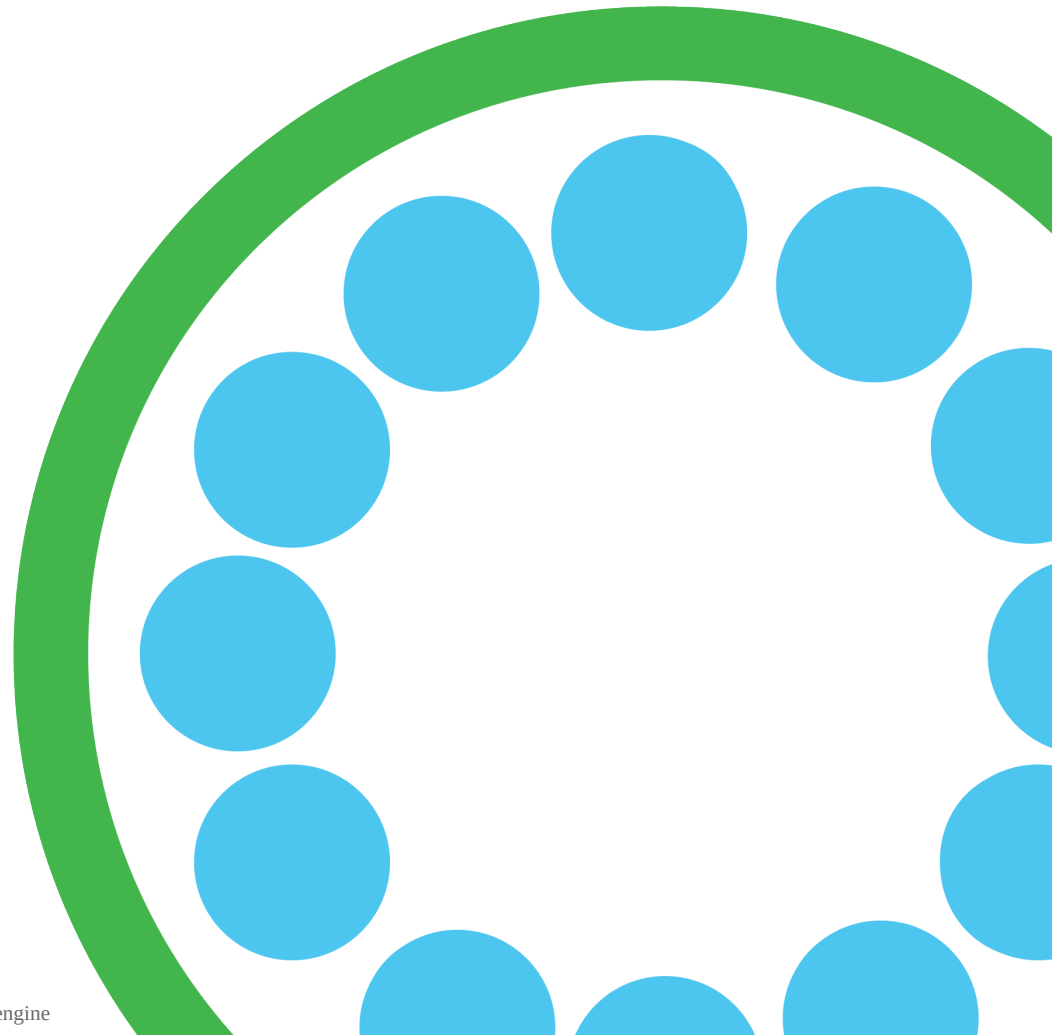
Installation Manual

HomeLine | 26.03.2018



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1. Safety regulations

WARNING: RISK OF ELECTRIC SHOCK.

