

SIMATIC NET

Industrial Ethernet security SCALANCE SC-600

Operating Instructions

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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 AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

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

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Introduction

CAUTION

To prevent injury, read the manual before use.

Purpose of the Operating Instructions

These operating instructions support you when installing and connecting up the SCALANCE SC-600 product line.

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

Validity of the Operating Instructions

These operating instructions apply to the following devices:

- SCALANCE SC632-2C
- SCALANCE SC636-2C
- SCALANCE SC642-2C
- SCALANCE SC646-2C

Designations used

Classification	Description	Terms used
Product line	If information applies to all product groups within the product line, the term SCALANCE SC-600 is used.	SCALANCE SC-600
Product group	If information applies to all devices of a product group, a suitable term is used. • SCALANCE SC632-2C and SCALANCE SC642-2C • SCALANCE SC636-2C and SCALANCE SC646-2C	SC6x2-2C SC6x6-2C
Device	If information relates to a specific device, the device name is used.	SCALANCE SC632-2C SCALANCE SC636-2C SCALANCE SC642-2C SCALANCE SC646-2C

Documentation on configuration

You will find detailed information on configuring the devices in the following configuration manuals:

- SCALANCE SC-600 Web Based Management (WBM)
- SCALANCE SC-600 Command Line Interface (CLI)

You will find the configuration manuals here:

- On the data medium that ships with some products:
 - Product CD / product DVD
 - SIMATIC NET Manual Collection
- On the Internet pages of Siemens Industry Online Support:
Link: (<https://support.industry.siemens.com/cs/ww/en/ps/15327/man>)

Further documentation

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

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

You will find the system manuals here:

- On the data medium that ships with some products:
 - Product CD / product DVD
 - SIMATIC NET Manual Collection
- On the Internet pages of Siemens Industry Online Support:
 - Industrial Ethernet / PROFINET Industrial Ethernet System Manual
Link: (<https://support.industry.siemens.com/cs/ww/en/view/27069465>)
 - Industrial Ethernet / PROFINET - Passive Network Components System Manual
Link: (<https://support.industry.siemens.com/cs/ww/en/view/84922825>)

SIMATIC NET manuals

You will find the SIMATIC NET manuals here:

- On the data medium that ships with some products:
 - Product CD / product DVD
 - SIMATIC NET Manual Collection
- On the Internet pages of Siemens Industry Online Support:
Link: (<https://support.industry.siemens.com/cs/ww/en/ps/15247>)

License conditions

Note

Open source software

Read the license conditions for open source software carefully before using the product.

You will find license conditions in the following documents on the supplied data medium:

- OSS_SCALANCE-SC-600_99.pdf

Security information

Siemens provides products and solutions with industrial security 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 security 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.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For additional information on industrial security measures that may be implemented, please visit

Link: (<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 customers' exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under

Link: (<https://www.siemens.com/industrialsecurity>)

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 on the Internet at the following address:

Link: (<https://support.industry.siemens.com/cs/ww/en/view/50305045>)

Catalogs

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

- SIMATIC NET Industrial Communication / Industrial Identification, catalog IK PI
- SIMATIC Products for Totally Integrated Automation and Micro Automation, catalog ST 70
- Industry Mall - catalog and ordering system for automation and drive technology, Online catalog

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

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.

Recycling and disposal



The product is low in pollutants, can be recycled and meets the requirements of the WEEE directive 2012/19/EU "Waste Electrical and Electronic Equipment".

Do not dispose of the product 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.

Keep to the local regulations.

You will find information on returning the product on the Internet pages of Siemens Industry Online Support:

Link: (<https://support.industry.siemens.com/cs/ww/en/view/109479891>)

Trademarks

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

SIMATIC NET, SCALANCE, SINEMA, C-PLUG

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

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".

NOTICE
Cleaning the housing
Only clean the outer parts of the housing with a dry cloth.
Do not use any liquids or solvents.

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 notices when using the device according to Hazardous Locations (HazLoc) and FM.

If you use the device under HazLoc or FM conditions you must also keep to the following safety notices in addition to the general safety notices 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.

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

Security recommendations

To prevent unauthorized access, note the following security recommendations.

General

- You should make regular checks to make sure that the device meets these recommendations and/or other security guidelines.
- Evaluate your plant as a whole in terms of security. Use a cell protection concept with suitable products.
Link: (<https://www.industry.siemens.com/topics/global/en/industrial-security/pages/default.aspx>)
- Separate connections correctly (WBM, Telnet, SSH etc.).

Physical access

- Restrict physical access to the device to qualified personnel because the plug-in data medium can contain sensitive data.
- Lock unused physical interfaces on the device. Unused interfaces can be used to gain access to the plant without permission.

Software (security functions)

- Keep the firmware up to date. Check regularly for security updates for the device. You can find information on this at the Industrial Security (<http://www.siemens.com/industrialsecurity>) website.
- Inform yourself regularly about security recommendations published by Siemens ProductCERT (<http://www.siemens.com/cert/en/cert-security-advisories.htm>).
- Only activate protocols that you require to use the device.
- Restrict access to the management of the device with rules in an access control list (ACL).
- The option of VLAN structuring provides protection against DoS attacks and unauthorized access. Check whether this is practical or useful in your environment.
- Use a central logging server to log changes and accesses. Operate your logging server within the protected network area and check the logging information regularly.

Passwords

- Define rules for the assignment of passwords.
- Regularly change your passwords to increase security.
- Use passwords with a high password strength.

- Make sure that all passwords are protected and inaccessible to unauthorized persons.
- Do not use the same password for different users and systems.

Keys and certificates

- The device contains a pre-installed X.509 certificate with key. Replace this certificate with a self-made certificate with key. We recommend that you use a certificate signed by a reliable external or internal certification authority.
- Use the certification authority including key revocation and management to sign the certificates.
- Make sure that user-defined private keys are protected and inaccessible to unauthorized persons.
- Verify certificates and fingerprints on the server and client to prevent "man in the middle" attacks.
- It is recommended that you use password-protected certificates in the PKCS #12 format
- It is recommended that you use certificates with a key length of at least 2048 bits.
- Change keys and certificates immediately, if there is a suspicion of compromise.

Secure/non-secure protocols

- Avoid or disable non-secure protocols, for example HTTP, Telnet and TFTP. For historical reasons, these protocols are still available, however not intended for secure applications. Use non-secure protocols on the device with caution.
- Avoid or disable non-secure protocols. Check whether use of the following protocols is necessary:
 - Non authenticated and unencrypted ports
 - MRP, HRP
 - IGMP snooping
 - LLDP
 - Syslog
 - RADIUS
 - DHCP Options 66/67
 - TFTP
 - GMRP and GVRP

- The following protocols provide secure alternatives:

- HTTP → HTTPS
- Telnet → SSH
- SNMPv1/v2c → SNMPv3

Check whether use of SNMPv1/v2c is necessary. SNMPv1/v2c are classified as non-secure. Use the option of preventing write access. The device provides you with suitable setting options.

If SNMP is enabled, change the community names. If no unrestricted access is necessary, restrict access with SNMP.

Use the authentication and encryption mechanisms of SNMPv3.

- Use secure protocols when access to the device is not prevented by physical protection measures.
- If you require non-secure protocols and services, operate the device only within a protected network area.
- Restrict the services and protocols available to the outside to a minimum.
- For the DCP function, enable the "Read Only" mode after commissioning.
- If you use RADIUS for management access to the device, activate secure protocols and services.
- For secure storage of your configuration, use the option of assigning a password with "Load and Save".

Interfaces security

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

Available protocols

The following list provides you with an overview of the open protocol ports.

The table includes the following columns:

- **Protocol**
- **Port**

- **Factory setting**

- Open

The factory setting of the port is "Open".

- Closed

The factory setting of the port is "Closed".

- **Port status**

- Open

The port is always open and cannot be closed.

