SIEMENS

SIMATIC NET

Industrial Ethernet switches SCALANCE XR-500

Operating Instructions

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SCALANCE XR502-32
SCALANCE XR522-12
SCALANCE XR526-8
SCALANCE XR524-8WG

10/2025
C79000-G8976-C692-04

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 persons are those who, because of their training and experience, are familiar with the installation, assembly, commissioning, operation, decommissioning and disassembly of the product and can recognize risks and avoid possible hazards.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the application described in the catalog and the associated usage information. 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

All names identified by ® are registered trademarks of Siemens Aktiengesellschaft. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

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

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Introduction

1

These operating instructions will help you to install and connect devices of the SCALANCE XR-500 product group.

The configuration and the integration of the devices in a network are not described in these operating instructions.

1.1 Purpose

The SCALANCE XR-500 switches are high-performance and industry-compatible Layer 3 switches for setting up electrical and optical line, ring and star structures with transmission rates of up to 10 Gbps and are intended for installation in 19" cabinets.

SCALANCE XR-500 switches are ideal for use in industrial networks and for integrating the plant network in an existing enterprise network. From the control level to the management level, the Layer 3 switches handle the networking of both plant sections and distributed field devices and ensures high plant availability with wide-ranging diagnostics options and high transmission speeds.

SCALANCE XR-500 devices can be used as both switches and routers. You link the industrial backbone layer and the enterprise network to one another in this way thanks to IP routing.

1.2 Scope of validity

These operating instructions apply to the following devices:

- SCALANCE XR502-32
- SCALANCE XR522-12
- SCALANCE XR524-8WG
- SCALANCE XR526-8

Unless specified otherwise, the descriptions in these operating instructions refer to all devices of the SCALANCE XR-500 product group specified in the scope of validity.

1.3 Designations used

This section describes the conventions used in this document to clearly and efficiently present information.

Classification	Description	Terms used
Product line	The product line includes all devices and variants of all product groups. If information applies to all product groups within the product line, the term SCALANCE X-500 is used.	SCALANCE X-500
Product group	If information applies to all devices and variants of a product group, the term SCALANCE XR-500 is used.	SCALANCE XR-500
Device	If information relates to a specific device, the device name is used.	e.g. SCALANCE XR526-8
Device version	For a version of the device, the device name contains the special feature of the version.	e.g. SCALANCE XR526-8 24 V AC/DC device version

1.4 Additional documentation

The following additional documents may be of interest. Unless specified otherwise, the documents are available in the Siemens Industry Online Support (SIOS) (https://support.industry.siemens.com/cs/ww/en/ps/15247).

Note

The listed documents are the documents that were available at the time of the publication. Newer versions of these documents or the associated products may be available. Additional information is available in the SIOS or contact your Siemens customer service.

Product notes

Product notes are available online in the SIOS (https://support.industry.siemens.com/cs/ww/en/ps/15247).

Manuals

Document title	Link
Configuration manual "SIMATIC NET: Industrial Ethernet switches SCALANCE XR-500 Command Line Interface (CLI)"	Visit (https://support.industry.siemens.com/cs/ww/en/ps/15316/man)
Configuration manual "SIMATIC NET: Industrial Ethernet switches SCALANCE XR-500 Web Based Management (WBM)"	
"Transceiver SFP/SFP+/SCP/STP" Operating Instructions	Visit (https://support.industry.siemens.com/cs/ww/en/ps/25547/man)
"Industrial Ethernet/PROFINET Industrial Ethernet" System Manual	Visit (https://support.industry.siemens.com/cs/ww/en/view/27069465)
"Industrial Ethernet/PROFINET Passive Network Components" System Manual	Visit (https://support.industry.siemens.com/cs/ww/en/view/84922825)

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 communication partners that you require for the design.

Catalogs

You will find the article numbers for the Siemens products of relevance here in the following catalogs:

- SIMATIC NET Industrial Communication / Industrial Identification, catalog IK PI
- SIMATIC Products for Totally Integrated Automation and Micro Automation, catalog ST 70
- Industry Mall - catalog and ordering system for automation and drive technology, Online catalog (https://mall.industry.siemens.com/goos/WelcomePage.aspx?regionUrl=/de&language=en)

You can request the catalogs and additional information from your Siemens representative.

1.5 Service & Support

Industry Online Support

In addition to the product documentation, you are supported by the comprehensive online information platform of Siemens Industry Online Support at the following Internet address: SIOS (https://support.industry.siemens.com/cs/de/en/)

Apart from news, there you will also find:

- Project information: Manuals, FAQs, downloads, application examples etc.
- Contacts, Technical Forum
- The option submitting a support query:
  Support requests (https://support.industry.siemens.com/My/ww/en/requests)
- Our service offer:
  Right across our products and systems, we provide numerous services that support you in every phase of the life of your machine or system - from planning and implementation to commissioning, through to maintenance and modernization.

You will find contact data on the Internet at the following address:
Contact partners (https://www.automation.siemens.com/aspa_app/?ci=yes&lang=en)

SITRAIN - Training for Industry

The training offer includes more than 300 courses on basic topics, extended knowledge and special knowledge as well as advanced training for individual sectors - available at more than 130 locations. Courses can also be organized individually and held locally at your location.

You will find detailed information on the training curriculum and how to contact our customer consultants at the following Internet address:

Link: (https://new.siemens.com/global/en/products/services/industry/sitrain/personal.html)

Industrial Networks Education

Training and certification for Industrial Networks

In our Industrial Networks Education courses you'll learn to design and implement wired and wireless data networks and connect them to a corporate network. You will also receive instruction on how to secure, diagnose and optimize communication networks. Certification can also be offered to supplement almost all training courses.

Link: (https://www.siemens.com/industrial-networks-education)

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1.6 SIMATIC NET glossary

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

You will find the SIMATIC NET glossary here:

- SIMATIC NET Manual Collection or product DVD
  The DVD ships with certain SIMATIC NET products.
- On the Internet under the following address:
  50305045 (https://support.industry.siemens.com/cs/ww/en/view/50305045)

1.7 Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial cybersecurity measures that may be implemented, please visit
https://www.siemens.com/cybersecurity-industry (https://www.siemens.com/industrialsecurity).

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Cybersecurity RSS Feed under
https://new.siemens.com/cert (https://www.siemens.com/cert).

1.8 Firmware/software support

Check regularly for new firmware/software versions or security updates and apply them. After the release of a new version, previous versions are no longer supported and are not maintained.

1.9 Error/fault

If a fault develops, send the device to your SIEMENS representative for repair. Repairs on-site are not permitted.

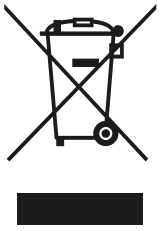
1.10 Decommissioning

Shut down the device properly to prevent unauthorized persons from accessing confidential data in the device memory.

To do this, restore the factory settings on the device.

Also restore the factory settings on the storage medium.

1.11 Recycling and disposal



The products are low in pollutants, can be recycled and meet the requirements of the WEEE directive 2012/19/EU for the disposal of electrical and electronic equipment.

Do not dispose of the products at public disposal sites.

For environmentally friendly recycling and the disposal of your old device contact a certified disposal company for electronic scrap or your Siemens contact (Product return (https://support.industry.siemens.com/cs/ww/en/view/109479891)).

Note the different national regulations.

1.12 Trademarks

The following and possibly other names not identified by the registered trademark sign ® are registered trademarks of Siemens AG:

- SCALANCE
- SINEC

1.13 Electrostatic discharge



NOTICE
Electrostatic sensitive devices (ESD) Electronic modules contain electrostatic sensitive components These components can easily be destroyed if handled incorrectly. Note the following instructions to avoid damage. • Touch electronic modules only when you absolutely need to work on them. • If electronic modules need to be touched, the body of the person involved must first be electrostatically discharged and grounded. • Do not bring electronic modules in contact with electrically isolating materials such as plastic film, isolating table top pads or clothing made of synthetic fibers. • Place the modules only on conductive surfaces. • Pack, store and transport electronic modules and components only in conductive packaging such as metalized plastic or metal containers, conductive foam or household aluminum foil.

Safety notices

2

Read the safety notices

Note the following safety notices. These relate to the entire working life of the device.

You should also read the safety notices relating to handling in the individual sections, particularly in the sections "Installation" and "Connecting up".

⚠ CAUTION
To prevent injury and damage, read the manual before using the device.

NOTICE
Information security
Connect to the device and change the standard password for the user set in the factory "admin" and "" before you operate the device.

Safety notices on use in hazardous areas

General safety notices relating to protection against explosion

⚠ WARNING
EXPLOSION HAZARD
Do not open the device when the supply voltage is turned on.

Safety instructions for use in hazardous locations according to UL/FM HazLoc

If you use the device under UL or FM HazLoc conditions, you must also adhere to the following safety instructions in addition to the general safety instructions for protection against explosion:

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

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

Security recommendations

3

3.1 Security recommendations

To prevent unauthorized access to the device and/or network, observe the following security recommendations.

General

- Check the device regularly to ensure that these recommendations and/or other internal security policies are complied with.
- Evaluate the security of your location and use a cell protection concept with suitable products (https://www.industry.siemens.com/topics/global/en/industrial-security/pages/default.aspx).
- When the internal and external network are disconnected, an attacker cannot access internal data from the outside. Therefore operate the device only within a protected network area.
- No product liability will be accepted for operation in a non-secure infrastructure.
- Use VPN to encrypt and authenticate communication from and to the devices.
- For data transmission via a non-secure network, use an encrypted VPN tunnel (IPsec, OpenVPN).
- Separate connections correctly (WBM, SSH etc.).
- Check the user documentation of other Siemens products that are used together with the device for additional security recommendations.
- Using remote logging, ensure that the system protocols are forwarded to a central logging server. Make sure that the server is within the protected network and check the protocols regularly for potential security violations or vulnerabilities.
- Keep the firmware up to date. Check regularly for security updates of the firmware and use them.
  Download (https://sieportal.siemens.com/su/blCGg)
  Check regularly for new features on the Siemens Internet pages.
  - You can find information on Industrial Security here:
    Link: (https://www.siemens.com/industrialsecurity)
  - You can find a selection of documents on the topic of network security here:
    Link: (https://support.industry.siemens.com/cs/ww/en/view/92651441)

  If Siemens detects and resolves security incidents in the products, this is published in Security Advisories. You will find the documents for the device on the Internet under: (https://new.siemens.com/global/en/products/services/cert.html#SecurityPublications)

Authentication and users

Note

Accessibility risk - Risk of data loss

Do not lose the passwords for the device. Access to the device can only be restored by resetting the device to factory settings which completely removes all configuration data.

- Replace the default passwords for all user accounts, access modes and applications (if applicable) before you use the device. Create a separate user account for each user that will receive access to the device.
- Define rules for the assignment of passwords. Follow current recommendations on defining strong passwords, e.g. by the German Federal Office for Information Security.
  Link: (https://www.bsi.bund.de)
- Use passwords with a high password strength. Avoid weak passwords, (e.g. password1, 123456789, abcdefgh) or recurring characters (e.g. abcabc).
  This recommendation also applies to symmetrical passwords/keys configured on the device.
- Make sure that passwords are protected and only disclosed to authorized personnel.
- Do not use the same passwords for multiple user names and systems.
- Store the passwords in a safe location (not online) to have them available if they are lost. You can use password managers or encrypted files/drives for this purpose.
- A password must be changed if it is known or suspected to be known by unauthorized persons.
- When authentication is performed via RADIUS, make sure that all communication takes place within the security environment or is protected by a secure channel.
- Watch out for link layer protocols that do not offer their own authentication between endpoints, such as ARP or IPv4. An attacker could use vulnerabilities in these protocols to attack hosts, switches and routers connected to your layer 2 network, for example, through manipulation (poisoning) of the ARP caches of systems in the subnet and subsequent interception of the data traffic. Appropriate security measures must be taken for non-secure layer 2 protocols to prevent unauthorized access to the network. Physical access to the local network can be secured or secure, higher layer protocols can be used, among other things.

Certificates and keys

- There is a preset SSL certificate on the device with a key length of 256 bits for the elliptic-curve cryptography (ECDSA). Replace this certificate with a self-made certificate with key. You can install the certificate via the WBM ("System > Load and Save"). We recommend that you use a certificate signed by a reliable external or internal certification authority.
  Use ECDSA certificates in PEM format that were generated with one of the following curves:
  - secp256r1 (NIST P-256)
  - secp384r1 (NIST P-384)
  - secp521r1 (NIST P-521)

  RSA certificates with a recommended key length of 4096 bits can also be used. However, this is not recommended for performance reasons.
- Use the certification authority including key revocation and management to sign the certificates.
- Make sure that user-defined private keys are protected and inaccessible to unauthorized persons.
- If there is a suspected security violation, change all certificates and keys immediately.
- Use password-protected certificates in the format "PKCS #12".
- Verify certificates based on the fingerprint on the server and client side to prevent "man in the middle" attacks. Use a second, secure transmission path for this.
- Before sending the device to Siemens for repair, replace the current certificates and keys with temporary disposable certificates and keys, which can be destroyed when the device is returned.
- For the device to be able to correctly check digital certificates and establish secure connections, the system time always needs to be up to date. Follow the steps outlined below:
  Check and set time
  Check whether the time is set correctly on the device, especially after a reset to factory settings or a long power supply interruption.
  Enable time-of-day synchronization (recommended)
  Activate one of the supported synchronization methods.
  Make sure that there is a stable connection to the synchronization partner so that the device can regularly receive the current time.

Physical/remote access

- Operate the devices only within a protected network area. Attackers cannot access internal data from the outside when the internal and the external network are separate from each other.
- Limit physical access to the device exclusively to trusted personnel.
  The memory card or the PLUG (C-PLUG, KEY-PLUG, CLP) contains sensitive data such as certificates and keys that can be read out and modified. An attacker with control of the device's removable media could extract critical information such as certificates, keys, etc. or reprogram the media.
- Lock unused physical ports on the device. Unused ports can be used to gain forbidden access to the plant.

- We highly recommend that you keep the protection from brute force attacks (BFA) activated to prevent third parties from gaining access to the device. For more information, see the configuration manuals, section "Brute Force Prevention".
- For communication via non-secure networks, use additional devices with VPN functionality to encrypt and authenticate communication.
- When you establish a secure connection to a server (e.g. for an upgrade), make sure that strong encryption methods and protocols are configured for the server.
- Terminate the management connections (e.g. HTTP, HTTPS, SSH) properly.
- Make sure that the device has been powered down completely before you decommission it. For more information, refer to "Decommissioning".
- We recommend formatting a PLUG that is not being used.

Software (security functions)

- Keep the firmware up to date. Check regularly for security updates for the device. You can find information on this at the Industrial Security (https://www.siemens.com/industrialsecurity) website.
- Inform yourself regularly about security recommendations published by Siemens ProductCERT (https://www.siemens.com/cert).
- Only activate protocols that you require to use the device.
- Restrict access to the management of the device with rules in an access control list (ACL).
- The option of VLAN structuring provides protection against DoS attacks and unauthorized access. Check whether this is practical or useful in your environment.
- Use a central logging server to log changes and accesses. Operate your logging server within the protected network area and check the logging information regularly.
- Files (e.g. configuration files) can be downloaded from the device. Ensure that the files are adequately protected. The options for achieving this include storing the files in a secure location and transmitting them only through secure communication channels.
  In addition, you can create hash sums from the files after the download. This allows you to check that the file is unchanged before further use.
- Configuration files can be password-protected during download. You enter passwords on the WBM page "System > Load & Save > Passwords".
- The names of the configuration files can be changed. To improve security, do not use spaces in the TFTP file name.
- Only use VXLAN in trustworthy networks.

Secure/non-secure protocols and services

- Avoid or disable non-secure protocols and services, for example HTTP, Telnet and TFTP. For historical reasons, these protocols are available, however not intended for secure applications. Use non-secure protocols on the device with caution.
- Check whether use of the following protocols and services is necessary:
  - Non authenticated and unencrypted ports
  - DCP
  - DHCP
  - DNS client
  - HTTP
  - IEEE 802.1x (RADIUS)
  - ICMP
  - IGMP Snooping
  - LLDP
  - MRP, HRP, STP, RSTP and MSTP
  - NTP client
  - PROFINET
  - SIMATIC NET Time
  - SMTP client
  - SNMP v1/2c
  - SNMP Traps
  - SNTP-Client
  - Syslog client
  - Telnet
  - TFTP
  - GMRP and GVRP

- The following protocols provide secure alternatives:
  - SNMPv1/v2c → SNMPv3
    Check whether use of SNMPv1/v2c. is necessary. SNMPv1/v2c is classified as non-secure. Use the option of preventing write access. The product provides you with suitable setting options.
    If SNMP is enabled, change the community names. If no unrestricted access is necessary, restrict access with SNMP.
    Use SNMPv3 in conjunction with passwords.
  - HTTP → HTTPS
  - Telnet → SSH
  - NTP → NTPsecure
  - TFTP → SFTP
  - Syslog Client → Syslog Client TLS
- Use secure protocols when access to the device is not prevented by physical protection measures.
- If you require non-secure protocols and services, operate the device only within a protected network area.
- Select a trusted DNS provider.
- Restrict the services and protocols available to the outside to a minimum.
- With authentication on the RADIUS server and RADIUS client, use the Message Authenticator attribute to check packets.
- If you use RADIUS for management access to the device, activate secure protocols and services.
- The LAN interface of the product must not be operated in unprotected or untrusted networks (e.g. the Internet) without additional upstream protective devices.
- Only operate Syslog, SNTP and other non-secure protocols over secure connections (e.g. SINEMA RC/OpenVPN).

Interfaces security

- Disable unused interfaces.
- Use IEEE 802.1X for interface authentication.
- Use the function "Locked Ports" to block interfaces for unknown nodes.
- Use the configuration options of the interfaces, e.g. the "Edge Type".
- Configure the receive ports so that they discard all untagged frames ("Tagged Frames Only").

3.2 Available interfaces

The following is a list of all available interfaces through which the device can be accessed.

Interface	Default status	Change to the status	
		WBM / CLI (administrator)	Physical
LAN 1 to 32 *)	Enabled	✓	-
WAN	Disabled	✓	-
Signaling contact	Enabled	-	✓
USB console interface	Enabled	-	✓
PLUG slot	Enabled	✓	✓

*) Depending on the device variant

3.3 Available services

List of available services

Note

Packet filtering

Packets are processed according to their importance for the operation of the network. Some packets directed to the CPUs of the switch may be discarded due to various security-relevant packet filters. Therefore, it can occur that not all ICMP packets are delivered to the CPUs, for example, and are thus not responded to.

The following is a list of all available services and their ports through which the device can be accessed.

The table includes the following columns:

- **Service**
  The services that the device supports
- **Default port status**
  This is the status of the port in the delivery state (factory setting).
- **Configurable port/service**
  Indicates whether the port number or the service can be configured via WBM / CLI.
- **Authentication**
  Specifies whether the communication partner is authenticated.
  If optional, the authentication can be configured as required.
- **Encryption**
  Specifies whether the transfer is encrypted.
  If optional, the encryption can be configured as required.

Service	Protocol / Port number	Default setting of service	Default port status	Configurable		Authentication	Encryption [7]
				Port	Service		
DHCPv4 Server	UDP/67	Active	Closed	✓	✓	-	-
DHCPv4 Client (IPv4)	UDP/68	Disabled	Open	-	✓	-	-
DNS Client	TCP/53 UDP/53	Disabled	Outbound only	-	✓	-	-
EtherNet/IP [2]	TCP/44818 UDP/2222 UDP/44818	Disabled	Closed	-	✓	-	-
HTTP Server [4] [5]	TCP/80	Disabled	Closed	✓	✓	✓	-
HTTPS WBM Server	TCP/443	Active	Open	✓	✓	✓	✓
NTP Client	UDP/123	Disabled	Closed	✓	✓	-	-
NTP (secure)	UDP/123	Disabled	Closed	✓	✓	✓	-
Ping	ICMP	Active	Open	-	-	-	-
PROFINET	UDP/34964 UDP/ 49151 ... 49159 [1]	Disabled	Open	-	✓	-	-
RADIUS Client	UDP/1812 [6] UDP/1813 [6]	Disabled	Outbound only	✓	✓	-	-
	UDP/3799	Disabled	Open	✓	✓	-	-
SFTP Client	TCP/22	Active	Outbound only	✓	✓	✓	✓
SMTP Client	TCP/25	Disabled	Closed	✓	✓	-	-
SMTP Client (secure)	TCP/465	Disabled	Closed	✓	✓	✓	✓
SNMPv1/v2c [3] [4]	UDP/161	Disabled	Open	✓	✓	-	-
SNMPv3	UDP/161	Disabled	Open	✓	✓	Optional	Optional
SNMP Traps	UDP/162	Disabled	Outbound only	-	✓	-	-
SNTP Client	UDP/123	Disabled	Closed	✓	✓	-	-
SSH CLI Server	TCP/22	Active	Open	✓	✓	✓	✓
Syslog Client	UDP/514	Disabled	Closed	✓	✓	-	-
Syslog (secure) Client	TCP/6514	Disabled	Closed	✓	✓	-	✓
Telnet [4]	TCP/23	Disabled	Closed	✓	✓	✓	-
TFTP Client	UDP/69	Disabled	Outbound only	✓	✓	-	-
VRRP	TCP/50000	Disabled	Open, filtered	-	✓	-	-

1) Port number can be configured via the WBM.

2) Service disabled by default.

3) Read-only access only.

4) Protocol according to Security by Default.

5) The HTTP port is always open. If the service is disabled, automatic HTTP forwarding to the HTTPS port takes place.

6) The port is closed by default and is displayed when a RADIUS server is configured.

7) You can find additional information on the encryption methods used in the WBM appendix "Ciphers used".

The following is a list of all available Layer 2 services through which the device can be accessed.

The table includes the following columns:

- **Layer 2 service**
  The Layer 2 services that the device supports**.**
- **Default status**
  The default status of the service (open or closed).
- **Service configurable**
  Indicates whether the service can be configured via WBM / CLI.

