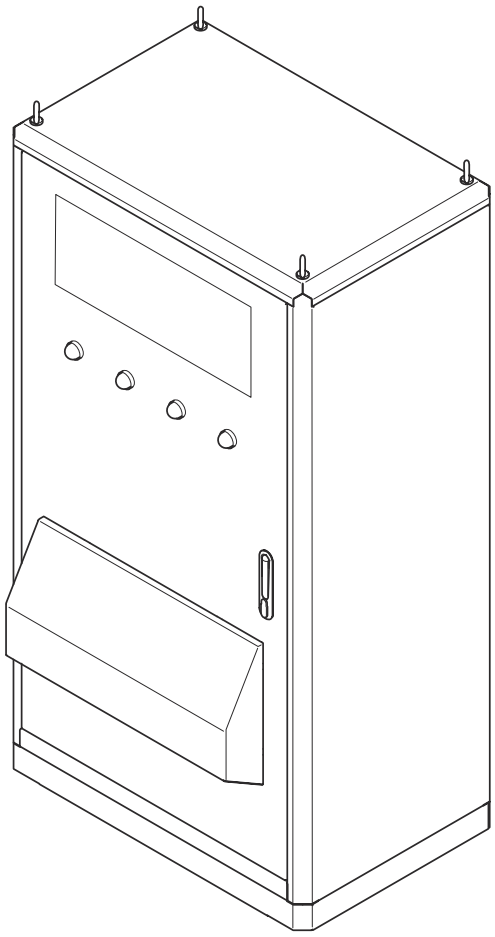
Operation and installation manual

HVC 200-300-360 NA



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Contents

1 About this document

1.1 Function of this document

The document is only applicable for this EVSE (HVC-200/300/360), including the variants and options listed in section 12.1.
The document gives the information that is necessary to safely do these tasks:

- Install the EVSE
- Use the EVSE
- Do basic maintenance tasks

Note: "HVC-200/300/360": This is a generic name for the EVSE to address the main types of the EVSE.

1.2 Target group

The document is intended for these groups:

- Owner of the EVSE
- Installation engineer

For a description of the responsibilities of the owner, refer to section 2.3.
For the required qualifications for the installation engineer, refer to section 2.4.

1.3 Revision history

Version	Date	Description
001	October 2023	Initial version
002	November 2023	Added 12.3 "Required Parts" section

Note: Follow this link to get the latest version of this manual:
search.abb.com

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

In this manual SI units of measurement (metric system) as well as North American units of measurement are used. The different units are 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 section 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.	

Signal word	Description	Symbol
-	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.	
-	Alternating current supply	

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
	Hot surface that gives risk of burn injuries

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

1.11 Manufacturer and contact data

ABB E-mobility USA
ABB E-mobility Inc.
950 W Elliott Rd
Tempe AZ 85284 Suite 101
United States of America
Phone: 800-825-2556
E-mail: US-evci@us.abb.com

ABB E-mobility Canada
ABB E-mobility Inc.
800 Boul. Hymus
St-Laurent, Quebec H4S 0B5
Canada
Phone: 800-825-2556
E-mail: CA-evci@us.abb.com

Contact data
ABB E-mobility Inc. in your country can give you support on the EVSE. You can find the contact data here: https://new.abb.com/ev-charging

1.12 Abbreviations

Abbreviation	Definition
AC	Alternating current
BESS	Battery energy storage system
CAN	Controller area network
CPU	Central processing unit
DC	Direct current
EMC	Electromagnetic compatibility
EV	Electric vehicle
EVSE	Electric vehicle supply equipment
EVSS	Electric vehicle site solutions
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
UPS	Uninterruptible power supply

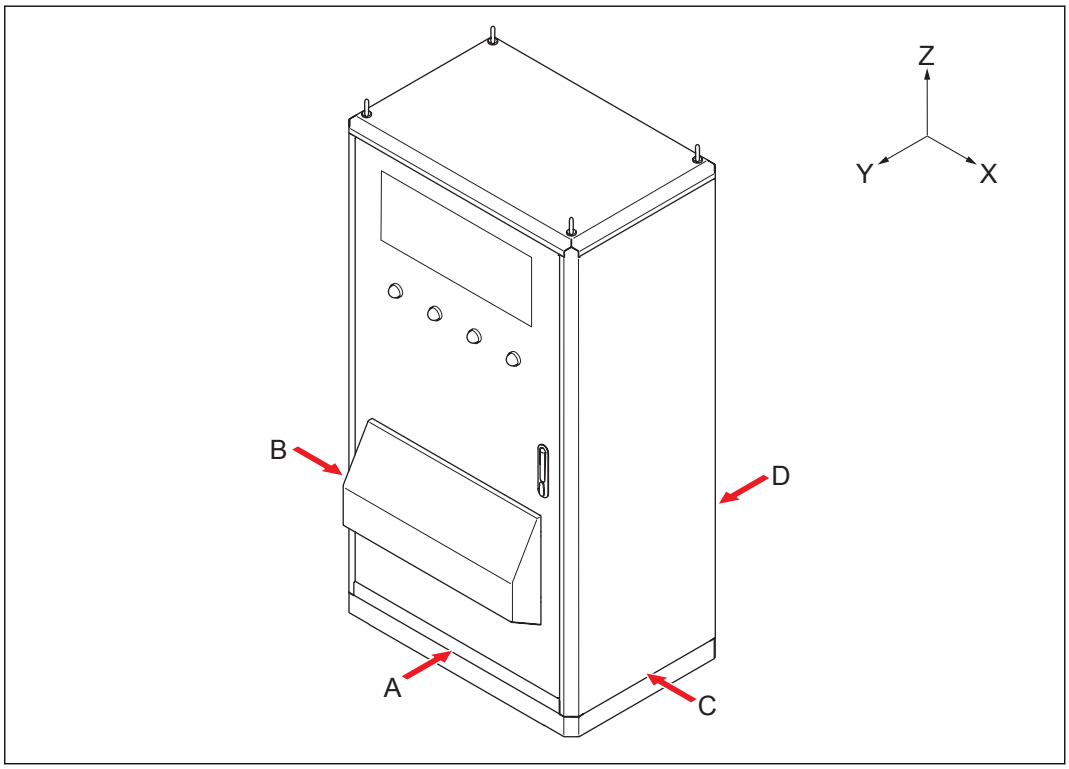
Note: It is possible that not all abbreviations are present in this document.

1.13 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 internal components
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 transmission and distribution of electricity
Applicable laws and local rules	All rules that apply to the EVSE during the entire lifecycle of the EVSE. This includes national laws, regulations and other local rules that are applicable.
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.

1.14 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 to the front)
C	Right side	Z	Z-direction (positive is upward)
D	Rear side		

2 Safety

2.1 Liability

The manufacturer is not liable for damages, losses, costs or expenses incurred by any user of the EVSE (e.g. the qualified installation engineer or owner of the EVSE) if such damages, losses, costs or expenses result from a failure to comply with the applicable safety instructions given by the manufacturer, including, but not limited to, the following:

- Power outages or disruptions to the electrical supply to the EVSE.
- Accumulation of dirt or ingress of foreign substances within the EVSE.
- Corrosion of component parts.
- Upgrades enhancements or modifications to the equipment or its use.
- Damage to software or hardware due to any IT security problem, such as but not limited to a virus breakout or malicious hacking of the system.
- Damage or failure of equipment caused by vermin, insect infestations or the like.
- Damage or failure resulting from faults in some other equipment connected to the scope of work.
- Damage or loss caused by hazards such as fire, flood, storm or the like or spillage or leakage of chemicals or harmful substances onto the EVSE.
- Fault tracing caused by problems from a source external to the scope of work.
- Unprofessional or incorrect installation, installation not complying to standards, or installation not following the installation instructions contained in the product specific manual.
- Improper operation (in breach of the technical requirements or specifications or manuals of the product), negligence or repairs carried out by the Owner (or any third party not authorized by ABB).
- Non-compliance with the applicable safety regulations or other legal standards by other parties than ABB.
- Insufficient ventilation of the EVSE.
- Operation of the EVSE outside of its design conditions.
- Relocation of the EVSE from the original installation location or alteration of the overall system design.
- Only make changes to the EVSE if the manufacturer approves in writing of the changes.

2.2 General safety instructions

- Only perform the procedures as indicated in this document.
- Only perform service by a qualified installation engineer or use the EVSE when you are fully qualified to do so.
- Comply with the applicable laws and local rules in this manual.

  If and to the extent permitted by law, in case of inconsistency between any requirements or procedure contained in this document and any such applicable laws and local rules, comply with the stricter applicable laws and local rules, requirements and procedures specified in this document.

2.3 Responsibilities for the owner

The owner is the person who runs the EVSE for commercial or business purposes for itself or leaves it to a third party for use. During operation the owner bears legal responsibility for the protection of the user, other employees or third parties. The owner has the responsibilities that follow:

- To know and implement the applicable laws and the local rules.
- To identify the hazards (in terms of a risk assessment), resulting from the working conditions on the site.
- To operate the EVSE with the protective devices installed.
- To make sure that all protective devices are installed after installation or maintenance work.
- To make an emergency plan that instructs people what to do in case of an emergency.
- To make sure that all employees and third parties are qualified according to the applicable laws and local rules to do the work.
- To make sure that there is sufficient space around the EVSE to safely do maintenance and installation work.
- To identify a site operator who is responsible for the safe operation of the EVSE and for the coordination of all work, if the owner does not do these tasks.

2.4 Required qualifications for the qualified installation engineer

- The qualified installation engineer fully knows the EVSE and its safe installation.
- The qualified installation engineer is qualified according to the applicable local rules to do the work.
- 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.

2.5 Personal protective equipment

Symbol	Description
	Protective clothing
	Safety gloves
	Safety shoes
	Safety glasses

2.6 Safety instructions during transport

Preliminary requirements

	• Qualified installation engineer		• 

- Make sure that the hoisting equipment or forklift truck can lift the EVSE safely. Take into account the mass and the center of gravity of the EVSE. Refer to section 12.7.
- Obey the applicable safety instructions for the hoisting equipment or for the forklift truck. For example, the instructions specified on the related shipment label that is applied to the EVSE packaging.
- Put on the correct personal protective equipment. Refer to section 2.5.

2.7 Safety instructions during installation

Preliminary requirements

	•  Qualified installation engineer		• 

- 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 2.10.
- 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 and measures that the local rules specify.
- If it is necessary to remove safety devices for maintenance or repairs, immediately install the safety devices after the work is completed.
- Put on the correct personal protective equipment. Refer to section 2.5.

2.8 Safety instructions for use

Do not use the EVSE and immediately get in contact with the manufacturer if the safety or the safe use of the EVSE is at risk. This includes, but is not limited to, these conditions:

- An enclosure has damage.
- An EV charge cable or connector has damage.
- Lightning struck the EVSE.
- There was an accident or a fire at or near the EVSE.
- Water entered the EVSE.

2.9 Safety instructions during cleaning or maintenance

Preliminary requirements

- Keep unauthorized personnel at a safe distance during cleaning or maintenance.
- If for cleaning or maintenance 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 2.5.

2.10 Safety instructions for earthing

Preliminary requirements

- Make sure that the EVSE is connected to a grounded, metal, permanent wiring system. If that is not possible, then an equipment-grounding conductor must be run with the circuit conductors. The equipment-grounding conductor must be connected to the equipment grounding terminal or lead on the product.
- Make sure that the connections to the EVSE comply with all applicable local rules.

2.11 Signs on the EVSE

Symbol	Description
	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
	Hot surface that gives risk of burn injuries
	Appliance class 1
	Sign that means that you must read the manual before you use or install the EVSE
	Waste from electrical and electronic equipment

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

2.12 Discard the EVSE or parts of the EVSE

Incorrect waste handling can have a negative effect on the environment and human health due to potential hazardous substances. With the correct disposal of this

product, you contribute to reuse and recycling of materials and protection of the environment.

- Obey the local rules to discard parts, packaging material, electrical and electronic equipment or the EVSE.
- As the symbol of the crossed out wheeled-bin on your EVSE indicates, do not mix or dispose the EVSE with your household waste, at the end of use. Instead, hand the EVSE over to your local community waste collection point for recycling.
- For more information, contact the Government Waste-Disposal department in your country.

2.13 Cyber security

Note: This topic is valid for a wired Ethernet connection.

This product is designed to be connected to and to communicate information and data via a network interface. It is the Owner's sole responsibility to provide and continuously ensure a secure connection between the product and Owner's network or any other network (as the case may be).
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, installation of anti-virus programs, etc) to protect the product, 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 (ABB E-mobility Inc.) and its affiliates are 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.

2.14 FCC compliance statement

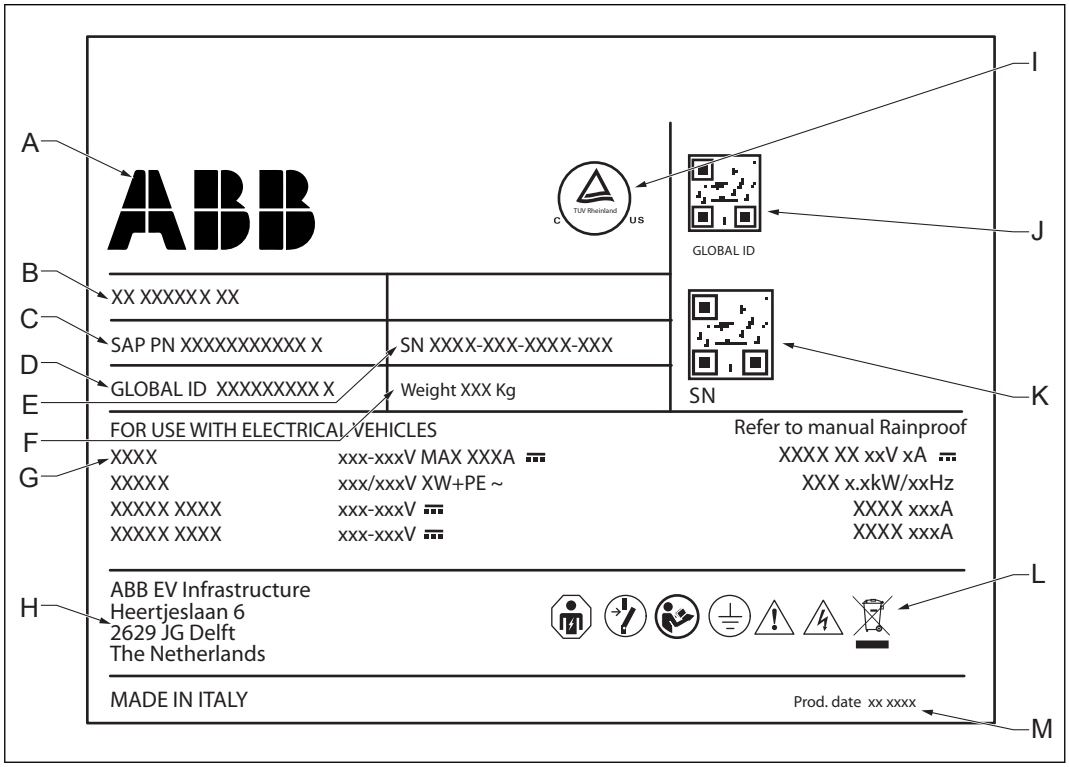
Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

3 Description

3.1 Type plate



A	Manufacturer	H	Address of the manufacturer
B	Full EVSE type	I	cTUVus mark
C	Part number of the EVSE	J	QR code with the global identification number of the EVSE
D	Global identification number of the EVSE	K	QR code with the serial number of the EVSE
E	Serial number	L	Additional EVSE rating data
F	Mass of the EVSE	M	Production date
G	EVSE rating		

Note: The data in the illustration are only an example. Find the type plate on your EVSE to see the applicable data. Refer to section 3.3.2.

3.2 Intended use

Note: The EVSE can only be used in a configuration and cannot be used as standalone equipment.

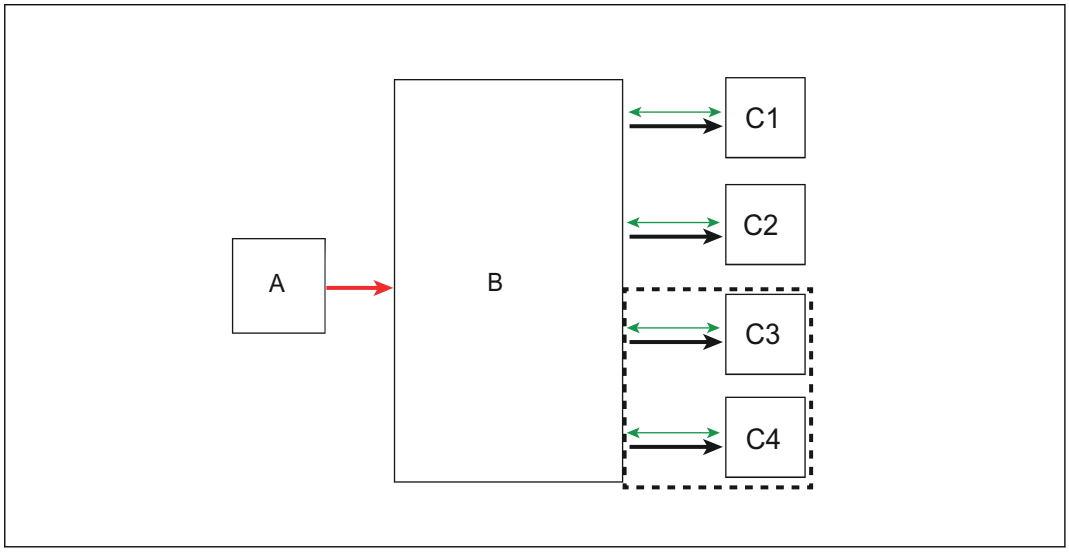
Danger:

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

The EVSE is intended for the DC charging of EVs. The EVSE is intended for indoor or outdoor use.
The properties of the electrical grid, the ambient conditions, and the EV must comply with the technical data of the EVSE. Refer to section 12.
Only use the EVSE with accessories that the manufacturer provides and that obey the local rules.

3.3 Overview

3.3.1 System overview

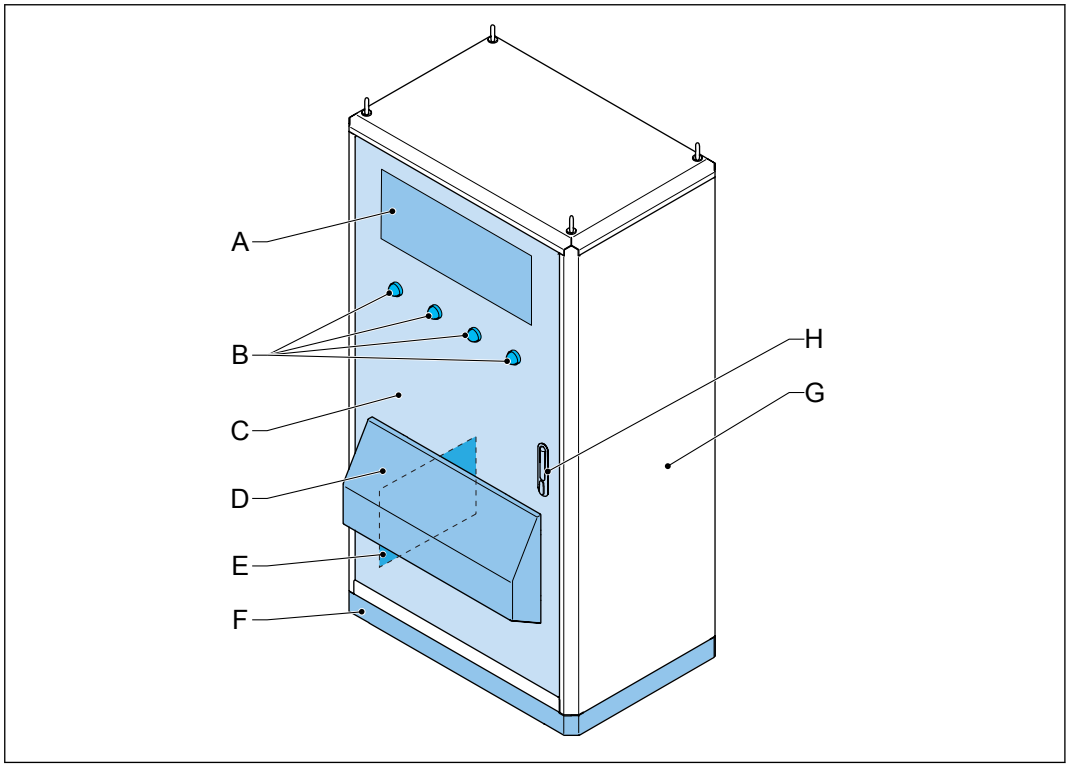


The power cabinet has variants with 2 or 4 outlets.

