

badgerEV
LEADING THE CHARGE

OCPP EV Charger Installation Manual

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badgerEV
LEADING THE CHARGE





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Safety Precautions



Important safety instructions

This document contains important instructions and warnings that must be followed when installing and maintaining the EV Charger.






Warning

-  Read this entire document before installing or using the EV charger.
-  This device should be supervised when used around children.
-  The BadgerEV Charger must be grounded through a permanent wiring system or an equipment grounding conductor.
-  Do not install or use the EV Charger near flammable, explosive, harsh, or combustible materials, chemicals, or vapors.
-  Use the EV Charger only within the specified operating parameters.
-  Never spray water or any other liquid directly at the wall mounted EV Charger. Never spray any liquid onto the charger handle or submerge the charger handle in liquid. Store the charger handle above the ground to prevent unnecessary exposure to contamination or moisture. Always attach charger handle to the holster on the side of the charger.
-  Do not use the EV Charger if it is defective, appears cracked, frayed, broken, or otherwise damaged, or fails to operate, or continue operation.
-  Do not attempt to disassemble, repair, tamper with, or modify the EV Charger. The EV Charger is not user serviceable. Contact BadgerEV for any repairs or modification.
-  When transporting the EV Charger, handle with care. Do not subject it to strong force or impact or pull, twist, tangle, drag, or step on the EV Charger, to prevent damage to it or any components.
-  Do not touch the EV Charger's end terminals with sharp metallic objects, such as wire, tools, or needles.
-  Do not forcefully fold or apply pressure to any part of the EV Charger or damage it with sharp objects.

Safety Precautions

-  Do not insert foreign objects into any part of the EV Charger.
-  Use of the EV Charger may affect or impair the operation of any medical or implantable electronic devices, such as an implantable cardiac pacemaker or an implantable cardioverter defibrillator. Check with your electronic device manufacturer concerning the effects that charging may have on such electronic devices before using the EV Charger.

> Warnings

-  Do not use private power generators as a power source for charging.
-  Incorrect installation and testing of the EV Charger could potentially damage either the vehicle's battery and/or the EV Charger itself. Any resulting damage is excluded from New Vehicle Limited Warranty and the EV Charger Limited Warranty.
-  Do not operate the EV Charger in temperatures outside its operating range of -25°C to +55 °C.
-  Type 2 to Type 1 adaptors or conversion adaptors are not allowed to be used.
-  Cord extension sets are not allowed to be used.

Notes

- Ensure that the EV Charger's charging cable is positioned so it will not be stepped on, driven over, tripped on, or subjected to damage or stress.
- Do not use cleaning solvents to clean any of the EV Charger's components. The outside of the EV Charger, the charging cable, and the connector end of the charging cable should be periodically wiped with a clean dry cloth to remove accumulation of dirt and dust.
- Be careful not to damage the circuit board when removing the power entry knock-out.

Prepare for Installation



> Minimum installation requirements

The installation of this EV charger requires that you:

- Calculate the existing electrical load to determine the maximum operating current.
- Calculate the distance to ensure minimal voltage drop.
- Obtain any necessary permits from the local authority that has jurisdiction and confirm that the follow-up inspection has been scheduled by an electrician after the installation is complete.
- Use only copper conductors.
- Use copper wire that meets the specifications of local wiring regulations. The selected cable must be capable of withstanding continuous loads of up to 40A at all times. The selected circuit protection device must incorporate at the consumer unit and be able to handle a minimum of 40A.

Prepare for Installation

> Position

- Ensure that the parking position is within range of the charging cable.
- For the tethered model, ensure there is enough clearance for the charging cable to wrap around and that the charging handle can be correctly attached to the side holster.
- For outdoor installations, it is recommended but not mandatory to install the charger with some protection from the elements.
- Install in a well-ventilated space. Avoid installation in enclosed boxes or close to high power appliances.

> Height

- Maximum height (indoor and outdoor: 1.5 m)
- Recommended height: ~1.2 m
- Minimum outdoor height: 0.6 m
- Minimum interior height: 0.45 m

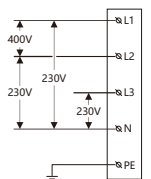
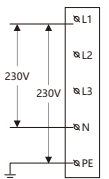
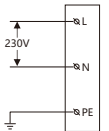
Power supply

230V single-phase power supply

- For the single-phase 7.4kW EV charger, a single-phase wire (L, Neutral and earth wire) must be connected. The phase voltage between the Line and Neutral wires should be 230V.
- For our 3-phase EV chargers, connect the single phase wire (L1, the neutral wire and the earth wire; do not connect the other phase wires (L2 or L3). The phase voltage between the Line and Neutral wires should be 230V.

