



ALL IN ONE ESS Low Voltage

AI-W5.1-5P3-EU-ESS

AI-W5.1-6P3-EU-ESS

AI-W5.1-8P3-EU-ESS

AI-W5.1-10P3-EU-ESS

AI-W5.1-12P3-EU-ESS

User Manual



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	<i>Model</i>
Inverter	AI-W5.1-5/6/8/10/12P3-EU
Battery System	AI-W5.1

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 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@deye.com.cn

1. Safety Introductions

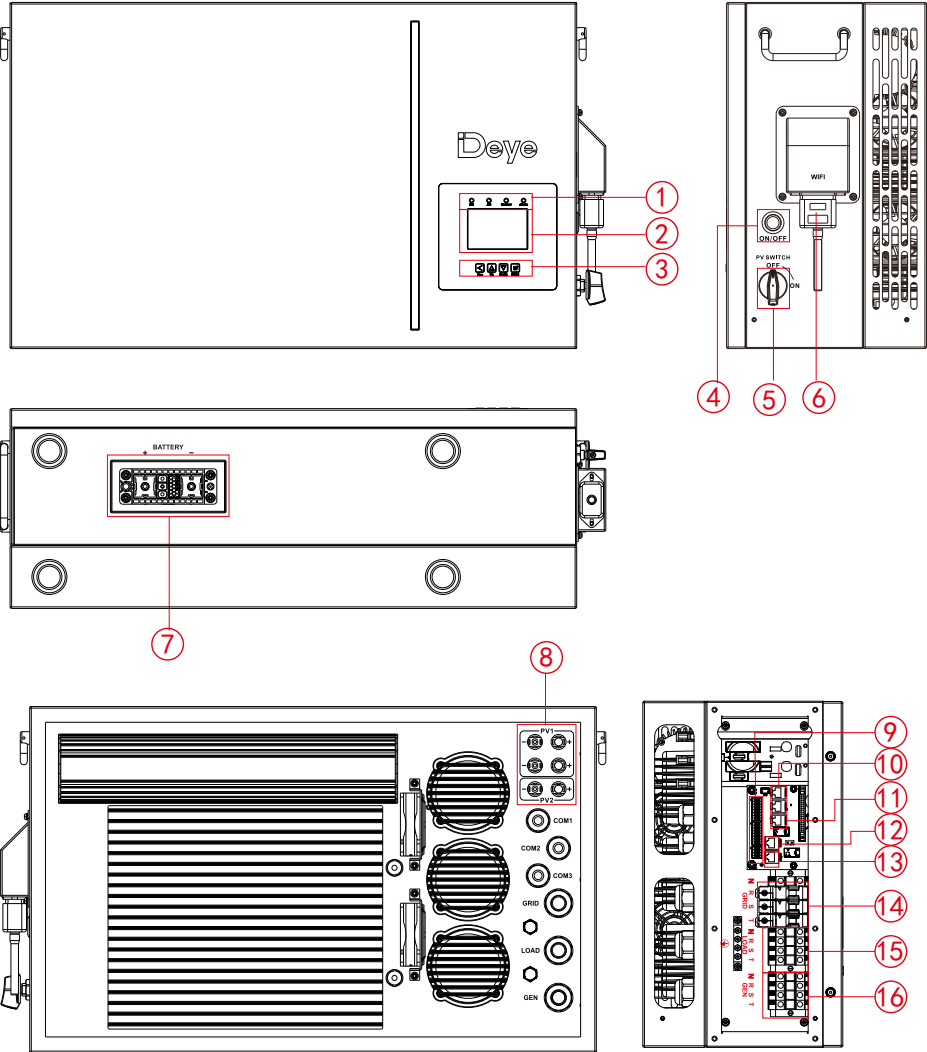
- This chapter contains important safety and operating instructions. Read and keep this manual for future reference.
- Before using the inverter, please read the instructions and warning signs of the battery and corresponding sections in the instruction manual.
- Do not disassemble the inverter. If you need maintenance or repair, take it to a professional 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 inverter, please follow required specification to select appropriate cable size. It is very important to correctly operate this 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 inverter should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this 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 an All-in-one energy storage system, integrated 5kW~12kW hybrid inverters and energy storage batteries. Modular stacked design, easy installation, easy expansion, capacity range of 5kWh to 30kWh. Lithium iron phosphate battery, safe and reliable.

This is a multifunctional inverter, combining functions of 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.

2.1 Product Overview



1: Inverter indicators

2: LCD display

3: Function buttons

4: Power on/off button

5: DC switch

6: WiFi Interface

7: Battery input connectors

8: PV input with two MPPT

9: Function port

10: Parallel port

11: Meter-485 port

12: ModeBUS port

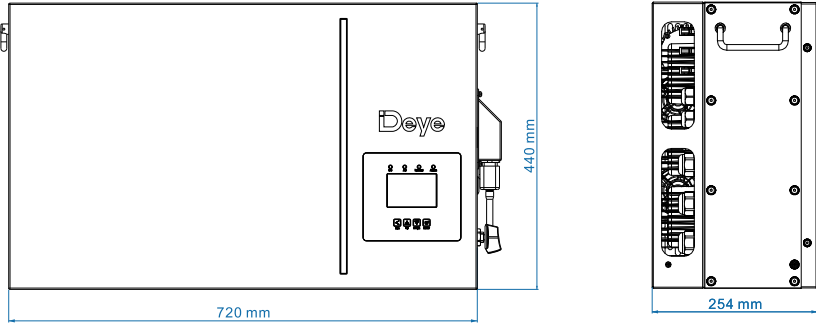
13: BMS port

14: Grid port

15: Load port

16: Generator port

2.2 Product Size



Inverter Size

2.3 Product Features

- 230V/400V Three phase Pure sine wave inverter.
- 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 monitoring and build-in 2 strings for 1 MPP tracker, 1 string for 1 MPP tracker.
- Smart settable three stages MPPT charging for optimized battery performance.
- Time of use function.
- Smart Load Function.

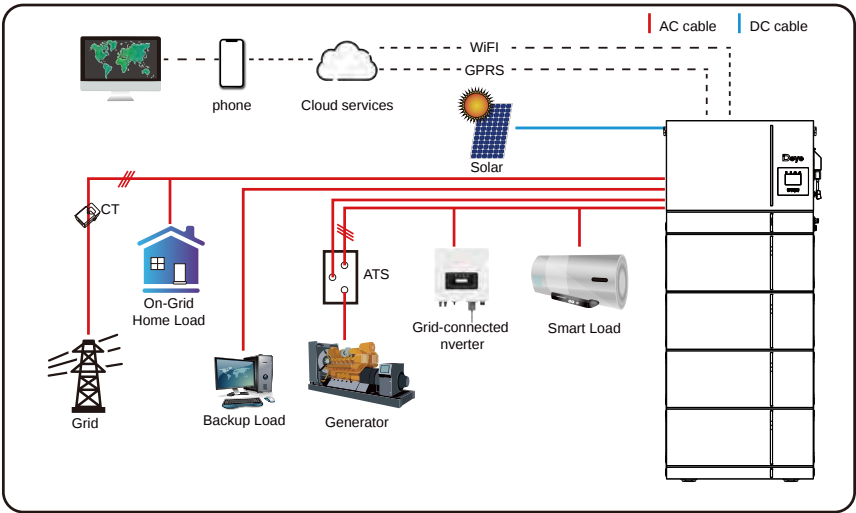
2.4 Basic System Architecture

The following illustration shows basic application of this inverter. It also includes following devices to have a Complete running system.

- Generator or Utility
- PV modules

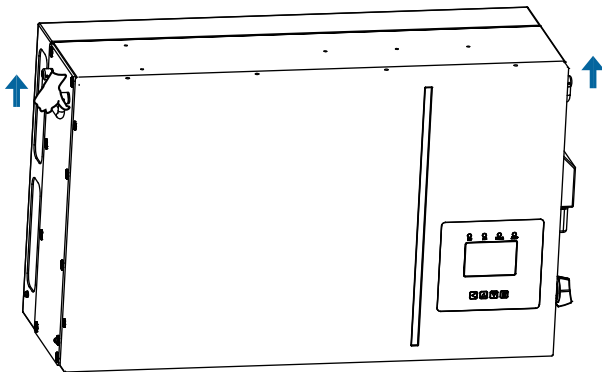
Consult with your system integrator for other possible system architectures depending on your requirements.

This inverter can power all kinds of appliances in home or office environment, including motor type appliances such as refrigerator and air conditioner.



2.5 Product handling requirements

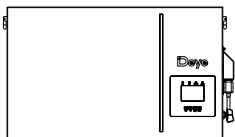
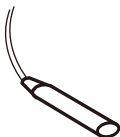
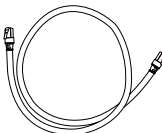
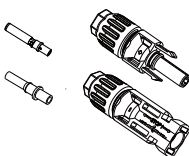
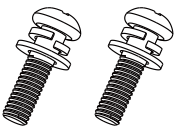
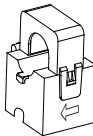
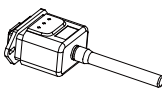
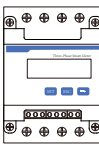
Two people stand on both sides of the machine, holding one handles to lift the machine.



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:

 Hybrid inverter x1	 L-type Hexagon wrench x1	 Battery temperature sensor x1	
 Parallel communication cable x1	 DC+/DC- Plug connectors including metal terminal xN	 Stainless steel mounting screws M4*12 x2	
 User manual x1	 Sensor Clamp x 3	 Wi-Fi-Plug(optional) x1	 Meter(optional) x 1

3.2 Mounting instructions

Installation Precaution

This 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%)

3.3.1 Install the Battery



CAUTION:

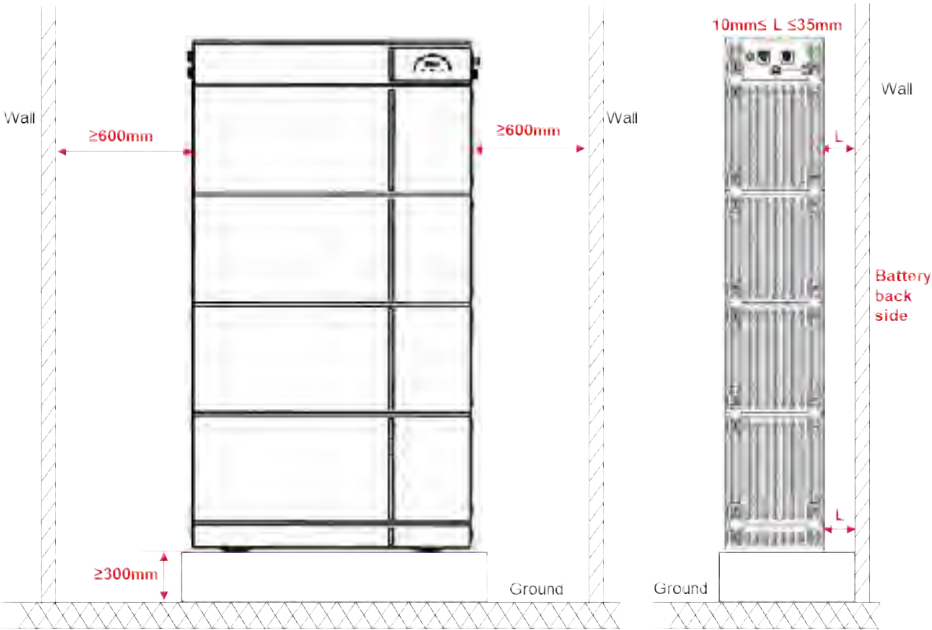
Remember that this battery is heavy! Please be careful when lifting out from the package.

The battery module must be installed by at least two persons using movable handles.

3.3.1.1 Selection of installation sites

It is necessary to choose the appropriate installation site according to the requirements of 5.1. The system must not be immersed in water. The battery base should not be placed in rain or other water sources. It is recommended that the height of the base is 300mm from the ground, and the weight of the base should be able to support the weight of the entire battery system 124kg~336kg.

