



Cabur PLUS EV Smart Chargers

Installation and operating manual



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Markings



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1 Revision history

Version	Release date	Authors	Notes
0.1	June 2021	Cabur Technical Office	Preliminary version (English) EV PLUS series Internal version only
0.2	09/07/2021	Cabur Technical Office	Power management info added
0.3	13/07/2021	Cabur Technical Office	System upgrade and language configuration info added
1.0	13/07/2021	Cabur Technical Office	New name: Cabur_EV_PLUS_Installation_Instruction_Manual
1.1	19/07/2021	Cabur Technical Office	Updated cover Chapters 2,3,4 revised
1.2	27/07/2021	Cabur Technical Office	WebApp details updated (chapter 8, chapter 12)
1.3	20/11/2021	Cabur Technical Office	OCPD command list updated SSID info updated
1.4	18/02/2022	Cabur Technical Office	RCD indication note fixed

2 Introduction

This manual introduces the Cabur EV PLUS Charging Line products for EV battery charging and provides all the necessary information about their installation process and their usage.



Important: Please read carefully this manual before installing and using the charger.



Important: All the installation operations must be performed by qualified personnel only.

2.1 General information

2.1.1 About this manual

- The present manual must be available to all the persons who take care of the charger installation and usage
- The installation and commissioning of the charger must be performed by authorized and qualified personnel only in compliance to all the safety related regulations and laws
- The charger producer is not responsible for any damage due to an incorrect or missing application of the rules contained in the present manual
- Due to the continuous improvement process, the charger producer has the right to apply changes to the product whenever needed
- The reproduction of this manual is not allowed without the written authorization by Cabur s.r.l.

2.1.2 About safety

The product conforms with the state of the art and the applicable safety and health regulations.

Nevertheless, the following risks can be caused by incorrect operations or misuse:

- Hazards to life and limb of the user or third parties
- Perils to the product and other material assets of the operator
- Risks for the efficient use of the product

It is mandatory to apply the following rules:

- The input voltage must be disconnected before any maintenance operation on the charger.
- Please be sure the input voltage is not present by means of dedicated measures with appropriate tools
- Before switching on the charger, the earth cable connection must be checked
- The input cables, the plugs and all the necessary accessories for the installation must be carefully selected in compliance with the current regulations and laws (see paragraph 6.5)
- An MGT protection device must be installed to protect the charger input (see paragraph 6.3)

- No cable adapter or patch or cord set extension is allowed for the charger cord set
- The EV must be blocked before connecting for charging
- It is prohibited to remove, modify, bridge or bypass any protective, safety or monitoring equipment and, in general, it is prohibited to apply modifications to the charger
- It is prohibited to reconfigure or modify the product
- The product may only be operated in perfect conditions

2.1.3 About maintenance

- Do not open the charger
- Do not touch the electronic parts/boards
- Do not install or use the charger if it is damaged
- The charger must be repaired by authorized personnel only
- Use a soft cloth with neutral detergent liquid, suitable for plastic surfaces, to clean the charger

3 Warranty and liability

The warranty period of the charging station is specified by the official Cabur's selling conditions.

This operating manual serves to ensure fault-free and safe use of the product; compliance with its content is a prerequisite for the fulfilment of any warranty claims.

Excluded from the warranty are such defects that result from any arrangement and assembly not effected by the producer, insufficient equipment, failure to observe the installation requirements and conditions of use, excessive load on the components beyond the capacities specified by the seller, negligent or incorrect handling and use of unsuitable operating materials.

This also applies to defects that are attributable to material provided by the user.

In particular, claims for damages expire in the event of:

- Inappropriate use
- Modifications or additions
- Repairs carried out improperly
- Disasters, foreign body impact and force majeure

The producer is also not liable for damage caused by the actions of third parties, atmospheric discharges, overvoltage and events related to chemical influences.

The warranty does not apply to the replacement of parts that are subject to natural wear and tear.

4 Limits of use

This charger is an electrical equipment designed for charging battery electric vehicles (BEV).

The plug and the socket compliant to EN 62196 (alternating current charging, MODE 3) are used for charging BEVs.

The charger is suitable for indoor and outdoor usage. The product is built according to the state of the art and the generally accepted safety regulations. Nevertheless, during its use hazards to life and limb of the operator or third parties may occur or the product and other material assets may be negatively affected. Intended use includes observing the operating manual and compliance with the maintenance requirements.

Only use the product if it is in technically perfect condition. Use the product as intended and in a safe way.

In case of malfunctions or damages that could impact safety please contact a qualified technician and inform the producer.



The charging station must be mounted on a wall or on its own stand and installed in a stable way. It is not allowed to operate the charging station in a loose state (not steadily mounted) because this would not comply with the ratings.



Unmounting, tampering with or deactivating the safety devices is forbidden.



No technical changes may be made to the product without consulting the manufacturer. Furthermore, liability and warranty claims are excluded in case of non-compliance with the intended use.



The product may only be operated under the operating conditions specified in the documentation.



This documentation is mandatorily to be read by qualified personnel for installation and initial operation, as well as by the user for the Installation and Instruction Manual of the product.



For what concerns users, unattended operation of the product is only allowed if they

- have read and understood this Installation and Instruction Manual
- have read and understood all the safety instructions



For what concerns the qualified personnel (electrical engineering/technician specialist), only qualified personnel are allowed to perform installation, initial operation, inspection and configuration work. The qualified personnel must have read and understood this manual.

5 Technical data

Product Information				
				
Model	EVPLUS7C	EVPLUS7S	EVPLUS22C	EVPLUS22S
Power	3.5-7.4kW	3.5-7.4kW	3.5-22kW	3.5-22kW
Charging Mode	MODE 3 CASE C (with cable)	MODE 3 CASE B (with socket)	MODE 3 CASE C (with cable)	MODE 3 CASE B (with socket)
Connector standard	Type 2	--	Type 2	--
Socket	--	Type 2	--	Type 2
Dimensions (W x H x D)	355x650x150 mm	355x650x150 mm	355x650x150 mm	355x650x150 mm
Weight	10.98kg	9.08kg	12.48kg	9.48kg
Enclosure Material	PC+ASA (UL94-V0)	PC+ASA (UL94-V0)	PC+ASA (UL94-V0)	PC+ASA (UL94-V0)
Cooling system	Integrated fan	Integrated fan	Integrated fan	Integrated fan
Mounting	Wall / Stand	Wall / Stand	Wall / Stand	Wall / Stand
Electrical Data				
Mains Voltage	230 V±15%	230 V±15%	400V±15% (three phase) 230 V±15% (single phase)	400V±15% (three phase) 230 V±15% (single phase)
Mains Frequency	50/60Hz self-adjustable	50/60Hz self-adjustable	50/60Hz self-adjustable	50/60Hz self-adjustable
Network Configuration	TN/TT/IT(1P+N+PE or 2P+PE)	TN/TT/IT(1P+N+PE or 2P+PE)	TN/TT/IT(3P+N+PE or 3P+PE) (3-phase) TN/TT/IT(1P+N+PE or 2P+PE) (1-phase)	TN/TT/IT(3P+N+PE or 3P+PE) (3-phase) TN/TT/IT(1P+N+PE or 2P+PE)(1-phase)
Efficiency	>99%	>99%	>99%	>99%

Earth Leakage Protection	DC Leak (6ma)	DC Leak (6ma)	DC Leak (6ma)	DC Leak (6ma)
Start Charging	RFID Card OCPP Control APP Control			
Indicator	LED Light belt (red, blue, green) Digital display LED indicators	LED Light belt (red, blue, green) Digital display LED indicators	LED Light belt (red, blue, green) Digital display LED indicators	LED Light belt (red, blue, green) Digital display LED indicators
Power Metering	Power meter (MID certified)	Power meter (MID certified)	Power meter (MID certified)	Power meter (MID certified)
Connectivity	Wifi(Client)/Wifi (AP) Hotspot RS485 (Power management with external meter) CAN (Load balancing)	Wifi(Client)/Wifi (AP) Hotspot RS485 (Power management with external meter) CAN (Load balancing)	Wifi(Client)/Wifi (AP) Hotspot RS485 (Power management with external meter) CAN (Load balancing)	Wifi(Client)/Wifi (AP) Hotspot RS485 (Power management with external meter) CAN (Load balancing)
Communication Protocol	OCPP1.6J	OCPP1.6J	OCPP1.6J	OCPP1.6J
Background Functions	WIFI system upgrade	WIFI system upgrade	WIFI system upgrade	WIFI system upgrade
Reports	Charge reports Fault reports	Charge reports Fault reports	Charge reports Fault reports	Charge reports Fault reports
Protection Function	Overcurrent protection Overvoltage protection Undervoltage protection Relay over temperature protection; Socket or plug over temperature protection; CP fault protection; Relay adhesion protection;	Overcurrent protection Overvoltage protection Undervoltage protection Relay over temperature protection; Socket or plug over temperature protection; CP fault protection; Relay adhesion protection;	Overcurrent protection Overvoltage protection Undervoltage protection Relay over temperature protection; Socket or plug over temperature protection; CP fault protection; Relay adhesion protection;	Overcurrent protection Overvoltage protection Undervoltage protection Relay over temperature protection; Socket or plug over temperature protection; CP fault protection; Relay adhesion protection;
IP Degree	IP54	IP54	IP54	IP54
Ambient Temperature	-25°C to +50°C	-25°C to +50°C	-25°C to +50°C	-25°C to +50°C
Operating Humidity	≤95%RH	≤95%RH	≤95%RH	≤95%RH
Certificates				
Standards	IEC 61851-1: 2017 (RED WiFi 2.4GHz----RF: EN 300 328 RF-EMC: EN 301 489-1&-17 Health (MPE): EN 62311) (RED RFID 13.56MHz----RF: EN 300 330 RF-EMC: EN 301 489-1&-3 Health (MPE): EN 62311)			
CE Certificates	CB from DEKRA/CE from DEKRA			



The integrated protections are not automatically or remotely reclosed as prescribed by the IEC 61851-1.

6 Installation

The following paragraphs describe the charger installation process.



The installation must be performed by qualified personnel only.

6.1 Installation conditions / Environmental requirements

The charger can be used outdoors. Pay attention to the operating environment to meet the equipment operation, otherwise it will affect the service life of the equipment. The following conditions are mandatory for a correct installation of the device (see also paragraph 4 “Technical data”):

- Operation temperature must be within the range -25 °C up to 50 °C
- Operation humidity must be $\leq 95\%$
- Avoid installation places affected by strong vibrations and mechanical shocks
- Keep away the charger from explosives or dangerous materials, conductive media and harmful gases, all of them can damage the electrical insulation
- The use environment should be kept clean, no mold is allowed, and it should be kept away from moisture, dust, flammable gas, flammable liquid, etc., away from heat sources and corrosive environments
- The altitude of the installation site must be ≤ 2000 m.

