JUSTSTANDOUT

The Energy Warriors

JUSTSTANDOUT SMART HYBRID INVERTER

JSO12048156

About This Manual

The manual mainly describes the product information, guidelines for installation, operation and maintenance. The manual cannot include complete information about the photovoltaic (PV) system.

How to Use This Manual

Read the manual and other related documents before performing any operation on the smart inverter.

Documents must be stored carefully and be available at all times.

Contents may be periodically updated or revised due to product development. The information in this manual is subject to change without notice.

The latest manual can be acquired via service@juststandout.com

1. Safety Introductions

➢ This chapter contains important safety and operating instructions. Read and keep this manual for future reference.

➢ Before using the smart inverter, please read the instructions and warning signs of the battery and corresponding sections in the instruction manual.

➢ Do not disassemble the smart inverter. If you need maintenance or repair, take it to a professional Juststandout service center.

➢ Improper reassembly may result in electric shock or fire.

➢ To reduce risk of electric shock, disconnect all wires before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.

➢ Caution: Only qualified personnel can install this device with battery.

➢ Never charge a frozen battery.

➢ For optimum operation of this smart inverter, please follow required specification to select appropriate cable size. It is very important to correctly operate this smart inverter.

➢ Be very cautious when working with metal tools on or around batteries. Dropping a tool may cause a spark or short circuit in batteries or other electrical parts, even cause an explosion.

➢ Please strictly follow installation procedure when you want to disconnect AC or DC terminals.

➢ Please refer to "Installation" section of this manual for the details.

➢ Grounding instructions - this smart inverter should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this smart inverter.

➢ Never cause AC output and DC input short circuited. Do not connect to the mains when DC input short circuits.

2. Product Introduction

This is a multifunctional smart inverter, combining functions of smart inverter, solar charger and battery charger to offer uninterruptible power support with portable size. Its comprehensive LCD display offers user configurable and easy accessible button operation such as battery charging, AC/solar charging, and acceptable input voltage based on different applications. If you need any clarification, please reach out our team at service@juststandout.com.

2.1 Product Overview
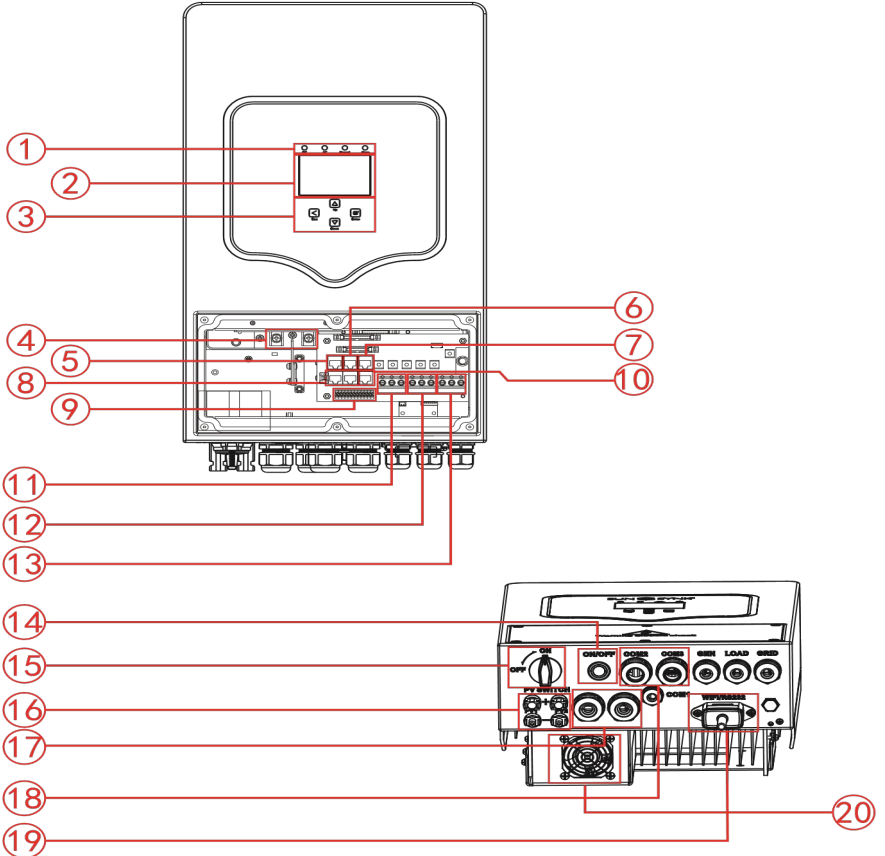
1: Smart inverter Indicators

2: LCD display

3: Function Buttons

4: Battery input connectors

5: BMS 485 Port

6: BMS CAN Port

7: DRMs Port

8: Parallel port

9: Function Port

10: RS 485 Port

11: Generator input

12: Load

13: Grid

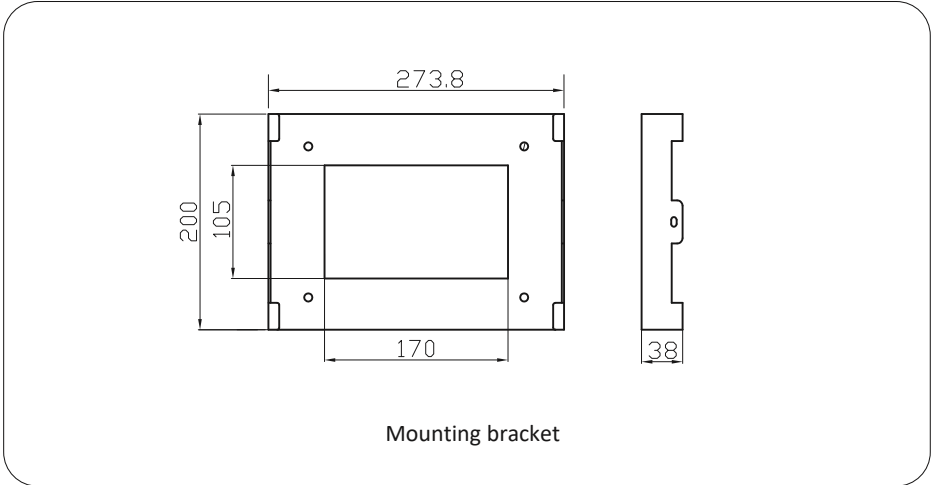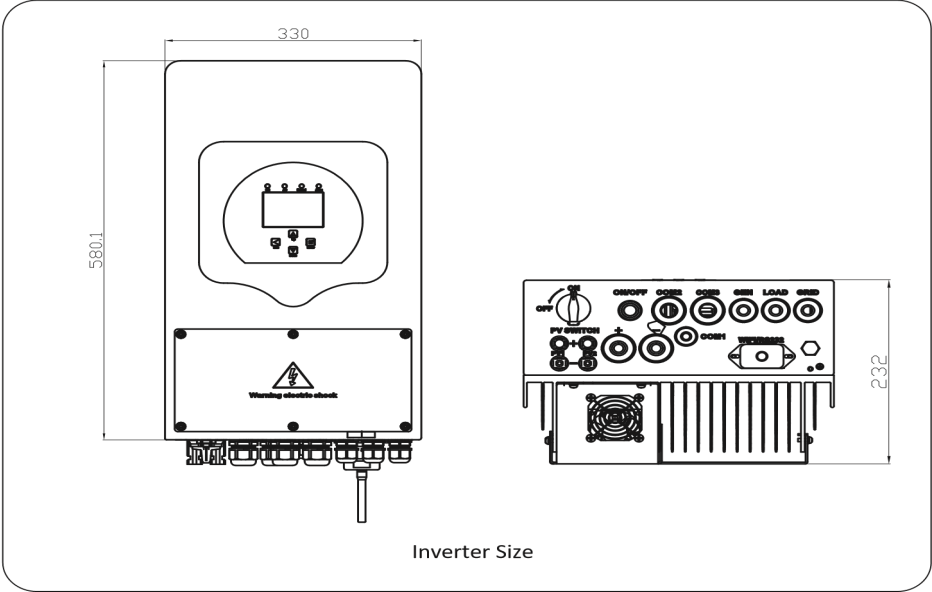14: Power on/off button

15: DC Switch

16: PV input with two MPPT

17: Battery

18: Temperature sensor

19: WiFi Interface

20: fan (*Note: For some hardware version, it doesn't have this fan)

2.2 Product Size

330

580.1

⚠️
Warning electric shock

OFF
ON/OFF COM2 COM3 GEN LOAD GRID
PV SWITCH
+ - + - COM1 WEINRANER

232

Inverter Size

273.8

200

105

170

38

Mounting bracket

2.3 Product Features

- Self-consumption and feed-in to the grid.
- Auto restart while AC is recovering.
- Programmable supply priority for battery or grid.
- Programmable multiple operation modes: On grid, off grid and UPS.
- Configurable battery charging current/voltage based on applications by LCD setting.
- Configurable AC/Solar/Generator Charger priority by LCD setting.
- Compatible with mains voltage or generator power.
- Overload/over temperature/short circuit protection.
- Smart battery charger design for optimized battery performance- With limit function,
  prevent excess power overflow to the grid.
- Supporting WiFi/GPRS monitoring and build-in 2 strings of MPP trackers
- Smart settable three stages MPPT charging for optimized battery performance.
- Time of use function.
- Smart Load Function.

2.4 Basic System Architecture

The following illustration shows basic application of this smart inverter.
It also includes following devices to have a Complete running system.
- Generator or Utility
- PV modules
Consult with your system integrator for other possible system architectures depending on
your requirements.
This smart inverter can power all kinds of appliances in home or office environment,
including motor type appliances such as refrigerator and air conditioner.
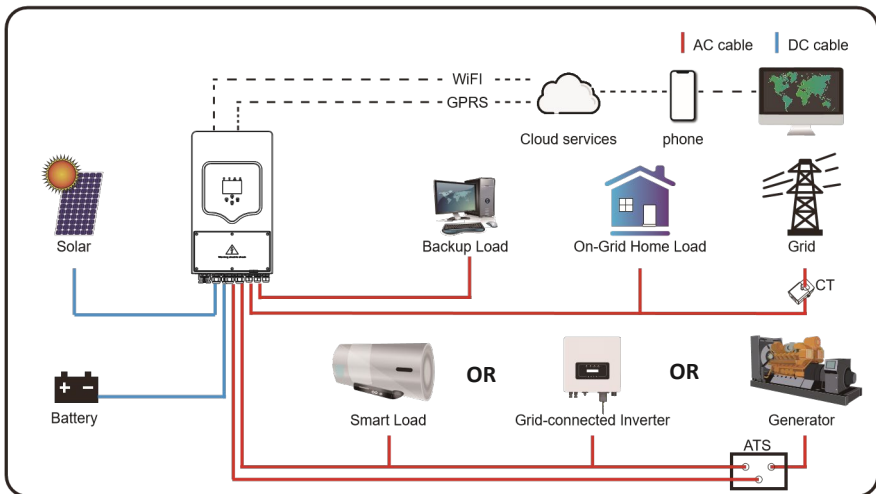
3. Installation

3.1 Parts List

Check the equipment before installation. Please make sure nothing is damaged in the package.
You should have received the items in the following package:

 Smart Hybrid inverter x1	 Wall mounting bracket x1	 Stainless steel anti-collision bolt M8×80 x4
 Stainless steel mounting screws M6*12 x2	 Parallel communication cable x1	 L-type Hexagon wrench x1
 User manual x1	 Wi-Fi/GPRS dongle x1	 Battery temperature sensor x1
 Sensor Clamp x 1		
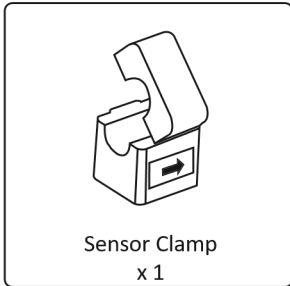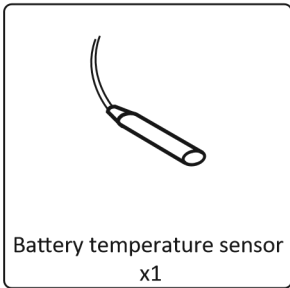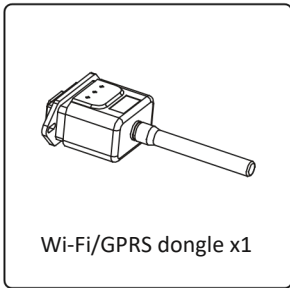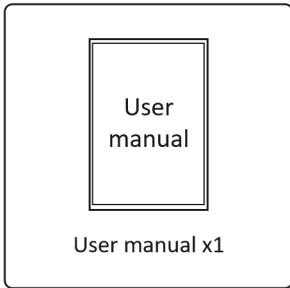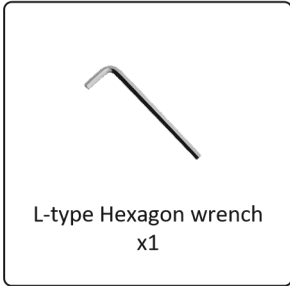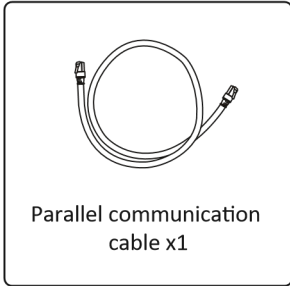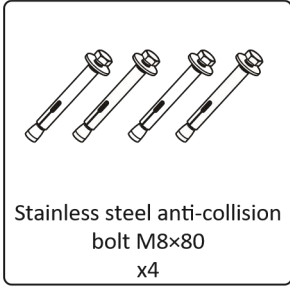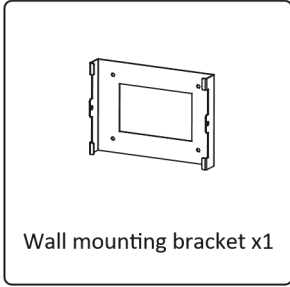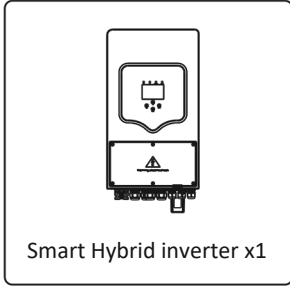
3.2 Mounting instructions
Installation Precaution

This Smart Hybrid inverter is designed for outdoor use(IP65), Please make sure the installation site meets below conditions:

- ➢ Not in direct sunlight
- ➢ Not in areas where highly flammable materials are stored.
- ➢ Not in potential explosive areas.
- ➢ Not in the cool air directly.
- ➢ Not near the television Antenna or antenna cable.
- ➢ Not higher than altitude of about 2000 meters above sea level.
- ➢ Not in environment of precipitation or humidity (>95%)

Please **AVOID** direct sunlight, rain exposure, snow laying up during installation and operation. Before connecting all wires, please take off the metal cover by removing screws as shown below:
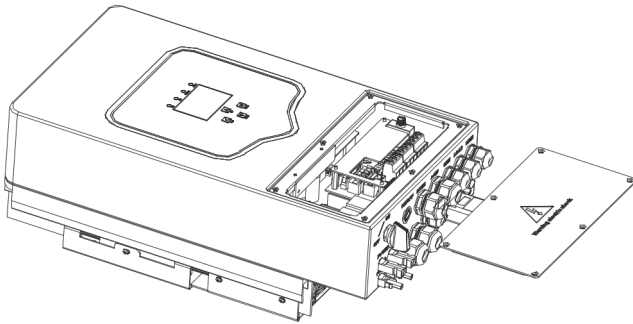
Consider the following points before selecting where to install:

- ➢ Please select a vertical wall with load-bearing capacity for installation, suitable for installation on concrete or other non-flammable surfaces, installation is shown below.
- ➢ Install this smart inverter at eye level in order to allow the LCD display to be read at all times.
- ➢ The ambient temperature should be between -25~60℃ to ensure optimal operation. Be sure to keep other objects and surfaces as shown in the diagram to guarantee sufficient heat dissipation and have enough space for removing wires.
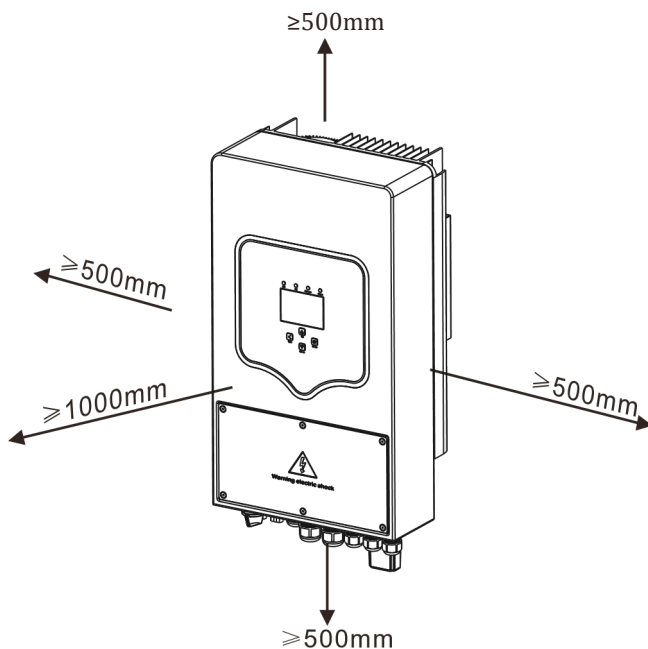
For proper air circulation to dissipate heat, allow a clearance of approximate 50cm to the side and approximate 50cm above and below the unit. And 100cm to the front.

Mounting the smart inverter

Remember that this smart inverter is heavy! Please be careful when lifting out from the package. Choose the recommend drill head (as shown in below pic) to drill 4 holes on the wall, 52-60mm deep.

1. Use a proper hammer to fit the expansion bolt into the holes.
2. Lift the smart inverter and hold it, make sure the hanger aims at the expansion bolt, then fix the smart inverter on the wall.
3. Fasten the screw head of the expansion bolt to finish the mounting.
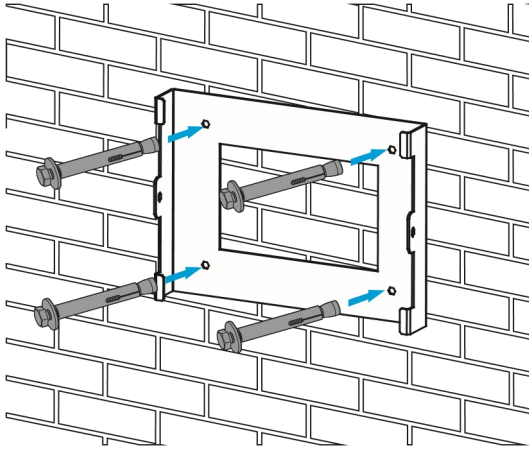
Inverter hanging plate installation
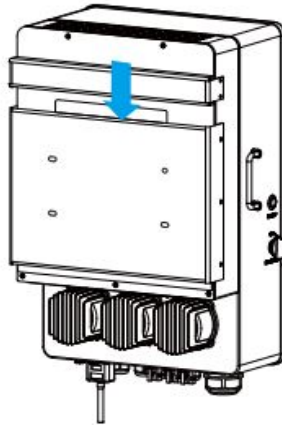
3.3 Battery connection

For safe operation and compliance, a separate DC over-current protector or disconnect device is required between the battery and the smart inverter. In some applications, switching devices may not be required but over-current protectors are still required. Refer to the typical amperage in the table below for the required fuse or circuit breaker size.

Model	Wire Size	Cable(mm)^2	Torque value(max)
12kW	1/0AWG	60	24.5Nm

Chart 3-2 Cable size

Please follow the steps below to connect the battery:
1. Please choose a suitable battery cable and the correct cable lug that can fit the battery terminals.
2. Use a suitable screwdriver to unscrew the bolts and fit the battery cable lug in, then fasten the bolt by the screwdriver, make sure the bolts are tightened with torque of 24.5 N.m in clockwise direction.
3. Make sure polarity at both the battery and smart inverter is correctly connected.
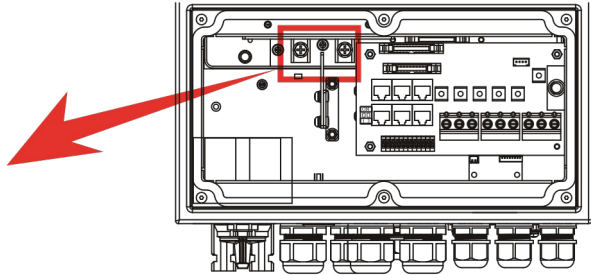
For 8kW model, battery connector screw size: M10

4. To prevent children touching or insects going into the smart inverter, please make sure the smart inverter connector is fastened to waterproof position by twisting it clockwise.

3.3.2 Function port definition

Inverter

Parallel A: Parallel communication port 1 (CAN interface).
Parallel B: Parallel communication port 2 (CAN interface).
Meter_485: for energy meter communication.
ModeBUS: Reserved.
BMS: BMS port for battery communication(CAN/RS485).

CN1:

TEMP (1,2): battery temperature sensor for lead acid battery.
CT-L1 (3,4): current transformer (CT1) for"zero export to CT"mode clamps on L1 when in three phase system.
CT-L2 (5,6): current transformer (CT2) for"zero export to CT"mode clamps on L2 when in three phase system.
CT-L3 (7,8): current transformer (CT3) for"zero export to CT"mode clamps on L3 when in three phase system.

CN2:

G-start (1,2): dry contact signal for startup the diesel generator.
When the "GEN signal" is active, the open contact (GS) will switch on (no voltage output).
G-valve (3,4): reserved.
Grid_Ry(5,6): 230V output port when inverter is on
RSD (7,8): provide 12Vdc output when inverter is on.

