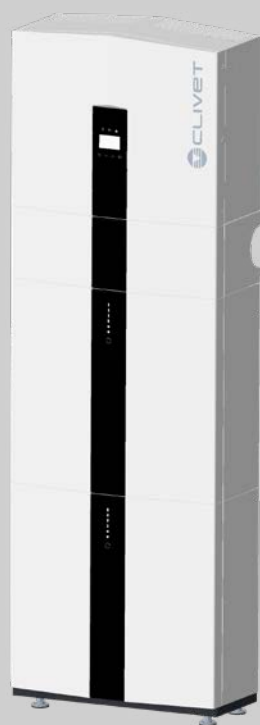




Clivet SINERGY

CEC-S 3K/5K

ENERGY STORAGE SYSTEM



MANUAL FOR INSTALLATION,
USE AND MAINTENANCE

en



ROMANIAN



BULGARIAN



SLOVENIAN



HRVATSKI

MOHI00002-04

04/2025

Copyright Statement

Please keep the manual properly and operate in strict accordance with all safety and operating instructions in this manual. Please do not operate the system before reading through the manual.

Copyright Statement Contact the nearest hazardous waste disposal station when the products or components are discarded.

Summary

1.	Introduction.....	5
1.1	System Introduction.....	5
1.2	Operation Modes:	5
2.	Safety Introduction.....	6
2.1	Manual Keeping.....	6
2.2	Operator Requirements.....	6
2.3	Protection of Warning Sign.....	6
2.4	Setting of Warning Sign for Safety.....	6
2.5	Measuring Equipment.....	6
2.6	Moisture Protection	6
2.7	Operation After Power Failure.....	6
2.8	Battery Safety Datasheet	6
3.	General Precautions.....	6
3.1	DANGER	6
3.2	WARNING	7
3.3	CAUTION	7
4.	Parts list	8
4.1	System Appearance	8
4.2	Liability Limitation.....	9
5.	Accessory	10
5.1	Mechanical Top cover	10
5.2	Floor stand support	10
5.3	Dimension	10
6.	Installation	11
6.1	Installation Site and Environment	11
6.2	General	11
6.3	Maintain the envisaged clearances.....	11
6.4	Restricted Locations	11
6.5	Protection in dangerous environments.....	11
6.6	Clearances	12
6.7	Installation	13
6.8	External CT Connection	18
6.9	Single Line Diagram	19
7.	System Operation.....	21
7.1	Switch On	21
7.2	Switch Off	21
7.3	Emergency Procedure	21
7.4	Hazards.....	21
7.5	Fire	21
7.6	Fire extinguishing media	21
8.	EMS Introduction and Set up (Energy Management System).....	22
8.1	Function Description	22
8.2	LED Indicator Description	23
8.3	Display and Setting.....	24
8.4	User setting.....	27
8.5	Setting	27

8.6	System setting.....	28
8.7	Battery parameters	32
8.8	Grid standard.....	36
8.9	Operation parameters.....	36
8.10	485 Address	42
8.11	485 Baud rate	42
8.12	Language.....	42
8.13	LCD backlight.....	43
8.14	Date/time	43
8.15	Clear history.....	43
8.16	Password Setting.....	43
8.17	Maintenance	43
8.18	Factory default setting	44
8.19	AutoTest	44
8.20	Factory default setting	45
8.21	AutoTest	45
8.22	Inquiry.....	45
8.23	Machine modelg.....	46
8.24	Serial number	46
8.25	Firmware Version	46
8.26	Running records	46
8.28	Statistics.....	47
8.29	Restart	48
9.	Battery Storage And Recharging	49
9.1	Battery storage requirements.....	49
9.2	Storage expirations.....	49
9.3	Table Stored lithium battery recharging interval.....	49
9.4	Inspection before battery recharging	49
9.5	Recharge Operation Steps	49
10.	Alarm Code and Error Code.....	50
10.1	Battery Storage And Recharging	50
10.2	Alarm Code.....	50
11.	Product Specifications.....	53
12.	Table.....	56
13.	Routine Maintenance	57
13.1	Maintenance Plan.....	57
13.2	Operating Environment	57
13.3	Equipment Cleaning.....	57
13.4	Cable, Terminal and Equipment Inspection.....	57
13.5	Notes	57
14.	Quality Assurance	58
14.1	Evidence.....	58
14.2	Conditions	58
14.3	Exclusion of Liability	58

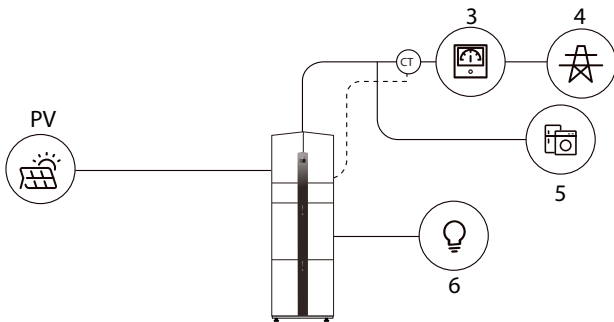
1. INTRODUCTION

1.1 System Introduction

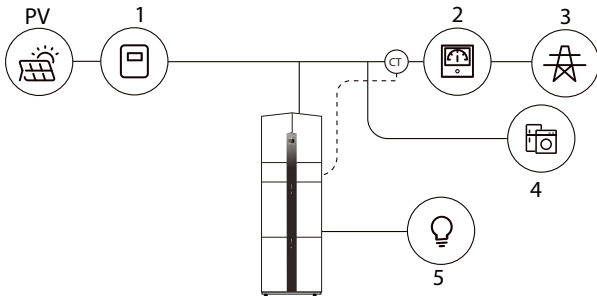
CEC-S 5B (incl. CEC-S B 10K and CEC-S 5K) can be applied in DC-coupled systems (mostly new installation), AC-coupled systems (mostly retrofit) and Hybrid-coupled systems (mostly retrofit, and PV capacity-increase), as the following schemes show:

Solution	Configuration	
	Inverter	Battery pack
CEC-S 5B5	CEC-S 3K/5K	CEC-S B 5K
CEC-S 5B10	CEC-S 3K/5K	CEC-S B 10K
CEC-S 5B15	CEC-S 3K/5K	CEC-S B 15K
CEC-S 5B20	CEC-S 3K/5K	CEC-S B 20K

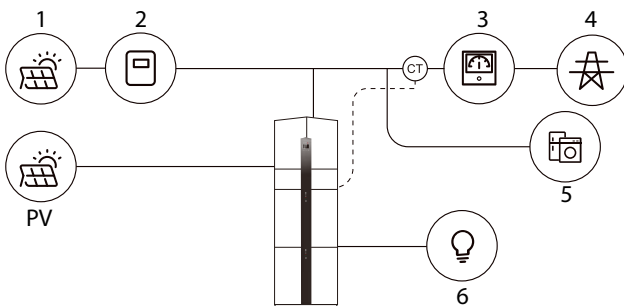
1.1.1 DC-coupled Storage System – Scheme



1.1.2 AC-coupled Storage System – Scheme



1.1.3 Hybrid-coupled Storage System – Scheme

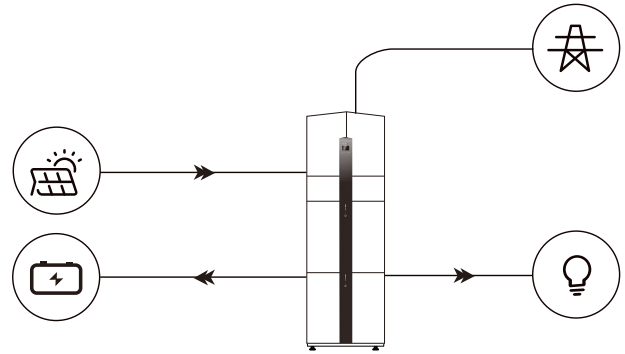


1	PV Inverter
2	Grid Meter
3	Grid
4	Normal Loads
5	Backup Loads

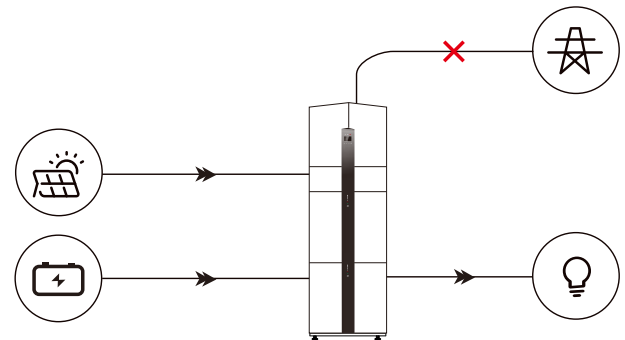
1.2 Operation Modes:

There are three basic modes that end users can choose via inverter screen/APP.

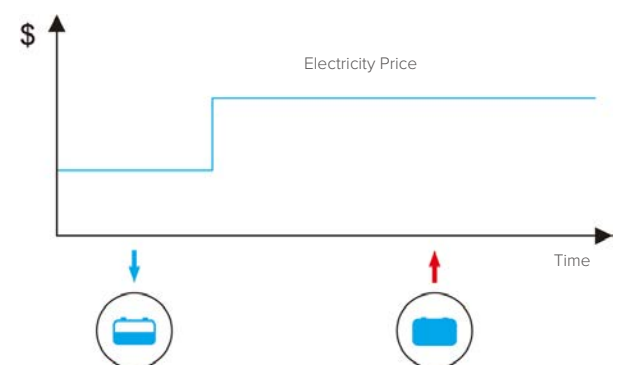
- **SELF CONSUMPTION:** The energy generated by the solar panels will be used in the following order: Feed the home loads; Charge the battery and then, feed into the grid. When the sun is off, the load will be supported by battery to enhance self consumption. If the power supply from the batteries is not sufficient, the grid will support the load demand.



- **BAT PRIORITY:** Under this mode, the battery is only used as a backup power supply when the grid fails and as long as the grid works, the batteries won't be used to power the loads. The battery will get charged with the power generated by the PV system or from the grid



- **PEAK SHIFT:** This mode is designed for time-use mode customer. The customer is able to set up the charging/discharging time & power via inverter screen.



2. SAFETY INTRODUCTION

2.1 Manual Keeping

This manual contains important information about operating the system.

Before operating, please read it very carefully.

The system should be operated in strict accordance with the instructions in the manual, otherwise it can cause damages or loss to equipment, personnel and property.

This manual should be kept carefully for maintenance.

2.2 Operator Requirements

The operators should get a professional qualification, or be trained.

The operators should be familiar with the whole storage system, including compositions and working principles of the system.

The operators should be familiar with the product Instruction.

While maintaining, the maintainer is not allowed to operate any equipment until all the equipment has been turned off and fully discharged.

2.3 Protection of Warning Sign

The warning signs contain important information for the system to operate safely, and it is strictly prohibited to tear or damage them.

Ensure that the warning signs are always well-functioned and correctly placed.

The signs must be replaced immediately when damaged.



This sign indicates a hazardous situation which, if not avoided, could result in death or serious injury!



The SINERGY must not be touched or put into service until 5 minutes after it has been switched off or disconnected to prevent an electric shock or injury.



This sign shows danger of hot surface!



Refer to the operating instructions.

2.4 Setting of Warning Sign for Safety

During instruction, maintenance and repair, follow the instructions below to prevent non-specialist personnel from causing misuse or accident:

Obvious signs should be placed at front switch and rear switch to prevent accidents caused by false switching.

Warning signs should be set near operating areas.

The system must be reinstalled after maintenance or operation.

2.5 Measuring Equipment

To ensure the electrical parameters to match requirements, related measuring equipment are required when the system is being connected or tested.

Ensure that the connection and use matched specification to prevent electric arcs or shocks.

2.6 Moisture Protection

It is very likely that moisture may cause damages to the system. Repair or maintaining activities in wet weather should be avoided or limited.

2.7 Operation After Power Failure

The battery system is part of the energy storage system which stores life-threatening high voltage even when the DC side is switched off. Touching the battery outlets is strictly prohibited.

The inverter can keep a life-threatening voltage even after disconnecting it from the DC and / or AC side.

Therefore, for safety reasons, it must be tested with a properly calibrated voltage tester before an installer works on the equipment.

2.8 Battery Safety Datasheet

Hazard Information

Classification of the Hazardous Chemical

Exempt from classification according to Australian WHS regulations.

Other Hazards

This product is a Lithium Iron Phosphate Battery with certified compliance under the UN Recommendations on Transport of Dangerous Goods, Manual of Tests and Criteria, Part III, subsection 38.3.

For the battery cell, chemical materials are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use.

As a result, during normal use, there is no physical

danger of ignition or explosion and chemical danger of hazardous materials' leakage.

However, if the product is exposed to a fire, added mechanical shocks, decomposed, added electric stress by misuse, the gas release vent will be operated.

The battery cell case will be breached at the extreme. Hazardous materials may be released. Moreover, if heated strongly by the surrounding fire, acrid or harmful fume may be emitted.

Safety Datasheet

For detailed information please refer to the provided battery safety datasheet.

3. GENERAL PRECAUTIONS

3.1 DANGER



Danger to life due to high voltages of the PV array, battery and electric shock.

When exposed to sunlight, the photovoltaic panels generates dangerous DC voltage which will be present in the DC conductors and the live components of the inverter.

Touching the DC conductors or the live components can lead to lethal electric shocks.

If you disconnect the DC connectors from the system under load, an electric arc may occur leading to electric shock and burns.

- Do not touch uninsulated cable ends.
- Do not touch the DC conductors.

- Do not open the inverter and battery.
- Do not wipe the system with damp cloth.
- Have the system installed and commissioned by qualified personnel with the appropriate skills only.
- Prior to performing any work on the inverter or the battery pack, disconnect the inverter from all voltage sources as described in this document.

3.2 WARNING



- Risk of chemical burns from electrolyte or toxic gases.
- During standard operation, no electrolyte shall leak from the battery pack and no toxic gases shall form.
- Despite careful construction, if the Battery Pack is damaged or a fault occurs, it is possible that electrolyte may be leaked or toxic gases formed.
- Do not install the SINERGY in any environment of temperature below -10°C or over 50°C and in which humidity is over 90%.
- Do not touch the SINERGY with wet hands.
- Do not put any heavy objects on top of the SINERGY.
- Do not damage the SINERGY with sharp objects.
- Do not install or operate the system in potentially explosive atmospheres or areas of high humidity.
- Do not mount the inverter and the battery pack in areas containing highly flammable materials or gases.
- If moisture has penetrated the system (e.g. due to a damaged enclosure), do not install or operate the system SINERGY.
- Do not move the system when it is already connected with battery modules.
- Secure the system to prevent tipping with restraining straps in your vehicle.
- The transportation of SINERGY must be made by the manufacturer or an instructed personnel. These instructions shall be recorded and repeated.
- A certified ABC fire extinguisher with minimum capacity of 2kg must be carried along when transporting.
- It is totally prohibited to smoke in the vehicle as well as close to the vehicle when loading and unloading.
- For the exchange of a battery module, please request for new hazardous goods packaging
- In case of contact with electrolyte, rinse the affected areas immediately with water and consult a doctor without delay.

3.3 CAUTION








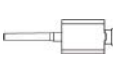



Risk of injury through lifting or dropping the system. The inverter and battery are




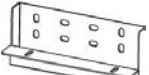
- heavy. There is risk of injury if the inverter or battery is lifted incorrectly or dropped during transport or when attaching to or removing from the wall.
- Lifting and transporting the inverter and battery must be carried out by more than 2 people.



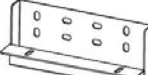



4. PARTS LIST



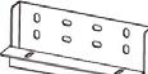



Check the following parts list to ensure it is complete.






