SIEMENS

SIMATIC NET

Industrial Ethernet Switches SCALANCE XCH-300/XCM-300

Equipment Manual

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Legal information

Warning notice system

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

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

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

Qualified Personnel

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

Proper use of Siemens products

Note the following:

⚠ WARNING

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

Trademarks

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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1 Introduction

These operating instructions will help you to install and connect devices of the SCALANCE XCH-300/XCM-300 product group.

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

1.1 Scope of validity

These operating instructions apply to the following devices:

- SCALANCE XCM324
- SCALANCE XCH328
- SCALANCE XCM328
- SCALANCE XCM332

Unless mentioned otherwise, the descriptions in these operating instructions refer to all devices of the SCALANCE XCH-300/XCM-300 product group specified in the scope of validity.

1.2 Designations used

This section describes the conventions used in this document to clearly and efficiently portray 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-300 is used.	SCALANCE X-300
Product group	If information applies to all devices and versions of a product group, the term SCALANCE XCH-300/XCM-300 is used.	For example SCALANCE XCH-300 for devices with conformal-coated PCBs
Device	If information relates to a specific device, the device name is used.	e.g. SCALANCE XCM332

1.3 Supplementary 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
"Command Line Interface (CLI) SINEC OS" configuration manual	Visit (https://support.industry.siemens.com/cs/de/en/ps/29061/man)
"Web User Interface (Web UI) SINEC OS" configuration manual	Visit (https://support.industry.siemens.com/cs/de/en/ps/29061/man)
"SCALANCE LPE" operating instructions	Visit (https://support.industry.siemens.com/cs/ww/en/ps/26683/man)
"SCALANCE LPE" configuration manual	Visit (https://support.industry.siemens.com/cs/ww/en/ps/26683/man)
"Pluggable 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 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.

1.4 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)

1.5 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)

1.6 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).

1.7 Error/fault

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

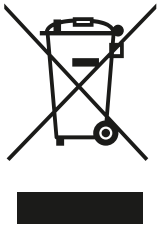
1.8 Decommissioning

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.

1.9 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.

1.10 Trademarks

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

- SCALANCE
- SINEC

1.11 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

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

General

- Periodically audit the device to make sure it complies with these recommendations and/or any internal security policies.
- Backup the device configuration to an external server following the initial setup and after each major configuration change.
- Evaluate the security of your site and use a cell protection concept with suitable products. For more information, visit Industrial Security (https://www.siemens.com/industrialsecurity).
- Review the user documentation for other Siemens products used along with the device for further security recommendations.
- Use remote system logging to forward system logs to a central logging server. Make sure the server is within the protected network and check the logs regularly to identify potential security breaches/vulnerabilities.
  For more information, refer to "Supplementary documentation (Page 8)".

Authentication

NOTICE
Accessibility hazard - risk of data loss
Do not misplace passwords for the device. Access to the device can only be restored by resetting it to factory defaults, which will remove all configuration data.

- Each device has a default **admin** profile with administrator access rights. During commissioning, this profile should be replaced by a unique, user-defined profile that is assigned the admin role.
  At least one user profile with the admin role is required.
- Replace the default passwords for all user accounts, access modes and applications (where applicable) before the device is deployed.
- Use strong passwords. Avoid weak passwords (e.g. password1, 123456789, abcdefgh) or repeated characters (e.g. abcabc).
  This recommendation also applies to symmetric passwords/keys configured on the device.
- Make sure passwords are protected and not shared with unauthorized personnel.
- Do not re-use passwords across different user names and systems.
- Record passwords in a safe, secure, off-line location for future retrieval should they be misplaced.
- Change passwords regularly and often.

- When RADIUS or TACACS+ are utilized for user authentication, make sure all communications are within the security perimeter or protected by a secure channel.
- Be aware of any link layer protocols that do not provide any inherent authentication between endpoints, such as ARP in IPv4. A malicious entity could exploit weaknesses in these protocols to attack hosts, switches, and routers connected to your Layer 2 network, for example, by poisoning the ARP caches of systems within the subnet and subsequently intercepting traffic. Appropriate safeguards against non-secure Layer 2 protocols, such as securing physical access to the local network and using secure higher layer protocols, should be taken to prevent unauthorized access to the network.
- Take precautions to protect your 2FA authenticator devices/applications. This includes maintaining individual possession of authenticators, not sharing authenticators with others, and immediately reporting lost or compromised authenticators.

Certificates and keys

- Use a trusted Certificate Authority (CA) that supports key revocation and certificate signing.
- SINEC OS includes default vendor certificates and keys for the purpose of initial onboarding. Do not deploy the device before installing certificates and keys signed by a trusted Certificate Authority (CA).
- Certificates and keys must be unique to each device. Do not reuse certificates and keys between devices and servers.
- Immediately change all certificates and keys upon suspision of a security breach.
- SSH and SSL keys are accessible to admin users. Make sure to take appropriate precautions when shipping the device beyond the boundaries of the trusted environment:
  - Replace the SSH and SSL keys with throwaway keys prior to shipping.
  - Take the existing SSH and SSL keys out of service. When the device returns, create and program new keys for the device.
- Use password-protected certificates that are in PKCS #12 format.
- Use certificates with a key length of 4096 bits.
- Before returning the device to Siemens for repair, replace the current certificates and keys with temporary throwaway certificates and keys that can be destroyed upon the device's return.
- Verify certificates and fingerprints on the server and client to prevent Man-in-the-Middle (MitM) attacks.

Physical/remote access

- Only operate the devices in a protected network area. Attackers cannot access internal data from outside when the internal and external network are disconnected.
- Restrict physical access to the device to only trusted personnel. A malicious user in possession of the device's removable media could extract critical information, such as certificates, keys, etc. (user passwords are protected by hash codes), or reprogram the media.
- Control access to the serial console to the same degree as any physical access to the device.
- Never allow the serial console port to be accessible from the Internet. This port is exempt from Brute Force Attack (BFA) prevention measures to allow administrators to access the device during an active Denial of Service (DoS) attack.

- It is highly recommended to keep Brute Force Attack (BFA) protection enabled to prevent a third-party from obtaining unauthorized access to the device.
  For more information, refer to "Supplementary documentation (Page 8)".
- For communication via non-secure networks, use additional devices with VPN functionality to encrypt and authenticate communications.
- When securely connecting to a server (e.g. in the case of a secure upgrade), make sure the server side is configured with strong ciphers and protocols.
- Terminate management connections (e.g. HTTP, HTTPS, SSH, etc.) properly.
- Make sure the device is fully decommissioned before taking the device out of service.
  For more information, refer to "Supplementary documentation (Page 8)".

Secure/non-secure protocols

- Use secure protocols when access to the device is not prevented by physical protection measures.
- Disable or limit the use of non-secure protocols. While some protocols are secure (e.g. HTTPS, SSH, 802.1X, etc.) , others were not designed for secure applications (e.g. SNMPv1/v2c, RSTP, etc.).
  Appropriate safeguards against non-secure protocols should be taken to prevent unauthorized access to the device/network.
- Whenever possible, use the SSH File Transfer Protocol (SFTP) to transfer files. While other protocols are available (e.g. FTP, TFTP, HTTP), SFTP is the only protocol that transfers files encrypted. The other protocols are not protected against interception and manipulation.
- If non-secure protocols and services are required, make sure the device is operated within a protected network area.
- When a secure alternative is available for a protocol, use the secure version instead. For example:
  - Use HTTPS instead of HTTP
  - Use SNMPv3 instead of SNMPv1/v2c
- Avoid or limit use of the following:
  - Non-authenticated and unencrypted protocols
  - Link Layer Discovery Protocol (LLDP)
- After commissioning the device, access rights for the Discovery and basic Configuration Protocol (DCP) are automatically set to read-only. If your environment does not require DCP, it is recommended to disable it fully.
  For more information, refer to "Supplementary documentation (Page 8)".

Hardware/software

- Limit critical applications and access to management services to private networks. Connecting a SINEC OS device to the Internet is possible. However, the utmost care should be taken to protect the device and the network behind it using secure means, such as a firewall and IPsec.
- Whenever possible, use VLANs to protect against Denial of Service (DoS) attacks and unauthorized access.

- Select services are enabled by default in SINEC OS. It is recommended to only enable the minimum services that are required for your setup.
  For more information about available services, "Available services (Page 19)".
- Use the latest Web browser version compatible with SINEC OS to make sure the most secure ciphers available are employed. Additionally, 1/n-1 record splitting is enabled in the latest Web browser versions of Mozilla Firefox, Google Chrome and Microsoft Edge, and mitigates against attacks such as SSL/TLS Protocol Initialization Vector Implementation Information Disclosure Vulnerability (e.g. BEAST).
- Make sure the latest firmware version is installed, including all security-related patches. For the latest information on security patches for Siemens products, visit the Industrial Security (https://www.siemens.com/industrialsecurity) website or the ProductCERT Security Advisories (https://www.siemens.com/cert/en/cert-security-advisories.htm) website. Updates to the Siemens Product Security Advisories can be obtained by subscribing to the RSS feed on the Siemens ProductCERT Security Advisories website, or by following @ProductCert on Twitter.
- Only enable services that will be used on the device, including physical ports. Unused physical ports could potentially be used to gain access to the network behind the device.
- For optimal security, use the authentication and encryption mechanisms in SNMPv3 whenever possible, and apply strong passwords.
- Configuration files can be downloaded from the device. Make sure configuration files are properly protected. For instance, digitally sign and encrypt the files, store them in a secure place, and only transfer configuration files via secure communication channels. Configuration files can be password-protected when downloaded. For information about protecting a configuration file with a password, refer to "Supplementary documentation (Page 8)".
- When using SNMP (Simple Network Management Protocol):
  - Configure SNMP to raise a trap upon authentication failures.
    For more information, refer to "Supplementary documentation (Page 8)".
  - Make sure the default community strings are changed to unique values.
  - Use SNMPv3 whenever possible. SNMPv1 and SNMPv2c are considered non-secure and should only be used when necessary.
  - Whenever possible, prevent write access.

Available services

4

The following is a list of all available protocols or services and their ports through which the device can be accessed, including the following information:

- **Service**
  The service supported by the device.
- **Protocol**
  The protocol used by the service.
- **Default port number**
  The default port number assigned to the client/service.
- **Default status**
  The default state of the service.
- **Status**
  The state of the service when active.
- **Configurable service**
  Specifies whether or not the service can be configured.
- **Configurable port number**
  Specifies whether the port number is configurable.
- **Authentication**
  Specifies whether an authentication of the communication partner takes place or whether an authentication can be configured.
- **Encryption**
  Specifies whether the transfer is encrypted or whether the encryption is configurable.

Clients

Service	Protocol	Default port number	Default status	Status	Configurable service	Configurable port number	Authentication	Encryption
DHCP Client	UDP	67/68	Open	Open if configured	✓	-	-	-
DNS	UDP/ TCP	53	Closed	Only outgoing open if configured	✓	-	-	-
FTP	TCP	20 (local) 21 (remote)	Closed	Only outgoing open	✓	-	✓	-
HTTP	TCP	80	Closed	Open if configured with login	✓	✓	-	-
NTP	UDP	123	Closed	Open if configured	✓	-	-	-
RADIUS	UDP	1812	Closed	Only outgoing open if configured	✓	✓	✓	-
RIPv2	UDP	520	Closed	Open if configured	✓	-	-	-
Secure NTP	UDP	123	Closed	Open if configured	✓	-	Configurable	-

Service	Protocol	Default port number	Default status	Status	Configurable service	Configurable port number	Authentication	Encryption
Secure Syslog	TCP	6514	Closed	Only outgoing open if configured	✓	✓	✓	✓
SFTP	TCP	22	Closed	Only outgoing open if configured	✓	✓	✓	✓
SNMP trap	UDP	162	Closed	Only outgoing open if configured	✓	-	-	-
Syslog	UDP	514	Closed	Only outgoing open if configured	✓	✓	-	-
TACACS+	TCP	49	Closed	Open if configured	✓	✓	✓	-
TFTP	UDP	69	Closed	Only outgoing open if configured	✓	-	-	-
SMTP	TCP	25	Closed	Only outgoing open if configured	✓	-	✓	-

Servers

Service	Protocol	Default port number	Default status	Status	Configurable service	Configurable port number	Authentication	Encryption
EtherNet/IP	UDP	2222 and four ports in the range of 49152 to 65535	Closed	Only outgoing open if configured	✓	-	-	-
	TCP	44818						
DHCP Server	UDP	67	Closed	Open if configured	✓	-	-	-
HTTP	TCP	80	Closed	Open if configured with login	✓	✓	-	-
HTTPS	TCP	443	Open	Open if configured with login	✓	✓	✓	✓
VRRP ARP Sync	UDP	50000	Closed	Open if configured	✓	-	-	-
NTP	UDP	123	Closed	Open if configured	✓	-	Configurable	-
PROFINET	UDP	One port in the range of 49152 to 65535	Open	Open because of base function	-	-	-	-
PROFINET Device	UDP	34964 and one port in the range of 49152 to 65535	Open	Open because of base function	-	-	-	-

