

Version

2.3

VOLT.E EV CHARGING SOLUTIONS

7kW/22kW AC Home Chargers

Installation and User Manual

7KW/22KW AC HOME CHARGERS

Installation and User Manual

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Table of Contents

1.	Safety Instructions	1
1.1.	Symbols	1
1.2.	Safety Notes.....	1
2.	Before the installation	3
2.1.	Electrical Protections.....	3
2.2.	Power Supply	3
2.3.	Packing List.....	4
2.4.	Site Selection	4
2.5.	Space Requirements.....	5
3.	Dimensions	6
3.1.	Overview Drawings	6
3.2.	Type Plate	7
3.3.	Product description.....	8
3.4.	Customizable Options	9
3.5.	Main Features	9
4.	Installation	10
4.1.	Water Drainage	10
4.2.	Mounting the charging device.....	11
4.3.	Cable Installation.....	13
4.4.	Verification	14
5.	Technical Data	15
6.	Operation	18
6.1.	How to Connect?	18
6.2.	How to Charge?	18
7.	Maintenance	20
7.1.	Preventive Maintenance	20
7.2.	Trouble Shooting.....	20
8.	Technical Support	21
9.	Warranty	21
9.1.	Validity.....	21
9.2.	Exclusion.....	22

Disclaimer

COTTON CONSTELLATION LDA reserves the right to make modifications to the equipment or the unit specifications set out in this instruction manual without prior notice.

COTTON CONSTELLATION LDA on the website of its brand VOLT.E, supplies its customers with the latest versions of the device specifications and the most updated manuals. Please visit www.volt.e.pt for the latest version.

Document History

DATE	VERSION	DESCRIPTION
03/2019	v.1.0	Initial version

Important

This manual contains general descriptions and technical characteristics of the performance of the products contained herein. This document is not intended as a substitute for and is not to be used for determining suitability or reliability of the appliance for specific user applications.

The purpose of this manual is to provide necessary information for a safe installation, operation and maintenance of this equipment. Read this manual thoroughly and make sure you understand all the procedures before attempting to install or operate this equipment.

VOLT.E recommends all products of the EV charging series be installed by a qualified electrician, and the installation must be in accordance with all applicable local and national electrical codes and standards.

For reasons of safety and to help guarantee compliance with documented system data, only the manufacturer and its certified technicians should perform repairs to components. Failure to observe this precaution could result in death or severe personal injury.

VOLT.E has taken every precaution to produce an accurate, comprehensive and user-friendly manual and will therefore assume no responsibility nor liability for direct, indirect or accidental personal and/or material damage due to any misunderstanding or undesired mistakes in this manual.

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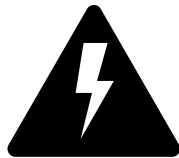
1. Safety Instructions



Read thoroughly and save these instructions!

This manual contains important instructions for the AC Home Charger series that shall be followed during the installation, operation and maintenance of each unit.

1.1. Symbols



DANGER

Indicates extremely important information about safety instructions which, if not followed, will result in death or serious injury.



ATTENTION!

Indicates important information about safety observations which, if not followed, could result in personal injury or cause fire or equipment overheating.

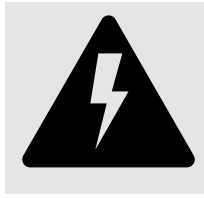


USEFUL INFORMATION

Indicates reference information for installation, operation and maintenance which does not contain personal injury or equipment safety related information.

1.2. Safety Notes

The AC home charger is designed for both in indoor and outdoor installations. For each of the different conditions of installation, the device must be installed safely with appropriate protection precautions.

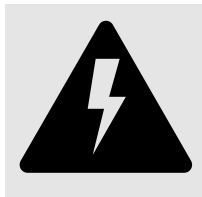


Ensure you have read carefully all the instructions included in this installation and user manual before starting the installation, making special attention to the following precautions:

- The charging device must NOT be installed in areas with potential explosion risk.
- Do NOT install the charging device where falling objects may damage the device.
- The surface of the installation site must withstand mechanical forces.
- This equipment is ONLY designed to be used for electric vehicle charging modes specified in IEC 61851.
- Do NOT open, disassemble or modify this unit. Any unauthorized third-party modification will void the warranty.
- Comply strictly with all applicable local and national electrical standards and regulations.
- Do NOT make repairs or manipulations before the input power is completely turned off.
- ONLY trained and qualified personnel should have access to all the electrical parts inside the device.
- Ensure the device is inspected regularly by qualified technicians to guarantee a safe installation and operation.
- Use ONLY authorized spare parts.
- Do NOT use this product if the enclosure or the EV connector is broken, cracked, open, or shows any other indication of damage.
- Do not use the charging device when either you, the vehicle, or the device is exposed to severe rain, snow, electrical storm or other severe weather conditions.