GS (diesel generator startup signal)

3.3.3 Temperature sensor connection for lead-acid battery

Temp. sensor
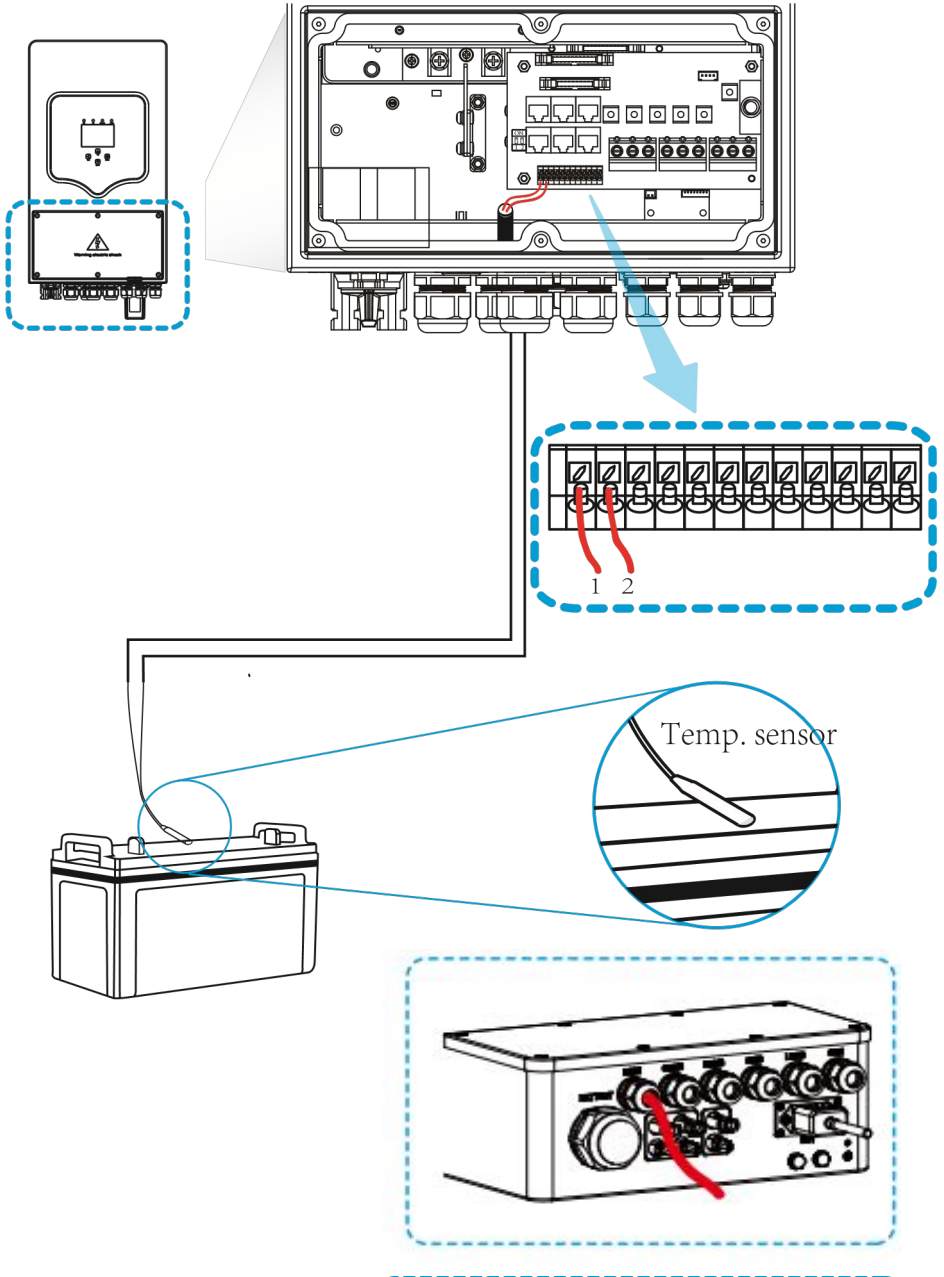
3.4 Grid connection and backup load connection

Before connecting to grid, please install a separate AC breaker between smart inverter and grid. Also, it is recommended that you install an AC breaker between backup load and smart inverter. This will ensure that the smart inverter can be securely disconnected during maintenance and fully protected from over current. For the 8kW model, the recommended AC breaker for backup load is 20A.

There are three terminal blocks with "Grid" "Load" and "GEN" markings. Please do not misconnect input and output connectors.

> ⚠️ All wiring must be performed by a **qualified personnel**. It is very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable as below.

Model	Wire Size	Cable(mm)²	Torque value(max)
12kW	11AWG	4	1.2Nm

Chart 3-3 Recommended Size for AC wires

Please follow below steps to implement AC input/output connection:

1. Before making Grid, load and Gen port connection, be sure to turn off or disconnect AC breaker.
2. Remove insulation sleeve 10mm length, unscrew the bolts, insert the wires according to polarities indicated on the terminal block and tighten the terminal screws. Make sure the connection is tight.

GRID   LOAD GEN PORT
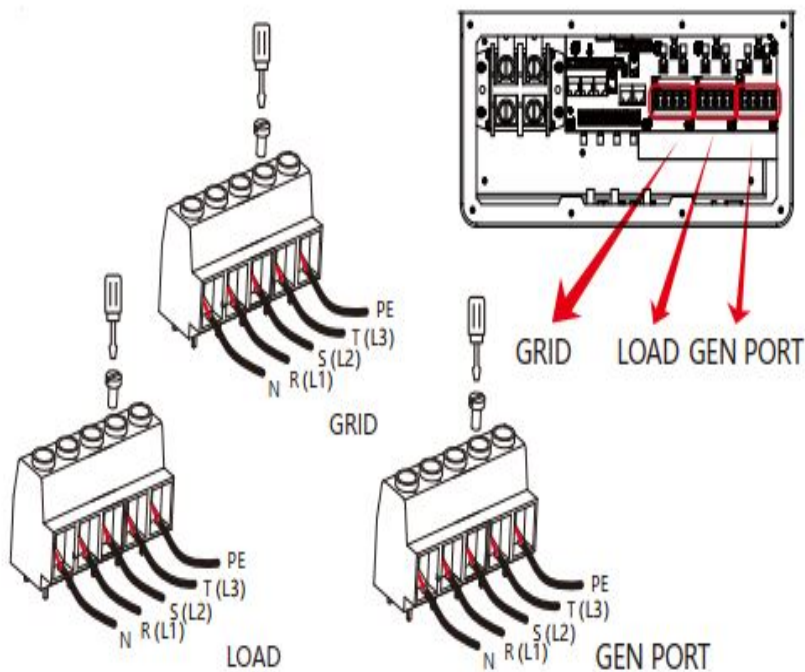
⚠ Be sure that AC power source is disconnected before attempting to connect it to the unit.

3. Then, insert AC output wires according to polarities indicated on the terminal block and tighten the terminal. Be sure to connect corresponding N wires and PE wires to related terminals as well.
4. Make sure the wires are securely connected.
5. Appliances such as air conditioner are required at least 2-3 minutes to restart because it is required to have enough time to balance refrigerant gas inside of circuit. If a power shortage occurs and recovers in short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check with the manufacturer of the air conditioner, if it is equipped with time-delay function before installation. Otherwise, this smart inverter will trigger overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner

3.5 PV Connection

Before connecting to PV modules, please install a separately DC circuit breaker between smart inverter and PV modules. It is very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

Model	Wire Size	Cable(mm)^2
8kW	12AWG	4

Chart 3-4 Cable size

⚠️ To avoid any malfunction, do not connect any PV modules with possible current leakage to the smart inverter. For example, grounded PV modules will cause current leakage to the smart inverter. When using PV modules, please be sure PV+ and PV- are not grounded

⚠️ It is requested to use PV junction box with surge protection. Otherwise, it will cause damage on smart inverter when lightning occurs on PV modules.

3.5.1 PV Module Selection:

When selecting proper PV modules, please be sure to consider the parameters below:
1) Open circuit Voltage (Voc) of PV modules does not exceeds maximum PV array open circuit voltage of smart inverter.
2) Open circuit Voltage (Voc) of PV modules should be higher than minimum start voltage.

Smart inverter Model	12kW
PV Input Voltage	550V (150V~800V)
PV Array MPPT Voltage Range	200V-650V
No. of MPP Trackers	2
No. of Strings per MPP Tracker	2+1

Chart 3-5

3.5.2 PV Module Wire Connection

1. Switch the Grid Supply Main Switch(AC)OFF.
2. Switch the DC Isolator OFF.
3. Assemble PV input connector to the inverter.

Safety Hint:
Please don't connect PV array positive or negative pole to the ground, it could cause serious damages to the inverter.

Safety Hint:
Before connection, please make sure the polarity of the output voltage of PV array matches the "DC+" and "DC-" symbols.

Safety Hint:
Before connecting inverter, please make sure the PV array open circuit voltage is within the 1000V of the inverter.

Pic 3.1 DC+connector (MC4)   Pic 3.2 DC-connector (MC4)

Cable type	Cross section （mm²）	
	Range	Recommended value
Industry generic PV cable (model: PV1-F)	4.0~6.0 (12~10AWG)	4.0(12AWG)

Chart 3-6

The steps to assemble the DC connectors are listed as follows:
a) Strip off the DC wire about 7mm, disassemble the connector cap nut (see picture 5.3).

7mm

7mm

Pic 3.3 Disassemble the connector cap nut
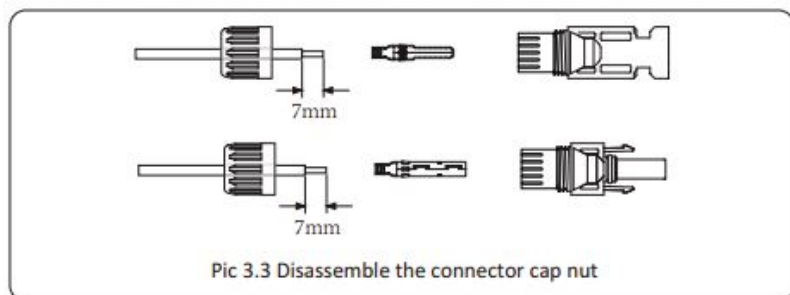
b) Crimping metal terminals with crimping pliers as shown in picture 5.4.

Crimping plier

Pic 3.4 Crimp the contact pin to the wire
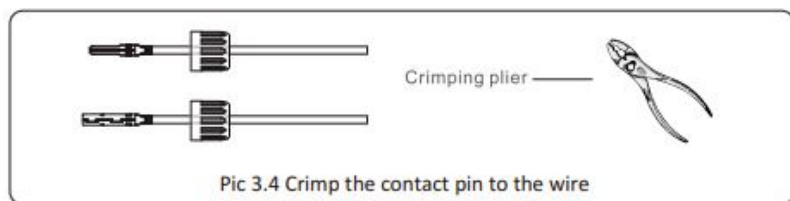
c) Insert the contact pin to the top part of the connector and screw up the cap nut to the top part of the connector. (as shown in picture 5.5).

