User Manual of KWT Series

S40K

KOWINT ENERGY

YOUR GREEN ENERGY MANUFACTURER

Kowint Energy(Shenzhen) Co.,Ltd

KOWINT

Established in 2014, KOWINT ENERGY is a high-tech enterprise focusing on the R&D, design, production, and sales of lithium battery energy storage systems, BMS, EMS, and lithium battery modules.

We have continuous independent innovation capabilities, excellent lithium battery module development & design abilities, and advanced manufacturing technology. Our products have passed UL, CE, ROHS, TUV, PSE, and other related certifications. Our factory has passed ISO9001 and ISO14000 system certifications.

Our products are designed to meet the needs of a wide range of applications, from residential and commercial buildings to industrial facilities and utility-scale projects. Whether you're looking to reduce your energy bills, increase your energy independence, or support your sustainability goals, KOWINT has the right solution for you.

10+
Years Experience in the energy storage

4
Countries with warehouse deployment

3GWh/year
Global Production Capacity

MAIN BUSINESS

Residential Solution

C&I Solution

UPS Solution

Contents

1. Safety

1.1. Safety Instructions

For safety reasons, installers are responsible for familiarizing themselves with the contents of this manual and all warnings before performing installation.

1.1.1. General Safety Precautions

WARNING!

Please don't crush or impact the battery, and always dispose it according to the safety regulation.

Observe the following precautions:

- Risks of explosion

Do not subject the battery to strong impacts. Do not crush or puncture the battery.
Do not dispose of the battery in a fire.

- Risks of fire

Do not expose the battery to temperatures in excess of 55°C. Do not place the battery near a heat source, such as a fireplace. Do not expose the battery to direct sunlight.
Do not allow the battery connectors to touch conductive objects such as wires.

- Risks of electric shock

Do not disassemble the battery.
Do not touch the battery with wet hands.
Do not expose the battery to moisture or liquids. Keep the battery away from children and animals.

- Risks of damage to the battery

Do not allow the battery to get in contact with liquids. Do not subject the battery to high pressures.
Do not place any objects on top of the battery.

CAUTION!

If the battery is not installed within three month since the battery arrived, the battery should be perform the maintenance charge operation, the target is keep the SOC not less than 50% .

1.2. Response to Emergency Situations

1.2.1. Leaking Batteries

If the battery leaks electrolyte which is corrosive, avoid contact with the leaking liquid or gas. Direct contact may lead to skin irritation or chemical burns. If one is exposed to the leaked substance, do these actions:

- Accidental inhalation of harmful substances: Evacuate people from the contaminated area and seek medical attention immediately.
- Eye contact: Rinse eyes with flowing water for 15 minutes and seek medical attention immediately.

- Dermal contact: Wash the affected area thoroughly with soap and water and seek medical attention immediately.
- Ingestion: Induce vomiting and seek medical attention immediately.

1.2.2. Fire Protection

In case of a fire, make sure an ABC or carbon dioxide extinguisher is nearby.

WARNING!

The battery pack may catch fire when heated above 150°C.

If a fire breaks out at where the battery is installed, do these actions:

1. Extinguish the fire before the battery catches fire.
2. If the battery has caught fire, do not try to extinguish the fire. Evacuate people immediately.

WARNING!

If the battery catches fire, it will produce noxious and poisonous gases. Do not approach.

1.2.3. Wet Batteries and Damaged Batteries

- If the battery is wet or submerged in water, do not try to access it.
- If the battery seems to be damaged, they are not fit for use and may pose a danger to people or property.
- Please pack the battery in its original container, and then return it to your distributor.

CAUTION!

Damaged batteries may leak electrolyte or produce flammable gas. If you suspect such damage, immediately contact your distributor for advice and support.

1.3. Qualified Installer

WARNING!

All operations of Power Matrix relating to electrical connection and installation must be carried out by qualified person.

A skilled worker is defined as a trained and qualified electrician or installer who has all the following skills and experience:

- Knowledge of the functional principles and operation of on-grid systems
- Knowledge of the dangers and risks associated with installing and using electrical devices and acceptable mitigation methods.
- Knowledge of the installation of electrical devices
- Knowledge of and adherence to this manual and all safety precautions and best practices.

2. Preparation before Installation

2.1. Installation Prerequisites

Make sure that the installation location meets the following conditions:
The building is designed to withstand earthquakes.
The location is far away from the sea, to avoid saline water and humid air.
The floor is flat and level.
There are no flammable or explosive materials nearby.
The ambient environment is shady and cool, and away from heat as well as direct sunlight.
The temperature and humidity stay at a constant level.
There is minimal dust and dirt in the area.
There is no corrosive gases present, including ammonia and acid vapor.
The ambient temperature is within the range from 0°C to 55°C, and the optimal ambient temperature is between 15°C and 35°C.

NOTE !

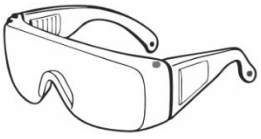
The S40K battery is rated at IP65 and thus can be installed outdoors as well as indoors. However, if installed outdoors, do not expose the battery directly to sunlight and moisture.

NOTE !

If the ambient temperature is beyond the operating range, the battery will stop operating to protect itself. The optimal temperature range for the battery to operate is from 15°C to 35°C. Frequent exposure to harsh temperatures may deteriorate the performance and lifetime of the battery.

2.2. Safety Prepare

Installation and maintenance personnel must operate according to applicable federal, state and local regulations as well as the industry standard.
The product installation personnel shall wear safety gears, etc. in order to avoid short circuit and personal injury.



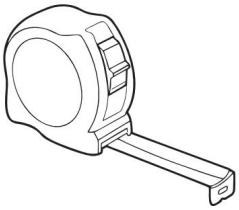
Safety goggles

Insulated gloves

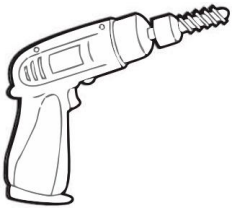
Safety shoes

2.3. Required Tools

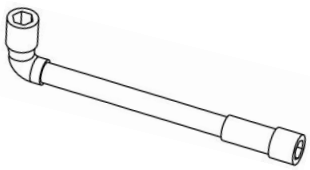
Pencil or Mark



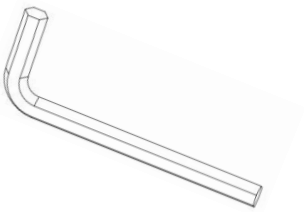
Tape Measure



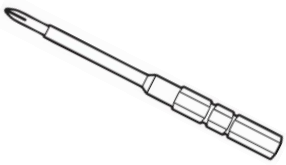
Driller



Socket Nut Wrenchs



Hex Wrenchs



Pillips Screwdrivers

2.4. Packaging Inspection

Check the battery packages to find the visible damages, any visible damages, such as cracks, please contact your dealer immediately.

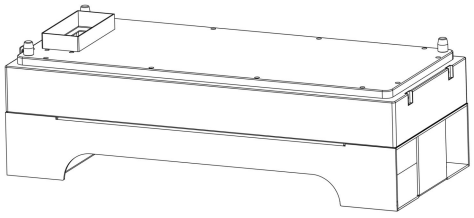
2.5. Open Box

Open the battery package by cutting the packing tape, please check if the battery package and all relevant items are intact.

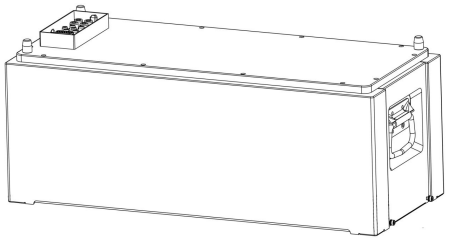
Check the package items on section 3.6, check the packing list carefully, if there's any item missing, please contact your distributer directly.

2.6. Packing List

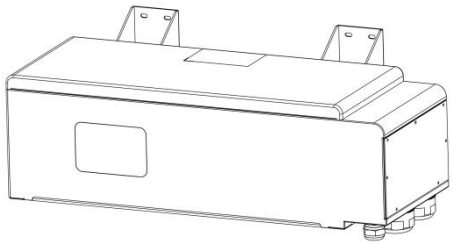
2.6.1. Main Control



Base Module*1



Battery Module*N(N≤6)



Main Control Module*1

User Manual*1

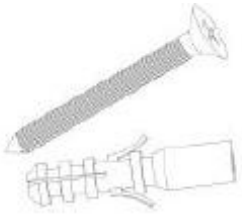
M4x12 Screw*8

M6x16 Screw*6

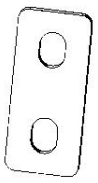
M4x8 Screw*4

M8x80 Screw*4

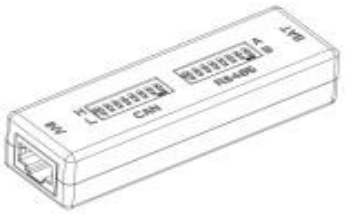
M4x10 Screw*4



Expansion Screw*4



Side Panel Connector*4

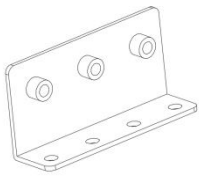


Communication Switch Box*1

Wrench*1

WiFi Antenna*1

Main Fixed Holder*2



Bottom Fixed Holder*2

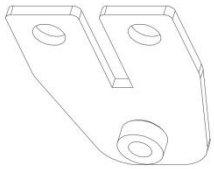
OT Terminal SC120-8*2

OT Terminal SC70-8*4

Parallel Communication Cable 2m*1

Communication Cable 2m*1

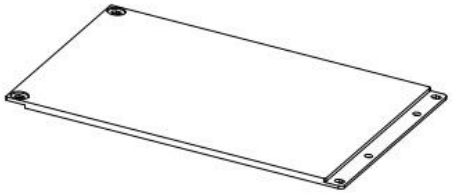
Communication Cable 200mm*1



Busbar*2

2.6.2. Battery

M4x10 Screw*4

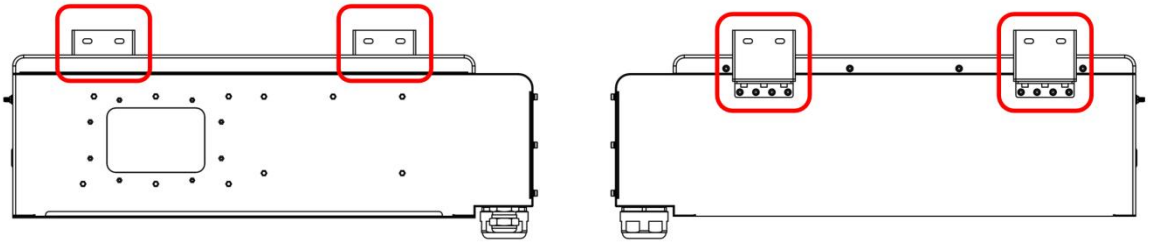


Side Panel*2

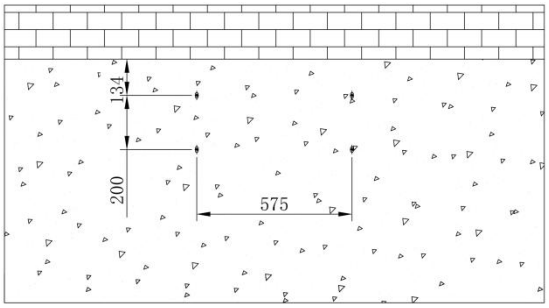
3. Installation

3.1. Battery Installs Steps

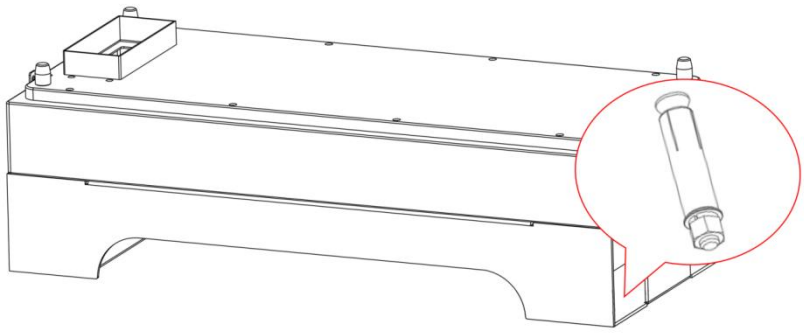
Step 1: Install the mounting plate to the main control.