Layer 2 service	Default setting of service	Default port status	Service configurable	Encryption
DCP	Active	Setup mode [1)]	✓	-
ICMP	Active	Open	-	-
LLDP	Active	Open	✓	-
RSTP	Disabled	Closed	✓	-
MSTP	Disabled	Open	✓	-
SIMATIC NET TIME	Disabled	Closed	✓	-
VLAN	Disabled	Open (when configured)	✓	-
VXLAN [2)]	Disabled	Closed	✓	-

1) Setting according to Security by Default

2) Not with SCALANCE XR-500WG

Description of the device

4

4.1 Article numbers

Device	Properties	Article number
SCALANCE XR502-32	**24 V AC/DC version** • 2 x 1 / 2.5 / 5 / 10 Gbps RJ45 ports • 24 x SFP plug-in transceiver slots with 100 / 1000 Mbps • 8 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 2 x 2-pin terminal block 24 V DC / 24 V AC, power supply connection • 1 x CLP slot • 1 x USB Type B, serial interface connection • 1 x 2-pin terminal block 24 V DC, signaling contact connection	6GK5534-5TR00-2AR3
	100 to 240 V AC / 110 to 250 V DC version • 2 x 1 / 2.5 / 5 / 10 Gbps RJ45 ports • 24 x SFP plug-in transceiver slots with 100 / 1000 Mbps • 8 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 1 x IEC plug (C14) 100 to 240 V AC, power supply connection, non-redundant • 1 x DC terminal block, 2-pin, 110 to 250 V DC, power supply connection, non-redundant • 1 x CLP slot • 1 x USB Type B, serial interface connection • 1 x 2-pin terminal block 24 V DC, signaling contact connection	6GK5534-5TR00-3AR3
	100 to 240 V AC / 110 to 250 V DC version • 2 x 1 / 2.5 / 5 / 10 Gbps RJ45 ports • 24 x SFP plug-in transceiver slots with 100 / 1000 Mbps • 8 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 2 x IEC plug (C14) 100 to 240 V AC, power supply connection, redundant • 2 x DC terminal block, 2-pin, 110 to 250 V DC, power supply connection, redundant • 1 x CLP slot • 1 x USB Type B, serial interface connection • 1 x 2-pin terminal block 24 V DC, signaling contact connection	6GK5534-5TR00-4AR3

Device	Properties	Article number
SCALANCE XR522-12	**24 V AC/DC version** • 20 x 10 / 100 / 1000 Mbps RJ45 ports • 2 x 1 / 2.5 / 5 / 10 Gbps RJ45 ports • 4 x SFP plug-in transceiver slots with 100 / 1000 Mbps • 8 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 2 x 2-pin terminal block 24 V DC / 24 V AC, power supply connection • 1 x CLP slot • 1 x USB Type B, serial interface connection • 1 x 2-pin terminal block 24 V DC, signaling contact connection	6GK5534-3TR00-2AR3
	100 to 240 V AC / 110 to 250 V DC version • 20 x 10 / 100 / 1000 Mbps RJ45 ports • 2 x 1 / 2.5 / 5 / 10 Gbps RJ45 ports • 4 x SFP plug-in transceiver slots with 100 / 1000 Mbps • 8 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 1 x IEC plug (C14) 100 to 240 V AC, power supply connection, non-redundant • 1 x DC terminal block, 2-pin, 110 to 250 V DC, power supply connection, non-redundant • 1 x CLP slot • 1 x USB Type B, serial interface connection • 1 x 2-pin terminal block 24 V DC, signaling contact connection	6GK5534-3TR00-3AR3
	100 to 240 V AC / 110 to 250 V DC version • 20 x 10 / 100 / 1000 Mbps RJ45 ports • 2 x 1 / 2.5 / 5 / 10 Gbps RJ45 ports • 4 x SFP plug-in transceiver slots with 100 / 1000 Mbps • 8 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 2 x IEC plug (C14) 100 to 240 V AC, power supply connection, redundant • 2 x DC terminal block, 2-pin, 110 to 250 V DC, power supply connection, redundant • 1 x CLP slot • 1 x USB Type B, serial interface connection • 1 x 2-pin terminal block 24 V DC, signaling contact connection	6GK5534-3TR00-4AR3

Device	Properties	Article number
SCALANCE XR524-8WG	**24 V AC/DC version** • 24 x 10 / 100 / 1000 Mbps RJ45 ports without securing collar • 8 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 2 x 2-pin terminal block 24 V DC / 24 V AC, power supply connection • 1 x CLP slot • 1 x USB Type B, serial interface connection	6GK5532-2SR00-2AR3
	24 V AC/DC version • 24 x 10 / 100 / 1000 Mbps RJ45 ports without securing collar • 8 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 2 x 2-pin terminal block 24 V DC / 24 V AC, power supply connection • 1 x CLP slot • 1 x USB Type B, serial interface connection • Reduced approvals	6GK5532-2SR00-2RR3
	100 to 240 V AC / 110 to 250 V DC version • 24 x 10 / 100 / 1000 Mbps RJ45 ports without securing collar • 8 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 1 x IEC plug (C14) 100 to 240 V AC, power supply connection, non-redundant • 1 x DC terminal block, 2-pin, 110 to 250 V DC, power supply connection, non-redundant • 1 x CLP slot • 1 x USB Type B, serial interface connection	6GK5532-2SR00-3AR3
	100 to 240 V AC / 110 to 250 V DC version • 24 x 10 / 100 / 1000 Mbps RJ45 ports without securing collar • 8 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 1 x IEC plug (C14) 100 to 240 V AC, power supply connection, non-redundant • 1 x DC terminal block, 2-pin, 110 to 250 V DC, power supply connection, non-redundant • 1 x CLP slot • 1 x USB Type B, serial interface connection • Reduced approvals	6GK5532-2SR00-3RR3

Device	Properties	Article number
SCALANCE XR526-8	**24 V AC/DC version** • 24 x 10 / 100 / 1000 Mbps RJ45 ports • 2 x 1 / 2.5 / 5 / 10 Gbps RJ45 ports • 8 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 2 x 2-pin terminal block 24 V DC / 24 V AC, power supply connection • 1 x CLP slot • 1 x USB Type B, serial interface connection • 1 x 2-pin terminal block 24 V DC, signaling contact connection	6GK5534-2TR00-2AR3
	100 to 240 V AC / 110 to 250 V DC version • 24 x 10 / 100 / 1000 Mbps RJ45 ports • 2 x 1 / 2.5 / 5 / 10 Gbps RJ45 ports • 8 x SFP / SFP+ plug-in transceiver slots with 1G / 10 Gbps • 1 x IEC plug (C14) 100 to 240 V AC, power supply connection, non-redundant • 1 x DC terminal block, 2-pin, 110 to 250 V DC, power supply connection, non-redundant • 1 x CLP slot • 1 x USB Type B, serial interface connection • 1 x 2-pin terminal block 24 V DC, signaling contact connection	6GK5534-2TR00-3AR3
	100 to 240 V AC / 110 to 250 V DC version • 24 x 10 / 100 / 1000 Mbps RJ45 ports • 2 x 1 / 2.5 / 5 / 10 Gbps RJ45 ports • 8 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 2 x IEC plug (C14) 100 to 240 V AC, power supply connection, redundant • 2 x DC terminal block, 2-pin, 110 to 250 V DC, power supply connection, redundant • 1 x CLP slot • 1 x USB Type B, serial interface connection • 1 x 2-pin terminal block 24 V DC, signaling contact connection	6GK5534-2TR00-4AR3

4.2 Factory settings

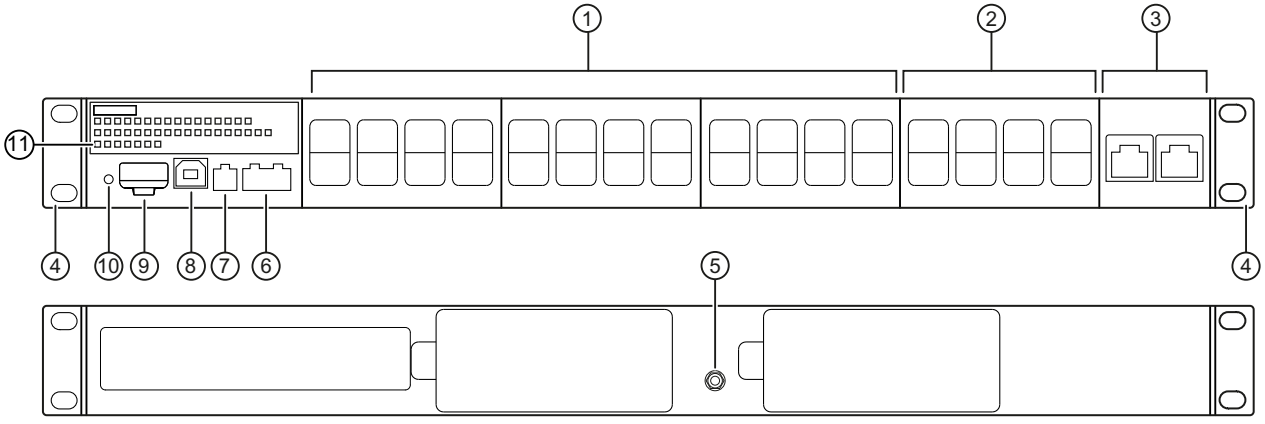
Factory settings for the Industrial Ethernet profile:

- Industrial Ethernet protocol: PROFINET
- Base Bridge Mode: 802.1Q VLAN Bridge
- Redundancy mechanism: RSTP
- Trust mode: Trust CoS-DSCP
- IGMP Snooping/IGMP Querier: Off
- IPv4 Address Collision Detection: Never give up

4.3 Device views

4.3.1 SCALANCE XR502-32 24 V AC/DC

The following figure shows an overview of the components of a 24 V AC/DC device version of the SCALANCE XR502-32.

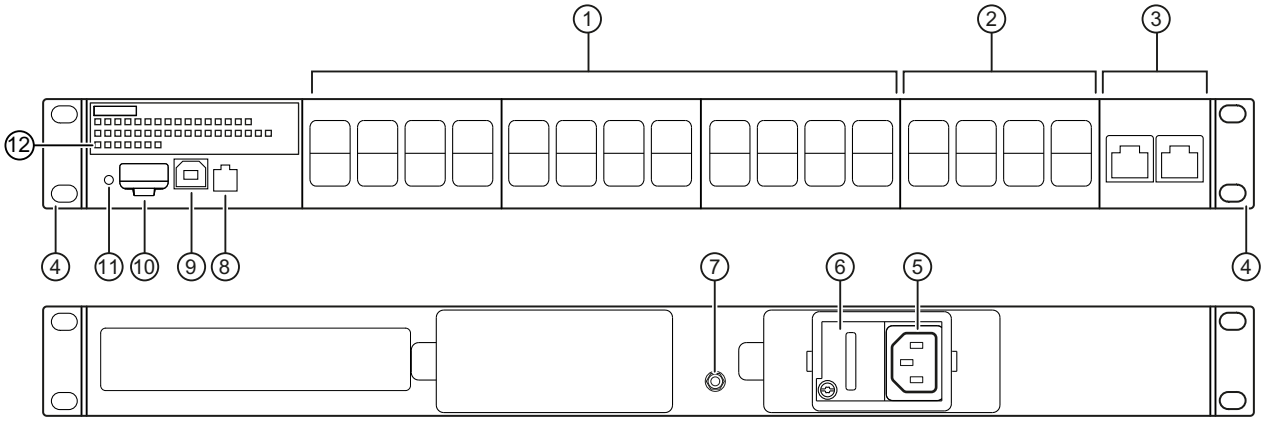


① Slots for SFP plug-in transceiver with 100/1000 Mbps
② Slots for SFP/SFP+ plug-in transceiver with 1/10 Gbps
③ Electrical ports with 1/2.5/5/10 Gbps
④ Mounting brackets for 19" rack installation
⑤ Grounding bolt for connecting the protective grounding, on the back of the device
⑥ 24 V AC/DC power supply, redundant
⑦ Signaling contact
⑧ USB console interface (2.0 port, Type B, serial via USB)
⑨ CLP slot with an inserted CLP
⑩ "SELECT/SET" button
⑪ LED display
- Port LEDs
- "F" LED for the fault display
- "L1/L2" LED for the power supply
- "RM" LED for the redundancy manager function
- "SB" LED for the status of the standby function
- "DM1/DM2" LED for the display mode

Figure 4-1 SCALANCE XR502-32 24 V AC/DC, front and rear

4.3.2 SCALANCE XR502-32 100 to 240 V AC / 110 to 250 V DC

The following figure shows an overview of the components of a 100 to 240 V AC / 110 to 250 V DC device version of the SCALANCE XR502-32.

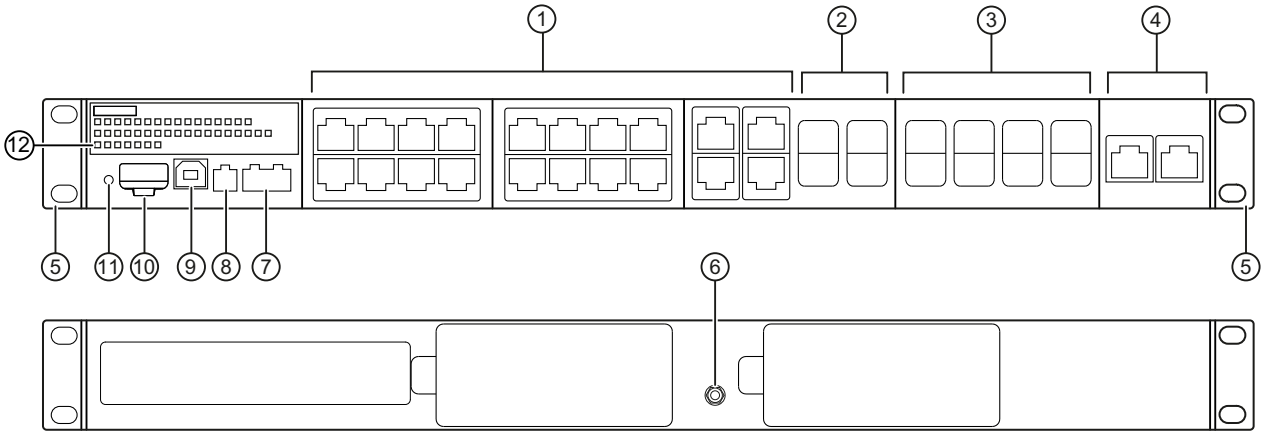


① Slots for SFP plug-in transceiver with 100/1000 Mbps
② Slots for SFP/SFP+ plug-in transceiver with 1/10 Gbps
③ Electrical ports with 1/2.5/5/10 Gbps
④ Mounting brackets for 19" rack installation
⑤ Connection to the 100 to 240 V AC power supply
Single or redundant design depending on the device version. The figure shows the device with a redundant connection.
⑥ Connection to the 110 to 250 V DC power supply (hidden behind a screw-retained cover)
Single or redundant design depending on the device version. The figure shows the device with a redundant connection.
⑦ Grounding bolt for connection of protective grounding
⑧ Signaling contact
⑨ USB console interface (2.0 port, Type B, serial via USB)
⑩ CLP slot with an inserted CLP
⑪ "SELECT/SET" button
⑫ LED display
- Port LEDs
- "F" LED for the fault display
- "L1/L2" LED for the power supply
- "RM" LED for the redundancy manager function
- "SB" LED for the status of the standby function
- "DM1/DM2" LED for the display mode

Figure 4-2 SCALANCE XR502-32 100 to 240 V AC / 110 to 250 V DC, front and rear

4.3.3 SCALANCE XR522-12 24 V AC/DC

The following figure shows an overview of the components of a 24 V AC/DC device version of the SCALANCE XR522-12.



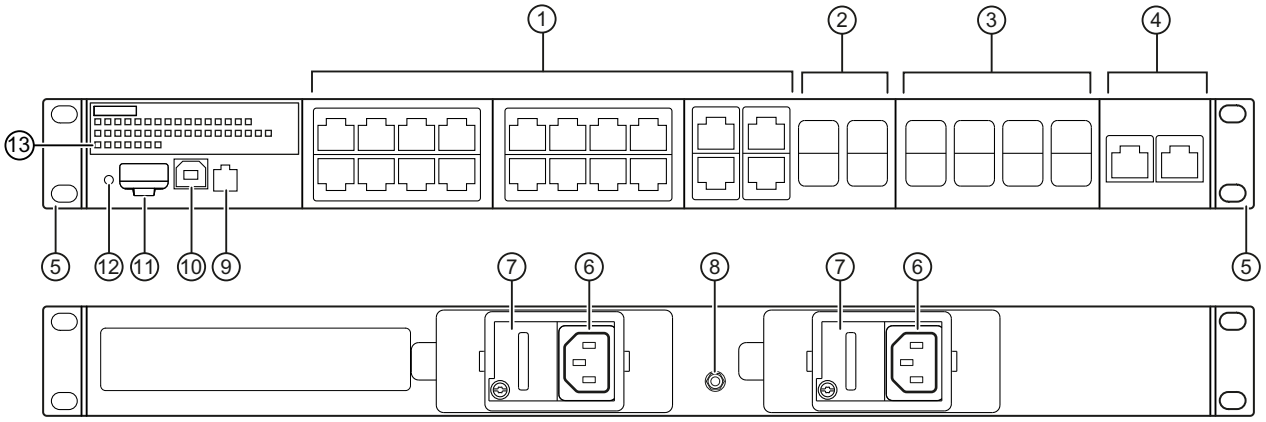
① Electrical ports with 10/100/1000 Mbps
② Slots for SFP plug-in transceiver with 100/1000 Mbps
③ Slots for SFP/SFP+ plug-in transceiver with 1/10 Gbps
④ Electrical ports with 1/2.5/5/10 Gbps
⑤ Mounting brackets for 19" rack installation
⑥ Grounding bolt for connecting the protective grounding, on the back of the device
⑦ 24 V AC/DC power supply, redundant
⑧ Signaling contact
⑨ USB console interface (2.0 port, Type B, serial via USB)
⑩ CLP slot with an inserted CLP
⑪ "SELECT/SET" button
⑫ LED display

- Port LEDs
- "F" LED for the fault display
- "L1/L2" LED for the power supply
- "RM" LED for the redundancy manager function
- "SB" LED for the status of the standby function
- "DM1/DM2" LED for the display mode

Figure 4-3 SCALANCE XR522-12 24 V AC/DC, front and rear

4.3.4 SCALANCE XR522-12 100 ... 240 V AC / 110 ... 250 V DC

The following figure shows an overview of the components of a 100 to 240 V AC / 110 to 250 V DC device version of the SCALANCE XR522-12.

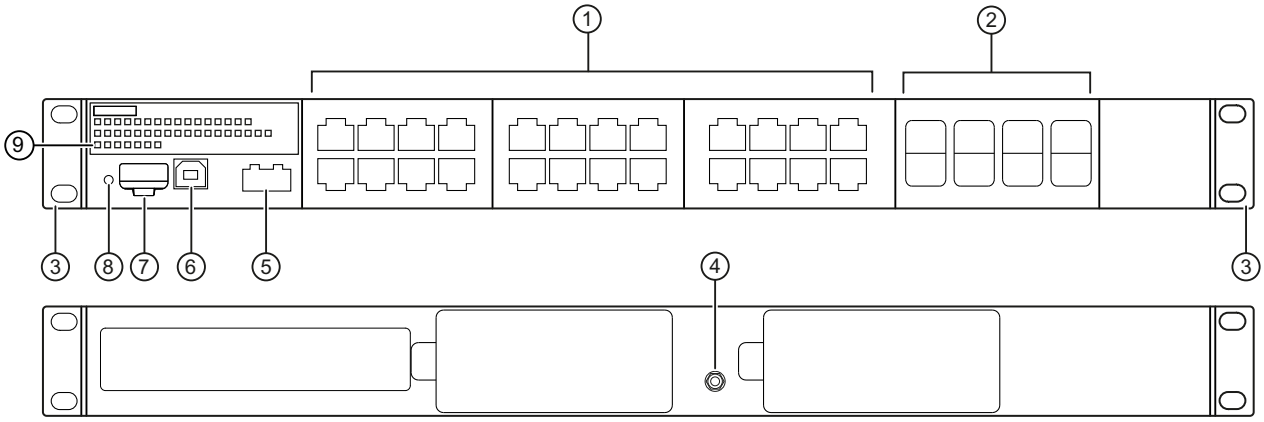


① Electrical ports with 10/100/1000 Mbps
② Slots for SFP plug-in transceiver with 100/1000 Mbps
③ Slots for SFP/SFP+ plug-in transceiver with 1/10 Gbps
④ Electrical ports with 1/2.5/5/10 Gbps
⑤ Mounting brackets for 19" rack installation
⑥ Connection to the 100 to 240 V AC power supply
Single or redundant design depending on the device version. The figure shows the device with a redundant connection.
⑦ Connection to the 110 to 250 VDC power supply (hidden behind a screw-retained cover)
Single or redundant design depending on the device version. The figure shows the device with a redundant connection.
⑧ Grounding bolt for connection of protective grounding
⑨ Signaling contact
⑩ USB console interface (2.0 port, Type B, serial via USB)
⑪ CLP slot with an inserted CLP
⑫ "SELECT/SET" button
⑬ LED display
- Port LEDs
- "F" LED for the fault display
- "L1/L2" LED for the power supply
- "RM" LED for the redundancy manager function
- "SB" LED for the status of the standby function
- "DM1/DM2" LED for the display mode

Figure 4-4 SCALANCE XR522-12 100 ... 240 V AC / 110 ... 250 V DC, front and rear

4.3.5 SCALANCE XR524-8WG 24 V AC/DC

The following figure shows an overview of the components of a 24 V AC/DC device version of the SCALANCE XR524-8WG.



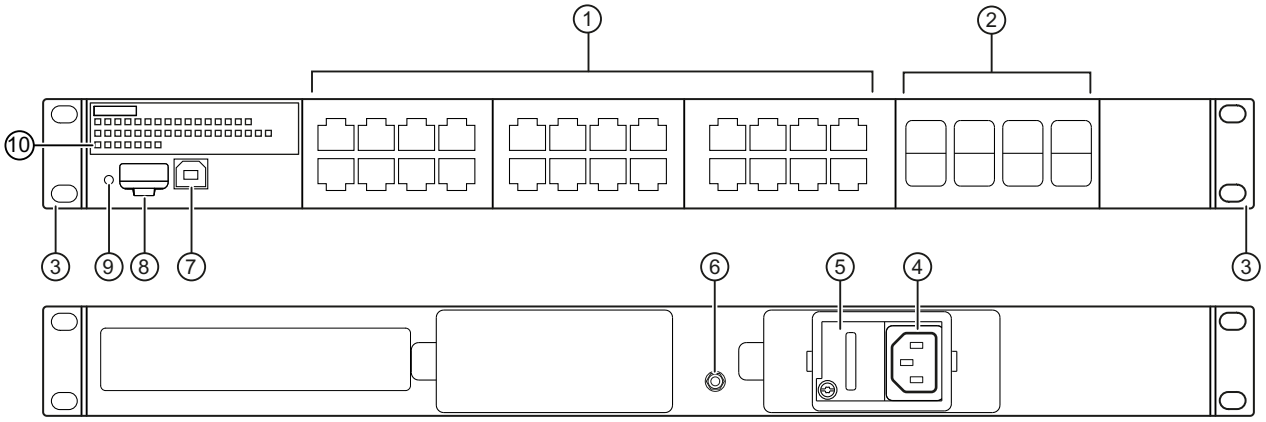
① Electrical ports with 10/100/1000 Mbps without securing collar
② Slots for SFP/SFP+ plug-in transceiver with 1/10 Gbps
③ Mounting brackets for 19" rack installation
④ Grounding bolt for connecting the protective grounding, on the back of the device
⑤ 24 V AC/DC power supply
⑥ USB console interface (2.0 port, Type B, serial via USB)
⑦ CLP slot with an inserted CLP
⑧ "SELECT/SET" button
⑨ LED display

- Port LEDs
- "F" LED for the fault display
- "L1/L2" LED for the power supply
- "RM" LED for the redundancy manager function
- "SB" LED for the status of the standby function
- "DM1/DM2" LED for the display mode

Figure 4-5 SCALANCE XR524-8 24 V AC/DC, front and rear

4.3.6 SCALANCE XR524-8WG 100 ... 240 V AC / 110 ... 250 V DC

The following figure shows an overview of the components of a 100 to 240 V AC / 110 to 250 V DC device version of the SCALANCE XR524-8WG.



