

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

SIEMENS SCALANCE

6GK5216-0HA00-2AS6

MANAGED INDUSTRIAL ETHERNET SWITCH

Applicable product family: SCALANCE X Industrial Ethernet switches

OFFICIAL SOURCE

6GK5216-0HA00-2AS6.pdf

The following pages are selected from the supplied manufacturer document and retain their original page content.

Description of the device

2.1 Product overview

Article numbers

There are two variants of some devices with different article numbers. These variants differ only in their factory settings. All other properties are identical.

Device	Description	Article number (Ethernet/IP)	Article number (PROFINET)
SCALANCE XP208	8 x 10/100 Mbps M12 connector technology electrical	6GK5 208-0HA00-2TS6	6GK5 208-0HA00-2AS6
SCALANCE XP208EEC	8 x 10/100 Mbps M12 connector technology electrical, varnished circuit board	-	6GK5 208-0HA00-2ES6
SCALANCE XP208PoE EEC	8 x 10/100 Mbps M12 connector technology electrical, varnished circuit board, Power over Ethernet on 4 ports	-	6GK5 208-0UA00-5ES6 ¹⁾
SCALANCE XP216	12 x 10/100 Mbps and 4 x 10/100/1000 Mbps M12 connector technology electrical	6GK5 216-0HA00-2TS6	6GK5 216-0HA00-2AS6
SCALANCE XP216EEC	12 x 10/100 Mbps and 4 x 10/100/1000 Mbps M12 connector technology electrical, varnished circuit board	-	6GK5 216-0HA00-2ES6
SCALANCE XP216PoE EEC	12 x 10/100 Mbps und 4 x 10/100/1000 Mbps M12 connector technology electrical, varnished circuit board, Power over Ethernet on 8 ports	-	6GK5 216-0UA00-5ES6 ¹⁾

¹⁾ The PoE variants SCALANCE XP-200 are expected to be available as of the second half of 2016.

Factory settings

EtherNet/IP variants

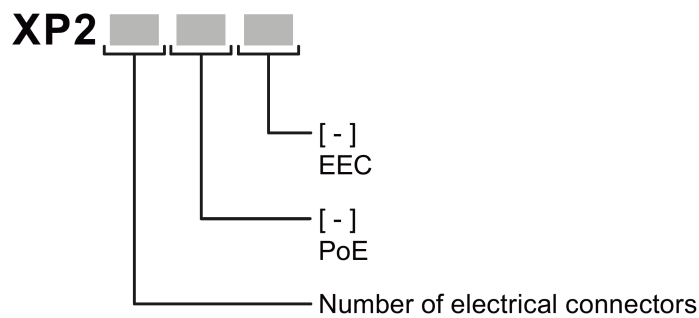
- Industrial Ethernet protocol: EtherNet/IP
- Base bridge mode: 802.1Q VLAN Bridge
- Redundancy mechanism: RSTP
- Trust mode: Trust COS-DSCP

PROFINET variants

- Industrial Ethernet protocol: PROFINET
- Base bridge mode: 802.1D transparent bridge
- Redundancy mechanism: Ring redundancy
- Trust mode: Trust COS

Type designation

The type designation of a SCALANCE XP-200 is made up of several parts that have the following meaning:



Property	Description
EEC	Enhanced Environmental Conditions
PoE	Power over Ethernet

Components of the product

The following components are supplied with a SCALANCE XP-200:

- One device
- One product DVD with documentation and software
- Protective caps for all connectors
- 4 screws for mounting on a rack
- Grounding screw

Accessories

The following accessories are available for SCALANCE XP-200:

C-PLUG

Component	Description	Article number
C-PLUG	Configuration plug, exchangeable storage medium for configuration data	6GK1 900-0AB00
	Configuration plug, Exchangeable storage medium for configuration data, Varnished (conformal coating)	6GK1 900-0AQ00

M12 data plug-in connector

Component	Description		Article number
IE FC M12 PLUG PRO 2x2	M12 data plug-in connector for IE FC TP cables 2x2, IP65/67, D-coded, axial cable outlet	1 connector per package	6GK1 901-0DB20-6AA0
		8 connectors per package	6GK1 901-0DB20-6AA8
IE FC M12 PLUG PRO 4x2	M12 data plug-in connector for IE FC TP cables 4x2, IP65/67, X-coded, axial cable outlet	1 connector per package	6GK1 901-0DB30-6AA0
		8 connectors per package	6GK1 901-0DB30-6AA8
IE FC M12 CABLE CONNECTOR PRO 4X2	M12 plug-in connector (X-coded) can be assembled in the field, 8-pin, metal housing, FC fast connection technology, socket insert	1 connector per package	6GK1 901-0DB40-6AA0
		8 connectors per package	6GK1 901-0DB40-6AA8

Data line

Component	Description	Article number
Connecting cable (M12/RS-232)	Preassembled, serial cable with M12 and RS-232 plug, Length: 3 m pack of 1	6GK5 980-3BC00-0AA5
IE FC TP STANDARD CABLE GP2X2 (PROFINET type A)	Standard bus cable, TP installation cable for connection to FC OUTLET RJ-45, for universal use, 4-wire, shielded, CAT 5E Sold by the meter	6XV1 840-2AH10