Element	Description
A	AC power grid
B	Power cabinet
C1-C4	Charging interface installed on outlets 1-4

Lines	Description
	AC input connection
	DC output connections
	Communication and monitoring connections
	Equipment for 4 outlet version

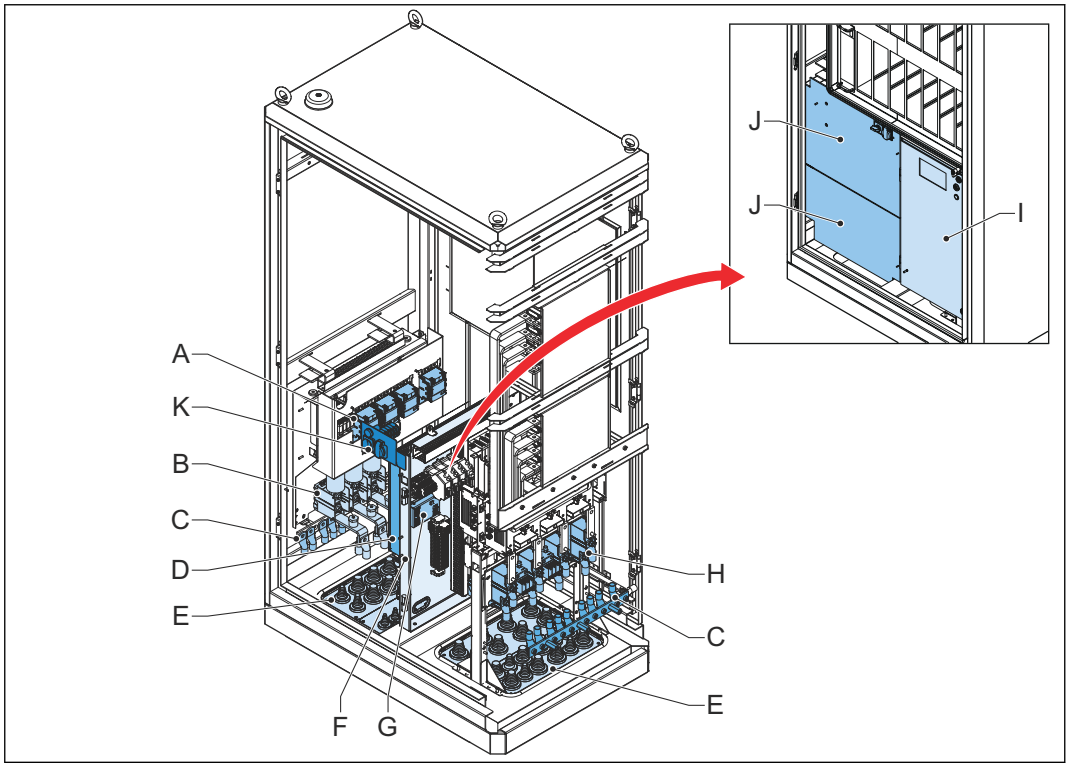
3.3.2 Power cabinet, outside



A	Air outlet	E	Type plate
B	LED indicators	F	Plinth cover
C	Door	G	Enclosure
D	Air inlet with muffler	H	Lockable door handle

Part	Function
Air inlet and outlet	To let the air in and out. The airflow prevents overheating of the parts on the inside of the EVSE
LED indicators	To indicate the status of the EVSE outlets
Door	To give authorized personnel access to the inside of the cabinet
Type plate	To show the identification data of the power cabinet
Muffler	To decrease the noise level
Plinth cover	To cover the bottom part of the EVSE
Enclosure	To reduce the accessibility of unqualified persons to the inside of the cabinet
Lockable door handle	To open and lock the door

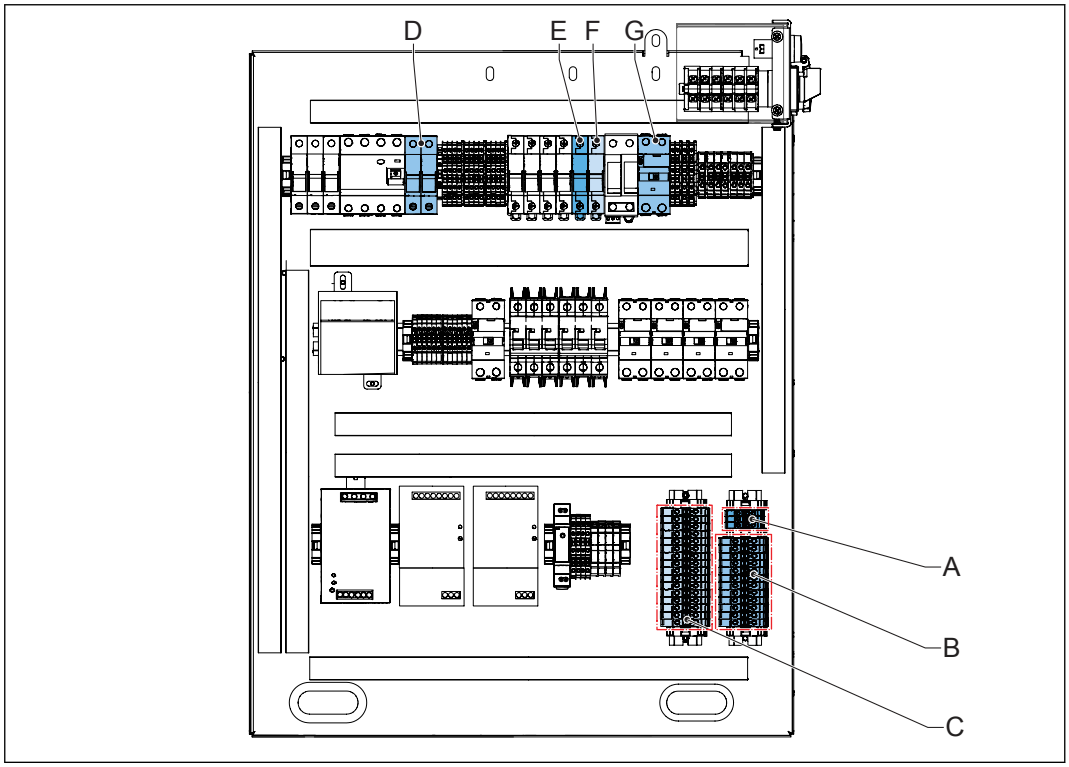
3.3.3 Power cabinet, inside



A	AC contactor	G	CAN2ETH board
B	AC input fuses	H	DC output busbars
C	PE busbar	I	DC door
D	AC plate	J	AC protection covers
E	Cable inlet	K	Precommissioning switch
F	DC plate		

Part	Function
AC contactor	To connect the AC power
AC input fuses	To protect the device from a power disruption
PE busbar	To connect PE cables
AC plate	To connect the AC and the precommissioning cables
Cable inlet	Opening for the cables
DC plate	To connect the interlock and LED cables
CAN2ETH board	To connect the Ethernet cables
DC output busbars	To connect the DC output power cables
Precommissioning switch	To start or stop the precommissioning mode

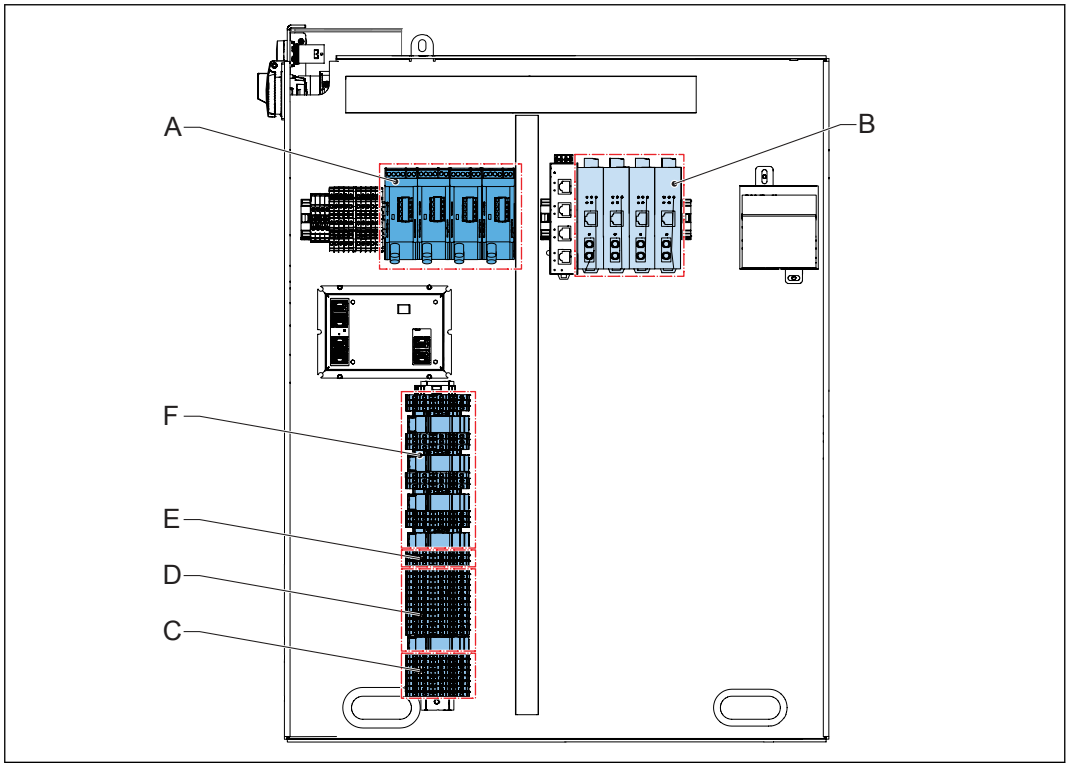
3.3.4 AC plate



A Terminal X1
B Terminal X2
C Terminal X3
D Fuse F10
E Fuse F21
F Fuse F22
G Circuit breaker Q2

Part	Function
Terminal X1	To connect the precommissioning cables
Terminal X2	To connect the AC cables
Terminal X3	To connect the AC cables
Fuse F10	To prevent the electrical circuit from an overload
Fuse F21	To prevent the electrical circuit from an overload
Fuse F22	To prevent the electrical circuit from an overload
Circuit breaker Q2	To stop or start the electrical current

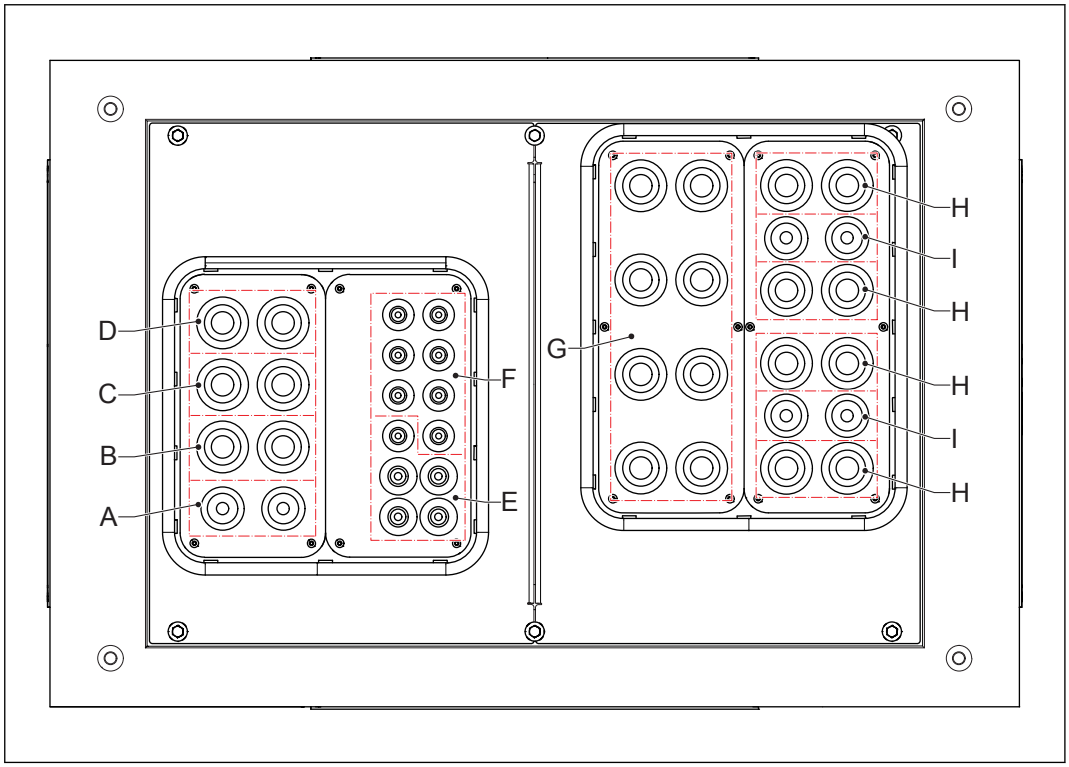
3.3.5 DC plate



A	Terminals D1-D4	D	Terminals X9
B	Terminals D6-D9	E	Terminals X8
C	Terminal X10	F	Terminals X4-X7

Part	Function
Terminals D1-D4	CAN-to-fiber converters to connect the optical fiber cables
Terminals D6-D9	Ethernet-to-fiber converters to connect the optical fiber cables
Terminal X10	To connect the LED cables
Terminal X9	To connect the RCD and EMO cables
Terminal X8	To connect the EVSS cables
Terminals X4-X7	To connect the interlock, DC guard, and ethernet cables

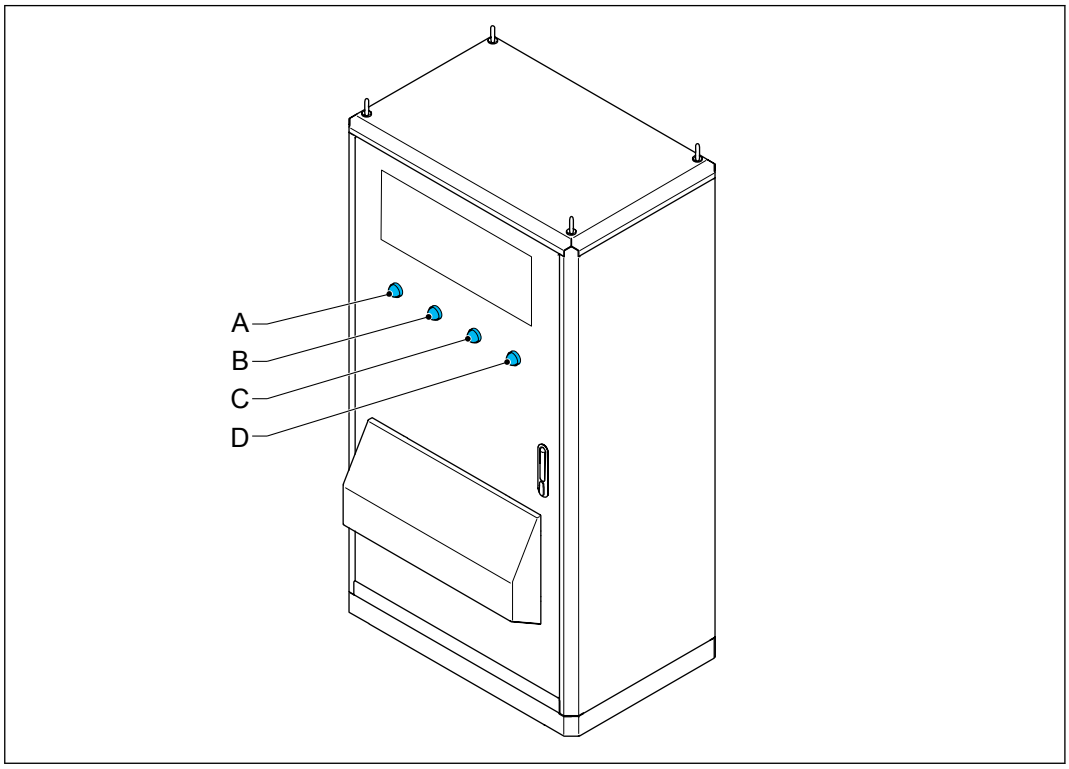
3.3.6 Cable glands in the power cabinet



A	PE	F	Cables for terminals X4-X10, terminals X84-X87, terminals D1-D4, and terminals D6-D9
B	L1 cables	G	DC out+
C	L2 cables	H	DC out-
D	L3 cables	I	PE
E	Cables for terminals X1, X2, X3		

3.4 Control elements

3.4.1 LED indicators



A LED indicator for outlet 1
B LED indicator for outlet 2
C LED indicator for outlet 3
D LED indicator for outlet 4

The LED indicators show the status of the EVSE.