2. Before the installation

Before any installation work is performed, study all drawings provided by the supplier for the installation, including the arrangement drawings (front and top view) of each functional component.



Study carefully this section before handling the wiring of the charging unit. Before and during the wiring procedure, all the following instructions shall be strictly followed.

2.1. Electrical Protections

The charging device is equipped with internal two circuit breakers installed in each socket-outlet for the protection of the user against an electrical failure, according to the international standard IEC 61851-1:2017.

To guarantee the total protection of the charging device's operation and the installation against any electrical hazard, it is mandatory to install a main circuit breaker (MCB) and a residual current device (RCD) upstream of the charger.

These electrical protections and the rest of the installation must be aligned with the local and national rules. The selectivity of the protections must be guaranteed throughout the whole installation process.

2.2. Power Supply

The charging device should be connected directly to the customer power distribution board for the best performance and safety precaution. The charging device requires a three-phase connection. A normal domestic or small business power connection may NOT be enough. Contact your electricity distributor and/or grid owner for more information.

The dimensioning of the input power supply line of the charging device must be verified by a qualified electrician. Please note that various factors such as cable length between distribution board and charging device, maximum output current of the charging device may affect the selected cable. In such cases, cross-section may be required to adapt the temperature resistance of the power supply line.

Please refer to the technical data sheet for detailed default factory settings from maximum output current of the charging device. If the power supply is less than

maximum output current, adjustment to a lower nominal current may need to be performed. Please refer to detailed instructions provided in the operation section.

Depending on the model, the recommended value may be different.

2.3. Packing List

Charging Device x1
Installation and User Manual x1
Installation Template x1
Installation Bushing and Screws x5
Cable support x1

2.4. Site Selection

For the best operating conditions and longest operating life, please take care in selecting the installation site. Operating life and performance will be influenced by the selected installation and operation location.

The charging station was constructed for the indoor and outdoor area. Accordingly, it is necessary to ensure the correct set-up requirements and the protection of the device at the installation site.

The following criteria must be considered when selecting a location:

- ✓ Consider the local electrical installation regulations, fire prevention measures and accident prevention regulations as well as emergency routes at this site.
- ✓ The charging station may not be installed in potentially explosive atmospheres (EX environment).
- ✓ The charging station may only be installed in stationary applications.
- ✓ Mount the charging station so that it is not located in the direct flow of passersby and so that no one can trip over connected charging cables and so that the charging cables do not cover or cross passing pedestrian and motorized traffic.
- ✓ Do not install the charging station at locations where it is exposed to ammonia or ammonia gas (e.g. in or at stables).

- ✓ The mounting surface must be sufficiently stable in order to withstand the mechanical forces.
- ✓ Do not install the charging station at locations where falling objects could damage the device (e.g. hung up ladders or automobile tires).
- ✓ The device must not be exposed to direct spray water (e.g. neighboring manual car wash facility, high-pressure cleaner, garden hose).
- ✓ The device should be protected against direct rain as far as possible to prevent icing, hail damage or similar.
- ✓ If possible, the device should be mounted protected from direct sunlight. Otherwise, (e.g. set up outside at a parking space) the charging current specification will be reduced to 16 A if the maximum permitted temperature is exceeded. The charging procedure can also subsequently be switched off.
- ✓ Observe the permissible environmental conditions (see Technical data).

Observe the internationally valid installation standards (e.g. IEC 60364-1 and IEC 60364-5-52) and comply with the nationally applicable installation standards and regulations.

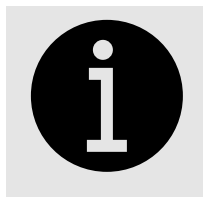
2.5. Space Requirements

In the case of device variants with optional cable holder, additional space must be planned for at the bottom for hanging up the charging cable.