400V three-phase power supply with neutral line

- If three phases are applied, all three phases (L1, L2 and L3 and the neutral line) should be connected to the correct terminals and the voltage of each phase to the neutral line should be 230V.



Prepare for Installation

Warning

- ⚠ For situations where the earth connection is conflicting with other devices, in order to enable the EV Charger to operate, you must enter the App to turn off the earth detection. This will allow the charger to operate normally but it will reduce to the leakage protection safety level.
- ⚠ All BadgerEV chargers must be properly grounded via a permanent electrical system or equipment grounding conductors to operate correctly.
- ⚠ Before installing any EV charger, please confirm the type of grid connection available. If you are unsure of the type of connection available on the service panel, please consult your DNO.
- ⚠ Note: Please consult your local electrician or refer to your local code in order to choose the proper wire sizes and other electrical equipment required for this installation.

> Installation considerations

Three wiring methods are available for installing our EV charger. The location of the conduit determines which installation method to follow.

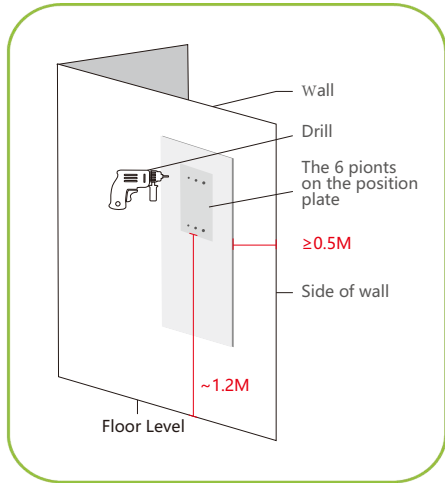
- Note: Throughout the manual, "conduit" is used as the standard term for the protective casing that houses the service wiring.
- In regions where conduit is not used (Europe for example), a cable comprised of service wiring enclosed in a protective jacket may be substituted for conduit if allowed by local regulations.
- Cable glands are sized for 32 mm conduit and CAT5 Ethernet cables to fit simultaneously. Conduit needs to be metal and flame retardant.
- Use an appropriate circuit breaker.
- To keep the housing weatherproof, always use cable glands.

In the Box

① 	② 	③ 	④ 
EV Charger	Top Wiring Box	Mounting Bracket	RFID Cards
			
⑤ 	⑥ 	⑦ 	⑧ 
M32*1.5 Cable Gland	M6*8 Screws	8*40 Socket Head Screws and Anchors	8*40 Flat Head Screws and Anchors
			
⑨ 	⑩ 	⑪ 	⑫ 
Position Template	DLB Box + 2 CT Clamps	Fascia Remover	Waterproof Cover
			

Installation Instructions

> Step-by-step installation instructions (BOTTOM ENTRY WIRING)



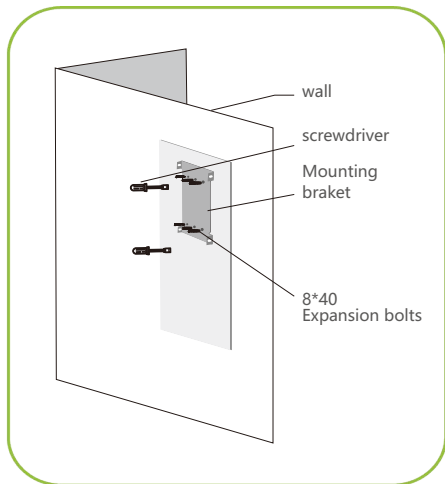
Step 1

Position

Peel and stick the Position Template to the surface where the charger will be located. If the EV charger is installed close to the edge of the wall, the Position Template should be more than 0.5 m away from the edge of the wall.

Drilling Pilot Holes:

Drilling the holes according to the instruction on the Position Template for different installation and wiring ways. Use the 6 white holes for the Mounting Bracket or the 2 black holes for the Top Wiring Box.



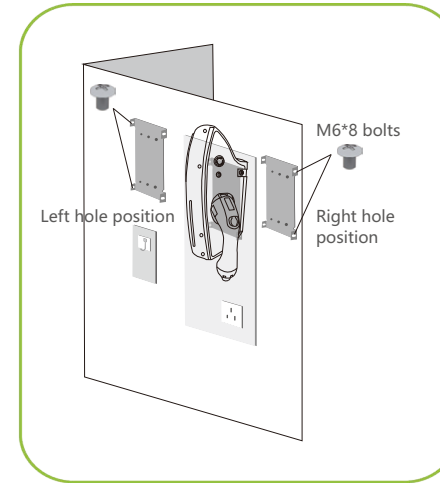
Step 2

Installing the Mounting Bracket:

Put the wall anchors into the holes and ensure they are securely in place. Ensure that the wider part of the bracket is facing upwards, then use a screwdriver to insert the screws to fix the Mounting Bracket to the wall.