2.1 Product overview

Component	Description	Article number
IE FC TP ROBUST STANDARD CABLE GP 2X2 (PROFINET type A)	Standard bus cable, ATPE outer jacket for connection to FC RJ45 PLUG and FC OUTLET RJ45, fixed installation, for universal use, 4-wire, shielded, CAT 5 Sold by the meter	6XV1 841-2A
IE FC TP ROBUST FLEXIBLE CABLE GP 2X2 (PROFINET type B)	Flexible bus cable, TPE outer jacket for connection to FC RJ45 PLUG and FC OUTLET RJ45, flexible wires, 4-wire, shielded, CAT 5 Sold by the meter	6XV1 841-2B
IE FC TP FLEXIBLE CABLE GP 2X2 (PROFINET type B)	Flexible bus cable, TP installation cable, flexible wires, shielded, CAT 5 Sold by the meter	6XV1 870-2B
IE FC TP TRAILING CABLE 2X2 (PROFINET type C)	Highly flexible bus cable, TP installation cable for connection to FC OUTLET RJ45, for use in drag chains, 4-wire, shielded, CAT 5 Sold by the meter	6XV1 840-3AH10
IE TP TORSION CABLE 2X2 (PROFINET type C)	Highly flexible bus cable, TP installation cable for use in highly flexible applications (torsion), 4-wire Sold by the meter	6XV1 870-2F
IE FC TP STANDARD CABLE GP 4X2	Shielded TP installation cable for connection to IE FC RJ45 PLUG 4X2, CAT 6, AWG 24 Sold by the meter	6XV1 878-2A
IE FC TP FLEXIBLE CABLE GP 4X2	Shielded TP installation cable for connection to IE FC RJ45 PLUG 4X2, flexible wires, CAT 6, 24 AWG Sold by the meter	6XV1 878-2B
IE CONNECTING CABLE M12-180/IE RJ45	Flexible IE connecting cable, 4-wire, preassembled with a 4-pin M12 plug (D-coded) and an IE FC RJ-45 Plug 145	6XV1 871-5T*
IE CONNECTING CABLE M12-180/M12-180	Flexible IE connecting cable, 4-wire, preassembled with two 4-pin M12 plugs (D-coded)	6XV1 870-8A*

* Available in different lengths

Installation

3.1 Safety notices for installation

Safety notices

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

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

WARNING
--

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

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.
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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.

Further notes

CAUTION

Use only approved components

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

Only use components approved for the SIMATIC NET devices.

NOTICE

Warming and premature aging of the IE switch due to direct sunlight

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

Provide suitable shade to protect the IE switch against direct sunlight.

Note

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

You will find information on the system manuals in the section "Introduction (Page 3)", in "Further documentation".

3.2 Types of installation

Types of installation

The SCALANCE XP-200 can be installed in the following ways:

- Wall mounting
- Wall mounting
- Rack mounting

3.3 Wall mounting

Note

Depending on the mounting surface, use suitable fittings.

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 drill holes for wall mounting. For the precise dimensions, refer to the section "Dimension drawings".
2. Screw the device to the wall using the keyhole hang-up mechanisms.
3. Fit the connectors for the power supply, see the section "Power supply".
4. Fit the connectors for the signaling contact, refer to the section ""Signaling contacts".

3.4 Wall mounting

Installation

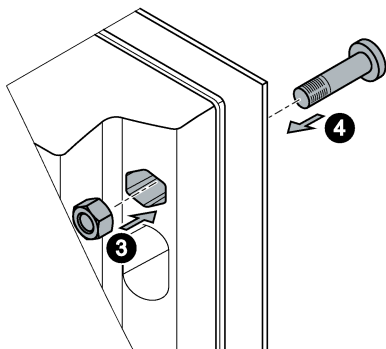


Figure 3-1 Wall mounting

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

1. Prepare the drill holes for mounting. For the precise dimensions, refer to the section "Dimension drawings (Page 81)".
2. Bring the drill holes and the cutouts for the hexagon nuts together so that they cover the same area.
3. Place the hexagon nuts in the corresponding cutouts. The nuts cannot be turned in the cutouts.
4. Push the screws through the drill holes and screw them to the nuts.
5. Fit the connectors for the power supply, see the section "Power supply (Page 56)".
6. Fit the connectors for the signaling contact, refer to the section "Signaling contact (Page 60)".

Removal

To remove the device from the wall, follow the steps below:

1. Disconnect all connected cables.
2. Loosen the screws.

3.5 Rack mounting

Mounting on a rack

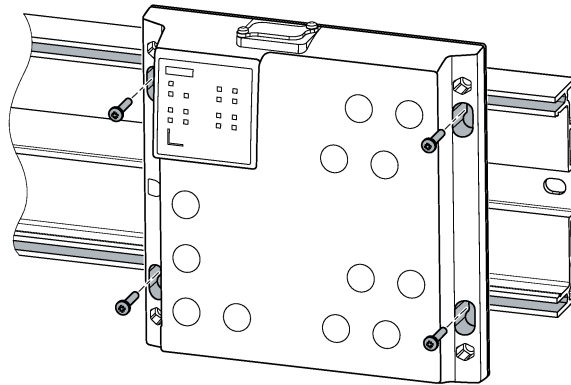


Figure 3-2 Mounting rack

To screw the device to a rack, you require fixing screws with the following properties:

- Self-tapping screw M5 x 20 mm
Four self-tapping screw M5 x 20 ship with the device.
- Screw head diameter: max. 7 mm

To install the device on a rack, follow the steps below:

1. Screw the device to the rack using the keyhole hang-up mechanisms, see also sections "Dimension drawings (Page 81)" and "Product overview (Page 17)".
2. Fit the connectors for the power supply, see the section "Power supply (Page 56)".
3. Fit the connectors for the signaling contact, refer to the section "Signaling contact (Page 60)".

Note

Grounding

The device is not grounded via the rack by the keyhole hang-up mechanisms.

If necessary connect a separate ground.

Removal

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

1. Disconnect all connected cables.
2. Loosen the screw connection.
3. Lift the device from the rack via the keyhole hang-up mechanisms.
4. Loosen the screws completely.

