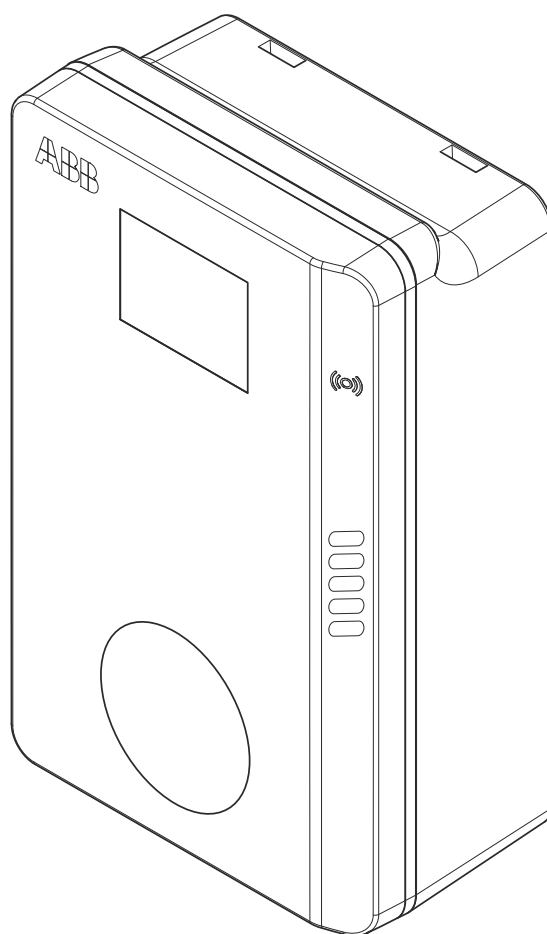

Installation manual

Terra AC



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1 About this document

1.1 Function of this document

The document is only applicable for this EVSE (Terra AC), including the variants and options listed in section [11.1](#). The EVSE from here on in the document is referred to as the EVSE.

The document gives the information that is necessary to do these tasks:

- Installation
- Commissioning

1.2 Target group

The document is intended for qualified installation engineers.

For a description of the required qualifications, refer to section [3.2](#).

1.3 Revision history

Version	Date	Description
001	March 2020	Initial version

1.4 Language

The original instructions of this document are in English (EN-US). All other language versions are translations of the original instructions.

1.5 Illustrations

It is not always possible to show the configuration of your EVSE. The illustrations in this document show a typical setup. They are for instruction and description only.

1.6 Units of measurement

SI units of measurement (metric system) are used. If necessary, the document shows other units between parentheses () or in separate columns in tables.

1.7 Typographical conventions











The lists and steps in procedures have numbers (123) or letters (abc) if the sequence is important.

1.8 How to use this document

1. Make sure that you know the structure and contents of this document.
2. Read the safety chapter and make sure that you know all the instructions.

3. Do the steps in the procedures fully and in the correct sequence.
4. Keep the document in a safe location that you can easily access. This document is a part of the EVSE.





1.9 General symbols and signal words

Signal word	Description	Symbol
Danger	If you do not obey the instruction, this can cause injury or death.	Refer to section 1.10 .
Warning	If you do not obey the instruction, this can cause injury.	Refer to section 1.10 .
Caution	If you do not obey the instruction, this can cause damage to the EVSE or to property.	
Note	A note gives more data, to make it easier to do the steps, for example.	
-	Information about the condition of the EVSE before you start the procedure.	
-	Requirements for personnel for a procedure.	
-	General safety instructions for a procedure.	
-	Information about spare parts that are necessary for a procedure.	
-	Information about support equipment that is necessary for a procedure.	
-	Information about supplies (consumables) that are necessary for a procedure.	
-	Make sure that the power supply to the EVSE is disconnected.	
-	Electrotechnical expertise is required, according to the local rules.	



Note: It is possible that not all symbols or signal words are present in this document.

1.10 Special symbols for warnings and dangers

Symbol	Risk type
	General risk
	Hazardous voltage that gives risk of electrocution
	Risk of pinching or crushing of body parts
	Rotating parts that can cause a risk of entrapment



Note: It is possible that not all symbols are present in this document.

1.11 Related documents

Document name	Target group
Product data sheet	All target groups
Installation manual	Qualified installation engineer
User manual	Owner
Service manual	Qualified service engineer
Declaration of conformity (CE)	All target groups

1.12 Manufacturer and contact data

Manufacturer
 ABB EV Infrastructure
 Heertjeslaan 6
 2629 JG Delft
 The Netherlands

Contact data

The local representative of the manufacturer can give you support on the EVSE. You can find the contact data here: <https://new.abb.com/>

1.13 Abbreviations

Abbreviation	Definition
AC	Alternating current
CAN	Controller area network
CPU	Central processing unit
DC	Direct current
EMC	Electromagnetic compatibility
EV	Electric vehicle
EVSE	Electric vehicle supply equipment
MiD	Measuring Instruments Directive
NFC	Near field communication
NoBo	Notified body
OCPP	Open charge point protocol
PE	Protective earth
PPE	Personal protective equipment
RFID	Radio-frequency identification



Note: It is possible that not all abbreviations are present in this document.

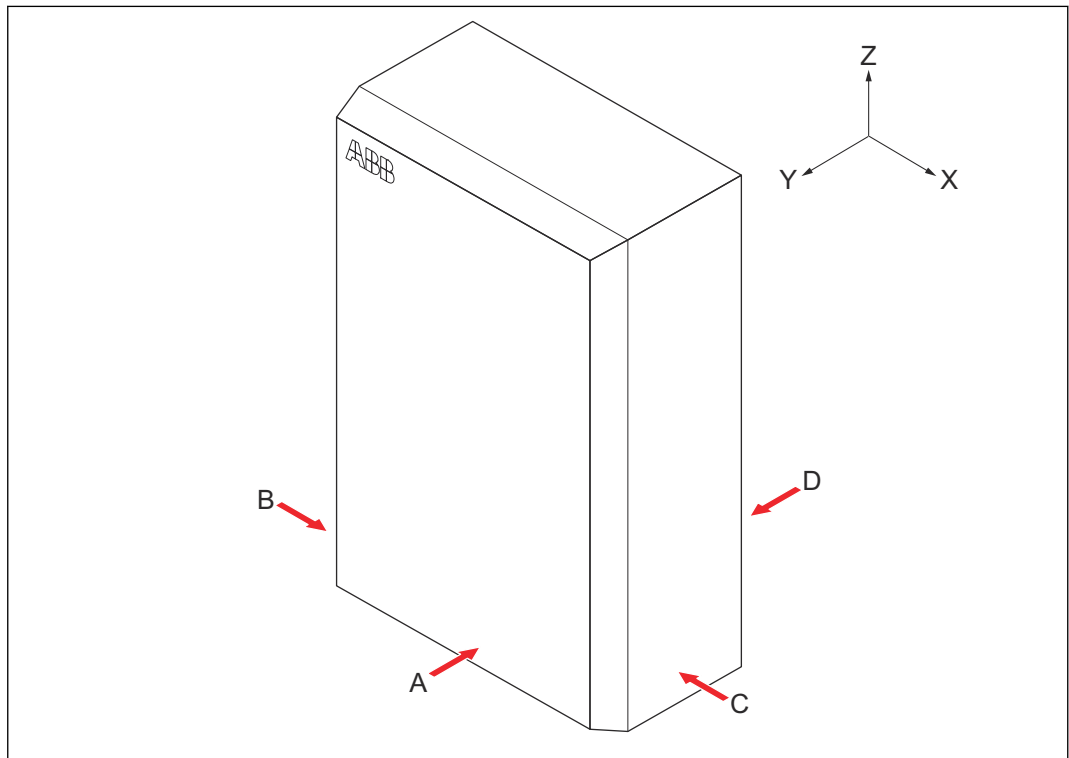
1.14 Terminology

Term	Definition
Network operating center of the manufacturer	Facility of the manufacturer to do a remote check on the correct operation of the EVSE
Cabinet	Enclosure of the EVSE, including the components on the inside
Contractor	Third party that the owner or site operator hires to do engineering, civil and electrical installation work
Grid provider	Company that is responsible for the transport and distribution of electricity
Local rules	All rules that apply to the EVSE during the entire lifecycle of the EVSE. The local rules also include the national laws and regulations.
Open charge point protocol	Open standard for communication with charge stations
Owner	Legal owner of the EVSE
Site operator	Entity that is responsible for the day-to-day control of the EVSE. The site operator does not have to be the owner.
User	Owner of an EV, who uses the EVSE to charge the EV



Note: It is possible that not all terms are present in this document.

1.15 Orientation agreements



- | | | | |
|---|--|---|--|
| A | Front side: face forward to the EVSE during normal use | X | X-direction (positive is to the right) |
| B | Left side | Y | Y-direction (positive is rearward) |
| C | Right side | Z | Z-direction (positive is upward) |
| D | Rear side | | |

2 Description

2.1 Short description

The EVSE (Terra AC) is an AC charging station that you can use to supply electricity to an EV. The Terra AC offers tailor-made, intelligent and network charging solutions for your company or home. The EVSE can connect to the internet via GSM, WiFi or LAN.

2.2 Intended use

The EVSE is intended for the AC charging of EVs. The EVSE is intended for indoor or outdoor use.

The technical data of the EVSE must comply with the properties of the electrical grid, the ambient conditions and the EV. Refer to chapter 11.

Only use the EVSE with accessories that the manufacturer provides or that obey the local rules.

The EVSE AC input is intended for a hardwired installation that complies with the applicable national regulations.

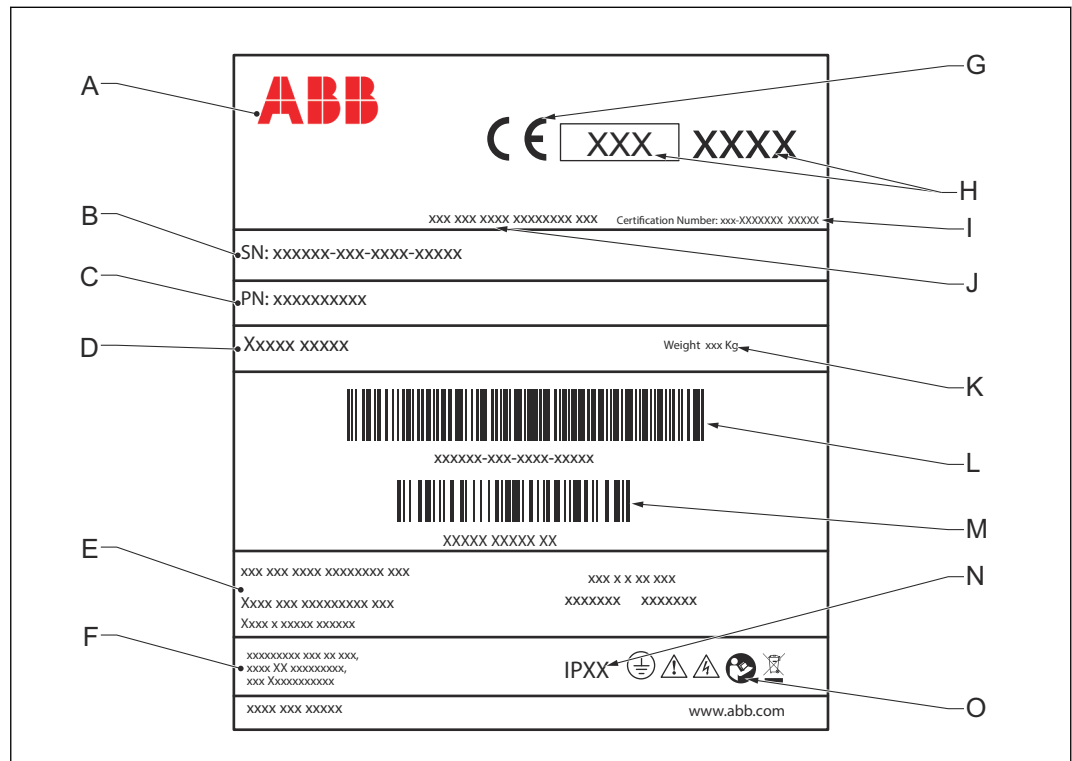
Danger:



General risk

- If you use the EVSE in any other way than described in the related documents, you can cause death, injury and damage to property.
- Use the EVSE only as intended.

