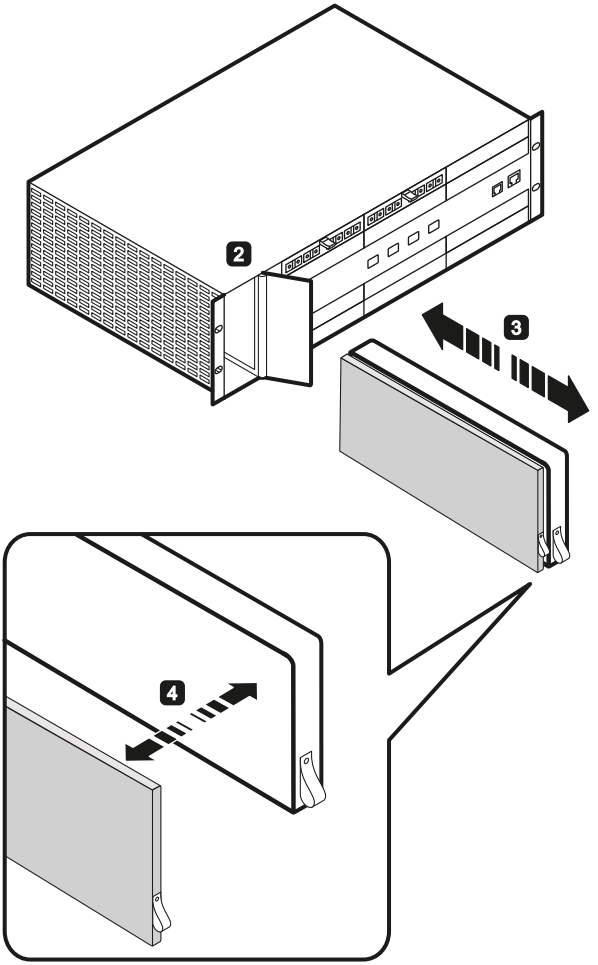
1. Unlock the cover by pushing the catch to the right with a slotted screwdriver.



2. Open the hinged cover.

⚠ WARNING
Danger of injury by touching rotating fan blades
There is a risk of injury if you touch rotating fan blades.
Do not touch rotating fan blades.
Allow the fan blades to come to a stop.

3. Pull the fan unit out of the housing using the handle on the fan unit. Make sure that the filter frame with the filter mat is also be pulled out.
4. Push the new fan unit into the slot along the guide rails.



5. Push the filter frame into the slot along the guide rails.
6. Close the cover and lock it by pushing the catch from right to left with a slotted screwdriver.

Note

After turning on the main device, the fans rotate at full speed for approximately 1 minute before the fan controller becomes active.

Changing the filter pad

CAUTION
A badly contaminated filter reduces air flow and can cause the device to be damaged. Check the degree of contamination of the filter regularly and clean / replace the filter mat as necessary.

Procedure

Follow the steps below to replace the filter pad SCALANCE XR-500M:

1. Unlock the cover by pushing the catch to the right with a screwdriver.
2. Pull the filter frame out of the housing pulling on the strap of the filter frame.
3. Remove the filter pad.
4. Clean or replace the filter pad.
5. Insert the cleaned or new filter mat in the filter frame.
6. Insert the filter frame in the slot again.
7. Close the cover and lock it by pushing the catch from right to left with a screwdriver.

Note

After turning on the main device, the fans rotate at full speed for approximately 1 minute before the fan controller becomes active.

Downloading new firmware using TFTP without WBM and CLI

Procedure

Using TFTP, you can supply a device with new firmware whatever the situation even when it cannot be reached using Web Based Management or the CLI. Follow the steps below to load new firmware using TFTP:

1. Turn off the power to the device.
2. Now press the Reset button and reconnect the power to the device while holding down the button.
3. Hold down the button until the red fault LED (F) starts to flash after approximately 30 seconds.
4. Now release the button. The bootloader waits in this state for a new firmware file that you can download by TFTP.
5. Connect a PC to the device over the Ethernet interface.
6. Assign an IP address to the device using DHCP or the Primary Setup Tool.
7. Open a DOS box and change to the directory where the file with the new firmware is located and then execute the following command :
   `tftp -i <IP address> put <firmware file>`
   >As an alternative, you can use a different TFTP client.
8. Once the firmware has been transferred completely to the device, there is an automatic restart on the device. This may take several minutes.

Restoring the default parameter settings

Procedure

Follow the steps below to reset the device parameters to the factory settings:

NOTICE
When you reset the device parameters, all previously changed settings are lost!