Installation Instructions

> Step-by-step installation instructions (BOTTOM ENTRY WIRING)



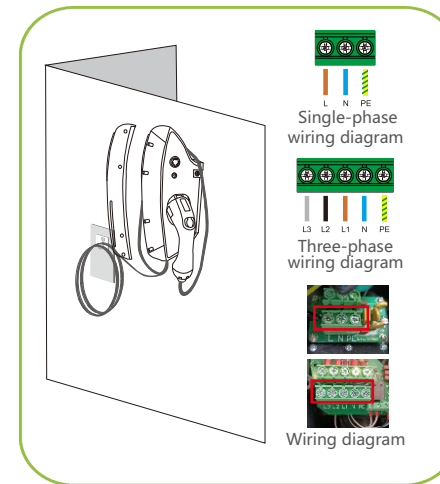
Step 3

Installing the EV Charger to the mounting plate:

Align the side holes of EV charger to the side holes of the bracket.

Installation:

Use the 4pcs M6*8 screws to fix the EV charger to the mounting plate as picture shows (Screws torque 1.5NM-2.0NM).



Step 4

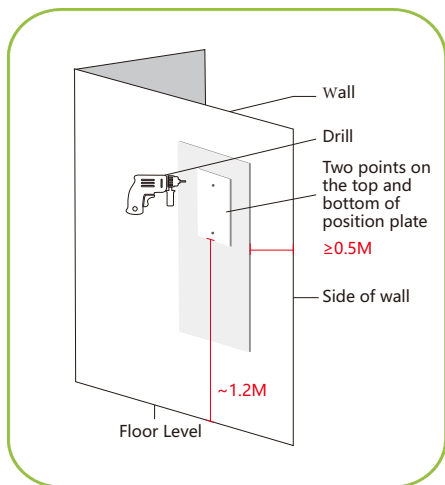
Wiring:

Note: Consult with your local electrician or refer to your local code for proper wire sizing appropriate for the currents in your EV Charger.

Remove the fascia and the front cover of the charger by undoing all the screws. Next, wire the cable to the according terminals inside the charger as shown in the image.

Installation Instructions

> Step-by-step installation instructions (TOP ENTRY WIRING)



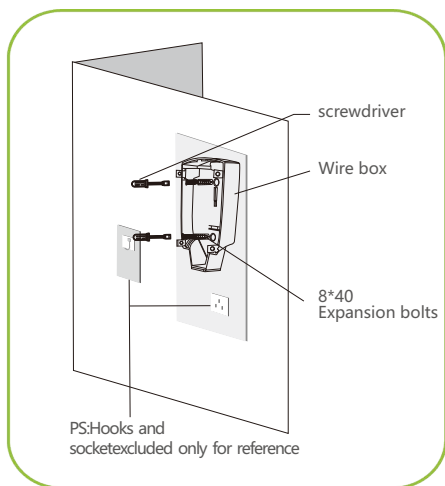
Step 1

Position:

Peel and stick the Position Template to the surface where the charger will be located. If the EV charger is installed close to the edge of the wall, the Position Template should be more than 0.5 m away from the edge of the wall.

Drilling Pilot Holes:

Drilling the holes according to the instruction on the Position Template for different installation and wiring ways. Use the 6 white holes for the Mounting Bracket or the 2 black holes for the Top Wiring Box.



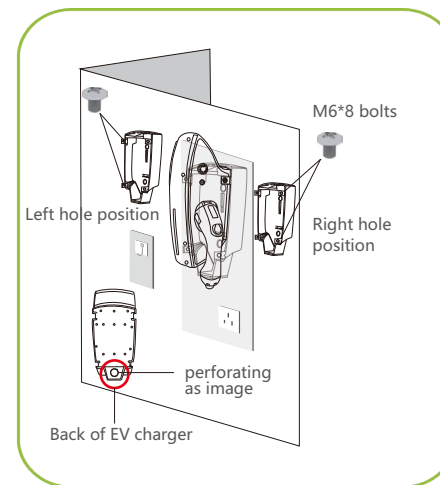
Step 2

Fix the Top Wiring Box:

Put the wall anchors into the holes and ensure they are securely in place. Use a screwdriver to insert the screws to fix the Mounting Bracket to the wall.

