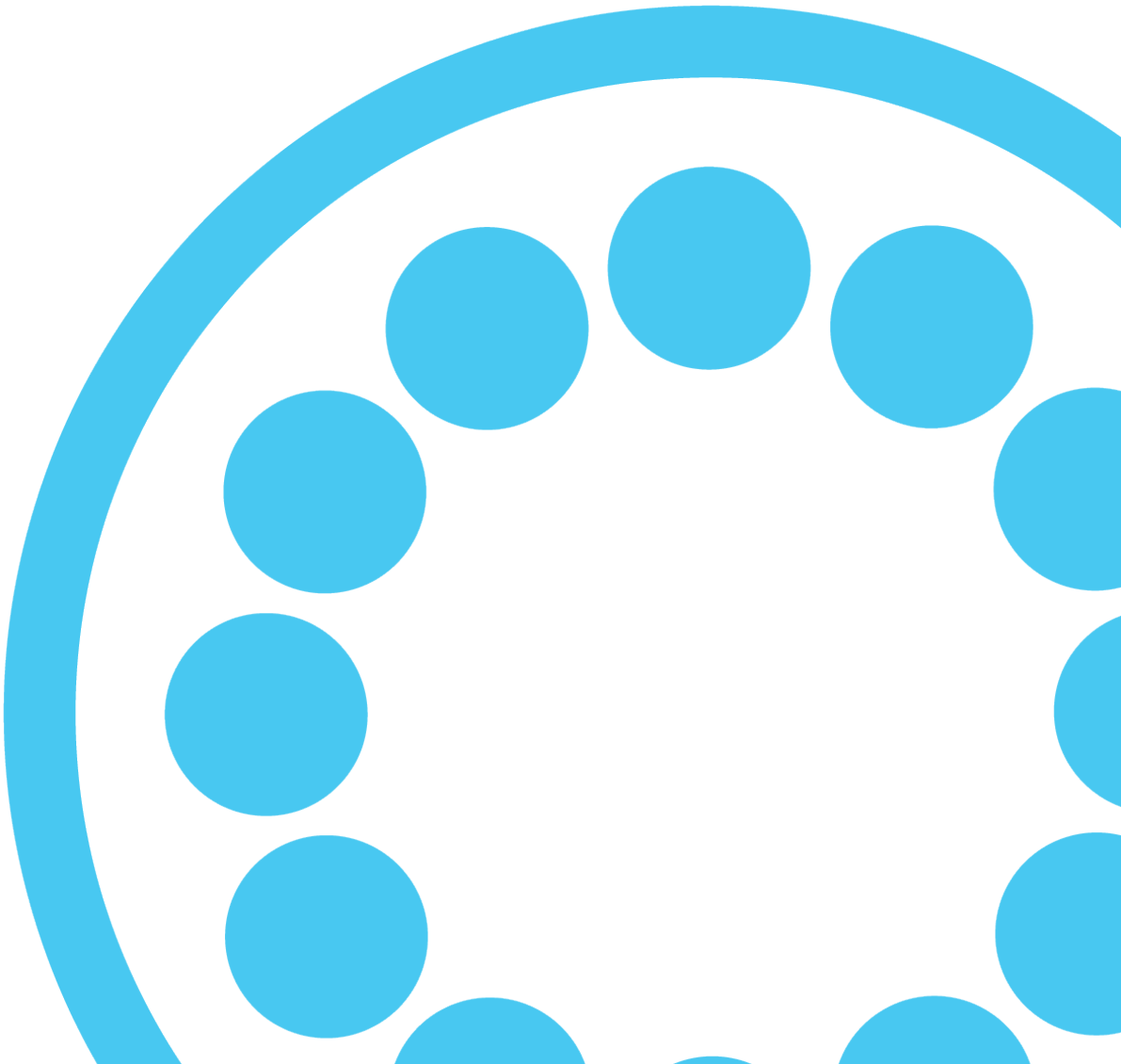
EVBox Troniq

Installation Manual



D000782AA6

Content

1. SPECIFICATIONS

Equipment without storage option:

	50 kW
Grid connection	400 V_{AC} +/- 10% 77 A (nominal) / 87 A (maximum) 54 kVA 50 Hz 3P + N + T Neutral network TT or TN IT (optional)
Output DC Charge	DC 500 V / 120 A / 50 kW
Output AC Charge	Mode 3: AC 400 V / 63 A / 43 kW Mode 2: AC 230 V / 10 A / 2,3 kW (optional)
Connectors	DC 1: CHAdeMO DC 2: CCS2 AC Mode 3: Type 2 tethered cable for 43 kW or Type 2 socket outlet for 22 kW AC Mode 2: Type E or F Domestic socket (optional)
Charging cables length	3,95 m with cable auto-retractable system
Weight	345 (Bi-standard) / 350 kg (Tri-standard)
Dimensions WxHxD (mm)	820 x1920 x 465 (Bi-standard) / 920 x1920 x 465 (Tri-standard)
External Housing material	Aluminum and stainless steel
IP level / IK level	IP54 / IK10
Operating temperature	-30°C to +50°C
Storage temperature	-40°C to +70°C
Relative Humidity	5% to 95% without condensation
Altitude	<2000 m
Cooling system	Forced air ventilation
Technology	IGBT, Low Frequency insulation

Identification	RFID, NFC (card or telephone), SMS, Keyboard
Communication	GPRS or Ethernet / OCPP 1.5; 1.6
Internal electrical security	RCBO 30 mA Type A; RCD 30 mA Type A + 6 mA detection; MCB curve C/D
Standby power consumption	100 W
Efficiency at nominal output power	95%
Certification	CHAdeMO compliant, EV/ZE READY compliant
Standards	CE Compliant, IEC 61851-1, IEC 61851-21, IEC 61851-22, IEC 62196 (plug)

Equipment with storage option:

	36 kW + 15 kW storage option
Grid connection	400 V_{AC} +/- 10% 52 A (nominal) / 60 A (maximum) 36 kVA 50 Hz 3P + N + T Neutral network TT or TN IT (optional)
Output DC Charge	DC 500 V / 120 A / 50 kW
Output AC Charge	Mode 3: AC 400 V / 60 A / 41 kW Mode 2: AC 230 V / 10 A / 2,3 kW (optional)
Weight	350 kg + 45 kg - 2 battery modules 350 kg + 55 kg - 3 battery modules 350 kg + 65 kg - 4 battery modules 350 kg + 85 kg - 6 battery modules

2. TRANSPORT

The following commissioning requirements are given for information and do not commit in anyway, EVBox responsibility. The charger should be installed by a qualified installer, and be carried out "according to state of the art" and adapted to the specificities of the installation site and the own countries rules.

2.1 Load

In case that the charger comes with storage system, its maximum total weight excluding packaging is estimated to be 450 kg.

2.2 Packaging

The charger will be protected against external hangings with safety conventional material. However, you must be careful not to use tools that can get through the packaging and damage the charger.

2.3 Logistics

The lower support of the charger is equivalent to the shape of a pallet. A lifting system pallet type is therefore sufficient to move and install it. However, be careful to remove the charger from the delivery van; it will eventually be necessary to provide a lifting system with a necessary working height (about 1,3 m).

The transportation and the set up can only be done in an appropriate manner:

- For moving, using of a pallet truck with a charge capacity of at least 1000 Kg.
- For placement, using a pallet truck (> 150 mm of rising) or a forklift truck with a charge capacity of at least 1000 Kg, and before that it is necessary to check the stability of the charger on the machine.

2.4 Warnings!

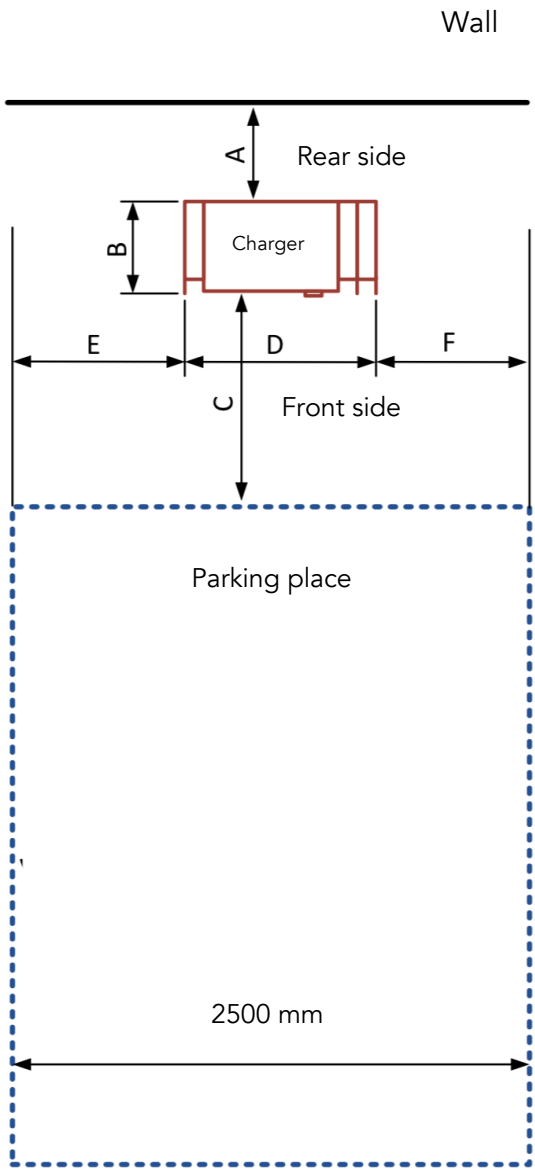
To ensure secure installation, make sure to follow these recommendations and thus avoid:

- Transporting the charger in a manner other than upright.
- Carrying the charger in any other ways than those indicated above.
- Using a lifting device while the charger is s electrically connected.
- Using a crane type hoist that would not support the weight of the charger. The use of slings is allowed by taking the charger through the lower support.
- The charger's centre of gravity is located in the central position, thus care is needed when handling.