1. Turn off the power to the device.
2. Now press the Reset button and reconnect the power to the device while holding down the button.
3. Hold down the button until the red fault LED (F) stops flashing after approximately 40 seconds and is permanently lit.
4. Now release the button and wait until the fault LED (F) goes off again.
5. The device then starts automatically with the default parameters.

Technical data

Mechanical and electrical data

Device variants

The following technical specifications apply to the following device:

- SCALANCE XR552-12M

Interfaces

Power	• 4-pin terminal block for 2 x 24 VDC on the front of the device. • 2 terminal blocks on the rear of the device for direct connection of up to two PS598-1 power supply units.
Data	• 12 slots for media modules • 4 slots for SFP+ transceivers • 2-pin terminal block for a signaling contact • Serial interface (RJ-11 jack) • Out-of-band interface (RJ-45 jack)

Construction

Dimensions without brackets for rack mounting (W x H x D)	446 x 133 x 305 mm (3 height unit)
Weight (without media modules inserted)	10 kg
Degree of protection	IP20 (with closed service panel)
Installation 483 mm rack (19" rack)	Yes
DIN rail mounting	No
S7-300 standard rail mounting	No
Wall mounting	No

Electrical data - basic device without modules

Power supply*	24 VDC (19.2 to 28.8 V)
Current consumption	1.42 A
Maximum power consumption	34.08 W
Overcurrent protection of the power supply	Non-replaceable fuse
	Fan unit: T 5 A / 125 V
	Electronics: F15 A / 125 V
	PoE: F15 A / 125 V
Voltage for the signaling contact	24 VDC
Switching capacity (resistive load)	100 mA

Electrical data - with maximum device configuration	
Power supply	24 VDC (19.2 to 28.8 V)
Current consumption	12.5 A
Maximum power consumption	300 W
Overcurrent protection of the power supply	Non-replaceable fuse
	Fan unit: T 5 A / 125 V
	Electronics: F15 A / 125 V
	PoE: F15 A / 125 V
Voltage for the signaling contact	24 VDC
Switching capacity (resistive load)	100 mA

Environmental conditions	
Transportation/storage temperature	-40 to +70 °C
Operating temperature	0 to +60 °C
Maximum relative humidity in operation at 25 °C	< 95 % no condensation
Operating altitude above sea level depending on ambient temperature	• 2000 m at max. 56 °C • 3000 m at max. 50 °C

Design of the mounting bracket for use on ships	
Dimensions without brackets for 19" rack mounting (W x H x D)	60 x 130.5 x 18.3 mm (3 height unit)
Plate thickness	1.5 mm
Bending radii	1.5 mm
Surface of the housing	Stainless steel X6CR17

Note

ISO tolerance and punching burr

For dimensions without tolerance details, the general tolerances acc. to DIN ISO 2768 apply. No punching burrs are permitted

Other properties

Table 1 Switching properties

Max. number of learnable addresses	16 000
Aging time	Can be configured (default value: 40 seconds)
Switching technique	Store and forward
Latency	5 µs

Table 2 Reconfiguration times for redundancy mechanisms

Redundancy mechanism	Reconfiguration times
HSR	300 ms
Standby link	300 ms
MRP	200 ms

Table 3 Mean time between failure (MTBF)

Device version [1]	MTBF [2]
XR552-12M	> 15.73 years

[1] At 40 °C ambient temperature

[2] These times apply to the mounting device without media modules.

Table 4 Full wire speed switching

Number of frames per second			At a frame length of
At 100 Mbps	At 1000 Mbps	For 10 Gbps	
148810	1488095	14880952	64 bytes
84459	844595	8445946	128 bytes
45290	452899	4528986	256 bytes
23496	234962	2349664	512 bytes
11973	119732	1197318	1024 bytes
9615	96154	961538	1280 bytes
8127	81274	811688	1518 bytes

Note

The following applies for SCALANCE XR-500M:

The number of SCALANCE XR-500M devices connected in line influences the frame delay time. When a frame passes through the switch, this is delayed by the Store&Forward function of the SCALANCE XR-500M by the following values:

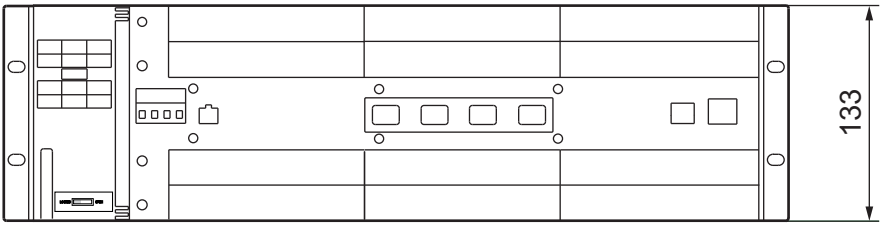
- at 64 bytes frame length: Delay of approx. 25-70 microseconds (at 1000 Mbps)