If several charging stations are installed adjacent to each other, a distance of at least 200 mm between charging stations must be complied with.



We recommend mounting the charging station (height of the charging socket) at a height of 1.2-1.4 m. Observe that national regulations can limit this height.



For questions related to the surface for the installation of this charging unit, due to the weight and dimensions, it is suggested to consult specialized architectural personnel prior to its installation.

3. Dimensions

Study all drawings carefully and make sure you have enough knowledge of each functional component.

3.1. Overview Drawings

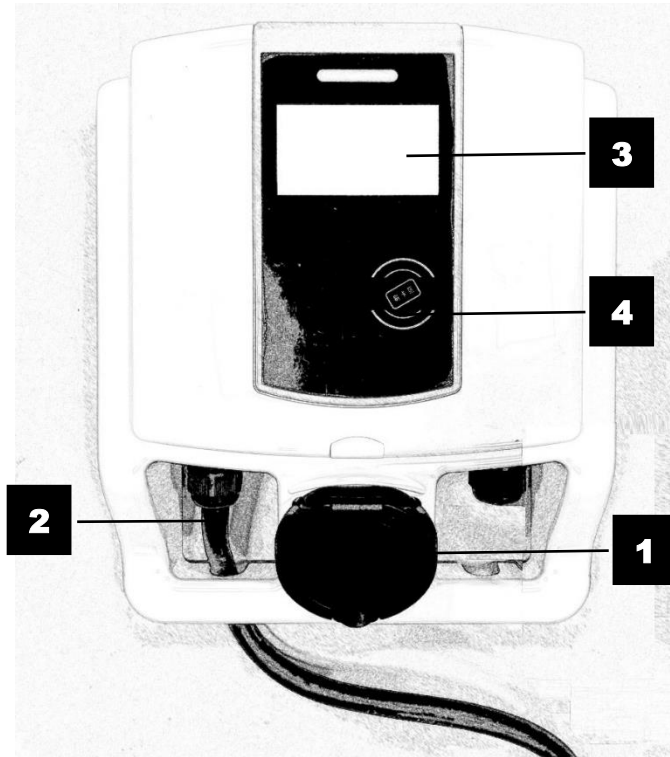


FIGURE 1 Front View

1	Outlet socket
2	Power supply cable
3	Screen*
4	RFID reader*

(*: touch screen and RFID reader are not available for model 2.3)



Depending on the design of the charging device, the output socket or charging cable may be different from the pictures shown above.