- Open (when configured)

The port is open if it has been configured.

- **Authentication**

Specifies whether or not the protocol is authenticated.

- **Encryption**

Specifies whether or not the transfer is encrypted.

Protocol	Port	Factory setting		Port status	Authentication	Encryption
		VLAN1 ¹⁾	VLAN2 ²⁾			
SSH	TCP/22	Open	Closed	Open (when configured with login)	Yes	Yes
PROFINET	UDP/34964 UDP/40xxx	Open	Closed	Open (when configured)	No	No
HTTP	TCP/80	Open	Open	Open (when configured with login)	No	No
HTTPS	TCP/443	Open	Closed	Open (when configured with login)	Yes	Yes
HTTPS	TCP/any when there is a SINEMA RC connection	Open	Closed	Open	Yes	Yes
SNMP	UDP/161 UDP/162	Open	Closed	Open (when configured)	Yes	Yes (when configured)
DNS	TCP/53	Open	Closed	Open (when configured)	No	No
	UDP/53	Open	Closed	Open (when configured)	No	No
Syslog	UDP/514	Closed	Closed	Open (only outgoing)	No	No
IPsec	UDP/500 UDP/4500	Closed	Open	Open (when configured)	Yes	Yes
DHCP	UDP/67 UDP/68	Open	Open	Open (when configured)	No	No
NTP	UDP/123	Closed	Closed	Open (only outgoing)	Yes	Yes (when configured)

Protocol	Port	Factory setting		Port status	Authentication	Encryption
		VLAN1 ^{*)}	VLAN2 ^{*)}			
SRS	TCP/443	Closed	Closed	Open (only outgoing when configured)	Yes	Yes
OpenVPN	TCP/UDP, depending on the configuration in SINEMA RC	Closed	Closed	Open (when configured)	Yes	Yes
TFTP	UDP/69	Closed	Closed	Open (only outgoing)	No	No
DDNS	TCP/80	Closed	Closed	Open (only outgoing when configured)	No	No
ICMP	-	Open	Closed	Open	No	No

^{*)} Depending on the device type VLAN1 and VLAN2 are on different physical ports:

SC6x2-2C: VLAN1 = port 1, VLAN2 = port 2

SC6x6-2C: VLAN1 = port 1-4, VLAN2 = port 5-6

Description of the device

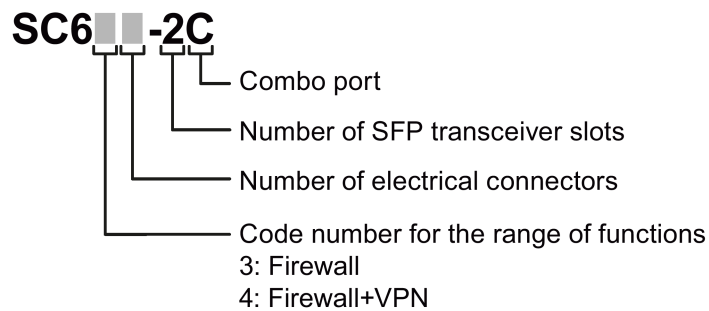
4.1 Product overview

Article numbers

Device	Description	Article number
SCALANCE SC632-2C	2 RJ-45 ports, 2 SFP transceiver slots as combo ports	6GK5632-2GS00-2AC2
SCALANCE SC636-2C	6 RJ-45 ports, 2 SFP transceiver slots as combo ports	6GK5636-2GS00-2AC2
SCALANCE SC642-2C	2 RJ-45 ports, 2 SFP transceiver slots as combo ports	6GK5642-2GS00-2AC2
SCALANCE SC646-2C	6 RJ-45 ports, 2 SFP transceiver slots as combo ports	6GK5646-2GS00-2AC2

Type designation

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



Interfaces

Device	Total usable ports	SFP transceiver slots	Electrical connectors	Combo ports
SCALANCE SC632-2C	2 RJ-45 ports	2	2	2
SCALANCE SC636-2C	6 RJ-45 ports	2	6	2
SCALANCE SC642-2C	2 RJ-45 ports	2	2	2
SCALANCE SC646-2C	6 RJ-45 ports	2	6	2

Components of the product

The following components are supplied with a SCALANCE SC-600:

- A SCALANCE SC-600 module
- A SIMATIC NET Manual Collection with documentation
- One securing screw for mounting on an S7 standard rail
- One 4-pin terminal block for the power supply (spring-loaded terminal)
- One 2-pin terminal block for the signaling contact (spring-loaded terminal)
- One 2-pin terminal block for the digital input (spring-loaded terminal)
- One connecting cable for the serial interface with RJ-11 plug and 9-pin D-sub female connector

4.2 Accessories

The following accessories are available for the SCALANCE SC-600 :

C-PLUG

Component	Description	Article number
C-PLUG	Exchangeable storage medium (32 MB) for the configuration data	6GK1900-0AB00

Cable

Component	Description	Article number
Connecting cable (RJ-11/RS-232)	Preassembled, serial cable with RJ-11 and RS-232 plug, Length: 3 m pack of 1	6GK5 980-3BB00-0AA5

Pluggable transceiver

 WARNING
Use only approved pluggable transceivers If you use pluggable 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 pluggable transceivers, this can lead to the following problems: • Damage to the device • Loss of the approvals • Violation of the EMC regulations Use only approved pluggable transceivers.

Note

Plugging and pulling during operation

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

SFP transceiver

Type	Properties	Order ID
SFP991-1	1 x 100 Mbps, LC port optical for glass FO cable (multimode), up to max. 5 km	6GK5 991-1AD00-8AA0
SFP991-1 (C)	1 x 100 Mbps, SC port optical, for glass FO cable (multimode), up to max. 5 km, varnished	6GK5 991-1AD00-8FA0

Type	Properties	Order ID
SFP991-1LD	1 x 100 Mbps LC port optical for glass FO cable (single mode) up to max. 26 km	6GK5 991-1AF00-8AA0
SFP991-1LD (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
SFP992-1	1 x 1000 Mbps, LC port optical for glass FO cable (multimode), up to max. 750 m	6GK5 992-1AL00-8AA0
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
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
SFP992-1LH	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

Types appended with a (C) are provided with a UL-R/C-approved coating.

Note

Restriction for pluggable transceivers

The maximum ambient temperature changes if you use pluggable transceivers. You will find the permitted temperature ranges in the section Technical specifications (Page 61).