6.2 Installation accessories

The following accessories are needed for the charger installation process:

- This manual
- The certificate of conformity
- The expansion screws (4 pieces, provided with the charger), to fix the charger to the wall
- The mounting template (provided with the charger), to identify the correct position of the mounting holes on the wall
- The anti-theft stainless screw (provided with the charger)

6.3 Installation of the protection against short circuit

The charger itself has an overcurrent protection integrated function. Nevertheless, a short-circuit protection device shall be installed at the upper level, for example in the control panel, for short-circuit protection purpose.

If the short-circuit protection device is not installed the charger cannot be used.

The rated current of the supply circuit short-circuit protection device must be in line with the current used by the charger.

If the charger is used at full load, the rated current should be 40A, otherwise the charger will not work properly.



It is mandatory to install a circuit breaker with C or B curve, 40A, before the charger input. If there are uncertainties about how to choose the appropriate short-circuit protection device, please contact the manufacturer.

6.4 Installation of the protection against residual current

In compliancy with the IEC 61851-1 standard, the charger contains an appropriate circuit that ensures the disconnection of the supply in case of DC fault current above 6mA (DC Leak protection circuit).

No external installation of any type B RCD is prescribed.



An external type A RCD, with supply disconnection in case of fault current above 30mA shall be installed in the upstream side.



The protection device selection and installation must be performed by qualified personnel only.

6.5 Overvoltage protection

The charger is compliant to the Overvoltage Category III

6.6 Installation cables

The cable for connecting the mains supply to the charger must have a section in the following range 6-10 mm².



The cable selection must be done by the qualified personnel involved in the installation process, taking into account the national regulations for the safety and the state of the art of the electrical installations.

6.7 Supported power supply systems

Both single-phase and three-phase chargers support the following power supply systems.

- TN-S
- TN-C
- TN-C-S
- TT
- IT (only single-phase products are supported)

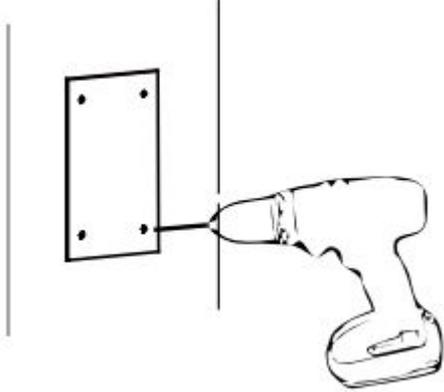
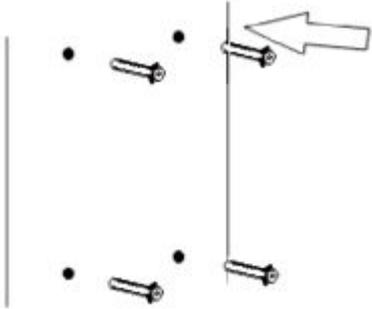
For single-phase charger, in a power supply system with a neutral line, the voltage between the phase line and the neutral line cannot be higher than the rated voltage requirement (240VAC).

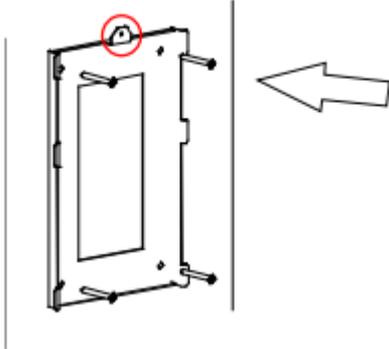
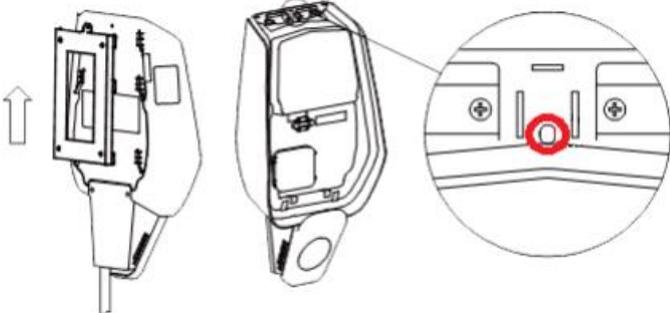
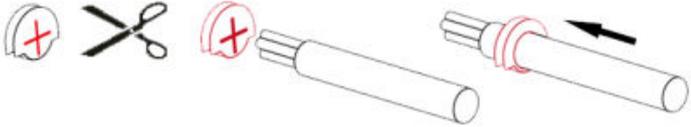
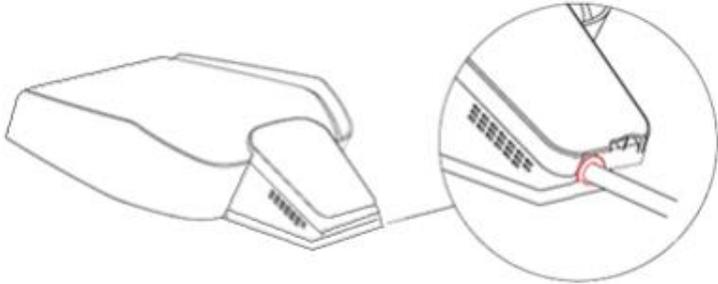
In a power supply system without a neutral line, the voltage between the phase line and the phase line cannot be higher than the constant voltage requirement (240VAC).

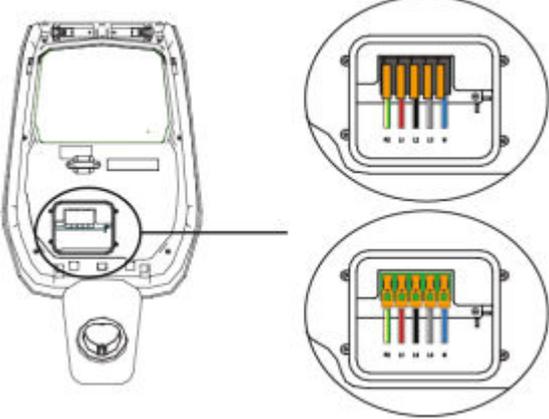
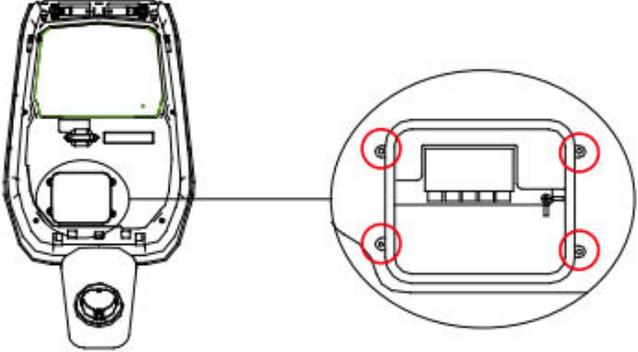
For three-phase charger, in a power supply system with a neutral line, the voltage between the phase line and the neutral line cannot be higher than the rated voltage requirement (240VAC).

6.8 Installation steps

In the following all the steps to perform for a correct installation of the wallbox:

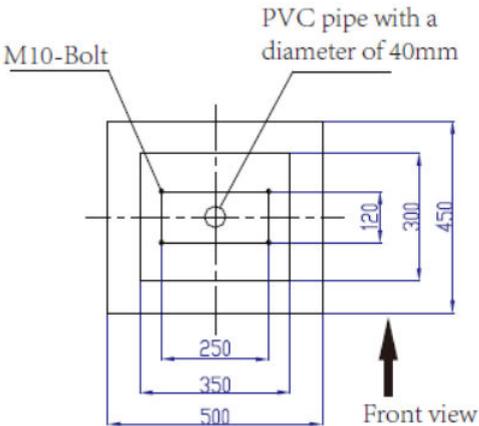
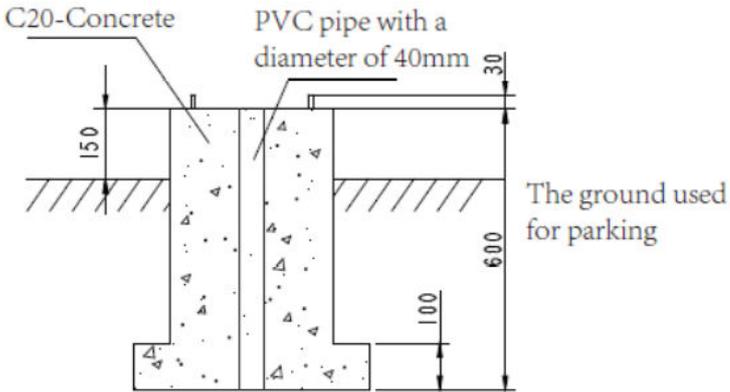
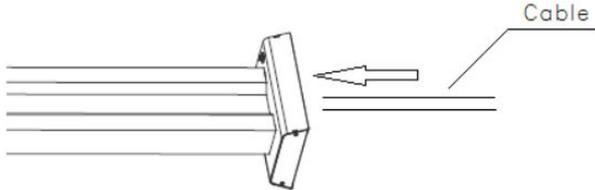
Step No.	Description	Picture
1	<p>Open the package which contains the charger and its accessories.</p> <p>Package content:</p> <ul style="list-style-type: none"> ▪ the charger ▪ four expansion screws ▪ a mounting template ▪ a mounting metal bracket (already attached to the charger rear side) ▪ one rubber gland for the input cable 	
2	<p>Lean the mounting template against the wall. The height from the centre of the template to the ground should be determined according to your ideal height (1500mm is recommended).</p> <p>Check the template is fully horizontally aligned.</p> <p>Mark the expansion screw holes positions on the wall.</p> <p>Create the screw holes with a tool.</p>	
3	<p>Insert the four expansion bolts into the four holes and just push them manually or, in case of resistance, by means of an hammer</p>	

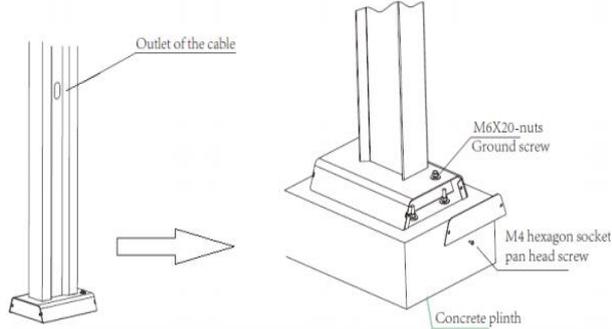
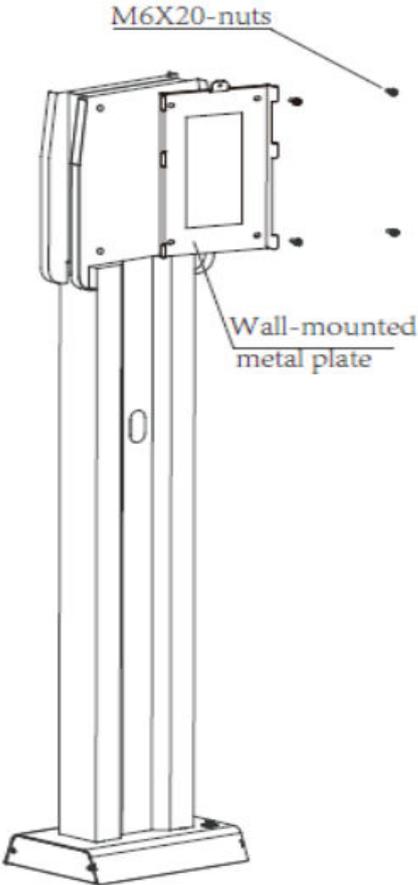
Step No.	Description	Picture
4	<p>Open the black front cover of the charger (this can be done simply moving at the same time the two black cursors which lock the cover in the back side of the charger)</p> <p>Remove the anti-theft screw located on the top of the mounted bracket (marked with the red circle in the picture)</p> <p>Fix the wall mount bracket on the wall with the expansion screws</p>	
5	<p>Hang the charger on the wall mounted bracket. This is done just sliding, from top to bottom, the charger into the bracket binaries</p> <p>Then screw up the anti-theft screw</p>	
6	<p>Use scissors to cut the cross line of the rubber stopper and pass the cable through the rubber stopper</p>	
7	<p>Place the cable through the hole in the bottom of the charger into the wiring position inside the charger and then put the rubber stopper in the hole position at the bottom</p>	