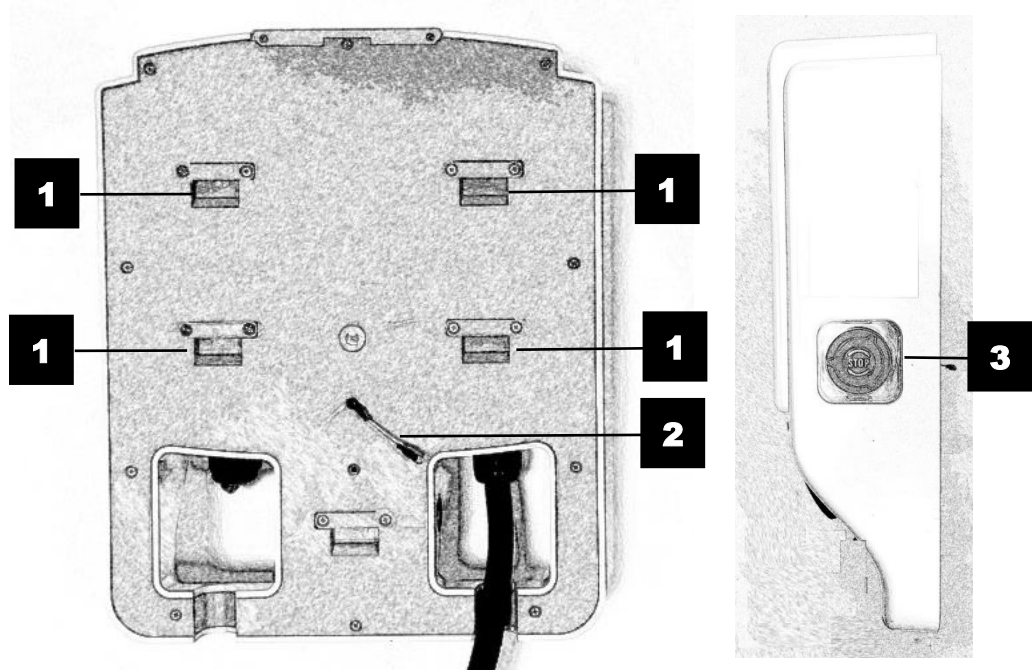


FIGURE 2 Back and side view

1	Mounting joints
2	Manual cable lock release trigger
3	Emergency button

(*: trigger not available for model 2.3)

3.2. Type Plate

The type plate is located at the top of the charging station. The illustration below shows all the information that can be found on the rating plate. The actual size of the type plate may differ depending on the device variant.

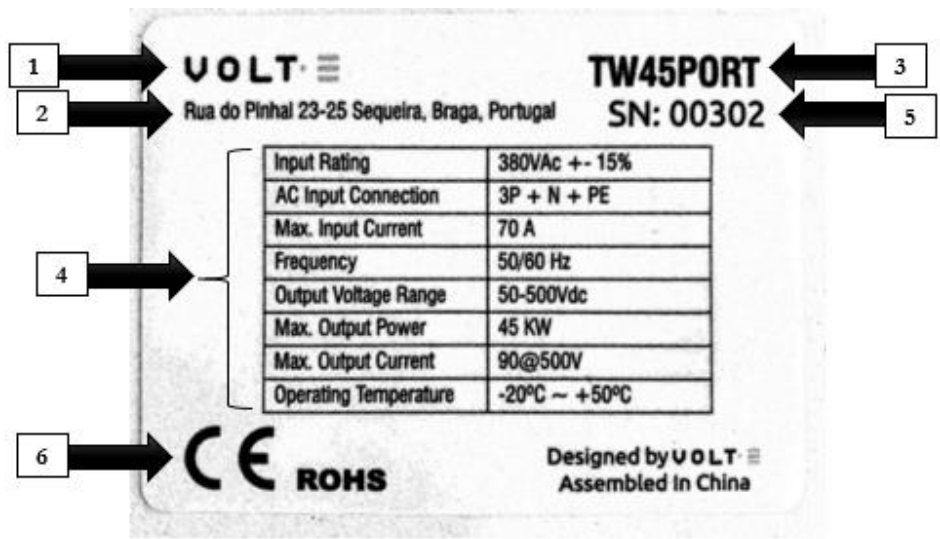


Figure 3 Nameplate

1	Manufacturer	4	Technical data
2	Manufacturer address	5	Serial number
3	Product designation	6	CE mark

3.3. Product description

The domestic chargers have been specially designed to be easily installed in external and internal areas with public and private access, to charge all brands of the market in MODE 3 (according to the European standard IEC 61851-1), through the plug built-in type 2 charging¹.

Available in various configurations of power 22 kVa and with the possibility of incorporating a fixed charging cable, customizable domestic chargers offer maximum market flexibility for this type of equipment.

With the possibility of integrating the RFID payment system with access control, domestic chargers are still open to be connected to a remote central management back-end or integrated into a public infrastructure network.

¹The outlets may vary depending on the model ordered.

3.4. Customizable Options

- **Display:** Information about the status of charging program, namely the output connectors, detailed data as kWh and duration time.
- **RFID:** User authentication through the proximity card reader.
- **Ethernet:** TCP/IP communication protocol for remote monitoring and configuration from anywhere.
- **3G Modem:** For places where wired communications are not efficient.

3.5. Main Features

- **Plug & Play:** To start charging, simply connect the charging cable to the car and the type 2 socket
- **Automatic lock:** type 2 sockets are equipped with an automatic locking system to prevent disconnection of the connectors during the charging process
- **Energy metering:** Inside the charging device an integrated meter is equipped to measure the power and energy consumed by the EV during a charging program.
- **Charging log:** The charging device can generate and store information about the charging procedures.
- **OCPP:** The unit complies with the open standard communication protocol, which allows communication between the charging device and the central management system.