Table 1: Indications of the lights

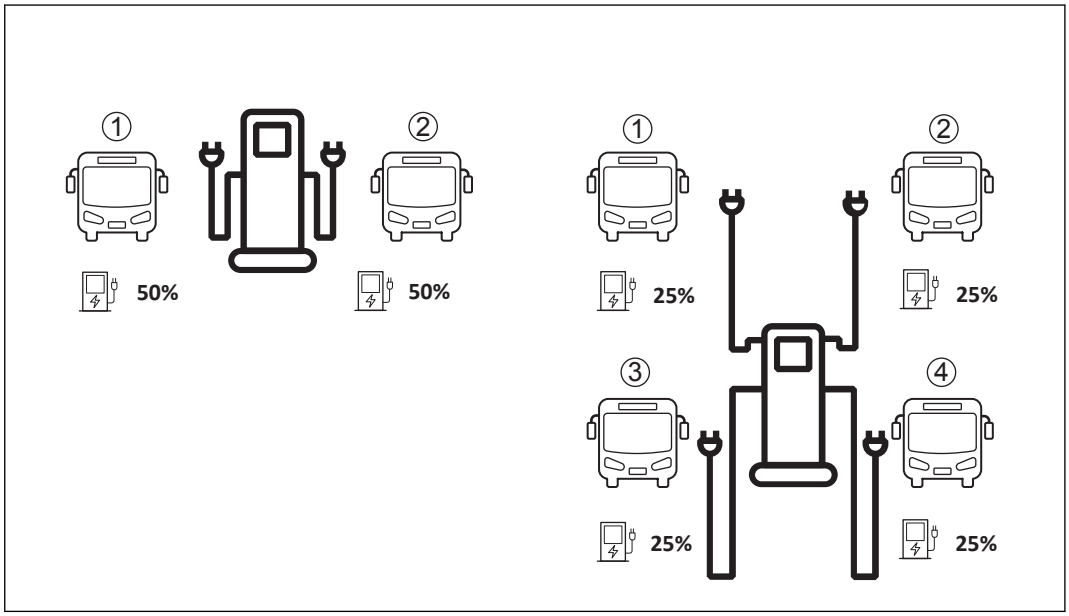
LED color	LED status	Status of the EVSE
		 Idle – Ready to charge
		 Preparing to charge
		 Charging
		 Charging complete
		 Error

3.5 Power allocation strategies

The EVSE can be configured to operate with different power allocation strategies. The configuration of the EVSE allows for these power allocation strategies:

Power allocation strategy	Available for EVSE models	Reference
Static	All models	Section 3.5.1
Dynamic	Models with more than one device installed at the outlets	Section 3.5.2

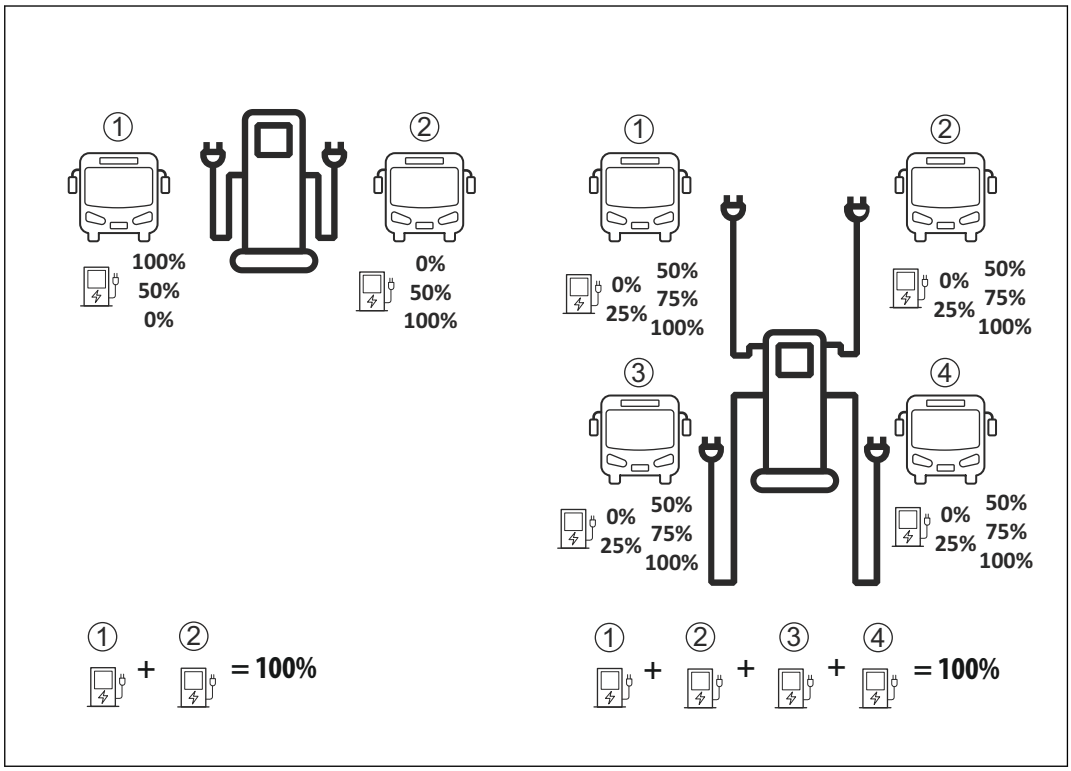
3.5.1 Static allocation



If there are two outlets, each EV receives 50 percent of the available power of the EVSE.
If there are four outlets, each EV receives 25 percent of the available power of the EVSE.

3.5.2 Dynamic allocation

Note: Dynamic allocation is currently not available. The equipment is prepared with a switch matrix for dynamic charging. The matrix can be upgraded through a software update when this feature becomes available.



Example of an EVSE with two outlets:

- EV1 receives 75 percent of the power from the EVSE until it is fully charged.
- EV2 receives 25 percent of the power of the EVSE. After EV1 is fully charged, EV2 receives 100 percent of the power of the EVSE.

Other possible allocations are: EV1 and EV 2 receive 0-100 percent of the power of the EVSE and the total power allocated to all outlets is percent of the available power.

Example of an EVSE with four outlets:

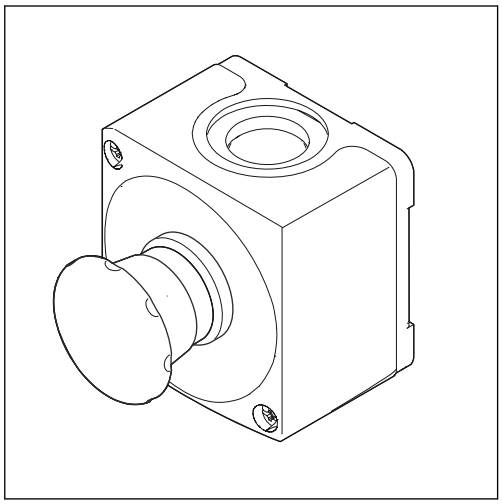
- EV1 receives 100 percent of the power from the EVSE until it is fully charged.
- EV2, EV 3 and EV 4 must wait until EV1 is fully charged. After that EV2 receives 50 percent of the power from the EVSE, EV3 and EV4 each recieve 25 percent of the power from the EVSE.

EV1, EV2, EV3 and EV4 receive 0-100 percent of the power from the EVSE and the total power allocated to all outlets is 100 percent of the available power.

3.6 Options

3.6.1 Emergency stop button (EMO)

The EVSE can have an emergency stop button. The button is installed on location during the installation of the EVSE.



When it is activated, the emergency stop button (EMO) trips the breakers to cut off the power to the chargers.

Note:

- The emergency stop button (EMO) is optional and the placement of this button is customized for every configuration.
- For the connection information, refer to section 6.3.15.

4 Transport, handling and unpacking

4.1 Transport the EVSE to the site

A transport company delivers the EVSE close to the site. The movement of the EVSE to its final location is the responsibility of the transport company.
If you need to store the EVSE before installation, obey the ambient conditions for storage. Refer to section 12.11.

Caution: YOU ARE PROHIBITED FROM TRANSPORTING OR HANDLING THE EV CHARGER UNLESS YOU ARE AUTHORISED TO HANDLE THE CHARGER AND YOU COMPLY WITH THE FOLLOWING SAFETY MEASURES!

Warning: Please follow these steps to comply with the applicable Safety measures applicable to the working area including Instructions for safe handling of the power cabinet

- Check the weight on the transport document before moving the load. Make sure that the offloading equipment used can handle this specific weight.
- Check that the forklift truck or hoisting equipment for loading/unloading is suitable, able to move the power cabinet based on weight, and that the forks of the forklift truck is fully able to move into the pallet to provide full support. Forklift operators must comply to all local regulations.
- Handling personnel must wear all appropriate and applicable personal protective equipment (PPE) and follow all the applicable Health and Safety measures applicable to the working area.
- Check the position of the center of gravity before lifting the power cabinet – the higher the position of center of gravity, the more care is required to handle the power cabinet to avoid overturning.
- Check that the pallet is not damaged. If there is damage, contact the responsible Health and Safety manager for the site to get instructed on how to unload the power cabinet and move it in a safe way.
- Check that the working place conditions are safe before handling the load (such as obstacle-free unloading area, proper flooring, safe path and other conditions).
- Ensure that the area is not accessible to unauthorized personnel and the personnel involved in handling the power cabinet are fully aware of the safety measures to apply when handling the power cabinet and keep sufficient distance away from the moving EV Charger.

ABB is not liable for any damages resulting from the improper handling and transportation of the power cabinet, in particular damage resulting from non-compliance with these instructions and other applicable regualtions and standards (e.g. transport, occupational health and other safety standards).

4.1.1 Hoist the packaged cabinet

Preliminary requirements

	• The cabinet is packed.		• Hoisting equipment
	• Installation engineer		

Warning:

Risk of pinching or crushing, the cabinet is heavy

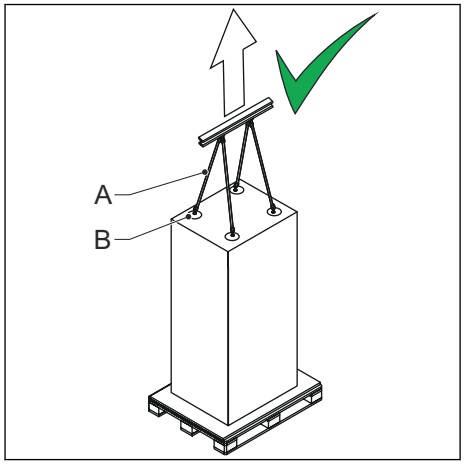
- Make sure that the hoisting equipment can lift the cabinet safely.
- Obey the safety instructions that apply to the hoisting equipment.
- Take into account the dimensions, the mass and the center of gravity of the EVSE. Refer to section 12.7.

Caution:

- Do not drop the cabinet.
- Do not tilt the cabinet more than allowed. Refer to section 12.7.
- Make sure there are no dynamic forces on the lifting points.

Procedure

1. Connect the ropes or chain (A) of the hoisting equipment to the eye bolts (B).
2. Move the cabinet to the correct location.



4.1.2 Move the packaged cabinet with a forklift truck

Preliminary requirements

	• The cabinet is packed.		• Forklift truck
	• Installation engineer		

Warning:

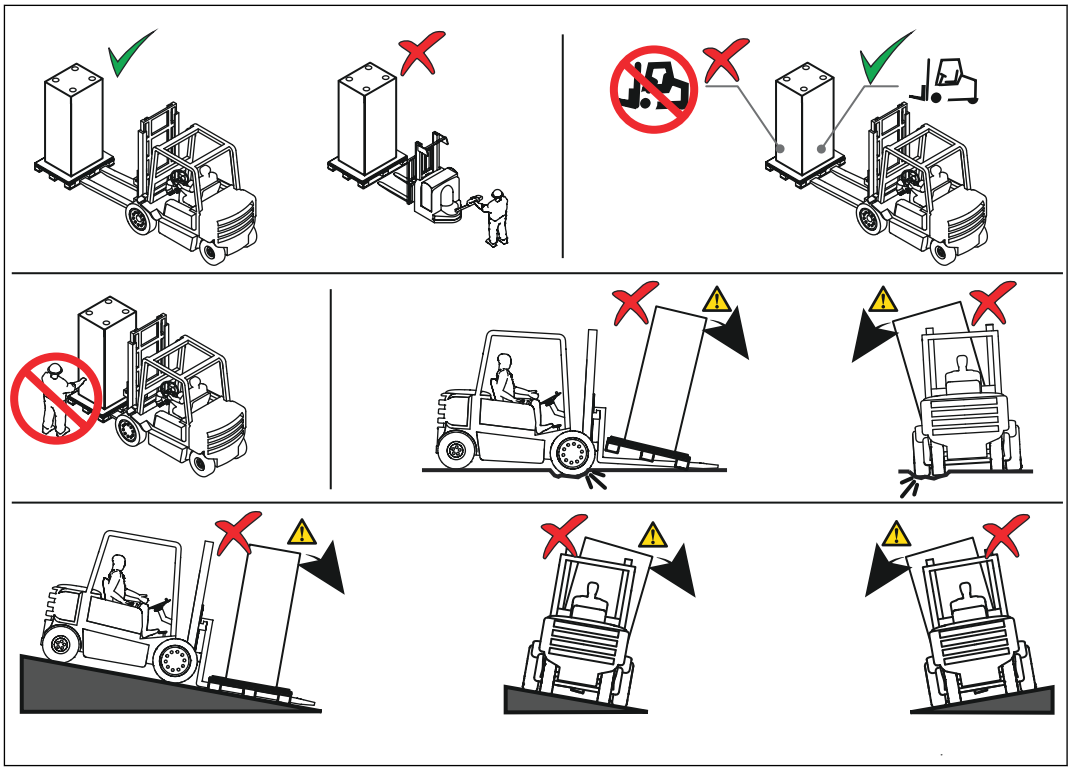
Risk of pinching or crushing, the cabinet is heavy

- Make sure that the forklift truck can lift the cabinet safely.
- Obey the safety instructions that apply to the forklift truck.
- Take into account the mass, the dimensions and the center of gravity of the EVSE. Refer to chapter 12.7.

Caution:

- Do not drop the cabinet.
- Do not tilt the cabinet more than allowed. Refer to section 12.7.

Procedure



1. Move the forks of the forklift truck in the gaps at the side of the cabinet.
2. Move the cabinet to the correct location.

4.2 Unpacking

4.2.1 Unpacking procedure

Preliminary requirements

	• Installation engineer

Procedure

1. Do a check on the transport sensors.
2. Remove the packaging material. To discard the packaging material, refer to section 2.12.
3. Make sure that all parts are delivered according to the order. Refer to the order and section 12.2.
4. If you find damage or the parts are not according to the order, contact the local representative of the manufacturer.

4.2.2 Do a check of the transport sensors

Preliminary requirements

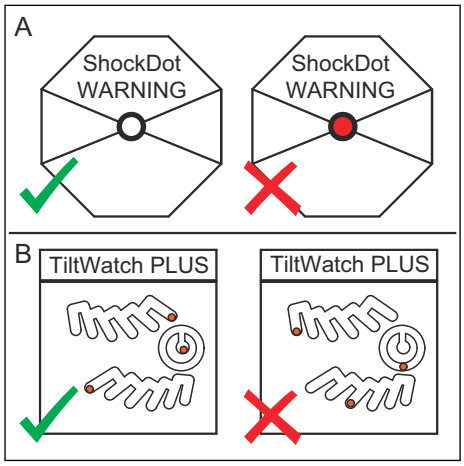
	• Installation engineer

Procedure

1. Do a check on the sensors (A) that record the shocks during transport.
2. Do a check on the sensors (B) that record the maximum tilt during transport.
3. If the sensors (A) show a red indication or the sensors (B) show a tilt that is too high, do these steps:

   For the transport specifications, refer to section 12.7.

   a. Accept the delivery of the EVSE.
   b. Make a note on the delivery receipt.
   c. If damage occured, leave the item in its original packaging and request an immediate inspection from the carrier within the applicable time period.



5 Pre-installation

5.1 Prepare the site

Note:
Also refer to the installation brief, the installation drawing and the installation manuals of all components of the system that you ordered.

1. Make sure that the space and the airflow around the cabinet is sufficient. Refer to section 12.9.
2. Design the site according to these rules:
   a. The length of the DC power cables between the power cabinet and the devices that are installed at each outlet do not exceed the maximum length. Refer to the manuals of the devices that are installed at each outlet for the maximum length of the cables.

Note: It is possible to increase the maximum length of the cables with an optional long-distance kit. The long-distance kit has its own manual. Ask the manufacturer.

   b. Obey the ambient conditions. Refer to section 12.11 .
   c. Install sunlight protection at locations, where the power cabinet is exposed to direct sunlight and high ambient temperatures for most of the day.
3. a. Make sure that a circuit breaker and a residual current device are installed to protect the AC auxiliary (power supply line of charging posts). Refer to section 12.16.
   b. Contact the manufacturer when the circuit breaker or the residual current device are not installed. Refer to section 1.11.
4. Prepare the input cables:
   - AC input cable. Refer to section 12.13.2.
   - Ethernet cable, if no wireless 2G/3G/4G signal is available. Refer to section 12.13.10. Contact the manufacturer if you require a specific configuration. Refer to section 1.11.

Note:

- The cables enter the cabinet from the bottom.
- If you install a long-distance kit, then pay attention to these items:
  - Ignore the procedures in this manual regarding the installation of the Ethernet cables.
  - Follow the instructions in this manual regarding the installation of the cables of the long-distance kit. Refer to section 6.3.12.
  - Follow the instructions in the manual that comes with the long-distance kit.

5. Prepare the output cables:
   - DC power cables. Refer to section 12.13.5.
   - AC auxiliary power cables (3 phase 480 V). Refer to section 12.13.3.
   - AC auxiliary power cables (1 phase 120 V). Refer to section 12.13.4.
   - DC auxiliary power cables (24 V). Refer to section 12.13.6.
   - Interlock cables. Refer to section 12.13.8.
   - Interlock+DC guard cables. Refer to section 12.13.9.
   - Optical fiber cables. Refer to section 12.13.11.
   - Ethernet cables. Refer to section 12.13.10.

   Prepare the cables according to the number of outlets and the requirements of the devices that are installed at the outlets.

Note: The cables enter the cabinet from the bottom.

6. Make sure that the cable slack is sufficient to guide the cables in the EVSE. Refer to section 12.8.
7. If you use an Ethernet cable, make sure that the internet connection is available for an approved service engineer and the network operating center of the manufacturer.

5.2 Control the space and airflow around the EVSE

1. Make sure that the floor spaces meet the requirements. Refer to section 12.9.
2. Make sure that the air flow inlet and outlet do not become blocked by objects such as snow, equipment, etc.

5.3 Install the cable ducts

1. Install two flexible cable ducts below the power cabinet.
2. Install traction wires in the cable ducts.

5.4 Prepare the foundation

5.4.1 Prepare a foundation - general procedure

1. Use the correct foundation. Make sure that the foundation is suitable for the surface on which the cabinet is installed:

Surface	Type of foundation	Refer to section
Soil	Concrete foundation	5.4.2
Solid floor	Metal frame	5.4.3
Solid floor	Custom foundation	

2. Embed the cables in the ground with or without a cable duct. Refer to the local rules.
3. Prepare the selected foundation type for the power cabinet.

5.4.2 Prepare the foundation for the power cabinet (concrete)

1. Make and install your own prefabricated or poured concrete foundation on site. For important dimensions, refer to section 12.10.1.

Caution: Make sure that the top surface of the foundation is above the ground level, to prevent intrusion of water.

2. Put the cable conduits into the cable entries of the foundation.
3. Mark the position of the holes (A) for the grommet plate on the foundation. For the correct dimensions, refer to section 12.10.1.
4. Drill the holes.
5. Put the cables through the cable conduits in the foundation. Apply the full cable slack.

   For the specification of the cable slack, refer to section 12.8.
6. Fill the foundation with gravel or another substance to prevent that rodents go into the cabinet.

5.4.3 Prepare a metal foundation for the power cabinet

Preliminary requirements

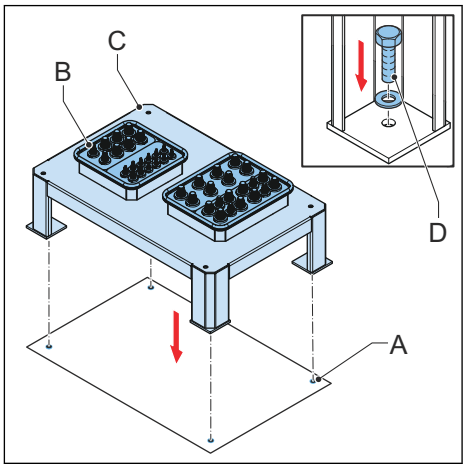
	• Drill with screw tap • Torque wrench		• Metal frame. Refer to section 12.10.2. If you have not included the foundation in the initial order, contact the manufacturer to order the foundation for your power cabinet. Refer to section 1.11.

Procedure

1. Mark the position of the holes (A) on the floor. For the correct dimensions, refer to section 12.10.1.
2. Drill and thread the holes.

Caution: Do not make holes in the metal foundation that can compromise the structural integrity.

3. Guide the cables to the grommet plate (B).
4. Align the metal frame (C) with the threaded holes.
5. Install the fasteners (D) with washers.
6. Tighten the fasteners to the correct torque. For the specification, refer to section 12.4.



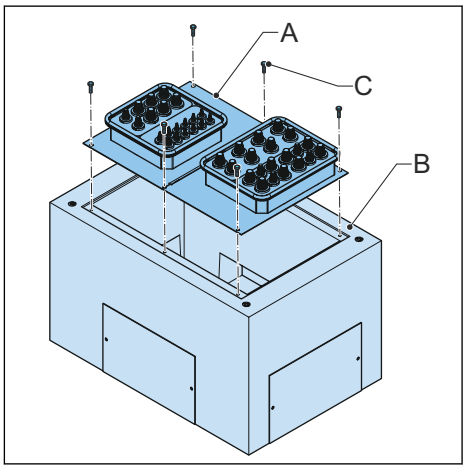
5.4.4 Install the cable gland plate for the concrete foundation of the power cabinet

Preliminary requirements

	• Torque wrench		• Cable gland plate

Procedure

1. Contact the manufacturer to order the cable gland plate for your EVSE. Refer to section 1.11.
2. Guide the cables through the cable gland plate (A).
3. Install the cable gland plate on the foundation (B).
4. Install the fasteners (C) that are supplied with the cable gland plate.
5. Tighten the fasteners to the correct torque. For the specification, refer to section 12.4.