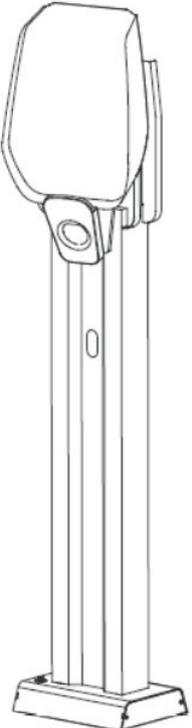
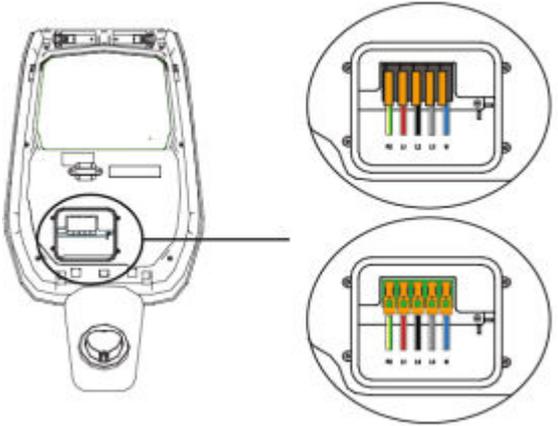
Step No.	Description	Picture		
8	<p>⚠️ ⚡ Make sure the input cable is not powered.</p> <p>Open the wire cover (circled in the picture), insert the power supply cables into the bottom hole, and connect the cables according to the signs as specified on the wire cover scheme.</p> <p>It should be noted that there is no device for fixing the input cable, so you must leave enough space for the cable to avoid the cable from being pulled by external forces, or you can add a cable fixing device which stabilize the input cable.</p>	 <div data-bbox="715 772 1423 1167" style="background-color: #333; color: white; padding: 10px;"> <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>FOR TT, TN-S, TN-C-S Voltage between phase line and neutral line $\leq 240\text{VAC}$</p>  <p>Three phase PE L1 L2 L3 N</p> <p>Single phase PE L1 N</p> </td> <td style="width: 50%; vertical-align: top;"> <p>FOR IT Voltage between phase line and phase line $\leq 240\text{VAC}$</p>  <p>Single phase PE L1 L2</p> </td> </tr> </table> </div>	<p>FOR TT, TN-S, TN-C-S Voltage between phase line and neutral line $\leq 240\text{VAC}$</p>  <p>Three phase PE L1 L2 L3 N</p> <p>Single phase PE L1 N</p>	<p>FOR IT Voltage between phase line and phase line $\leq 240\text{VAC}$</p>  <p>Single phase PE L1 L2</p>
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9	<p>Close the wire cover and screw up the wire cover with 4 screws</p>			
10	<p>Close the front cover and the installation is finished.</p> <p>⚠️ Important note: the front cover must be correctly installed and closed before using the charger. Do not use the device if the cover cannot be closed for any reason.</p>			

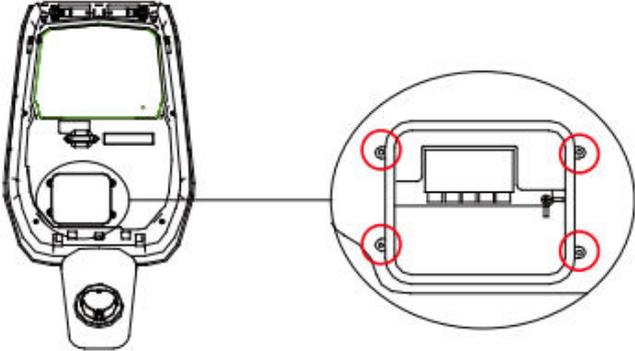
6.9 Installation on stand

If the user decides not to install on the wall but on the dedicated stand, provided as accessory, the following steps shall be performed. Please note that, in this case, the screws and fixing accessories must be provided by the installer depending on the different conditions of the installation site.

Step No.	Description	Picture
1	<p>Select a stable and solid concrete platform to fix the stand. In case such a platform is not available, pour a dedicated platform.</p> <p>The platform must be equipped with M10 bolts and a 40 mm diameter PVC conduit embedded below the base.</p> <p>The top part of the platform must be flat to have a safe and stable installation, avoiding dangerous breaks of the stand.</p> <p>In case of newly poured concrete platform, wait until it is solidified before proceeding.</p>	 <p>The diagram shows a front view of a rectangular concrete platform. It features an M10-bolt and a PVC pipe with a diameter of 40mm. The dimensions are: total width 500mm, total height 450mm, bolt hole diameter 120mm, distance from bolt center to the right edge 300mm, distance from bolt center to the left edge 250mm, and distance from the bottom edge to the bolt hole 350mm. An arrow points to the diagram with the label 'Front view'.</p>
2	<p>The depth of the M10 bolts buried in the poured platform shall be not less than 150mm, while the exposed length is recommended to be in the range from 15 to 30mm.</p> <p>The power cables, arriving through the PVC conduit shall be pulled out not less than 1.3m from the ground, to allow an easy installation of the cable.</p>	 <p>The diagram shows a cross-section of the stand base. It is made of C20-Concrete. A PVC pipe with a diameter of 40mm is embedded in the concrete. The depth of the bolt in the concrete is 150mm. The exposed length of the bolt is 30mm. The total height of the concrete base is 600mm. The distance from the ground to the bottom of the concrete base is 100mm. The ground is labeled 'The ground used for parking'.</p>
3	<p>Incline the stand in order to insert the cable through the bottom side. Make the cable pass through, until it reaches the outlet in the middle of the stand. Pull the cable out of this outlet</p>	 <p>The diagram shows a cable being inserted into the stand. The cable is labeled 'Cable'.</p>

Step No.	Description	Picture
4	<p>Put the stand in the vertical position and use the M10 nuts together with flat washers to secure the stand base to the concrete platform.</p> <p>An M6x20 bolt needs to be added to the stainless-steel nut at the bottom of the stand to provide ground protection.</p>	
5	<p>Remove the wall mounted metal plate that comes with the charger. Then remove the four M6x20 bolts on the stand hanging plate. Finally align the holes of the two metal plates and fix them using the M6x20 bolts.</p>	

Step No.	Description	Picture		
6	<p>Hang the charger on the stand just sliding it bottom side on the dedicated binaries and check it is stable.</p> <p>Each stand can be mounted with two chargers.</p>			
7	<p>Now the supply cable must be connected. Open the frontal cover.</p> <p> Make sure the input cable is not powered.</p> <p>Open the wire cover (circled in the picture), insert the power supply cables into the bottom hole, and connect the cables according to the signs as specified on the wire cover scheme.</p> <p>It should be noted that there is no device for fixing the input cable, so you must leave enough space for the cable to avoid the cable from being pulled by external forces, or you can add a cable fixing device which stabilize the input cable.</p>	 <div data-bbox="710 1579 1428 1982" style="background-color: #333; color: white; padding: 10px;"> <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top; padding-right: 10px;"> <p>FOR TT, TN-S, TN-C-S Voltage between phase line and neutral line $\leq 240\text{VAC}$</p> <div style="text-align: center;">  </div> <p>Three phase PE L1 L2 L3 N</p> <p>Single phase PE L1 N</p> </td> <td style="width: 50%; vertical-align: top;"> <p>FOR IT Voltage between phase line and phase line $\leq 240\text{VAC}$</p> <div style="text-align: center;">  </div> <p>Single phase PE L1 L2</p> </td> </tr> </table> </div>	<p>FOR TT, TN-S, TN-C-S Voltage between phase line and neutral line $\leq 240\text{VAC}$</p> <div style="text-align: center;">  </div> <p>Three phase PE L1 L2 L3 N</p> <p>Single phase PE L1 N</p>	<p>FOR IT Voltage between phase line and phase line $\leq 240\text{VAC}$</p> <div style="text-align: center;">  </div> <p>Single phase PE L1 L2</p>
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Step No.	Description	Picture
8	Close the wire cover and screw up the wire cover with 4 screws	 <p>The diagram illustrates the process of securing the wire cover. On the left, a top-down view of the device shows the internal components and the wire cover. On the right, a circular inset provides a magnified view of the wire cover, which is a rectangular frame. Four screws are shown being inserted into the corners of this frame to secure it. Each screw is highlighted with a red circle.</p>
9	<p>Close the front cover and the installation is finished.</p> <p>⚠ Important note: the front cover must be correctly installed and closed before using the charger. Do not use the device if the cover cannot be closed for any reason.</p>	

7 Operations

After the charger is installed, it is ready for charging the EVs. The following describes the operating elements and the display/indicators elements of the charger.

7.1 Operating elements

7.1.1 Display Areas

The charger has three display areas AREA1, AREA2, AREA3 on its front side



Each AREA has its own function as in the following table:

Display Area	Type	Function description
AREA1	Digital character display	It displays the following information: <ul style="list-style-type: none">• Main network voltage• Main network frequency• Station number• Output current (only during the charging process)• Error code
AREA2	LED indicators	They give real time information about: <ul style="list-style-type: none">• WiFi mode and status• Charger connection to the EV• Charging process• Errors

Display Area	Type	Function description
AREA3	Tap RFID card area prompt light	The four square corners of the RFID card tap area are highlighted to show where the RFID card should be active
All around the charger	LED indicator	A LED belt is placed all around the charger and assumes different colours to indicate the current status (see table below)

LED Belt		
Colour	Blinking mode	Status
White	No blinking	Power on self-test: the charger is switching on and performing the power on tests
Green	Blinking slowly	Stand-By mode: the charger is on, available for charging
Blue	Fast blinking	Pause during the charging process
Blue	No blinking	Charging mode setup: the charger is preparing to start the charging process
Blue	Blinking slowly	Charging mode: the charging process is ongoing
Red		Error mode: errors are detected by the internal protections

7.1.2 Digital character display (AREA1)

The following table shows the format of the information presented by the frontal display:

Display string format (Letter "c" = single character)	Unit	Description
ccc.0	V	Where ccc = Input supply voltage value (V)
cc.c	A	Where cc.c = Charging current value (A)
cc.c	Hz	Where cc.c = Input supply voltage frequency (Hz)
cc.c	kWH	Where cc.c = Output power (kWH)
ccc	Min	Where ccc = Charging process duration (Min)

These data are presented in rotation on the display.