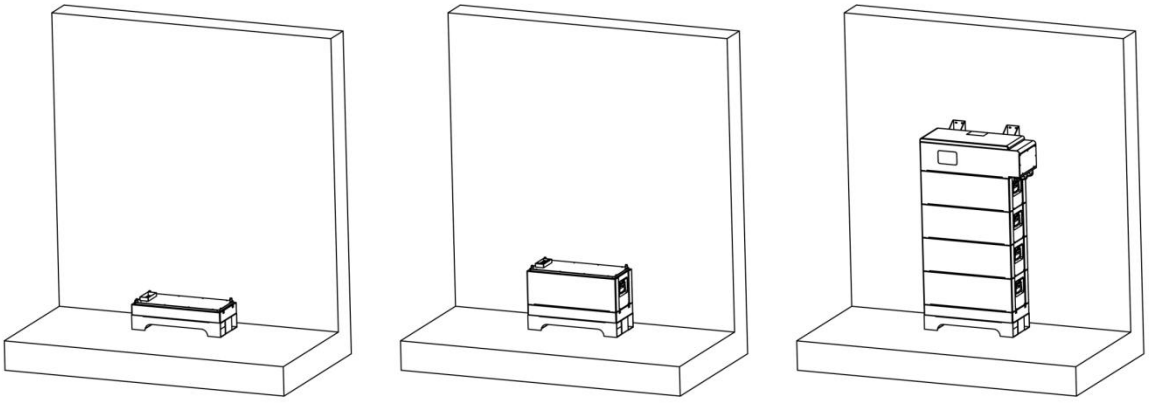
Step 2: Measure and drill holes on the ground to ensure alignment with the mounting plate.



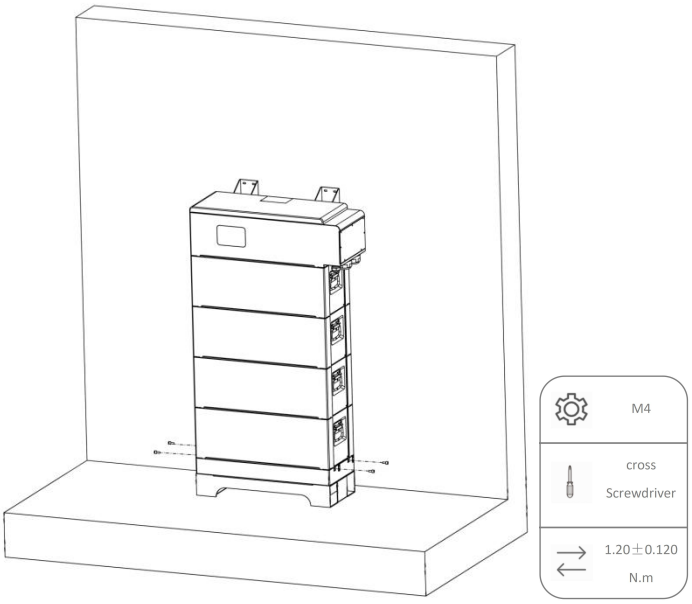
Step 3: Secure the base with expansion bolts at the confirmed position.



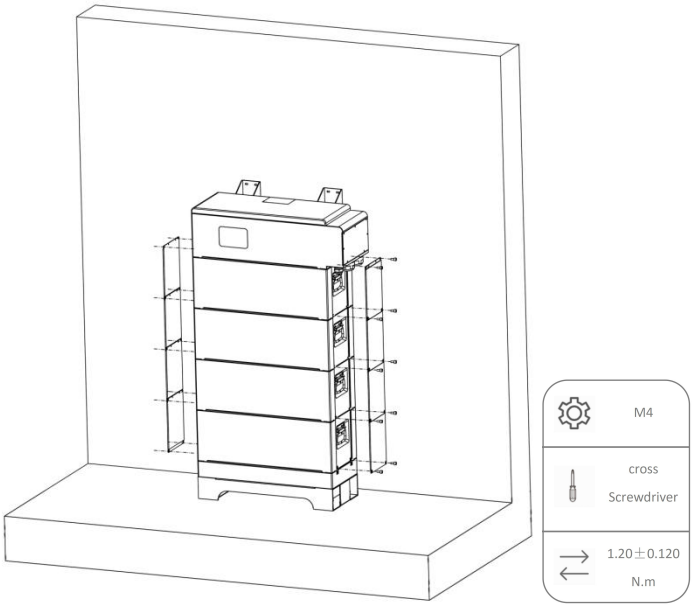
Step 4: Stack the modules and the main control in order from bottom to top.



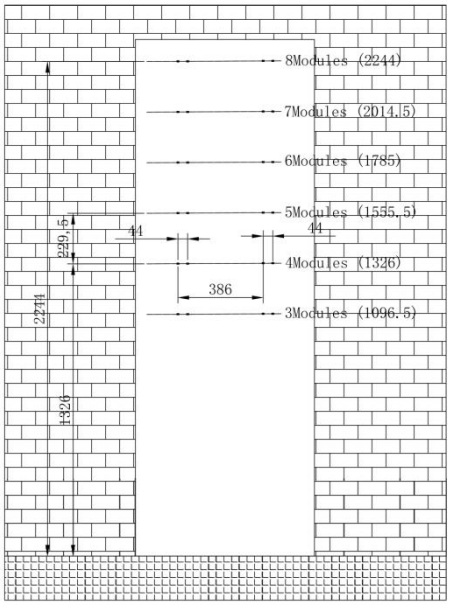
Step 5: Use M4x10 screws to fix both sides of base module.



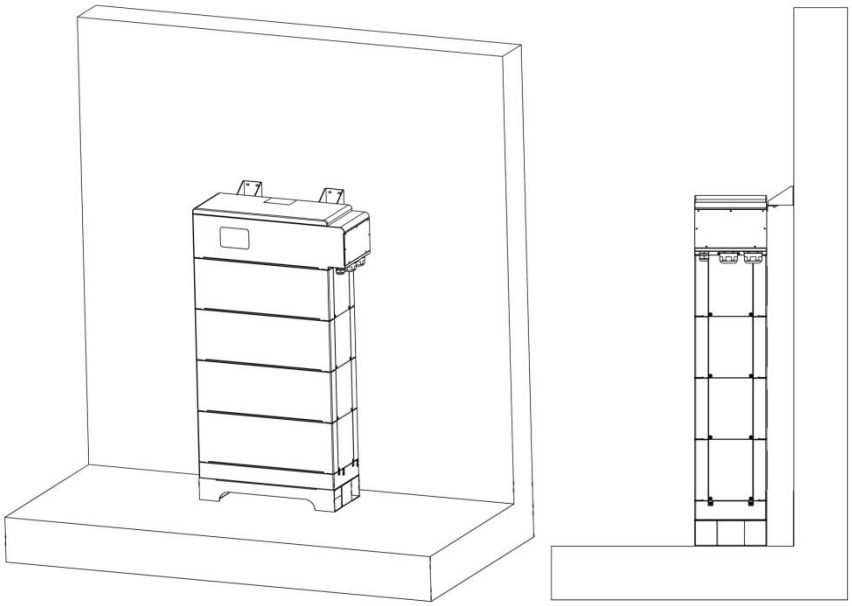
Step 6: Use M4x10 screw to fix side panel in the battery both sides.



Step 7: Drill holes in the wall according to the actual needs of the stacked modules as shown in the below for subsequent installation.

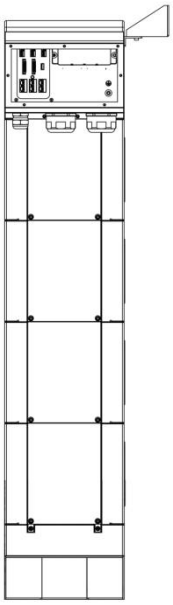


Step 8: Secure the mounting palte of the main control to the wall using expansion screws.



3.2. Connection

Step 1: Remove side panel

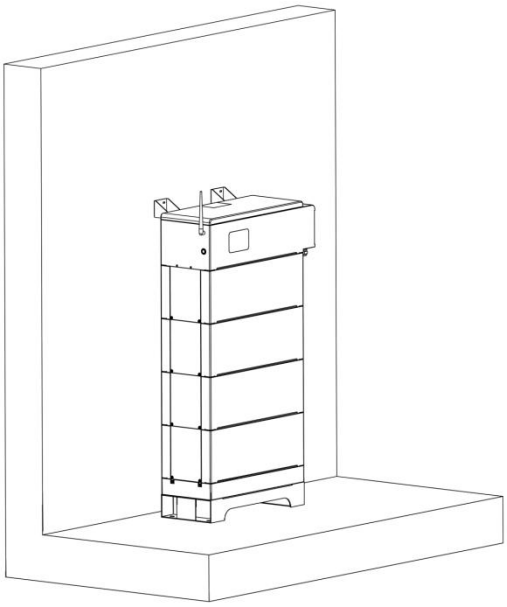


Step 2: Power cable connection

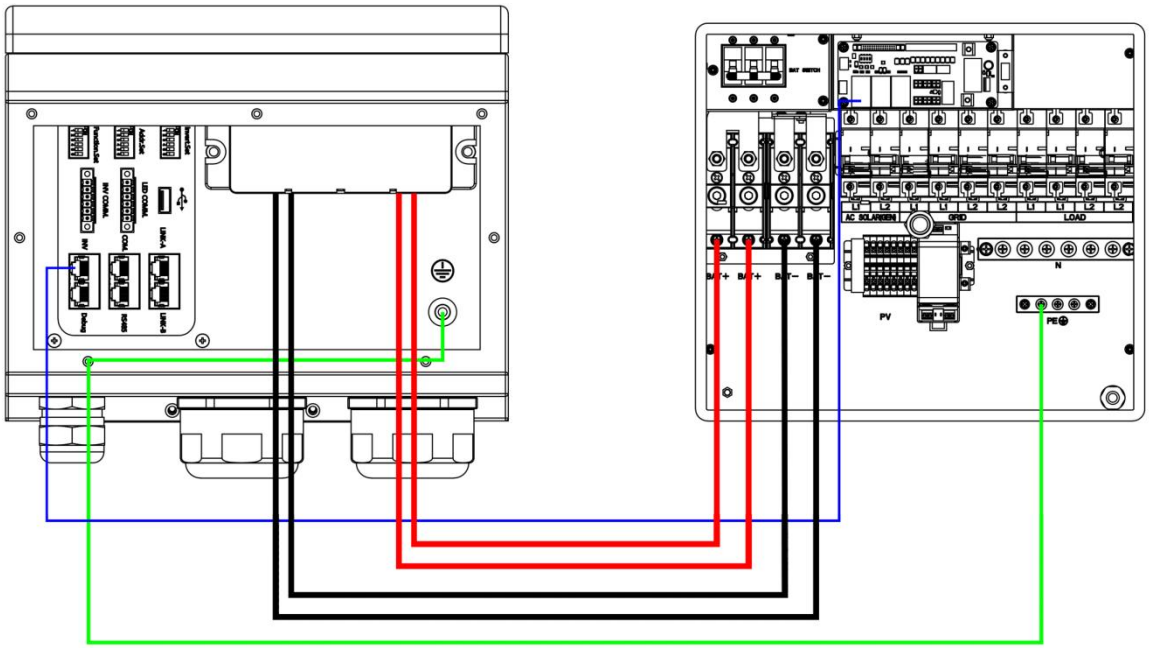
Step 3: Ground cable connection

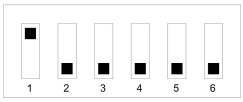
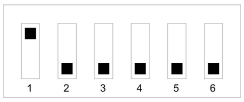
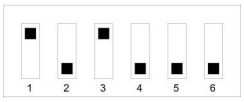
Step 4: Communication cable connection

Step 5: WiFi



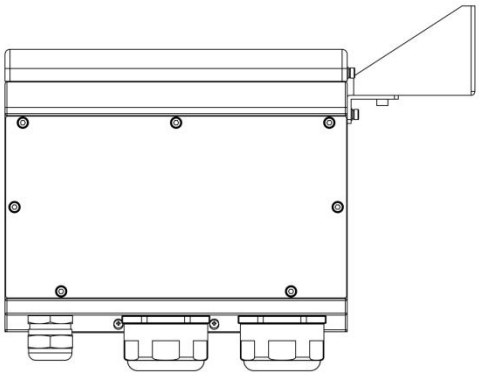
Step 6: Dial code setting



The Role of the Device	Function	Address	Inverter
Battery			

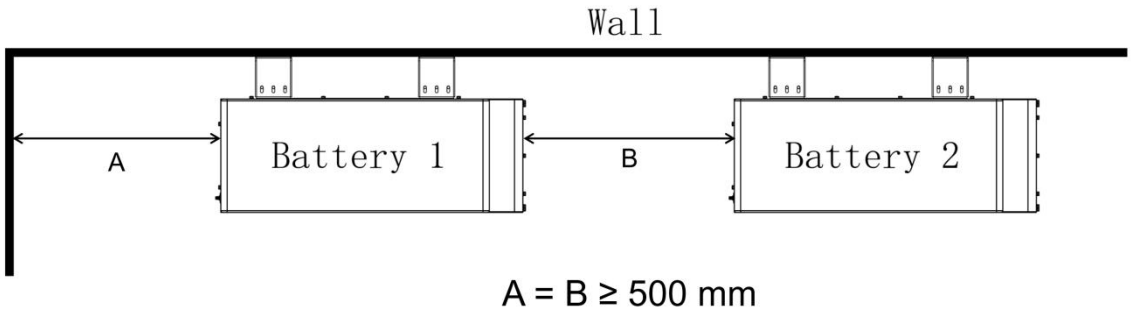
OT terminal	Screw	Torsion	Wire diameter
SC120-8	M8	11±1.2N.m	4/0 AWG
SC70-8	M8	11±1.2N.m	2/0AWG