Service	Protocol	Default port number	Default status	Status	Configurable service	Configurable port number	Authentication	Encryption
SNMPv1/v2c	UDP	161	Closed	Open if configured	✓	✓	Configurable	-
SNMPv3	UDP	161	Closed	Open if configured with login	✓	✓	Configurable	Configurable
SSH	TCP	22	Open	Open if configured with login	✓	✓	✓	✓
NETCONF (SSH)	TCP	830	Open	Open if configured	✓	✓	✓	✓

Description of the device

5

5.1 Article numbers

Device	Description	Article number
SCALANCE XCM324	• 16 x 10 / 100 / 1000 Mbps RJ45 ports • 8 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 2 x 2-pin terminal block 24 V DC, 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 • 1 x function extender interface for the SCALANCE LPE • Firmware SINEC OS as of version 2.1	6GK5324-8TS01-2AC2
SCALANCE XCH328	• 24 x 10 / 100 / 1000 Mbps RJ45 ports • 4 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 2 x 2-pin terminal block 24 V DC, 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 • 1 x function extender interface for the SCALANCE LPE • Conformal-coated PCBs • Firmware SINEC OS as of version 2.1	6GK5328-4TS01-2EC2
SCALANCE XCM328	• 24 x 10 / 100 / 1000 Mbps RJ45 ports • 4 x SFP / SFP+ plug-in transceiver slots with 1 / 10 Gbps • 2 x 2-pin terminal block 24 V DC, 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 • 1 x function extender interface for the SCALANCE LPE • Firmware SINEC OS as of version 2.1	6GK5328-4TS01-2AC2
SCALANCE XCM332	• 32 x 10 / 100 / 1000 Mbps RJ45 ports • 2 x 2-pin terminal block 24 V DC, 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 • 1 x function extender interface for the SCALANCE LPE • Firmware SINEC OS as of version 2.0	6GK5332-0GA01-2AC2

5.2 Factory settings

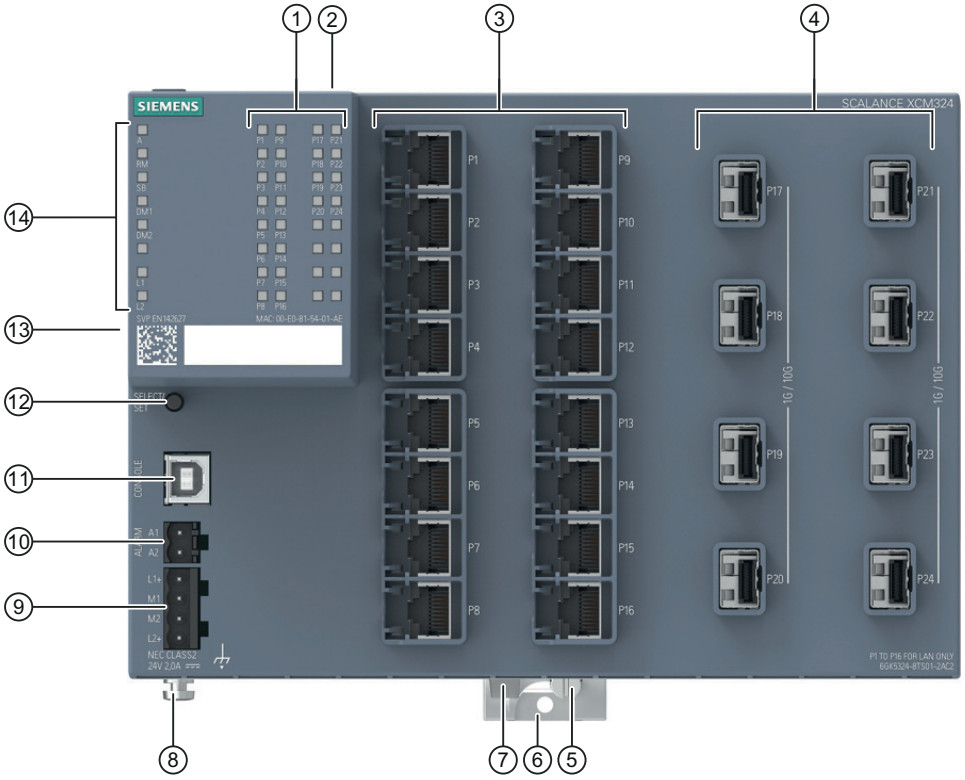
The devices are supplied with the following factory settings:

- Spanning Tree Protocol: Enabled
- Spanning Tree version: RSTP
- Operating mode: VLAN-capable (IEEE 802.1Q)
- PROFINET: Enabled
- DCP mode: Setup
- IGMP Snooping: Enabled
- IGMP Querier: Disabled
- EtherNet/IP: Disabled
- DLR: Disabled
- Trust mode: PCP
- DHCP: Enabled for VLAN 1

5.3 Device views

5.3.1 SCALANCE XCM324

The following figure shows an overview of the components of SCALANCE XCM324:

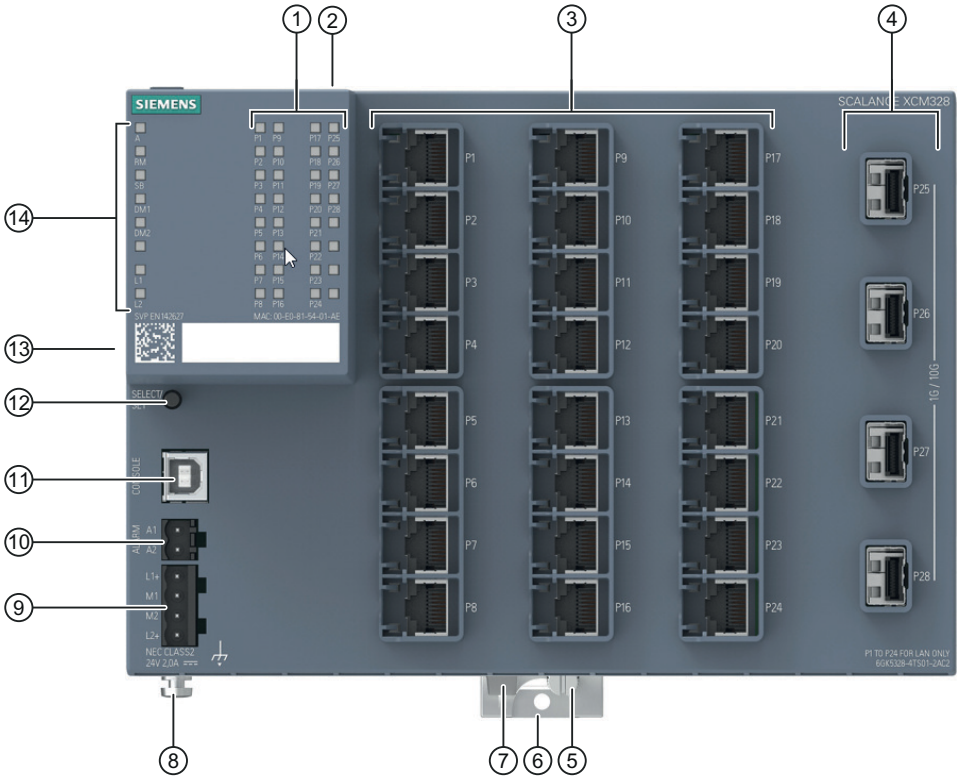


① Port LEDs
② CLP slot
③ Electrical ports with 10/100/1000 Mbps
④ Slots for SFP/SFP+ plug-in transceiver with 1/10 Gbps
⑤ Knurled screw
⑥ Securing bar
⑦ Levering aid for moving the securing bar with a screwdriver
⑧ Grounding screw
⑨ Power supply
⑩ Signaling contact
⑪ USB console interface (2.0 port, Type B, serial via USB)
⑫ "SELECT/SET" button
⑬ Function extender interface for the SCALANCE LPE
⑭ LED display
- "A" LED for the alarm display
- "RM" LED without function
- "CM" LED without function
- "DM1/DM2" LED for the display mode
- "L1/L2" LED for the power supply

Figure 5-1 SCALANCE XCM324

5.3.2 SCALANCE XCH328 /XCM328

The following figure shows an overview of the components of SCALANCE XCM328. The SCALANCE XCH328 device is identical in design except that it has conformal-coated PCBs.

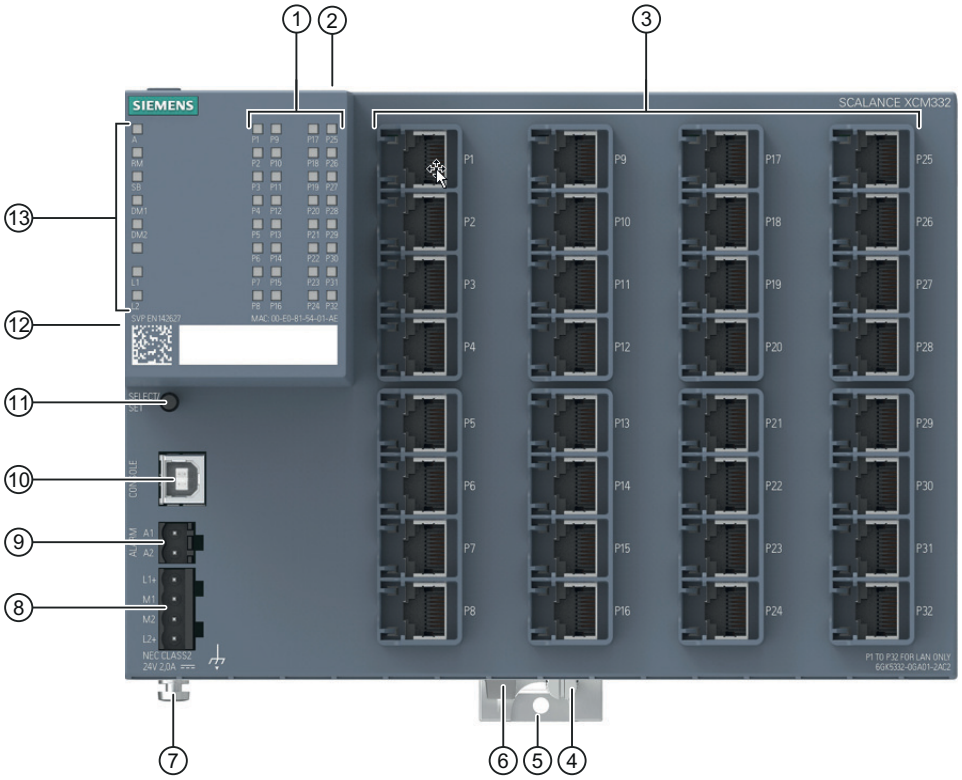


① Port LEDs
② CLP slot
③ Electrical ports with 10/100/1000 Mbps
④ Slots for SFP/SFP+ plug-in transceiver with 1/10 Gbps
⑤ Knurled screw
⑥ Securing bar
⑦ Levering aid for moving the securing bar with a screwdriver
⑧ Grounding screw
⑨ Power supply
⑩ Signaling contact
⑪ USB console interface (2.0 port, Type B, serial via USB)
⑫ "SELECT/SET" button
⑬ Function extender interface for the SCALANCE LPE
⑭ LED display
- "A" LED for the alarm display
- "RM" LED without function
- "CM" LED without function
- "DM1/DM2" LED for the display mode
- "L1/L2" LED for the power supply

Figure 5-2 SCALANCE XCM328

5.3.3 SCALANCE XCM332

The following figure shows an overview of the components of the SCALANCE XCM332:



① Port LEDs
② CLP slot
③ Electrical ports with 10/100/1000 Mbps
④ Knurled screw
⑤ Securing bar
⑥ Levering aid for moving the securing bar with a screwdriver
⑦ Grounding screw
⑧ Power supply
⑨ Signaling contact
⑩ USB console interface (2.0 port, Type B, serial via USB)
⑪ "SELECT/SET" button
⑫ Function extender interface for the SCALANCE LPE
⑬ LED display
- "A" LED for the alarm display
- "RM" LED without function
- "CM" LED without function
- "DM1/DM2" LED for the display mode
- "L1/L2" LED for the power supply

Figure 5-3 SCALANCE XCM332

5.4 Components of the product

The following components are supplied with a SCALANCE XCH-300/XCM-300:

- One SCALANCE XCH-300 or XCM-300
- One CLP removable data storage medium 2 GB
  - For a SCALANCE XCM-300 without conformal-coated PCBs: Article number 6GK1900-0UB00-0AA0
  - For a SCALANCE XCH-300 with conformal-coated PCBs: Article number 6GK1900-0UQ00-0AA0
- Two 2-pin spring-loaded terminal blocks 24 V DC for the power supply
- One 2-pin spring-loaded terminal block 24 V DC for the signaling contact
- One product DVD with documentation and software

The following components are also supplied with a SCALANCE XCH-300/XCM-300 with plug-in transceiver slots:

- One cover for each plug-in transceiver slot

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.