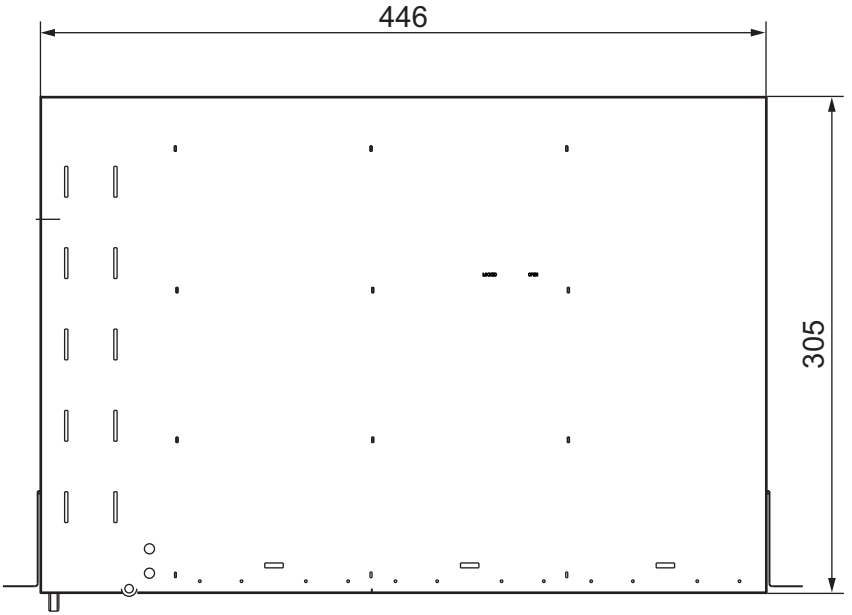
This means, the more SCALANCE XR-500M devices a frame runs through, the higher the frame delay.

Dimension drawings

SCALANCE XR552-12M

View from front and above





Dimensions are specified in mm.

Mounting brackets for use on ships

Introduction

To install a SCALANCE XR-500M on a ship horizontally, you require special mounting brackets.

Below, you will find information on how to make these mounting brackets.

Note

Different mounting brackets

Note that if the device is used on a ship, two different mounting brackets are required (right and left) and that these are not identical.

Two identical mounting brackets are fitted to each side (left and right). Below you will find the design drawing for making the mounting brackets.

Note

ISO tolerance and punching burr

For dimensions without tolerance details, the general tolerances acc. to DIN ISO 2768 apply. No punching burrs are permitted

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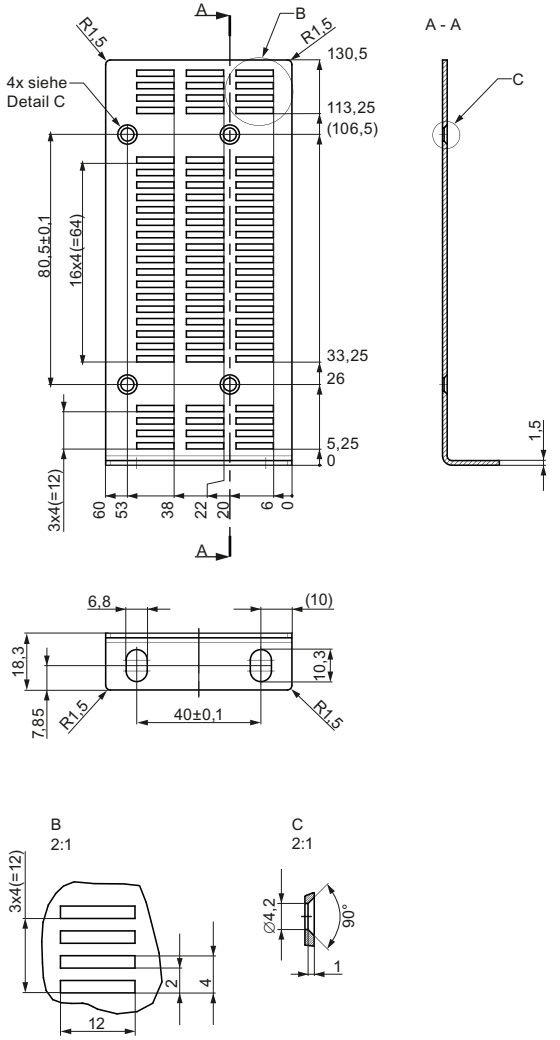
Mounting bracket left