The installation location is recommended to meet the size requirements of the figure below :

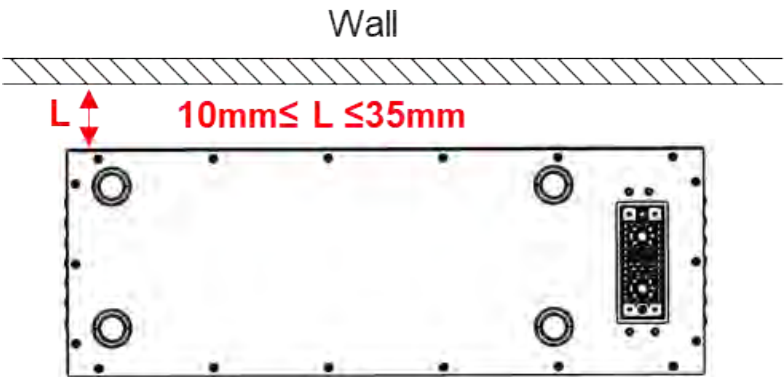


3.3.1.2 Unpacking order

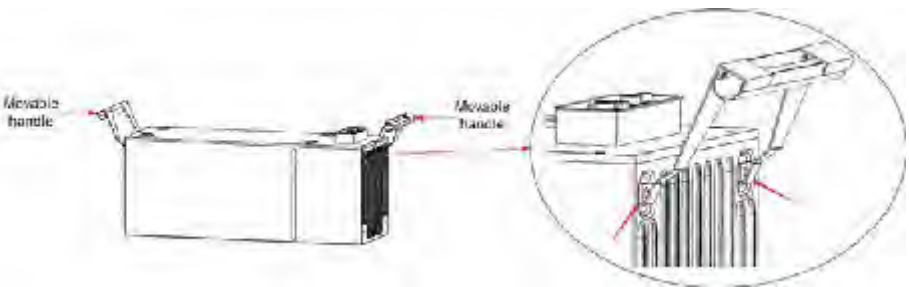
First open the box of the **System Power Distribute Unit** packaging box, take out the base and handle, the handle is used to carry the battery module, without the handle the battery module will be difficult to remove from the battery box.

3.3.1.3 Installation order

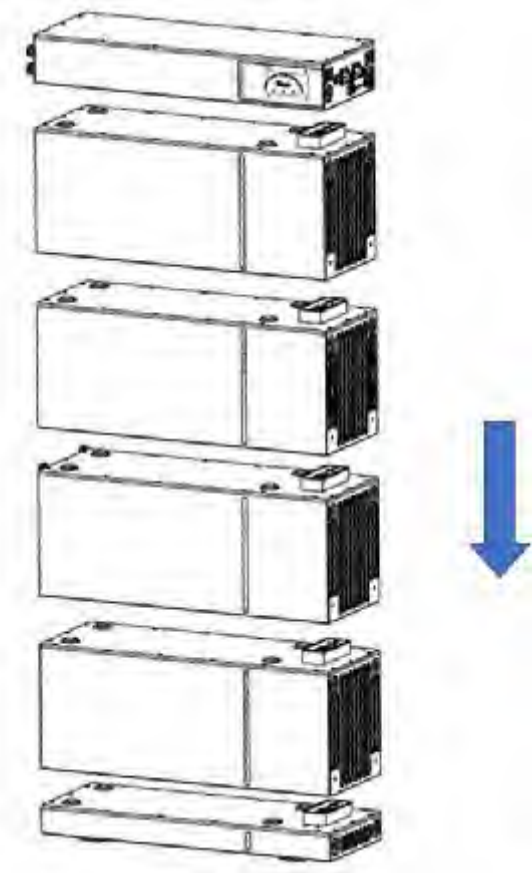
i. Put the installed base and feet along the wall, and keep the distance of 10~35 mm between the wall and the base.



ii. Open the battery box, take a battery module from the package out. Put one battery module on the base. Pay attention to the direction of the module to make sure that the blind-mating connectors of the module and the base are at the same side.



iii. Repeat the operations for other battery modules.

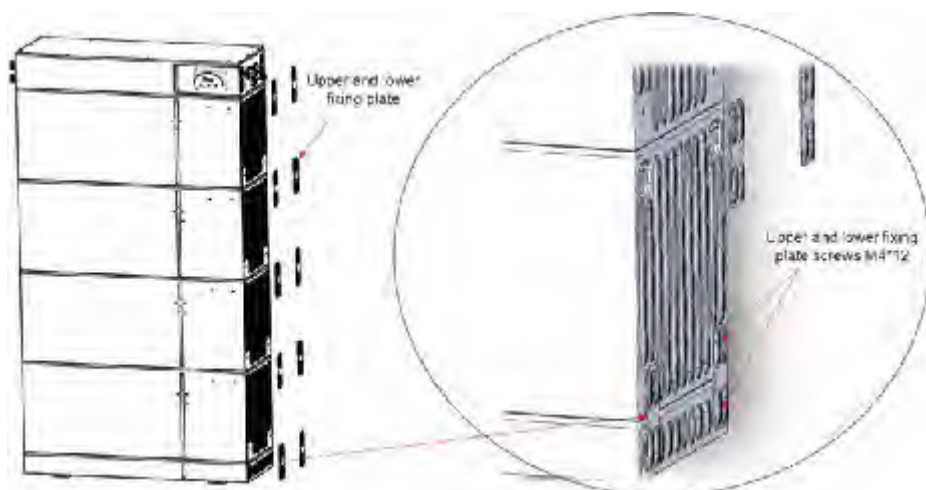


iv. Install the wall fixing plate (PDU part) to the PDU. To do this, follow the instructions below to install and tighten them on the back side of PDU (torque: 2 Nm).

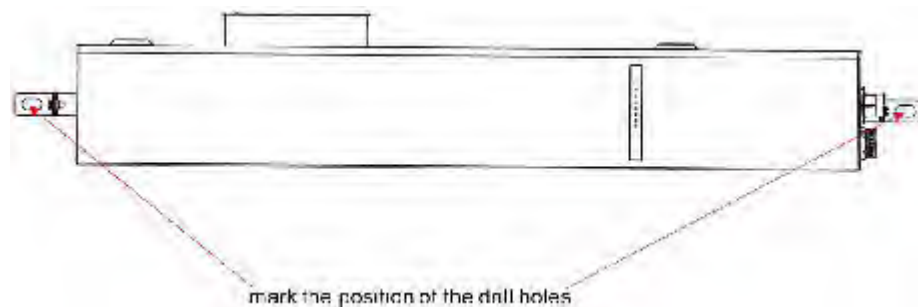


v. Put the PDU on top of the battery modules.

vi. Fix the upper and lower fixing plate connection between the battery module and the base, between battery modules, and between PDU and battery module. To do this, insert the screws (M4x12) through the holes on them, using a Hexagon Wrench (2.5mm) and tighten them (torque: 2 Nm).

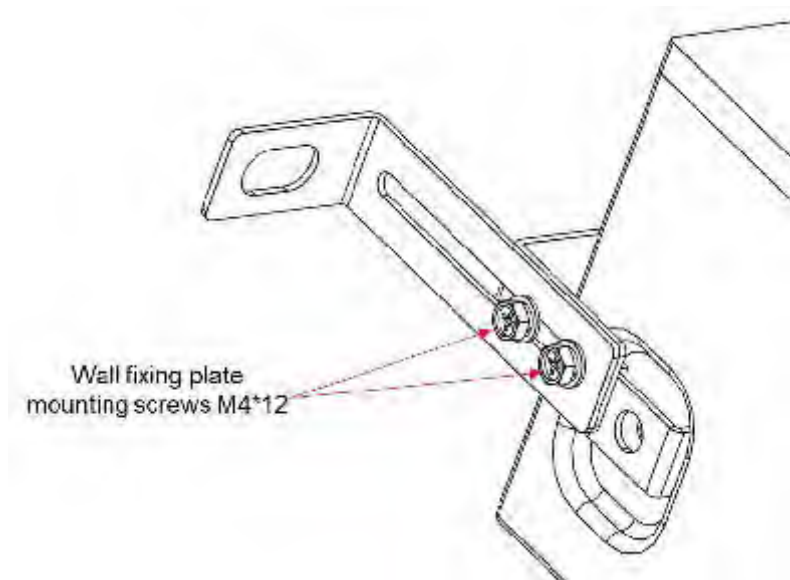


vii. Hold the wall fixing plate (wall part) where it intends to be mounted on the wall and mark the position of the drill holes. Please pay attention that there may be power cables or other supply lines (e.g., gas or water) routed inside of the wall. Ensure that no lines are laid in the wall, which could be damaged when drilling holes.

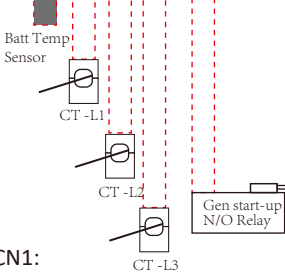
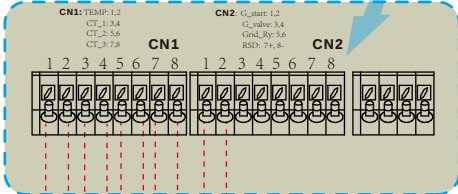
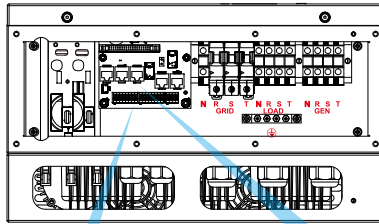


viii. Set the wall fixing plate (wall part) aside and drill the marked holes. Choose the recommend drill head (10mm) to drill 2 holes on the wall, 100mm-110mm deep. Put the wall fixing plate (wall part) in front of the holes, then insert the expansion screw of M6*100 and tighten.

ix. Fix the two hangers (wall part and PDU part) with M4X12 screws, using a cylinder screwdriver (10 mm) to tighten it (torque: 2 Nm).



3.3.2 Function port definition



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:

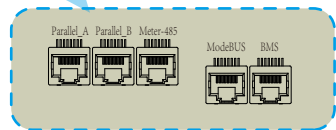
G-start (1,2): dry contact signal for startup the diesel generator.

When the "GEN signal" is active, the open contact (GS) will switch on (no voltage output).

G-valve (3,4): Dry contact output. When the inverter is in off-grid mode and the “signal island mode” is checked, the dry contact will switch on.

Grid_Ry (5,6): reserved.

RSD (7,8): When battery is connected and the inverter is in "ON" status, it will provide 12Vdc.



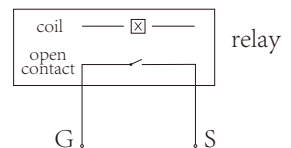
Parallel A: Parallel communication port 1 (CAN interface).

Parallel B: Parallel communication port 2 (CAN interface).

Meter_485: for energy meter communication.

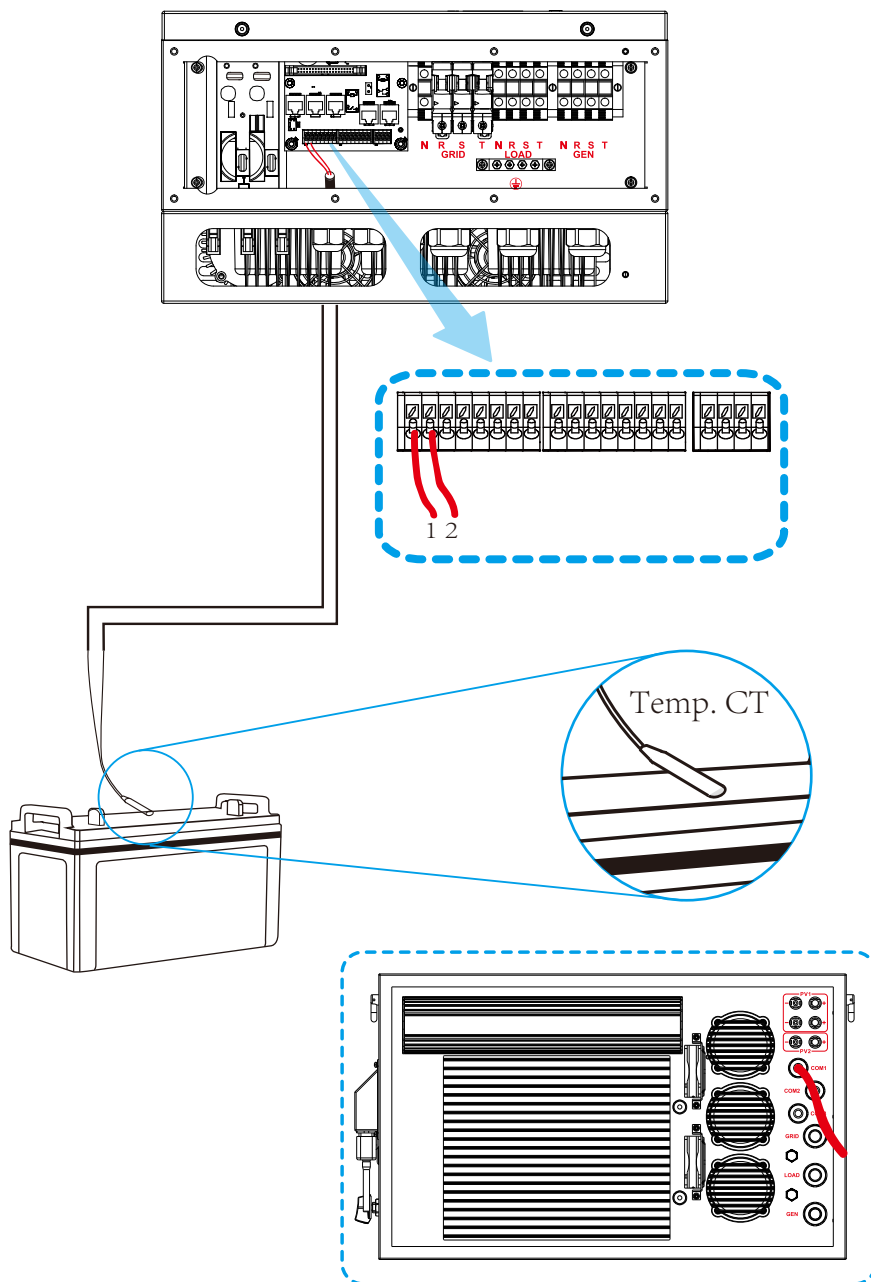
ModeBUS: Reserved.