Step 7: Recover side panel

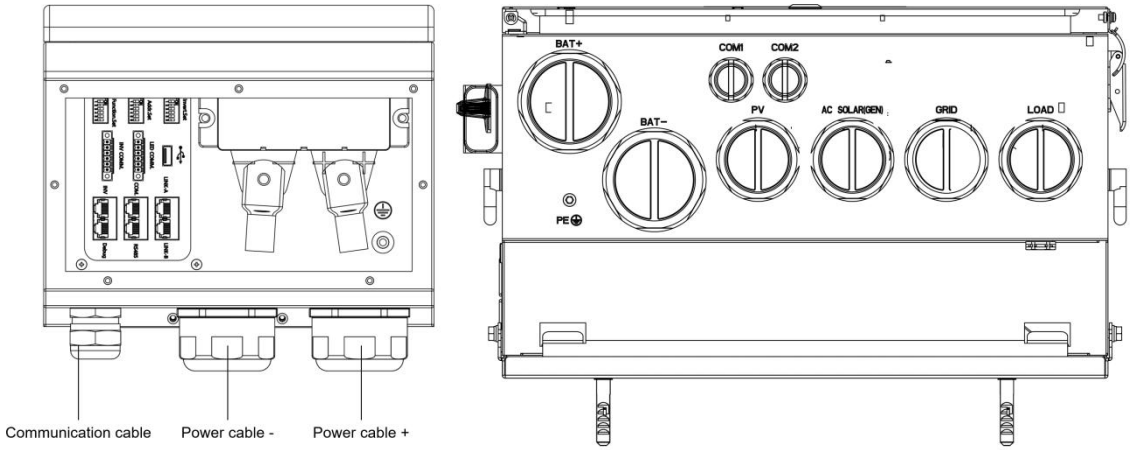


3.3. Parallel

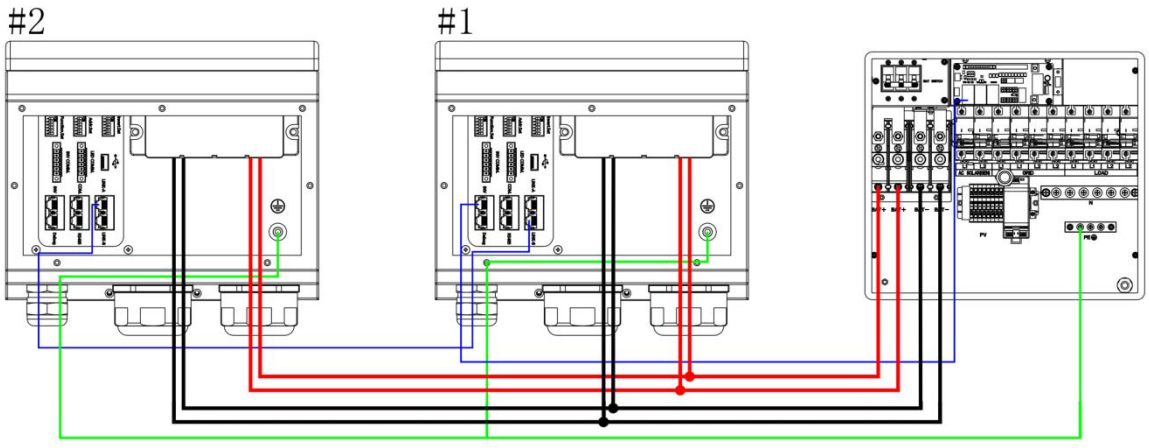
Step 1: Installation distance



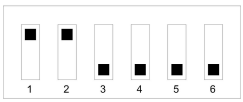
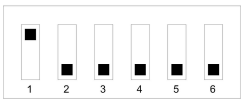
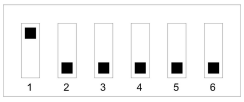
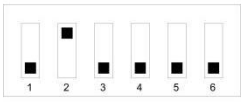
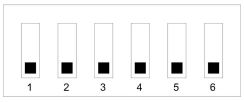
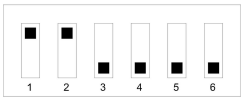
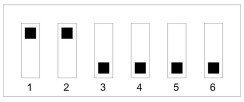
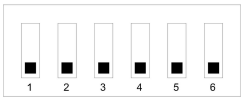
Step 2: Precautions before wiring



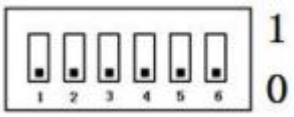
Step 3: Connects with inverter



Step 4: S40K Dial Switch setting

The Role of the Device	Function	Address	Inverter
Parallel Mode Master Battery			
Parallel Mode Middle Slave Battery			
Parallel Mode Last Slave Battery			

A. Set the Addr SET switch refer to the ADDR SET Reference table.



The Address Dial Switch used for Hardware address configure.

ADD Switch: 6 ADD switches, “0”and “1”, refer to picture right.

The settings will be active only after restart the battery. When the battery communicates with the inverter, the address of the battery pack must be set to 1, and the address of the parallel slave should be greater than 1.

When the battery is connected in parallel, cascading communication is required. Hardware address configuration is required for both the master battery and the slave battery, and the hardware address can be set by the dial switch on the board. The definition of the switch refers to the table 7.1.

4. WiFi Configuration

4.1. Commissioning Steps

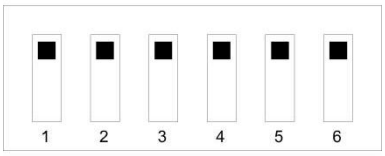
After all the battery packs are installed, follow these steps to put it into operation.

- Verify the batteries communication cable connection is correct.
- Verify the batteries power connection is correct.
- Verify the batteries dial switch setting is correct
- Press the Power button on the master battery to turn on all of the batteries.
- Check the Battery's screen to confirm the batteries working normal.
- Power on the Inverter and other electronic devices.

4.2. WIFI Configuration

Antenna connection port is recommended to fasten tight before WIFI configuration, since the antenna is critical for a communication receive in and send out quality. For details, please refer to the figure below.

Set the inverter dial code (INV SET) to 63(111111) as shown below before WiFi configuration.



Step 1: Download the Smart Energy APP on phone

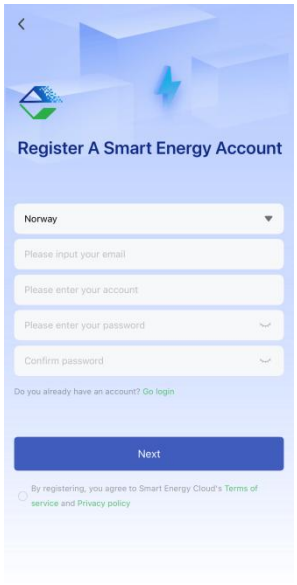
Search the keyword "Smart Energy" from AppStore on iphone or Google play on Android phone, download APP and finish installation. If users fail to upgrade the latest APP version or to install the APP on phone, please contact Smart Energy technical support for advice.

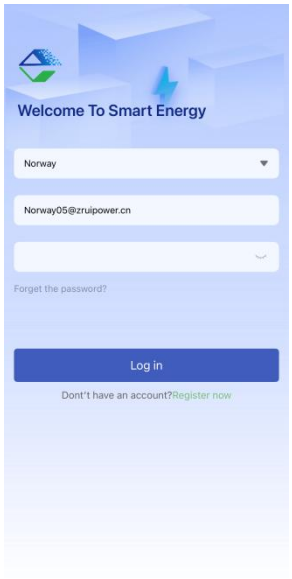
Android QR code

IOS QR code

Step 2: Create APP user account

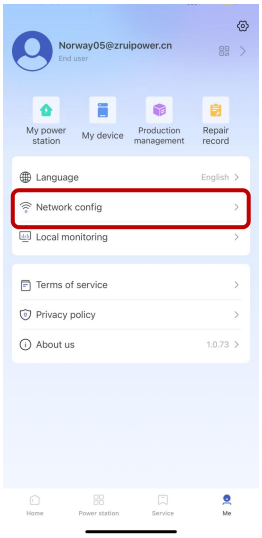
Select the area where you live.Click Register button and type in account and password.If you already had an account, you may use it to log in the APP directly otherwise you need to create an account.





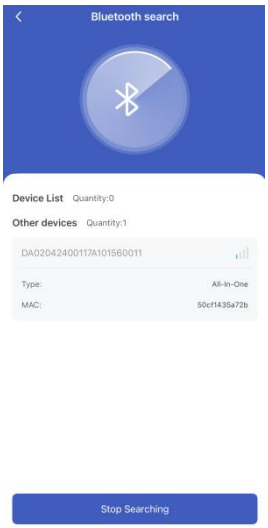
Step 3: Create AP for APP parameter settings

Turn to the page Me, click the Network configuration, then click Bluetooth Model, and following by the instruction of network setting for WIFI configuration.



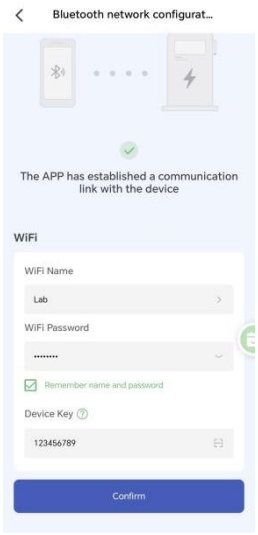
Step 4: Bluetooth setting

Connect your mobile phone to the Bluetooth from the master controller which SSID is same as controller's serial number (SN).



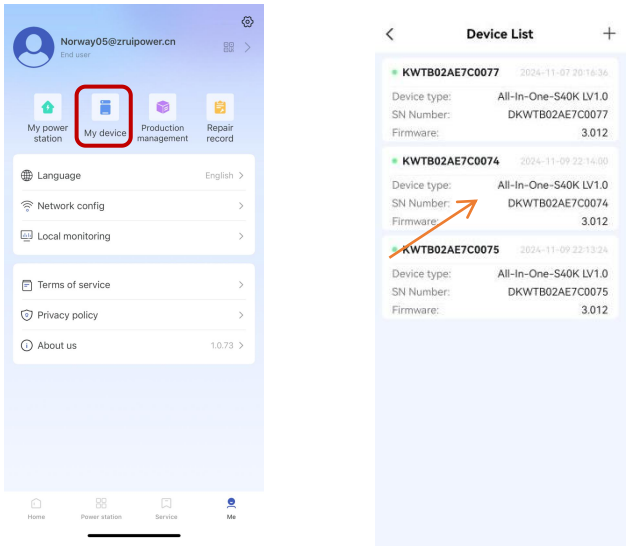
Step 5: Bluetooth network configuration

Please link the appriciate WiFi and enter the passwod. If this device already exists, there will be a Device key automatically generated and please do not modify it. If users have trouble to connect the product WIFI, please contact Smart Energy FAE for further help.



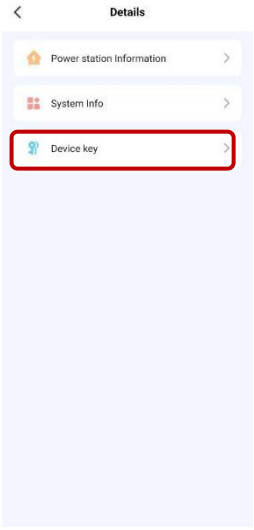
Step 6: Find the device verification code on APP

Click my device at page Mine and make sure your SN number.



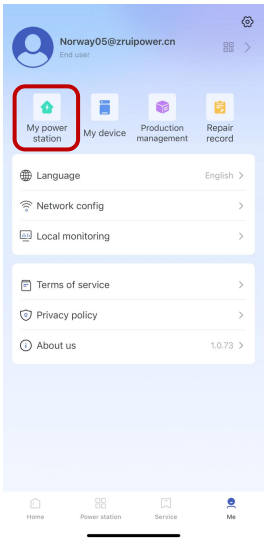
Step 7: Enter my device and find the device key

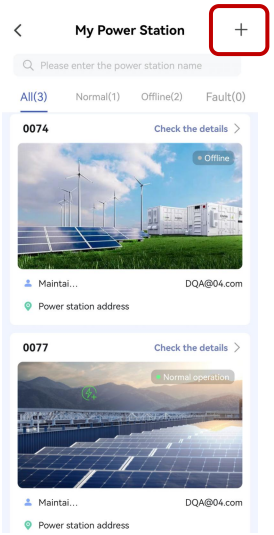
Click the device and click the “details”in the upper right corner of the interface, and then click “Device key”. It will show the verification code.