In case of errors/faults/abnormal behaviours, the display can show the following error message codes. The following table explains the meaning of each error code:

Display string format	Description
ERR OCP	Over-current fault
ERR OVP	Over-voltage fault
ERR LVP	Under-voltage fault
ERR MET or ERR CAN ADDR	Meter communication fault or CAN bus fault
ERR PE	Ground fault
ERR CP	CP voltage fault
ERR R12	Relay 1 blocked fault
ERR R3N	Relay 2 blocked fault
ERR ROT	Relay over-temperature fault
ERR ELK	Electronic lock abnormal fault
ERR OCT	Plug holder over-temperature fault
ERR IRD	Leakage fault
ERR FAN	Fan fault (the fan is blocked)

Display string format	Description
ERR PP	Unreliable connection fault
ERR MIS	Missing power phase fault

In case of system upgrade operations, the display can show the following messages:

Display string format	Description
100 UP	Upgrade successful
E01 UP	Upgrade unsuccessful
E02 UP	The captcha does not match
E03 UP	Upgrade time out
E04 UP	Upgrade file error

7.1.3 LED indicators (AREA2)

The LED indicators give real time information about the charger status. Four different indicators are available with the functions explained in the following table:

LED indicator	Application	Description																		
	WiFi network mode and status	<p>Depending on its colour and on its behaviour (blinking or steady) it gives the following different information:</p> <table border="1"> <thead> <tr> <th>Status</th> <th>Colour</th> <th>Information</th> </tr> </thead> <tbody> <tr> <td>Steady</td> <td>Blue</td> <td>WiFi in AP mode, no device connected</td> </tr> <tr> <td>Blinking</td> <td>Blue</td> <td>WiFi in AP mode, devices are connected</td> </tr> <tr> <td>Steady</td> <td>Green</td> <td>WiFi in client mode, not connected</td> </tr> <tr> <td>Blinking</td> <td>Green</td> <td>WiFi in client mode, connected</td> </tr> <tr> <td>Steady</td> <td>Red</td> <td>Damaged WiFi module</td> </tr> </tbody> </table>	Status	Colour	Information	Steady	Blue	WiFi in AP mode, no device connected	Blinking	Blue	WiFi in AP mode, devices are connected	Steady	Green	WiFi in client mode, not connected	Blinking	Green	WiFi in client mode, connected	Steady	Red	Damaged WiFi module
Status	Colour	Information																		
Steady	Blue	WiFi in AP mode, no device connected																		
Blinking	Blue	WiFi in AP mode, devices are connected																		
Steady	Green	WiFi in client mode, not connected																		
Blinking	Green	WiFi in client mode, connected																		
Steady	Red	Damaged WiFi module																		
	Plug status	<p>Depending on its colour and on its behaviour (blinking or steady) it gives the following different information:</p> <table border="1"> <thead> <tr> <th>Status</th> <th>Colour</th> <th>Information</th> </tr> </thead> <tbody> <tr> <td>Steady</td> <td>White</td> <td>The EV is connected and ready to start charging</td> </tr> <tr> <td>Off</td> <td></td> <td>No EV connected</td> </tr> </tbody> </table>	Status	Colour	Information	Steady	White	The EV is connected and ready to start charging	Off		No EV connected									
Status	Colour	Information																		
Steady	White	The EV is connected and ready to start charging																		
Off		No EV connected																		
	Charging process	<p>Depending on its colour and on its behaviour (blinking or steady) it gives the following different information:</p> <table border="1"> <thead> <tr> <th>Status</th> <th>Colour</th> <th>Information</th> </tr> </thead> <tbody> <tr> <td>Steady</td> <td>White</td> <td>The charging process is in progress</td> </tr> <tr> <td>Blinking</td> <td>White</td> <td>The charging process is temporarily suspended</td> </tr> <tr> <td>Off</td> <td></td> <td>No charging process in progress</td> </tr> </tbody> </table>	Status	Colour	Information	Steady	White	The charging process is in progress	Blinking	White	The charging process is temporarily suspended	Off		No charging process in progress						
Status	Colour	Information																		
Steady	White	The charging process is in progress																		
Blinking	White	The charging process is temporarily suspended																		
Off		No charging process in progress																		
	Fault indication	<p>Depending on its colour and on its behaviour (blinking or steady) it gives the following different information:</p> <table border="1"> <thead> <tr> <th>Status</th> <th>Colour</th> <th>Information</th> </tr> </thead> <tbody> <tr> <td>Steady</td> <td>Red</td> <td>A fault occurred</td> </tr> <tr> <td>Off</td> <td></td> <td>No fault</td> </tr> </tbody> </table>	Status	Colour	Information	Steady	Red	A fault occurred	Off		No fault									
Status	Colour	Information																		
Steady	Red	A fault occurred																		
Off		No fault																		

7.1.4 Tap RFID card area (AREA3)

This is the area where the RFID card is operative. The RFID card is used to start or stop the charging process. In order to perform these operations, the user should lay the card on the tap rectangular area indicated by the four light square angles.

8 System connectivity

The charger is equipped with three types of connection interfaces:

- the WiFi interface: used for configuration purpose (when set to AP mode) and used for network-based maintenance/management (when set to CLIENT mode)
- the RS-485 interface: used to connect to an external meter in order to manage the maximum available power for charging
- the CAN Bus interface: used to interconnect a pool of chargers and perform the load balancing between all of them

8.1 WiFi interface

There are two possible WiFi modes:

- WiFi AP (Access Point)
- WiFi CLIENT mode

The WiFi AP mode is the default one. The dedicated button on the front black display area, under the black frontal cover, must be pushed for more than 3 sec. to switch between the two WiFi modes (see the picture below where the switch mode button is highlighted by the red circle).



8.1.1 WiFi AP mode

The WiFi AP (Access Point) mode (also referred as "Hot Spot") is mainly used for configuration and monitoring purposes.

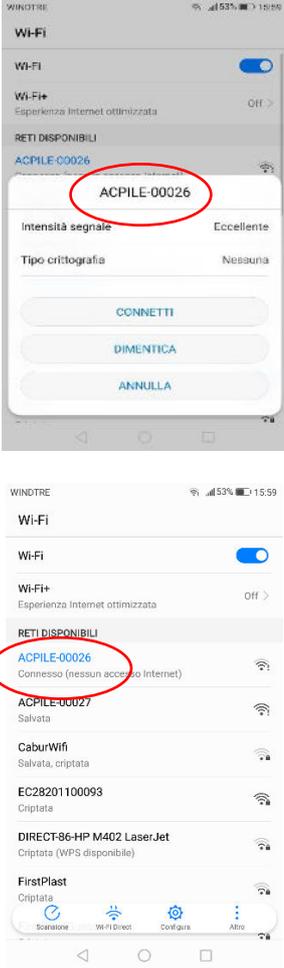
In this mode, the charger creates a WiFi network with a specified SSID and the user can connect to that network, based on a point-to-point approach, to apply all the necessary configurations or to monitor the charger parameters.



The connection to the charger can be established by a PC, tablet or smartphone.

The following steps are necessary to setup the connection between the user device (PC, tablet, smartphone) and the charger:

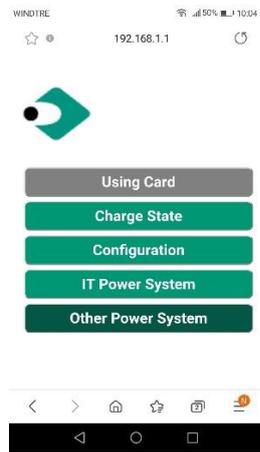
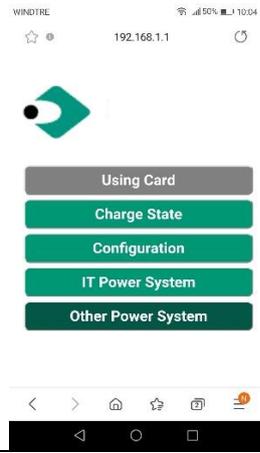
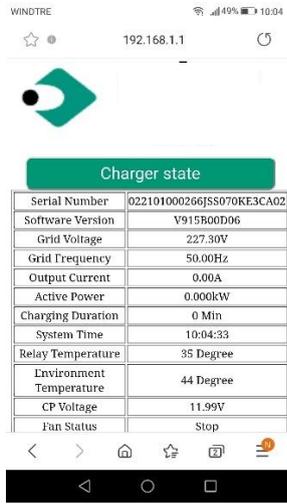
Step No.	Description	Picture
1	<p>The WiFi interface must be in AP mode. The Wi-Fi LED indicator on the front panel (par. 6.1.3) is blue coloured.</p>	
2	<p>Scan for available WiFi networks with the connecting device utility</p>	

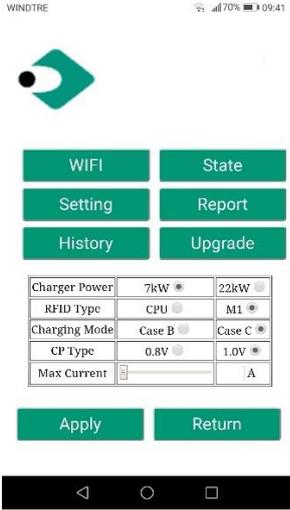
Step No.	Description	Picture
3	Connect the device (PC, Tablet, Smartphone) to the WiFi network generated by the charger (it should have an SSID name similar to ACPILE_xx or represented by a numeric string)	
4	Now the connecting device is connected to the charger AP. The WiFi LED indicator starts blinking, confirming that a device is connected to the charger AP	
5	 Note: only one device can be connected, to the AP, at a time	

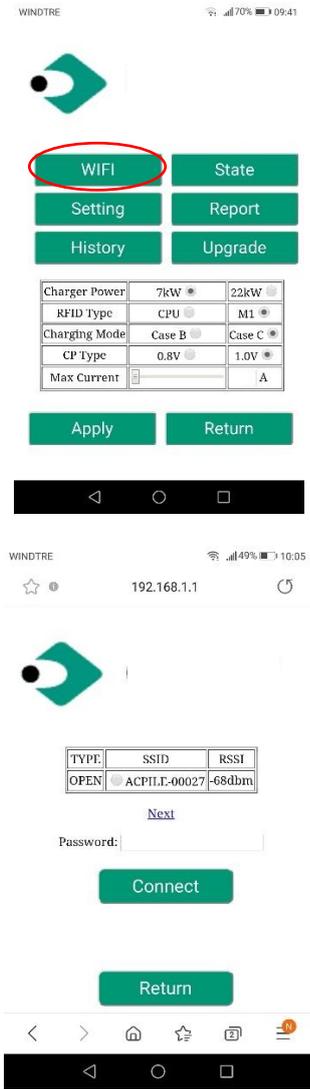
8.1.2 Configurations through WiFi AP mode

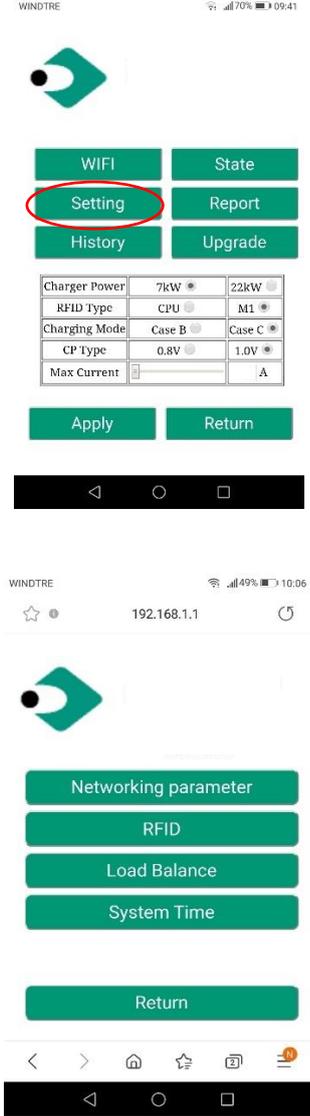
When connected through the AP, the user can configure the charger parameters. The configuration is performed by means of a web app which connects to the charger internal web server.