BMS: BMS port for battery communication(CAN/RS485).



GS (diesel generator startup signal)

3.3.3 Temperature sensor connection for lead-acid battery



3.4 Grid connection and backup load connection

- Before connecting to grid, please install a separate AC breaker between inverter and grid. Also, it is recommended that installs an AC breaker between backup load and inverter.This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current.The recommended of AC breaker for the load port is 20A for 8kw, 32A for 10kw and 32A for 12KW. The recommended of AC breaker for the grid port is 63A for 8kw, 63A for 10kw and 63A for 12KW.
- 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.

backup load connection

Model	Wire Size	Cable(mm²)	Torque value(max)	Phase
AI-W5.1-5/6/8/10/12P3-EU	10AWG	4	1.2Nm	3L+N

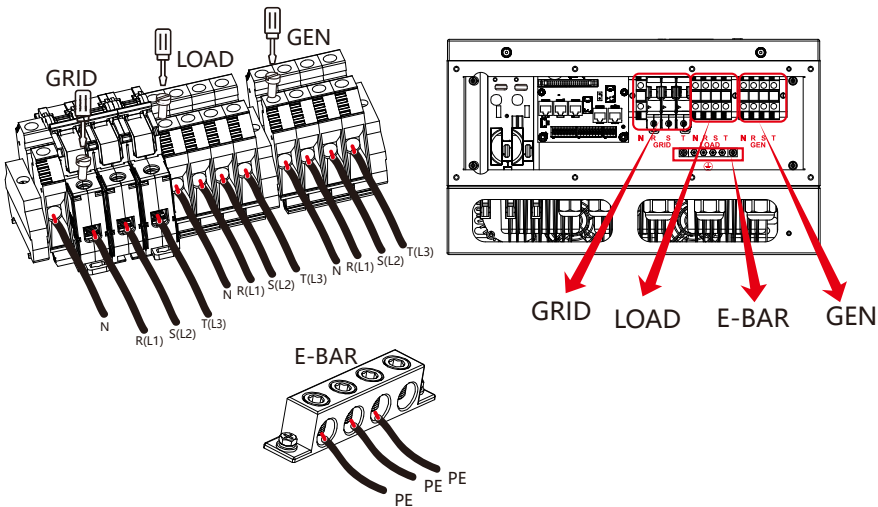
Grid connection

Model	Wire Size	Cable(mm²)	Torque value(max)	Phase
AI-W5.1-5/6/8/10/12P3-EU	10AWG	6	1.2Nm	3L+N

Chart 3-3 Recommended Size for AC wires

Please follow below steps to implement Grid, load and Gen port connection:

1. Before making Grid, load and Gen port connection, be sure to turn off AC breaker or disconnecter first.
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 complete.





Be sure that AC power source is disconnected before attempting to wire it to the unit.

3. Then, insert AC output wires according to polarities indicated on the terminal block and tighten 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 manufacturer of air conditioner if it is equipped with time-delay function before installation. Otherwise, this 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 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.

<i>Model</i>	<i>Wire Size</i>	<i>Cable(mm²)</i>
AI-W5.1-5/6/8/10/12P3-EU	12AWG	4

Chart 3-4 Cable size



To avoid any malfunction, do not connect any PV modules with possible current leakage to the inverter. For example, grounded PV modules will cause current leakage to the inverter. When using PV modules, please ensure the PV+ & PV- of solar panel is not connected to the system ground bar.



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

3.5.1 PV Module Selection:

When selecting proper PV modules, please be sure to consider below parameters:

- 1) Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
- 2) Open circuit Voltage (Voc) of PV modules should be higher than min. start voltage.
- 3) The PV modules used to connected to this inverter shall be Class A rating certified according to IEC 61730.

Inverter Model	AI-W5.1-5P3-EU	AI-W5.1-6P3-EU	AI-W5.1-8P3-EU	AI-W5.1-10P3-EU	AI-W5.1-12P3-EU
PV Input Voltage	550V (160V~800V)				
PV Array MPPT Voltage Range	200V-650V				
No. of MPP Trackers	2				
No. of Strings per MPP Tracker	1+1	1+1	1+1	2+1	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:

When using PV modules, please ensure the PV+ & PV- of solar panel is not connected to the system ground bar.



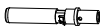
Safety Hint:

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 800V of the inverter.



Pic 5.1 DC+ male connector



Pic 5.2 DC- female connector



Safety Hint:

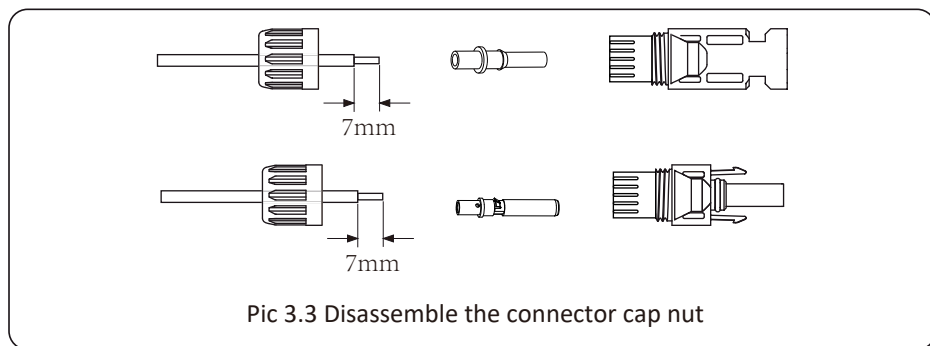
Please use approved DC cable for PV system.

Cable type	Cross section (mm ²)	
	Range	Recommended value
Industry generic PV cable (model: PV1-F)	4.0~6.0 (12~10AWG)	4.0(12AWG)

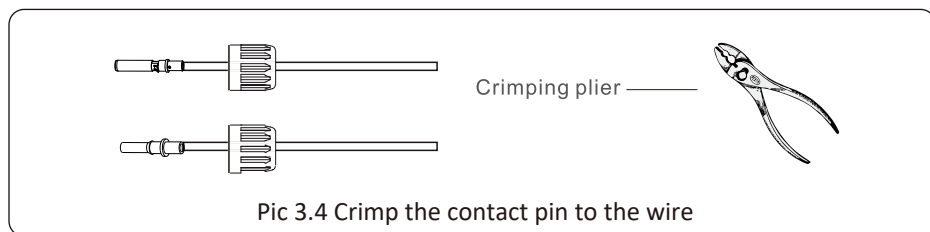
Chart 3-6

The steps to assemble the DC connectors are listed as follows:

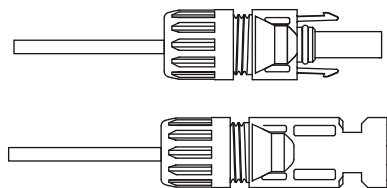
- a) Strip off the DC wire about 7mm, disassemble the connector cap nut (see picture 5.3).



- b) Crimping metal terminals with crimping pliers as shown in picture 5.4.

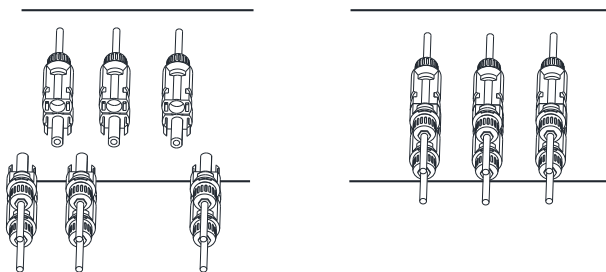


- c) Insert the contact pin to the top part of the connector and screw up the cap nut to the top part of the connector. (as shown in picture 5.5).



Pic 3.5 connector with cap nut screwed on

d) Finally insert the DC connector into the positive and negative input of the inverter, shown as picture 5.6



Pic 3.6 DC input connection



Warning:

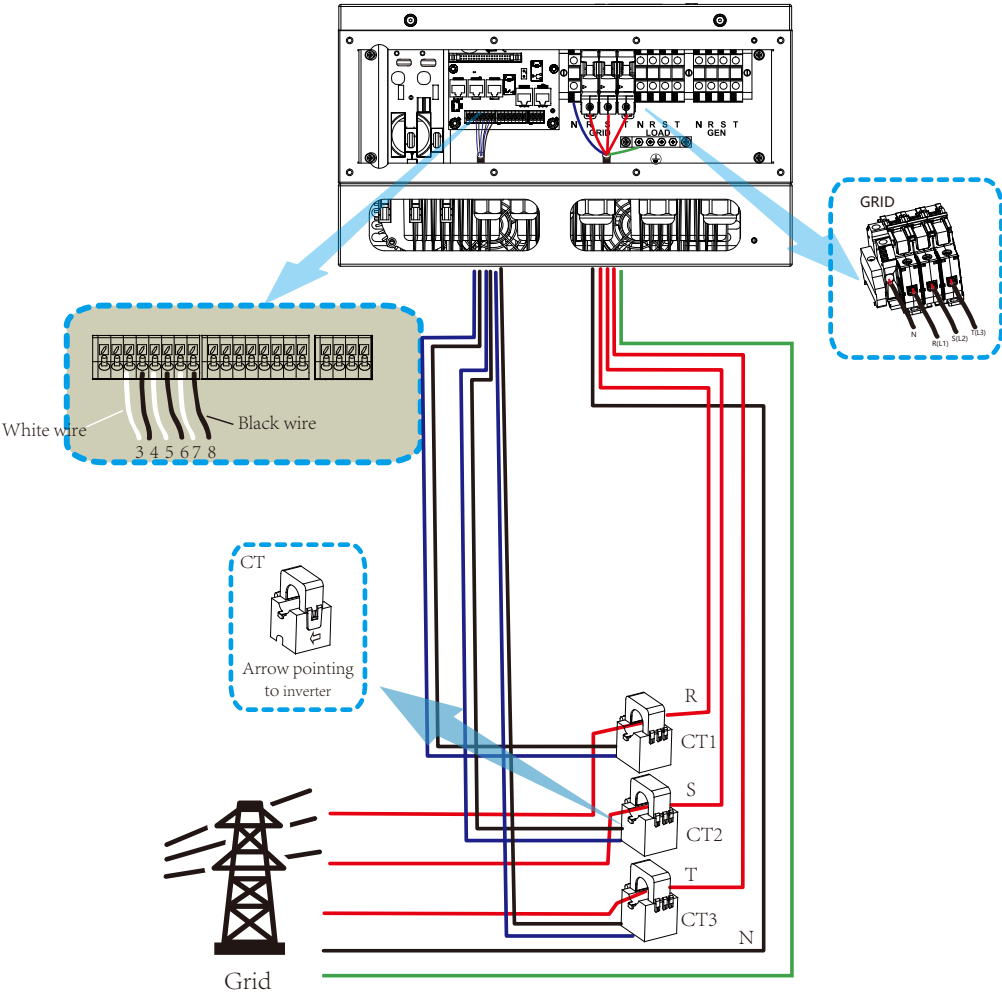
Sunlight shines on the panel will generate voltage, high voltage in series may cause danger to life. Therefore, before connecting the DC input line, the solar panel needs to be blocked by the opaque material and the DC switch should be 'OFF', otherwise, the high voltage of the inverter may lead to life-threatening conditions.