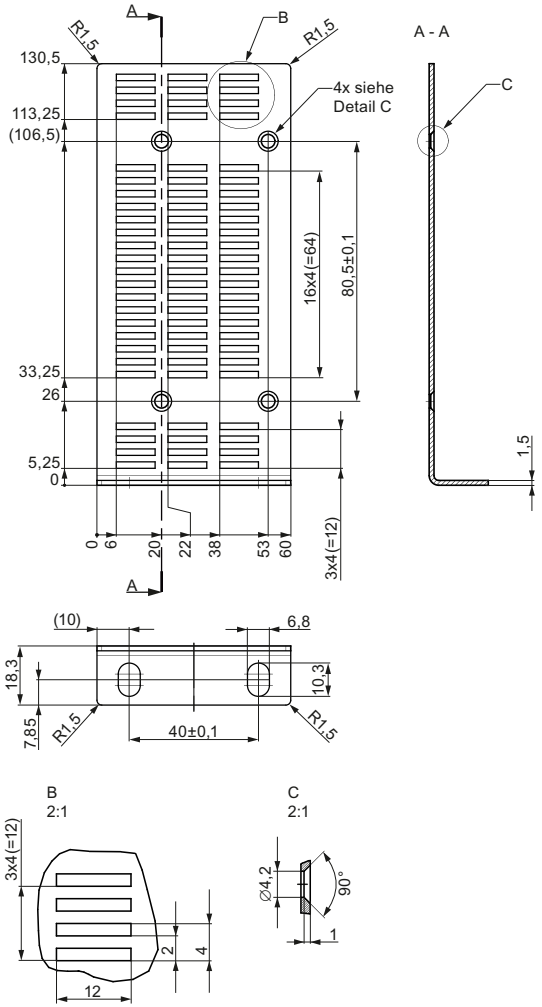
View from the front, top, and side (left)



Dimensions are specified in mm.

Mounting bracket right

View from the front, top, and side (right)



Dimensions are specified in mm.

Certification

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

Note for Australia

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

⚠ 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 product meets 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 product.
- **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:
  - SIMATIC NET Industrial Ethernet Network manual

    ID = 27069465
    (http://support.automation.siemens.com/WW/view/en/27069465)
  - EMC Installation Guideline, Planning Guide

    ID = 28518276
    (http://support.automation.siemens.com/WW/view/en/28518276)
  - **Working on the product**
    To protect the product from electrostatic discharge, personnel must first discharge any electrostatic charge from their body before touching the product.

    Note

    The product was tested with a device that also complies with the standards listed above.
    If the product is operated with a device that does not meet these standards, there is no guarantee that the corresponding values will be adhered to.

Safety of electrical equipment

In the version put into circulation by Siemens AG, the SIMATIC NET products described in these Operating Instructions conform to the regulations of the following European directive:

- EN 60950-1
  Information technology equipment - Safety - Part 1: General requirements

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

cULus Approval Hazardous Location

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

Underwriters Laboratories Inc. complying with

- UL 60950-1 (Information Technology Equipment)
- CSA C22.2 No. 60950-1-03
- ANSI/ISA 12.12.01 (Hazardous Locations)

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

EU declaration of conformity

EU declaration of conformity

You will find the EU declaration of conformity for these products on the Internet under the following entry IDs/Internet page specified here:

ID = 50040269 (http://support.automation.siemens.com/WW/view/en/50040269)

- Entry list
- Entry type "Certificates"
- Type of certificate "Declaration of Conformity"

Example German: "EG-Konformitätserklärung SCALANCE XR552-12M",
Example English: "Declaration of Conformity SCALANCE XR552-12M".

FDA and IEC marks

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

Product group	Device	Fulfills FDA and IEC requirements
XR-500M	XR552-12M	-
Note: With modular devices , the marking is on the MM900 media modules and the SFP and SFP+ transceivers.		

Figure 1 FDA and IEC approvals

Mechanical stability (in operation)

Device: SCALANCE	IEC 60068-2-6 vibration *)	IEC 60068-2-27 shock	IEC 60068-2-6 vibration
	5 - 9 Hz: 3.5 mm 9 - 150 Hz: 1 g octave/min, 20 sweeps	15 g, 11 ms duration 6 shocks per axis	10 - 58 Hz: 0.075 mm 85 - 150 Hz: 1 g 1 octave/min, 20 sweeps
XR552-12M	•	•	•
*) Note: When rack mounted with four securing points			

Siemens AG
Industry Sector
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SCALANCE XR-500M
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