3. CIVIL ENGINEERING

3.1 Charger positioning (without Auxiliary power cabinet – APC)

As there are some limitations (including cables length), we recommend the following installation for the charger in relation to a parking space of 2500 mm width:



A: Distance to the wall
→ Minimum: 100 mm to do not compromise good ventilation
→ Minimum: 600 mm to do not compromise the access to the rear socket type E or F

B: Depth of the charger
→ 448 mm

C: Distance between charger and parking place as marked on the ground:
→ Minimum: 500 mm to allow free access to emergency stop and the HMI
→ Maximum: 800 mm limited by the length of the vehicle charging cables

D: Width of the charger
→ 920 mm

E & F: Distance to the parking place
→ Minimum: 550 mm not to hinder the user when handling the connector.
→ Maximum: 930 mm, limited by the length of the vehicle charging cables.

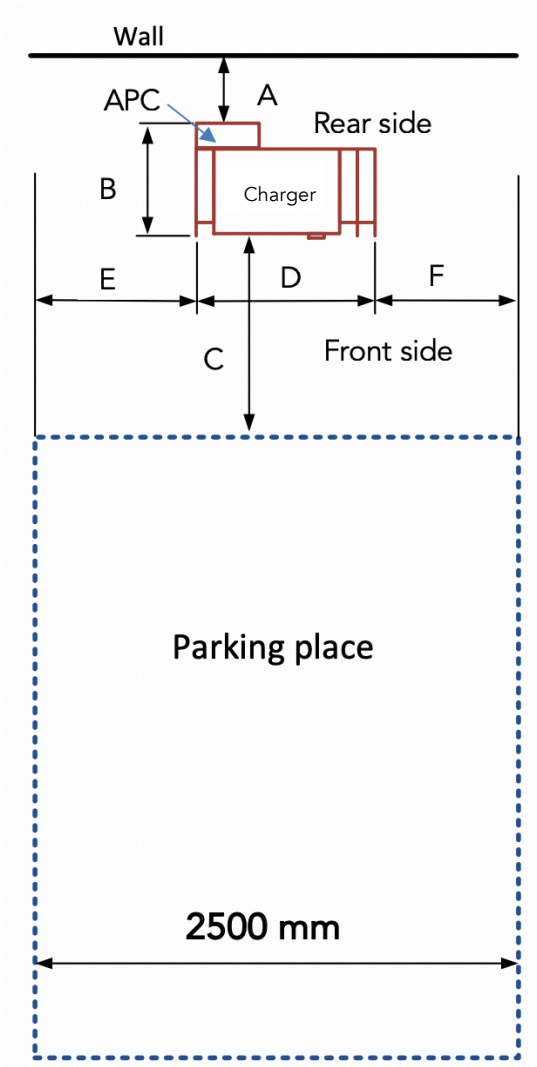
(A + B + C) minimum = 1048 mm

Warning:

- It is recommended, so as to avoid overheating, install it under a shelter or shaded-area in order to protect from direct sunlight.
- If installed indoors, the room should be ventilated by a permanent air exchange system. The ventilation rate of the charger can reach 1200 m^3/h.

3.2 Charger positioning (with Auxiliary power cabinet – APC)

As there are some limitations (including cables length), we recommend the following installation for the charger in relation to a parking space of 2500 mm width:



A: Distance to the wall
→ Minimum: 600 mm to do not compromise the access to the rear socket type E or F as well as to the Auxiliary power cabinet (APC).

B: Depth of the charger
→ 648 mm

C: Distance between charger and parking place as marked on the ground
→ Minimum: 500 mm to allow free access to emergency stop and the HMI
→ Maximum: 800 mm limited by the length of the vehicle charging cables

D: Width of the charger
→ 920 mm

E & F: Distance to the parking place
→ Minimum: 550 mm not to hinder the user when handling the connector.
→ Maximum: 930 mm, limited by the length of the vehicle charging cables.

(A + B + C) minimum = 1748 mm

Notes:

- It is recommended, so as to avoid overheating, install it under a shelter or shaded-area in order to protect from direct sunlight.

- If installed indoors, the room should be ventilated by a permanent air exchange system. The ventilation rate of the charger can reach 1200 m^3/h.

3.3 Charger installation on site

The structural engineering is to be performed according to the rules of art, including:

- The concrete used must have a density of 350 kg/m^3 and should be frost proof.
- The charger shall be secured to the ground and perfectly levelled.
    - Indeed, a tilt gap left/right or front/rear can damage the permeability of the product.
    - This will require setting the system level without ever using washers or other material that does not guarantee continuous support between the base of the charger and the ground.

Reminder of the key data of the charger subsets:

- The screen of the charger is located at a height of 125 cm.
- The emergency stop button is located at a height of 104 cm.
- The charging car connectors are located at a height of 118 cm.
- These heights must be considered to avoid compromising the use of HMI from the charger in case it is raised by a concrete foundation.

Note:

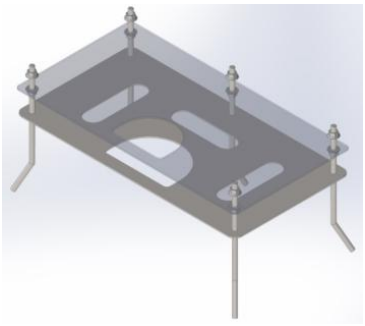
- It is recommended not to raise the charger more than 18 cm from the ground level where the user will be positioned.
- For the reasons above, we strongly recommend the use of our mounting kit.

3.3.1 Installation with Mounting kit (recommended option):

To ensure proper installation and therefore durability of our products, we recommend using the clamping/sealing kit sold as an option with your charger.

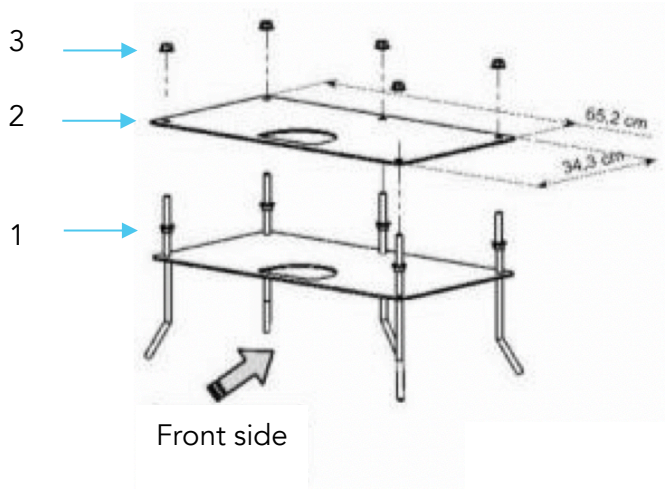
The clamping/sealing kit comprises:

- The upper sheet plate, raw aluminium, will remain on the surface (outside) 0,5 cm over the concrete, acting as a guide for electrical conduit and charger support.
- The lower sheet plate, galvanised, widely perforated for effective penetration into the concrete, will be sealed in concrete as shown in the sealing insert.
- 10u x M12 nuts.



How to assemble:

1. Screw one M12 nut from the upper end of each threaded rod.
2. Mount the upper plate (alumimium).
3. Screw one M12 nut on each threaded rod above the upper face of the upper plate.
4. The distance between plates must be 4,5 cm.
5. The distance from the upper plate (Al) to the upper end of the threaded rod must be 7,5 cm as a maximum.

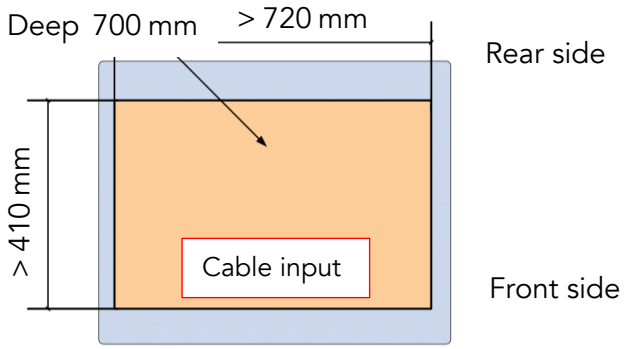


3.3.2 Charger foundations WITHOUT Auxiliary power cabinet (APC):

The different steps of installation are:

Step 1:

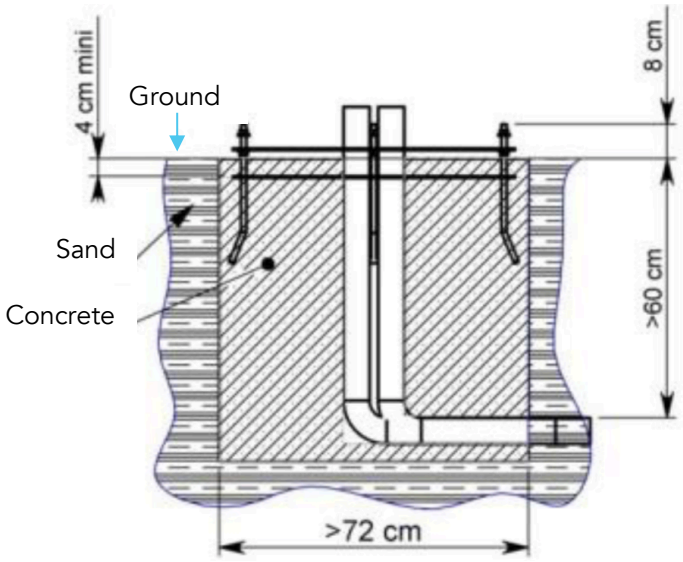
- Dig a hole at selected location of minimum dimensions on the plan (> 720 mm x > 410 mm). The disbursement depth should be greater than 700 mm. **Don't forget to allocate room for the cables passage indicated in APPENDIX 2.**



Step 2:

- Place and lock the clamping/sealing kit with regards to the specified measures as shown in the next drawing. With no clamping kit available, lock the equipment to ground using chemical sealant.