- Please read the documentation provided with the charging station to acquaint yourself with the safety instructions and directions before you use the charging station.
- This charging station is designed and tested in accordance with international standards.
- Use this charging station for charging all mode 3 compatible electric vehicles only. Refer to your vehicle owner's manual to determine if your vehicle is suitable.
- This charging station must be used exclusively for the purpose intended.
- Do not operate the charging station if it or the charging cable is physically cracked, frayed, other otherwise visibly damaged. Please consult the stations owner and/or an electrician right away.
- This charging station contains no user serviceable parts. Please consult EV-Box or a certified electrician for more information. Do not attempt to service the charging station yourself.
- These directions for use are valid for different models of the charging station. It is possible that a number of features are described that are not applicable to your charging station.
- This charging station may only be installed, maintained and repaired by qualified personnel. Incompetent installation or repairs may result in danger to the user.
- Do not install a faulty charging station.
- For instructions on installation, see Chapter 4.
- The charging station is used in combination with a power source. Always switch off the power supply before carrying out maintenance. The charging station contains no internal components that can be maintained by the user. The "0n"/ "Off" and "green" position of the charging station's main switch does not guarantee that the system is disconnected from the power source and does not safeguard against the voltage applied.
- Do not switch on the charging station if the cover is not in place.
- Ensure that the equipment is used under the correct operating conditions.
- Do not use explosive or readily flammable substances in the vicinity of the charging station.
- Persons unable to assess the dangers should not use the charging station.
- Do not direct powerful jets of water onto the charging station, and never operate with wet hands.
- Ensure that the charging cable is **not kinked or jammed**!
- Make sure the charge cable is positioned so it will not be stepped on, driven over, tripped over, or otherwise subjected to damage or stress.
- Ensure that the charging cable cannot come into contact with heat sources.
- Always pull on the plug's hand grip, and never on the cable.
- **While charging the charging cable must be completely unwound and connected to the vehicle without overlapping loops!** This is to avoid the risk of the charging cable overheating.
- In the event of danger and/or accidents, have the charging station disconnected immediately by a competent person (electrician).
- Please carefully read our instructions and the vehicle instructions in your owner's handbook before charging your electric vehicle

Transport and storage

Ensure that the main power source has been disconnected when storing or transporting the charging station. No liability can be accepted for damage during the transportation, if the charging station is transported in anything other than the original packaging. Store the charging station in a dry environment. The storage temperature must be between –25°C and +60°C.

2. Product description

General

The EV-Box charging station (Figure 1) is compatible with all mode 3 electric vehicles. The charging station is meant for both indoor and outdoor use. Usage of the charging station is allowed in an ambient temperature between -25°C and +60°C. Charging station models with a modem are connected to a central system for registration of the kWh charged.

Figure 1: HomeLine

Online - Model with modem and BackOffice

The smart charging station is designed with a RFID card reader, a Kilowatt hour meter and a GSM/GPS/GPRS modem. These components together provide for the authorization and communication of the charging session procedure with the central system (BackOffice) for processing and settlement of the transactions as required. **A GSM link with the charging station is essential for the charging station to work properly.** However, a good link cannot always be obtained in enclosed spaces, for instance a closed or underground car park. In cases like this, the modem should be positioned outside the charging station along with the GSM/GPS antenna and connected to the charging station. See Chapter 5.

Safety

There's no power on the socket of the charging station as long as no plug is inserted and it has not been started up by the RFID card. No protective residual current device or circuit breaker is installed within the charging station. An external residual current device type A or B as required by applicable regulation is necessary for installation. (See table 7, Technical specifications).

Mode 3 Controller

The Type 2 socket is connected to the Mode 3 Controller and locking module in accordance with IEC-61851. This means that the charging station is constantly checking for the presence of a ground connection. In addition, the current is only switched on once the cable has been connected to both the charging station and the vehicle and the presented RFID card is authorized.

Operation

A charging session may be started by holding an authorized RFID card (Mifare Classic, 13.56Mhz) against the front of the charging station at the round surface showing a hand with a RFID card (Figure 1). See also Chapter 3.

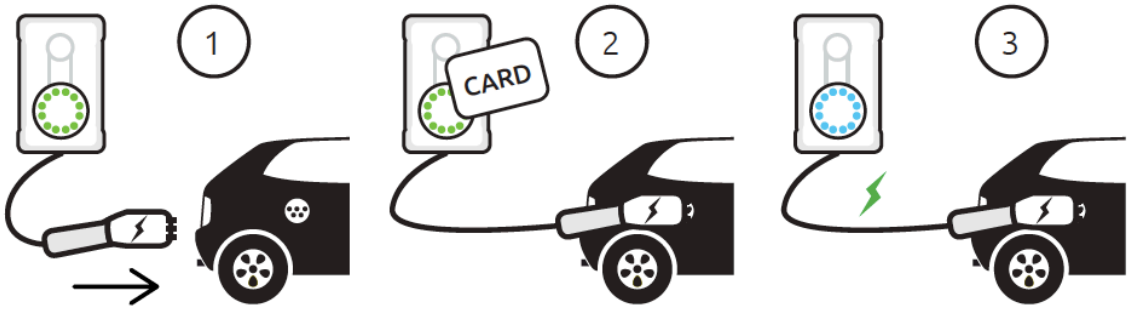
Warranty

EV-Box warranties its equipment and software against errors and defects in materials and workmanship for twenty four (24) months from the date of delivery, during which time it will use its best efforts to repair the errors, if any. However, any such problems encountered out of any causes that are not attributable to EV-Box, shall be for customer's risk and account.

