EFAPOWER
EV HC G3
HOME CHARGING STATION

Installation and User Manual

efacec

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Symbols Index

The following symbols are used in this manual to prevent accidents which may occur as a result of incorrect use of the charger.

Note
Read the notes carefully to ensure safe and proper use

Warning or safety observation
Read the instructions carefully to ensure safe and proper use

Risk of electric shock
Read the instructions carefully to ensure safe and proper use

TABLE OF CONTENTS

1 GENERAL PRODUCT DESCRIPTION 2

2 GENERAL CHARACTERISTICS 3

2.1 TECHNICAL CHARACTERISTICS 3
2.2 STANDARDS 4

3 PRODUCT PARTS PRESENTATION 5

4 IMPORTANT SAFETY INSTRUCTIONS 6

5 INSTALLATION 7

5.1 ENVIRONMENTAL REQUIREMENTS 7
5.1.1 Local Conditions 7
5.1.2 Site Verification and Inspection 8
5.2 SITE PREPARATION 9
5.2.1 Upstream Wiring Information 9
5.2.2 Surface Preparation 10
5.2.3 Resources for Installation 10
5.2.4 Site Verification and Inspection 10
5.3 HANDLING AND PLACING 11
5.3.1 Packaging 11
5.3.2 Visual Inspection 11
5.3.3 Handling 11
5.3.4 Placing 12

6 START-UP 19

6.1 VERIFICATION AND INSPECTION 19
6.2 SWITCH ON 19

7 USER MANUAL 21

7.1 OUTPUT CONNECTOR 21
7.1.1 Type 1 Connector 21
7.1.2 Type 2 Connector 21
7.1.3 Type GB Connector 21
7.1.4 Type 2 outlet 22
7.2 OPERATION 22
7.2.1 Operation Sequences (for EV-HC without Authentication) 22
7.2.2 Operation Sequences (for EV-HC with Authentication) 24

8 MAINTENANCE MANUAL 25

8.1 PREVENTIVE MAINTENANCE 25
8.2 TROUBLESHOOTING 26

The information presented in this guide is subject to change without prior notice.
The technical specifications indicated here do not constitute a contractual obligation.

In case of any doubt regarding a subject described in this manual, please contact us at:

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1 GENERAL PRODUCT DESCRIPTION

EFAPOWER EV-Home Charger (HC) station is able to charge all electric vehicles compliant with AC charging system standards.

The battery charging cycle finishes by itself or can be interrupted by user command.

EFAPOWER EV-HC consists on a Charging Station with one output.

Are available the following AC outputs: 3,7kVA; 7,4kVA; 11kVA and 22kVA.

EFAPOWER EV-HC station is user friendly and safe. Different models are available, with power plug or socket. When equipped with a socket, the power cord plug is coupled into it in the charger bay. There is a locking mechanism on the socket that prevents the user from disconnecting the power cord during the charging process, without first interrupt the charging process on the system or on the vehicle. The charger has a color warning light which shows its own operation status.

Figure 1 - EFAPOWER EV-HC

EFAPOWER EV-Home Charger station codification and configurations are presented in chapter 3.

2 GENERAL CHARACTERISTICS

2.1 TECHNICAL CHARACTERISTICS

EFAPOWER EV-HC station technical characteristics are indicated in Table 1.

Table 1 – EFAPOWER EV-HC Technical Characteristics

Central Command Unit					
User Interface	User Identification (optional)	Contactless RFID Card (Mifare) ISO14443			
Outputs		CE and GB Units			
Nominal Input	Phases/Lines	1 line + neutral + earth		3 line + neutral + earth	
	Voltage	(230 ± 10%) Vac		(400 ± 10%) Vac	
	Current	16 A	32 A	16 A	32 A
	Power	3,7 kVA	7,4 kVA	11 kVA	22 kVA
	Frequency	(50 ± 10%) Hz			
Output	Connector	CE Units: Type 1 according to EN 62196-1 CE Units: Type 2 according to EN 62196-2 GB Units: Mode 3 according with GB/T20234.2		CE Units: Type 2 according to EN 62196-2 GB Units: Mode 3 according with GB/T20234.2	
	EV Connection to EVSE	CE units: EN 61851-1 and IEC 61851-1 Case B and IEC 61851-1 Case C GB units: GB/T 18487.1 Case C			
Outlet Protection	Over-current (not included)	20 A	40 A	20 A	40 A
	RCD	30 mA			
Charging Mode	Direct connection between the EV and the EVSE using the cable supplied with the vehicle.	CE units: EN 61851-1 e IEC 61851-1 Mode 3 GB units: GB/T 18487.1 Mode 3			
Energy metering	(optional)	Yes			
Mechanical Characteristics	Dimensions(WxDxH) mm	300x156x169 mm		320x156x224 mm	
	Architecture	Standalone box equipped with one output			
	Weight	from 4kg to 7kg (depending on the output)			
Environmental conditions	Degree of protection	IP 54			
	Temperature	Natural cooling (Range -30˚C to +50˚C)			
	Humidity	Range 5% to 95%			
	Installation site	Outdoor/Indoor			

Specifications are subject to change, without prior notice.

2.2 STANDARDS

The EFAPOWER EV-Public Charger station complies with the following standards:

Table 2 – EFAPOWER EV-HC Applicable Standards

Technical Data		CE	GB
Applicable Directives / Standards	Universal:	2006/95/CE[1] 2004/108/CE[2] EN/IEC 61851-1[3] IEC 62196[4]	GB 156-2007[5] GB/T 18487.1[6] GB/T 20234[7] GB/T 18487.3[8]
	AC Charging System:	EN/IEC 61851-22[9] EN/IEC 61000-6-1[10] EN/IEC 61000-6-3[11] EV-READY	GB/T 17626[12] GB 4824[13] EV-READY

[1] **2006/95/CE**: Low Voltage Directive
[2] **2004/108/CE**: EMC directive
[3] **EN/IEC 61851-1**: Electric vehicle conductive charging system. Part 1: General Requirements
[4] **IEC 62196**: Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles
[5] **GB 156-2007**: Standard Voltage
[6] **GB/T 18487.1**: Electric vehicle conductive charging system. Part 1: General Requirements
[7] **GB/T 20234**: Connection Set of Conductive Charging for Electric Vehicles
[8] **GB/T 18487.3**: Electric vehicle conductive charging system. AC/DC Electric Vehicle Charging Station
[9] **EN/IEC 61851-22**: Electric vehicle conductive charging system. Part 22: AC Electric Vehicle Charging Station
[10] **EN/IEC 61000-6-1**: Electromagnetic compatibility (EMC). Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments
[11] **EN/IEC 61000-6-3**: Electromagnetic compatibility (EMC). Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
[12] **GB/T 17626**: Electromagnetic compatibility – Immunity to Disturbance (GB/T 17626.2; GB/T 17626.3; GB/T 17626.4; GB/T 17626.5; GB/T 17626.6; GB/T 17626.11)
[13] **GB 4824**: Industrial, scientific and medical (ISM) radio-frequency equipment. Disturbance characteristics. Limits and methods of measurement.

3 PRODUCT PARTS PRESENTATION

EFAPOWER EV-HC is composed by a standalone box with one output. Its codification is presented below.

EV-XX G3 YY 0F-00-G-KK ZZP

EV-XX G3
- Home Charger 3kW – **HC3**
- Home Charger 7kW – **HC7**
- Home Charger 11kW – **HC11**
- Home Charger 22kW – **HC22**

YY
- **CE** European markets
- **GB** China market

ZZP
- ZZ **Meter**
  - **MS** Simple Meter
  - **--** wo Meter
- P **Card Reader**
  - **C** RFID
  - **--** wo Card Reader

0F-00-G-KK
- 0F **Number of Phases**
  - **1F** One-phase
  - **3F** Three-phase
- 00 **Current**
  - **16** 16 A
  - **32** 32 A
- G **Plug/Socket**
  - **P** Plug
  - **S** Socket
- KK **Mode**
  - **T2** Type T2
  - **GB** Type GB

Figure 2 - EFAPOWER EV-HC Codes

EFAPOWER EV-HC has two boxes depending on the power rate. For **3,7kVA** and **7,4kVA** the box is represented in **Figure 3**.

