

SIEMENS

SIMATIC NET

Industrial Wireless LAN SCALANCE W786-x

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

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Disclaimer of Liability

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

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Information on the Internet

Bitte beachten Sie die Warnhinweise und zusätzlichen Informationen in der Kompaktbetriebsanleitung in Ihrer Sprache im Internet:

<http://support.automation.siemens.com/ww/view/at/10806097>

<http://support.automation.siemens.com/ww/view/ch/10806097>

<http://support.automation.siemens.com/ww/view/de/10806097>

<http://support.automation.siemens.com/ww/view/li/10806097>

<http://support.automation.siemens.com/ww/view/lu/10806097>

Please observe the warnings and additional information in the compact operating instructions in your language in the Internet:

<http://support.automation.siemens.com/ww/view/au/10806097>

<http://support.automation.siemens.com/ww/view/ca/10806097>

<http://support.automation.siemens.com/ww/view/gb/10806097>

<http://support.automation.siemens.com/ww/view/ie/10806097>

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Veillez tenir compte des avertissements et informations supplémentaires de la notice de service dans votre langue sur Internet:

<http://support.automation.siemens.com/ww/view/be/10806097>

<http://support.automation.siemens.com/ww/view/ch/10806097>

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<http://support.automation.siemens.com/ww/view/lu/10806097>

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<http://support.automation.siemens.com/ww/view/it/10806097>

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Dbejte prosím na výstražné pokyny a doplňkové informace v kompaktním návodu k obsluze ve vašem jazyce na internetu:

<http://support.automation.siemens.com/ww/view/cz/10806097>

Vær venligst opmærksom på de advarselsanvisninger og ekstra informationer der findes på dit sprog i kompaktdriftsvejledningen på internettet:

<http://support.automation.siemens.com/ww/view/dk/10806097>

Noudata lyhyen käyttöoppaan sisältämiä varoituksia ja huomio sen muutkin tiedot. Oman kielisesi käyttöoppaan löydät internetistä osoitteesta:

<http://support.automation.siemens.com/ww/view/fi/10806097>

Λάβετε υπόψη τις υποδείξεις προειδοποίησης και τις πρόσθετες πληροφορίες των συνοπτικών οδηγιών χρήσης που παρέχονται στη γλώσσα σας στο Διαδίκτυο:

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Kérjük, vegye figyelembe az interneten található, az Ön anyanyelvén íródott kompakt használati útmutatóban található figyelmeztetéseket és további információkat:

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Skoðið vel viðvaranir og aðrar upplýsingar í notkunarleiðbeiningunum á ykkar tungumáli á internetinu:

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<http://support.automation.siemens.com/ww/view/jp/10806097>

사이트에 있는 귀하의 언어로 된 콤팩트 사용 설명서에 명시된 경고 지침 및 추가 정보를 준수하십시오:

<http://support.automation.siemens.com/ww/view/kr/10806097>

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ارشادات التحذير و المعلومات الإضافية المذكورة في دليل التشغيل الملخص بلغتكم و الموجود على شبكة الانترنت

<http://support.automation.siemens.com/ww/view/kw/10806097>

Neem goed nota van de waarschuwingen en extra informatie in de compacte gebruiksaanwijzing in uw taal op internet:

<http://support.automation.siemens.com/ww/view/be/10806097>

<http://support.automation.siemens.com/ww/view/nl/10806097>

Vennligst følg advarslene og annen informasjon i den kompakte bruksanvisningen, som du finner på ditt språk på internett:

<http://support.automation.siemens.com/ww/view/no/10806097>

Proszę zwrócić uwagę na ostrzeżenia oraz dodatkowe informacje w kompaktowej instrukcji obsługi, dostępnej w odpowiednim języku w internecie:

<http://support.automation.siemens.com/ww/view/po/10806097>

Observera varningshänvisningarna och extrainformationerna i kompaktbruksanvisningen som finns på ditt språk på internet:

<http://support.automation.siemens.com/ww/view/se/10806097>

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Safety instructions

2.1 General safety information for the SCALANCE W786



⚠ WARNING

Danger from line voltage

After removing the housing cover, there is a risk of touching live parts in the area of the connecting terminals of the power supply adapter.

Only authorized personnel is permitted to open the device and carry out any work on the open device (e.g. connection and disconnection of cables, operating the reset button, replacing the PLUG)!

Introduction

3.1 Information on the Operating Instructions

Validity of the Operating Instructions

These operating instructions cover the following products:

	Article no. of the RoW version	Article no. of the US version
SCALANCE W786-1 RJ-45	6GK5 786-1FC00-0AA0	6GK5 786-1FC00-0AB0
SCALANCE W786-2 RJ-45	6GK5 786-2FC00-0AA0	6GK5 786-2FC00-0AB0
SCALANCE W786-2IA RJ-45	6GK5 786-2HC00-0AA0	6GK5 786-2HC00-0AB0
SCALANCE W786-2 SFP	6GK5 786-2FE00-0AA0	6GK5 786-2FE00-0AB0

If information relates to all the named products, the term SCALANCE W786 will be used.

These operating instructions apply to the following software version:

- SCALANCE W786 with firmware as of version 5.00

Note

These operating instructions do not apply to devices of the SCALANCE W786-2C product group (use with WLAN controller).

Purpose of the Operating Instructions

Based on the operating instructions, you will be able to install and connect up the SCALANCE W786 correctly. Configuring the SCALANCE W786 and integration in a WLAN are not dealt with in this manual.

Documentation on the accompanying CD

You will find detailed information about configuration in the SCALANCE W700 configuration manuals on the accompanying SIMATIC NET IWLAN CD under the file name:

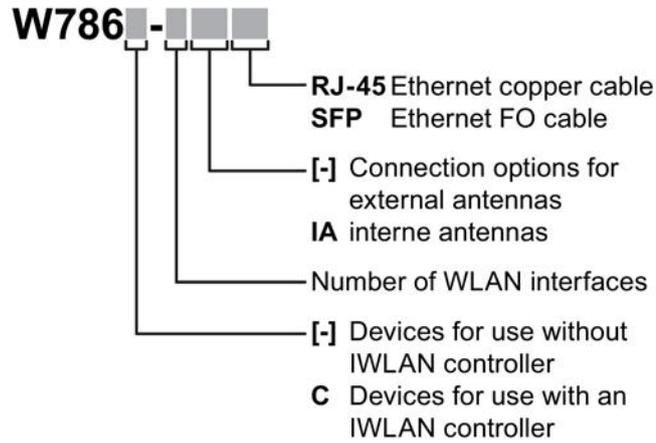
PH_SCALANCE-W700-WBM_76.pdf and PH_SCALANCE-W700-CLI_76.pdf

Note

Make sure that you read the explanations and instructions in the README.txt file

3.2 Structure of the type designations

The type designation of a SCALANCE W786 is made up of several parts that have the following meaning:



Description

4.1 Scope of delivery

The following components are supplied with the SCALANCE W786:

- SCALANCE W786
- 5 caps for the cover screws
- Depending on the version, up to 8 plugs for sealing the housing
- Depending on the version, up to 8 strain relief clamps
- Connector for the 24 VDC power supply
- SIMATIC NET Industrial Wireless LAN CD

Note

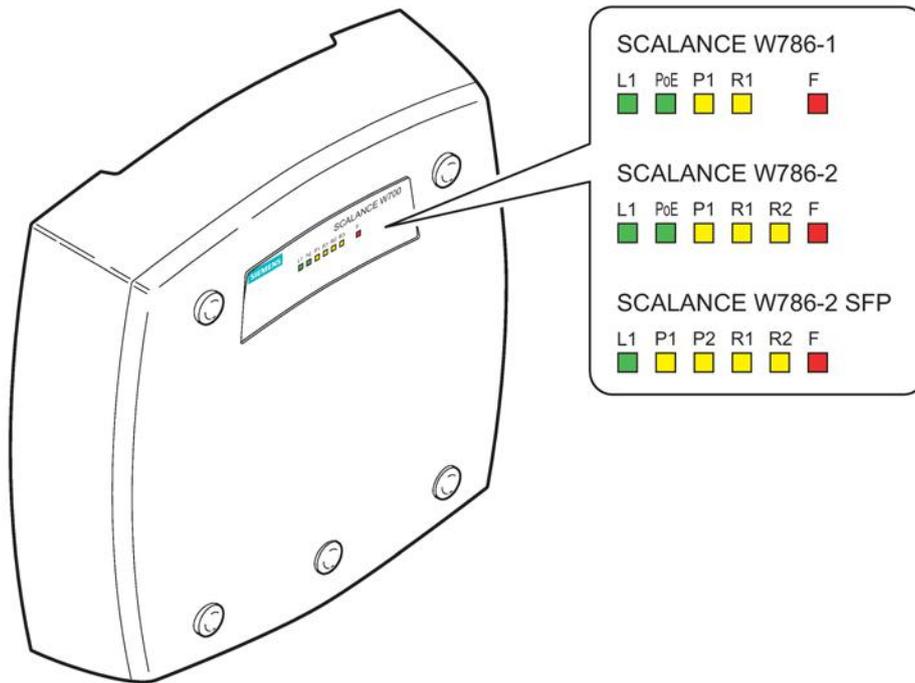
The installation set with the mounting plate for attachment to an S7-300 rail, a 35 mm DIN rail or a mast does not ship with the product. You can obtain the installation set under the following order number: 6GK5 798-8ML00-0AB3.

Please check that the consignment you have received is complete. If the consignment is incomplete, contact your supplier or your local Siemens office.

4.2 LED display

Information on operating status and data transfer

On the front of the housing, several LEDs provide information on the operating status of the SCALANCE W786:



LED	Color	Meaning
L1	Green	Power supply over a power supply adapter or the 24 VDC energy contacts of devices with an interface for FO cable.
PoE (1)	Green	Power over Ethernet or power over the 24 VDC energy contacts of devices with an RJ-45 interface.
P1	Green	There is a connection over the Ethernet port. (Link).
	Green and yellow flashing alternately	Data transfer over the Ethernet interface (traffic).
P2 (2)	Green	There is a connection over the Ethernet port. (Link).
	Green and yellow flashing alternately	Data transfer over the Ethernet interface (traffic).
R1	Green and yellow flashing alternately	Data transfer over the first WLAN interface.

LED	Color	Meaning
	Green	<i>Access Point Mode:</i> The WLAN interface is initialized and ready for operation. <i>Client Mode:</i> There is a connection over the first WLAN port.
	Flashing fast yellow	<i>Access Point Mode:</i> With 802.11h, the channel is scanned for one minute for primary users before the channel can be used for data traffic. <i>Client Mode:</i> The client waits for the adopt MAC address due to the setting <Auto Find Adopt MAC> and is connected to no access point.
	Yellow 3 x fast, 1 x long flashing	<i>Client Mode:</i> The client waits for the adopt MAC address due to the setting <Auto Find Adopt MAC> and is connected to an access point.
R2	Green and yellow flashing alternately	<i>Access Point Mode:</i> Data transfer over the second WLAN port. <i>Client Mode:</i> The LED is always off because the 2nd port is not available in client mode.
	Green	<i>Access Point Mode:</i> The WLAN interface is initialized and ready for operation. <i>Client Mode:</i> The LED is always off because the 2nd port is not available in client mode.
	Flashing fast yellow	<i>Access Point Mode:</i> With 802.11h, the channel is scanned for one minute for primary users before the channel can be used for data traffic. <i>Client Mode:</i> The LED is always off because the 2nd interface is not available in client mode.
F	Red	An error occurred during operation with the SCALANCE W786.
	Flashing red	Ready to load firmware. The device was either stopped with the reset button or there is incorrect firmware on the device.
	Red, R1, R2 flashing yellow simultaneously	A primary user was found on all enabled channels.
P1 R1 R2	Flashing yellow and green simultaneously.	"Flashing" enabled using SIMATIC NET Primary Setup Tool (PST).