5.5 Spare parts

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

5.5.1 Terminal blocks (2-pin)

Component	Description	Article number
2-pin spring-loaded terminal block	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

5.5.2 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

5.6 Accessories

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

5.6.1 Energy cable

Component	Description	Article number
Energy Cable 2 x 0.75	Energy cable for connection of signaling contact and power supply 24 V DC, 2-wire, stranded 2 x 0.75 mm^2, trailable, not assembled Sold by the meter	6XV1 812-8A
Robust Energy Cable 4 x 0.75	Energy cable for connection of power supply 24 V DC, 4-wire, stranded 4 x 0.75 mm^2, robust, flexible, not assembled Sold by the meter	6XV1 801-2A
Energy Cable 4 x 1.5	Energy cable for connection of power supply 24 V DC, 4-wire, stranded 4 x 1.5 mm^2, trailable, not assembled Sold by the meter	6XV1 801-2B

5.6.2 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

5.6.3 SCALANCE LPE

The SCALANCE LPE (Local Processing Engine) is an industrial IoT (Internet of Things) device with a Debian GNU/Linux operating system. The device provides computing power for a wide range of Edge applications (Edge Computing). A further main application is the use of Docker containers in industrial environments. The rugged housing in SIMATIC S7-1500 format and the fanless design enable use in direct manufacturing environments.

Device	Description	Article number
SCALANCE LPE9403	The SCALANCE LPE9403 can be operated either standalone or connected with a SCALANCE switch. In **standalone operation**, the SCALANCE LPE9403 has the following ports: • 2 x 10/100/1000 Mbps RJ45 ports • 1 x combo port (1 x 10/100/1000 Mbps RJ45 port / 1 x pluggable transceiver slot with 100/1000 Mbps) When the SCALANCE LPE9403 is **connected to a SCALANCE switch**, the ports of the SCALANCE LPE9403 work as function extender interface (FEI) ports of the SCALANCE switch with the following speeds: • 2 x 1 Gbps • 1 x 10 Gbps The three FEI ports are available as bridge ports within the SCALANCE switch.	6GK5 998-3GS00-2AC2

Note

The function extender interface is supported as of SINEC OS firmware version 2.1.

5.6.4 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).

Active plug-in transceiver SFP (100 Mbps)

With active plug-in transceivers, Gigabit slots can be used as Fast Ethernet interfaces.

Type	Property	Article number
SFP991-1A	1 x 100 Mbps, LC port optical for glass FO cable (multimode), up to max. 5 km	6GK5 991-1AD00-8GA0
SFP991-1LD A	1 x 100 Mbps LC port optical for glass FO cable (single mode) up to max. 26 km	6GK5 991-1AF00-8GA0

Note

Restricted approvals

If you operate the device with active SFP transceivers, 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

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
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).

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
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

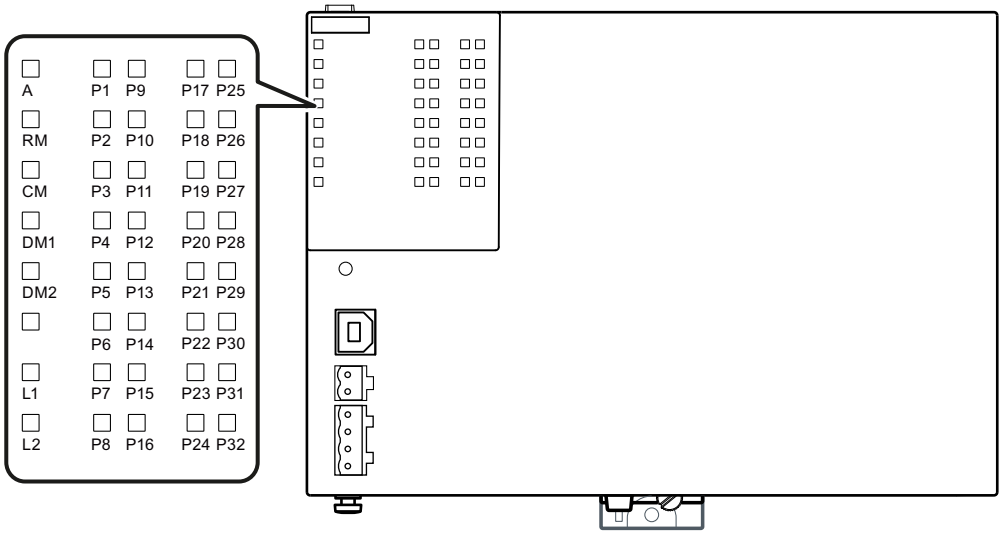
5.6.5 Terminal blocks (4-pin)

Component	Description	Article number
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

5.7 LED display

5.7.1 Position

The following figure shows the arrangement of the LEDs.



A	LED for displaying the alarm status
RM	LED for displaying the "redundancy manager" function
CM	LED without function
DM1/DM2	LEDs for displaying the display mode
L1/L2	LEDs for displaying the power supply
P	LEDs for displaying the port status *)

Figure 5-4 Arrangement of the LEDs

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

5.7.2 A LED

The **A** LED (alarm LED) indicates the fault 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 complete yet.

Meaning during operation

LED color	LED status	Meaning during operation
-	Off	The device is operating free of errors.
Red	On	The device has detected a problem.
Red	Flashes once per period*	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.
* 1 period ≙ 2.5 seconds		

5.7.3 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.

5.7.4 DM1 and DM2 LEDs

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.

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

5.7.5 L1 and L2 LEDs

The **L1** and **L2** LEDs indicate the current state of the power supply at connectors **L1** and **L2**.

The meaning of the **L1** and **L2** LEDs depends on the set display mode; refer to section "DM1 and DM2 LEDs (Page 35)".

Meaning in display modes A, B and C

In the specified display modes, the **L1** and **L2** LEDs tell you whether the power supply is connected.

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 the current version, the display mode D does not display any information.

5.7.6 P 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, refer to section "DM1 and DM2 LEDs (Page 35)".

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 on the port (e.g. the communication partner is switched off or the cable is not connected) or the link is present but the port is switched off by management. In this state, no data is sent or received via the port.
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 four times per period*	Link exists and 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
	Flashes once per period*	Port operating at 10 Gbps

LED color	LED status	Meaning
Yellow	On	Port works at 1 Gbps
	Flashes twice per period*	Port works at 2.5 Gbps
	Flashes five times per period*	Port works at 5 Gbps

* 1 period ≙ 2.5 seconds

When the transfer settings of a port are permanently set (autonegotiation disabled) and a connection error occurs, the port LED will still show the set transmission rate. When autonegotiation is enabled, the port LED will go off in case of a connection error.

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 the current version, the display mode D does not display any information.

5.8 SELECT/SET button

5.8.1 Position

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

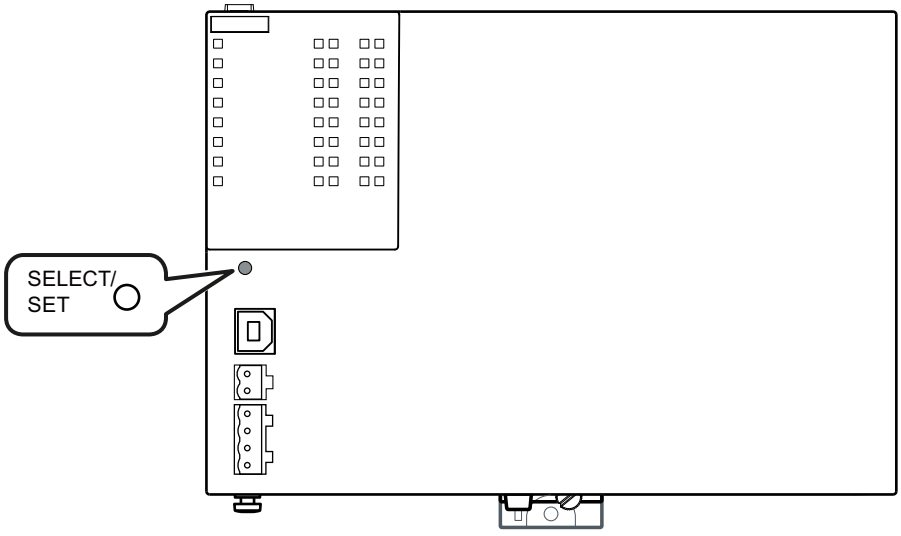


Figure 5-5 Position of the "SELECT/SET" button

5.8.2 Function

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 79)" and "Resetting the device to default settings with the button (during operation) (Page 80)".
- **Load a firmware file via TFTP**
  For more information, refer to "Loading a firmware file via TFTP (Page 81)".
- **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 "DM1 and DM2 LEDs (Page 35)".
  For more information on the display modes, refer to "Setting the display mode (Page 38)".

5.8.3 Setting the display mode

To set the display mode, press the SELECT/SET button as follows:

Pressing the 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

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

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

5.9 Configuration and 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

5.9.1 Position

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

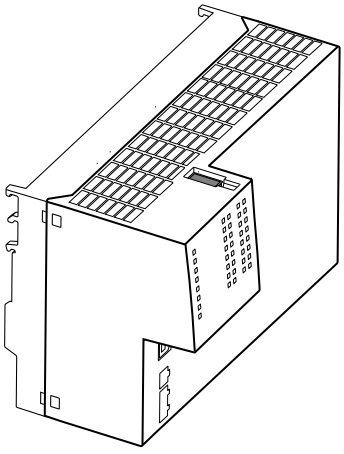


Figure 5-6 Position of the CLP slot

5.9.2 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 76)".

5.10 Function extender interface for the SCALANCE LPE

This interface is supported as of SINEC OS firmware version 2.1.

On the left side of the housing, there is an interface for connecting the SCALANCE switch with a SCALANCE LPE. Take the exact position from section "Device views (Page 25)". This interface is closed with a cover in the delivery state.

The SCALANCE LPE can run a large number of customer-specific applications. For example, it records, collects and processes production data such as quantities, temperature, maintenance information and utilization. This data can then be forwarded to a wide variety of destinations, such as cloud platforms or other internal applications. Available communication information enables the detection of irregularities in the plant network and, with the right response, increases plant availability.

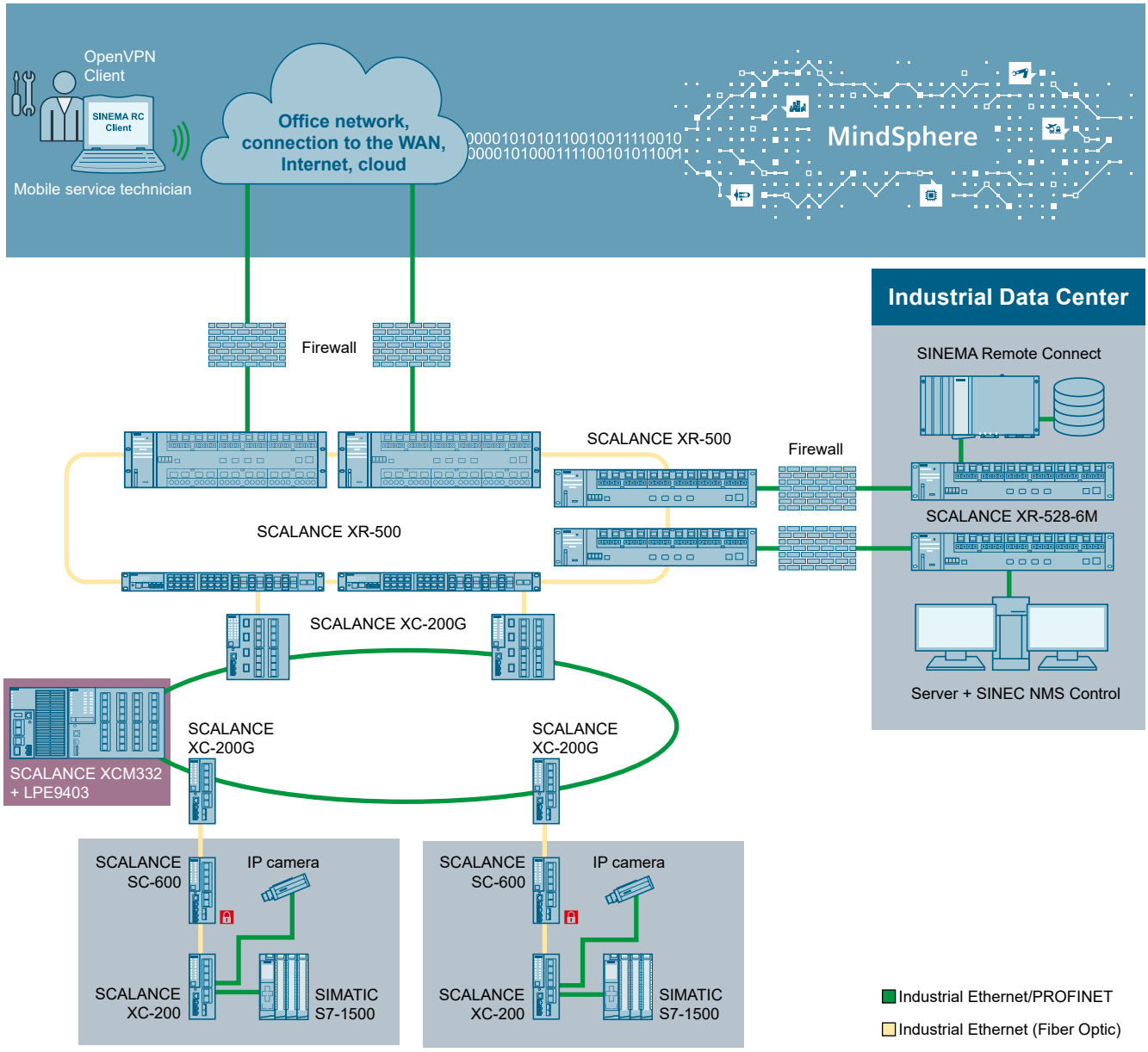


Figure 5-7 Preventive maintenance based on data evaluation using SCALANCE LPE (connected with a SCALANCE XCM332 as example)

In addition, applications that take on important functions in the plant, for example network services such as DHCP or NTP, can run directly on the SCALANCE LPE.