2.3 Type plate



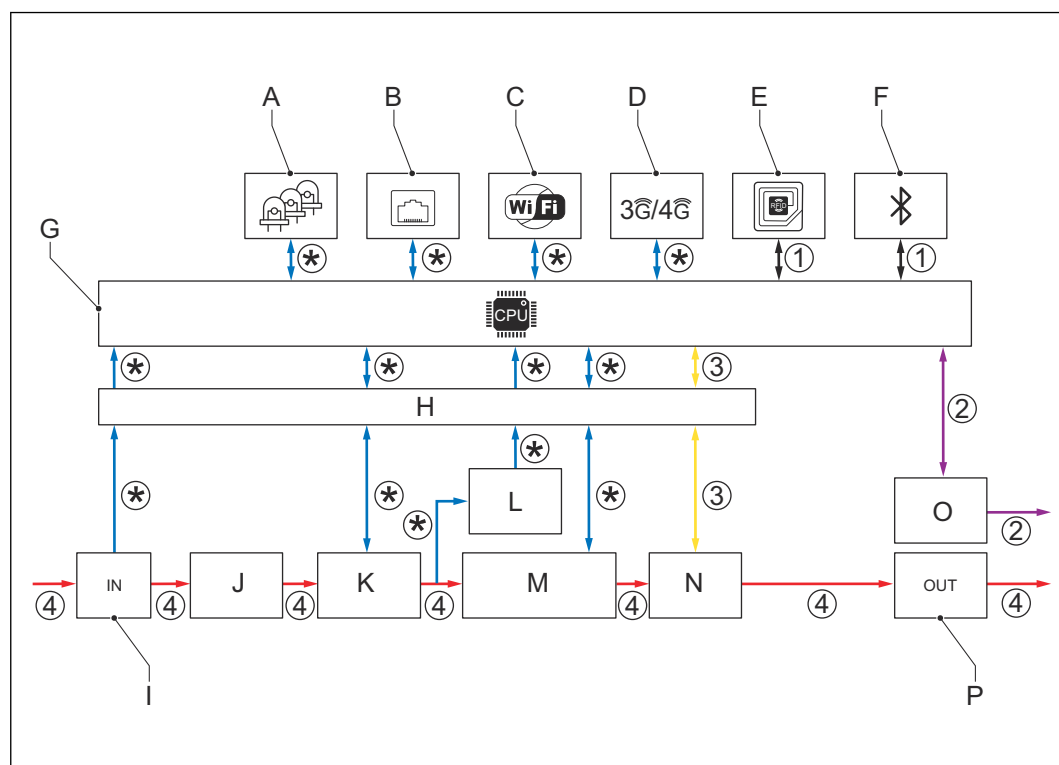
A	Manufacturer	H	MiD mark and Nobo number
B	Serial number	I	MiD accuracy class
C	Part number of the EVSE	J	MiD type examination number
D	Product name	K	Barcode with the serial number of the EVSE
E	EVSE rating information	L	Barcode with the part number of the EVSE
F	Address of the manufacturer	M	Ingress protection rating date of the EVSE
G	CE mark	N	Reference to the manual



Note: The data in the illustration is only an example. Find the type plate on your EVSE to see the applicable data. Refer to section [2.5.2](#).

2.4

Working principle



A	LEDs	I	AC/DC power supply
B	Ethernet	J	AC input
C	WiFi	K	Surge protection
D	3G/4G	L	Earth(ground) fault protection
E	RFID	M	AC input metering
F	Bluetooth	N	AC isolation relay
G	CPU system	O	Control pilot
H	Isolation	P	AC output

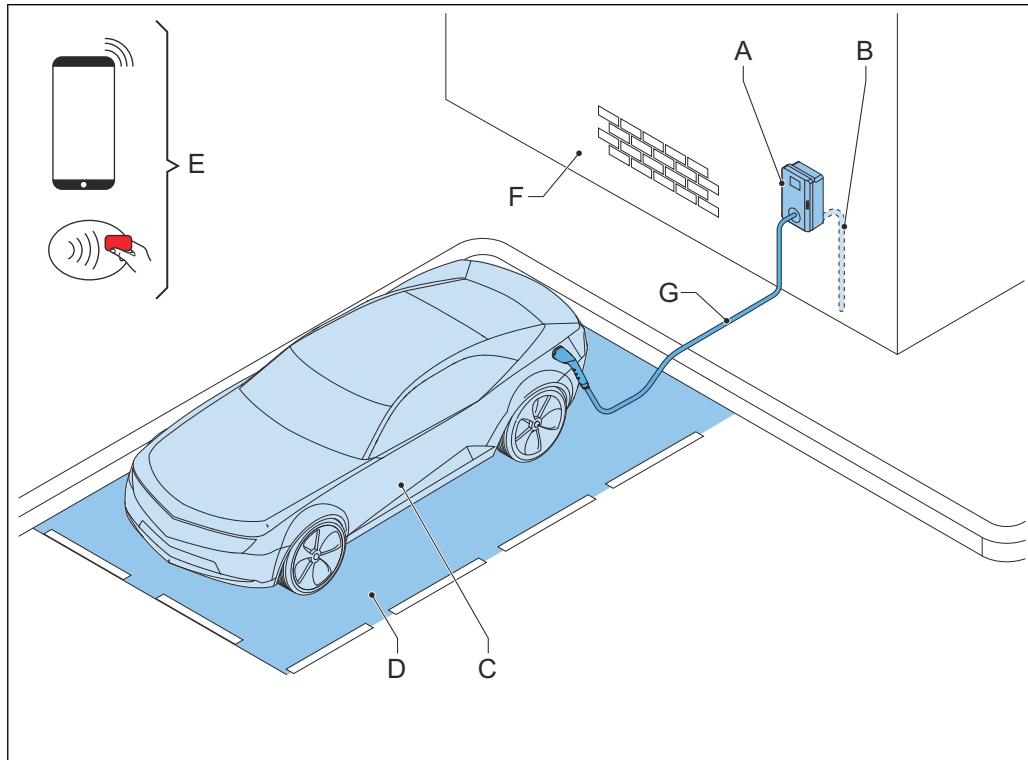
1. The user initiates a charge session request (black lines).
2. The EVSE verifies the status of the EV (purple lines).
3. The EVSE goes on and AC power goes to the EV (yellow lines).
4. The charge session starts. AC power flows from the power grid to the EV (red lines).

5. The electrical interfaces of the EVSE communicate with the on-board computer (blue lines).

(*): Connections between parts of the EVSE and the CPU system. The arrow shows the direction of the input and output signals.

2.5 Overview

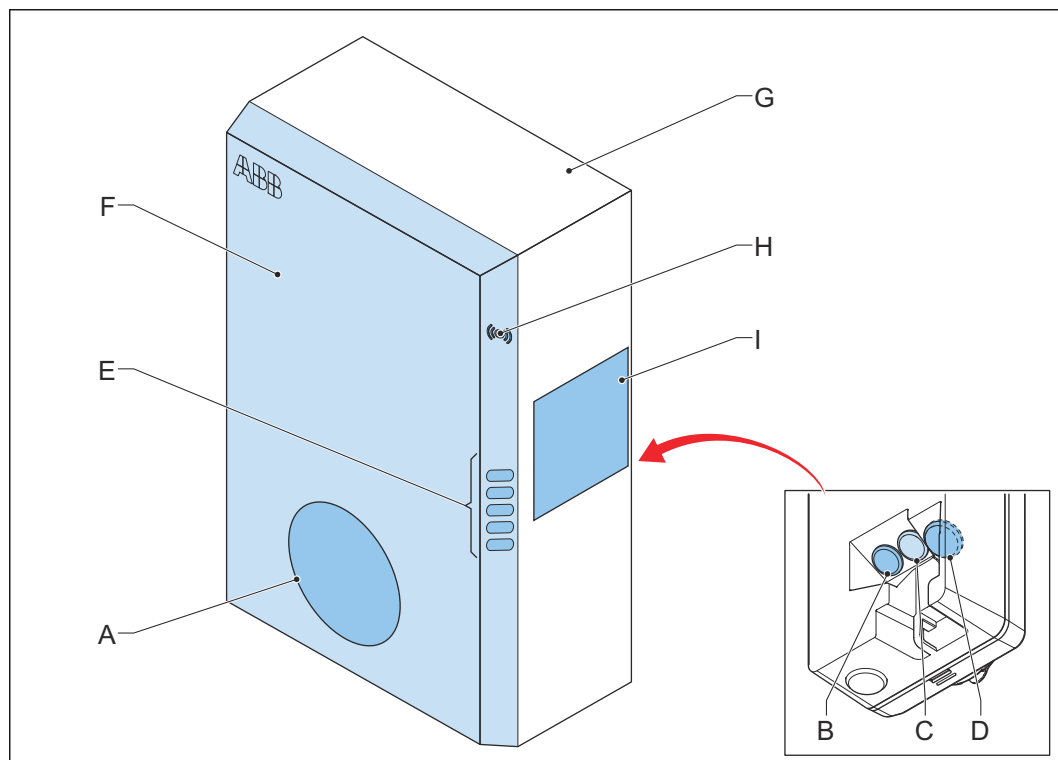
2.5.1 Overview of the system



A	EVSE	E	RFID card or smartphone
B	AC grid input	F	Structure to install the EVSE on
C	EV	G	EV charge cable
D	Parking space		

Part	Function
EVSE	Refer to section 2.2 .
Structure	To install the EVSE on and to keep the EVSE in position.
AC grid input	To supply the electricity to the EVSE
EV charge cable	To conduct the charge from the EVSE to the EV
EV	The EV of which the batteries need to be charged
Parking space	Location for the EV during the charge session
RFID card or smartphone	To authorize the user to use the EVSE

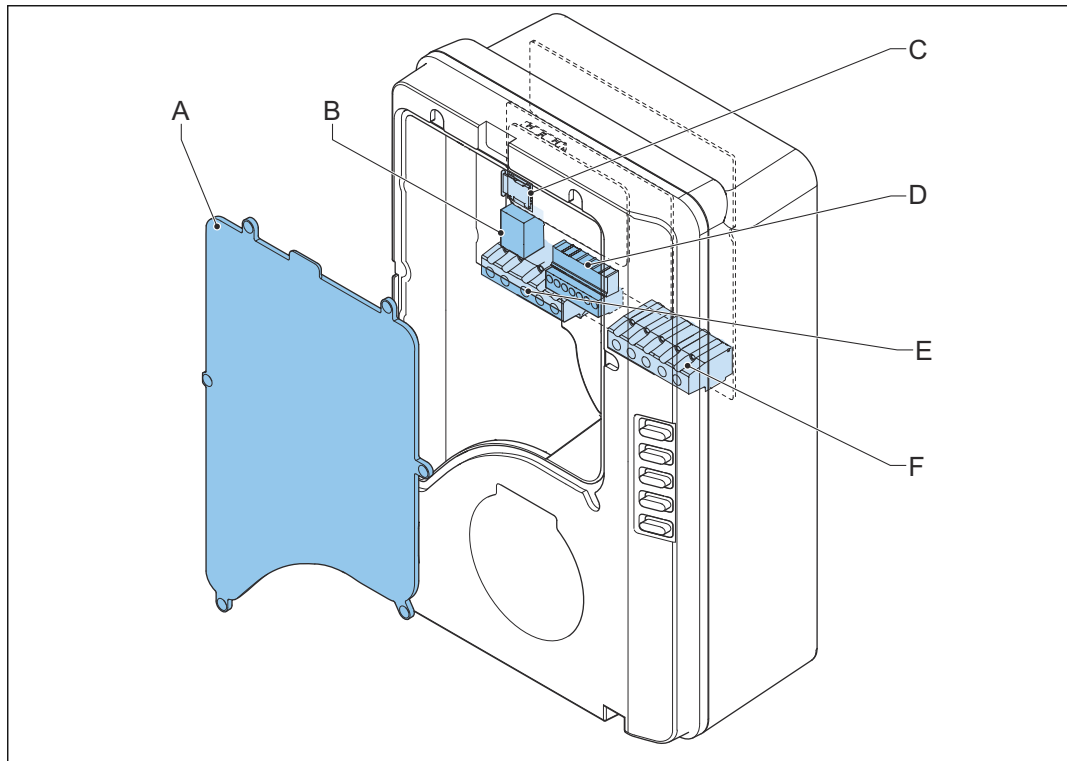
2.5.2 Overview of the EVSE, outside



A	Connection for the EV charge cable	F	Cabinet cover
B	Openings for the smart meter connections	G	Enclosure
C	Opening for the Ethernet cable	H	RFID reader
D	Opening for the AC input cable	I	Type plate
E	LED indicators		

Part	Function
Connection for the EV charge cable	To connect the EV charge cable
Openings	Openings for the cables that go into the EVSE
LED indicators	To show the status of the EVSE and the charge session. Refer to section 2.7.1 .
Cabinet cover	To prevent a user to access the installation and maintenance parts of the EVSE
Enclosure	To reduce the accessibility of unqualified persons to the inside of the EVSE
RFID reader	To authorize the start or stop of a charging session with an RFID card
Type plate	To show the identification data of the EVSE. Refer to section 2.3 .