Installation Instructions

> Step-by-step installation instructions (TOP ENTRY WIRING)

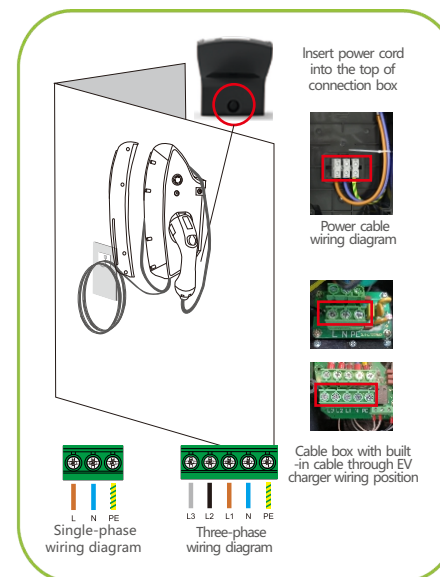


Step 3

Remove Rear Knockout:

Remove the rear knockout on the back of EV charger with a drill. Be extra careful not to damage the internal components.

Use the 4pcs M6*8 screws to fix the EV charger to the mounting plate as the image shows (Screws torque 1.5NM-2.0NM).



Step 4

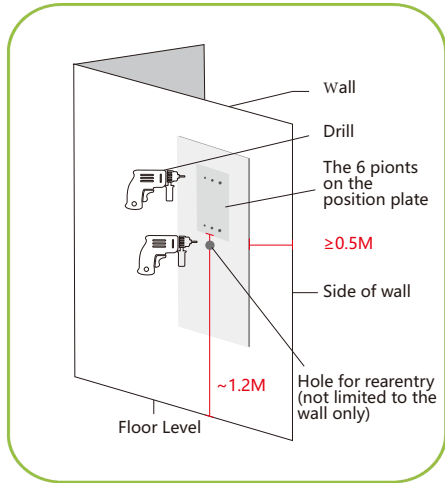
Wiring:

Note: Consult with your local electrician or refer to your local code for proper wire sizing appropriate for the currents for this EV Charger.

Remove the fascia and the front cover of the charger by undoing all the screws. Next, wire the cable to the according terminals inside the charger as shown in the image.

Installation Instructions

> Step-by-step installation instructions (REAR ENTRY WIRING)



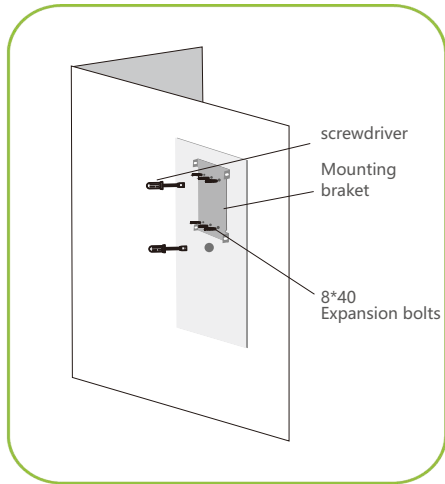
Step 1

Position:

Peel and stick the Position Template to the surface where the charger will be located. If the EV charger is installed close to the edge of the wall, the Position Template should be more than 0.5 m away from the edge of the wall.

Drilling Pilot Holes:

Drilling the holes according to the instruction on the Position Template for different installation and wiring ways. Use the 6 white holes for the Mounting Bracket or the 2 black holes for the Top Wiring Box.



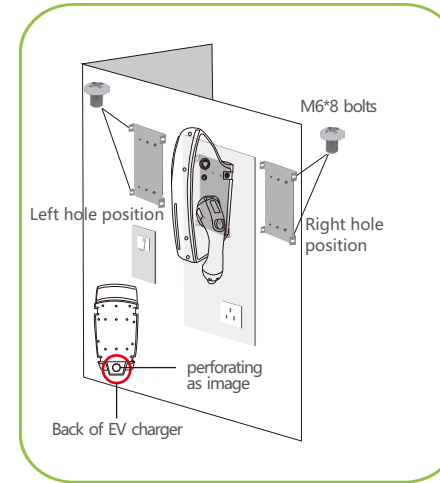
Step 2

Installing the Mounting Bracket:

Put the wall anchors into the holes and ensure they are securely in place. Ensure that the wider part of the bracket is facing upwards, then use a screwdriver to insert the screws to fix the Mounting Bracket to the wall.

Installation Instructions

> Step-by-step installation instructions (REAR ENTRY WIRING)



Step 3

Remove Rear Knockout:

Remove the rear knockout on the back of EV charger with a drill. Be extra careful not to damage the internal components.