For more information, refer to the product information for SCALANCE LPE (https://mall.industry.siemens.com/mall/en/WW/Catalog/Products/10399441?tree=CatalogTree).

installing and removing

6

6.1 Safety during mounting

Safety notices

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

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.

⚠ 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.

⚠ WARNING
If the temperature of the cable or housing socket exceeds 70 °C or the temperature at the branching points of the cables exceeds 80 °C, special precautions must be taken. If the device is operated at max. ambient temperature, you must use cables with a permitted maximum operating temperature of at least 90 °C for power supply, functional grounding and signaling contact and of at least 75 °C for data cables.

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.

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:

Note

You must not install the device on a wall in hazardous areas.

⚠ 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 cables with a permitted maximum operating temperature of at least 90 °C for power supply, functional grounding and signaling contact and of at least 75 °C for data cables.

⚠ WARNING

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

⚠ WARNING

Wall mounting is only permitted if the requirements for the housing, the installation regulations, the clearance and separating regulations for the control cabinets or housings are adhered to. The control cabinet cover or housing must be secured so that it can only be opened with a tool. An appropriate strain-relief assembly for the cable must be used.

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" according 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 cabinet.
- Installation in a suitable enclosure.
- Installation in a suitably equipped, enclosed control room.

⚠ 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 device is operated at ambient temperatures of over 40 °C, you must use cables with a permitted maximum operating temperature of at least 90 °C for power supply, functional grounding and signaling contact and of at least 75 °C for data cables.

Further notes

NOTICE
Warming and premature aging of the network component due to direct sunlight
Direct sunlight can heat up the device and can lead to premature aging of the network component and its cabling.
Provide suitable shade to protect the network component against direct sunlight.

6.2 Types of installation

The devices can be installed in the following ways:

- DIN rail
- S7-300 standard rail
- S7-1500 standard rail
- Wall mounting

6.3 Installation clearance

Keep to the following minimum clearances so that the convection ventilation of the device is not blocked:

- Below at least 10 cm
- Above at least 10 cm

If you install the device with installation distances < 10 cm, you must observe the following:

- The minimum distance must not be less than 30 mm.
- The maximum permissible ambient temperature in the direct vicinity of the device must be observed.
- Sufficient convection ventilation of the device must be ensured.

6.4 Installation position

The following installation position is recommended:

- **Horizontal** (position 1)
  Horizontal installation of the rack (DIN rail/mounting rail)

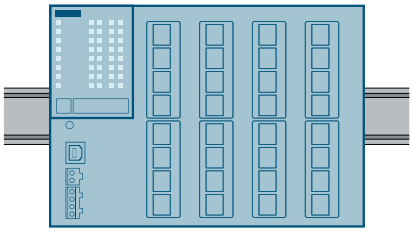


Figure 6-1 Horizontal installation position on a DIN rail

Note

If the device is connected to a SCALANCE LPE, only the horizontal installation position is permitted; see also "Connecting a SCALANCE XCH-300/XCM-300 with a SCALANCE LPE (Page 53)".

The following installation positions are permitted, but with deviating temperature values (Page 83):

- **Vertical** (position 2)
  Vertical installation of the rack (DIN rail/mounting rail)

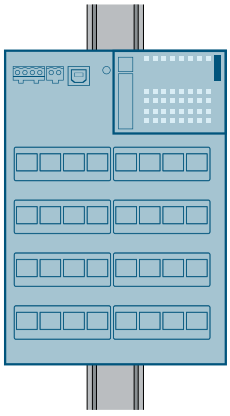


Figure 6-2 Vertical installation position on a DIN rail

- **Ceiling installation/Face down** (position 3)
  The device is installed on the ceiling of a control cabinet, for example.
- **Floor installation/Face up** (position 4)
  The device is installed on the floor of a control cabinet, for example.

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.

Plug-in transceivers

Information about pulling and plugging SFP or SFP+ plug-in transceivers can be found in the section "Inserting and removing pluggable transceivers (Page 72)".

6.5 Mounting on DIN rails

Installation

Note

Note the position of the securing bar, see also section “Dimension drawings SCALANCE XCM-300 (Page 93)“.

When supplied, the securing bar is in the wall mounting position. To change the position of the securing bar, refer to the section “Changing the position of the securing bar (Page 52)“.

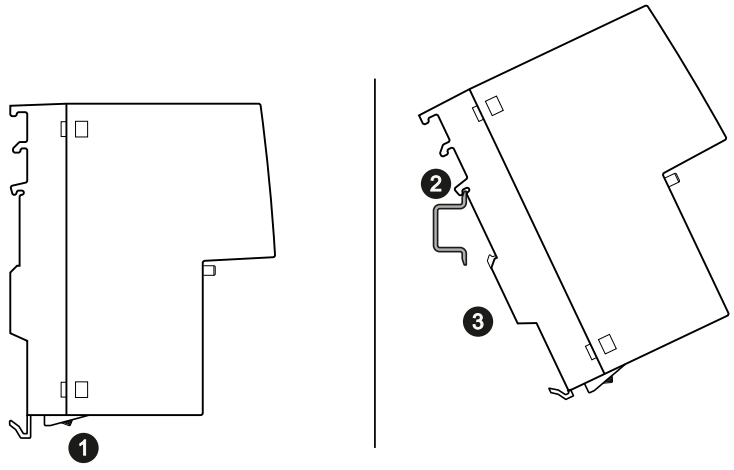


Figure 6-3 DIN rail mounting with securing bar in the wall mounting position.

Securing bar in the wall mounting position (as supplied).

To install the device on a 35 mm DIN rail complying with DIN EN 60715, follow the steps below:

1. Loosen the knurled screw with your hand or a screwdriver.
2. Place the third housing guide of the device on the top edge of the DIN rail.
3. Press the device down against the DIN rail until the spring securing bar locks in place.
4. When you tighten the knurled screw. you cannot release the securing bar (torque 0.5 Nm). The device is additionally fixed.
5. Connect the electrical connecting cables, refer to the section "Connecting up (Page 57)".

Removal

To remove the device from a DIN rail, follow the steps below:

1. Disconnect all connected cables.
2. If necessary, loosen the knurled screw with your hand or a screwdriver.
3. Lever the securing bar down using a screwdriver as far as it will go.
4. Pull the device away from the bottom of the DIN rail with the bar pulled.

6.6 Installation on a standard S7-300 rail

Installing on an S7-300 standard rail

Note

Note the position of the securing bar, see also section "Dimension drawings SCALANCE XCM-300 (Page 93)".

When supplied, the securing bar is in the wall mounting position. To change the position of the securing bar, refer to the section "Changing the position of the securing bar (Page 52)".

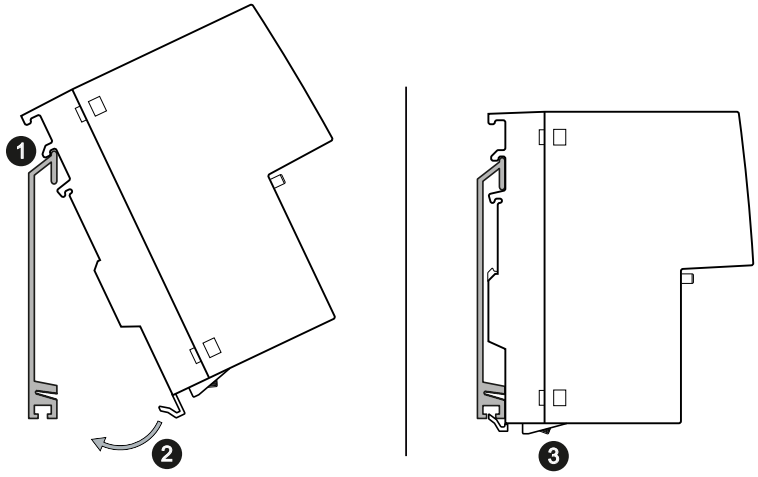


Figure 6-4 S7-300 mounting rail installation with the securing bar in the wall mounting position.

Securing bar in the wall mounting position (as supplied).

To install the device on an S7-300 standard rail, follow the steps below:

1. Place the second housing guide of the device on the top edge of the standard rail.
2. Swing the device down towards the back against the mounting rail.
3. Loosen the knurled screw with your hand or a screwdriver. The spring mounted securing bar locks in place.

4. When you tighten the knurled screw. you cannot release the securing bar (torque 0.5 Nm). The device is additionally fixed.
5. Connect the electrical connecting cables, refer to the section "Connecting up (Page 57)".

Removal

To remove the device from a standard rail, follow the steps below:

1. Disconnect all connected cables.
2. If necessary, loosen the knurled screw with your hand or a screwdriver.
3. Lever the securing bar down using a screwdriver as far as it will go.
4. Remove the device from the mounting rail with the bar pulled.

6.7 Installation on a standard S7-1500 rail

Installing on an S7-1500 standard rail

Note

Note the position of the securing bar, see also section “Dimension drawings SCALANCE XCM-300 (Page 93)“.

When supplied, the securing bar is in the wall mounting position. To change the position of the securing bar, refer to the section “Changing the position of the securing bar (Page 52)“.

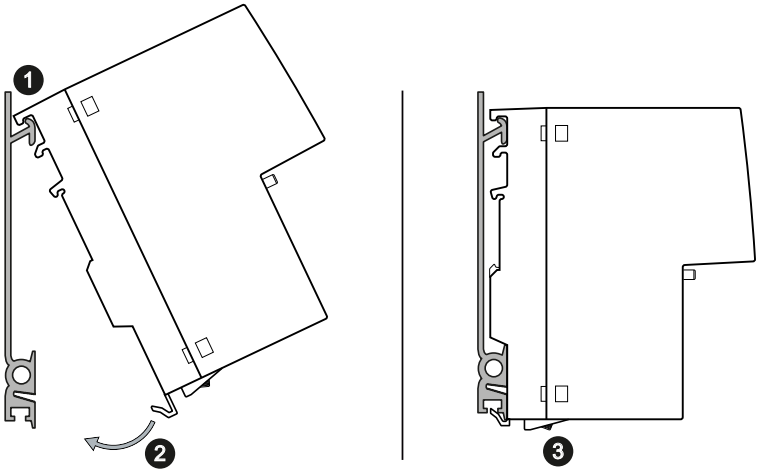


Figure 6-5 S7-1500 mounting rail installation with the securing bar in the wall mounting position.

Securing bar in the wall mounting position (as supplied).

To install the device on an S7-1500 standard rail, follow the steps below:

1. Place the first housing guide of the device on the top edge of the standard rail.
2. Swing the device down towards the back against the mounting rail.
3. Loosen the knurled screw with your hand or a screwdriver. The spring mounted securing bar locks in place.
4. When you tighten the knurled screw. you cannot release the securing bar (torque 0.5 Nm). The device is additionally fixed.
5. Connect the electrical connecting cables, refer to the section "Connecting up (Page 57)".

Removal

To remove the device from a standard rail, follow the steps below:

1. Disconnect all connected cables.
2. If necessary, loosen the knurled screw with your hand or a screwdriver.
3. Lever the securing bar down using a screwdriver as far as it will go.
4. Remove the device from the mounting rail with the bar pulled.

6.8 Wall mounting

Preparation

Note the position of the securing bar, see also section “Dimension drawings (Page 93)”.

When supplied, the securing bar is in the wall mounting position. You do not need to prepare the device any further.

If the securing bar is in the rail mounting position, note the section “Changing the position of the securing bar (Page 52)”.

Tools

To mount the device on a wall, you require the following:

- 2 wall plugs with a diameter of 6 mm and a minimum length of 35 mm.
- 2 oval-head screws with a diameter of 3.5 mm to 4 mm and a minimum length of 50 mm.

Note

Use suitable fitting material depending on the mounting surface.

Mounting on a concrete wall

The following table shows the size of the drill hole and the required fastening material using a concrete drill hole as an example:

Base	Concrete	
Drill hole	Depth	Min. 45 mm
	Diameter	6 mm
Fastening material	Plugs	6 x 35
	Oval-head screws	4 x 50

Assembly

Note

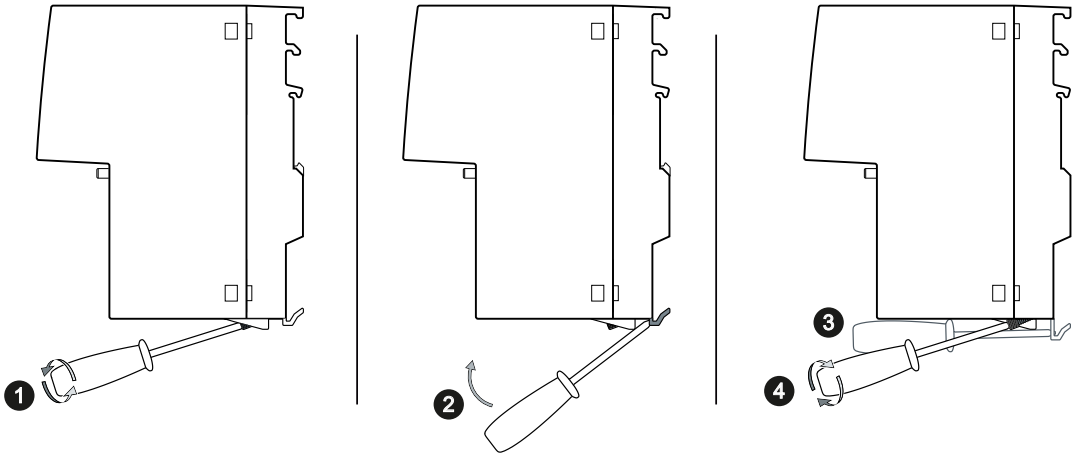
The wall mounting must be capable of supporting at least four times the weight of the device.