2.5.3 Overview of the EVSE, inside

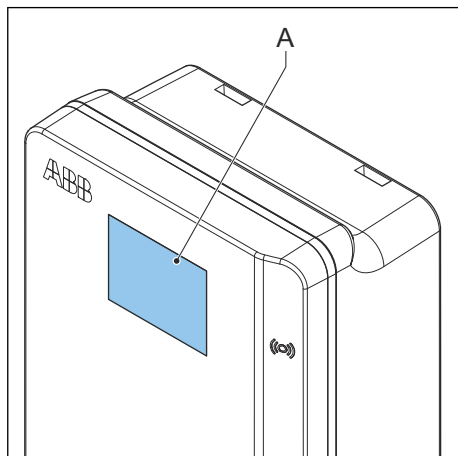


- | | | | |
|---|----------------------------|---|--|
| A | Maintenance cover | D | Smart meter connection |
| B | Ethernet connection | E | Terminal block for the AC input |
| C | Socket for a Nano-SIM card | F | Terminal block for the EV charge cable or the socket |

Part	Function
Maintenance cover	To prevent access to the electrical components of the EVSE
Ethernet connection	To connect the ethernet cable
Socket for a Nano-SIM card	To connect the EVSE to the internet 3G/4G
Smart meter connection	To connect the cables for RS485 and ModBus
Terminal block for the AC input	To connect the AC input cable from the grid
Terminal block for the EV charge cable	To connect the EV charge cable or the socket outlet

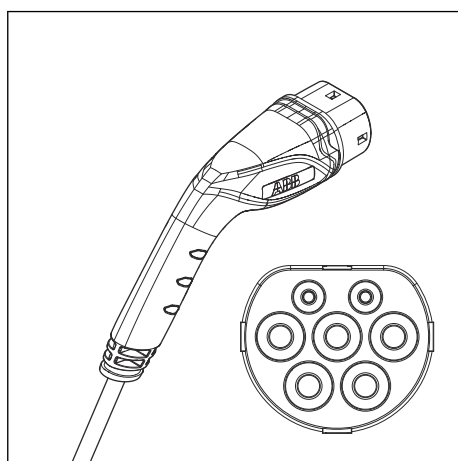
2.6 Options

2.6.1 Display

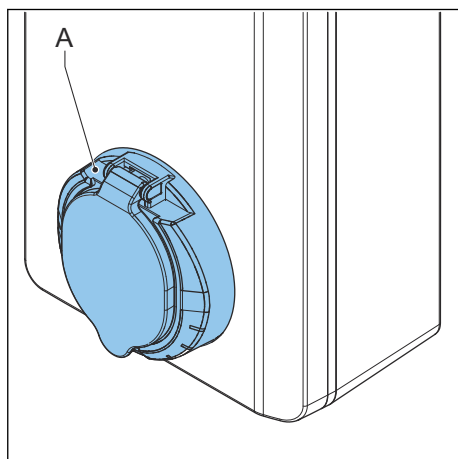


A Display

2.6.2 EV charge cable, type 2



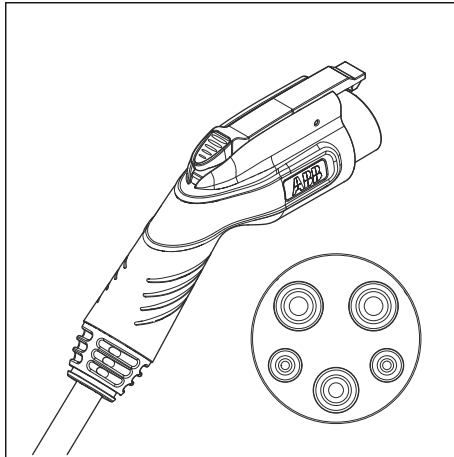
2.6.3 Socket, type 2



A Socket

The socket for an EV charge cable type 2 is available with or without a shutter.

2.6.4 EV charge cable, type 1



2.6.5 3G/4G Communication

You can connect to a 3G/4G network.

2.6.6 Load management

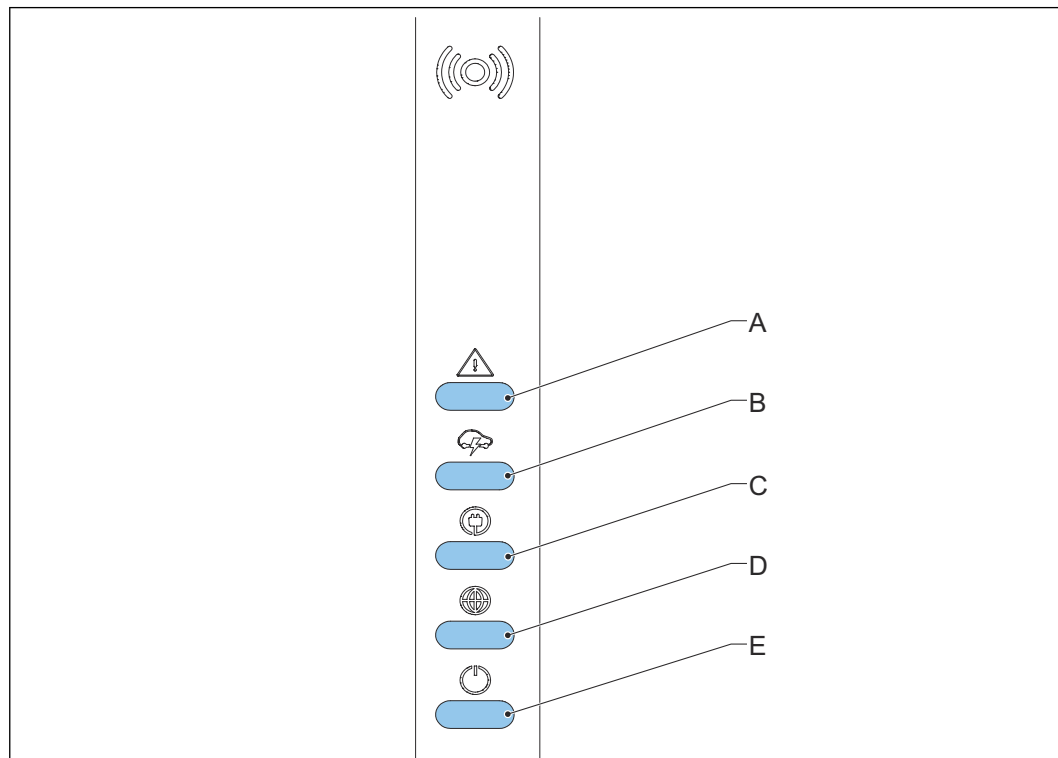
Load management makes sure that the available capacity of the building or home is not exceeded. A number of devices share a grid connection, that has a maximum capacity. The total power demand of the devices that use the grid connection must not exceed the grid capacity.

The load management feature prevents that the system exceeds the grid capacity and prevents damage of the fuses. At times when the current demand is high, the Terra AC will pause the charge session. The charge session will start again when there is availability on the grid.

Also, the load management feature makes sure that the available load is optimally shared.

2.7 Control elements

2.7.1 LED indicators



A	Error LED	D	Internet connection LED
B	Charging LED	E	EVSE on/off LED
C	Cable and car detection, and car authorization LED		

Table 1: Error LED

Status of the LED	Status of the EVSE
On	Error
Off	No error

Table 2: Charging LED

Status of the LED	Status of the EVSE
On	EV is fully charged or has stopped charging
Off	Not charging
Flashing	Charging

Table 3: Cable and car detection, and car authorization LED

Status of the LED	Status of the EVSE
On	A car is connected. The connection is authorized.
Off	No car connected
Flashing	A car is connected, waiting for authorization

Table 4: Internet connection LED

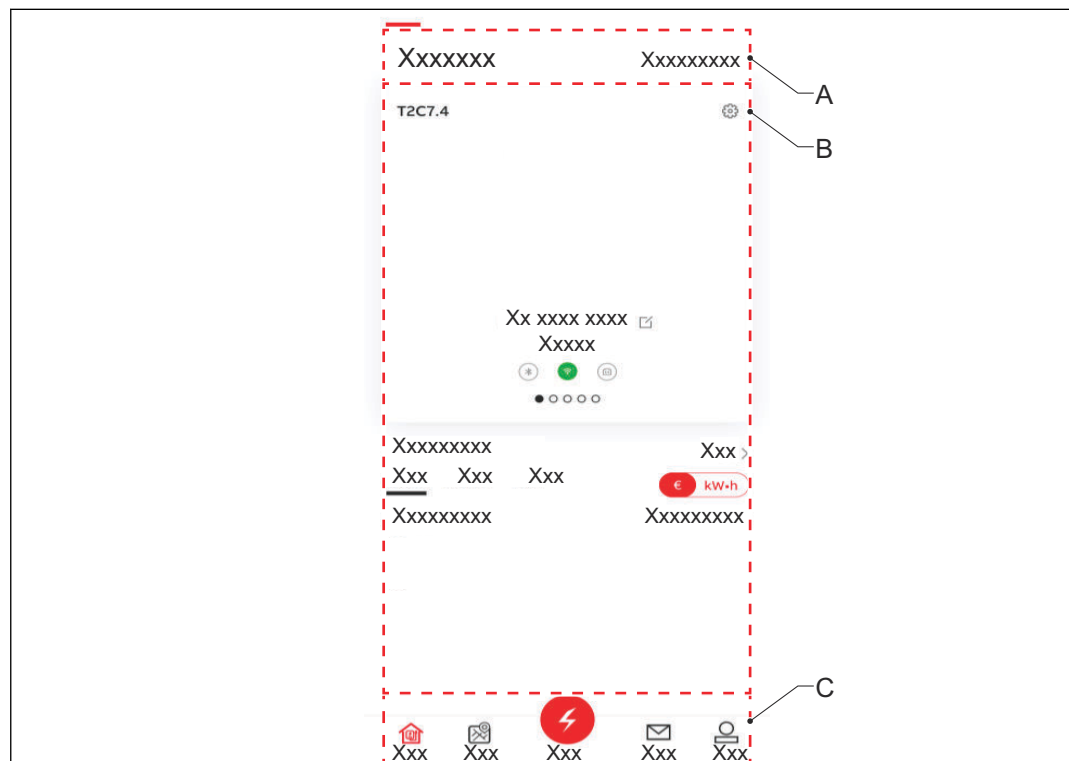
Status of the LED	Status of the EVSE
On	Connected to the internet
Off	Not connected to the internet
Flashing	The internet connection is set up.

Table 5: EVSE on/off LED

Status of the LED	Status of the EVSE
On	The EVSE is on
Off	The EVSE is off
Flashing	The EVSE is in setup.

2.8 Description of the mobile app for the EVSE

2.8.1 General description of the lay-out of the mobile app


















A Menu title
 B Main screen area
 C Menu buttons

Screen part	Description
Menu title	This area shows the current menu.
Main screen area	This area shows information about the charge session or the available menus.
Menu buttons	To navigate through the menus of the app and to use the functions. For a description of the buttons, refer to section 2.8.2 .

2.8.2

General description of the buttons and colors

Button	Name / color	Description
	Home	To go to the main menu
	Map	To go to the map menu
	Start button	To start the charge session
	Message	To go to the message menu
	Account button	To go to the account menu, that has the personal preferences and settings
	Schedule	To go to the schedule menu
	Charger care	To go to the charger care menu
	Energy plan	To go to the energy plan menu
	Load balance	To go to the load balance menu
	Upgrade	To go to the upgrade menu

Button	Name / color	Description
	Charger link	To go to the charger link menu
	Settings	To go to the settings menu
	More options	To select more options
	Previous	To go to a previous page
	Next	To go to a next page

2.8.3

Overview of the menus

Menu	Description
Login menu	Shows the fields to log in.
Account menu	Shows the personal preferences and settings
Setup menu	Shows the screens to set up the EVSE
Main menu	Shows: <ul style="list-style-type: none"> • Navigation buttons • Buttons to manage the charge session • Information about the current charge session
Map menu	Shows the locations of public charge sites Shows the current location of users, to help the users to find the nearest available EVSE.
Message menu	To give the user important information
Schedule menu	To create a schedule for a charge session
Charger care menu	To show the status of the EVSE in machine-life-cycle perspective. To give solutions for potential problems that can occur during the use of the EVSE
Energy plan menu	To select an energy plan for the charge session.
Load balance menu	To adjust the settings for load balance management.
Upgrade menu	To start the software upgrade.
Configuration menu	To show and adjust the configuration settings.
Charger link menu	To connect the EVSE to the power grid of the site network.