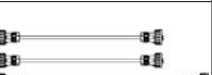
Delivers a total system this consists of:

CEC-S 5K			
			
4xM5*12	2xφ8*60	1xCT and com cable	2xAC Collector
			
2xMC4	1xCollector	1x Mounting Panel	1xCT Connector
			
1xUser Manual			

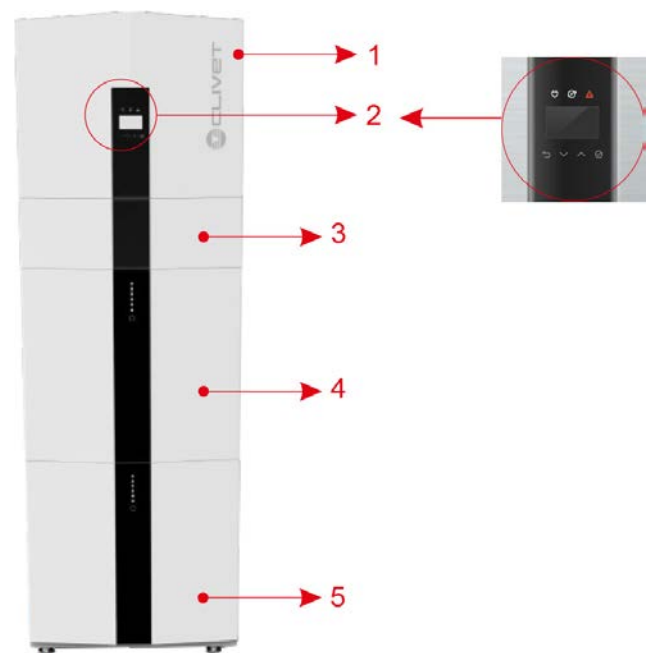
CEC-S B 5K		
		
4xφ8*60	2xM5*12	4xM6 Gasket
		
1x Mounting Panel		

CEC-S B 10K (include two pieces CEC-S B 5K)		
		
8xφ8*60	4xM5*12	2xMounting Panel
		
8xM6 Gasket	2xPower Cable (1 black, 1 red)	1x Battery Communication Cable

CEC-S B 15K (include three pieces CEC-S B 5K)		
		
12xφ8*60	6x M5*12	3x Mounting Panel
		
12xM6 Gasket	4xPower Cable (2 black, 2 red)	2x Battery Communication Cable

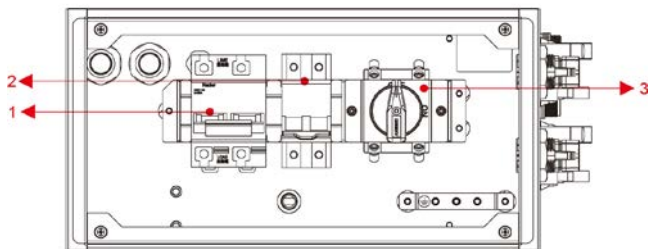
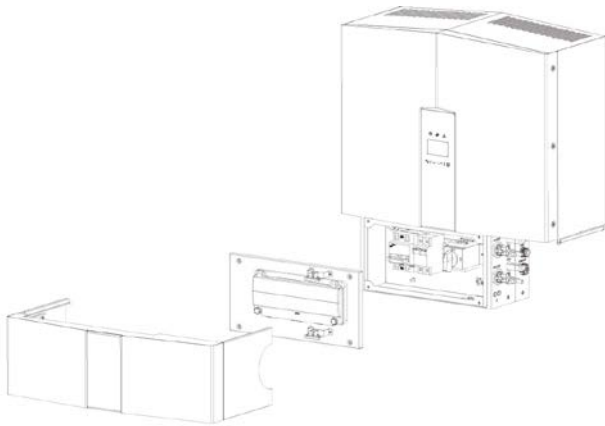
CEC-S B 20K (include four pieces CEC-S B 5K)		
		
16xφ8*60	8x M5*12	4x Mounting Panel
		
16xM6 Gasket	6xPower Cable (3 black, 3 red)	3x Battery Communication Cable

4.1 System Appearance



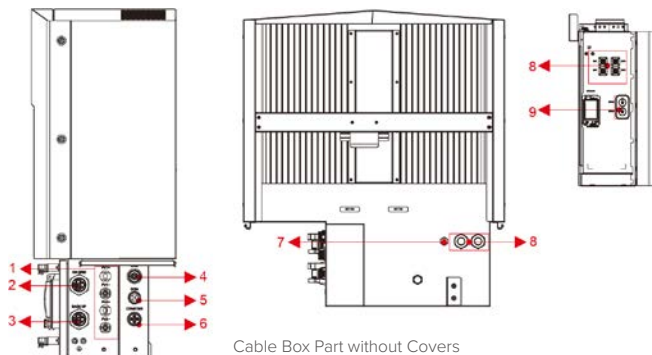
Object	Description
1	Hybrid Inverter CEC-S 3K/5K
2	EMS Display Screen (Energy Management System)
3	Cable Box (connected to Inverter)
4	CEC-S B 5K (Battery 1)
5	CEC-S B 5K (Battery 2, when present)

Inverter without Cable Box Covers– Front View



Cable Box Part without Covers
Front view

Object	Description
1	Battery circuit breaker
2	Output terminal block BACK UP
3	DC isolation switch (direct current)



Cable Box Part without Covers

Object	Description		DVC class
1	PV1, PV2		DVC C
2	GRID	Grid connection	DVC C
3	BACKUP	Back-up output	DVC C
4	DRM	(not used)	DVC A
5	COM	Serial communication port	DVC A

6	CT/METER	Amperometric transformer	DVC A
7	INV	Cable for connecting the inverter to the first battery (INV terminal)	DVC C
8	BAT+,BAT-	Terminal blocks for power connection between batteries	DVC C
9	RJ45	Terminal blocks for signal connection between batteries (BMS)	DVC C

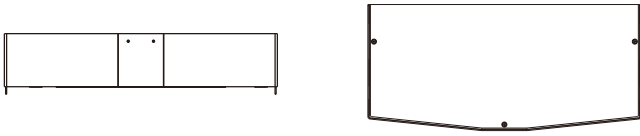
4.2 Liability Limitation

Any product damage or property loss caused by the following conditions, does not assume any direct or indirect liability by the manufacturer.

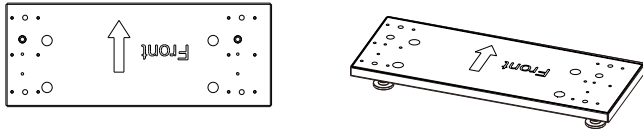
- Modification of the product, aesthetics or replacement of parts without prior authorization from the manufacturer;
- Changes, repair attempts and erasing of series number or seals by personnel not authorized by Clivet S.p.A.;
- System design and installation are not in compliance with standards and regulations;
- Fail to comply with the local safety regulations (VDE for DE, SAA for AU);
- Transport damage (including painting scratch caused by rubbing inside packaging during shipping). A claim should be made directly to shipping or insurance company in this case as soon as the container/package is unloaded and such damage is identified;
- Fail to follow any/all of the user manual, the installation guide and the maintenance regulations;
- Improper use or misuse of the device;
- Insufficient ventilation of the device;
- The maintenance procedures relating to the product have not been followed to an acceptable standard;
- Force majeure (violent or stormy weather, lightning, overvoltage, fire etc.);
- Damages caused by any external factors.

5. ACCESSORY

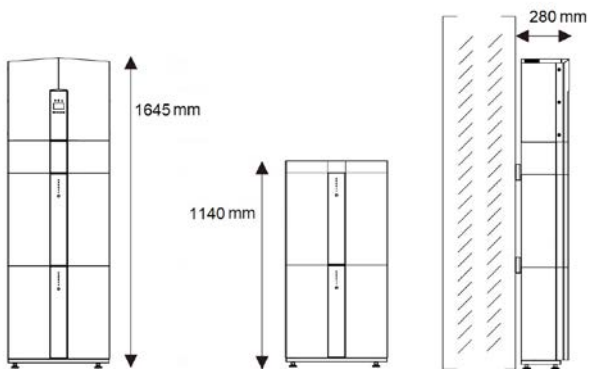
5.1 Mechanical Top cover



5.2 Floor stand support



5.3 Dimension



Dimension		Length	Height	Depth
Inverter	mm	540	610	255
Battery pack	mm	540	490	255
Battery cover	mm	540	105	255
Base	mm	539	48 ÷ 55	210

6. INSTALLATION

This Manual introduces the basic steps to install and set up .



NOTE:

Please be cautious unpacking the battery, otherwise components could be damaged.

6.1 Installation Site and Environment

6.2 General

This SINERGY energy storage system is outdoor version and can be installed in an outdoor location.

When SINERGY systems are installed inside a room, access to the various parts must not be hindered by the structure of the building or by the furniture and equipment in the room.

6.3 Maintain the envisaged clearances.

The SINERGY is naturally ventilated.

The location should therefore be clean, dry and adequately ventilated.

The mounting location must allow free access to the unit for installation and maintenance purposes, and the system panels must not be blocked.

The following locations are not allowed for installation:

- Habitable rooms;
- Ceiling cavities or wall cavities;
- On roofs that are not specifically considered suitable;
- Access / exit areas or under stairs / access walkways;
- Where the freezing point can be reached, such as garages, carports or other places as well as wet rooms (environmental category 2);
- Locations with humidity and condensation over 90%;
- Places where salty and humid air can penetrate;
- Seismic areas - additional security measures are required;
- Sites with altitude over 2000m;
- Places with an explosive atmosphere;
- Locations with direct sunlight or a large change in the ambient temperature;
- Places with flammable materials or gases or an explosive atmosphere
- Places directly exposed to the elements

6.4 Restricted Locations

The SINERGY shall not be installed :

- a** In restricted locations as defined for panels in AS / NZS 3000;
- b** Within 600mm of any heat source, such as hot water unit, gas heater, air conditioning unit or any other appliance.
- c** Within 600mm of any exit;
- d** Within 600mm of any window or ventilation opening;
- e** Within 900mm of access to 240Vac connections;
- f** Within 600mm of side of other device.

A SINERGY installed in any corridor, hallway, lobby or the like and leading to an emergency exit shall ensure sufficient clearance for safe egress of at least 1 meter.

The SINERGY must also not be installed in potentially explosive atmospheres for gas cylinders that are heavier than air gases and have a vent clamp in accordance with AS /NZS 3000.

6.5 Protection in dangerous environments

To protect against the spread of fire in living spaces where the SINERGY is mounted or on surfaces of a wall or structure in living spaces with a SINERGY on the other side, the wall or structure shall have a suitable non-combustible barrier. If the mounting surface itself is not made of a suitable non-combustible material, a non-combustible barrier can be placed between the SINERGY and the surface of a wall or structure.

If the SINERGY is mounted at a wall or at a distance of 300mm from the wall or the structure separating it from the habitable space, the distances to other structures or objects must be increased.

The following distances must remain free :

- (i) 600 mm beside the SINERGY;
- (ii) 500 mm above the SINERGY;
- (iii) 600 mm before the SINERGY.

If the distance between the SINERGY and the ceiling or any object above the system is less than 500mm, the ceiling or structural surface above the system must be made of noncombustible material within a radius of 600mm around the system.

The SINERGY must be mounted to ensure the highest point is not more than 2.2m above the ground or the platform.

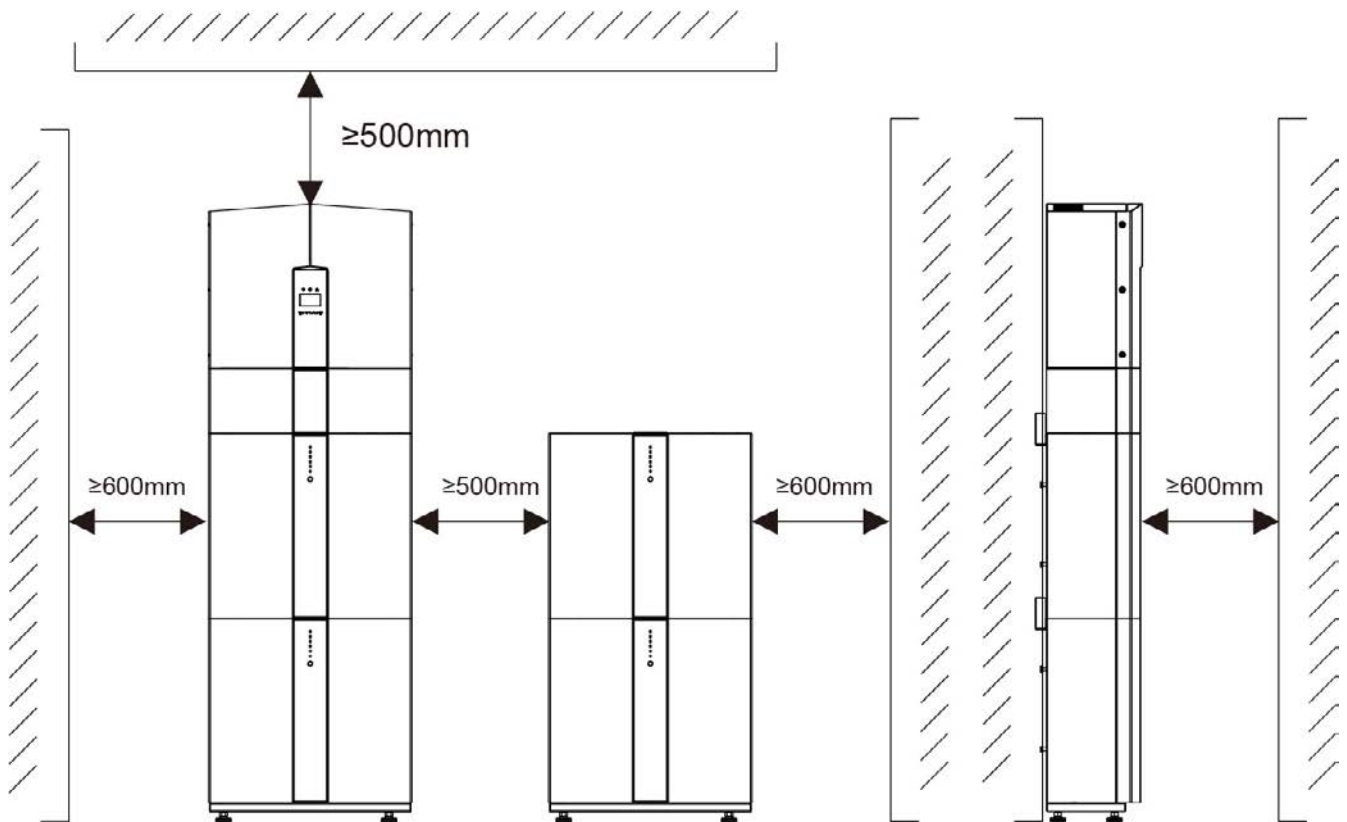
6.6 Clearances

Limited Distance of Installation to Neighboring Objects

Top----- 500mm

Front----- 600mm

Laterals-----600mm



6.7 Installation

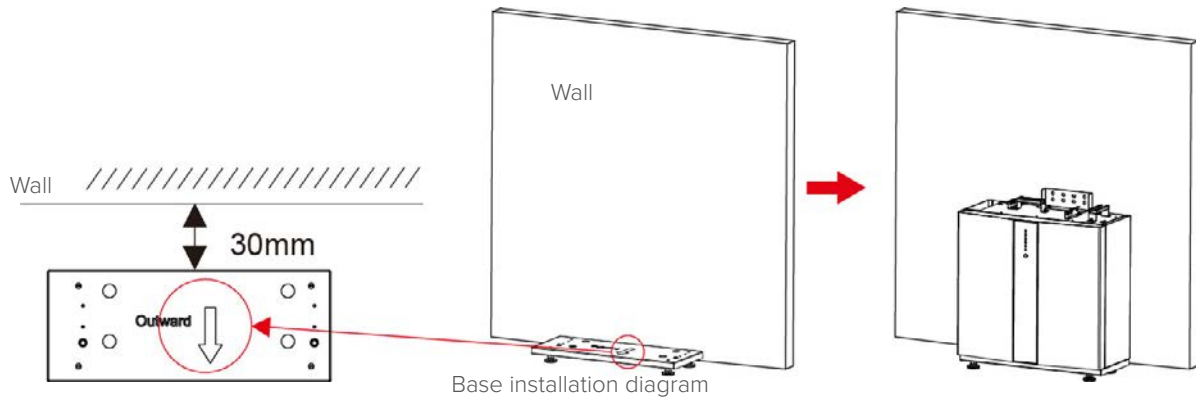
STEP 1

Remove the battery and inverter from the packaging box.

Find the base accessory kit, Keep the base level and place the battery pack on the base.

The installation distance between the base and the wall shall be 30mm.