3. Control

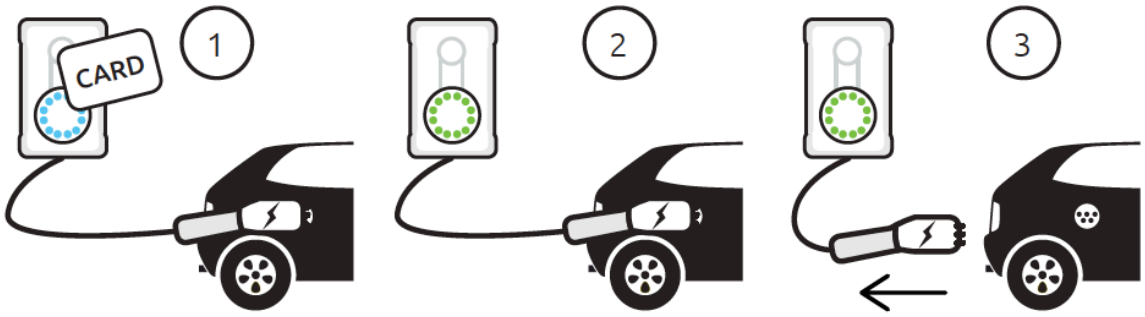
Charging stations with RFID reader

Start charging



1. Use your charging cable to connect the EV-Box station to your vehicle.
2. Present your charging card (RFID Card) to the card reader.
   The charging station will react with a tone. This indicates your card is being validated. It's possible that the LED ring will light up yellow for a couple of seconds.
3. The transaction will start automatically (LED ring is Blue).

Stop charging:



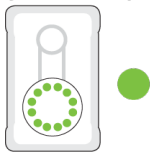
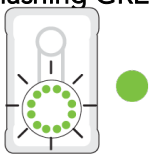
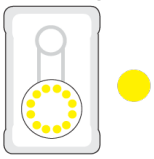
1. Present your charging card (RFID Card) to the card reader.
2. The charging session stops (LED ring will be GREEN)
3. Unplug the charge cable from the EV-Box and your vehicle.

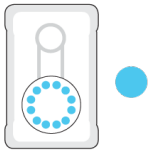
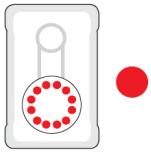
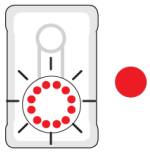
Charging Stations without RFID charging card / modem

For charging stations that don't operate with a RFID card, there will be either a key switch or an AUTO-START. With the key switch you turn the key or push the button to start or stop the charging session. To start charging on an AUTO-START charging station just plug the charging cable into the vehicle. Simply unplug the charging cable from the vehicle to stop the transaction.

LED ring indicator

The socket is surrounded by an LED ring. It shows the status of the charging station, so that you can see which mode the charging station is in (see Chapter 8). A blinking yellow LED-ring (once every second) indicates a paused charging session. This is only possible in a Hub-Satellite configuration (see chapter 6). Charging automatically resumes when power becomes available. For charging stations that don't operate with a RFID card the Led ring is off in stand-by mode. For RFID card operated charging stations the LED ring is green in stand-by mode.

Green or OFF	Flashing GREEN	YELLOW
		
Stand-by or ready for use	Your charging card is being verified	Awaiting communication from your vehicle or vehicle

BLUE	RED	Flashing RED
		
Charging	Faulted, please contact our service desk	Your charging card is not authorized to start a session

Note for installers

Once the installation has been done, the LED ring indications can be tested with an appropriate test equipment or with a card. These are available as an option.

4. Installation

Safety requirements

Connecting and installing this charging station must be done by a qualified technician. The owner or user is responsible for the installation, operation and maintenance of the charging station, whereby both the law regarding the safety of persons, animals and property must be observed, as well as the installation instructions and regulations in force in the country of use.

Read the installation instructions before you start working on the installation.

The charging station complies with Safety Class I (the charging station is supplied with a ground terminal for safety) and voltage Category III.

The incoming and/or outgoing terminals for the alternating current are fitted with an uninterruptible grounding for safety. If it is plausible that the ground safety has been damaged, the charging station must be taken out of operation and secured against being activated accidentally.

Ensure the correct supply voltage/power and ensure that the meter cabinet is properly safe.