CE marked units can be supplied with socket or cable and GB marked units are supplied only with cable.

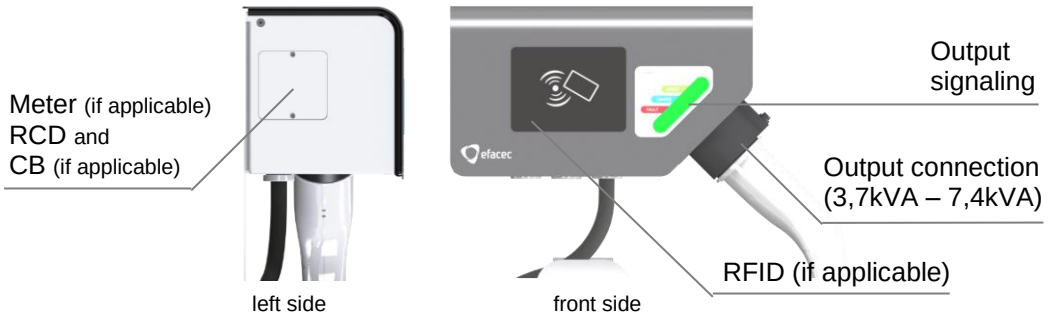

Figure 3 - EFAPOWER EV-HC 3 / 7 Parts

In **Figure 4** is presented the box for **11kVA** and **22kVA**.

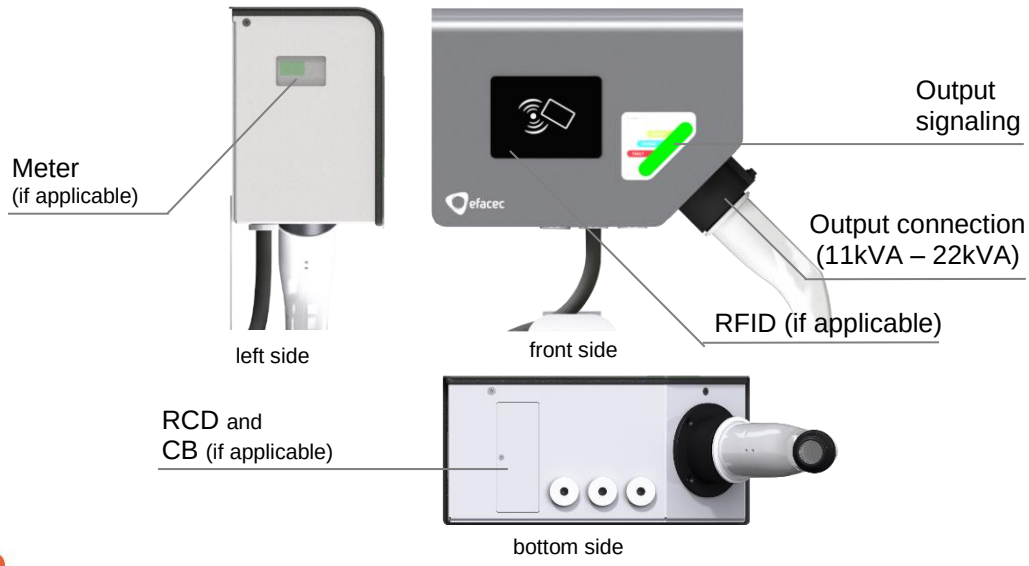

Figure 4 - EFAPOWER EV-HC 11 / 22 Parts

4 IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions that must be followed during installation of the EFAPOWER EV-HC Station.

Grounding instructions

The EFAPOWER EV-HC Station must be connected to a grounded, metal, permanent wiring system; or an equipment-grounding conductor is to be run with circuit conductors and connected to the equipment grounding terminal or lead on the Electric Vehicle Supply Equipment (EVSE). Connections to the EVSE shall comply with all local codes and ordinances.

Safety and compliance

This document provides instructions to install the EFAPOWER EV-HC Station and should not be used for any other product. Before installing the EFAPOWER EV-HC Station, you should review this manual carefully and consult with a licensed contractor, licensed electrician and trained installation expert to ensure compliance with local building practices, climate conditions, safety standards, and state and local codes. The EFAPOWER EV-HC Station should be installed only by a licensed contractor and a licensed electrician and in accordance with all local and national codes and standards. The EFAPOWER EV-HC Station should be inspected by a qualified installer prior to the initial use. Under no circumstances will compliance with the information in this manual relieve the user of his/her responsibility to comply with all applicable codes or safety standards. This document describes the most commonly-used installation and mounting scenarios. If situations arise in which it is not possible to perform an installation following the procedures provided in this document, contact EFACEC. EFACEC is not responsible for any damages that may occur resulting from custom installations that are not described in this document.

No accuracy guarantee

Reasonable effort was made to ensure that the specifications and other information in this manual are accurate and complete at the time of its publication. However, the specifications and other information in this manual are subject to change at any time without prior notice.

Warranty information and disclaimer

Your use of, or modification to, the EFAPOWER EV-HC Station in a manner in which the EFAPOWER EV-HC Station is not intended to be used or modified will void the limited warranty. Other than any such limited warranty, the EFACEC products are provided “AS IS,” and EFACEC and its distributors expressly disclaim all implied warranties, including any warranty of design, merchantability, fitness for a particular purposes and non-infringement, to the maximum extent permitted by law.

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5 INSTALLATION

All matters for installing the EFAPOWER EV-HC are described in this chapter.

5.1 ENVIRONMENTAL REQUIREMENTS

EFAPOWER EV-HC Station reliability is dependent upon compliance of environmental specifications. The design of the environmental control system for your EFAPOWER EV-HC Station, in case of extreme environmental conditions, must ensure that the Unit can operate reliably while remaining within the range of its operating specifications.

5.1.1 LOCAL CONDITIONS

EFAPOWER EV-HC Station has a protection degree of IP54. This Unit is intended to work below 50°C ambient temperature.

Clearance around the unit
There should be enough space to operate the unit in the front and both sides. For EV-HC 11 / 22 please ensure also clearance in the bottom to access to the RCD.

Input Power Cables
AC input cables must be copper with appropriate power rating.

EFAPOWER EV-HC is intended to be placed on the wall, as showed in Figure 5.

Figure 5 - EFAPOWER EV-HC Station – placing

On locations with harsh weather conditions (high temperatures, heavy dust, snow and/or very low temperatures) it's recommended to provide additional protection, either inside a building or a shelter, or providing a roof protection for the Unit. See example in Figure 6.