  The clamping kit has a specific mobile metal sheet (upper sheet) to tune the ground level whenever necessary.

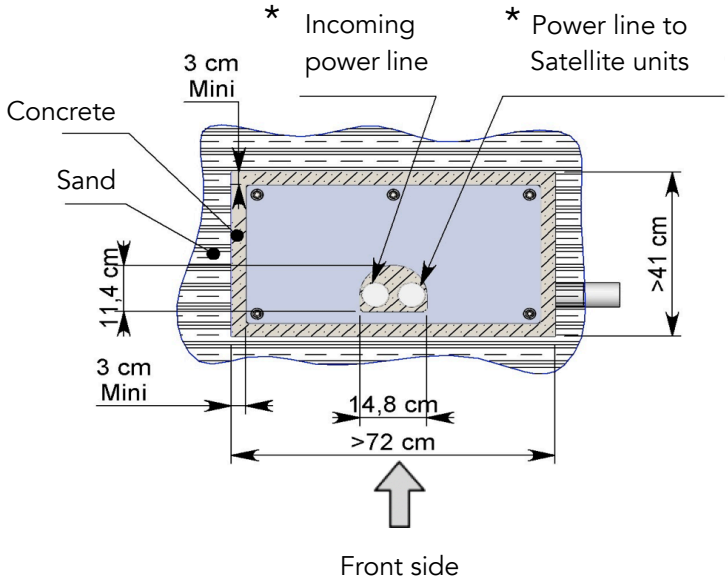


Notes:

1. Leave the upper sheet metal 0,5 cm over the concrete (outside), to leave the bottom nuts accessible.
2. Before setting the charger the upper sheet metal has to be levelled.
3. The lower sheet metal must be inside the concrete at least 4 cm.

Step 3:

- Set up and install electric cables as stated in annex 2. Please allocate sufficient cable length to include an excess of minimum 1000 mm over the ground level for proper connection to the equipment.



*** If the charger is to be used independently, it is not necessary to use two electrical conduits.**

Step 4:

- Place concrete up to the ground level. The lower plate must be sealed at least 4 cm in the concrete. The five available threaded rods must have a height of 80 mm from the ground.

Step 5:

- Allow it to dry for the time required.

Note:

1. If necessary, level the terminal support plate (raw aluminium) using the bottom nuts.

3.3.3 Preparing and installing the charger WITHOUT Auxiliary power cabinet (APC):

To be movable and easily installed, some mechanical parts can be removed prior to installation:

Step 1:

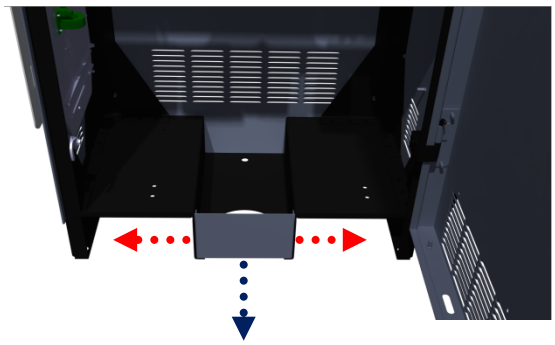
- Remove the front bumper by unscrewing the screws from the inside and underside of the door.

Step 2:

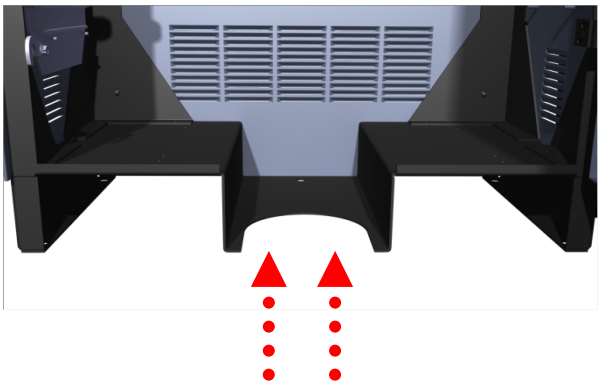
- Remove the rear plate by unscrewing the two nuts shown with red arrows in the picture from below and from the front of the system.

Step 3:

- Take off the front grommet cover (bezel) by removing the two screws shown in the picture by red arrows.



Internal overview:



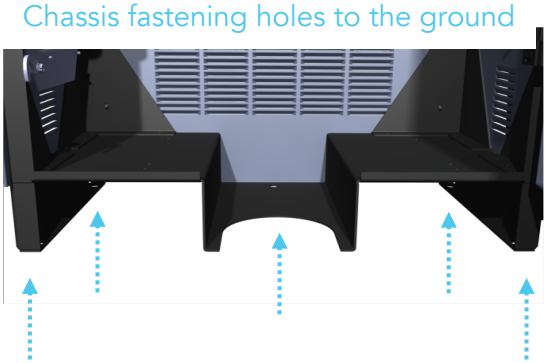
Step 4:

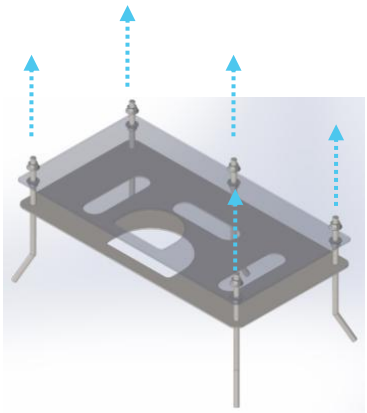
- Bring the charger near to its final location in accordance with the transport safety notes "Transportation" (See chapter 2)

Step 5:

- Remove the M12 nuts from the upper metal sheet and Install the charger over the 5 threaded rods which come out of the ground, it must pass through the 5 holes of the chassis, green arrows as shown bellow:

Chassis fastening holes to the ground





Step 6:

- Rise the charger using a forklift and place it over the 5 threaded rods which come out of the ground. Lower it slowly.

Step 7:

- Tight the M12 nuts provided, the maximum torque has to be between 40 and 50 Nm.

Step 8:

- Route the electrical cables, and then install again the front grommet cover (bezel).

Step 9:

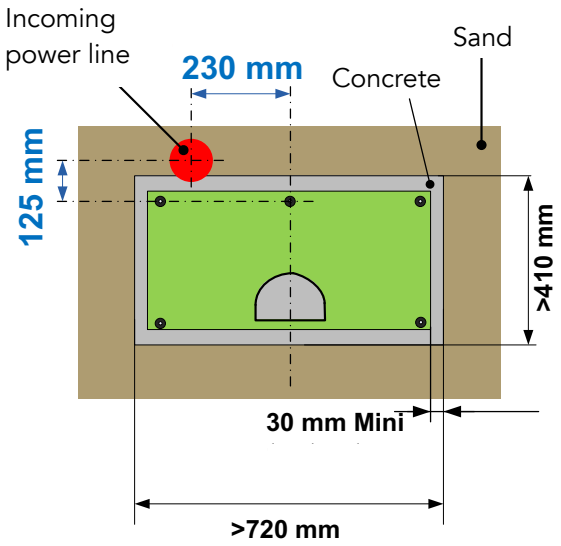
- Assemble again the rear plate and the front bumper.

Notes:

- Never disassemble electrical terminals connected in advance (factory) to facilitate cable feeding.
- Check charger levelling, it should be perfectly levelled.