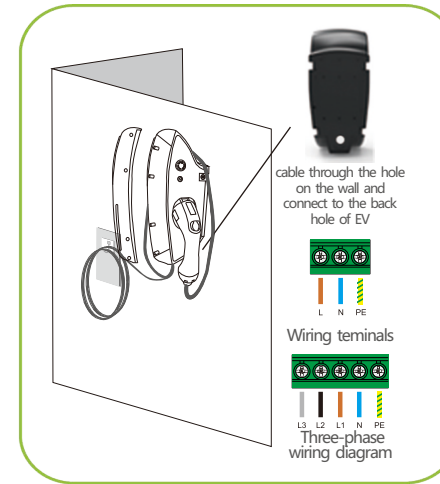
Use the 4pcs M6*8 screws to fix the EV charger to the mounting plate as the image shows (Screws torque 1.5NM-2.0NM).

Step 4

Wiring:

Note: Consult with your local electrician or refer to your local code for proper wire sizing appropriate for the currents in your EV Charger.

Remove the fascia and the front cover of the charger by undoing all the screws. Next, wire the cable to the according terminals inside the charger as shown in the image.

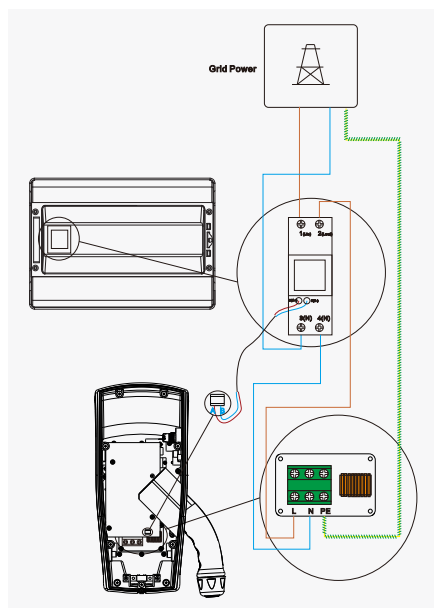


Installation Instructions

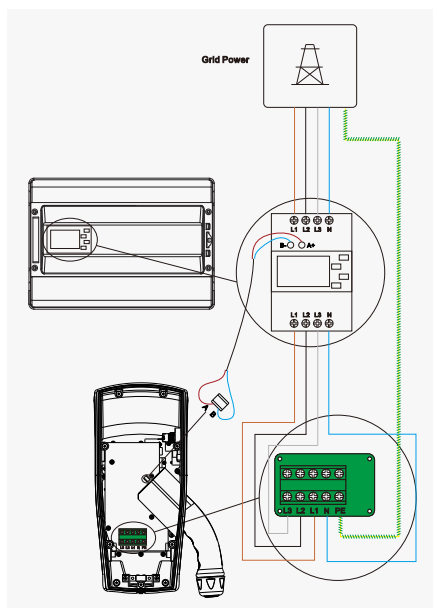
> External Meter Installation

It is possible to install external meters without entire range of OCPP EV chargers; this can help improve your on-site energy monitoring and overall system management.

- Isolate the power at the property, then find the Neutral wire and the Line wire at the consumer unit.
- According to the wiring diagram, connect the meter in series with the grid supply and the EV charger. This should be done only using the Live and Neutral wires.
- The AB terminals on the meter need to be connected to the AB terminals on the EV charger PCB via a communication cable. Do not use a copper cable.
- The ground wire of the grid needs to be connected to the ground wire terminal which is located inside charger.



Single Phase



Three Phase

Installation Instructions

⚠ Warning

- Be careful of electric shock. Before use, use a voltmeter to confirm that there is no voltage on the power supply line or terminal to ensure that the power has been isolated.

> Set the operating current

- After installation, users can set the maximum operating current of the EV charger in the App. Please refer to App manual for details.

> Replace the cover and switch on power

Use a screwdriver to secure the cover by installing the screws at 1.5NM-2.0NM torque.

After sealing cover, put the fascia on and securely attach it by firmly pressing down on all the edges.