(1) Not with the SCALANCE W786-2 SFP

(2) Only with the SCALANCE W786-2 SFP

Note

Primary user (radar) on all enabled channels

If the device detects a primary user (for example radar signals) on all enabled channels of WLAN interface 1, the LEDs **F** and **R1/R2** flash. No data traffic is then possible for the next 30 minutes. After this time, the device runs the scan again and checks whether a primary user still exists. If no primary user is detected, data traffic is possible again.

The wait time of 30 minutes is necessary due to legal requirements and cannot be shortened even by restarting the device.

4.3 Reset button



▲ WARNING
Danger from line voltage
After removing the housing cover, there is a risk of touching live parts in the area of the connecting terminals of the power supply adapter.
Only authorized personnel is permitted to open the device and carry out any work on the open device (e.g. connection and disconnection of cables, operating the reset button, replacing the PLUG)!

Functions of the reset button

The reset button is located below the housing cover beside on the right-hand side above the cable feed:

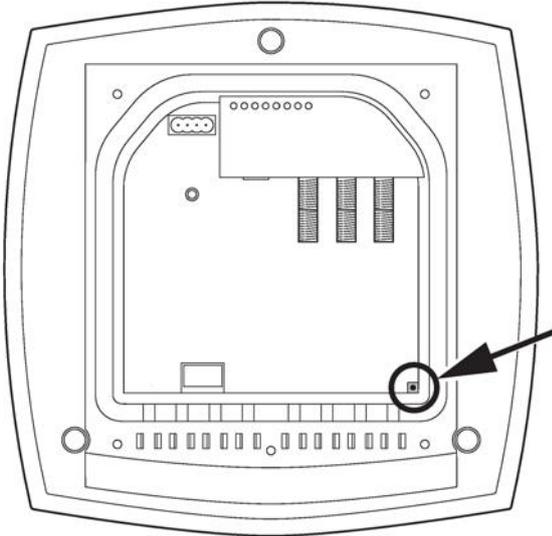


Figure 4-1 Position of the reset button with the housing cover removed

The reset button has the following functions:

- **Restart of the device**

To restart the device, press the Reset button briefly.

Note

If you make changes to the configuration and restart immediately afterwards with the reset button, the changes may be lost. If you restart the device using the WBM (menu command "System > Restart") or using the CLI (command "restart" in the Privileged EXEC Modus), the configuration changes are always retained.

- **Loading new firmware**

If the normal procedure with the "Load & Save" menu of Web Based Management is unsuccessful, the reset button can be used to load new firmware. This situation can occur if there is a power outage during the normal firmware update. You will find more information in the section "Troubleshooting/FAQ" in the SCALANCE W700 WBM configuration manual.

- **Restoring the default parameters (factory defaults)**

You will find more information is in the section "Restoring the default parameters" in the SCALANCE W700 WBM configuration manual.

Mounting

5.1 Safety notes relating to installation

 CAUTION**Danger of injury by falling objects**

If the SCALANCE W7x8 is subjected to strong vibration ($> 10 \text{ g}$), mounting on a 35 mm DIN rail does not provide adequate support. Under such conditions, the device can come out of the mounting and may cause injury.

In this case, install the device on an S7-300 standard rail or on a wall.

 CAUTION**Minimum distance to antennas**

Fit the device so that there is a minimum clearance of 20 cm between antennas and persons.

 WARNING

If a device is operated in an ambient temperature of more than $40 \text{ }^\circ\text{C}$, the temperature of the device housing may be higher than $70 \text{ }^\circ\text{C}$. 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 $40 \text{ }^\circ\text{C}$.

5.2 Removing / fitting the housing cover

When does the housing cover need to be removed?

You can only perform the following activities when the cover is removed.

- You want to screw the SCALANCE W786 to a wall or onto the optional mounting plate.
- You want to connect cables to the SCALANCE W786 for the power supply, for Ethernet or for external antennas.
- You want to insert a PLUG in the device or replace an existing PLUG.
- You want to use the reset button.

Removing the housing cover



⚠ WARNING

Danger from line voltage

After removing the housing cover, there is a risk of touching live parts in the area of the connecting terminals of the power supply adapter.

Only authorized personnel is permitted to open the device and carry out any work on the open device (e.g. connection and disconnection of cables, operating the reset button, replacing the PLUG)!

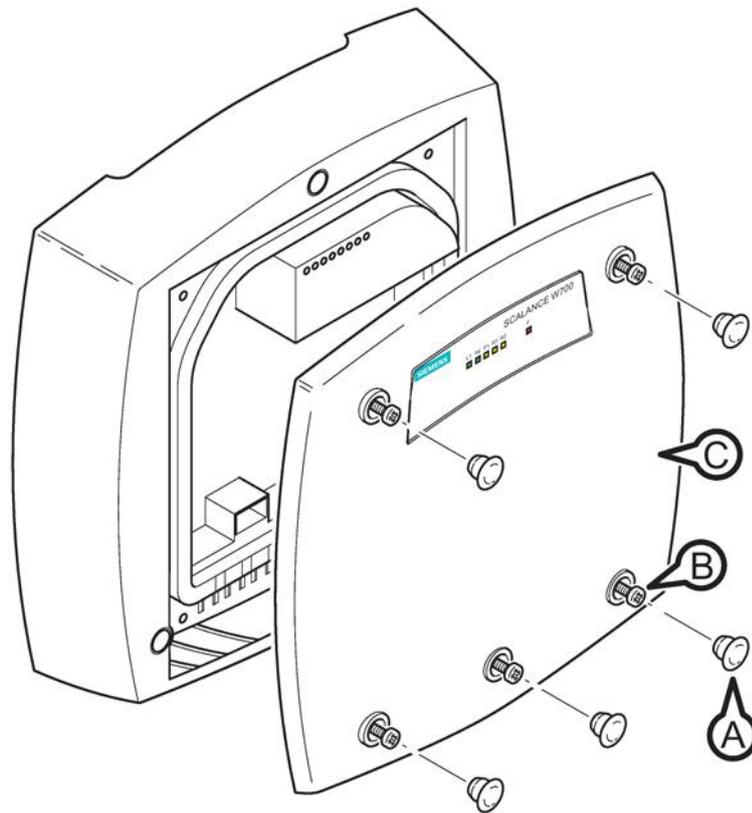


Figure 5-1 Removing the cover
A Sealing cap
B Cover screw
C Housing cover

Follow the steps below to remove the housing cover:

1. Remove the sealing caps from the housing cover (position **A** in the figure above)
2. Loosen the screws in the cover (position **B** in the figure above).
3. Remove the housing cover (position **C** in the figure above).

Fitting the housing cover

Fitting the housing cover is carried out in the reverse order. Tightening torque for the cover screws 1.8 Nm.

5.3 Laying the cables

Connecting up cables prior to mounting

Before you screw a SCALANCE W786 to a wall or to the optional mounting plate, the cables for the power supply, for Ethernet, and, when necessary, for the external antennas must be connected up first. The available options are as follows:

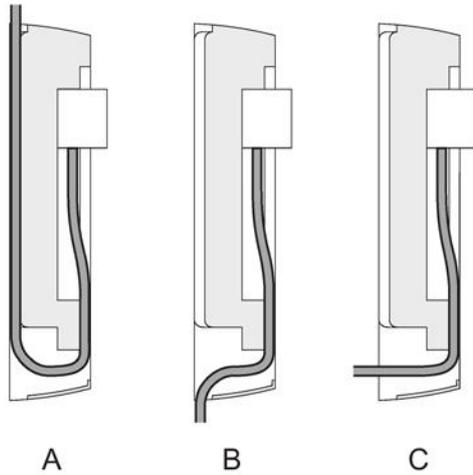


Figure 5-2 Side view of a SCALANCE W786 with cables entering from different directions

- The cables are inserted from above (position **A** in the previous schematic). The housing of the SCALANCE W786 has an opening at the top for this purpose.
- The cables are inserted from below (position **B** in the previous schematic). There is also an opening at the bottom for this purpose.
- Cables inserted through a wall behind the SCALANCE W786 (position **C** in the previous schematic). In this case, you will need to mount the SCALANCE W786 so that the opening in the wall is located above the lower edge of the device.

Grounding terminal

⚠ WARNING

To operate the SCALANCE W786 safely, the chassis ground connector must have a suitable cable connected. Do not use the SCALANCE W786 without a ground cable connected.

The chassis ground connector is located on the rear of the device (M4 thread). Connect the ground cable before you mount the SCALANCE W786 on a wall or on the optional mounting plate. Once the SCALANCE W786 is mounted, the connector is no longer accessible.

Place the supplied toothed washer directly on the rear of the device before screwing on the ground cable. Only then can you be sure that there is ideal contact with the screwed-on cable.

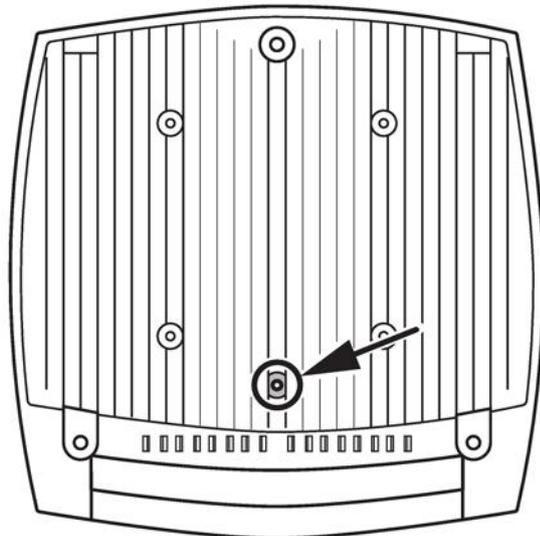


Figure 5-3 Chassis ground connector on the rear of the SCALANCE W786

5.4 Mounting without an adapter (wall mounting only)

Drilling template

Note

Installation location

The following should be noted with regard to the installation location:

- Devices with an internal antenna must be aligned according to the characteristics of the internal antenna (refer to the technical specifications of the antenna --> Radiation pattern diagrams). Since the internal antennas are integrated in the housing, the location and alignment of the housing decides the radiation direction of the antennas.
 - There are no restrictions relating to devices without internal antennas.
-

The location of the holes for mounting the SCALANCE W786 on a wall is shown in the following figure:

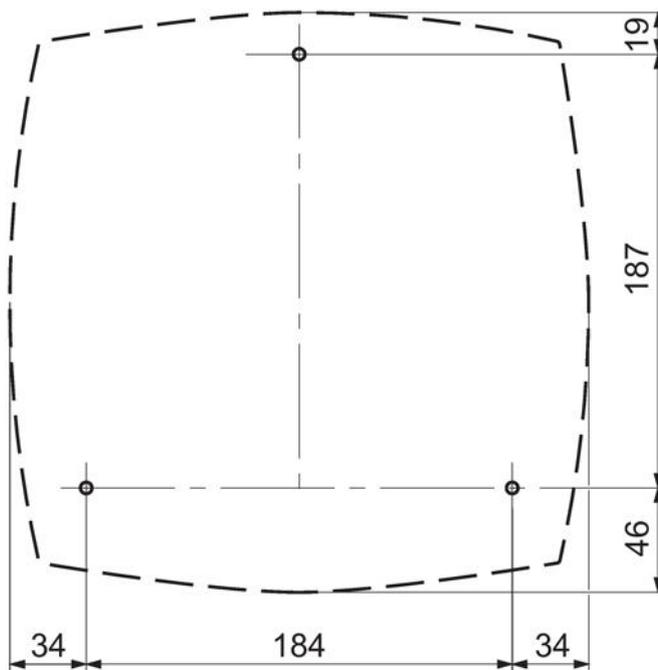


Figure 5-4 Drilling template for wall mounting of the SCALANCE W786

Procedure

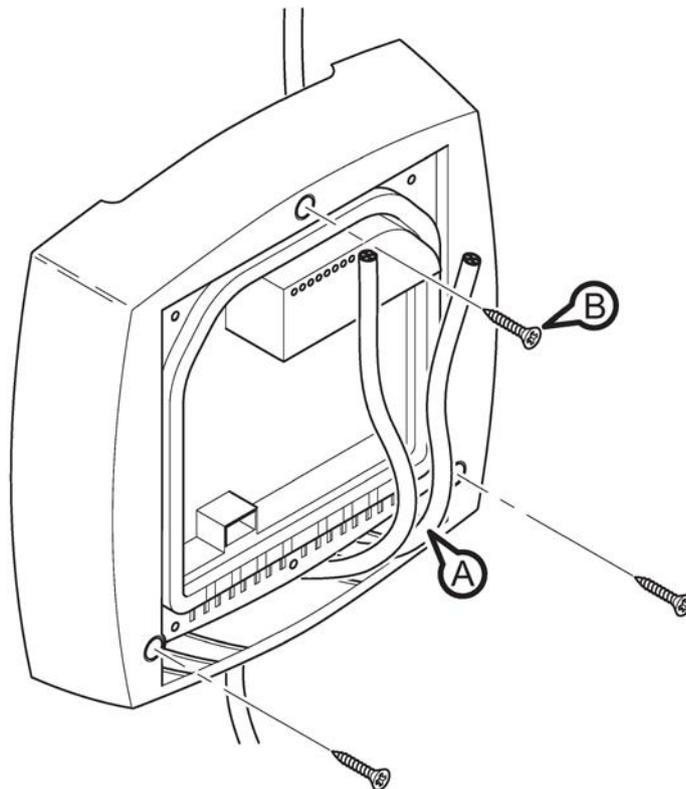


Figure 5-5 SCALANCE W786 wall mounting

Follow the steps below to screw a SCALANCE W786 to a wall:

1. Lead the cables into the housing of the SCALANCE W786 (position **A** in the figure above). Note the information in the section "Connecting up cables".
2. Secure the SCALANCE W786 to the wall with three screws (position **B** in the figure above). The screws are not supplied with the device. The type and length of the screws depend on the type of wall.