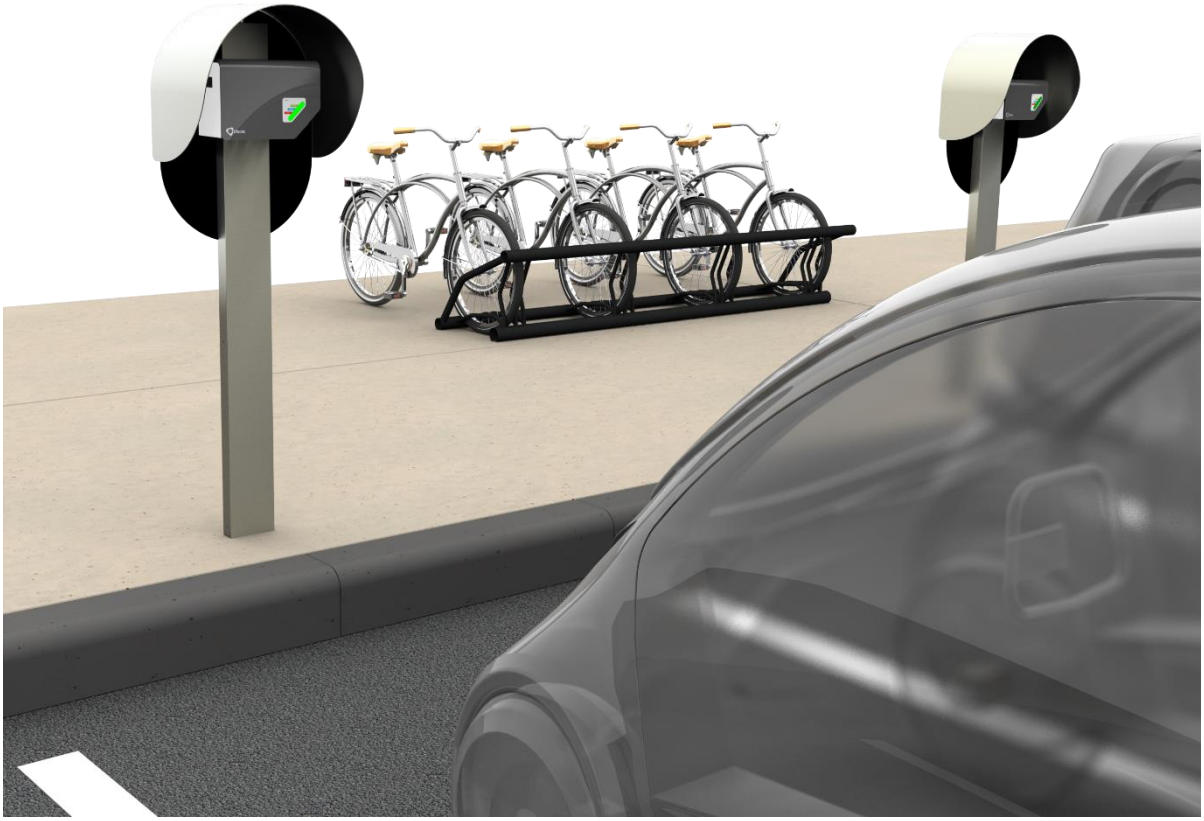

Figure 6 - EFAPOWER EV-HC with roof protection

5.1.2 SITE VERIFICATION AND INSPECTION

✓ **Check** if **Home Charger** Station **layout site** is **compliant** with the specified **clearance** around the **box**;

5.2 SITE PREPARATION

Once the local conditions are verified is time to set up the site in order to be ready for the installation of the EFAPOWER EV-HC Station.

5.2.1 UPSTREAM WIRING INFORMATION

The power feeding of the EFAPOWER EV-HC with origin on the LVDB (low voltage distribution board) must be done with dedicated wiring (line(s), neutral and earth conductors only used to supply the equipment) and protected by a circuit breaker and a voltage suppressor, please refer Figure 7 and Figure 8.

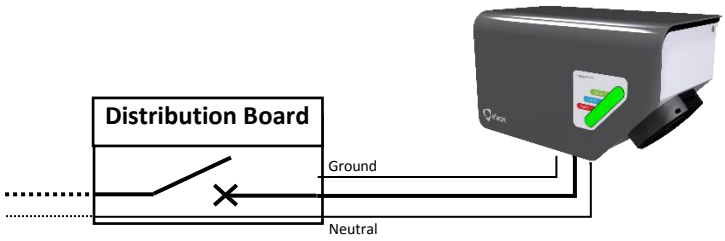

Figure 7 - EFAPOWER EV-HC 3 / 7 Wiring Information

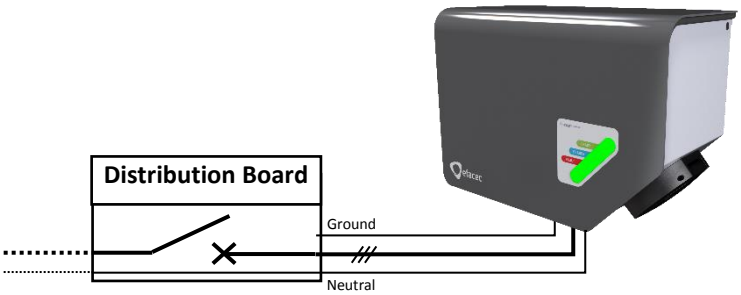

Figure 8 - EFAPOWER EV-HC 11 / 22 Wiring Information

Depending on the output of the Unit, we can have several scenarios for the circuit breaker to be installed in the distribution board for each Unit. The appropriate circuit breaker is represented in Table 3.

Table 3 - Overcurrent protection upstream

3,7 kVA	**Circuit Breaker 20A 1P C**
7,4 kVA	**Circuit Breaker 40A 1P C**
11 kVA	**Circuit Breaker 20A 3P C**
22 kVA	**Circuit Breaker 40A 3P C**

NOTES
Unless it's required by local code it's not necessary to install a residual-current device (RCD) for EFAPOWER EV-HC Station as it is already installed inside the unit.

5.2.2 SURFACE PREPARATION

Each Charging Station must be fixed to a pole or a wall by a fixing plate.

5.2.3 RESOURCES FOR INSTALLATION

For the installation of EFAPOWER EV-HC Station the following resources are going to be needed:

Fasteners:

- 3x Screws M4 + 3x matching Anchors
- If EV-HC with cable, for cable holder: 2x Screw M4 + 2x matching Anchor

End terminals for input wiring by Unit:

EV-HC 3 / 7

- 3 (three) end terminals for cable according to Table 5 or according to local codes (1 phase + neutral + protective ground)

EV-HC 11 / 22

- 5 (five) end terminals for cable according to Table 5 or according to local codes (3 phases + neutral + protective ground)

Table 4 – Max current by phase

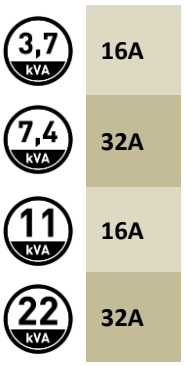

Table 5 - Input lines –cross-section range

max A	Min cross-section*	Terminal block section
16 A	2,5mm²	4mm²
32 A	4mm²	4mm²

* These cross-sections are applied to copper cable length up to 50m or according to local codes. For higher distances contact the manufacturer.

Tools:

- Screwdriver - for wall mount
- Crimping tool - for power and earth cables
- Torque screwdriver with flat blade - for input terminal blocks

5.2.4 SITE VERIFICATION AND INSPECTION

- ✓ **Check** if **Home Charger** has the **appropriate upstream protection** depending on the configuration of it
- ✓ **Verify** if the **neutral** is of **type TT or TN**. Only these two regimes guarantee a good and correct functioning of the EFAPOWER EV-HC residual current device
- ✓ **Verify** the **earth circuit resistance**: it should be **according** to **IEC 60364/GB 16895.3**, and other applicable standards. In either case it must be **under 150 Ω**
- ✓ **Verify** if the **main distribution board** has **conditions** to **support one** more **circuit with** the **characteristics** required **depending on** the **model**
- ✓ **Execute** and **test** the **installation according** to **IEC 60364** standard or **local regulations for CE marked units** and according to **GB 16895.3, GB/T 16895.10, GB16895.5** standards or **local regulations for GB marked units**
- ✓ A **test document** will be **issued by** the **installer** responsible as a **guarantee** to the user that the **Homecharger was properly installed** and ready to supply energy to charge the EV battery

5.3 HANDLING AND PLACING

Before installing stations
The instructions provided in this manual assume that the appropriate wiring, circuit protection, and metering are in place at the installation location.
To assist in the process of preparing the installation site, it is recommended that before you begin installing the Charging Station, you thoroughly review the contents of this document to familiarize yourself with the required installation steps.

In case of any doubt regarding items described in this guide, please contact us at:

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5.3.1 PACKAGING

EFAPOWER EV-HC Station is shipped in a personalized package (493x400x187mm), please refer to Figure 9. The Unit dimension is in Technical characteristics - 2.1.

Figure 9 - EFAPOWER EV-HC Package

5.3.2 VISUAL INSPECTION

- ✓ **Check if** the **exterior case** has been **damaged** by mechanical impacts or any accidents during transportation
- ✓ If applicable, **check if** the EFAPOWER EV-HC Station **decor** is in **perfect condition**
- ✓ **Check** for proper Unit(s) **protective ground connection point**, which should be interconnected with the low voltage switchboard ground connection during the installation

5.3.3 HANDLING

Due to its weight (max 7kg), this Charging Station can be placed by one person.