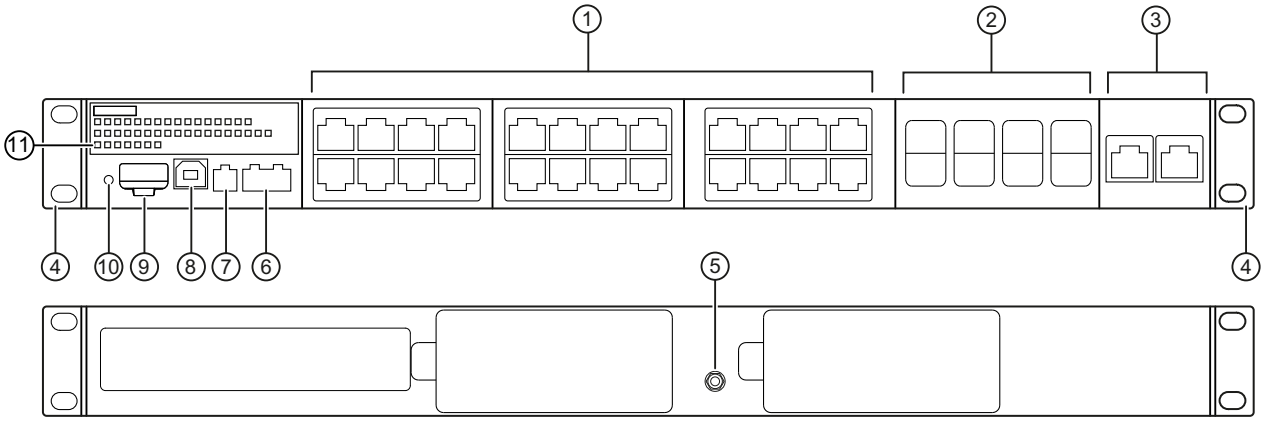
① Electrical ports with 10/100/1000 Mbps without securing collar
② Slots for SFP/SFP+ plug-in transceiver with 1/10 Gbps
③ Mounting brackets for 19" rack installation
④ Connection to the 100 ... 240 V AC power supply
⑤ Connection to the 110 to 250 V DC power supply (hidden behind a screw-retained cover)
⑥ Grounding bolt for connection of protective grounding
⑦ USB console interface (2.0 port, Type B, serial via USB)
⑧ CLP slot with an inserted CLP
⑨ "SELECT/SET" button
⑩ LED display

- Port LEDs
- "F" LED for the fault display
- "L1/L2" LED for the power supply
- "RM" LED for the redundancy manager function
- "SB" LED for the status of the standby function
- "DM1/DM2" LED for the display mode

Figure 4-6 SCALANCE XR524-8 100 ... 240 V AC / 110 ... 250 V DC, front and rear

4.3.7 SCALANCE XR526-8 24 V AC/DC

The following figure shows an overview of the components of a 24 V AC/DC device version of the SCALANCE XR526-8.



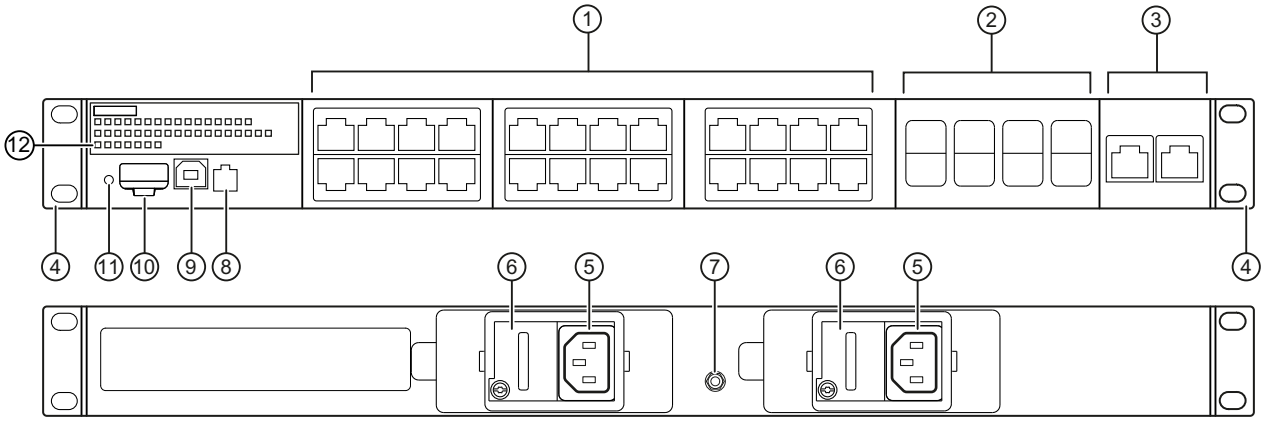
① Electrical ports with 10/100/1000 Mbps
② Slots for SFP/SFP+ plug-in transceiver with 1/10 Gbps
③ Electrical ports with 1/2.5/5/10 Gbps
④ Mounting brackets for 19" rack installation
⑤ Grounding bolt for connecting the protective grounding, on the back of the device
⑥ 24 V AC/DC power supply
⑦ Signaling contact
⑧ USB console interface (2.0 port, Type B, serial via USB)
⑨ CLP slot with an inserted CLP
⑩ "SELECT/SET" button
⑪ LED display

- Port LEDs
- "F" LED for the fault display
- "L1/L2" LED for the power supply
- "RM" LED for the redundancy manager function
- "SB" LED for the status of the standby function
- "DM1/DM2" LED for the display mode

Figure 4-7 SCALANCE XR526-8 24 V AC/DC, front and rear

4.3.8 SCALANCE XR526-8 100 ... 240 V AC / 110 ... 250 V DC

The following figure shows an overview of the components of a 100 to 240 V AC / 110 to 250 V DC device version of the SCALANCE XR526-8.

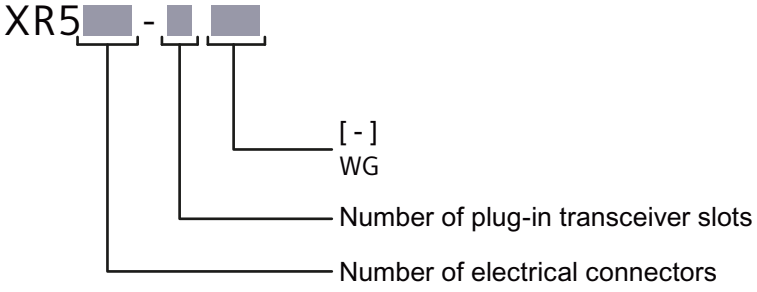


① Electrical ports with 10/100/1000 Mbps
② Slots for SFP/SFP+ plug-in transceiver with 1/10 Gbps
③ Electrical ports with 1/2.5/5/10 Gbps
④ Mounting brackets for 19" rack installation
⑤ Connection to the 100 to 240 VAC power supply
Single or redundant design depending on the device version. The figure shows the device with a redundant connection.
⑥ Connection to the 110 to 250 VDC power supply (hidden behind a screw-retained cover)
Single or redundant design depending on the device version. The figure shows the device with a redundant connection.
⑦ Grounding bolt for connection of protective grounding
⑧ Signaling contact
⑨ USB console interface (2.0 port, Type B, serial via USB)
⑩ CLP slot with an inserted CLP
⑪ "SELECT/SET" button
⑫ LED display
- Port LEDs
- "F" LED for the fault display
- "L1/L2" LED for the power supply
- "RM" LED for the redundancy manager function
- "SB" LED for the status of the standby function
- "DM1/DM2" LED for the display mode

Figure 4-8 SCALANCE XR526-8 100 ... 240 V AC / 110 ... 250 V DC, front and rear

4.4 Type designation

The type designation of a SCALANCE XR-500 is made up of several parts that have the following meaning:



4.5 Components of the product

The following components ship with a SCALANCE XR-500:

- One device
- One CLP removable data storage medium (article number 6GK1900-0UB00-0AA0)
- Two mounting brackets for 19" rack mounting, pre-assembled with 8 screws M3 x 5 recessed head, drive: Torx
- A 2-pin spring-loaded terminal block for the signaling contact
- Covers for the interfaces of the SFP/SFP+
  - 32 x for SCALANCE XR502-32
  - 12 x for SCALANCE XR522-12
  - 8 x for SCALANCE XR524-8WG and SCALANCE XR526-8

The following parts are additionally included in the scope of delivery of a 24 V AC/DC version:

- Two 2-pin spring-loaded terminal blocks 24 V for 24 V AC/DC power supply

The following parts are also included in the scope of delivery of an 100 to 240 V AC / 110 to 250 V DC version:

- One 2-pin DC terminal block 110 to 250 V DC for the device versions with a non-redundant power supply 100 to 240 V AC or 110 to 250 V DC non-redundant power supply
- Two 2-pin DC terminal block 110 to 250 V DC for the device versions with a redundant power supply 100 to 240 V AC or 110 to 250 V DC

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.

4.6 Spare parts

The following spare parts are available for the devices mentioned in the scope of validity:

Component	Description	Article number
Spring-loaded terminal block, 2-pins	2-pin spring-loaded terminal block for connecting the 24 V DC power supply and the 24 V DC signaling contact. Pack of 5	6GK5980-0BB10-0AA5
4-pin spring-loaded terminal block	4-pin spring-loaded terminal block for connecting the 24 V DC power supply Pack of 5	6GK5980-1DB10-0AA5

4.7 Accessories

The following accessories are available for the devices mentioned in the scope of validity:

4.7.1 Installation

Component	Description	Article number
SCALANCE XR-300 Rack Mount Kit	Mounting bracket for four-point mounting Pack of 4	6GK5980-2BA00-0AA4

4.7.2 Serial USB cable

Component	Description	Article number
Connecting cable (USB Type A / USB Type B)	Preassembled USB cable with USB Type A and USB Type B connector, length: 2 m Pack of 1	7ML1930-1FN

4.7.3 Power cable

Component	Description	Article number
Power cable 100 to 240 V AC, straight, 3 m	For Germany, France, Spain, Netherlands, Belgium, Sweden, Austria, Finland	6ES7 900-0AA00-0XA0
Power cable 100 to 240 V AC, straight, 3 m	For Great Britain	6ES7 900-0BA00-0XA0
Power cable 100 to 240 V AC, straight, 3 m	For Switzerland	6ES7 900-0CA00-0XA0
Power cable 100 to 240 V AC, straight, 3 m	For America	6ES7 900-0DA00-0XA0
Power cable 100 to 240 V AC, straight, 3 m	For Italy	6ES7 900-0EA00-0XA0
Power cable 100 to 240 V AC, straight, 3 m	For China	6ES7 900-0FA00-0XA0

4.7.4 Configuration and License PLUG

Component	Description	Article number
SCALANCE CLP 2 GB	Configuration and License PLUG, removable data storage medium for configuration data, 2 GB	6GK1900-0UB00-0AA0
SCALANCE CLP EEC 2 GB	Configuration and License PLUG, removable data storage medium for configuration data, 2 GB conformal-coated PCBs	6GK1900-0UQ00-0AA0

4.7.5 SFP Transceivers

Pluggable transceiver SFP (100 Mbps)

Type	Property	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
	10 packing unit (VPE 10)	6GK5 991-1AD00-8AC0
SFP991-1 (C)	1 x 100 Mbps, LC port optical, for glass FO cable (multimode), up to max. 5 km, varnished	6GK5 991-1AD00-8FA0
SFP991-1LD	1 x 100 Mbps LC port optical for glass FO cable (single mode) up to max. 26 km	6GK5 991-1AF00-8AA0
	10 packing unit (VPE 10)	6GK5 991-1AF00-8AC0
SFP991-1LD (C)	1 x 100 Mbps LC port optical for glass FO cable (single mode) up to max. 26 km, varnished	6GK5 991-1AF00-8FA0
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

The SFP plug-in transceiver (100 Mbps) cannot be operated in SFP+ slots.

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

Pluggable transceiver SFP (1000 Mbps)

Type	Property	Article number
SFP992-1	1 x 1000 Mbps, LC port optical for glass FO cable (multimode), up to max. 750 m	6GK5 992-1AL00-8AA0
	10 packing unit (VPE 10)	6GK5 992-1AL00-8AC0
SFP992-1 (C)	1 x 1000 Mbps, LC port optical, for glass FO cable (multimode), up to max. 750 m, varnished	6GK5 992-1AL00-8FA0
SFP992-1+	1 x 1000 Mbps, LC port optical for glass FO cable (multimode), up to max. 2 km	6GK5 992-1AG00-8AA0
SFP992-1LD	1 x 1000 Mbps LC port optical for glass FO cable (single mode) up to max. 10 km	6GK5 992-1AM00-8AA0
	10 packing unit (VPE 10)	6GK5 992-1AM00-8AC0
SFP992-1LD (C)	1 x 1000 Mbps LC port optical for glass FO cable (single mode) up to max. 10 km, varnished	6GK5 992-1AM00-8FA0
SFP992-1LD+	1 x 1000 Mbps LC port optical for glass FO cable (single mode) up to max. 30 km	6GK5 992-1AM30-8AA0
SFP992-1LH	1 x 1000 Mbps LC port optical for glass FO cable (single mode) up to max. 40 km	6GK5 992-1AN00-8AA0

Type	Property	Article number
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

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

Note

Restriction for SFP transceivers

The maximum ambient temperature changes if you use SFP transceivers:

- If you use SFP transceivers of the types LH, LH+ or ELH, the maximum ambient temperature is reduced to 40 °C or 50 °C, depending on the device version.
  For more information, refer to "Dependency between ports and ambient temperature (derating) (Page 81)".

For the values of the ambient temperature without SFP transceivers, refer to the section "Technical specifications (Page 97)".

Bidirectional plug-in transceiver SFP

Bidirectional plug-in transceivers feature only one fiber connection. They transmit and receive on two different wavelengths. To establish a connection, you need two matching bidirectional SFPs. The connected SFPs must respectively transmit on the wavelength at which the connection partner receives.

Type	Properties	Article number
SFP992-1BXMT	1 x 1000 Mbps LC port optical for glass FO (multimode) with max. 500 m, transmits at 1550 nm, receives at 1310 nm	6GK5 992-1AL00-8TA0
SFP992-1BXMR	1 x 1000 Mbps LC port optical for glass FO (multimode) with max. 500 m, transmits at 1310 nm, receives at 1550 nm	6GK5 992-1AL00-8RA0
SFP992-1BX10T	1 x 1000 Mbps LC port optical for glass FO (single mode) with max. 10 km, transmits at 1550 nm, receives at 1310 nm	6GK5 992-1AM00-8TA0
SFP992-1BX10R	1 x 1000 Mbps LC port optical for glass FO (single mode) with max. 10 km, transmits at 1310 nm, receives at 1550 nm	6GK5 992-1AM00-8RA0

SFP+ transceiver

Type	Properties	Article number
SFP993-1	1 x 10 Gbps, LC port optical for glass FO cable (multimode), up to max. 550 m	6GK5 993-1AT00-8AA0
SFP993-1(C)	1 x 10 Gbps, LC port optical for glass FO cable (multimode), up to max. 550 m, coated	6GK5 993-1AT00-8FA0

Type	Properties	Article number
SFP993-1LD	1 x 10 Gbps, LC port optical for glass FO cable (single mode), up to max. 10 km	6GK5 993-1AU00-8AA0
SFP993-1LD(C)	1 x 10 Gbps, LC port optical for glass FO cable (single mode), up to max. 10 km, coated	6GK5 993-1AU00-8FA0
SFP993-1LH	1 x 10 Gbps, LC port optical for glass FO cable (single mode), up to max. 40 km	6GK5 993-1AV00-8AA0
SFP993-1LH+	1 x 10 Gbps, LC port optical for glass FO cable (single mode), up to max. 80 km	6GK5 993-1AW00-8AA0

Can only be operated in SFP+ slots.

Pluggable transceivers with the suffix (C) in the type name have coated printed circuit boards (conformal coating).

Note

Restricted approvals

If you operate the device with an SFP transceiver of the type SFP993-1(C) or SFP993-1LD(C), the following approvals and certifications lose their validity for the device:

ATEX, IECEx, UKEX and CCC-Ex certification, FM, cULus approval Hazardous Location

If you operate the device with an SFP transceiver of the type SFP993-1LH+, the following approvals and certifications lose their validity for the device:

ATEX, IECEx, UKEX and CCC-Ex certification, FM, cULus approval Hazardous Location, cULus approvals

Note

Restriction for SFP transceivers

The maximum ambient temperature changes if you use SFP transceivers:

- If you use SFP transceivers of the types SFP993-1LH or SFP993-1LH+, the maximum ambient temperature is reduced to 40 °C or 50 °C, depending on the device version.
  For more information, refer to "Dependency between ports and ambient temperature (derating) (Page 81)".

For the values of the ambient temperature without SFP transceivers, refer to the section "Technical specifications (Page 97)".

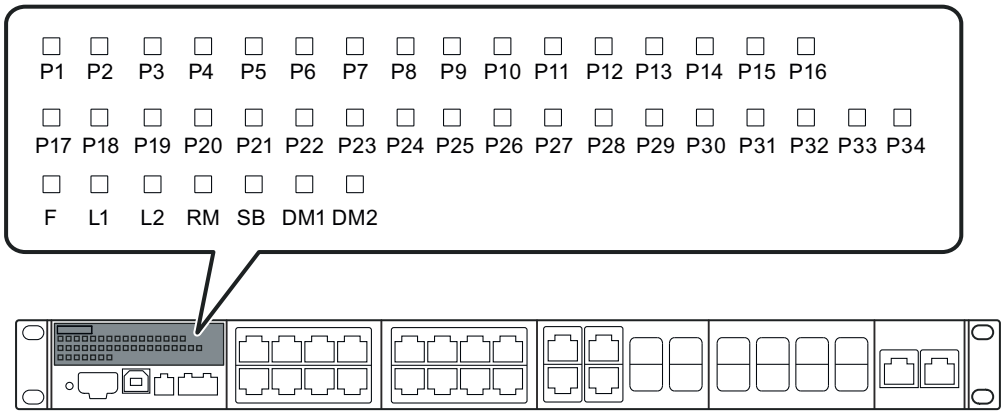
Preassembled IE cable with SFP+ plugs

Component	Description		Article number
IE Cable SFP+/SFP+	Preassembled IE cable with two permanently mounted SFP+ plugs, electrical, 10 Gbps, pack of 1	Length 1 m	6GK5 980-3CB00-0AA1
		Length 2 m	6GK5 980-3CB00-0AA2
		Length 7 m	6GK5 980-3CB00-0AA7

4.8 LED display

4.8.1 Position

The following figure shows the arrangement of the LEDs*).



P	LEDs for displaying the port status *)
F	LED for displaying the fault/error status
L1/L2	LEDs for displaying the power supply
RM	LED for displaying the "redundancy manager" function
SB	LED for displaying the "standby" function
DM1/DM2	LEDs for displaying the display mode

Figure 4-9 Arrangement of the LEDs using a 24 V AC/DC device version with 12 SFP-/SFP+ slots

*) The number of port LEDs depends on the device.

4.8.2 Port LEDs

The port LEDs "P1", "P2" etc. show information about the corresponding ports.

The meaning of the Port LEDs depends on the set display mode, see section "LEDs "DM1" and "DM2" (Page 47)".

Meaning in display mode A

In display mode A, the port LEDs indicate whether a valid link exists.

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 state, the port can receive and send data.
	Flashes once per period*	Link exists and port in "blocking" status. In this state, the port only receives management data (no user data).
	Flashes three times per period*	Link exists and port turned off by management. In this state, no data is sent or received via the port.
	Flashes four times per period*	Link exists and port is in the "monitor port" status. In this state, the data traffic of another port is mirrored to this port.
Yellow	Flashing / lit	Receiving data at port

* 1 period ≙ 2.5 seconds

Meaning in display mode B

In display mode B, the port LEDs indicate the transmission speed.

LED color	LED status	Meaning
-	Off	Port operating at 10 Mbps
Green	On	Port operating at 100 Mbps
Yellow	On	Port operating at 1000 Mbps
Green	Flashing	Port operating at 10 Gbps

If a connection error occurs when the transmission mode is permanently set (autonegotiation off), the target state, i.e. the set transmission speed (10 Gbps, 1 Gbps, 100 Mbps, 10 Mbps), is still displayed. If there is a connection problem and autonegotiation is active, the port LED goes off.

Meaning in display mode C

In display mode C, the port LEDs indicate the mode.

LED color	LED status	Meaning
-	Off	Port operating in half duplex mode
Green	On	Port operating in full duplex mode

Meaning in display mode D

In display mode D, the port LEDs indicate whether the port is monitored.

LED color	LED status	Meaning
-	Off	Port is not monitored.
Green	On	Port is monitored for "Link up". Error handling is triggered when the port changes to the active status. If a link has been established at the port, but it should not be available, the signaling contact indicates an error.
Yellow	On	Port is monitored for "Link down". Error handling is triggered when the port changes to the inactive status. If no valid link has been established at the port (e.g. the communication partner is switched off or the cable is not connected), the signaling contact indicates an error.

4.8.3 "F" LED

The "F" LED shows the fault/error status of the device.

Meaning during device startup

LED color	LED status	Meaning during device startup
-	Off	Device startup was completed successfully.
Red	On	Device startup is not yet completed or errors have occurred.
Red	Flashing	There are errors in the firmware.

Meaning during operation

LED color	LED status	Meaning during operation
-	Off	The device is operating free of errors. The signaling contact is closed.
Red	On	The device has detected a problem. The signaling contact has opened.
Red	Flashing	The device is starting up for the first time or has been reset to factory settings. The password of the default user "admin" has not yet been changed.

4.8.4 LEDs "L1" and "L2"

The "L1" and "L2" LEDs indicate the current range of the power supply at connectors L1 and L2.

The meaning of the "L1" and "L2" LEDs depends on the set display mode, see section "LEDs "DM1" and "DM2" (Page 47)".

Meaning in display modes A, B, C and E

In the display modes A, B, C and E, you can determine whether the power supply is connected by observing LEDs "L1" and "L2" .

L1/L2 LED		L1/L2 connector
LED color	**LED status**	
-	Off	No external power supply connected
Green	On	Power supply connected to L1/L2

Meaning in display mode D

In display mode D, the "L1" and "L2" LEDs indicate whether the power supply is monitored.

L1/L2 LED		L1/L2 connector
LED color	**LED status**	
-	Off	Power supply is not monitored. The signal contact does not respond if neither L1 nor L2 is connected to an adequate power supply.
Green	On	Power supply is monitored. The signal contact responds if neither L1 nor L2 is connected to an adequate power supply.

4.8.5 "RM" LED

The "RM" LED indicates whether the device has the Media Redundancy Manager (MRM) role and whether the MRP ring is operating error-free.

LED color	LED status	Meaning
-	Off	The device is not an MRM.
Green	On	The device has the MRM role. The MRP ring is in normal state. The MRM has blocked data traffic on one of its ring ports and is monitoring the MRP ring.
Green	Flashing	The device has the MRM role. The MRP ring is in error state. The MRM has detected an error in the MRP ring or at one of its ring ports and activates an alternative communication path.

4.8.6 "SB" LED

The "SB" 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	Flashing	The standby function is enabled. The standby section is active.

4.8.7 LEDs "DM1" and "DM2"

The "DM1" and "DM2" LEDs indicate which display mode is set.

There are 4 display modes (A, B, C and D). Display mode A is the default mode.

Depending on the set display mode, the "L1", "L2" LEDs and the port LEDs show different information.

