ETEC

AC Electric Vehicle Charging Pile

EKEC1

USER MANUAL

Ver.3.1

ZHEJIANG ETEK ELECTRICAL TECHNOLOGY CO.,LTD.

Thank you for purchasing a ETEK EV charge point.

This guide is intended to instruct in the proper use of all models of ETEK Charging stations.

Installation of this equipment should only be carried out by a fully qualified professional. ETEK EV accepts no responsibility for damage caused by improperly installed equipment.

Safety precautions

This guide contains several instructions to which the following symbols have been attached. Failure to comply with instruction could result in:

DANGER
Indicates where failure to comply with instructions will cause death or serious injury.

WARNING
Indicates where failure to comply with instructions could lead to death or serious injury.

CAUTION
Indicates where failure to comply with instructions could lead to minor or moderate injury.

NOTE
Provides tips that are valuable for the optimal operation of your product.

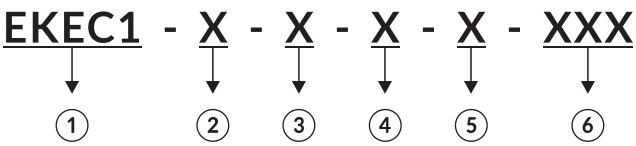
This document is intended to instruct on the use of and general maintenance of all models of ETEK manufactured charging stations (current model numbers at the time of writing listed below). Instructions specific to particular models will be highlighted and clearly marked.

1 Product description

1.1 Product brief introduction

This product is a single or three-phase AC charging pile, which is mainly used for AC charging of electric vehicles. The equipment adopts industrial design principles. The protection level of the whole machine reaches IP54, with good dustproof and waterproof functions, and can be safely operated and maintained outdoors. The AC charging pile is divided into two categories: with cable version and socket version.

1.2 Naming rules



①	②	③	④
Product serial number	S2: Socket C1: T1 Cable C2: T2 Cable SS: Shutter Socket	03: 1P+N 240V 16A 07: 1P+N 240V 32A 11: 3P+N 420V 16A 22: 3P+N 420V 32A	O: Built in EKEPC3 controller M: Built in EKEPC2 controller

⑤	⑥
A: TypeA RCCB + DC6mA B: TypeB RCCB C: EV RCCB D: Built-in RCMU (DC6mA), required for installation use an external Type-A RCCB	1: RFID function (If you are using the EKEPC3 OCPP protocol controller, the RFID function is necessary.) 2: DLB function external CT 3: DLB function external electricity meter 4: LCD display 5: Built in MID sampling meter 6: Built in SPD (only applicable for single-phase voltage) 7: Emergency stop button 8: With PEN protection

If you need a charging post to meet the following configuration: European Standard Cable version 22KW. Using TypeA RCCB + DC6mA + OCPP-J-1.6 protocol + LCD display + meter, then its model is: EKEC1-C2-22-O-A-145

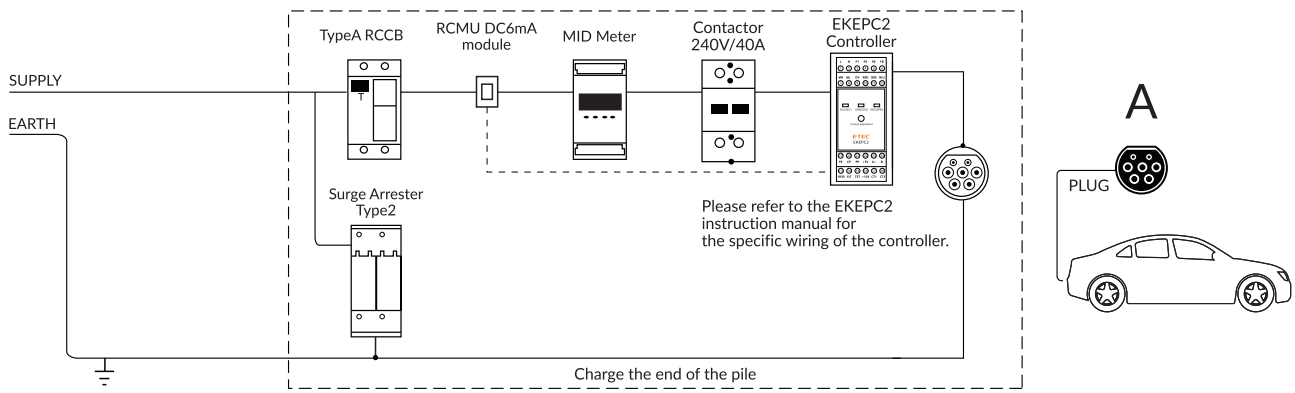
1.3 Technical data

Model / Specification technical data	Cable type		Socket type	
	EKEC1-C1/C2-03 EKEC1-C1/C2-07	EKEC1-C1/C2-11 EKEC1-C1/C2-22	EKEC1-S2/SS-03 EKEC1-S2/SS-07	EKEC1-S2/SS-11 EKEC1-S2/SS-22
Power mode	1P+N+PE	3P+N+PE	1P+N+PE	3P+N+PE
Operation voltage	AC240V±10%50Hz	AC420V±10%50Hz	AC240V±10%50Hz	AC420V±10%50Hz
Output current	10A,16A,20A,25A,32A			
Output voltage	AC240V±10%50Hz	AC420V±10%50Hz	AC240V±10%50Hz	AC420V±10%50Hz
Phase number	1P	3P	1P	3P
Max output power	3.7KW/7.3KW	11KW/22KW	3.7KW/7.3KW	11KW/22KW
Cable length	5m		-	
Plug/socket standard	(American standard / European standard)Type1/Type2			
Communication function	If you want to control this product through RS485 interface, please follow the Modbus-RTU, 9600, n, 8,1. Equipment address number please use broadcast address: 255 for communication operation. Please refer to the operating instructions of EKEPC2 and EKEPC3 controllers.			
Ambient temperature	-25°C~+40°C			
Humidity	⩽85%			
IP degree	IP54			
Cooling method	Natural cooling			
Installation method	wall mounted type / Column type			
Weight	4.8kg	5.5kg	2.5kg	3.1kg
Overall dimension	357mm×245mm×123mm			
Installation dimension	180mm×280mm			