Each charging station must be protected by a residual current device Type A (>30mA/AC) or Type B with direct current fault detection (>6mA/DC and > 30 mA/AC. The residual current device must switch off all the phases connected and the "N". The applied RCB must comply with local law and regulations. A residual current device Type B with direct current fault detection >6mA/DC is necessary for certain electric vehicles. See the vehicle's owner's manual.

Never replace a safety component by one of another type.

- All components are correctly connected and operationally tested before dispatch of the charging station.
- Before switching on the charging station check that the power source available corresponds to the configuration settings of the charging station as described in the manual and that all the cables in the charging station have been properly connected.
- Ensure that the equipment is used under the correct operating conditions.
- Never operate the charging station in wet or very dusty surroundings.

- Ensure that there is always adequate free space (at least 20cm) around the charging station for ventilation purposes.

Location

Position the charging station, where possible, in surroundings not subject to extreme sunlight and where damage from outside cannot occur. The charging station can be installed on the stainless steel pole with bracket supplied with the charging station. The power supply cable enters through the bottom of the pole.

The other option is to mount it onto a sturdy wall between 90cm and 120cm from ground level. The supply line is fed through a cablegland at the lower side of the aluminium base plate or the hole on the back side.

Power supply cable

Figure 2

The charging station is furnished with one 16A or 32A socket. There is no protective residual current device or circuit breaker in the charging station. The power supply cable is fed through a removable opening for a connection to the lower side (figure 2). Alternatively the power supply cable can be inserted through a removable opening in the backside of the unit (figure 3).

Figure 3

It is important to use a separate cable for the electrical distribution board, the main power supply cable must be fitted with a MCB/RCB taking into account de-rating according to IEC61439-2. The appropriate wire gauge of the supply cable depends on the power rating and the distance between meter cabinet and charging station. The voltage drop must not exceed 5%, it is advisable to take into account a maximum allowable voltage drop of 3%. The maximum wire gauge that can be fitted is 10mm^2.

Installing the charging station

- Before starting installation switch off power supply in the distributor and in the charging station.
- Secure the work environment to ensure that the power supply can't be switched on unintentionally.

Figure 4

Wall mounting

- Choose a flat vertical mounting surface, with a clearance of 20cm around the charging station for ventilation purposes. Mount the charging station on the wall with properly dimensioned mounting material suitable for > 40kg. Check the contents of the package and all accessories for damages once the delivery is completed.

- Remove the cover (Figure 4), it is attached with 4 bolts at the backside of the base unit. Mount the base unit onto the wall with a pipe wrench tightening the nuts evenly and crosswise so that the base unit is not deformed. The cover needs to lock in tightly to ensure IP54 protection.

Wall plate for easier mounting

A wall plate for easier mounting is available as an option (figure 5). It's an accessory that can adjust to any wall mounting situation independently of the chosen mounting surface.

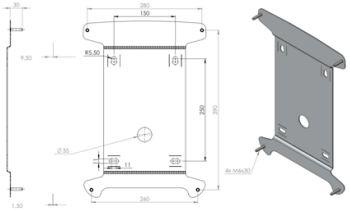


Figure 5

Pole mounting

Our charging stations can also be mounted on a pole in the ground. To this end EV-Box offers its' CombiPole (art. no. 290150 – Figure 6). The HomeLine station is to be attached to our CombiPole by using the provided HomeLine Adapter Kit (art. no. 290160 – Figure 7). The HomeLine Adapter Kit is provided with a separate installation manual.

Figure 7

Dig in the CombiPole to 60cm below ground level and align vertically. Ensure that the holes for securing the charging station are in the correct position with respect to the relevant parking place(s). The CombiPole is provided with anchor blades of 300 mm x 300 mm. Place the HomeLine base unit on the Adapter Kit's brackets (Figure 8) and tighten the nuts evenly and crosswise with a pipe wrench so that the base part is not deformed. The front cover needs to lock in tightly on the base unit to ensure IP54 level protection.

Figure 6

Figure 8

Connecting charging station

1. Run the power cable to the bottom 40cm through the M25 cable opening.
2. Remove the cable sheath so that the cables can be connected to the main switch by a small loop. Make sure the incoming PE cable is approximately 5cm longer for the best fit.
3. Secure the power cord into the cable opening. Apply a zip tie to the power supply line.
4. Connect the Phase and +N + PE and clamp beside the main switch. Attach PE first!