To mount the device on a wall, follow the steps below:

1. Prepare the wall mounting with drilled holes and plugs. For the precise dimensions, refer to the section "Dimension drawings (Page 93)".
2. Turn the upper screw in to the wall so that 10 mm remains jutting out.
3. Hang the device with the keyhole hanging mechanism on the rear on the screw.
4. Fix the device to the wall with the lower screw.
5. Connect the electrical connecting cables, refer to the section "Connecting up (Page 57)".

6.9 Changing the position of the securing bar

Rail mounting position - wall mounting position



To change the securing bar from the rail mounting position to the wall mounting position follow the steps below:

1. If necessary, loosen the knurled screw with your hand or a screwdriver.
2. Move the securing bar down as far as it will go.
   - Use the levering aid and level the securing bar down using a screwdriver into this position.
   - Push the securing bar down using your hand.
3. Hold the securing bar in this position.
   - Hold the securing bar with the screwdriver.
   - Use the gap on the rear of the device and fix the securing bar briefly with a pin.
4. Tighten the knurled screw (torque 0.5 Nm).
   The securing bar is fixed in the wall mounting position.
5. Remove the pin.

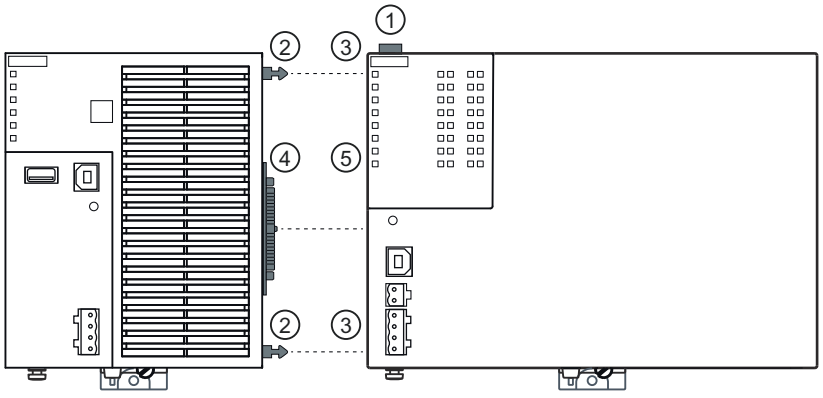
Wall mounting position - rail mounting position

To move the securing bar from the wall mounting position to the rail mounting position, loosen the knurled screw.

6.10 Connecting a SCALANCE XCH-300/XCM-300 with a SCALANCE LPE

Position

The following figure shows the elements required to connect a SCALANCE switch with a SCALANCE LPE.



① Lock (on the device rear of the SCALANCE switch)
② Centering pin
③ Opening to hold a centering pin
④ Multipole connector for connection to the function extender interface
This connector is closed with a cover in the delivery state.
⑤ Function extender interface
This interface is closed with a cover in the delivery state.

Installation options

You have the following options for connecting the devices:

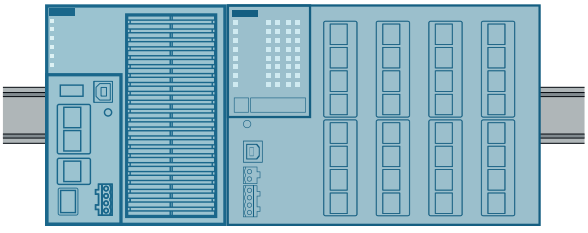
- You can connect the devices and mount them together on a DIN or S7 standard rail.
- You can mount a device on a DIN rail or S7 mounting rail and connect it later.

Note

For mounting on a rail as well as for removing from the rail, plan enough space between the devices, see section "Dimension drawings (Page 93)".

Installation position

If a SCALANCE switch is connected to a SCALANCE LPE, only the following installation position is permitted:

Horizontal Horizontal installation of the rack (e.g. DIN rail)	

Any other installation position can lead to impermissibly high temperatures and damage the devices.

Connecting devices

NOTICE
Danger of damage to property The two devices cannot be connected during operation. Disconnect the two devices from the power supply before connecting the devices.

Follow these steps to connect a SCALANCE switch with a SCALANCE LPE:

1. Disconnect the two devices from the power supply.
2. Remove the function extender interface cover on the SCALANCE switch.
3. Remove the connector cover on the SCALANCE LPE.
4. Fit the two devices together so that the two centering pins ② are accommodated by the opposing openings ③.

5. Press the devices together until they are flush.
   The centering pins click audibly into place. The locking device ① is automatically pressed up briefly as this happens.
6. Connect the SCALANCE switch to the power supply.
   The SCALANCE switch supplies the SCALANCE LPE with power over the function extender interface.

NOTICE
Operating risk - Danger of malfunction during device startup If you have connected a SCALANCE LPE to a SCALANCE switch via the function extender interface, the power for the SCALANCE LPE is supplied exclusively via the SCALANCE switch. This also applies to a redundant power supply. If the SCALANCE switch has a redundant power supply, this redundancy is also provided to the SCALANCE LPE. If you connect both devices to a power supply, this leads to a malfunction during device startup. • Connect the power supply only to the SCALANCE switch. • Do not connect a power supply to the SCALANCE LPE when it is connected to a SCALANCE switch.

Disconnecting devices

NOTICE
Danger of damage to property The two devices cannot be disconnected during operation. Disconnect the SCALANCE switch from the power supply before disconnecting the devices.

Follow these steps to disconnect a SCALANCE switch and a SCALANCE LPE:

1. Disconnect the SCALANCE switch from the power supply.
2. Release the locking device using a screwdriver ①.
   The two devices are separated from each other.
3. Pull the two devices apart in a straight line until the two centering pins ② are completely out of the openings ③.
4. Close the function extender interface on the basic device and the connector on the SCALANCE LPE with the corresponding covers.

6.11 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

7

7.1 Safety when connecting up

Safety notices for operation with a power supply according to NEC Class 2

Operate the device with a power supply according to NEC Class 2. When connecting up the device, keep to the safety notices listed below.

⚠ 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 therefore needs to meet at least one of the following conditions:

- The conditions for ES1, PS2 according to IEC/EN/UL 62368-1 or SELV/LPS according to IEC/UL/EN 60950-1
- The conditions for 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

Power supply

The device is designed for operation with a directly connectable power supply according to UL/IEC 61010-1 and UL/IEC 61010-2-201 whose output power corresponds to "Limited Energy" according to UL/IEC 61010-1.

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

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
  - Breaking characteristics: B or C
  - Approval according to IEC/EN 60127-1 for fuses
  - Breaking 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
  - Breaking characteristics: max. 120s at 2 x I_n

*) AC or DC depending on availability

Further notes

WARNING

Insulation of external power supplies

Ext. circuits intended to be connected to this device shall be galv. separated from hazardous live voltage by reinforced or double insulation.

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).

Note

Protective ground

A PELV circuit contains a connection to protective ground. Without a connection to protective ground, or in case there is a fault in the connection to the protective ground, the voltage for the circuit is not stabilized.

Note

The temperature stability of cables connected to terminals must be at least 90 °C for power supply, functional grounding and signaling contact, and at least 75 °C for data cables.

Safety notices on use in hazardous areas

General safety notices relating to protection against explosion

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

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

⚠ 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

If the device is operated at max. ambient temperature, you must use cables with a permitted maximum operating temperature of at least 90 °C for power supply, functional grounding and signaling contact and of at least 75 °C for data cables. The cable entries used on the enclosure must comply with the IP degree of protection required by EN IEC / IEC 60079-0, GB 3836.1.

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.

7.2 Wiring rules

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

Wiring rules for ...		**Screw/spring-loaded terminals**
connectable cable cross sections for flexible cables ...	without wire end ferrule	0.25 - 2.5 mm^2
		AWG: 24 - 13
	with wire end ferrule with plastic ferrule**	0.25 - 2.5 mm^2
		AWG: 24 - 13
	with wire end ferrule without plastic ferrule**	0.25 - 2.5 mm^2
		AWG: 24 - 13
	with TWIN wire end ferrule**	0.5 - 1 mm^2
		AWG: 20 - 17
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.

7.3 Power supply

Notes on the power supply

WARNING

Operation only with safety extra low voltage

The equipment is designed for operation with a directly connectable safety extra low voltage (SELV).

- Do not operate the device with DC voltage higher than 32 V DC or AC voltage.

⚠ CAUTION

Damage to the device due to overvoltage

The connector of the external power supply is not protected against strong electromagnetic pulses that can, for example, result from lightning strikes or switching large 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. A suitable device is, for example, the Dehn Blitzductor BVT AVD 24, article number 918 422 or a comparable protective element.

Manufacturer: DEHN+SOEHNE GmbH+Co. KG, Hans-Dehn-Str.1, Postfach 1640, D92306 Neumarkt, Germany

Operate the device with suitable overvoltage protection.

Note

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

Information on the power supply

- The "L1" and "L2" LEDs indicate the current range of the power supply, see the section "L1 and L2 LEDs (Page 35)".
- You can use two 2-pin terminal blocks or one 4-pin terminal block (spring-loaded terminal) to connect the power supply.
  If you use two 2-pin terminal blocks, you can disconnect only the affected power supply from the device to perform repairs.
  Two 2-pin terminal blocks are included in the scope of delivery of the device. You can order 2- and 4-pin terminal blocks as spare parts, see section "Spare parts".
- 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 62).
- The power supply must meet the requirements in relation to RF radiation according to IEC 61000-4-3/NAMUR NE21 so that the overall system meets these requirements; see also "RF radiation according to NAMUR NE21 (Page 91)".

Position and assignment

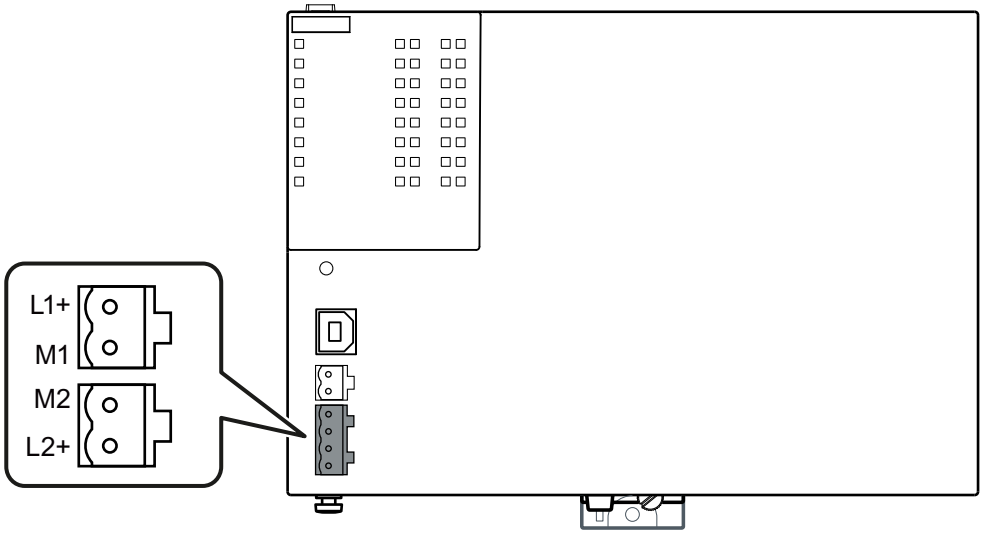


Figure 7-1 Position of the power supply and assignment of the terminal block

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

7.4 Functional ground

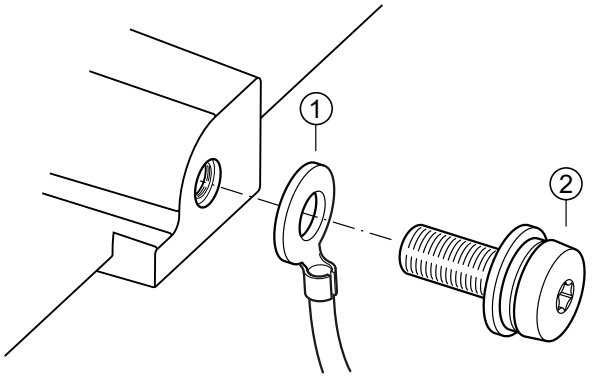
EMC disturbances are diverted to ground via the functional ground. This ensures the immunity of the data transmission.

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.

The IE switch has a grounding screw (fillister head screw with clamping washer und disk) for functional ground, refer to the section "Device views (Page 25)".