Note: the base is placed outward according to the silk screen arrow. (The base is optional)

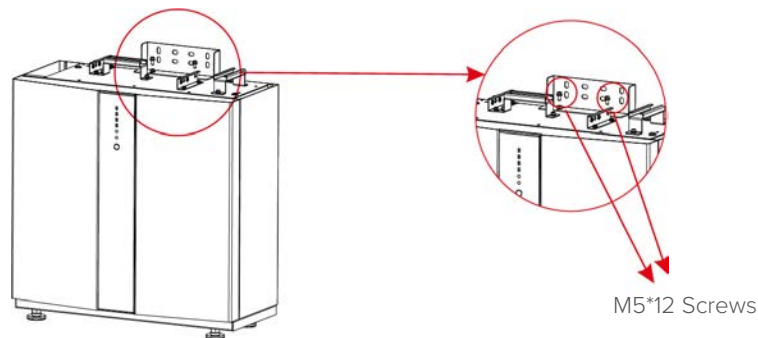


Battery Installation

STEP 2

Assemble the battery mounting panel on the battery.

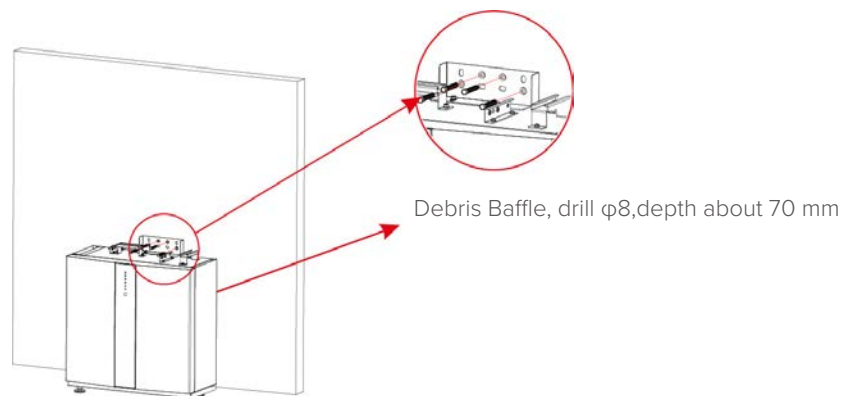
Assemble Battery Mounting Panel



STEP 3

Position the battery parallel to the wall and use a $\Phi 8$ mm drill to drill holes at a depth of about 70mm in the wall for subsequent fixation of the mounting plates.

Battery Installation Drill Holes



**NOTE:**

The type B RCD must be installed on the backup port of the system.

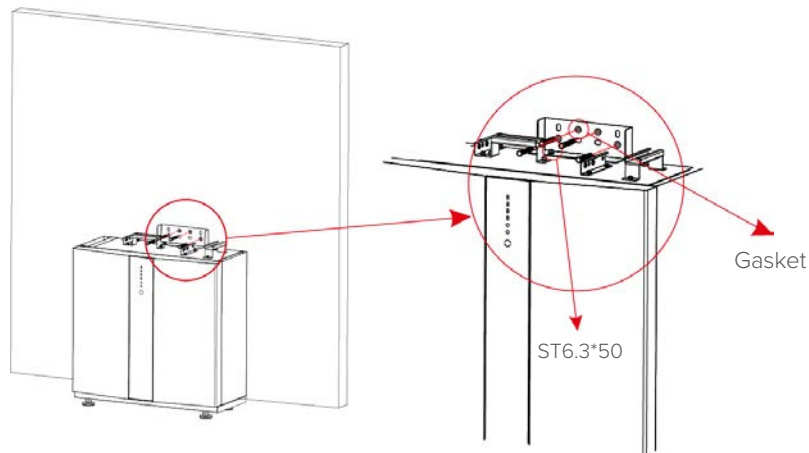
In addition, the installation of inverter must fulfill AS/NZS 3000, AS/NZS 4777.1 and AS/NZS 5033.

the internal N line of converter is connected to grid neutral via internal relays, when in stand-alone mode

STEP 4

Remove the debris baffle and secure the battery to the wall with screws and gaskets.

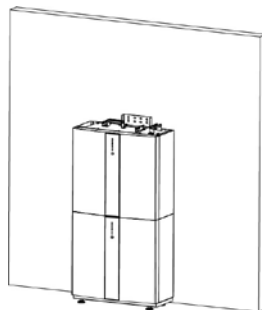
Battery Installation – Mounting on the Wall

**STEP 5**

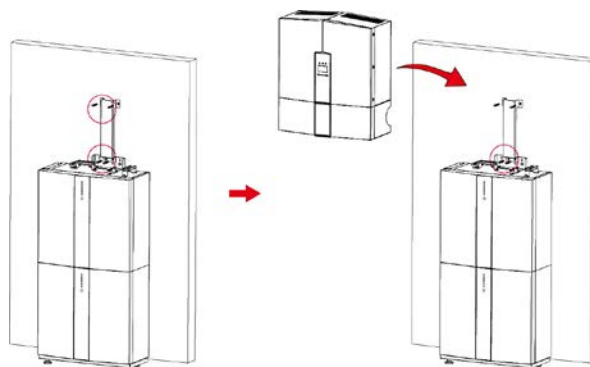
To assemble the second (and all other) battery, repeat steps 6 and 7, respectively.

Battery Installation Second

Battery Installation

**Inverter Installation****STEP 6**

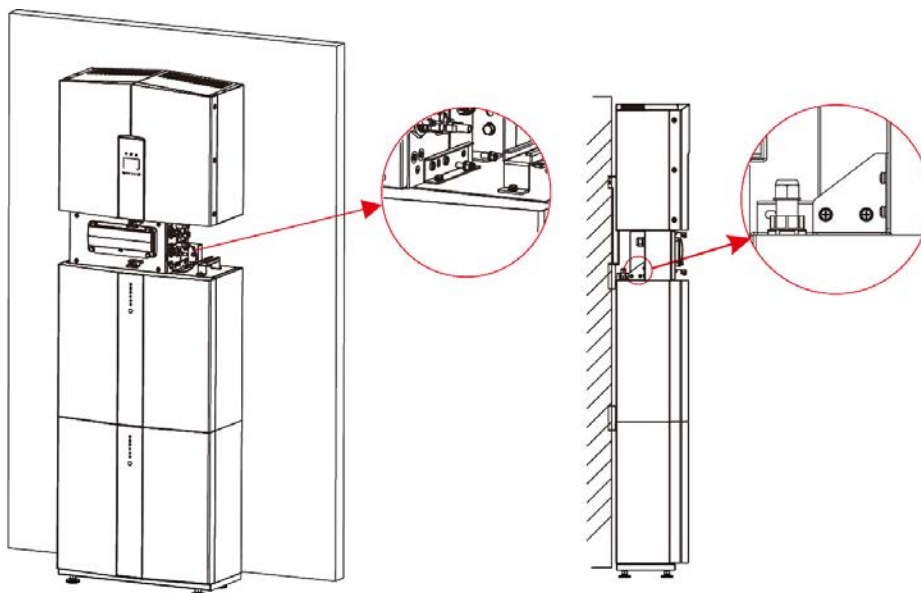
Inverter Installation.



STEP 7

Hang the inverter onto the mounting panels, adjust the entire system and ensure that the battery and the inverter have been securely hung onto the panels and brackets. Installation.

Inverter Installation on the Wall



STEP 8

Please make AC cables on site.

STEP 8-1

Please make AC cables on site.

For all AC connections, 4-10mm² 105 XJ cable is required to be used.

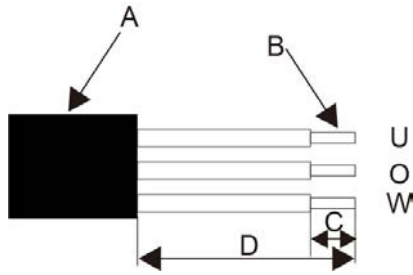
Please make sure the resistance of cable is lower than 1 ohm.

If the wire is longer than 20m, it's recommended to use 10mm² cable.



WARNING:

There are "L" "N" "⚡" symbols marked inside the connector, the Line wire of grid must be connected to "L" terminal; the Neutral wire of grid must be connected to "N" terminal; the Earth of grid must be connected to "⚡"

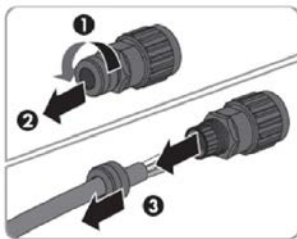


Object	Description	Value
A	External diameter	12mm to 18mm
B	Copper conductor cross-section	4mm ² to 10mm ²
C	Stripping length of the insulated conductors	approx.13mm
D	Stripping length of the outer sheath of the AC cable	approx.53mm
The PE conductor must be 10mm longer than the L and N conductors		

1. Insert the conductor into the suitable ferrule acc. to DIN 46228-4 and crimp the contact.



2. Unscrew the swivel nut from the threaded sleeve and thread the swivel nut and threaded sleeve over the AC cable.



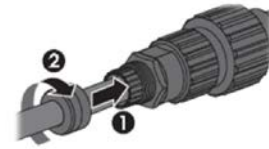
3. Insert the crimped conductors L, N and PE into the corresponding terminals and tighten the screw with a hex key wrench screwdriver(size:2.5, 1.2~2.0 N.m). Ensure that all conductors are securely in place in the screw terminals on the bush insert.



4. Screw the swivel nut onto the threaded sleeve. This seals the AC connector and provides strain relief for the AC cable.

When doing so, hold the bush insert firmly by the locking cap.

This ensure that the swivel nut can be screwed firmly onto the threaded sleeve.



5. Assembly the plug shell ,adapter as below picture, push the adapter and shell by hand until a “Click” is heard or felt.

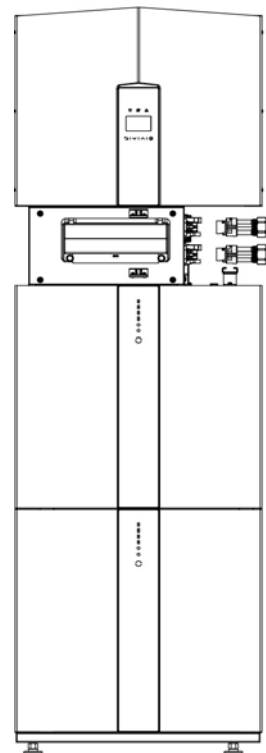


6. Plug the AC connector into the jack for the AC connection by hand until a “Click” is heard or felt.

7. Use tool to clamp the AC wiring terminal and wire rod; screw the nut, but do not tighten it.

Make sure that the cable is free to pass through the waterproof components.

Once the terminal is connected to the right site of the inverter, tighten the nut.



8. Connect the AC wiring terminal to the corresponding hole site of the inverter and lock it with a screw driver or electric screw driver (suggestion: stem diameters and torsion of screwdriver or electric screwdriver should be 4mm and 8~12kg-f.cm respectively)

9. Tighten the nut.

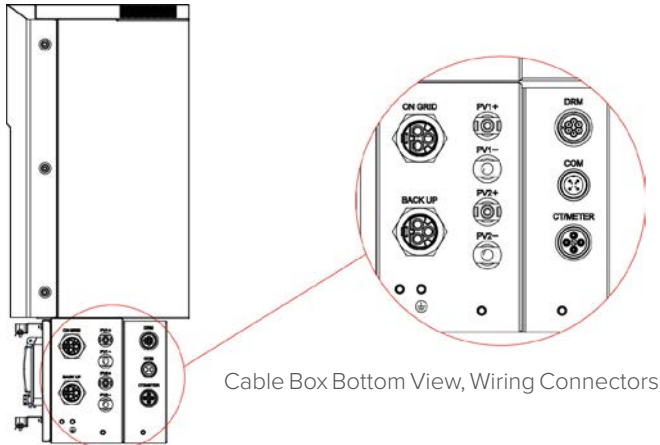
10. Circuit breaker parameters are recommended:

Back-up 32A/400Vac 6KA

On-grid 40A/400Vac 6KA

STEP 8-2

Connect the Backup and Grid cables in advance according to the connector mode, and connect them to the Backup and Grid board connectors in turn.

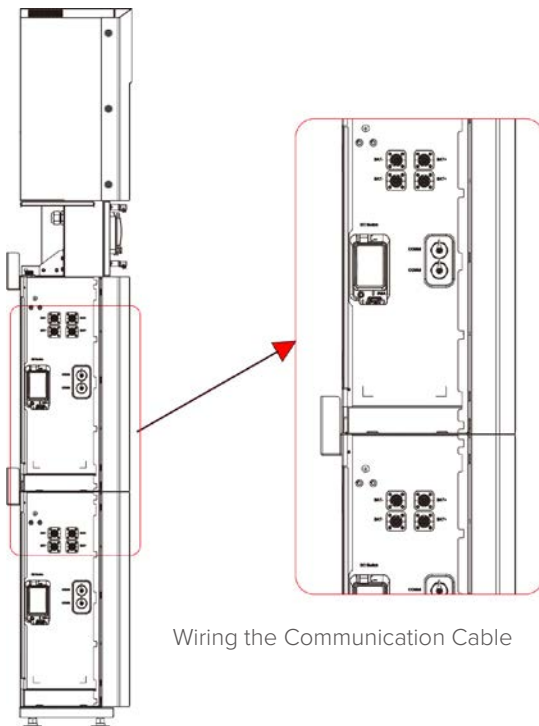


STEP 9

Connect the BAT communication cable of the cable box to the topmost battery at the right side.

Then use the communication cable supplied with the batteries to connect the batteries to each other via the respective connectors on the left side.

After you have connected all the modules together, close all covers (if you want to connect further battery modules, you must mount them before closing).

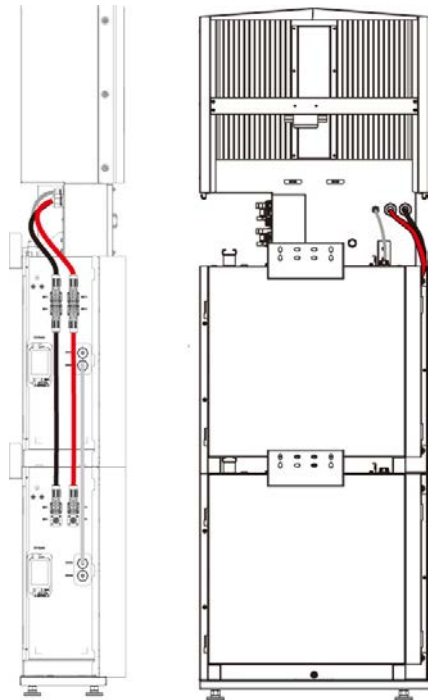


STEP 10

Connect the power cables of the bottom battery from step 4 to the side terminals of the top battery.

Make sure that red connects to red and black connects to black.

Wiring the Battery Power Cable



STEP 11

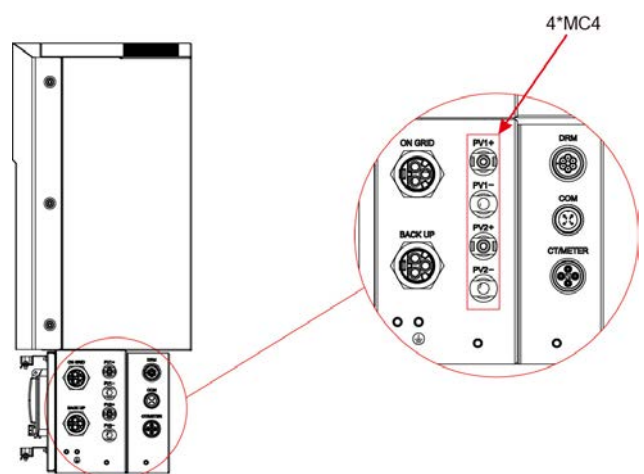
Close the battery covers and connect the PV-MC4 connectors to the system (connection on both sides).

Also, connect all AC cables, the meter communications cable METER, and the ethernet cable LAN.

Then close the cable box cover.