⚠ *Make sure the main supply line does not block the manual locking lever of the servo motor, mounted on the charging socket.*

Finishing installation

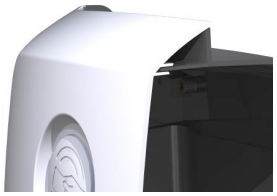


Figure 9

1. Make sure the circuit breaker / residual current device in the meter cabinet is in the "On" position and that the main switch in the charging station is off.
2. Check the grounding resistance. This should be as low as possible but not to exceed 150 Ohms. Certain electrical vehicles may need a special grounding resistance.
3. Check whether all connectors are tightly connected to the controller by firmly pressing them into position.
4. Make sure all switches in the charging station are in the "ON" position
5. Mount the cover onto the frame by inserting the top into the edge at the top of the frame and hinging it downwards (figure 9). Be extra careful to align the cover properly to ensure that the seals are in the right position after the cover closes (IP54 protection).
6. Check also that the cover locks securely into the open notch at the bottom of the frame
7. Switch on the supply current at the main distributor / meter cabinet. The charging station will now carry out a self test. The LED ring around the socket shows the following color indications during the test (max. 60 seconds)
   a) **RED flashing**: Starting up, running test protocol and looking for connection to the network.
   b) **GREEN or OFF:** Stand-by, ready for use.
8. Check line to line and neutral to line voltages upstream of the power relays, for each charging point.
9. Carry out a functional test in accordance with the specifications of the charging station. For this use a test box for charging stations available as an option.
10. You can now tighten the 4 cover bolts with a Hex key, tightening the nuts evenly and crosswise. (TIP: use a small ratchet with a Hex key bit – 4 mm)

Maintenance

Dirt on the outside of the charging station can be cleaned off using a damp soft cloth. The owner or user is responsible for the maintenance of the charging station, whereby both the law regarding the safety of persons, animals and property must be observed, as well as the installation instructions in force in the country of use.

Product and environmental characteristics

The charging station has been CE-certified by the manufacturer and bears the CE logo. The relevant declaration of conformity may be obtained from the manufacturer.

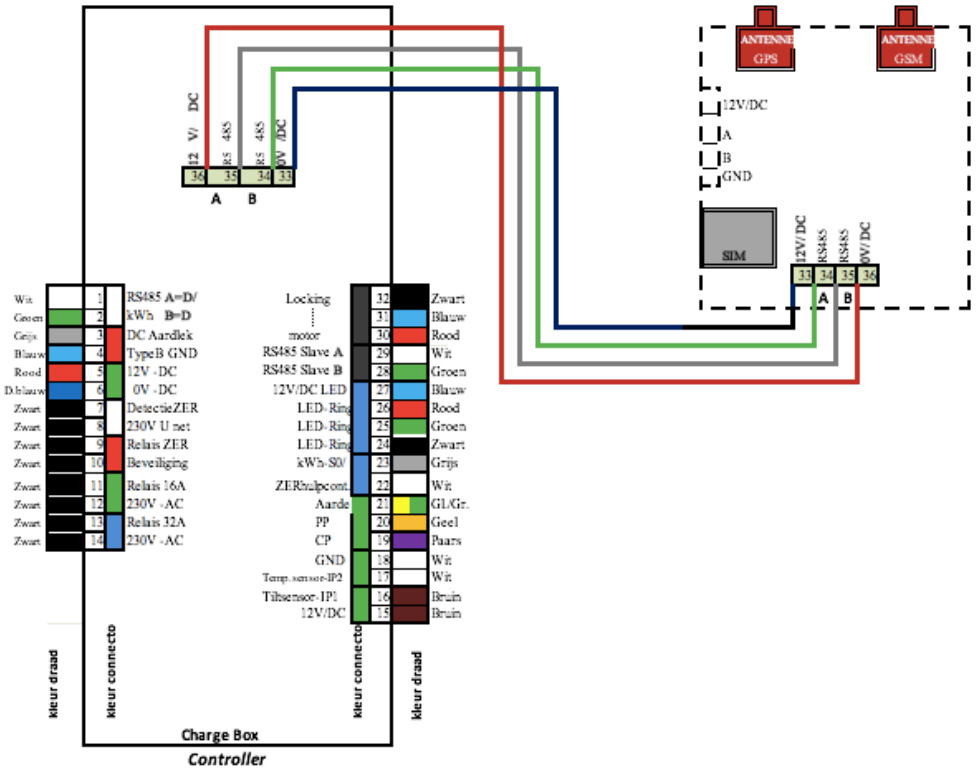
The charging station complies with the RoHS Directive (RL 2011/65/EU). The relevant declaration of conformity may be obtained from the manufacturer.