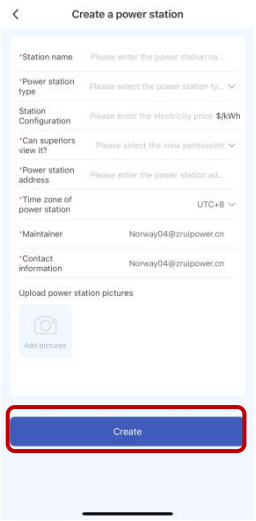


Step 8: Create a new power station

Turn to Me page of the APP, create a plant, and set a power station name, power station type, grid price configuration,superiors view and power station address for it.

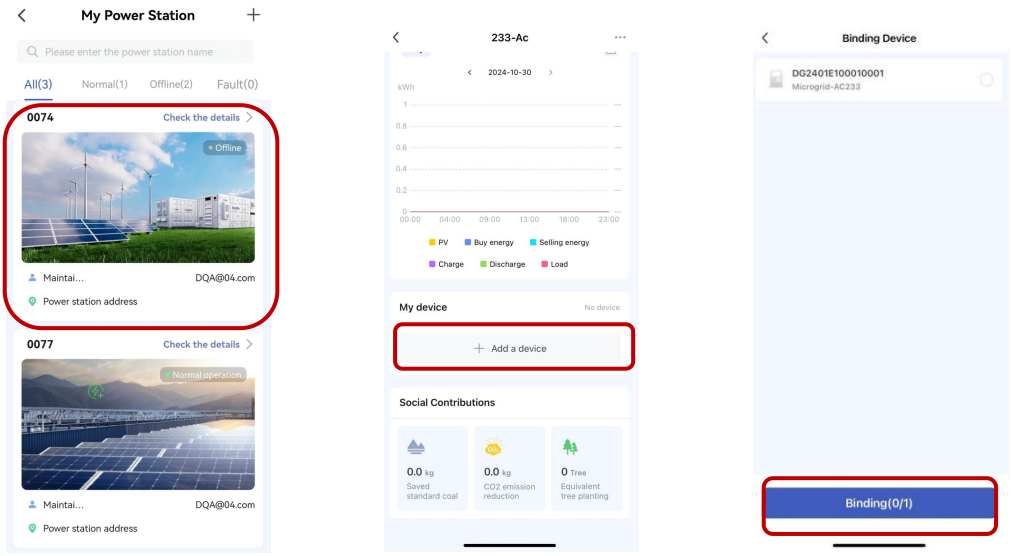






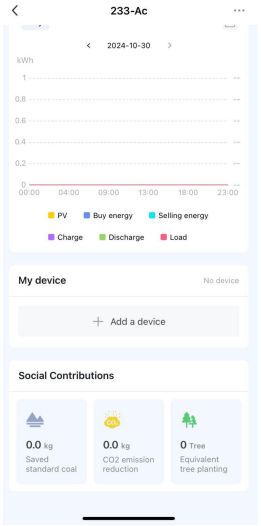
Step 9: Binding the device

Click the device and enter the page to add a device to your plant and all your products will show up as their SN, select proper products and confirm.



Step 10: Manage your product

Now you can manage your products in the APP, and you can also manage them in Website, ask your installer for the site URL.



Step 11: Set the inverter dial code(INV.SET)

Set the INV.SET as 0 in order to let the battery drop out distribution mode, after configuring WiFi. Wait a minutes, if the cloud paltform displays information about the battery online, the network has been configured successfully.

Step 12: Monitor all real-time data

After the product is connected to WiFi, the running status, real-time power, daily power consumption and cumulative power of the product can be monitored in real time on the network platform or mobile APP. It can also be used to configure parameters.

5. Product Introduction

5.1. Product Overview

The S40K series product is a 48V/51.2V lithium iron phosphate battery storage system independently developed by Kowint Energy (Shenzhen)Co.,Ltd., The rated voltage of the system is 48V/51.2V, and the maximum Output power can reach to 15kW . The parallel connection of multi systems is supported.

5.2. Benefits

- Extreme safety ---lithium iron phosphate battery, long life.
- High performance---a single system supports 15kW load.
- Data Visualization ---large screen display, the running status is clear at a glance.
- Easy installation---stacked design, the system automatically recognizes the module.
- Excellent scalability --- 2~8 modules in a single system can be flexibly configured, and 15 systems can be connected in parallel.
- High operability ---multi-system parallel, one-key switch.
- High maintainability --- support cloud monitoring and cloud upgrade (optional).
- Strong adaptability---outdoor design, suitable for installation in outdoor environment.
- High compatibility---matching test with mainstream energy storage system inverter.

5.3. Specification 1

No	Items		Parameters					
1	Model		S4001-ST/ S4001-STW	S4002-ST/ S4002-STW	S4003-ST/ S4003-STW	...	S4007-ST/ S4007-STW	S4008-ST/ S4008-STW
2	Main Control Module		CM300-S40K					
3	Battery Module Type		S40K-ST/ S40K-STW					
4	Battery Module Chemistry		LiFePO4					
5	Battery Module QTY		1	2	3	...	7	8
6	Nominal Capacity (Ah)		100	200	300	...	700	800
7	Nominal Energy(kWh)		5.12	10.24	15.36	...	35.84	40.96
8	Maximum Continuous Discharge Rates (MCDR)(kW)		5	10	15	15	15	15
9	Voltage	Nominal(V)	51.2					
		Recommend Charging(V)	56.8					
		Max. Charging(V)	58.4					
		Discharge Cut-off(V)	43.2					
10	Current	Max. Charging(A)	95	190	285	300	300	300
		Max. Discharging(A)	95	190	285	300	300	300
		Peak for 10s(A)	100	200	330	350	350	350
11	Weight (Approx.) (Kg)		80.7	129.9	179.2	...	376.2	425.4
12	Dimensions (W*H*D) mm		715*620 *268	715*847.5 *268	715*1075 *268	...	715*1985 *268	715*2212.5 *268
13	Heating Film Resistance (Ω)		16 (-STW model only)					
14	Heating Start Temperature (℃)		5 (-STW model only)					
15	Communication		CAN, RS485, WiFi					
16	Designed Calendar Life		≥10 years					
17	Safety Function		Over-charge, Over-discharge, Over-current, Low/High-temperature, Low-voltage, Short-circuit Protections					
18	Parallel Capability		Maximum 15 units					
19	Charging Temperature Range (℃)		0~50					
20	Discharging Temperature Range(℃)		-20~50					
21	Best Operating Temperature Range(℃)		15~35					
22	Storage Temperature Range(℃)		-20~55					
23	Best Storage Temperature Range(℃)		0~35					
24	Humidity (@RH)		10% -90%					
25	Altitude		⩽4000m					

5.4. Specification 2

No	Items		Parameters					
1	Model		S4001-SS/ S4001-SSW	S4002-SS/ S4002-SSW	S4003-SS/ S4003-SSW	...	S4007-SS/ S4007-SSW	S4008-SS/ S4008-SSW
2	Main Control Module		CM300-S40K					
3	Battery Module Type		S40K-SS/ S40K-SSW					
4	Battery Module Chemistry		LiFePO4					
5	Battery Module QTY		1	2	3	...	7	8
6	Nominal Capacity (Ah)		100	200	300	...	700	800
7	Nominal Energy(kWh)		4.8	9.6	14.4	...	33.6	38.4
8	Maximum Continuous Discharge Rates (MCDR)(kW)		4.8	9.6	14.4	15	15	15
9	Voltage	Nominal(V)	48					
		Recommend Charging(V)	53.25					
		Max. Charging(V)	54.75					
		Discharge Cut-off(V)	40.5					
10	Current	Max. Charging(A)	95	190	285	300	300	300
		Max. Discharging(A)	95	190	285	300	300	300
		Peak for 10s(A)	100	200	330	350	350	350
11	Weight (Approx.) (Kg)		79.7	128.9	178.2	...	375.2	424.4
12	Dimensions (W*H*D) mm		715*620 *268	715*847.5 *268	715*1075 *268	...	715*1985 *268	715*2212.5 *268
13	Heating Film Resistance (Ω)		16 (-SSW model only)					
14	Heating Start Temperature (℃)		5 (-SSW model only)					
15	Communication		CAN, RS485, WiFi					
16	Designed Calendar Life		≥10 years					
17	Safety Function		Over-charge, Over-discharge, Over-current, Low/High-temperature, Low-voltage, Short-circuit Protections					
18	Parallel Capability		Maximum 15 units					
19	Charging Temperature Range (℃)		0~50					
20	Discharging Temperature Range(℃)		-20~50					
21	Best Operating Temperature Range(℃)		15~35					
22	Storage Temperature Range(℃)		-20~55					
23	Best Storage Temperature Range(℃)		0~35					
24	Humidity (@RH)		10% -90%					
25	Altitude		⩽4000m					

5.5. Product Architecture

5.5.1. Product Overview

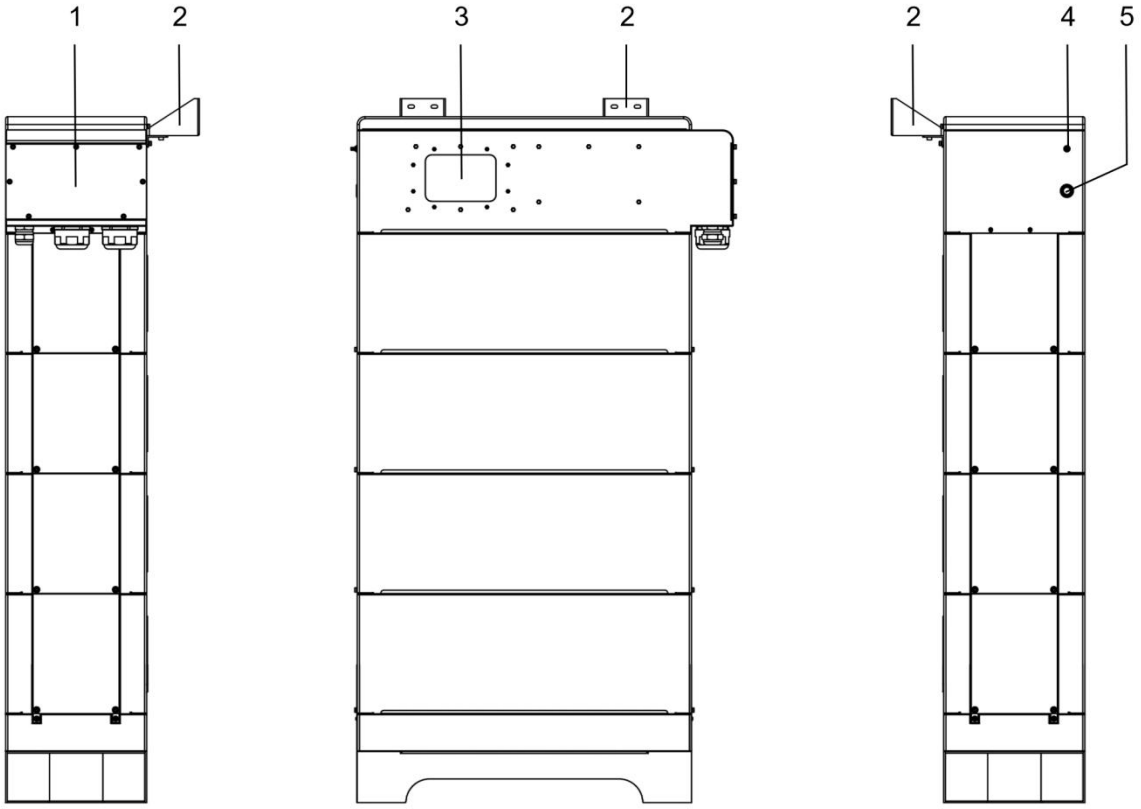


Table 1: Architecture introduce

No.	Items	Instructions
1	Interface cover	Interface panel cover
2	Bracket	Wall mount Bracket*2
3	Display Screen	The system monitor display screen
4	WIFI Interface	WIFI Antenna Interface
5	Power Button	Power Button

5.5.2. Module design

The S40K Battery Energy Storage System modularity was defined in order to realize the best compromise between the following constraints:

- Flexible growth from 4.8kWh/5.12kWh to 28.8kWh/40.96kWh.
- High reliability and ease of maintenance.
- Maximize the power output.