3.6 CT Connection

Inverter

White wire ——— Black wire
3 4 5 6 7 8

N R S T PE

N

R
CT1

S
CT2

T
CT3

N
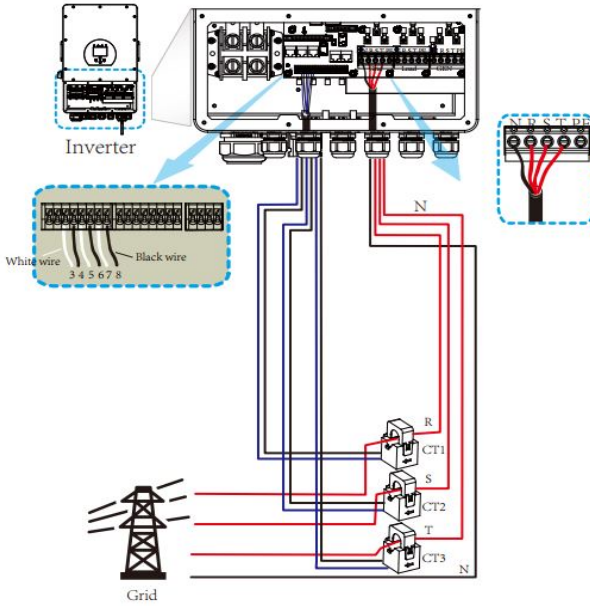
Grid

*Note: when the inverter is in the off-grid state, the N line needs to be connected to the earth.

3.7 Earth Connection(mandatory)

Ground cable should be connected to ground plate on grid side this prevents electric shock, if the original protective conductor fails.
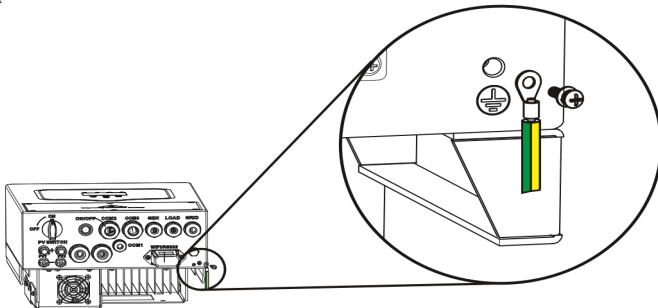
3.8 WiFi Connection

For the configuration of Wi-Fi Plug, please refer to illustrations of the Wi-Fi Plug.

3.9 Wiring System for Smart inverter

This diagram is an example for an application that neutral connects with the PE in a distribution box.

For countries such as Australia, New Zealand, South Africa, etc., please follow local wiring regulations!
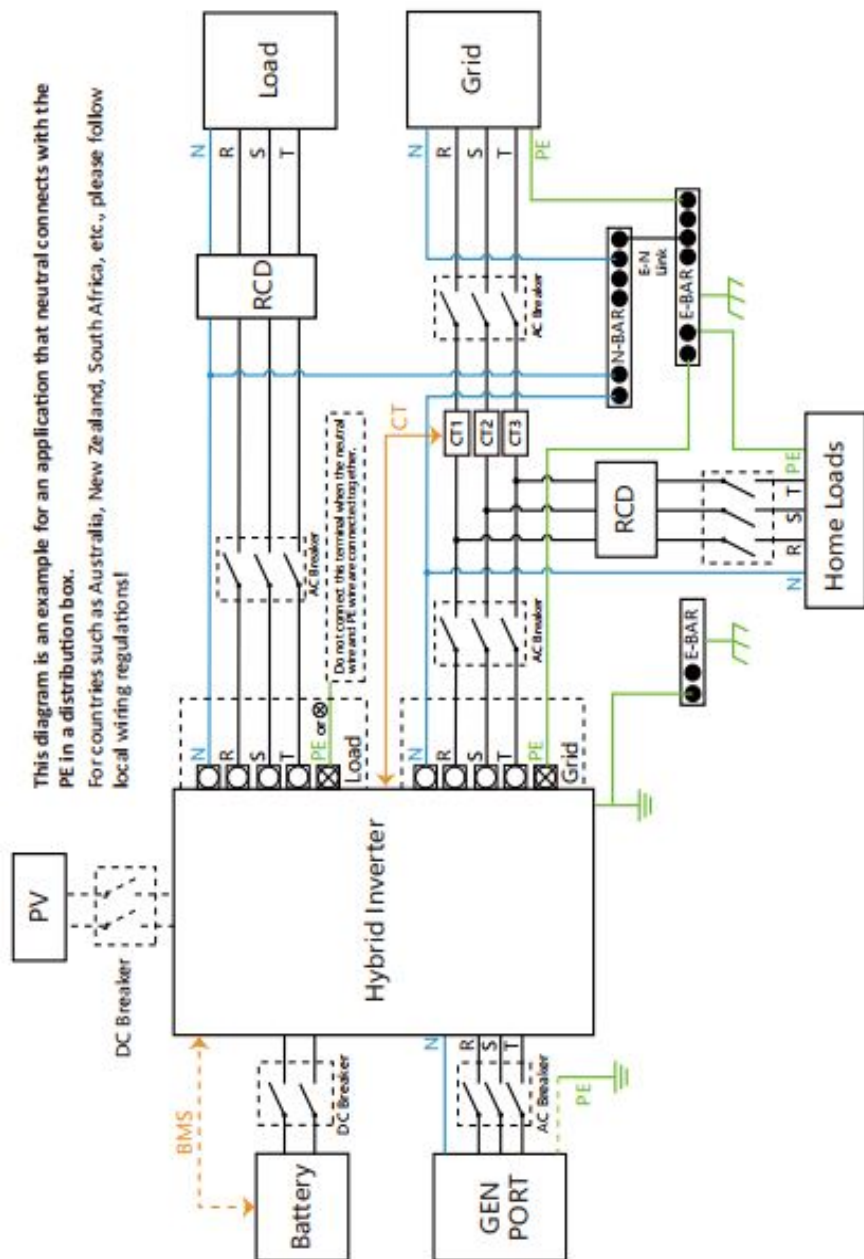
3.10 Wiring diagram
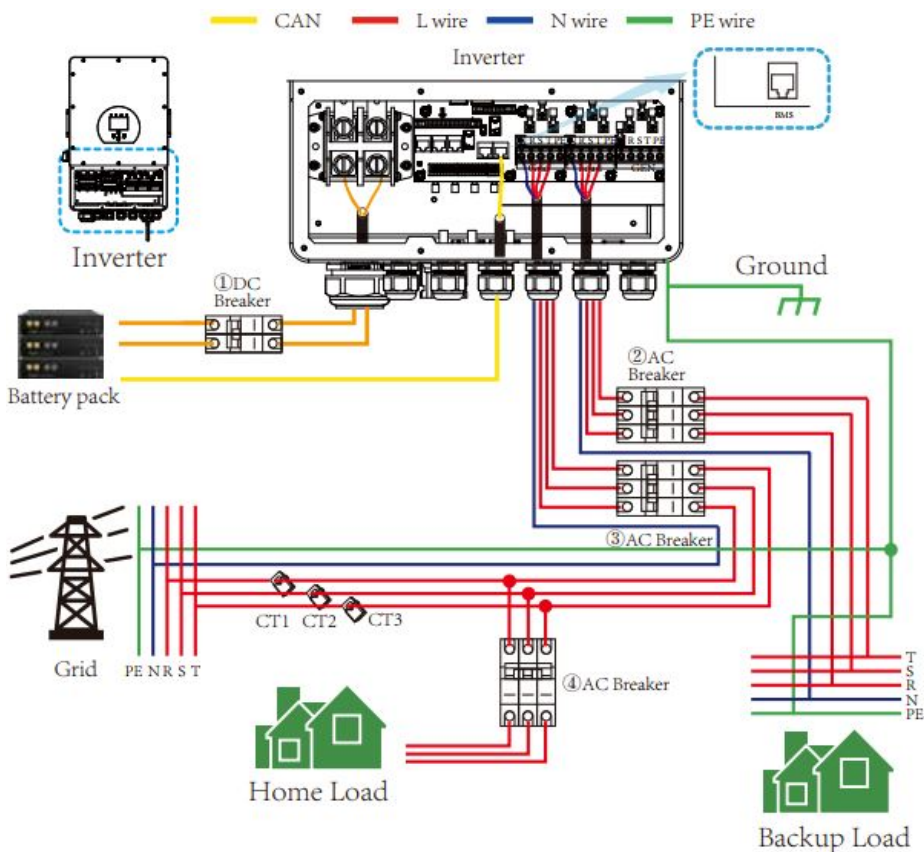
① DC Breaker for battery
JSO12048156: 250A DC breaker

② AC Breaker for grid and backup load
JSO12048156: 80A AC breaker

③ ④ AC Breaker for grid and backup load
JSO12048156: 20A AC breaker

3.11 Phase parallel connection diagram

CAN — L wire — N wire — PE wire

Inverter No.3 (slave)

Inverter No.2 (slave)

Inverter No.1 (master)

Inverter

Battery pack

Ground

Grid   PE N R S T

CT1 CT2 CT3

Home Load

Backup Load

1,2,3. DC Breaker for battery
JSO 12048156
4,6,8. AC Breaker for grid port
JSO 12048156
579 AC Breaker for backup load
JSO 12048156
10. AC Breaker
Depends on household loads
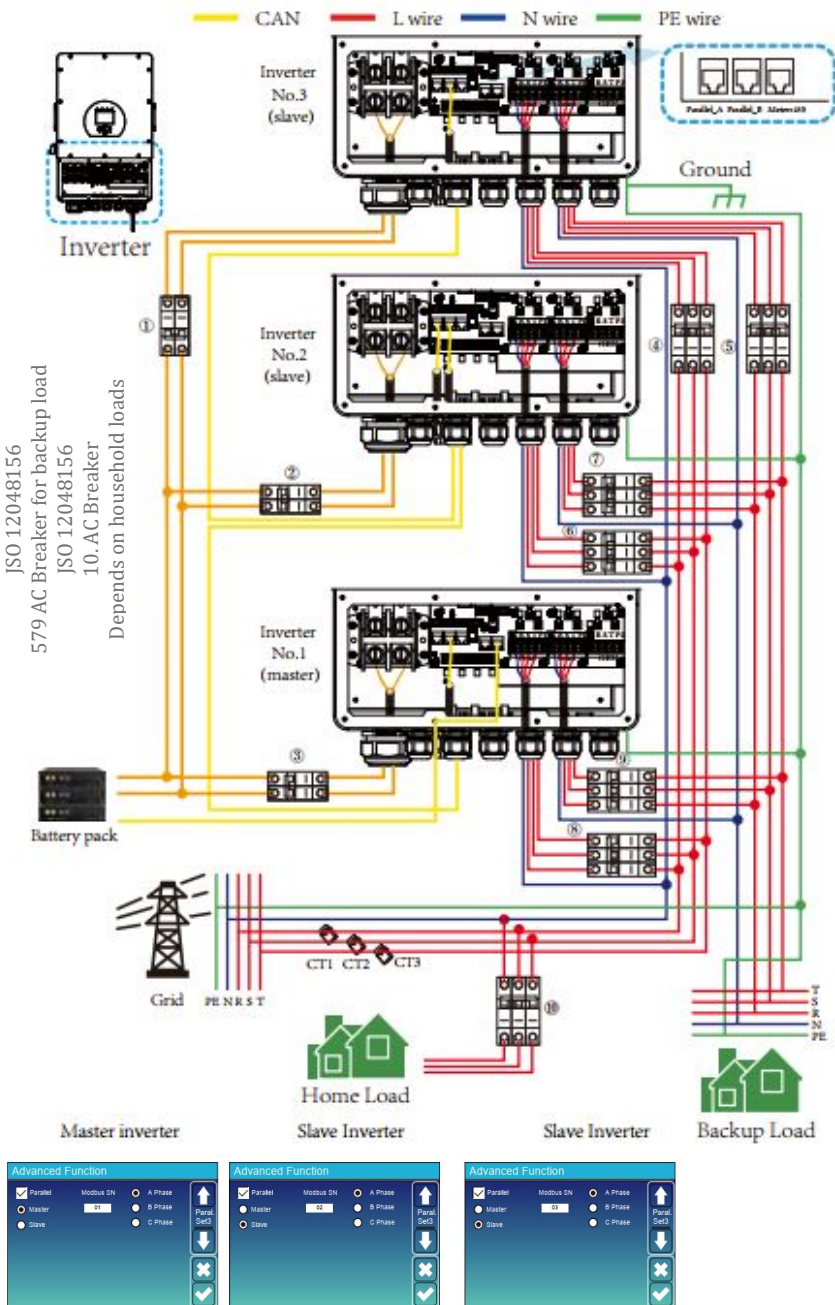
* Paralleling operation function is developing, and it will be avaiable soon.