Connecting up

4.1 Safety when connecting up

Safety notices

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

Safety extra low voltage

WARNING

Power supply

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

General notices

NOTICE

Suitable fusing for the power supply cables

The current on the terminal may not exceed 5 A. Use a fuse, that protects against currents > 5 A. The fuse must meet the following requirements:

- In areas where NEC or CEC applies:
 - Suitable for DC (min. 60 V / max. 5 A)
 - Breaking current at least 10 kA
 - Approval according to ANSI/UL 248-1 or CSA C22.2 No. 248.1
 - Classes R, J, L, T or CC
 - Suitable for the protection of DC power supply circuits
- In other areas:
 - Suitable for DC (min. 60 V / max. 5 A)
 - Breaking current at least 10 kA
 - Approval in compliance with IEC 60127-1 / EN 601127-1
 - Switch off characteristics: B or C for circuit breakers and fuses
 - Suitable for the protection of DC power supply circuits

With 24 VDC devices you do not need to fuse the supply cable if you only use power sources with a limited power source (LPS) or power sources according to NEC Class 2 for the power supply of the devices.

Note

Close unused sockets

Close all unused M12 sockets with protective caps (torque at least 0.4 Nm) to achieve the specified type of protection.

Safety notices on use in hazardous areas

General safety notices relating to protection against explosion

WARNING
--

EXPLOSION HAZARD

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

WARNING
--

EXPLOSION HAZARD

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

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

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

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).

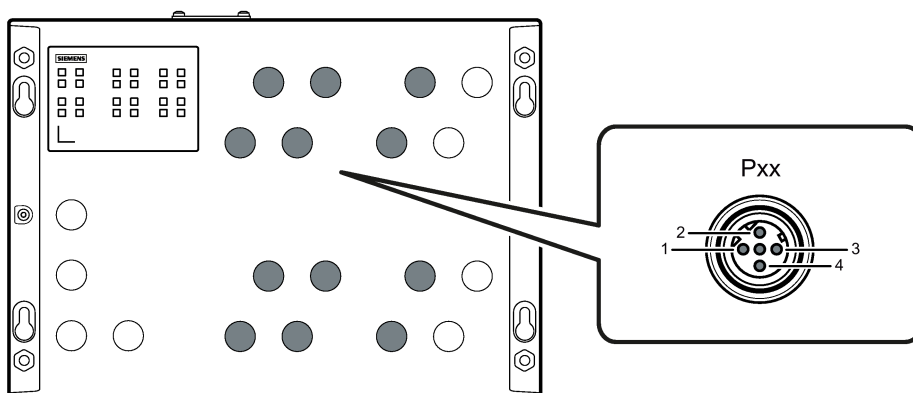
4.2 Industrial Ethernet

Ethernet ports

The attachment to Industrial Ethernet uses M12 connector technology with MDI-X assignment.

Fast Ethernet

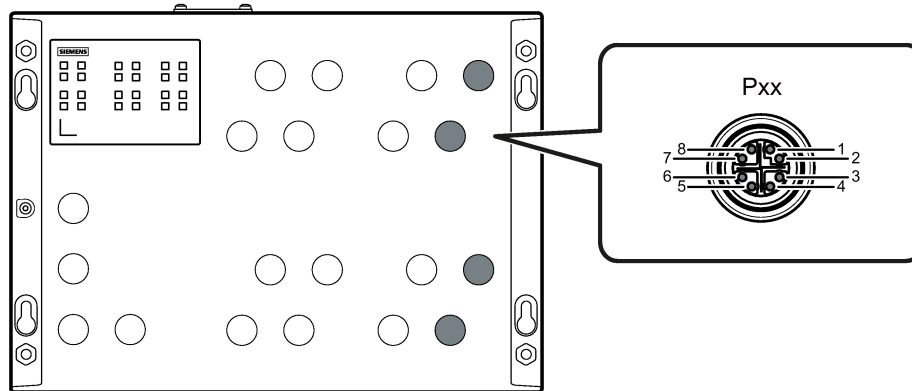
For connection to Industrial Ethernet at 10/100 Mbps, the device has the following M12 interfaces: D-coded, 4-pin, female.



Pin number	Assignment
1	TD+
2	RD+
3	TD-
4	RD-

Gigabit Ethernet

For connection to Industrial Ethernet at 10/100/1000 Mbps, the device has the following M12 interfaces: X-coded, 8-pin, female.

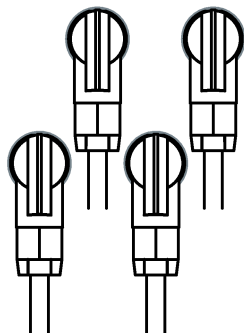


Pin number	Assignment
1	D0+
2	D0-
3	D1+
4	D1-
5	D3+
6	D3-
7	D2-
8	D2+

Connecting an Ethernet port

1. Connect the plug and socket. Make sure that they lock in place correctly.
2. Tighten the knurled screw (torque 1 Nm).

To allow an orderly cable outlet, you can arrange the angled M12 plug as follows:



Ring ports

When shipped the ring ports are marked by a label. The labels are only clipped on and you can remove them if necessary.

IE FC M12 PLUG PRO

The IE FC M12 Plug PRO has a high degree of protection (IP65/67) and is suitable for connecting to Industrial Ethernet, see the section "Product overview (Page 17)".

MDI / MDI-X autocrossover function

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

Note

Formation of loops

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

Autonegotiation

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

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

Note

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

4.3 24 VDC power supply

Notes on the power supply

WARNING

Incorrect power supply

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

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

If you do not use power sources with a limited power source (LPS) or power sources according to NEC Class 2 for the power supply of the devices, you need to fuse the power sources externally, see the section "Safety when connecting up (Page 51)".

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 devices of the IE switches SCALANCE XP-200 to electromagnetic interference was the "surge immunity test" according to EN61000-4-5. 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 SCALANCE XP-200 with suitable overvoltage protection.

Information on the power supply

- To connect to the power supply, the device has two M12 interfaces: A-coded, 4-pin, male.
- The power supply can be connected redundantly. Both inputs are isolated. There is no distribution of load. 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.
- To connect the power supply, use a copper cable of category 24 AWG or a cable with a cross-section $\geq 0.25 \text{ mm}^2$.
- To connect the functional ground, use a copper cable of category 20 AWG or a cable with a cross-section $\geq 0.75 \text{ mm}^2$.