4.3 Spare parts

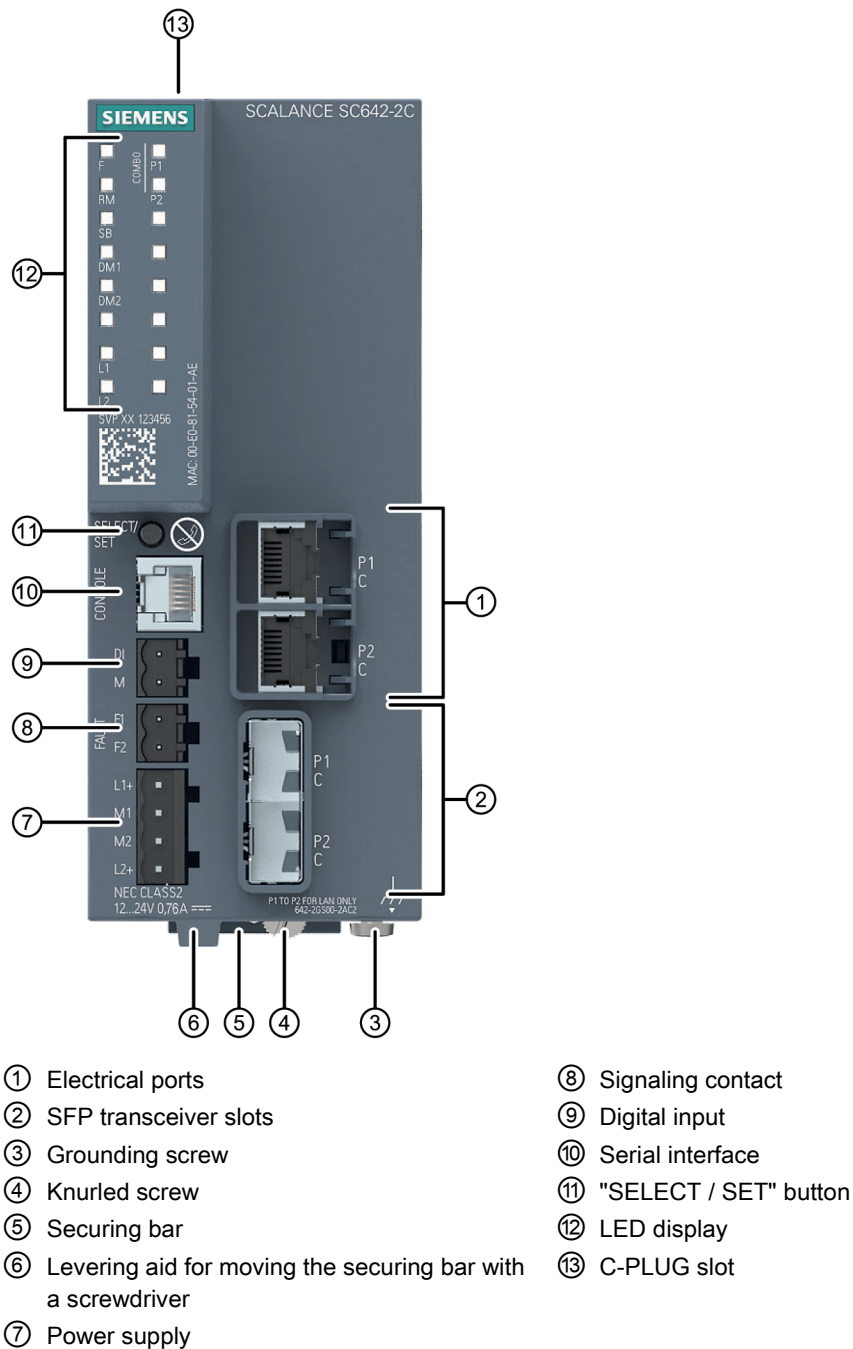
The following spare parts are available for SCALANCE SC-600 :

Component	Description	Article number
Spring-loaded terminal block, 4 terminals	4-terminal spring-loaded terminal block to connect the power supply (24 VDC), for SCALANCE X/W/S/M, pack of 5	6GK5 980-1DB10-0AA5
Spring-loaded terminal block, 2 terminals	2-terminal spring-loaded terminal block to connect the signaling contact (24 VDC), for SCALANCE X/W/S/M, pack of 5	6GK5 980-0BB10-0AA5

4.4 Device views

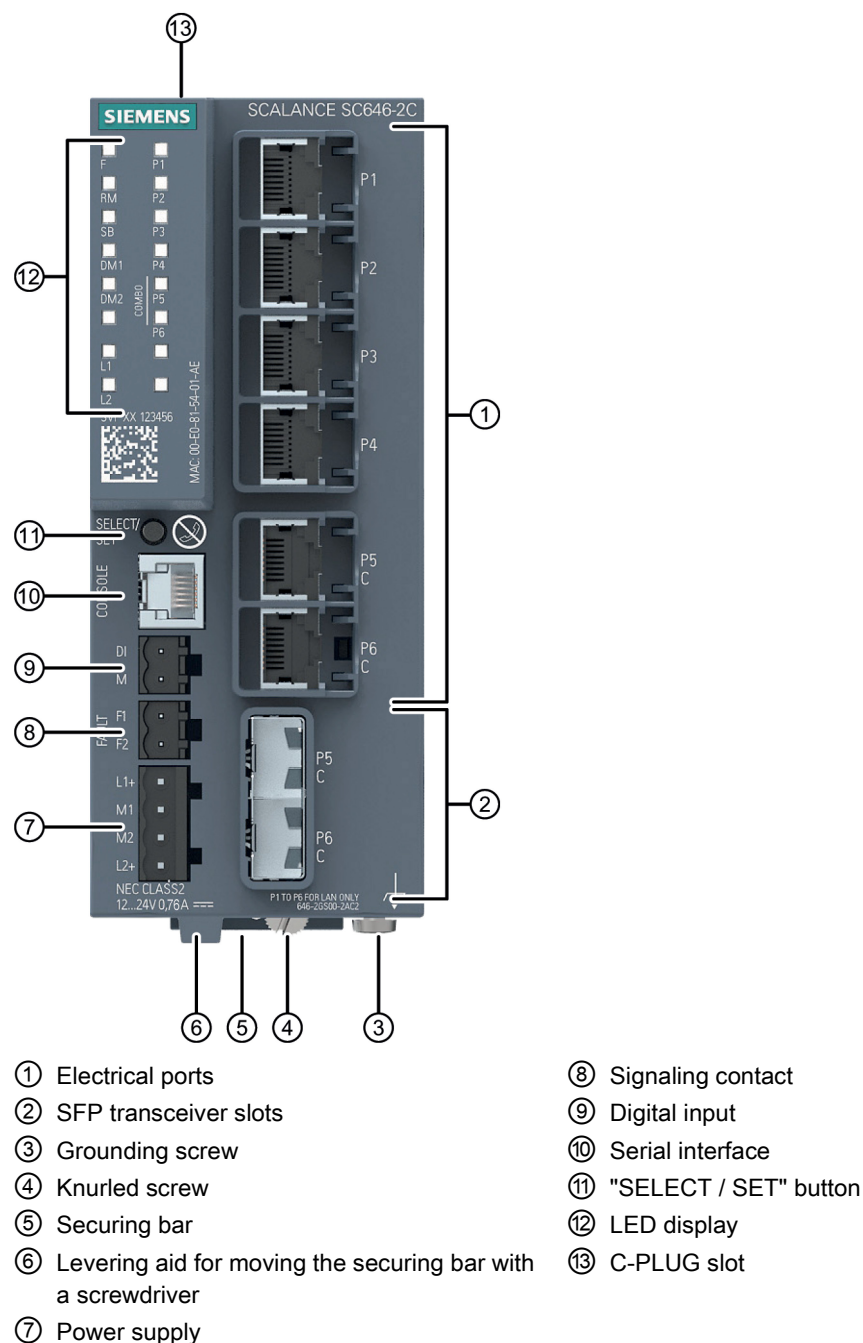
4.4.1 Device view of a SCALANCE SC6x2-2C

The following figure shows the design of the SC6x2-2C.



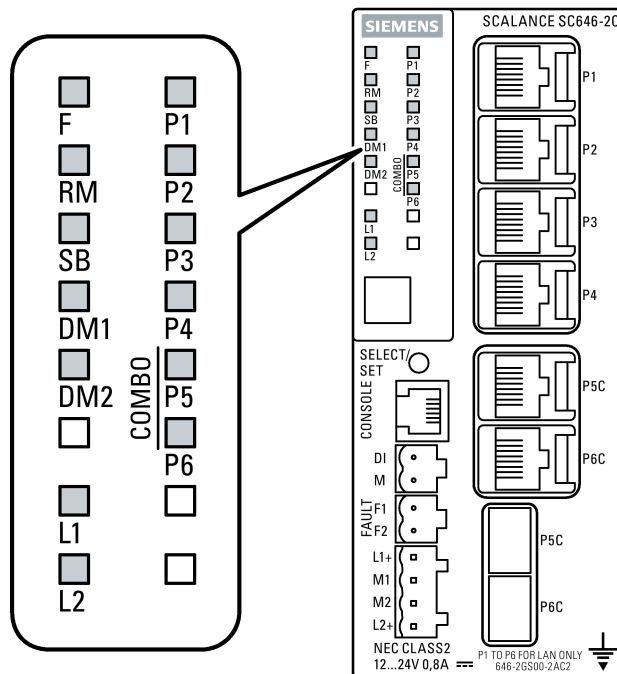
4.4.2 Device view of a SCALANCE SC6x6-2C

The following figure shows the design of the SC6x6-2C.