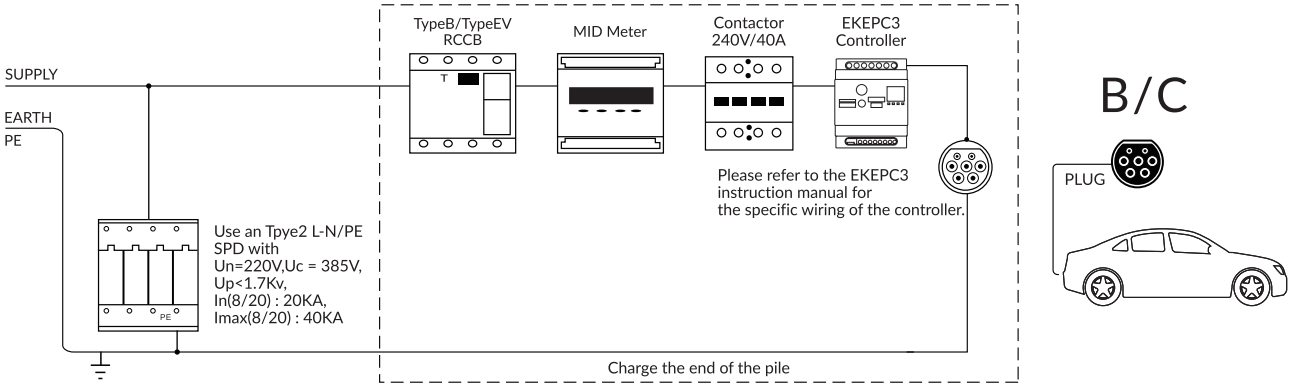
2 Mechanical and electrical installation

2.1 Internal structure drawing

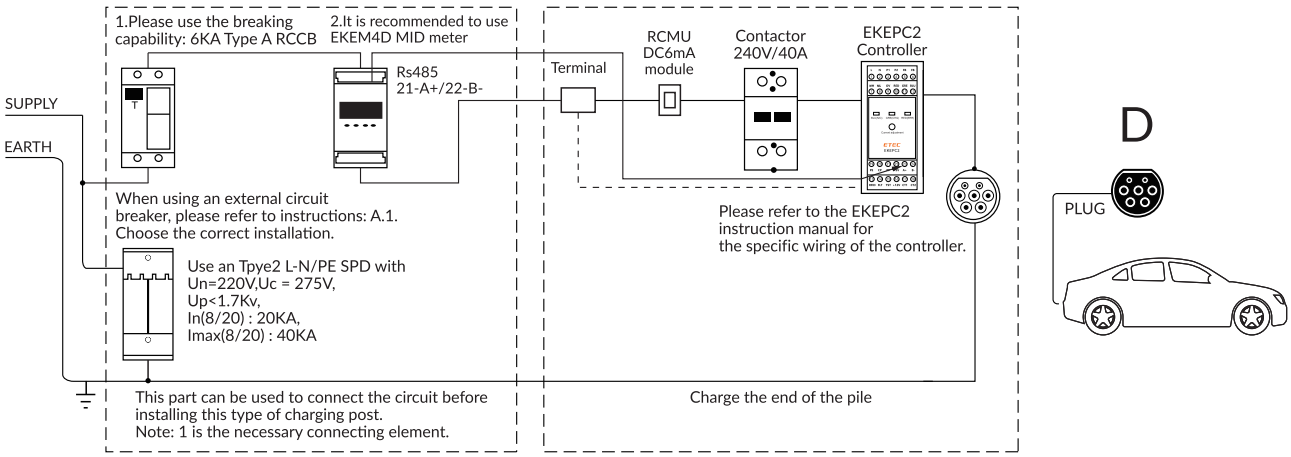
Electrical schematic for model: EKEC1–X–07–M-A-XXXX56XX



Electrical schematic for model: EKEC1–X–22–O-B-XXXX5XXX or EKEC1–X–22–O-C-XXXX5XXX



Electrical schematic for model: EKEC1–X–7–M-D-XXXXXXXX



A.1 Circuit breaker parameters: comply with IEC 60898-1 or IEC 60947-2 or IEC61009-1, and can limit the short-circuit current to 6kA or below or limit I^2t does not exceed 75000A^2s, energy class 3, Rated voltage and rated electricity, The flow should be able to match the charging station.

Type A RCD parameters: comply with IEC 61008-1 or IEC 61009-1, Type A, The remaining operating current is AC 30mA.

Type B RCD parameters: comply with IEC 61008-1 or IEC 61009-1, And IEC 62423, Type B, The remaining operating current is AC 30mA.

3 Introduction of DLB function and how to use it

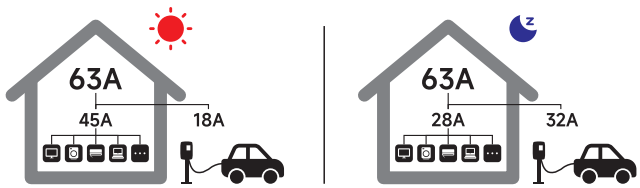
3.1 A basic introduction to the functions of DLB

DLB function: Dynamic load balancing (DLB) is used to protect the main circuit safe operation, to prevent the main circuit because of long-term overload or full load operation, which will cause accelerated circuit aging, and then make the line exist security risks. If DLB technology is used, it will protect the safe operation of the line and prevent the occurrence of safety accidents.

Working principle: DLB is using PID algorithm, dynamic detection of the main circuit current, when the charging current of the charging pile plus the total current of other loads exceeds the maximum current set by DLB, the controller will reduce the output of the charging current until the operating current of the main circuit is less than or equal to the maximum current set by DLB.

- If the charging current of the pile drops to 6A and the operating current of the main circuit is still greater than or equal to the maximum current set by DLB, the pile will stop output charging current.
- If the current in the main circuit falls to the minimum starting current set by DLB, the controller automatically starts charging again.
- The maximum current and minimum starting current of DLB are set by special software through RS485 interface of Controller. The default value is 100A/45A.

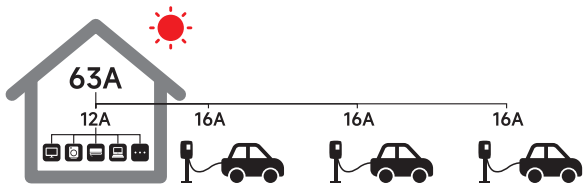
Dynamic Load Balancing is a feature that monitors changes in power usage in a circuit and automatically allocates available capacity between Home Loads or EVs.



For single home

It adjusts the charging output of electric vehicles according to the change of electric.