Position and assignment

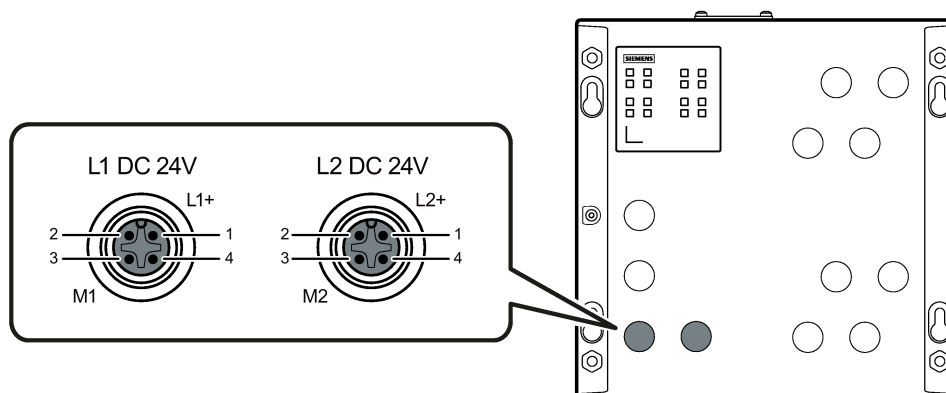


Figure 4-1 Position of the power supply, for example on the SCALANCE XP208

Pin number	Contact	Assignment
1	L1+	24 VDC
3	M1	Ground
1	L2+	24 VDC
3	M2	Ground

Connecting/disconnecting the power supply

NOTICE

Turn off the power supply before you insert or remove the plug of the power supply.

1. Connect the plug and socket. Make sure that they lock in place correctly.
2. Tighten the knurled screw (torque 1 Nm).

M12 Power T-Tap

To connect several to a power supply so that they are cascading, you can use an M12 Power T-Tap, see the section "Product overview (Page 17)".

The M12 Power T-Tap has two M12 sockets and one M12 plug.

Note

The M12 Power T-Tap has not been released for PoE power supply.

Note

The M12 Power T-Tap is only released for ambient temperatures from -25 °C to +85 °C. In the specified temperature range, you can load the M12 Power T-Tap with up to 2 A.

4.4 54 VDC power supply

Notes on the power supply



WARNING

Incorrect power supply

Never operate the PoE variants of the device with AC voltage or DC voltage higher than 60 VDC.

Information on the power supply

- Make sure that among other things the external power supply unit meets the following basic requirements:
 - The output voltage (PoE voltage) is a safety extra-low voltage (SELV).
 - The output voltage (PoE voltage) meets the isolation requirements according to IEEE 802.3at (in other words 1500 VAC or 2250 VDC) to ground, to touchable conductive parts and (if they exist) other secondary voltages.
 - Fuse the output voltage (PoE voltage) externally, see the section "Safety when connecting up (Page 51)".
- Select a suitable power of the external power supply unit, so that the power supply to the power consumers is ensured, see the section "Power over Ethernet (PoE) (Page 41)".
- For the cable supplying the power supply, use a cable with a length of max. 3 m.
- To connect the power supply, use a copper cable of category 18 AWG or a cable with a cross-section $\geq 0.75 \text{ mm}^2$, see e.g. the section "Product overview (Page 17)".
- To connect to the power supply, the device has two M12 interfaces: A-coded, 4-pin, male.
- The power supply can be connected redundantly. Both inputs are isolated. There is no distribution of load. 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.
- To connect the functional ground, use a copper cable of category 18 AWG or a cable with a cross-section $\geq 0.75 \text{ mm}^2$.

Position and assignment

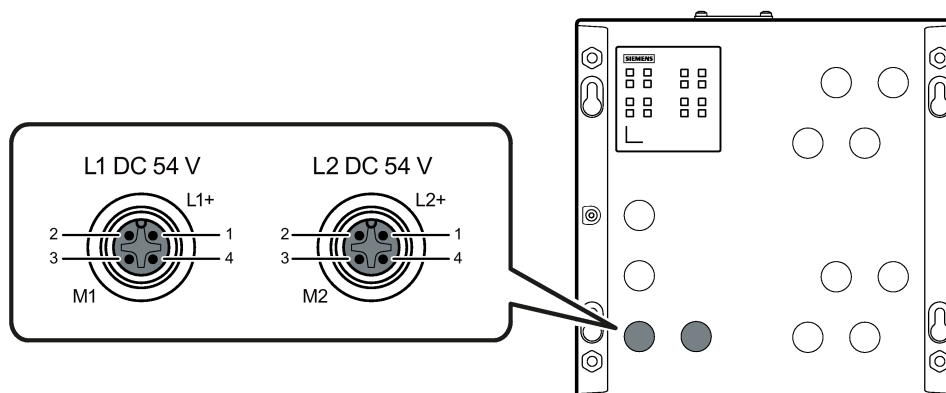


Figure 4-2 Position of the power supply, for example on the SCALANCE XP208PoE EEC

Pin number	Contact	Assignment
1	L1+	54 VDC
3	M1	Ground
1	L2+	54 VDC
3	M2	Ground

Connecting/disconnecting the power supply

NOTICE

Turn off the power supply before you insert or remove the plug of the power supply.

1. Connect the plug and socket. Make sure that they lock in place correctly.
2. Tighten the knurled screw (torque 1 Nm).

Note

Restriction of the power consumers

To supply Poe consumers of type 2 according to the standard, the power supply must provide an output voltage in the range 52 - 57 VDC.

4.5 Signaling contact

Information on the signaling contact

- To connect the signaling contact, the device has an M12 interface: B-coded, 5-pin, male.
- 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.
- To connect the signaling contact, use a copper cable of category 24 AWG or a cable with a cross-section of $\geq 0.25 \text{ mm}^2$, see e.g. the section "Product overview (Page 17)".