Type of screw:

- for wooden walls: wood screw 4 x 30 mm
- for concrete walls: 4 x 50 mm with 5 mm concrete plug
- for metal walls: M4 x 25 mm with machine thread in the wall

Option: Threaded holes on rear of housing

When a wall is extremely thin, it is often not possible to use wall plugs for the screws. To allow wall mounting even in this situation, there are four M4 threaded holes on the rear of the SCALANCE W786. The drilling template is a square with sides 100 mm long. The device can therefore be mounted on a wall with bolts through the wall.

Calculate the length of the required M4 screws as follows:

Screw length = wall thickness + 7 mm

5.5 Mounting with mounting plate

5.5.1 Fitting the mounting plate to a wall

Drilling template

Note

Installation location

The following should be noted with regard to the installation location:

- Devices with an internal antenna must be aligned according to the characteristics of the internal antenna (refer to the technical specifications of the antenna --> Radiation pattern diagrams). Since the internal antennas are integrated in the housing, the location and alignment of the housing decides the radiation direction of the antennas.
 - There are no restrictions relating to devices without internal antennas.
-

The location of the holes for fitting the mounting plate to a wall is shown in the following figure:

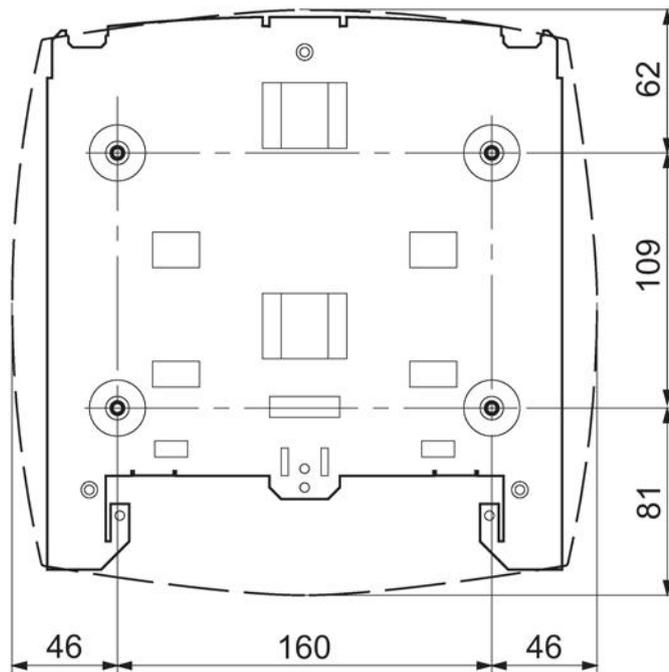


Figure 5-6 Drilling template for fitting the mounting plate to a wall

Procedure

Secure the mounting plate to the wall with four screws. The screws are not supplied with the device. The type and length of the screws depend on the type of wall.

Type of screw:

- for wooden walls: wood screw 4 x 30 mm
- for concrete walls: 4 x 50 mm with 5 mm concrete plug
- for metal walls: M4 x 25 mm with machine thread in the wall

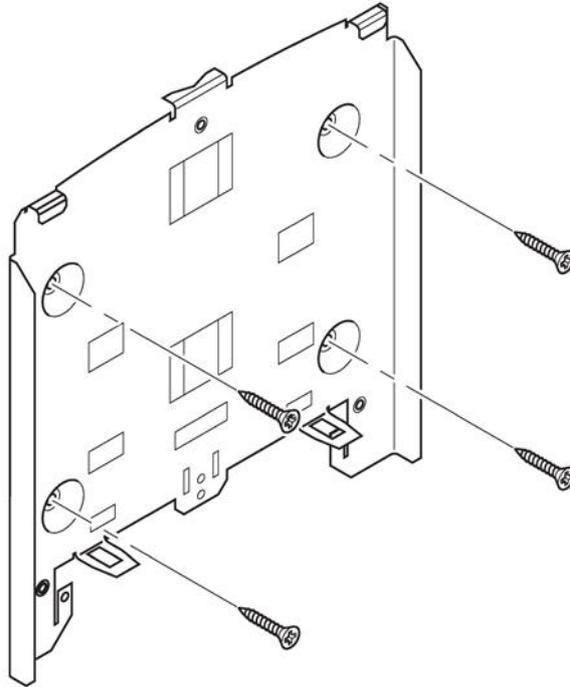


Figure 5-7 Fitting the mounting plate for the SCALANCE W786 to a wall

5.5.2 Screwing the cover plate for the cable feedthrough to the mounting plate

Protection of the cable feedthrough against strong water jets

The cabling of a SCALANCE W786 is led out of the rear of the device. The housing seal is effective only when it is not subjected to water jets. If the device is mounted on a wall, this is the case and no further measures are necessary. When mounted in any other way, except for mounting on an S7-300 standard rail, an additional cover plate must be screwed to the mounting plate.



⚠ WARNING

Danger from line voltage

If the cable feedthrough is subjected to strong water jets, water can penetrate the device and create a live connection to the line voltage. There is then a risk of electric shock.

Make sure that you use the cover plate for the cable feedthrough if you do not mount the SCALANCE W786 on a wall.

Procedure

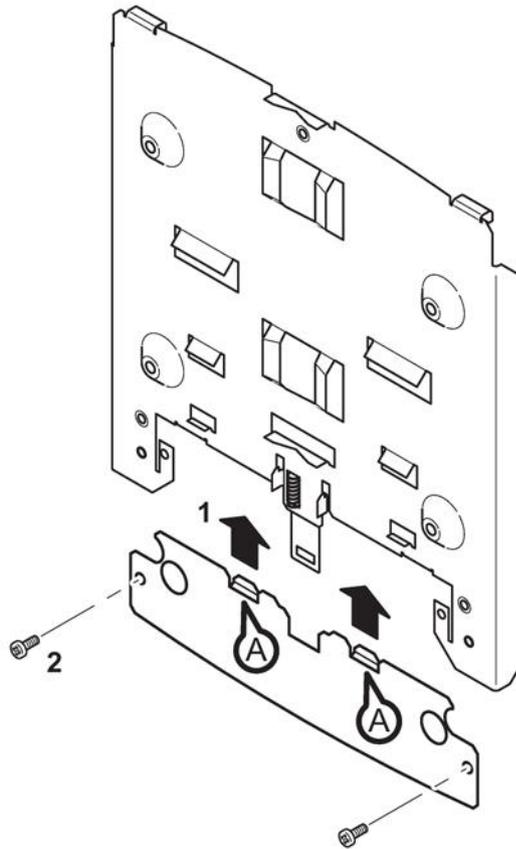


Figure 5-8 Fitting and securing the cover plate for the cable feedthrough

To screw the cover plate for the cable feedthrough to the mounting plate, follow the steps below:

1. Fit the cover plate on the mounting plate from below until the two lugs (position A in the figure above) engage the lower edge of the mounting plate.
2. Secure the cover plate to the mounting plate with two M4 screws. The screws are supplied with the assembly kit.

5.5.3 Fitting the mounting plate to an S7-300 standard rail

Procedure

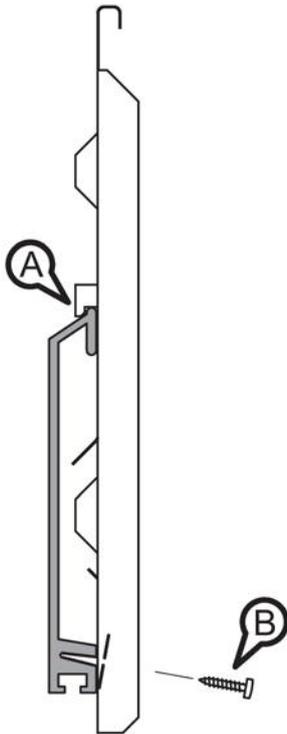


Figure 5-9 Side view of a mounting plate on an S7-300 standard rail

Follow the steps below to fit the mounting plate to an S7-300 standard rail:

1. Place the mounting plate with the two protruding catches on the top edge of the S7-300 standard rail (position **A** in the figure above).
2. At the bottom, the mounting plate has two lugs with holes. Screw the lugs to the S7-300 standard rail (position **B** in the figure above). The required screws are supplied with the mounting plate.

5.5.4 Fitting the mounting plate to a DIN rail

Procedure

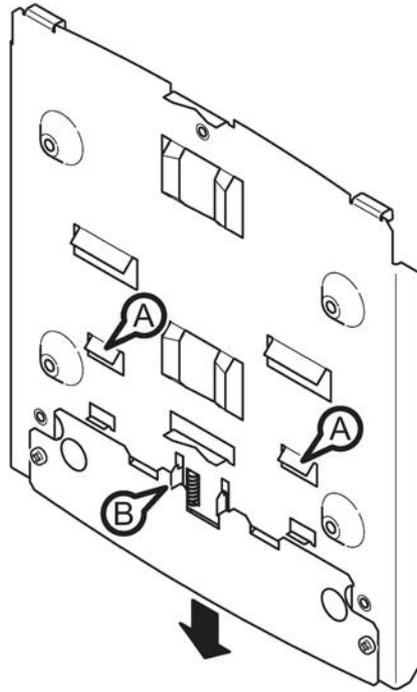


Figure 5-10 Mounting plate with fittings for DIN rail mounting

Follow the steps below to fit the mounting plate to a DIN rail:

1. Place the mounting plate with the two catches (position A in the figure above) on the upper edge of the DIN rail.
2. Pull down the DIN rail sliding catch (position B in the figure above) and press the mounting plate against the DIN rail until the sliding catch engages.

5.5.5 Fitting the mounting plate to a mast

Procedure

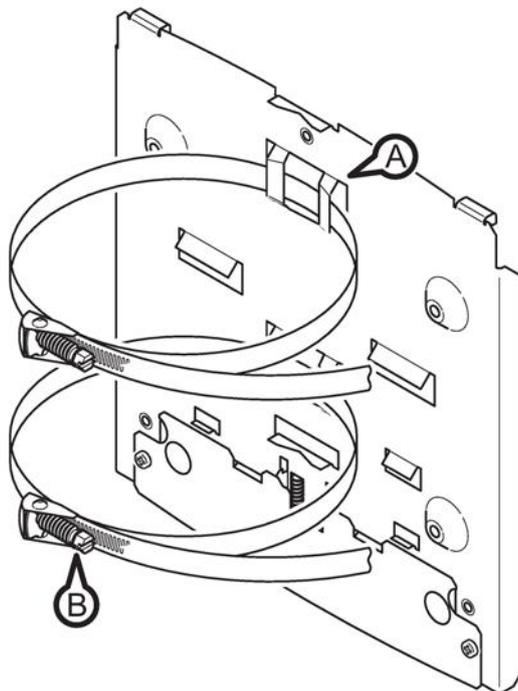


Figure 5-11 Mounting plate with fittings for mast mounting

Follow the steps below to fit the mounting plate to a mast:

1. Feed the fastening straps through the openings in the mounting plate (position **A** in the figure above).
2. Place the fastening straps around the mast at the required position.
3. Feed the free end of the strap through the quick-release fastener. You can twist the tensioning screw (position **B** in the figure above) to the side to adapt a fastening strap to the diameter of the mast.
4. Press the tensioning screw against the fastening strap and tighten the tensioning screw, tightening torque 4.5 Nm.