LED color	LED status		Meaning
	DM1 LED	DM2 LED	
-	Off		Display mode A
Green	On	Off	Display mode B
Green	Off	On	Display mode C
Green	On		Display mode D

Setting the display mode

To set the required display mode, press the "SELECT/SET" button.

If you do not press the "SELECT/SET" button for longer than 1 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
Press once	On	Off	Display mode B
Press twice	Off	On	Display mode C
Press three times	On		Display mode D

4.9 SELECT / SET button

4.9.1 Position

The "SELECT/SET" button is located on the front of the device.

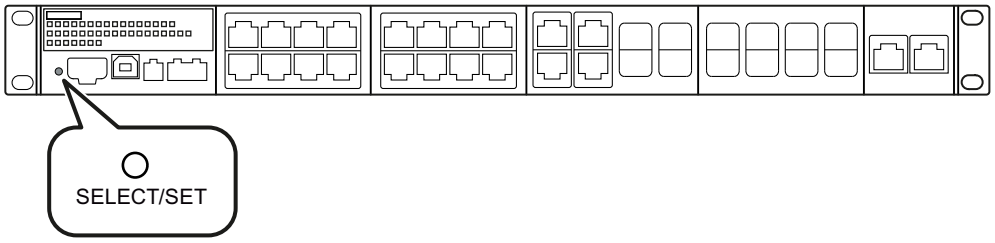


Figure 4-10 Position of the "SELECT/SET" button using a 24 V AC/DC device version with 12 SFP/SFP+ slots as an example

The device has a button with the following functions:

- **Reset the device to default settings**
  Please note that the button function distinguishes between the startup phase and running operation.
  For more information, refer to "Resetting the device to default settings with the button (in the startup phase) (Page 93)" and "Resetting the device to default settings with the button (during operation) (Page 94)".
- **Load a firmware file via TFTP**
  For more information, refer to "Load a firmware file via TFTP. (Page 95)".
- **Setting the display mode**
  The display mode is used for diagnostics of the device. Depending on the set display mode, the LEDs of the device show different information and indicate the state of the device.
  For more information, refer to "Setting the display mode (Page 48)".
  For more information on the display modes, refer to "LEDs "DM1" and "DM2" (Page 47)".

4.9.2 Setting the display mode

To set the display mode, press the button as follows:

Pressing the button starting at display mode A	**LED status**		**Display mode**
	DM1	**DM2**	
-	Off		Display mode A
Press once	On	Off	Display mode B
Press twice	Off	On	Display mode C
Press three times	On		Display mode D

Depending on the set display mode, the "L1", "L2" LEDs and the port LEDs show different information.

If you do not press the button for longer than 1 minute, the device automatically changes to display mode A.

4.10 Configuration License PLUG

The Configuration and License PLUG (CLP) is a USB storage medium for backing up and exchanging data and licenses.

The CLP has a USB type C interface and can be used with the following devices that have a corresponding interface:

- Siemens products
- Personal computers (PCs), such as desktop PCs, tablet PCs, laptops, or smartphones

4.10.1 Position

The CLP slot is located on the front of the device.

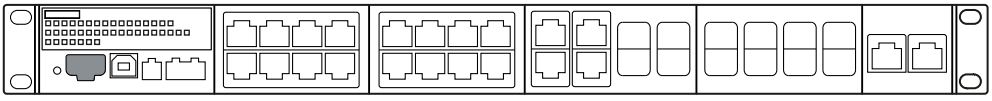


Figure 4-11 Position of the CLP slot using a 24 V AC/DC device version with 12 SFP/SFP+ slots as an example

4.10.2 Function

Devices with a CLP slot support the following operating modes:

- **Without CLP**
  The device saves the configuration data in the internal memory. This mode is active when no CLP is inserted.
- **With CLP**
  In the startup phase:
  - When an CLP **with no data** (default setting) is plugged into a device, the device automatically saves its configuration data on the CLP during the startup phase. After that, it behaves like a CLP with data.
  - If a CLP **with data** is plugged into a device, the device automatically adopts the configuration of the CLP during the startup phase.

  During operation:
  - During operation, changes to the configuration are saved on the CLP and in the internal memory.
  - The configuration data and firmware of the device are stored in a secured memory area of the CLP. This secured memory area can only be accessed via the authentication of the Siemens device.
  - The device checks whether a CLP is inserted at one second intervals. If the device detects that the CLP has been removed, it restarts automatically.

NOTICE
Operating hazard - risk of data loss Only pull and plug the CLP when the device is de-energized.

  - The device signals deviations from normal operation of the CLP (e.g. incompatible data, incorrect operation or malfunctions) via the existing diagnostics mechanisms (e.g. LEDs or user interfaces).

The procedure for pulling and plugging the PLUG can be found in the section "Replacing a CLP (Page 89)".

Installing and removing

5

5.1 Safety during installation

Safety notices

When installing the device, keep to the safety notices listed below.

⚠ WARNING

If a device is operated in an ambient temperature of more than 40 °C, the temperature of the device housing may be higher than 70 °C. The device must therefore be installed so that it is only accessible to service personnel or users that are aware of the reason for restricted access and the required safety measures at an ambient temperature higher than 40 °C.

⚠ WARNING

If the device is installed in a cabinet, the inner temperature of the cabinet corresponds to the ambient temperature of the device.

NOTICE

Improper mounting

Improper mounting may damage the device or impair its operation.

- Before mounting the device, always ensure that there is no visible damage to the device.
- Mount the device using suitable tools. Observe the information in the respective section about mounting.

Note

The device is intended for stationary operation only.

Note

This device is not suitable for use in areas where children may be present.

Safety notices on use in hazardous areas

General safety notices relating to protection against explosion

WARNING

EXPLOSION HAZARD

Replacing components may impair suitability for Class 1, Division 2 or Zone 2.

WARNING

The device is intended for indoor use only.

WARNING

The device shall only be used in an area with pollution degree 1 or 2 (according to EN/IEC 60664-1, GB/T 16935.1).

WARNING

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.

Notes for use in hazardous locations according to ATEX, IECEx, UKEX and CCC Ex

If you use the device under ATEX, IECEx, UKEX or CCC Ex conditions you must also keep to the following safety instructions in addition to the general safety instructions for protection against explosion:

WARNING

To comply with EU Directive 2014/34 EU (ATEX 114), UK Regulation SI 2016/1107 or the conditions of IECEx or CCC-Ex, the housing or cabinet must meet the requirements of at least IP54 (according to EN/IEC 60529, GB/T 4208) in compliance with EN IEC/IEC 60079-7, GB/T 3836.3.

WARNING

If the temperature of the cable or housing socket 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 to 60 °C, only use cables with a permissible operating temperature of at least 85 °C.

Safety notices when using according to FM

If you use the device under FM conditions you must also keep to the following safety notices in addition to the general safety notices for protection against explosion:

WARNING

Wall mounting outside of the control cabinet or housing does not fulfill the requirements of the FM approval.

WARNING

To fulfill the requirements of the FM approval rack mounting is only possible in a vent free, tool-secured enclosure.

WARNING

If a device is operated in an ambient temperature of more than 60 °C, the temperature of the device housing may be higher than 70 °C. The device must therefore be installed so that it is only accessible to service personnel or users that are aware of the reason for restricted access and the required safety measures at an ambient temperature higher than 60 °C.

WARNING

Substitution of components may impair suitability of the equipment.

WARNING

Substitution of components may impair suitability for Division 2.

WARNING

EXPLOSION HAZARD

For operation the device is intended to be installed within an enclosure/control cabinet. The inner temperature of the enclosure/control cabinet corresponds to the ambient temperature of the device. Use installation wiring connections with admitted maximum operating temperature of at least 30 °C higher than maximum ambient temperature.

WARNING

The IP degree of protection marking on the nameplate is not associated with FM approval.

Safety notices when using the device as industrial control equipment according to UL 61010-2-201

If you use the device under UL 61010-2-201 conditions you must also keep to the following safety notices in addition to the general safety notices for protection against explosion:

⚠ WARNING

Open equipment

The devices are "open equipment" acc. to the standard IEC 61010-2-201 or UL 61010-2-201 / CSA C22.2 No. 61010-2-201. To fulfill requirements for safe operation with regard to mechanical stability, flame retardation, stability, and protection against contact, the following alternative types of installation are specified:

- Installation in a suitable control cabinet protected against electric shock and spread of fire
- Installation in a suitable protective housing protected against electric shock and spread of fire
- Installation in a suitable closed control room protected against electric shock and spread of fire

⚠ WARNING

Damage in the event of improper use

The protection offered by the device can be impaired if the device is used differently to the description in section Proper use (Page 7).

The device cannot be opened and repaired independently in the event of a fault; see Fault (Page 11).

⚠ WARNING

If the temperature at the cable or housing socket or at the branching points of the cables exceeds 60 °C, special precautions must be taken. If the equipment is operated at ambient temperatures in excess of 40 °C, only use cables with permitted operating temperature of at least 80 °C.

Further notes

NOTICE

Use only approved components

If you use components and accessories that are not approved for SIMATIC NET devices or their target systems, this may violate the requirements and regulations for safety and electromagnetic compatibility.

Use only components that are approved for SIMATIC NET devices.

⚠ WARNING

Warming and premature aging of the device due to direct sunlight/UV light

Direct sunlight and UV light can heat up the device and can lead to premature aging of the device and its cabling.

Provide suitable shade to protect the device against direct sunlight and UV light.

Note

During installation and operation, keep to the installation guidelines and safety notices described in this document and in the system manuals "Industrial Ethernet / PROFINET Industrial Ethernet" and "Industrial Ethernet / PROFINET passive network components".

You will find information on the system manuals in the section "Introduction", under "Further documentation".

5.2 Types of installation

The devices can be installed in the following ways:

- 19" rack mounting
- Four-point mounting using special mounting brackets

Note

Installation of 100 to 240 V AC / 110 to 250 V DC devices

The operation of 100 to 240 V AC / 110 to 250 V DC devices connected to the power supply via one or two DC terminal blocks is only permitted inside a control cabinet.

Installation clearances

Adhere to the following minimum clearances so that the convection ventilation of the devices is not blocked:

- At least 1 height unit (43.6 mm) below
- At least 1 height unit (43.6 mm) above

Installation position

Only the following installation position is permitted for all installation types of the devices:

- **Horizontal**
  The horizontal installation position is shown using the example of a control cabinet.

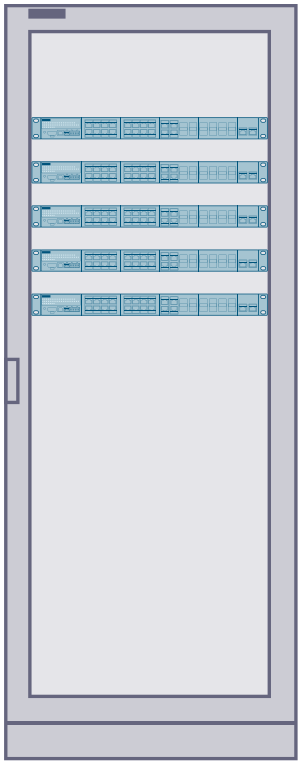


Figure 5-1 Horizontal installation position of devices in a control cabinet

Note

Other installation positions are not permitted.

Cooling

The devices do not require any air flow generated by a fan for cooling in the control cabinet.

SFP transceivers

Information about pulling and plugging SFP or SFP+ transceivers can be found in the section "Inserting and removing pluggable transceivers (Page 85)".

5.3 19" rack mounting

Notes on 19" rack mounting

⚠ WARNING

Increased ambient temperature

When installed in a closed rack or a rack unit with several devices, the ambient temperature of the rack may be higher than the room temperature. Install the devices in an environment compatible with the maximum ambient temperature specified by the manufacturer.

⚠ WARNING

Reduced air flow

Install the devices in a rack so that there is an adequate air flow for the reliable operation of the devices.

⚠ WARNING

Mechanical load

When installing the devices in a rack, avoid the dangers of unequal mechanical load.

⚠ WARNING

Circuit overload

When connecting the devices to the power supply, avoid the effects of circuit overload on the overcurrent protection and the power supply cables. Take into account the rated values on the nameplate of the devices.

⚠ WARNING

Reliable grounding

Devices mounted in racks must be reliably grounded. Pay particular attention to supply connectors that are not directly connected to the circuit branch (e.g. socket strip).

Note

Mounting with two mounting brackets

Mounting in a 19" rack is performed with two mounting brackets, which are pre-installed on the front of the rack unit.

Alternatively, you can mount the rack unit in a 19" control cabinet from the rear. To do this, unscrew the two mounting brackets from the rack unit and attach them upside down to the two side panels at the rear of the unit. The rack unit can then be installed in a 19" control cabinet.

Note

Installation with four-point mounting

Where mechanical strain is liable to be high, for example when used on a ship, four-point mounting is necessary.

You will find details in the sections "Four-point mounting (Page 59)" and "Mechanical stability (in operation) (Page 115)".

Mounting

⚠ CAUTION

Risk of injury if subjected to irregular mechanical strain

The device must be mounted in the 19" rack so that even if there is irregular mechanical strain, no dangerous situation can result.

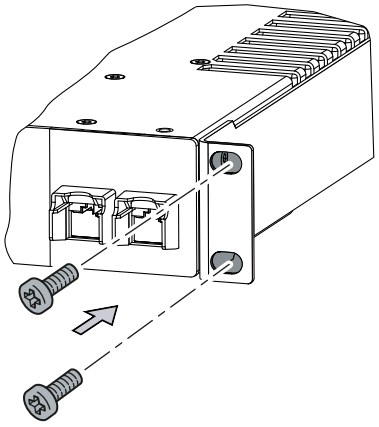


Figure 5-2 19" rack mounting

To install the device in a 19" rack, follow the steps below:

1. Position the device at the required location in the 19" rack.
2. Screw the two brackets to the 19" rack in each case with 2 securing screws.
3. Connect the cables, see section "Connecting up (Page 63)".

Uninstalling

To remove the device from a 19" rack, follow the steps below:

1. Disconnect all connected cables.
2. Undo the securing screws on the mounting brackets
3. Remove the device from the 19" rack.

NOTICE

Rack-mount instructions

A) Elevated Operating Ambient - If installed in a closed or multi-unit rack, the operating ambient temperature of the rack environment may be greater than the room ambient. Therefore consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

B) Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

C) Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

D) Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

E) Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e. g. use of power strips).

5.4 Four-point mounting

Notes on four-point mounting

Note

Installation with four-point mounting

Where mechanical strain is liable to be high, for example when used on a ship, four-point mounting is necessary.

You will find details in the section "Mechanical stability (in operation) (Page 115)".

Example of a four-point mounting: Two mounting brackets on the left-hand side of the device (front and back) and two mounting brackets on the right-hand side of the device (front and back).

Requirements

For the four-point mounting, you require the following:

- 4 suitable brackets
- 4 recessed head screws (M3 x 6) per mounting bracket for fastening the mounting bracket to the device
- 2 suitable half-round screws (6 mm diameter) per mounting bracket for fastening the mounting bracket to the base.

Mounting bracket

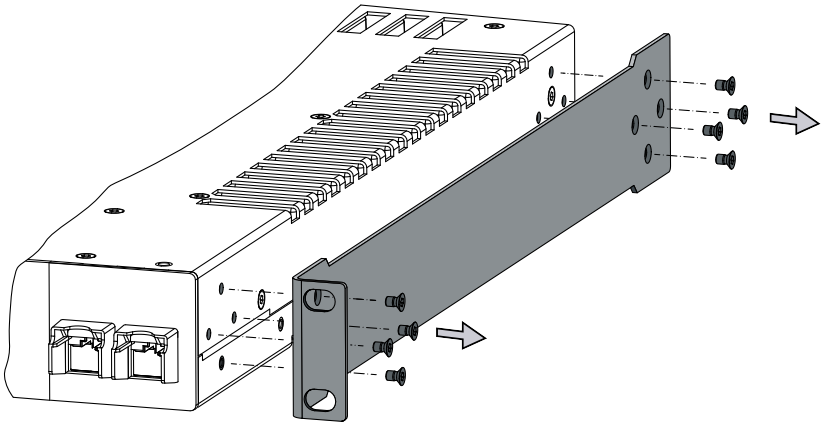
For the four-point mounting, you require special mounting brackets. You can order four mounting brackets as accessories (Page 38) or manufacture them yourself according to the design drawings. The design drawings can be found in the section "Mounting brackets for use on ships (Page 118)".

The brackets for left and right are identical.

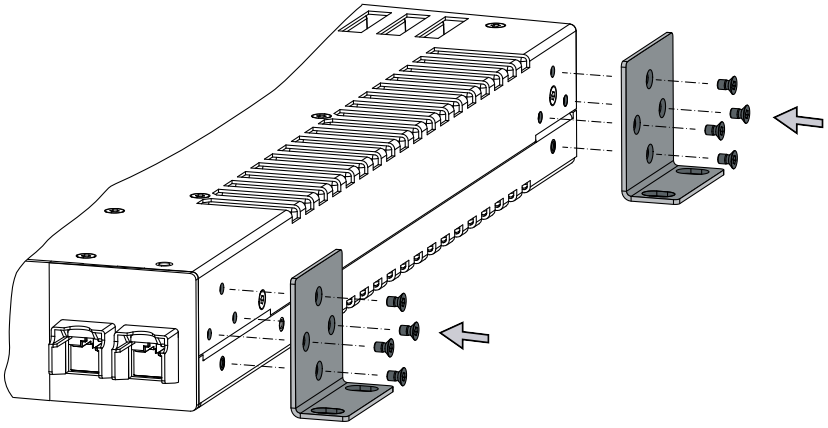
Procedure

To install the device with a four-point mounting, follow the steps below:

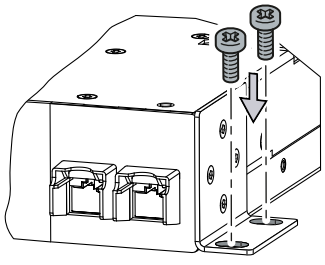
1. Remove the mounting brackets for 19" rack installation, if necessary. To do so, loosen the 8 screws on each side and remove the mounting bracket.



2. Secure the four mounting brackets each with four recessed head screws (M3 x 6 in the scope of delivery) to the side panels of the device.
   The maximum tightening torque for these screws is 0.5 Nm.



3. Position the device at the desired location and secure the four mounting brackets with two round-head screws each (6 mm diameter).



5.5 Disassembly

⚠ WARNING

Improper disassembly

Improper disassembly may result in a risk of explosion in hazardous areas.

For proper disassembly, observe the following:

- Before starting work, ensure that the electricity is switched off.
- Secure remaining connections so that no damage can occur as a result of disassembly if the system is accidentally started up.

Connecting up

6

6.1 Safety when connecting up

Safety notices

When connecting up the device, keep to the safety notices listed below.

If using power sources according to NEC Class 2 or PS2/LPS complying with UL 62368-1, please note the following information.

⚠ WARNING

Power supply

The device is designed for operation with a directly connectable safety extra low voltage (SELV) from a limited power source (LPS). The power supply must meet the requirements for ES1/SELV and PS2/LPS complying with IEC/UL 62368-1.

The power supply also needs to meet at least one of the following conditions:

- Only safety extra low voltage (SELV) with limited power source (Limited Power Source, LPS / Power Source Class 2, PS2) complying with IEC 62368-1 / EN 62368-1 / VDE 62368-1 may be connected to the power supply terminals.
- The power supply unit for the device must meet NEC Class 2 according to the National Electrical Code (r) (ANSI / NFPA 70).

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

⚠ WARNING

Do not remove or replace while circuit is live when a flammable or combustible atmosphere is present.

Note

No light power measurement (PROFINET diagnostics)

The devices do not support diagnostics with light power measurement.

Safety notices on use in hazardous areas

General safety notices relating to protection against explosion

WARNING

Unsuitable cables or connectors

Risk of explosion in hazardous areas

- Only use connectors that meet the requirements of the relevant type of protection.
- If necessary, tighten the connector screw connections, device fastening screws, grounding screws, etc. according to the specified torques.
- Close unused cable openings for electrical connections.
- Check the cables for a tight fit after installation.

WARNING

Lack of equipotential bonding

If there is no equipotential bonding in hazardous areas, there is a risk of explosion due to equalizing current or ignition sparks.

- Ensure that equipotential bonding is available for the device.

WARNING

Unprotected cable ends

There is a risk of explosion due to unprotected cable ends in hazardous areas.

- Protect unused cable ends according to IEC/EN 60079-14.

WARNING

Improper installation of shielded cables

There is a risk of explosion due to equalizing currents between the hazardous area and the non-hazardous area.

- Ground shielded cables that cross hazardous areas at one end only.
- Lay a potential equalization conductor when grounding at both ends.

WARNING

Insufficient isolation of intrinsically safe and non-intrinsically safe circuits

Risk of explosion in hazardous areas

- When connecting intrinsically safe and non-intrinsically safe circuits, ensure that the galvanic isolation is performed properly in compliance with local regulations (e.g. IEC 60079-14).
- Observe the device approvals applicable for your country.

Notes for use in hazardous locations according to ATEX, IECEx, UKEX and CCC Ex

If you use the device under ATEX, IECEx, UKEX or CCC Ex conditions you must also keep to the following safety instructions in addition to the general safety instructions for protection against explosion:

⚠ WARNING

Transient overvoltages

Take measures to prevent transient surges of more than 40% of the rated voltage. Under no circumstances may transient surges exceed 119 V. This is the case if you only operate devices with SELV (safety extra low voltage).

⚠ WARNING

Suitable cables at high ambient temperatures in hazardous area

At an ambient temperature of ≥ 60 °C, use heat-resistant cables designed for an ambient temperature at least 20 °C higher. The cable entries used on the housing must comply with the IP degree of protection required by EN IEC / IEC 60079-0, GB/T 3836.1.

⚠ WARNING

EXPLOSION HAZARD

Do not connect or disconnect cables to or from the device when a flammable or combustible atmosphere is present.

⚠ WARNING

EXPLOSION HAZARD

The USB console interface is intended to serve as a service interface for repairs, commissioning and maintenance. Remove the USB plug before you operate the device in a hazardous atmosphere.

⚠ WARNING

EXPLOSION HAZARD

Electrical connectors including SFP/SFP+ transceivers must not be connected to the device or disconnected from the device in a hazardous atmosphere.

⚠ WARNING

EXPLOSION HAZARD

Do not press the SELECT/SET button when there is an explosive atmosphere.

Safety instructions for use in hazardous locations according to UL/FM HazLoc

If you use the device under UL or FM HazLoc conditions, you must also adhere to the following safety instructions in addition to the general safety instructions for protection against explosion:

⚠ WARNING

EXPLOSION HAZARD

You may only connect or disconnect cables carrying electricity when the power supply is switched off or when the device is in an area without inflammable gas concentrations.

Safety notices when using according to FM

If you use the device under FM conditions you must also keep to the following safety notices in addition to the general safety notices for protection against explosion:

⚠ WARNING

EXPLOSION HAZARD

Do not disconnect while circuit is live unless area is known to be non-hazardous.

⚠ WARNING

Explosion hazard

Do not disconnect equipment when a flammable or combustible atmosphere is present.

Safety instructions when using in accordance with UL 61010-1 / CSA-C22.2 No. 61010-1

If you use the device under UL 61010-1 / CSA-C22.2 No. 61010-1 conditions, you must also keep to the following safety instructions in addition to the general safety instructions for protection against explosion:

⚠ WARNING

Connecting cables for DC power supply

To connect the power supply in the scope of validity of UL 61010-1 / CSA-C22.2 No. 61010-1, only use copper cables.