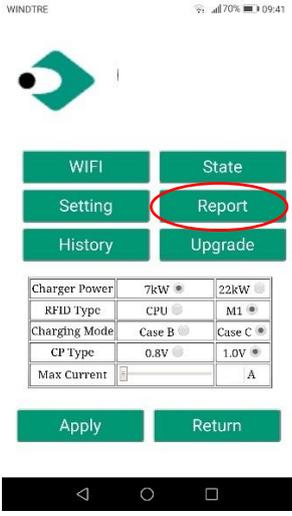
Please consider the following instructions to properly use the app for configuration.

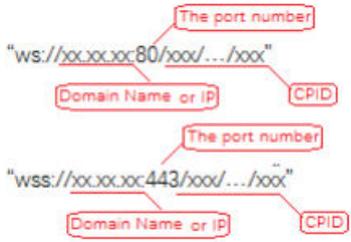
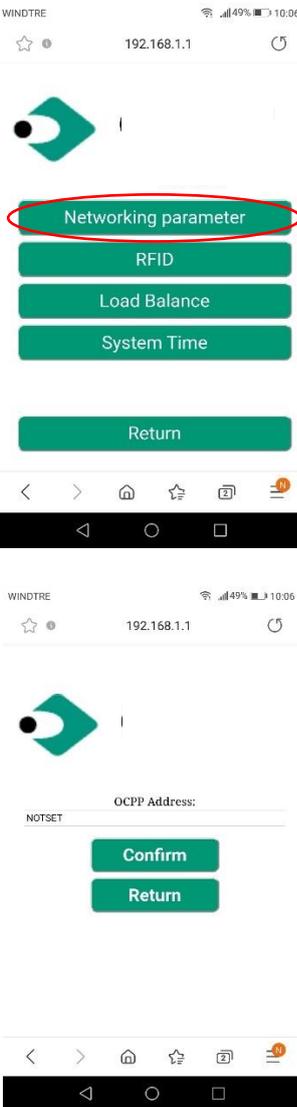
Step No.	Description	Picture																										
1	<p>The connecting device (PC, tablet, smartphone) is connected to the charger WiFi AP.</p> <p>Open the internet browser.</p> <p>Connect to the following URL: http://192.168.1.1</p> <p>The home page of the web app is shown.</p>																											
2	<p>Using card button Using Card</p> <p>This button indicates the status of the charging process with its label:</p> <ul style="list-style-type: none"> • <i>Using card</i> means the charger is not charging and the charging process can be activated by using the RFID card. This button also indicates to the user that the charging process, for this charger model, has to be triggered by means of the RFID card 																											
3	<p>Charger state button Charge State</p> <p>Pressing this button, the user can access the charger state page to monitor all the parameters of the charger and their status.</p> <p>The user can return back to the home page just clicking on the “return button” at the end of the page</p>	 <table border="1" style="margin-top: 10px;"> <thead> <tr> <th colspan="2">Charger state</th> </tr> </thead> <tbody> <tr><td>Serial Number</td><td>022101000266JSS070RE3CA02</td></tr> <tr><td>Software Version</td><td>V915R00D06</td></tr> <tr><td>Grid Voltage</td><td>227.30V</td></tr> <tr><td>Grid Frequency</td><td>50.00Hz</td></tr> <tr><td>Output Current</td><td>0.00A</td></tr> <tr><td>Active Power</td><td>0.000kW</td></tr> <tr><td>Charging Duration</td><td>0 Min</td></tr> <tr><td>System Time</td><td>10:04:33</td></tr> <tr><td>Relay Temperature</td><td>35 Degree</td></tr> <tr><td>Environment Temperature</td><td>44 Degree</td></tr> <tr><td>CP Voltage</td><td>11.99V</td></tr> <tr><td>Fan Status</td><td>Stop</td></tr> </tbody> </table>	Charger state		Serial Number	022101000266JSS070RE3CA02	Software Version	V915R00D06	Grid Voltage	227.30V	Grid Frequency	50.00Hz	Output Current	0.00A	Active Power	0.000kW	Charging Duration	0 Min	System Time	10:04:33	Relay Temperature	35 Degree	Environment Temperature	44 Degree	CP Voltage	11.99V	Fan Status	Stop
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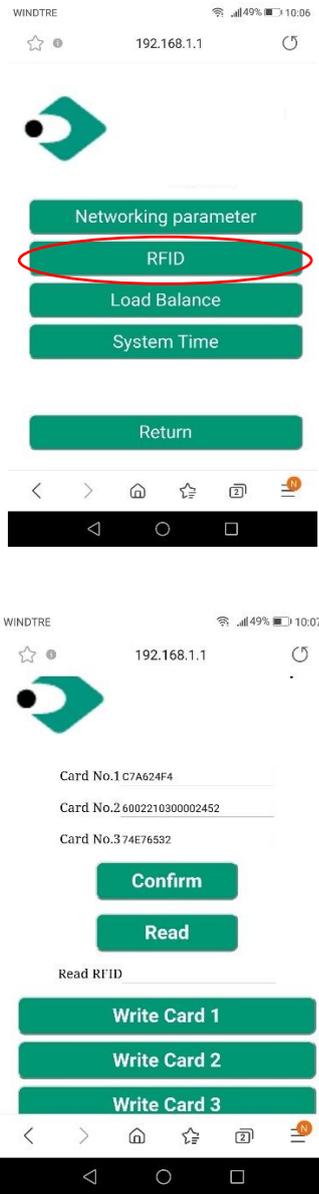
Step No.	Description	Picture															
4	<p>Configuration button </p> <p>Pressing this button, the user can access the charger configuration pages to set all the parameters of the charger.</p> <p>After clicking on the configuration button, a login window will appear.</p> <p> Important note: to enter into the configuration pages the user must insert a password. The default password is "123456". It must be entered into the "Verification" field.</p> <p>The user is now allowed to see the configuration main page.</p> <p>From this page the user can access other pages by clicking the 6 buttons at the top of the page. These buttons will be explained later in the document.</p> <p><u>System parameter settings</u></p> <p>In this page the main system parameters can be set:</p> <ul style="list-style-type: none"> • <i>Charge power:</i> set the output power value of the charger • <i>RFID type:</i> two RFID tag standard can be used, CPU type (for payment related purposes) and M1 type (no payment functionality, only for triggering the charging process) • <i>Charging mode:</i> set the mode with (case C) or without the cable (case B) • <i>CP type:</i> set the voltage value of the CP signal • <i>Max Current:</i> set the maximum charge current value (<u>accepted range 6 – 32 A</u>) <p> Important note: these parameters shall be configured by qualified personnel only</p>	  <table border="1" data-bbox="997 1088 1246 1200"> <tbody> <tr> <td>Charger Power</td> <td>7kW</td> <td>22kW</td> </tr> <tr> <td>RFID Type</td> <td>CPU</td> <td>M1</td> </tr> <tr> <td>Charging Mode</td> <td>Case B</td> <td>Case C</td> </tr> <tr> <td>CP Type</td> <td>0.8V</td> <td>1.0V</td> </tr> <tr> <td>Max Current</td> <td></td> <td>A</td> </tr> </tbody> </table>	Charger Power	7kW	22kW	RFID Type	CPU	M1	Charging Mode	Case B	Case C	CP Type	0.8V	1.0V	Max Current		A
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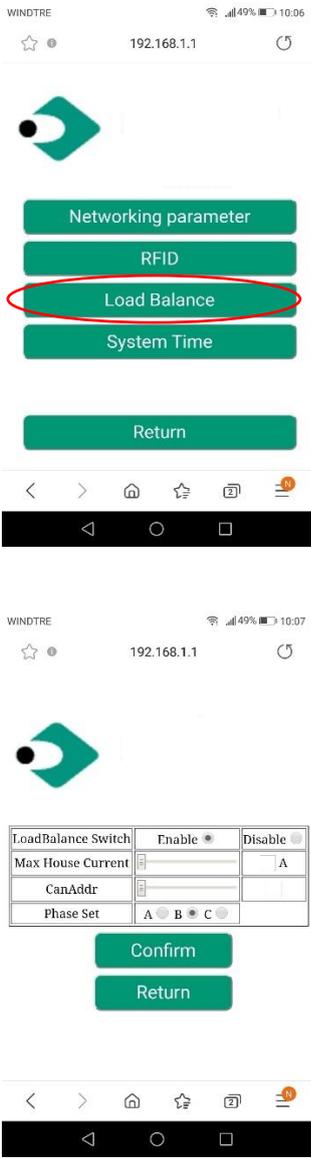
Step No.	Description	Picture																					
5	<p>Clicking on the “WIFI” button , the user can access the CLIENT mode wifi settings.</p> <p>The user can configure the AP, that the charger can connect to, when in WiFi Client Mode.</p> <p>The list of the networks is shown automatically after entering this page. Or the user can set it.</p> <p>To connect to a particular SSID, select it, insert the password in the proper field and click connect.</p> <p>The charger will automatically connect to the selected SSID from now on, when set in Client Mode.</p> <p> Important note: these parameters shall be configured by qualified personnel only</p>	 <p>The top screenshot shows the WINDTRE mobile application interface. At the top, there is a status bar with 'WINDTRE', signal strength, 70% battery, and time 09:41. Below the status bar is the WINDTRE logo. A menu of green buttons is displayed: 'WIFI' (circled in red), 'State', 'Setting', 'Report', 'History', and 'Upgrade'. Below the menu is a settings table:</p> <table border="1" data-bbox="1002 566 1246 678"> <tr> <td>Charger Power</td> <td>7kW</td> <td>22kW</td> </tr> <tr> <td>RFID Type</td> <td>CPU</td> <td>M1</td> </tr> <tr> <td>Charging Mode</td> <td>Case B</td> <td>Case C</td> </tr> <tr> <td>CP Type</td> <td>0.8V</td> <td>1.0V</td> </tr> <tr> <td>Max Current</td> <td></td> <td>A</td> </tr> </table> <p>Below the table are 'Apply' and 'Return' buttons. The bottom screenshot shows the WINDTRE mobile application interface. At the top, there is a status bar with 'WINDTRE', signal strength, 49% battery, and time 10:05. Below the status bar is the WINDTRE logo. A table of detected networks is displayed:</p> <table border="1" data-bbox="1027 1032 1219 1081"> <thead> <tr> <th>TYPE</th> <th>SSID</th> <th>RSSI</th> </tr> </thead> <tbody> <tr> <td>OPEN</td> <td>ACPILE-00027</td> <td>-68dbm</td> </tr> </tbody> </table> <p>Below the table is a 'Next' button, a 'Password:' field, and a 'Connect' button. At the bottom is a 'Return' button.</p>	Charger Power	7kW	22kW	RFID Type	CPU	M1	Charging Mode	Case B	Case C	CP Type	0.8V	1.0V	Max Current		A	TYPE	SSID	RSSI	OPEN	ACPILE-00027	-68dbm
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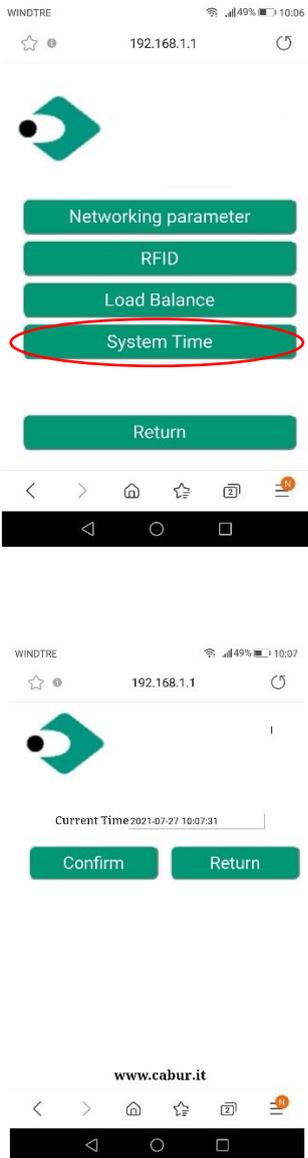
Step No.	Description	Picture
6	<p>Clicking on the <u>“Setting”</u> button  a new setting page is presented, with the following menus:</p> <ul style="list-style-type: none"> • Network parameter • RFID settings • Load Balance • System time <p> Important note: these parameters shall be configured by qualified personnel only</p>	 <p>The screenshot shows two mobile application screens. The top screen is the main settings menu with buttons for WIFI, State, Setting (circled in red), Report, History, and Upgrade. Below these are configuration options for Charger Power, RFID Type, Charging Mode, CP Type, and Max Current, with 'Apply' and 'Return' buttons at the bottom. The bottom screen shows the 'Networking parameter' menu with buttons for Networking parameter, RFID, Load Balance, System Time, and Return.</p>