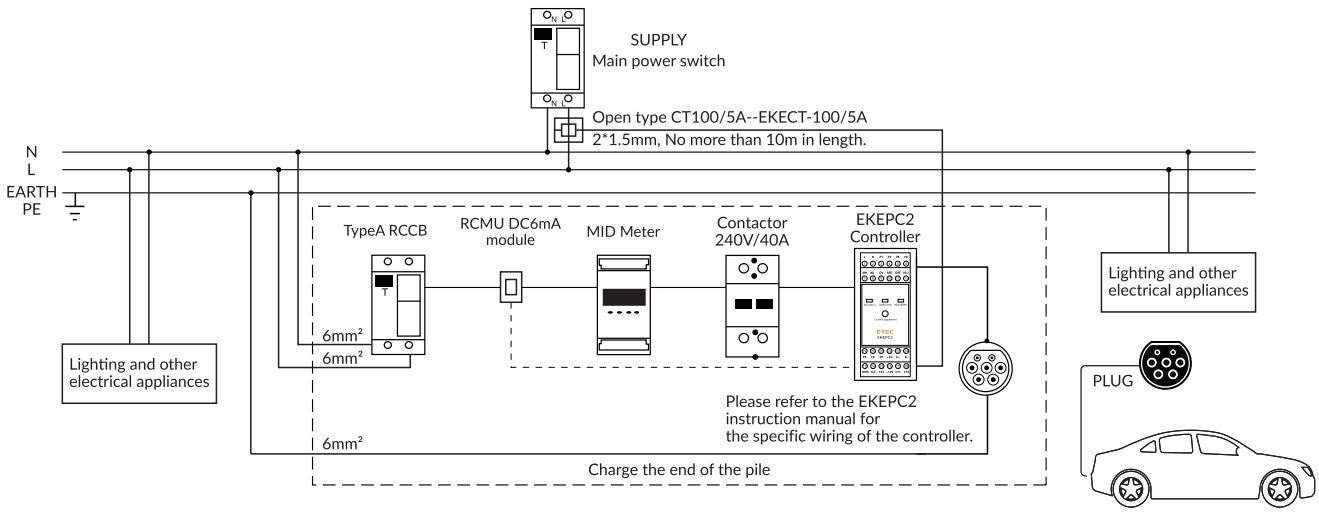
One DLB device can manage three or more charging stations



For commercial and fleet

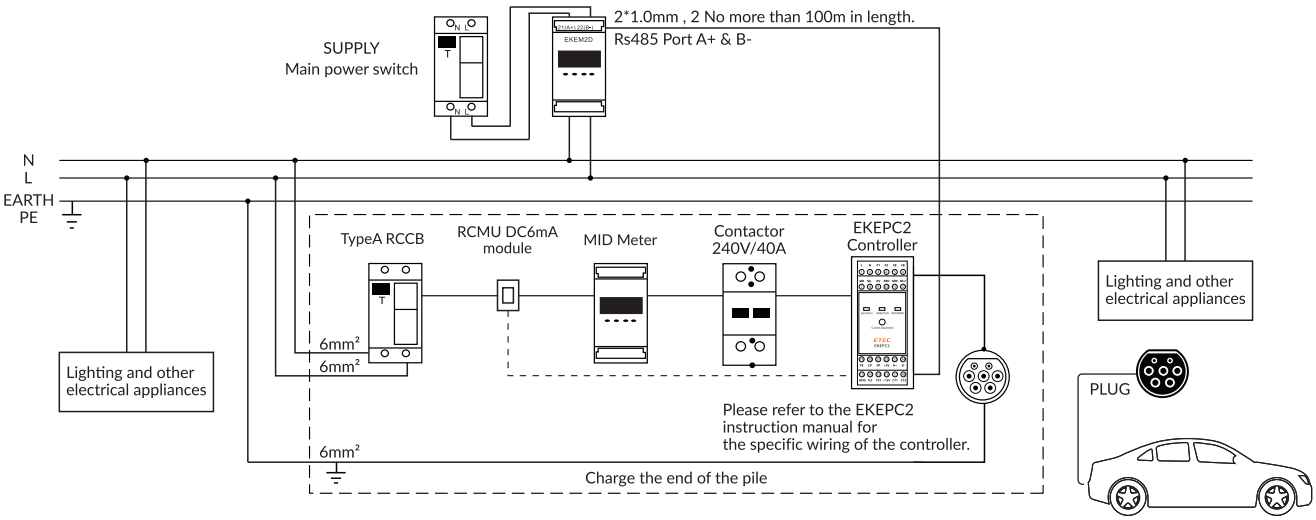
3.2 DLB function when the external CT electrical schematic diagram.

For example: Charger for model: EKEC1-X-07-M-A-X2XX5XXX



3.3 DLB function when the external Meter electrical schematic diagram.

For example: Charger for model: EKEC1–X–07–M-A-X3XX5XXX



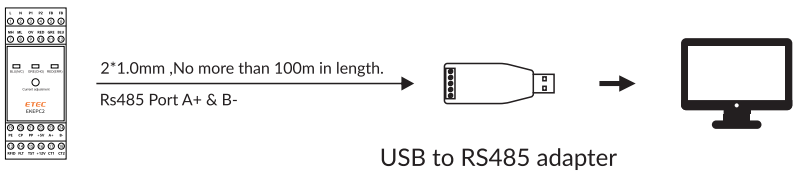
3.4 EKEPC2 controller charging post, DLB function of external CT or meter software setting method.

3.4.1 Use tools

USB to RS485 adapter + A computer with a USB port + "Mthings" software

http://gulink.cn/download-

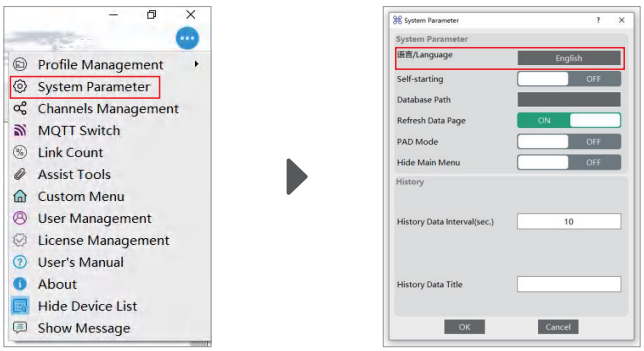
3.4.2 Open the top cover of the charging station, locate the EKEPC2 controller, and connect the A+ and B- of the controller to the A+and B - wiring ports of the USB to 485 module, respectively.