Electrical and electronic appliances, including accessories must be disposed of separately from the general municipal solid waste. Recycling of materials saves raw materials and energy and makes a major contribution to conserving the environment.

5. Installing the modem externally

A GSM link with the charging station is essential for the charging station to work properly. However, a good link cannot always be obtained in enclosed spaces, for instance in a closed or underground car park. In cases such as this, the modem can be positioned outside the charging station along with the GSM/GPS antenna and connected to the charging station. The procedure is as follows:

- Remove the modem from the controller to which it is fixed by pinching the top points of the white feet on which it rests using pliers.
- Remove the GPS/GSM antenna from the charging stations frame.
- Find a suitable point where the GSM signal is well received.
- Install 4-pole plugs on the modem and the controller. These plugs can be obtained separately.
- Make the connection below. A 4-core RS485 cable (STP/FTP, Profibus or equivalent) should be used for this. The maximum distance between the modem and the charging station is 1200m. With large distances (>60m it may be necessary to install a 12V external power supply.
- Install the modem and antenna in a closed cabinet (IP54). An assembly set with all the materials needed for this (excl. cable and 12V adapter) is available as an option, part #470050.

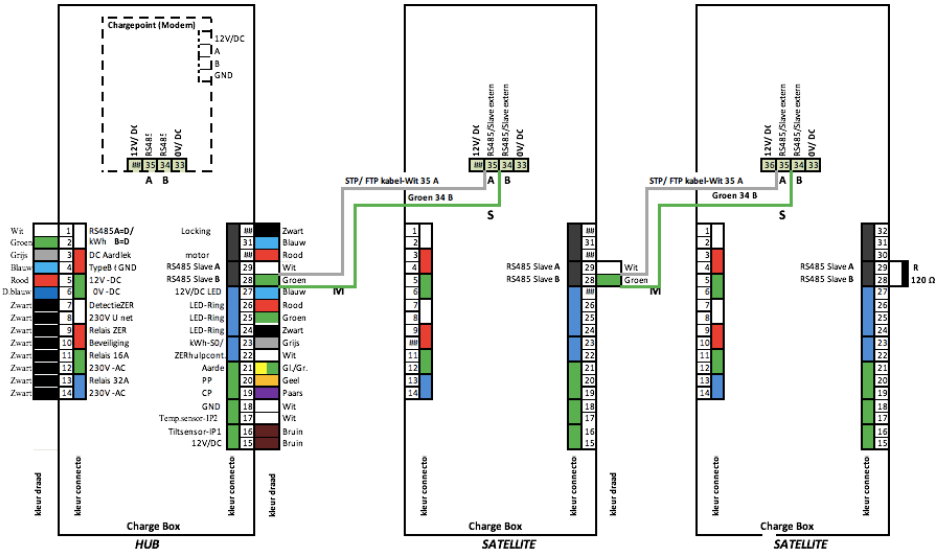


6. Adding extra connectors (Satellites)

Several charging stations without a modem (Satellites) can be linked to a charging station with a modem in a hub / satellite connection thus forming a grid. The grid can support up to a total of 20 sockets. The advantages are that control of the charging stations is simpler and that, for locations with a poor GSM link, only a single modem has to be installed externally. Also a smartgrid can be established over all sockets thus optimizing power usage, enabling more electrical vehicles to charge simultaneously should power limitations exist The Satellite charging stations are connected in a chain.

- Use a green 4-pole plug on the Satellite "S" side and a black 2-pole plug on the Hub side of the controller. These are available as a separate set, part #471040.
- Make the connection below. The network must be set up with a cable suited to the RS485 protocol. (STP/FTP, Profibus or equivalent cable).
- The maximum number of sockets that may be connected to a single modem is 20.
- The network must be closed off with a terminal resistance of 120 Ω at terminals 28 and 29, when more than 6 sockets are installed. The terminator resistance is available as a separate set, part #471041.
- In the case of a Star or T network, reflections can occur in the cable. This method of installation is not possible for this use.