3.3.4 Charger foundations WITH Auxiliary power cabinet (APC):

If the charger to be installed is equipped with the auxiliary power cabinet, the steps for making the base are the same as in the previous point, 3.3.1.1, but the passage of the electrical conduit must be done behind the charger, as shown below:

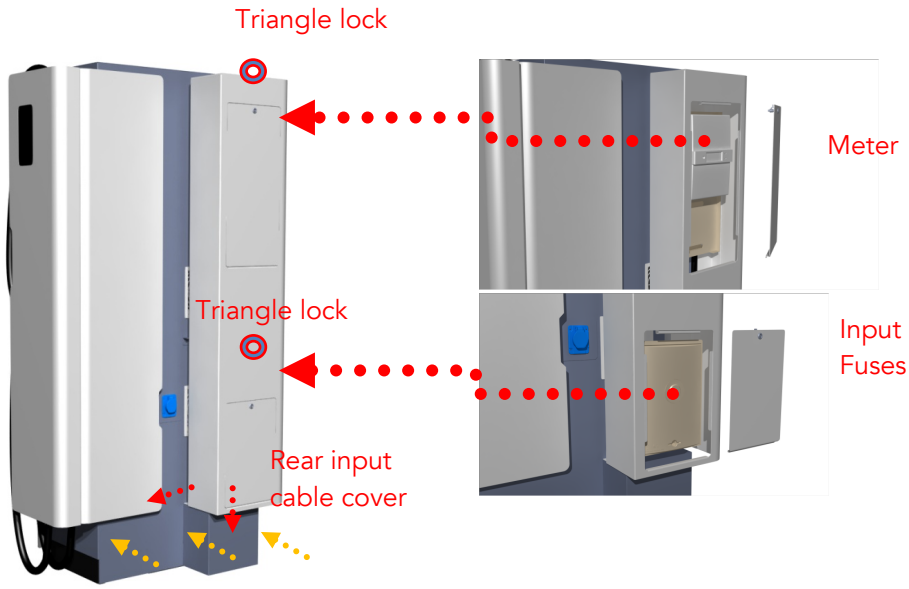


3.3.5 Preparing and installing the charger WITH Auxiliary power cabinet (APC):

To be movable and easily installed, some mechanical parts can be removed prior to installation:

Step 1:

- Remove the rear input cable cover from back of the charger as shown with two red arrows in the picture, the rear plate by unscrewing the three nuts from below as shown with orange arrows and the Meter and Input fuses lids.



Step 2:

- In order to install the charger over the threaded rods, please follow all the steps as in the previous point, *"3.3.1.2 Preparing and installing the charger WITHOUT Auxiliary power cabinet (APC)"*

Step 3:

- In this case, the electrical connection of the charger has to be done in the rear side, as shown in the next picture. Insert the cables through the bottom of the fuses box and connect them.

The connection cable
goes here, in the rear side of the charger

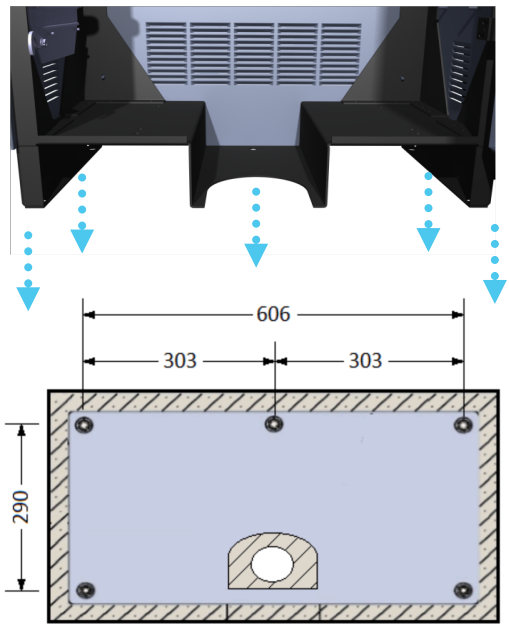
Step 4:

- Replace all the covers.

3.3.6 Installation directly with chemical anchor: *

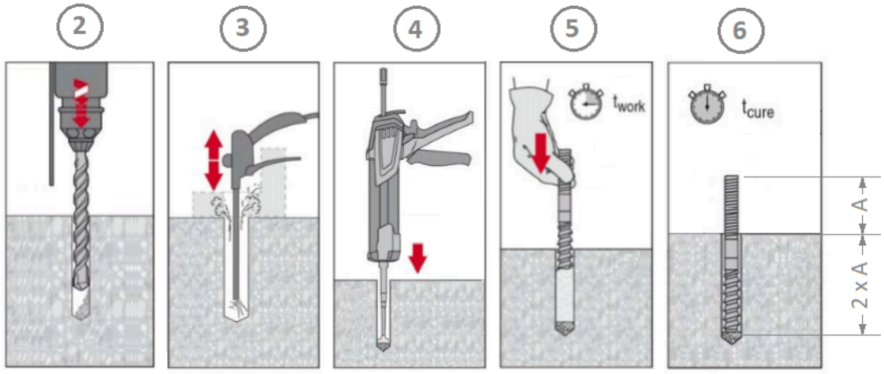
If the installation already has an adequate concrete floor or there is a problem to make a hole in the ground (ie. multi-storey car park) the Charger can also be installed by chemical anchor.

1. Make sure to mark every hole of the charger over the floor



* Measures in millimeters

2. Drill 5 holes on the floor for M12 threaded rod. Take into account the required drilling depth.
3. Blow into the holes to eliminate the rests of the drill.
4. Inject the adhesive starting at the bottom of the holes.
5. Introduce the M12 threaded rod within the work time.
6. Adjust the distance of the threaded rod and wait for the curation time. **A = 8 cm**



***This is the advised procedure. Follow in every moment the instruction of your chemical anchor system.**

4. ELECTRICAL GRID CONNECTION

4.1 Electrical connection for charger without storage

The electrical connection is the responsibility of customer and should be done by qualified person.

The charger should be connected to an electrical grid:

3 Phases plus neutral (3P + N + PE)
400/230 V +/- 10%
50 Hz
Neutral network TT or TN, (IT under option)

Notes:

1. The short-circuit current at the connection point has to be below 10 kA.
2. The loop impedance of the earthing system must be less than 20 ohms.

This connection must be protected upstream by:

- A head switch capable of handling at least 120 A to electrically isolate the charger in case of maintenance.

- A tetra polar circuit breaker (MCCB), curve D, 120 A, suitable for 54 kVA equipment.

- A Residual current device (RCD) capable of handling at least the maximum current of the above-mentioned circuit breaker with a sensitivity of 300 mA; type A, HI, S.

- The electrical connection is made internally on terminal X1 (see APPENDIX 1) by feeding through the power cables using the channel provided for this purpose (see APPENDIX 2).

- It should be ensured that the section of the power supply cable is sufficient. This section is defined according to the maximum rated current of the charger, the voltage drop and the installation method.

Note:

1. Size according to the regulations and standards in force in the country of installation.

Thus, to calculate the required minimum section, be aware that a fast charging station has a maximum primary current of:

- 50 kW model: 87 A per phase with power factor > 0.98

4.2 Electrical connection for charger with storage

Follow all the instructions shown in the previous point "4.1 Electrical connection for charger without storage" but taking in account next values:

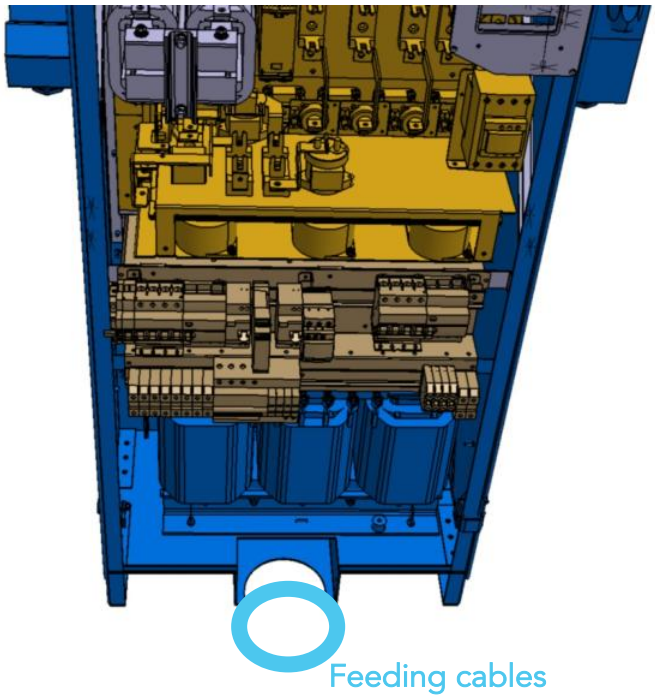
- A head switch capable of handling at least 80 A to electrically isolate the charger in case of maintenance.
- A tetra polar circuit breaker (MCCB), curve D, 80 A, suitable for 36 kVA equipment.
- A Residual current device (RCD) capable of handling at least the maximum current of the above-mentioned circuit breaker with a sensitivity of 300 mA; type A, HI, S.
- 36 kW model: 60 A per phase with power factor > 0.98.

4.3 Passage of the input cables

We recommend the use of a flexible multicore 3P+N+T cable or independents flexible cables for easy installation (either copper or aluminium). A rigid cable can be used, but at the expense of comfort of the installer.

Be aware about the specific countries rules, there might be some differences in the conductor material and the kind of cable coating.

It is advisable to adjust the length of the cables to terminal blocks in order to have the least amount of cable inside the terminal (while retaining some flexibility).
To access the passage of the input cables and their connection to the terminal (see APPENDIX 1), please remove various covers (see point 3.3.4) from the charger (no need to remove the rear cover) taking care to remove the ground wires if necessary (do not forget to put them back when reassembling).



The entrance of the cables (green circle) is accessible on the front side

4.4 Special attention should be paid to the ground cable

The ground impedance must be lower than 20 ohms in dry weather to ensure proper system operation. An earthing greater than 20 ohms load can cause unwanted stops.

There should be an equipotential bond between the terminal and ground of the electricity supplier.

There should also be an equipotential with any metal object located near the charger.