5.5.6 Fitting/removing the SCALANCE W786 to/from a mounting plate

Procedure for mounting the device

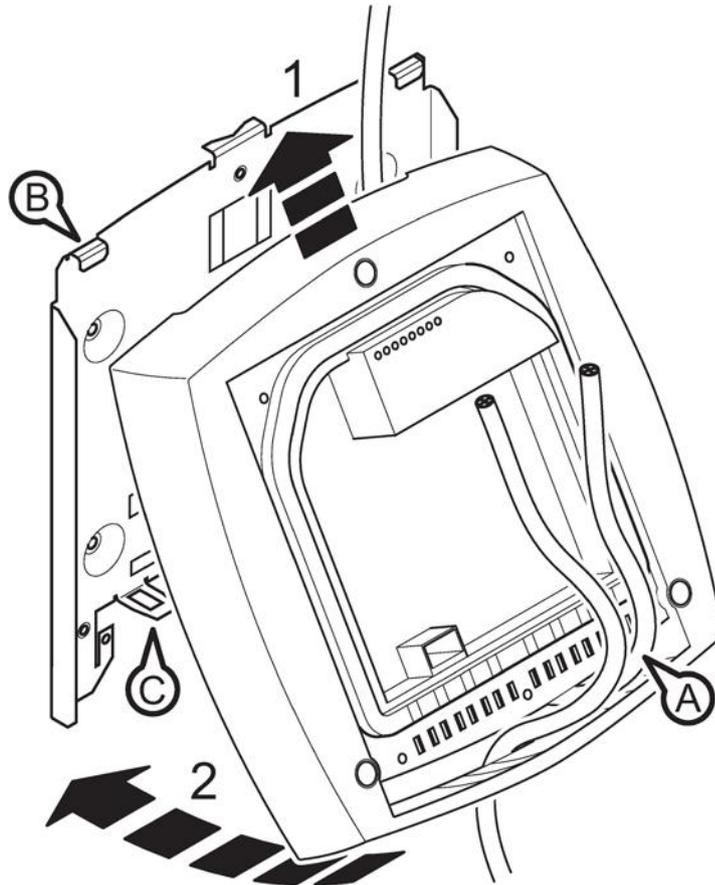


Figure 5-12 Fitting the SCALANCE W786 to a mounting plate

Follow the steps below to fit a SCALANCE W786 to a mounting plate:

1. Lead the cables into the housing of the SCALANCE W786 (position **A** in the figure above). Note the information in the section "Connecting up cables".
2. Fit the SCALANCE W786 so that the upper edge of the rear of the housing is below the two catches of the mounting plate (position **B** in the figure above).

3. Push in the SCALANCE W786 until it engages in the notches at the lower edge of the mounting plate (position **C** in the figure above).

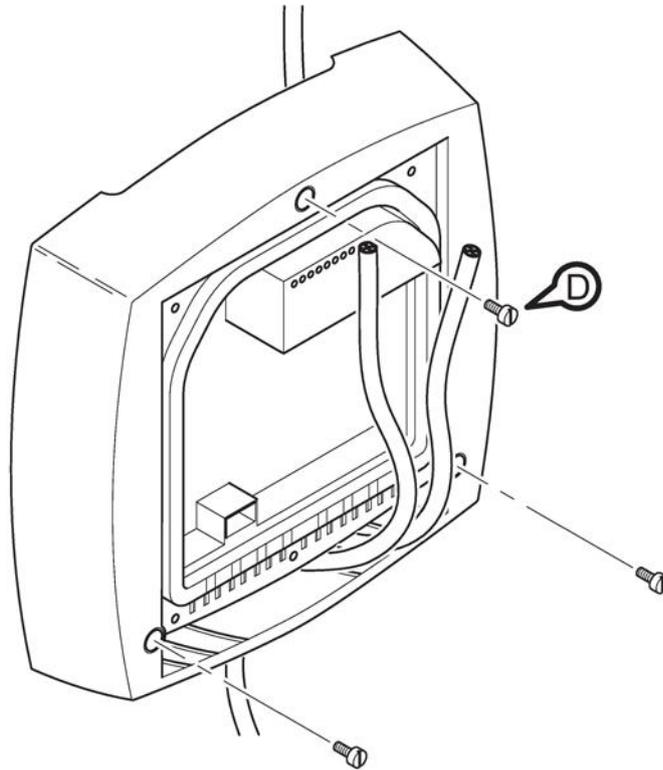


Figure 5-13 Screwing a SCALANCE W786 to a mounting plate

4. Screw the SCALANCE W786 using the three M4 screws supplied with the mounting plate (position **D** in the figure above), tightening torque 1.8 Nm.

Procedure for removing the device

Follow the steps below to remove a SCALANCE W786 from a mounting plate:

1. Loosen the screws between the SCALANCE W786 and mounting plate.
2. Using a screwdriver or similar tool, press down the two lugs on the lower edge of the mounting plate (position **C** in the first figure in this section) and release the SCALANCE W786 from the recesses.
3. Pull out the lower edge of the SCALANCE W786 to the front and then release it from the two clips on the mounting plate (position **B** in the first figure in this section).

Connecting up

6.1 Lightning protection, power supply and grounding

Notes on lightning protection



⚠ WARNING

Danger due to lightning strikes

Antennas installed outdoors must be within the area covered by a lightning protection system. Make sure that all conducting systems entering from outdoors can be protected by a lightning protection potential equalization system.

When implementing your lightning protection concept, make sure you adhere to the VDE 0182 or IEC 62305 standard.

Suitable lightning protectors are available in the range of accessories of SIMATIC NET Industrial WLAN:

- Lightning protector LP798-1N (order no. 6GK5798-2LP00-2AA6)
- Lightning protector LP798-2N (order no. 6GK5798-2LP10-2AA6)

Note

We recommend that you use the maintenance-free lightning protector LP798-2N.
Exception:

When there is also DC power is supplied via the antenna cable. In this case, only the lightning protector LP798-1N can be used.



⚠ WARNING

Danger due to lightning strikes

Installing this lightning protector between an antenna and a SCALANCE W700 is not adequate protection against a lightning strike. The LP798-1N lightning protector only works within the framework of a comprehensive lightning protection concept. If you have questions, ask a qualified specialist company.

Note

The requirements of EN61000-4-5, surge immunity tests on power supply lines, are met only when a Blitzductor is used with 12 to 24 VDC:

BVT AVD 24

type no. 918 422

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

Safety extra low voltage



⚠ WARNING

Danger to life from overvoltage, fire hazard

SCALANCE W700 devices are designed for operation with a directly connectable safety extra-low voltage or with the power supply adapters available as accessories (available only for the SCALANCE W786 device). Therefore only safety extra-low voltage (SELV) with limited power source (LPS) complying with IEC950/EN60950/VDE0805 may be connected to the power supply terminals (exception: Power supply adapter for 100 - 240 VAC for the SCALANCE W786).

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).

The power supply unit to supply the SCALANCE W700 must comply with NEC Class 2 (requirements of class 2 for power supply units of the "National Electrical Code, table 11 (b)") or SELV with LPS (Limited Power Source) EN 60950-1. If the power supply is designed redundantly (two separate power supplies), both power supplies must meet these requirements.

Exception:

Power supply with PELV (according to VDE 0100-410 or IEC 60364-4-41) is also possible if the generated rated voltage does not exceed the voltage limits 25 VAC or 60 VDC.

Grounding

NOTICE

Damage to the device due to potential differences

To fully eliminate the influence of electromagnetic interference, the device must be grounded. There must be no potential difference between the following parts, otherwise the device or other connected device could be severely damaged:

- Housing of the SCALANCE W700 and the ground potential of the antenna.
- Housing of the SCALANCE W700 and the ground potential of a device connected over Ethernet.
- Housing of the SCALANCE W700 and the shield contact of the connected Ethernet cable.

Connect both grounds to the same foundation earth or use an equipotential bonding cable.

If it is used outdoors, the device must always be connected to protective earth.

Notice for USA/Canada (UL Requirements)

When an external antenna or the device itself is located outdoor:

- The Ethernet-Port (RJ45) is considered a TNV-1 circuit (according IEC 60950-1). Connected Ethernet circuits must fulfill TNV-1 requirements (SELV circuits are not sufficient).
- The device must be properly earthed at the chassis earthing terminal.
- The 12 – 24 V power supply lines of the device are considered a TNV-1 circuit. Connected power supply circuits must fulfill TNV-1 requirements. The PS791-2AC power supply may be connected directly to 100 – 240 C AC primary circuits. The 100 – 240 AC wiring system must be conducted to conduits. This wiring system (including conduits) shall be secured before installation of the product, for example by using an outlet box, according to NEC or CEC.

When the device is located indoor:

- The Ethernet Port (RJ45) is considered a SELV circuit (according IEC 60950-1). All connected Ethernet circuits must fulfill SELV requirements and shall be entirely contained within a single low-voltage power distribution and within a single building.
- Do not connect any external LAN-circuit, powersupply or antenna coming from outdoor.

WARNING

EXPLOSION HAZARD

DO NOT CONNECT OR DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

 WARNING
EXPLOSION HAZARD SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2 OR ZONE 2.

 WARNING
EXPLOSION HAZARD DO NOT OPEN WHEN ENERGIZED.

General notes on use according to ATEX and IECEx

 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).

General notes on use in hazardous areas according to UL-HazLoc

 WARNING
EXPLOSION HAZARD DO NOT DISCONNECT WHILE CIRCUIT IS LIVE UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS.

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 - Cat. Nos. EAPN-Wx-yy-zx (US installation only):

- PLTC cable type and manufacturer shall be specified: Listed (QPTZ), Type 5240U1 (Waterdog PLTC-ER) manufactured by Belden.
- The PLTC cable for the power supply must be installed in a manner to avoid tensile stress at the termination fittings in accordance with Article 501.10 (B)(1)(4) of the NEC.
- The PLTC cable for the power supply must be installed in accordance with Article 725.154 (D)(1) through (D)(4) of the NEC.

WARNING -Cat. Nos. EAPN-Wx-yy-zx (Canadian installation only):

- TC cable type and manufacturer shall be specified: Listed (QPOR), Type JZ-604 TC manufactured by Helukabel GmbH.

- The TC cable for the power supply must be installed in areas of industrial establishments that are inaccessible to the public and in a manner that meets the requirements in Rule 12-2202(2) of the CEC:

Installed in conduit, other suitable raceway, or direct buried, when not in cable tray. Provided with mechanical protection where subject to damage either during or after installation. Installed only where qualified persons service the installation.

When operated in potential hazardous areas:

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

6.2 Suitable cables for power supply and Ethernet

Cable specification

The following table lists the requirements for a cable depending on the use case.

Application	Specification
Direct 24 V DC supply	<ul style="list-style-type: none"> Round cable cross-section with 6 to 8 mm diameter. Two-wire cable with 0.5 to 1.5 mm² cross-section per wire. Permitted tensile load at least 100 N. UL listing: Type PLTC or ITC
Power supply adapter 12 to 24 VDC	<ul style="list-style-type: none"> Round cable cross-section with 6 to 8 mm diameter. Two-wire cable with 0.5 to 1.5 mm² cross-section per wire. Permitted tensile load at least 100 N. UL listing: Type PLTC or ITC
Power supply adapter 100 to 240 VAC	<ul style="list-style-type: none"> Round cable cross-section with 6 to 8 mm diameter. Three-core cable with 0.5 - 1.5 mm² cross section of the individual cores. Permitted tensile load at least 100 N.