The S40K is based on the following Modules:
Battery base module is responsible for the base function of the S40K.
Battery module storage the energy.
Main control module integrated the BMS and communication function, is responsible for the battery system management and communication with the other S40K system and inverter.

5.5.3. Battery Base Module

The Battery Base Module is an empty module, it's designed for the system's base.

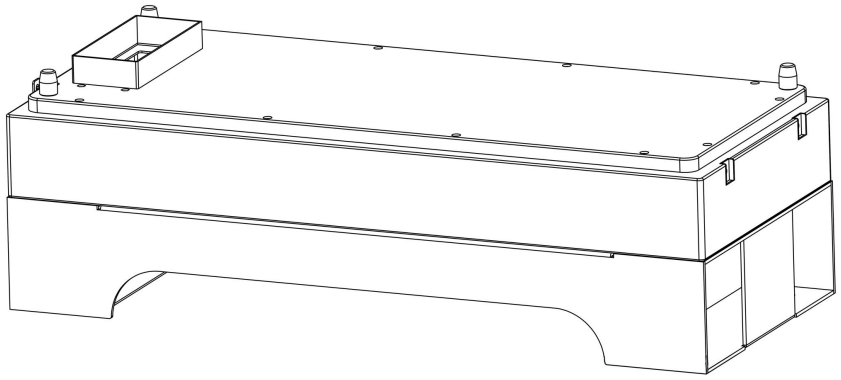


Table2: Battery Base Module Parameters

No.	Items	Parameters
1	Model	S40K-Base
2	Weight (Approx.)	13.1kg
3	Dimensions (W*D*H)	635*268*205±2mm

5.5.4. Battery Module

The Battery Module is composed of 48V/51.2V Battery pack and BMS, each Battery Module can support 4.8kWh/5.12kWh energy.

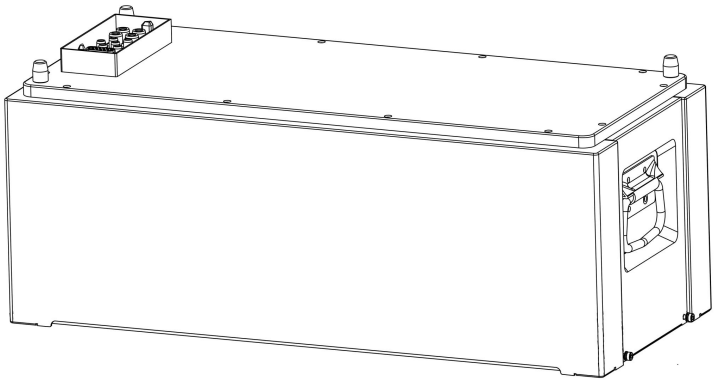


Table3: Battery Module Parameters

No.	Items	Parameters	
1	Model	S40K-SS/ S40K-SSW	S40K-ST/ S40K-STW
2	Cell Configuration	15S1P	16S1P
3	Nominal Capacity	100Ah	100Ah
4	Nominal Energy	4800Wh	5120Wh
5	Weight (Approx.)	48.3Kg	49.3Kg
6	Dimensions (W*D*H)	635*268*264.5±2mm	635*268*264.5±2mm

5.5.5. Main Control Module

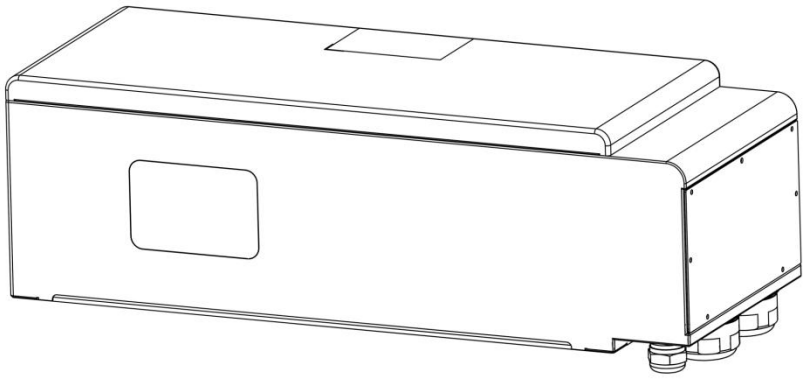
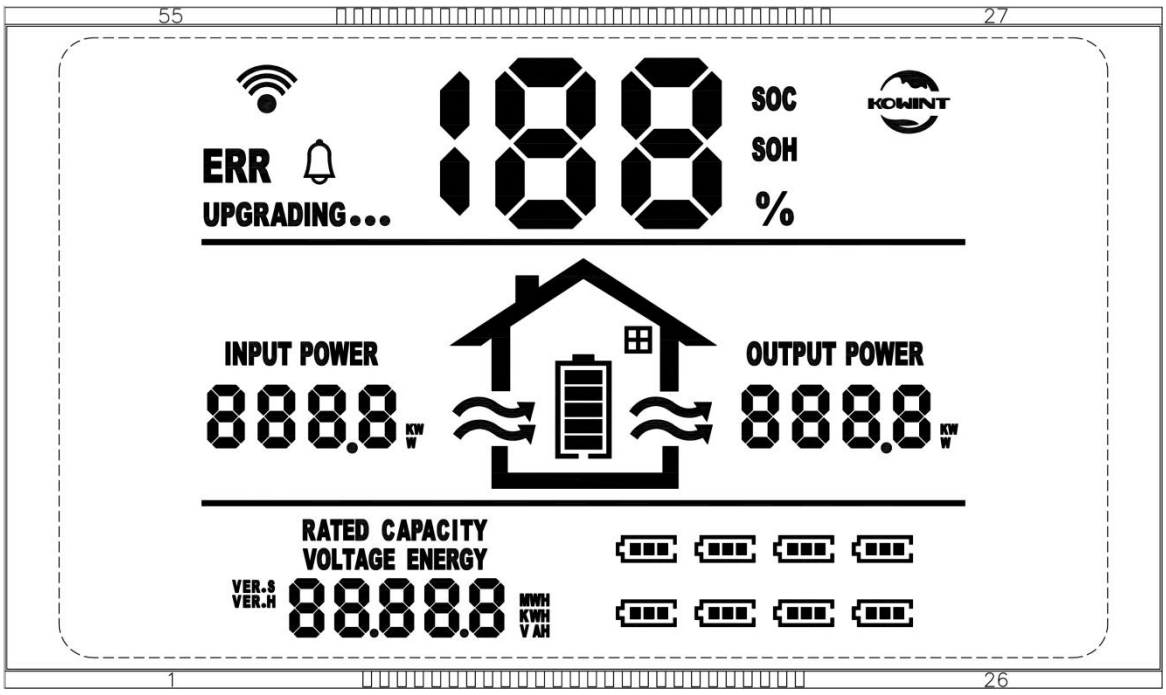


Table4: Main Control Module Parameters

No.	Items	Parameters
1	Model	CM300-S40K
2	Operation Voltage Range	36V~60V
3	Maximum Operation Current	300A
4	Communication	CAN、RS485、WiFi
5	Weight (Approx.)	18.3kg
6	Dimensions (W*D*H)	715*268*221±2mm

5.5.6. Screen



Warning Code (Sign like "🔔")

Warning code 400 is available for all-in-one

No.	Warning codes	Instructions
1	101	Battery cell undervoltage protection
2	102	Charge overcurrent protection
3	103	Discharge overcurrent protection
4	104	Excessive charge temp protection
5	105	Excessive discharge temp protection
6	106	Low charge temp protection
7	107	Low discharge temp protection
8	108	Excessive ambient temp protection
9	109	Excessive voltage differnce protection
10	110	High relay temp protetction
11	111	Copper bar overtemp protection
12	112	Low insulation resistance portection
13	113	Low total voltage protection
14	114	Low ambient temp protection
15	115	Mos overtemp protection
16	400	Pack disconnect

Error Code (Sign like “ERR”)

No.	Error codes	Instructions
1	200	Discharge relay fault
2	201	Charge relay fault
3	202	Battery cell fault
4	203	NTC fault
5	204	Current sensor fault
6	205	Pack disconnect fault
7	206	Short circuit protection
8	207	Internal total pressure check failure
9	208	Heating fault
10	209	Module address conflict
11	210	Master address conflict
12	211	Charge mos fault
13	212	Discharge mos fault
14	213	Addressing failure
15	214	Precharge fault
16	215	Cluster disconnect
17	216	Battery reverse connected fault
18	217	External total pressure check failure
19	218	Address non-1
20	219	Address Loss
21	220	Pack disconnect
22	230	Master disconnect fault
23	300	Battery cell undervoltage safety lock
24	301	Battery cell overvoltage safety lock
25	302	High charge temp safety lock
26	303	Low charge temp safety lock
27	304	High discharge temp safety lock
28	305	Low discharge temp safety lock
29	306	Charge overcurrent safety lock
30	307	Discharge overcurrent safety lock

5.6. Interface Panel Description

The Interface panel at the right side of the main control module.

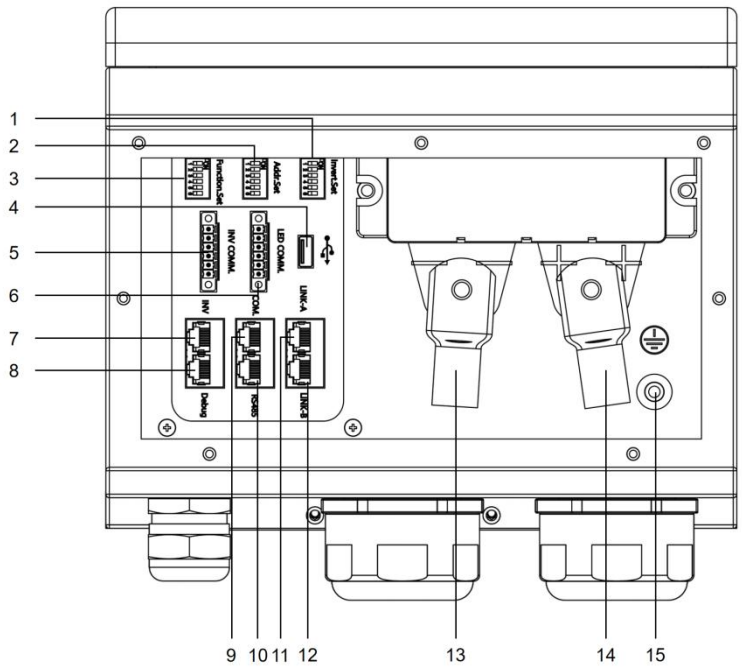
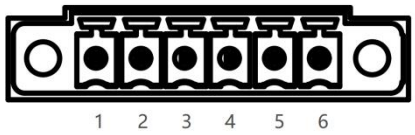


Table5: Interface panel introduce.

No.	Items	Instructions
1	Invert.Set	Inverter communication match select switch
2	Addr.Set	Address Dial Switch
3	Function.Set	The Battery role setting switch
4	USB	USB connection Port
5	LED COMM.	LED communication Port
6	INV COMM.	Inverter RS485/CAN communication port
7	INV	Inverter RS485/CAN communication port
8	Debug	Debug port
9	COM.	CAN communication connection
10	RS485	Communication connection
11	Link-A	Multi-device parallel connection
12	Link-B	Multi-device parallel connection
13	-	Power cathode
14	+	Power anode
15	Ground	Grounding connection

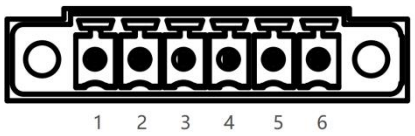
5.6.1. LED COMM.

LED Communication Port

Port Definition	PIN Number	PIN Definition
	1	LCD_12V
	2	GND
	3	LCD_485A
	4	LCD_485B
	5	CAN1H
	6	CAN1L

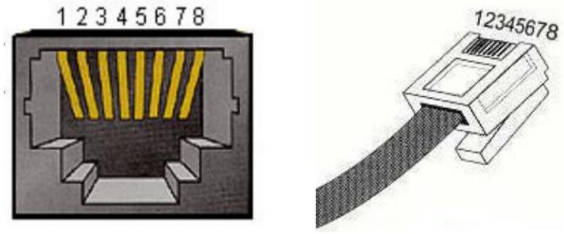
5.6.2. INV COMM.

The Inverter Communication Port: Communicate with inverter.

Port Definition	PIN Number	PIN Definition
	1	RS485_2B
	2	RS485_2A
	3	RS485_2GND
	4	CAN2L
	5	CAN2H
	6	CAN2GND

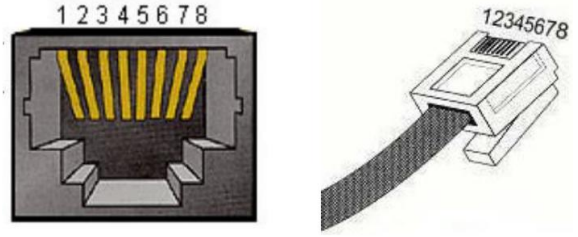
5.6.3. LINK-A & LINK-B Interface

Multi-device parallel connection: The same RJ45 port, two RJ45 parallel. Comply with CAN protocol (baud rate: 500Kbps), used for parallel communication between batteries.