Menu	Description
Settings menu	Shows the functions that the user has activated.
Add card menu	To add and bind RFID cards

2.8.4

Overview of the error codes

If the EVSE detects a problem, the error LED comes on. The mobile app shows the error code.

Error code	Short description	Description
0x0004	Overcurrent	There is an overload on the EV side.
0x0008	Overvoltage	The connection of the phase and neutral wires is incorrect.
0x0010	Undervoltage	The connection of the phase and neutral wires is incorrect.
0x0100	Internal board to board communication error	The internal boards of the EVSE fail to communicate with each other.
0x0102	Residual current error (DC 6mA)	There is residual current in the charge circuit. Current leaks into the ground.
0x0104	Residual current error (AC 30mA)	There is residual current in the charge circuit. Current leaks into the ground.
0x0106	Residual current monitor selftest error	The residual current monitoring sensor is defective.
0x0108	Relay stuck error	The relay contact is overheated or has damage.
0x0110	Cable undercapacity	On the socket version of the EVSE, the rated current capacity of the cable is less than the rated current of the EVSE.
0x0112	Missing earth error	The EVSE is not earthed correctly.
0x0114	L/N reverse error	Incorrect wiring in the AC input side: The line and neutral wires are reversed.
0x0116	Overheat	The charging current is too high.
0x0118	Missing phase	A phase is missing or reversed.

3 Safety

3.1 Liability

The manufacturer is not liable to the purchaser of the EVSE or to third parties for damages, losses, costs or expenses incurred by the purchaser or third parties if any target group mentioned in the related documents does not obey the rules below:

- Obey the instructions in the related documents. Refer to section 1.11.
- Do not misuse or abuse the EVSE.
- Only make changes to the EVSE, if the manufacturer approves in writing of the changes.

This EVSE is designed to be connected to and to communicate information and data via a network interface. It is the sole responsibility of the owner to provide and continuously ensure a secure connection between the EVSE and the network of the owner or any other network.

The owner shall establish and maintain any appropriate measures (such as - but not limited to - the installation of firewalls, application of authentication measures, encryption of data and installation of anti-virus programs) to protect the EVSE, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information.



The manufacturer is not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.



3.2 Required qualifications for the installation engineer



- The qualified installation engineer fully knows the EVSE and its safe installation.
- The installation engineer is qualified to work on high-voltage and high-current electrical installations.
- The qualified installation engineer obeys all local rules and the instructions in the installation manual.
- It is the responsibility of the owner of the EVSE to make sure that all qualified installation engineers obey the local rules, the installation instructions, and the specifications of the EVSE.

3.3 Personal protective equipment

Symbol	Description
	Protective clothing
	Safety gloves

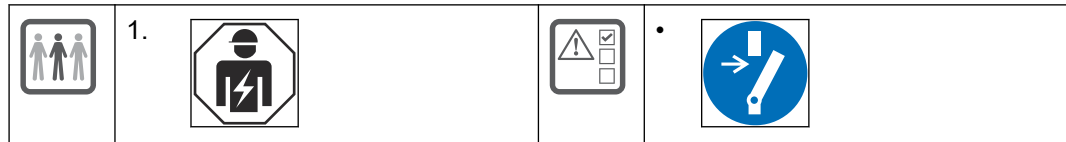
Symbol	Description
	Safety shoes
	Safety glasses

3.4 General safety instructions

- This document, the related documents and the warnings included do not replace your responsibility to use your common sense when you do work on the EVSE.
- Only do the procedures that the related documents show and that you are qualified for.
- Obey the local rules and the instructions in this manual. If the local rules contradict the instructions in this manual, the local rules will apply.
If and to the extent permitted by law, in case of inconsistency or contradiction, between any requirements or procedure contained in this document and any such local rules, obey the stricter between the requirements and procedures specified in this document and the local rules.

3.5 Safety instructions during installation

Preliminary requirements










- Do not use adaptors or conversion adapters.
- Do not use cord extension sets.
- Make sure that there is no voltage on the AC input cables during the complete installation procedure.
- Keep unqualified personnel at a safe distance during installation.
- Only use electrical wires of sufficient gauge and insulation to handle the rated current and voltage demand.
- Make sure that the load capacity of the grid is in accordance with the EVSE.
- Earth the EVSE correctly. Refer to section [3.6](#).
- Make sure that the wiring inside the EVSE is protected from damage and cannot get trapped when you open or close the cabinet.
- Make sure that water cannot enter the cabinet.
- Protect the EVSE with safety devices that the local rules specify.
- If it is necessary to remove safety devices, immediately install the safety devices after the work.
- Put on the correct personal protective equipment. Refer to section [3.3](#).

3.6 Safety instructions for earthing

- Make sure that the EVSE is connected to an earthed, metal, permanent electrical system. Alternatively, install an equipment-earthing conductor with circuit conductors. Connect this earthing conductor to an equipment-earthing terminal or lead on battery charger.
- Make sure that the connections to the EVSE comply with all applicable local rules.

3.7 Signs on the EVSE

Symbol	Risk type
	General risk
	Hazardous voltage that gives risk of electrocution
	Risk of pinching or crushing of body parts
	Rotating parts can cause a risk of entrapment
	PE
	Sign that means that you must read the manual before you install the EVSE
	Waste from electrical and electronic equipment



Note: It is possible that not all symbols are present on the EVSE.




3.8 Discard parts or the EVSE

- Obey the local rules to discard parts, packaging material or the EVSE.

4 Installation

4.1 General installation procedure

Preliminary requirements

	<ol style="list-style-type: none"> 1. All required permits to agree with the local rules are granted. 2. The AC input cable is available. 		<ul style="list-style-type: none"> • There is no voltage on the AC input cable during the complete installation procedure.
	<ul style="list-style-type: none"> • Tools for installation. Refer to section 11.6. 		

Procedure

1. Unpack the EVSE. Refer to section [4.2](#).
2. Prepare the site. Refer to chapter [5](#).
3. Remove the cabinet cover. Refer to section [9.1](#).
4. Do the mechanical installation. Refer to section [6.1](#).
5. Do the electrical installation. Refer to section [7.1](#).
6. Install the cabinet cover. Refer to section [9.2](#).
7. Do the commissioning procedure. Refer to section [8.1](#).

4.2 Unpack the EVSE

1. Open the box.
2. Remove the EVSE from the box.
3. Remove all packaging material from the EVSE.
4. Discard the packaging material. Refer to section [3.8](#).
5. Make sure that all parts are delivered according to the order. Refer to the order and section [11.4](#).
6. Do an inspection of the EVSE and the parts for installation for damage.
7. If you find damage or the parts are not according to the order, contact the local representative of the manufacturer (ABB EV Infrastructure).


5 Site preparation

5.1 Select the site

1. Find a suitable site on a wall. For the specifications of the wall, refer to section [11.8](#).
2. Make sure that the correct power supply is available. For the power supply specifications, refer to section [11.11](#).
3. Obey the space requirements. Refer to section [11.10.3](#).

5.2 Prepare the site

Preliminary requirements

	1. The site must be suitable to install the EVSE. Refer to section 5.1 .
---	--

Procedure

1. Make sure that the space and the airflow around the EVSE are sufficient. Refer to section [11.10.3](#).
2. Make sure that the correct cables are available at the site.
 - AC input cable. Refer to section [11.13](#).
 - ModBus and RS485 cables. Refer to section [11.13.4](#).
 - Ethernet cable. Refer to section [11.13.3](#).

6 Mechanical installation

6.1 General mechanical installation procedure

1. Install the mounting screws. Refer to section [6.2](#).
2. Install the EVSE on the site. Refer to section [6.3](#).

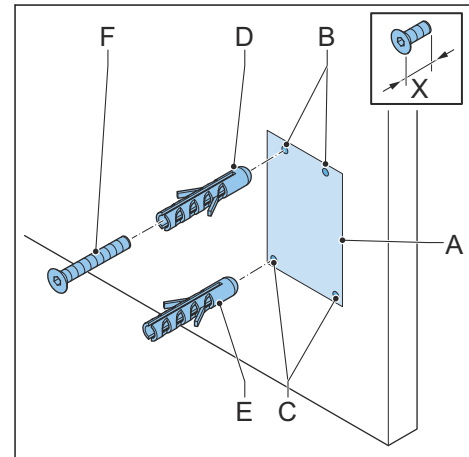
6.2 Install the mounting screws

Preliminary requirements

	<ul style="list-style-type: none"> • Installation template • Plugs • Mounting screws • Spirit level • Drill
---	--

Procedure

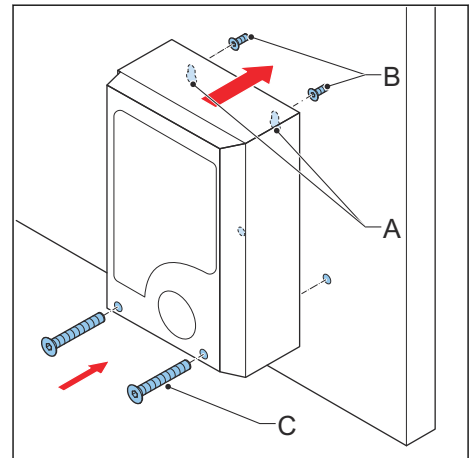
1. Hold the installation template (A) against the wall. Use the spirit level and make sure that the installation template is level.
2. Mark the location for the upper mounting holes (B) and the lower mounting holes (C).
3. Remove the installation template.
4. Drill the upper and the lower mounting holes.
5. Insert the plugs (D) into the upper mounting holes.
6. Insert the plugs (E) into the lower mounting holes.
7. Install the upper mounting screws (F).
Make sure that a part of the screws stays out of the wall. For the specifications, refer to section [11.8](#)



Note: The mounting screws that are included in the delivery are serviceable for a brick wall. If you want to mount the EVSE on a different type of wall, contact your local representative of the manufacturer (ABB EV Infrastructure).

6.3 Install the EVSE on the wall

1. Put the openings (A) over the mounting screws (B).
The upper mounting screws support the EVSE.
2. Install the mounting screws (C). For the torque specifications, refer to section [11.16](#).



7 Electrical installation

7.1 General electrical installation procedure

Preliminary requirements



Procedure

1. Remove the maintenance cover. Refer to section [9.3](#).
2. Install the AC input cable.
 - Insert the AC input cable. Refer to section [7.2](#).
 - Connect the AC input cable. Refer to section [7.3](#).
3. Install the Ethernet cable.
 - Insert the Ethernet cable. Refer to section [7.4.1](#).
 - Connect the Ethernet cable. Refer to section [7.4.2](#).
4. If necessary, install the cables for smart meter communication.
 - Insert the cables for smart meter communication. Refer to section [7.4.3](#).
 - Connect the cables for smart meter communication. Refer to section [7.4.4](#).
5. If you want to use the internet, insert the Nano-SIM card. Refer to section [7.4.5](#).
6. If necessary, replace the EV charge cable. Refer to section [7.5](#).
7. Install the maintenance cover. Refer to section [9.4](#).

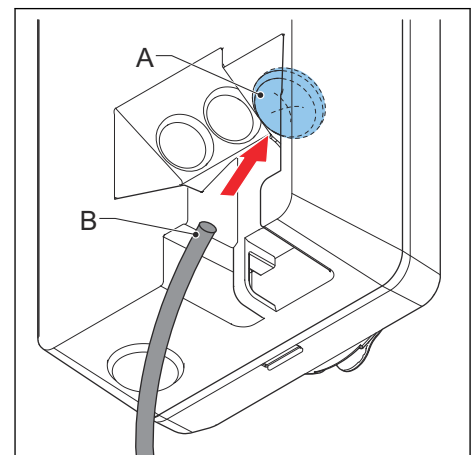
7.2 Insert the AC input cable

Preliminary requirements



Procedure

1. Remove the membrane (A) from the EVSE.
2. Make a hole in the center of the membrane.
3. Install the membrane.
4. Strip the wires. For the specification, refer to section [11.13](#).
5. Push the wires through the membrane.
6. Put the AC input cable (B) through the inlet hole.