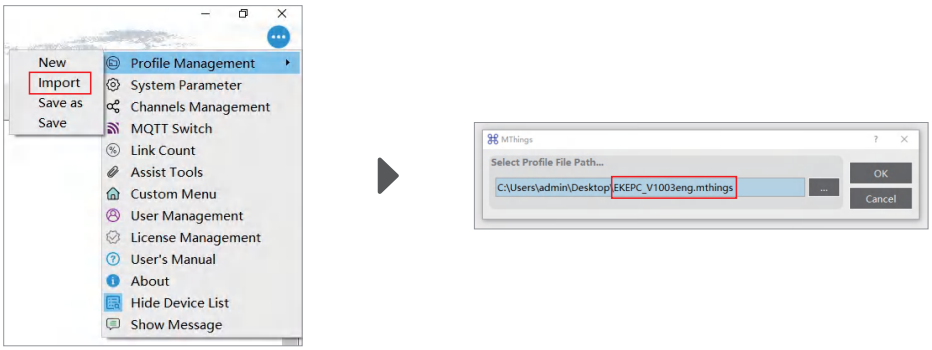
EKEPC2 controller

USB to RS485 adapter

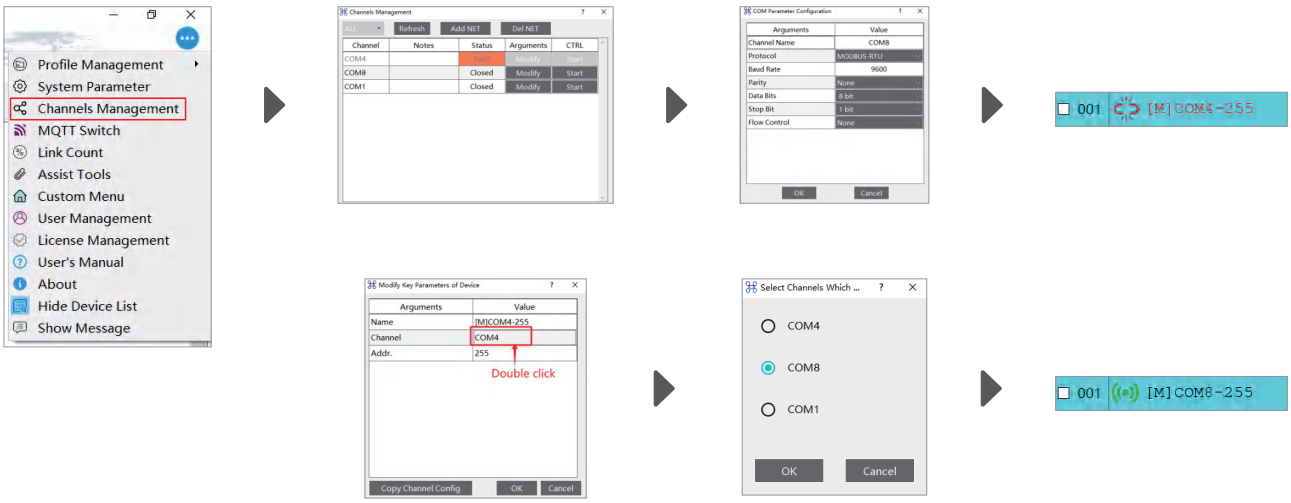
3.4.3 Open the "Mthings" software, select the language, import the configuration file:



3.4.4 Import recipe file:



3.4.5 Open the software and set the serial port number



3.4.6 View and modify the parameters you want

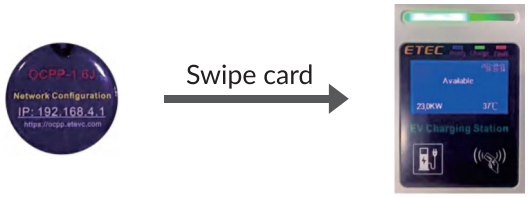
Data

ID	Name	Value	CMD	Write	Unitang	Block	Addr.	Quantity	Bit Offset	Bit Num.
1	OV protection value	26500		Write	--	Holding Reg.	86	1	0	16
2	UV protection value	16500		Write	--	Holding Reg.	87	1	0	16
3	Current protection value	120		Write	--	Holding Reg.	88	1	0	16
4	Remote start&stop (0 invalid, 1 start, 2 stop)	0	2	Write	--	Holding Reg.	89	1	0	16
5	kWH meter voltage A phase address	2304	2304	Write	--	Holding Reg.	90	1	0	16
6	kWH meter voltage B phase address	2306	2306	Write	--	Holding Reg.	91	1	0	16
7	kWH meter voltage C phase address	2308	2308	Write	--	Holding Reg.	92	1	0	16
8	kWH meter current address	2318	2318	Write	--	Holding Reg.	93	1	0	16
9	kWH meter power address	2322	2322	Write	--	Holding Reg.	94	1	0	16
10	kWH meter electricity using address	2332	2332	Write	--	Holding Reg.	95	1	0	16
11	DLB using kWH meter address	2334	2334	Write	--	Holding Reg.	96	1	0	16
12	Spare	--		Write	--	Holding Reg.	97	1	0	16
13	Device address No.	255	200	Write	--	Holding Reg.	100	1	0	16
14	DLB resume work current value	2200		Write	--	Holding Reg.	101	1	0	16
15	DLB protection current(mian circuit Max current)	3200		Write	--	Holding Reg.	102	1	0	16
16	Ref. current value	10000		Write	--	Holding Reg.	103	1	0	16
17	Ref. current AD value	1270		Write	--	Holding Reg.	104	1	0	16
18	Charger PWM Max value (90%)	9000		Write	--	Holding Reg.	109	1	0	16
19	RCMU function choose (0 off,1 On)	3		Write	--	Holding Reg.	110	1	0	16
20	RFID function choose (0 off,1 On)	3		Write	--	Holding Reg.	111	1	0	16
21	Lock function choose (0 off,1 On)	3		Write	--	Holding Reg.	112	1	0	16
22	Cable/socket version choose (0 cable,1 socket)	3		Write	--	Holding Reg.	113	1	0	16
23	DLB function choose (0 off,1 On)	3		Write	--	Holding Reg.	114	1	0	16
24	PID control parameter KP	1		Write	--	Holding Reg.	115	1	0	16
25	PID control parameter KI	180		Write	--	Holding Reg.	116	1	0	16
26	PID control parameter KD	1		Write	--	Holding Reg.	117	1	0	16
27	Controller ID number	0		Write	--	Holding Reg.	118	1	0	16
28	Temperature correction (Input how much difference) H	1024		Write	--	Holding Reg.	120	1	0	16
29	Temperature correction (Input how much difference) L	65456		Write	--	Holding Reg.	121	1	0	16
30	Overtemperature protection value of stop	850		Write	--	Holding Reg.	122	1	0	16
31	Overtemperature protection value of start	1000		Write	--	Holding Reg.	123	1	0	16
32	Frequency correction (Input how much difference)	0		Write	--	Holding Reg.	124	1	0	16
33	Duty cycle correction (Input how much difference)	0		Write	--	Holding Reg.	125	1	0	16
34	Phase selection: 1Ph/3Ph Default: 1Ph	0		Write	--	Holding Reg.	127	1	0	16
35	The first gear current setting value PWM	1667		Write	--	Holding Reg.	128	1	0	16
36	The second gear current setting value PWM	2667		Write	--	Holding Reg.	129	1	0	16
37	The third gear current setting value PWM	3333		Write	--	Holding Reg.	130	1	0	16
38	The fourth gear current setting value PWM	4167		Write	--	Holding Reg.	131	1	0	16
39	The fifth gear current setting value PWM	5333		Write	--	Holding Reg.	132	1	0	16
40	The sixth gear current setting value PWM	5333		Write	--	Holding Reg.	133	1	0	16
41	Spare	0		Write	--	Holding Reg.	134	1	0	16
42	Software version	2200		Write	--	Holding Reg.	140	1	0	16