Warning:

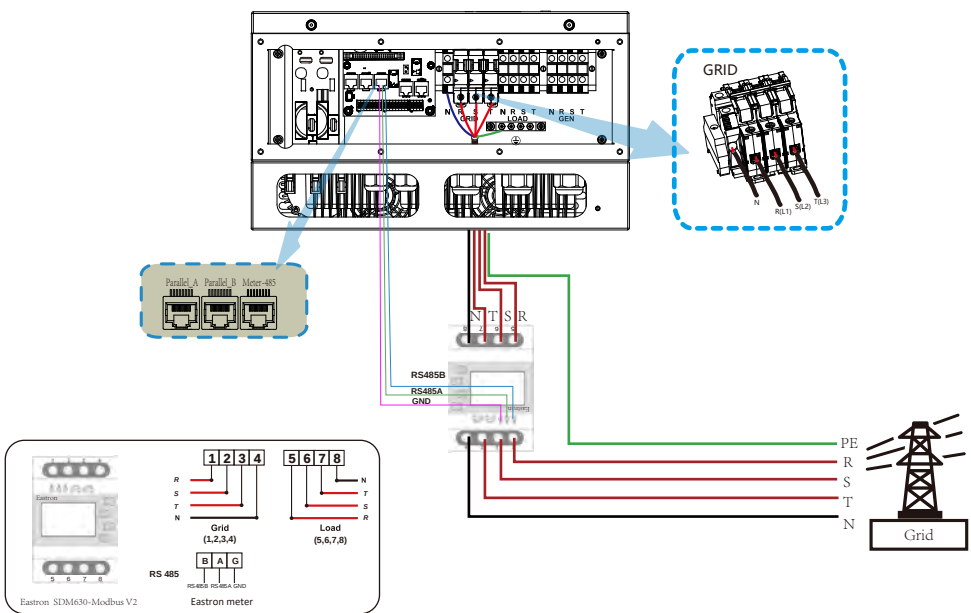
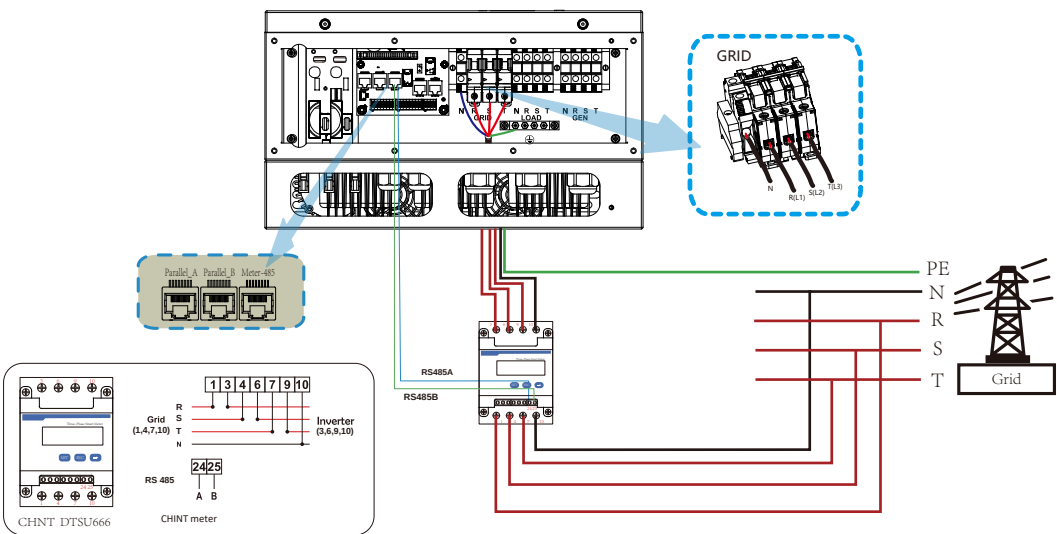
Please use its own DC power connector from the inverter accessories. Do not interconnect the connectors of different manufacturers. Max. DC input current should be 20A. if exceeds, it may damage the inverter and it is not covered by Deye warranty.

3.6 CT Connection



***Note:** when the reading of the load power on the LCD is not correct, please reverse the CT arrow.

3.6.1 Meter Connection





Note:

When the inverter is in the off-grid state, the N line needs to be connected to the earth.

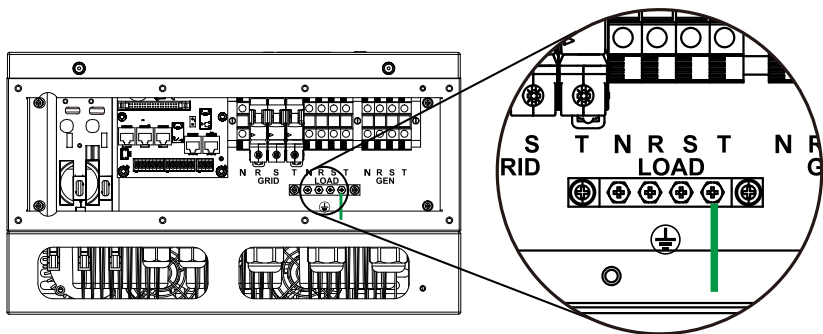


Note:

In final installation, breaker certified according to IEC 60947-1 and IEC 60947-2 shall be installed with the equipment.

3.7 Earth Connection(mandatory)

Ground cable shall be connected to ground plate on grid side this prevents electric shock if the original protective conductor fails.



Earth connection(Copper wires)

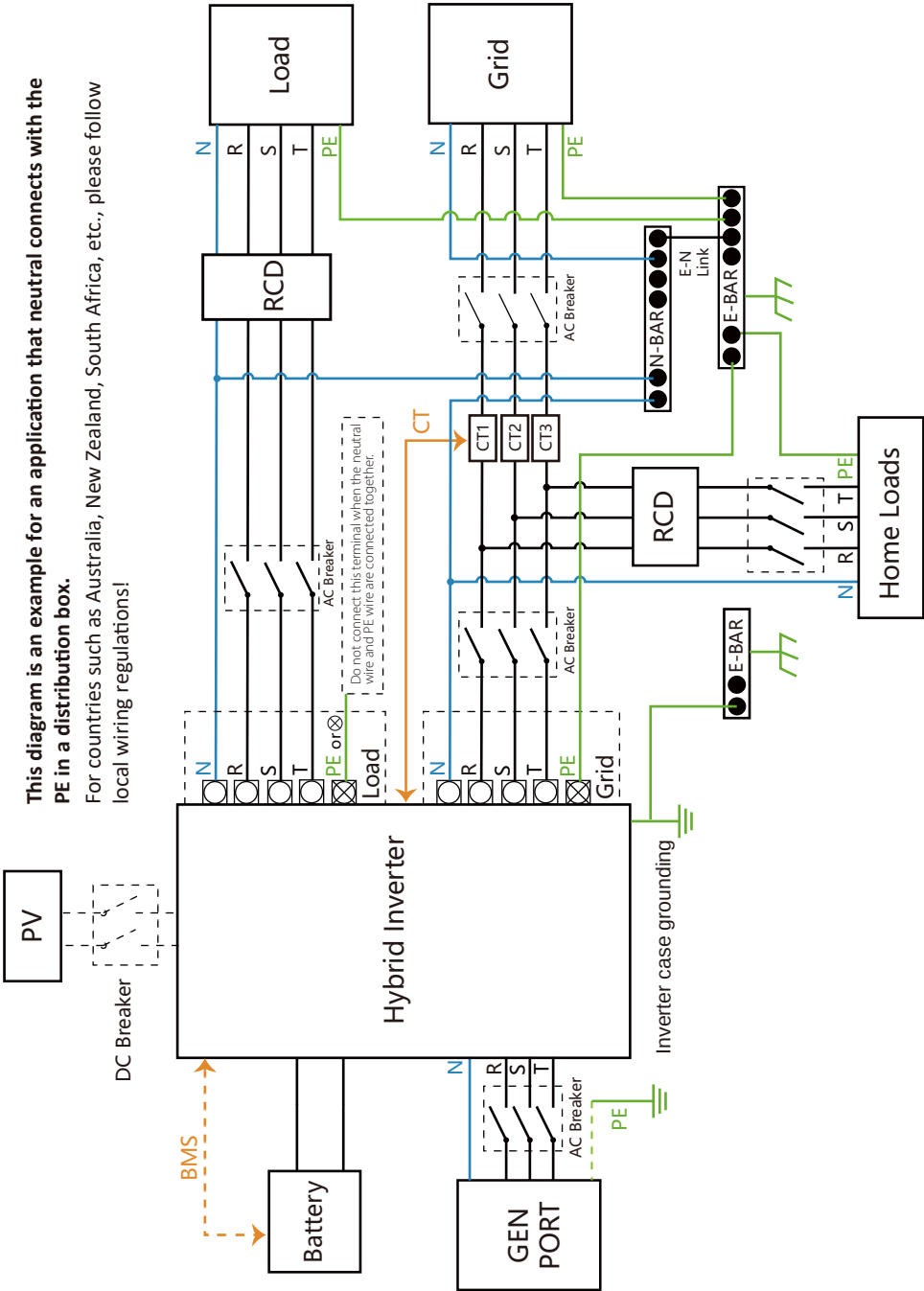
Model	Wire Size	Cable(mm ²)	Torque value(max)
AI-W5.1-5/6/8/10/12P3-EU	6AWG	13	12.4Nm

The conductor should be made of the same metal as the phase conductors.

3.8 WIFI Connection

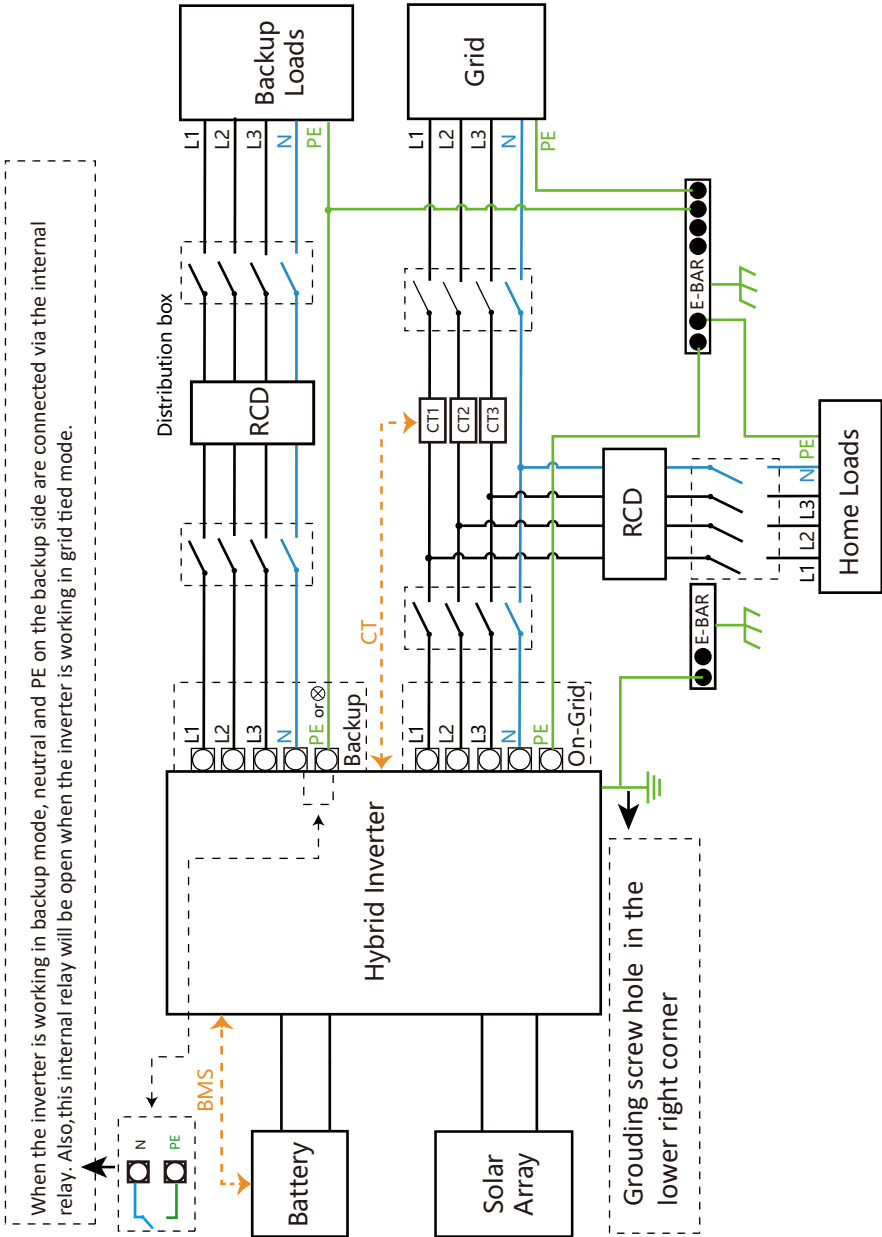
For the configuration of Wi-Fi Plug, please refer to illustrations of the Wi-Fi Plug. The Wi-Fi Plug is not a standard configuration, it's optional.