7.3 Connect the AC input cable

7.3.1 Connect the AC input cable (1 phase)

Preliminary requirements

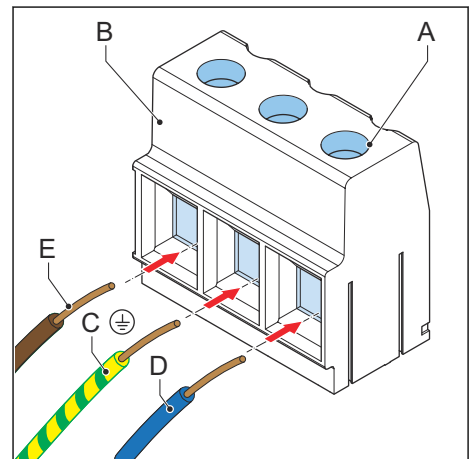
	<ul style="list-style-type: none"> • Torque screw driver 		<ul style="list-style-type: none"> • AC input cable (1 phase)
---	---	--	--

Procedure

1. Loosen the screws (A).
2. Strip the wires. For the specification, refer to section [11.13.1](#).
3. Insert the cable connector into the terminal block (B).
4. Connect the below wires:
 1. Earthing wire (C)
 2. Neutral wire (D)
 3. AC input wire (E)

Refer to section [11.11](#).

5. Tighten the screws (A) to the correct torque. For the specification, refer to section [11.16](#).



7.3.2 Connect the AC input cable (split phase)(North America)

Preliminary requirements

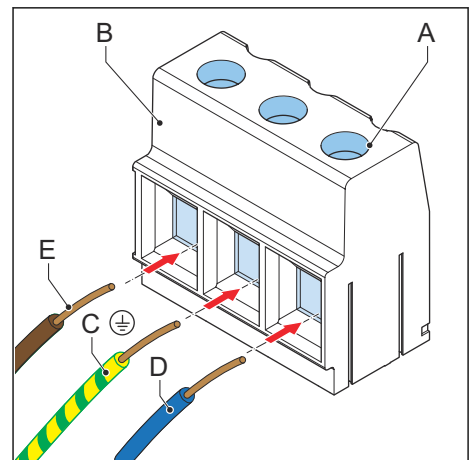
	<ul style="list-style-type: none"> • Torque screw driver 		<ul style="list-style-type: none"> • AC input cable (1 phase)
---	---	--	--

Procedure

1. Loosen the screws (A).
2. Strip the wires. For the specification, refer to section [11.13.2](#).
3. Insert the cable connector into the terminal block (B).
4. Connect the below wires:
 1. Earthing wire (C)
 2. L2 wire for split phase (D)
 3. L1 wire for split phase (E)

Refer to section [11.11](#).

5. Tighten the screws (A) to the correct torque. For the specification, refer to section [11.16](#).



7.3.3 Connect the AC input cable (3 phase)

Preliminary requirements

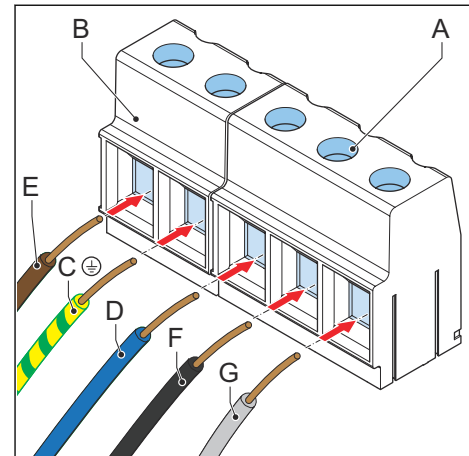
	<ul style="list-style-type: none"> • Torque screw driver 		<ul style="list-style-type: none"> • AC input cable (3 phase, TN-TT networks)
---	---	--	--

Procedure

1. Loosen the screws (A).
2. Insert the cable connector into the terminal block (B).
3. Connect these wires:
 1. Earthing wire (C)
 2. Neutral wire (D)
 3. L1 (E)
 4. L2 (F)
 5. L3 (G)

Refer to section [11.11](#).

4. Tighten the screws (A) to the correct torque. For the specification, refer to section [11.16](#).



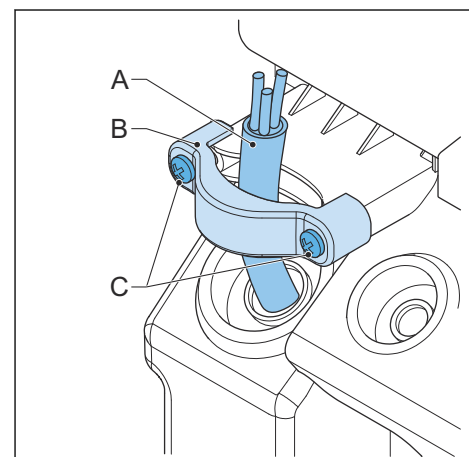
7.3.4 Secure the cables

Preliminary requirements

	<ul style="list-style-type: none"> • Torque screw driver 		<ul style="list-style-type: none"> • Strain relief for the cable
---	---	--	---

Procedure


1. Secure the cables (A) with the strain relief (B).
2. Install the two screws (C) of the strain relief.



7.4 Communication connections

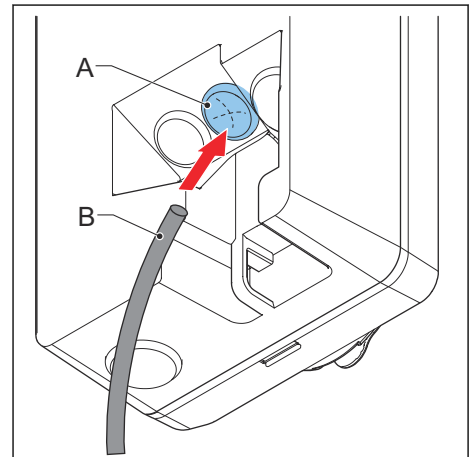
7.4.1 Insert the Ethernet cable

Preliminary requirements

	<ol style="list-style-type: none">1. The cabinet cover is removed. Refer to section 9.1.2. The maintenance cover is removed. Refer to section 9.3.
---	---


Procedure

1. Remove the membrane (A) from the EVSE.
2. Make a hole in the center of the membrane.
3. Install the membrane.
4. Put the Ethernet cable (B) through the cable inlet hole.



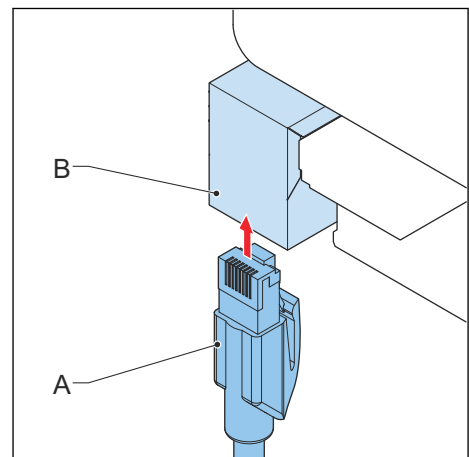
7.4.2 Connect the Ethernet cable

Preliminary requirements

	<ol style="list-style-type: none">1. The Ethernet cable is inserted. Refer to section 7.4.1.
---	--

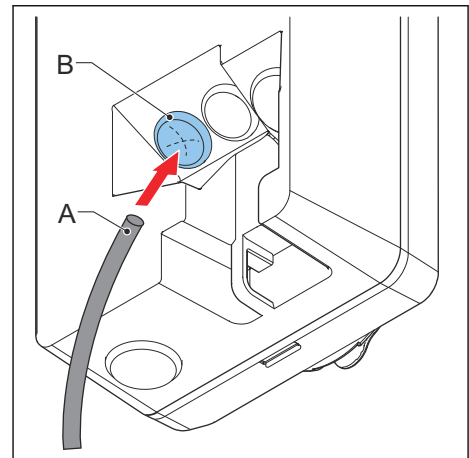
Procedure

1. Put the RJ45 plug (A) of the Ethernet cable in the Ethernet RJ45 socket (B).
2. Connect the Ethernet cable to a PC, router, or gateway.





7.4.3 Insert the wires for the smart meter communication

1. Remove the membrane (A) from the EVSE.
2. Make a hole in the center of the membrane.
3. Install the membrane.
4. If necessary, strip the cable to the correct length. Refer to section [11.13.4](#).
5. Push the wires through the membrane.
6. Put the cable (B) through the inlet hole.



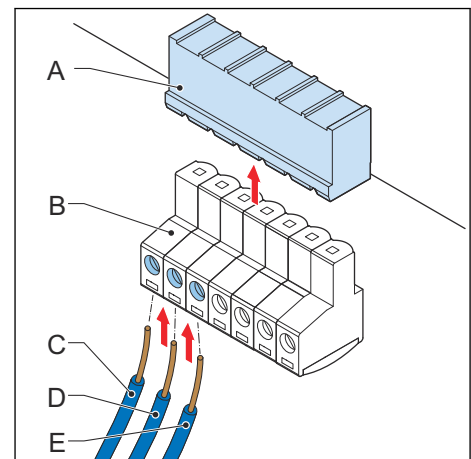
7.4.4 Connect the wires for the smart meter communication

Connect the smart meter with ModBus RTU over RS485 to the EVSE.
 Preliminary requirements

	<ul style="list-style-type: none"> • Slotted screw driver 		<ul style="list-style-type: none"> • Smart meter with ModBus RTU interface • Wire for RS485. Refer to section 11.13.4. Obey the local rules for the correct wire insulation rating.
--	--	---	---


Procedure

1. Remove the plug (A) of the terminal block (B) from the terminal block (B) of the smart meter connection.
2. Connect the wires:
 - a. Connect the positive wire (C).
 - b. Connect the negative wire (D).
 - c. If the smart meter has an earthing wire, connect the earthing wire (E).
3. Tighten the screws to the correct torque. For the specification, refer to section [11.16](#).
4. Install the plug on the terminal block.



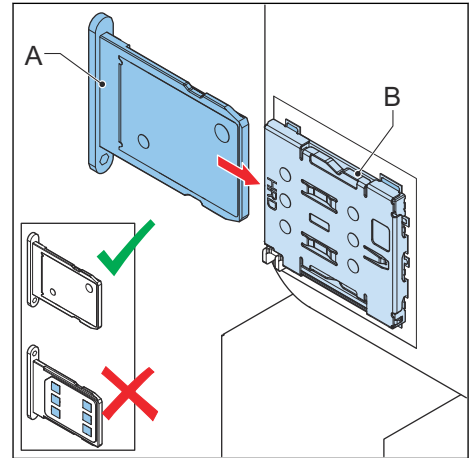
7.4.5 Insert the Nano-SIM card

Preliminary requirements

	<ul style="list-style-type: none"> • A Nano-SIM card from the provider of the mobile network
---	---




Procedure

1. Insert the Nano-SIM card (A) into the socket (B). Make sure that the position of the connection points is correct.



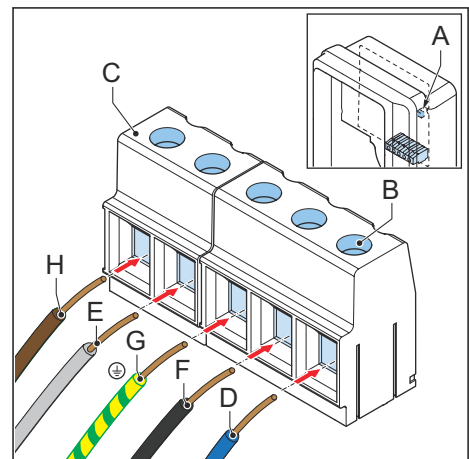
7.5 Replace the EV charge cable

Preliminary requirements

	<ol style="list-style-type: none"> 1. The standard supplied EV charge cable on the EVSE does not agree with the specifications. 		<ul style="list-style-type: none"> • EV charge cable within the specifications. Refer to section 11.13.
	<ul style="list-style-type: none"> • Torque screw driver 		

Procedure

1. Get access to the EV charge cable connection:
 - a. Remove the cabinet cover. Refer to section [9.1](#).
 - b. Remove the maintenance cover. Refer to section [9.3](#).
 - c. Remove the plastic cover.
2. Disconnect the EV charger 2-pin connector (A) that is receptable to the CP/PP connector.
3. Loosen the screw (B) on the terminal block output connector (C).
4. Disconnect the wires:
 - L1(D)
 - L2 (E)
 - L3 (F)
 - Earthing wire (G)
 - Neutral wire (H)
5. Remove the EV charge cable.



6. Connect the new EV charge cable:
 - a. Connect the wires.
 - b. Tighten the screws (B) to the correct torque. For the specification, refer to section [11.16](#).
 - c. Connect the EV charger 2-pin connector that is receptable to the CP/PP connector.
7. Prepare for operation:
 - a. Install the plastic cover.
 - b. Install the maintenance cover. Refer to section [9.4](#).
 - c. Install the cabinet cover. Refer to section [9.2](#).