ID	Description
1	Set overvoltage protection value * 0.01v
2	Set undervoltage protection value * 0.01v
3	Set the percentage of overcurrent protection, usually set to 120% (1.2 times)
5,6,7	The electric energy collection meter 01H # installed in the charging station. Molel:EKEM4D If it is a three-phase electric meter EKEM2D type, please set the address numbers of the voltage registers for phases B and C to 65535
11	If you are using Figur 3.2,please set parameter to 2334 instead of setting it to 65535
14	Please set the minimum and maximum current values required for restart after setting a DLB protection here - this value is the restart current value.
15	Please set a maximum current value for DLB protection here.
24	If the adjustment speed is not fast enough, please increase this value; otherwise, please decrease this value.
25	If the adjustment accuracy is not enough, please increase this value appropriately. If theoutput current fluctuates greatly, please reduce the value.
26	If the output current fluctuates too much, please reduce some values; The default values for the three parameters of PID are: 1,180, 1

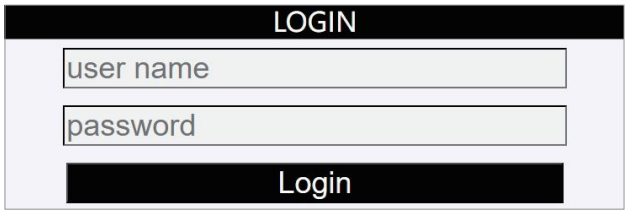
3.5 The EKEPC3 controller can only use the DLB function of the external meter. The software setting method is as follows.

3.5.1 Go to the local configuration page



3.5.2 You can use devices that receive wireless network signals, such as mobile phones and laptops, to search for Wireless LAN: **OCPP_XXXX**, password: **88888888**.

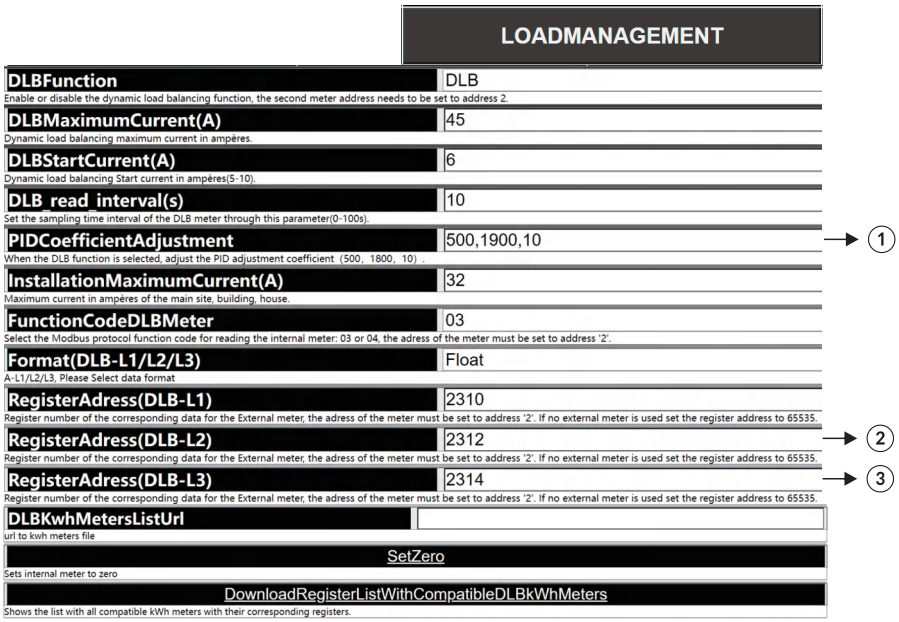
3.5.3 Open the browser, enter the IP address: 192.168.4.1 in the browser's address bar, and open the local web page.



Enter the local web page access rights, the factory default is

User	User name	Password
Manufacturer permissions	WLQ01	40000003
Dealer privileges	etec	88888888
General user privileges	user	88888888