4.5 LED display

The following figure shows the arrangement of the LEDs based on the example of the SCALANCE SC646-2C.



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

4.5.1 "RM" LED / "SB" LED

This function/LED is not currently used.

4.5.2 "F" LED

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

Meaning during device startup

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

Meaning during operation

LED color	LED status	Meaning during operation
-	Off	The device is operating free of errors. The signaling contact is closed.
Red	On	The device has detected a problem. The signaling contact has opened.

4.5.3 LEDs "DM1" and "DM2"

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

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

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

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

Setting the display mode

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

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

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

4.5.4 LEDs "L1" and "L2"

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

The meaning of the "L1" and "L2" LEDs depends on the set display mode, see section "LEDs "DM1" and "DM2" (Page 27)".

4.5 LED display

Meaning in display modes A, B and C

In display modes A, B and C, from the "L1" and "L2" LEDs you can see whether the power supply is higher or lower than 9.3 V.

L1/L2 LED		L1/L2 connector
LED color	LED status	
-	Off	Power supply lower than 9.3 V
Green	On	Power supply higher than 9.3 V

Meaning in display mode D

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

L1/L2 LED		L1/L2 connector
LED color	LED status	
-	Off	Power supply is not monitored. If the power supply falls below 9.3 V, the signaling contact does not respond.
Green	On	Power supply is monitored. If the power supply falls below 9.3 V, the signaling contact responds.

4.5.5

Port LEDs

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

The meaning of the Port LEDs depends on the set display mode, see section "LEDs "DM1" and "DM2" (Page 27)".

Meaning in display mode A

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

LED color	LED status	Meaning
-	Off	No valid link to the port (for example communications partner turned off or cable not connected).
Green	On	Link exists and port in normal status. In this status, the port can receive and send data.
	Flashes once per period*	Function is not currently used.
	Flashes three times per period*	Link exists and port turned off by management. In this status, no data is sent or received via the port.
	Flashes four times per period*	Function is not currently used.
Yellow	Flashing / lit	Receiving data at port

* 1 period $\triangleq$ 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
Orange	On	Port operating at 1000 Mbps

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

Meaning in display mode C

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

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

Meaning in display mode D

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

LED color	LED status	Meaning
-	Off	Port is not monitored. If no link was established at the port the signaling contact does not indicate an error.
Green	On	Port is monitored. If no link was established at the port the signaling contact indicates an error.

4.6 SELECT / SET button

Position

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

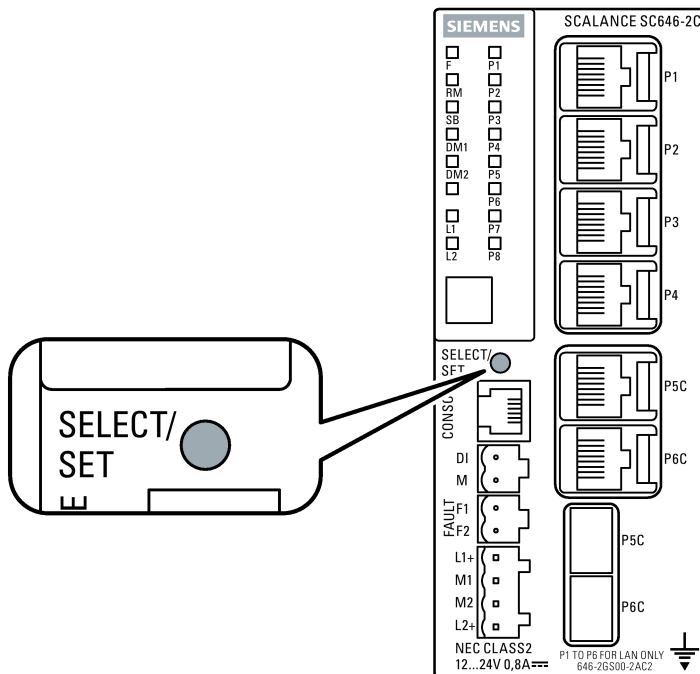


Figure 4-1 Position of the "SELECT/SET" button, for example on the SCALANCE SC646-2C

Setting the display mode

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

For more detailed information on the display modes, refer to the section "LED display (Page 26)".

Resetting the device to factory defaults

NOTICE

Previous settings

If you reset, all the settings you have made will be overwritten by factory defaults.

NOTICE

Inadvertent reset

An inadvertent reset can cause disturbances and failures in the configured network.

Requirement

- The device is in operation.
- The function "Reset to Factory Defaults" is enabled for the "SELECT / SET" button.

Note**Reset despite disabled "SELECT/SET" button**

If you have disabled the "Restore Factory Defaults" function for the "SELECT/SET" button in the configuration, this does not apply during the startup phase, see section "Restoring the factory settings (Page 60)".

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

Procedure

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

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, you will need to press the "SET/SELECT" repeatedly until the "DM1" and "DM2" LEDs go off.

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

2. Hold down the "SELECT/SET" button for 12 seconds.

After 9 seconds, the "DM1" and "DM2" LEDs start to flash for 3 seconds. At the same time, the port LEDs go on one after the other.

After you have held down the button for 12 seconds, the device restarts and the factory defaults are restored.

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

Enabling and disabling the button

In the configuration, you can enable or disable the button function.

Defining the fault mask

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

You configure newly plugged-in connections in the configuration.

4.6 SELECT / SET button

To define the fault mask, follow the steps below:

1. Switch to display mode D.

Display mode D is active if the "DM1" and "DM2" LEDs are lit green..

If another display mode is active, you will need to press the "SET/SELECT" button repeatedly until the "DM1" and "DM2" LEDs are lit green.

2. Hold down the "SELECT/SET" button for 5 seconds.

After 2 seconds, the "DM1" and "DM2" LEDs start to flash for 3 seconds. At the same time, the port LEDs go on one after the other.

After you have held down the button for 5 seconds, the current settings are stored as the "good status".

If you release the button before the 5 seconds have elapsed, the previous fault mask will be retained.

4.7 C-PLUG

4.7.1 Function of the C-PLUG

NOTICE
Do not remove or insert a C-PLUG during operation
A C-PLUG may only be removed or inserted when the device is turned off.

Saving the configuration data

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

A C-PLUG stores the current information about the configuration of a device.

Note

The device can also be operated without a C-PLUG.

How it works

Operating mode

In terms of the C-PLUG, there are three modes for the device:

- Without C-PLUG

The device stores the configuration in internal memory.

This mode is active if no C-PLUG is inserted.

- With unwritten C-PLUG

If an unwritten C-PLUG (factory status or deleted with Clean function) is used, the local configuration already existing on the device is automatically stored on the inserted C-PLUG during startup.

This mode is active as soon as an unwritten C-PLUG is inserted.

- With written C-PLUG

A device with a written and accepted C-PLUG uses the configuration data of the C-PLUG automatically when it starts up. The requirement for acceptance is that the data was written by a compatible device type.

If there is configuration data in the internal memory of the device this is overwritten.

This mode is active as soon as a written C-PLUG is inserted.

4.7 C-PLUG

Operation with C-PLUG

The configuration stored on the C-PLUG is displayed over the user interfaces.

If changes are made to the configuration, the device stores the configuration directly on the C-PLUG, if this is in the "ACCEPTED" status and in internal memory.

Response to errors

Inserting a C-PLUG that does not contain the configuration of a compatible device type and inadvertently removing the C-PLUG, or general malfunctions of the C-PLUG are indicated by the diagnostic mechanisms of the device.