The grounding screw is identified by the following symbol for the functional ground ⏚.

Follow the steps below to connect the functional ground:



① Grounding terminal with cable
② Fillister head screw with spring washer and washer

1. Loosen the grounding screw).
2. Put the grounding terminal and grounding screw together.
3. Tighten the grounding screw with a maximum torque of 0.75 Nm.

Protective/functional ground

The connection of the reference potential surface with the protective ground system is normally in the cabinet close to the power feed-in. This ground conducts fault currents to ground safely and according DIN/VDE 0100 is a protective ground to protect people, animals and property from too high contact voltages.

Apart from the protective ground, there is functional grounding in the cabinet. According to EN60204-1 (DIN/VDE 0113 T1) electrical circuits must be grounded. The chassis (0 V) is grounded at one defined point. Here, once again the 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.

7.5 Industrial Ethernet

7.5.1 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.

Note

Unlocking the plug with a screwdriver

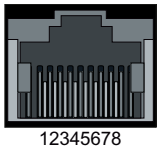
If installation space is limited, you can unlock the connectors using a screwdriver, see also "SIMATIC NET: IE FC RJ45 Plug 4x2 CAT 6A (https://support.industry.siemens.com/cs/ww/en/view/102047916)".

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+	 12345678
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 is also turned off. Then use a crossover cable.

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.

7.5.2 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

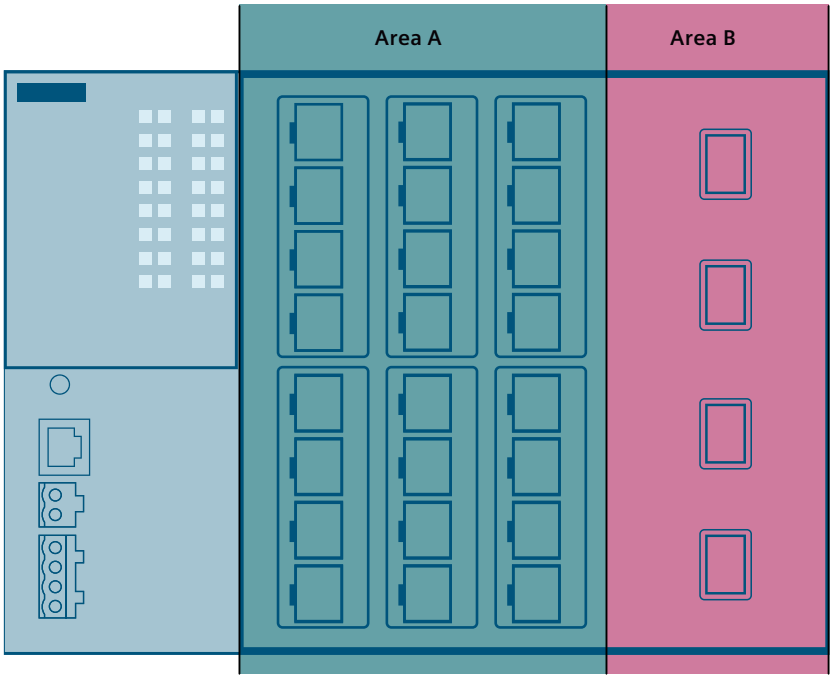
7.5.3 Dependency between ports and ambient temperature (derating)

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
SFP Active		SFP991-1A	6GK5 991-1AD00-8GA0
		SFP991-LD A	6GK5 991-1AF00-8GA0

7.5.3.1 Devices with 4 SFP/SFP+ slots



Temperature Horizontal installation position (position 1)	Area A	Area B
-40 °C ... 60 °C *)	RJ45 to 1 Gbps	SFP group 1
-40 °C ... 55 °C **)	RJ45 to 1 Gbps	SFP group 1 SFP group 2 SFP+ group 1 SFP Active Restriction 1)
-40 °C ... 40 °C	RJ45 to 1 Gbps	SFP group 1 SFP group 2 SFP+ group 1 SFP+ group 2 SFP Active Restriction 2)

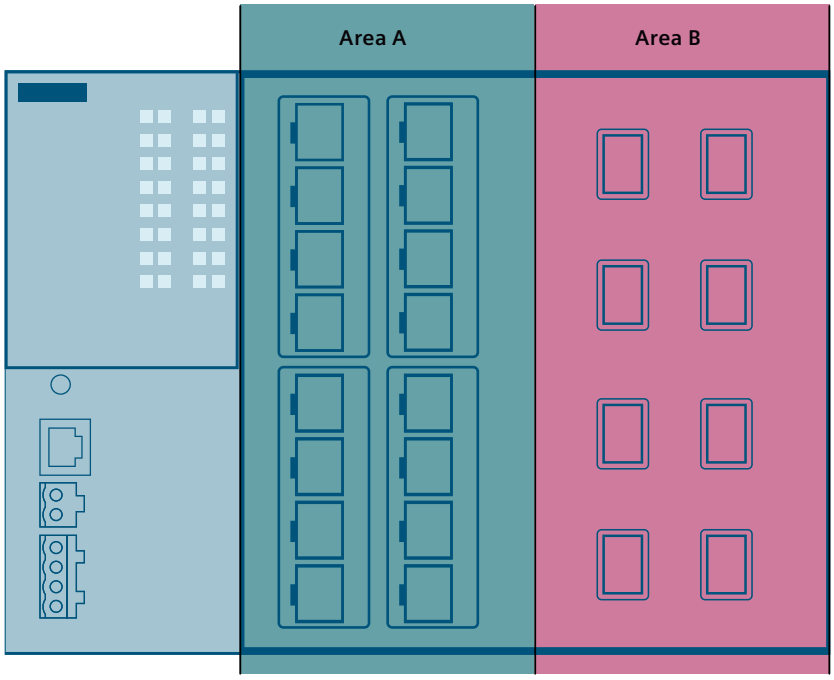
1) SFP transceivers of the type SFP993-1 (C) cannot be used. SFP transceivers of the SFP group 2 can be used in a maximum of two of these ports. Only use the P27 and P28 slots for this. The remaining ports of the area can be filled with SFP transceivers from SFP group 1, SFP+ group 1 or SFP Active.

2) SFP transceivers from the SFP group 2 or SFP+ group 2 can be used in a maximum of two of these ports. Only use the P27 and P28 slots for this. If you use SFP transceivers from SFP+ group 2, only the horizontal installation position (position 1) is permissible. The remaining ports of the area can be filled with SFP transceivers from SFP group 1, SFP+ group 1 or SFP Active.

*) The installation positions 2, 3 and 4 reduce the maximum temperature to 50 °C.

*) The installation positions 2 and 3 reduce the maximum temperature to 50 °C. The installation position 4 reduces the maximum temperature to 40 °C.

7.5.3.2 Devices with 8 SFP/SFP+ slots



Temperature Horizontal installation position (position 1)	Area A	Area B
-40 °C ... 60 °C *)	RJ45 to 1 Gbps	SFP group 1
-40 °C ... 55 °C **)	RJ45 to 1 Gbps	SFP group 1 SFP group 2 SFP+ group 1 SFP Active Restriction 1)
-40 °C ... 40 °C	RJ45 to 1 Gbps	SFP group 1 SFP group 2 SFP+ group 1 SFP+ group 2 SFP Active Restriction 2)

1) SFP transceivers of the type SFP993-1 (C) cannot be used. SFP transceivers of the SFP group 2 can be used in a maximum of two of these ports. Only use the P19, P20, P23 or P24 slots for this. The remaining ports of the area can be filled with SFP transceivers from SFP group 1, SFP+ group 1 or SFP Active.

2) SFP transceivers from the SFP group 2 or SFP+ group 2 can be used in a maximum of two of these ports. Only use the P19, P20, P23 or P24 slots for this. If you use SFP transceivers from SFP+ group 2, only the horizontal installation position (position 1) is permissible. The remaining ports of the area can be filled with SFP transceivers from SFP group 1, SFP+ group 1 or SFP Active.

*) The installation positions 2, 3 and 4 reduce the maximum temperature to 50 °C.

*) The installation positions 2 and 3 reduce the maximum temperature to 50 °C. The installation position 4 reduces the maximum temperature to 40 °C.

7.5.4 Inserting and removing pluggable transceivers

7.5.4.1 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".

7.5.4.2 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.

7.5.4.3 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.

7.6 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".

- Note the wiring rules (Page 62).
- The signaling contact can be controlled manually via the user interfaces. Information on this can be found in the Configuration manuals (Page 8).

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

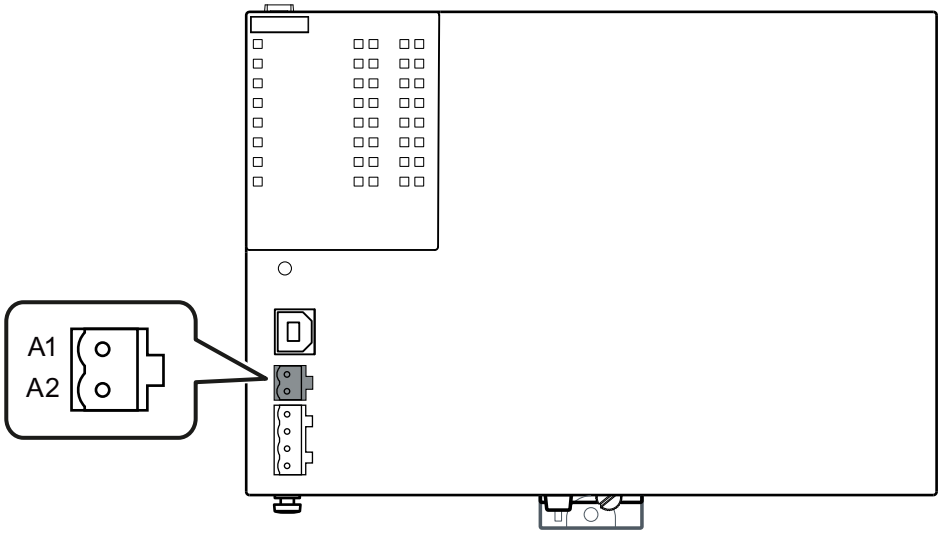


Figure 7-2 Position of the signaling contact and assignment of the terminal block

Contact	Assignment
A1	Alarm contact 1
A2	Alarm contact 2

7.7 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 29)".

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

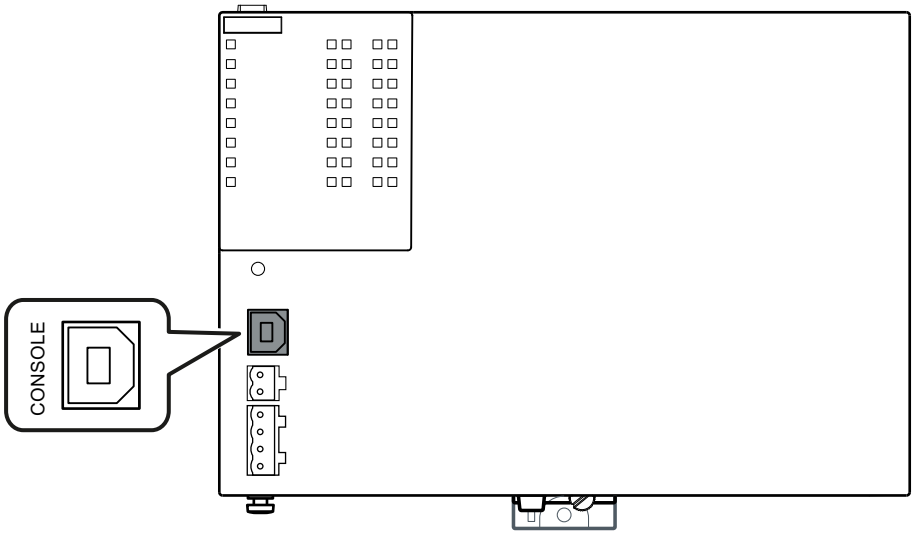
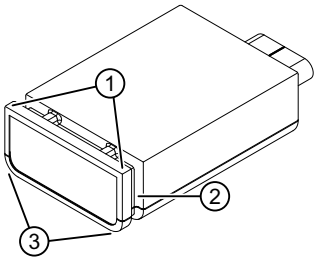


Figure 7-3 Position of the USB console interface (USB socket Type B)

7.8 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

8

⚠ 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 and original spare parts.
- 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

9

9.1 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 Web UI of the device via a network connection with a preset user profile.

To reset the device to default settings in the startup phase, do the following:

1. Turn off the power to the device.
2. Press the button and reconnect the power supply to the device while holding down the button.
3. Hold down the button until the red alarm LED **A** stops flashing and is permanently lit.
4. Release the button and wait until the alarm LED **A** goes off again.
   The device starts automatically with the default settings.

9.2 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 Web UI of the device via a network connection with a preset user profile.

Requirements

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

Resetting the device to default settings

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

1. Switch 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.

9.3 Loading 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.

Initial situation

If you cannot access the device via HTTPS (Web UI) or SSH (CLI), you can upload firmware to the device using the Trivial File Transfer Protocol (TFTP).

This situation can arise, for example, if a power failure has occurred during a firmware update.

When pressing the button, observe the information in the section "SELECT/SET button (Page 37)".