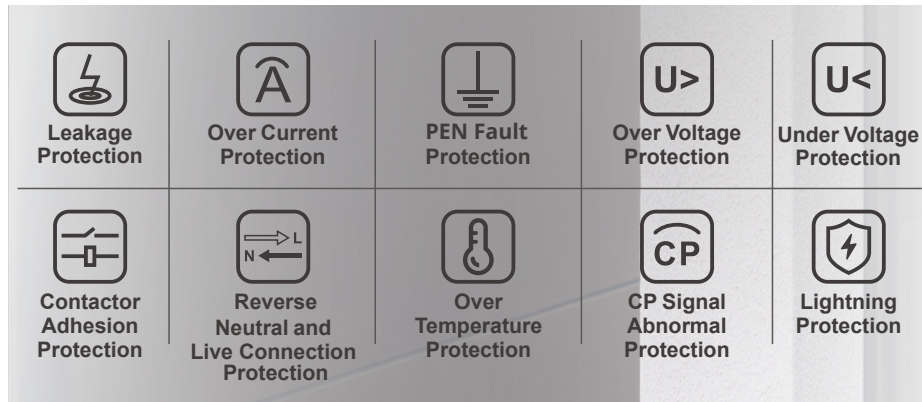
If you need to open the front cover, please use the trim removal tool along the edge of the fascia.

Recommend to install a 40A/2P 30mA circuit breaker.



Protection Features

> Protection Features

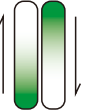
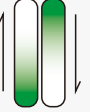
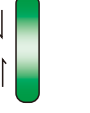

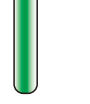


LED Lights Explained

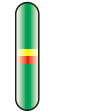
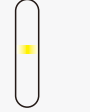

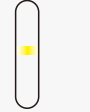
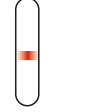

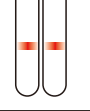
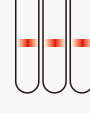
> LED Lights Explained

LED Lights				
LED Behavior	LED Status	Status Description	Potential Cause	Solution
	Lights OFF	No power supply	No power	Check the power source
	All lights ON, Yellow and Green lights are flashing. Then Amber light flashes	Charger Power ON self test		
	Small Green LED flashing quickly ON and OFF	Enter WPS configuration	In WPS configuration status	Recheck the configuration page
	Small Green LED flashing slowly ON and OFF	WIFI not connected	WIFI connection failure or wrong password	1. Ensure that you are not using a 5GHz network 2.Ensure password is correct 3.Reset the charger
	Small Green LED slowly strobing	Standby mode, awaiting connection to an EV		
	Half the LED light flashes Green slowly ON and OFF	The charger is reserved		
	Green LED streams from top to middle	Waiting RFID card authorisation		





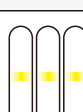

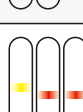
LED Lights Explained

Normal Status				
LED Behavior	LED Status	Status Description	Potential Cause	Solution
	Green LED lights streaming up and down slowly	Charger ready, awaiting authorisation from the EV		
	Green LED lights streaming up and down rapidly	EV is ready, awaiting charger App to start charging		
	Green LED lights stream from top and bottom to the middle	RFID card authorised, EV not ready to accept charge		
	Green LED streaming from middle to top and bottom	EV charging		
	Full Green LED light ON	Charging finished		