- Fault LED
- Web Based Management (WBM)
- SNMP
- Command Line Interface (CLI)

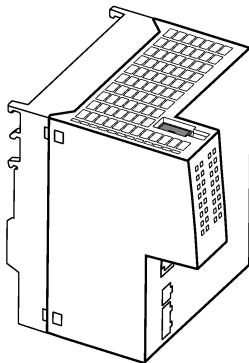
The user then has the choice of either removing the C-PLUG again or selecting the option to reformat the C-PLUG.

4.7.2 Replacing the C-PLUG

Position of the C-PLUG

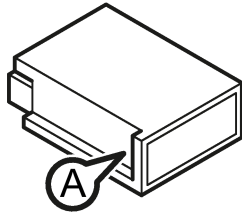
NOTICE
Do not remove or insert a C-PLUG during operation
The C-PLUG may only be removed or inserted when the device is turned off.

The C-PLUG slot is on the top of the device housing.



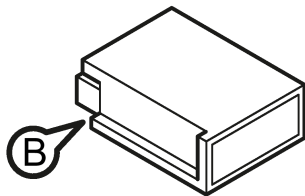
Replacing a C-PLUG.

Removing a C-PLUG



1. Turn off the power to the device.
2. Insert a screwdriver between the front edge of the C-PLUG (A) and the slot and release the C-PLUG.
3. Remove the C-PLUG.

Inserting a C-PLUG



1. Turn off the power to the device.
2. The housing of the C-PLUG has a protruding ridge on the long side (B). The slot has a groove at this position. Insert the C-PLUG correctly oriented into the slot.

4.7 C-PLUG

Mounting

5.1 Safety notices for installation

Safety notices

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

WARNING
--

If a device is operated in an ambient temperature of more than 50 °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 50 °C.

WARNING

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

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 may only be operated in an environment with pollution degree 1 or 2 (see IEC 60664-1).

 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.

Safety notices for use according to ATEX and IECEx

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

 WARNING

To comply with EC Directive 2014/34/EU (ATEX 114) or the conditions of IECEx, this enclosure or cabinet must meet the requirements of at least IP54 in compliance with EN 60529.

 WARNING

If the cable or conduit entry point exceeds 70 °C or the branching point of conductors exceeds 80 °C, special precautions must be taken. If the equipment is operated in an air ambient in excess of 60 °C, only use cables with admitted maximum operating temperature of at least 80 °C.

Safety notices when using according to FM

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

 WARNING

EXPLOSION HAZARD

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

 WARNING

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.

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.

5.2 Types of installation

Types of installation

For the SCALANCE SC-600 the following types of installation are possible:

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

Installation location

Note

Installation location - Dependency of the temperature range

Note the dependency of the permitted temperature range of the installation location:

- Horizontal installation of the rack (DIN rail) means a vertical position of the devices.
- Vertical installation of the rack (DIN rail) means a horizontal position of the devices.

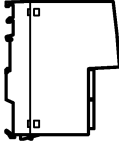
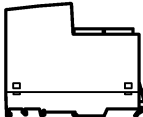
You will find the permitted temperature ranges in the section Technical specifications (Page 61).

Minimum clearances

The module must be installed so that its upper and lower ventilation slits are not covered, allowing adequate ventilation.

Keep to the following minimum clearances for the circulation of air when the rack is installed horizontally:

- Above the device: Minimum 10 cm
- Below the device: Minimum 10 cm

Installation of the rack	Installation location
Horizontal installation of the rack	
Vertical installation of the rack	

5.2.1 Mounting on DIN rails

Installation

Note

Note the position of the securing bar, see also section "Dimension drawings (Page 67)".

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 45)".

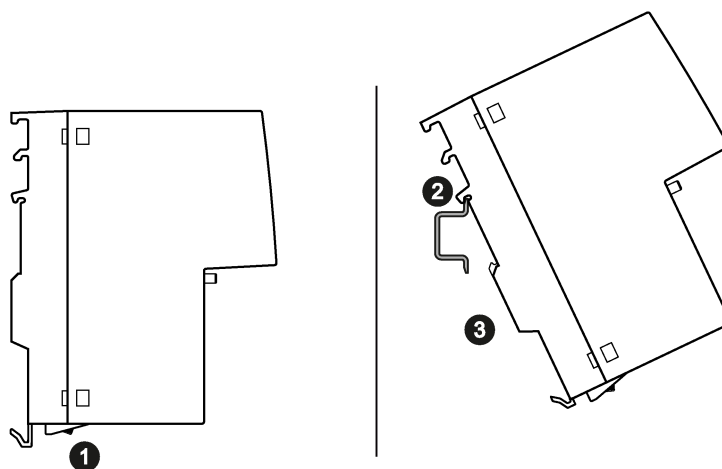


Figure 5-1 DIN rail mounting with securing bar in the wall mounting position.

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 "Connection (Page 47)".

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.

5.2.2 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 (Page 67)".

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 45)".

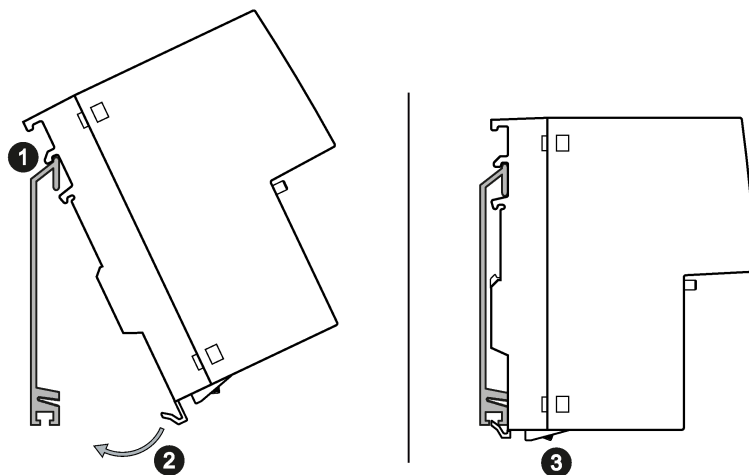


Figure 5-2 S7-300 mounting rail installation with the securing bar in the wall mounting position.

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 "Connection (Page 47)".

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.

5.2.3 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 (Page 67)".

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 45)".

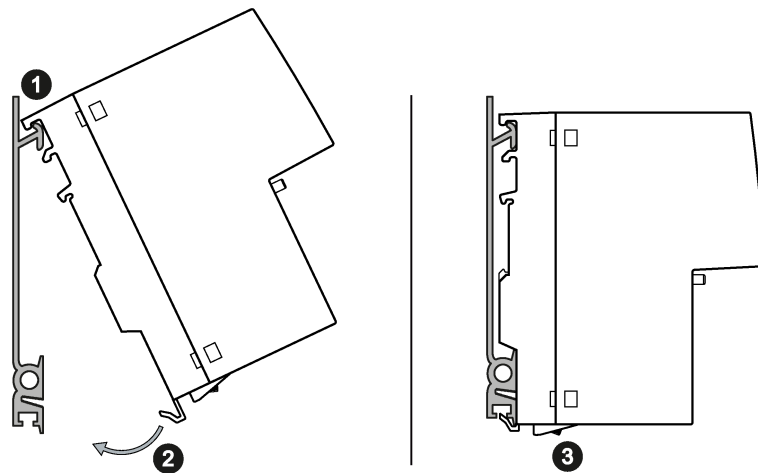


Figure 5-3 S7-1500 mounting rail installation with the securing bar in the wall mounting position.

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 "Connection (Page 47)".

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.

5.2.4 Wall mounting

Preparation

Note the position of the securing bar, see also section "Dimension drawings (Page 67)".

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 45)".

Tools

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

- 2 wall plugs
- 2 fillister head screws

Note

Depending on the mounting surface, use suitable fittings.