Application	Specification
Ethernet	1. IE FC TP standard cable GP 2 x 2 (type A) Order no.: 6XV1 840-2AH10 2. IE TP torsion cable 2 x 2 (type C) Order no.: 6XV1 870-2F 3. IE FC TP trailing cable 2 x 2 (type C) Order no.: 6XV1 840 3AH10 UL listing: Type PLTC or ITC (the three named types have this approval)
Fiber-optic cable multimode (for device variants with optical connectors)	FO standard cable GP order no. 6XV1 873-2A Minimum bending radius 65 mm. You will find detailed information on preassembled cable lengths in the "Catalog IK PI".
	FO Robust Cable GP 2G50/125/900 Order no. 6XV1873-2R Halogen-free, UV-resistant cable for indoors and outdoors for ambient temperatures -40 °C ... +70 °C.

 WARNING
<p>Only use cables suitable for high temperatures!</p> <p>If temperatures in excess of 70 °C occur on the cable or at the housing socket, or the temperature at the branching points of the cables exceeds 80 °C, special measures need to be taken.</p> <p>If the equipment is operated in an air ambient at 45 - 60 °C, only use cables with admitted maximum operating temperature of at least 90 °C.</p>

6.3 Connecting the cables

Procedure



⚠ WARNING

Danger from line voltage

If the housing is not perfectly sealed, there is a danger to life due to the line voltage if the SCALANCE W786 is subjected to spray water or dampness. Make sure that you keep to the following safety rules.

- Before connecting up, turn off the power supply.
- The sealing of the cable feedthroughs of the SCALANCE W786 is only assured when the cable has a suitable diameter and adequate tensile strength. Only use cables that meet the specifications in the section "Cables for the SCALANCE W786".
- Never wrap insulating tape, adhesive tape or other materials around thinner cables to achieve the required diameter. In this case, neither the housing seal nor the strain relief clamps can fulfill their function.
- Close all unused openings in the housing seal with the sealing plugs supplied with the SCALANCE W786. Do not use fillers or any other material under any circumstances.



⚠ WARNING

Danger from line voltage

If the supply cable of a power supply adapter for 100 to 240 VAC is disconnected from the line power, a dangerous voltage may be present for a brief period.

For this reason, do not connect the contacts of the supply cable to the mains power supply using a plug-in connector but screw the contacts to a terminal block that can be disconnected from the mains power by a switch.

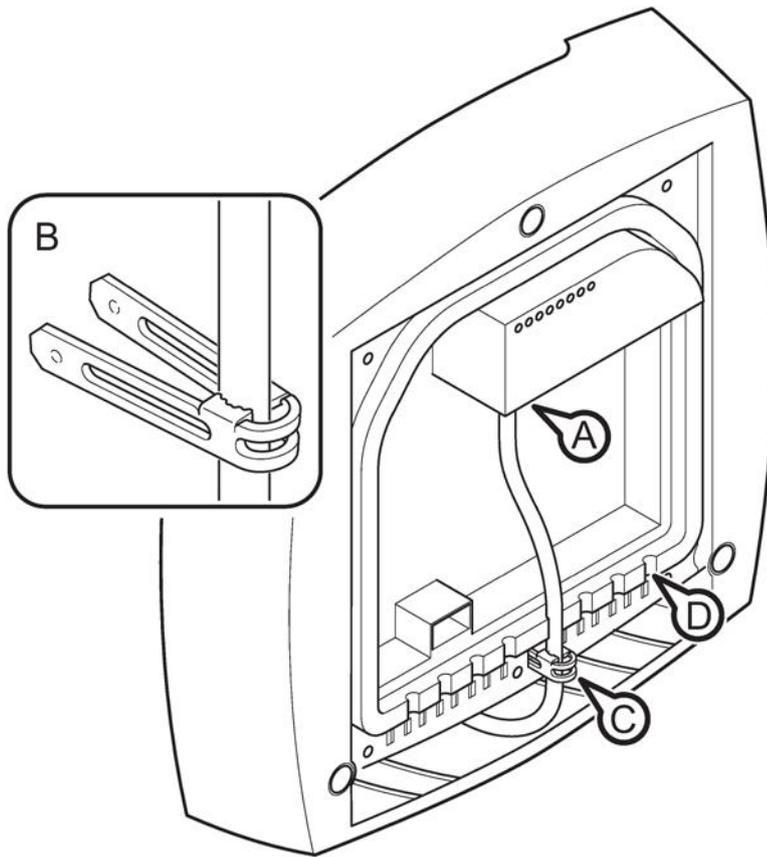


Figure 6-1 Connecting a cable and fitting the strain relief clamps

Follow the steps below to connect cables to the SCALANCE W786:

1. Connect the cables to the appropriate contacts. (Position **A** in the figure above) You have the following options:
 - Connect cables preassembled with a connector (Ethernet, antennas) by inserting the connector into the appropriate socket. Secure antenna cables by tightening the sleeve nut of the connector (key size SW8). You will find more information on this topic in the sections "Connection for Industrial Ethernet" and "Connections for external antennas".
 - 24 V DC power supply. Use the connector supplied with the SCALANCE W786. For details of the terminal assignment, refer to the section "Connectors for the power supply".
 - 12 - 24 V DC or 100 - 240 V AC power supply. With these power supplies, you require a power supply adapter (do not ship with the SCALANCE W786). You will find more information in the section "Connecting a power supply adapter".
2. Fit a strain relief clamp to the connected cable. The toothed part of the clamp must enclose the cable completely (as shown by position **B** in the figure above).
3. Press the strain relief clamp into the housing until the cable is located completely in the opening in the housing seal (position **C** in the figure above).

4. Seal all openings not required for cables with sealing plugs (position **D** in the figure above).
5. Fit these sealing plugs in a strain relief clamp. The lower surrounding notch must be enclosed by the tothing of the strain relief clamp (as shown in the figure below). Press the strain relief clamp into the housing until the sealing plug is located completely in the opening of the housing seal.

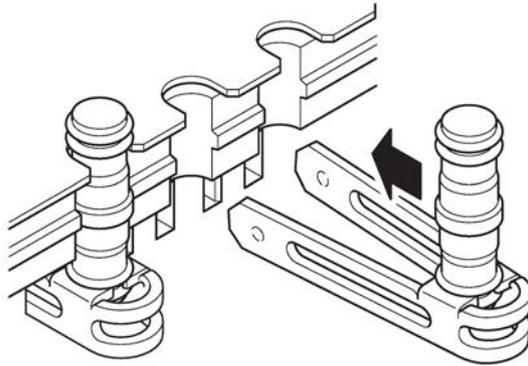


Figure 6-2 Securing a sealing plug with a strain relief clamp

Note

Keep unused sealing plugs and strain relief clamps for later use.

6.4 Connecting the power supply

Possible power supplies

You have the following options for the power supply of the SCALANCE W786:

Direct 24 VDC supply - direct voltage

A two-pin plug ships with the SCALANCE W786.

Power supply adapter 12 to 24 VDC - direct voltage

The power supply adapter Power Supply PS791-2DC is available as an accessory, order number: 6GK5 791-2DC00-0AA0

Power supply adapter 100 to 240 VAC alternating voltage

The power supply adapter Power Supply PS791-2AC is available as an accessory, order number: 6GK5 791-2AC00-0AA0

Power over Ethernet (PoE)

With the SCALANCE W786-x RJ-45, power supply using Power over Ethernet (PoE) is also possible. The devices support the standards 802.3at Type 1 (IEEE 802.3af) and IEEE 803.at Type 2. With SCALANCE W786-2SFP, Power over the Ethernet is not possible in any situation.

- Gigabit Ethernet

When you connect to gigabit Ethernet, the power supply is a phantom power supply over data wires 1, 2, 3 and 6. This corresponds to alternative A according to IEEE 802.3af.

- Fast Ethernet

On an 8-wire Fast Ethernet cable, the power is supplied via the free data wires 4, 5, 7 and 8. This corresponds to alternative B according to IEEE 802.3af.

Note

Disabling the PoE power supply

Before you pull a plug via which the device is supplied with power using PoE, disable the relevant PoE power supply.

Note

No power sourcing equipment (PSE)

The W786 cannot be used as a PoE power supply for other devices.

Procedure for connecting the supplied connector for direct supply 24 VDC

The cable for direct power supply is connected to the SCALANCE W786 with the supplied connector. The connector is safe against polarity reversal and can only be inserted in the left-hand half of the housing. When connecting the wires, you should therefore make sure that the connector is oriented as shown in the following figure:

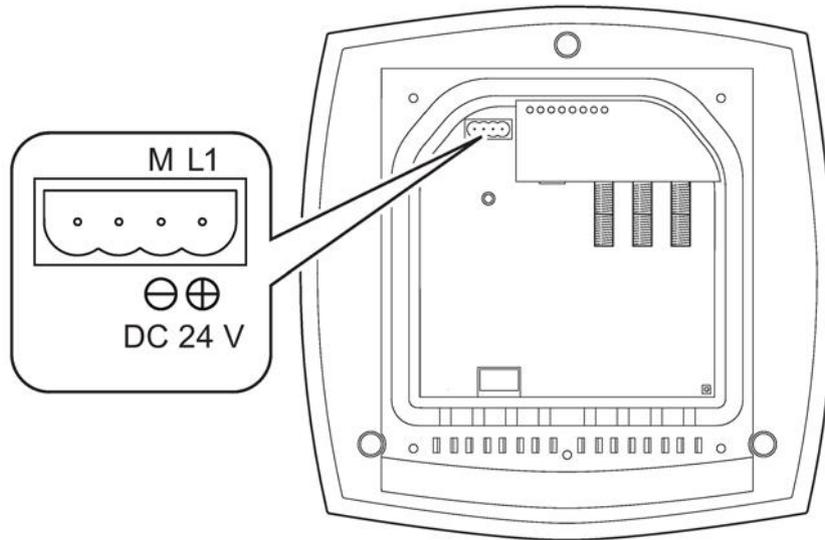


Figure 6-3 Position of the socket in the housing for the power supply

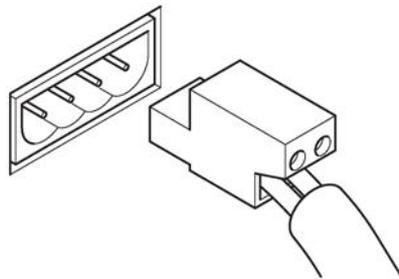


Figure 6-4 Position of the connector when inserted in the socket of the housing

Follow the steps below to connect a 24 VDC cable to a SCALANCE W786:

1. Connect the supplied connector to the 24 VDC cable.
2. Press the plug into the left-hand half of the socket until it locks in place.
3. Secure the power supply with a strain relief clamp as shown in the section "Connecting the cables".

6.5 Connecting a power supply adapter

Input voltage options

The optional power supply adapter is available in two versions:

- Power supply adapter for 12 to 24 VDC direct voltage
Power Supply PS791-2DC
Order number: 6GK5 791-2DC00-0AA0
- Power supply adapter for 100 to 240 VAC alternating voltage
Power Supply PS791-2DC
Order number: 6GK5 791-2AC00-0AA0

Note

Applies only to SCALANCE W786-2

If a SCALANCE W786-2 is operated with six external antennas, the power supply for 12 to 24 VDC cannot be supplied redundantly. In this case, there is no further opening in the housing for a second power cable.



WARNING

Danger from line voltage

Only electrical specialists may open the device and connect the power supply adapter.

Connect or disconnect power supply cables only when the power is turned off.

Start the SCALANCE W786 only when you have screwed down the housing cover again so that there is once again protection against touching live parts.

NOTICE**Exceeding the EMC limit values****SCALANCE W786 with RJ-45 interface with DC power supply adapter or without power supply adapter**

When using a SCALANCE W786 with RJ-45 connector without a power supply adapter or with a DC power adapter, no additional measures are necessary for use in a residential environment.