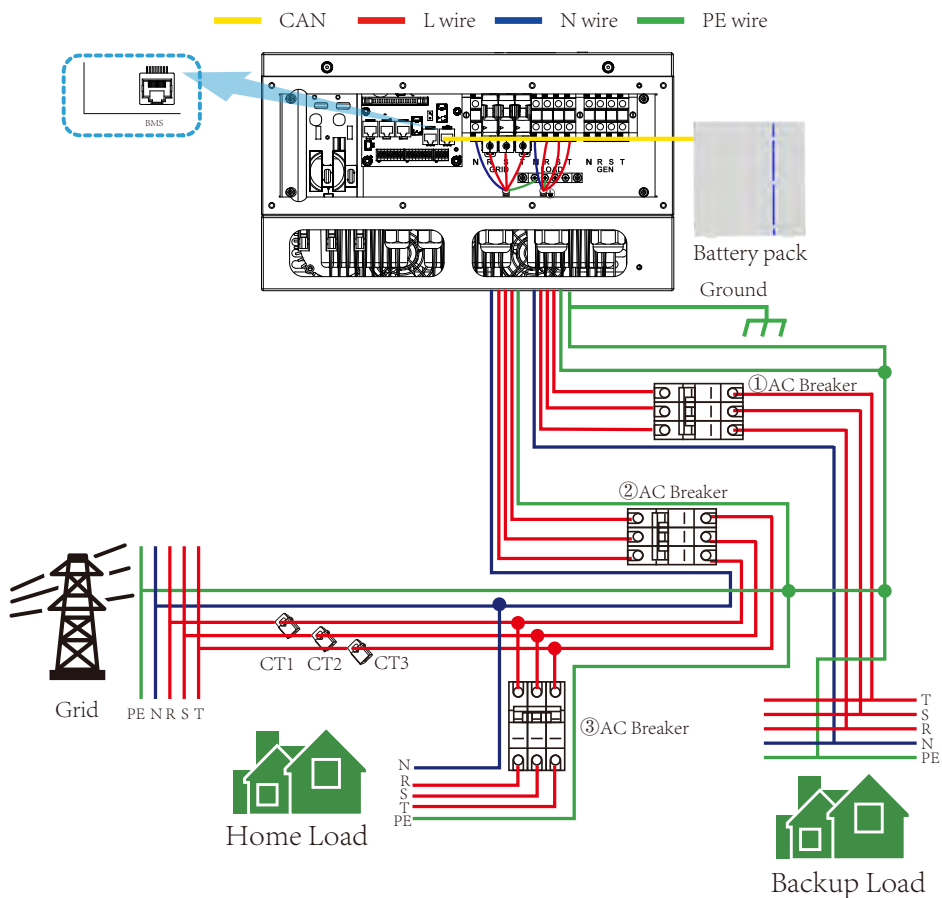
3.9 Wiring System for Inverter



3.10 Wiring diagram

This diagram is an example for an application in which neutral is separated from the PE in the distribution box.
For countries such as China, Germany, the Czech Republic, Italy, etc., please follow local wiring regulations!
Note: Backup function is optional in German market; please leave backup side empty if backup function is not available in the inverter.





① AC Breaker for backup load

AI-W5.1-5P3-EU: 16A AC breaker
 AI-W5.1-6P3-EU: 16A AC breaker
 AI-W5.1-8P3-EU: 20A AC breaker
 AI-W5.1-10P3-EU: 32A AC breaker
 AI-W5.1-12P3-EU: 32A AC breaker

② AC Breaker for grid

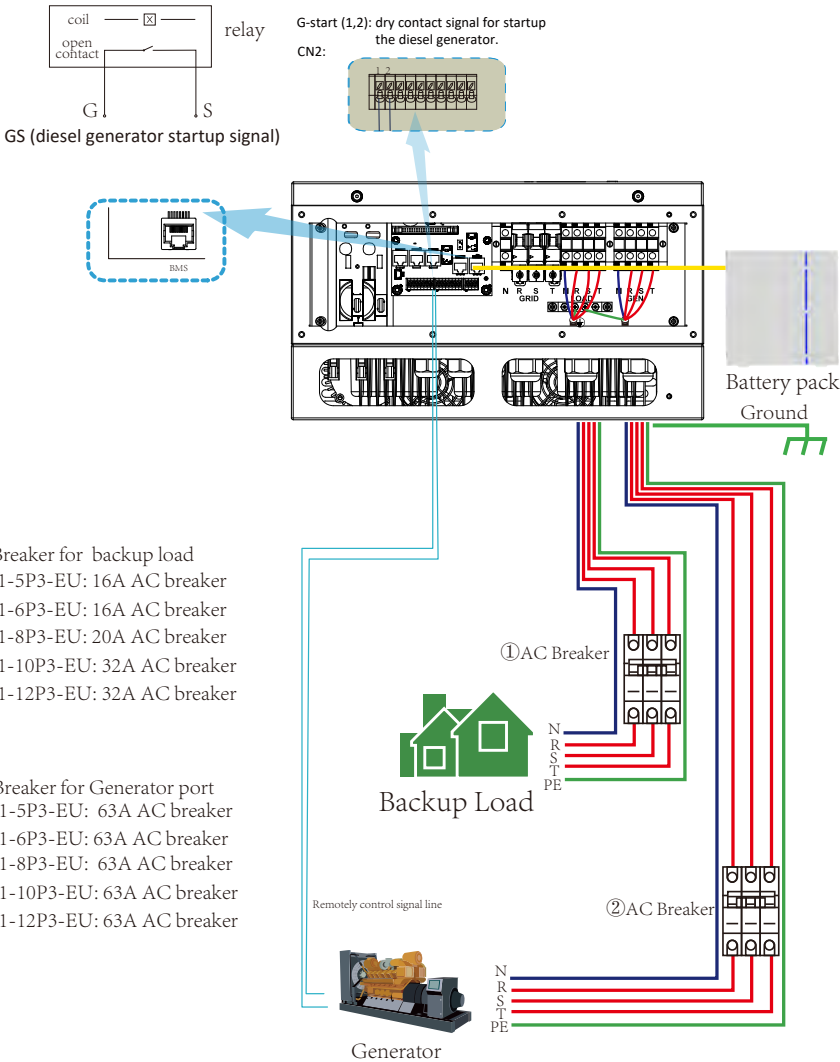
AI-W5.1-5P3-EU: 63A AC breaker
 AI-W5.1-6P3-EU: 63A AC breaker
 AI-W5.1-8P3-EU: 63A AC breaker
 AI-W5.1-10P3-EU: 63A AC breaker
 AI-W5.1-12P3-EU: 63A AC breaker

③ AC Breaker for home load

Depends on household loads

3.11 Typical application diagram of diesel generator

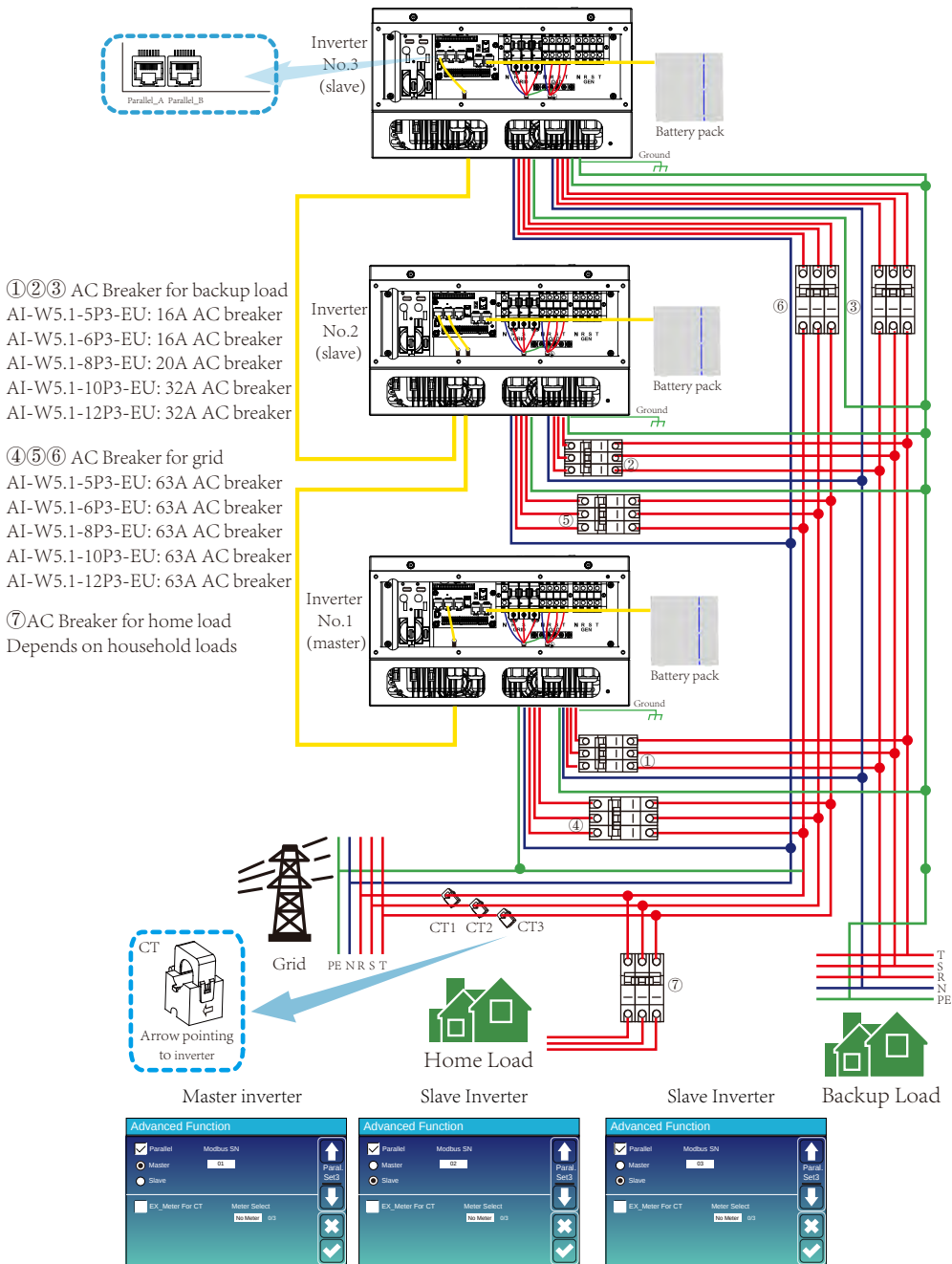
— CAN — L wire — N wire — PE wire



3.12 Three phase parallel connection diagram

Max. 10pcs parallel for on-grid and off-grid operation.

CAN L wire N wire PE wire



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 without battery connected, 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 switch on ON/OFF button and select NO battery,system can still working.

4.2 Operation and Display Panel

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

<i>LED Indicator</i>		<i>Messages</i>
DC	Green led solid light	PV Connection normal
AC	Green led solid light	Grid Connection normal
Normal	Green led solid light	Inverter operating normal
Alarm	Red led solid light	Malfunction or warning

Chart 4-1 LED indicators

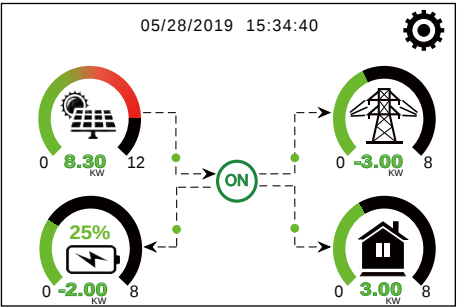
<i>Function Key</i>	<i>Description</i>
Esc	To exit setting mode
Up	To go to previous selection
Down	To go to next selection
Enter	To confirm the selection

Chart 4-2 Function Buttons

5. LCD Display Icons

5.1 Main Screen

The LCD is touchscreen, below screen shows the overall information of the inverter.



1.The icon in the center of the home screen indicates that the system is Normal operation. If it turns into "comm./F01~F64" , it means the inverter has communication errors or other errors, the error message will display under this icon(F01-F64 errors, detail error info can be viewed in the System Alarms menu).