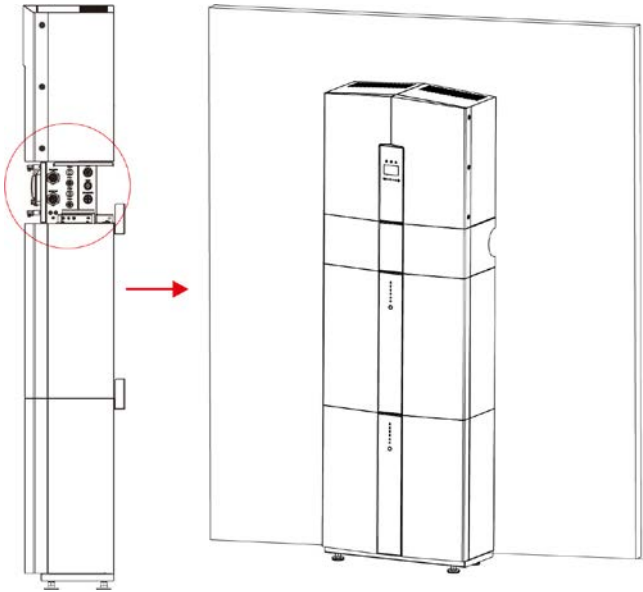
The installation is now complete.

PV Wiring



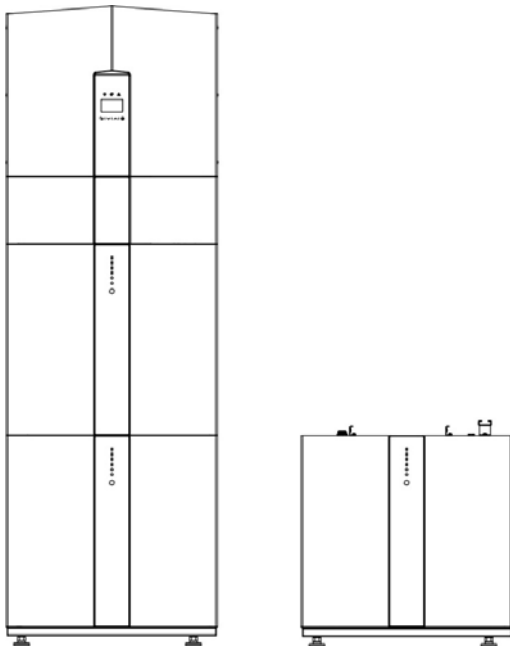
STEP 12

Close the lid and tighten the screw.



If you connect more than 2 battery modules to the system, please only install the additional batteries 3~4 on the side of the system. You can connect up to 4 batteries, 2 each mounted on top of each other, to the SINERGY.

Increase the Battery Modules



! NOTE:

Recommended AC circuit breaker rating is 32A.

! NOTE:

It is necessary to disconnect the power line, communication line and communication line between battery pack and inverter to manually sleep all battery packs.



STATEMENT:

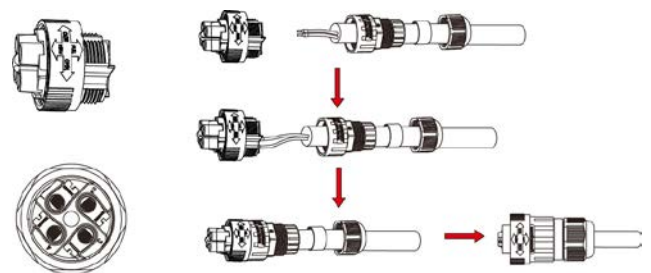
The method of anti-islanding protection is Method(c)

6.8 External CT Connection

The electricity meter should be mounted and connected at the grid transition point (feed-in point) so that it can measure the grid reference and feed-in power.

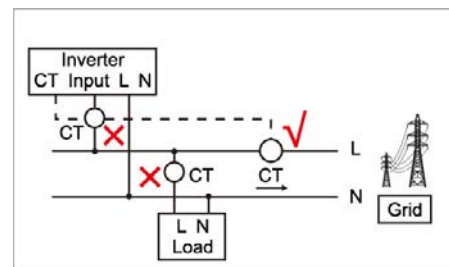
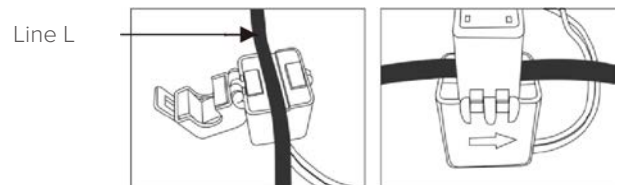
1. Loosen the nut, and untangle the single-aperture sealing ring.

Pin	Description
1	CT positive electrode(White)
2	CT negative pole(Black)
3	RS485-A
4	RS485-B



2. Install the waterproof component and screw on the waterproof sheath nut.

3. Open the external CT wiring port, the arrow points to the direction of the power grid, put the wire into the external CT card slot, and buckle the buckle.



NOTE:

External CT should be placed near the power grid.

If CT test pass but inverter still can't achieve export power (power is not controllable or always 0 power output).

Please check installation location of the CT.

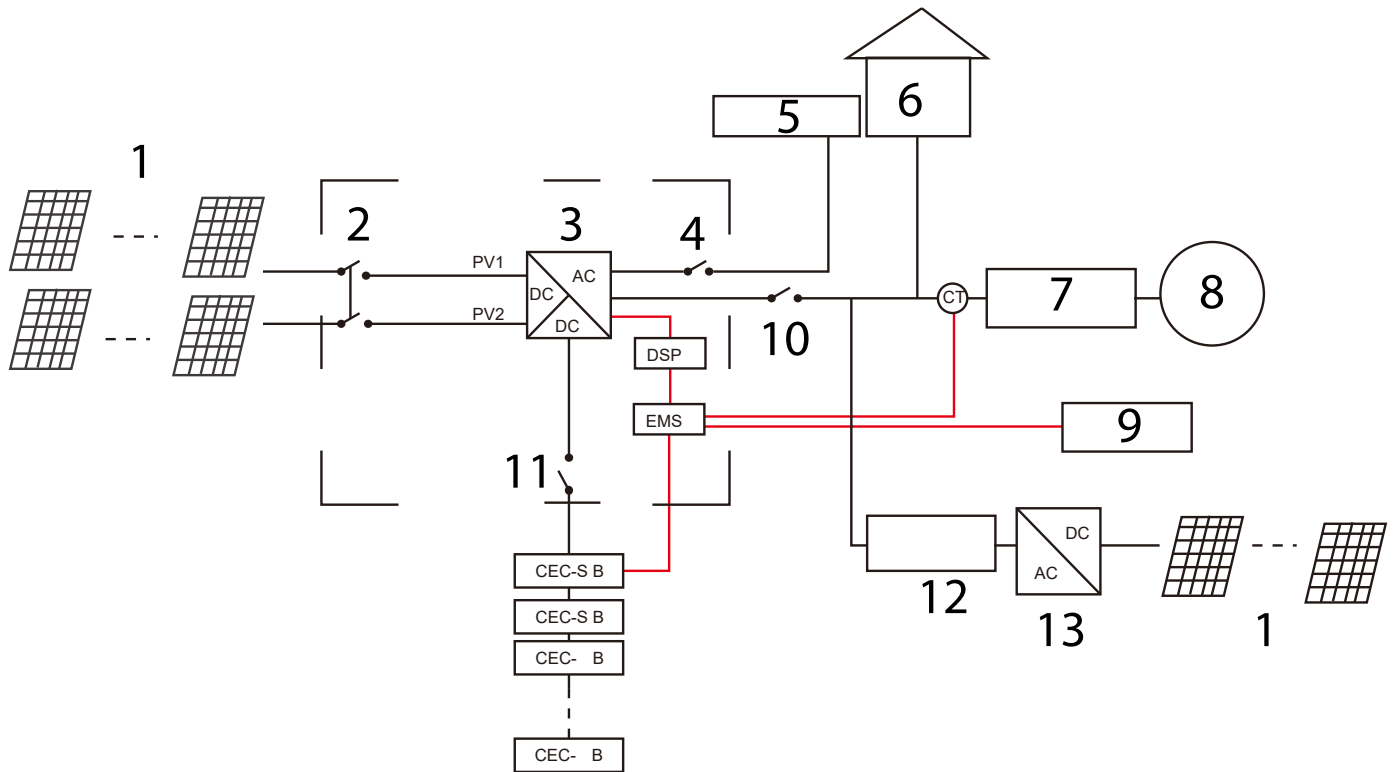
The diagram illustrates the proposed energy management system architecture, showing two configurations for integrating a PV system with a house and a battery bank.

Top Configuration:

- 1:** PV System (represented by solar panels).
- 2:** Switch connecting the PV system to the DC/AC converter.
- 3:** DC/AC converter.
- 4:** Switch connecting the DC/AC converter to the house.
- 5:** House (represented by a house icon).
- 6:** Battery Bank (represented by a battery icon).
- 7:** Battery Bank (represented by a battery icon).
- 8:** Battery Bank (represented by a battery icon).
- 9:** Battery Bank (represented by a battery icon).
- 10:** CT (Current Transformer) connected to the battery bank.
- 11:** Switch connecting the DC/AC converter to the battery bank.
- 12:** DSP (Digital Signal Processor) connected to the DC/AC converter.
- 13:** EMS (Energy Management System) connected to the DC/AC converter.
- 14:** CEC-S B (Control and Energy Conversion) block connected to the battery bank.

Bottom Configuration:

- 1:** PV System (represented by solar panels).
- 2:** Switch connecting the PV system to the DC/AC converter.
- 3:** DC/AC converter.
- 4:** Switch connecting the DC/AC converter to the house.
- 5:** House (represented by a house icon).
- 6:** Battery Bank (represented by a battery icon).
- 7:** Battery Bank (represented by a battery icon).
- 8:** Battery Bank (represented by a battery icon).
- 9:** Battery Bank (represented by a battery icon).
- 10:** CT (Current Transformer) connected to the battery bank.
- 11:** Switch connecting the DC/AC converter to the battery bank.
- 12:** DSP (Digital Signal Processor) connected to the DC/AC converter.
- 13:** EMS (Energy Management System) connected to the DC/AC converter.
- 14:** CEC-S B (Control and Energy Conversion) block connected to the battery bank.



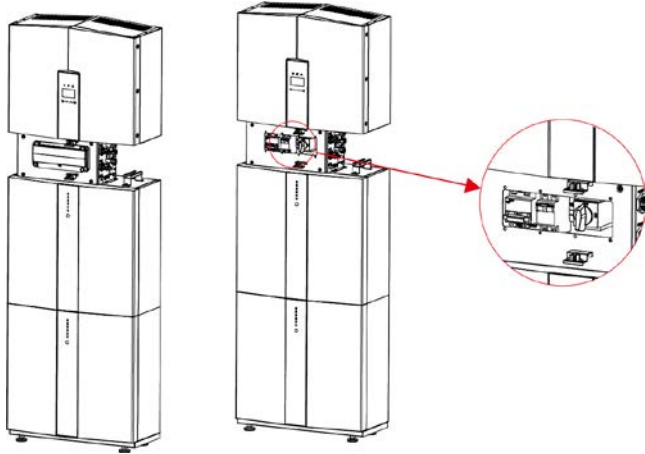
1	PV Panels
2	PV Switch
3	5kW Hybrid Inverter
4	Back up switch
5	Back up load
6	Normal load
7	Grid meter
8	Grid
9	Router
10	Grid switch
11	Battery switch
12	PV meter
13	PV Inverter

7. SYSTEM OPERATION

7.1 Switch On

When turning on the system, it is very important to follow the steps below to prevent damage to the system.

WARNING: Please check the installation again before turning on the system.



STEP 1

Turn on the external PV switch.

STEP 2

Turn on the external grid switch.

STEP 3

3: If backup load is applied, turn on the external backup switch.



NOTE:

the Backup switch is only used when a backup load is applied.

STEP 4

Open the outer shell of the cable box. Open the battery switch cover and turn on the battery switch on the cable box.

STEP 5

Press power button on all the batteries until the indicator lights turn on.

STEP 6

Close the battery switch cover and the outer shell of the cable box.

7.2 Switch Off

STEP 1

Press the power button on all the batteries, till the lights turn off.

STEP 2

Open cable box outer shell, open the battery switch cover and turn off the battery switch.

STEP 3

Turn off the external grid switch.

STEP 4

If backup load is applied, turn off the external backup switch.

STEP 5

Turn off the external PV switch on the cable box..

STEP 6

Close the battery switch cover and the outer shell of the cable box.
Close the battery switch cover and the outer shell of cable box.

7.3 Emergency Procedure

When the SINERGY energy storage system appears to be running abnormally, you can turn off the grid-connected main switch that directly feeding the BESS, and turn off all load switches within the BESS, turn off the battery switch at the same time.

To prevent a potentially fatal personal injury, if you want to repair or open the machine after the power is switched off, please measure the voltage at the input terminals with a suitably calibrated voltage tester.

Before working on this equipment, please confirm that there is no grid electric supply to the BESS!

The upper cover plate cannot be opened until the DC-link capacitance inside the battery modules discharges completely about 15 minutes later.

7.3.1 Emergency Handling Plan

- 1 Disconnect the AC breaker.
- 2 Check the control power supply. If it is OK, return the power supply to find out the reason.
- 3 Please record every detail related to the fault, so company can analyse and solve the fault. Any operation of equipment during a fault is strictly forbidden, please contact company as soon as possible.
- 4 As battery cells contain a little oxygen inside and all cells have got explosion-proof valves, explosion hardly happens.
- 5 When the indicator light on the battery shows a red fault, check the fault type through the communication protocol, and contact our after-sales service personnel for advice.

7.4 Hazards

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas.

If one is exposed to the leaked substance, immediately perform the actions described below:

Inhalation: Evacuate the contaminated area, and seek medical attention.

Eye contact: Rinse eyes with running water for 5 minutes, and seek medical attention.

Contact with skin: Wash the affected area thoroughly with soap and water, and seek medical attention.

Ingestion: Induce vomiting and seek medical attention.

7.5 Fire

If a fire breaks out in the place where the battery pack is installed, perform the following countermeasures:

7.6 Fire extinguishing media

During normal operation, no respirator is required.

Burning batteries can not be extinguished with a regular fire extinguisher, this requires special fire extinguishers.

If the fire is not from a battery, normal ABC fire extinguishers can

be used for extinguishing.

Fire-fighting instructions

- 1 If fire occurs when charging batteries, if it is safe to do so, disconnect the battery pack circuit breaker to shut off the power to charge.
- 2 If the battery pack is not on fire yet, extinguish the fire before the battery pack catches fire.
- 3 If the battery pack is on fire, do not try to extinguish but evacuate people immediately.



There may be a possible explosion when batteries are heated above 150°C.

Effective ways to deal with accidents.

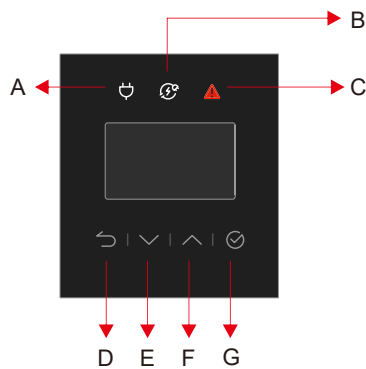
Battery in dry environment: Place damaged battery into a segregated place and call local fire department or service engineer.

Battery in wet environment: Stay out of the water and don't touch anything if any part of the battery, inverter, or wiring is submerged.

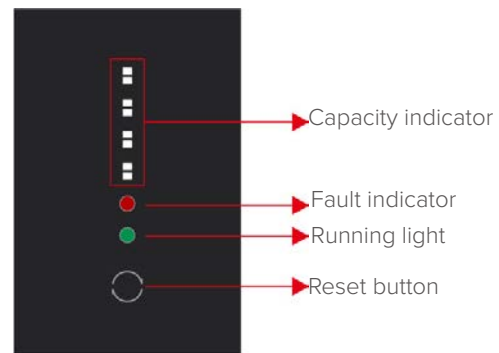
Do not use a submerged battery again and contact the service engineer.

8. EMS INTRODUCTION AND SET UP (ENERGY MANAGEMENT SYSTEM)

8.1 Function Description



SINERGY EMS Interface












SINERGY Interface

Object	Name	Description
A	Indicator LED	Grid connection
B		Off-grid (SINERGY isolated from the electric network)
C		Red: The inverter is in fault.
D	Button Function	Return Button: Escape from current interface or function.
E		Up button: Move cursor to upside or increase value.
F		Down Button: Move cursor to downside or decrease value.
H		ENT Button: Confirm the selection.