SCALANCE W786 with RJ-45 interface with AC power supply adapter PS791-2AC

When using a SCALANCE W786 with a power supply adapter PS791-2AC (100 to 240 VAC), the requirements for use in an industrial environment are met without any additional measures being necessary.

When used in a residential environment, noise produced by this configuration can be reduced by fitting an EMC ferrite (a snap ferrite) to the power supply cable as close as possible to the power supply adapter.

If you use the power supply adapter PS791-2AC (100 to 240 V AC voltage) in a domestic area (EMC class B), fit an EMC ferrite (a snap ferrite) to the supply cable as close as possible to the power supply adapter. This measure is unnecessary in an industrial environment.

You can order suitable ferrites from the following company:

Würth Elektronik eiSos GmbH & Co. KG
Max-Eyth-Strasse 1-3; 74638 Waldenburg, Germany

Model designation: STAR-TEC with safety key technology
cable diameter 6 – 7.5 mm, order number: 74271131
Cable diameter 7 - 8.5 mm, order number: 74271132

Applies only to the power supply adapter PS791-2AC (100 to 240 VAC)

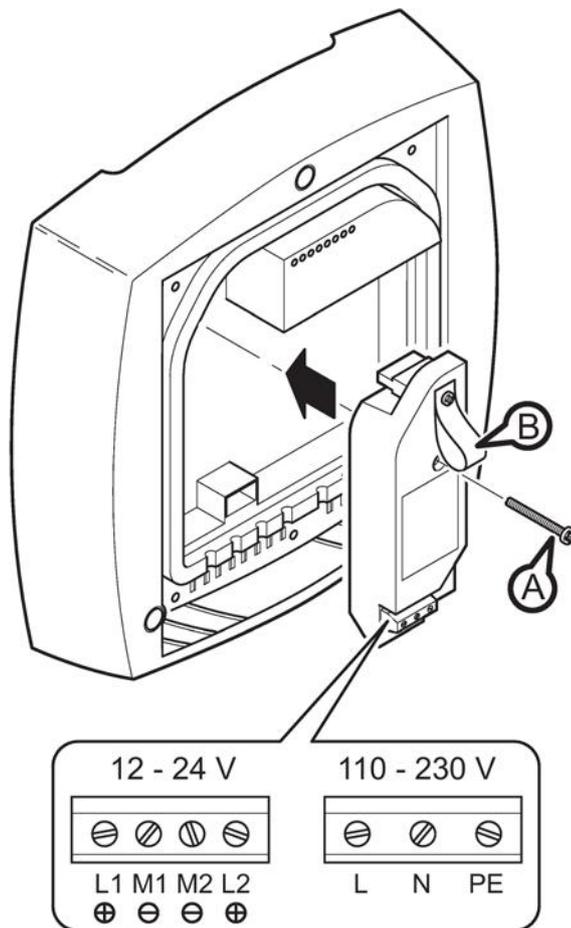
**⚠ WARNING****Danger from line voltage**

The strain relief clamp may damage the insulation under unfavorable circumstances. You run the risk of encountering danger from line voltage through the strain relief clamp.

For a line with 100 to 240 VAC use an insulated strain relief clamp only; this ships with the power supply adapter.

How to fit a power supply adapter

The following figure shows how a power supply adapter is fitted:



- O Securing screw
- B Pull-out loop

Figure 6-5 Fitting a power supply adapter

Follow the steps below to fit and connect a power supply adapter:

1. Fit the power supply adapter in the SCALANCE W786 as shown in the figure above.
 - The connector on the rear of the power supply adapter must engage fully in the socket of the housing.
 - The entire rear surface of the power supply adapter must make contact with the inner surface of the SCALANCE W786.
2. Connect the power supply adapter and the SCALANCE W786 using the screw (position B) that ships with the power supply adapter.
3. Connect the cable for the power supply. The assignment of the terminals is shown above.
4. Secure the power supply cable with a strain relief clamp. For more detailed information on this topic, refer to the section "Connecting the cables".

How to remove the power supply adapter

NOTICE

Use only the pull-out loop (position A) when removing the power supply adapter from the SCALANCE W786. This prevents the connector skewing on the back of the power supply adapter and breaking off.
--

Follow the steps below to remove a power supply adapter from a SCALANCE W786:

1. Disconnect the power supply cable from the power supply adapter.
2. Remove the securing screw of the power supply adapter (position B).
3. Pull the loop (position A) to remove the plug on the rear of the power supply adapter from the socket in the housing.
4. Remove the power supply adapter.

6.6 Connecting to Industrial Ethernet

With the W786, the Ethernet cable is connected via an RJ-45 jack (copper cable). The following figure shows the position of the Ethernet interface with the housing cover open:

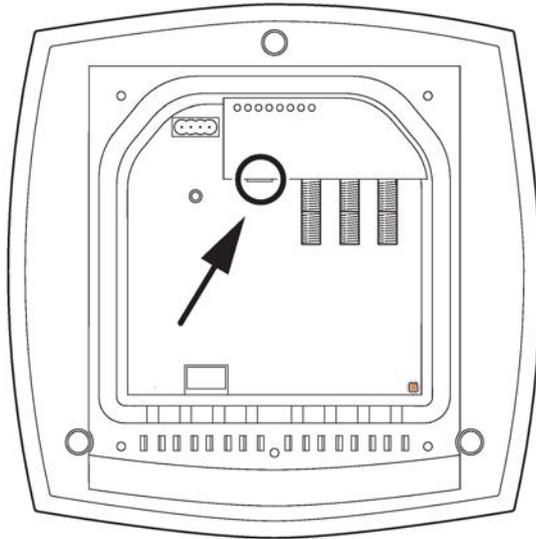


Figure 6-6 Position of the Ethernet interface

Device variant W786-x RJ-45

Follow the steps below to connect an Ethernet cable to a SCALANCE W786 with an RJ-45 jack:

1. Insert the RJ-45 plug of the Ethernet cable in the jack of the SCALANCE W786-x RJ-45.
2. Secure the Ethernet cable with a strain relief clamp.

Note

Keep the dummy plugs

Keep any dummy plugs taken out of the slots for later use.

See also

Suitable cables for power supply and Ethernet (Page 37)

6.7 SFP/SFP+ transceiver

Transceivers permitted for SCALANCE W786-2 SFP and W786C-2 SFP

SFP/SFP+ transceivers allow the SCALANCE W786-2 SFP and W786C-2 SFP devices to be equipped with interfaces for fiber-optic cables. There are SFPs for different cable materials (multimode, single mode) and cable lengths. The following table lists the models permitted for SCALANCE W786-2 SFP and W786C-2 SFP.

Transceiver	Properties	Order number
SFP992-1	1 x 1000 Mbps, LC port optical, multimode glass, up to max. 750 m	6GK5 992-1AL00-8AA0
SFP992-1LD	1 x 1000 Mbps, LC port optical, single mode glass, up to max. 10 km	6GK5 992-1AM00-8AA0
SFP992-1LH	1 x 1000 Mbps, LC port optical, single mode glass, up to max. 40 km	6GK5 992-1AN00-8AA0
SFP992-1LH+	1 x 1000 Mbps, LC port optical, single mode glass, up to max. 70 km	6GK5 992-1AP00-8AA0
SFP992-1ELH	1 x 1000 Mbps, LC port optical, single mode glass, up to max. 120 km	6GK5 992-1AQ00-8AA0

NOTICE

The maximum operating temperature depends on the transceiver you are using

The following temperature limits apply for the individual transceivers:

SFP992-1: 60 °C
 SFP992-1LD: 55 °C
 SFP992-1LH: 50 °C
 SFP992-1LH+: 50 °C
 SFP992-1ELH: 45 °C

If a SCALANCE W786 -2 SFP or W786C-2 SFP is operated at a temperature higher than the specified temperature, the device and transceiver may be damaged. For this reason, do not use the SCALANCE in ambient temperatures above the specified temperature limits.

NOTICE

Use only approved SFP transceivers

If you use SFPs not approved by Siemens AG, Siemens cannot accept any responsibility for the correct functioning of the device according to the specification.

If components are used that have not been Siemens approved, Siemens cannot vouch for their compatibility or for risk-free use of these components.

You will find detailed information on installing and connecting transceivers in the "Operating Instructions SFP/SFP+ Transceiver". This document is on the CD that ships with the SCALANCE W786 or W786C.

NOTICE

Insert and remove transceivers only when the power is off

SFP/SFP+ transceivers may only be inserted in or removed from an SFP slot when the power supply to the device has been turned off.

Position of the SFP slots

The SFP slots are located below the housing cover to the left of the antenna sockets.

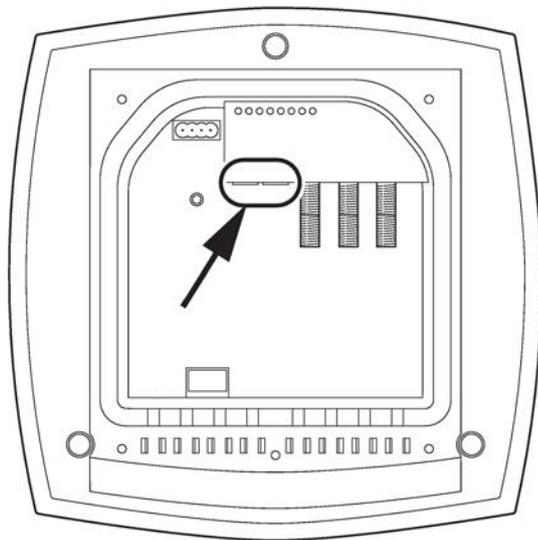


Figure 6-7 Position of the SFP slots with the housing cover removed

6.8 Suitable antenna cables and antennas

N-Connect/R-SMA connecting cable for RJ-45

The N-Connect/R-SMA male/male flexible connecting cable is available as an accessory for connecting to a SCALANCE W700 with R-SMA connectors.

Length	Order number
0.3 m	6XV1875-5CE30
1 m	6XV1875-5CH10
2 m	6XV1875-5CH20
5 m	6XV1875-5CH50
10 m	6XV1875-5CN10

N-Connect / N-Connect connecting cable for M12

The N-Connect/N-Connect male/male flexible connecting cable is available as an accessory for connecting to a SCALANCE W700 M12 or for connection to the LP798-1N/LP798-2N lightning protector.

Length	Order number
1 m	6XV1875-5AH10
2 m	6XV1875-5AH20
5 m	6XV1875-5AH50
10 m	6XV1875-5AN10

Connecting cable IWLAN QMA/N-Connect male/female

Flexible adapter cable of antennas with QMA socket for antenna connecting cable. pack of 3

Length	Order number
1 m	6XV1875-5JH10

Suitable antennas

Note

When you select an antenna, keep in mind the national approvals for your SCALANCE W786.