4. Installation

Before the installation, make sure you have studied all related drawings and known well about all installation procedures. Observe strictly the following steps to guarantee a safe and functional installation of the unit.

Depending on the device model or for special materials, the installation materials must be provided by the customer. Proper installation is necessary and lies outside of the scope of responsibility of the manufacturer.

4.1. Water Drainage

Only a vertical installation of the charging station is permitted. The charging station must be mounted with the supplied washers at a 90° angle to the mounting surface - no inclination is allowed, otherwise water drainage will not be possible and damage to the device will result.

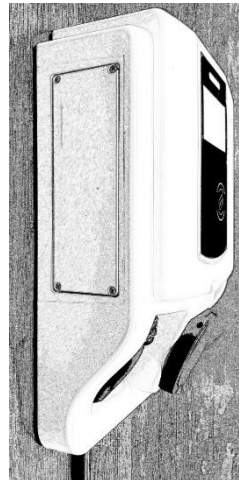


FIGURE 4 Water Drainage



In the case of interior condensation due to a sudden temperature change, wait until the temperature of the charging station decreases and the moisture disappears before connecting the device to the power supply.

4.2. Mounting the charging device

Use the supplied wall fixing materials (wall plugs and screws) to fix the charger to the wall. make sure that the installation surface is flat. The charging station must be prepared for this before mounting. To do this, proceed as follows:

➤ **Attention: The fastening materials equipped may vary depending on the types of wall surfaces. The use of appropriate fixing devices ensures the correct functioning of the equipment.**

1. After correctly adjusting the vertical position of the charger, mark 6 mounting holes (for version 2.3 only those marked with the number 1 in the image) at the desired location on the wall. The supplied wall mounting plate can be used as a guide for this purpose.

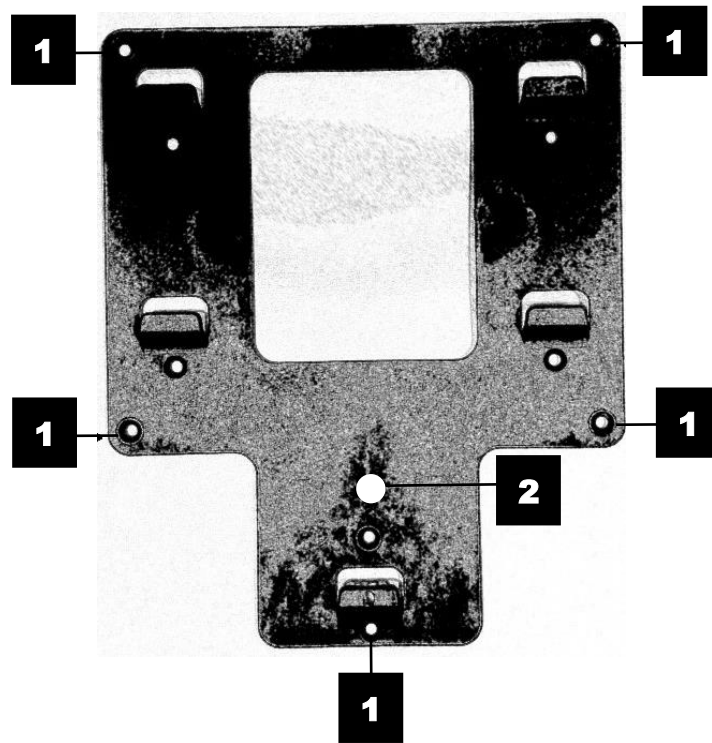


FIGURE 5 Installation template

1	Mounting holes
2	Manual cable lock release trigger hole *(not available for model 2.3)

- **Pay attention to hole “2” in figure 6. It is necessary to reserve enough space for the manual operation of the cable lock release trigger.**
2. Insert five dowels into the 5 holes drilled in the edge of the wall mounting plate (marked "1" in figure 6). Use the supplied screws or other appropriate fastening materials to secure the installation plate to the wall.
 3. After attaching the installation plate to the desired location, the charging device can now be attached to the backing plate (see the following illustration).