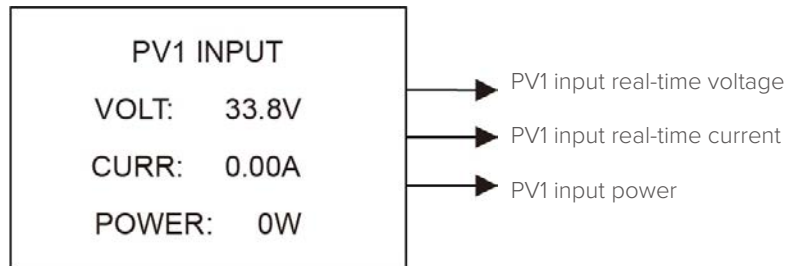
8.2 LED Indicator Description

LED working status indication

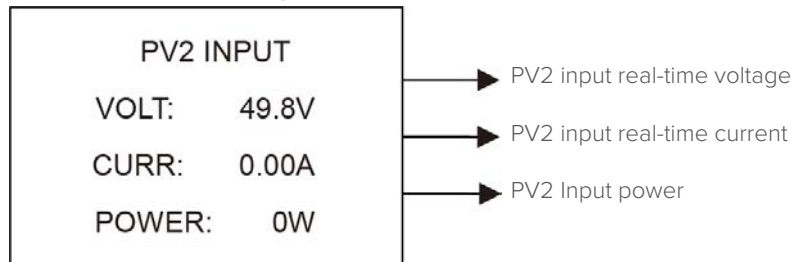
Status	Normal/Alarm / Protection	ON/ OFF	RUN	ALM	Power indicator LED						Instructions
											
Shut down	dormancy	off	off	off	off	off	off	off	off	off	All off
Standby	Normal	light	Flash one time	off	According to battery indicator						standby mode
	Alarm	light	Flash one time	Flash three times							Module low voltage
Charge	Normal	light	light	off	According to battery indicator (Power indicator highest LED flashes two)						The maximum power LED flashes twice, and the ALM does not flash when an overcharge alarm occurs
	Alarm	light	light	Flash three times							
	Overcharge protection	light	light	off	light	light	light	light	light	light	If there is no mains electricity, the indicator light turns to standby
	Temperature, overcurrent, failure, protection	light	off	light	off	off	off	off	off	off	Stop charging
Discharge	Normal	light	Flash three times	off	According to battery indicator						
	Alarm	light	Flash three times	Flash three times							
	Undervoltage protection	light	off	off	off	off	off	off	off	off	Stop discharging
	Temperature, overcurrent, short circuit, reverse connection, failure protection	light	off	light	off	off	off	off	off	off	Stop discharging
Failure		off	off	light	off	off	off	off	off	off	Stop charging and discharging

8.3 Display and Setting

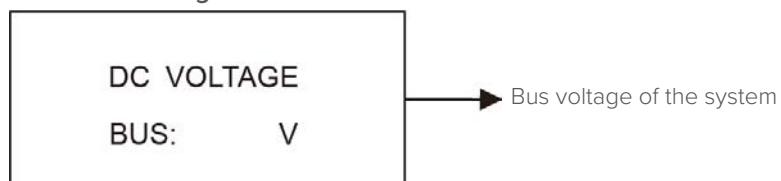
8.3.1 PV1 input display interface



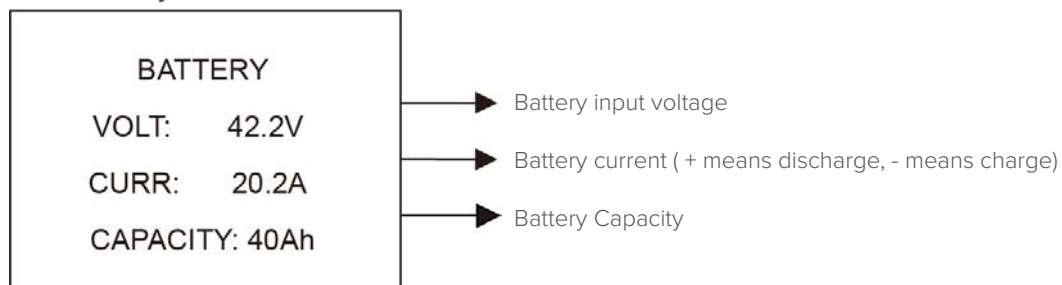
8.3.2 PV2 input display interface



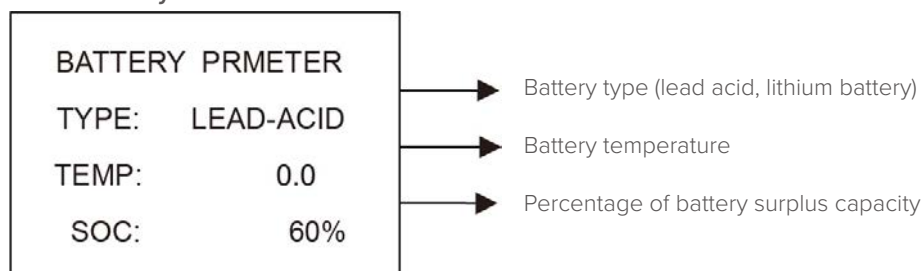
8.3.3 Bus voltage



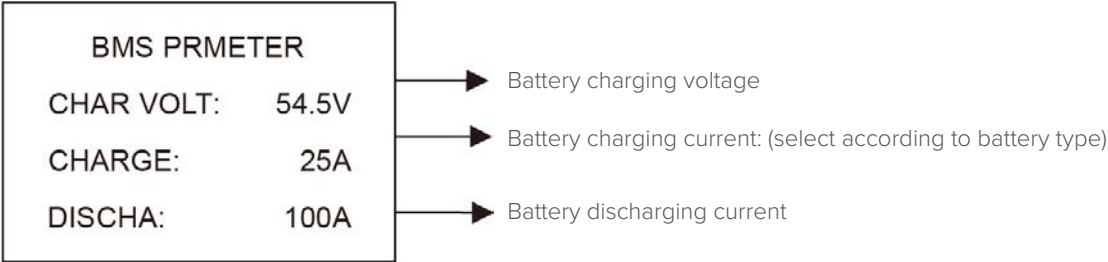
8.3.4 Battery



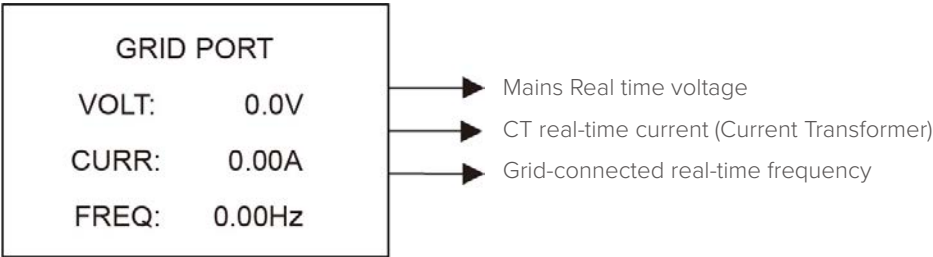
8.3.5 Battery Parameter



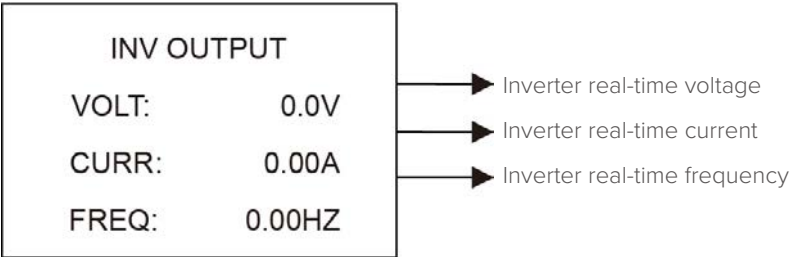
8.3.6 BMS parameters



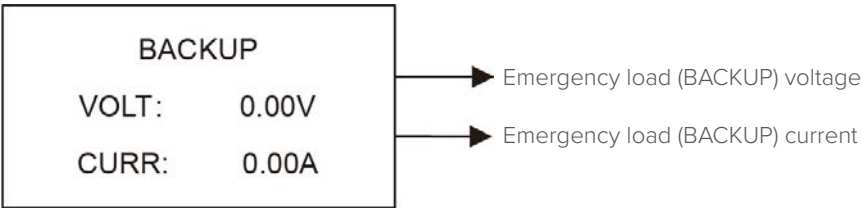
8.3.7 Grid-connected output



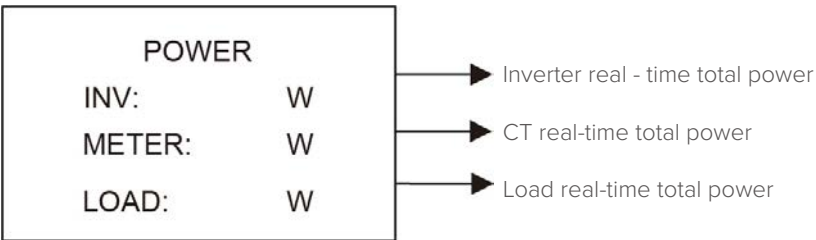
8.3.8 Inverter output



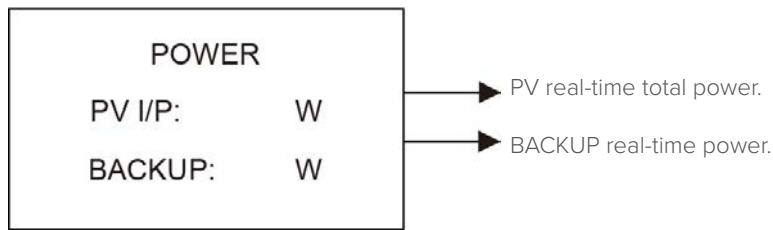
8.3.9 Load



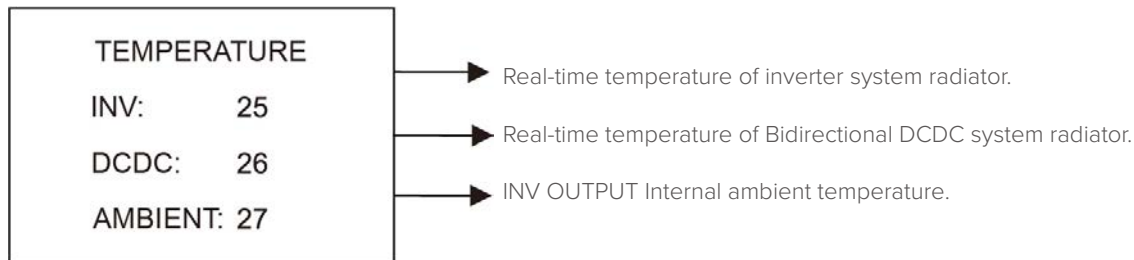
8.3.10 Power



8.3.11 Power



8.3.12 Temperature



8.3.13 Status information

STATE	
SYS:	ERROR
INV:	STANDBY
DCDC:	STANDBY

Description**System information:**

Power-up mode, standby mode, hybrid grid-connection, off-grid operation, mains charging mode, PV charging mode, by pass mode, fault mode, DSP programming, ARM programming.

INV:

standby mode, off-grid inverter mode, gridconnected mode, and transition of grid-connection to off-grid, transition of off-grid to grid mode.

DCDC:

standby mode, soft start mode, charging mode,discharging mode.

8.3.14 Error information



8.3.15 System setting

SYSTEM	
STATE:	PEAKS HIFT
GRID STD:	China
PV I/P:	INDEPN

Description**Status mode:**

Self-generation self-consumption, Peak load shifting,and Battery priority.

Grid-connection standards:

China,Germany, Australia, Italy, Spain, UK, Hungary, Belgium, Western Australia, Greece, France, Bangkok, Thailand, local and 60Hz.

PV input mode:

independent connection,parallel connection,constant voltage

Press ESC button to enter user setting

8.4 User setting

```

-USER-
→1:SETUP
  2:INQUIRE
  3:STATISTIC

```

Description

Press ESC on the Main Display Interface to enter the user interface.
See chapter 8.2 for more setting details.

Enter the password before setting up the user.

```

-PASSWORD-
INPUT:  XXXXX

```

Description

After entering the setup interface, the system will prompt to input password;
The default password is "000000", which can be altered in Password setting menu;
Press UP/DOWN button to increase or decrease the figure that is input;
Press ENTER button to move the cursor backwards or confirm the setting;
Press ESC button to move the cursor forward.

8.5 Setting

```

--SETUP--
→1:SYS SETTING
  2:BAT SETTING
  3:GRID STD
  4:RUN SETTING
  5:485 ADDRESS
  6:BAUD RATE
  7:LANGUAGE
  8:BACKLIGHT
  9:DATE/TIME
 10:CLEAR REC
 11:PASSWORD
 12:MAINTENANCE
 13:FCTRY RESET
 14:AUTO TEST

```

Description

This interface is used for various information inquiry options.
Press UP/DOWN button to move the corresponding options.
Press ENTER to enter the selected menu.
Press ESC button to return to the user interface.
There are 13 options in total, including system mode, battery parameters, grid standard, operation parameters, 485 address, 485 baud rate, language display, LCD backlight, date/time, clear history, password setting and maintenance, and factory setting.

8.6 System setting

```
--SYS SETTING--
→1:WORK MODE
2:PV INPUT
3:ZERO EXPORT
4:DRM ENABLE
5:EPS ENABLE
6:REMOTE CTRL
7:START DELAY
8:CEI SPI CTRL
9:GFCICLK ENB
10:DISC MODE
11:DISCHGDEPTH
12:GENERATOR
13:CT OR METER
14:AC COUPLE
15:CT Directio
16:ISLAND
```

Description

This interface is used to access system information.

Press UP/DOWN button to move corresponding options.

Press ENTER to enter the selected menu.

Press ESC button to return to the setting interface.

There are 16 options in total, including working mode, PV input type, anti-reflux enable, DRM enable, EPS enable, remote controlled enable, boot delay time.

See from 1 to 16

8.6.1 Working mode

```
--WORKE MODE--
1:SELF CONSUME
→2:PEAK SFT
3:BAT PRIORITY
```

Description

This interface is used to opt for the working mode.

After selecting the three modes, the restart interface will be entered.

Press ESC button to return to setting interface.

After completing the setup of peak load shifting mode, the time for charging and discharging also needs to be set.

```
-- SELF CONSUME --
1:DISABLE
→2:ENABLE
```

Description

1.DISABLE 2.ENABLE

After selecting Allow, the charging time setting page is displayed.

```
--CHARGE TIME--
00:00-23:59
MAX SOC:100
```

1. Self-consumption mode disables grid charging:
Battery pack can only be charged by PV.
2. Self-consumption mode enables grid charging:
Grid charges battery pack until MAX SOC during set time.

Time setup

```
CHA STAR1: 00:00
CHA REND1: 00:00
DIS START1: 00:00
DISC END1: 00:00
```

Description

This interface is used to set the time-1 of peak load shifting.
Press UP/DOWN button to change the value.
Press ENTER to confirm.
Press ESC button to return.

```
CHA STAR2: 00:00
CHA REND2: 00:00
DIS START2: 00:00
DISC END2: 00:00
```

This interface is used to set the time-2 of peak load shifting.
Press UP/DOWN button to change the value.
Press ENTER to confirm.
Press ESC button to return.

8.6.2 Input mode

```
--INPUT MODE--
→1:INDEPENDANT
2:PARALLEL
3:CV
```

Description

Setup of PV Input mode.
The factory setting by default is standalone mode.
When parallel input is set to be stand-alone mode,
PV power will be imbalanced.

8.6.3 ZERO EXPORT

```
--ZERO EXPORT--
→1:DISABLE
2:ENABLE
```

Description

Back-flow-prevention function.
Default option is disabling.

8.6.4 DRM enable

```
--DRM ENABLE--
→1:DISABLE
2:ENABLE
```

Description

It is enabled when BACKUP load needs power.
Default option is disabling.

8.6.5 Backup enable

```
--EPS ENABLE--
→1:DISABLE
2:ENABLE
```

Description

It is enabled when BACKUP load needs power.
Default option is Enabling.

8.6.6 Remote Control enable

```
--REMOTE CTRL--
→1:DISABLE
2:ENABLE
```

Description

The power switch of the machine can be realized through remote control.
Default option is disabling.