Installation

Note

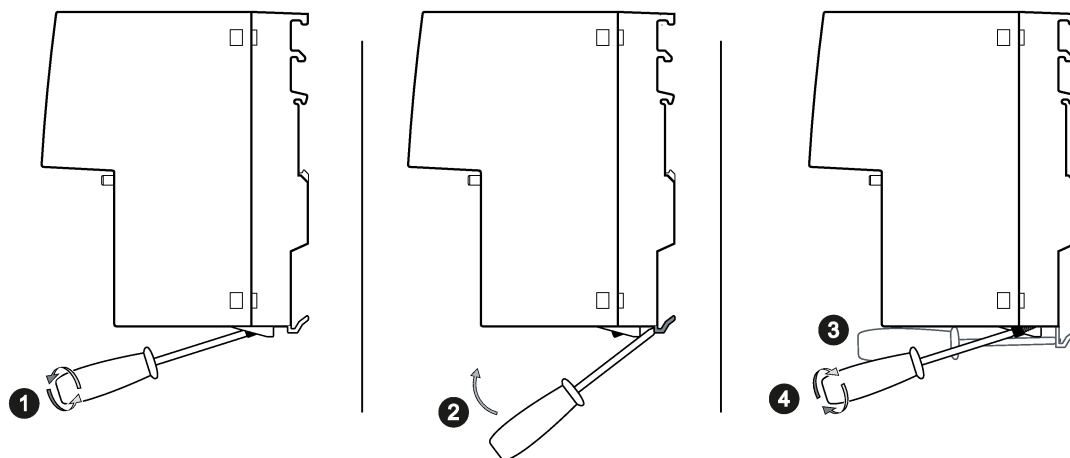
The wall mounting must be capable of supporting at least four times the weight of the device.

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 67)".
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 "Connection (Page 47)".

5.2.5 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.

Connection

6.1 Safety when connecting up

Safety notices

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

WARNING

The equipment is designed for operation with Safety Extra-Low Voltage (SELV) by a Limited Power Source (LPS).

This means that only SELV / LPS complying with IEC 60950-1 / EN 60950-1 / VDE 0805-1 must be connected to the power supply terminals, or the power supply unit for the equipment power supply must comply with NEC Class 2, as described by 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.

NOTICE

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

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

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

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

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.

Safety notices when using the device according to Hazardous Locations (HazLoc)

If you use the device under HazLoc conditions you must also keep to the following safety notices in addition to the general safety notices 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 for use according to ATEX and IECEx

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



WARNING

Take measures to prevent transient voltage surges of more than 40% of the rated voltage. This is the case if you only operate devices with SELV (safety extra-low voltage).



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).



WARNING

EXPLOSION HAZARD

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

6.2 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.

6.3 Power supply

Notes on the power supply



WARNING

Incorrect power supply

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

Never operate the device with AC voltage or DC voltage higher than 32 V DC.



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 "LED display (Page 26)".
- The power supply is connected using a 4-pin plug-in terminal block (spring-loaded terminal). The terminal block ships with the device and can also be ordered as a spare part.
- 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.

Position and assignment

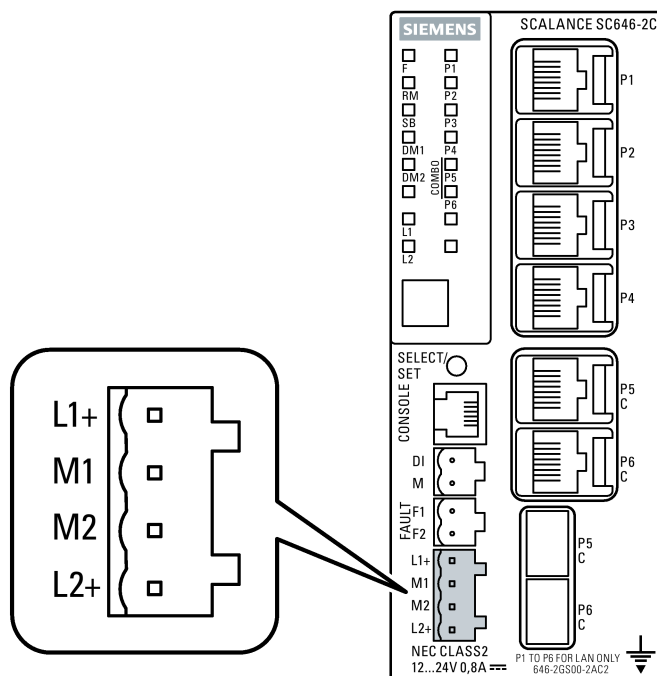


Figure 6-1 Position of the power supply based on the example of the SCALANCE SC646-2C and the assignment of the terminal block

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

6.4 Signaling contact

Information on the signaling contact

- The signaling contact is a floating switch that signals error statuses by opening the contact.
The signaling contact must be operated within the range of the operating voltage. If an error/fault 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 ships with the device and can also be ordered as a spare part.
- Note the wiring rules.

NOTICE
Damage due to voltage being too high The signaling contact can be subjected to a maximum load of 100 mA (safety extra-low voltage SELV, 24 VDC). Higher voltages or currents can damage the device.

Position and assignment

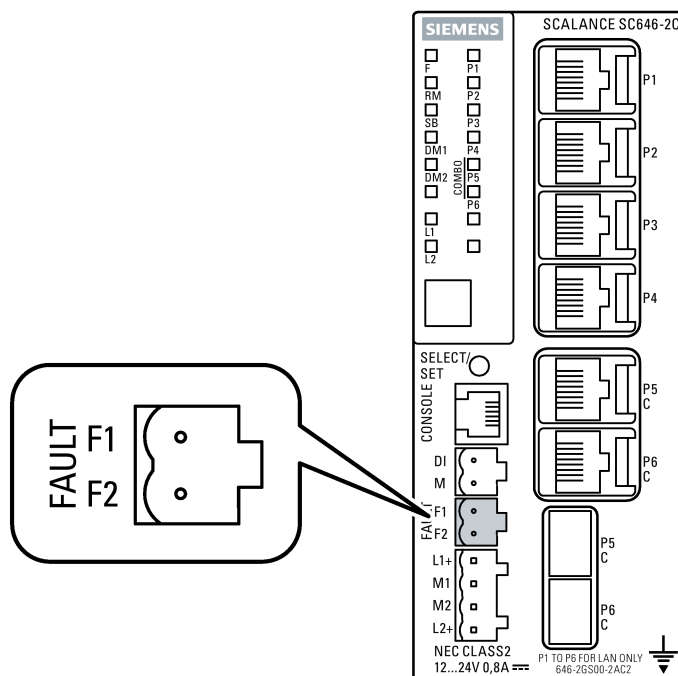


Figure 6-2 Position and assignment of the signaling contact based on the example of the SCALANCE SC646-2C.

Contact	Assignment
F1	Fault contact 1
F2	Fault contact 2

Signaling faults

- The signaling of errors by the signaling contact is synchronized with the fault LED "F", see section "LED display (Page 26)".
All errors that the fault LED "F" indicates (freely configurable) are also signaled by the signaling contact.
- If an internal fault occurs, the fault LED "F" lights up and the signaling contact opens.
- If you connect a communications node to an unmonitored port or disconnect it, this does not cause an error message.
- The signaling contact remains open until one of the following events occurs:
 - The problem is eliminated.
 - The current status is entered in the fault mask as the new desired status.

Information on the digital input

- The digital input can be used to allow authorized access to the device with a key switch function.
- The digital input is connected using a 2-pin plug-in terminal block (spring-loaded terminal). The terminal block ships with the device and can also be ordered as a spare part.
- The voltage applied to the "DI" contact is converted to a digital status by the device as follows.

Voltage	Status
-30 to +3 VDC	0
+13 to +30 VDC	1

- The maximum input current is 8 mA
- The digital input is isolated from the electronics.