5.3.4 PLACING

5.3.4.1 FIXING ON THE WALL

Each unit must be installed by using 3 (three) screw anchors, M4 – length must comply with local codes.

The fixation of the **EV-HC** should assure that **no part of it is under 0,8m or above 1,5m from ground** thus permitting a comfortable handling of the equipment and charging cable.

Mounting steps:

1. **Unscrew the lid**

   All 4 screws must be untighten to take off the lid.

2. **Disconnect the lid**

   The lid shall not be hanging on the wires!

   a. Unplug the earth cable on it (faston terminal)
   b. Unplug the flat cable on the board (X14)
   c. Unplug the card reader cable on the board (X6) – if applicable

3. **Fix the Unit to the wall** (use the drilling layout template)

   In the following figures some details are shown regarding the drilling layout for both boxes.
   Only 3 (three) **points** are **needed to fix** each **Unit** on the wall (marked with a red circle) with M4 bolt.

   To make easier the wall mounting, a drilling layout template, 1:1 scale, is supplied with the unit.

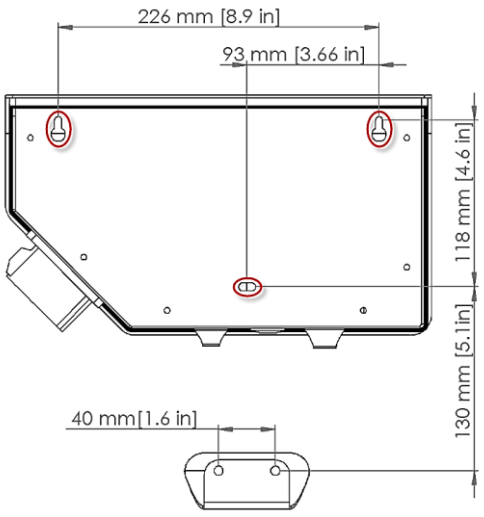

Figure 10 - EFAPOWER EV-HC 3 / 7 Drilling Layout

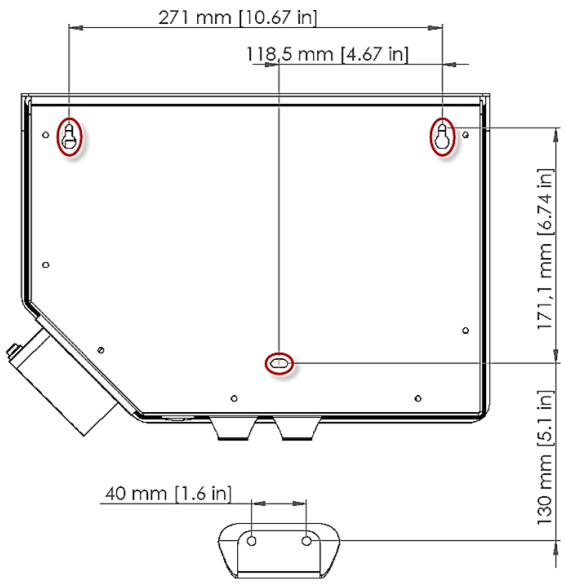

Figure 11 - EFAPOWER EV-HC 11 / 22 Drilling Layout

Additional 2 (two) **screws** and matching **anchors** are need **if** the EV-HC has **charging cable** (for cable holder).

4. Connect the cables

The **cables entrance shall respect** the **place** that was **assigned** to it at the bottom of the Unit:

EV-HC3 / EV-HC7	**EV-HC11 / EV-HC22**
✓ **Left** grommet – **Charging Cable** (if applicable)	✓ **Left** grommet – **Charging Cable** (if applicable)
✓ **Middle** grommet – **Communications** (refer chapter 5.3.4.4)	✓ **Middle** grommet – **Input** power **cables** (refer chapters 5.3.4.2 and 5.3.4.3).
✓ **Right** grommet – **Input** power **cables** (refer chapters 5.3.4.2 and 5.3.4.3).	✓ **Right** grommet – **Communications** (refer chapter 5.3.4.4)

5. Connect the lid

Do not forget to re-connect the cables!

a. Plug the earth cable on it (faston terminal)
b. Plug the flat cable on the board (X14)
c. Plug the card reader cable on the board (X6) – if applicable

6. Screw the lid

First, tighten all 4 screws only to the point where they are snug.

Then, tighten the screws all the way starting with the lower screws.

5.3.4.2 POWER CABLES CONNECTION

EVERY OPERATION ON THE EFAPOWER EV-HC MUST BE EXECUTED BY QUALIFIED PERSONNEL AND PROPERLY AUTHORIZED. DO NOT OPERATE IN CASE OF WATER PRESENT OR HUMIDITY.
BY OPENING THE EFAPOWER EV-HC STATION'S COVERS YOU RUN RISK OF EXPOSURE TO DANGEROUS VOLTAGES!

After unpacking and physically installing, the authorized technician must start installing the input cables.

Before connecting the EFAPOWER EV-HC must be assured:

- **The Grid Voltage level and frequency match** the **specifications** on the EFAPOWER EV-HC characteristics label
- The **Ground connection** is connected in **accordance** with the **harmonized standards** or **local regulation**
- The **upstream protection** is **provided** for the Unit

To ensure protection to technicians during installation of the EFAPOWER EV-HC, please verify the connections are done according to the following conditions:

- There is **no input Voltage** (not connected to the Grid);
- No **connection** to **Loads** from the **EFAPOWER EV-HC**
- The **EFAPOWER EV-HC** is **OFF**.

The input AC connections are done on the Charging Station as represented in Figure 12 through the grommet mentioned below:

✓ For **3,7kW/ 7,4kW** - 1Ph+N+PE, 50/60Hz, and shall come **through** the **right grommet**

✓ For **11kW/ 22kW** - 3Ph+N+PE, 50/60Hz, and shall come **through** the **middle grommet**

Cable section of each line, depending on the power rate of EV-HC, can be consulted in Table 3 on page 9.

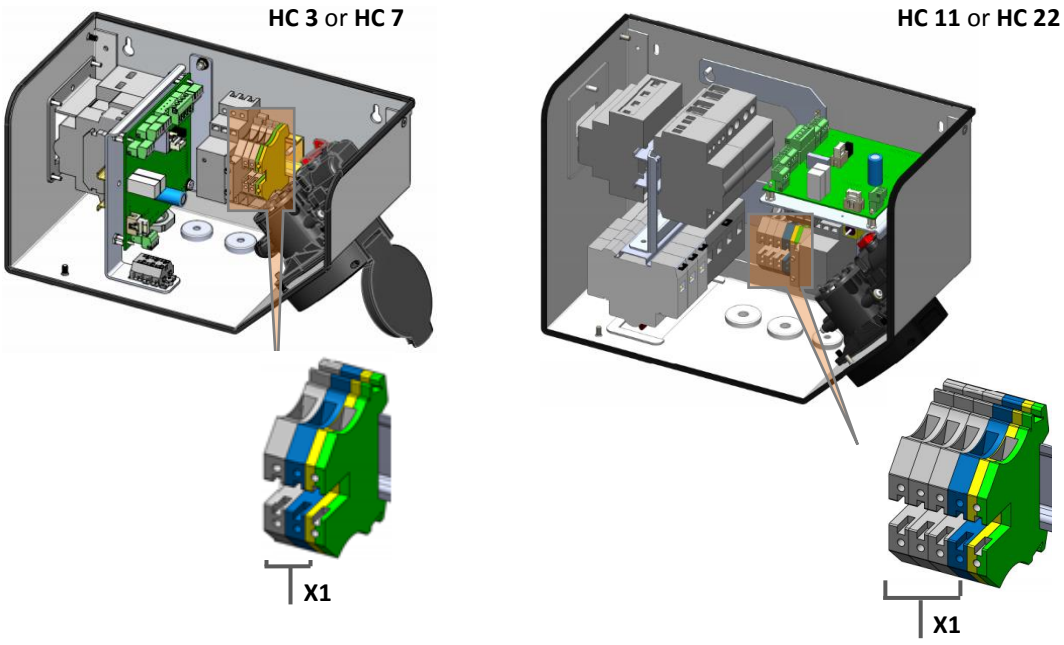

Figure 12 – Home Charger (front view) - Input Terminals

5.3.4.3 PROTECTIVE GROUND

The metallic structure is connected to the protective earth connection, as shown in Figure 13, which should be interconnected with the low voltage switchboard earth connection.