For correct performance of the smartgrid it is **essential** that you contact your supplier to set the maximum power available on the grid. If multiple three phase satellite stations are connected in the smartgrid it is also advisable to swap the primary phase to distribute power consumption as evenly as possible over all phases. Be sure to note the connector number printed on the mode 3 controller board and the phase it uses as its primary phase. **For optimal performance of the smartgrid it is essential to inform your supplier of these changes as well.**

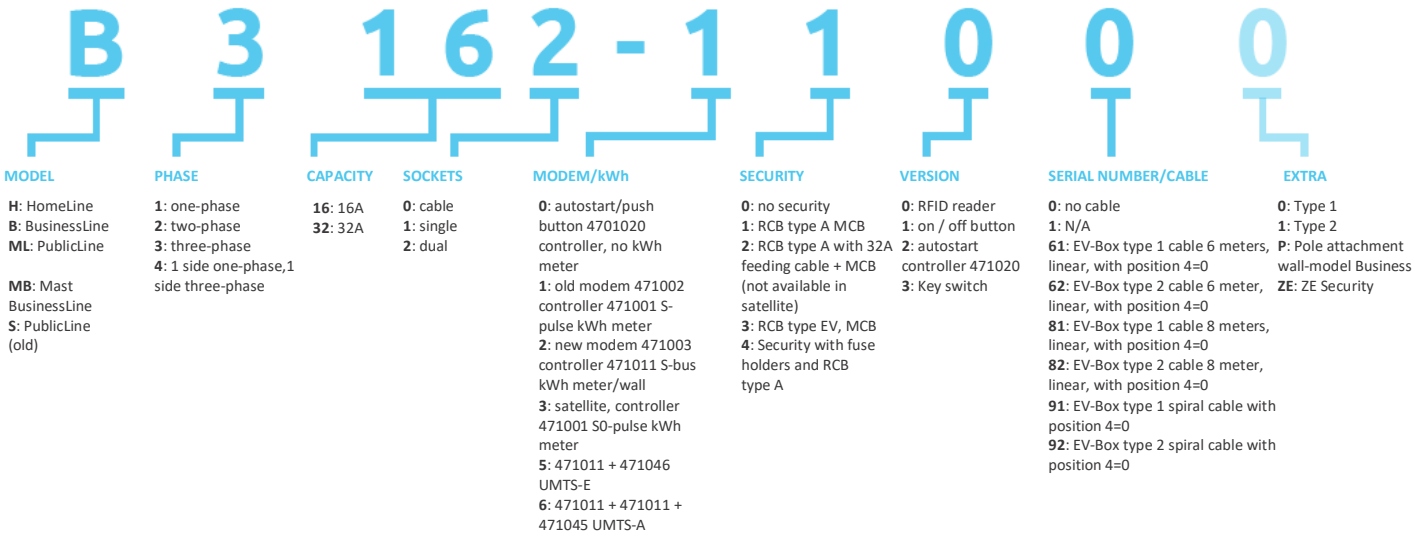


7. Technical Specifications

These are general specifications for the HomeLine charging station. You can find more about the technical specifications for your specific model in the "Downloads" section of EV-Box.com

Item	Description
Connection capacity	1-phase or 3-phase, 50Hz, between 2.5 – 10mm2
Output power per connector	1-phase or 3-phase, 230V – 400V, 16A or 32A
Secondary power supply	12VDC – 2.5A
Load capacity per socket	3.7kW, 7.4kW, 11kW, 22kW
External RCB (not included)	RCD Type A (>30mA/AC) or Type B, ((>30mA/AC;>6mA/DC) (external)
Communication	GPS / GSM / GPRS Modem / controller with RFID reader
Temperature range	- 25°C – +60°C
Moisture (non-regulating)	Max. 95%
Protection class	IP54
Max. Installation height	+2,000m NAP
Dimensions in mm (L x W x H)	490 x 310 x 170
Housing	Polycarbonate (Bayblend)
Housing (rating)	IK09
Communication protocol	OCPP 1.2, 1.5 en 1.6
Weight	<5kg

Type number guide:



8. Troubleshooting

⚠ **EV-Box highly recommends the installation work to be done by a qualified electrician and or installation partner.**

Problem	Possible cause	Solution
Charging station does not react	• No power to charging station	• Are the residual current device and circuit breaker in the meter cabinet on? (**check by user)** • Is main switch in the charging station on? (if installed, must be done **by electrician).** • Is the supply cable entering the charging station live? • Turn the charging station on again
Charging station does not emit clear tone when it is turned on	• Control current circuit breaker (C6) is off • 12V is not on (check light on 12V supply is off) • Small plugs on the controller are not fully pushed in • Wiring harness runs too close to the 12V supply, with the result that the magnetic field activates the safety module of the 12V supply.	• Is the control current circuit breaker (C6) on? There is a clear tone when the circuit breaker is switched on • Is there 230V on the input terminals of the power supply? If this is not the case, check the circuit breaker • Is there 12V on the output terminals of the power supply? If this is not the case, switch off the C6 circuit breaker and wait two minutes before switching on again. If there is still not 12V DC on the output, the power supply should be replaced. • Snugly fit all plug connections, in particular to the controller unit. • Relocate wiring harness
Residual current device trips constantly	• Grounding error in the charging station • Special ground resistance is needed for the vehicle • Fault in the vehicle or defective charging cable	• Check electrical wiring for damage. Replace damaged wiring • Moisture or condensation on electrical connections. Dry the connections if necessary • Replace the charging cable • Measure the grounding resistance and compare it with the resistance required by the supplier of the vehicle, e.g. Renault Zoe < 150 Ohm.
LED ring lights up red constantly	• Residual current device and/or circuit breaker are off	• Switch on residual current device and/or circuit breaker
One or more LED ring(s) continues to flash red in Hub / Satellite configuration	• Crossover in Hub / Satellite connection. • Charge point cannot be located.	• Check RS485 cabling 1:1 • Press modem into position. • Check 12V power supply status to the Hub (Charging station with modem).