Port Definition	PIN Number	PIN Definition
	1	CAN2L
	2	CAN2H
	3	CAN2GND
	4	CAN2GND
	5	CAN2GND
	6	CAN2GND
	7	CAN2H
	8	CAN2L

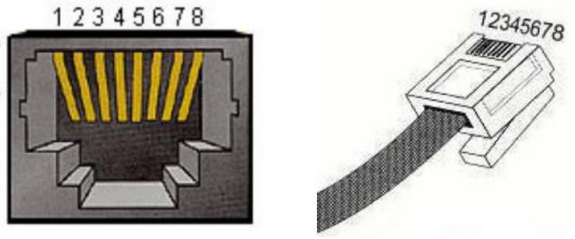
5.6.4. COM.

The COM communication port: (RJ45 port) combined with RS232/RS485 protocol, for manufacturers or professional engineers debugging or service.

Port Definition	PIN Number	PIN Definition
	1	RS232_RIN
	2	RS232_OUT
	3	RS485_2B
	4	Reserved
	5	RS485_2A
	6	Reserved
	7	Reserved
	8	SGND

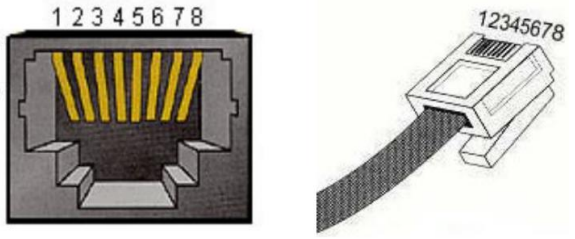
5.6.5. RS485

RS485 Communication Port:RS485 Interface.

Port Definition	PIN Number	PIN Definition
	1	RS485_2B
	2	RS485_2A
	3	RS485_2GND
	4	Reserved
	5	Reserved
	6	RS485_2GND
	7	Reserved
	8	Reserved

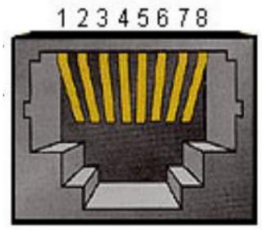
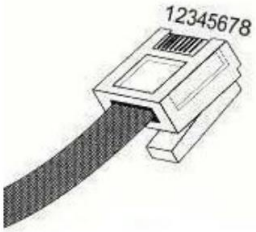
5.6.6. Invert COMM-Communication with Inverter (RS485 & CAN) Interface

Device supply Inverter communication connection: RS485 & CAN Interface. CAN/RS485 communication port: (RJ45 port) follow CAN protocol and RS485 protocol, for output batteries information, the battery uses this interface to communicate with external inverters.

Port Definition	PIN Number	PIN Definition
	1	RS485_2B
	2	RS485_2A
	3	RS485_2GND
	4	CAN2GND
	5	CAN2GND
	6	RS485_2GND
	7	CAN2H
	8	CAN2L

5.6.7. Debug

The Debug interface comply with RJ45 and CAN protocol for manufactures or professional engineers debugging or service.

Port Definition	PIN Number	PIN Definition
 	1	CAN1L
	2	CAN1H
	3	CAN1GND
	4	BAT_SW-
	5	BAT_SW+
	6	CAN1GND
	7	BAT1_GND
	8	XUNZOUT+

5.6.8. Communication Switch Connection

Dial Switch Definition	Area Number	Area Definition
	1	INV COM
	2	BAT COM
	3	CAN DIP switch
	4	RS485 DIP switch

The communication DIP switch is applied for both CAN and RS485 communication protocol of various inverter band. Each DIP switch has three level. Before any start-up, set CAN & RS485 DIP switch to NC, the middle of CAN high & low and RS485 A & B. If any update or conflict description of inverter PIN order and Kowint battery's, please contact Kowint FAE for further help.

5.7. Parallel(ALL-IN-ONE)

When the battery and MEGAREVO 12K inverter as All-in-one:

Inverter internal communication

Each dial code can be checked by corresponding chapter.

1. When there are multiple inverter in parallel:

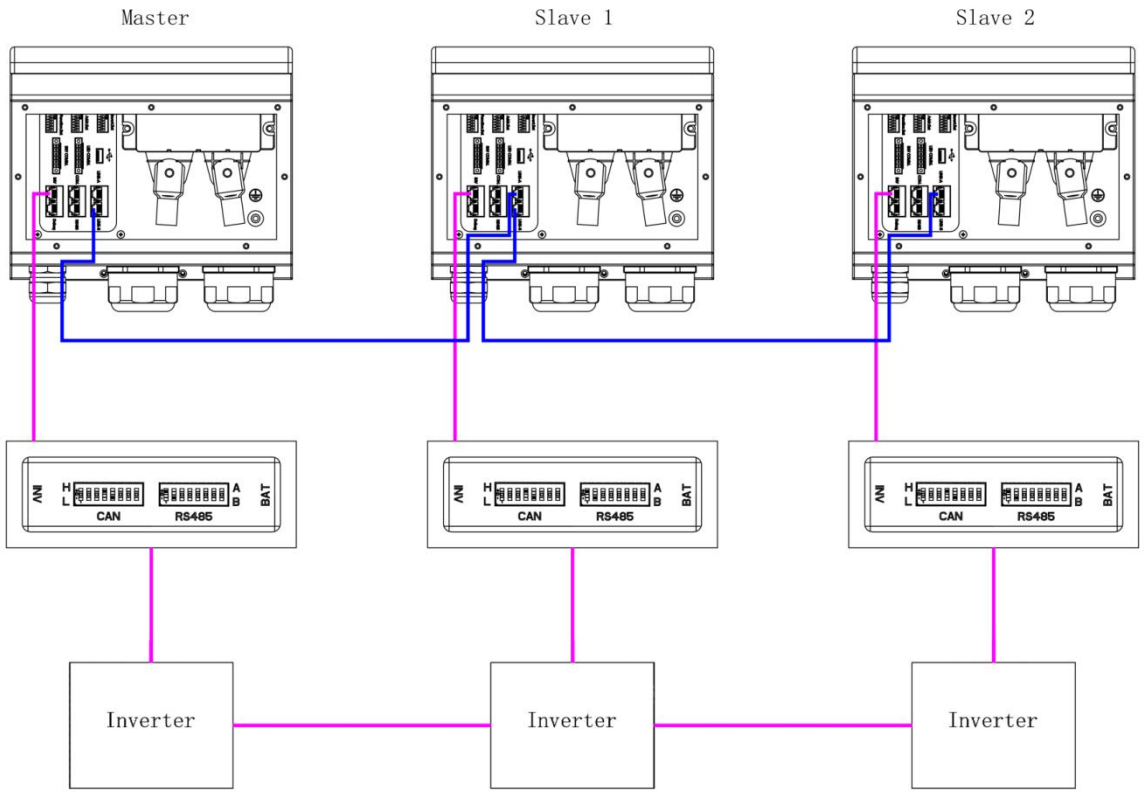
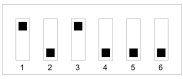
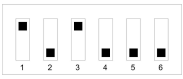
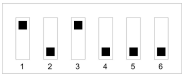
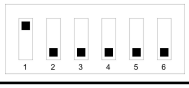
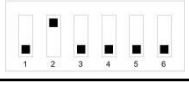
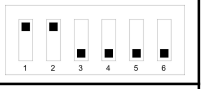
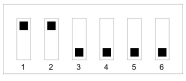
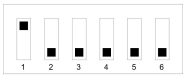
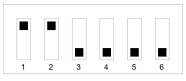
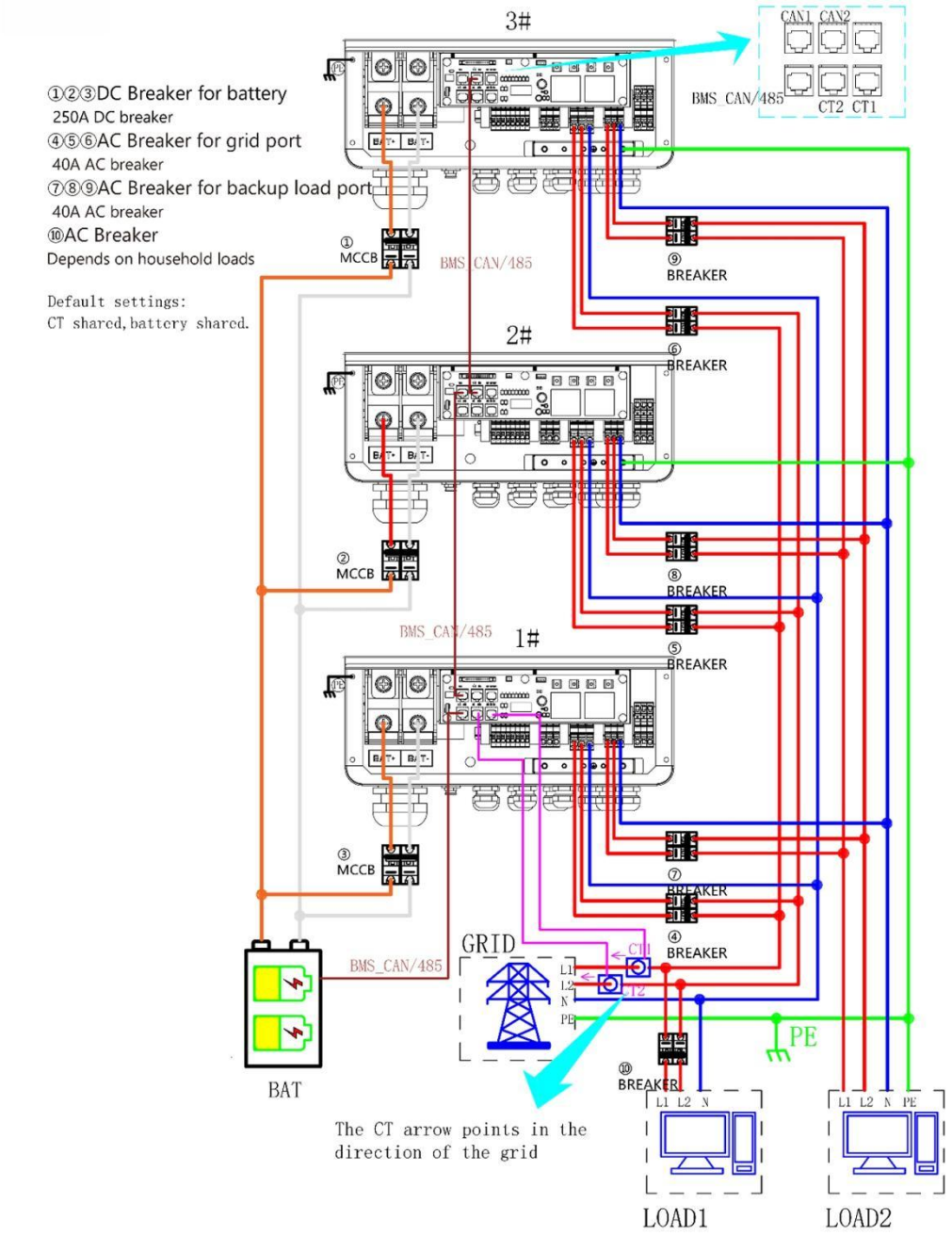


Table 1: Dial code introduce

	Master	Slave 1	Slave 2
Invert.Set			
Addr.Set			
Function.Set			
Communication switch box CAN	4H5L	/	/
Communication switch box RS485	1A2B	1A2B	1A2B

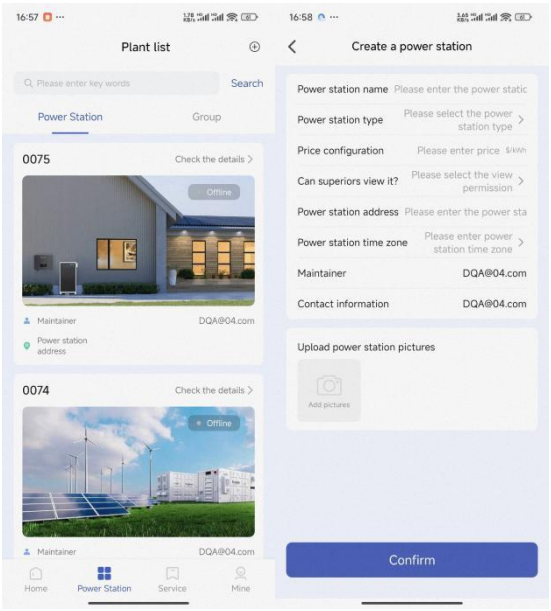
For parallel inverters, please check the MEGAREVO 12K user manual for details.