⚠ WARNING

Circuit breaker for DC power supply

An external switch or miniature circuit breaker must be provided and marked as circuit breaker for the device. The circuit breaker must be located close to the device and easily accessible for actuation.

For operation with AC power supply, the IEC plug is provided for disconnecting the device.

Further notes

WARNING

Safety notice for connecting with a LAN ID (Local Area Network)

A LAN or LAN segment with all the interconnected devices should be contained completely in a single low voltage power distribution in a building. The LAN is designed either for "Environment A" according to IEEE802.3 or "Environment 0" according to IEC TR 62102.

Do not connect any electrical connectors directly to the telephone network (telephone network voltage) or a WAN (Wide Area Network).

6.2 Wiring rules

When wiring, use cables with the following AWG* categories or cross sections.

Wiring rules for ...		**Spring-loaded terminals**
connectable cable cross sections for flexible cables ...	without wire end ferrule	0.75 - 2.5 mm^2
		AWG: 20 - 14
	with wire end ferrule**	0.75 - 2.5 mm^2
		AWG: 20 - 14
	with TWIN wire end ferrule**	0.75 - 1 mm^2
		AWG: 20 - 18
Stripped length of the cable		8 - 10 mm
Wire end ferrule according to DIN 46228 with plastic ferrule**		8 - 10 mm

* AWG: American Wire Gauge

** See note "Wire end ferrules"

Note

Wire end ferrules

Use crimp shapes with smooth surfaces, such as provided by square and trapeze shaped crimp cross sections.

Crimp shapes with wave-shaped profile are unsuitable.

6.3 24 V AC/DC power supply

Safety extra low voltage

WARNING

Power supply

The equipment is designed for operation with a directly connectable safety extra low voltage (SELV) or with a power supply unit that meets the requirements ES1/SELV and PS2/LPS according to IEC/UL 62368-1.

NOTICE

Suitable fuse for the power supply cables (corresponds to "Limited Energy")

The current on the terminal may not exceed 3 A. Use a fuse for the power supply that is suitable for protection of AC/DC power supply circuits *) and protects against currents > 3 A.

- In areas subject to the NEC or CEC, the fuse must meet the following requirements:
  - Suitable for AC/DC *) (min. 60 V / 3 A)
  - Breaking current at least 10 kA
  - Approval according to ANSI/UL 248-14 (suppl. fuses), ANSI/UL 248-4 (Class CC), ANSI/UL 248-8 (J), ANSI/UL 248-15 (T), or CSA C22.2-4 No. 248.14 (suppl. fuses), No. 248-4 (Class CC), No. 248-8 (J), No. 248-15 (T)
- In other areas, the fuse must meet the following requirements:
  - Suitable for AC/DC *) (min. 60 V / 3 A)
  - Breaking current at least 10 kA
  - Approval according to IEC/EN 60947-1/2/3 or IEC/EN 60898-1/2 for circuit breakers
  - Switch off characteristics: B or C
  - Approval according to IEC/EN 60127-1 for fuses
  - Switch off characteristics: max. 120 s at 2 x I_n (corresponds to melting integral $I^2t < 4320$)

If the properties of the supplying current source are known, the following fuse is also possible:

- In areas subject to the NEC or CEC, the fuse must meet the following requirements:
  - Suitable for AC/DC *) (min. 60 V / 3 A)
  - Breaking current > highest possible current of the current source (incl. short circuit current and fault)
  - Approval according to UL 1077 or CSA C22.2 No. 235
- In other areas, the fuse must meet the following requirements:
  - Suitable for AC/DC *) (min. 60 V / 3 A)
  - Breaking current > highest possible current of the current source (incl. short circuit current and fault)
  - Approval according to IEC/EN 60934
  - Switch off characteristics: max. 120 s at 2 x I_n

You do not need to fuse the supply cable if you only use power sources with a limited power source (LPS) or power sources according to NEC Class 2 or PS2/LPS according to UL 62368-1 for the power supply of the devices.

*) AC or DC depending on availability

Notes on the power supply

⚠ WARNING

Incorrect power supply

The power supply unit for supplying the devices must comply with NEC Class 2 or PS2/LPS according to UL 62368-1:

- Voltage range 19.2 - 30.0 V for AC (50 / 60 Hz) and 19.2 - 31.2 V for DC
- Current requirements
  - Max. 3.2 A for AC (24 V AC/DC device version with 32 SFP/SFP+ slots)
  - Max. 3.0 A for AC (all other 24 V AC/DC device versions)
- Current requirements
  - Max. 3.2 A for DC (24 V AC/DC device version with 32 SFP/SFP+ slots)
  - Max. 3.0 A for DC (all other 24 V AC/DC device versions)

Do not operate the devices on AC voltages higher than 30.0 V AC.

Do not operate the devices on DC voltages higher than DC 31.2 V.

⚠ CAUTION

Overvoltage protection for the power supply cables

If the device is supplied over long 24 V power cables or extensive power grids, measures against coupling of strong electromagnetic pulses to the power cables are required. These can result, for example, due to lightning or switching of large inductive loads.

One of the tests used to attest the immunity of the device to electromagnetic interference is the "surge immunity test" according to EN 61000-4-5. This test requires overvoltage protection for the power supply lines. The following Blitzductors are suitable, for example:

24 V DC: Dehn Blitzductor BVT AVD 24, order number 918 422

24 V AC: Dehn Blitzductor BVT ALD 60, order number 918 409.

Manufacturer: 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 two 2-pin plug-in terminal blocks. The terminal blocks ship with the device.
- 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 device 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 the wiring rules (Page 67).

⚠ WARNING

Operation only with 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 VAC / 110 to 250 VDC devices).

- Do not operate the device with an AC voltage higher than 30 V AC or a DC voltage higher than 31.2 V DC.

Note

The device can be disconnected from the power supply by removing the terminal block.

Position and assignment

The connection is located on the front of the device.

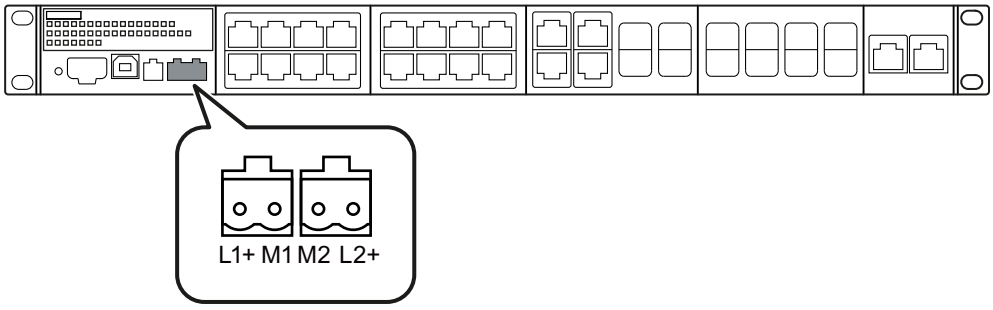


Figure 6-1 Position of the power supply using a 24 V AC/DC device version with 12 SFP/SFP+ slots

Contact	Assignment
L1+	24 V DC / 24 V AC
M1	Ground
M2	Ground
L2+	24 V DC / 24 V AC

6.4 Power supply 100 to 240 VAC / 110 to 250 VDC

Notes on the power supply

⚠ WARNING

Danger from line voltage

The supply voltage for the devices listed is 100 to 240 V AC / 110 to 250 V DC.

This device can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

Terminal blocks may only be connected and disconnected by a qualified electrician.

Connect or disconnect power supply cables only in the de-energized state.

⚠ WARNING

Devices with a 100 to 240 V AC/110 to 250 V DC power supply do not have an approval for hazardous areas.

Devices with a 100 to 240 V AC / 110 to 250 V DC power supply are not approved for use in hazardous areas according to ATEX, IECEx, FM and UL HazLoc.

⚠ WARNING

Restricted access area

- Operate the device including the power supply units in a restricted access area according to IEC 62368-1.

NOTICE

Securing cables with dangerous voltage

- Make sure that the connector cannot be released accidentally by pulling on the connecting cable.
- Lay the cables in cable ducts or cable channels and secure the cables, where necessary, with cable ties.

Information on the power supply

There are two possibilities for connecting the power supply:

- Via a C14 IEC plug (100 to 240 V AC)
- Via a DC terminal block (110 to 250 V DC)

The connections for the power supply are located on the rear of the device.

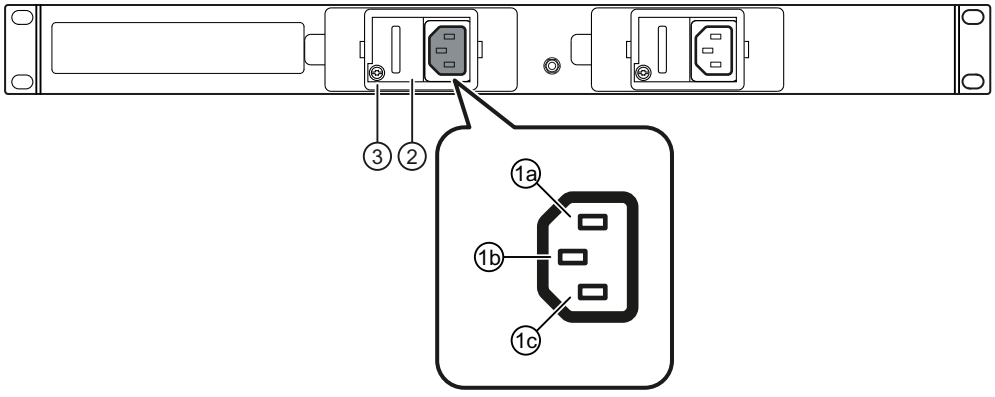
The two connection options are next to each other. The unused connection is protected against use by a sliding cover. When shipped, the IEC plug is available.

The power supply is either single or redundant, depending on the device version.

IEC plug

When shipped, the connection for the 3-pin IEC plug ① is available. The device is grounded via the power cable. To connect the power supply, use the power cable listed in the section "Accessories (Page 38)".

Position

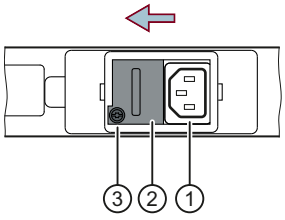


① IEC plug
- a Outer conductor
- b Protective conductor (PE)
- c Neutral conductor

② Sliding cover
③ Screw for protection of the DC connection

Figure 6-2 Position of the IEC plug using a redundant 100 to 240 V AC / 110 to 250 V DC device version as an example

Using an IEC plug



① IEC plug
② Sliding cover
③ Screw for protection of the DC connection

Figure 6-3 Sliding cover - IEC plug available

To use the IEC plug, follow these steps:

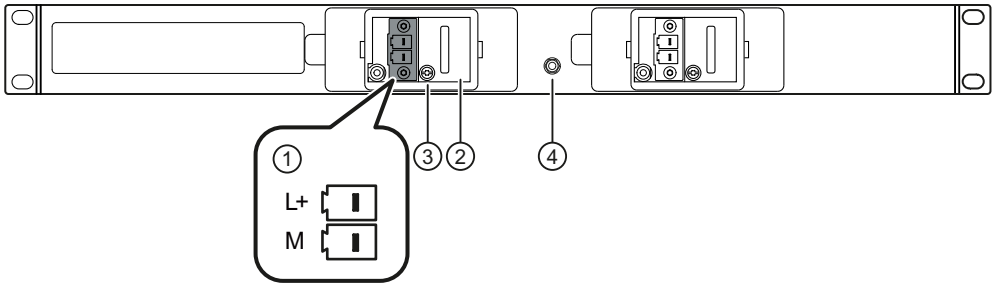
1. Slide the cover ② to the left.
2. To secure the cover in place, tighten the screw for protection of the DC connection ③. The tightening torque is 0.4 Nm.
3. Connect the device to the power supply using the IEC plug ①.

DC terminal block

When shipped, the connection for the 2-pin DC terminal block ① is covered. The DC terminal block ships with the device. Protective grounding is provided by the grounding bolt ④.

You can recognize the type of power supply from the labeling on the device and the labeling of the terminal block for the power supply of the switch.

Position



① DC terminal block
② Sliding cover
③ Screw for protection of the DC connection
④ Grounding bolt

Figure 6-4 Position of the DC terminal blocks using a redundant 100 to 240 V AC / 110 to 250 V DC device version as an example

Contact	Assignment
L+	110 to 250 V DC
M	Ground

Using the DC terminal block

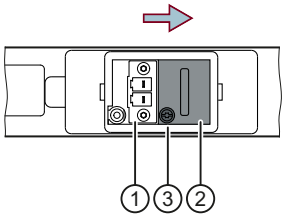


Figure 6-5 Sliding cover - DC terminal block available

To use the DC terminal block, follow these steps:

1. Slide the cover ② to the right.
   In this position, you cannot tighten the screw ③. The screw is captive and stays connected to the cover.
2. Connect the device to the power supply using the DC terminal block ①.
   DC voltage is connected at the following terminals:
   - Plus to "L"
   - M to "N"
3. Tighten the screws on the DC terminal block to clamp the connecting wires onto it. The tightening torque is 0.5 Nm to 0.6 Nm.

Note

If you do not use the DC connection, slide the cover over the DC connection (to the left) and tighten the screw for protection of the DC connection ③.

6.5 Grounding

⚠ WARNING

Danger from line voltage

Grounding simply via the housing is inadequate.

- To ensure safe operation, connect the protective grounding in any case.

For device versions with connection to the power supply via a terminal block, grounding is performed via the mounting brackets on the device or via the grounding bolt on the rear of the device.

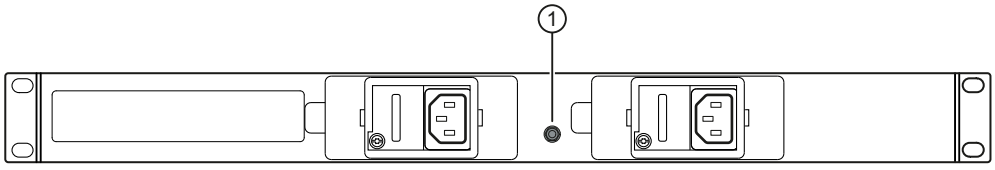
The grounding bolt is used as follows:

- For 24 V AC/DC devices
  - For functional grounding
  - For protective and functional grounding according to UL 62368-1 / CSA-C22.2 No. 62368-1 and UL 61010-1 / CSA-C22.2 No. 61010-1
- For protective and functional grounding for 100 to 240 VAC / 110 to 250 VDC devices

For 100 to 240 VAC / 110 to 250 VDC devices connected to the power supply via an IEC plug, grounding is performed via the power cable.

Note

Grounding via power cable is not approved for operation in compliance with UL 62368-1 / CSA-C22.2 No. 62368-1 and UL 61010-1 / CSA-C22.2 No. 61010-1.



① Grounding bolt

Figure 6-6 Position of the grounding bolt on the rear of the device using a redundant 100 to 240 V AC / 110 to 250 V DC device version as an example

6.5.1 Functional ground

EMC disturbances are diverted to ground via the functional ground. This ensures the immunity of the data transmission.

According to EN60204-1 (DIN/VDE 0113 T1) electrical circuits must be grounded. The chassis (0 V) is grounded at one defined point. Grounding is implemented with the lowest leakage resistance to ground in the vicinity of the power feed-in.

With automation components, functional ground also ensures interference-free operation of a controller. Via the functional ground, interference currents coupled in via the connecting cables are discharged to ground.

Requirements for functional grounding

The functional ground must be implemented with low impedance. The connection of the functional ground must be established directly on the mounting plate or the DIN rail terminal.

To connect the functional ground, use a copper cable of category 20 AWG or a cable with a cross-section ≥ 0.75 mm^2.

6.5.2 Protective grounding (24 V AC/DC device versions)

Note

Protective grounding during operation in compliance with UL 62368-1 / CSA-C22.2 No. 62368-1 and UL 61010-1 / CSA-C22.2 No. 61010-1

When you operate the device in compliance with UL 62368-1 / CSA-C22.2 No. 62368-1 and UL 61010-1 / CSA-C22.2 No. 61010-1, you must connect the protective grounding via the grounding bolt to meet the conditions for recognition of the UL approval. The work must be performed by a specialist according to UL 62368-1 / CSA-C22.2 No. 62368-1 and UL 61010-1 / CSA-C22.2 No. 61010-1.

You can find the procedure described in the section "Connecting the grounding via a grounding bolt (Page 78)".

Requirements for protective grounding

To wire a permanently connected protective grounding, use copper cables with a cross-section of ≥ 2.5 mm^2 if the cables are mechanically protected. If the cables are not mechanically protected, use cables with a cross-section of 4.0 mm^2.

6.5.3 Protective grounding (100 to 240 VAC / 110 to 250 VDC device versions)

The connection of the reference potential surface with the protective conductor system is normally in the control cabinet close to the power feed-in. This grounding safely conducts fault currents to ground and thus ensures the safety of the electrical system. According to DIN/VDE 0100, it protects persons, animals, and property from excessive contact voltages.

⚠ WARNING

No protective grounding for devices with 100 to 240 VAC / 110 to 250 VDC power supply

Risk of electric shock

When connecting to the power supply, observe the following:

- **IEC plug**: Ensure that the socket outlet used has a protective earth connection that matches the power plug used.
- **Connection terminals**: Connect the terminals according to the terminal assignment diagram. Connect the protective ground first.
  Terminal blocks may only be connected and disconnected by a qualified electrician.
  Connect or disconnect power supply cables only in the de-energized state.

⚠ WARNING

Connect the second protective conductor

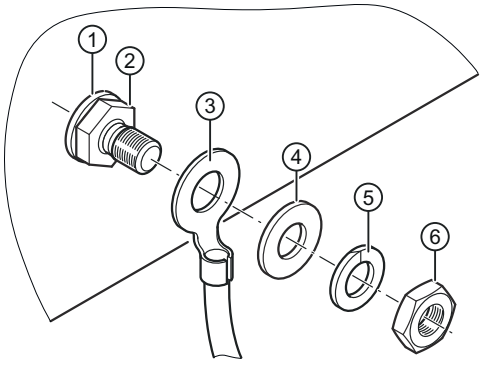
Due to the possible leakage currents, it is imperative that you connect a second protective conductor permanently to the device. The work must be performed by a specialist according to IEC 62368-1.

Requirements for protective grounding

To wire a permanently connected protective grounding, use copper cables with a cross-section of ≥ 2.5 mm^2 if the cables are mechanically protected. If the cables are not mechanically protected, use cables with a cross-section of 4.0 mm^2.

For the 100 to 240 VAC / 110 to 250 VDC devices, the grounding bolt is provided to connect the protective grounding as well as the functional grounding at the same time.

6.5.4 Connecting the grounding via a grounding bolt



① Toothed washer
② Grounding bolt
③ Grounding terminal with cable
④ Washer
⑤ Spring washer
⑥ Nut

To connect the functional or protective grounding on devices with a screw-in grounding bolt, follow these steps:

1. Place the toothed washer ① on the screw-in grounding bolt ② and tighten the grounding bolt into the grounding connection thread on the device with a maximum torque of 2 Nm.
2. Put the ground terminal ③, the washer ④ and the spring lock washer together ⑤ on the grounding bolt as shown in the drawing.
3. Tighten the nut ⑥ with a maximum tightening torque of 0.5 Nm.

6.6 Industrial Ethernet

6.6.1 Electrical

Note

Strain relief for the Ethernet cables

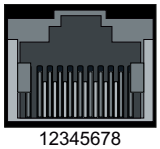
In order to avoid mechanical stress on the Ethernet cables and resulting interruption of the contact, fasten the cables at a short distance from the connector using a cable guide or busbar.

R-45 connector technology

The attachment to Industrial Ethernet uses RJ-45 connected technology with MDI-X assignment.

Pin assignment

The following table shows the pin assignment of the RJ45 connectors.

Pin number	Assignments for ports up to			RJ45 connector
	Max. 100 Mbps	Max. 1000 Mbps	Max. 10000 Mbps	
Pin 1	RD+	D1+	D1+	
Pin 2	RD-	D1-	D1-	
Pin 3	TD+	D2+	D2+	
Pin 4	n. c. (Not connected)	D3+	D3+	
Pin 5	n. c. (Not connected)	D3-	D3-	
Pin 6	TD-	D2-	D2-	
Pin 7	n. c. (Not connected)	D4+	D4+	
Pin 8	n. c. (Not connected)	D4-	D4-	

MDI / MDI-X autocrossover

With the MDI/MDI-X autocrossover function, the send and receive contacts of an Ethernet port are assigned automatically. The assignment depends on the cable with which the communications partner is connected. This means that it does not matter whether the port is connected using a patch cable or crossover cable. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

Note

Formation of loops

Please note that the direct connection of two ports on the IE switch or accidental connection over several IE switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Autonegotiation

Autonegotiation means the automatic detection/negotiation of the transmission rate and the operating mode of ports at the opposite end. This makes it possible to configure different devices automatically.

Two components connected to a link segment can exchange information about the transfer and can adapt their settings to each other. The mode with the highest possible speed is set.

Note

- If a port is set permanently to full duplex, the connected partner port must also be set to full duplex.
- If a port operating in the "Auto negotiation" mode is connected to a partner port that is not operating in the"Auto negotiation" mode, the partner port setting must be fixed at 100 Mbps or 10 Mbps half duplex mode.
- If you disable the "Auto negotiation" function, the "MDI/MDI-X autocrossover" function remains active.

Fast Retrain

The devices support the Fast Retrain function in accordance with standard IEEE 802.3. The Fast Retrain function ensures that no link interruptions occur in the case of electromagnetic interferences (EMI) on the connection cable to the partner.

If a Fast Retrain event occurs, the device tries to reestablish the communication to the partner device for a duration of up to 30 ms. Only if this is unsuccessful, is the link disconnected.

During the Fast Retrain procedure no telegrams are transferred via the affected connection.

Note

The function is always enabled and cannot be deactivated.

The function is relevant only for 10 Gbps ports.

There are no Fast Retrain events for port speeds ≤ 1 Gbps.

6.6.2 Optical

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. Take the following precautions to avoid functional impairments: • Clean the end face of field-assembled connectors carefully before connecting. No residues of processing may remain on the connector. • Only remove the dust caps of optical transceivers and pre-configured cables shortly before connecting the cables. • Close unused optical sockets and plugs as well as pluggable transceivers and slots with the supplied protective caps.

LC connector technology

The attachment to Industrial Ethernet uses LC connector technology (Lucent Connector).



Pluggable transceiver slot/
plugged in transceiver

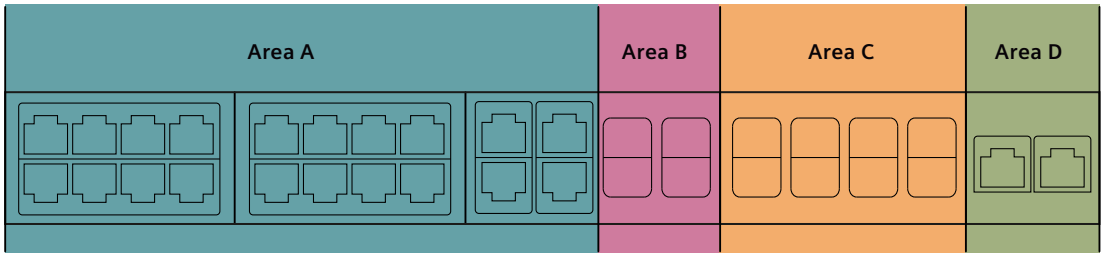
6.6.3 Dependency between ports and ambient temperature (derating)

The figures in this section show which ports you can use in which area so that the maximum ambient temperature specified in the left-hand column is permissible.