3.5.4 Login operation page



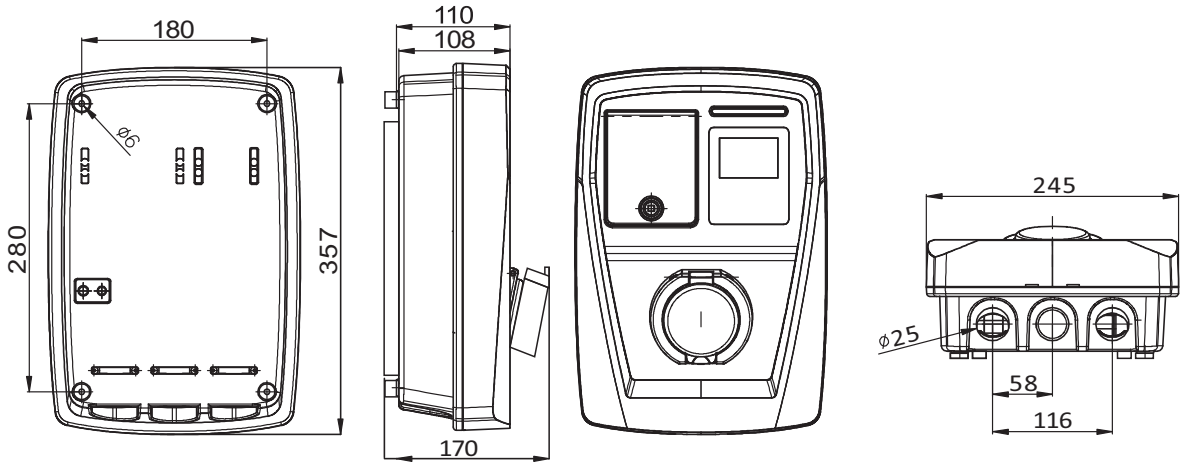
① This parameter is only for adjustments with DLB function. If the DLB function is enabled, your output current will be generated in the background, If there is fluctuation, it is necessary to adjust this parameter appropriately. For specific adjustment methods, please refer to other explanatory documents

② If your external DLB meter is single-phase, please set the value of this item to: 65535

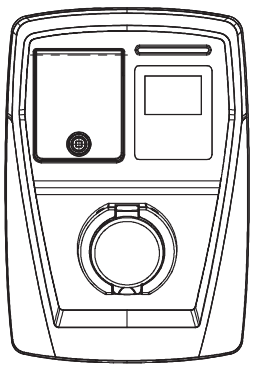
③ If your external DLB meter is single-phase, please set the value of this item to: 65535

4 Installation

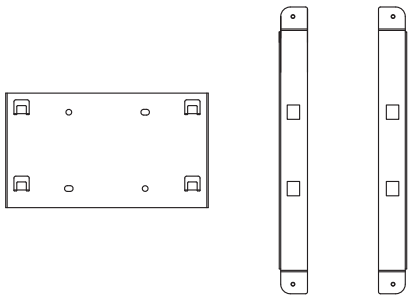
4.1 Overall dimension and installation size for EKEC1 Series



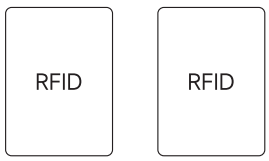
4.2 Preparation before installation



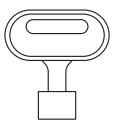
Charging post



Wall hangers

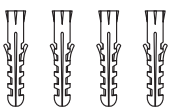


ID card



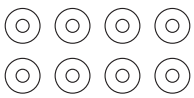
key

30mm screws



30mm plastic bolts

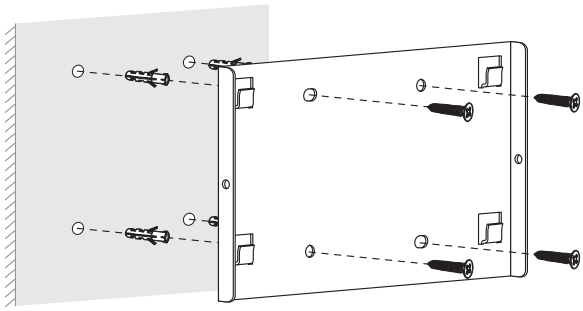
Screws for holder



Washer

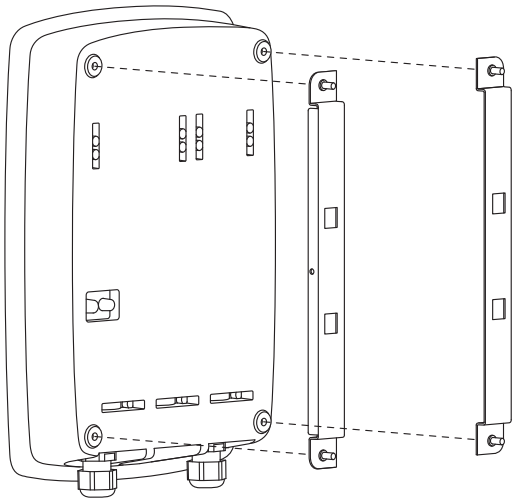
4.3 Start your installation process

4.3.1 Install the locating plate

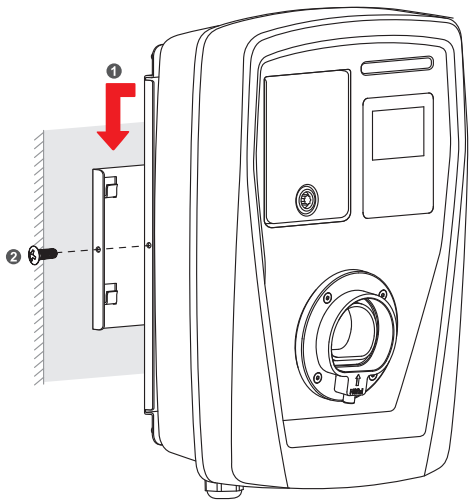


4.3.2 Install the charging pile bracket

The brackets for some products are already installed at the factory. You can skip this step and proceed to the next step.

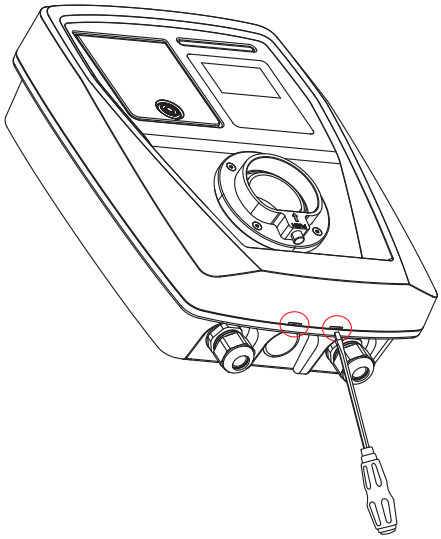


4.3.3 Fixed the charging post

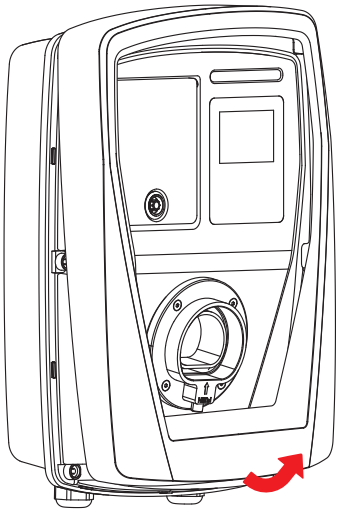


4.4 Power supply line connection

4.4.1 Using a screwdriver, put it into the indicated marks, at the bottom of the box, and start removing the frame doing click at the bottom.