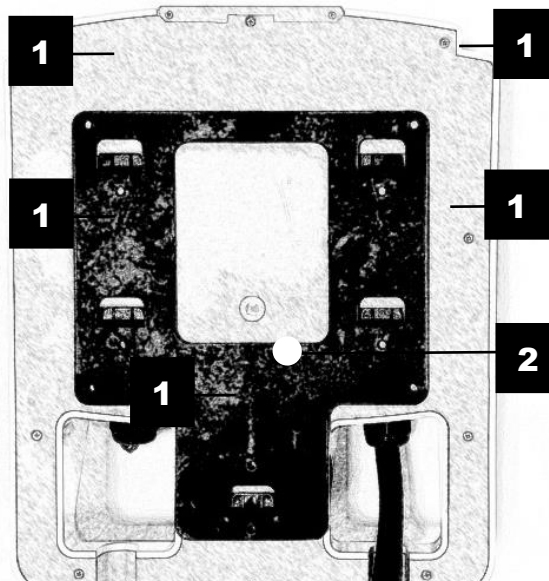
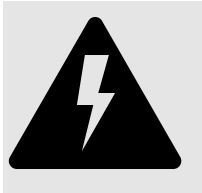


FIGURE 6 Fitting the device on the installation template

1	Mounting holes & joints
2	Manual cable lock release trigger & hole *(not available for model 2.3)

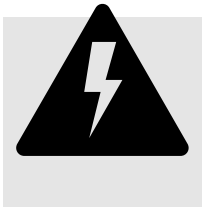
4. Make special attention to the manual cable lock release trigger. Make sure the trigger is correctly placed through the correspondent hole to guarantee the correct function of the cable lock.

- After correctly hooking the device on the installation template, now the device is ready for operation.



Ensure there is enough space for the correct function of the manual cable lock release trigger. Otherwise during the operation, the cable may not be properly locked on the device.

4.3. Cable Installation



Ensure the AC input power supply is completely turned OFF during the whole wiring procedure. Make sure the unit is correctly connected a grounded, metal, permanent wiring system, or an equipment grounding conductor.

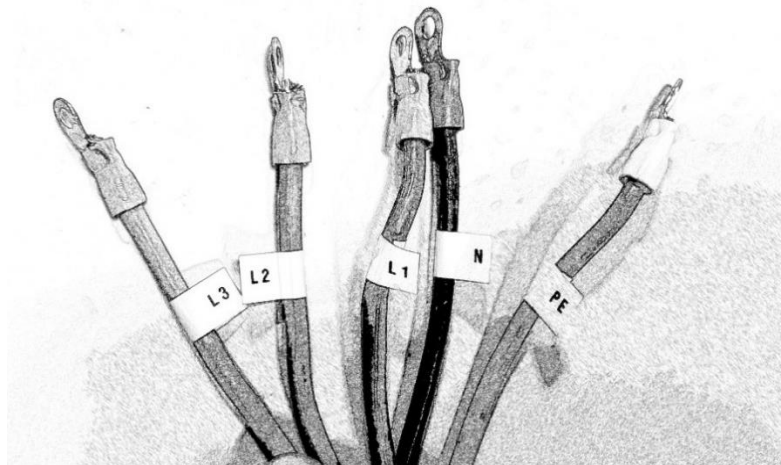


FIGURE 8 Wiring indications

L1	Phase 1 (brown)	N	Neutral (blue)
L2	Phase 2 (black)	PE	Earth (yellow & green)
L3	Phase 3 (grey)		

- ✓ Connect the three phases according to the color indications for power of 22 KW and single phase connect Phase 1 (properly identified on the cable) for the power of 7 kw;

- ✓ Factory programmable charger for other powers from 3.6 kw to 22 kw. (necessary to ask the manufacturer);
- ✓ Check the protection between power and equipment;
- ✓ Check the ground connection.

4.4. Verification

Make sure you carry out all the following instructions during the whole installation, operation and maintenance procedure.

➤ Power Input

Before proceeding, make sure voltage is present in the terminal blocks.



Pay special attention the neutral cable when establishing a three-phase connection. Make sure each cable is securely attached and fastened

➤ Maintenance Mode

Make sure all power supply has been cut OFF before carrying out any maintenance work.

➤ Check the wires

Before closing the front door and fixing the unit, ensure that all cables are kept inside the inside to guarantee the best water-proof performance.

➤ Check the connectors

Make sure the charging sockets are in good conditions before inserting any external connector to the unit.