6.8 Suitable antenna cables and antennas

The models SCALANCE W786-2IA RJ-45 and SCALANCE W786C-2IA RJ-45 use internal omni antennas (3/4 dBi at 2.4 GHz or 5 GHz). For the other SCALANCE W786 models, the following antennas have been approved:

Type	Properties	Order number
ANT792-6MN	Omni antenna, mast/wall mounting, 6 dBi 2.4 GHz, N-Connect female	6GK5 792-6MN00-0AA6
ANT793-6MN	Omni antenna, mast/wall mounting, 5 dBi 5 GHz, N-Connect female	6GK5 793-6MN00-0AA6
ANT792-8DN	Directional antenna, mast/wall mounting, 14 dBi 2.4 GHz, N-Connect female	6GK5 792-8DN00-0AA6
ANT793-8DJ	Directional antenna, mast/wall mounting, 18 dBi 5 GHz, 2 x N-Connect female	6GK5 793-8DJ00-0AA0
ANT793-8DK	Directional antenna, mast/wall mounting, 23 dBi 5 GHz, 2 x N-Connect female	6GK5 793-8DK00-0AA0
ANT793-8DP	Directional antenna, mast/wall mounting, 13 / 13.5 dBi 4.9 GHz and 5 GHz, N-Connect female	6GK5793-8DP00-0AA0
ANT793-6DT	Wide angle antenna (MIMO), mast/wall mounting, 8 dBi 5 GHz, 3 x QMA connector female	6GK5 793-6DT00-0AA0
ANT795-6DC	Wide angle antenna, mast/ wall mounting, 9 dBi 2.4 GHz and 5 GHz, N-Connect female	6GK5 795-6DC00-0AA0
ANT793-6DG	Wide angle antenna, mast/ wall mounting, 9 dBi 5 GHz, 2 x N-Connect female	6GK5 793-6DG00-0AA0
ANT795-6MN	Omni antenna, mounted on roof/vehicle, 6/8 dBi 2.4 GHz and 5 GHz, N-Connect female	6GK5 795-6MN10-0AA6
ANT795-6MT	Omni antenna (MIMO), mounted on roof/vehicle/ceiling, 5/7 dBi 2.4 GHz and 5 GHz, 3 x QMA connector female	6GK5 795-6MT00-0AA0
ANT795-4MC	Omnidirectional antenna, 3/5 dBi, 2.4 GHz and 5 GHz, IP65, N-Connect male for direct installation on the device, straight connector.	6GK5 795-4MC00-0AA3
ANT795-4MD	Omnidirectional antenna, 3/5 dBi, 2.4 GHz and 5 GHz, IP65, N-Connect male for direct installation on the device, 90° con- nector.	6GK5 795-4MD00-0AA3
ANT795-4MA	Omni antenna, directly on the device, 3/5 dBi 2.4 GHz and 5 GHz, IP30, R-SMA con- nector male for direct mounting on the device, connector angle adjustable 0° to 180°.	6GK5 795-4MA00-0AA3

Type	Properties	Order number
ANT792-4DN	RCoax helical antenna, circular polarization, 4 dBi, 2.4 GHz, N-connect female.	6GK5 792-4DN00-0AA6
ANT793-4MN	RCoax $\lambda/8$ antenna with vertical polarization, 6 dBi, 5 GHz, N-connect female.	6GK5 793-4MN00-0AA6
IWLAN RCoax cable 2.4 GHz PE 1/2"	Omni antenna, 0 dBi 2.400 - 2.485 GHz, N-Connect female.	6XV1875-2A
IWLAN RCoax cable 5 GHz PE 1/2"	Omni antenna, 0 dBi 5.150 - 5.875 GHz, N-Connect female.	6XV1875-2D

Note**ANT793-8DJ**

The antenna ANT793-8DJ may only be used with the antenna cable 6XV1875-5CH50 (5 m length) or 6XV1875-5CN10 (10 m length). Other antenna cables are not permitted.

Notice for USA/Canada

Only one antenna per device can be used (connected to R1A1, R1A2 or R2A1, R2A2).

Note**ANT793-8DK**

The antenna ANT793-8DK may only be used with the antenna cable 6XV1875-5CN10 (10 m length). Other antenna cables are not permitted.

Notice for USA/Canada

Only one antenna per device can be used (connected to R1A1, R1A2 or R2A1, R2A2).

6.9 Connecting external antennas

How to connect external antennas

Note

- If both interfaces of access points with two IWLAN interfaces are operated in the same frequency range,
 - the distance between the antennas connected to R1A1, R1A2, R1A3 and those connected to R2A1, R2A2, R2A3 must be at least 1 m.
 - there may be wireless interference on one or both IWLAN interfaces if the transmit power is higher than 15 dB.
- First, connect the cables to the "R2" sockets if you are using more than one antenna for an interface. After connecting the cables to the "R1" sockets, the "R2" sockets are difficult to reach.

The following figure shows the interfaces of a SCALANCE W786-2 with the housing cover removed:

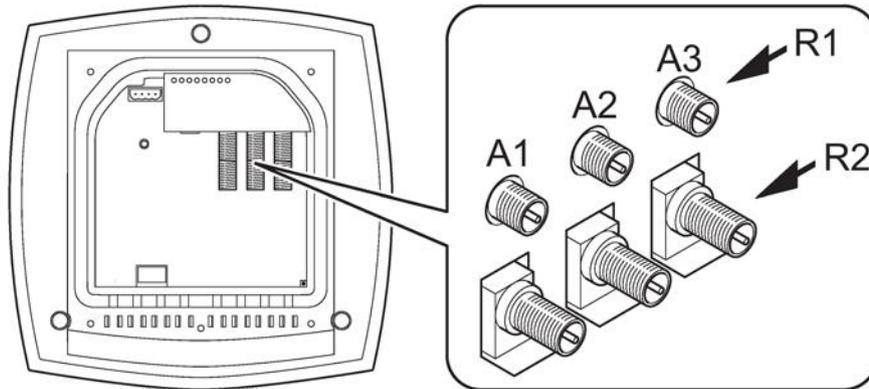


Figure 6-8 R1: Interface for the first wireless card
 R2: Interface for the second wireless card. On devices with only one IWLAN interface (W786-1), this interface does not exist.

For each WLAN port, there are three R-SMA sockets on a SCALANCE W786 to connect external antennas. The figure above shows how the R-SMA sockets are assigned to the WLAN ports. On device variants with only one WLAN interface (W786-1), there is only one row of sockets labeled "R1".

Perform the following steps to connect a cable for an external antenna to a SCALANCE W786:

1. Insert the connector on the antenna cable into the R-SMA socket and tighten the sleeve nut on the socket (key size SW8), tightening torque 0.6 Nm. First connect the cable for the "R2" interface if you want to use both interfaces. Once the cable for interface "R1" is connected, it is difficult to reach socket "R2".
2. Screw a terminating resistor to the unused socket if you use only one antenna on a port.
3. Secure the antenna cable(s) with a strain relief clamp. For more detailed information on this topic, refer to the section "Connecting the cables".

Note

Terminating resistor

Each WLAN interface has three antenna connectors. Connectors that are not used must have a terminating resistor fitted.

The antennas R1A1 and R2A1 must be always be connected as soon as the associated WLAN Interface is turned on. if no antenna is connected, the relevant interface must also be disabled for RX and TX. Otherwise, there may be transmission disruptions.

You will find information on the configuration of the antennas in the following documents:

- SCALANCE W786
 SCALANCE W700 configuration manual, section "Configuring antennas"
- SCALANCE W786C
 SCALANCE WLC711 User Guide, section "Configuring wireless AP radio properties"

6.10 Replacing the PLUG (C-PLUG or KEY-PLUG)



▲ WARNING

Danger from line voltage

After removing the housing cover, there is a risk of touching live parts in the area of the connecting terminals of the power supply adapter.

Only authorized personnel is permitted to open the device and carry out any work on the open device (e.g. connection and disconnection of cables, operating the reset button, replacing the PLUG).

How it works

If a new C-PLUG or KEY-PLUG with a valid license is inserted in a SCALANCE W786, the configuration stored locally on the device is saved on the PLUG.

If an incorrect PLUG, for example from another product or a damaged plug is inserted, the device signals an error with the red LED. The user then has the choice of either removing the PLUG again or selecting the option to reformat the PLUG.

In terms of the PLUG, the WLAN devices work in two modes:

- Without PLUG

The device stores the configuration in internal memory. This mode is active when no PLUG is inserted.

- With PLUG

The configuration stored on the PLUG is displayed over the user interfaces. If changes are made to the configuration, the device stores the configuration directly on the PLUG and in the internal memory. This mode is active as soon as a PLUG is inserted. As soon as the device is started with a PLUG inserted, the SCALANCE W700 starts up with the configuration data on the PLUG.

NOTICE

Do not remove or insert a C-PLUG / KEY-PLUG during operation!

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

The device checks whether or not a PLUG is inserted at one second intervals. If it is detected that the PLUG was removed, there is a restart.

If a KEY-PLUG was inserted in the device, the device changes to a defined error state following the restart. With SCALANCE W, the available wireless interfaces are deactivated in this case.

Removing the PLUG

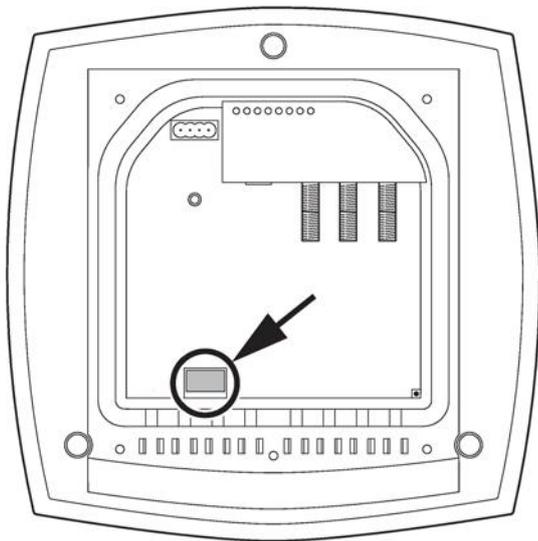


Figure 6-9 Location of the PLUG slot with the housing cover removed

Follow the steps below to remove a PLUG from the device:

1. Turn off the power to the device.
2. Remove the housing cover, see section "Removing/fitting the housing cover".
3. Insert a screwdriver between the front edge of the PLUG and the slot and release the PLUG.
4. Remove the PLUG from the slot.
5. Screw the housing cover back onto the device.

Inserting the PLUG

Follow the steps below to insert a PLUG in the device:

1. Turn off the power to the device.
2. Remove the housing cover, see section "Removing/fitting the housing cover".
3. The housing of the PLUG has a protruding ridge on the long side. The slot has a groove at this position. Insert the PLUG correctly oriented into the slot. The PLUG is correctly inserted when it is completely inside the device and does not jut out of the slot.
4. Screw the housing cover back onto the device.

Licenses on the KEY-PLUG

A C-PLUG only stores information about the configuration of a device. In addition to the configuration, a KEY-PLUG also contains a license with which you can enable special functions, for example iFeatures:

Type	Order number
KEY-PLUG W780 iFeatures AP	6GK5907-8PA00
KEY-PLUG W740 iFeatures Client	6GK5907-4PA00
KEY-PLUG W700 Security	6GK5907-0PA00

Technical specifications

Product versions

The technical specifications of the product variants of the SCALANCE W786 are largely identical. Unless indicated otherwise in the table, the following tables apply to all W786 product variants:

Data transfer	
Ethernet transfer rate	1 Gbps
Wireless transmission rate	1 ... 450 Mbps
Wireless standards supported	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11h IEEE 802.11n
Power supply standards supported	IEEE 802.3at type 2, IEEE 802.3af (IEEE 802.3at type 1)

Note

You will find detailed information on the transmit power and receiver sensitivity in the document "Leistungsdaten 802.11abgn PCIe Minicard / Characteristics 802.11abgn PCIe Minicard" (REF_W700-RadioInterface_74.pdf).