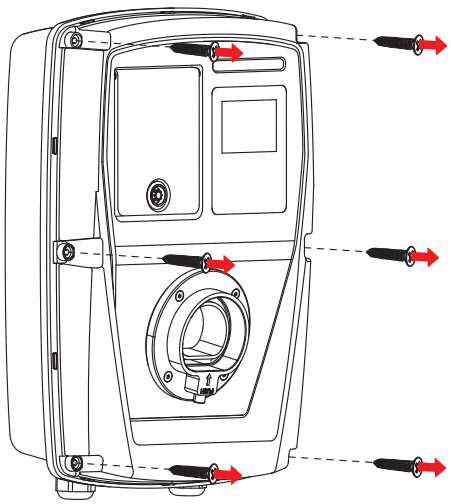
4.4.2 Grabbing the frame with the hand by the lower part, pull and take it off totally, from the bottom to the top.

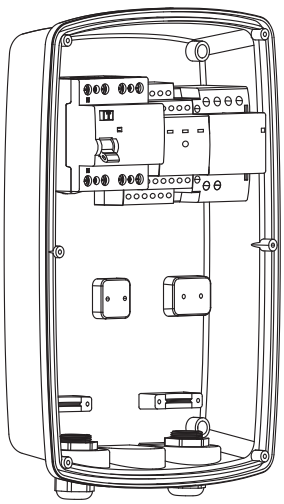


NOTE

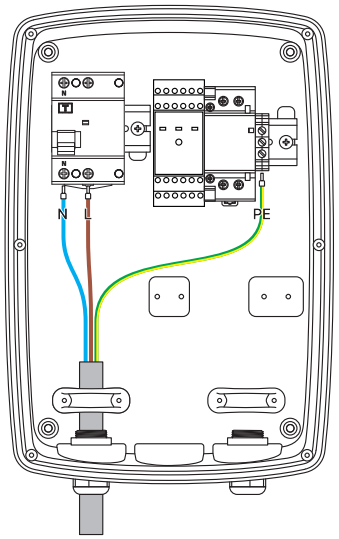
Beware of not breaking the plastic of the frame with the screwdriver.

4.4.3 Remove the 6 screws of the front part by using a screwdriver and take out the front part of the enclosure.

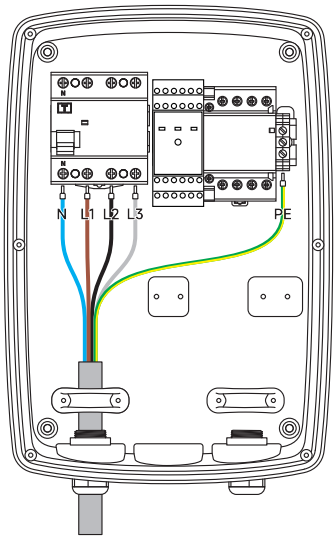




4.4.4 Perform the 230V~ single-phase or 400V~ three-phase connection as shown. Do not forget to connect the ground cable (PE) to the corresponding terminal.



Single phases

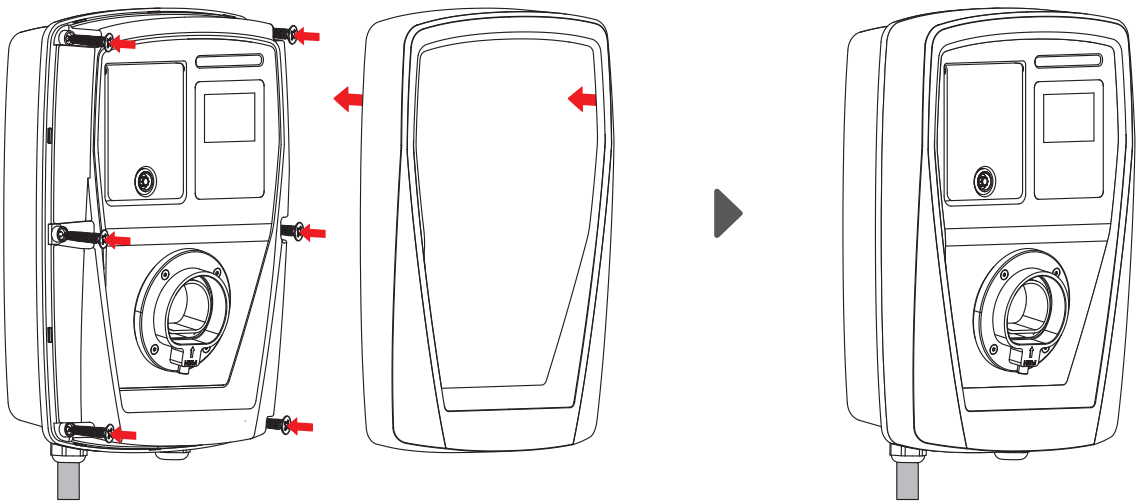


Three phases

NOTE

The RCD wiring method provided by ETEK Electric is for reference only. If you replace the RCD device with one from another supplier, the actual wiring instructions shall prevail.

4.4.5 Replace the cover, tighten the six screws, and reinstall the frame.



4.4.6 RCD closing check indicator status

Once all installation procedure has been performed, check the following

1. Check that the EV tethered cable and its connector are in proper conditions before starting the charging operation.

2. Check that no abnormal noise appears while the device is charging.

3. Check the status LED bar to know the present operating status of the device. Below you can see the table with the four possible LED bar operating colors:

State	Suspend	Ready	Charge	Fault
LED bar color	Green (Flash)	Green (Flicker)	Blue	Red (Flicker)

NOTE
For further information about the different status led bar sequences, please refer to 5 & 6 section.

4.5 Installation precautions

WARNING
Indicates where failure to comply with instructions could lead to death or serious injury.

4.5.1. All work must be performed by a qualified electrician with knowledge and experience in electrical installation.

4.5.2. The installation location should be kept away from humid or corrosive substances. Keep it away from flammable and explosive materials to avoid the risk of fire disasters.