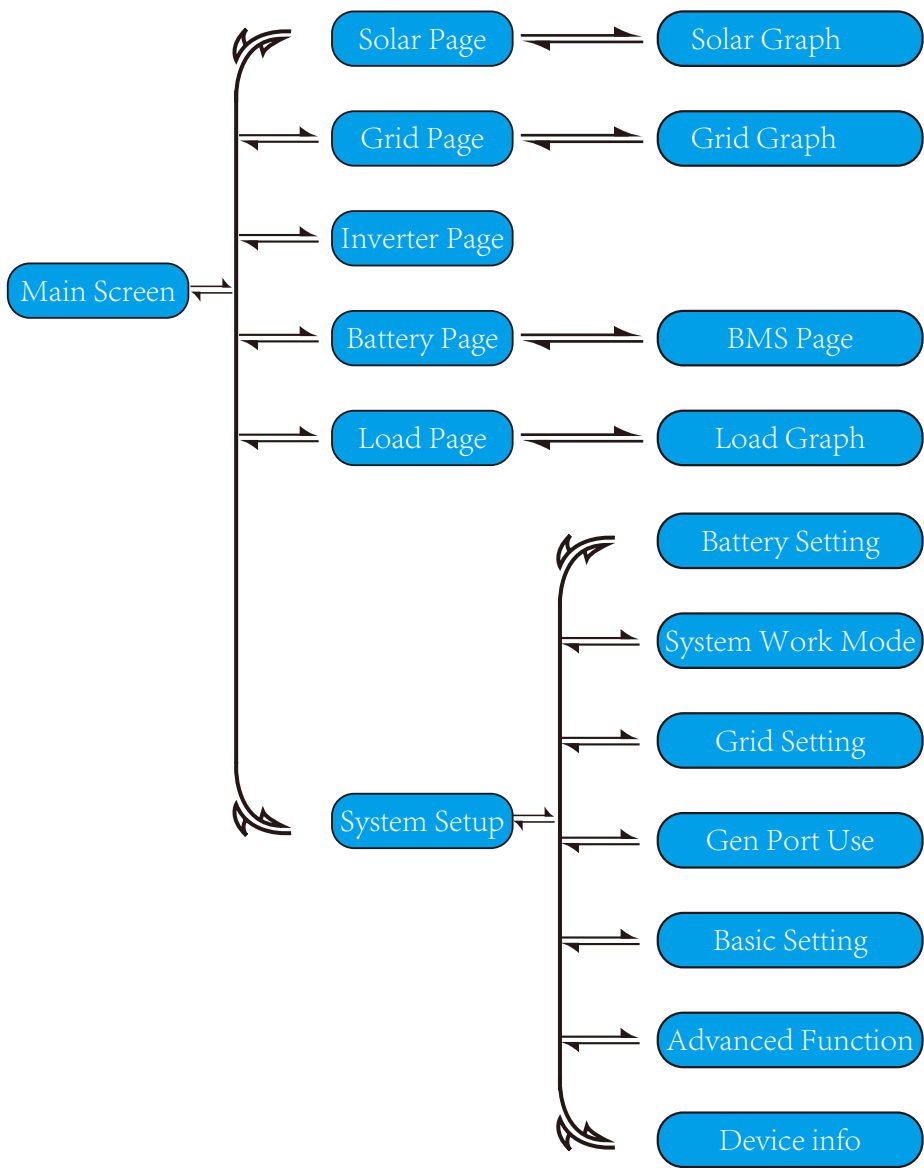
2.At the top of the screen is the time.

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-Batt info.

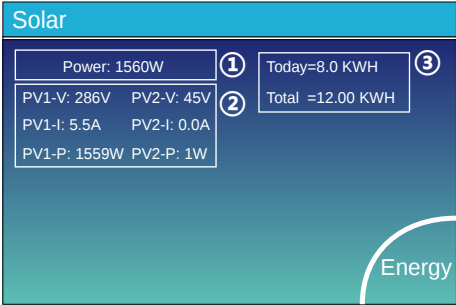
4.The main screen showing the info including Solar, Grid, Load and Battery. Its also displaying the energy flow direction by arrow. When the power is approximate to high level, the color on the panels will changing from green to red so system info showing vividly on the main screen.

- PV power and Load power always keep positive.
- Grid power negative means sell to grid, positive means get from grid.
- Battery power negative means charge, positive means discharge.

5.1.1 LCD operation flow chart



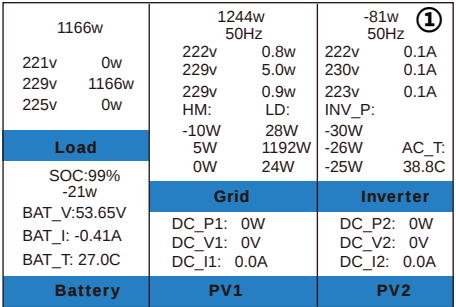
5.2 Solar Power Curve



This is Solar Panel detail page.

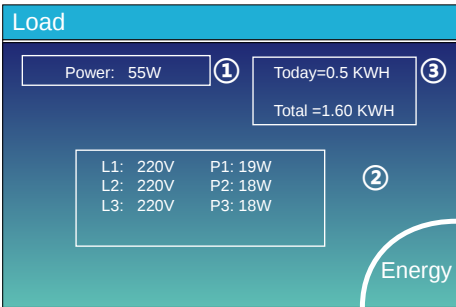
- ① Solar Panel Generation.
- ② Voltage, Current, Power for each MPPT.
- ③ Solar Panel energy for Day and Total.

Press the “Energy “button will enter into the power curve page.



This is Inverter detail page.

- ① Inverter Generation.
- Voltage, Current, Power for each Phase.
- AC-T: mean Heat-sink temperature.



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 will enter into the power curve page.



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 will enter into the power curve page.

Batt

Discharge

U:49.58V

I:2.04A

Power: 101W

Temp:25.0C

Energy

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

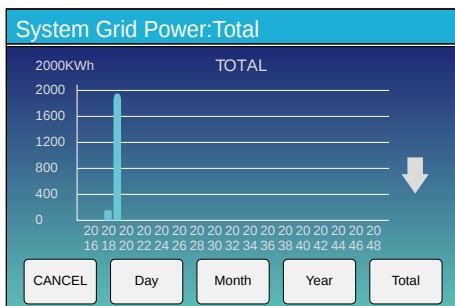
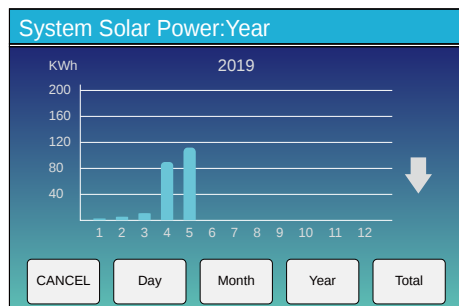
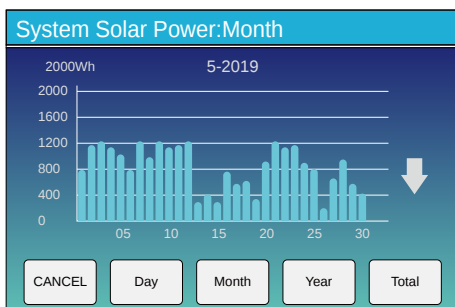
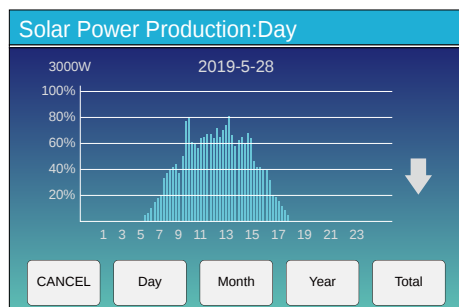
The screenshot shows the 'Li-BMS' application interface. At the top, there's a blue header with the text 'Li-BMS'. Below the header, the battery status is displayed in a grid:

- 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

On the right side, there are two buttons: 'Sum Data' (highlighted with a red box) and 'Details Data'.

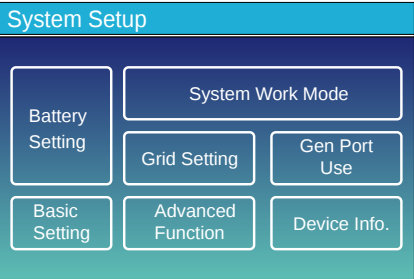
Li-BMS												
Volt				Temp				SOC		Charge		Fault
1	50.38V	19.70A	30.6C	50.2	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	Data Sum
2	50.33V	19.33A	31.0C	50.1	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	
3	50.30V	19.60A	30.2C	12.0%	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A	
4	0.00V	0.00A	0.0C	0.0%	0.0A	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	Data Detail
5	0.00V	0.00A	0.0C	0.0%	0.0A	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	
6	0.00V	0.00A	0.0C	0.0%	0.0A	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	
7	0.00V	0.00A	0.0C	0.0%	0.0A	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	
8	0.00V	0.00A	0.0C	0.0%	0.0A	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	
9	0.00V	0.00A	0.0C	0.0%	0.0A	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	
10	0.00V	0.00A	0.0C	0.0%	0.0A	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	
11	0.00V	0.00A	0.0C	0.0%	0.0A	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	
12	0.00V	0.00A	0.0C	0.0%	0.0A	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	
13	0.00V	0.00A	0.0C	0.0%	0.0A	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	
14	0.00V	0.00A	0.0C	0.0%	0.0A	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	
15	0.00V	0.00A	0.0C	0.0%	0.0A	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	

5.3 Curve Page-Solar & Load & Grid



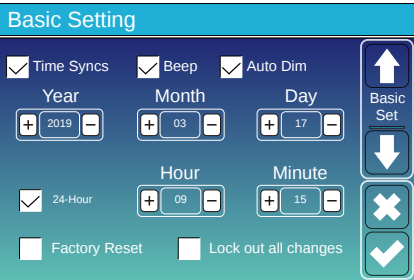
- 31 -

5.4 System Setup Menu

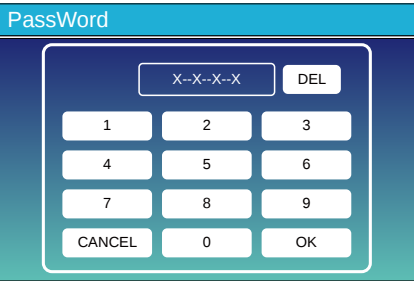


This is System Setup page.

5.5 Basic Setup Menu



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.



Factory Reset Password: 9999
Lock out all changes Password: 7777

5.6 Battery Setup Menu

Battery Setting

Batt Mode

Lithium

Use Batt V

Use Batt %

No Batt

Activate Battery

Batt Capacity

400Ah

Max A Charge

40A

Max A Discharge

40A

Batt Mode

Battery capacity: it tells Deye hybrid 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(0-190A for 8KW model, 0-210A for 10KW model, 0-240A for 12KW 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%

A

40A

Gen Charge

Gen Signal

Gen Max Run Time

24.0 hours

Gen Down Time

0.0 hours

30%

40A

Grid Charge

Grid Signal

Batt Set2

This is Grid Charge, you need select. 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.

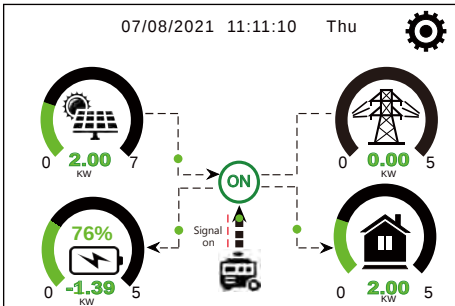
A = 40A: Charge rate of 40A from the attached generator in Amps.

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

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.



This page tells the PV and diesel generator power the load and battery.

Generator

Power: 6000W	Today=10 KWH Total =10 KWH
V_L1: 230V	P_L1: 2KW
V_L2: 230V	P_L2: 2KW
V_L3: 230V	P_L3: 2KW

This page tells generator output voltage, frequency, power. And, how much energy is used from generator.

Battery Setting

Lithium Mode	00	 Batt Set3   
Shutdown	10%	
Low Batt	20%	
Restart	40%	

Lithium Mode: This is BMS protocol. Please reference the document (Approved Battery).

Shutdown 10%: It indicates the inverter will shutdown if the SOC below this value.

Low Batt 20%: It indicates the inverter will alarm if the SOC below this value.

Restart 40%: Battery voltage at 40% AC output will resume.

Battery Setting

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

12000

Max Solar Power

☒ Zero Export To Load

☒ Solar Sell

☐ Zero Export To CT

☒ Solar Sell

Max Sell Power

12000

Zero-export Power

20

Energy pattern

☒ BattFirst

☐ LoadFirst

☒ Grid Peak Shaving

8000

Power

↑

↓

✕

✓

Work Mode1

Work Mode

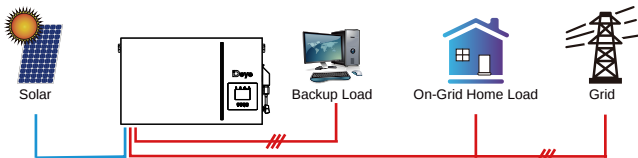
Selling First: This Mode allows hybrid inverter to sell back any excess power produced by the solar panels to the grid. If time of use is active, the battery energy also can be sold into grid.

The PV energy will be used to power the load and charge the battery and then excess energy will flow to grid.

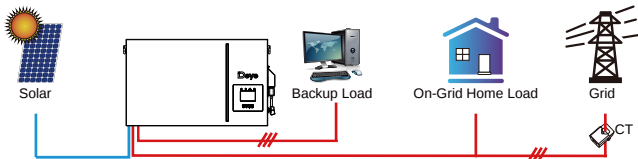
Power source priority for the load is as follows:

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.