Cable section of protective earth line, depending on the power rate of EV-HC, can be consulted in Table 3 on page 9.

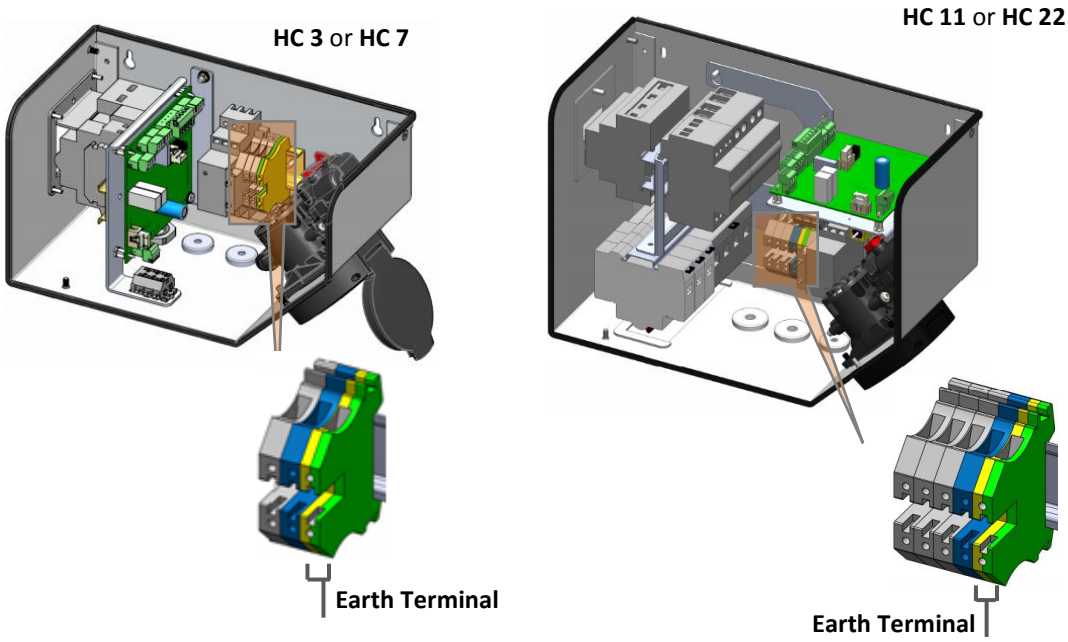

Figure 13 – Home Charger (front view) - Earth Terminals

5.3.4.4 COMMUNICATIONS (IF APPLICABLE)

When applicable, the communications on the EV-HC shall be done through X2 double terminal (marked with a red circle), represented in both EV-HC boxes on the next figure.

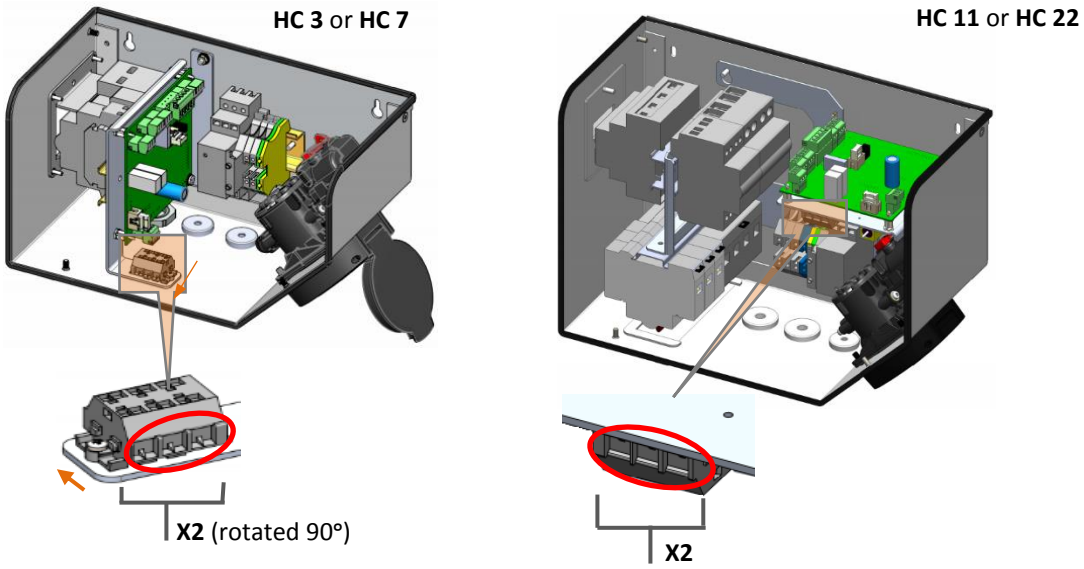

Figure 14 – Home Charger (front view) – X2 Terminals

NOTE: The following communication scenarios are going to be represented on the one phase EV-HC box, although they are valid also for the three phase EV-HC box.

EV-HC Standalone connected to a Local PC

This scenario includes an EV-HC with RFID card reader and/or meter, with a port for communication with the PC program Efacec Communication Manager. For more information on the Efacec Communication Manager, please contact Efacec Electric Mobility commercial team.

If the charger isn't equipped with an Energy Meter, the energy field on the transactions will be zero.

This communication is based on RS-485 and shall be used a USB-RS485 converter.
The Figure 16 represents the USB-RS485-WE FTDI converter.

The converter has several lines, although only 3 are needed for this communication, as referred in the following table.

Table 6 - USB-RS485-WE FTDI converter - Connections

Cable Color	Function	X2 Terminal
Black	GND	X2.3
Orange	RS-485 D+	X2.1
Yellow	RS-485 D-	X2.2

A. Converter connected to a pre-installation outside EV-HC

If it's not suitable the USB-RS485 converter connected directly to the EV-HC, due to distance constraints, alternative pre-installation it's allowed (Figure 15):

- A **shielded communication** cable of at least **3 conductors** can be connected to the EV-HC (through X2) and **end** into a **3 pin panel outlet connector** near a suitable place to connect the PC.

  ATTENTION: This **panel connector shall not be standard** in order to prevent anyone to connect an everyday use cable to the charger. USB, RJ45 adapter should not be used. This connector can also be somehow locked to prevent inadequate use.

- The **mate male connector** shall be **assembled to** the **USB-RS485 FTDI** converter, refer Table 6.

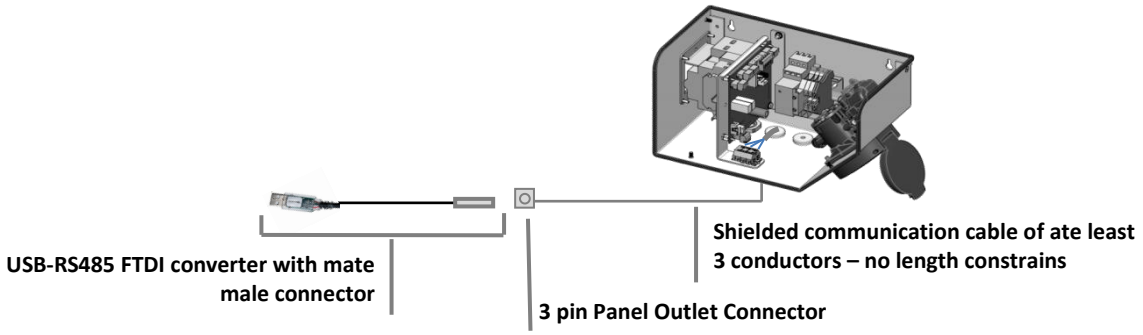

Figure 15 - Converter connected to a pre-installation outside EV-HC

The panel outlet connector can now be installed in a suitable place, without length constrains, where the PC is located. The USB-RS485 converter will link between the panel connector and the PC providing full access to the Home Charger.