The table below shows the assignment of the SFP transceivers to the specified groups.

Category	Group	Type	Article number
SFP	Group 1	SFP991-1	6GK5 991-1AD00-8AA0
		SFP991-1 (C)	6GK5 991-1AD00-8FA0
		SFP991-1LD	6GK5 991-1AF00-8AA0
		SFP992-1	6GK5 992-1AL00-8AA0
		SFP992-1LD	6GK5 992-1AM00-8AA0
		SFP992-1LD (C)	6GK5 992-1AM00-8FA0
	Group 2	SFP991-1LH+	6GK5 991-1AE00-8AA0
		SFP991-1ELH200	6GK5 991-1AE30-8AA0
		SFP992-1+	6GK5 992-1AG00-8AA0
		SFP992-1LD+	6GK5 992-1AM30-8AA0
		SFP992-1LH	6GK5 992-1AN00-8AA0
		SFP992-1LH+	6GK5 992-1AP00-8AA0
		SFP992-1ELH	6GK5 992-1AQ00-8AA0
		SFP992-1BXMT	6GK5 992-1AL00-8TA0
		SFP992-1BXMR	6GK5 992-1AL00-8RA0
		SFP992-1BX10T	6GK5 992-1AM00-8TA0
		SFP992-1BX10R	6GK5 992-1AM00-8RA0
SFP+	Group 1	SFP993-1	6GK5 993-1AT00-8AA0
		SFP993-1 (C)	6GK5 993-1AT00-8FA0
		SFP993-1LD	6GK5 993-1AU00-8AA0
		SFP993-1LD (C)	6GK5 993-1AU00-8FA0
	Group 2	SFP993-1LH	6GK5 993-1AV00-8AA0
		SFP993-1LH+	6GK5 993-1AW00-8AA0

6.6.3.1 Devices with 12 SFP/SFP+ slots



Temperature	Area A	Area B	Area C	Area D
-40 °C to 70 °C	RJ45 to 1 Gbps	-	-	RJ45 to 10 Gbps
-40 °C to 60 °C	RJ45 to 1 Gbps	SFP group 1	SFP group 1 SFP+ group 1 Restriction [1]	RJ45 to 10 Gbps
-40 °C to 55 °C	RJ45 to 1 Gbps	SFP group 1	SFP group 1 SFP+ group 1 Restriction [2]	RJ45 to 10 Gbps
-40 °C to 50 °C	RJ45 to 1 Gbps	SFP group 1 SFP group 2 Restric-tion [3]	SFP group 1 SFP group 2 SFP+ group 1 SFP+ group 2 Restriction [4]	RJ45 to 10 Gbps

The following restrictions apply to the areas:

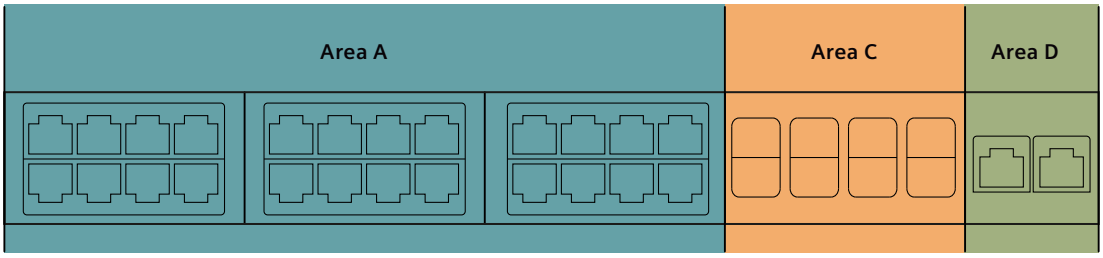
[1] SFP transceivers of the type SFP993-1LD can be used in a maximum of four of these ports. The remaining ports of the area can be filled with SFP transceivers from SFP group 1 or SFP+ group 1. SFP transceivers of the type SFP993-1 (C) and SFP993-1 LD (C) cannot be used.

[2] SFP transceivers of the type SFP993-1 (C) cannot be used.

[3] SFP transceivers of the SFP group 2 can be used in a maximum of two of these ports. The remaining ports of the area can be filled with SFP transceivers from SFP group 1.

[4] SFP transceivers of the SFP group 2 or SFP+ group 2 can be used in a maximum of two of these ports. The remaining ports of the area can be filled with SFP transceivers from SFP group 1 or SFP+ group 1.

6.6.3.2 Devices with 8 SFP/SFP+ slots



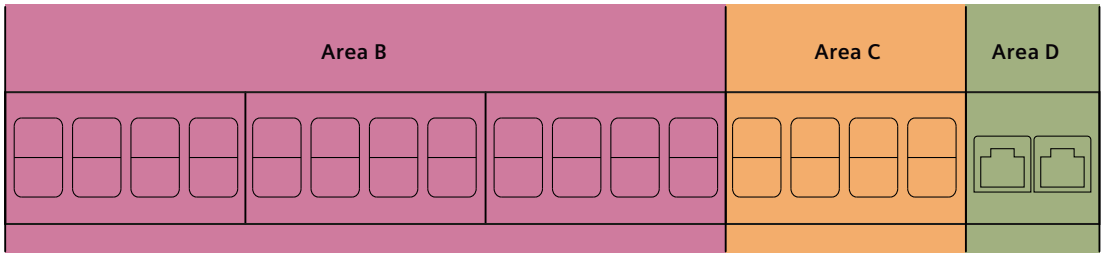
Temperature	Area A	Area C	Area D
-40 °C to 70 °C	RJ45 to 1 Gbps	-	RJ45 to 10 Gbps
-40 °C to 60 °C	RJ45 to 1 Gbps	SFP group 1 SFP+ group 1 Restriction [1]	RJ45 to 10 Gbps
-40 °C to 55 °C	RJ45 to 1 Gbps	SFP group 1 SFP+ group 1 Restriction [2]	RJ45 to 10 Gbps
-40 °C to 50 °C	RJ45 to 1 Gbps	SFP group 1 SFP group 2 SFP+ group 1 SFP+ group 2 Restriction [3]	RJ45 to 10 Gbps

1) SFP transceivers of the type SFP993-1LD can be used in a maximum of four of these ports. The remaining ports of the area can be filled with SFP transceivers from SFP group 1 or SFP+ group 1. SFP transceivers of the type SFP993-1 (C) and SFP993-1 LD (C) cannot be used.

2) SFP transceivers of the type SFP993-1 (C) cannot be used.

3) SFP transceivers of the SFP group 2 or SFP+ group 2 can be used in a maximum of two of these ports. The remaining ports of the area can be filled with SFP transceivers from SFP group 1 or SFP+ group 1.

6.6.3.3 Devices with 32 SFP/SFP+ slots



Temperature	Area B	Area C	Area D
-40 °C to 55 °C	SFP group 1	SFP group 1 SFP+ group 1 Restriction [1]	RJ45 to 10 Gbps
-40 °C to 50 °C	SFP group 1 SFP group 2 Restriction [2]	SFP group 1 SFP+ group 1	RJ45 to 10 Gbps
-40 °C to 40 °C	SFP group 1 SFP group 2 Restriction [2]	SFP group 1 SFP group 2 SFP+ group 1 SFP+ group 2 Restriction [3]	RJ45 to 10 Gbps

[1] SFP transceivers of the type SFP993-1 (C) and SFP993-1 LD (C) cannot be used.

[2] SFP transceivers of the SFP group 2 can be used in a maximum of two of these ports. The remaining ports of the area can be filled with SFP transceivers from SFP group 1.

[3] SFP transceivers of the SFP group 2 or SFP+ group 2 can be used in a maximum of two of these ports. The remaining ports of the area can be filled with SFP transceivers from SFP group 1 or SFP+ group 1.

6.6.4 Inserting and removing pluggable transceivers

6.6.4.1 General notes for SFP transceivers

WARNING

Use only approved plug-in transceivers

If you use plug-in transceivers that have not been approved by Siemens AG, there is no guarantee that the device will function according to its specifications.
If you use unapproved plug-in transceivers, this can lead to the following problems:

- Damage to the device
- Loss of the approvals
- Violation of the EMC regulations

Use only approved plug-in transceivers.

Note

Plugging and pulling during operation

You can plug and pull plug-in transceivers with the device in operation.

Note

LASER Class 1

All plug-in transceivers you use in the devices must comply with LASER Class I according to IEC/EN 60825-1. All plug-in transceivers from Siemens AG comply with LASER Class I according to IEC/EN 60825-1.

Documentation for plug-in transceivers

You will find detailed information in the operating instructions of the plug-in transceivers, see the chapter "Introduction (Page 7)" section "Additional documentation".

6.6.4.2 Inserting a plug-in transceiver (SFP/SFP+)

Follow the steps below to insert a pluggable transceiver:

1. Remove the sealing plug of the pluggable transceiver slot.
2. Close the clip of the pluggable transceiver.
3. Insert the pluggable transceiver in the pluggable transceiver slot until you hear it engage. The pluggable transceiver is then firmly secured.
4. Insert the connecting cable into the pluggable transceiver until you hear it engage. The connecting cable is then firmly secured.

6.6.4.3 Removing a pluggable transceiver (SFP/SFP+)

Notes on deinstallation



CAUTION

Risk of burns due to the high temperatures of the pluggable transceiver

The pluggable transceivers can be plugged and pulled during operation. Leave the transceiver to cool down.

Procedure

Follow the steps below to remove a pluggable transceiver:

1. Remove the connecting cable of the pluggable transceiver.
2. Open the clip of the pluggable trabsceiver.

3. Remove the pluggable transceiver from the pluggable transceiver slot.

Note

Do not use force

It must be possible to remove the pluggable transceiver easily and without applying any force.

4. Close the pluggable transceiver slot with a sealing plug.

6.7 Signaling contact

The signaling contact is an event-driven or manually controlled failsafe alarm relay. Individual alarms can be configured to trigger the relay when the associated event occurs. The relay can also be fixed in an open or closed state.

Manually controlling the relay may be useful to:

- Verify the failsafe relay is properly connected following the installation of the device
- Verify the open/close state is caused by the device itself or some other hardware
- Keep the relay in an open/close state while troubleshooting a network issue

Information on the signaling contact

- The signaling contact is a floating switch that signals error states by interrupting the contact. If an error occurs, the signaling contact opens. In normal operation, the signaling contact is closed.
- The signaling contact is connected using a 2-pin plug-in terminal block (spring-loaded terminal). The terminal block is included in the scope of delivery of the device and can be ordered as a spare part, see section "Spare parts (Page 38)".
- Note the wiring rules (Page 67).
- The signaling contact can be controlled manually via the user interfaces. Information on this can be found in the Configuration manuals.

⚠ WARNING

Risk of electric shock and property damage due to voltage being too high

The signaling contact can be operated in the voltage range of 19.2 to 31.2 V DC or 19.2 to 30.0 V AC and subjected to a maximum load of 100 mA.

With higher voltages or currents, there is a risk of electric shock and damage to the device.

Position and assignment

The connection is located on the front of the device.

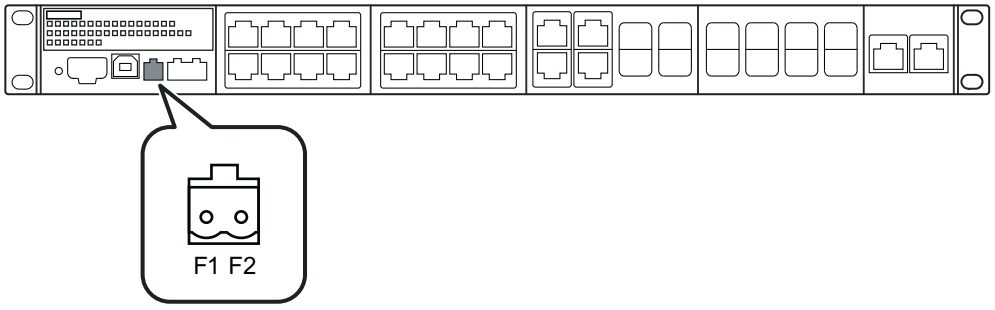


Figure 6-7 Position of the signaling contact using a 24 V AC/DC device version with 12 SFP/SFP+ slots as an example

Contact	Assignment
F1	Fault contact 1
F2	Fault contact 2

Signaling faults

- The signaling of errors by the signaling contact is synchronized with the fault LED "F", see section ""F" LED (Page 45)".
  All errors that the fault LED "F" indicates (freely configurable) are also signaled by the signaling contact.
- If an internal fault occurs, the fault LED "F" lights up and the signaling contact opens.
- If you connect a communications node to an unmonitored port or disconnect it, this does not cause an error message.
- The signaling contact remains open until one of the following events occurs:
  - The problem is eliminated.
  - The current status is entered in the fault mask as the new desired status.

6.8 USB console interface

Information on the USB console interface

- Via the USB console interface on the device (USB socket Type B), you can access the device directly via a virtual serial interface (115200 8N1) without assigning an IP address.
- Access to the device is possible independent of the Ethernet ports.
- To connect the USB console interface to a PC, you require a cable with a USB Type B plug and USB Type A plug. The connecting cable for the USB console interface can be ordered as accessory; see section "Accessories (Page 38)".

Driver for the USB console interface

To use the USB console interface under Windows, you must download and install the following driver: Drivers (https://support.industry.siemens.com/cs/ww/en/ps/6GK5998-3GS00-2AC2/dl).

Position

The interface is located on the front of the device.

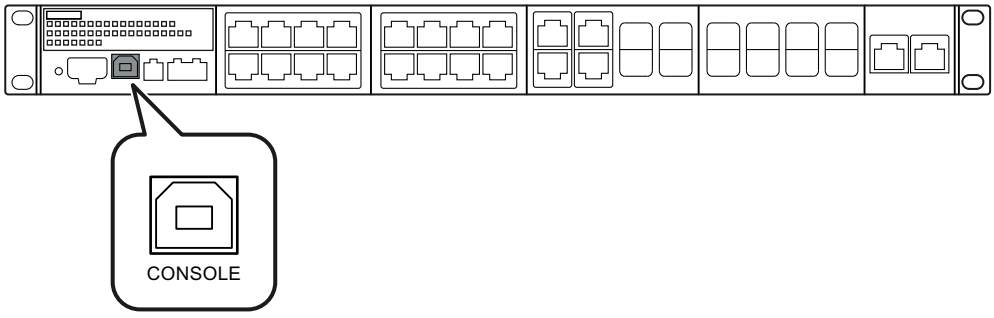
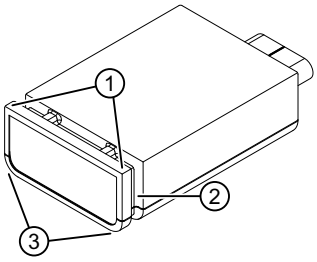


Figure 6-8 Position of the USB console interface using a 24 V AC/DC device version with 12 SFP/SFP+ slots as an example

6.9 Replacing a CLP

To use the CLP correctly, note the structure of the CLP:



① Square edges
② Front edge of the CLP
③ Round edges

Removing a CLP

To remove a CLP from the device, follow the steps below:

1. Turn off the power to the device.
2. To release the CLP, insert a screwdriver between the front edge of the CLP ② and the slot.
3. Remove the CLP from the slot.

Inserting the CLP

To insert a CLP into the device, follow the steps below:

1. Turn off the power to the device.
2. The CLP housing has two square ① and two round ③ edges. Accordingly, the slot opening has two square and two round edges. Note this orientation when inserting the CLP. Insert the CLP in the correct orientation into the slot.

Maintenance and cleaning

7

⚠ WARNING

Unauthorized repair of devices in explosion-proof design

Risk of explosion in hazardous areas

- Repair work may only be performed by personnel authorized by Siemens.
- For function checks, maintenance and servicing work, you need to observe the requirements on checking and maintaining plants in hazardous areas according to the standards EN / IEC 60079-17.

⚠ WARNING

Impermissible accessories and spare parts

Risk of explosion in hazardous areas

- Only use original accessories (Page 38) and original spare parts (Page 38).
- Observe all relevant installation and safety instructions described in the manuals for the device or supplied with the accessories or spare parts.



⚠ CAUTION

Hot surfaces

Risk of burns during maintenance work on parts with a surface temperature above 70 °C (158 °F).

- Take appropriate protective measures, for example, wear protective gloves.
- Once maintenance work is complete, restore the touch protection measures.

NOTICE

Cleaning the housing

If the device is not in a hazardous area, only clean the outer parts of the housing with a dry cloth.

If the device is in a hazardous area, use a slightly damp cloth for cleaning.

Do not use solvents.

Troubleshooting

8

8.1 Resetting the device to default settings with the button (in the startup phase)

NOTICE
Connection hazard - risk of communication failure
Depending on the configuration of your network, a reset device can cause circular frames and thus the loss of data traffic.

NOTICE
Configuration hazard - risk of data loss
If a CLP is inserted in the device, the CLP is also reset to default settings.

Note

When you reset the device to the default settings, all configurations are deleted, including:

- The IP address
- The created user
- The passwords
- The user-defined keys and certificates

Following this, the device can only be reached via the serial interface.

If you assign an IP address to the device via DHCP or DCP (e.g. SINEC PNI), you can access the CLI and WBM of the device via a network connection with a preset user profile.

Note

Reset despite disabled "SELECT/SET" button

Using the "SELECT/SET" button, you can always reset the device parameters to the factory settings during the startup phase of the device. This applies also if the "Reset to Factory Defaults" function was disabled in the configuration. This allows you to reset the device to the factory defaults in an emergency.

If the function has been disabled in the configuration, it is only disabled on completion of the startup phase.

Resetting the device to factory defaults

To reset the device to the factory defaults during the startup phase, follow the steps below:

1. Turn off the power to the device.
2. Now press the "SELECT/SET" button and reconnect the power to the device while holding down the button.
3. Hold down the button until the red error LED **F** stops flashing and is permanently lit.
4. Now release the button and wait until the fault LED **F** goes off again.
5. The device starts automatically with the factory defaults.

8.2 Resetting the device to default settings with the button (during operation)

NOTICE
Connection hazard - risk of communication failure Depending on the configuration of your network, a reset device can cause circular frames and thus the loss of data traffic.

NOTICE
Configuration hazard - risk of data loss If a CLP is inserted in the device, the CLP is also reset to default settings.

Note

When you reset the device to the default settings, all configurations are deleted, including:

- The IP address
- The created user
- The passwords
- The user-defined keys and certificates

Following this, the device can only be reached via the serial interface.

If you assign an IP address to the device via DHCP or DCP (e.g. SINEC PNI), you can access the CLI and WBM of the device via a network connection with a preset user profile.

Requirement

- The device is in operation.
- The "Reset to factory defaults**"** button function is enabled.
  You can enable or disable this button function. For more information, refer to "Additional documentation (Page 8)".

Resetting the device to factory defaults

To reset the device to default settings during operation, do the following:

1. Switch the device to display mode **A**.
   Display mode **A** is active if the LEDs **DM1** and **DM2** are unlit.
   If the **DM1** and **DM2** LEDs are lit or flashing, press the button briefly several times until the LEDs are off.
   If you do not press the button for longer than 1 minute, the device automatically changes to display mode **A**.
2. Hold down the button for 12 seconds.

   Note

   If you release the button before the 12 seconds have elapsed, the operation is canceled.

3. Release the button after 12 seconds.
   The device restarts with default settings.

8.3 Load a firmware file via TFTP.

Firmware

The firmware is signed and encrypted. This ensures that only firmware created by Siemens can be downloaded to the device.

Procedure with Microsoft Windows

You can download new firmware to the device using TFTP. To do this, the device does not need to be reachable either using Web Based Management (WBM) or using the Command Line Interface (CLI). This can be the case if there was a power failure during a firmware update.

When pressing the button, observe the information in the section "SELECT / SET button (Page 48)".

Follow the steps below to load new firmware using TFTP:

1. Turn off the power to the device.
2. Press the SELECT/SET button and reconnect the device to the power supply with the button pressed.
3. Hold down the button until the red fault LED "F" starts to flash.
4. Release the button as long as the red error LED is still flashing..
   This time only lasts a few seconds.
   The bootloader of the device waits in this status for a new firmware file that you can download by TFTP.
5. Connect a PC to an Ethernet port of the device with an Ethernet cable.

6. Assign an IP address to the device using DHCP or SINEC PNI.
7. In a Windows command prompt, go to the directory where the file with the new firmware is located and use the following command:
   `tftp -i <IP address> put <firmware file>`.

Note

You can enable TFTP in Microsoft Windows as follows:

"Control Panel" > "Programs and Features" > "Turn Windows features on or off" > "TFTP Client".

Once the firmware has been transferred completely to the device and validated, the device restarts. This may take a few minutes.

Technical specifications

9

9.1 SCALANCE XR502-32

9.1.1 24 V AC/DC device version

The following technical specifications apply to the 24 V AC/DC version of the SCALANCE XR502-32.

Technical specifications		
Connection to Industrial Ethernet		
Electrical connectors	Quantity	2
	Connector	RJ45 jack
	Transmission speed	1 / 2.5 / 5 / 10 Gbps
	Properties	Half/full duplex, MDI-X pinning
Slots for SFP transceivers (SFP)	Quantity	24
	Connector	SFP transceiver
	Transmission speed	100 / 1000 Mbps
Slots for SFP transceivers (SFP+)	Quantity	8
	Connector	SFP / SFP+ transceiver
	Transmission speed	1 / 10 Gbps
Diagnostics interface		
Serial interface	Quantity	1
	Connector	USB Type B
Signaling contact [1)]	Quantity	1
	Design	Spring-loaded terminal block, 2-pin
	Permitted voltage range	24 V DC
	Load rating	Max. 100 mA
Button	Quantity	1
Configuration interface		
Removable data storage medium	Quantity	1
	Product name	Siemens Configuration and License PLUG (CLP)
Connection to power supply		

Technical specifications		
Power supply [1]	Design	Spring-loaded terminal block, 2-pin
	Rated voltage	24 V AC / 24 V DC
	Voltage range	19.2 to 30.0 V AC 19.2 to 31.2 V DC
	Frequency	50 / 60 Hz (with AC)
	Frequency range	50 Hz to 60 Hz
	Fusing	10 A / 250 V
	Properties	Implemented redundantly. The connected power supply must meet the requirements of NEC Class 2 or PS2/LPS in compliance with UL 62368-1. If you connect the power supply redundantly, you are operating the device either only with alternating voltage or only with direct voltage. Do not connect alternating voltage to one connector and direct voltage to the other.
	Degree of pollution	2
Current consumption	At nominal voltage	3.2 A
Effective power loss	At nominal voltage	72 W
Cable cross-section	Minimum	0.75 mm^2 (AWG 18)
	Maximum	2.5 mm^2 (AWG 12)
Permitted ambient conditions		
Ambient temperature [2]	Property	Startup at -40 °C
	With LAN operation with RJ45 plug	During operation in horizontal installation position:
	Up to 2000 m above sea level	-40 °C to +55 °C
	When operating with SFP transceivers up to 2000 m above sea level, refer to "Devices with 32 SFP/SFP+ slots (Page 85)"	
	With operation between 2000 m and 3000 m above sea level	The maximum ambient temperature is reduced by 5 °C [3]
	With operation between 3000 m and 4000 m above sea level	The maximum ambient temperature is reduced by 10 °C [3]
	During storage	-40 °C to +85 °C
	During transportation	-40 °C to +85 °C
Relative humidity	During operation at 25 °C	≤ 95% without condensation
Housing, dimensions and weight		
Design	Rack	
Housing material	Metal	
Degree of protection	IP20 [4] [5]	
Dimensions (W x H x D)	446 x 43.5 x 374.8 mm (1 height unit)	
Weight	8000 g	

Technical specifications	
Installation options	• 19" rack mounting • Four-point mounting
Mounting restriction	None
Conformal coating of the PCBs	No
Design of the mounting bracket for four-point mounting	
Dimensions (W x H x D)	43.6 x 43.6 x 18.3 mm (1 height unit)
Plate thickness	1.5 mm
Bending radii	1.5 mm
Surface of the housing	Stainless steel X6CR17
Mean time between failure (MTBF)	
MTBF (EN/IEC 61709; 40 °C)	> 16.7 years

[1] Wiring rules

Note the wiring rules (Page 67).