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 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 inverter won't feed power to grid.

Energy Pattern: PV Power source priority.

Batt 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 provide power to load.

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.

System Work Mode

Grid Charge	Gen	Time	Power	Batt
☐	☐	01:00	5:00	12000
☐	☐	05:00	9:00	12000
☒	☐	09:00	13:00	12000
☒	☐	13:00	17:00	12000
☒	☐	17:00	21:00	12000
☒	☐	21:00	01:00	12000

Time Of Use: ☒ Time Power Batt

Work Mode2

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.

Note: when the grid is present, only the “time of use” is ticked, then the battery will discharge. Otherwise, the battery won't discharge even the battery SOC is full. But in the off-grid mode (when grid is not available, inverter will work in the off-grid mode automatically).

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,

if battery SOC is lower than 80%, it will use grid to charge the battery until battery SOC reaches 80%.

During 05:00-08:00,

if battery SOC is higher than 40%, hybrid inverter will discharge the battery until the SOC reaches 40%. At the same time, if battery SOC is lower than 40%, then grid will charge the battery SOC to 40%.

During 08:00-10:00,

if 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%.

Battery Setting

Start: 30% 30%

A: 40A 40A

Gen Charge: ☐ Grid Charge: ☒

Gen Signal: ☐ Grid Signal: ☒

Gen Max Run Time: 0.0 hours

Gen Down Time: 0.5 hours

Batt Set2

System Work Mode

Grid Charge	Gen	Time	Power	Batt
☒	☐	01:00	5:00	12000
☒	☐	05:00	8:00	12000
☐	☐	08:00	10:00	12000
☒	☐	10:00	15:00	12000
☐	☐	15:00	18:00	12000
☐	☐	18:00	01:00	12000

Time Of Use: ☒ Time Power Batt

Work Mode2

5.8 Grid Setup Menu

Grid Setting/Grid code selection

Grid Mode

General Standard

0/11

Grid Frequency

50HZ

60HZ

Phase Type

0/120/240

0/240/120

Grid Level

LN:220VAC LL:380VAC

☐ IT system-neutral is not grounded

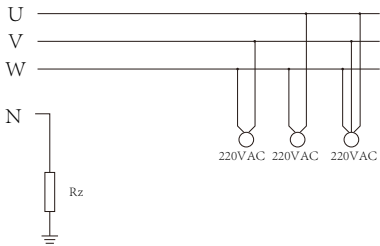
Grid Set1

↓

✕

✓

(between any two lines in a three-phase circuit) is 230V_{ac}, and the diagram is as follow.If your grid system is IT system, please enable “IT system” and tick the “Grid level” as 133-3P as below picture shows.



R_z: Large resistance ground resistor. Or the system doesn't have Neutral line

Grid Setting/Connect

Normal connect

Normal Ramp rate

10s

Low frequency

48.00Hz

High frequency

51.50Hz

Low voltage

185.0V

High voltage

265.0V

Reconnect after trip

Reconnect Ramp rate

36s

Low frequency

48.20Hz

High frequency

51.30Hz

Low voltage

187.0V

High voltage

263.0V

Reconnection Time

60s

PF

1.000

Grid Set2

↑

↓

✕

✓

Normal connect: The allowed grid voltage/frequency range when the inverter first time connect to the grid.
Normal Ramp rate: It is the startup power ramp.

Reconnect after trip: The allowed grid voltage /frequency range for the inverter connects the grid after the inverter trip from the grid.

Reconnect Ramp rate:It is the reconnection power ramp.

Reconnection time: The waiting time period for the inverter connects the grid again.

PF: Power factor which is used to adjust inverter reactive power.

Grid Setting/IP Protection

Over voltage U>(10 min. running mean)

260.0V

HV3

265.0V

HF3

51.50Hz

HV2

265.0V

0.10s

HF2

51.50Hz

0.10s

HV1

265.0V

0.10s

HF1

51.50Hz

0.10s

LV1

185.0V

0.10s

LF1

48.00Hz

0.10s

LV2

185.0V

0.10s

LF2

48.00Hz

0.10s

LV3

185.0V

LF3

48.00Hz

Grid Set3

↑

↓

✕

✓

HV1: Level 1 overvoltage protection point;
HV2: Level 2 overvoltage protection point; ② 0.10s—Trip time.
HV3: Level 3 overvoltage protection point.

LV1: Level 1 undervoltage protection point;
LV2: Level 2 undervoltage protection point;
LV3: Level 3 undervoltage protection point.

HF1: Level 1 over frequency protection point;
HF2: Level 2 over frequency protection point;
HF3: Level 3 over frequency protection point.

LF1: Level 1 under frequency protection point;
LF2: Level 2 under frequency protection point;
LF3: Level 3 under frequency protection point.

Grid Setting/F(W)

☐ F(W)

Over frequency	Drift F	40%PE/Hz
Start freq F	50.20Hz	Stop freq F
Start delay F	0.00s	Stop delay F
Under frequency	Drift F	40%PE/Hz
Start freq F	49.80Hz	Stop freq F
Start delay F	0.00s	Stop delay F

FW: this series inverter is able to adjust inverter output power according to grid frequency.

Drift F: percentage of nominal power per Hz

For example, "Start freq F > 50.2Hz, Stop freq F < 51.5, Drift F = 40%PE/Hz" when the grid frequency reaches 50.2Hz, the inverter will decrease its active power at Drift F of 40%. And then when grid system frequency is less than 50.1Hz, the inverter will stop decreasing output power.

For the detailed setup values, please follow the local grid code.

Grid Setting/V(W) V(Q)

☐ V(W)

V1	108.0%	P1	100%
V2	110.0%	P2	80%
V3	112.0%	P3	60%
V4	114.0%	P4	40%

☐ V(Q)

Lock-in/Pn	5%	Lock-out/Pn	20%
V1	94.0%	Q1	44%
V2	97.0%	Q2	0%
V3	105.0%	Q3	0%
V4	108.0%	Q4	-44%

V(W): It is used to adjust the inverter active power according to the set grid voltage.

V(Q): It is used to adjust the inverter reactive power according to the set grid voltage. This function is used to adjust inverter output power (active power and reactive power) when grid voltage changes.

Lock-in/Pn 5%: When the inverter active power is less than 5% rated power, the VQ mode will not take effect.

Lock-out/Pn 20%: If the inverter active power is increasing from 5% to 20% rated power, the VQ mode will take effect again.

For example: V2=110%, P2=80%. When the grid voltage reaches the 110% times of rated grid voltage, inverter output power will reduce its active output power to 80% rated power.

For example: V1=94%, Q1=44%. When the grid voltage reaches the 94% times of rated grid voltage, inverter output power will output 44% reactive output power.

For the detailed setup values, please follow the local grid code.

Grid Setting/P(Q) P(F)

☐ P(Q)

P1	0%	Q1	2%
P2	2%	Q2	0%
P3	0%	Q3	21%
P4	22%	Q4	25%

☐ P(PF)

Lock-in/Pn	50%	Lock-out/Pn	50%
P1	0%	PF1	-0.000
P2	0%	PF2	-0.000
P3	0%	PF3	0.000
P4	62%	PF4	0.264

P(Q): It is used to adjust the inverter reactive power according to the set active power.

P(PF): It is used to adjust the inverter PF according to the set active power.

For the detailed setup values, please follow the local grid code.

Lock-in/Pn 50%: When the inverter output active power is less than 50% rated power, it won't enter the P(PF) mode.

Lock-out/Pn 50%: Lock-out/Pn 50%: When the inverter output active power is higher than 50% rated power, it will enter the P(PF) mode.

Note : only when the grid voltage is equal to or higher than 1.05times of rated grid voltage, then the P(PF) mode will take effect.

Grid Setting/LVRT

☐ L/HVRT

HV3	0%	HV3_T	30.24s
HV2	0%	HV2_T	0.04s
HV1	0%	HV1_T	22.11s
LV1	0%	LV1_T	22.02s
LV2	0%	LV2_T	0.04s

Reserved: This function is reserved. It is not recommended.

5.9 Generator Port Use Setup Menu

GEN PORT USE

Mode

☒ Generator Input
 ☐ GEN connect to Grid input

Rated Power

8000W

☐ SmartLoad Output
 ☐ On Grid always on

AC Couple Frz High

55.00Hz

☐ Micro Inv Input
 ☐ MI export to Grid cutoff

OFF(V)

51.0V

ON(V)

54.0V

PORT Set1

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✕

✓

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 is above a user programmable threshold.

e.g. ON: 100%, OFF=95%: When the battery bank SOC reaches 100%, Smart Load Port will switch on automatically and power the load connected. When the battery bank SOC < 95%, 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. 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, Microinverter or grid-tied inverter will shut down.
- * **Micro Inv Input ON:** when the battery SOC is lower than setting value, Microinverter or grid-tied inverter will start to work.

AC Couple Frz 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 Frz high) and the Microinverter will stop working.

MI export to grid cutoff: 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

Advanced Function

☐ Solar Arc Fault ON
 ☐ Clear Arc_Fault

Backup Delay

0s

☐ System selfcheck
 ☐ Gen peak-shaving

2000: 1

CT Ratio

☐ DRM
 ☐ BMS_Err_Stop

☐ Signal Island Mode
 ☐ CEI Report

☐ Asymmetric phase feeding

Func Set1

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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.

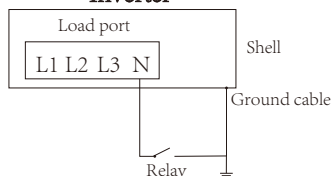
DRM: For AS4777 standard

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: If "Signal island mode" is checked and When inverter is in off-grid mode, the relay on the Neutral line (load port N line) will switch ON then the N line (load port N line) will bind to inverter ground.

Inverter



Asymmetric phase feeding: If it was checked, the excess PV energy that feeds into the grid will be balanced on the three phase.

Advanced Function

☐ Parallel

Modbus SN

00

☒ Master

00

☐ Slave

☐ EX_Meter For CT

Meter Select

No Meter

CHNT

Eastron

0/3

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✓

Paral.

Set3

Ex_Meter For CT: when using zero-export to CT mode, the hybrid inverter can select EX_Meter For CT function and use the different meters.e.g.CHNT and Eastron.

5.11 Device Info Setup Menu

Device Info.

SUN-12K

Inverter ID: 2102199870

Flash

HMI: Ver 1001-8010

MAIN: Ver2002-1046-1707

Alarms Code

Occurred

F13 Grid_Mode_changed

2021-06-11 13:17

F23 Tz_GFCL_OC_Fault

2021-06-11 08:23

F13 Grid_Mode_changed

2021-06-11 08:21

F56 DC_VoltLow_Fault

2021-06-10 13:05

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✕

✓

Device Info

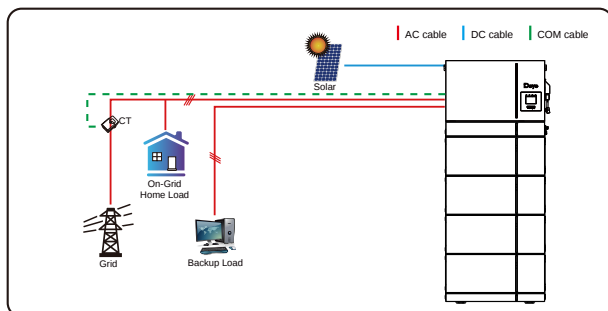
This page show Inverter ID, Inverter version and alarm codes.

HMI: LCD version

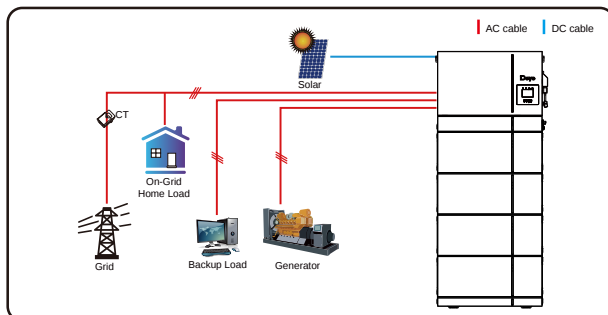
MAIN: Control board FW version

6. Mode

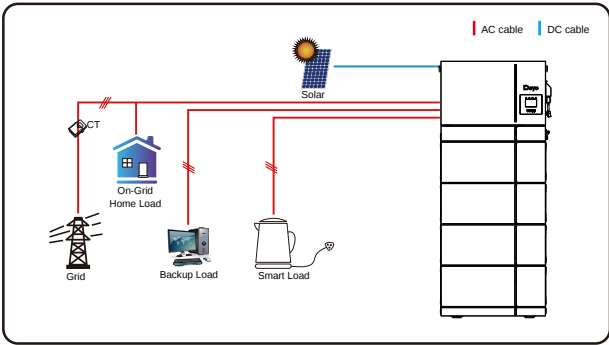
Mode I: Basic



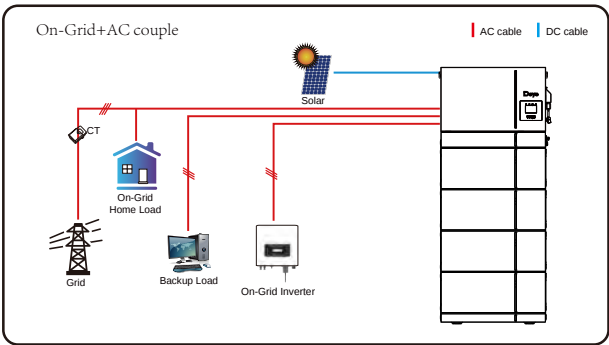
Mode II: With Generator



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. Limitation 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.