5.8. VPP(ALL-IN-ONE)

First step:Add station

Click Station Group that have been created, and turn to group detail page, then click the Add icon on upper right corner, follow the prompts in the information column to fill in the information.

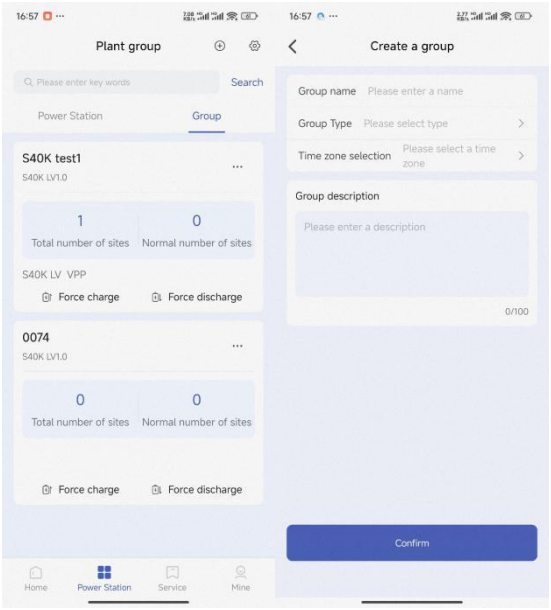


Second step:Create a station group

Click menu to into Plamt group, and click Add icon on the upper right corner to add grouping, turn to create grouping page.You need to fill in Group Name, Group Type, Grouping time zones, above fields are required, and the Group Description can be optionally filled in.

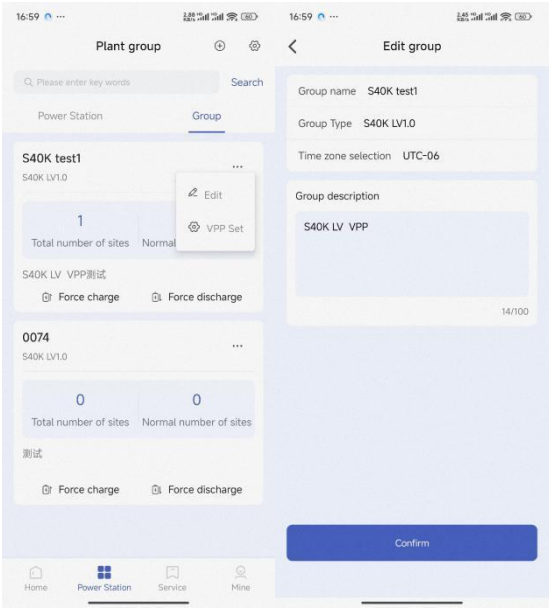
Note:

1. Only the same or similar power station can be added in a group.
2. If the device module of all power station in a group are the same, the charge and discharge settings of these devices can be unified.



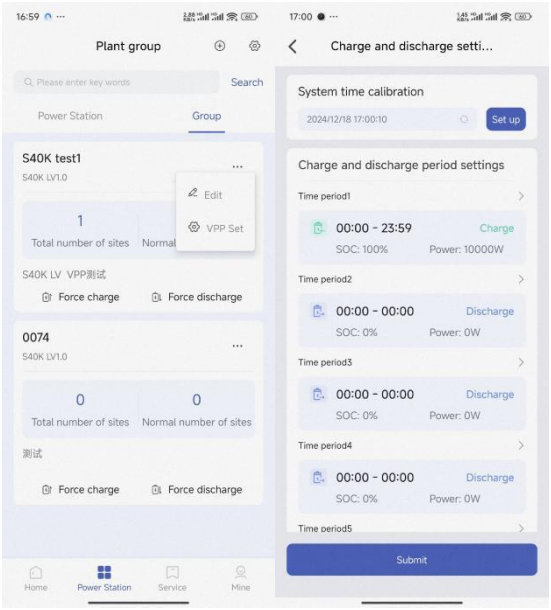
Thrid step:Edit

Into Plant group and click Edit on the upper right corner, you can add describtion to relative group, for example, description of the basis for naming group name.



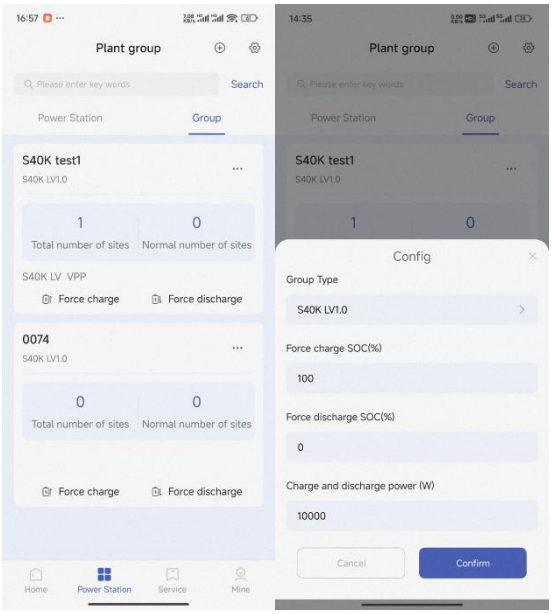
Fourth step:VPP setting

Into Plant group, click VPP Set of group upper right corner, you can set charge and discharge period for all power station devices in the group in batches.Time period including Start time, End time, Discharge cut-off SOC, Discharge power, Charge and Discharge.



Quick settings:Charge and diacharge

Into Plant group, and click Configuration on the upper right corner, you can select corresponding Group type, and modify charge and discharge poewr,Forced charging SOC, Forced discharging SOC.



6. Troubleshooting&Maintenance

The following status codes are displayed on the cloud.

6.1. Warning Codes

Code	Warning type	Investigation & troubleshooting
W101	Battery cell undervoltage alarm	1. Low voltage level and needs to be charged.
W102	Charge overcurrent alarm	1. Restore to factory setting. 2. Make sure the inverter's setting of max current do not excess the max charge current of the battery.
W103	Discharge overcurrent 1 alarm	1. Make sure the power of load do not exceed the power of battery.
W104	High charge temp alarm	1. Make sure the battery's temperature shown on the inverter or the APP is below 131℉ (55℃), otherwise turn off the battery till the temperature is below 131℉ (55℃) and then try to charge battery.
W105	High discharge temp alarm	1. 1.Make sure the battery's temperature shown on the inverter or the APP is below 131℉ (55℃), otherwise turn off the battery till the temperature is below 131℉ (55℃) and then try to discharge battery.
W106	Low charge temp alarm	1. 1.Make sure the battery's temperature shown on the inverter or the APP is above 32℉ (0℃), otherwise turn off the battery till the temperature is above 32℉ (0℃) and then try to charge battery.
W107	Low discharge temp alarm	1. Make sure the battery's temperature shown on the inverter or the APP is above -4℉ (-20℃), otherwise turn off the battery till the temperature is above -4℉ (-20℃) and then try to charge battery.
W108	High ambient temp alarm	1. Make sure the ambient temperature of the battery is below 122℉ (50℃).
W109	High voltage difference alarm	1. Restart the battery, and if the error code W109 still remaining or reappear, contact your installer.
W111	High main DC busbar temp alarm	1. Restart the battery, and if the error code W111 still remaining or reappear, contact your installer.
W112	Low insulation resistance alarm	1. Restart the battery, and if the error code W112 still remaining or reappear, contact your installer.

W113	Low total voltage alarm	1. Low voltage level and needs to be charged
W114	Low ambient temp alarm	1. Make sure the ambient temperature of the battery is above -13℉ (-25℃).
W115	High MOS temp alarm	1. Reduce the ambient temperature and restart the battery.
W116	Battery cell overvoltage alarm	1. High voltage level and needs to be discharged.
W117	High total voltage alarm	1. High voltage level and needs to be discharged.
W118	Low SOC alarm	1. Low SOC and needs to be charged.
W122	Positive connector high temp alarm	1. Restart the battery, and if the error code W122 still remaining or reappear, contact your installer.
W123	Negative connector high temp alarm	1. Restart the battery, and if the error code W123 still remaining or reappear, contact your installer.
W124	Relay high temp alarm	1. Restart the battery, and if the error code W124 still remaining or reappear, contact your installer.
W125	Positive high temp alarm for docking terminal	1. Restart the battery, and if the error code W125 still remaining or reappear, contact your installer.
W126	Negative high temp alarm for docking terminal	1. Restart the battery, and if the error code W126 till remaining or reappear, contact your installer.
W127	Positive high temp alarm for discharge port	1. Restart the battery, and if the error code W127 still remaining or reappear, contact your installer.
W128	Negative high temp alarm for discharge port	1. Restart the battery, and if the error code W128 still remaining or reappear, contact your installer.
W400	PCS disconnection	1. Restart the battery, and if the error code W400 still remaining or reappear, contact your installer.

6.2. Protection Codes

Code	Portection type	Investigation & troubleshooting
P101	Battery cell undervoltage protection	1. Low voltage level and needs to be charged.
P102	Overcurrent charge protection	1. Restore to factory setting. 2. Make sure the inverter's setting of max current do not excess the max charge current of the battery.
P103	Overcurrent discharge protection	1. Make sure the power of load do not exceed the power of battery.
P104	High charge temp protection	1. Make sure the battery's temperature shown on the inverter or the APP is below 131℉ (55℃), otherwise turn off the battery till the temperature is below 131℉ (55℃) and then try to charge battery.
P105	High discharge temp protection	1. Make sure the battery's temperature shown on the inverter or the APP is below 131℉ (55℃), otherwise turn off the battery till the temperature is below 131℉ (55℃) and then try to discharge battery.
P106	Low charge temp protection	1. Make sure the battery's temperature shown on the inverter or the APP is above 32℉ (0℃), otherwise turn off the battery till the temperature is above 32℉ (0℃) and then try to charge battery.
P107	Low discharge temp protection	1. Make sure the battery's temperature shown on the inverter or the APP is above -4℉ (-20℃), otherwise turn off the battery till the temperature is above -4℉ (-20℃) and then try to charge battery.
P108	High ambient temp protection	1. Make sure the ambient temperature of the battery is below 122℉ (50℃).
P109	Excessive voltage difference protection	1. Restart the battery, and if the error code P109 still remaining or reappear, contact your installer.
P110	Excessive temp of main control relay	1. Reduce the ambient temperature and restart the battery.
P111	Overtemp protection of master DC busbar	1. Reduce the ambient temperature and restart the battery.
P112	Low insulation resistance protection	1. Restart the battery, and if the error code P112 still remaining or reappear, contact your installer.
P113	Low total voltage protection	1. Low voltage level and needs to be charged.

P114	Low ambient temp protection	1. Make sure the ambient temperature of the battery is above -13℉ (-25℃).
P115	High MOS temp protection	1. Reduce the ambient temperature and restart the battery.
P116	Battery cell overvoltage protection	1. High voltage level and needs to be discharged.
P117	High total voltage protection	1. High voltage level and needs to be discharged.
P118	Low SOC protection	1. Low voltage level and needs to be charged.
P119	Overcurrent discharge 2 protection	1. Make sure the power of load do not exceed the power of battery.
P122	Positive connector high temp protection	1. Reduce the ambient temperature and restart the battery.
P123	Negative connector high temp protection	1. Reduce the ambient temperature and restart the battery.
P124	Relay high temp protection	1. Reduce the ambient temperature and restart the battery.
P125	Positive high temp protection for docking terminal	1. Reduce the ambient temperature and restart the battery.
P126	Negative high temp protection for docking terminal	1. Reduce the ambient temperature and restart the battery.
P127	Positive high temp protection for discharge port	1. Reduce the ambient temperature and restart the battery.
P128	Negative high temp protection for discharge port	1. Reduce the ambient temperature and restart the battery.
P130	Charger overvoltage protection	1. Restart the battery, and if the error code P130 still remaining or reappear, contact your installer.