[2] Ambient temperature with SFP

The maximum ambient temperature during operation depends on the operating elevation and the inserted SFP transceivers.

[3] Derating

The derating values depend on the maximum ambient temperatures during operation up to 2000 m.

[4] Degree of protection

The degree of protection was not examined in the context of UL certification.

[5] Degree of protection

The degree of protection was not examined in the context of FM certification.

9.1.2 100 to 240 V AC / 110 to 250 V DC device versions

The following technical specifications apply to the 100 to 240 V AC / 110 to 250 V DC device versions of the SCALANCE XR502-32.

Technical specifications		
Connection to Industrial Ethernet		
Electrical connectors	Quantity	2
	Connector	RJ45 jack
	Transmission speed	1 / 2.5 / 5 / 10 Gbps
	Properties	Half/full duplex, MDI-X pinning
Slots for SFP transceivers (SFP)	Quantity	24
	Connector	SFP transceiver
	Transmission speed	100 / 1000 Mbps

Technical specifications				
Slots for SFP transceivers (SFP+)	Quantity		8	
	Connector		SFP / SFP+ transceiver	
	Transmission speed		1 / 10 Gbps	
Diagnostics interface				
Serial interface	Quantity		1	
	Connector		USB Type B	
Signaling contact [1)]	Quantity		1	
	Design		Spring-loaded terminal block, 2-pin	
	Permitted voltage range		24 V DC	
	Load rating		Max. 100 mA	
Button	Quantity		1	
Configuration interface				
Removable data storage medium	Quantity		1	
	Product name		Siemens Configuration and License PLUG (CLP)	
Connection to power supply				
Power supply [1)]	Design		IEC plug C14 (AC)	DC terminal block, 2-pin (DC)
	Rated voltage		100 to 240 V AC	110 to 250 V DC
	Voltage range		85 to 264 V AC	77 to 300 V DC
	Frequency		50 / 60 Hz	
	Frequency range		50 Hz to 60 Hz	
	Fusing		4 A / 250 V	
	Properties	6GK5534-5TR00-3AR3	Not redundant	Not redundant
		6GK5534-5TR00-4AR3	Redundant	Redundant
	Overvoltage category		OVC II	
	Recommended fusing		Fuse max. 20 A slow-acting Class CC, Class RK5	
	Degree of pollution		2	
Current consumption	At nominal voltage		1.2 A	1.2 A
Effective power loss	At nominal voltage		99 W	
Permitted ambient conditions				
Ambient temperature [2)]	Property		Startup at -25 °C	
	With LAN operation with RJ45 plug Up to 2000 m above sea level		During operation in horizontal installation position: -25 °C to +55 °C	
	When operating with SFP transceivers up to 2000 m above sea level, refer to "Devices with 32 SFP/SFP+ slots (Page 85)"			
	With operation between 2000 m and 3000 m above sea level		The maximum ambient temperature is reduced by 5 °C [3)]	
	During storage		-40 °C to +85 °C	
	During transportation		-40 °C to +85 °C	
Relative humidity	During operation at 25 °C		≤ 95% without condensation	
Housing, dimensions and weight				

Technical specifications		
Design	Rack	
Housing material	Metal	
Degree of protection	IP20 [4)]	
Dimensions (W x H x D)	446 x 43.5 x 384.8 mm (1 height unit)	
Weight	Device version with one power supply unit	8200 g
	Device version with two power supply units	8400 g
Installation options	• 19" rack mounting • Four-point mounting	
Mounting restriction	Operation with a DC terminal block only within a control cabinet	
Conformal coating of the PCBs	No	
Design of the mounting bracket for four-point mounting		
Dimensions (W x H x D)	43.6 x 43.6 x 18.3 mm (1 height unit)	
Plate thickness	1.5 mm	
Bending radii	1.5 mm	
Surface of the housing	Stainless steel X6CR17	
Mean time between failure (MTBF)		
MTBF (EN/IEC 61709; 40 °C)	6GK5534-5TR00-3AR3	> 9.9 years
	6GK5534-5TR00-4AR3	> 12.7 years

[1)] Wiring rules

Note the wiring rules (Page 67).

[2)] Ambient temperature with SFP

The maximum ambient temperature during operation depends on the operating elevation and the inserted SFP transceivers.

[3)] Derating

The derating values depend on the maximum ambient temperatures during operation up to 2000 m.

[4)] Degree of protection

The degree of protection was not examined in the context of UL certification.

9.2 SCALANCE XR522-12

9.2.1 24 V AC/DC device version

The following technical specifications apply to the 24 V AC/DC version of the SCALANCE XR522-12.

Technical specifications			
Connection to Industrial Ethernet			
Electrical connectors	Quantity	20	2
	Connector	RJ45 jack	RJ45 jack
	Transmission speed	10 / 100 / 1000 Mbps	1 / 2.5 / 5 / 10 Gbps
	Properties	Half/full duplex, MDI-X pinning	
Slots for SFP transceivers (SFP)	Quantity	4	
	Connector	SFP transceiver	
	Transmission speed	100 / 1000 Mbps	
Slots for SFP transceivers (SFP+)	Quantity	8	
	Connector	SFP / SFP+ transceiver	
	Transmission speed	1 / 10 Gbps	
Diagnostics interface			
Serial interface	Quantity	1	
	Connector	USB Type B	
Signaling contact [1)]	Quantity	1	
	Design	Spring-loaded terminal block, 2-pin	
	Permitted voltage range	24 V DC	
	Load rating	Max. 100 mA	
Button	Quantity	1	
Configuration interface			
Removable data storage medium	Quantity	1	
	Product name	Siemens Configuration and License PLUG (CLP)	
Connection to power supply			

Technical specifications		
Power supply [1]	Design	Spring-loaded terminal block, 2-pin
	Rated voltage	24 V AC / 24 V DC
	Voltage range	19.2 to 30.0 V AC 19.2 to 31.2 V DC
	Frequency	50 / 60 Hz (with AC)
	Frequency range	50 Hz to 60 Hz
	Fusing	10 A / 250 V
	Properties	Implemented redundantly. The connected power supply must meet the requirements of NEC Class 2 or PS2/LPS in compliance with UL 62368-1. If you connect the power supply redundantly, you are operating the device either only with alternating voltage or only with direct voltage. Do not connect alternating voltage to one connector and direct voltage to the other.
	Degree of pollution	2
Current consumption	At nominal voltage	3 A
Effective power loss	At nominal voltage	72 W
Cable cross-section	Minimum	0.75 mm^2 (AWG 18)
	Maximum	2.5 mm^2 (AWG 12)
Permitted ambient conditions		
Ambient temperature [2]	Property	Startup at -40 °C
	With LAN operation with RJ45 plug	During operation in horizontal installation position:
	Up to 2000 m above sea level	-40 °C to +70 °C
	When operating with SFP transceivers	up to 2000 m above sea level, refer to "Devices with 12 SFP/SFP+ slots (Page 83)"
	With operation between 2000 m and 3000 m above sea level	The maximum ambient temperature is reduced by 5 °C [3]
	With operation between 3000 m and 4000 m above sea level	The maximum ambient temperature is reduced by 10 °C [3]
	During storage	-40 °C to +85 °C
	During transportation	-40 °C to +85 °C
Relative humidity	During operation at 25 °C	≤ 95% without condensation
Housing, dimensions and weight		
Design	Rack	
Housing material	Metal	
Degree of protection	IP20 [4] [5]	
Dimensions (W x H x D)	446 x 43.5 x 374.8 mm (1 height unit)	
Weight	8000 g	
Installation options	• 19" rack mounting • Four-point mounting	
Mounting restriction	None	
Conformal coating of the PCBs	No	

Technical specifications	
Design of the mounting bracket for four-point mounting	
Dimensions (W x H x D)	43.6 x 43.6 x 18.3 mm (1 height unit)
Plate thickness	1.5 mm
Bending radii	1.5 mm
Surface of the housing	Stainless steel X6CR17
Mean time between failure (MTBF)	
MTBF (EN/IEC 61709; 40 °C)	> 13.2 years

[1] Wiring rules

Note the wiring rules (Page 67).

[2] Ambient temperature with SFP

The maximum ambient temperature during operation depends on the operating elevation and the inserted SFP transceivers.

[3] Derating

The derating values depend on the maximum ambient temperatures during operation up to 2000 m.

[4] Degree of protection

The degree of protection was not examined in the context of UL certification.

[5] Degree of protection

The degree of protection was not examined in the context of FM certification.

9.2.2 100 to 240 V AC / 110 to 250 V DC device versions

The following technical specifications apply to the 100 to 240 V AC / 110 to 250 V DC device versions of the SCALANCE XR522-12.

Technical specifications			
Connection to Industrial Ethernet			
Electrical connectors	Quantity	20	2
	Connector	RJ45 jack	RJ45 jack
	Transmission speed	10 / 100 / 1000 Mbps	1 / 2.5 / 5 / 10 Gbps
	Properties	Half/full duplex, MDI-X pinning	
Slots for SFP transceivers (SFP)	Quantity	4	
	Connector	SFP transceiver	
	Transmission speed	100 / 1000 Mbps	
Slots for SFP transceivers (SFP+)	Quantity	8	
	Connector	SFP / SFP+ transceiver	
	Transmission speed	1 / 10 Gbps	
Diagnostics interface			

Technical specifications				
Serial interface	Quantity		1	
	Connector		USB Type B	
Signaling contact [1]	Quantity		1	
	Design		Spring-loaded terminal block, 2-pin	
	Permitted voltage range		24 V DC	
	Load rating		Max. 100 mA	
Button	Quantity		1	
Configuration interface				
Removable data storage medium	Quantity		1	
	Product name		Siemens Configuration and License PLUG (CLP)	
Connection to power supply				
Power supply [1]	Design		IEC plug C14 (AC)	DC terminal block, 2-pin (DC)
	Rated voltage		100 to 240 V AC	110 to 250 V DC
	Voltage range		85 to 264 V AC	77 to 300 V DC
	Frequency		50 / 60 Hz	
	Frequency range		50 Hz to 60 Hz	
	Fusing		4 A / 250 V	
	Properties	6GK5534-3TR00-3AR3	Not redundant	Not redundant
		6GK5534-3TR00-4AR3	Redundant	Redundant
	Overvoltage category		OVC II	
	Recommended fusing		Fuse max. 20 A slow-acting Class CC, Class RK5	
	Degree of pollution		2	
Current consumption	At nominal voltage		800 mA	800 mA
Effective power loss	At nominal voltage		99 W	
Permitted ambient conditions				
Ambient temperature [2]	Property		Startup at -25 °C	
	With LAN operation with RJ45 plug Up to 2000 m above sea level		During operation in horizontal installation position: -25 °C to +60 °C	
	When operating with SFP transceivers up to 2000 m above sea level, refer to "Devices with 12 SFP/SFP+ slots (Page 83)"			
	With operation between 2000 m and 3000 m above sea level		The maximum ambient temperature is reduced by 5 °C [3]	
	During storage		-40 °C to +85 °C	
	During transportation		-40 °C to +85 °C	
Relative humidity	During operation at 25 °C		≤ 95% without condensation	
Housing, dimensions and weight				
Design	Rack			
Housing material	Metal			
Degree of protection	IP20 [4]			
Dimensions (W x H x D)	446 x 43.5 x 384.8 mm (1 height unit)			

Technical specifications		
Weight	Device version with one power supply unit	8200 g
	Device version with two power supply units	8400 g
Installation options	• 19" rack mounting • Four-point mounting	
Mounting restriction	Operation with a DC terminal block only within a control cabinet	
Conformal coating of the PCBs	No	
Design of the mounting bracket for four-point mounting		
Dimensions (W x H x D)	43.6 x 43.6 x 18.3 mm (1 height unit)	
Plate thickness	1.5 mm	
Bending radii	1.5 mm	
Surface of the housing	Stainless steel X6CR17	
Mean time between failure (MTBF)		
MTBF (EN/IEC 61709; 40 °C)	6GK5534-3TR00-3AR3	> 8.6 years
	6GK5534-3TR00-4AR3	> 10.6 years

[1] Wiring rules

Note the wiring rules (Page 67).

[2] Ambient temperature with SFP

The maximum ambient temperature during operation depends on the operating elevation and the inserted SFP transceivers.

[3] Derating

The derating values depend on the maximum ambient temperatures during operation up to 2000 m.

[4] Degree of protection

The degree of protection was not examined in the context of UL certification.

9.3 SCALANCE XR524-8WG

9.3.1 24 V AC/DC device versions

The following technical specifications apply to the 24 V AC/DC versions of the SCALANCE XR524-8WG.

Technical specifications		
Connection to Industrial Ethernet		
Electrical connectors	Quantity	24
	Connector	RJ45 jack
	Transmission speed	10 / 100 / 1000 Mbps
	Properties	Half/full duplex, MDI-X pinning
Slots for SFP transceivers (SFP+)	Quantity	8
	Connector	SFP / SFP+ transceiver
	Transmission speed	1 / 10 Gbps
Diagnostics interface		
Serial interface	Quantity	1
	Connector	USB Type B
Button	Quantity	1
Configuration interface		
Removable data storage medium	Quantity	1
	Product name	Siemens Configuration and License PLUG (CLP)
Connection to power supply		
Power supply [1)]	Design	Spring-loaded terminal block, 2-pin
	Rated voltage	24 V AC / 24 V DC
	Voltage range	19.2 to 30.0 V AC 19.2 to 31.2 V DC
	Frequency	50 / 60 Hz (with AC)
	Frequency range	50 Hz to 60 Hz
	Fusing	10 A / 250 V
	Properties	Implemented redundantly. The connected power supply must meet the requirements of NEC Class 2 or PS2/LPS in compliance with UL 62368-1. If you connect the power supply redundantly, you are operating the device either only with alternating voltage or only with direct voltage. Do not connect alternating voltage to one connector and direct voltage to the other.
	Degree of pollution	2
Current consumption	At nominal voltage	3 A
Effective power loss	At nominal voltage	72 W

Technical specifications		
Cable cross-section	Minimum	0.75 mm^2 (AWG 18)
	Maximum	2.5 mm^2 (AWG 12)
Permitted ambient conditions		
Ambient temperature [2]	Property	Startup at 0 °C
	With LAN operation with RJ45 plug Up to 2000 m above sea level	During operation in horizontal installation position: 0 °C to +60 °C
	When operating with SFP transceivers up to 2000 m above sea level, refer to "Devices with 8 SFP/SFP+ slots (Page 84)"	
	With operation between 2000 m and 3000 m above sea level	The maximum ambient temperature is reduced by 5 °C [3]
	With operation between 3000 m and 4000 m above sea level	The maximum ambient temperature is reduced by 10 °C [3]
	During storage	-40 °C to +85 °C
	During transportation	-40 °C to +85 °C
Relative humidity	During operation at 25 °C	≤ 95% without condensation
Housing, dimensions and weight		
Design	Rack	
Housing material	Metal	
Degree of protection	IP20 [4] [5]	
Dimensions (W x H x D)	446 x 43.5 x 374.8 mm (1 height unit)	
Weight	8000 g	
Installation options	• 19" rack mounting • Four-point mounting	
Mounting restriction	None	
Conformal coating of the PCBs	No	
Design of the mounting bracket for four-point mounting		
Dimensions (W x H x D)	43.6 x 43.6 x 18.3 mm (1 height unit)	
Plate thickness	1.5 mm	
Bending radii	1.5 mm	
Surface of the housing	Stainless steel X6CR17	
Mean time between failure (MTBF)		
MTBF (EN/IEC 61709; 40 °C)	> 12.6 years	

[1] Wiring rules

Note the wiring rules (Page 67).

[2] Ambient temperature with SFP

The maximum ambient temperature during operation depends on the operating elevation and the inserted SFP transceivers.

[3] Derating

The derating values depend on the maximum ambient temperatures during operation up to 2000 m.

[4] Degree of protection

The degree of protection was not examined in the context of UL certification.

[5] Degree of protection

The degree of protection was not examined in the context of FM certification.

9.3.2 100 to 240 V AC / 110 to 250 V DC device versions

The following technical specifications apply to the 100 to 240 V AC / 110 to 250 V DC device versions of the SCALANCE XR524-8WG.

Technical specifications			
Connection to Industrial Ethernet			
Electrical connectors	Quantity	24	
	Connector	RJ45 jack	
	Transmission speed	10 / 100 / 1000 Mbps	
	Properties	Half/full duplex, MDI-X pinning	
Slots for SFP transceivers (SFP+)	Quantity	8	
	Connector	SFP / SFP+ transceiver	
	Transmission speed	1 / 10 Gbps	
Diagnostics interface			
Serial interface	Quantity	1	
	Connector	USB Type B	
Button	Quantity	1	
Configuration interface			
Removable data storage medium	Quantity	1	
	Product name	Siemens Configuration and License PLUG (CLP)	
Connection to power supply			
Power supply [1]	Design	IEC plug C14 (AC)	DC terminal block, 2-pin (DC)
	Rated voltage	100 to 240 V AC	110 to 250 V DC
	Voltage range	85 to 264 V AC	77 to 300 V DC
	Frequency	50 / 60 Hz	
	Frequency range	50 Hz to 60 Hz	
	Fusing	4 A / 250 V	
	Properties	Not redundant	Not redundant
	Overvoltage category	OVC II	
	Recommended fusing	Fuse max. 20 A slow-acting Class CC, Class RK5	
	Degree of pollution	2	
Current consumption	At nominal voltage	800 mA	800 mA
Effective power loss	At nominal voltage	99 W	
Permitted ambient conditions			

Technical specifications		
Ambient temperature [2]	Property	Startup at 0 °C
	With LAN operation with RJ45 plug Up to 2000 m above sea level	During operation in horizontal installation position: 0 °C to +60 °C
	When operating with SFP transceivers up to 2000 m above sea level, refer to "Devices with 8 SFP/SFP+ slots (Page 84)"	
	With operation between 2000 m and 3000 m above sea level	The maximum ambient temperature is reduced by 5 °C [3]
	During storage	-40 °C to +85 °C
	During transportation	-40 °C to +85 °C
Relative humidity	During operation at 25 °C	≤ 95% without condensation
Housing, dimensions and weight		
Design	Rack	
Housing material	Metal	
Degree of protection	IP20 [4]	
Dimensions (W x H x D)	446 x 43.5 x 384.8 mm (1 height unit)	
Weight	8200 g	
Installation options	• 19" rack mounting • Four-point mounting	
Mounting restriction	Operation with a DC terminal block only within a control cabinet	
Conformal coating of the PCBs	No	
Design of the mounting bracket for four-point mounting		
Dimensions (W x H x D)	43.6 x 43.6 x 18.3 mm (1 height unit)	
Plate thickness	1.5 mm	
Bending radii	1.5 mm	
Surface of the housing	Stainless steel X6CR17	
Mean time between failure (MTBF)		
MTBF (EN/IEC 61709; 40 °C)	> 8.3 years	

[1] Wiring rules

Note the wiring rules (Page 67).

[2] Ambient temperature with SFP

The maximum ambient temperature during operation depends on the operating elevation and the inserted SFP transceivers.

[3] Derating

The derating values depend on the maximum ambient temperatures during operation up to 2000 m.

[4] Degree of protection

The degree of protection was not examined in the context of UL certification.

9.4 SCALANCE XR526-8

9.4.1 24 V AC/DC device version

The following technical specifications apply to the 24 V AC/DC version of the SCALANCE XR526-8.

Technical specifications			
Connection to Industrial Ethernet			
Electrical connectors	Quantity	24	2
	Connector	RJ45 jack	RJ45 jack
	Transmission speed	10 / 100 / 1000 Mbps	1 / 2.5 / 5 / 10 Gbps
	Properties	Half/full duplex, MDI-X pinning	
Slots for SFP transceivers (SFP+)	Quantity	8	
	Connector	SFP / SFP+ transceiver	
	Transmission speed	1 / 10 Gbps	
Diagnostics interface			
Serial interface	Quantity	1	
	Connector	USB Type B	
Signaling contact [1)]	Quantity	1	
	Design	Spring-loaded terminal block, 2-pin	
	Permitted voltage range	24 V DC	
	Load rating	Max. 100 mA	
Button	Quantity	1	
Configuration interface			
Removable data storage medium	Quantity	1	
	Product name	Siemens Configuration and License PLUG (CLP)	
Connection to power supply			
Power supply [1)]	Design	Spring-loaded terminal block, 2-pin	
	Rated voltage	24 V AC / 24 V DC	
	Voltage range	19.2 to 30.0 V AC 19.2 to 31.2 V DC	
	Frequency	50 / 60 Hz (with AC)	
	Frequency range	50 Hz to 60 Hz	
	Fusing	10 A / 250 V	
	Properties	Implemented redundantly. The connected power supply must meet the requirements of NEC Class 2 or PS2/LPS in compliance with UL 62368-1. If you connect the power supply redundantly, you are operating the device either only with alternating voltage or only with direct voltage. Do not connect alternating voltage to one connector and direct voltage to the other.	
	Degree of pollution	2	

Technical specifications		
Current consumption	At nominal voltage	3 A
Effective power loss	At nominal voltage	72 W
Cable cross-section	Minimum	0.75 mm^2 (AWG 18)
	Maximum	2.5 mm^2 (AWG 12)
Permitted ambient conditions		
Ambient temperature [2]	Property	Startup at -40 °C
	With LAN operation with RJ45 plug Up to 2000 m above sea level	During operation in horizontal installation position: -40 °C to +70 °C
	When operating with SFP transceivers up to 2000 m above sea level, refer to "Devices with 8 SFP/SFP+ slots (Page 84)"	
	With operation between 2000 m and 3000 m above sea level	The maximum ambient temperature is reduced by 5 °C [3]
	With operation between 3000 m and 4000 m above sea level	The maximum ambient temperature is reduced by 10 °C [3]
	During storage	-40 °C to +85 °C
	During transportation	-40 °C to +85 °C
Relative humidity	During operation at 25 °C	≤ 95% without condensation
Housing, dimensions and weight		
Design	Rack	
Housing material	Metal	
Degree of protection	IP20 [4] [5]	
Dimensions (W x H x D)	446 x 43.5 x 374.8 mm (1 height unit)	
Weight	8000 g	
Installation options	• 19" rack mounting • Four-point mounting	
Mounting restriction	None	
Conformal coating of the PCBs	No	
Design of the mounting bracket for four-point mounting		
Dimensions (W x H x D)	43.6 x 43.6 x 18.3 mm (1 height unit)	
Plate thickness	1.5 mm	
Bending radii	1.5 mm	
Surface of the housing	Stainless steel X6CR17	
Mean time between failure (MTBF)		
MTBF (EN/IEC 61709; 40 °C)	> 12.6 years	

[1] **Wiring rules**

Note the wiring rules (Page 67).