NOTICE

Damage due to voltage being too high

You can load the signaling contact with the operating voltage of the device and a maximum of 100 mA.

Higher voltages or currents can damage the device.

Position and assignment

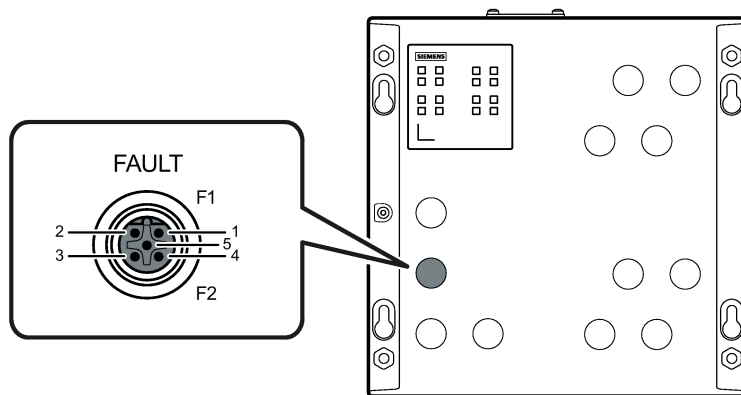


Figure 4-3 Position of the signaling contact, for example on the SCALANCE XP208

Pin number	Contact	Assignment
1	F1	Fault contact 1
4	F2	Fault contact 2

Signaling faults

- The signaling of errors by the signaling contact is synchronized with the fault LED "F", see section ""F" LED (Page 29)".
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.

Connecting the signaling contact

1. Connect the plug and socket. Make sure that they lock in place correctly.
2. Tighten the knurled screw (torque 1 Nm).

4.6 Serial interface

Information on the serial interface

- To connect the serial interface, the device has an M12 interface: A-coded, 5-pin, female.
- Via the serial interface, you can access the CLI of the device directly via an RS-232 connection (115200 8N1) without assigning an IP address.
- Access to the device is also possible independent of the Ethernet ports.
- To connect the serial interface to the PC, you require a cable with an M12 plug and 9-pin D-sub female connector. You can order the connecting cable for the serial interface as an accessory.
- When it ships, the cover for the serial interface is secured to the housing see "Device views (Page 24)".

Position and assignment

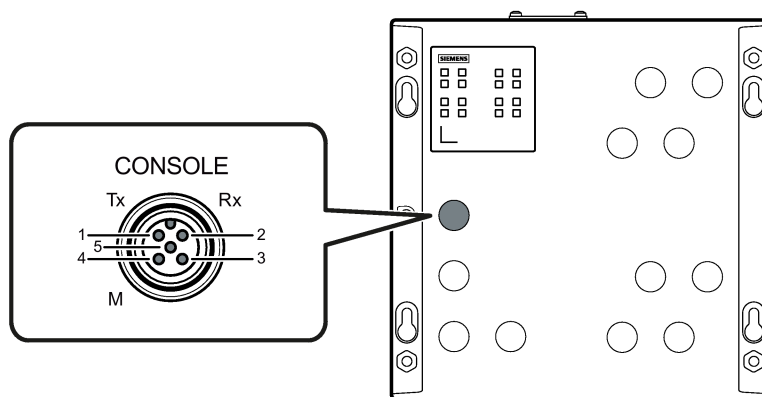


Figure 4-4 Position and pin assignment of the serial interface, for example on the SCALANCE XP208

Pin number	Assignment
1	TD (Transmit Data)
2	RD (Receive Data)
3	internal use only (do not connect)
4	SG (Signal Ground)
5	internal use only (do not connect)

Assignment of the terminal block

The connecting cable listed in the "Accessories" section has the following pin assignment:

Pin number	Pin assignment of the M12 plug	Pin assignment of the D-sub female connector
1	TD (Transmit Data)	-
2	RD (Receive Data)	RD (Receive Data)
3	-	TD (Transmit Data)
4	SG (Signal Ground)	-
5	-	SG (Signal Ground)
6		-
7		-
8		-
9		-

Connecting the serial interface

1. Connect the plug and socket. Make sure that they lock in place correctly.
2. Tighten the knurled screw (torque 1 Nm).

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

Protective earth/functional ground

The connection of the reference potential surface with the protective circuit is normally in the cabinet close to the power feed-in. This ground conducts fault currents to ground safely and according to 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) operational 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.

Position

The functional ground is established via a grounding screw.

The connector for the grounding cable is on the front of the housing.

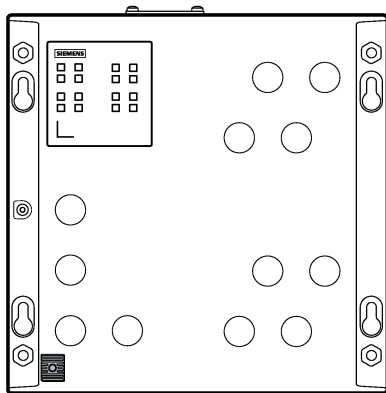
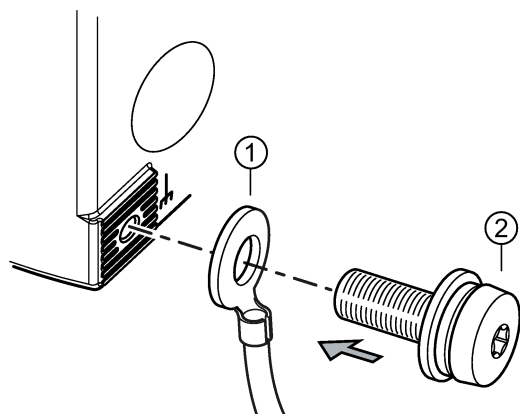


Figure 4-5 Position of the grounding screw on the SCALANCE XP-200

Connecting up functional ground



- ① Grounding terminal with cable
- ② Screw (M4 thread) with spring washer and washer

Follow the steps below to connect the functional ground:

1. Put the grounding terminal ①, and the bolt ② together as shown in the drawing.
2. Screw in the bolt ② with a maximum tightening torque of 1.5 Nm.