4.5 Special attention to the need for a surge arrester

The presence of a surge arrester to protect the charger power line is the responsibility of the installer. Indeed, the presence and selection of the material must be adapted and in compliance with the regulations and standards in force in the countries where the charger is installed.

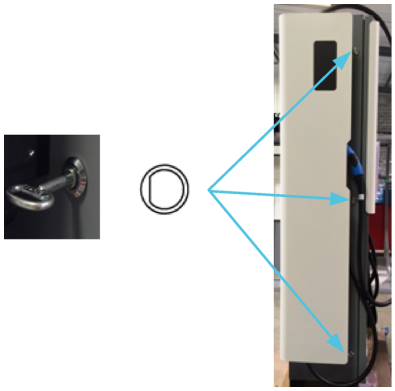
5. COMMISSIONING

5.1 Opening procedure locks:

- To facilitate opening, remove the AC charging connector and the DC charging connector from their holders.

- Before opening, check that you have your Personal Protective Equipment.

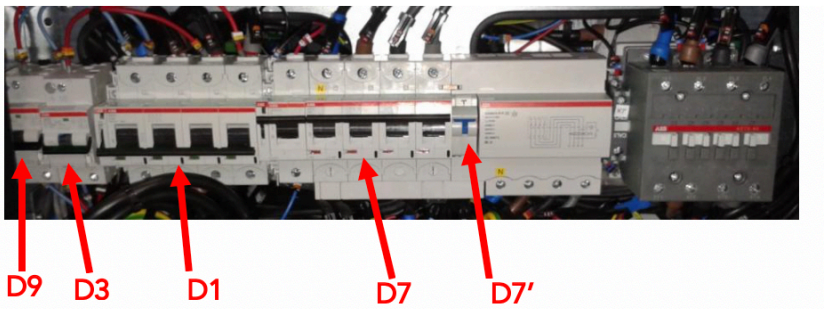
- **Opening/Closing:**
  - There are 3 Eastern EU locks on the left flank of the charger
  - Open by ¼ left turn
  - Close by ¼ right turn



5.2 Charger restart procedure without battery

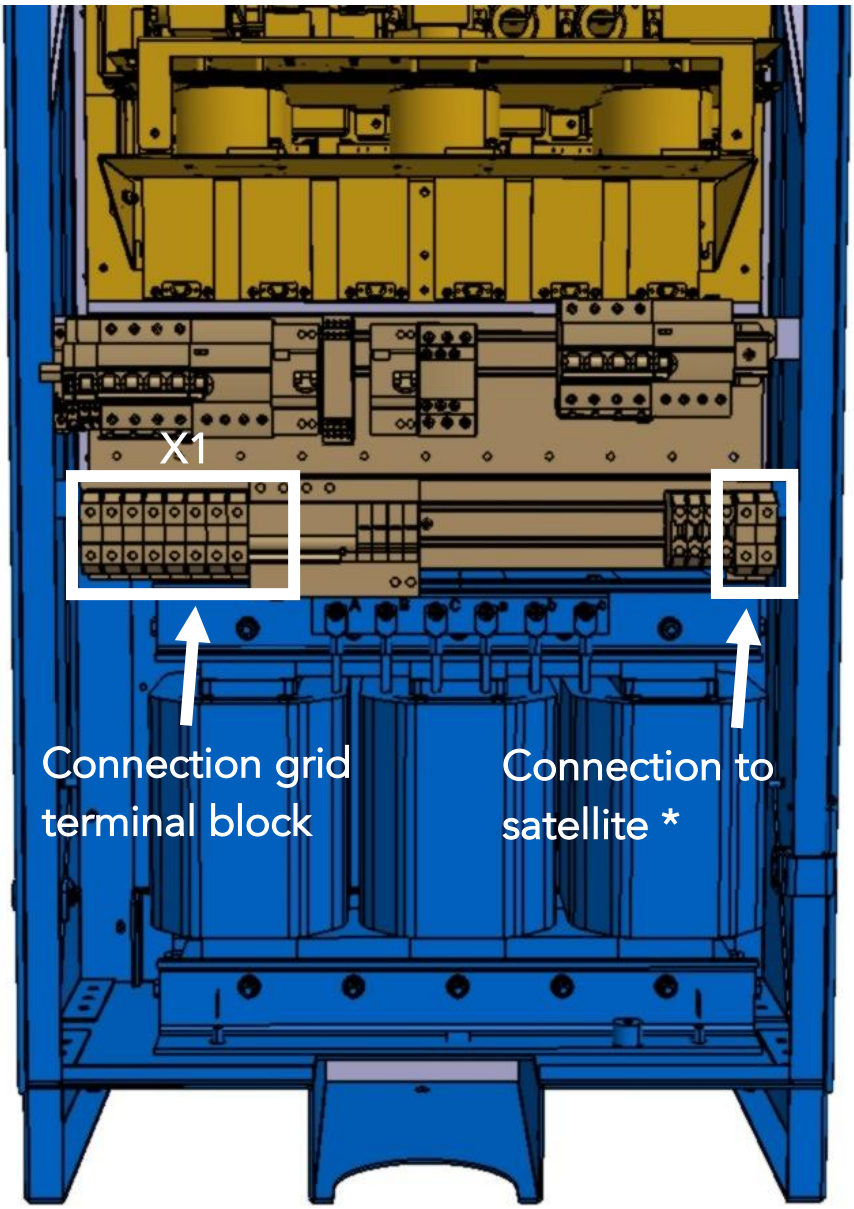
The restart/commissioning procedure is as follows:

1. Set the D3 circuit breaker to OFF, if applicable
2. Wait 10 seconds
3. Switch circuit breaker D7 to ON
4. Switch circuit breaker D7' to ON
5. Switch circuit breaker D9 to ON
6. Switch circuit breaker D3 to ON
7. Finally switch circuit breaker D1 to ON
8. You must close the door; there is no time limit for this
9. Once the door is closed and locked, check that the side lights are green, and therefore indicate a functional restart, otherwise repeat the procedure from step 1.



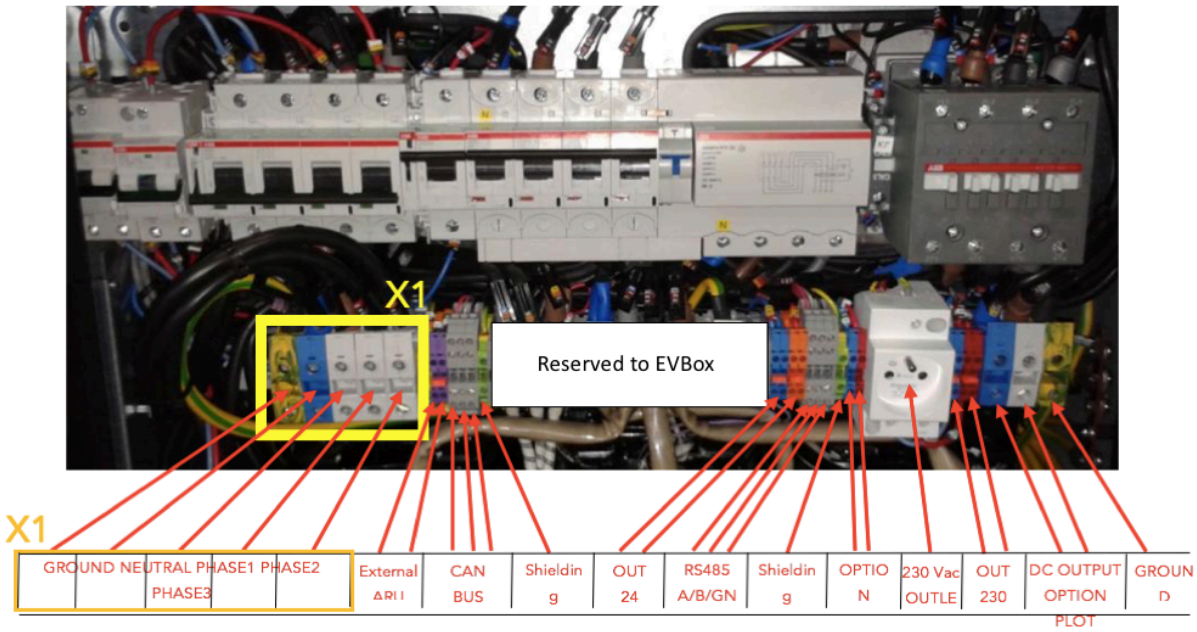
6. APPENDIX 1: CONNECTION GRID TERMINAL BLOCK

Positioning the various power and communication connection terminals.