Position and assignment

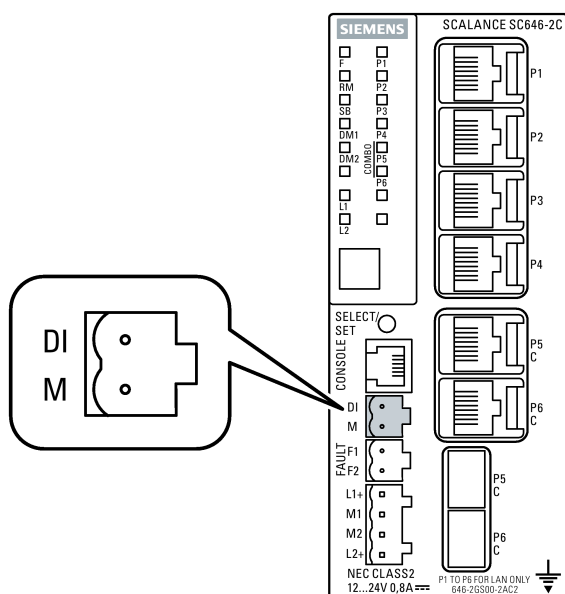


Figure 6-3 Position and assignment of the digital input based on the example of the SCALANCE SC646-2C.

Contact	Assignment
DI	-30 to +30 VDC
M	Ground

6.6 Serial interface

Information on the serial interface

- Via the serial interface on the device (RJ-11 jack), you can access the Command Line Interface of the device directly via an RS-232 (115200 8N1) connection without assigning an IP address.
- Access to the device is possible independent of the Ethernet ports.
- To connect the serial interface to a PC, you require a cable with an RJ-11 plug and 9-pin D-sub female connector. The connecting cable for the serial interface can be ordered as an accessory.

Position and assignment

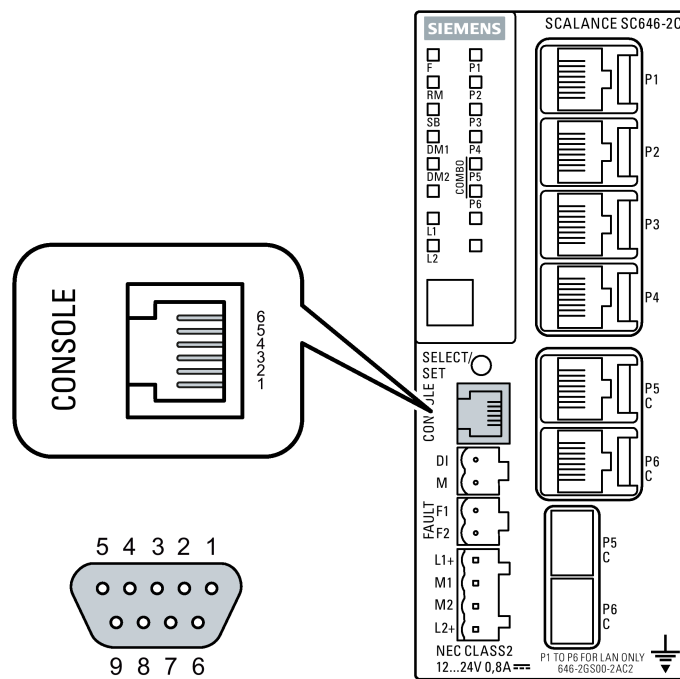


Figure 6-4 Position and pin assignment of the serial interface (RJ-11 jack), for example on the SCALANCE SC646-2C as well as the pin assignment of the D-sub socket.

Assignment of the terminal block

The connecting cable has the following assignment:

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

Note

Pin assignment of the RJ-11 jack on the device

The RJ-11 jack on the device has a pinout to match the RJ-11 plug of the connecting cable.

6.7 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 SCALANCE SC-600 has a grounding screw (fillister head screw with clamping washer und disk) for functional ground, refer to the section "Device views (Page 24)".

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



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.

Service and maintenance

7.1 Loading new firmware using TFTP

Firmware

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

Procedure with Microsoft Windows

Using TFTP, you can supply a device with new firmware even when it cannot be reached using WBM or CLI. This section explains the procedure based on the example of Microsoft Windows.

Follow the steps below to load new firmware using TFTP:

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 fault LED "F" starts to flash.
4. Release the button as long as the red error LED is still flashing..

Note

This time only lasts a few seconds.

The bootloader of the device waits in this status for a new firmware file that you can download by TFTP.

5. Connect a PC to port 0.1 via an Ethernet cable.
6. Assign an IP address to the device using DHCP or the Primary Setup Tool.
7. Open a Windows command prompt and change to the directory where the file with the new firmware is located and then execute the following command :

```
tftp -i <IP address> put <firmware file>
```

Note

You can enable TFTP in Microsoft Windows as follows:

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

8. Once the firmware has been transferred completely to the device and validated, there is an automatic restart on the device. This may take several minutes.

7.2 Restoring the factory settings

NOTICE

Previous settings

If you reset, all the settings you have made will be overwritten by factory defaults.

NOTICE

Inadvertent reset

An inadvertent reset can cause disturbances and failures in the configured network.

Requirement

The device is in the startup phase.

NOTICE

Reset despite disabled "SELECT/SET" button

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

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

Procedure

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

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

Restoring the factory defaults during operation

You can also reset the device to the factory defaults during operation, see section "SELECT / SET button (Page 30)".

Technical data

8.1 Technical specifications of the SCALANCE SC-600

Technical specifications				
Attachment to Industrial Ethernet				
Electrical connectors			SC6x2-2C	SC6x6-2C
	Quantity		2	6
	Connector		RJ-45 jack	
	Properties		Half/full duplex, MDI-X pinning	
	Transmission speed		10 / 100/ 1000 Mbps	
Slots for pluggable transceivers	Quantity		2	
	Connector		SFP transceiver	
	Transmission speed		100 / 1000 Mbps	
Diagnostics interface				
Serial interface	Quantity		1	
	Connector		RJ-11 jack	
Electrical data				
Power supply ¹⁾	Rated voltage		12 to 24 VDC	
	Voltage range (incl. tolerance)		9.6 to 31.2 VDC Safe Extra Low Voltage (SELV)	
	Design		Terminal block, 4 terminals	
	Properties		Implemented redundantly	
Current consumption			SC6x2-2C	SC6x6-2C
	12 VDC	Without SFP	660 mA	700 mA
		With SFP	760 mA	800 mA
	24 VDC	Without SFP	330 mA	350 mA
		With SFP	380 mA	400 mA
	Effective power loss	Without SFP	7.92 W	8.4 W
With SFP		9.12 W	9.6 W	
Fusing			2.5 A / 125 V	
Signaling contact ¹⁾	Quantity		1	
	Design		Terminal block, 2 terminals	
	Permitted voltage range		12 ... 24 VDC	
	Load capability		max. 100 mA	
Digital input	Quantity		1	
	Design		Terminal block, 2 terminals	
	Property		Isolated from electronics	
	Rated voltage		24 VDC safety extra-low voltage (SELV)	

8.1 Technical specifications of the SCALANCE SC-600

Technical specifications		
	For state "0":	-30 to 3 VDC
	For state "1":	13 to 30 VDC
	Maximum input current	8 mA
	Maximum cable length	< 3 m
Permitted ambient conditions		
Ambient temperature	When operating with pluggable transceivers of the types:	During operation with the rack installed horizontally:
	• SFP991-1/1LD	-40 °C to +65 °C
	• SFP992-1/1LD	During operation with the rack installed vertically:
	up to 2000 m	-40 °C to +60 °C
	When operating with pluggable transceivers of the types:	During operation with the rack installed horizontally:
	• SFP991-1LH+/1ELH200	-40 °C to +60 °C
	• SFP992-1+/1LH/1LH+/1ELH	During operation with the rack installed vertically:
	up to 2000 m	-40 °C to +50 °C
	During LAN operation with RJ45 connector up to 2000 m	During operation with the rack installed horizontally:
		-40 °C to +70 °C
Relative humidity		During operation with the rack installed vertically:
		-40 °C to +70 °C
	With operation between 2000 m and 3000 m	The maximum ambient temperature is reduced by 5 °C
	With operation between 3000 m and 4000 m	The maximum ambient temperature is reduced by 10 °C
	Storage	-40 °C to +85 °C
	Transportation	-40 °C to +85 °C
	Operation at 25 °C	≤ 95 % no 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)	60 x 145 x 125 mm	
Weight	580 g	
Installation options	• Wall mounting	
	• Installation on a DIN rail	
	• Mounting on an S7-300 standard rail	
	• Mounting on an S7-1500 standard rail	