Master inverter   Slave Inverter   Slave Inverter

Advanced Function
☑ Parallel   Modbus SN   ○ A Phase
○ Master   01   ● B Phase
● Slave   ● C Phase
Paral. Set3

Advanced Function
☑ Parallel   Modbus SN   ○ A Phase
● Master   02   ● B Phase
○ Slave   ● C Phase
Paral. Set3

Advanced Function
☑ Parallel   Modbus SN   ○ A Phase
● Master   03   ● B Phase
○ Slave   ● C Phase
Paral. Set3

4. OPERATION

4.1 Power ON/OFF

Once the unit has been properly installed and the batteries are connected well, simply press On/Off button (located on the left side of the case) to turn on the unit. When system is not connected to a battery, but connect with either PV or grid, and ON/OFF button is switched off, LCD will still light up (Display will show OFF), In this condition, when switched on, by pressing on the ON/OFF button, select NO battery, so system can still work.

4.2 Operation and Display Panel

The operation and display panel, shown in the chart below, is on the front panel of the smart inverter. It includes four indicators, four function keys and a LCD display, indicating the operating status and input/output power information.

LED Indicator		Messages
DC	Green led solid light	PV Connection normal
AC	Green led solid light	Grid Connection normal
Normal	Green led solid light	Smart inverter operating normal
Alarm	Red led solid light	Malfunction or warning

Chart 4-1 LED indicators

Function Key	Description
Esc	To exit setting mode
Up	To go to previous selection
Down	To go to next selection
Enter	To confirm the selection

Chart 4-2 Function Buttons

5. LCD Display Icons

5.1 Main Screen
The LCD is touchscreen; the screen below shows the overall information of the smart inverter.
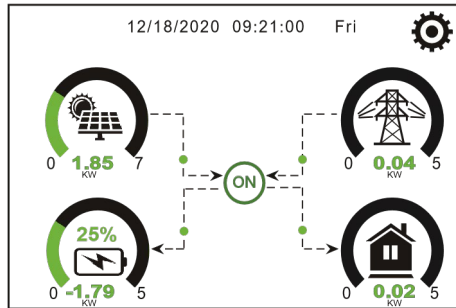
1. The icon in the center of the home screen indicates that the system is in the 'Normal operation" mode. If it turns into "comm./FXX", it means the smart inverter has communication error or other errors, the error message will display under this icon (FXX errors, detail error info can be viewed in the System Alarms menu).

2. At the top of the screen is the time.

3.System Setup Icon, press this set button, you can enter into the system setup screen which including Basic Setup, Battery Setup, Grid Setup, System Work Mode, Generator port use, Advanced function and Li-Ba info.

4. The main screen shows the information which includes Solar, Grid, Load and Battery. It's also displaying the energy flow direction by arrow. When the power is approximate too high level, the color on the panels will change from green to red. The system information is displayed clearly on the main screen.

➢ PV power and Load power should always be kept positive.
➢ When Grid power is negative, it means "you are selling to the grid; while positive means you are "getting power from grid".
➢ When Battery power is negative, it means "Battery is charging", when positive it means "Battery is being discharged".

5.1.1 LCD operation flow chart

```
                 Solar Page  ⇄  Solar Graph

                 Grid Page   ⇄  Grid Graph

                 Smart inverter

Main Screen      Battery Page ⇄  BMS Page

                 Load Page   →  Load Graph


                              Battery Setting

                              System Work Mode

                              Grid Setting

System Setup  ⇄               Gen Port Use

                              Basic Setting

                              Advanced Function

                              Device info
```

5.2 Solar Power Curve

Solar

Power: 1560W	①	Today=8.0 KWH ③
PV1-V: 286V PV2-V: 45V	②	Total =12.00 KWH
PV1-I: 5.5A PV2-I: 0.0A		
P1: 1559W P2: 1W		
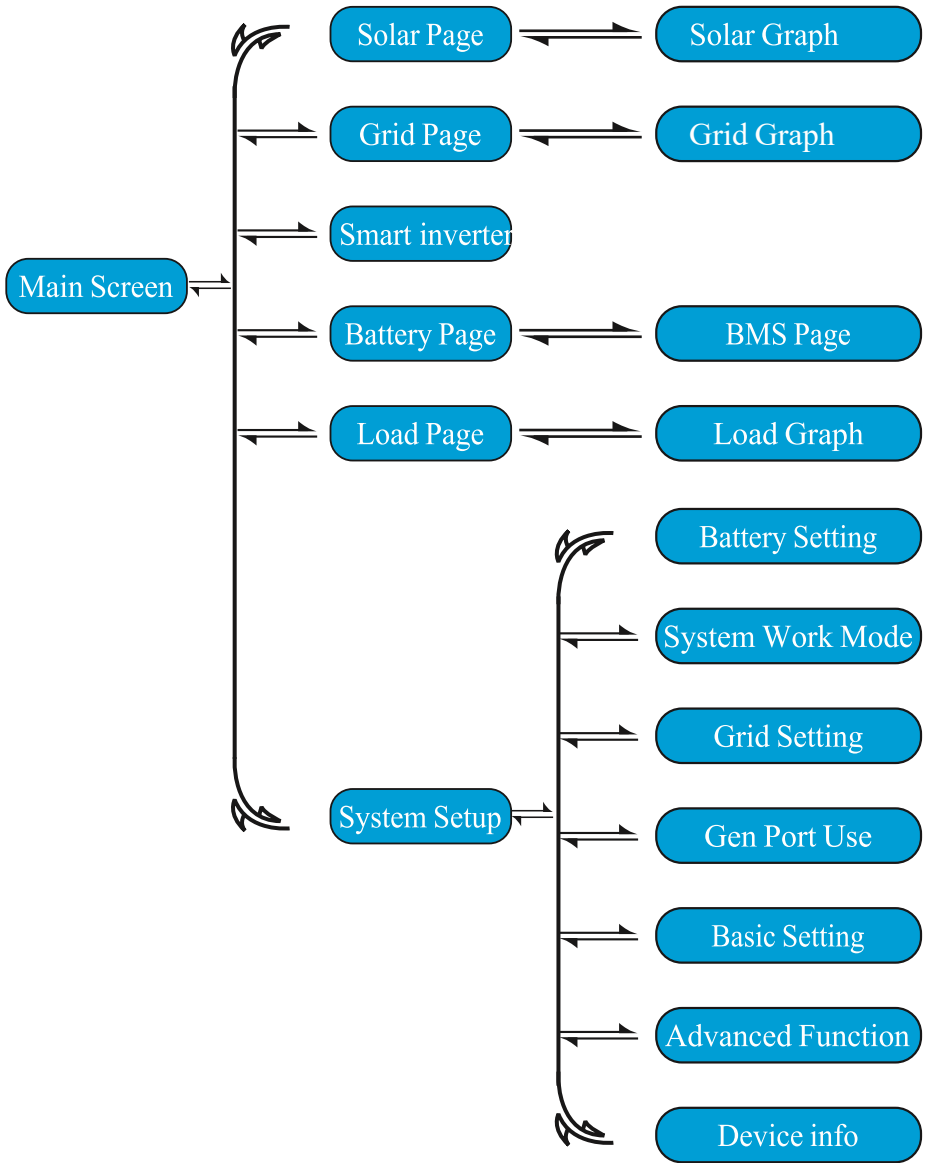
Energy

This is Solar Panel detail page.
① Solar Panel Generation.
② Voltage, Current, Power for each MPPT.
③ Solar Panel energy for Day and Total.

Press the "Energy" button to enter into the power curve page

Inverter

Power: 44W	①	DC-T:52.6C ③
L1: 240V	②	AC-T:41.0C
I1:0.6A		

This is Inverter detail page.
① Inverter Generation.
② Voltage, Current, Power for each Phase.
③ *DC-T: mean DC-DC temperature,
    AC-T: mean Heat-sink temperature.

*Note: this part info is not available for some LCD FW

Load

Power: 0W	①	Today=0.0 KWH ③
L: 0V	②	Total =0.40 KWH

Energy

This is Back-up Load detail page.
① Back-up Power.
② Voltage, Power for each Phase.
③ Back-up consumption for Day and Total.

Press the "Energy" button to enter into the power curve page

Grid

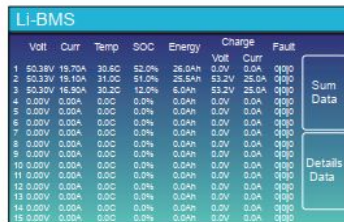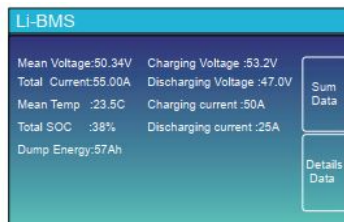|		
Stand-by	①	BUY ③
Power: 0W		Today=2.2KWH
0.0Hz		Total =11.60 KWH
		SELL
0V 0.0A	②	Today=0.0KWH
CT: 0W		Total =8.60 KWH
LD: 0W		

Energy

This is Grid detail page.
① Status, Power, Frequency.
② L: Voltage for each Phase
    CT: Power detected by the external current sensors
    LD: Power detected using internal sensors on AC grid in/out breaker
③ BUY: Energy from Grid to Inverter,
    SELL: Energy from Inverter to grid.
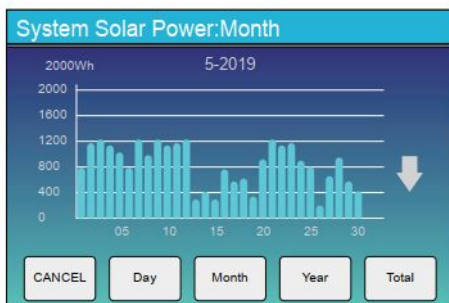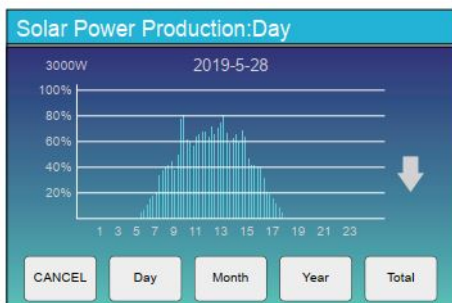
Press the "Energy" button to enter into the power curve page

Batt

Stand-by

SOC: 36%

U:50.50V

I:-58.02A

Power: -2930W

Temp:30.0C

Li-BMS
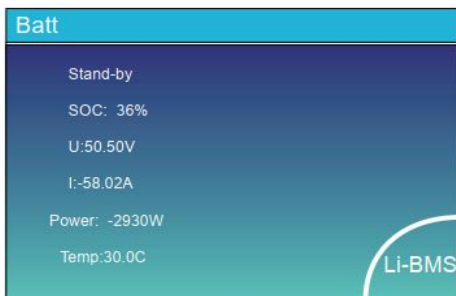
This is Battery detail page.

if you use Lithium Battery, you can enter BMS page.