6 Installation

6.1 Install the power cabinet - general procedure

Preliminary requirements

	• The site is prepared.

Note: For the installation of the whole system (power cabinet and charging posts), refer to the installation brief, the installation drawing and the installation manuals of the devices that are installed in the charging system you ordered.

Procedure

1. Prepare the foundation for the power cabinet. Refer to section 5.4.1.
2. Unpack the power cabinet. Refer to section 4.2.
3. Do the mechanical installation of the power cabinet. Refer to section 6.2.1.
4. Do the electrical installation of the power cabinet. Refer to section 6.3.1.

6.2 Mechanical installation

6.2.1 Mechanical installation of the power cabinet - general procedure

Preliminary requirements

	• The cabinet is above the foundation.

Procedure

1. Remove the plinth covers of the power cabinet. Refer to section 10.3.
2. Install the cabinet on the foundation. Refer to section 6.2.2.
3. Install the cover plate of the foundation. Refer to section 6.2.3.
4. Install the plinth covers of the power cabinet. Refer to section 10.4.

6.2.2 Install the cabinet on the foundation

Preliminary requirements

	• Hoisting equipment or forklift truck • Torque wrench		• Four fasteners M16 and washers

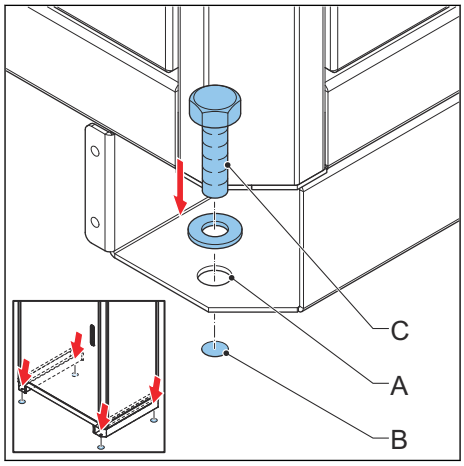
Procedure

1. Carefully lower the cabinet on the foundation with a hoisting equipment or a forklift truck.

Caution: Make sure that there is no kink in the cables.

2. Make sure that the holes in the cabinet (A) and the foundation (B) are aligned.

Caution: Install a cabinet with only 3 three screws when there is no access to the rear corner of a cabinet. This occurs when 4 or more cabinets are installed..



3. Install the fasteners (C) and the washers.
4. Tighten the fasteners to the correct torque. For the specification, refer to section 12.4.

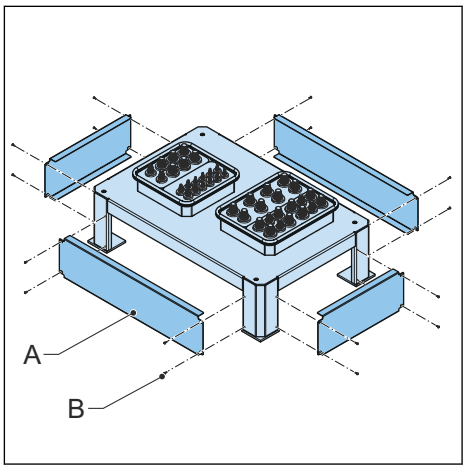
6.2.3 Install the cover plates of the metal foundation

Preliminary requirements

	• The cabinet is installed on the foundation.		• 16 fasteners M6 (included in the foundation kit)

Procedure

1. Install the cover plates (A).
2. Install the fasteners (B).
3. Tighten the fasteners to the correct torque. For the specification, refer to section 12.4.



6.3 Electrical installation

6.3.1 Electrical installation of the power cabinet - general procedure

Preliminary requirements

	• The power cabinet and other elements of the system are machanically installed on site. • If the cable ducts are used: the DC cables are installed in one of the cable ducts. • If the cable ducts are used: the AC cables, the earthing wires and the communication cables are installed in the other cable duct.		• 

Procedure

1. Open the door of the power cabinet. Refer to section 10.1.
2. Connect the PE wire and the AC cables to the power cabinet.
   a. Remove the AC covers. Refer to section 10.5.
   b. Connect the PE wire to the power cabinet. Refer to section 6.3.2.
   c. Connect the AC input cable to the power cabinet. Refer to section 6.3.3.
   d. Connect the AC auxiliary output cable (3 phase 480 V) to the power cabinet. Refer to section 6.3.4.
   e. Connect the AC auxiliary output cable (1 phase 120 V) to the power cabinet. Refer to section 6.3.5.
   f. Install the AC covers. Refer to section 10.6.
3. Open the DC door. Refer to section 10.7.
4. Connect these cables to the power cabinet.
   - Connect the DC power cables to the power cabinet. Refer to section 6.3.6.
   - Connect the DC auxiliary output cables to the power cabinet. Refer to section 6.3.7.
   - Connect the interlock and DC guard cables to the power cabinet. Refer to section 6.3.8.
   - If the charging interface uses ethernet cables, then connect the Ethernet output cables to the power cabinet. Refer to section 6.3.9.
   - If the charging interface uses optical fiber cables, then connect the optical fiber cables to the power cabinet. Refer to section 6.3.10 and 6.3.11.
   - Connect the long-distance kit optical cables to the power cabinet (option). Refer to section 6.3.12.
5. Close the DC door. Refer to section 10.8.
6. Close the door of the power cabinet. Refer to section 10.2.

6.3.2 Connect the PE wire of the AC input cable

Preliminary requirements

	• Wire stripper pliers • Wire cutter • Torque wrench		• 
	• Cable lug • Fasteners M10 • Bolts M10x20		

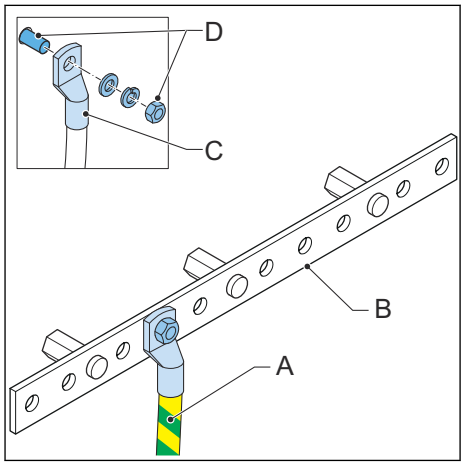
Procedure

1. Prepare the wire:
   a. Cut the PE wire (A) of the AC input cable so that that the length is sufficient for connection at the PE busbar (B) below the terminal block for the AC input.

      Make sure the wire has a loop. The loop is necessary so that the PE wire is not the first wire that is disconnected if a collision moves the power cabinet.

   b. Strip the insulation from the end of the wire. Make sure that the stripped length is compatible with the cable lug specification.

   c. Attach the cable lug (C) to the end of the wire.



2. Attach the PE wire to the PE busbar. Use the fasteners (D).
3. Tighten the fasteners to the correct torque. For the specification, refer to section 12.4.

6.3.3 Connect the AC input wires

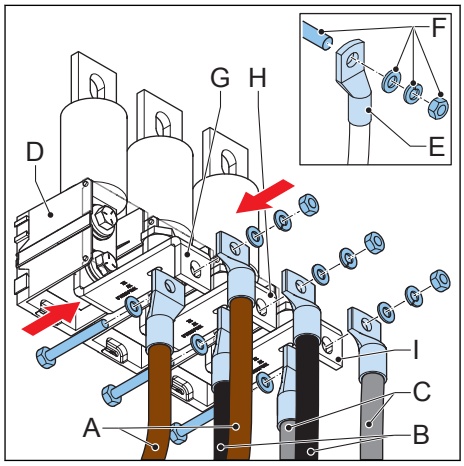
Preliminary requirements

	• The front and right doors are open.		• Cable lugs and fasteners. Refer to section 12.13.3.
	•  Qualified installation engineer		• 
	• Wire stripper pliers, cable lug tool and torque socket wrench.		

Procedure

1. Prepare the wires:
   a. Cut the wires (A), (B) and (C). Make sure that the lenght is sufficient for connection at the connectors (D).
   b. Strip the insulation from the end of the wires. Make sure that the strip length is compatible with the cable lugs (E).
   c. Attach the cable lugs to the end of the wires. Use the cable lug tool.
2. Attach the wires to the connectors:
   - L1 wire (A) to the connector F1:1 (G)
   - L2 wire (B) to the connector F2:1 (H)
   - L3 wire (C) to the connector F3:1 (I)

   Use the fasteners (F) on each connection.
3. Tighten the fasteners to the correct torque. For the specification, refer to section 12.4.



6.3.4 Connect the AC auxiliary power cable (3 phase 480 V) in the power cabinet

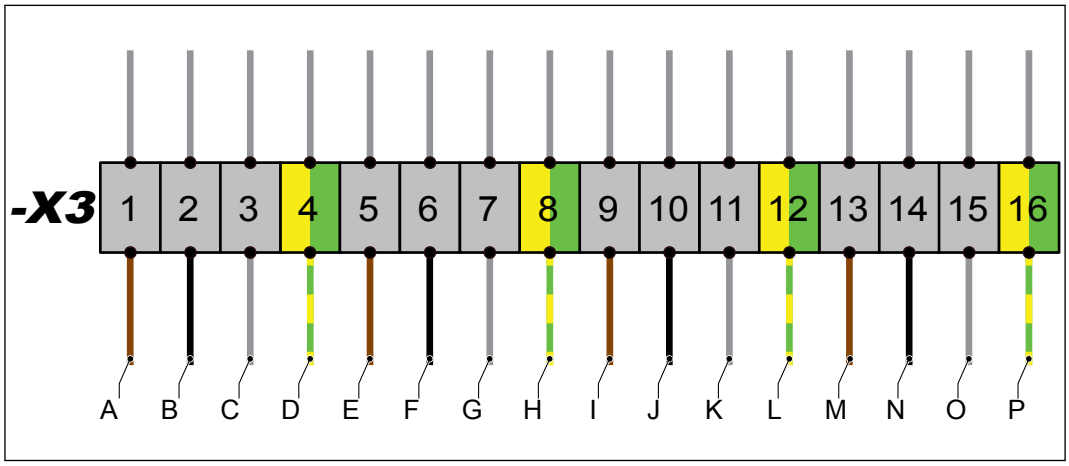
Preliminary requirements

	• Torque screwdriver, cross • Wire cutter • Wire stripper pliers • Crimp pliers		•
	• 3 phase 480 V AC auxiliary power cable. Refer to section 12.13.2. • Ferrules		

Note:

- The illustration shows the terminal block X3 on the power cabinet and the connections that are in this section.
- For the specific connections, refer to the installation brief, the installation drawing and the installation manuals of the devices installed in the system you ordered.
- For information about the part numbers of the terminals, refer to section 12.18.

Procedure



1. Prepare the wires that are mentioned below. Refer to section 6.3.16.
2. Loosen the screws of the terminal block X3.
3. Connect the below listed wires from the outlets. Use the illustration above as a reference:

Outlet	Wire	Connect to terminal
1	(A) L1 wire	X3-1
	(B) L2 wire	X3-2
	(C) L3 wire	X3-3
	(D) PE wire	X4-4
2	(E) L1 wire	X3-5
	(F) L2 wire	X3-6
	(G) L3 wire	X3-7
	(H) PE wire	X3-8
3	(I) L1 wire	X3-9
	(J) L2 wire	X3-10
	(K) L3 wire	X3-11
	(L) PE wire	X3-12
4	(M) L1 wire	X3-13
	(N) L2 wire	X3-14
	(O) L3 wire	X3-15
	(P) PE wire	X3-16

4. Tighten the screws to the correct torque. For the specification, refer to section 12.4.

6.3.5 Connect the AC auxiliary power cable (1 phase 120 V) in the power cabinet

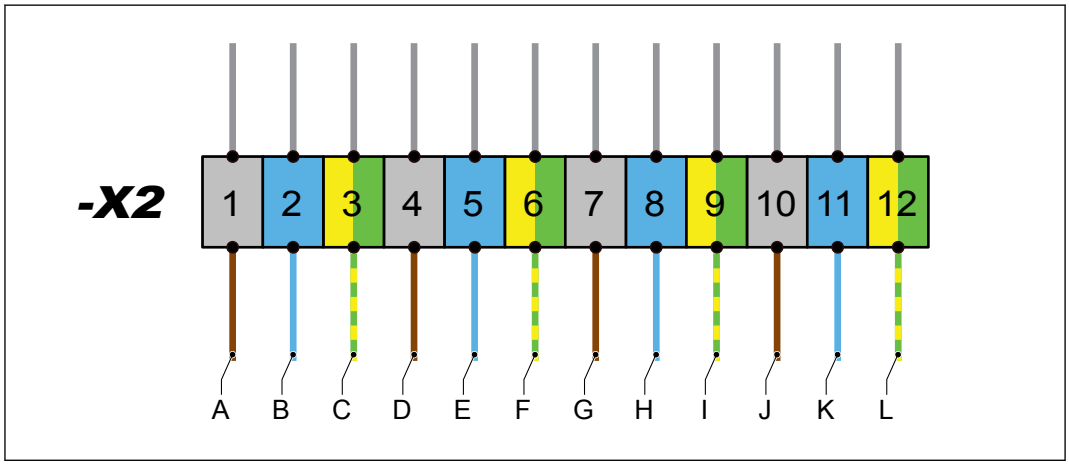
Preliminary requirements

	• Torque screwdriver, cross • Wire cutter • Wire stripper pliers • Crimp pliers		• 
	• 1 phase 120 V AC auxiliary power cable. Refer to section 12.13.4. • Ferrules		

Note:

- The illustration shows the terminal block X2 on the power cabinet and the connections treated in this section.
- For the specific connections, refer to the installation brief, the installation drawing and the installation manuals of the devices installed in the system you ordered.
- For information about the part numbers of the terminals, refer to section 12.18.

Procedure



1. Prepare the wires that are mentioned below. Refer to section 6.3.16.
2. Loosen the screws of the terminal block X2.

3. Connect the below listed wires from the outlets. Use the illustration above as a reference:

Outlet	Wire	Connect to terminal
1	(A) L1 wire	X2-1
	(B) neutral wire	X2-2
	(C) PE wire	X2-3
2	(D) L2 wire	X2-4
	(E) neutral wire	X2-5
	(F) PE wire	X2-6
3	(G) L3 wire	X3-7
	(H) neutral wire	X3-8
	(I) PE wire	X3-9
4	(J) L4 wire	X3-10
	(K) neutral wire	X3-11
	(L) PE wire	X3-12

4. Tighten the screws to the correct torque. For the specification, refer to section 12.4.

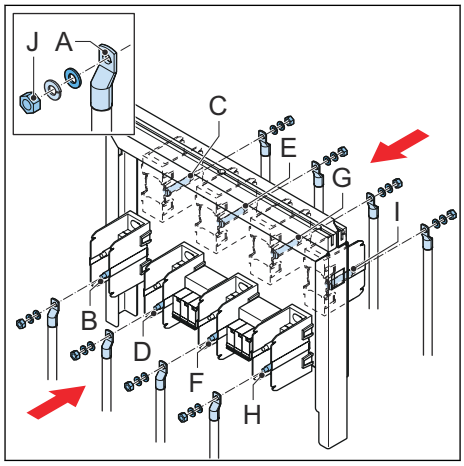
6.3.6 Connect the DC power cables

Preliminary requirements

	• Torque wrench • Wire cutter • Wire stripper pliers		• 
	• DC power cables (for each outlet: one positive, one negative). Refer to section 12.13.5. • Cable lugs 3/8”		

Note: For the specific connections, refer to the installation brief, the installation drawing and the installation manuals of the devices installed in the system you ordered.

Procedure



1. Cut the DC power cables to make sure that the length is sufficient for connection at the DC busbars.
2. Strip the insulation from the end of the cables. Make sure that the strip length agrees with the cable lugs (A).
3. Attach the cable lugs to the end of the wires.
4. Connect these wires on the DC busbar connectors:
   - Outlet 1 DC+ wire, marked red, to the connector X522 (B)
   - Outlet 1 DC- wire to the connector X526 (C)
   - Outlet 2 DC+ wire, marked red, to the connector X523 (D)
   - Outlet 2 DC- wire to the connector X527 (E)
   - Outlet 3 DC+ wire, marked red, to the connector X524 (F)
   - Outlet 3 DC- wire to the connector X528 (G)
   - Outlet 4 DC+ wire, marked red, to the connector X525 (D)
   - Outlet 4 DC- wire to the connector X529 (E)
5. Install the nuts and washers (J) on the connectors.
6. Tighten the nuts to the correct torque. For the specification, refer to section 12.4.

6.3.7 Connect the DC auxiliary power cables (24 V) to the power cabinet

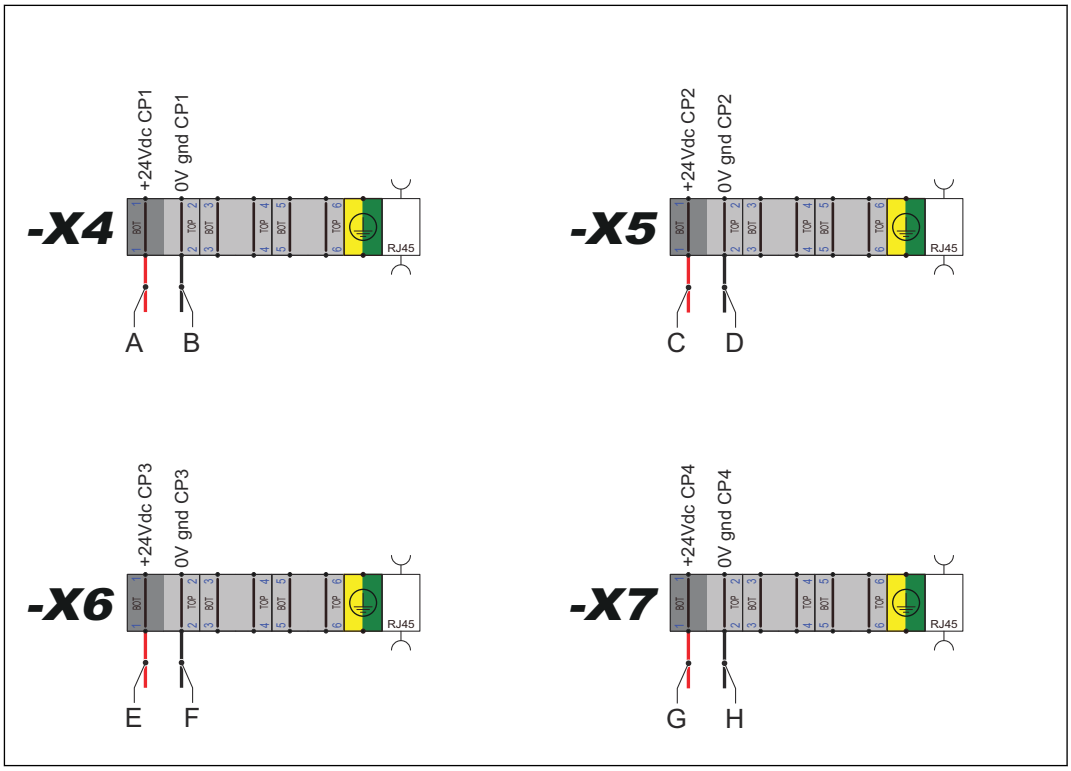
Preliminary requirements

	• 24 V DC auxiliary power cables. Refer to section 12.13.6.		• 

Note:

- The illustration shows the terminal blocks X4, X5, X6 and X7 on the power cabinet and the connections treated in this section.
- For the specific connections, refer to the installation brief, the installation drawing and the installation manuals of the devices installed in the system you ordered.
- For information about the part numbers of the terminals, refer to section 12.18.