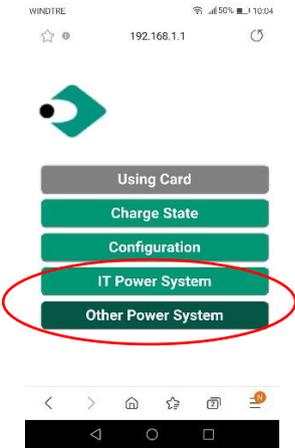
Step No.	Description	Picture																																																		
7	Clicking on the “History”  button the user can access the historical logs of the device	 <p>WINDTRE 70% 09:41</p> <p>WIFI State Setting Report History Upgrade</p> <table border="1"> <tr><td>Charger Power</td><td>7kW</td><td>22kW</td></tr> <tr><td>RFID Type</td><td>CPU</td><td>M1</td></tr> <tr><td>Charging Mode</td><td>Case B</td><td>Case C</td></tr> <tr><td>CP Type</td><td>0.8V</td><td>1.0V</td></tr> <tr><td>Max Current</td><td></td><td>A</td></tr> </table> <p>Apply Return</p> <hr/> <p>WINDTRE 49% 10:08 192.168.1.1</p> <p>Charging Record</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Start</th> <th>End</th> <th>Start Mode</th> <th>Stop Mode</th> <th>Energy</th> <th>Id</th> </tr> </thead> <tbody> <tr> <td>13</td> <td>2021-07-25 09:38:35</td> <td>09:48:52</td> <td>RFID</td> <td>RFID</td> <td>1.119kWh</td> <td>0</td> </tr> <tr> <td>12</td> <td>2021-07-10 08:45</td> <td>15:38:04</td> <td>RFID</td> <td>RFID</td> <td>17.260kWh</td> <td>0</td> </tr> <tr> <td>11</td> <td>2021-06-30 09:20:04</td> <td>16:52:12</td> <td>RFID</td> <td>RFID</td> <td>5.973kWh</td> <td>0</td> </tr> <tr> <td>10</td> <td>2021-06-14 5:20</td> <td>14:56:20</td> <td>RFID</td> <td>RFID</td> <td>0.703kWh</td> <td>0</td> </tr> </tbody> </table>	Charger Power	7kW	22kW	RFID Type	CPU	M1	Charging Mode	Case B	Case C	CP Type	0.8V	1.0V	Max Current		A	No.	Start	End	Start Mode	Stop Mode	Energy	Id	13	2021-07-25 09:38:35	09:48:52	RFID	RFID	1.119kWh	0	12	2021-07-10 08:45	15:38:04	RFID	RFID	17.260kWh	0	11	2021-06-30 09:20:04	16:52:12	RFID	RFID	5.973kWh	0	10	2021-06-14 5:20	14:56:20	RFID	RFID	0.703kWh	0
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8	Clicking on the “Report”  button the user can access the reports of the device	 <p>WINDTRE 70% 09:41</p> <p>WIFI State Setting Report History Upgrade</p> <table border="1"> <tr><td>Charger Power</td><td>7kW</td><td>22kW</td></tr> <tr><td>RFID Type</td><td>CPU</td><td>M1</td></tr> <tr><td>Charging Mode</td><td>Case B</td><td>Case C</td></tr> <tr><td>CP Type</td><td>0.8V</td><td>1.0V</td></tr> <tr><td>Max Current</td><td></td><td>A</td></tr> </table> <p>Apply Return</p>	Charger Power	7kW	22kW	RFID Type	CPU	M1	Charging Mode	Case B	Case C	CP Type	0.8V	1.0V	Max Current		A																																			
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Max Current		A																																																		

Step No.	Description	Picture															
9	<p>Clicking on the “Upgrade” button  the user can upgrade the system (see chapter 12 for details)</p> <p> Important note: these parameters shall be configured by qualified personnel only</p>	 <p>The screenshot shows the WINDTRE interface with a menu of options: WIFI, State, Setting, Report, History, and Upgrade. The Upgrade button is highlighted with a red circle. Below the menu is a configuration table:</p> <table border="1" data-bbox="1002 573 1246 685"> <tr> <td>Charger Power</td> <td>7kW</td> <td>22kW</td> </tr> <tr> <td>RFID Type</td> <td>CPU</td> <td>M1</td> </tr> <tr> <td>Charging Mode</td> <td>Case B</td> <td>Case C</td> </tr> <tr> <td>CP Type</td> <td>0.8V</td> <td>1.0V</td> </tr> <tr> <td>Max Current</td> <td></td> <td>A</td> </tr> </table> <p>Buttons for 'Apply' and 'Return' are visible at the bottom.</p>	Charger Power	7kW	22kW	RFID Type	CPU	M1	Charging Mode	Case B	Case C	CP Type	0.8V	1.0V	Max Current		A
Charger Power	7kW	22kW															
RFID Type	CPU	M1															
Charging Mode	Case B	Case C															
CP Type	0.8V	1.0V															
Max Current		A															
10	<p>Setting/Network parameters: Settings for the OCPP server address to support OCPP based management</p> <p>The format of the OCPP server address shall follow the proper rules, as in the picture below:</p> <div data-bbox="368 1115 719 1357" style="text-align: center;">  </div> <p> Important note: these parameters shall be configured by qualified personnel only</p>	 <p>The top screenshot shows the 'Networking parameter' button circled in red. Below it are buttons for 'RFID', 'Load Balance', and 'System Time', followed by a 'Return' button.</p> <p>The bottom screenshot shows the 'OCPP Address' field with the value 'NOTSET' and 'Confirm' and 'Return' buttons.</p>															

Step No.	Description	Picture
11	<p>Setting/RFID</p> <p>In this page the user can find the list of the authorized RFID cards and grant the authorization to new cards. The upper part of the page presents the numbers of the authorized RFID cards.</p> <p>Note: a maximum number of three RFID cards can be associated to the charger.</p> <p>Note: the card association process can only be performed when the charger is in stand-by mode.</p> <p>The new card to be associated must be read before. To read it the user should</p> <ul style="list-style-type: none"> • click on the Read button • put the card near to the RFID tap area (see 6.1.1), the number of the read card should appear in the Read RFID field • select which of the three card slots associate with the new card by pressing the “Write card x” (x = 1,2,3) button <p>The new RFID card number should now appear in the “Card No. x” line and this card is authorized.</p> <p> Important note: these parameters shall be configured only by qualified personnel</p>	

Step No.	Description	Picture												
12	<p>Setting/Load Balance: In this page the load balancing can be configured</p> <ul style="list-style-type: none"> • <i>LoadBalance Switch</i>: load balancing activation • <i>Max House Current</i>: sets the maximum available current (power) • <i>CANAddr</i>: sets the CAN address for master/slave communication between two chargers • <i>Phase Set</i>: selects the phase to be measured <p> Important note: these parameters shall be configured by qualified personnel only</p>	 <p>The top screenshot shows a mobile application interface with a menu. The menu items are: Networking parameter, RFID, Load Balance (highlighted with a red oval), and System Time. Below the menu is a 'Return' button. The bottom screenshot shows the configuration screen for 'Load Balance'. It features a table with the following settings:</p> <table border="1" data-bbox="970 1115 1273 1214"> <tr> <td>LoadBalance Switch</td> <td>Enable <input checked="" type="radio"/></td> <td>Disable <input type="radio"/></td> </tr> <tr> <td>Max House Current</td> <td><input type="text"/></td> <td><input type="text"/> A</td> </tr> <tr> <td>CanAddr</td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td>Phase Set</td> <td colspan="2">A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/></td> </tr> </table> <p>Below the table are 'Confirm' and 'Return' buttons.</p>	LoadBalance Switch	Enable <input checked="" type="radio"/>	Disable <input type="radio"/>	Max House Current	<input type="text"/>	<input type="text"/> A	CanAddr	<input type="text"/>	<input type="text"/>	Phase Set	A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/>	
LoadBalance Switch	Enable <input checked="" type="radio"/>	Disable <input type="radio"/>												
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CanAddr	<input type="text"/>	<input type="text"/>												
Phase Set	A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/>													

Step No.	Description	Picture
13	<p>Setting/System time</p> <p>In this page the system time can be set. The correct time is automatically read from the connecting device and is shown in the “Current time” field. Clicking the “Confirm” button the time setting is saved as the charger time.</p> <p>! Important note: these parameters shall be configured by qualified personnel only</p>	 <p>The top screenshot shows the application's main menu. The 'System Time' option is highlighted with a red oval. The bottom screenshot shows the 'System Time' configuration screen, where the current time is displayed as '2021-07-27 10:07:31' and there are 'Confirm' and 'Return' buttons.</p>

Step No.	Description	Picture
	<p><u>IT Power system</u> </p> <p>this button enables the charger to be supplied by IT power network systems</p> <p><u>Other Power systems</u> </p> <p>this button enables the charger to be supplied by TT or TN power network systems</p> <p> The selected power system is indicated by the different colour of the button after the selection</p> <p> Important note: these parameters shall be configured by qualified personnel only</p>	

8.1.3 WiFi CLIENT mode

When in CLIENT mode, the charger can be connected to an available WiFi network. The charger control can be achieved by a server which supports the OCPP protocol.