B. Converter directly connected to EV-HC

In this case the converter is directly connected to the X2 terminal of EV-HC, as represented in Figure 16.

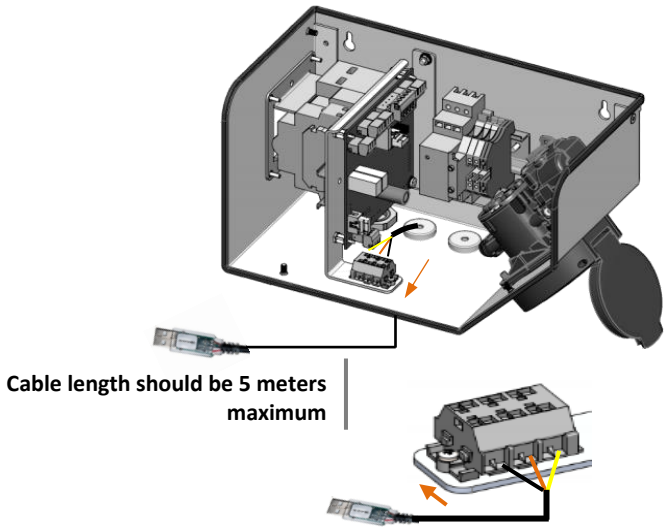

Figure 16 - Converter directly connected to EV-HC

The USB connection point can now be installed in a fixed location where the PC is located, providing full access to the Home Charger.

A Network of EV-HCs connected to a Local PC

This scenario is a development of the previous. In this situation, all the chargers are connected together through the X2 connector in Unit, and each charger is equipped with a RFID card reader and/or meter.

If the charger isn't equipped with an Energy Meter, the energy field on the transactions will be zero.

The transactions can be saved in an excel file ant therefore reports of charge associated to a specific RFID card can be generated.
ATTENTION: There is a Maximum limit of the number of the chargers that can be connected this way: 127 chargers in the network.

A USB-RS485 converter is used to connect all the chargers to a Local PC, refer Table 6.
The USB converter is connected between the Local PC and the first/closest charger (through X2). The pre-installation presented above can be implemented.

Thereafter each charger is connected through the same X2 terminal till the last. A shielded communication cable of at least 3 conductors shall be used, as represented in the following figure.

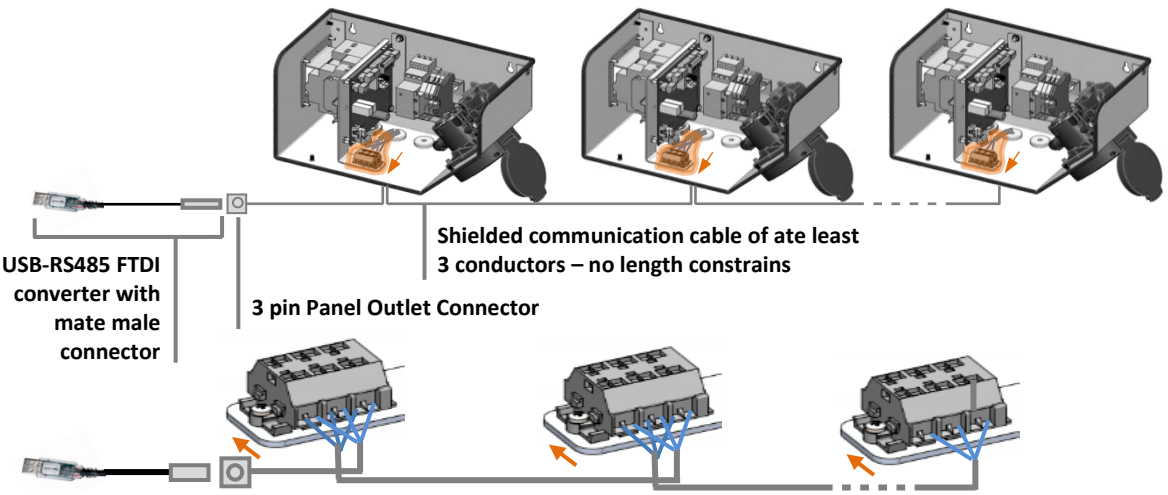

Figure 17 - Network of EV-HCs connected to a local PC

In this scenario the chargers are always connected between each other and the PC.

A Network of EV-HCs as Satellites of a Central Unit

The EV-HC has the ability of behaving like a public satellite connected to a central unit. Just connect to the X2 terminal of the EV-HC the respective RS-485 cables of the satellites network. Is possible to have a network up to 25 satellite units.

In this solution, the RFID card reader is only located on the Central Unit, which also has GSM communications with a back office. Each satellite (EV-HC) has its meter.

The actual satellites communicate between each other and with the central unit with a shielded communication cable of at least 3 conductors, as represented in the following figure.

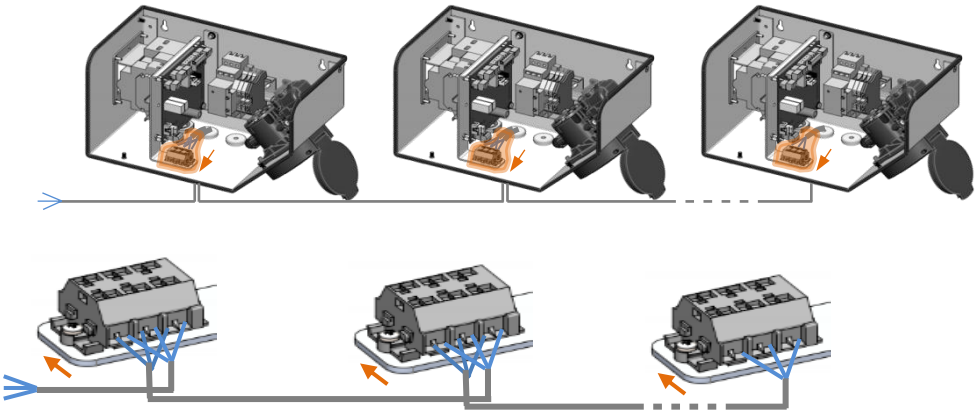

Figure 18 - Network of EV-HCs as Satellites of a Central Unit

6 START-UP

6.1 VERIFICATION AND INSPECTION

- ✓ **Check if** the **bolts** of the AC and **protective ground** cables of the EFAPOWER EV-HC Station are correctly **tightened**
- ✓ **Check** the **resistance between** the EFAPOWER **EV-HC protective ground and** the **low voltage switchboard ground** connection; the **value** must be **according** to **local codes**
- ✓ Before switching ON all circuit breakers, **check** the **supply voltage** according to voltage required in the characteristics label.

6.2 SWITCH ON

BEFORE ATTEMPTING TO INSTALL OR START UP THE EFAPOWER EV-HV STATION THE USER MUST ENSURE THAT THE SAFETY INSTRUCTIONS IN THIS MANUAL ARE CAREFULLY READ AND OBSERVED BY TECHNICALLY COMPETENT PERSONNEL.
KEEP THIS MANUAL WITH THE EFAPOWER EV-HC STATION FOR FUTURE REFERENCE.
THIS EFAPOWER EV-HC STATION MUST NOT BE STARTED OR PUT INTO USE WITHOUT HAVING BEEN COMMISSIONED BY A FULLY TRAINED AND AUTHORIZED PERSON

ALL SERVICING MUST BE PERFORMED ONLY BY QUALIFIED PERSONNEL. DO NOT ATTEMPT TO SERVICE THE EFAPOWER EV-HC STATION YOURSELF.
BY OPENING THE EV-HC STATION'S COVERS YOU RUN RISK OF EXPOSURE TO DANGEROUS VOLTAGES!
IN CASE OF ANY KIND OF DOUBT REGARDING THIS, PLEASE CONTACT:

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EFACEC WILL ASSUME NEITHER RESPONSIBILITY NOR LIABILITY DUE TO INCORRECT OPERATION OR MANIPULATION OF THE EFAPOWER EV-HV STATION.