Procedure



1. Prepare ferrules for the wires that are mentioned below. Refer to section 6.3.16.
2. Connect the below listed wires from the outlets. Use the illustration above as a reference:

Outlet	Wire	Connect to terminal	Terminal name
1	(A) 24V DC	X4-1	+24Vdc CP1
	(B) 0V DC	X4-2	0Vdc gnd CP1
2	(C) 24V DC	X5-1	+24Vdc CP2
	(D) 0V DC	X5-2	0Vdc gnd CP2
3	(E) 24V DC	X6-1	+24Vdc CP3
	(F)0V DC	X6-2	0Vdc gnd CP3
4	(G) 24V DC	X7-1	+24Vdc CP4
	(H)0V DC	X7-2	0Vdc gnd CP4

6.3.8 Connect the interlock and DC guard cables to the power cabinet

Preliminary requirements

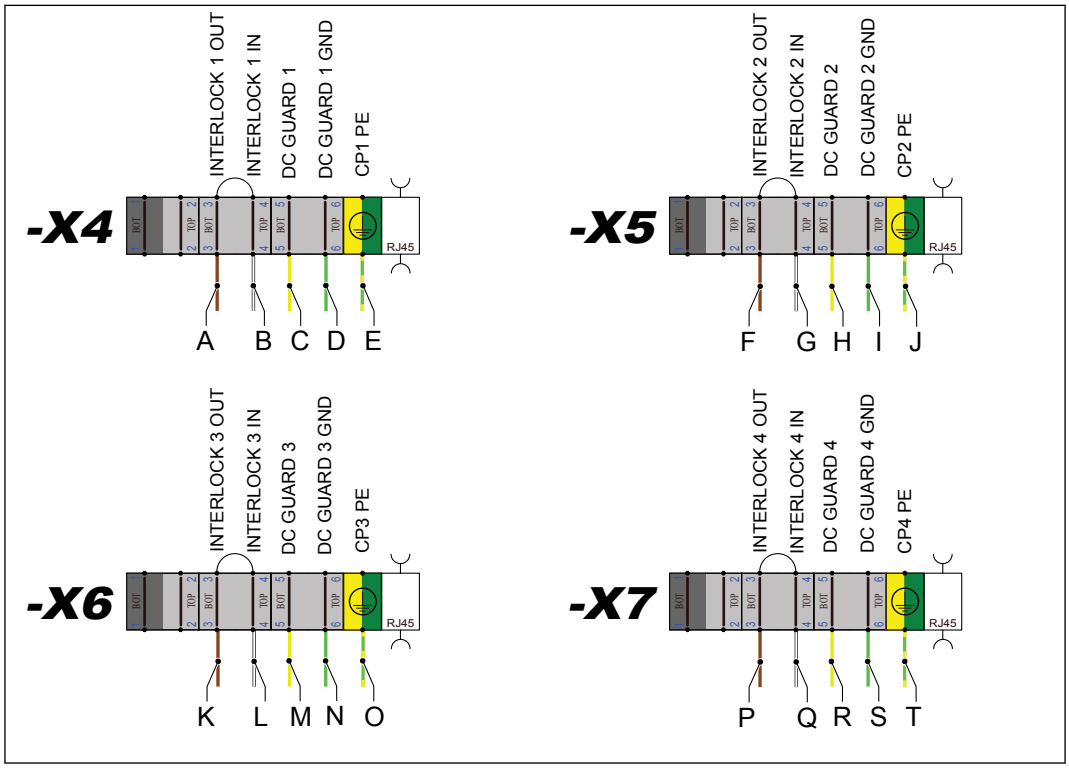
	• Interlock and DC guard cables. Refer to section 12.13.9.		• 

Note:

- The illustration shows the terminal blocks X4, X5, X6 and X7 on the power cabinet and the connections that are in this section.
- For the specific connections, refer to the installation brief, the installation drawing, and the installation manuals of the devices installed in the system you ordered.
- For information about the part numbers of the terminals, refer to section 12.18.

Caution: Always remove the jumper when the outlet is connected.

Procedure



1. Prepare ferrules for the wires that are mentioned below. Refer to section 6.3.16.
2. Connect the below listed wires from the outlets. Use the illustration above as a reference:

Outlet	Wire	Connect to terminal	Terminal name
1	(A) Interlock OUT	X4-3	INTERLOCK 1 OUT
	(B) Interlock IN	X4-4	INTERLOCK 1 IN
	(C) DC guard signal	X4-5	DC GUARD 1
	(D) DC guard GND	X4-6	DC GUARD 1 GND
	(E) Ground wire or shield mesh	X4 earthing terminal	CP1 PE
2	(F) Interlock OUT	X5-3	INTERLOCK 2 OUT
	(G) Interlock IN	X5-4	INTERLOCK 2 IN
	(H) DC guard signal	X5-5	DC GUARD 2
	(I) DC guard GND	X5-6	DC GUARD 2 GND
	(J) Ground wire or shield mesh	X5 earthing terminal	CP2 PE
3	(K) Interlock OUT	X6-3	INTERLOCK 3 OUT
	(L) Interlock IN	X6-4	INTERLOCK 3 IN
	(M) DC guard signal	X6-5	DC GUARD 3
	(N) DC guard GND	X6-6	DC GUARD3 GND
	(O) Ground wire or shield mesh	X6 earthing terminal	CP3 PE
4	(P) Interlock OUT	X7-3	INTERLOCK 4 OUT
	(Q) Interlock IN	X7-4	INTERLOCK 4 IN

Outlet	Wire	Connect to terminal	Terminal name
	(R) DC guard signal	X7-5	DC GUARD 4
	(S) DC guard GND	X7-6	DC GUARD 4 GND
	(T) Ground wire or shield mesh	X7 earthing terminal	CP3 PE

6.3.9 Connect the Ethernet output cables to the power cabinet

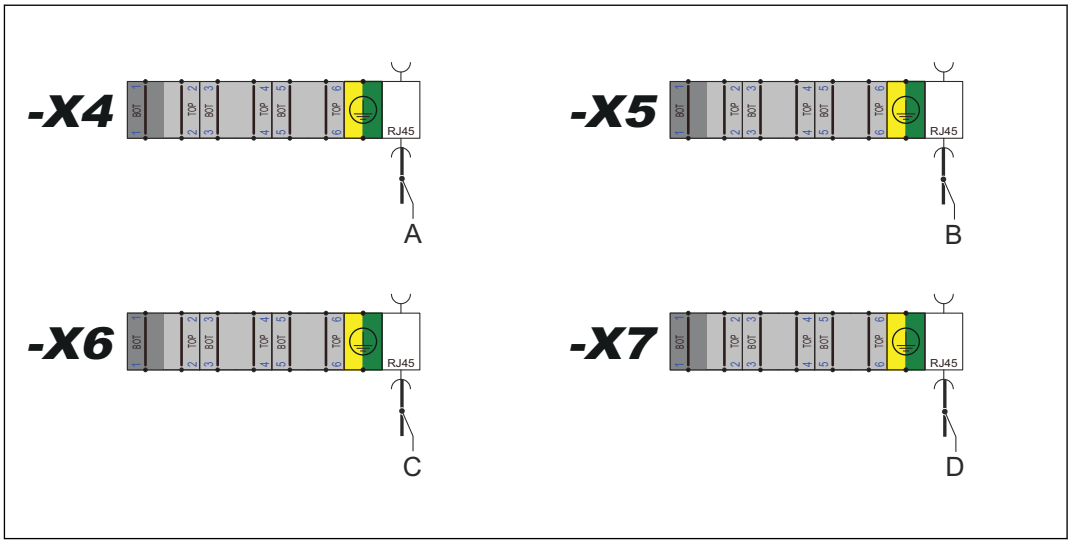
Preliminary requirements

	• Ethernet cables. Refer to section 12.13.10.		• 

Note:

- The maximum length of the ethernet cable is 100 meters.
- The illustration shows the terminal blocks X4, X5, X6 and X7 on the power cabinet and the connections that are in this section.
- For the specific connections, refer to the installation brief, the installation drawing and the installation manuals of the devices installed in the system you ordered.
- For information about the part numbers of the terminals, refer to section 12.18.

Procedure



1. Connect the below listed wires from the outlets. Use the illustration above as a reference:

Outlet	Wire	Connect to terminal
1	(A) Ethernet output	X4-X84
2	(B) Ethernet output	X5-X85
3	(C) Ethernet output	X6-X86
4	(D) Ethernet output	X7-X87

6.3.10 Connect the optical fiber cables (Ethernet to fiber)

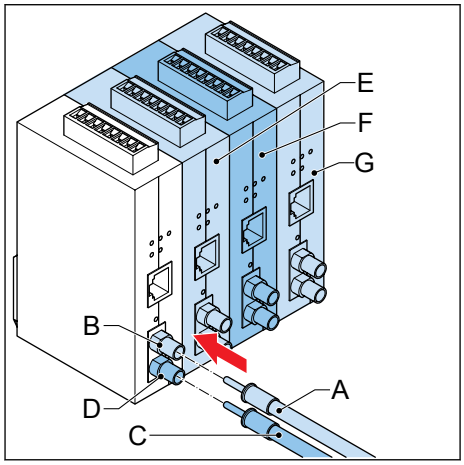
Preliminary requirements

	• Optical fiber cable. Refer to section 12.13.11.		•

- The maximum length of the optical fiber cable is 150 meters.
- For the wiring diagram, refer to section 12.12.
- For the specific connections, refer to the installation brief, the installation drawing and the installation manuals of the devices installed in the system you ordered.

Procedure

1. Guide the cables to the terminals.
2. Connect these optical fiber cables for outlet 1:
   - Output cable (A) to the output terminal D6 (B)
   - Input cable (C) to the input terminal D6 (D)
3. Repeat step 2 for the other outlets to these terminals:
   - For outlet 2: connect the cables to D7 (E)
   - For outlet 3: connect the cables to D8 (F)
   - For outlet 4: connect the cables to D9 (G)



6.3.11 Connect the optical fiber cables (CAN to fiber)

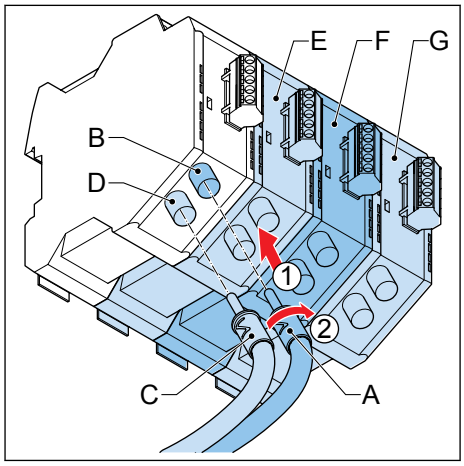
Preliminary requirements

	• Optical fiber cables. Refer to section 12.13.11.		•

- The maximum length of the optical fiber cable is 150 meters.
- For the wiring diagram, refer to section 12.12.
- For the specific connections, refer to the installation brief, the installation drawing and the installation manuals of the devices installed in the system you ordered.

Procedure

1. Guide the cables to the terminals.
2. Connect these optical fiber cables for the outlet 1:
   - Output cable (A) to the output terminal D1-TD (B)
   - Input cable (C) to the input terminal D1-RD (D)
3. Repeat step 2 for the other outlets to these terminals:
   - For outlet 2: connect the cables to D2 (E)
   - For outlet 3: connect the cables to D3 (F)
   - For outlet 4: connect the cables to D4 (G)



6.3.12 Installation procedure for the the long distance kit (optional)

Preliminary requirements

	• 

Procedure

1. Open the DC door. Refer to section 10.7.
2. Connect the optical fiber cable that replaces the ethernet cable of the outlet. Refer to section 6.3.10.
3. Disconnect the ethernet cable from the ethernet-to-fiber converter. Refer to section 6.3.13.
4. Connect the ethernet cable to the connector. Refer to section 6.3.14.
5. Repeat steps 2 thru 4 for each long distance kit that is installed.
6. Close the DC door. Refer to section 10.8.

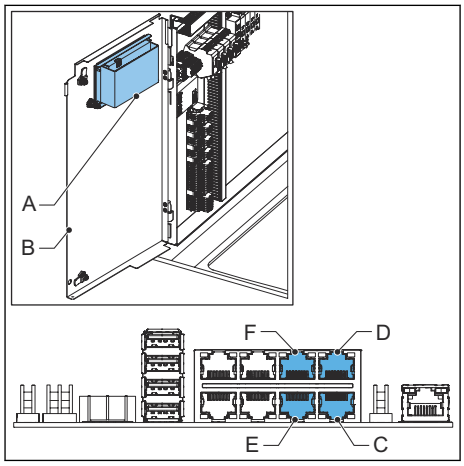
6.3.13 Disconnect the ethernet cable from the converter

Preliminary requirements

	•  • Only do this procedure if another procedure refers to it.

Procedure

1. Remove the cable from the socket of the board (A) that is attached to the DC door (B). Look at the table that follows, to see which socket belongs to which outlet.



Outlet number of the power cabinet	Socket
Outlet 1	C (CB 4B)
Outlet 2	D (CB 4A)
Outlet 3	E (CB 3B)
Outlet 4	F (CB 3A)

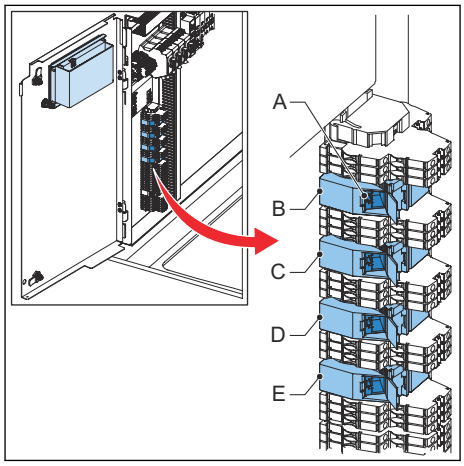
6.3.14 Connect the ethernet cable to the connector

Preliminary requirements

- 
- Only do this procedure if another procedure refers to it.

Procedure

1. Put the cable in the socket (A) of the connector (B, C, D or E). Look at the table that follows, to see which connector belongs to which outlet.



Outlet number of the power cabinet	Connector
Outlet 1	B (-X84 (-X4:8))
Outlet 2	C (-X85 (-X5:8))
Outlet 3	D (-X86 (-X6:8))
Outlet 4	E (-X87 (-X7:8))

6.3.15 Connect the EMO cable to the power cabinet (optional)

Preliminary requirements

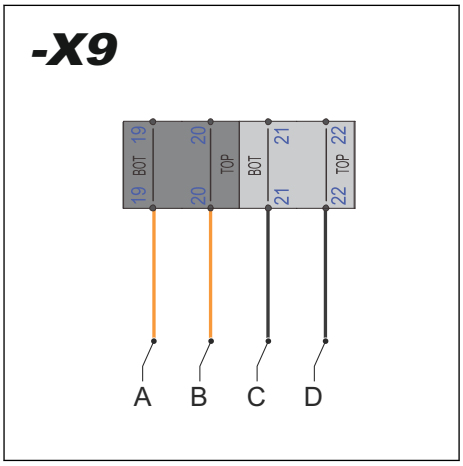
	• EMO cable.		• 

Note:

- The illustration shows the terminal block X9 on the power cabinet and the connections treated in this section.
- Typically, an EMO has two internal switches that are connected to four terminals on the connection block.

Procedure

1. Prepare ferrules for the wires that are mentioned below. Refer to section 6.3.16.
2. Remove the jumpers from the X9 terminals.
3. Connect the below listed wires from the charge post. Use the illustration as a reference:



Wire from charge post	Connect to terminal
(A) EMO1	X9-19
(B) EMO2	X9-20
(C) EMO1 GND	X9-21
(D) EMO2 GND	X9-22

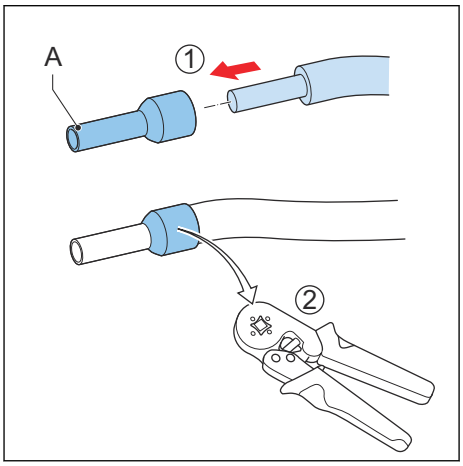
6.3.16 Install a ferrule on a wire

Preliminary requirements

	• Wire cutter • Wire stripper pliers • Crimp plier		• 
	• Ferrule		

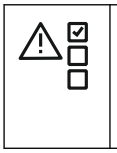
Procedure

1. Make sure that the diameter of the ferrule is correct. The ferrule must be compatible with the wire. Obey the technical specifications set by the manufacturer. Refer to section 12.13.
2. Strip the insulation from the wire. The stripped length must be the same as the length of the cavity of the ferrule. For the specifications, refer to section 12.13.
3. Put the ferrule in the crimp plier.
4. Insert the wire into the cavity of the ferrule.
5. Install the ferrule on the wire. Use the crimp plier.



6.3.17 Connect a wire that has a ferrule

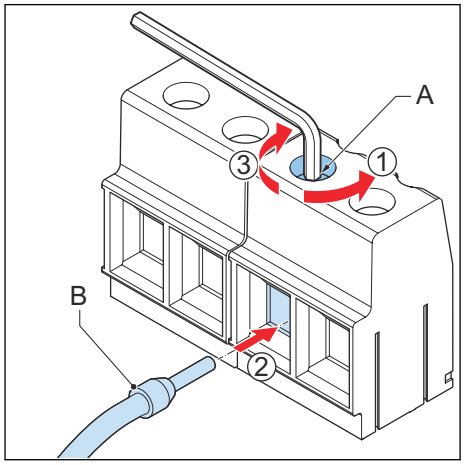
Preliminary requirements



- 

Procedure

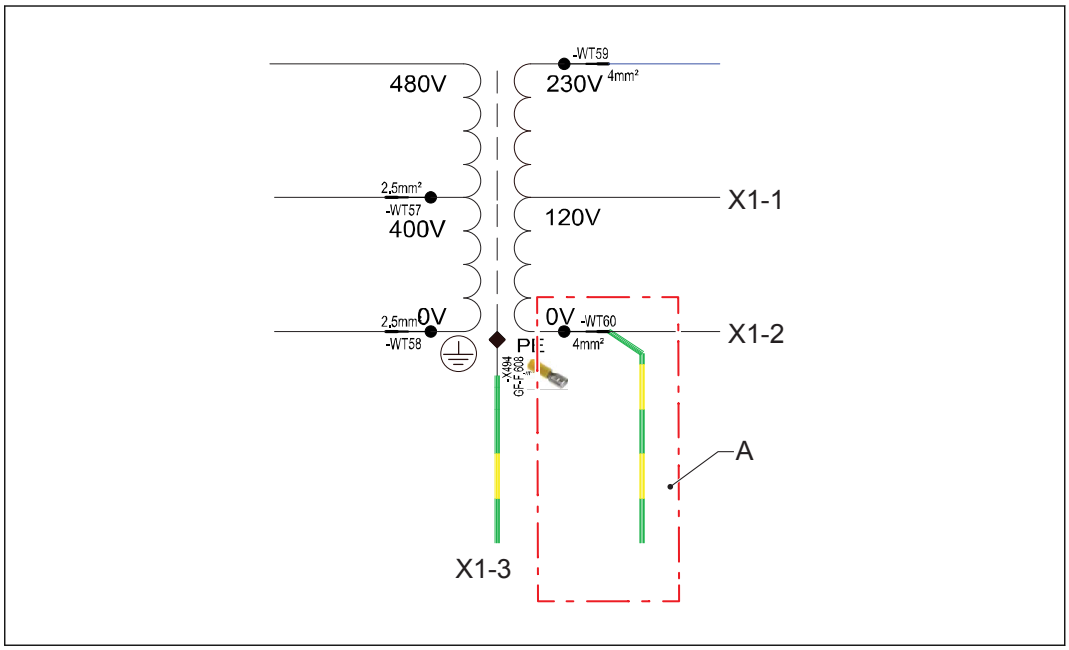
1. Loosen the screw of the connection on the terminal.
2. Install the ferrule in the connection of the terminal.
3. Tighten the screw to the correct torque. For the specifications, refer to section 12.4.
4. Make sure that unused wires are protected and cannot touch metal parts.