Technical specifications

6.1 Technical specifications SCALANCE XP208 and SCALANCE XP208EEC

The following technical specifications apply to the following devices:

- SCALANCE XP208
- SCALANCE XP208EEC

Technical specifications		
Attachment to Industrial Ethernet		
	Quantity	8
	Connector	M12 socket
	Properties	D-coded, half/full duplex, MDI-X pinning
	Transmission speed	10 / 100 Mbps
Diagnostics interface		
Serial interface	Quantity	1
	Connector	M12 socket
Electrical data		
Power supply	Rated voltage	24 VDC
	Voltage range	19.2 to 28.8 VDC Safety Extra Low Voltage
	Design	M12 socket, 4-pin
	Cable cross-section	≥ 0.25 mm ² (24 AWG)
	Property	Implemented redundantly
Current consumption	at 24 VDC	200 mA
Effective power loss	at 24 VDC	4.8 W
Fusing		5 A / at least 60 V Or power supply with LPS or NEC class 2
Permitted ambient conditions		
Ambient temperature	During operation up to 2000 m	-40 °C to +70 °C ¹⁾
	During storage	-40 °C to +70 °C
	During transportation	-40 °C to +70 °C
Relative humidity	During operation at 25 °C	≤ 95 % no condensation
Housing, dimensions and weight		
Design	compact	
Housing material	Aluminum	

6.1 Technical specifications SCALANCE XP208 and SCALANCE XP208EEC

Technical specifications	
Degree of protection	IP 65/67
Dimensions (W x H x D)	200 x 200 x 49 mm (57 mm incl. protective caps)
Weight	1800 g
Installation options	• Wall mounting • Back wall mounting • Rack mounting
Mean time between failure (MTBF)	
MTBF (EN/IEC 61709; 40 °C)	> 77 years

¹⁾ EEC variants with EN 50155 support -40 °C ... +85 °C for 10 minutes

6.2 Technical specifications of the SCALANCE XP208PoE EEC

The following technical specifications apply to the SCALANCE XP208PoE EEC.

Technical specifications		
Attachment to Industrial Ethernet		
	Quantity	8
	Connector	M12 socket
	Properties	D-coded, half/full duplex; MDI-X pin assignment, P5 - P8 with Power over Ethernet
	Transmission speed	10 / 100 Mbps
Diagnostics interface		
Serial interface	Quantity	1
	Connector	M12 socket
Electrical data		
Power supply	Rated voltage	54 VDC
	Voltage range with PoE consumers type 1	46 to 57 VDC Safety Extra Low Voltage
	Voltage range with PoE consumers type 2	52 to 57 VDC Safety Extra Low Voltage
	Design	M12 socket, 4-pin
	Cable cross-section	≥ 0.75 mm ² (18 AWG)
	Property	Implemented redundantly
Current consumption	At 54 VDC without PoE load	110 mA
	At 54 VDC with max. PoE load	2500 mA
Effective power loss	At 54 VDC	6 W
	At 54 VDC in PoE operation	9 W
Fusing		5 A / at least 60 V
PoE power per device	At 54 VDC	120 W
Permitted ambient conditions		
Ambient temperature	During operation up to 2000 m	-40 °C to +70 °C ¹⁾
	During storage	-40 °C to +70 °C
	During transportation	-40 °C to +70 °C
Relative humidity	During operation at 25 °C	≤ 95 % no condensation
Housing, dimensions and weight		
Design	compact	
Housing material	Aluminum	
Degree of protection	IP 65/67	
Dimensions (W x H x D)	200 x 200 x 49 mm (57 mm incl. protective caps)	
Weight	1800 g	

Technical specifications

Installation options	• Wall mounting • Back wall mounting • Rack mounting
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Mean time between failure (MTBF)

MTBF (EN/IEC 61709; 40 °C)	> 55 years
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¹⁾ EEC variants with EN 50155 support -40 °C ... +85 °C for 10 minutes

6.3 Technical specifications SCALANCE XP216 and SCALANCE XP216EEC

The following technical specifications apply to the following devices:

- SCALANCE XP216
- SCALANCE XP216EEC

Technical specifications		
Attachment to Industrial Ethernet		
	Quantity	16
	Connector	M12 socket
	Properties	D-/X-coded, half/full duplex, MDI-X pin assignment
	Transmission speed	• P1 - P8, P9, P11, P13 and P15 • 10 / 100 Mbps • P10, P12, P14 and P16 • 10 / 100/ 1000 Mbps
Diagnostics interface		
Serial interface	Quantity	1
	Connector	M12 socket
Electrical data		
Power supply	Rated voltage	24 VDC
	Voltage range	19.2 to 28.8 VDC Safety Extra Low Voltage
	Design	M12 socket, 4-pin
	Cable cross-section	≥ 0.25 mm ² (24 AWG)
	Property	Implemented redundantly
Current consumption	at 24 VDC	400 mA
Effective power loss	at 24 VDC	9.6 W
Fusing		5 A / at least 60 V Or power supply with LPS or NEC class 2
Permitted ambient conditions		
Ambient temperature	During operation up to 2000 m	-40 °C to +70 °C ¹⁾
	During storage	-40 °C to +70 °C
	During transportation	-40 °C to +70 °C
Relative humidity	During operation at 25 °C	≤ 95 % no condensation
Housing, dimensions and weight		
Design	compact	
Housing material	Aluminum	
Degree of protection	IP 65/67	
Dimensions (W x H x D)	200 x 280 x 49 mm (57 mm incl. protective caps)	
Weight	2500 g	

Technical specifications

Installation options	• Wall mounting • Back wall mounting • Rack mounting
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Mean time between failure (MTBF)

MTBF (EN/IEC 61709; 40 °C)	> 48 years
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¹⁾ EEC variants with EN 50155 support -40 °C ... +85 °C for 10 minutes

6.4 Technical specifications of the SCALANCE XP216PoE EEC

The following technical specifications apply to the SCALANCE XP216PoE EEC.