EFACEC HAS TAKEN EVERY PRECAUTION TO PRODUCE AN ACCURATE, COMPLETE AND EASY TO UNDERSTAND MANUAL AND WILL THEREFORE ASSUME NO RESPONSIBILITY NOR LIABILITY FOR DIRECT, INDIRECT OR ACCIDENTAL PERSONAL OR MATERIAL DAMAGE DUE TO ANY MISINTERPRETATION OR UNDESIRED MISTAKES IN THIS MANUAL.
THIS MANUAL MAY NOT BE COPIED NOR REPRODUCED WITHOUT PRIOR WRITTEN PERMISSION OF EFACEC

✓ **Switch on residual current device** and the **circuit breaker** (if applicable) in the Charging Station:

Residual current devices: **Q0**

Circuit breakers: **Q1** (if socket output in 32A models)

The RCD can be armed by removing the left window and moving up the lever. There is a test button for operation and differential protection test.

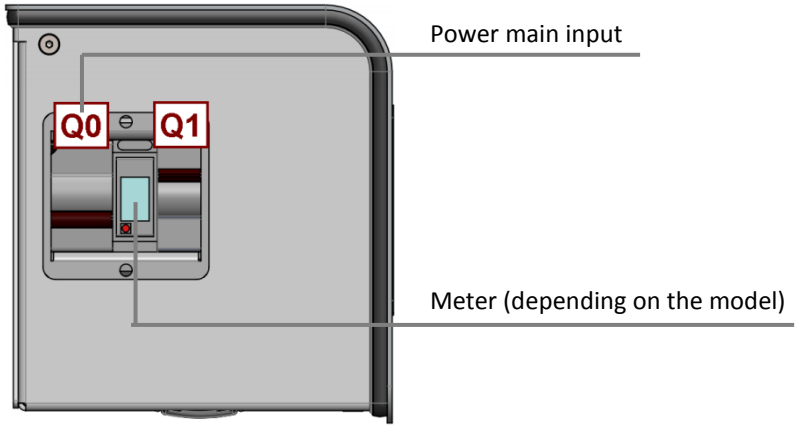

Figure 19 – HC 3 / 7 - left view

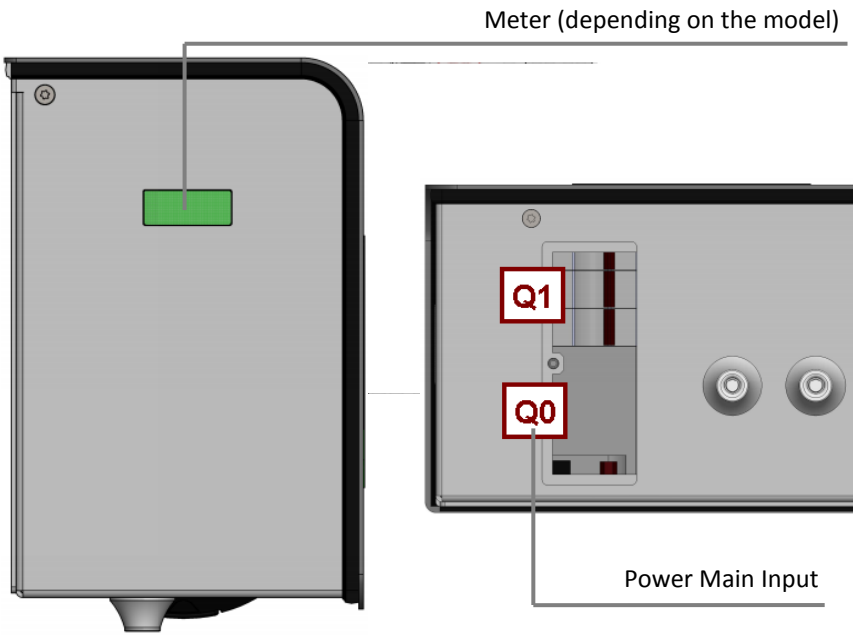

Figure 20 – HC 11 / 22 - left view

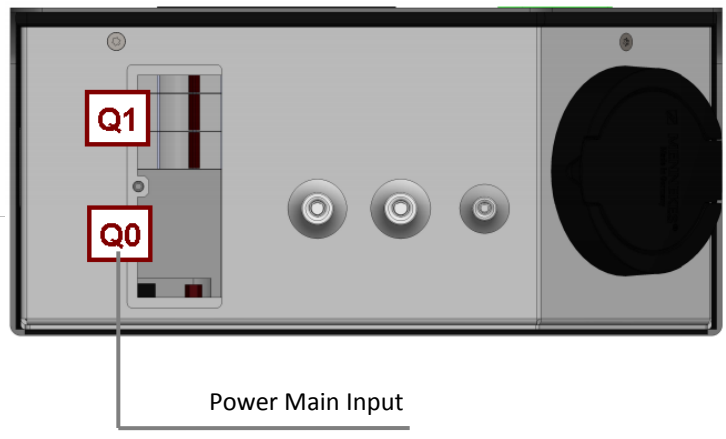

Figure 21 – HC 11 / 22 - bottom view

After connecting the charging station for the **first time, wait** a few seconds and the **EV-HC Station should be ready to use.**

AT THIS POINT THE **COMMISSIONING CHECK LIST REPORT,** PROVIDED WITH THIS MANUAL, **SHALL BE FILLED IN** AND **SENT** TO EFACEC VIA **E-MAIL: serviceEEM@efacec.com**.

7 USER MANUAL

The EFAPOWER EV-HC is very simple and intuitive.

As presented in Chapter 3, the Human Machine Interface (HMI), will signal different stages on the led. These sequences are showed in this chapter.

7.1 OUTPUT CONNECTOR

EFAPOWER EV-HC is prepared to charge electric vehicles according to the mentioned charging systems.

7.1.1 TYPE 1 CONNECTOR

Mode 3

Figure 22 - Mode 3 Type 1 Connector

This connector is available for the following power rates on CE marked units:

7.1.2 TYPE 2 CONNECTOR

Mode 3

Figure 23 - Mode 3 Type 2 Connector

This connector is available for the following power rates on CE marked units:

7.1.3 TYPE GB CONNECTOR

Mode 3

Figure 24 - Mode 3 Type GB Connector

This connector is available for the following power rates on GB marked units:

7.1.4 TYPE 2 OUTLET

Mode 3

This connector is available for the following power rates on CE marked units:

Figure 25 - Mode 3 Type 2 Outlet

7.2 OPERATION

When a user intends to start an operation on the EFAPOWER EV-HC, one of the following LEDs color is presented. Each LEDs color stands for a stage:

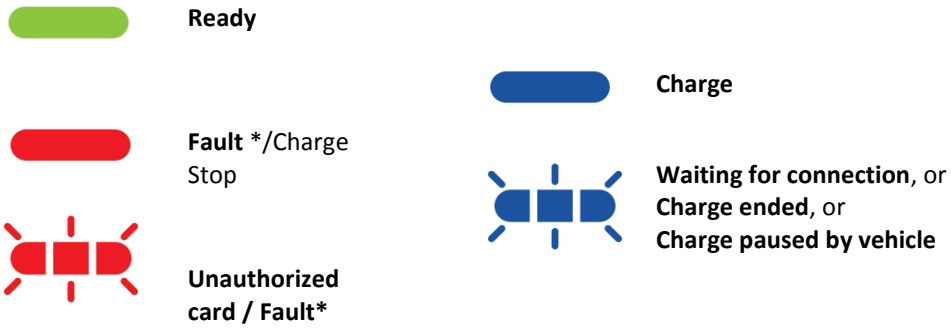

Figure 26 - EFAPOWER EV-HC Stages

*In case of Fault, please refer to chapter 8.2.

7.2.1 OPERATION SEQUENCES (FOR EV-HC WITHOUT AUTHENTICATION)

The **green light** (Ready) indicates the EV-HC is **ready to be connected to a vehicle**.
In the **following figure** is represented the operation **sequence** to **start charging**.