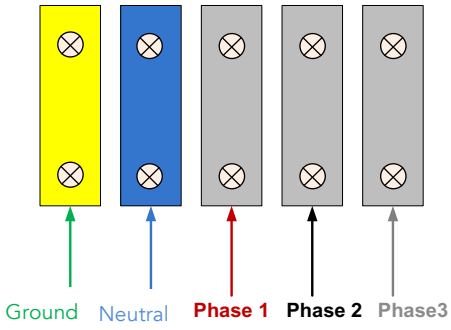
*** Not used for standalone charger.**

Photo of terminal X1:



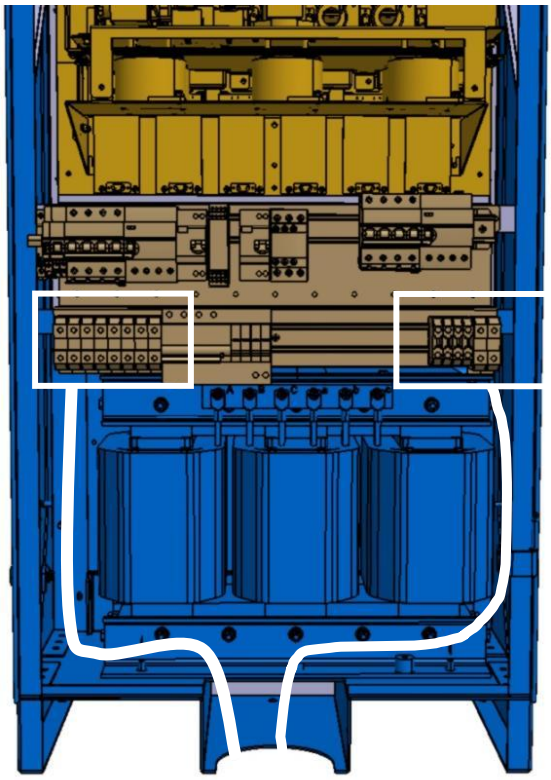
X1 Terminal (Connection grid terminal block):

- Neutral : Neutral power input
- Phase 1 : Phase 1 power input
- Phase 2: Phase 2 power input
- Phase 3 : Phase 3 power input
- Ground : Input Power Cable Ground



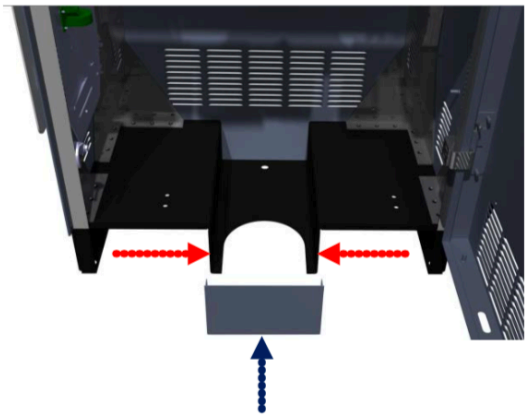
7. APPENDIX 2: CABLES PASSAGE

- Input of the power supply cables without auxiliary power cabinet (APC)



Power supply cables

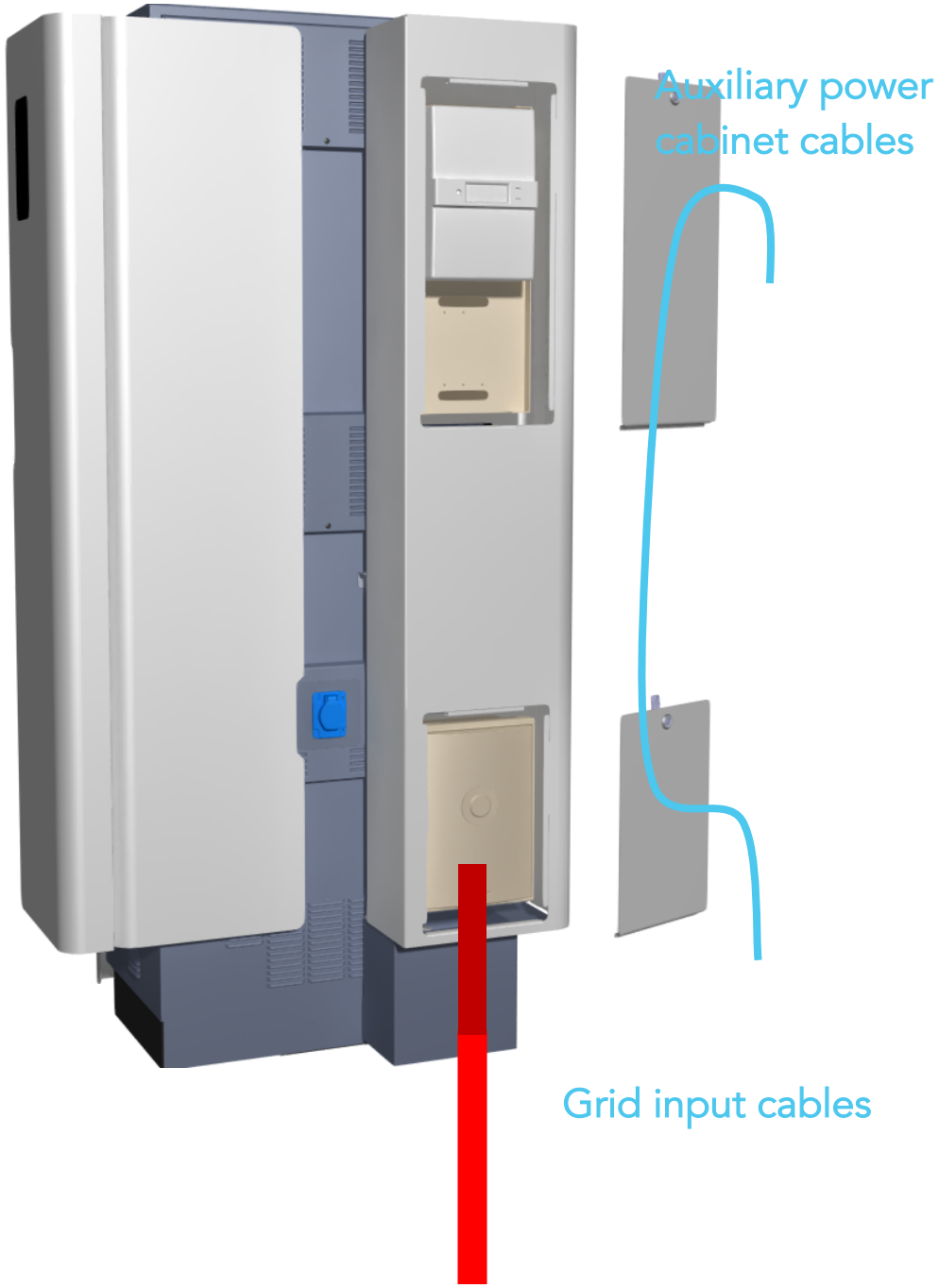
The cables are to be pressed along the walls to reach the electrical terminal blocks located on the left and on the right side.



Once the electrical cables are connected, install the front bezel with two screws, shown by the red arrows, and put expanding foam in the conduit in order to avoid the entrance of any animal

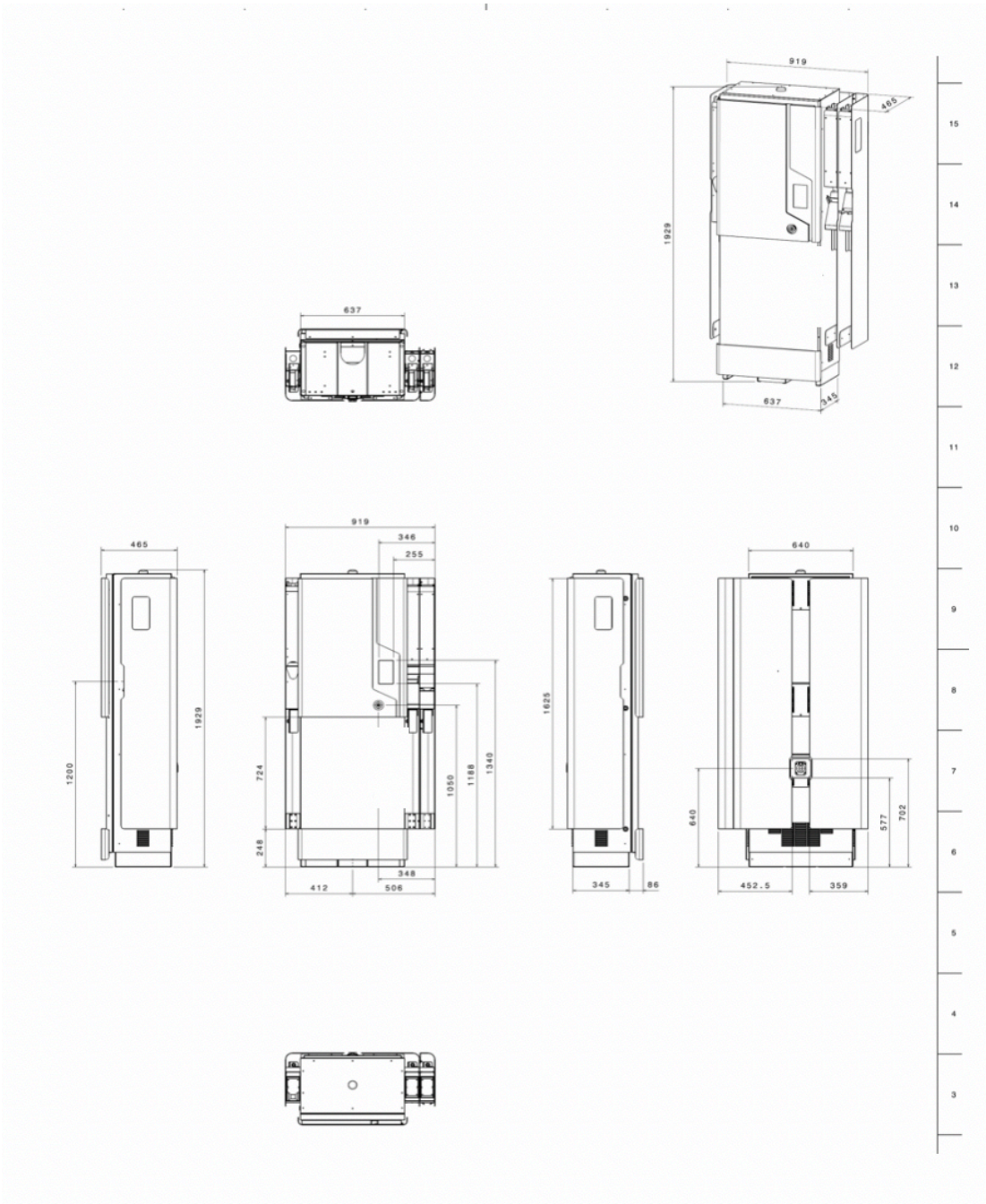
*** Not used for standalone charger.**

- Input of the cables that come to the charger with auxiliary power cabinet (APC)