8 Commissioning

8.1 General commissioning procedure

1. Energize the EVSE. Refer to section [8.2](#).
2. Set up the EVSE. Refer to section [8.3](#).
3. Connect the EVSE with the mobile app. Refer to section [8.4](#).
4. Add a RFID card to the mobile app. Refer to section [8.5](#).

8.2 Energize the EVSE

1. Close the breaker that supplies the power to the EVSE.



Warning:

Hazardous voltage

- Be careful when you work with electricity.
- The power supply comes on.
- A series of self-checks start, to make sure that the EVSE works correctly and safely.
- If the EVSE detects a problem, the error LED comes on. An error code shows on the mobile app. Refer to section [2.8.4](#) for an overview of the error codes.

8.3 Set up the EVSE

Preliminary requirements



- Mobile device

Procedure

1. Download the mobile app.
 - For an Android OS mobile device, go to Google Play Store.
 - For an iOS mobile device, go to Apple Store.
2. Open the mobile app.
3. Enter your username and password.
4. Select *Set up your Wallbox*.
5. Do the instructions that the mobile app shows.

8.4 Connect the EVSE with the mobile app

Preliminary requirements



- Mobile device with the mobile app

Procedure

1. Find your pin code in the package with the RFID card.
 - The pin code has 8 characters.
 - The letters are case-sensitive.
2. Download the ChargerSync App from the Play Store or App Store.
3. Start the mobile app.
4. Do the instructions that the mobile app shows.

8.5 Add an RFID card to the mobile app

Preliminary requirements



- RFID card
- Mobile device with the mobile app

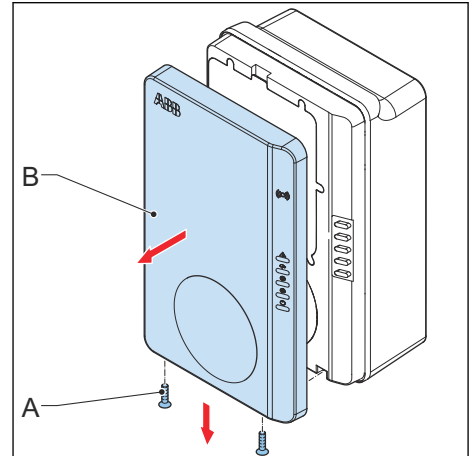
Procedure

1. Go to the *Add Card* menu in the mobile app.
2. Press *Add Card*.
3. Hold the RFID card against the RFID reader of the EVSE.
 - The binding process starts.
 - The screen of the mobile app shows the status of the binding process.
 - When the binding process is completed, the mobile app shows 'done'.
 - The *My Cards* page shows the name or the number of the EVSE in the overview of the added RFID cards.
4. Make sure that the data are correct.
5. To add a new RFID card, do these steps:
 - a. Select *+*.
 - b. Do steps 1 to 3 of this procedure again.

9 Access to parts

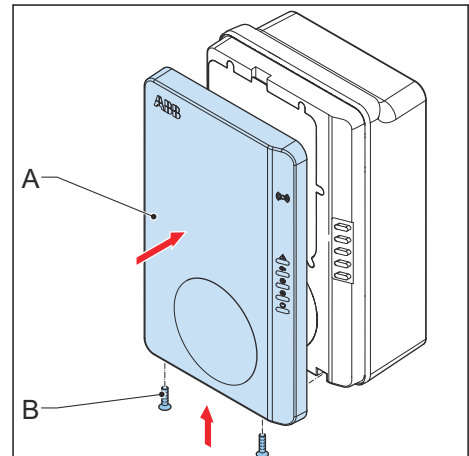
9.1 Remove the cabinet cover

1. Remove these parts:
 - Screws (A)
 - Cabinet cover (B)



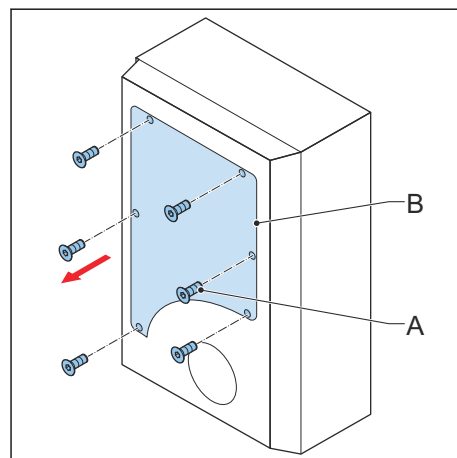
9.2 Install the cabinet cover

1. Install these parts:
 - Cabinet cover (A)
 - Screws (B)



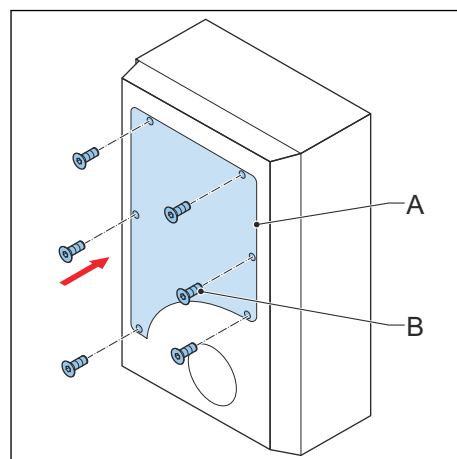
9.3 Remove the maintenance cover

1. Remove these parts:
 - Screws (A)
 - Maintenance cover (B)



9.4 Install the maintenance cover

1. Install these parts:
 - Maintenance cover (A)
 - Screws (B)



10 Troubleshooting

10.1 Troubleshooting procedure

1. Try to find a solution for the problem with the aid of the information in this document.
2. If you cannot find a solution for the problem, contact your local representative of the manufacturer. Refer to section [1.12](#).

10.2 Troubleshooting table

Problem	Possible cause	Possible solution
The current is too high	There is an overload on the EV side	<ol style="list-style-type: none"> 1. Examine the EV charge cable connection. 2. Connect the EV charge cable correctly.
The AC input voltage is too high or too low There is a failure in the electrical connections	The line and neutral wires are reversed.	<ol style="list-style-type: none"> 1. Examine the electrical connections. 2. Make sure that the connection of the phase and line and neutral wires is correct. 3. If necessary, adjust the electrical connections. Refer to chapter 7.
The EVSE is overheated	The ambient temperature exceeds the operation temperature specification AC power supply input voltage is too high Internal charger malfunction	The EVSE will decrease the current output. <ol style="list-style-type: none"> 1. Do a check of the operation temperature on the type plate. 2. If it is necessary, install the EVSE in an environment with a lower ambient temperature. 3. Do the procedure that is described for the problem 'the AC input voltage is too high'. 4. If you can not solve the problem, do not use the EVSE. Contact your local company representative or a qualified electrical contractor.
There seems to be residual current in the charging circuit	The monitoring sensor for residual current has a failure. There is residual current in the charging circuit.	Replace the monitoring sensor for residual current. <ol style="list-style-type: none"> 1. De-energize the EVSE. Refer to section 10.3. 2. Contact your local representative of the manufacturer or a qualified electrical contractor. Refer to section 1.9.

Problem	Possible cause	Possible solution
There is a relay contact failure	The relay contact is overheated or defective.	<ol style="list-style-type: none"> 1. Examine the relay contact. 2. If necessary, adjust the current. 3. If necessary, replace the relay contact.
The AC input lines are reversed.	The rated current capacity of the cable is different from the rated current of the EVSE.	Connect a cable that has the same rated current as the EVSE. Refer to section 11.11 .
The error <i>Missing earth</i> shows	The EVSE is not earthed correctly.	<ol style="list-style-type: none"> 1. Do a check of the protective earth line of the connector of the AC input. 2. Install the protective earth conductor.
There is no internet connection	The internet connectivity between the EVSE and the router is lost.	Connect the EVSE to the internet.
	The RJ45 cable or plug is defective	If it is necessary, replace the RJ45 cable or plug.
	There is no WiFi	Do a check of the WiFi signal strength at the site.
	There is no 3G/4G connectivity	<ol style="list-style-type: none"> 1. Do a check of the Nano-SIM card connections. 2. Do a check of the 3G/4G signal strength at the site.
The EV is not charged	There is a problem with the EVSE	<ol style="list-style-type: none"> 1. Make sure that the power supply to the EVSE is on. 2. Examine the EVSE to find if is working correctly. 3. Examine the mobile app and the charge LED to make sure that the charging session is authorized. 4. Start the charging session.
	The EV charge cable is defective.	<ol style="list-style-type: none"> 1. Examine the EV charge cable. 2. If the standard supplied EV charge cable is defective, replace the EV charge cable. Refer to section 7.5.
The car connection or authorization process fails	The EV charge cable is defective.	<ol style="list-style-type: none"> 1. Examine the EV charge cable. 2. If the standard supplied EV charge cable is defective, replace the EV charge cable. Refer to section 7.5.

Problem	Possible cause	Possible solution
	The EV charge cable is not connected correctly.	<ol style="list-style-type: none"> 1. Examine the connection of the EV charge cable. 2. If necessary, connect the EV charge cable.
	There is a problem with the mobile app or the RFID card.	<ol style="list-style-type: none"> 1. Make sure that you have registered in the mobile app. 2. Make sure that you use a RFID card that the manufacturer provided. 3. Make sure that the RFID card is added on the mobile app. 4. Start the mobile app. 5. Start the authorization process.

10.3

De-energize the EVSE

1. Open the breaker that supplies the power to the EVSE.
2. Wait for minimum 1 minute.

11 Technical data

11.1 EVSE Type

The EVSE type is a code.
The code is has 10 parts: A1 - A10.

Code part	Description	Value	Meaning of the value
A1	Brand name	Terra AC	-
A2	Type	W	Wallbox
		C	Column
A3	Power output	4	3.7 kW
		7	7 kW
		9	9 kW
		11	11 kW
		19	19 kW
		22	22 kW
A4	Cable type or socket	P	Type 1 cable
		G	Type 2 cable
		T	Type 2 socket
		S	Type 2 socket with shutter
A5	Cable length	-	No cable
		5	5 m
		8	8 m
A6	Authorization	R	RFID enabled
		-	No RFID
A7	Ethernet	-	Single
		D	Double
A8	Metering	M	Certified (only with display)
		-	Not certified
A9	SIM slot	C	Yes
		-	No
A10	Display	D	Yes
		-	No

Example

Terra AC W22-SR-0

- A1 = Brand name = Terra AC
- A2 = Type = Wallbox
- A3 = 22, Power output = 22 kW
- A4 = Cable type, socket = type 2 socket with shutter

- A5 = not applicable for socket version
- A6 = authorization = RFID enabled
- A7 = Ethernet = single
- A8 = metering = not certified
- A9 = SIM slot = applicable
- A10 = display = not applicable
- The '0' is an empty field.

11.2

Mass



EVSE type	Weight [kg]
Terra AC wallbox type 2 with socket (Europe)	2
Terra AC wallbox type 2 with an EV charge cable (Europe)	3.5
Terra AC wallbox type 1 (North America)	4.5

11.3

Protective device compliance


11.3.1

Protective device compliance (Europe)

Requirements	Specifications
Dedicated upstream protection device(s)	Options: <ul style="list-style-type: none"> • RCD (Type A minimum) + MCB • RCBO (Type A minimum), (for example: ABB model PN: DS201 C40 A30)
Upstream overcurrent protection breaker (for example: RCBO or MCB).  Note: The breaker value depends on the diameter and the length of the cable, the EVSE rating, and the environmental parameters (for the electrician to decide).	Breaker rating: <ul style="list-style-type: none"> • 40A for a 32 Amp rated EVSE • 20A for a 16 Amp rated EVSE
The breaker serves as the main disconnect switch to the EVSE.	
Upstream residual-current device (RCD)	Minimum Type A, with a rated residual operation current of maximum 30 mA  Note: Internal to EVSE is DC fault current monitoring > 6mA

11.3.2 Protective device compliance (North America)

Requirements	Specifications
Dedicated upstream protection device(s)	Breaker
EVSE internal Ground Fault Protection	20mA AC
Upstream overcurrent protection breaker	Breaker rating: <ul style="list-style-type: none"> • 40A for a 32 Amp rated EVSE • 20A for a 16 Amp rated EVSE

 **Note:** The breaker value depends on the diameter and the length of the cable, the EVSE rating, and the environmental parameters (for the electrician to decide).

The breaker serves as the main disconnect switch to the EVSE.