Problem	Possible cause	Solution
LED ring continues to light up yellow	• Charging station waiting for the vehicle • Vehicle is fully charged • Faulty charging cable • Grounding resistance too high, with certain vehicles this must be < 150 Ohm. • Vehicle is on a timer	• Are the plugs properly inserted in the vehicle and charging station? (**check by user)** • Grounding resistance correct? (grounding measurement by electrician) • Replace the charging cable (have fixed cable replaced by an electrician) • Change the setting of the timer in the vehicle. (**check by user)**
LED ring lights up blue during a few seconds, then yellow	• Vehicle refuses to charge	• Check that minimum current accepted by the car is not higher than min current supplied by the station (**check by user**) • Check line to line and neutral to line voltages at various spots on the power circuit(s) (**check by electrician**) • Ground resistance correct? (**check by electrician**)
Charging station does not start charging, LED ring flashes green for 30 seconds, followed by 10 x red. Then LED ring green or off.	• Plug not locked • Vehicle not connected • Lock in charging station blocked.	• Is the plug pushed far enough into the charging station? (**check by user)** • Is the plug properly inserted in the vehicle? (**check by user)** • Check the plug for damage or bent pins. (**check by user)** • Check whether there is something in the socket. (**check by user)** • Check whether the wiring harness is blocking the red locking handle. (**check by electrician)**
Plug does not come out of charging station	• Incorrect card used to stop charging (LED ring flashes purple briefly) • Unlocking pin will not lift	• Use the same card to stop charging as to start charging • Push the plug further into the charging station and hold the card against the card reader again • Turn power in the meter cabinet off and then on again after two minutes • The red handle on the lock can be manually turned upwards to unlock **by the electrician**.
Red LED starts flashing immediately after the card is held against the reader	• Charging card is not authorized for charging at this charging station. • There is no communication with the Back Office.	• Check that the charging card is registered correctly. (authorized for use on public charging stations) (**check by user)** • Check the settings of your charging station in your online account (**check by user)** • Check whether the modem is in contact with the cellular network.

9. EU Declaration of Conformity

MANUFACTURER'S DECLARATION

(in accordance with Appendix II-B of the Machinery Directive)

EV-Box B.V.,

NL registration KvK 32165082_000018683428

Pedro de Medinalaan 31, 1086XP Amsterdam, The Netherlands

declares under its' sole responsibility that the following products:

Article H116X-XXXX: EV-Box Charging station, 1-phase 16A

Article H132X-XXXX: EV-Box Charging station, 1-phase 32A

Article H316X-XXXX: EV-Box Charging station, 3-phase 16A

Article H332X-XXXX: EV-Box Charging station, 3-phase 32A

provided that they are installed, maintained and used in the applications for which they were designed, in accordance with professional practices, relevant installation standards and manufacturer's instructions for use and installation, are CE certified and comply with the essential requirements of EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU in accordance with the following standards:

- EN/IEC61000-3-2 (2014)
- EN/IEC61000-3-3 (2013)
- EN/IEC 61000-6-2 (2016)
- EN/IEC61000-6-3 (2007) + A1 (2011)
- EN/IEC 60335-1 (2012) +A13 (2017)
- EN/IEC 60364-4-41 (2017)
- EN/IEC60529-1 (1989) +A1 (1999) + A2 (2013)
- EN/IEC60950-1 (2005) + A1 (2009) + A2 (2013)
- EN/IEC60950-22 (2017)
- EN/IEC61851-1 (2017)
- EN/IEC61851-22 (2002)
- EN/IEC62196-1 (2014)
- EN/IEC62196-2(2017)

Amsterdam, January 5th 2018

A. van Rooijen

Chief Technical Officer