6.4 Precommissioning mode

6.4.1 General information

You can only start the commissioning of the power cabinet when there is a 3 phase 480 V AC power supply from the AC power grid. If there is no 3 phase 480 V AC power supply from the AC power grid, you can set the power cabinet in precommissioning mode to prevent condensation.
The precommissioning mode only works correctly when the Neutral wire after the transformer is not earthed. If the Neutral wire is earthed, then contact the manufacturer. Refer to section 1.11.



A PE-neutral wire

6.4.2 Precommissioning mode - general procedure

Preliminary requirements

	• The power cabinet is mechanically installed. Refer to section 6.2.1. • The power cabinet is electrically installed. Refer to section 6.3.1. • A separate single phase 120 V AC cable from the AC power grid is available in the power cabinet. • There is no 3 phase 480 V AC power supply from the AC power grid.		• 

Note: If the single phase 120 V AC cable from the AC grid is not installed, contact the manufacturer. Refer to section 1.11.

Procedure

1. Do an inspection of the PE connection. Refer to section 6.4.3.
2. Connect the 120 V AC cable for the precommissioning mode. Refer to section 6.4.4.
3. Do a check on the condition or the position of the electrical parts. Refer to section 6.4.5.
4. Set the precommissioning switch. Refer to section 6.4.6.

6.4.3 Do an inspection of the PE connection

Preliminary requirements

	• Only do this procedure when a different procedure refers to this procedure.		• 

Procedure

1. Use a multimeter to make sure that the terminals X1-1 and X1-2 are not earthed.
2. If the terminals are earthed, then contact the manufacturer. Refer to 1.11.

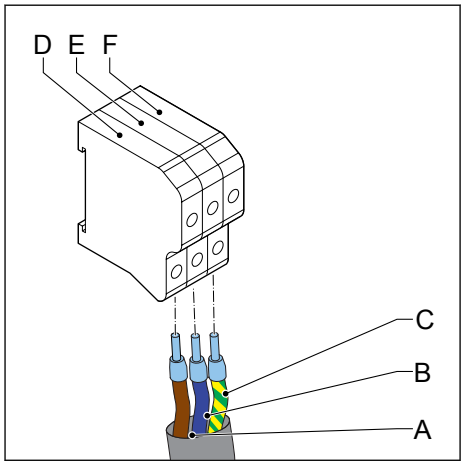
6.4.4 Connect the 120 V cable for the precommissioning mode

Preliminary requirements

	• Only do this procedure when a different procedure refers to this procedure.		• AC single-phase cable. Refer to section 12.13.4 • Ferrules
	• Torque screwdriver, cross • Wire cutter • Wire stripper pliers • Crimp pliers		• 

Procedure

1. Install the ferrules on the wires. Refer to section 6.3.16.
2. Loosen the screws of the terminal block X-1.
3. Connect the wires to the terminals.



Wire	Connect to terminal
L1 wire (A)	X1-1 (D)
Neutral wire (B)	X1-2 (E)
PE wire (C)	X1-3 (F)

4. Tighten the screws to the correct torque. Refer to section 12.4.

6.4.5 Do a check on the electrical parts

Preliminary requirements

	• Only do this procedure when another procedure refers to it.		• 

Procedure

1. Make sure that these parts on the AC plate are in the correct condition or position. For the location of the electrical parts, refer to section 3.3.4.

Part	Condition / Position
Fuse F10	it conducts power
Fuse F21	it conducts power
Fuse F22	it conducts power
Circuit breaker Q2	Off

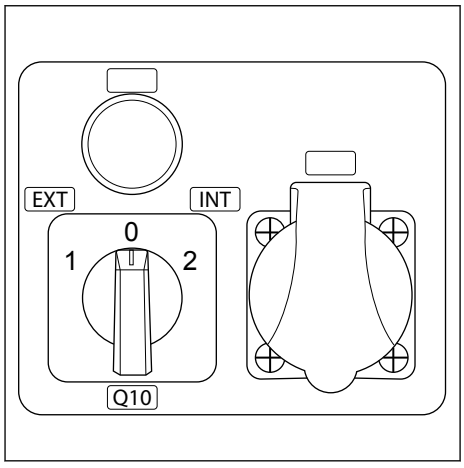
6.4.6 Set the precommissioning switch

Preliminary requirements

	• Only do this procedure when another procedure refers to it.		• 

Procedure

1. Make sure that these fuses are serviceable:
   - F10
   - F21
   - F22
2. Set these circuit breakers to OFF:
   - Q1
   - Q2
3. Set the precommissioning switch Q10 to the position 0. For the location of Q10, refer to 3.3.3.
4. Energize the 120 V AC connection for the precommissioning mode.
5. Measure the voltage before the breaker Q2. It must be 120 V AC.
6. Set the breaker Q2 to ON.
7. Set the precommissioning switch Q10 to the postion 1 (EXT).



7 Commissioning

7.1 Precommissioning mode

7.1.1 Do a check on the status of the precommisioning mode

Before the cabinet is prepared for commissioning, the cabinet must be out of the precommissioning mode.
Do this check to know what the status is of the precommissioning mode:

1. Look if the the precommissioning switch Q10 is set to 1 (EXT).
2. Look if the 120 V AC cable is connected to terminal block X-1.
3. Do an inspection of the PE connection. Refer to section 6.4.3.

If all these conditions are true, then the cabinet is in precommissioning mode. Take the cabinet out of precommissioning mode. Refer to section 7.1.2.
If one or more of these conditions are false, then the cabinet is out of the precommissioning mode. Prepare the cabinet for commissioning. Refer to section 7.2.

7.1.2 General procedure

Preliminary requirements

	• The cabinet is in the precommissioning mode. Refer to section 7.1.1.

Procedure

1. Set the precommissioning switch. Refer to section 7.1.3.
2. Remove the 120 V AC cable. Refer to section 7.1.4.

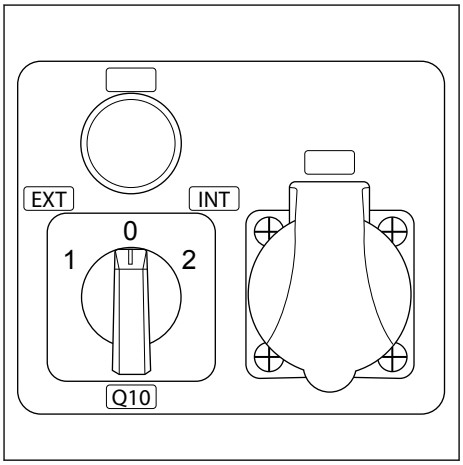
7.1.3 Set the precommissioning switch

Preliminary requirements

	• Only do this procedure when another procedure refers to it.

Procedure

1. Set the precommissioning switch Q10 to the postion 0.
2. Set the breaker Q2 to OFF.
3. De-energize the external 120 V AC power supply.
4. Measure the voltage before the breaker Q2. It must be 0 V AC.



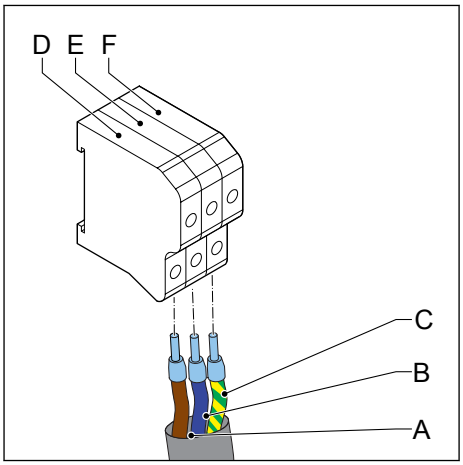
7.1.4 Remove the 120 V cable for the precommissioning mode

Preliminary requirements

	• Only do this procedure when a different procedure refers to this procedure.		• 
	• Torque screwdriver, cross		

Procedure

1. Loosen the screws of the terminals (D, E, F) of terminal block X-1.
2. Disconnect the wires (A, B, C) from the terminals.
3. Tighten the screws.
4. Disconnect the 120 V AC cable from the external power supply.
5. Fully remove the cable from the electrical system.



7.2 Prepare for commissioning

Preliminary requirements

	•  Qualified installation engineer

Danger:

Hazardous voltage

- Do not commission the EVSE. Only a service engineer of the manufacturer is qualified to commission the EVSE.

Procedure

1. Tell the owner that the EVSE is ready for commissioning.
2. Make sure that the site complies with these requirements:
   - The EVSE is installed.
   - AC input power is available from the grid provider.
   - You are present during the commissioning, for assistance and to energize the power to the EVSE on the power distribution board.
   - Internet access is available, through 2G/3G/4G or through a wired Ethernet connection.
   - An EV must be available with a compatible connection. If the EVSE has more than one connection type, an EV of each type must be available.
   - The site operator or owner is available to receive instructions from the service engineer of the manufacturer.
3. Make sure that this data is available:
   - Contact data of the contact person on site
   - Address of the EVSE
   - Site name
   - Exact location of the EVSE: longitude and latitude. If there are more EVSEs on one location, make sure that the coordinates are slightly different (at least 0.0001 degree) so that the EVSEs are not at the same location on the map.
   - Specification of the external fuse at the power distribution board
   - Date that the installation is done
   - Special remarks, for example to decline the authorization for the service engineer of the manufacturer to take photos

8 Operation

8.1 Prepare before use

1. Appoint a site operator and a qualified installation engineer, if these are other persons than you.
2. Make sure that the EVSE is installed according to the instructions in this manual.
3. Make an emergency plan that instructs people what to do in case of an emergency.
4. Make sure that the manufacturer commissions the EVSE. Contact the manufacturer when the EVSE is ready for commissioning. Refer to section 1.11.

Danger: Make sure that you have approval of the manufacturer to use the EVSE after commissioning. After approval, do not move or modify the EVSE.

5. Make sure that the space around the EVSE stays clear. Think of snow, mulch, branches or other objects. Refer to the space requirements in section 12.9.
6. Make sure that regular maintenance is done on the EVSE. Refer to section 9.1.

8.2 Emergency stop

A standard power cabinet does not have an emergency stop button. An emergency stop button can be installed near the power cabinet or in one or more outlets that are connected to the power cabinet. Refer to section 3.6.1.

1. If there is an emergency, push the emergency stop button.
   - The EVSE stops all charge sessions.
   - The LED indicators of all the beacons are red.
2. Do not start the EVSE until the situation is safe.

Note: Do not use the emergency stop procedure to stop the charge session, unless there is an emergency.

8.3 Reset the EVSE after an emergency stop

1. Make sure that the situation is safe again.
2. Turn the knob to release the emergency stop button.
   - The EVSE starts.
   - The LED indicator of the beacons become green.
   - The EVSE resumes the normal operation.

8.4 Charge session

8.4.1 Charge an EV

1. Park the EV at the charging location.
2. Start the charge session. Refer to section 8.4.2.
3. Stop the charge session. Refer to section 8.4.3.

8.4.2 Start a charge session

1. Follow the EV's instructions to start the charge session.
2. The EVSE shows the progress on the beacon for each outlet. Refer to section 3.4.1.
3. If the charge session does not start, contact ABB E-mobility Inc..

8.4.3 Stop a charge session

Do this procedure to stop a charge session at any time.

1. Follow the instructions of the charging interface or follow the instructions of the EV.

Note: The charge session stops automatically when the battery is full.

2. The EVSE shows the current status of a charging session on the beacon lights for each outlet.

9 Maintenance and cleaning

9.1 Maintenance schedule

Task	Frequency	Procedure
Do a check for damage on the EVSE.	1 week	Refer to section 9.2.
Clean the power cabinet.	3 months	Refer to section 9.3.
Make sure that the manufacturer does maintenance on the EVSE.	1 year or after replacement of a part	Ask the manufacturer to schedule the maintenance service. Refer to section 1.11.

9.2 Do a check on the cabinet

1. Do a check for damage on these parts:

Part	Damage
Beacon	Cracks
Coating of the EVSE	Cracks or ruptures

2. If you see damage, contact the manufacturer. Refer to section 1.11.

9.3 Clean the EVSE

Preliminary requirements

- Cleaning agent. Refer to section 12.6.
- Non-abrasive tool. Refer to section 12.6.

Danger:

Hazardous voltage

- Do not apply high-pressure water jets. Water can leak into the EVSE.

Note: When the EVSE is put in a corrosion sensitive environment, superficial rust is possible on welding points. This rust is only visual. There is no risk for the integrity of the EVSE. The procedure below removes the rust.

Procedure

1. Rinse with low-pressure tap water to remove rough dirt.
2. Apply a a solution of cleaning agent to the surface and let it soak.
3. Manually remove dirt. Use the non-abrasive tool.

Caution: Do not use abrasive tools.

4. Rinse with low-pressure tap water.
5. If necessary, apply wax on the front for extra protection and gloss.
6. If there was rust and you want it not to appear again, apply a rust-preventive primer. Ask the manufacturer for specifications and instructions.

10 Access to parts

10.1 Open the door of the power cabinet

Preliminary requirements

	• Door key of the power cabinet

Danger:

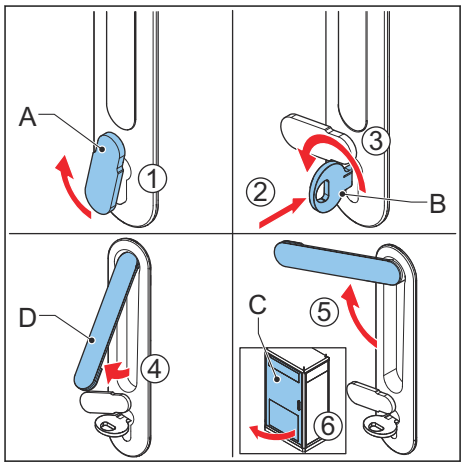
Hazardous voltage

- Make sure that only qualified personnel has access to the door key.

Note: There is one unique door key for each power cabinet.

Procedure

1. Turn the cover plate (A).
2. Insert the door key (B).
3. Turn the door key counterclockwise to unlock the door (C).
4. Pull the handle (D).
5. Turn the handle clockwise.
6. Open the door.



10.2 Close the door of the power cabinet

Preliminary requirements

	• Door key to the power cabinet.

Danger:

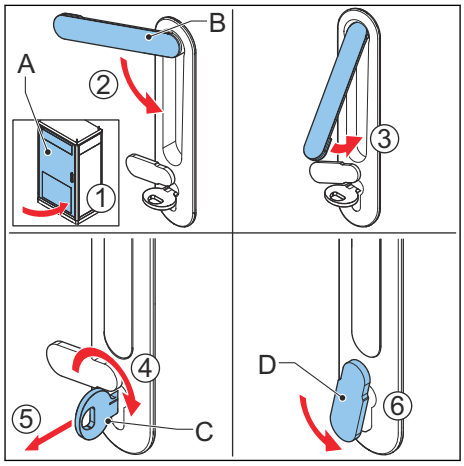
Hazardous voltage

- Make sure that only qualified personnel has access to the door key.

Note: There is one unique door key for each cabinet.

Procedure

1. Close the door (A).
2. Turn the handle (B) counterclockwise.
3. Push the handle.
4. Turn the door key (C) clockwise to lock the door.
5. Remove the door key (C).
6. Turn the cover plate (D) to cover the keyhole.



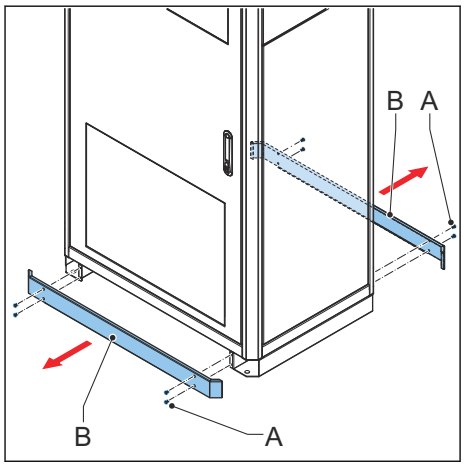
10.3 Remove the plinth covers of the power cabinet

Preliminary requirements

	• Set of open spanners

Procedure

1. Remove these parts:
   - Fasteners (A)
   - Plinth covers (B)



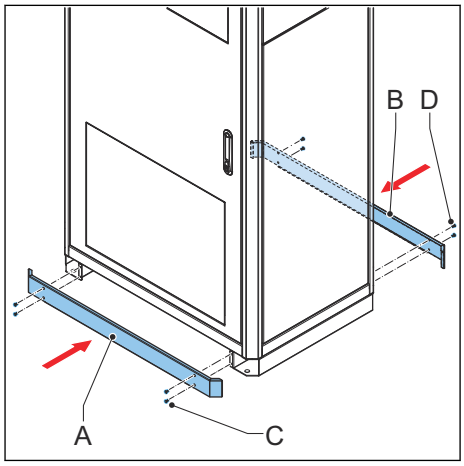
10.4 Install the covers

Preliminary requirements

	• Set of open spanners		• Four nuts with washers M6 (C), four bolts M5 (D)

Procedure

1. Install the front border cover (A):
   a. Align the cover bolts with the holes in the bottom part of the cabinet.
   b. Install the nuts and wahers (C).
   c. Tighten the nuts.
2. Install the rear cover (B):
   a. Install the cover.
   b. Install the bolts (D).
   c. Tighten the bolts.



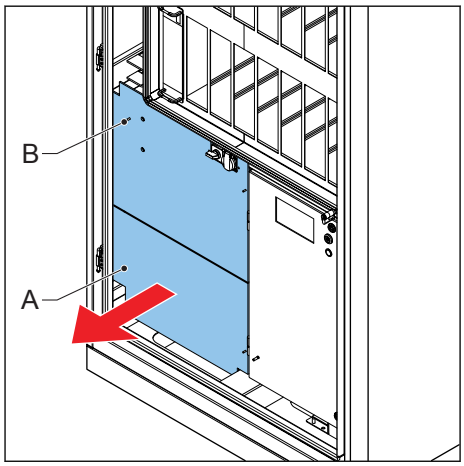
10.5 Remove the AC cover

Preliminary requirements

	• The main switch is set to OFF.		• Screwdriver

Procedure

1. Loosen the fasteners and remove the lower lexan cover (A).
2. Loosen the fasteners and remove the upper lexan cover (B).



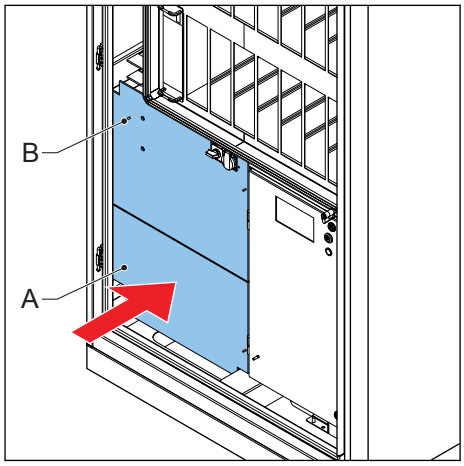
10.6 Install the AC cover

Preliminary requirements

	• The main switch is set to OFF.		• Screwdriver

Procedure

1. Install the lower lexan cover (A) and tighten the fasteners.
2. Install the upper lexan cover (B) and tighten the fasteners.



10.7 Open the DC door

Preliminary requirements

	• Door key of the DC door

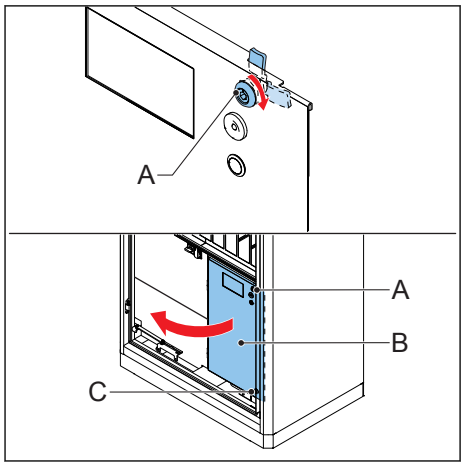
Danger:

Hazardous voltage

- Make sure that only qualified personnel has access to the door key.