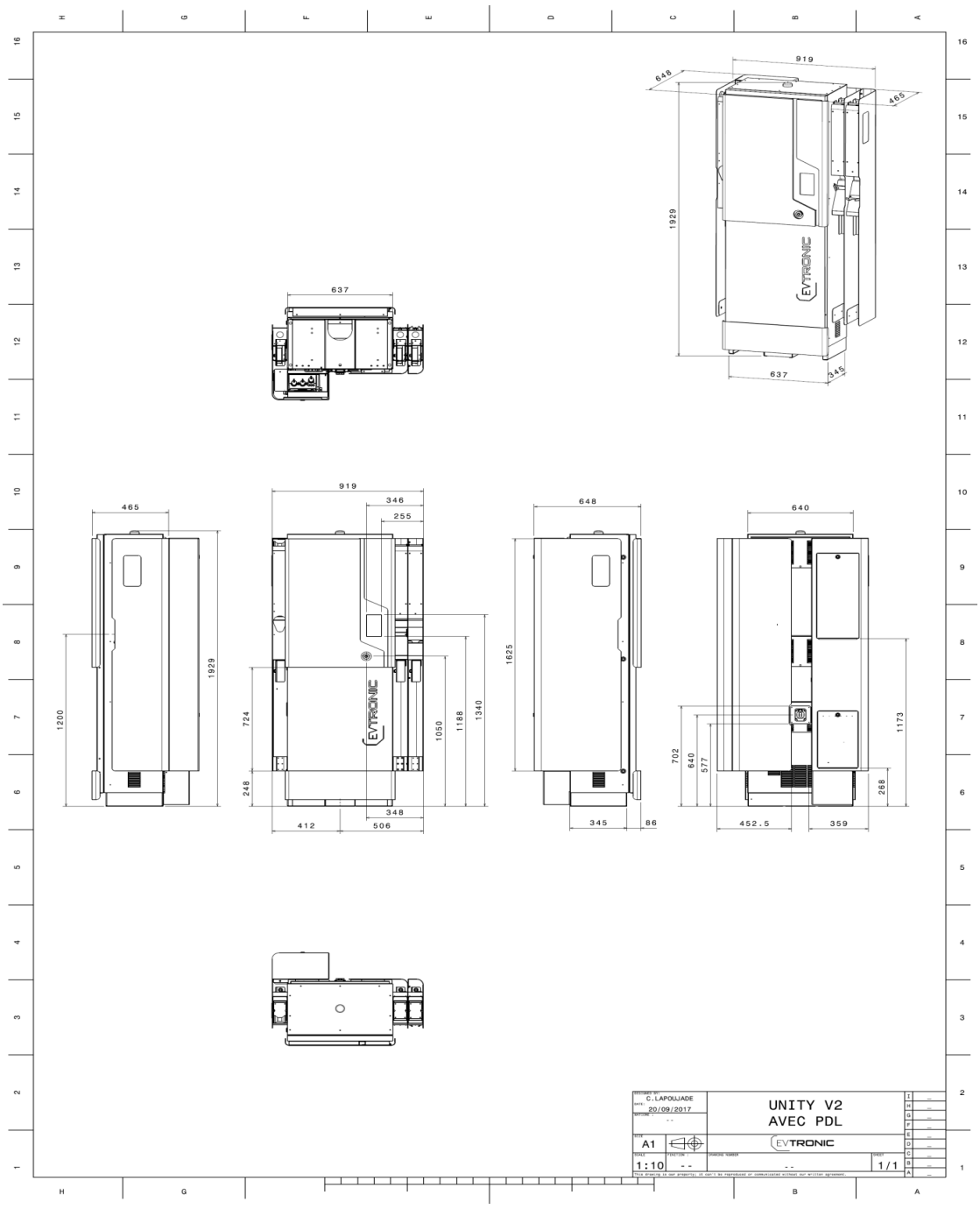


8. APPENDIX 3: DIMENSIONS

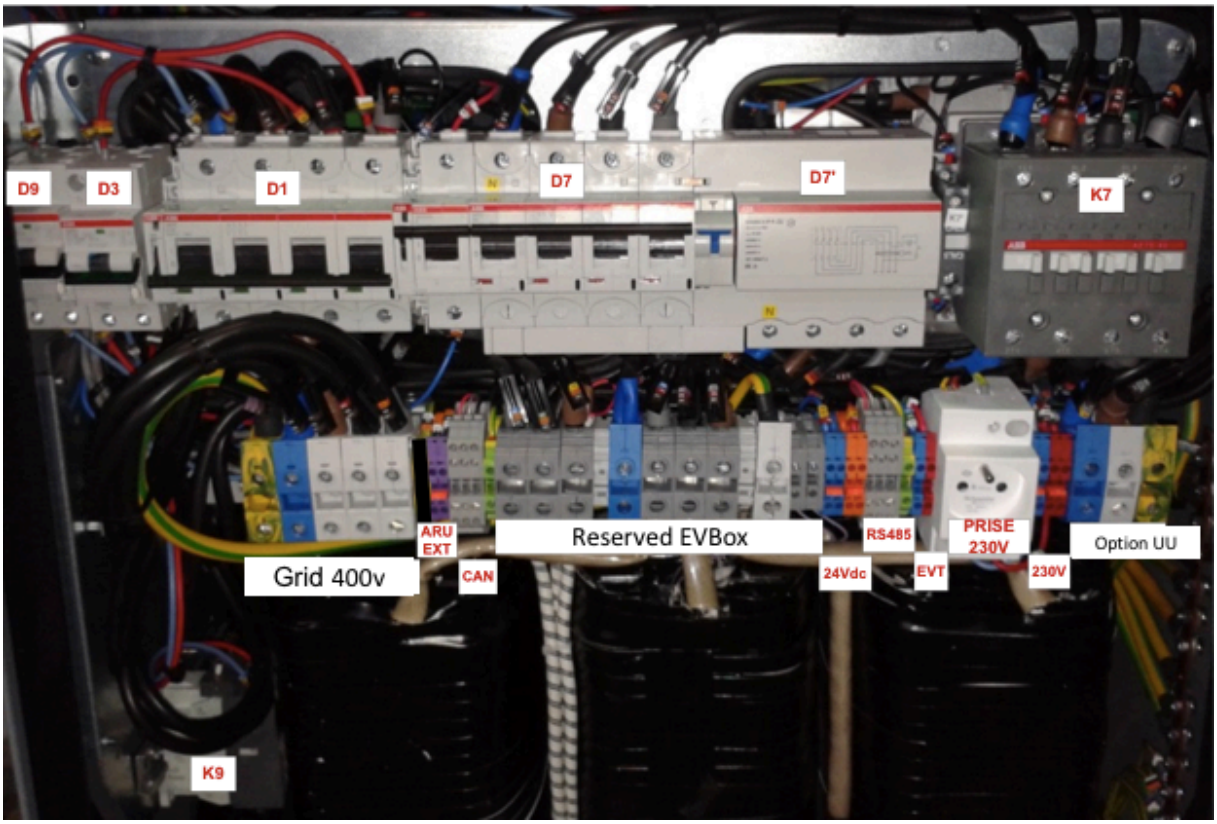
Charger dimensions without Auxiliary power cabinet (APC)



Charger dimensions with Auxiliary power cabinet (APC)



9. APPENDIX 4: CONNECTION TERMINALS DETAILS: POWER AND COMMUNICATION



1. 400 V GRID CONNECTION TERMINAL BLOCK:

- Ground GRID: Max section: 95 mm², allows connection of the ground terminal
- Neutral GRID: Max Section: 95 mm², allows connection of the neutral terminal
- Ph1 GRID: Max section: 95 mm², allows connection of the phase 1 terminal
- Ph2 GRID: Max section: 95 mm², allows connection of the phase 2 terminal
- Ph3 GRID: Max section: 95 mm², allows connection of the phase 3 terminal

2. ARU EXT: Maximum section: 2,5 mm², allows connection of an external ARU button, voltage 24 Vdc, 10 mA max current.

3. CAN: Maximum section 2,5 mm², can connect the CAN communication (terminal of 1 input/3 outputs), voltage 10 Vdc, 50 mA max current.

4. BUS CAN shield: Maximum section 2,5 mm², to connect the CAN communication cable shield.

5. 24 Vdc: (for floor sensor) Maximum section 2,5 mm², Orange = +24 V, Blue = GND, 24 Vdc voltage, 7 A max current.