Technical specifications		
Attachment to Industrial Ethernet		
	Quantity	16
	Connector	M12 socket
	Properties	D-/X-coded, half/full duplex; MDI-X pin assignment, P5 - P8 and P13 - P16 with Power over Ethernet
	Transmission speed	- P1 - P8, P9, P11, P13 and P15 - P10, P12, P14 and P16 10 / 100 Mbps 10 / 100/ 1000 Mbps
Diagnostics interface		
Serial interface	Quantity	1
	Connector	M12 socket
Electrical data		
Power supply	Rated voltage	54 VDC
	Voltage range with PoE consumers type 1	46 to 57 VDC Safety Extra Low Voltage
	Voltage range with PoE consumers type 2	52 to 57 VDC Safety Extra Low Voltage
	Design	M12 socket, 4-pin
	Cable cross-section	≥ 0.75 mm ² (18 AWG)
	Property	Implemented redundantly
Current consumption	At 54 VDC without PoE load	180 mA
	At 54 VDC with max. PoE load	2500 mA
Effective power loss	At 54 VDC	10 W
	At 54 VDC in PoE operation	13 W
Fusing		5 A / at least 60 V
PoE power per device	At 54 VDC	120 W
Permitted ambient conditions		
Ambient temperature	During operation up to 2000 m	-40 °C to +70 °C ¹⁾
	During storage	-40 °C to +70 °C
	During transportation	-40 °C to +70 °C
Relative humidity	During operation at 25 °C	≤ 95 % no condensation
Housing, dimensions and weight		
Design	compact	
Housing material	Aluminum	
Degree of protection	IP 65/67	
Dimensions (W x H x D)	200 x 280 x 49 mm (57 mm incl. protective caps)	
Weight	2500 g	

6.5 Cable lengths

Technical specifications	
Installation options	• Wall mounting • Back wall mounting • Rack mounting
Mean time between failure (MTBF)	
MTBF (EN/IEC 61709; 40 °C)	> 35 years

1) EEC variants with EN 50155 support -40 °C ... +85 °C for 10 minutes

6.5 Cable lengths

The following technical specifications apply to the following devices:

- SCALANCE XP208
- SCALANCE XP208EEC
- SCALANCE XP208PoE EEC
- SCALANCE XP216
- SCALANCE XP216EEC
- SCALANCE XP216PoE EEC

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	

6.6 Switching properties

The following technical specifications apply to the following devices:

- SCALANCE XP208
- SCALANCE XP208EEC
- SCALANCE XP208PoE EEC
- SCALANCE XP216
- SCALANCE XP216EEC
- SCALANCE XP216PoE EEC

Switching properties		
Maximum frame size	1632	
Aging time	Can be configured (default value: 40 seconds)	
Max. number of learnable addresses	8192	
Switching technique	Store and forward	
Latency	10 microseconds	
Full wire speed switching:		
	Number of frames per second (at 100 Mbps)	Frame length
	148810	64 bytes
	84459	128 bytes
	45290	256 bytes
	23496	512 bytes
	11973	1024 bytes
	9615	1280 bytes
	8127	1518 bytes

Note

The number of SCALANCE XP-200 modules connected in a line influences the frame delay. When a frame passes through the IE switch, this is delayed by the store-and-forward function of the SCALANCE XP-200 by 10-130 microseconds (at 100 Mbps).

Dimension drawings

Note

Dimensions are specified in mm.