➤ Electrical protections

Make sure all input power supply switch is turned off and the connection from the charging unit to the external circuit breaker is correctly established.

➤ Operation

Ensure no abnormal noise appears during the charging process.

5. Technical Data

Technical data	22kW AC Charging device
AC NOMINAL INPUT	
Phases / lines	Single/3-phase L1,L2,L3+N+PE
Voltage	220V/380V
Frequency	50Hz
Input current	16/32A
Input power	7/22kW
AC NOMINAL OUTPUT	
Voltage	220V/380V
Current	16/32A
Nominal power	7/22kW
Overcurrent Protection	63A
GENERAL SPECIFICATIONS	
Number of sockets	Single output equipment
Socket type	IEC62196 Type-2 (others under request)
Mounting	Wall-mount
Communication with EV	Pilot signal according to IEC61851
Human machine interface	By default
- Display	Color touch screen (4.5 inch)
- RFID system	ISO/IEC 14443A
- Light indicators	Three colored indicators
- Button	Emergency stop button

- Communication	3G/LAN/Wi-Fi
Cooling system	Self-cooled
Communication Protocols	OCPP 1.6
Place of installation	Indoor/Outdoor
Altitude	Up to 1000m
ENVIRONMENTAL CONDITIONS	
Operating temperature	-45~+45°C
Storage temperature	-45~+45°C
Humidity	10~90%
MECHANICAL DATA	
Enclosure rating	IP67
Enclosure material	Aluminum
Enclosure door	Frontal door
Measures (W x D x H)	485*285*160mm
Weight	11kg
STANDARDS	
Universal	IEC 60950-1 ² IEC 61851-1 ³
Connectors	IEC 62196-1 ⁴ IEC 62196-2 ⁵

² IEC 60950-1: Safety of information technology equipment - Part 1: General requirements

³ IEC 61851-1: Electric vehicle conductive charging system - Part 1: General requirements

⁴ IEC 62196-1: Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 1: General requirements

⁵ IEC 62196-2: Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 2: Dimensional compatibility and interchangeability requirements for a.c. pin and contact-tube accessories

Emission	IEC 61000-6-3 ⁶ IEC 61000-3-2 ⁷ IEC 61000-3-3 ⁸
Immunity	IEC 61000-6-1 ⁹ IEC 61000-4-2 ¹⁰ IEC 61000-4-3 ¹¹ IEC 61000-4-4 ¹² IEC 61000-4-5 ¹³ IEC 61000-4-6 ¹⁴ IEC 61000-4-8 ¹⁵ IEC 61000-4-11 ¹⁶

TABLE 1 22kW AC Charging device Technical Data

6 IEC 61000-6-3: Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
7 IEC 61000-3-2: Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
8 IEC 61000-3-3: Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection
9 IEC 61000-6-1: Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments
10 IEC 61000-4-2: Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
11 IEC 61000-4-3: Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
12 IEC 61000-4-4: Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
13 IEC 61000-4-5: Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
14 IEC 61000-4-6: Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
15 IEC 61000-4-8: Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency
16 IEC 61000-4-11: Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests

6. Operation



Incorrect handling or installation of the unit may result in severe personal injury as well as damage to the charging device. In particular, handling with voltages applied may result in electric shock, which may cause death or serious injury to personnel. Defective installation or maintenance may also lead to the risk of fire.



Read the manual carefully before connecting the charging device. Follow all installation, operation and maintenance instructions throughout the device's functional life. Pay special attention to the compliance with all installation and operation standards of the National Electrical Code.

6.1. How to Connect?

Once the installation and verification procedures are been properly carried out according to Section 4 – Installation, the charging device is ready to be used.

➤ **Connect the cable**

- ✓ Connect a qualified and compatible charging cable to your EV and plug the appropriate terminal to the home charger. Make sure that both the terminals are securely attached.

➤ **Unplug the cable**

- ✓ Once the charging circle is terminated, unplug the cable from the home charger and your EV and stall it properly.

6.2. How to Charge?

Once a qualified and compatible charging cable is securely connected to both your EV and the home charger, the charging program is ready to be initiated.