Requirements

- There is a client PC in the same network as the device
  If Microsoft Windows runs on the client PC, make sure that TFTP is enabled.

  Note

  You can enable TFTP in Microsoft Windows as follows:

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

- A copy of the target firmware is saved on the client PC.

Procedure

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 power supply to the device while holding down the button.
3. Hold down the button until the alarm LED A starts to flash.
4. Release the button as long as the red alarm LED A is still flashing.
   This time only lasts a few seconds.
   In this state, the device is ready to receive a firmware file from a TFTP server (update mode).
5. Connect a client PC to an Ethernet port of the device via an Ethernet cable.

   Note

   In this state, only direct communication with the device is possible. Data traffic is not forwarded across ports.

6. Assign an IP address for the device using DHCP or SINEC PNI.
7. Carry out the following steps on the client PC:
   - Open a command prompt and go to the directory containing the firmware file.
   - Start the file transfer TFTP.
     If you are using Microsoft Windows, for example, execute the following command:
     `tftp -i { IP address of device } put { firmware file }`

   Once the firmware has been transferred completely to the device and validated, the device restarts. This may take a few minutes.
8. [Optional] Log into the device using CLI or Web UI and check the firmware version.
   For more information, refer to the SINEC OS configuration manuals for the loaded firmware version.

Technical specifications

10

10.1 SCALANCE XCM324

The following technical specifications apply to the SCALANCE XCM324.

Technical specifications		
Connection to Industrial Ethernet		
Electrical connectors	Quantity	16
	Connector	RJ45 jack
	Properties	Half/full duplex, MDI-X pinning
	Transmission speed	10 / 100 / 1000 Mbps
Slots for plug-in transceiver (SFP+)	Quantity	8
	Connector	SFP / SFP+ plug-in 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)
Function extender interface (SCALANCE LPE)		
	Quantity	1
	Ethernet interfaces	3 • 2 x 1 Gbps • 1 x 10 Gbps
	Power supply from SCALANCE XCM-300 to SCALANCE LPE	24 V DC
Electrical data		
Power supply [1)]	Rated voltage	24 V DC
	Voltage range (incl. tolerance)	19.2 to 28.8 V DC, safety extra-low voltage (SELV)
	Design	2x spring-loaded terminal block, 2-pin
	Property	Implemented redundantly; The connected power supply must meet the requirements of NEC Class 2.
	Fusing	10A / 250V

Technical specifications			
Current consumption	DC nominal voltage:		
	With LPE		2.6 A
	Without LPE		1.8 A
Effective power loss	DC nominal voltage:		
	With LPE	max.	62.4 W
		typical	55.0 W
	Without LPE	max.	43.2 W
		typical	35.8 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 (position 1): -40 °C to +60 °C During operation in a different installation position (positions 2, 3 and 4): -40 °C ... +50 °C
	When operating with SFP transceivers up to 2000 m above sea level, see "Devices with 8 SFP/SFP+ slots (Page 71)"		
	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	compact		
Housing material	Basic housing		Die cast aluminum, powder coated
	Front cover		Polycarbonate (PC-GF10)
Degree of protection	IP20		
Dimensions (W x H x D)	210 x 147 x 125 mm		
Weight	1800 g		
Installation options	• Wall mounting • Installation on a DIN rail • Mounting on an S7-300 standard rail • Mounting on an S7-1500 standard rail		
Mounting restriction	Observe mounting positions (Page 47)		
Conformal coating of the PCBs	No		
Mean time between failure (MTBF)			
MTBF (EN/IEC 61709; 40 °C)	13.4 years		

[1] Wiring rules

Note the wiring rules (Page 62).

[2] Ambient temperature with SFP

The maximum ambient temperature during operation depends on the operating elevation and the installed plug-in transceivers, see also the section "SFP plug-in transceiver (Page 31)" in the "Accessories" section.

[3] Derating

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

10.2 SCALANCE XCH328 / XCM328

The following technical specifications apply to SCALANCE XCM328 and SCALANCE XCH328.

Technical specifications		
Connection to Industrial Ethernet		
Electrical connectors	Quantity	24
	Connector	RJ45 jack
	Properties	Half/full duplex, MDI-X pinning
	Transmission speed	10 / 100 / 1000 Mbps
Slots for plug-in transceiver (SFP+)	Quantity	4
	Connector	SFP / SFP+ plug-in 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)
Function extender interface (SCALANCE LPE)		
	Quantity	1
	Ethernet interfaces	3 • 2 x 1 Gbps • 1 x 10 Gbps
	Power supply from SCALANCE XCM-300 to SCALANCE LPE	24 V DC

Technical specifications			
Electrical data			
Power supply [1]	Rated voltage		24 V DC
	Voltage range (incl. tolerance)		19.2 to 28.8 V DC, safety extra-low voltage (SELV)
	Design		2x spring-loaded terminal block, 2-pin
	Property		Implemented redundantly; The connected power supply must meet the requirements of NEC Class 2.
	Fusing		10 A / 250 V
Current consumption	DC nominal voltage:		
	With LPE		2.6 A
	Without LPE		1.8 A
Effective power loss	DC nominal voltage:		
	With LPE	max.	62.4 W
		typical	55.0 W
	Without LPE	max.	43.2 W
		typical	35.8 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 (position 1): -40 °C to +60 °C During operation in a different installation position (positions 2, 3 and 4): -40 °C ... +50 °C
	When operating with SFP transceivers up to 2000 m above sea level, see "Devices with 4 SFP/SFP+ slots (Page 70)"		
	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	compact		
Housing material	Basic housing		Die cast aluminum, powder coated
	Front cover		Polycarbonate (PC-GF10)
Degree of protection	IP20		
Dimensions (W x H x D)	210 x 147 x 125 mm		
Weight	1900 g		

Technical specifications		
Installation options	• Wall mounting • Installation on a DIN rail • Mounting on an S7-300 standard rail • Mounting on an S7-1500 standard rail	
Mounting restriction	Observe mounting positions (Page 47)	
Conformal coating of the PCBs	SCALANCE XCM328	No
	SCALANCE XCH328	Yes
Mean time between failure (MTBF)		
MTBF (EN/IEC 61709; 40 °C)	15.6 years	

[1] Wiring rules

Note the wiring rules (Page 62).

[2] Ambient temperature with SFP

The maximum ambient temperature during operation depends on the operating elevation and the installed plug-in transceivers, see also the section "SFP plug-in transceiver (Page 31)" in the "Accessories" section.

[3] Derating

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

10.3 SCALANCE XCM332

The following technical specifications apply to the SCALANCE XCM332.

Technical specifications		
Connection to Industrial Ethernet		
Electrical connectors	Quantity	32
	Connector	RJ45 jack
	Properties	Half/full duplex, MDI-X pinning
	Transmission speed	10 / 100 / 1000 Mbps
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		

Technical specifications			
Removable data storage medium	Quantity		1
	Product name		Siemens Configuration and License PLUG (CLP)
Function extender interface (SCALANCE LPE)			
	Quantity		1
	Ethernet interfaces		3
			• 2 x 1 Gbps • 1 x 10 Gbps
	Power supply from SCALANCE XCM-300 to SCALANCE LPE		24 V DC
Electrical data			
Power supply [1]	Rated voltage		24 V DC
	Voltage range (incl. tolerance)		19.2 to 28.8 V DC, safety extra-low voltage (SELV)
	Design		2x spring-loaded terminal block, 2-pin
	Property		Implemented redundantly; The connected power supply must meet the requirements of NEC Class 2.
	Fusing		10 A / 250 V
Current consumption	DC nominal voltage:		
	With LPE		2.6 A
	Without LPE		1.8 A
Effective power loss	DC nominal voltage:		
	With LPE	max.	62.4 W
		typical	55.0 W
	Without LPE	max.	43.2 W
		typical	35.8 W
Cable cross-section	Minimum		0.75 mm^2 (AWG 18)
	Maximum		2.5 mm^2 (AWG 12)
Permitted ambient conditions			
Ambient temperature	Property		Startup at -40 °C
	With operation up to 2000 m above sea level		During operation in horizontal installation position (position 1): -40 °C to +60 °C During operation in a different installation position (positions 2, 3 and 4): -40 °C ... +50 °C
	With operation between 2000 m and 3000 m above sea level		The high value of the temperature range is reduced by 5 °C [2].
	With operation between 3000 m and 4000 m above sea level		The high value of the temperature range is reduced by 10 °C [2].
	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	compact	
Housing material	Basic housing	Die cast aluminum, powder coated
	Front cover	Polycarbonate (PC-GF10)
Degree of protection	IP20	
Dimensions (W x H x D)	210 x 147 x 125 mm	
Weight	2040 g	
Installation options	• Wall mounting • Installation on a DIN rail • Mounting on an S7-300 standard rail • Mounting on an S7-1500 standard rail	
Mounting restriction	Observe mounting positions (Page 47)	
Conformal coating of the PCBs	No	
Mean time between failure (MTBF)		
MTBF (EN/IEC 61709; 40 °C)	11.6 years	

1) Wiring rules

Note the wiring rules (Page 62).

2) Derating

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

10.4 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

10.5 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)

10.6 Cable lengths

The cable lengths listed below apply to the devices named in the scope of validity:

Cable	Permitted cable length
IE TP torsion cable with IE FC Outlet RJ-45 + 10 m TP cord	0 to 45 m + 10 m TP cord
IE TP torsion cable with IE FC RJ-45 Plug 180	0 to 55 m
IE FC TP Marine / Trailing / Flexible cable with IE FC Outlet RJ-45 + 10 m TP cord	0 to 75 m + 10 m TP cord
IE FC TP Marine / Trailing / Flexible cable with IE FC RJ-45 Plug 180	0 to 85 m
IE FC TP standard cable with IE FC Outlet RJ-45 + 10 m TP cord	0 to 90 m + 10 m TP cord
IE FC TP standard cable with IE FC RJ-45 Plug 180	0 to 100 m

10.7 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: 30 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	811688

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.

10.8 RF radiation according to NAMUR NE21

The devices listed in the scope of validity meet the following requirements regarding RF radiation:

RF radiation according to IEC 61000-4-3/NAMUR NE21	
80 MHz - 2.0 GHz	2.0 GHz - 2.7 GHz
10 V/m	3 V/m
80% AM (1kHz)	

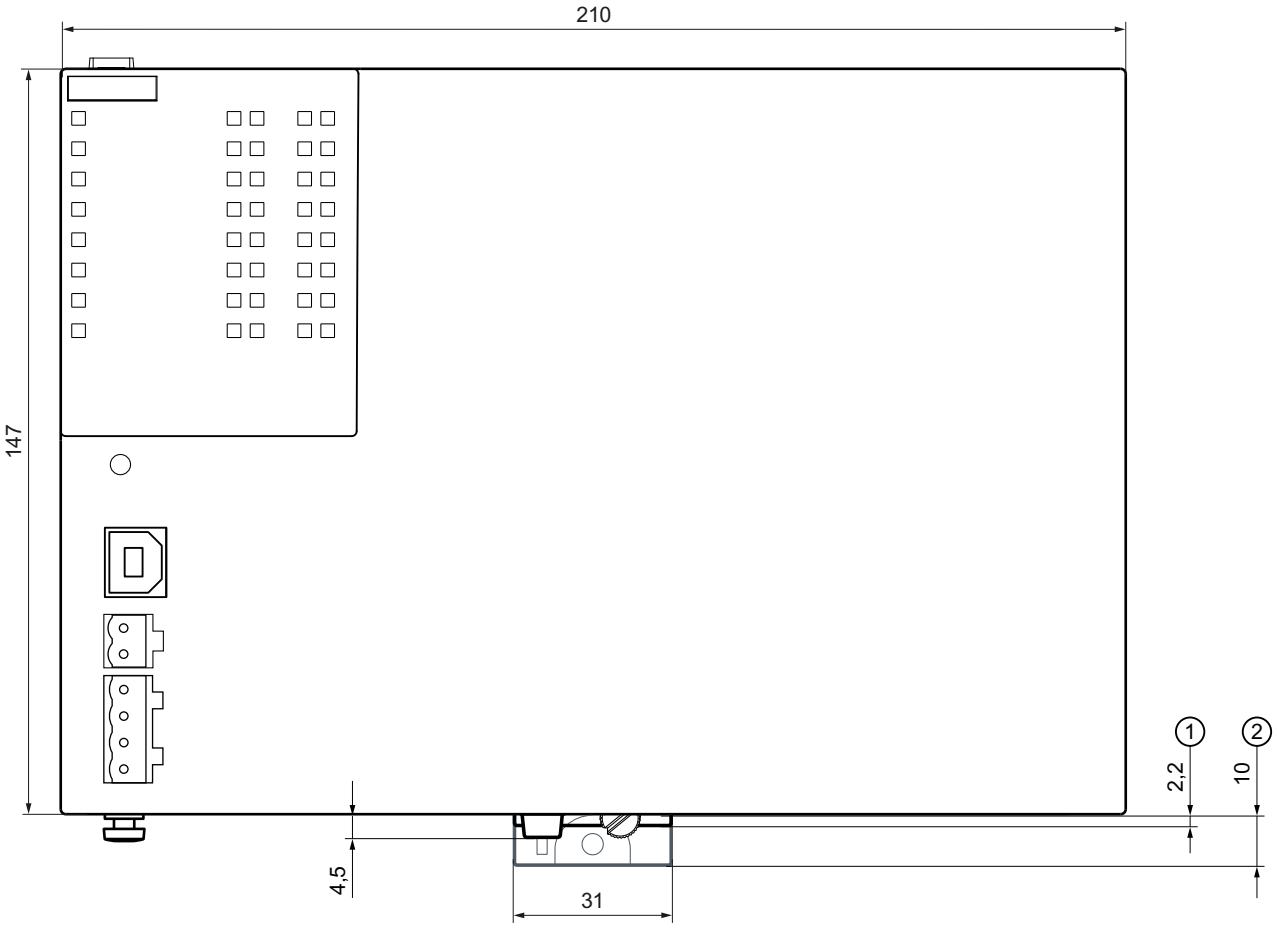
11 Dimension drawings

11.1 Dimension drawings SCALANCE XCM-300

Note

Dimensions are specified in mm.