4.5.3. Before installing the charging station, all power supplies must be disconnected. Failure to do so may result in electric shock, personal injury, or damage to the electrical system and charging device.

4.5.4. The charging station must be connected to a grounded metal permanent wiring system, or the equipment grounding conductor must be used with the circuit conductor and connected to the grounding terminal or cable on the charging station.

5 Indicator light and corresponding status description for EKEPC2 Controller.

NO	Lights			External state	Power output	Status	LCD display instructions
	Blue	Green	Red				
1	O	O	5Hz Flash	Power supply self-check failed.	OFF	Fault--1#	Power self-check failed!
2	O	●	O	vehicle not connected	OFF	Ready	Available
3	O	2Hz Flash	O	Wait for the IC Card	OFF	RFID Waiting	Preparing
4	O	1Hz Flash	O	Connect the vehicles	OFF	Connected	Connected
5	Breathe	O	O	Start charging	ON	Charging	Charging
6	O	O	●	Ventilation failure	OFF	Fault--2#	Need Ventilation!
7	O	O	1Hz flash	CP Short Circuit	OFF	Fault--3#	CP- PE short circuit! Please check the CP line
8	O	O	5Hz flash	RCMU failure	OFF	Fault--4#	RCMU leakage or self-inspection failure
9	O	O	2Hz flash	Charging block failure	OFF	Fault--5#	EV-Charing Socket Fault
10	2Hz flash	O	2Hz flash	PP Disconnect	OFF	Fault--6#	SPLIT PP wire Please check the PP line
11	2Hz flash	2Hz flash	2Hz flash	Electronic lock failure	OFF	Fault--7#	Electronic Lock Disabled
12	5Hz flash	O	O	RFID deactivated	OFF	Fault--8#	RFID card is not valid
13	O	1Hz flash	1Hz flash	DLB Circuit overload	OFF	Fault--9#	Circuit overload DLB Mode activated
14	5Hz flash	5Hz flash	5Hz flash	Over temperature	OFF	Fault--10#	Over temperature
15	O	O	5Hz flash	Working power failure	OFF	Fault--1#	Power self-check failed! Please turn the power back on!
16	O	O	5Hz flash	Leakage protection	OFF	Fault--11#	RCMU leakage or self-inspection failure
17	O	2Hz flash	2Hz flash	Over-under voltage protection	OFF	Fault--11#	Overvoltage and undervoltage
18	O	5Hz flash	5Hz flash	Over current protection	OFF	Fault--12#	OverCurrent
19	●	●	●	External controls stop	OFF	Fault--13#	External stop
20	●	●	●	Communication failure	OFF	Fault--14#	Communication failure

Duty cycle of PWM output and current

10A-->16.67% 13A-->21.67% 16A-->26.67% 20A-->33.3% 25A-->41.67% 32A-->53.33% 63A-->89.2% 80A-->96.0%

PP line resistance value 13A---1.5K 20A--680R 32A--220R 63A--100R

6 Indicator light and corresponding status description for EKEPC3 Controller.

States	Blue	Green	Red	Yellow	LCD Display
Starting	Flash slow				Starting up...
Local web settings	Flash fast				
Firmware upgrade in progress	Running				Firmware update...XXX%
Not network	O	O	O	O	E/W/G LCD1602
Network connected	O	O	O	Flash fast	
Backend connected	O	O	O	O	OCPP
Available	O	O	O	O	Available
Authorization unconnected vehicle	O	Flash fast	O	O	SuspendedEV
Unauthorized connected vehicle	O	Flash slow	O	O	Preparing
Start charging	Breathing	O	O	O	Charging
State D	O	O	Flash slow		Need Ventilation
CP-PE Short Circuit	O	O		O	Please check the CP line
Diode short circuit	O	O		O	EV-Charing Socket Fault
PP Disconnect	O	O		O	SPLIT PP wire Please check the PP line
Lock fault on or off	O	O		O	Lock error/Unlock error
DLB Protection	O	O		O	Circuit overload DLB Mode activated
RCMU Protection	O	O	O	O	RCMU leakage or self-inspection failure
OvervoltageProtection	O	O		O	Overvoltage or undervoltage
OverCurrentProtection	O	O		O	Check current
Contactor Overrun Protection	O	O		O	Contactor exceeds the upper limit
Plug ON or OFF Protection	O	O		O	Gun insertion exceeds the upper limit
Temperature too high	O	O		O	Temperature protected

For communications between the OCPP and OCPP servers, see the “Open Charge Point Protocol 1.6” document, as revised by the OCA committee.

7 Warranty agreement

7.1 The warranty period of this product is 36 months (it is subject to the barcode information of the product). During the warranty period, if the product has malfunction or damage under normal use according to the manual, we can provide free maintenance for you.

7.2 During the warranty period, if the damage is caused by the following reasons, it will need to charge repair fee:
1. The damage which is caused by mistaken use , unauthorized repairs and modifications;
2. The damage which is caused by fire, flood, abnormal voltage, and other natural disasters, secondary disasters, etc.
3. Hardware damage caused by falling and transportation after purchase;
4. The damage which is caused by not operation in accordance with the user manual ;

7.3 If you have any questions during the service process, please contact us or our agent in time;

7.4 The right to interpret this agreement belongs to our company.

8 Service and maintenance

DANGER
Indicates where failure to comply with instructions will cause death or serious injury.

8.1 Do not remove the circuit protection device or any other component before disconnecting all power supplies.

8.2 It is prohibited to use the charging station when the charging plug or the cable has defects, cracks, abrasion, exposure, etc. If you find any problem, please contact the staff in time.

8.3 It is recommended that you test the function of the fitted electrical protection once a month by open the access panel and pressing the test button. If the RCD or equivalent protection fails its function test you should immediately stop using the charging station and contact your installer for further assistance.

8.4 In order to avoid injury, children should not approach or use the charging station when it is charging.

8.5 The vehicle is prohibited from driving when it is charging and can only be charged when it is stationary. Please turn off the hybrid electric vehicle before charging.

9 Cleaning

CAUTION
Indicates where failure to comply with instructions could lead to minor or moderate injury.

9.1 Cleaning the charging station with a high-pressure water hose is not permitted and could cause water build up within the charging station.

9.2 The charging station should not be opened and cleaned internally.

9.3 Keep the charging plug head clean and dry. If it is dirty, please wipe it with a clean dry cloth. It is prohibited to touch the charging plug core with your hands when it is charging.

ETEC

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