LED Lights Explained

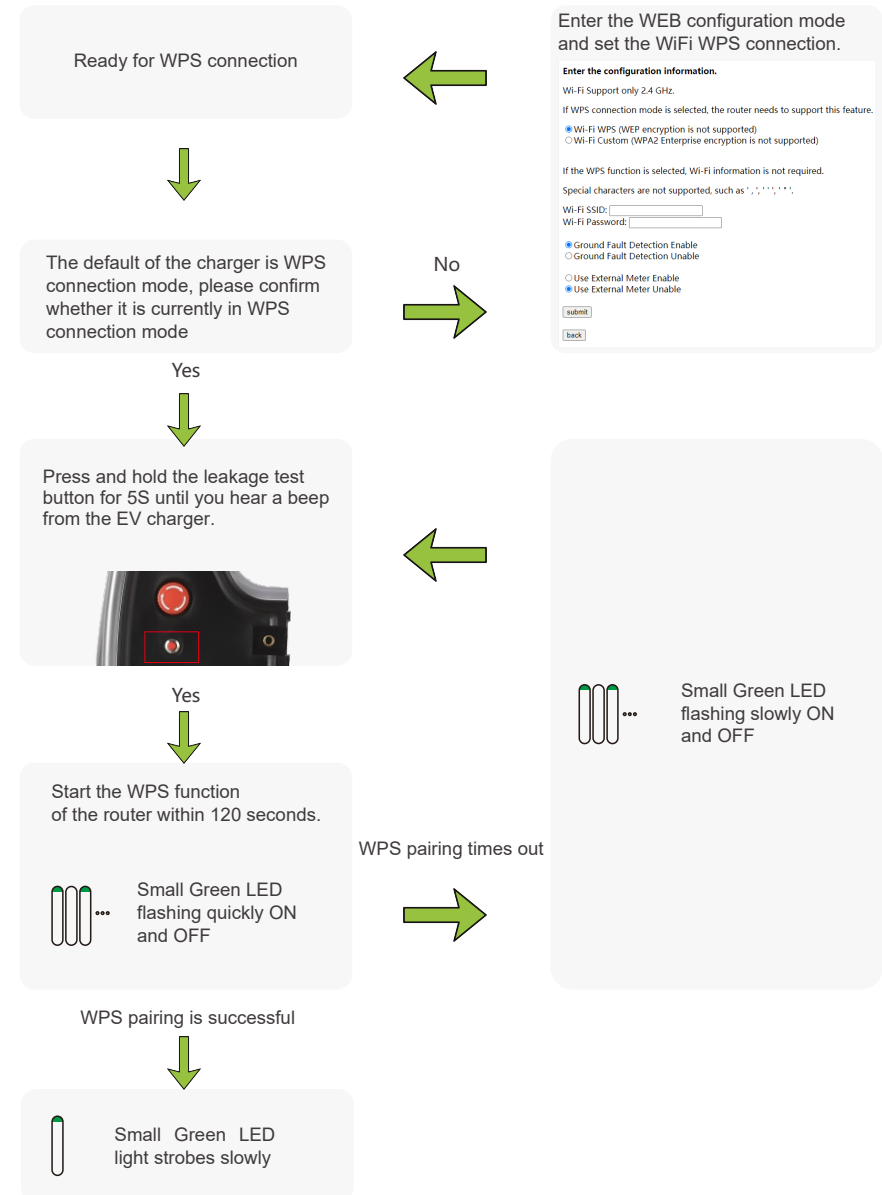
Fault Status				
LED Behavior	LED Status	Status Description	Potential Cause	Solution
	All lights strobe ON and OFF quickly	Contactor failure	Contactor adhesion or tripping	Power down the charger and contact technical support
	Amber LED light flashing	Charger is remotely disabled or not registered	Charger is not configured	Configure the charger
	Small Green LED flashing quickly ON and OFF	Enter the WPS configuration mode	In WPS configuration	Check whether the charger is successfully configured
	Amber LED light ON	Emergency stop protection	Emergency stop button is pressed	Rotate the emergency stop button to reset the charger
	Red LED lights ON	Grounding abnormality	The ground wire is not wired or the neutral wire is reversed	Check whether the grid connection and charger wiring is correct
	Red LED flashes once	Over Voltage	Power supply has short circuit or unstable	1.Check the power supply 2.Check the wire of power supply
	Red LED flashes twice	Under Voltage	Power supply voltage is insufficient	1.Check the power supply 2.Check the wiring of power supply
	Red LED flashes three times	Leakage fault	Leakage happens	1.Reset with emergency stop button 2.Check the charger connector or vehicle for leakage

LED Lights Explained

Fault Status				
LED Behavior	LED Status	Status Description	Potential Cause	Solution
	Red LED light flashes continuously	Over current	Short circuit may happen	Contact an electrician
	Red LED light flashes quickly	Over temperature alarm	High temperature	1.Wait for the charger to cool down 2.Ensure the wiring of charger terminals are not loose
	Red and Amber LED lights flashing alternatively	Abnormal CP signal	The connection between the charger and the vehicle is loose	1.Check for any water in the connector 2. Check the CP pins on the EV
	Red and Amber LED lights flashing together	Abnormal CC signal	The connection between the charger and the vehicle is loose	Check whether the charger connector is firmly inserted
	Yellow LED light flashes three times	LED board is offline	LED board is faulty or loose	Open the charger cover and check whether the light board cable is connected correctly and firmly
	Red and Amber LED lights flashing alternatively at a slow pace	DLB is offline	The DLB connection is loose	Check the connection between DLB box and charger
	Yellow LED light flashes ON, then Red LED flashes twice	DLB abnormal	The connection between the DLB box and the CT is loose or the CT is not clamped	1.Check the CT is in the correct position 2.Check whether the DLB box CT is firmly clamped 3.Check if the phase sequence of the DLB box CT is correct 4. Check if the connection between the DLB box CT and the DLB box is secure