6. RS485: (for floor sensor) Maximum section 2,5 mm², allows connection of the RS485/MODBUS communication (terminal of 1 input/3 outputs), voltage 10 Vdc, 50 mA max current.

7. RS485 shield: Maximum section 2,5 mm², to connect the RS485 communication cable shield.

8. SERVICE SOCKET (230 Vac): Allows connection of the 230 Vac equipment within the limit of 6 A, 230 Vac voltage, 16 A current (protect with the circuit breaker and differential D3).

9. 230 Vac terminal block: Max Section: 2,5 mm², used to connect 230 Vac equipment within the limit of 6 A, 230 Vac voltage, 16 A current (protect with the circuit breaker and differential D3).

10. SATTELITES OPTION: Max Section: 35 mm², used to connect a DC satellite, 600 Vdc voltage, 125 Adc current.

11. D9: E/F 230 Vac Home Plug head Circuit Breaker. 16 A, curve C (Circuit Breaker + 30 mA differential type A).

12. D3: 230 Vac control head circuit breaker, 16 A, curve C (Circuit Breaker + 30 mA differential type A).

13. D1'': Circuit breaker position sensor D1.

14. D1'' ': Transmission coil that allows D1 to deactivate.

15. D1: power head breaker, 100 A, 4-pole, D-curve.

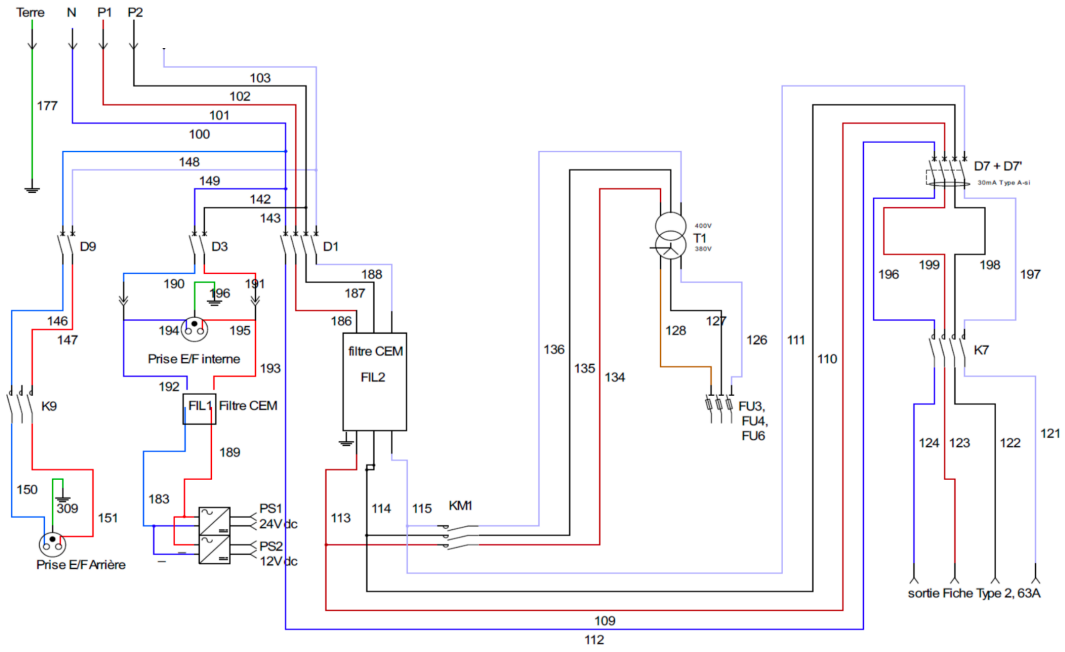
16. D7 ': Differential circuit breaker 30 mA, type A APR for AC output 43 kW.

17. D7: thermal magnetic circuit breaker 80 A, curve D for the 43 kW AC output (D7 is supplied with D1 series).

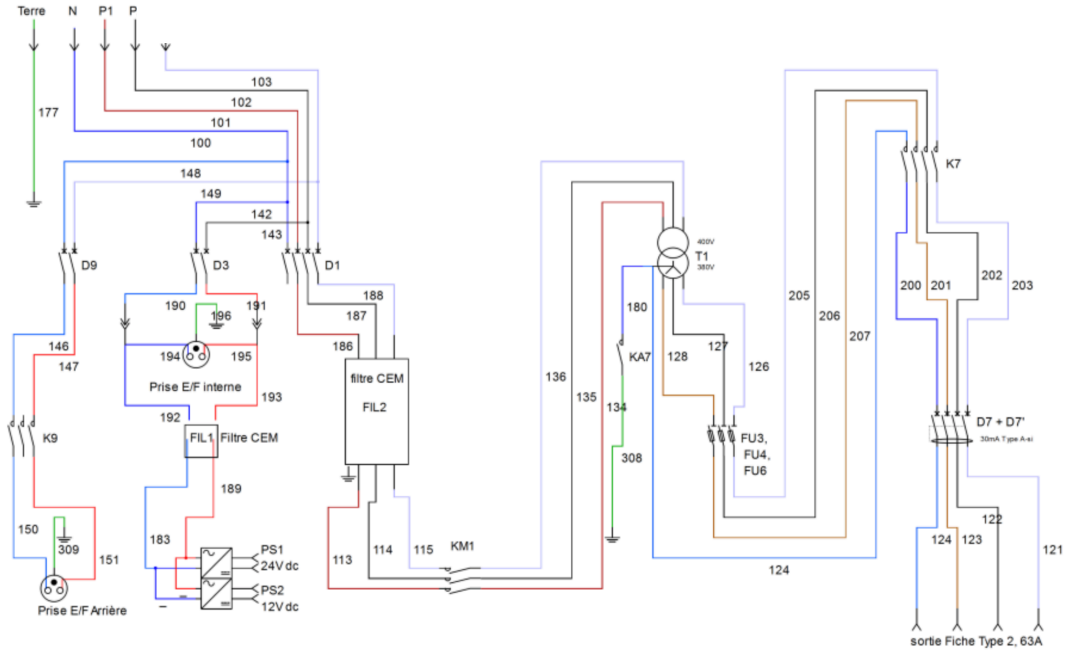
18. K7: power contactor, AC1/75 A 4-pole, that cuts power to the 43 kW AC.

19. K9: power contactor, AC1/26 A 3-pole, that cuts off power to the single-phase E/F home socket.

Charger electrical circuit diagram *



Charger electrical circuit diagram with isolated type 2 socket *



*** This schemes are not representative of all the models.**

10. APPENDIX 5: COMMISSIONING VALIDATION REPORT

Company	
Charger number	
Serial number	
SIM card number	
Order number	

Verification	Conformity	Comments
Casing in good condition, no damage. General condition and cleanliness of the structure is acceptable.		
Validation that the charger is level and flat to the ground as defined in the installation procedure.		
Validate that the different charging connectors: Type 2, CCS, CHADEMO and E/F plug are in good condition.		
Confirm no evidence of condensation on the display screen.		
Validate that the three door locks are correctly closed to guarantee sealing against water ingress		
Confirm no evidence of humidity or water ingress inside the charger.		
Confirm the door hinges are correctly adjusted.		
Verify visually the cables and cabling inside the charging unit are acceptable. No bare or loose wires evident.		
Confirm the presence of and tightness of the GPU fixing screws and the correct fixing / tightening of the CIRCUIT BREAKERS.		

Make sure the ventilation air flow is correct and there is not any obstruction at the ventilation inputs and output grill.		
With all circuit breakers down, check presence of voltage at the main terminal block: Phase – Phase à~ 400 V Phase – Neutral à~ 230 V Phase – Earth à~ 230 V Earth – Neutral à0 V		
Validate the EARTH loop value (< 20 ohms condition dry)		**Earth value:** **…… Ohm**
Check the equipotential connection between the metal parts of the charger, including door, with the main earthing terminal block		
With all circuit breakers down, Switch ON circuit breaker D3, with the door OPEN, verify that the LEDs are lit RED that the display screen is ON.		
Update software if needed.		
Close the door and verify that the LEDs are lit RED and that the screen displays "CHARGER UNAVAILABLE"		
Open the door again and Switch ON circuit breaker D1 and close the door. Verify that the LED on the DC side is GREEN. Verify that the LED on the AC side is RED.		
Open the door again and Switch ON circuit breaker D7 and Check the RCD function by the test button, reconnect it after the test.		
Close the door. Verify that the LED is GREEN on the AC side.		
Press the emergency button, one message will be displayed saying that the charger is unavailable. To turn the system on, simply turn and release the emergency stop button by applying a small turn to the right.		
Open the door again, Switch OFF circuit breaker D1 and D3, insert the SIM card in the screen, Switch ON circuit breaker D3 and configure the connection to the network controller if it is necessary. See User Manual.		

Switch ON circuit breaker D9 and close the door.		
Verify that the time displayed at the screen is correct and that the indicator lights for Signal connection and server connection are functioning correctly. If the indicators are not present (lit), verify the presence of the SIM card. Validate (if present) that the SIM car is correctly inserted. Also validate the presence and connection of the aerial unit.		
Verify that all the LED indicators are lit in green a there is not any abnormal noise.		
Test a normal client operation of the unit using a badge.		
Note any modifications undertaken during the commissioning (disconnecting earth cable, replacement of the SO-DIMM…):		

Validation location	
Date	
Certified Partner	
Signature and stamp	