Interfaces

Power	<p>Direct power supply 24 VDC min. 19.2 VDC, max. 28.8 VDC via supplied connector, not electrically isolating.</p> <p>Power over Ethernet 50 VDC min. 36 VDC, max. 57 VDC via RJ-45 jack, electrically isolated according to IEEE802.3at, dielectric resistance > 2 Mohms.</p> <p>12 to 24 VDC min. 9.6 VDC, max. 28.8 VDC via optional power supply adapter</p> <p>100 to 240 VAC via optional power supply adapter</p>
-------	---

Interfaces		
Data	W786-x RJ-45	RJ-45 jack for Ethernet
	W786C-2 RJ-45	3 or 6 antenna sockets of the type R-SMA female
	W786-2IA RJ-45	RJ-45 jack for Ethernet
	W786C-2IA RJ-45	2 internal antennas
	W786-2 SFP	2 slots for SFPs
	W786C-2 SFP	

Electrical data		
Maximum power consumption	15.6 W	
Maximum current consumption depending on power supply	12 to 24 VDC	1400 to 700 mA
	100 to 240 VAC	264 to 144 mA
Typical power consumption depending on the number of wireless cards	1 wireless card	24 VDC: 10.7 W
	2 wireless cards	24 VDC: 15 W

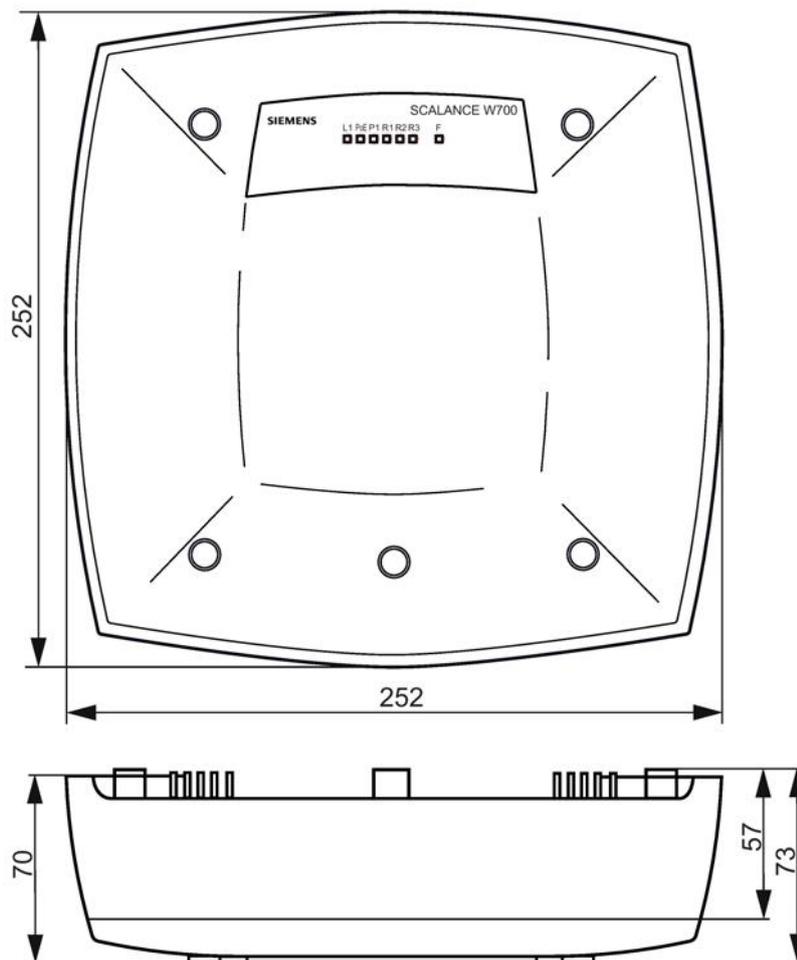
Construction		
Dimensions (W x H x D)	251 mm x 251 mm x 72 mm	
Weight (version with two wireless cards)	Without power supply adapter	2.24 kg
	With power supply adapter 12 to 24 VDC	2.4 kg
	With power supply adapter 100 to 240 VAC	2.4 kg

Permitted ambient conditions		
Operating temperature	-40 °C to +60 °C	
Operation with 100 V to 240 V	-40 °C to +60 °C	
You should also note the temperature ranges specified in the approvals.		
With the products W786-2 SFP and W786C-2 SFP, the maximum operating temperature depends on the transceiver you are using:	SFP992-1	60 °C
	SFP992-1LD	55 °C
	SFP992-1LH	50 °C
	SFP992-1LH+	50 °C
	SFP992-1ELH	45 °C
Transportation/storage temperature	-40 °C to +70 °C	
Degree of protection	Tested to IP65	

MTBF (mean time between failure)	
W786-1	41 years
W786-2	36 years
W786C-2	

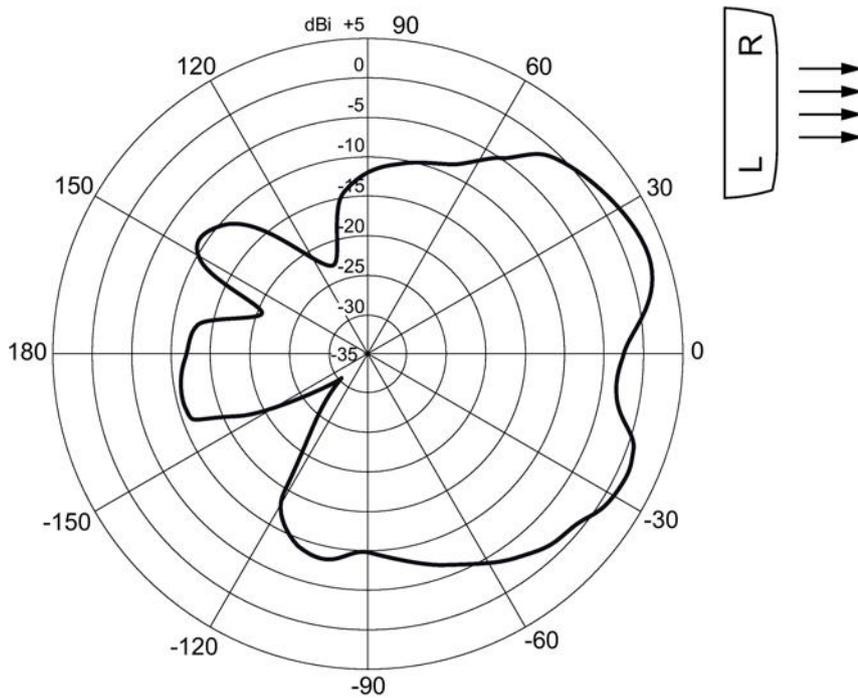
7.1 Dimension drawing SCALANCE W786

Front view and view from above of the SCALANCE W786

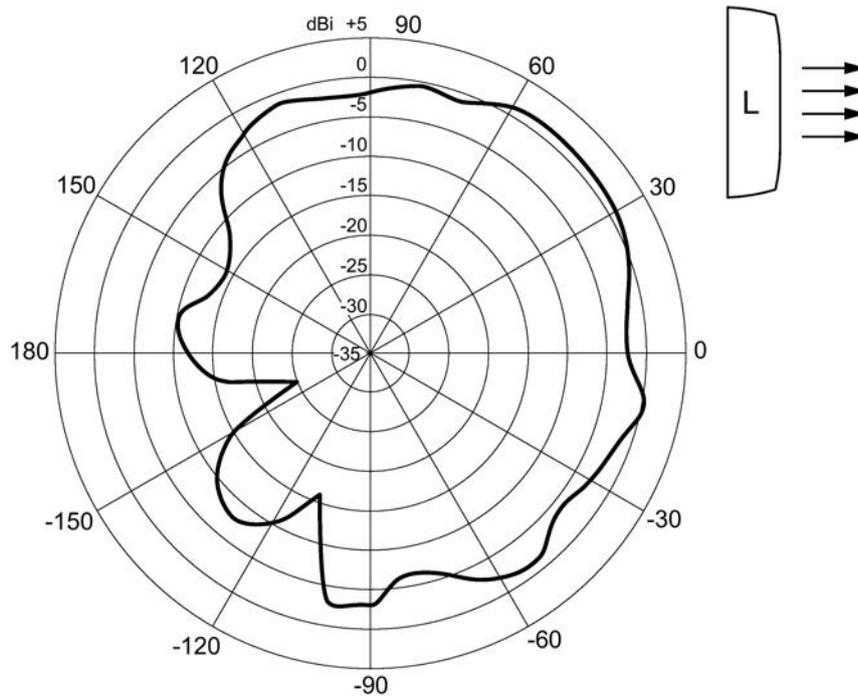


7.2 Radiation patterns diagrams of SCALANCE W786 internal antennas

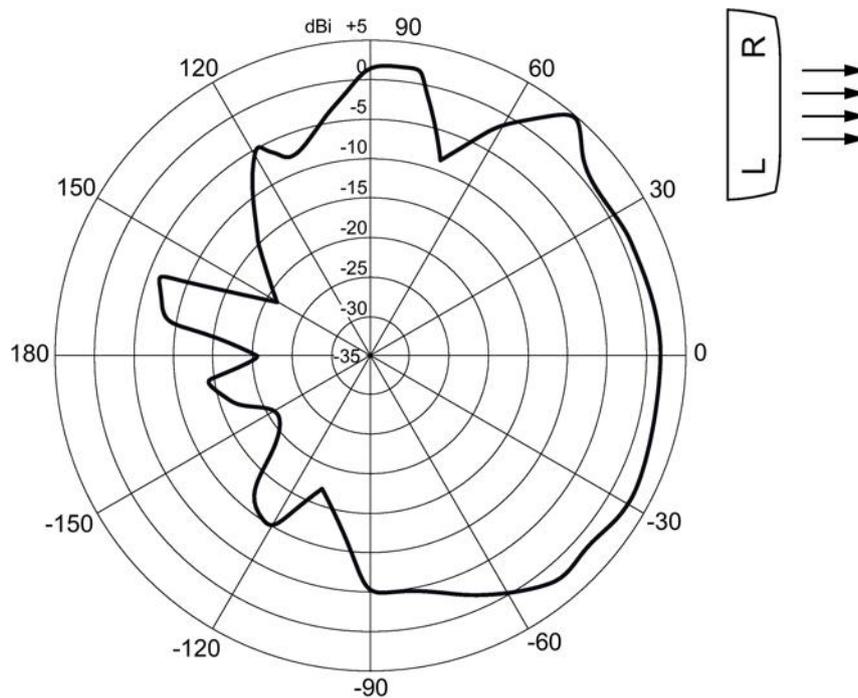
Horizontal radiation pattern 2500 MHz



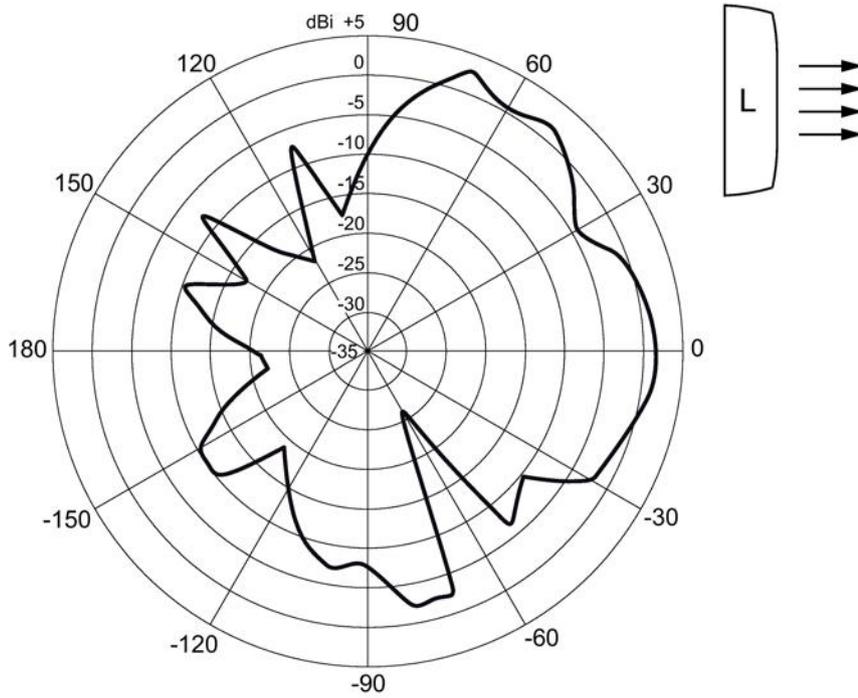
Vertical radiation pattern 2500 MHz



Horizontal radiation pattern 5800 MHz



Vertical radiation pattern 5800 MHz



You will find the approvals of the products in the reference work "Approvals SCALANCE W700 802.11n" on the Internet pages of Siemens Industry Online Support:

- Using the search function:
support.automation.siemens.com (<http://support.automation.siemens.com/WW/view/en>)
Enter the entry ID of the relevant manual as the search item.
- In the navigation panel on the left-hand side in the area "Industrial Communication":
Industrial communication
(<http://support.automation.siemens.com/WW/view/en/10805878/133300>)
Go to the required product group and make the following settings:
"Entry list" tab, Entry type "Manuals / Operating Instructions"

You will find the documentation for the SIMATIC NET products relevant here on the data storage medium that ships with some products:

- Product CD / product DVD
- SIMATIC NET Manual Collection
- SIMATIC NET IWLAN CD

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