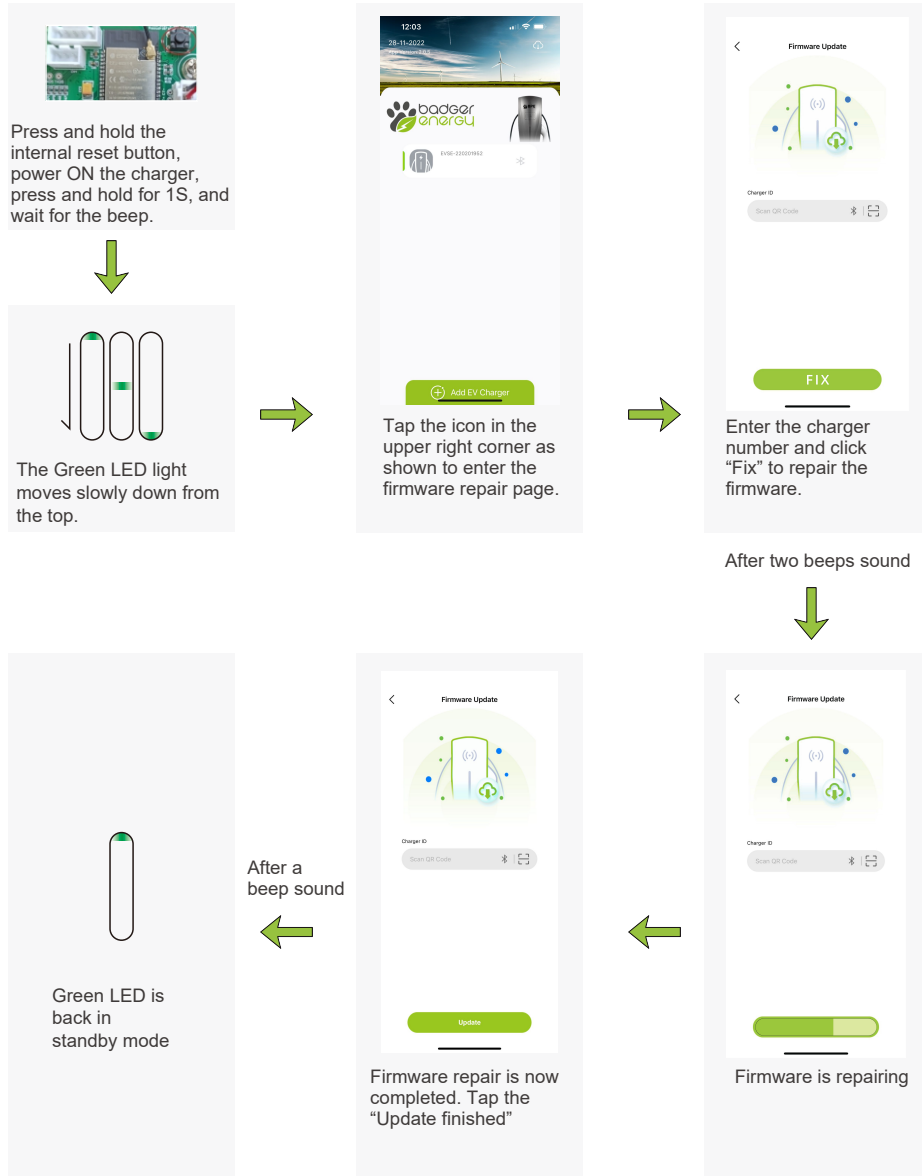
WPS Connection Method

> WPS connection method



Firmware Repair

> Repairing the firmware



Physical Buttons

> A breakdown of the physical buttons on charger

- Emergency stop button

Pressing the button	Stops charging session
Twisting and releasing the button	Fixes faults and enables charging to resume
Button in the released state	Operating as normal

- Test button

Pressing the button once	Conducts a DC leakage test
Holding down the test button	Activate WPS mode, search for WPS connection

- To restore the charger to be default settings, press in the emergency stop button and hold down the reset button on the PCB for 20 seconds.



- If you are experiencing connection issues to an OCPP platform, isolate the power to the EV charger. Then, while holding down both the emergency stop and DC leakage button, re-energise the charger and you will hear a audible beep. You will now be able to re-enter the configuration screen.

> Dynamic Load Balancing Kit

- DLB regulates the charging power to harmonise with other household loads to avoid current overloading the main breaker.

Hardware

> Tamper protection boundary

- Once the EV charger has been installed and commissioned, any attempt to remove the cover and access the internals of the charger will activate the anti-tamper protection. This means that if the cover is opened, the EV charger will send an alarm to the owner and with a red light will engage. The EV charger will stop charging once in this mode.

> Buzzer Explained

RFID card swiped, authentication successful	One Short Beep
RFID card swiped to stop the session, authentication successful	Two Short Beeps
RFID card authentication failed	Five Short Beeps
Enter OCPP configuration mode	One Long Beep
Server parameters are configured successfully	One Long Beep
Server parameter configuration failed	Five Short Beeps
Leakage test in progress	One Long Beep