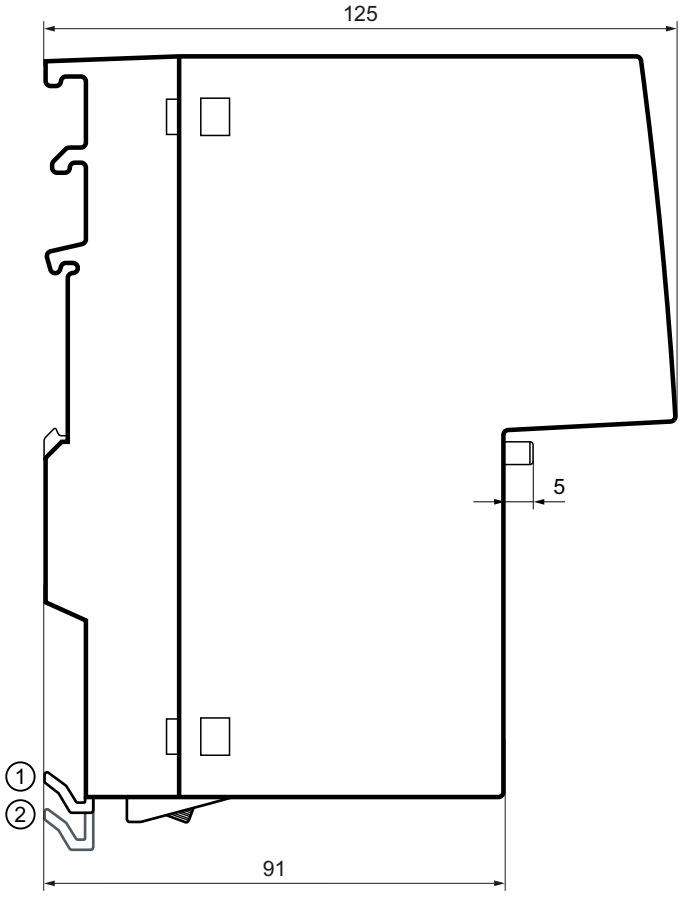
Front view



① Securing bar in the rail mounting position

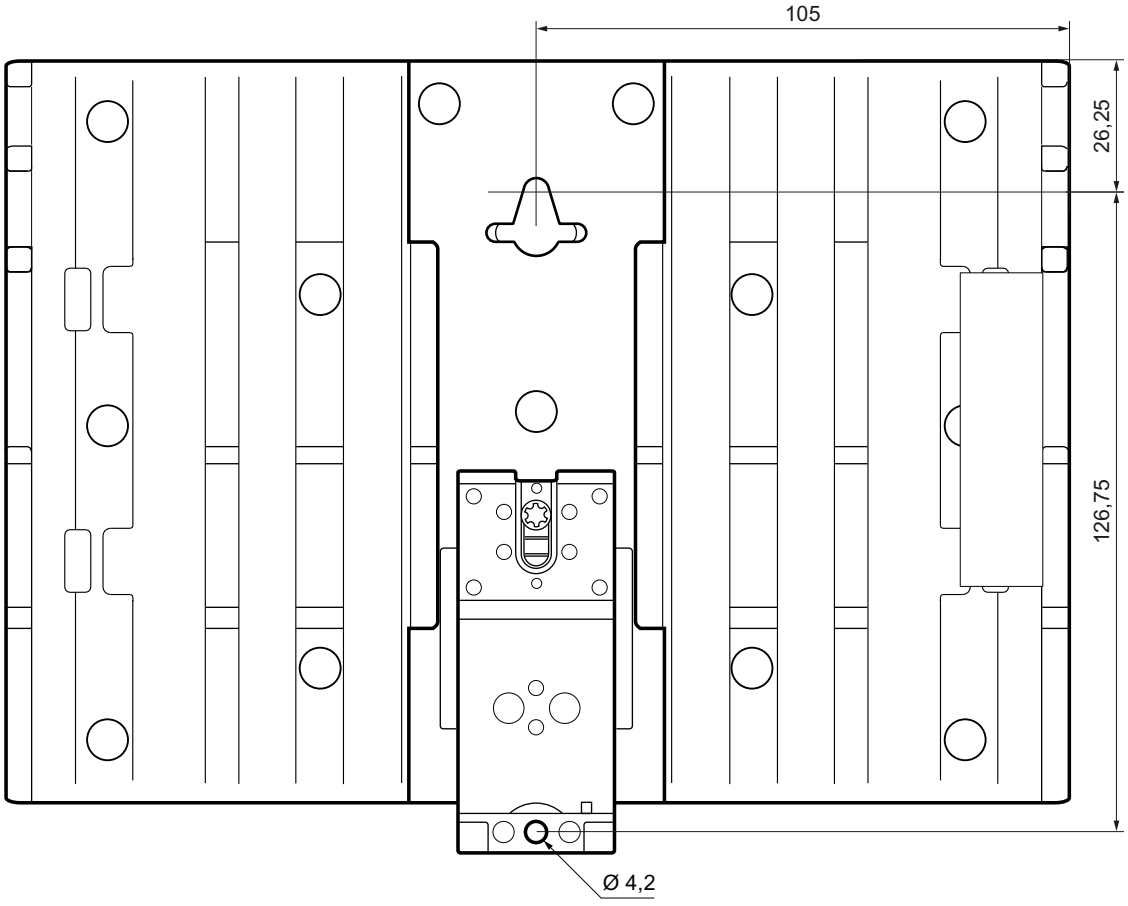
② Securing bar in the wall mounting position (as supplied).

Side view



① Securing bar in the rail mounting position
② Securing bar in the wall mounting position (as supplied).

Drilling template for wall mounting

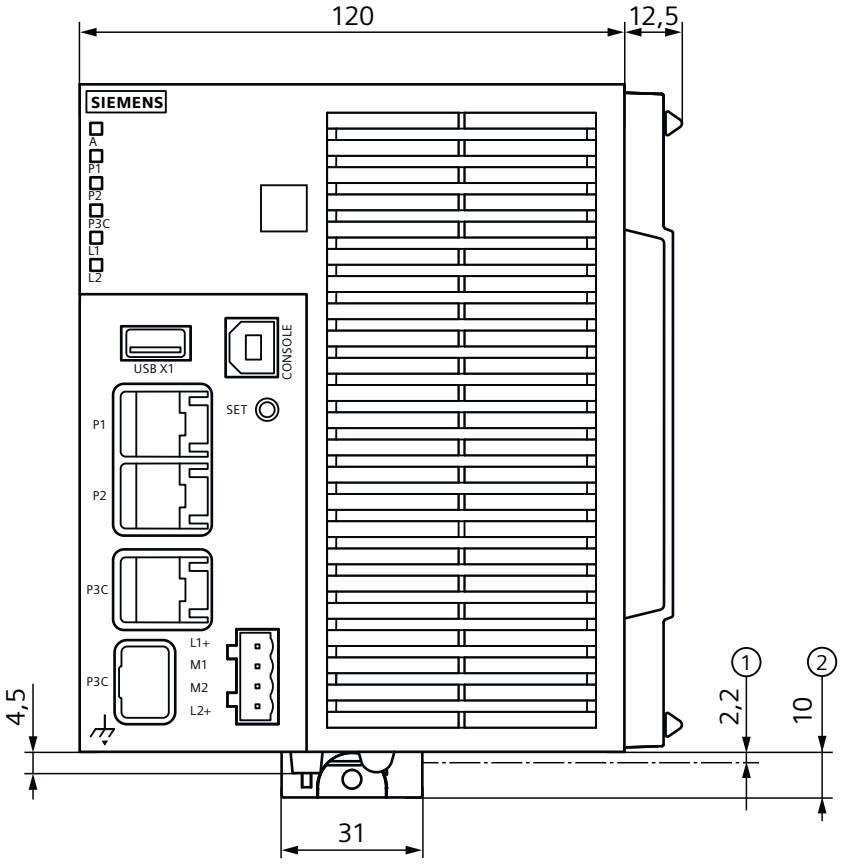


11.2 SCALANCE LPE dimension drawings

Note

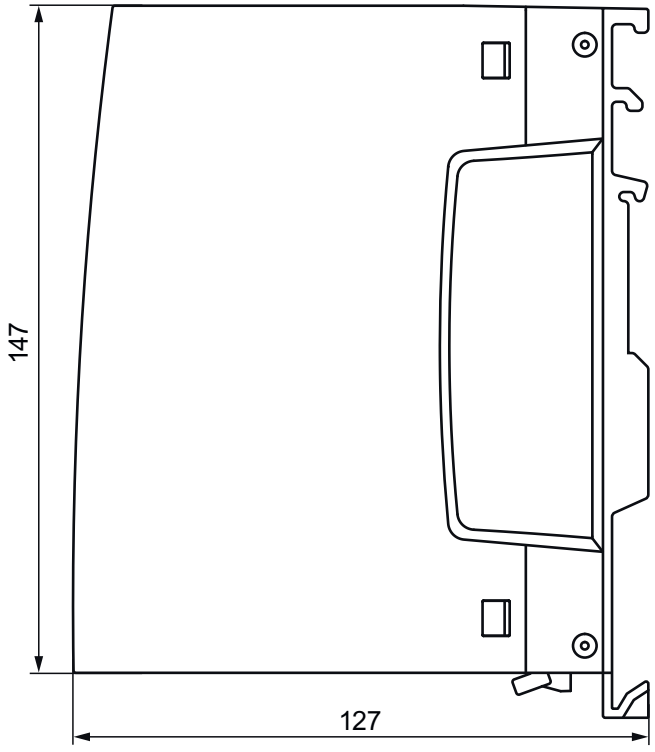
Dimensions are specified in mm.

Front view

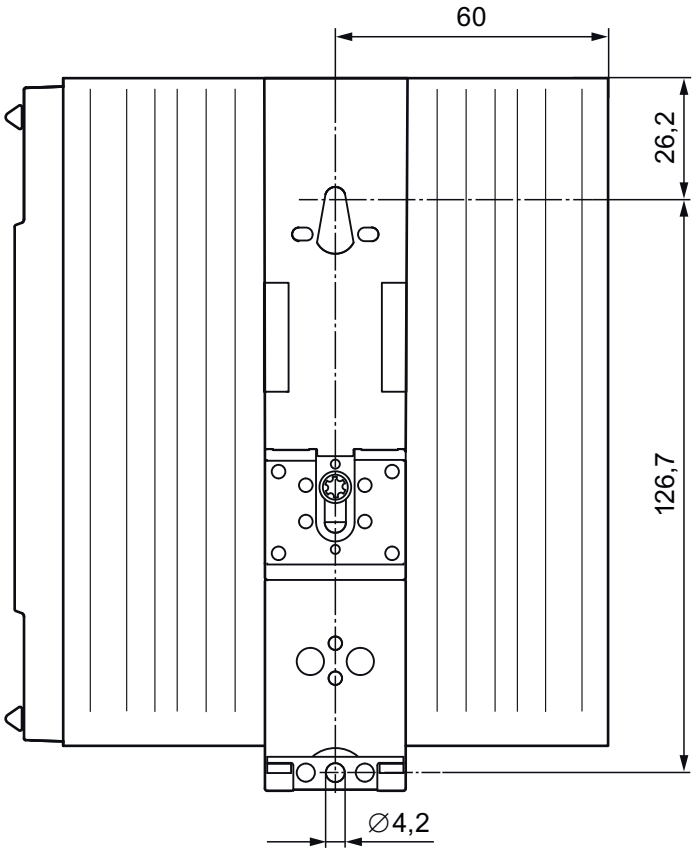


① Securing bar in the rail mounting position
② Securing bar in the wall mounting position (as supplied)

Side view



Drilling template for wall mounting



Certifications and approvals

12

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 EC 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, pages. 309-356
- **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, pages. 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, pages 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
DE-76181 Karlsruhe
Germany

UK Declaration of Conformity

UK CA

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 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.

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

cULus approval PROG. CNTLR.



cULus Listed PROG. CNTLR.

Underwriters Laboratories Inc. complying with

- UL 61010-2-201
- CAN/CSA C22.2 No. 61010-2-201

Report no. E85972

cULus Approval Hazardous Location



cULus Listed PROG.CNTLR. 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. E223122

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 XCM332	-
SCALANCE XCM324	(*)
SCALANCE XCH328	(*)
SCALANCE XCM328	(*)

* 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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