Procedure

1. Insert the door key in the lock (A).
2. Turn the door key counterclockwise to unlock the door (B).
3. Do step 1 and 2 again for the second lock (C).
4. Open the door.



10.8 Close the DC door

Preliminary requirements

	• Door key of the DC door

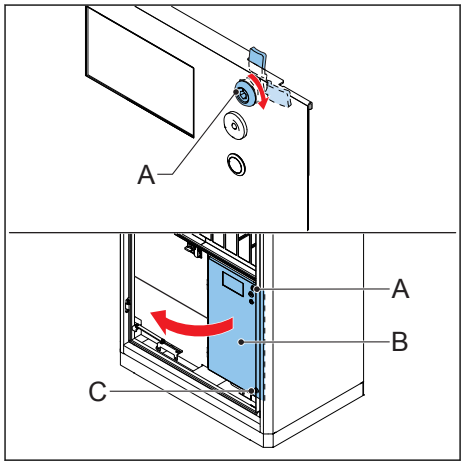
Danger:

Hazardous voltage

- Make sure that only qualified personnel has access to the door key.

Procedure

1. Close the door.
2. Insert the door key in the lock (A).
3. Turn the door key counterclockwise to lock the door (B).
4. Do step 2 and 3 again for the second lock (C).



11 Troubleshooting

11.1 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 the manufacturer or the local service unit. Refer to section 1.11.

12 Technical data

12.1 Types of EVSE

12.1.1 EVSE type

The EVSE type is a code. The code is explained below.

Description	Value	Meaning of the value
Type	HVC	Heavy Vehicle Charger
Power rating	200	200 kW
	300	300 kW
	360	360 kW
Number of oultets	2	2 outlets
	4	4 outlets
Model	S / [no letter]	Static
	D	Dynamic
Certification	CE	CE compliant
	UL	UL compliant

Example

HVC360-4D UL:

- Type = HVC
- Power rating = 360 kW
- Number of outlets = 4
- Model = Dynamic
- Certification = UL

Note: The equipment is prepared with a switch matrix for dynamic charging. It can be upgraded with a software update when this feature becomes available.

12.1.2 HVC variants

AGC code	Short description	Description
ABB6AGC115579	360-4D UL	HVC UL 360-4 M-PD-0
ABB6AGC116210	360-2D UL	HVC UL 360-2 M-PD-0
ABB6AGC116209	360-4S UL	HVC UL 360-4 M-P-0
ABB6AGC116217	360-2S UL	HVC UL 360-2 M-P-0
ABB6AGC116222	300-4D UL	HVC UL 300-4 M-PD-0
ABB6AGC116219	300-2D UL	HVC UL 300-2 M-PD-0
ABB6AGC116221	300-4S UL	HVC UL 300-4 M-P-0
ABB6AGC116220	300-2S UL	HVC UL 300-2 M-P-0
ABB6AGC116226	200-4D UL	HVC UL 200-4 M-PD-0

AGC code	Short description	Description
ABB6AGC116223	200-2D UL	HVC UL 200-2 M-PD-0
ABB6AGC116225	200-4S UL	HVC UL 200-4 M-P-0
ABB6AGC116224	200-2S UL	HVC UL 200-2 M-P-0

12.2 Parts included in the delivery

Part	Specification
Power cabinet	Refer to the type plate. Refer to section 3.1.
Key to the power cabinet door	Unique for each power cabinet
Key to the DC door	Unique for the DC door

Note: It is possible that more parts need to be included in the delivery. Refer to the order.

12.3 Required parts for installation

Part	Specification
Fasteners and washers, to connect the charge post to the foundation	M12, class A2, length 70 mm (2.75 in)
Fasteners and washers, to connect the power cabinet to the foundation	M16, class A2, length 70 mm (2.75 in)
Fasteners and washers, for the earthing connections	M10, class A2, length 70 mm (2.75 in)

Table 2: Cable lugs

Location	Wire	Size	Maximum width		Maximum length	
			[mm]	[in]	[mm]	[in]
Power cabinet	PE	M12	35	1.4	70	2.7
		M10	25	70	50	70
		M6	12	0.5	40	1.6
	AC input power	M12	39	1.5	70	2.7
	DC power	M12	39	1.5	70	2.7

12.4 Torque specifications

Parameter	Specification	
	[Nm]	[ft-lbs]
Nuts on PE busbar	30	22
Nuts on the AC power busbars	30	22
Screws in the terminal blocks (X1, X2, X3, X5, X6, X7, X8)	1,3	0.9
Nuts on the DC power busbars	30	22
M5 fasteners (if not specified otherwise)	3,5	2.6
M6 fasteners (if not specified otherwise)	9	6.6
M8 fasteners (if not specified otherwise)	20	15
M10 fasteners (if not specified otherwise)	40	29
M12 fasteners (if not specified otherwise)	70	51
M16 fasteners (if not specified otherwise)	180	132
M16 cable glands	2	1.4
M20 cable glands	4,5	3.3
M25 cable glands	5	3.6
M32 cable glands	6	4.4
M40 cable glands	10	7.3

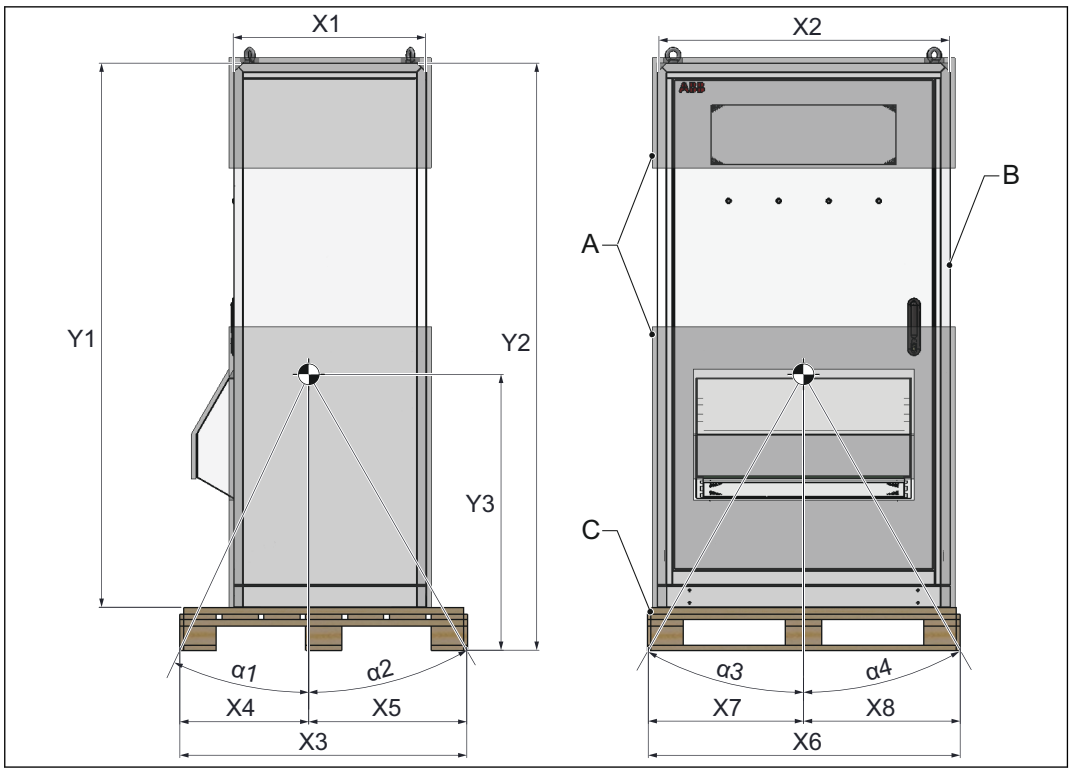
12.5 General specifications

Parameter	Specification
Compliance and safety	UL 2202:2009 R2.18
	CSA STD C22.2 No 107.1-16
	FCC Part 15 Class A
IP rating	IP54
IK rating according to IEC 62262: enclosure	IK10
Short circuit current rating	65 kA
Electro Magnetic Compatibility (EMC) rating	FCC Directive Immunity: Class A Emissions: Class A

12.6 Cleaning specifications

Parameter	Specification
Cleaning agent	pH value between 6 and 8
Non-abrasive tool	Non-woven nylon hand pad

12.7 Dimensions and mass



A Packaging
B Power cabinet
C Pallet

Parameter	Specification	
	[kg]	[lb]
Mass	< 1000	< 2200

Parameter	Specification	
	[mm]	[in]
X1	770	30
X2	1170	46
X3	1150	45.3
X4	517	20.4
X5	633	25
X6	1250	49.2
X7	622	24.5
X8	628	24.7
Y1	2180	85.8
Y2	2352	92.6
Y3	1105	43.5

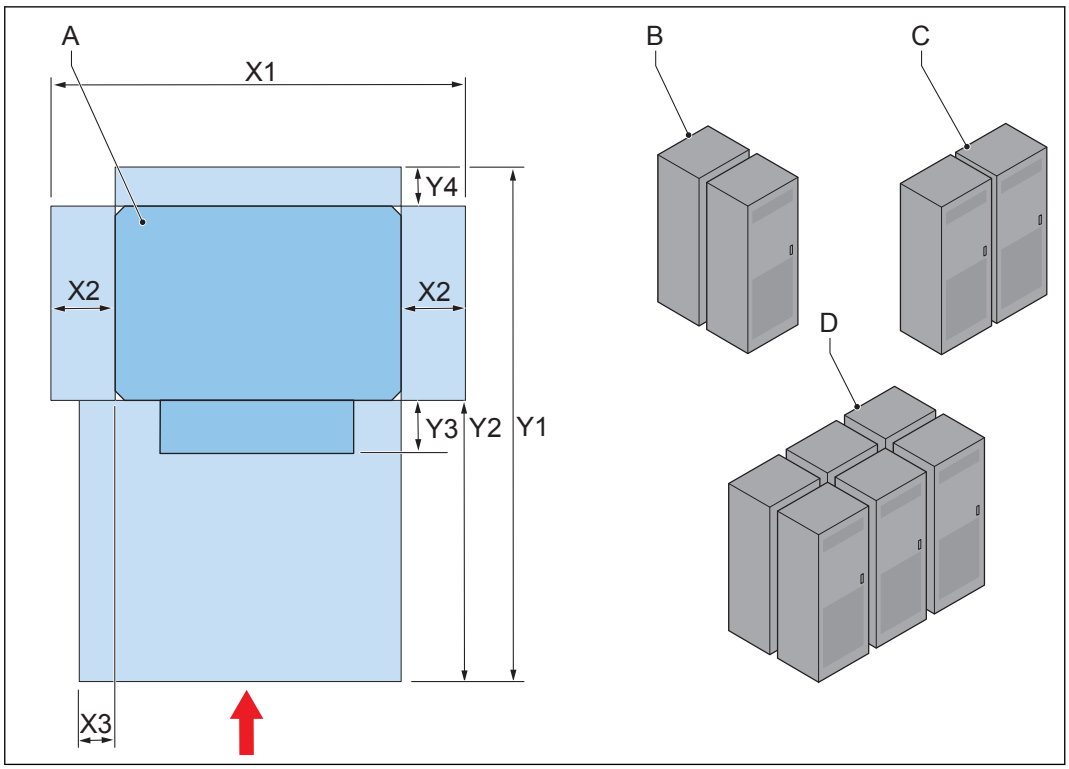
Parameter	Specification
	[degrees]
α1	25
α2	30
α3	30
α4	30

12.8 Cable slack

Note: Slack measured from the top of the foundation.

Parameter	Specification	
	[mm]	[ft-in]
AC input cable	1000	3'-4"
Auxiliary AC input cable	3000	15'-8"
DC power cable	3000	15'-8"
PE cable	3000	15'-8"
Interlock cable	3000	15'-8"
DC guard cable	3000	15'-8"
Ethernet cable	3000	15'-8"

12.9 Space requirements

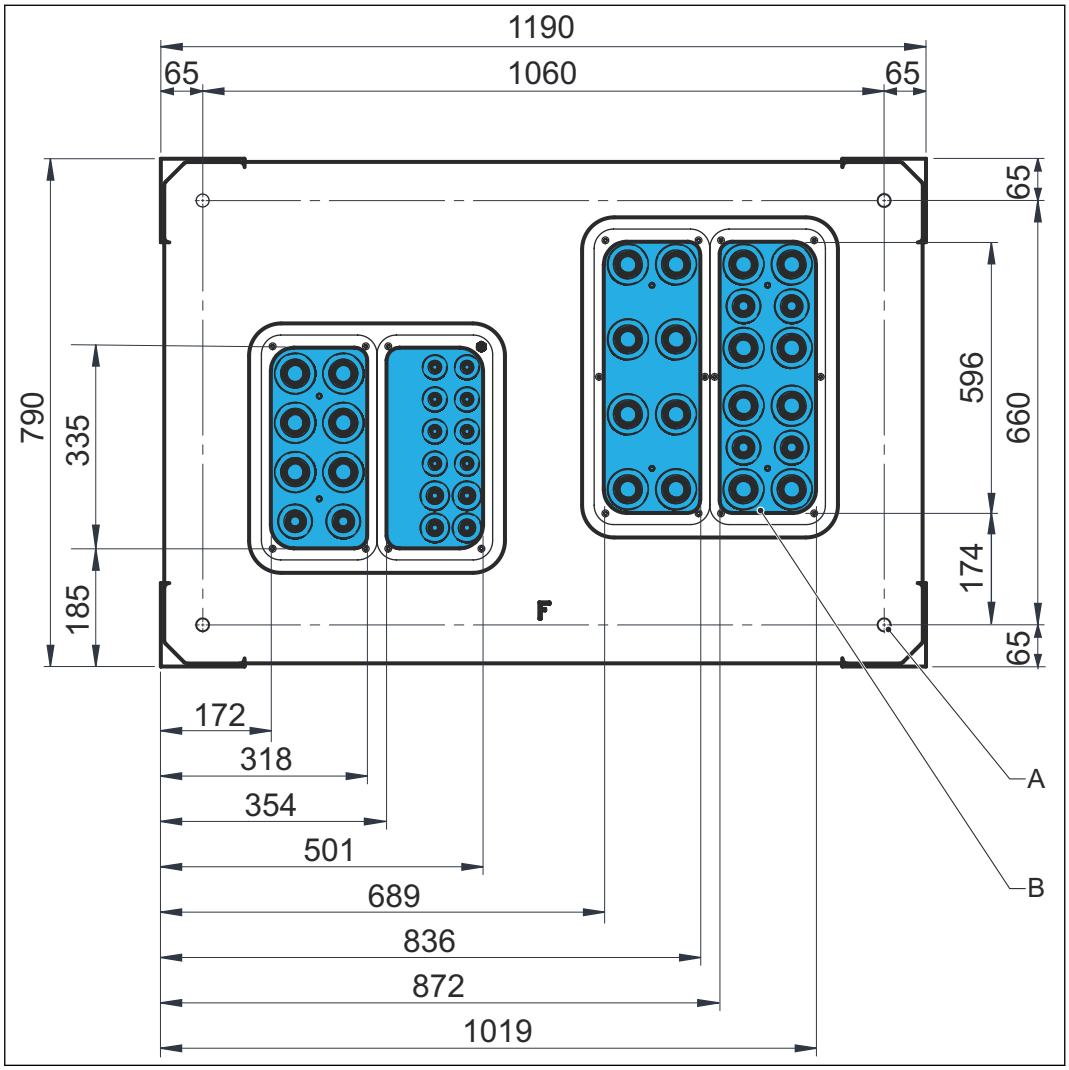


X1 Total width required for the power cabinet
X2 Space for the foundation
X3 Space to open the power cabinet door
Y1 Total depth required for the power cabinet
Y2 Space to open the power cabinet door
Y3 Depth of the muffler
Y4 Space for the foundation
A Power cabinet
B Back to back configuration
C Side by side configuration
D Side by side and back to back configuration, six power cabinets

Parameter	Specification for a single power cabinet	
	[mm]	[in]
X1	1370	53.9
X2	100	3.9
X3	50	1.9
Y1	1970	77.6
Y2	1100	43.3
Y3	150	5.9
Y4	100	3.9

12.10 Foundation specifications

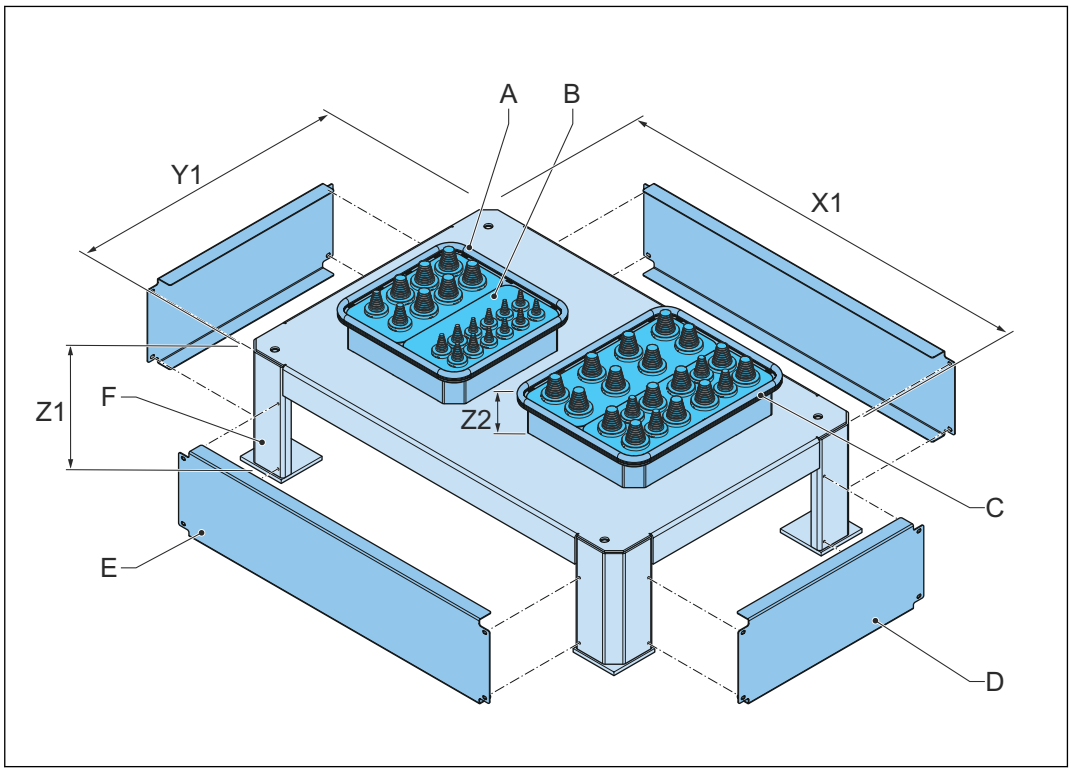
12.10.1 Power cabinet (custom foundation)



A Holes to install the fasteners of the power cabinet

B gland plate

12.10.2 Power cabinet (metal frame)



A	Gasket for the AC and signal gland plate	F	Metal frame
B	Gland plates	X1	Width of the foundation
C	Gasket for the DC gland plate	Y1	Depth of the foundation
D	Cover plate left and right	Z1	Height of the foundation
E	Cover plate front and rear	Z2	Height of the gland plate