The current series of Cabur chargers supports the OCPP 1.6 J version of the protocol.

To configure the WiFi interface of the charger in CLIENT mode the user should perform the following steps.



Important note: before switching to CLIENT mode all the needed configurations must be completed in AP mode.

Step No.	Description	Picture
1	Open the black front panel, just sliding the two locks in the charger backside	

Step No.	Description	Picture
2	Press the button highlighted in the following picture for more than 3 sec. continuously	
3	Wait for the sound (1 sec. duration) from the charge, which says the change of WiFi mode has been completed	
4	The WiFi indicator will change its colour from blue to green	
5	Close the black front panel of the charger.	
6	The charger will now automatically connect to the WiFi router set by the user (see par. 8.1.2 point 5), the same router (2) to which the OCPP server (4) is eventually connected.	

8.1.4 WiFi CLIENT mode operations (OCPP support)

When connected in WiFi CLIENT mode, the charger is able to interface to the OCPP server. This allows for network-based management solutions, both for the charger itself and its related charging process.

Through the OCPP software platform, provided by energy companies, organizations, etc., the charger activity is controlled and all the administrative processes, as charging authorizations, billing, reports, can be remotely managed by the central station of the service.

The Charger supports the following OCPP 1.6 J protocol functions:

- Operations initiated by the central server:
 - Remote Start Transaction

- Remote Stop Transaction
- Get Configuration
- Reset The server
- Change Availability
- Change Configuration
- Clear Cache
- Reserve Now
- Cancel Reservation

- Operation initiated by the charge point:
 - Boot Notification
 - Status Notification
 - Heartbeat
 - Authorize
 - Start transaction
 - Stop transaction
 - Meter values

The OCPP server address setting is specified in chapter 8.1.2, point 10.

9 Charging process

Before starting the charging process the user must be sure the plug is correctly connected to the EV.

In the **CASE B** mode (without integrated cable) connect the cable to the charger and then to the EV on the other side.

In the **CASE C** mode (integrated cable) connect the cable to the EV.

The charging process starts using the RFID card.

When the charger is connected to the vehicle, the tap card area four corners will light up, indicating that the charger can read the RFID card to start operating.

Hold the RFID card close to the tap area for a few seconds, trying to stay as close as possible to the tap area.

When a single sound is heard and the LED belt light changes from steady blue to blinking blue, the charger is ready and starts charging the EV battery.

The plug cannot be disconnected when the charging process is running.

To stop the charging process, hold the RFID card close to the tap area again. A sound is produced by the charger indicating that the charge process has been stopped. The connector can be unplugged.



Warning: if two sounds (whose interval is about 0.5 sec.) are produced instead of a single one, it means the RFID card is not working properly and somehow failed to trigger the process.



Warning: for the CASE B mode (without the integrated cable), there is an electronic lock inside the charger to keep the electrical connection stable during the charging process. When charging is completed or a fault occurs, the electronic lock will automatically unlock, please do not pull it forcibly otherwise.

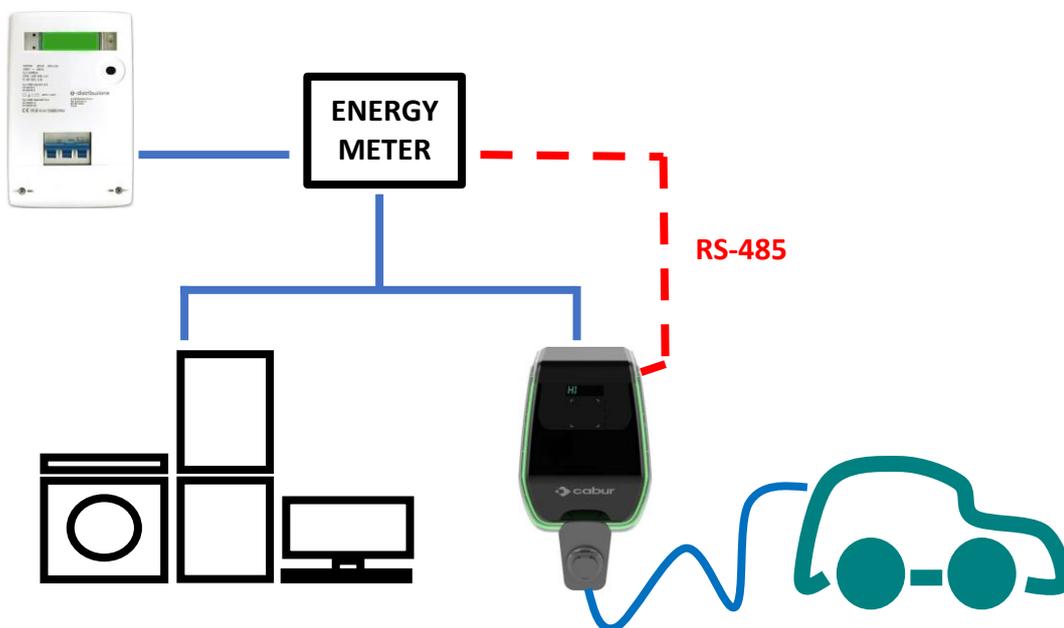
10 Power management with external meter interface

In order to perform the power management operations, a dedicated external energy meter interface is present.

Through this interface, the charger can be connected to an external energy metering device (provided as optional) which is able to inform the charger about the available amount of charging power in the main supply network.

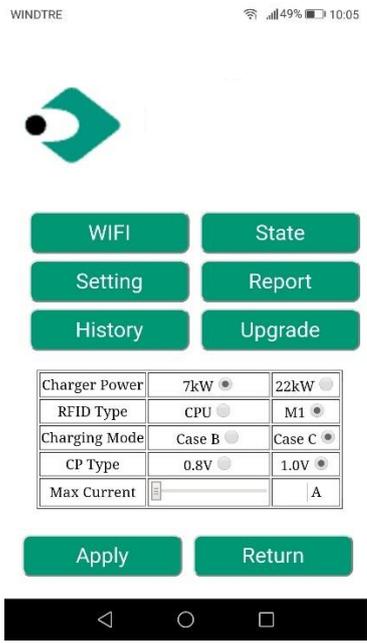
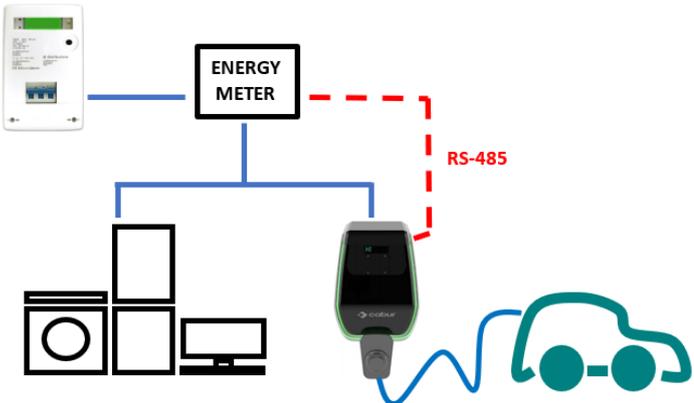
This means the charger knows, in every moment, the amount of power, left by the other loads, that can be used to charge the EV battery.

The following scheme helps to understand a possible application of the power management capability of the charger.



The following steps shall be considered to setup the external meter support for the power management operations.

Step No.	Description	Picture
1	<p>The external meter is connected to the charger through an RS-485 bus.</p> <p>The RS-485 terminal blocks can be reached removing the charger cover and then by removing the inner cover which protects the supply terminal blocks.</p> <p>The RS-485 wires are connected to the bus connector (terminal block) on the charger as presented in the picture.</p>	
2	<p>The RS-485 signals from the meter shall be connected as in the picture where</p> <ul style="list-style-type: none"> • RS-485 positive signal "+" is in "red" • RS-485 negative signal "-" is in "black" 	
3	<p>After the external meter is connected, the charger must be closed again with its covers. This is extremely important for functional and (mainly for safety reasons</p>	

Step No.	Description	Picture
4	<p>The maximum output power the charger is able to manage must be now set. The value must be equal to the maximum available power from the supply network (i.e. the maximum power value defined in the contract with the energy provider utility).</p> <p>To set the charger power value please refer to the 8.1.2 chapter, point 4.</p> <p>The value of the current determines the associated value of maximum output power for the charger.</p>	
5	<p>With these settings, the charger is real-time able to know the value of the maximum available power and the value of the power which is already used by the rest of the loads in the same networks (this information is provided by the external power meter, through the RS-485 interface)</p>	

As an example, if the supply system is able to provide up to 3.7 KW, the charger maximum output power must be set at 3.7KW (which means we need to set a maximum current equal to 16A).

Then, if the other loads, connected to the same supply network, are using 2KW, the charger will receive this information by the meter and will calculate the remaining available power for the EV charging process: $P_{\text{charger}} = 3.7 - 2 = 1.7 \text{ KW}$.

This is the value that the charger will automatically use to charge the EV battery with the current connected loads.



For additional information about how to configure the power management mode and about the meter device to be used please refer to the “*Cabur_EV_PLUS_Power_Management_ENG.pdf*” addendum document



Important note: the loads are higher priority compared to the EV battery charging process.