Li-BMS

Mean Voltage:50.34V   Charging Voltage :53.2V

Total Current:55.00A   Discharging Voltage :47.0V

Mean Temp   :23.5C   Charging current :50A

Total SOC   :38%   Discharging current :25A

Dump Energy:57Ah

Sum Data

Details Data

Li-BMS

	Volt	Curr	Temp	SOC	Energy	Charge Volt	Curr	Fault	
1	50.38V	19.70A	30.6C	52.0%	26.0Ah	0.0V	0.0A	0|0|0	
2	50.33V	19.10A	31.0C	51.0%	25.5Ah	53.2V	25.0A	0|0|0	
3	50.30V	16.90A	30.2C	12.0%	6.0Ah	53.2V	25.0A	0|0|0	Sum Data
4	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A	0|0|0	
5	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A	0|0|0	
6	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A	0|0|0	
7	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A	0|0|0	
8	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A	0|0|0	
9	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A	0|0|0	
10	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A	0|0|0	
11	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A	0|0|0	Details Data
12	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A	0|0|0	
13	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A	0|0|0	
14	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A	0|0|0	
15	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A	0|0|0	

5.3 Curve Page-Solar & Load & Grid

Solar Power Production:Day

3000W   2019-5-28

CANCEL   Day   Month   Year   Total

System Solar Power:Month

2000Wh   5-2019

CANCEL   Day   Month   Year   Total

System Solar Power:Year

KWh   2019

CANCEL   Day   Month   Year   Total

System Grid Power:Total

2000KWh   TOTAL

CANCEL   Day   Month   Year   Total
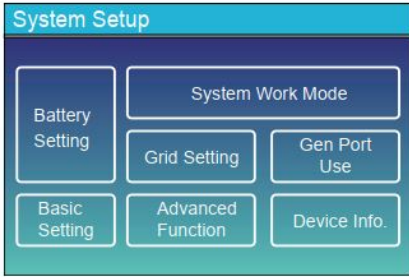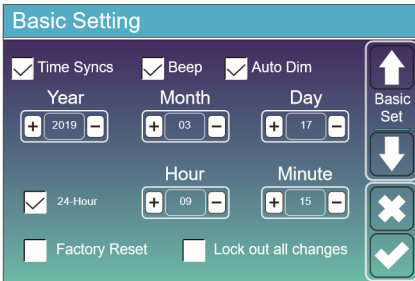
Solar power curve for daily, monthly, yearly and total can be roughly checked on the LCD, for more accuracy power generation, please check on the monitoring system. Click the up and down arrow to check power curve of different period.

5.4 System Setup Menu

System Setup	This is System Setup page.
Battery Setting · System Work Mode · Grid Setting · Gen Port Use · Basic Setting · Advanced Function · Device Info.	

5.5 Basic Setup Menu

Basic Setting

Time Syncs Beep Auto Dim

Year	Month	Day
+ 2019 −	+ 03 −	+ 17 −

Hour	Minute
24-Hour	+ 09 −	+ 15 −

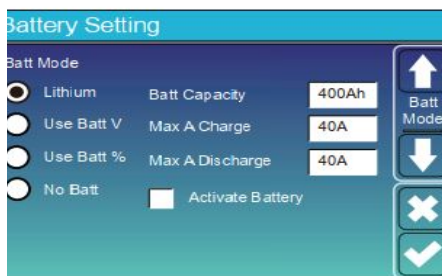Factory Reset   Lock out all changes

Basic Set

Factory Reset: Reset all parameters of the inverter.
Lock out all changes: Enable this menu for setting parameters that require locking and cannot be set up. Before performing a successful factory reset and locking the systems, to keep all changes you need to type in a password to enable the setting.
The password for factory settings is 9999 and for lock out is 7777.

PassWord

X--X--X--X	DEL
1	2	3
4	5	6
7	8	9
CANCEL	0	OK
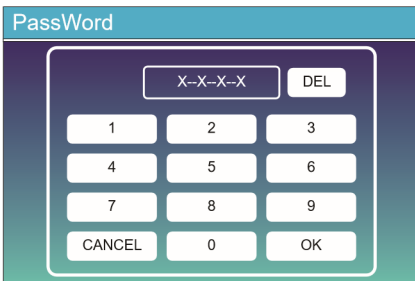
Factory Reset Password: 9999

Lock out all changes PassWork: 7777

5.6 Battery Setup Menu

Battery Setting

Batt Mode			
● Lithium	Batt Capacity	400Ah	Batt Mode
○ Use Batt V	Max A Charge	40A	
○ Use Batt %	Max A Discharge	40A	
○ No Batt	☐ Activate Battery		

Battery capacity: it tells JSO smart hybrid smart inverter to know your battery bank size.

Use Batt V: Use Battery Voltage for all the settings (V).

Use Batt %: Use Battery SOC for all the settings (%).

Max. A charge/discharge: Max battery charge/discharge current (0-115A for 8Kw model). For AGM and Flooded, we recommend
Ah battery size x 20%= Charge/Discharge amps.
. For Lithium, we recommend Ah battery size x 50% = Charge/Discharge amps.
. For Gel, follow manufacturer' s instructions.

No Batt: tick this item if no battery is connected to the system.

Active battery: This feature will help recover a battery that is over discharged by slowly charging from the solar array or grid.

Battery Setting

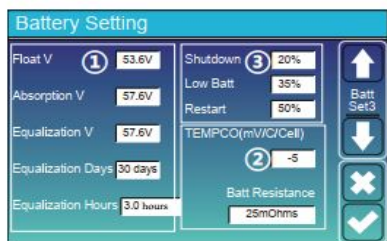| Start	30%	30% ②	Batt Set2
A ①	40A	40A	
☐ Gen Charge		☐ Grid Charge	
☐ Gen Signal		☐ Grid Signal	
Gen Max Run Time	0.0 hours ③		
Gen Down Time	0.5 hours		

This is Grid Charge, ②

Start =30%: No use, Just for customization.

A = 40A: It indicates the Current that the Grid charges the Battery.

Grid Charge: It indicates that the grid charges the battery.
Grid Signal: Disable.

This is Battery Setup page. ① ③

Start =30%: Percent S.O.C at 30% system will AutoStart a connected generator to charge the battery bank.

A = 40A: Charge rate of 40A from the attached generator in Amps.

Gen Charge: uses the gen input of the system to charge battery bank from an attached generator. fall

Gen Signal: Normally open relay that closes when the Gen Start signal state is active.

Gen Max Run Time: It indicates the longest time Generator can run in one day, when time is up, the Generator will be turned off. 24H means that it does not shut down all the time.

Gen Down Time: It indicates the delay time of the Generator to shut down after it has reached the running time.

Battery Setting

Float V ①	53.6V	Shutdown ③ 20%	Batt Set3
Absorption V	57.6V	Low Batt 35%	
Equalization V	57.6V	Restart 50%	
Equalization Days	30 days	TEMPCO(mV/C/Cell)	
Equalization Hours	3.0 hours	② -5	
		Batt Resistance	
		25mOhms	

There are 3 stages of charging the Battery . ①

This is for professional installers, you can keep it if you do not know. ②

Shutdown 20%: The inverter will shutdown if the SOC below this value.
Low Batt 35%: The inverter will alarm if the SOC below this value. ③
Restart 50%: Battery SOC at 50% AC output will resume.

Recommended battery settings

Battery Type	Absorption Stage	Float Stage	Torque value (every 30 days 3hr)
AGM (or PCC)	14.2v (57.6v)	13.4v (53.6v)	14.2v(57.6v)
Gel	14.1v (56.4v)	13.5v (54.0v)	
Wet	14.7v (59.0v)	13.7v (55.0v)	14.7v(59.0v)
Lithium	Follow its BMS voltage parameters		

5.7 System Work Mode Setup Menu

System Work Mode

○ Selling First [5000] Max Solar Power

◉ Zero Export To Load ☑ Solar Sell

○ Zero Export To CT ☑ Solar Sell

Max Sell Power [5000] Zero-export Power [20]

Energy pattern ☑ BattFirst ☐ LoadFirst

☑ Grid Peak Shaving [5000] Power

Work Mode1

Work Mode

Selling First: This Mode allows hybrid inverter to sell back any excess power produced by the solar panels to the grid. If time of use is active, the battery energy also can be sold into grid.

The PV energy will be used to power the load and charge the battery and then excess energy will flow to grid. Power source priority for the load is as follows:

1. Solar Panels.
2. Grid.
3. Batteries (until programable % discharge is reached).

Zero Export To Load: Hybrid inverter will only provide power to the backup load connected. The hybrid inverter will neither provide power to the home load nor sell power to grid. The built-in CT will detect power flowing back to the grid and will reduce the power of the inverter only to supply the local load and charge the battery.

Solar Backup Load On-Grid Home Load Grid
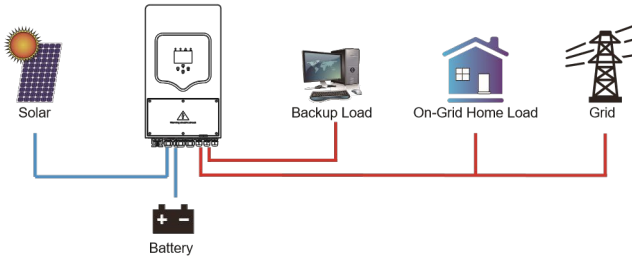
Battery

Zero Export To CT: Hybrid inverter will not only provide power to the backup load connected but also give power to the home load connected. If PV power and battery power is insufficient, it will take grid energy as supplement. The hybrid inverter will not sell power to grid. In this mode, a CT is needed. The installation method of the CT please refer to chapter 3.6 CT Connection. The external CT will detect power flowing back to the grid and will reduce the power of the inverter only to supply the local load, charge battery and home load.

Solar Backup Load On-Grid Home Load Grid CT
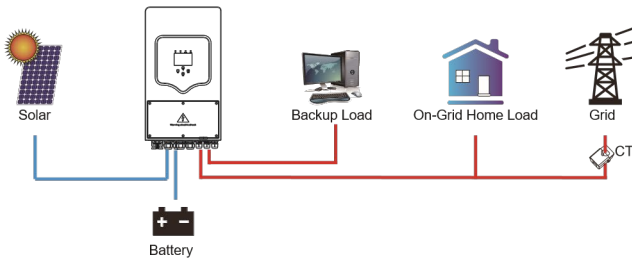
Battery

Solar Sell: "Solar sell" is for Zero export to load or Zero export to CT: when this item is active, the surplus energy can be sold back to grid. When it is active, PV Power source priority usage is as follows: load consumption and charge battery and feed into grid.