➤ **Switch on the charger**

To switch on the charging device, please carry out the following steps:

- ✓ Switch on the MCB and RCD installed on the distribution board;
- ✓ Once the power supply is switched on, the left indicator will present white light and the following default screenshots will appear on the touch screen:

➤ **Start charging**

- ✓ Once the charging plug is correctly connected to the AC socket and the electrical vehicle, the charging device will automatically initiate the default charging program.

➤ **Stop Charging**

The charging program will stop automatically once the battery of the EV is fully charged or when the program is terminated by user command. To interrupt the defined charging procedure, perform the following steps:

- ✓ In case of emergency, click the “STOP” button located on the right side of the charging unit to interrupt the charging program by force.
- ✓ Switch off the MCB and RCD installed on the distribution board and unplug the charging cable from the device.

7. Maintenance

This section provides detailed maintenance recommendations to guarantee the best performance and the longest operational life of the charging unit.

7.1. Preventive Maintenance

Compliance with the specified maintenance plans which provide cleaning procedures for the terminals, microswitches, capacitors, touch screen, emergency button and ventilation filters is advised. Cleaning should be performed every 6 (six)¹⁷ months and more often if the charger is installed and operated in harsh environmental conditions such as excessive dust accumulation. Check the following table for the recommended maintenance guide.

Operation	Periodicity	Estimated time (min)	Tools
Visual checking of the installation	Each 6 months	15	/
Check for unnatural noise during the charging program	Each 6 months	5	/
Cleaning dust	Each 6 months	30	Soft cloth
AC input cables: check the tightening torque of the cable connectors.	Each 6 months	30	Standard tools Torque wrench
AC output cables: check if the connectors, cables and its connections are in proper condition.	Each 6 months	15	Standard tools Torque wrench
Check if microswitches from the circuit breakers, fuses are working correctly.	Each 6 months	15	Multimeter
Check if the Emergency Stop Button works correctly	Each 6 months	1	Standard tools

TABLE 2 Recommended Maintenance Frequency

7.2. Trouble Shooting

The following table shows the most common errors during the operation.

¹⁷

Error	Possible Cause	Solution
Earth Leakage Fault	Current higher than expected	Disconnect and reconnect the power supply (by turning off the power supply to the charging device then back on again. If the message continues to appear, contact VOLT.E Customer Support.
The charger does not start charging	Emergency Stop Button pressed	Turn off the Emergency Button to allow the normal function of the charging program.

8. Technical Support

In case of any question concerning the installation, operation and maintenance of the charging device, please contact the technical support service.

9. Warranty

VOLT.E guarantees its products against any manufacturing defect for one year¹⁸ after the delivery of the units.

VOLT.E will repair or replace any defective factory product returned during the guarantee period.

9.1. Validity

The warranty is valid only when:

¹⁸ For purchases made by consumers in Portugal, the period for claiming defects of non-compliance related to the sales contract is 2 years from the date of delivery, according to the Decreto-Lei n.º 67/2003 de 8 de abril (with amendment).

- ✓ The product is purchased from VOLT.E, or its authorized dealers or distributors;
- ✓ The official assistance and maintenance plan offered by VOLT.E is purchased upon the purchase of the Charging device¹⁹;
- ✓ The cabinet of the Charging device is complete and un-opened by any non-certified third party;
- ✓ The product is NOT repaired or assisted by any third party other than those appointed and/or certified by VOLT.E;
- ✓ The product is NOT transferable to any third party either in ownership or during the period of contract.
- ✓ The model and serial label should NOT be defaced or removed from the product.

9.2. Exclusion

The warranty is not applicable to:

- ✓ Damage or loss caused by modification, alteration, repair by any unauthorized third party.
- ✓ Damage or loss caused by mishandling of the customer or people that has access to this product in the customer's premise.
- ✓ Normal wear and tear.
- ✓ Damage or loss caused by disasters or any other sources beyond VOLT.E's control.
- ✓ Damage or loss caused by external third bodies.
- ✓ Damage or loss caused by another device that is connected to the product.
- ✓ Damage resulting from accidents, misuse, abuse, tampering or failure of the customer to follow the normal operating procedures described in this installation and user manual.

¹⁹ The VOLT.E assistance and maintenance plan is a mandatory premise for the legal warranty, meanwhile, VOLT.E strongly recommend the Charging device be regularly inspected and maintained by the certified electricians.

✓ General maintenance and servicing.