11.4 Parts included in the delivery

Parameter	Specification
EVSE	Refer to the type plate. Refer to section 2.3 .
Upper mounting screws	M6 x 60
Plugs for the upper mounting screws (service cable for a brick wall)	8 x 60 mm
Lower mounting screws	M6 x 120
Plugs for the lower mounting screws (service cable for a brick wall)	10 x 60 mm
Installation template	-
RFID card	MIFARE

11.5 General specifications

Parameter	Specification
Compliance and safety	<ul style="list-style-type: none"> • IEC/EN 61851-1 • IEC/EN 62311 • IEC/UL 62479 • IEC/UL 62955 TÜV listed conforming to UL 2594, UL 2231-1, UL 2231-2, UL 1998 • CSA C22.2. NO.280
Certification	CE, MiD, TÜV, Energy Star
IP rating	The type plate shows the specification. Refer to section 2.3 .

Parameter	Specification
IK rating according to IEC 62262 (enclosure and display)	IK10 IK8+ for an operation temperature between -35 and -30 °C
EMC rating	IEC 61851-21-2, EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-3-2, EN 61000-3-3, EN 61000-3-11, EN 61000-3-12 CE RED- WLAN / RFID / E-UTRA: EN 300 328 V2.1.1, EN 300 330 V2.1.1, EN 301 908-1 V11.1.2, EN 301 908-13 EN 50470-1, EN 50470-3 FCC Part 15 Class B

11.6 Required tools for installation

Parameter	Specifications
Hammer	-
Spirit level	-
Drill	-
Torque screw driver, cross	-
Torque screw driver, slotted	For terminal blocks and plugs with 5 mm pitch

11.7 Ambient conditions

Parameter	Value
Operation temperature	-35°C to +50°C
Storage temperature	-40°C to +80°C
Storage conditions	Indoor, dry
Relative humidity	<95%, non-condensing

11.8 Requirements for the wall

Parameter	Value
Wall thickness	Minimum 89 mm (3.5 inches)
Wall strength	The wall must be serviceable for the items listed below: <ol style="list-style-type: none"> 1. The weight of the EVSE. Refer to section 11.5. 2. The torque for the lower mounting screws. Refer to section 11.16.

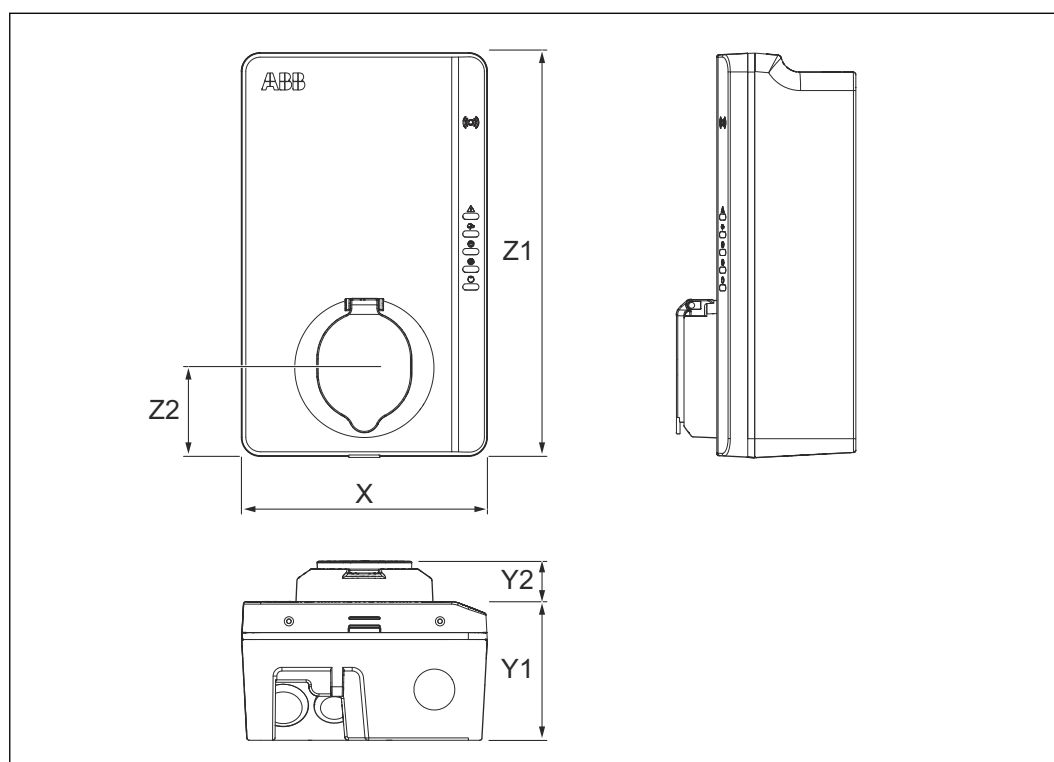
Parameter	Value
Wall material	The mounting surface must be flat and stable, for example a brick or concrete wall.
Length of the upper screws that stays out of the wall	10 mm

11.9 Noise level

Parameter	Specification
Noise level	Maximum 70 dB(A)

11.10 Dimensions

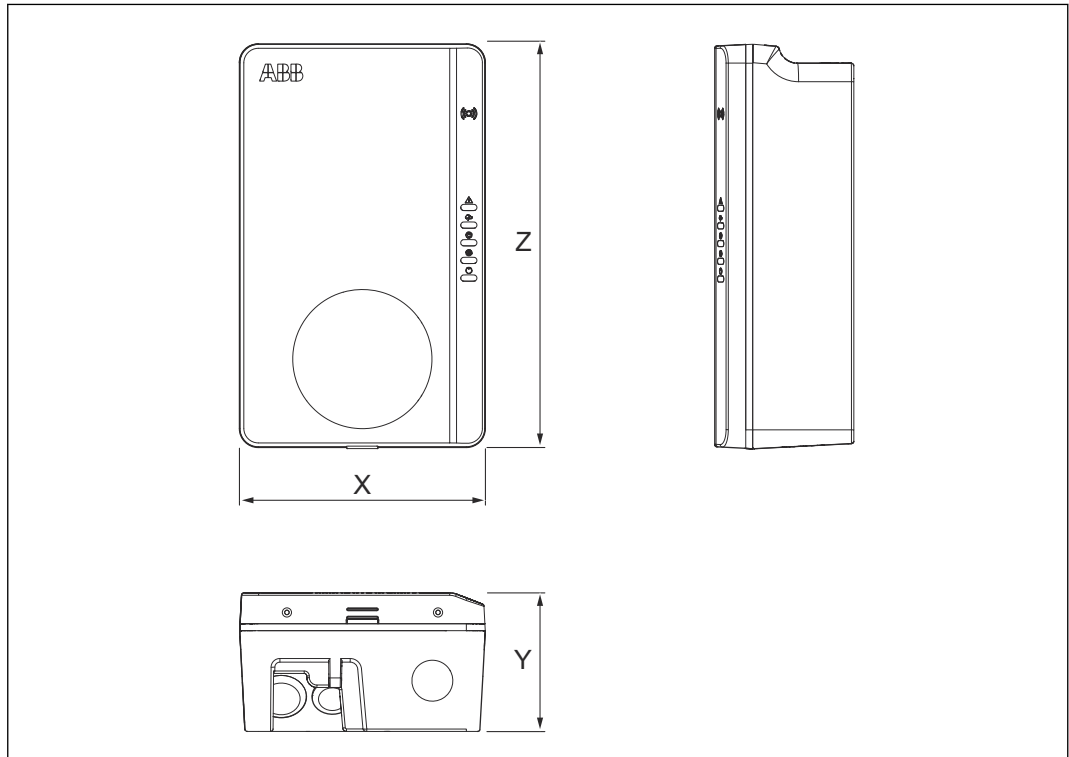
11.10.1 AC input with socket, cable Type 2



X	Width of the EVSE	Z1	Height of the EVSE
Y1	Depth of the EVSE	Z2	Distance from the bottom of the EVSE to the center of the socket.
Y2	Depth of the socket		

Parameter	Value [mm]
X	195
Y1	110
Y2	33
Z1	320
Z2	70

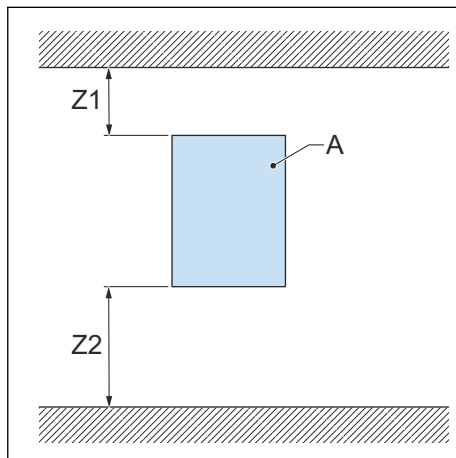
11.10.2 AC input with EV charge cable



X Width of the EVSE
 Y Depth of the EVSE
 Z Height of the EVSE

Parameter	Value [mm]
X	195
Y	110
Z	320

11.10.3 Space requirements for installation



A EVSE

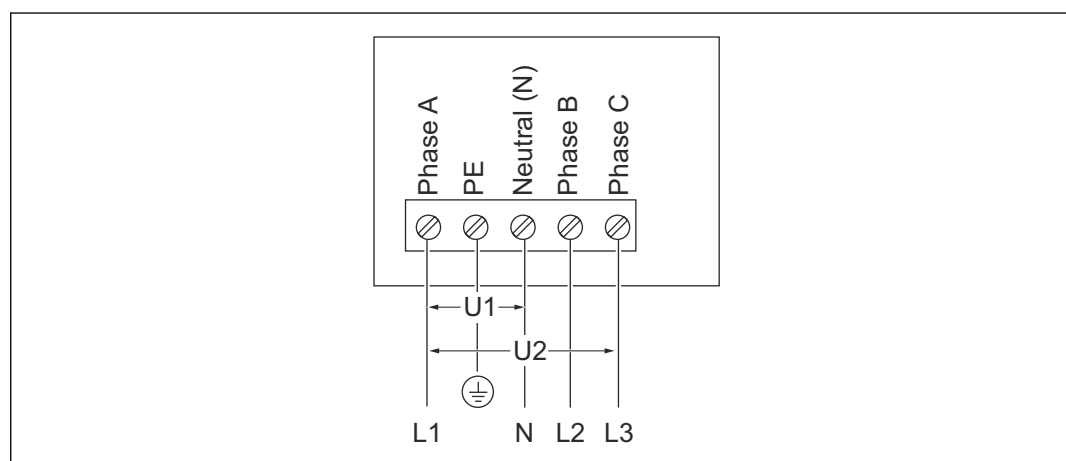
Parameter	Specification [mm]	Specification [inches]
Z1	> 200	> 8
Z2 (indoor use)	> 457.2	> 18
Z2 (outdoor use)	> 635	> 25

11.11 AC input specifications

11.11.1 General specifications

Parameter	Specification
Earthing systems	TT
	TN-S
	TN-C-S
	IT
Frequency	50 Hz or 60 Hz
Overtoltage category	Category III
Protection	Overcurrent
	Overtoltage
	Undervoltage
	Earth fault, including DC leakage protection
	Integrated surge protection

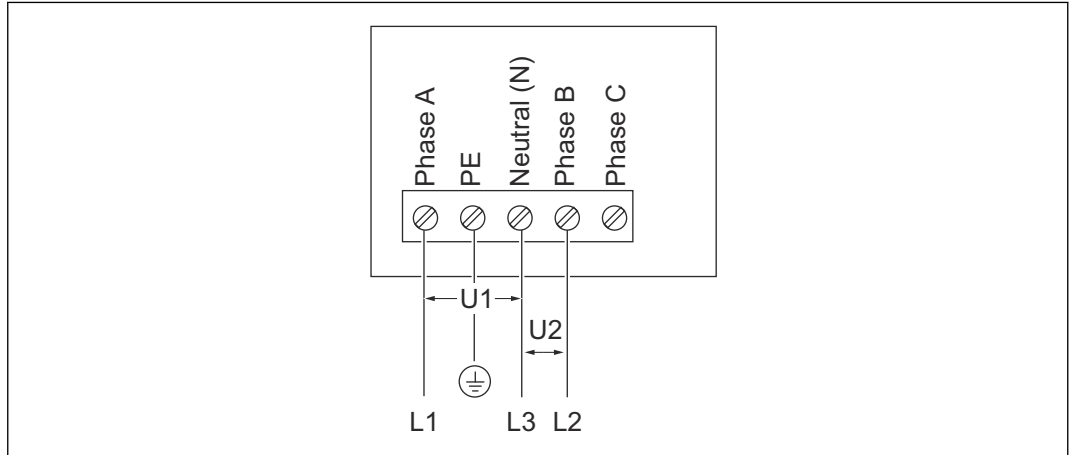
11.11.2 400 VAC 3-phase with neutral (TT, TN) (Europe)