Max. sell power: Allowed the maximum output power to flow to grid.

Zero-export Power: for zero-export mode, it tells the grid output power. Recommend to set it as 20-100W to ensure the hybrid smart inverter won' t feed power to grid.

Energy Pattern: PV Power source priority.

Battery First: PV power is firstly used to charge the battery and then used to power the load. If PV power is insufficient, grid will make supplement for battery and load simultaneously.

Load First: PV power is firstly used to power the load and then used to charge the battery. If PV power is insufficient, grid will make supplement for battery and load simultaneously.

Max Solar Power: allowed the maximum DC input power.

Grid Peak-shaving: when it is active, grid output power will be limited within the set value. If the load power exceeds the allowed value, it will take PV energy and battery as supplement. If still can't meet the load requirement, grid power will increase to meet the load needs.

Time of use: it is used to program when to use grid or generator to charge the battery, and when to discharge the battery to power the load. Only tick "Time Of Use" then the follow items (Grid, charge, time, power etc.) will take effect.

Note: when in selling first mode and click time of use, the battery power can be sold into grid.

Grid charge: utilize grid to charge the battery in a time period.

Gen charge: utilize diesel generator to charge the battery in a time period.

Time: real time, range of 01:00-24:00.

Power: Max. discharge power of battery allowed.

Batt(V or SOC %): battery SOC % or voltage at when the action is to happen.

For example:

During 01:00-05:00, when battery SOC is lower than 80%, it will use grid to charge the battery until battery SOC reaches 80%.

During 05:00-08:00 and 08:00-10:00, when battery SOC is higher than 40%, hybrid inverter will discharge the battery until the SOC reaches 40%.

During 10:00-15:00, when battery SOC is higher than 80%, hybrid inverter will discharge the battery until the SOC reaches 80%.

During 15:00-18:00, when battery SOC is higher than 40%, hybrid inverter will discharge the battery until the SOC reaches 40%.

During 18:00-01:00, when battery SOC is higher than 35%, hybrid inverter will discharge the battery until the SOC reaches 35%.

5.8 Grid Setup Menu

Grid Setting

Grid Mode
- General Standard
- UL1741 & IEEE1547
- CPUC RULE21
- SRD-UL-1741

Grid Type
- 220V Single Phase
- 120/240V Split Phase
- 120/208V 3 Phase
- 120V Single Phase

Please select the correct Grid Mode in your local area. If you are not sure, please choose General Standard.

Please select the correct Grid Type in your local area, otherwise the machine will not work or be damaged.

Grid Setting

Grid Frequency
- 50HZ
- 60HZ

Reconnection Time `60S` PF `1.000`

Grid HZ High `53.0Hz` Grid Vol High `265.0V`

Grid HZ Low `49.0Hz` Grid Vol Low `185.0V`

UL1741&IEEE1547, CPUC RULE21, SRD-UL-1741

No need to set the function of this interface.

General Standard

Please select the correct Grid Frequency in your local area.
You can hole this in default value.

Grid Setting

☐ Q(V) ☐ FW ☐ VW

V1:0.0V Q1:0.00 Fstart:0.00Hz Vstart:0.0V

V2:0.0V Q2:0.00 Fstop:0.00Hz Vstop:0.0V

V3:0.0V Q3:0.00 Normal Ramp rate `0.0%/s`

V4:0.0V Q4:0.00 Soft Start Ramp rate `0.0%/s`

For California only.

Grid Setting

☐ L/HVRT ☐ L/HFRT

HV2:0.0V 0.16S

HV1:0.0V 0.16S HF2:0.00HZ 0.16S

LV1:0.0V 0.16S HF1:0.00HZ 0.16S

LV2:0.0V 0.16S LF1:0.00HZ 0.16S

LV3:0.0V 0.16S LF2:0.00HZ 0.16S

For California only.

5.9 Generator Port Use Setup Menu

GEN PORT USE

Mode
- Generator Input   ☐ GEN connect to Grid Input
  Rated Power
  [5000W]
- SmartLoad Output   ☐ On Grid always on
  Power   AC Couple Fre High
  [500W]   [52.00Hz]   OFF [95%]
- Micro Inv Input   ON [100%]
  ☐ MI export to Grid cutoff

PORT Set1

Generator input rated power: allowed Max. power from diesel generator.
GEN connect to grid input: connect the diesel generator to the grid input port.
Smart Load Output: This mode utilizes the Gen input connection as an output which only receives power when the battery SOC and PV power is above a user programmable threshold.
e.g. Power=500W, ON: 100%, OFF=95%: When the PV power exceeds 500W, and battery bank SOC reaches 100%, Smart Load Port will switch on automatically and power the load connected. When the battery bank SOC < 95% or PV power < 500w, the Smart Load Port will switch off automatically.

Smart Load OFF Batt
- Battery SOC at which the Smart load will switch off.

Smart Load ON Batt
- Battery SOC at which the Smart load will switch on. Also, the PV input power should exceed the setting value (Power) simultaneously and then the Smart load will switch on.

On Grid always on: When click "on Grid always on" the smart load will switch on when the grid is present.

Micro Inv Input: To use the Generator input port as a micro-inverter on grid inverter input (AC coupled), this feature will also work with "Grid-Tied" inverters.

* Micro Inv Input OFF: when the battery SOC exceeds setting value, Microinveter or grid-tied inverter will shut down.
* Micro Inv Input ON: when the battery SOC is lower than setting value, Microinveter or grid-tied inverter will start to work.

AC Couple Fre High: If choosing"Micro Inv input", as the battery SOC reaches gradually setting value (OFF), During the process, the microinverter output power will decrease linear. When the battery SOC equals to the setting value (OFF), the system frequency will become the setting value (AC couple Fre high) and the Microinverter will stop working.

MI export to grid cutsoff: Stop exporting power produced by the microinverter to the grid.

* Note: Micro Inv Input OFF and On is valid for some certain FW version only.

5.10 Advanced Function Setup Menu

Solar Arc Fault ON: This is only for US.
System selfcheck: Disable. this is only for factory.
Gen Peak-shaving: Enable When the power of the generator exceeds the rated value of it, the inverter will provide the redundant part to ensure that the generator will not overload.
DRM: For AS4777 standard
Backup Delay: Reserved
BMS_Err_Stop: When it is active, if the battery BMS failed to communicate with inverter, the inverter will stop working and report fault.
Signal island mode: when the inverter connects grid, the ATS port will output 230Vac and it is used to cuts off Earth-Neutral(load port N line) bond via connect external relay. When the inverter disconnects from the grid, ATS port voltage will be 0 and the Earth-Neutral bond keeps on. More details, please refer to left picture.
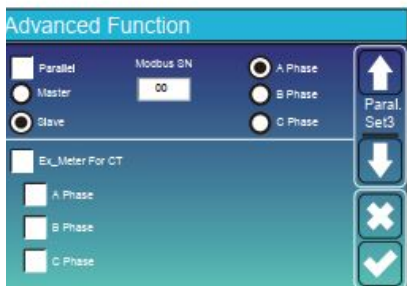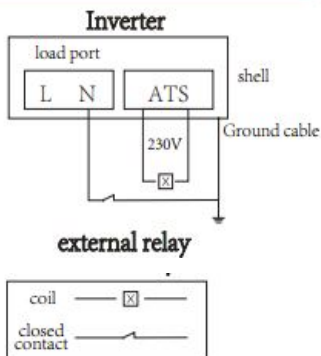
Ex_Meter For CT: when in Three phase system with CHNT Three phase energy meter (DTSU666), click corresponding phase where hybrid inverter is connected. e.g. when the hybrid inverter output connects to A phase, please click A Phase.

5.11 Device Info Setup Menu

Device Info.

Inverter ID: 1601012001   Flash
HMI: Ver0302   MAIN:Ver2138

Alarms Code   Occurred
F64 Heatsink_HighTemp_Fault 2019-03-11 15:56
F64 Heatsink_HighTemp_Fault 2019-03-08 10:46
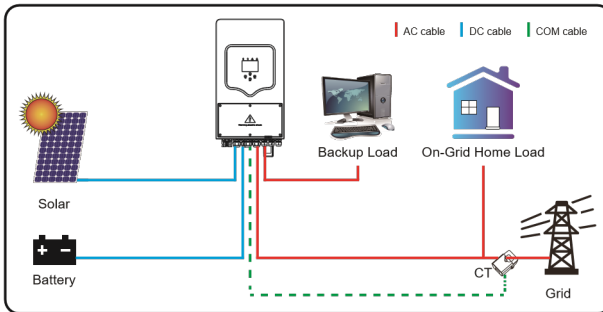F64 Heatsink_HighTemp_Fault 2019-03-08 10:45

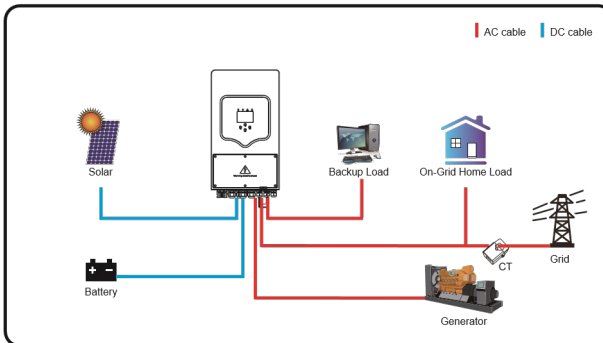This page show Inverter ID, Inverter version and alarm codes.

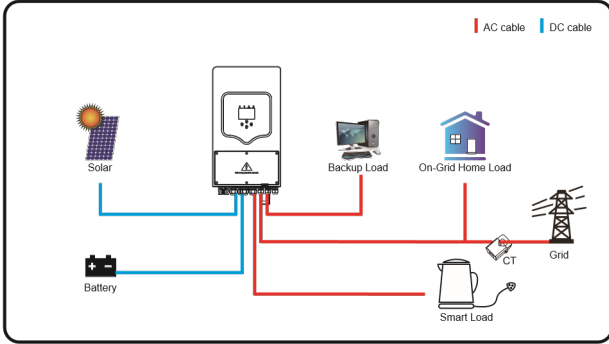HMI: LCD version

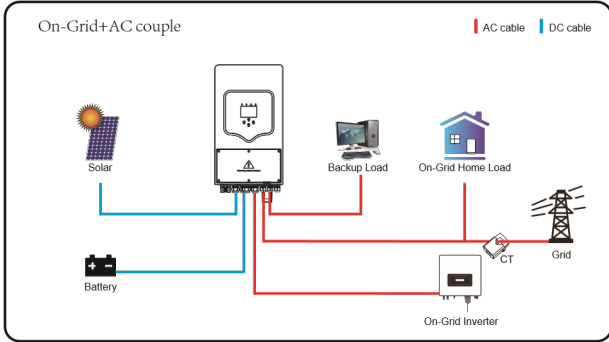MAIN: Control board FW version

6. Mode

Mode I: Basic

Mode II: With Generator

Mode III: With Smart-Load

Mode IV: AC Couple

The 1st priority power of the system is always the PV power, then 2nd and 3rd priority power will be the battery bank or grid according to the settings.
The last power backup will be the Generator if it is available.