Technical specifications	
Mean time between failure (MTBF)	
MTBF (EN/IEC 61709; 40 °C)	SC6x2-2C: 37.83 years
	SC6x6-2C: 31.64 years
Switching properties	
Aging time	Can be configured (default value: 300 seconds)
Response to LLDP frames	Blocking
CoS acc. to IEEE 802.1Q	Yes

¹⁾ Note the wiring rules (Page 49).

8.2 Mechanical stability (in operation)

Mechanical stability (in operation)

Device	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
SC6x2-2C	•	•
SC6x6-2C	•	•

8.3 Cable lengths

The following technical specifications apply to SCALANCE SC-600:

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

Dimension drawings

All dimensions specified in millimeters.

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

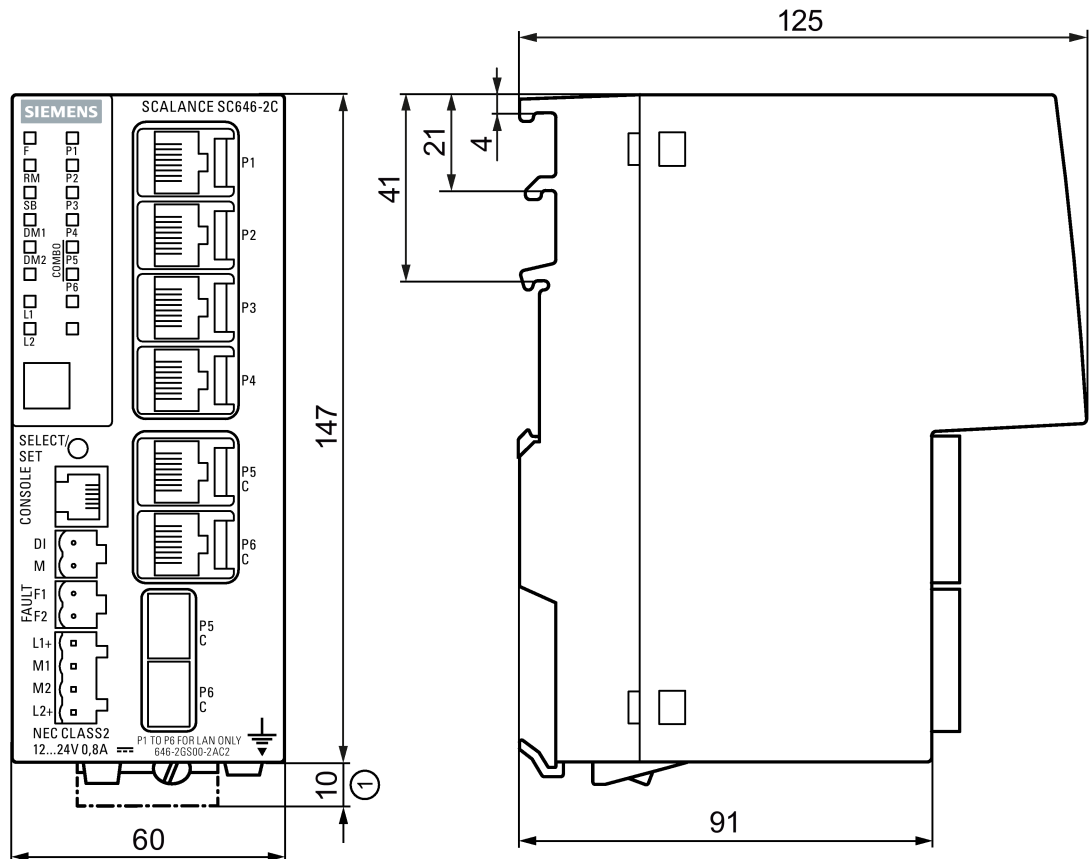


Figure 9-1 Front view and side view of the SCALANCE SC646-2C. All SCALANCE SC-600 modules have the same dimensions.

Approvals

Approvals issued

Note

Issued approvals on the type plate of the device

The specified approvals - with the exception of the certificates for shipbuilding - have only been obtained when there is a corresponding mark on the product. You can check which of the following approvals have been granted for your product by the markings on the type plate. The approvals for shipbuilding are an exception to this.

Certificates for shipbuilding and national approvals

The device certificates for shipbuilding and special national approvals can be found in Siemens Industry Online Support on the Internet:

Link: (<https://support.industry.siemens.com/cs/ww/en/ps/15326/cert>)

Notes for the manufacturers of machines

The devices are not machines in the sense of the EC Machinery Directive. There is therefore no declaration of conformity relating to the EC Machinery Directive 2006/42/EC for these devices.

If the devices are part of the equipment of a machine, they must be included in the declaration of conformity procedure by the manufacturer of the machine.

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.

EC declaration of conformity



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.

- **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

You will find the EC declaration of conformity for these products on the Internet pages of Siemens Industry Online Support.

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

Siemens Aktiengesellschaft

Division Process Industries and Drives

Process Automation

DE-76181 Karlsruhe

Germany

ATEX (explosion protection directive)

WARNING

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

"SIMATIC NET Product Information Use of 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 of Siemens Industry Online Support (<https://support.industry.siemens.com/cs/ww/en/ps>).

Enter the document identification number C234 as the search term.

The SIMATIC NET products meet the requirements of the EC directive 94/9/EC "Equipment and Protective Devices for Use in Potentially Explosive Atmospheres". and as of 20.04.2016 the EC directive 2014/34/EU.

ATEX classification:

II 3 G Ex nA IIC T4 Gc

KEMA 07ATEX0145 X

The products meet the requirements of the following standards:

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

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

IECEx

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

IECEx classification:

Ex nA IIC T4 Gc

DEK 14.0025X

The products meet the requirements of the following standards:

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

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

EMC directive (electromagnetic compatibility)

Until 19.04.2016 the SIMATIC NET products described in these operating instructions meet the requirements of the EC Directive:2004/108/EC "Electromagnetic Compatibility" (EMC directive) and as of 20.04.2016 the EC directive 2014/30/EU.

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

You will find the current versions of the standards in the currently valid EC declaration of conformity.

RoHS

The SIMATIC NET products described in these operating instructions meet the requirements of the EC directive 2011/65/EC for the restriction of the use of certain hazardous substances in electrical and electronic equipment:

Applied standard:

- EN 50581

FM

The product meets the requirements of the standards:

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

cULus approval for industrial control equipment

cULus Listed IND. CONT. EQ.

Underwriters Laboratories Inc. complying with

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

Report no. E85972

cULus Approval for Information Technology Equipment

cULus Listed I. T. E.

Underwriters Laboratories Inc. complying with

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

Report no. E115352

cULus Approval Hazardous Location

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

Underwriters Laboratories Inc. complying with

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

Approved for use in

Cl. 1, Div. 2, GP A, B, C, D T4

Cl. 1, Zone 2, GP IIC T4

Report no. E240480

RCM

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

MSIP 요구사항 - For Korea only

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Marking for the customs union



EAC (Eurasian Conformity)

Customs union of Russia, Belarus and Kazakhstan

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

CAUTION

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

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