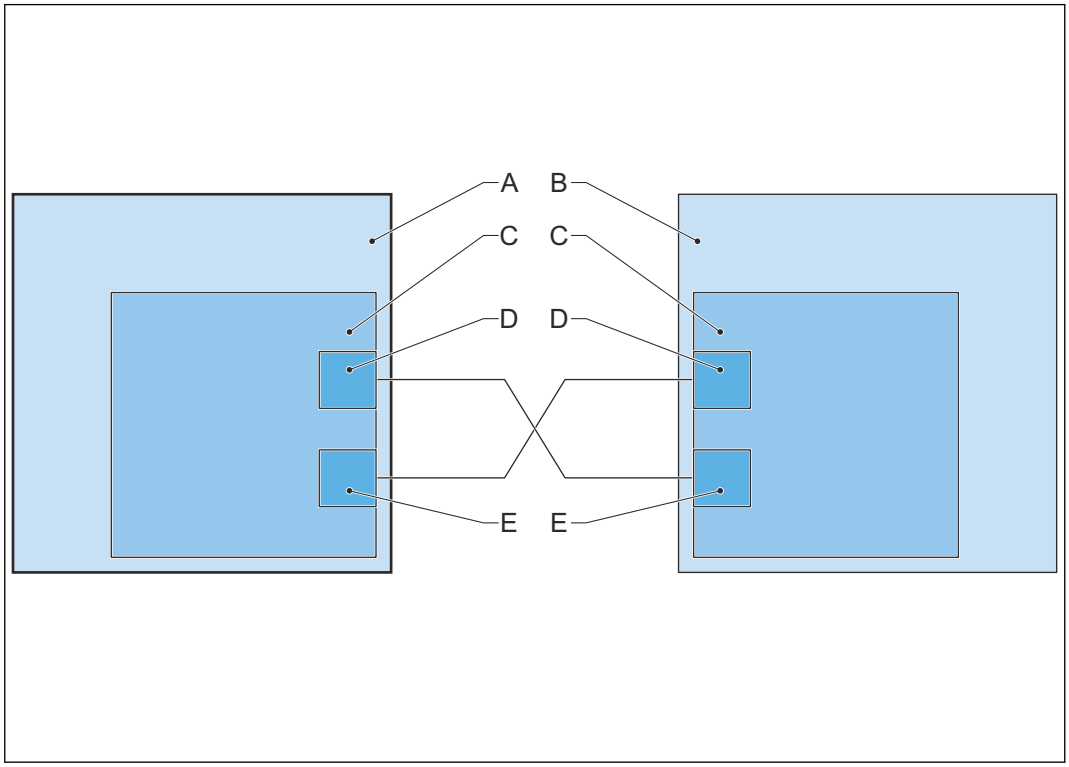
Parameter	Specification	
	[mm]	[in]
X1	1190	46.9
Y1	790	31.1
Z1	320	12.6
Z2	79	3.1

12.11 Ambient conditions

Parameter	Specification	
Operating temperature	-35 °C to +55 °C	-31 °F to +131 °F
Storage temperature	-10 °C to +70 °C	14 °F to +158 °F
Maximum allowed pressure decrease	300 Pa	0.09 inHg
Storage conditions	Indoor, dry	Indoor, dry
Relative humidity	5% - 95% (non-condensing)	5% - 95% (non-condensing)

Parameter	Specification	
Airflow	1450 m3/h	853 cfm
Altitude	Max. 2000 m above sea level	Max. 6561 ft above sea level

12.12 Wiring diagram for the optical fiber cables



A Power cabinet
B Charging interface
C Optical signal converter
D Output terminal (Tx)
E Input terminal (Rx)

Note: The cables between the power cabinet and the charging interface always connect an output terminal (D) to an input terminal (E). Do not connect terminals that are the same, for example an output terminal to an output terminal.

12.13 Cable specifications

12.13.1 General specifications for cables

Parameter	Specification
Ambient resistance	Resistance to placing in the ground, sub-merged in conduit
Compliance	UL recognized and approved components
Isolation requirements	UL recognized and approved components

12.13.2 AC input cables

Parameter	Specification
Cable shielding (optional)	If the local rules require shielded cables, the cable shielding must be connected to the PE rail at both 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
Maximum diameter of the cable conductor	240 mm² (500 MCM AWG) (Recommended)
Insulation	Special PVC that is serviceable for outdoor use, UV-protected, and oil resistant
Ambient temperature range	-40 °C to +80 °C (-40 °F to +176 °F)
Strip length	20 mm (0.75 in)

12.13.3 AC auxiliary power cable (3 phase 480 V AC)

Parameter	Specification
Type	Unshielded
Number of cores	4
Core identification	Acc. to IEC 60446
Cross section	2.5 mm² (14 AWG)
Diameter	5-10 mm (0.2-0.4 in)
Conductor	Bare copper, fine wired, bunch stranded acc. to VDE 0295 CI.5/IEC CI.5
Insulation	Special PVC that is serviceable for outdoor use, UV-protected, and oil resistant
Nominal voltage	0.6 KV / 1 kV
Test voltage	4 kV
Ambient temperature range	-40 °C to +80 °C (-40 °F to +176 °F)
Strip length	20 mm (0.78 in)

12.13.4 AC auxiliary power cable (1 phase 120 V)

Parameter	Specification
Type	Unshielded
Number of cores	3
Core identification	Acc. to IEC 60446
Cross section	2.5 mm² (14 AWG)
Diameter	6-12 mm (0.23-0.47 in)
Conductor	Bare copper, fine wired, bunch stranded acc. to VDE 0295 CI.5/IEC CI.5
Insulation	Special PVC that is serviceable for outdoor use, UV-protected, and oil resistant
Nominal voltage	0.45 kV / 0.75 kV

Parameter	Specification
Test voltage	4 kV
Ambient temperature range	-40 °C to +80 °C (-40 °F to +176 °F)
Strip length	20 mm (0.78 in)

12.13.5 DC power cables

Parameter	Specification
Type	1x positive, 1x negative cable Unshielded
Number of cores	1
Cross section range (minimum)	95 mm² (3/0 AWG)
Cross section range (maximum)	185 mm² (350 MCM)
Diameter	22-32 mm (0.9-1.25 in)
Maximum length between the power cabinet and the control box	100 m (330 ft)
Conductor	Stranded in tin plated copper or aluminum,fine wired, stranded according to VDE 0295 cl.5/IEC Cl.5
Diameter of the phase conductors	Refer to the local rules.
Insulation	Rubber or PVC that is serviceable for outdoor use, UV-protected, and oil resistant
Nominal voltage Uo/U	600/1000 Vac - 900/1500 Vdc
Minimum test voltage	6 kV
Ambient temperature range	-40 °C to +80 °C (-40 °F to +176 °F), permissible conductor operating temperature +90 °C (+194 °F)
Strip length	11 mm (0.4 in)

Note:

- Calculate the cable cross-section to guarantee the voltage drop below 10V. If the voltage drop is above 7V, consult the manufacturer.
- If the length of the cables between the power cabinet and the control box is between 328 and 492 ft, you need to install a long-distance package. The long-distance package is included in a separate manual. Ask the manufacturer.

12.13.6 DC auxiliary power cables

Parameter	Specification
Type	1x positive, 1x negative cable Unshielded
Number of cores	2 wires
Core identification	Color Acc. to IEC 60446
Cross section	2.5-10 mm² (14-8 AWG)
Diameter	10-14mm (0.4-0.6 in)

Parameter	Specification
Conductor	Bunch stranded in bare copper, fine wired, according to VDE 0295 Cl.5/IEC Cl.5
Insulation	PVC that is serviceable for outdoor use, UV-protected, and oil resistant
Nominal voltage Uo/U	480 Vac
Minimum test voltage	4 kV
Ambient temperature range	-40 °C to +80 °C (-40 °F to +176 °F)
Strip length	11 mm (0.4 in)

12.13.7 PE cables

Parameter		Specification
Type		Unshielded
Number of cores		1
Core identification		green-yellow
Diameter		10-14mm (0.4-0.6 in)
Cross section	Between earth and the power cabinet	120 mm² (4/0 AWG)
	Between the power cabinet and oher devices	35 mm² (2 AWG)
Conductor		Fine strand copper wire according to VDE 0295 Cl. 5/ IEC 60228 Cl. 5
Insulation		PVC that is serviceable for outdoor use, UV-protected, and oil resistant
Nominal voltage Uo/U		480 Vac
Minimum test voltage		4 kV
Ambient temperature range		-40 °C to +80 °C (-40 °F to +176 °F)
Strip length		Acc. to the used wire end ring

12.13.8 Interlock cables

Parameter	Specification
Type	Shielded (tinned copper braid)
Number of pairs	1 x 2
Core identification	Acc. to DIN 47100
Cross section	0.75-2.5 mm² (20-14 AWG)
Diameter	5-10mm (0.19-0.39 in)
Conductor	Fine strand copper wire
Insulation	PVC that is serviceable for outdoor use, UV-protected, and oil resistant
Characteristic impedance	120 Ω ± 10%
Test voltage	1.5 kV

Parameter	Specification
Ambient temperature range	-40 °C to +80 °C (-40 °F to +176 °F)
Strip length	11 mm (0.43 in)

12.13.9 Interlock + DC guard cable

Parameter	Specification
Type	Shielded (tinned copper braid)
Number of (twisted) pairs	2x2
Core identification	Acc. to DIN 47100
Cross section	0.75-2.5 mm² (20-14 AWG)
Diameter	5-10 mm (0.19-0.39 in)
Conductor	Fine strand copper wire
Insulation	PVC that is serviceable for outdoor use, UV-protected, and oil resistant
Characteristic impedance	120 Ω ± 10%
Test voltage	1.5 kV
Ambient temperature range	-40 °C to +80 °C (-40 °F to +176 °F)
Strip length	11 mm (0.43 in)

12.13.10 Ethernet cables

Parameter	Specification
Type	Cat6 or Cat5e, shielded (tinned copper braid)
Number of (twisted) pairs	4 x 2
Core identification	Acc. to DIN 47100
Cross section	0.5-0.75 mm² (21-20 AWG)
Diameter	5-10mm (0.19-0.39 in)
Conductor	Fine strand copper wire
Insulation	PVC that is serviceable for outdoor use, UV-protected, and oil resistant
Characteristic impedance	120 Ω ± 10%
Test voltage	1.5 kV
Ambient temperature range	-40 °C to +80 °C (-40 °F to +176 °F)

12.13.11 Optical fiber cables

Parameter	Specification
Type	OM3, prefabricated - OM3, PCF or fiberglass (multimode, 850 nm)
Number of fibers	4 (2 for spare)
Connector type	B-FCO(ST®)

12.14 AC input specifications

12.14.1 200 kW configuration

Parameter	Specification
Input AC power connection	3-phase, 480 V AC: PE, L1, L2, L3
Input voltage range	480 V AC +/- 10%
Frequency	60 Hz +/- 4%
Maximum power dissipation	218 kVA
Power factor at full load	≥ 0.95
Efficiency	>94% and 96% in power spectrum between 20% and 100% of full power
Nominal input current	262 A AC
Short-circuit capacity	25 kA

12.14.2 300 kW configuration

Parameter	Specification
Input AC power connection	3-phase, 480 V AC: PE, L1, L2, L3
Input voltage range	480 V AC +/- 10%
Frequency	60 Hz +/- 4%
Maximum power dissipation	326 kVA
Power factor at full load	≥ 0.95
Efficiency	>94% and 96% in power spectrum between 20% and 100% of full power
Nominal input current	392 A AC
Short-circuit capacity	25 kA

12.14.3 360 kW configuration

Parameter	Specification
Input AC power connection	3-phase, 480 V AC: PE, L1, L2, L3
Input voltage range	480 V AC +/- 10%
Frequency	60 Hz +/- 4%
Maximum power dissipation	391 kVA
Power factor at full load	≥ 0.95
Efficiency	>94% and 96% in power spectrum between 20% and 100% of full power
Nominal input current	470 A AC
Short-circuit capacity	25 kA

12.15 DC output specifications

12.15.1 DC output specifications

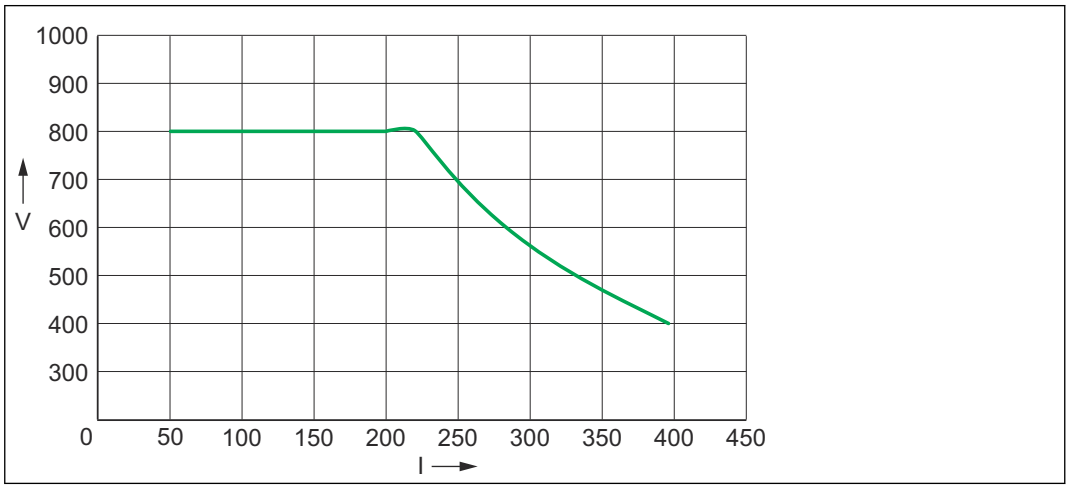
Parameter			Specification		
Power variant [kW]			200	300	360
Max output voltage [V DC]			940	940	940
Maximum output current **per one outlet** [A]	Static	2 outlets	• 142 A at 700 V DC • 125 A at 800 V DC	• 215 A at 700V DC • 188 A at 800 V DC	• 250 A at 700 V DC • 225 A at 800 V DC
		4 outlets	• 71A at 700 V DC • 63 A at 800 V DC	• 105 A at 700 V DC • 90 A at 800 V DC	• 125 A at 720 V DC • 125 A at 800 V DC
	Dynamic	2 outlets	• 285 A at 700 V DC • 250 A at 800 V DC	• 430 A at 700 V DC • 375 A at 800 V DC	• 500 A at 720 V DC • 450 A at 800 V DC
		4 outlets	• 285 A at 700 V DC • 250 A at 800 V DC	• 430 A at 700 V DC • 375 A at 800 V DC	• 500 A at 720 V DC • 450 A at 800 V DC
Maximum output current **in total for the whole charger** [A]	Static	2 outlets	• 285 A at 700 V DC • 250 A at 800 V DC	• 430 A at 700 V DC • 375 A at 800 V DC	• 500 A at 720 V DC • 450 A at 800 V DC
		4 outlets	• 285 A at 700 V DC • 250 A at 800 V DC	• 430 A at 700 V DC • 375 A at 800 V DC	• 500 A at 720 V DC • 450 A at 800 V DC
	Dynamic	2 outlets	• 285 A at 700 V DC • 250 A at 800 V DC	• 430 A at 700 V DC • 375 A at 800 V DC	• 500 A at 720 V DC • 450 A at 800 V DC
		4 outlets	• 285 A at 700 V DC • 250 A at 800 V DC	• 430 A at 700 V DC • 375 A at 800 V DC	• 500 A at 720 V DC • 450 A at 800 V DC

Note:

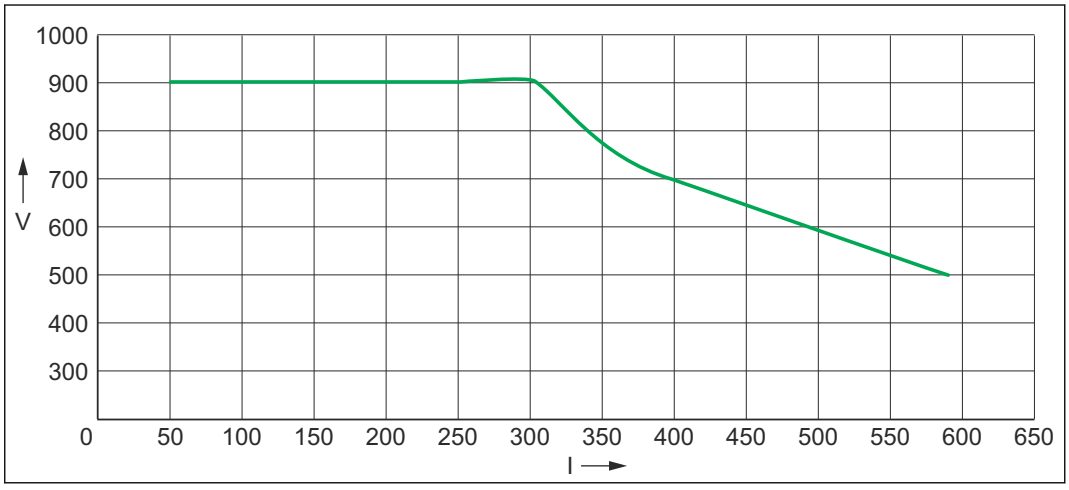
- The maximum amount of current supplied to the vehicle can be limited by the charging interface.
- If the temperature of the power module is higher than 55 °C, derating of the power cabinet occurs. The derating highly depends on the charging interface (cable/pantograph), the vehicle inlet, the temperature, and the duration. This can only be given on a system level.
- In the Dynamic variant the maximum output current for one outlet is available only when the sum of the output currents for all the outlets in use does not exceed the total output current of the power cabinet.

12.15.2 Power curve

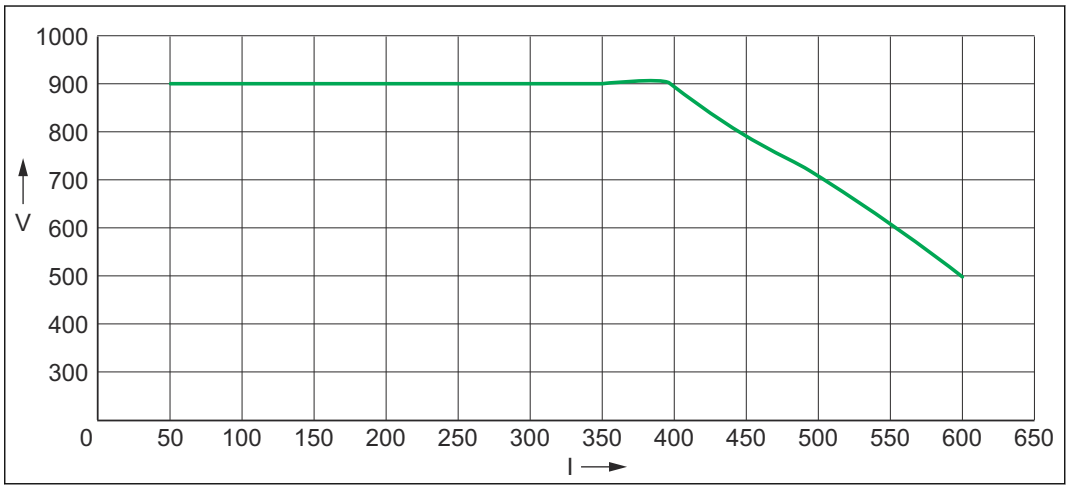
HVC 200



HVC 300



HVC 360



Item	Description
V	V_{out} [V]
I	I_{out} [A]

12.16 Protection for the AC auxiliary

Parameter	Specification
Circuit breaker (CB) - HVC 200	350 A
Circuit breaker (CB) - HVC 300	500 A
Circuit breaker (CB) - HVC 360	600 A

12.17 Power consumption specifications

Parameter	Specification
Standby power consumption for every variant of the power cabinet	60 W

12.18 Terminal part numbers

Type	ABB part number	Used in section	Color on the drawing
ZS10	ZEB.00244	X2, X3	Grey
ZS10-BL	ZEB.00245	X2, X3	Blue
ZS10-PE	ZEB.00246	X2, X3	Green/Yellow
ZS6-D2	ZEB.00465	X4, X5, X6, X7	Dark grey
ZS4-D2	ZEB.00200	X4, X5, X6, X7	Grey
ZS4-PE	ZEB.00185	X4, X5, X6, X7	Green/Yellow
IE-XM-RJ45 / RJ45 R	ZEB.00389	X4, X5, X6, X7	Grey