11 Load balancing

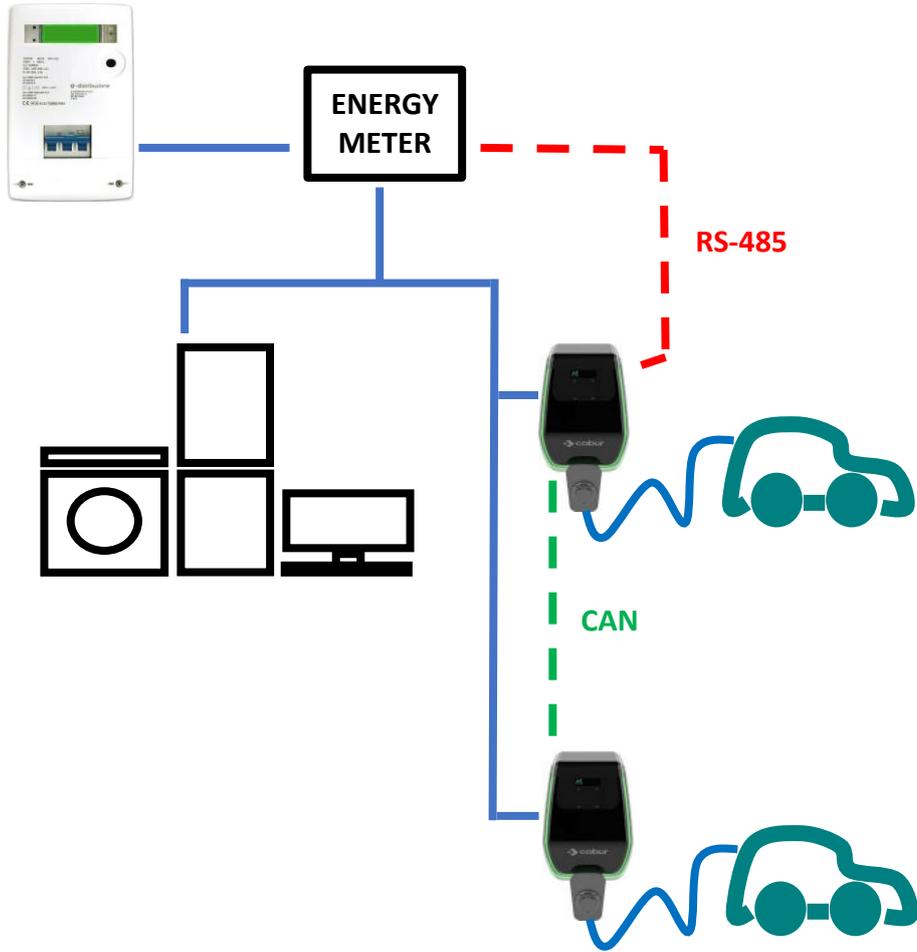
Up to two chargers can be connected together to the same supply network, with the possibility to share the overall amount of power, between each other and all the other loads supplied by the same network.

The limit of two chargers is due to the maximum rated current of the external power meter (i.e. in case of 32A charger and 80A rated meter two chargers are allowed, in case the meter can support up to 120A, three chargers can be managed).

The charger which is considered as the process master is connected to the external power meter, through its RS-485 interface, see paragraph 10.

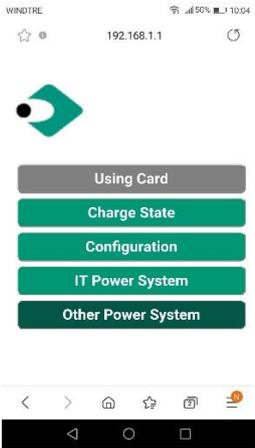
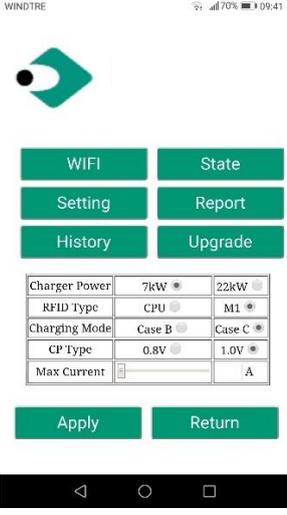
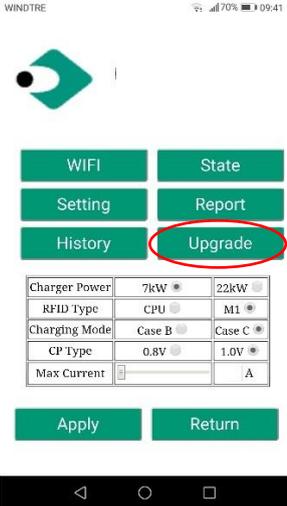
The other chargers are connected to the master charger and with each other's, by means of a CAN BUS interface. See the picture below for the application scheme.

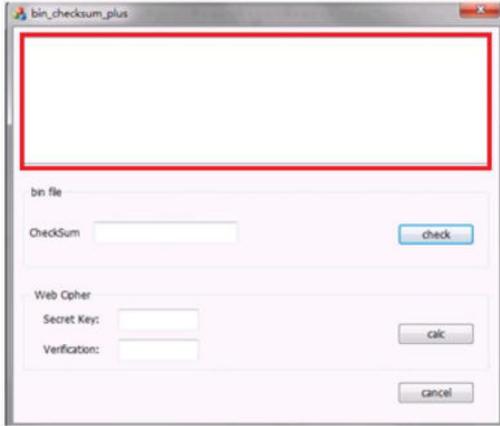
In this configuration the master charger informs the other chargers about the overall amount of available power to share between the parallel charging processes.

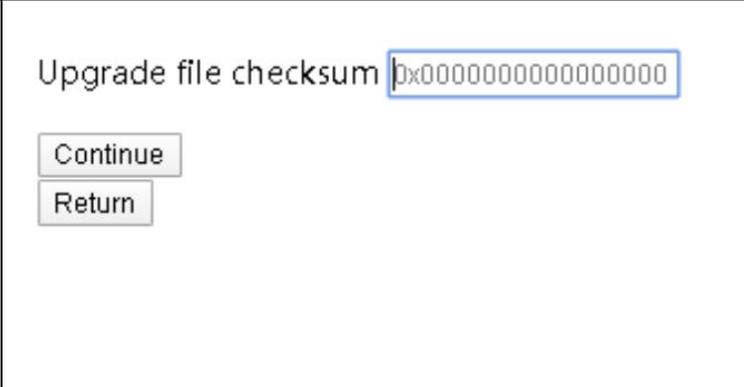


12 System upgrade

The following steps illustrate how to proceed to upgrade the system firmware

Step No.	Description	Picture															
1	<p>The connecting device (PC, tablet, smartphone) is connected to the charger WiFi AP.</p> <p>Open the internet browser.</p> <p>Connect to the following URL: http://192.168.1.1</p> <p>The home page of the web app is shown.</p>																
2	<p>Clicking on the “Configuration” button a new setting page is presented, as in the attached picture</p> <p>! Important note: these parameters shall be configured by qualified personnel only</p>	 <table border="1" data-bbox="954 1249 1200 1361"> <tr> <td>Charger Power</td> <td>7kW</td> <td>22kW</td> </tr> <tr> <td>RFID Type</td> <td>CPU</td> <td>M1</td> </tr> <tr> <td>Charging Mode</td> <td>Case B</td> <td>Case C</td> </tr> <tr> <td>CP Type</td> <td>0.8V</td> <td>1.0V</td> </tr> <tr> <td>Max Current</td> <td></td> <td>A</td> </tr> </table>	Charger Power	7kW	22kW	RFID Type	CPU	M1	Charging Mode	Case B	Case C	CP Type	0.8V	1.0V	Max Current		A
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RFID Type	CPU	M1															
Charging Mode	Case B	Case C															
CP Type	0.8V	1.0V															
Max Current		A															
3	<p>The upgrade process is initiated by clicking on the “Upgrade” button</p> <p>After entering the system upgrade page, the user must follow all the indications provided by the page itself, to avoid failures in the process and make it complete in a successful way.</p> <p>! Important note: these parameters shall be configured by qualified personnel only.</p>																

	<p> Important note: Make sure not to disconnect during the upgrade process</p>	
<p>4</p>	<p>Identify and select the upgrade file provided by the manufacturer (it is typically a file named as <i><name_of_the_upgrade_file>.bin</i>).</p> <p>This file can be eventually downloaded directly from the manufacturer website or requested directly to the manufacturer customer care office.</p>	
<p>5</p>	<p>Open the check_sum_tool provided by the manufacturer.</p> <p>This tool is a software application, which runs on PCs, used to generate the verification code for login and to automatically generate the MD5 checksum to validate the upgrade file integrity.</p> <p>Drag and drop the upgrade file <i><name_of_the_upgrade_file>.bin</i> into the red check box in the check_sum_tool interface.</p> <p>Then click the “check” button.</p>	
<p>6</p>	<p>A check sum MD5 value will automatically appear in the “Checksum” box.</p> <p> the verification code generation is not necessary if the user already has the MD5 code, provide by the manufacturer (in this case the point 5 can be skipped)</p> <p>The user shall now copy the value in the “Checksum” box.</p>	

<p>7</p>	<p>Now the user must be back to the system upgrade page in the web app.</p> <p>The MD5 checksum value generated by the check_sum_tool shall be copied in the “Upgrade file checksum” field.</p> <p>The “Continue” button shall be clicked after that.</p>																			
<p>8</p>	<p>The upgrade process starts and will last more or less 15 sec.</p> <p>At the end of the process a message could be presented on the charger display, indicating the result of the upgrade process.</p> <p>In case of no message the charger is completely restarted if the welcome message appears.</p> <p> Important note: The system is able to restart only if the status message is “100 UP”, which means successful upgrade. Do not restart the system otherwise and contact the manufacturer.</p>	<table border="1" data-bbox="719 618 1431 808"> <thead> <tr> <th>LED display</th> <th>Meaning</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>100 UP</td> <td>Upgrade success</td> <td>Wait for the device to restart automatically</td> </tr> <tr> <td>E01 UP</td> <td>Upgrade failed</td> <td>Failed to write flash</td> </tr> <tr> <td>E02 UP</td> <td>Checksum error</td> <td>Checksum not match</td> </tr> <tr> <td>E03 UP</td> <td>Upgrade timeout</td> <td>No valid data received within 15s</td> </tr> <tr> <td>E04 UP</td> <td>Bin File Mismatch</td> <td>Upgrade file does not match the AC Charger</td> </tr> </tbody> </table>	LED display	Meaning	Remarks	100 UP	Upgrade success	Wait for the device to restart automatically	E01 UP	Upgrade failed	Failed to write flash	E02 UP	Checksum error	Checksum not match	E03 UP	Upgrade timeout	No valid data received within 15s	E04 UP	Bin File Mismatch	Upgrade file does not match the AC Charger
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E03 UP	Upgrade timeout	No valid data received within 15s																		
E04 UP	Bin File Mismatch	Upgrade file does not match the AC Charger																		

13 Language configuration

The charger is configured with its factory default language. Other languages can be configured for the web-app interface, by a system upgrade operation with the same process illustrated in chapter 12.

This system upgrade operation will not affect the system functionalities but will only change the language.

The user can upload the system upgrade file which contains his own language, for example it is possible to have:

- <name_of_the_upgrade_file> **IT**.bin (IT = italian language)
- <name_of_the_upgrade_file> **EN**.bin (EN = english language)
- <name_of_the_upgrade_file> **DE**.bin (DE = german language)
- <name_of_the_upgrade_file> **ES**.bin (ES = spanish language)
- <name_of_the_upgrade_file> **FR**.bin (FR = french language)

.....

Repeating the system upgrade procedure, as described in chapter 12, will upload the charger firmware file with the selected language. This makes the app interface pages displayed in the language preferred by the user.



Important notes: these parameters shall be configured only by qualified personnel