Figure 27 - EV-HC from Ready to Charge sequence (without authentication)

When connected to a vehicle, the **blue light** (Charge) is on indicating the **power is available** on the vehicle socket. In the **following figure** is **represented** the **stop charging** sequence.

Figure 28 - EV-HC from Charge to Ready sequence (without authentication)

At this stage the station is ready to charge another vehicle.

NOTE: If the user **left the station charging** and **when returned light** is **blinking blue or red**, the user only has to **disconnect the cable** and the **LED** should turn **green**. **If not**, please refer to the **Troubleshooting chapter 8.2.**

7.2.2 OPERATION SEQUENCES (FOR EV-HC WITH AUTHENTICATION)

For an **EV-HC with authentication**, the **operation sequences are slightly different**. Nevertheless, the lights have the same meaning.
The **green light** stands for a charging station **ready to charge**. In the **following figure** is represented the **sequence** to **start charging**.

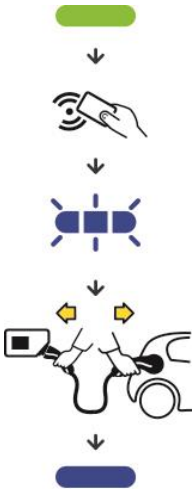

Figure 29 - EV-HC from Ready to Charge sequence (with authentication)

The **blue light** indicates that the **station** is **charging**.
At this stage, only the **same authentication ID**, used to start the charge, **will be able** to **stop charging**. There are two ways to stop charging: starting with authentication or by disconnecting the cable from the car. In the following figure are the sequences for each method.

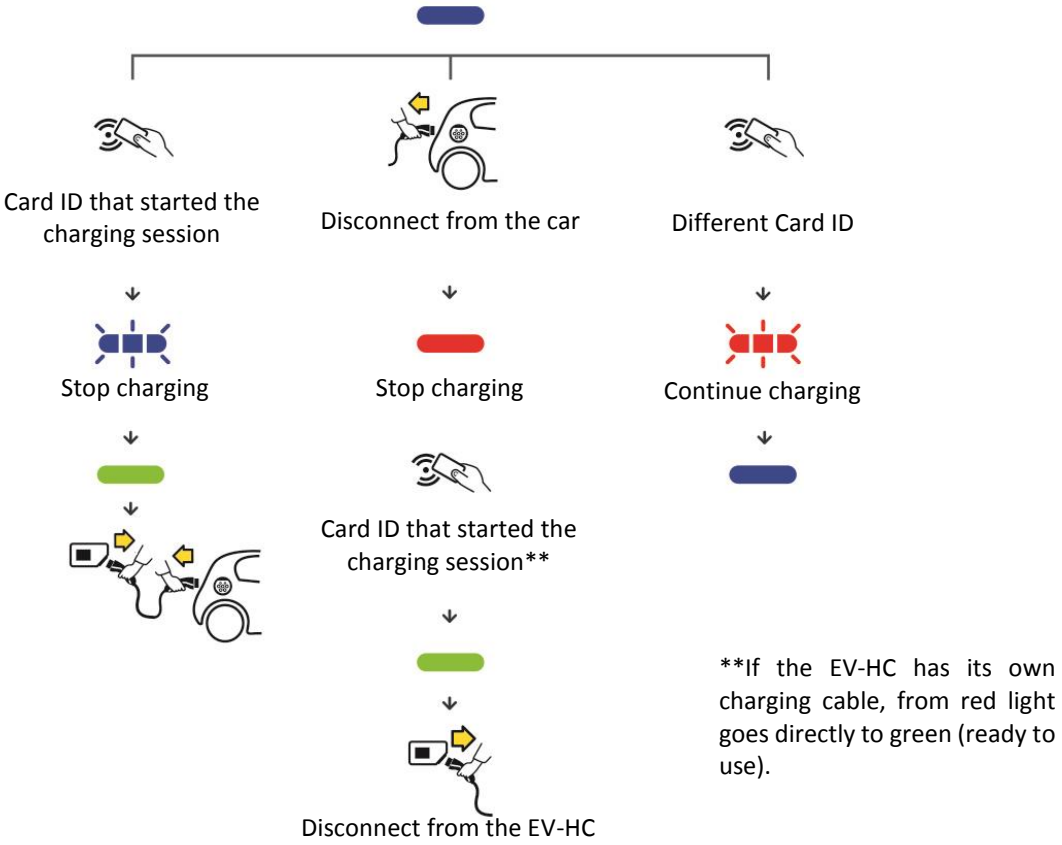

Figure 30 - EV-HC from Charge to Ready sequence (with authentication)

NOTE: If the user **left the station charging** and **when returned light** is **blinking blue or red**, the user has to **authenticate itself** and the **led** should turn **green unlocking** the **cable** to **be disconnected**. **If the led turns/remains red**, please refer to the **chapter 8.2.**

8 MAINTENANCE MANUAL

ALL SERVICING MUST BE PERFORMED ONLY BY QUALIFIED PERSONNEL. DO NOT ATTEMPT TO SERVICE THE EFAPOWER EV-HC STATION YOURSELF.
BY OPENING THE EFAPOWER EV-HC STATION'S COVERS YOU RUN RISK OF EXPOSURE TO DANGEROUS VOLTAGES!
IN CASE OF ANY KIND OF DOUBT REGARDING THIS, PLEASE CONTACT:

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EFACEC WILL ASSUME NEITHER RESPONSIBILITY NOR LIABILITY DUE TO INCORRECT OPERATION OR MANIPULATION OF THE EFAPOWER EV-HC STATION.

After discovering any malfunction, please check the troubleshooting section 8.2 of this manual, and act accordingly to reach a resolution. If none of the actions solved the malfunction, please contact the local technical support.
Equipment identification and detail description of the malfunction will be required for the remote support.

Please note that Efacec does not refund travel or shipping expenses.
The company does not hold any responsibility for any damages caused after the warranty period, but will gladly provide its customers with any technical consulting.

8.1 PREVENTIVE MAINTENANCE

This equipment must be kept in perfect condition to guarantee a safe and efficient battery charge. Make sure dust and moisture are kept out of the EV-HC.

It is also important to ensure that a complete test is carried out by a qualified technician on a yearly or bi-yearly basis.

We advise to carry out the following verifications:

Table 7 - EFAPOWER EV-HC Preventive Maintenance

Operation	Periodicity	Estimated time(min)	Tools
Visual checking of the installation Including **AC input cables**: Check the tightening torque of the cable connections.	Each 6 months	10	Standard Tools Torque wrench
Check value of **protective earth**	Each 6 months	5	Multimeter Standard Tools
Output cables: check if the connectors, cables and its connections are in perfect condition.	Each 6 months	5	Standard Tools Torque wrench
Test RCD by pressing the RCD test button	Each 6 months		Standard Tools

8.2 TROUBLESHOOTING

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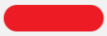
BY OPENING THE EFAPOWER EV-HC STATION'S COVERS YOU RUN RISK OF EXPOSURE TO DANGEROUS VOLTAGES!

We advise to carry out the following verifications:

Table 8 - EFAPOWER EV-HC Troubleshooting

LED	Description	Cause	Action
--	All LEDs are off	No energy supply	• Verify the existence of grid voltage • Verify if the circuit breaker on the main distribution board and the dedicated circuit to the charge are both switched ON
		Faulted LED's	• Replace LED's
	EV-HC without authentication: The Homecharger is ready but the charging process didn't start	The connector is not properly plugged into the vehicle	• Verify the correct connection to the vehicle
	The Homecharger signals fault	The differential circuit breaker of the homecharger is switched off or An error was detected troughout the charging process	• Disconnect any connection to the vehicle • Verify cable and connector/socket damage • If the connection is OK, then switch ON the circuit breaker • If the problem persists, please contact the technical support team
	No output voltage during charge	Faulty Homecharger	
	EV-HC with authentication: The Homecharger is ready but the charging process didn't start	The connector is not properly plugged into the vehicle	• Verify the correct connection to the vehicle
	EFAPOWER EV-HC charging is paused	Vehicle is on B state	

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