8.6.7 START-UP delay

```
START-UP DELAY
INPUT: 30
UNIT: SEC
```

Description

The input value ranges from 20 to 300, which varies with different standards.

8.6.8 CEI SPI CTRLT

```
-CEI SPI CTRL-
→1.DISABLE
2.ENABLE
```

Description

CEI SPI CTRL:(1. Disable 2. Enable)

When the DRM signal is enabled, this is used as a local signal.

When the DRM signal is enabled, when the CEI SPI Ctrl is enabled, the frequency range is 50.2Hz ~ 49.8Hz.

When the CEI SPI Ctrl is disabled, the frequency range is 51.5Hz ~ 49.8Hz

8.6.9 GFCICHK ENB

-GFCICHK ENB-
1.DISABLE
→2.ENABLE

Description

GFCICHK ENB (1. Disable 2. Enable) PV leakage protection enable.

8.6.10 DISC MODE

-DISC MODE-
→1.RATED POWER
2.LOAD PRIO

Description

DISC MODE (1.Rated Power, 2. Load Prio) This is only for test.

8.6.11 DISCHGDEPTH

-DISCHGDEPTH-
1.DISABLE
→2.ENABLE

Description

Discharge depth enable (1. Disable 2. Enable) : enable discharge depth. When the SOC of the battery is less than the discharge depth set by 1 -, the battery will no longer discharge, and alarm the low capacity of w13 battery. Set the discharge depth in the battery parameter setting.

8.6.12 GENERATOR

-GENERATOR-
1.DISABLE
→2.ENABLE

Description

Generator mode enabling (1. Disable 2. Enable) when the generator needs to be connected for AC measurement, the enabling generator mode is prohibited, and the generator mode is prohibited in other times. In the mode of enabling generator, the frequency protection range measured by AC will be relaxed to + -10%, the frequency protection range at 50Hz is 45Hz~55Hz, and that of 60Hz is 54Hz~66Hz.

8.6.13 CT OR METER

-CT OR METER-
1.CT
→2.METER

Description

CT or meter (1.CT 2.meter): the energy storage inverter supports the connection of single-phase ammeter. Replace CT with single-phase ammeter to detect the utility power. When connecting single-phase ammeter, select "ammeter" option, and when connecting CT, select "CT" option.

8.6.14 AC COUPLEB

-AC COUPLE-

1.DISABLE
→2.ENABLE**Description**

When SINERGY connects to other inverter by AC side,with other inverter charging SINERGY please enable AC couple.

8.6.15 CT DIRECTION

-CT DIRECTION-

→1.POSITIVE
2.NEGATIVE**Description**

If the CT connection is reversed, there is no need to change the direction actually but only set the direction on the interface by changing 1.POSITIVE to 2.NEGATIVE or 2.NEGATIVE to 1.POSITIVE ,which is equivalent to changing the direction of the CT wiring .

For example, when the battery is being charged and the grid power is positive “+”it means the CT connection is reversed. If the CT direction is 1. POSITIVE on the LCD, set it to 2. NEGATIVE, then the grid power will become negative “-”.

8.6.16 ISLAND

-ISLAND-

1.DISABLE
→2.ENABLE**Description**

1.Disabled for checking the anti-islanding function.
2.Enabled for the anti-islanding function.

8.7 Battery parameters

--BAT SETTING--

→ 1BAT TYPE
2:DISC-DEPTH
3:OFF GRID DOD
4:CHG CURR
5:DISC POWER
6:CHG POWER
7:BAT END VOLT
8:BAT WAKE-UP
9:HEATING FLIM
10:BMS DOD
11:Maintain SOC
12:FORCE WAKE

Description

This interface is used to select battery parameters.
Press UP/DOWN button to move corresponding options;
Press ENTER button to enter the selected menu;
Press ESC button to return to setting interface.
See from 1 to 12

8.7.1 BATTERY TYPE

```
--BAT TYPE--
1:LEAD-ACID
→2:LFP
3:BYD-LEP
4:CITIC-LEP
5:PYLON-LEP
6:BluE-LEP
7:KSTAR-LEP
```

Description

This interface is used to select battery type.
 Press UP/DOWN button to move corresponding options;
 Press ENTER button to enter the selected menu;
 Select the LEAD-ACID enter button to enter the LEADACID interface;
 Select the LFP enter button to enter the LFP interface;
 Select the other selections enter button to enter the restart interface.

Lead-acid battery parameter

```
--LEAD-ACID --
→1:CHARG-VOLT
2:EQUAL VOLT
3:BAT CAP
4:BAT OVP
```

Description

This interface is used to select other Li battery parameter.
 Press UP/DOWN button to move corresponding options;
 Press ENTER button to enter the selected menu;
 Options include battery charge voltage, battery capacity, battery discharge end voltage, battery over voltage protection .(see from 1 to 4)

8.7.2 Discharge depth

```
--DISC DEPTH--
INPUT: 60
UNIT: %
```

Description

Press UP/DOWN to increase or decrease the value;
 Press Enter to move cursor backward, confirm input and return to battery parameters interface;
 Press ESC to move cursor forward and return to battery parameters interface;
 The value ranges between 10% and 100%.

8.7.3 OFF GRID DOD

```
--OFF GRID DOD--
Input 0~100%
Default 90%
```

Description

Off grid discharge depth: the maximum allowable discharge depth of the machine off grid in case of mains power failure.

For example, if the off grid discharge depth is set to 90%, when the machine is off grid in case of mains power failure, when the SOC of the battery is less than or equal to 10%, the inverter stops off grid operation.
 Grid connected discharge depth: in the presence of mains power, the normal grid connection of the machine is the maximum allowable discharge depth.

For example, if the grid connected discharge depth is set to 80%, when the normal grid connection of mains power is allowed, when the SOC of the battery is lower than or equal to 20%, the battery will stop discharging and the discharge power will be zero.
 Relationship between off grid discharge depth and grid connected discharge depth.

Grid connected discharge depth < off grid discharge depth.

Off grid discharge depth - grid connected discharge depth = off grid standby SOC.
 For example, if the grid connected discharge depth is set to 80% and the off grid discharge depth is set to 90%, the battery will stop discharging if the SOC is equal to or lower than 10% under normal grid connected conditions.

When the mains power is off, the inverter will run off grid, At this time, 10% SOC of the battery can supply power to important loads until soc10% and the inverter stops working.

8.7.4 Charge current

--CHARGE CURR--

INPUT: 25

UNIT: A

Description

Press UP/DOWN button to increase or decrease the input figure;
 Press Enter to move cursor backward, confirm input and return to battery parameters interface;
 Press ESC button to move cursor forward and return to battery parameters interface.

8.7.5 Discharge Power

--DISC PERCENT--

INPUT: 080%

Description

Press UP/DOWN button to increase or decrease the input figure;
 Press Enter button to move cursor backward, confirm input and return to battery parameters interface;
 Press ESC button to move cursor forward and return to battery parameters interface.

8.7.6 Charge Power

--CHAR PERCENT--

INPUT: 020%

Description

Press UP/DOWN button to increase or decrease the input figure;
 Press Enter to move cursor backward, confirm input and return to battery parameters interface;
 Press ESC button to move cursor forward and return to battery parameters interface.

8.7.7 BAT END VOLT

--BAT END VOLT--

INPUT: 43.2

UNIT: V

Description

This function is used to set the discharge cut-off voltage.
 When select the battery type as SINERGY the default value is 43.0 V and the setting range is between 40.0 V to 48.0 V.

8.7.8 BAT WAKE-UP

-- BAT WAKE-UP --

→1:ENABLE

2:TIME

Description

Enter the option 1 to enable or disable the function.
 Enter the option 2 to adjust the value of the time.

Battery wake up enable

```
--BAT WAKE-UP--
→1:DISABLE
2:ENABLE
```

Description

Battery wake-up enable setting.
The default option is disabling.

Bat Wake Time

```
-- Bat Wake Time--
INPUT: 060min
```

Description

Press UP/DOWN button to increase or decrease the input figure;
Press Enter button to move cursor backward, confirm input and return to battery parameters interface;

8.7.9 HEATING FLIM

```
--HEATING FLIM --
→1:ENABLE
2:TIME
```

Description

Battery heating module control command.

- 1 Automatic enable: Automatically enable or disable the heating film according to the cell temperature and charging requirements.
- 2 Manually enable: When the cell temperature meets the conditions of enabling the heating film and the SOC is over 30%, then enable the heating film.
- 3 Manually disable: Manually disable the heating film immediately and unconditionally.

8.7.10 BMS DOD

```
--BMS DOD--
→1:DISABLE
2:ENABLE
```

Description

- 1 Disable BMS DOD: It will not close the discharge circuit when BMS discharging to the set SOC.
- 2 Enable BMS DOD: It will close the discharge circuit when BMS discharge to the set SOC.

Note that don not enable BMS DOD unless there's a special reason.

8.7.11 Maintain SOC

```
--Maintain SOC--
1:DISABLE
→2:ENABLE
```

Description

- 1 Disable: The minimum SOC will not be maintained.

- 2 Enable: The minimum SOC 2% is maintained.

When the battery SOC is less than 2%, the grid charges the battery pack to 5% through the inverter.

8.7.12 FORCE WAKE

```
--FORCE WAKE--
→1.DISABLE
2.ENABLE
```

Description

- 1 Disable: Do not force to wake up battery packs.
- 2 Enable: Force to wake up the battery pack immediately if the battery is not connected.

8.8 Grid standard

```
--GRID STD--
→ 1:CHN
2:GER
3:AUS
4:ITA
...
21:CHILE
22:Local
23:60Hz
```

Description

Press UP/DOWN button to move corresponding options. Here are eleven countries for selection, including China, Germany, Australia, Italy, Spain and U.K.(for detail, refers to table 10.1);

Press ENTER button to confirm the selection and enter restart interface ;

Press ESC button to cancel the selection and return to setting interface.

8.9 Operation parameters

```
--RUN SETTING--
→ 1:REACT POWER
2:GRID POWER
3:VOLT MAX
5:VOLT MIN
6:FREQ MAX
7:OVER VOLT
8:UNDER VOLT
9: OVER FREQ
10:UNDER FREQ
11:REACT RESP
12:VRT_ENABLE
13:POW SI RATE
```

Description

Press UP/DOWN button to move corresponding options;

Press Enter to enter the selected menu;

Press ESC button to return to setting interface.

Options include reactive compensation mode, grid power, discharge/charge power, low/high grid power, low/high grid voltage, low/high grid frequency, VoltOverStart and FreqOverStart (see from to)

Reactive mode

```
-REACT MODE-
→1:POWER FACTOR
2:REACT POWER
3:QU CURVE
4:QP CURVE
```

Description

Press UP/DOWN button to move corresponding options;

Press Enter to confirm the input and enter power factor setting interface;

(select 2, press Enter to confirm input and enter reactive power interface;

Select 3, 4, the corresponding mode will be selected and return to the parameter setting interface.)

Press ESC button to cancel the input and return to operation parameters interface.

8.9.1 Power factor setting

-POWER FACTOR- INPUT: C1.00
Value range (L1.00~C1.00)

Description

Press UP/DOWN to increase or decrease the input figure;
Press ENTER button to confirm or ESC button to cancel the input and return to working interface;
The input value should range between L0.80 and L0.99 or C0.8 and C1.00.

8.9.2 Reactive Power

-REACT POWER- INPUT: +60%
Value range (-60%~+60%)

Description

Press UP/DOWN button to adjust the input figure;
Press ENTER button to confirm or ESC button to cancel the input and return to working interface;
The input value should range between -60% and +60%, which varies with the standard.

Grid-connected power

-GRID PERCENT- INPUT: 100%
Value range (0~100)

Description

Press UP/DOWN button to adjust the input figure;
Press ENTER button to confirm or ESC button to cancel the input and return to operation parameters interface;
The input value should range between 0 and 100.

8.9.3 Volt Max

-VOLT MAX - →1:INV MAX 2:GRID MAX

Description

Enter option 1 to adjust the maximum volt of the INV.
Enter option 2 to adjust the maximum volt of the grid.

High INV voltage

-INV VOLT HIGH- INPUT: UNIT: V
Value range (240~280V)

Description**INV Over Voltage Protection Point**

Press UP/DOWN to adjust the input figure;
Press Enter to confirm the input and enter restart interface;
Press ESC to cancel the input and return to operation parameters interface;
The value should range between 240V and 280V, which varies with different standards.

8.9.4 GRID VOLT MAX

-GRID MAX-	
INPUT:	270V

Description**GRID Over Voltage Protection Point**

Press UP/DOWN to adjust the input figure;
Press Enter to confirm the input.

8.9.5 Volt Min

-VOLT MIN-	
→1:VAC-MIN	
2:GRID MIN	

Description

Enter option 1 to adjust the minimum volt of the INV.
Enter option 2 to adjust the minimum volt of the grid.

Low INV voltage

-INV VOLT LOW-	
INPUT:	
UNIT:	V
Value range (150~200V)	

Description**INV Low Voltage Protection Point**

Press UP/DOWN button to adjust the input figure;
Press Enter to confirm the input and enter restart interface;
Press ESC button to cancel the input and return to operation parameters interface;
The value should range between 150V and 220V, which varies with different standards.

Grid Volt Min

-GRID MIN-	
INPUT:	170V

Description**GRID Low Voltage Protection Point**

Press UP/DOWN to adjust the input figure;
Press Enter to confirm the input.

8.9.6 Freq Max

-FREQ MAX-	
→1:INV-MAX	
2:GRID MAX	

Description

Enter option 1 to adjust the maximum frequency of the INV. Enter option 2 to adjust the maximum frequency of the grid.

High INV frequency

<p>-INV FREQ HIGH-</p> <p>INPUT: 52.0</p> <p>UNIT: Hz</p>
<p>Value range</p> <p>(50.5~55)</p>

Description

Enter option 1 to adjust the maximum frequency of the INV.
Enter option 2 to adjust the maximum frequency of the grid.

GRID Freq Max

<p>-GRIDMAX-</p> <p>INPUT: 53.5Hz</p>

Description

INV Over Frequency Protection Point

Press UP/DOWN to adjust the input number;
Press ENTER to confirm the input and enter restart interface;
Press ESC to cancel the input and return to operational parameters interface;
The value ranges between 50.5 and 55, which varies with different standards.

Freq Min

<p>-FREQ MIN-</p> <p>→1:INV MIN</p> <p>2:GRID MIN</p>

Description

GRID Over Frequency Protection Point

Press UP/DOWN to adjust the input figure;
Press Enter to confirm the input.

Low INV frequency

<p>-INV FREQ LOW-</p> <p>INPUT:</p> <p>UNIT: Hz</p>
<p>Value range</p> <p>(45~49.8)</p>

Description

Enter option 1 to adjust the minimum frequency of the INV.
Enter option 2 to adjust the minimum frequency of the grid.

GRID Freq Min

<p>-GRID MIN-</p> <p>INPUT: 50.5Hz</p>
--

Description

INV Low Frequency Protection Point

Press UP/DOWN to adjust the input figure;
Press Enter to confirm the input and enter restart interface;
Press ESC to cancel the input and return to operation parameters interface;
The value ranges between 45 and 49.8, which varies with different standards.

8.9.7 OVER VOLT

-OVER VOLT-
→1:ENABLE
2:VOLT

Description

Enter the option 1 to enable or disable the function that the power of inverter derates when voltage is too high.
Enter the option 2 to adjust the exact value of the voltage when power starts to derate.

OVER VOLT ENABLE

-OVER VOLT-
→1:DISABLE
2:ENABLE

Description

Derate power when voltage over.
The default option is enable.

OVER VOLT START

-OVER START-
INPUT: 264V

Description

Press UP/DOWN to adjust the input figure;
Press Enter to confirm the input.

8.9.8 UNDER VOLT

-UNDER VOLT-
→1:ENABLE
2:VOLT

Description

Enter the option 1 to enable or disable the function that the power of inverter derates when voltage is too low.
Enter the option 2 to adjust the exact value of the voltage when power start to derate.

UNDER VOLT ENABLE

-UNDER VOLT-
→1:DISABLE
2:ENABLE

Description

Enable or disable the function that the power of inverter derates when voltage is too low.