U1 230 VAC, maximum 264 VAC

U2 400 VAC, maximum 460 VAC

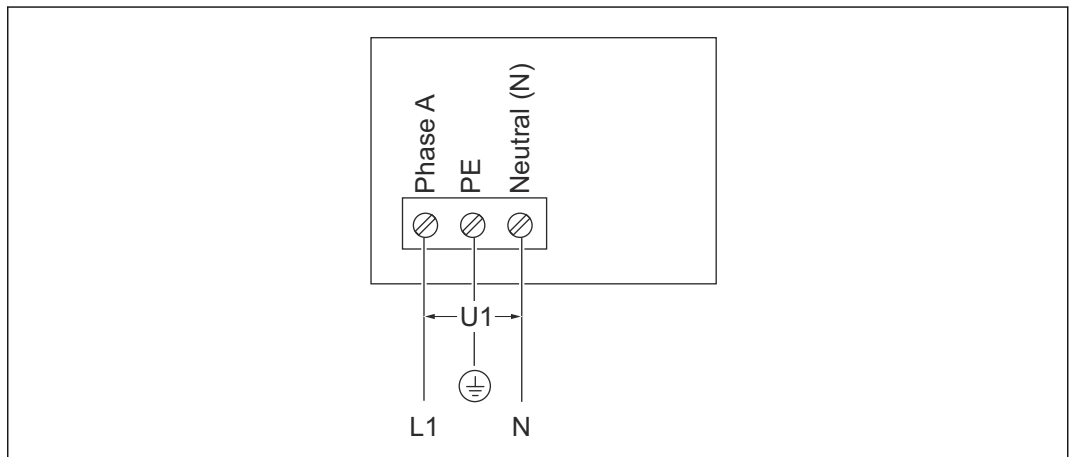
11.11.3 230 VAC 3-phase without neutral (IT)



U1 230 VAC, maximum 264 VAC

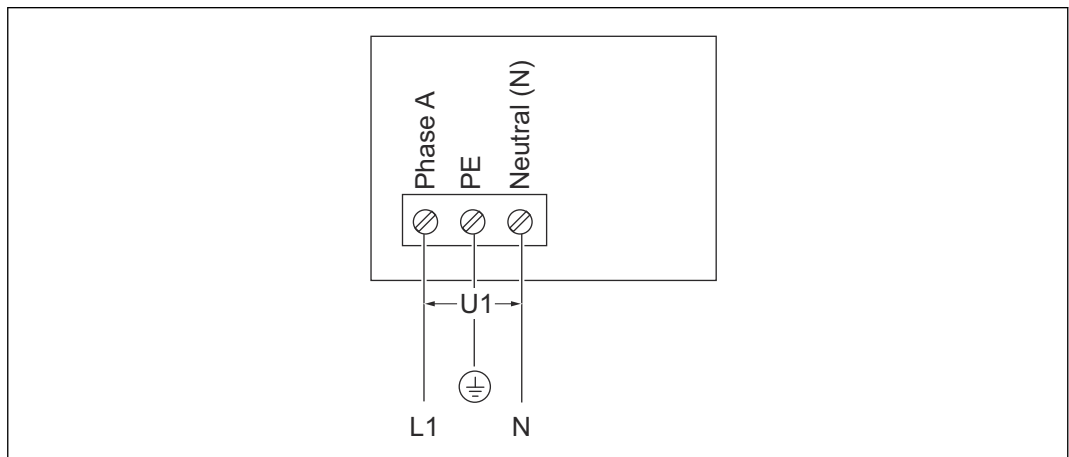
U2 230 VAC, maximum 264 VAC

11.11.4 230 VAC 1-phase (Europe)



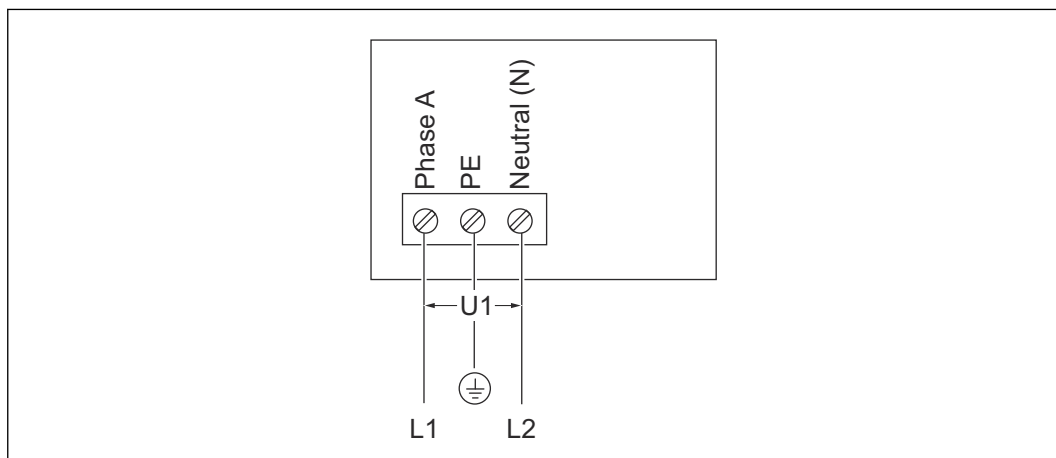
U1 230 VAC, maximum 264 VAC

11.11.5 120 VAC (North-America)



U1 120 VAC, maximum 264 VAC

11.11.6 240 VAC Split phase (North-America)



U1 240 VAC, maximum 264 VAC

11.11.7 AC input specifications (Europe)

Parameter	Specification
Input AC power connection	1 phase or 3 phase
Input voltage (1 phase)	220 to 240 VAC
Input voltage (3 phase)	380 to 415 VAC
Standby power consumption	4 W
Earth (ground) fault protection	30mA AC, 6 mA DC

11.11.8 AC input specifications (North America)

Parameter	Specification
Input AC power connection (1 phase or split phase)	110 to 240 V AC
Standby power consumption	4 W
Earth (ground) fault protection	internal 20 mA AC CCID

11.12 General logic interface specifications

Parameter	Specification
Connectivity	Mobile communication with Nano-SIM socket <ul style="list-style-type: none"> • Europe: GSM, 4G, LTE, WCDMA • North America: 4G, LTE, WCDMA
Smart meter communication	Modbus RTU (over RS485)
Ethernet	1x 10/100 BaseT, RJ45 Socket
Extra ethernet (daisy chain)	1x 10/100 BaseT, RJ45 Socket
WiFi (WAN)	IEEE 802.11 b/g/n, 2.4 GHz

Parameter	Specification
Bluetooth	BLE 5.0
RFID	MIFARE ISO/IEC 14443A RFID cards
Compatible mobile device operating systems	<ul style="list-style-type: none"> • Android 4.4 or higher • iOS8 or higher

11.13 Cable specifications

11.13.1 AC input cable (Europe)

Parameter	Specification
EV charger station connection type	Terminal block and screw
Wire size for the terminal block (allowed)	Cross section: 10 to 2.5 mm ²
Wire size for the terminal block (recommended for 32A EV Charger stations)	Minimum cross-section 6 mm ²
Wire size for the terminal block (recommended for 16A EV Charger stations)	Minimum cross-section 2.5 mm ²
Strip length	10 mm
Cable shielding (optional)	The local rules require shielded cables. The cable shielding must be connected to the PE rail at the two ends of the cable.
Diameter of the phase conductors	Refer to the local rules.
Diameter of the PE conductor	The same as the diameter of the phase conductors
	<ul style="list-style-type: none"> • Consult your local electrical codes for the correct wire size, based on the environment, the conductor type and the rating of the EVSE. • The wire cross-sectional area is based on the copper wire type.

11.13.2 AC input cable (North America)

Parameter	Specification
EV charger station connection type	Terminal block and screws
Wire size for the terminal block (allowed)	6 to 20 AWG
Wire size for the terminal block (recommended for 32A EV Charger stations)	Minimum 8 AWG
Wire size for the terminal block (recommended for 16A EV Charger stations)	Minimum 12 AWG
Strip length	10 mm
Cable shielding (optional)	The local rules require shielded cables. The cable shielding must be connected to the PE rail at the two ends of the cable.
Diameter of the phase conductors	Refer to the local rules.

Parameter	Specification
Diameter of the PE conductor	The same as the diameter of the phase conductors
	<ul style="list-style-type: none"> Consult your local electrical codes for the correct wire size, based on the environment, the conductor type and the rating of the EVSE. The wire AWG is based on the copper wire type.

11.13.3 Ethernet cable specifications

Parameter	Specification
EVSE connector type	RJ45 Modular jack
Cable type	Category 5 (Cat 5)

11.13.4 RS485 cable specifications

The RS485 cable specifications apply to smart meter ModBus RTU communication.

Parameter	Specification
Connector type for the EV charging station	Terminal block plug and screws
Conductor type	Twisted pair, shielded cable (recommended)
Conductor size for the terminal block plug (allowed)	Europe (IEC) cross-sectional area: 2.5 mm ² to 0.5 mm ² North America (UL): 12 AWG to 30 AWG
Conductor size for the terminal block plug (recommended)	Minimum 24 AWG (0.5 mm ²)
Strip length	5 mm
Terminal connections	485A: RS485 Positive/A/D0 485B: RS485 Negative/B/D1 PE: Common isolated ground for shielded cable (optional)
ModBus RTU baud rate	300 to 19.2K bps
ModBus RTU bus master	Terra EV charger station only
	<ul style="list-style-type: none"> Consult your local electrical codes and the wiring requirements of your smart meter device for the correct wire size. The wire AWG and cross-sectional area are based on the copper wire type.

11.13.5 Dry contacts input

The dry contacts input is the single contact provided by the user.

Parameter	Specifications
EVSE connector type	Terminal block plug and screws
Wire size for the terminal block plug (allowed maximum)	<ul style="list-style-type: none"> 2.5 - 0.5 mm² (Europe) 12 - 30 AWG (North America)

Parameter	Specifications
Wire size for the terminal block plug (recommended)	24 AWG (0.5 mm ²) minimum
Required torque	0.5 Nm
Strip length	5 mm
Terminal connections	<ul style="list-style-type: none"> • PE/Shield: Contact input terminal 1 or 2 • Configuration input: Contact input terminal 2 or 1

Wire AWG and cross section: based on a copper wire type

11.13.6 Dry contacts output

The dry contacts input is the single contact in the EVSE.

Parameter	Specifications
EVSE connector type	Terminal block plug and screws
Wire size for the terminal block plug (allowed maximum)	<ul style="list-style-type: none"> • 2.5 - 0.5 mm² (Europe) • 12 - 30 AWG (North America)
Wire size for the terminal block plug (recommended)	20 AWG (0.75 mm ²) minimum
Required torque	0.5 Nm
Strip length	5 mm
Terminal connections	<ul style="list-style-type: none"> • Configuration output dry contact 1: Contact output terminal 1 • Configuration output dry contact 2: Contact output terminal 2
Contact rated load	125 VAC/30VDC at 3A

The wire AWG and cross section are based on a copper wire type.

11.13.7 EV charge cable specifications

Parameter	Value [mm]
Length	508

11.14 AC output specifications

11.14.1 AC output specifications (Europe)

Parameter	Specification
AC output voltage range (1 phase)	220 - 240V AC
AC output voltage range (3 phase)	380 - 415V AC

Parameter	Specification
Connection standard	<ul style="list-style-type: none"> Type 1 cable Type 2 cable Type 2 socket Type 2 socket with shutter <p>According to IEC 62196-1, IEC 62196-2</p>
Maximum output power (1 phase)	7.4 kW
Maximum output power (3 phase)	22 kW

11.14.2 AC output specifications (North America)

Parameter	Specification
AC output voltage range	110 - 240V AC (1 phase)
Connection standard	Type 1 cable according to SAE J1772
Maximum output voltage	19 kW

11.15 Specific power consumption specifications

Power consumption during normal operation	Specification [W]
Charging Mode 1 Phase	7
Charging Mode 3 Phase	10

11.16 Torque specifications

Parameter	Specification [Nm][(lb.in.)]
Terminal block for the AC input	1.2 (10.6)
Terminal block for the communication wires and the smart meter connections	0.5 (4.43)
Terminal block for the EV charge cable	1.2 (10.6)
Lower mounting screws	4.4 (38.9)

ABB