[2] **Ambient temperature with SFP**

The maximum ambient temperature during operation depends on the operating elevation and the inserted SFP transceivers.

[3] Derating

The derating values depend on the maximum ambient temperatures during operation up to 2000 m.

[4] Degree of protection

The degree of protection was not examined in the context of UL certification.

[5] Degree of protection

The degree of protection was not examined in the context of FM certification.

9.4.2 100 to 240 V AC / 110 to 250 V DC device versions

The following technical specifications apply to the 100 to 240 V AC / 110 to 250 V DC device versions of the SCALANCE XR526-8.

Technical specifications			
Connection to Industrial Ethernet			
Electrical connectors	Quantity	24	2
	Connector	RJ45 jack	RJ45 jack
	Transmission speed	10 / 100 / 1000 Mbps	1 / 2.5 / 5 / 10 Gbps
	Properties	Half/full duplex, MDI-X pinning	
Slots for SFP transceivers (SFP+)	Quantity	8	
	Connector	SFP / SFP+ transceiver	
	Transmission speed	1 / 10 Gbps	
Diagnostics interface			
Serial interface	Quantity	1	
	Connector	USB Type B	
Signaling contact [1]	Quantity	1	
	Design	Spring-loaded terminal block, 2-pin	
	Permitted voltage range	24 V DC	
	Load rating	Max. 100 mA	
Button	Quantity	1	
Configuration interface			
Removable data storage medium	Quantity	1	
	Product name	Siemens Configuration and License PLUG (CLP)	
Connection to power supply			

Technical specifications				
Power supply [1]	Design		IEC plug C14 (AC)	DC terminal block, 2-pin (DC)
	Rated voltage		100 to 240 V AC	110 to 250 V DC
	Voltage range		85 to 264 V AC	77 to 300 V DC
	Frequency		50 / 60 Hz	
	Frequency range		50 Hz to 60 Hz	
	Fusing		4 A / 250 V	
	Properties	6GK5534-2TR00-3AR3	Not redundant	Not redundant
		6GK5534-2TR00-4AR3	Redundant	Redundant
	Overvoltage category		OVC II	
	Recommended fusing		Fuse max. 20 A slow-acting Class CC, Class RK5	
	Degree of pollution		2	
Current consumption	At nominal voltage		800 mA	800 mA
Effective power loss	At nominal voltage		99 W	
Permitted ambient conditions				
Ambient temperature [2]	Property		Startup at -25 °C	
	With LAN operation with RJ45 plug Up to 2000 m above sea level		During operation in horizontal installation position: -25 °C to +60 °C	
	When operating with SFP transceivers up to 2000 m above sea level, refer to "Devices with 8 SFP/SFP+ slots (Page 84)"			
	With operation between 2000 m and 3000 m above sea level		The maximum ambient temperature is reduced by 5 °C [3]	
	During storage		-40 °C to +85 °C	
	During transportation		-40 °C to +85 °C	
Relative humidity	During operation at 25 °C		≤ 95% without condensation	
Housing, dimensions and weight				
Design	Rack			
Housing material	Metal			
Degree of protection	IP20 [4]			
Dimensions (W x H x D)	446 x 43.5 x 384.8 mm (1 height unit)			
Weight	Device version with one power supply unit		8200 g	
	Device version with two power supply units		8400 g	
Installation options	• 19" rack mounting • Four-point mounting			
Mounting restriction	Operation with a DC terminal block only within a control cabinet			
Conformal coating of the PCBs	No			
Design of the mounting bracket for four-point mounting				
Dimensions (W x H x D)	43.6 x 43.6 x 18.3 mm (1 height unit)			
Plate thickness	1.5 mm			

Technical specifications		
Bending radii	1.5 mm	
Surface of the housing	Stainless steel X6CR17	
Mean time between failure (MTBF)		
MTBF (EN/IEC 61709; 40 °C)	6GK5534-2TR00-3AR3	> 8.3 years
	6GK5534-2TR00-4AR3	> 10.2 years

[1] Wiring rules

Note the wiring rules (Page 67).

[2] Ambient temperature with SFP

The maximum ambient temperature during operation depends on the operating elevation and the inserted SFP transceivers.

[3] Derating

The derating values depend on the maximum ambient temperatures during operation up to 2000 m.

[4] Degree of protection

The degree of protection was not examined in the context of UL certification.

9.5 Mechanical stability (in operation)

The devices listed in the scope of validity meet the following requirements for mechanical stability during operation:

IEC 60068-2-27 shock	**IEC 60068-2-6 vibration**
• 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

9.6 Resistance to harmful gases according to ISA-71.04

The devices listed in the scope of validity meet the following requirements regarding resistance to harmful gases:

Corrosive gases as airborne contaminants Reactive species H_2S and SO_2	ISA-71.04 severity level	G1, G2, G3 RH ≤ 75%, no condensation
	Test according to	IEC 60068-2-42 (SO_2 10ppm)
		IEC 60068-2-43 (H_2S 1ppm)

9.7 Switching properties

The switching characteristics listed below apply to the devices named in the scope of validity.

Switching properties				
Aging time	Can be configured (default value: 300 seconds)			
Maximum frame size	2048			
Max. number of learnable addresses	16382			
Response to LLDP frames	Blocking			
Response to spanning tree BPDU frames	Forwarding			
CoS acc. to IEEE 802.1Q	Yes			
QoS priority queues	8			
Switching technique	Store and forward			
Latency	10 microseconds			
Full wire speed switching	**Frame length (bytes)**	**Number of frames per second**		
		At 100 Mbps	At 1000 Mbps	With 10 Gbps
	64	148810	1488095	14880952
	128	84459	844595	8445946
	256	45290	452899	4528986
	512	23496	234962	2349664
	1024	11973	119732	1197318
	1280	9615	96154	961538
	1518	8127	81274	812744

Note

The number of devices connected in a line, which are named in the scope of validity, influences the frame delay. When a frame passes through an IE switch, it is delayed by the store-and-forward function of the device:

- With a 64-byte frame length by about 10 microseconds (at 100 Mbps)
- With a 1500-byte frame length by about 130 microseconds (at 100 Mbps)

This means that the more devices the frame passes through, the higher the frame run time.

Dimension drawings

10

10.1 SCALANCE XR-500 dimension drawings

Note

Dimensions are specified in mm.

Front view

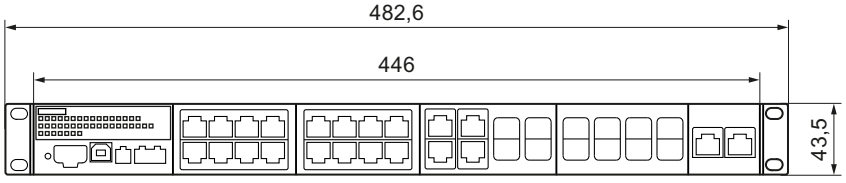


Figure 10-1 Width and height based using the example of a 24 V AC/DC device version

Top view of the 24 V AC/DC device versions

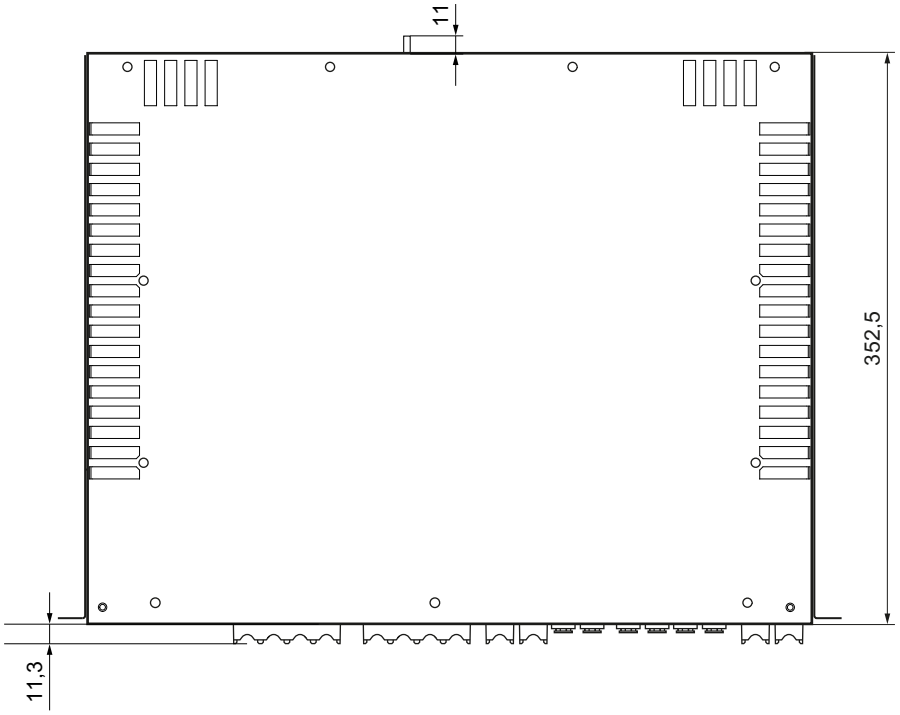


Figure 10-2 Depth

Top view of the 100 to 240 VAC / 110 to 250 VDC device versions

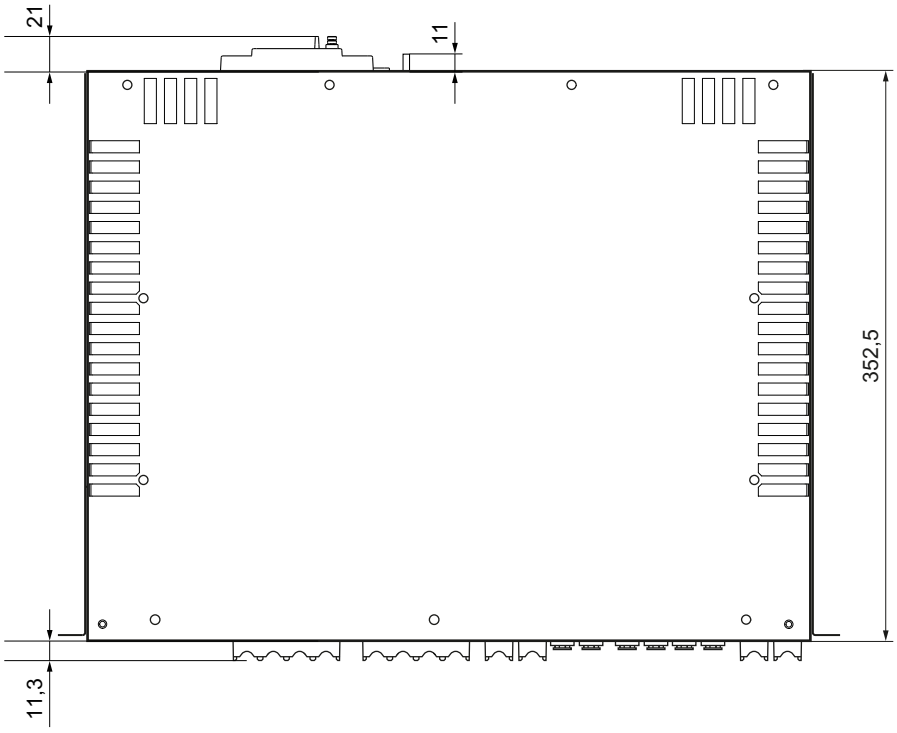


Figure 10-3 Depth

10.2 Mounting brackets for use on ships

You need special mounting brackets to install the device horizontally on a ship.

Below you will find the design drawing for making the mounting brackets.

You will find the more information on the construction of the mounting brackets in the section "Technical specifications (Page 97)".

Note

ISO tolerance and punching burr

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

Mounting bracket for four-point mounting

Dimensions are specified in mm.

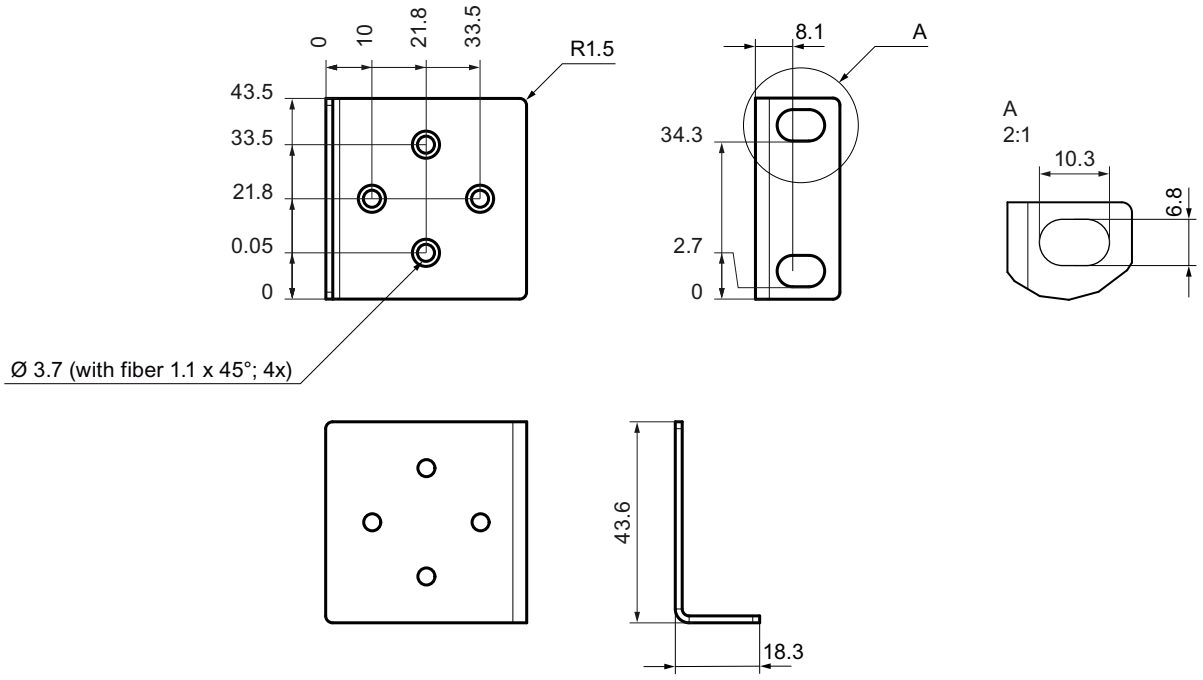


Figure 10-4 View from the front, top, and side

Approvals

11

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.

Current approvals on the Internet

You will find the current approvals for the product on the Internet pages of Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/15273/cert).

Notes for the manufacturers of machines

This product is not a machine in the sense of the EC Machinery Directive or the Supply of Machinery (Safety) Regulations (UK).

There is therefore no declaration of conformity relating to the EC Machinery Directive 2006/42/EEC or the Supply of Machinery (Safety) Regulations 2008 (UK) for this product.

If the product is part of the equipment of a machine, it must be included in the procedure for obtaining the EU/UK conformity assessment by the manufacturer of the machine.

Machinery directive

The product is a component in compliance with the EC Machinery Directive 2006/42/EEC and the Supply of Machinery (Safety) Regulations 2008 (UK).

According to the Machinery Directive respectively the Supply of Machinery (Safety) Regulations (UK), 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 Machinery Directive 2006/42/EEC and the Supply of Machinery (Safety) Regulations 2008 (UK).

EC declaration of conformity

CE

The SIMATIC NET products described in these operating instructions meet the requirements and safety objectives of the following EU directives and comply with the harmonized

European standards (EN) which are published in the official documentation of the European Union and here.

- **2014/34/EU (ATEX explosion protection directive)**
  Directive of the European Parliament and the Council of 26 February 2014 on the approximation of the laws of the member states concerning equipment and protective systems intended for use in potentially explosive atmospheres, official journal of the EU L96, 29/03/2014, p. 309-356

  Note

  Only device versions with 24 V AC/DC power supply meet the requirements of this approval.

- **2014/35/EU (Low Voltage Directive)**
  Directive of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits; official journal of the EU L96, 29/03/2014, p. 357-374.

  Note

  Only device versions with a 100 to 240 V AC / 110 to 250 V DC power supply meet the requirements of this approval.

- **2014/30/EU (EMC)**
  EMC directive of the European Parliament and of the Council of February 26, 2014 on the approximation of the laws of the member states relating to electromagnetic compatibility; official journal of the EU L96, 29/03/2014, p. 79-106
- **2011/65/EU (RoHS)**
  Directive of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, official journal of the EC L174, 01/07/2011, p. 88-110

You will find the 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).

The EC Declaration of Conformity is available for all responsible authorities at:

Siemens Aktiengesellschaft
Digital Industries
Process Automation
DE-76181 Karlsruhe
Germany

UK Declaration of Conformity

The UK declaration of conformity is available to all responsible authorities at:

Siemens Aktiengesellschaft
Digital Industries
Process Automation
DE-76181 Karlsruhe
Germany

Importer UK:

Siemens plc,
Manchester M20 2UR

You can find the current UK Declaration of Conformity for these products on the Internet pages under Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/15273/cert).

The SIMATIC NET products described in this document meet the requirements of the following directives:

- UKEX Regulation
  SI 2016/1107 Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016, and related amendments
- EMC Regulation
  SI 2016/1091 Electromagnetic Compatibility Regulations 2016, and related amendments
- RoHS Regulation
  SI 2012/3032 Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012, and related amendments

ATEX, IECEx, UKEX and CCC Ex certification

⚠ WARNING

Risk of explosion in hazardous areas

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 subassemblies/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 under Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/view/78381013).

Enter the document identification number "C234" as the search term.

The markings of the electrical devices are:

II 3 G Ex ec IIC T4 Gc
DEKRA 18ATEX0025 X
IECEx DEK 18.0017X

II 3 G Ex ec IIC T4 Gc
DEKRA 21UKEX0001 X

Importer UK:
Siemens plc,
Manchester, M20 2UR, UK

(Ex ec IIC T4 Gc, not on the nameplate)

The products meet the requirements of the following standards:

- EN/IEC 60079-7, GB/T 3836.3
- EN IEC/IEC 60079-0, GB/T 3836.1

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

Note

Only variants with 24 V AC / 24 V DC power supply meet the requirements of this approval.

Note for devices with CLASS 1 LASER

Important note on products certified according to Type Examination Certificate KEMA 07ATEX0145 X as of Issue 95 / DEKRA 18ATEX0025 X and IECEx Certificate of Conformity DEK 14.0025X as of Issue 43 / DEK 18.0017X and containing Class 1 optical radiation sources.

Note

CLASS 1 LASER

The device contains optical radiation sources which comply with the limits of Class 1 according to IEC 60825-1. Fiber-optic cables connected to these optical radiation sources may therefore be routed either to or through hazardous areas requiring Category 2G, 3G, 2D or 3D equipment.

Safety of electrical equipment (Low Voltage Directive)

The SIMATIC NET products described in these operating instructions meet the requirements of EU directive 2014/35/EU "Low Voltage Directive".

Applied standard:

- EN 62368-1 Equipment for audio/video, information and communication technology – Part 1: Safety requirements

Note

Only versions with 100 to 240 V AC / 110 to 250 V DC power supply meet the requirements of this approval.

EMC (electromagnetic compatibility)

The SIMATIC NET products described in these operating instructions meet the electromagnetic compatibility requirements according to the EU Directive 2014/30/EU as well as the UK-Regulation SI 2016/1091 and their associated amendments.

Applied standards:

- EN 61000-6-2 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
- EN 61000-6-4 Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

You will find the current versions of the standards in the currently valid EC/UK Declaration of Conformity.

RoHS

The SIMATIC NET products described in these operating instructions meet the requirements on the restriction of the use of certain hazardous substances in electrical and electronic equipment according to the EU Directive 2011/65/EU as well as the UK-Regulation SI 2012/3032 and their associated amendments.

Applied standard:

- EN IEC 63000

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

Note

Only variants with 24 V AC / 24 V DC power supply meet the requirements of this approval.

cULus approval for industrial control equipment

cULus Listed IND. CONT. EQ.

Underwriters Laboratories Inc. complying with

- UL 61010-1
- UL 61010-2-201
- CAN/CSA-IEC 61010-2-201

Report no. E85972

cULus Approval for Information Technology Equipment

cULus Listed I. T. E.

Underwriters Laboratories Inc. complying with

- UL 62368-1 (information/communication technology)
- CSA C22.2 No. 62368-1 (information/communication technology)

Report no. E115352

Note

Only variants with 24 V AC / 24 V DC power supply meet the requirements of this approval.

cULus Approval for Information Technology Equipment



cULus Recognized Approval only I. T. E.

Underwriters Laboratories Inc. complying with

- UL 62368-1 (information/communication technology)
- CSA C22.2 No. 62368-1 (information/communication technology)

Report no. E115352

Note

Only versions with 100 to 240 V AC / 110 to 250 V DC power supply meet the requirements of this approval.

cULus Approval Hazardous Location



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

Underwriters Laboratories Inc. complying with

- UL121201
- ANSI/ISA 12.12.01
- CSA C22.2 No. 213

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

Report no. E240480

Note

Only variants with 24 V AC / 24 V DC power supply meet the requirements of this approval.

Railway approval

Note

Use only in areas not accessible to the public

The following devices meet the requirements of EN 50121-4 "Railway applications – Electromagnetic compatibility – Part 4: Emissions and immunity of the signalling and telecommunications apparatus":

Device	Article number
SCALANCE XR522-12	6GK5534-3TR00-3AR3
	6GK5534-3TR00-4AR3
SCALANCE XR524-8WG	6GK5532-2SR00-3AR3
	6GK5532-2SR00-3RR3
SCALANCE XR526-8	6GK5534-2TR00-3AR3
	6GK5534-2TR00-4AR3

Note for Australia - RCM

The product meets the requirements of the RCM standard.

Applied standards:

- AS/NZS CISPR11 (Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement).
- EN 61000-6-4 Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

You will find the current versions of the standards in the currently valid RCM SDoCs (Self-Declaration of Conformity).

MSIP 요구사항 - For Korea only

A급 기기(업무용 방송통신기자재)

이 기기는 업무용(A급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정 외의 지역에서 사용하는것을 목적으로 합니다.

Marking for the customs union

EAC (Eurasian Conformity)

Eurasian Economic Union of Russia, Belarus, Armenia, Kazakhstan and Kyrgyzstan

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

FDA and IEC marking

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

Device	CLASS 1 LASER Product
SCALANCE XR502-32	(*)
SCALANCE XR522-12	(*)
SCALANCE XR524-8WG	(*)
SCALANCE XR526-8	(*)

* In modular devices, you can find the marking on the plug-in transceiver used or in the relevant operating instructions.

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

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.

- "Industrial Ethernet / PROFINET Industrial Ethernet" System Manual (https://support.industry.siemens.com/cs/ww/en/view/27069465)
- "Industrial Ethernet / PROFINET - Passive Network Components" System Manual (https://support.industry.siemens.com/cs/ww/en/view/84922825)
- "EMC Installation Guidelines" configuration manual (https://support.industry.siemens.com/cs/ww/en/view/60612658)

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.

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.

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