Front view of the SCALANCE XP208

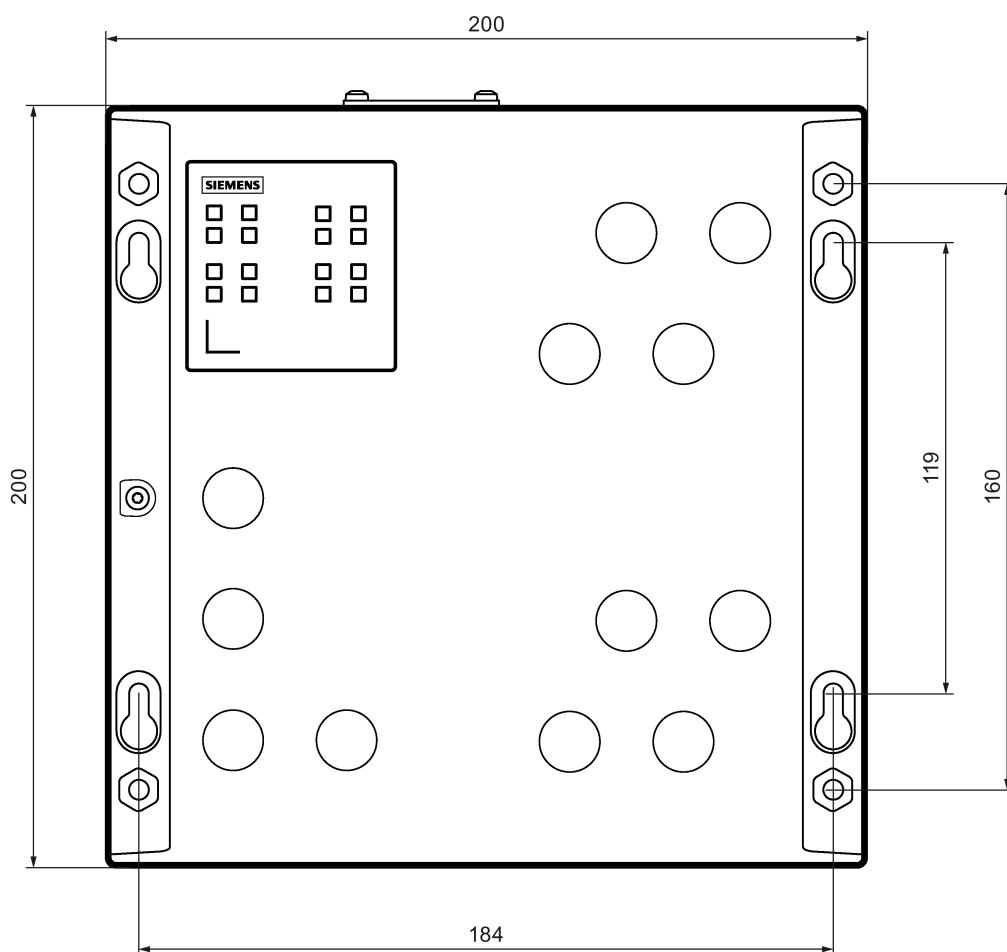


Figure 7-1 Width, height and dimensions for wall mounting

Front view of the SCALANCE XP216

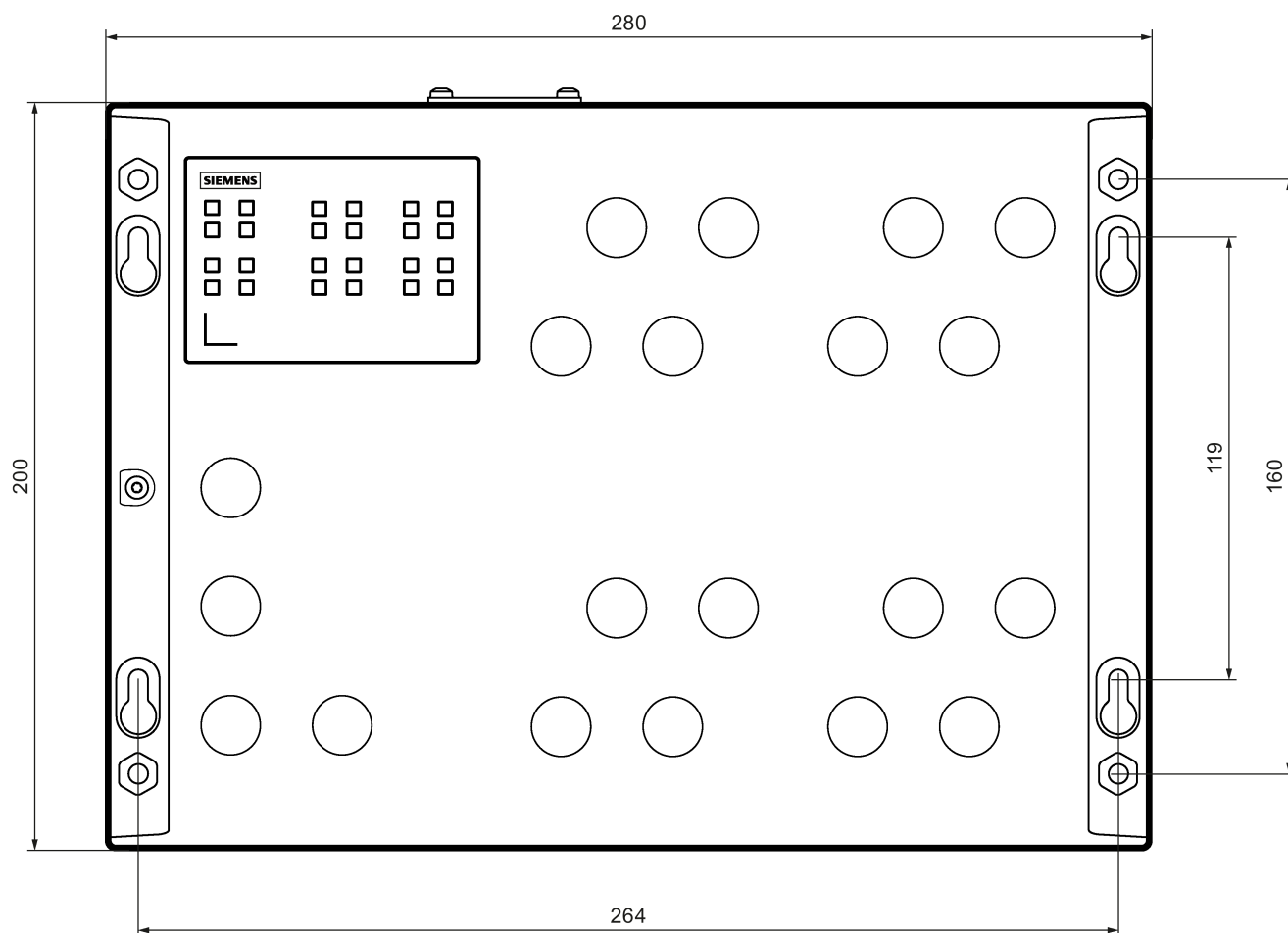


Figure 7-2 Width, height and dimensions for wall mounting

Side view of the SCALANCE XP-200

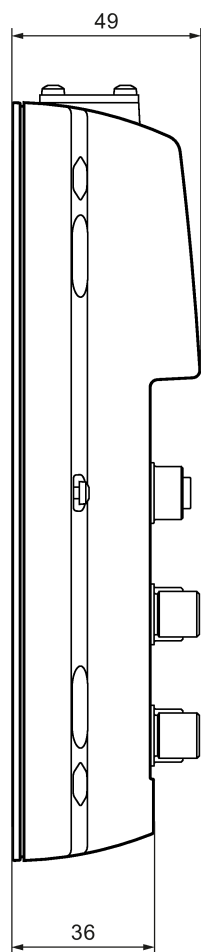


Figure 7-3 Depth