7. Fault information and processing

The energy storage smart inverter is designed according to the grid-connected operation standard and meets the safety requirements and electromagnetic compatibility requirements. Before leaving the factory, the smart inverter undergoes several rigorous tests to ensure that the smart inverter can operate reliably.

If any of the fault messages listed in Table 6-1 appear on your smart inverter and the fault has not been removed after restarting, please contact your local dealer or service center. You need to have the following information ready.

1. Smart inverter serial number;
2. Distributor or service center of the smart inverter;
3. On-grid power generation date;
4. The problem description (including the fault code and indicator status displayed on the LCD)
   is as detailed as possible.
5. Your contact information. In order to give you a clearer understanding of the smart inverter's fault information, we will list all possible fault codes and their descriptions when the smart inverter is not working properly.

Error code	Description	Solutions
F08	GFDI _Relay_Failure	1. When smart inverter is in Split phase(120/240Vac) or three-phase system (120/208Vac) system, the backup load port N line needs to connect ground; 2. If the fault still exists, please contact us for help.
F13	Working mode change	1. When the grid type and frequency changed it will report F13; 2. When the battery mode was changed to "No battery" mode it will report F13; 3. For some old FW version, it will report F13 when the system work mode changed; 4, Generally, it will disappear automatically when shows F13; 5. If still same, and turn off the DC switch and AC switch and wait for one minute and then turn on the DC/AC switch; 6. Seek help from us, if cannot go back to normal state.
F18	AC over current fault of hardware	AC side over current fault 1. Please check whether the backup load power and common load power are within the range; 2. Restart and check whether it is in normal; 3. Seek help from us, if cannot go back to normal state.
F20	DC over current fault of the hardware	DC side over current fault 1. Check PV module connect and battery connect; 2. When in the off-grid mode, the smart inverter startup with big power load, it may report F20. Please reduce the load power connected; 3. Turn off the DC switch and AC switch and then wait one minute then turn on the DC/AC switch again; 4. Seek help from us, if cannot go back to normal state.
F22	Tz_EmergStop_Fault	Please contact your installer for help.
F23	AC leakage current is transient over current	Leakage current fault 1. Check PV side cable ground connection. 2. Restart the system 2~3 times. 3. If the fault still exists, please contact us for help.
F24	DC insulation impedance failure	PV isolation resistance is too low 1. Check the connection of PV panels and smart inverter is firmly and correctly; 2. Check whether the PE cable of smart inverter is connected to ground; 3. Seek help from us, if cannot go back to normal state.
F26	The DC busbar is unbalanced	1. Please wait for a while and check whether it is normal; 2. When the hybrid in split phase mode, and the load of L1 and load of L2 is big different, it will report the F26. 3. Restart the system 2~3 times. 4. Seek help from us, if cannot go back to normal state.

F29	Parallel CANBus fault	1. When in parallel mode, check the parallel communication cable connection and hybrid smart inverter communication address setting; 2. During the parallel system startup period, smart inverters will report F29 when all smart inverters are in ON status, it will disappear automatically; 3. If the fault still exists, please contact us for help.

Error code	Description	Solutions
F34	AC Overcurrent fault	1. Check the backup load connected, make sure it is in allowed power range; 2. If the fault still exists, please contact us for help.
F35	No AC grid	No Utility 1. Please confirm grid is lost or not; 2. Check the grid connection is good or not; 3. Check the switch between smart inverter and grid is on or not; 4. Seek help from us, if cannot go back to normal state.
F41	Parallel system stop	1. Check the hybrid smart inverter working status. If there's 1 pcs hybrid smart inverter is in OFF status, the other hybrid smart inverters may report F41 fault in parallel system. 2. If the fault still exists, please contact us for help.
F42	AC line low voltage	Grid voltage fault 1. Check the AC voltage is in the range of standard voltage in specification; 2. Check whether grid AC cables are firmly and correctly connected; 3. Seek help from us, if cannot go back to normal state.
F47	AC over frequency	Grid frequency out of range 1. Check the frequency is in the range of specification or not; 2. Check whether AC cables are firmly and correctly connected; 3. Seek help from us, if cannot go back to normal state.
F48	AC lower frequency	Grid frequency out of range 1. Check the frequency is in the range of specification or not; 2. Check whether AC cables are firmly and correctly connected; 3. Seek help from us, if cannot go back to normal state.
F56	DC busbar voltage is too low	Battery voltage low 1. Check whether battery voltage is too low; 2. If the battery voltage is too low, using PV or grid to charge the battery; 3. Seek help from us, if ca not go back to normal state.
F58	BMS communication fault	1. It tells the communication between hybrid smart inverter and battery BMS disconnected when"BMS_Err-Stop" is active; 2. If don't want to see this happen, you can disable "BMS_Err-Stop" item on the LCD; 3. If the fault still exists, please contact us for help.
F63	ARC fault	1. ARC fault detection is only for US market; 2. Check PV module cable connection and clear the fault; 3. Seek help from us, if cannot go back to normal state.

F64	Heat sink high temperature failure	Heat sink temperature is too high 1. Check whether the work environment temperature is too high; 2. Turn off the smart inverter for 10mins and restart; 3. Seek help from us, if cannot go back to normal state.

Chart 7-1 Fault information

Under the guidance of our company, customers return our products so that our company can provide service of maintenance or replacement of products of the same value. Customers need to pay the necessary freight and other related costs. Any replacement or repair of the product will cover the remaining warranty period of the product. If any part of the product or product is replaced by the company itself during the warranty period, all rights and interests of the replacement product or component belong to the company.
Factory warranty does not include damage due to the following reasons:

· Damage during transportation of equipment；

· Damage caused by incorrect installation or commissioning；

· Damage caused by failure to comply with operation instructions, installation instructions or maintenance instructions；

· Damage caused by attempts to modify, alter or repair products；

· Damage caused by incorrect use or operation；

· Damage caused by insufficient ventilation of equipment；

· Damage caused by failure to comply with applicable safety standards or regulations；

· Damage caused by natural disasters or force majeure (e.g. floods, lightning, overvoltage, storms, fires, etc.)

In addition, normal wear or any other failure will not affect the basic operation of the product. Any external scratches, stains or natural mechanical wear does not represent a defect in the product.

8.Limitaon of Liability

In addition to the product warranty described above, the state and local laws and regulations provide financial compensation for the product's power connection (including violation of implied terms and warranties). The company hereby declares that the terms and conditions of the product and the policy cannot and can only legally exclude all liability within a limited scope.

9. Datasheet

| Model	JS128048156
Battery Input Date	
Battery Type	Lead-acid or Li-lon
Battery Voltage Range(V)	40-60V
Max. Charging Current(A)	240A
Max. Discharging Current(A)	240A
Charging Curve	3 Stages / Equalization
External Temperature Sensor	Optional
Charging Strategy for Li-lon Battery	Self-adaption to BMS
PV String Input Data	
Max. DC Input Power(W)	15600W
PV Input Voltage(V)	550V (150V~800V)
MPPT Range(V)	200~650V
Start-up Voltage(V)	150V
PV Input Current(A)	25A+12.5A
No. of MPPT Trackers	2
No. of Strings Per MPPT Tracker	2+1
AC Output Data	
Rated AC Output and UPS Power(W)	12000
Max. AC Output Power(W)	13200
Peak Power(off grid)	2 times of rated power, 10 S
AC Output Rated Current(A)	18A
Max. AC Current(A)	27A
Max. Continuous AC Passthrough (A)	50A
Output Frequency and Voltage	50/60Hz; 230/400Vac (Three phase)
Grid Type	Three Phase
Current Harmonic Distortion	THD<3% (Linear load<1.5%)
Efficiency	

Max. Efficiency	97.60%
Euro Efficiency	97.00%
MPPT Efficiency	99.90%
Protection	
PV Arc Fault Detection	Integrated
PV Input Lightning Protection	Integrated
An-islanding Protection	Integrated
PV String Input Reverse Polarity Protection	Integrated
Insulation Resistor Detection	Integrated
Residual Current Monitoring Unit	Integrated
Output Over Current Protection	Integrated
Output Shorted Protection	Integrated
Surge Protection	DC Type II / AC Type II

Model	**JSO12048156**
Certifications and Standards	
Grid Regulation	VDE 0126, AS4777, NRS2017, G98, G99, IEC61683, IEC62116, IEC61727
Safety Regulation	IEC62109-1, IEC62109-2
EMC	EN61000-6-1, EN61000-6-3, FCC 15 class B
General Data	
Operating Temperature Rande(℃)	-25~60℃, >45℃ Derating
Cooling	Smart cooling
Noise(dB)	<30 dB
Communication with BMS	RS485; CAN
Weight(kg)	36.8
Size(mm)	422W×658H×281D
Protection Degree	IP65
Installation Style	Wall-mounted
Warranty	5 years

10. Appendix I

Definition of RJ45 Port Pin for BMS

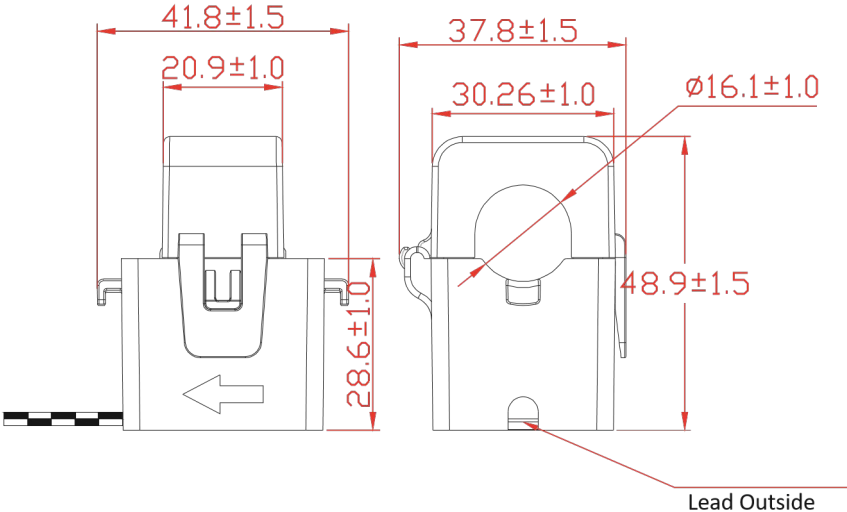| No.	RS485 Pin
1	485_B
2	485_A
3	--
4	CAN-H
5	CAN-L
6	GND
7	485_A
8	485_B
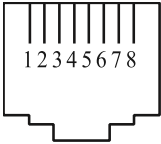
BMS Port
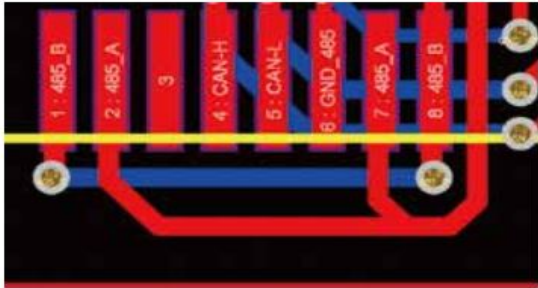
11. Appendix II

1. Split Core Current Transformer (CT) dimension:
(mm) 2. Secondary output cable length is 4m.

Lead Outside

Split Core CT
CTSA016-
100A/50mA
YUANXING *******
E466650

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