6.3. Error codes

Code	Error type	Investigation & troubleshooting
F200	The main control discharge relay is faulty	1. Restart the battery, and if the error code F200 still remaining or reappear, contact your installer.
F201	The main control charge relay is faulty	1. Restart the battery, and if the error code F201 still remaining or reappear, contact your installer.
F202	Battery cell fault	1. Restart the battery, and if the error code F202 still remaining or reappear, contact your installer.
F203	NTC fault	1. Restart the battery, and if the error code F203 still remaining or reappear, contact your installer.
F204	Current sensor fault	1. Restart the battery, and if the error code F204 still remaining or reappear, contact your installer.
F205	Pack disconnection	1. Restart the battery, and if the error code F205 still remaining or reappear, contact your installer.
F206	Short circuit fault	1. Make sure the external connection for both battery and inverters are proper. 2. Disconnect all external connections and restart the battery, and if the error code F206 still remaining or reappear, contact your installer.
F207	Internal total voltage detection fault	1. Restart the battery, and if the error code F207 still remaining or reappear, contact your installer.
F208	Heating fault	1. Restart the battery, and if the error code F208 still remaining or reappear, contact your installer.
F209	Battery module conflict	1. Restart the battery, and if the error code F209 still remaining or reappear, contact your installer.
F210	Cluster address conflict	1. Restart the battery, and if the error code F210 still remaining or reappear, contact your installer.

F211	Charge MOS fault	1. Restart the battery, and if the error code F211 still remaining or reappear, contact your installer.
F212	Discharge MOS fault	1. Restart the battery, and if the error code F212 still remaining or reappear, contact your installer.
F213	Addressing failure	1. Restart the battery, and if the error code F213 still remaining or reappear, contact your installer.
F214	Precharge fault	1. Restart the battery, and if the error code F214 still remaining or reappear, contact your installer.
F215	Cluster disconnection	1. Restart the battery, and if the error code F215 still remaining or reappear, contact your installer.
F216	Battery reverse connection fault	1. Restart the battery, and if the error code F216 still remaining or reappear, contact your installer.
F217	External total voltage detection fault	1. Restart the battery, and if the error code F217 still remaining or reappear, contact your installer.
F218	Address non-1 fault	1. Restart the battery, and if the error code F218 still remaining or reappear, contact your installer.
F219	Address break-sign failure	1. Restart the battery, and if the error code F219 still remaining or reappear, contact your installer.
F220	Pack disconnect fault	1. Restart the battery, and if the error code F220 still remaining or reappear, contact your installer.
F223	Microelectronic fault	1. Restart the battery, and if the error code F223 still remaining or reappear, contact your installer.
F224	Smoke sensor fault	1. Restart the battery, and if the error code F224 still remaining or reappear, contact your installer.
F225	The number of slave voltage strings does not match	1. Restart the battery, and if the error code F225 still remaining or reappear, contact your installer.

F226	Temp NTC short circuit of master relay	1. Restart the battery, and if the error code F226 still remaining or reappear, contact your installer.
F227	Temp NTC open circuit of master relay	1. Restart the battery, and if the error code F227 still remaining or reappear, contact your installer.
F228	Temp NTC short circuit of master DC busbar	1. Restart the battery, and if the error code F228 still remaining or reappear, contact your installer.
F229	Temp NTC open circuit of master DC busbar	1. Restart the battery, and if the error code F229 still remaining or reappear, contact your installer.
F230	Master drop-off fault	1. Restart the battery, and if the error code F230 still remaining or reappear, contact your installer.
F232	EMS SN is empty	1. Restart the battery, and if the error code F232 still remaining or reappear, contact your installer.
F233	Master SN is empty	1. Restart the battery, and if the error code F233 still remaining or reappear, contact your installer.
F234	Pack SN is empty	1. Restart the battery, and if the error code F234 still remaining or reappear, contact your installer.
F236	Relay voltage fault	1. Restart the battery, and if the error code F236 still remaining or reappear, contact your installer.
F300	Battery cell undervoltage safety lock	1. Restart the battery, and if the error code F300 still remaining or reappear, contact your installer.
F301	Battery cell high voltage safety lock	1. Restart the battery, and if the error code F301 still remaining or reappear, contact your installer.
F302	Charge high temp safety lock	1. Restart the battery, and if the error code F302 still remaining or reappear, contact your installer.
F303	Charge low temp safety lock	1. Restart the battery, and if the error code F303 still remaining or reappear, contact your installer.

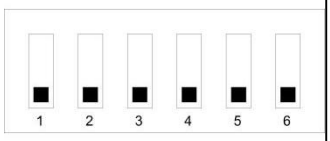
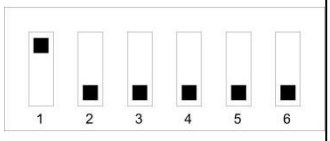
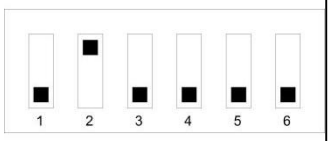
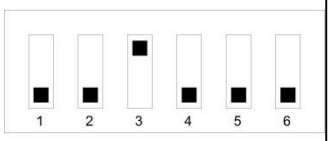
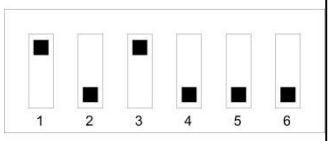
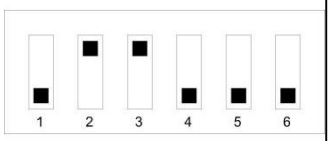
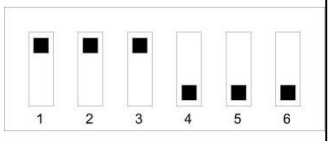
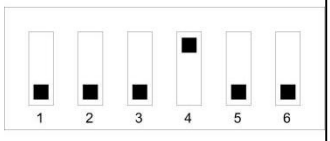
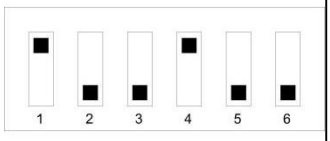
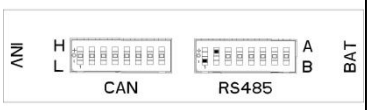
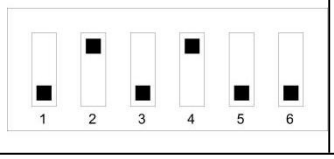
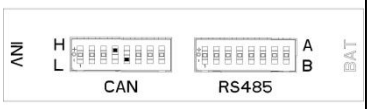
F304	Discharge high temp safety lock	1. Restart the battery, and if the error code F304 still remaining or reappear, contact your installer.
F305	Discharge low temp safety lock	1. Restart the battery, and if the error code F305 still remaining or reappear, contact your installer.
F306	Charge overcurrent safety lock	1. Restart the battery, and if the error code F306 still remaining or reappear, contact your installer.
F307	Discharge overcurrent safety lock	1. Restart the battery, and if the error code F307 still remaining or reappear, contact your installer.

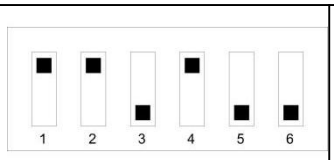
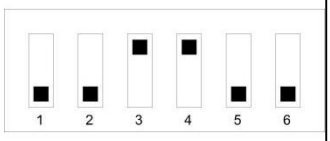
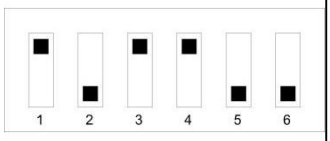
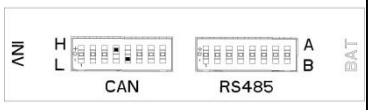
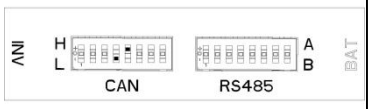
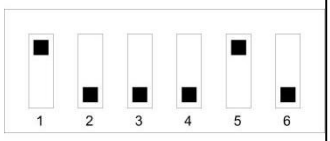
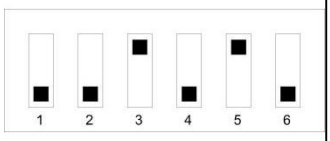
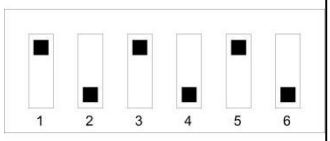
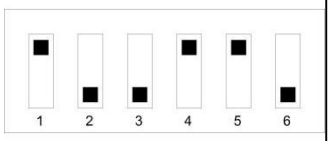
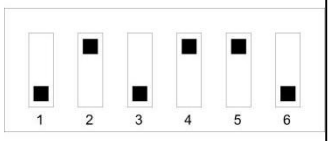
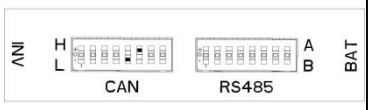
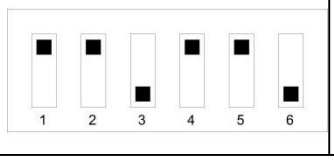
7. Appendix

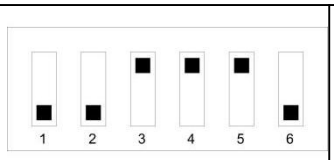
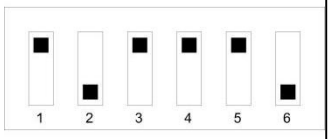
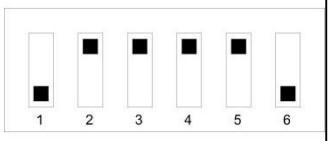
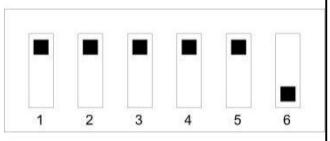
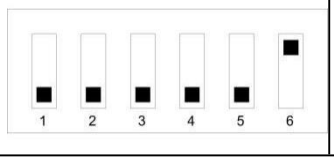
7.1. Addr Dial Switch reference table

Address Coding	Dial Code Switch Position						Definition
	#1	#2	#3	#4	#5	#6	
1	1	0	0	0	0	0	Set the master battery, and the inverter communicates with the battery at that address
2	0	1	0	0	0	0	Set to the slave battery1
3	1	1	0	0	0	0	Set to the slave battery 2
4	0	0	1	0	0	0	Set to the slave battery 3
5	1	0	1	0	0	0	Set to the slave battery 4
6	0	1	1	0	0	0	Set to the slave battery 5
7	1	1	1	0	0	0	Set to the slave battery 6
8	0	0	0	1	0	0	Set to the slave battery 7
9	1	0	0	1	0	0	Set to the slave battery 8
10	0	1	0	1	0	0	Set to the slave battery 9
11	1	1	0	1	0	0	Set to the slave battery10
12	0	0	1	1	0	0	Set to the slave battery 11
13	1	0	1	1	0	0	Set to the slave battery 12
14	0	1	1	1	0	0	Set to the slave battery 13
15	1	1	1	1	0	0	Set to the slave battery 14
16	0	0	0	0	1	0	Set to the slave battery 15
17	1	0	0	0	1	0	Set to the slave battery 16
18	0	1	0	0	1	0	Set to the slave battery 17
19	1	1	0	0	1	0	Set to the slave battery 18
20	0	0	1	0	1	0	Set to the slave battery 19
21	1	0	1	0	1	0	Set to the slave battery 20
22	0	1	1	0	1	0	Set to the slave battery 21
23	1	1	1	0	1	0	Set to the slave battery 22
24	0	0	0	1	1	0	Set to the slave battery 23
25	1	0	0	1	1	0	Set to the slave battery 24
26	0	1	0	1	1	0	Set to the slave battery 25
27	1	1	0	1	1	0	Set to the slave battery 26
28	0	0	1	1	1	0	Set to the slave battery 27
29	1	0	1	1	1	0	Set to the slave battery 28
30	0	1	1	1	1	0	Set to the slave battery 29
31	1	1	1	1	1	0	Set to the slave battery 30
32	0	0	0	0	0	1	Set to the slave battery 31

7.2. INV Dial Switch reference table

Brand	Type	ID	INV. set Position	Communication Switch Box Position	Comm Mode
/	Low Voltage	0		/	/
KOWINT	Low Voltage	1			RS485
Aiswei	Low Voltage	2			CAN
Victron	Low Voltage	4			CAN
MEGAREVO	Low Voltage	5			CAN
STUDER	Low Voltage	6			CAN
SOFAR	Low Voltage	7			CAN
PHOCOS	Low Voltage	8			RS485
Growatt_SPF	Low Voltage	9			RS485
Deye	Low Voltage	10			CAN

KOWINT	Low Voltage	11			RS485
Voltronic Power	Low Voltage	12			RS485
Growatt-SPH &SPA	Low Voltage	13			CAN
Schneider	Low Voltage	15			CAN
Sol-ark	Low Voltage	17			CAN
Solis	Low Voltage	20			CAN
SerMatec	Low Voltage	21			CAN
Afore	Low Voltage	24			CAN
LUX POWER	Low Voltage	25			CAN
MUST	Low Voltage	26			CAN
SMA	Low Voltage	27			CAN

SAJ	Low Voltage	28			CAN
Fronius	Low Voltage	29			RS485
CHISAGE	Low Voltage	30			CAN
Sinexcel	Low Voltage	31			CAN
Senergy	Low Voltage	32			CAN

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