UNDER VOLT START

-UNDER START-
INPUT: 200V

Description

Press UP/DOWN to adjust the input figure;
Press Enter to confirm the input.

8.9.9 OVER FREQ

-OVER FREQ-
→1:ENABLE
2:FREQ

Description

Enter the option 1 to enable or disable the function that the power of inverter derates when frequency is too low.
Enter the option 2 to adjust the exact value of the frequency when power start to derate.

OVER FREQ ENABLE

-OVER FREQ-
→1:DISABLE
2:ENABLE

Description

Derate power when frequency is too low.
The default option is enable.

OVER FERQ START

-OVER START-
INPUT: 50.50Hz

Description

Press UP/DOWN to adjust the input figure;
Press Enter to confirm the input.

8.9.10 UNDER FREQ

-UNDER FREQ-
→1:ENABLE
2:FREQ

Description

Enter the option 1 to enable or disable the function that the power of inverter derates when frequency is too low.
Enter the option 2 to adjust the exact value of the frequency when power start to derate.

UNDER FREQ ENABLE

-UNDER FREQ-
→1:DISABLE
2:ENABLE

Description

Derate power when frequency is too low.
The default option is enable.

UNDER FERQ STARTE

-UNDER FERQ START-
INPUT: 50.50Hz

Description

The function that the power of inverter derates when frequency is too low.
Press UP/DOWN to adjust the exact value of the frequency when power start to derate.

8.9.11 REACT RESP

-REACT RESP-
INPUT: 10s
Value Range 6s ~ 60s

Description

The input value of Reactive response time.
The value ranges from 6s to 60s and default value is 10s.

8.9.12 VRT_ENABLE

-VRT_ENABLE-
→1:DISABLE
2:ENABLE

Description

Enable or disable the High/Low voltage ride through capability.

8.9.13 POW SI RATE

-POW SI RATE-
INPUT: 250%

Description

The input value of power rising rate.
Default value is 250%.

8.10 485 Address

-485 ADDRESS-
INPUT:1
Value range (1~32)

Description

Press UP/DOWN button to adjust the input figure;
Press ENTER button to confirm or ESC button to cancel the input and return to setup interface;
The input value should range between 1 and 32.

8.11 485 Baud rate

-SELECT-
1:2400 bps
2:4800 bps
→39600 bps

Description

Press UP/DOWN button to move corresponding options;
Press ENTER button to confirm or ESC button to cancel the selection and return to setup interface;
There are three alternative options:
2400/4800/9600.

8.12 Language

-LANGUAGE-
→1CHINESE
2:ENGLISH
3:ITALIA

Description

The function that the power of inverter derates when frequency is too low.
Press UP/DOWN to adjust the exact value of the frequency when power start to derate.

8.13 LCD backlight

<p align="center">-LIGHT TIME-</p> <p>INPUT: 20</p> <p>UNIT: S (seconds)</p>
<p align="center">Value range (20~120)</p>

Description

Press UP/DOWN button to adjust the input figure;
Press ENTER button to confirm or ESC button to cancel the input and return to setup interface;
The input value should range between 20 and 120.

8.14 Date/time

<p align="center">--DATE/TIME--</p> <p>DATE:2020-07-19</p> <p>TIME:10:01:12</p> <p>WEEK:Monday</p>

Description

Press UP/DOWN button to adjust the input figure;
Press Enter button to move cursor backward, confirm input and return to setup interface;
Press ESC button to move cursor forward and return to setup interface;
The input value should range between 2000 and 2099.

8.15 Clear history

<p align="center">--DEL REC--</p> <p>1: CANCEL</p> <p>2: CONFIRM</p>

Description

Clear all the previous history in Inquiry/Record menu.
Press UP/DOWN button to move corresponding options;
Press ENTER button to confirm or ESC button to cancel the selection and return to setup interface;

8.16 Password Setting

<p align="center">--PASSWORD--</p> <p>OLD: XXXXX</p> <p>NEW: XXXXX</p> <p>CONFIRM: XXXXX</p>

Description

This interface will be used to change password for entry into the setup interface;
Press UP/DOWN to adjust the input figure;
Press Enter to move cursor backward, confirm input and return to setup interface;
Press ESC to move cursor forward and return to setup interface;

8.17 Maintenance

<p align="center">→12:MAINTENANCE</p>

Description

Maintainer use only.

8.18 Factory default setting

-FACTORY RESET

1: CANCEL

2: CONFIRM

Description

Press UP/DOWN button to move corresponding options;
Press Enter to enter the selected item.

8.19 AutoTest

-- PASSWORD--

INPUT: XXXXX

Description

The Auto test function works only in the Italy grid standard. After entering the Auto test interface, the system will prompt to input password;
The password is "00000".

Auto test . . .
603 s

Description

The self-test countdown interface.
This interface will show up at the beginning of the self-test.
The countdown will last for 603 seconds.
You can press the ESC Key to exit the self-test.

--TEST LIST--

1:VOLT MAX

→2:VOLT MIN

3:FREQ MAX

4:FREQ MIN

Description

After the countdown there is a test list interface which is used to select the parameter for Autotest.
There are four kinds of test results including Volt Max ,Volt Min ,Freq Max and Freq Min.
After entering the submenu items, you can press the UP and Down key to scan the result.

VACMAX(S1)

Set:253.0V 603s

Tes:253.0V 603s

Cur:230.0V Pass!

Description

- Threshold setting value: The value set by upper computer software.
- Threshold setting trip time: The trip time set by upper computer software.
- Threshold auto test value: The value of threshold during coincidence between the threshold and current measured value.
- Threshold auto test trip time: The time from the coincidence between the threshold and current to the trip signal of disconnection switch.
- Current measured voltage or frequency value: The measurement value of grid voltage or frequency during the coincidence.

VACMAX(S2)

Set:264.0V 190ms

Tes:264.0V 188ms

Cur:230.0V Pass!

8.20 Factory default setting

VACMIN
Set:195.0V 1.52s
Tes:195.0V 1.50s
Cur:230.0V Pass!

Description

- Threshold setting value: The value set by upper computer software.
- Threshold setting trip time: The trip time set by upper computer software.
- Threshold auto test value: The value of threshold during coincidence between the threshold and current measured value.
- Threshold auto test trip time: The time from the coincidence between the threshold and current to the trip signal of disconnection switch.
- Current measured voltage or frequency value: The measurement value of grid voltage or frequency during the coincidence.

8.21 AutoTest

FACMAX(S1)
Set:50.2Hz 100ms
Tes:50.2Hz 94ms
Cur:49.9Hz Pass!

Description

- Threshold setting value: The value set by upper computer software.
- Threshold setting trip time: The trip time set by upper computer software.
- Threshold auto test value: The value of threshold during coincidence between the threshold and current measured value.
- Threshold auto test trip time: The time from the coincidence between the threshold and current to the trip signal of disconnection switch.
- Current measured voltage or frequency value: The measurement value of grid voltage or frequency during the coincidence.

FACMAX(S2)
Set:51.5Hz 100ms
Tes:51.5Hz 94ms
Cur:49.9Hz Pass!

FACMIN(S1)
Set:49.8Hz 100ms
Tes:49.8Hz 97ms
Cur:49.9Hz Pass!

Description

- Threshold setting value: The value set by upper computer software.
- Threshold setting trip time: The trip time set by upper computer software.
- Threshold auto test value: The value of threshold during coincidence between the threshold and current measured value.
- Threshold auto test trip time: The time from the coincidence between the threshold and current to the trip signal of disconnection switch.
- Current measured voltage or frequency value: The measurement value of grid voltage or frequency during the coincidence.

FACMIN(S2)
Set:47.5Hz 100ms
Tes:47.5Hz 94ms
Cur:49.9Hz Pass!

8.22 Inquiry

--INQUIRE--
→1:INV MODULE
2:MODULE SN
3:FIRMWARE
4:RECORD
5:BMS INFO

Description

Press UP/DOWN button to move corresponding options;
Press Enter button to jump to the selected menu;
Press ESC button to return to user interface;
There are four alternative options: machine model serial number firmware version and running records (refer to 1 to 5).

8.23 Machine modelg

```
--INVERTER--
CEC-S 3K/5K
```

Description

This interface displays machine model of the inverter;
Press ESC button to return to inquiry interface.

8.24 Serial number

```
--SERIAL NUMBER-
SN:
123456789532625
```

Description

This interface displays serial number of the inverter;
Press ESC button to return to inquiry interface.

8.25 Firmware Version

```
--FIRMWARE--
ARM VER:1.0.0
DSP VER:1.0.0
```

Description

SN of the fault: Fault warning codes (500 at utmost)(the latest fault or alarm marked as No.1)

Time of the fault:

Press UP/DOWN button to view the record;

Press ENTER button to enter the description interface for corresponding records;

Press ESC button to return to Inquiry interface.

8.26 Running records

```
--REC (170)-- 1:F10-1
DATE: 2018 - 12-01
TIME: 00 01 02
```

Description

Press UP/DOWN button to move corresponding options;

Press Enter button to jump to the selected menu;

Press ESC button to return to user interface;

There are four alternative options: machine model serial number firmware version and running records (refer to 1 to 5).

Running records

8.27

```
--PACK INFO--
→1:PACK 1
2:PACK 2
3:PACK 3
4:PACK 4
5:PACK 5
```

Description

You can query the following information about the five battery packs:BMS program version,Whether the battery pack is online,Number of battery pack cycles,Heating film state, heating film open or closed,Charging MOS tube status: charging MOS off or on,Discharge MOS tube status: discharge MOS off or on,Battery pack BMS alarm code,Battery pack BMS protection code,BMS fault code of the battery pack.

```
VERSION: 1.012
STATUS: ONLINE
CYCLE CNT: 15
HEAT FILM: OFF
CHAR MOSFET: OFF
DISC MOSFET: OFF
WARN CODE: 12
PROTECT: 32
FAULT CODE: 14
```

8.28 Statistics

```

--STAT--
→1:TIME STAT.
  2:CONNE. TIMES
  3:PEAK POWER
  4:E-TODAY
  5:E-MONTH
  6:E-TEAR
  7:E-TOTAL

```

Description

Press UP/DOWN button to move corresponding options;

Press Enter to enter the selected menu;

Press ESC button to return to user interface;

There are eight alternative options in total: time accounting grid-connection frequency/ peak power/ power generation for the day / power generation for the month/ power generation for the year/gross power generation (refer to 1 to 8).

8.28.1 Time accounting

```

-Time-
RUN:    5
GRID:   0
UNIT:   HOUR

```

Description

Operation length of inverter hours.

Grid-connection length hours.

Press ESC button to return to statistics interface.

8.28.2 Grid-connection frequency

```

-- CONNE.TIMES --
TIMES:    0

```

Description

This interface displays grid-connection frequency of the inverter.

Press ESC button to return to statistics interface.

8.28.3 Peak power

```

--PEAK POWER--
HISTORY: 5000
TODAY:    0
UNIT:     W

```

Description

This interface displays power peak in history and for the day.

Press ESC button to return to statistics interface.

8.28.4 The day

```

--E-TODAY--
PV:      0.0KWH
METER:   0.0KWH
GRID:    0.0KWH
LOAD:    0.0KWH
CHARG:   0.0KWH
DISCH:   0.0KWH

```

Description

This interface displays power generation for the day kWh;

Production of the photovoltaic system;

Electric energy selling to grid;

Electric energy buying from grid;

Power consumption of electric loads;

8.28.5 The month

```
--E-MONTH--  
PV:      0.0KWH  
METER:   0.0KWH  
GRID:    0.0KWH  
LOAD:    0.0KWH
```

Description

This interface displays power generation for the month kWh;
Production of the photovoltaic system;
Electric energy selling to grid;
Electric energy buying from grid;
Power consumption of electric loads;

8.28.6 The year

```
--E-YEAR--  
PV:      0.0KWH  
METER:   0.0KWH  
GRID:    0.0KWH  
LOAD:    0.0KWH
```

Description

This interface displays power generation for the year kWh;
Production of the photovoltaic system;
Electric energy selling to grid;
Electric energy buying from grid;
Power consumption of electric loads;

8.28.7 Gross generationy

```
--E-TOTAL-  
PV:      0.0KWH  
METER:   0.0KWH  
GRID:    0.0KWH  
LOAD:    0.0KWH  
CHARG:   0.0KWH  
DISCH:   0.0KWH
```

Description

This interface displays gross power generation;
Production of the photovoltaic system;
Electric energy selling to grid;
Electric energy buying from grid;
Power consumption of electric loads;

8.29 Restart

Please Restart!

9. BATTERY STORAGE AND RECHARGING

9.1 Battery storage requirements

1. Storage environment requirements:

- ambient temperature: -10°C +45°C; recommended storage temperature: 20°C -30°C;
- relative humidity: 0%RH–90%RH;
- in a dry, ventilated and clean place;
- no contact with corrosive organic solvents, gases and other substances;
- no direct sunlight;
- less than 2 meters from any heat source.

9.2 Storage expirations

In principle, it is not advisable to keep the battery stationary in the warehouse and idle for long periods of time.

Be sure to use it in time.

The stored batteries should be disposed according to the following requirements.

9.3 Table Stored lithium battery recharging interval

Required Storage Temperature	Actual Storage Temperature	Required charging interval
-10°C +45°C	$-10^{\circ}\text{C} \leq T \leq 30^{\circ}\text{C}$	every 12 months
	$30^{\circ}\text{C} < T \leq 45^{\circ}\text{C}$	every 8 months

- 1 If a battery is deformed, broken or leaking, discard it immediately regardless of its storage time.
- 2 The allowable maximum stored battery recharging period is 3 years and the allowable maximum stored battery recharging times is 3. For example, if recharging is performed once every 8 months, the allowable maximum recharging times is 3 times; if recharging is performed once every 12 months, the allowable maximum recharging times is 3 times; if the allowable maximum stored battery recharging period or times is exceeded, it is recommended to discard the battery.
- 3 A lithium battery will have its capacity decreasing after being stored for a long time, and typically will have its capacity irreversibly decreasing by 3%–10% after being stored at the recommended storage temperature for 12 months. If the customer conducts the discharge test and acceptance according to the specification, there is a risk that the battery with a capacity less than 100% after being stored will fail the test.

9.4 Inspection before battery recharging

Before recharging a battery, check its appearance: Deformation/Shell damage/Leakage

9.5 Recharge Operation Steps

Step 1: Connect power cables to the battery charger correctly. The maximum number of battery PACK connected parallel is 4.

Step 2: Turn on the battery PACK DC breaker to ON; Press the battery “start key” for 3 second to start the battery PACK. Check the LED on the battery PACK is on.

Step 3: Turn on the battery charger.

Step 4: Set charging parameter on the battery charger.

Case 1, One battery PACK is charged. Set the charge limited voltage 56.5V; Set the charge limited current 50A;

Case 2, Two ~ Four battery PACKs are charged. Set the charge limited voltage 56.5V; Set the charge limited current 100A;

Step 5 After the battery is charged, switch off the battery charger and then the battery DC breaker. Disconnect the DC cables and then press the battery “start key” for 3 second to switch off the battery PACK.

10. ALARM CODE AND ERROR CODE

10.1 Battery Storage And Recharging

The inverter is easy to maintain. When you encounter the following problems, please refer to the Solutions below, and contact their service Clivet S.p.A. if the problem remains unsolved.

The following table lists some of the basic problems that may occur during the actual operation as well as their corresponding basic solutions.