Error code	Description	Solutions
F01	DC input polarity reverse fault	1, Check the PV input polarity 2, Seek help from us, if can not go back to normal state.
F07	DC_START_Failure	1, The BUS voltage can't be built from PV or battery. 2, Restart the inverter, 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 can not go back to normal state.
F15	AC over current fault of software	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 can not go back to normal state.
F16	AC leakage current fault	Leakage current fault 1, Check the PV side cable ground connection 2, Restart the system 2-3 times 3, if the fault still existing, please contact us for help.
F18	AC over current fault of hardware	AC side over current fault 1. Please check whether the backup load power and commonload 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 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 can not go back to normal state.

Error code	Description	Solutions
F21	Tz_HV_Overcurr_fault	BUS over current. 1. Check the PV input current and battery current setting 2. Restart the system 2~3 times. 3. If the fault still exists, please contact us for help.
F22	Tz_EmergStop_Fault	Remotely shutdown 1, it tells the inverter is remotely controlled.
F23	Tz_GFCI_OC_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 failure	PV isolation resistance is too low 1. Check the connection of PV panels and inverter is firmly and correctly; 2. Check whether the PE cable of inverter is connected to ground; 3. Seek help from us, if can not 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 load power of 3 phases is big different, it will report the F26. 3. When there's DC leakage current, it will report F26 4. Restart the system 2~3 times. 5. Seek help from us, if can not go back to normal state.
F29	Parallel CAN Bus fault	1. When in parallel mode, check the parallel communication cable connection and hybrid inverter communication address setting; 2. During the parallel system startup period, inverters will report F29. But when all inverters are in ON status, it will disappear automatically; 3. If the fault still exists, please contact us for help.
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
F41	Parallel system stop	1. Check the hybrid inverter work status. If there's 1pcs hybrid inverter shutdown, all hybrid inverters will report F41 fault. 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 inspection; 2. Check whether grid AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state.

Error code	Description	Solutions
F46	backup battery fault	1, Please check each battery status, such as voltage/ SOC and parameters etc., and make sure all the parameters are same. 2, If the fault still exists, please contact us for help
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 can not 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 can not go back to normal state.
F55	DC busbar voltage is too high	BUS voltage is too high 1. Check whether battery voltage is too high; 2. check the PV input voltage, make sure it is within the allowed range; 3. Seek help from us, if can not 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 can not go back to normal state.
F58	BMS communication fault	1, it tells the communication between hybrid 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
F62	DRMs0_stop	1, the DRM function is for Australia market only. 2, Check the DRM function is active or not 3, Seek help from us, if can not go back to normal state after restart the system
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 can not 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 inverter for 10mins and restart; 3. Seek help from us, if can not 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. Datasheet

Model	AI-W5.1-5P3-EU	AI-W5.1-6P3-EU	AI-W5.1-8P3-EU	AI-W5.1-10P3-EU	AI-W5.1-12P3-EU
Battery Input Data					
Battery Type	Lead-acid or Li-Ion				
Battery Voltage Range(V)	40-60V				
Max. Charging Current(A)	120A	150A	190A	210A	240A
Max. Discharging Current(A)	120A	150A	190A	210A	240A
Charging Curve	3 Stages / Equalization				
External Temperature Sensor	yes				
Charging Strategy for Li-Ion Battery	Self-adaption to BMS				
PV String Input Data					
Max. DC Input Power(W)	6500W	7800W	10400W	13000W	15600W
PV Input Voltage(V)	550V (160V~800V)				
MPPT Range(V)	200V-650V				
Start-up Voltage(V)	160V				
PV Input Current(A)	13A+13A	13A+13A	13A+13A	26A+13A	26A+13A
Max.PV Isc(A)	17A+17A	17A+17A	17A+17A	34A+17A	34A+17A
No. of MPPT Trackers	2				
No. of Strings Per MPPT Tracker	1+1	1+1	1+1	2+1	2+1
AC Output Data					
Rated AC Output and UPS Power(W)	5000	6000	8000	10000	12000
Max. AC Output Power(W)	5500	6600	8800	11000	13200
Peak Power(off grid)	2 times of rated power, 10 S				
AC Output Rated Current(A)	7.6/7.2A	9.1/8.7A	12.1/11.6A	15.2/14.5A	18.2/17.4A
Max. AC Current(A)	8.4/8A	10/9.6A	13.4/12.8A	16.7/15.9A	20/19.1A
Max. Three-phase Unbalanced Output Current (A)	11.4/10.9A	13.6/13A	18.2/17.4A	22.7/21.7A	27.3/26.1A
Max Output short circuit current(A)	75A				
Max. Continuous AC Passthrough(A)	45A				
Output Frequency and Voltage	50/60Hz;3L/N/PE 220/380, 230/400Vac (Three phase)				
Grid Type	Three Phase				
Total Harmonic Distortion (THD)	<3% (of nominal power)				
DC current injection	<0.5% In				
Efficiency					
Max. Efficiency	97.60%				
Euro Efficiency	97.00%				
MPPT Efficiency	>99%				
Protection					
PV Arc Fault Detection	Integrated				
PV Input Lightning Protection	Integrated				
Anti-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 III / AC Type III				
Over Voltage Category	DC Type II / AC Type III				

Certifications and Standards	
Grid Regulation	VDE4105,IEC61727/62116,VDE0126,AS4777.2,CEI 0 21,EN50549-1, G98,G99,C10-11,UNE217002,NBR16149/NBR16150
EMC/Safety Regulation	IEC/EN 62109-1,IEC/EN 62109-2,IEC/EN 61000-6-1, IEC/EN 61000-6-2,IEC/EN 61000-6-3,IEC/EN 61000-6-4
General Data	
Operating Temperature Range(℃)	-40~60℃, >45℃ Derating
Cooling	Smart cooling
Noise(dB)	≤45 dB(A)
Communication with BMS	RS485; CAN
Weight(kg)	37.75
Cabinet size(mm)	720W×440H×254D
Protection Degree	IP65
Installation Style	Wall-mounted
Warranty	5 years

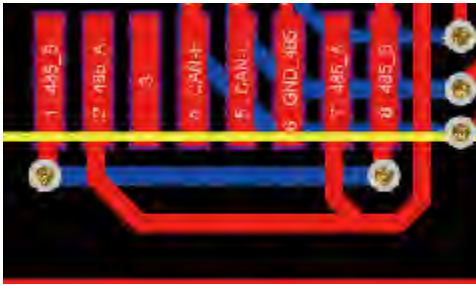
Model		AI - W5.1				
Main Parameter						
Battery Chemistry		LiFePO4				
Battery Module Energy (kWh)		5.12				
Battery Module Voltage (V)		51.2				
Battery Module Capacity (Ah)		100				
Scalability		2	3	4	5	6
Nominal Voltage (V)		51.2				
Operating Voltage(V)		43.2~57.6				
Energy (kWh)		10.24	15.36	20.48	25.6	30.72
Usable Energy (kWh)		9.2	13.8	18.4	23.0	27.6
Charge/Discharge Current (A)	Recommend	100	150	200	200	200
	Max.	180	210	240	250	250
	Peak(10s,25°C)	270	315	360	360	360
Other Parameter						
Recommend Depth of Discharge		90%				
System Dimension (W/D/H, mm)		720*255*765	720*255*1050	720*255*1335	720*255*1620	720*255*1905
System Weight (kg)		124	177	230	283	336
Battery Module Dimension(W/D/H, mm)		720*255*285				
Battery Module Weight (kg)		53				
Master LED Indicator		5LED(SOC:20%~100%), 3LED (working, alarming, protecting)				
IP Rating of Enclosure		IP65				
Operating Temperature		Charge: 0~55°C / Discharge: -20°C~55°C				
Storage Temperature		-20°C ~ 35°C				
Humidity		5%~95%				
Altitude		≤2000m				
Cycle Life		≥6000(25°C±2°C, 0.5C/0.5C,70%EOL)				
Installation		Floor-Mounted				
Communication Port		CAN2.0, RS485				
Warranty Period		10 years				
Energy Throughput		16MWh(Battery Module @70%EOL)				
Certification		IEC62619, CE,VDE2510-10, CEI 0-21, UN38.3				

9. 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_485
7	485_A
8	485_B

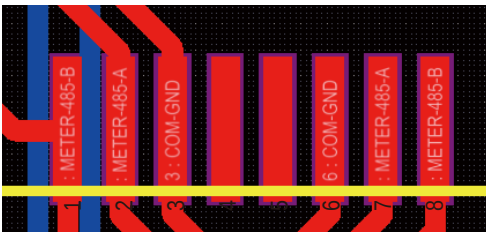
BMS Port



Definition of RJ45 Port Pin for Meter-485

No.	Meter-485 Pin
1	METER-485_B
2	METER-485_A
3	COM-GND
4	--
5	--
6	COM-GND
7	METER-485_A
8	METER-485_B

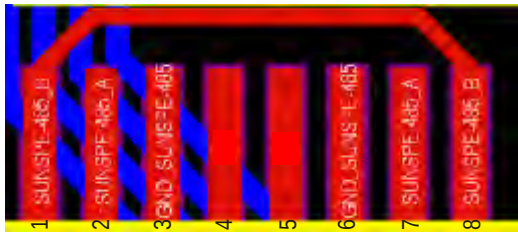
Meter-485 Port



Definition of RJ45 Port Pin of "Modbus port" for remotely monitoring

No.	Modbus port
1	485_B
2	485_A
3	GND_485
4	--
5	--
6	GND_485
7	485_A
8	485_B

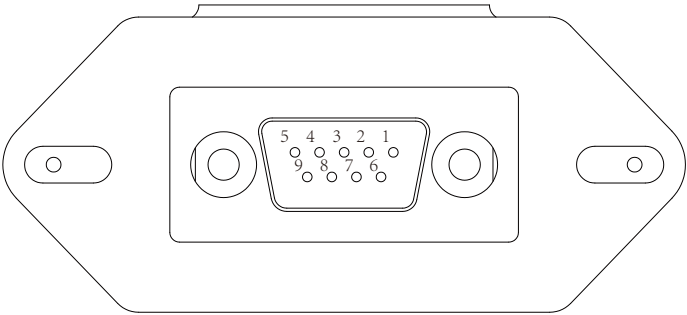
Modbus port



Note : for some hardware versions, this port is useless.

RS232

No.	WIFI/RS232
1	
2	TX
3	RX
4	
5	D-GND
6	
7	
8	
9	12Vdc

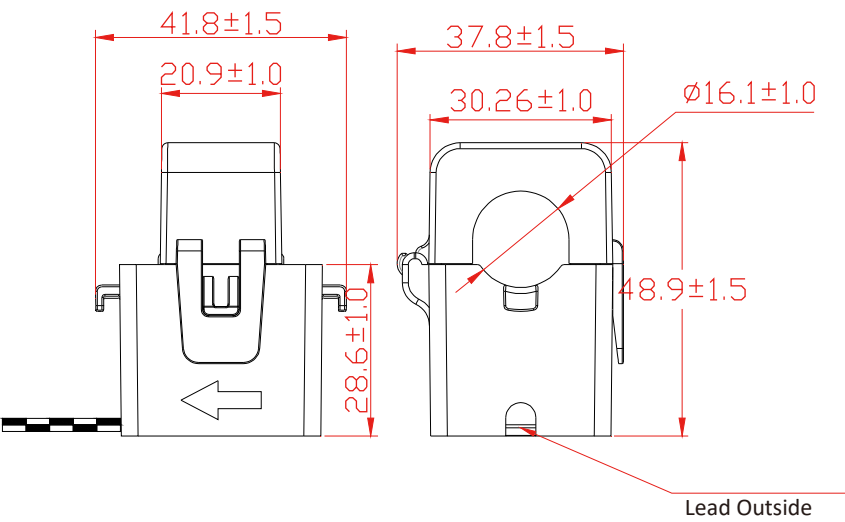


WIFI/RS232

This RS232 port is used to connect the wifi datalogger

10. Appendix II

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



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