10.2 Alarm Code

	Code	Description
F00	Soft Time Out	<ul style="list-style-type: none"> - Restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
F01	Inverter voltage short circuit	<ul style="list-style-type: none"> - Disconnect the power supply and switch off the whole system, disconnect the load from the inverter and reconnect it. Restart the system - Contact Clivet S.p.A. service if the error persists
F02	GFCI Sensor failure	<ul style="list-style-type: none"> - Disconnect the power supply, restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
F04 F05	DC link voltage low	<ul style="list-style-type: none"> - Check that the input mode setting is correct. - Restart the inverter and wait for it to operate normally; - Contact Clivet S.p.A. service if the error persists
F06	DC link short circuit	<ul style="list-style-type: none"> - Restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
F07	FV system fault	<ul style="list-style-type: none"> - Check the ground connection - Check whether the earth resistance between the FV+ and FV- inputs is higher than 2MΩ. - If it is lower than 2 MΩ, check the photovoltaic string if there is a ground fault or poor earth insulation; - if it is higher than 2 MΩ, contact Clivet S.p.A. service
F08	FV input short circuit	<ul style="list-style-type: none"> - Check that the input mode setting is correct - Disconnect the photovoltaic input, restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
F09 F14 F19	Relay fault	<ul style="list-style-type: none"> - Disconnect the power supply, restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
F10	Inverter overcurrent	<ul style="list-style-type: none"> - Wait five minutes for the inverter to restart automatically - Check whether the load is in accordance with the specification - Contact Clivet S.p.A. service if the error persists
F11	Inverter overvoltage	<ul style="list-style-type: none"> - Restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
F12 F13	Heat sink overheating	<ul style="list-style-type: none"> - Restart the system after it has cooled down for a few minutes - Check whether the ambient temperature is outside the system's normal operating temperature range - Contact Clivet S.p.A. service if the error persists
F16	Charge overcurrent	<ul style="list-style-type: none"> - Check whether the battery wiring port has short-circuited - Check that the charging current is in accordance with the operation parameters - Contact Clivet S.p.A. service if the error persists
F17	Current sensor failure	<ul style="list-style-type: none"> - Restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
F18	Inverter anomaly	<ul style="list-style-type: none"> - Contact Clivet S.p.A. service
F32	Communication fault	<ul style="list-style-type: none"> - Restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists

W00 W01 W02 W03	Grid fault	<ul style="list-style-type: none"> - Check whether the local voltage and frequency comply with the inverter specifications - If the voltage and frequency are within the inverter plate parameters, wait 2 minutes for the inverter to return to normal operation; - Contact your local energy provider if the voltage and frequency are out of range or unstable - Contact Clivet S.p.A. service if the error persists
W04	FV side leaks	<ul style="list-style-type: none"> - The FV field is not connected - Check the grid connection - Check the general operation of the photovoltaic field
W05	Battery side leaks	<ul style="list-style-type: none"> - The battery is not connected - Check the battery wiring port for any faults or short circuits - Contact Clivet S.p.A. service if the error persists
W06 W07	Battery voltage low	<ul style="list-style-type: none"> - Check availability of the battery - Contact Clivet S.p.A. service if the error persists
W08	Battery voltage high	<ul style="list-style-type: none"> - Check the battery operation parameters and wiring - If it works correctly, switch off and restart the system - Contact Clivet S.p.A. service if the error persists
W09	Overloading warning	<ul style="list-style-type: none"> - Wait one minute for the inverter to restart - Check whether the load is in accordance with the specification - Contact Clivet S.p.A. service if the error persists
W10	GFCI excessive	<ul style="list-style-type: none"> - Check the photovoltaic string and check the direct or indirect grounding conditions - Check the inverter's peripheral devices for electric leakage - Contact Clivet S.p.A. service if the error persists
W13	Battery capacity below 10%	<ul style="list-style-type: none"> - Low battery below the warning level, wait for it to recharge
W11	LN fault	<ul style="list-style-type: none"> - Check that the installation is correct - Contact Clivet S.p.A. service if the error persists
W12	Fan failure	<ul style="list-style-type: none"> - Restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
W14-24	BMS fault	<ul style="list-style-type: none"> - Contact Clivet S.p.A. service
F00	Soft Time Out	<ul style="list-style-type: none"> - Restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
F01	Inverter voltage short circuit	<ul style="list-style-type: none"> - Disconnect the power supply and switch off the whole system, disconnect the load from the inverter and reconnect it. Restart the system - Contact Clivet S.p.A. service if the error persists
F02	GFCI Sensor failure	<ul style="list-style-type: none"> - Disconnect the power supply, restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
F04 F05	DC link voltage low	<ul style="list-style-type: none"> - Check that the input mode setting is correct. - Restart the inverter and wait for it to operate normally; - Contact Clivet S.p.A. service if the error persists
F06	DC link short circuit	<ul style="list-style-type: none"> - Restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
F07	FV system fault	<ul style="list-style-type: none"> - Check the ground connection - Check whether the earth resistance between the FV+ and FV- inputs is higher than 2MΩ. - If it is lower than 2 MΩ, check the photovoltaic string if there is a ground fault or poor earth insulation; - if it is higher than 2 MΩ, contact Clivet S.p.A. service
F08	FV input short circuit	<ul style="list-style-type: none"> - Check that the input mode setting is correct - Disconnect the photovoltaic input, restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
F09 F14 F19	Relay fault	<ul style="list-style-type: none"> - Disconnect the power supply, restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists

F10	Inverter overcurrent	<ul style="list-style-type: none"> - Wait five minutes for the inverter to restart automatically - Check whether the load is in accordance with the specification - Contact Clivet S.p.A. service if the error persists
F11	Inverter overvoltage	<ul style="list-style-type: none"> - Restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
F12 F13	Heat sink overheating	<ul style="list-style-type: none"> - Restart the system after it has cooled down for a few minutes - Check whether the ambient temperature is outside the system's normal operating temperature range - Contact Clivet S.p.A. service if the error persists
F16	Charge overcurrent	<ul style="list-style-type: none"> - Check whether the battery wiring port has short-circuited - Check that the charging current is in accordance with the operation parameters - Contact Clivet S.p.A. service if the error persists
F17	Current sensor failure	<ul style="list-style-type: none"> - Restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
F18	Inverter anomaly	<ul style="list-style-type: none"> - Contact Clivet S.p.A. service
F32	Communication fault	<ul style="list-style-type: none"> - Restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
W00 W01 W02 W03	Grid fault	<ul style="list-style-type: none"> - Check whether the local voltage and frequency comply with the inverter specifications - If the voltage and frequency are within the inverter plate parameters, wait 2 minutes for the inverter to return to normal operation; - Contact your local energy provider if the voltage and frequency are out of range or unstable - Contact Clivet S.p.A. service if the error persists
W04	FV side leaks	<ul style="list-style-type: none"> - The FV field is not connected - Check the grid connection - Check the general operation of the photovoltaic field
W05	Battery side leaks	<ul style="list-style-type: none"> - The battery is not connected - Check the battery wiring port for any faults or short circuits - Contact Clivet S.p.A. service if the error persists
W06 W07	Battery voltage low	<ul style="list-style-type: none"> - Check availability of the battery - Contact Clivet S.p.A. service if the error persists
W08	Battery voltage high	<ul style="list-style-type: none"> - Check the battery operation parameters and wiring - If it works correctly, switch off and restart the system - Contact Clivet S.p.A. service if the error persists
W09	Overloading warning	<ul style="list-style-type: none"> - Wait one minute for the inverter to restart - Check whether the load is in accordance with the specification - Contact Clivet S.p.A. service if the error persists
W10	GFCI excessive	<ul style="list-style-type: none"> - Check the photovoltaic string and check the direct or indirect grounding conditions - Check the inverter's peripheral devices for electric leakage - Contact Clivet S.p.A. service if the error persists
W13	Battery capacity below 10%	<ul style="list-style-type: none"> - Low battery below the warning level, wait for it to recharge
W11	LN fault	<ul style="list-style-type: none"> - Check that the installation is correct - Contact Clivet S.p.A. service if the error persists
W12	Fan failure	<ul style="list-style-type: none"> - Restart the inverter and wait for it to operate normally - Contact Clivet S.p.A. service if the error persists
W14-24	BMS fault	<ul style="list-style-type: none"> - Contact Clivet S.p.A. service

11. PRODUCT SPECIFICATIONS

The characteristics of only the versions with single and double battery pack are shown

Battery Specifications	CEC-S B 5K single battery pack	CEC-S B 10K double battery pack
Electrical		
Energy capacity	5.12kWh	10.24kWh
Battery type	LFP (LiFePO4)	
Depth of discharge (DoD)	90%	
Rated voltage	51.2V	
Operating voltage range	44.8~56.5Vdc	
Operation		
Maximum charging current	50A (0.5C)	100A (0.5C)
Maximum discharging current	80A (0.8C)	100A (0.5C)
Operating temperature range	0°C ~ +50°C (Charging) / -10°C ~ +50°C (Discharging)	
Storage temperature range	-20°C ~ +50°C	
Humidity	0% ~ 90%	
BMS		
Modules connection	Max. 4 batteries in parallel	
Monitoring parameters	System voltage, current, cell voltage, cell temperature, PCBA temperature measurement	
Communication	CAN and RS-485 compatible	
Ventilation type	Passive and active cooling	
Physical		
Weight (Kg)	57	114
Dimension (W×H×D)mm	540*530*250	540*1060*250
IP Protection	IP65	
Warranty	5 Year Product Warranty, 10 Year Performance Warranty	
Certificate		
Safety(Cell)	IEC 62619 UL 1973 UN 38.3	

Inverter model	CEC-S 3K	CEC-S 5K
Electrical		
Connection section to the photovoltaic system		
Maximum applicable continuous voltage	580Vd.c.	

Nominal continuous voltage	400Vd.c.	
MPPT voltage range		80~560Vd.c.
MPPT range (full load)	165~520Vd.c.	210~520Vd.c.
MPPT tracker / strings	2	
Max. continuous PV input current	15Ad.c.(x 2 inputs)	
Photovoltaic short circuit current (Isc)	18Ad.c. × 2	
Maximum return current	0Ad.c.	
Max. continuous PV input power	4800W	6500W
Battery terminal		
Battery type	Lithium iron phosphate batteries	
Voltage range	40~60Vd.c.	
Rated voltage	48Vd.c.	
Maximum charge/discharge current	50Ad.c./80Ad.c.	100Ad.c./100Ad.c.
Maximum charge/discharge power	3000W/4000W	4600W/5000W
Grid terminal parameter		
Rated voltage	230Va.c.	
Rated frequency	50Hz/60Hz	
Maximum continuous input current	32Aa.c.	
Maximum continuous input power	7360VA	
Maximum continuous output current	16Aa.c.	22Aa.c.
Power factor (cos phi), adjustable	0.8 leading 0.8 lagging (0.95 leading 0.95 lagging for Germany)	
Maximum continuous output power	3680W	5000W
Max. output fault current	102 A peak	
Grid port inrush current	less than 22 A peak	
Grid port overcurrent protection	40A	
Backup load terminal parameter		
Rated voltage	230Va.c. 50 Hz	
Maximum continuous output current	16Aa.c.	20Aa.c.
Rated frequency	50/60Hz Fluctuation range±0.2%	
Rated continious output power	3680W	4600W
Maximum output apparent power	4000W	5000W
Max. output fault current	99 A peak	
Backup load overcurrent protection		32A

General parameter	
Temperature	-25°C to +60°C, derating above 45 °C
Protective class	Class I
Overvoltage category	II(DC side), III(AC side)
Ingress protection	IP65
Altitude	≤ 2000m
Dimension (W×H×D)mm	540*610*250
Weight (Kg)	36
Relative humidity	0~95% (No condensation)
Topology	High frequency isolation
Cooling	Natural convection
Display	LCD/APP
Communication Interface	RS485/CAN2.0/WIFI
Max. Conversion Efficiency (From Battery)	94.0%
Max. Conversion Efficiency (From PV)	97.6%
Euro Efficiency	97.0%
MPPT Efficiency	99.5%
Protection function	Short Circuit Protection, AC Leakage Fault Protection, Grounding Fault Protection, Anti-islanding Protection, Overload Protection, Surge Protection, DC Polarity
Certification& Standard	
Grid regulation	AS/NZS 4777.2, VDE-AR-N4105, VDE0126-1-1
Safety regulation	IEC/EN 62109-1&2, IEC62040-1
EMC	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4,EN61000-4-16, EN61000-4-18, EN61000-4-29

12. TABLE

Grid specification (single-phase)

Grid Specification	Output Voltage Range (Vac)	Output Frequency Range (Hz)	Boot wait time(S)
China	187~252	48~50.5	30
Germany	184~264	47.5~51.5	60
Australia	180~260	47~52	60
Italy	184~276	49.7~50.3	60
Spain	196~253	48~50.5	180
U.K.	184~264	47~52	180
Hungary	196~253	49~51	300
Belgium	184~264	47.5~51.5	60
W-Australia	180~260	45~52	60
Greece	184~264	49.5~50.5	180
France	184~64	47.5~50.4	60
Bangkok	150~264	49~51	150
Thailand	150~264	48~51	60
S.Africa	184~264	47.0~52.0	60
50549	196~253	47.5~51.5	60
Brazil	196~253	57.5~61.5	60
0126	184~253	47.5~51.5	60
Ireland	184~264	47.5-52.0	180
Israel	195.5~253.0	47.0~51.5	60
Poland	195.5~253.0	49.00~50.05	60
Chile	176.0~242.0	47.5~51.5	60
Local	150~280	45.0~55.0	30
60Hz	184~264	59.5-60.5	60

13. ROUTINE MAINTENANCE

13.1 Maintenance Plan

- Check if wire connections are loose.
- Check if cables are aged/damaged.
- Check if cable insulating ribbon drops.
- Check if cable terminal is loose, any overheat sign.
- Check if ground connection is good.

13.2 Operating Environment

(Every six months)

Carefully observe whether the battery system equipment is in effective or damaged;

When the system is running, listen to any part of the system for abnormal noise;

Check whether the voltage, temperature and other parameters of the battery and other equipment parameters are normal during system operation;

13.3 Equipment Cleaning

(Every six months to one year, depending on the site environment and dust content, etc.)

Ensure that the ground is clean and tidy, keep the maintenance access route unblocked, and ensure that the warning and guiding signs are clear and intact.

Monitor the temperature of the battery module and clean the battery module if necessary.

13.4 Cable, Terminal and Equipment Inspection

(Every six months to one year)

- Check if the cable connections are loose.
- Check whether the cables are aged / damaged.
- Check whether the cable tie of the cable has fallen off.
- Check if the cable terminal screws are loose and the terminal position has any signs of overheating.
- Check whether the management system of the system equipment, monitoring system and other related equipment are invalid or damaged.
- Check that the grounding of the equipment is good and the grounding resistance is less than 10 ohms.

13.5 Notes

After the equipment is out of operation, please pay attention to following notes while maintaining:

- Related safety standards and specifications should be followed in operation and maintenance.
- Disconnect all the electrical connections so that the equipment would not be powered on.
- Wait at least 5 minutes after disconnection, so that the residual voltage of the capacitors drops to a safe voltage. Use a multimeter to make sure that the equipment is completely discharged.
- The equipment should be repaired by professional staff only and it is strictly forbidden for maintenance staff to open equipment modules on their own.
- Appropriate protective measures should be taken while maintaining, such as insulated gloves, shoes, and antinoise ear plugs.
- Life is priceless. Make sure no one would get hurt first.
- In case of a deep discharge, the battery must be charged to a SOC rate of 30% to 50%
- if the entire system is static (the battery has not been charged for two weeks or more).

Please contact us in time if there are any conditions that could not be explained in the manual.

14. QUALITY ASSURANCE

When product faults occur during the warranty period, his partner will provide free service or replace the product with a new one.

14.1 Evidence

During the warranty period, the customer shall provide the product purchase invoice and date. In addition, the trademark on the product shall be undamaged and legible.

Otherwise, company has the right to refuse to honor the quality guarantee.

14.2 Conditions

- After replacement, unqualified products shall be processed by company.
- The customer shall give company or his partner a reasonable period to repair the faulty device.

14.3 Exclusion of Liability

In the following circumstances, company has the right to refuse to honor the quality guarantee:

- The free warranty period for the whole machine/components has expired.
- The device is damaged during transport.
- The device is incorrectly installed, refitted, or used.
- The device operates in harsh environment, as described in this manual.
- The fault or damage is caused by installation, repairs, modification, or disassembly performed by a service provider or personnel not from company or his authorized partner.
- The fault or damage is caused by the use of non-standard or company.

Components or software.

- The installation and use range are beyond stipulations of relevant international standards.
- The damage is caused by unexpected natural factors.

For faulty products in any of above cases, if the customer requests maintenance, paid maintenance service may be provided based on the judgment of company.

FOR OVER 35 YEARS WE HAVE BEEN
OFFERING SOLUTIONS TO ENSURE
SUSTAINABLE COMFORT AND THE WELL-
BEING OF PEOPLE AND THE ENVIRONMENT



Info & Contacts: www.clivet.com

