

User Operation Manual

Off Grid Inverter

DR-PCS5520N2FL02

Legal Information

In order to protect the legitimate rights and interests of users, please read our operating procedures and safety instructions carefully before using this equipment. Please operate the equipment according to the operating procedures and safety instructions.

Once using this device, you are deemed to have read, understood, endorsed and accepted all terms and contents of the device's operating procedures and safety instructions. The user is committed to being responsible for his or her own actions and all consequences arising therefrom.

The User undertakes to use the device solely for legitimate purposes and agrees to these Terms and any relevant national policies or guidelines.

In the process of using this equipment, please strictly observe and implement the requirements including but not limited to the operating procedures and safety instructions. All personal injury, accident, property damage, legal disputes and other adverse events that cause conflicts of interest caused by violations of the use instructions or force majeure indicated by the safety instructions are the responsibility and loss of the user. Our company will we do not assume any responsibility.

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Caution!

- Be sure to read this manual before installing this product.

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1. Safety Precautions



This chapter contains important safety and operational instructions. Please read carefully and keep the manual for future reference.

1. Before installing and using the equipment, carefully read the corresponding warning signs and the battery model specifications.
2. To reduce operational risks, it is recommended to use deep cycle lead-acid batteries. Other types of batteries may increase safety risks during operation.
3. Do not dismantle the equipment casually. If maintenance or repair is required, please contact Doart after-sales service. Improper operation may result in electric shock or even fire.
4. To reduce the risk of electric shock, disconnect all circuits before performing any maintenance or repair work.
5. Warning: The battery must be installed by professional technicians.
6. Do not short-circuit the battery.
7. Do not attempt to charge a non-rechargeable battery.
8. To maximize product functionality and efficiency, please use cables specified by the product manual.
9. Exercise caution when using metal tools during assembly or disassembly to avoid the danger of short circuits caused by metal conductors.
10. When disconnecting both the AC power and the battery for installation, please follow the installation instructions.
11. The fuse provides over current protection for the battery.
12. Grounding requirements: Choose a permanent and fixed location for the product wiring.
13. Do not short-circuit the AC output and DC input. If the DC input is short-circuited, do not connect the power supply.
14. Warning! Only qualified service personnel are authorized to service this device. If errors persist after troubleshooting, return the device to the local dealer or Doart after-sales and support for maintenance.

15. **Warning!** As this inverter is non-isolated, it can only accept three types of photovoltaic modules: Mono-crystalline, multi-crystalline grade A modules, and CIGS modules. To avoid any malfunctions, do not connect any photovoltaic modules with potential current leakage to the inverter. For example, grounded photovoltaic modules will cause leakage in the inverter. When using CIGS modules, ensure they are not grounded.
16. **Notice:** Use a photovoltaic junction box with surge protection. Otherwise, lightning strikes on photovoltaic modules may damage the inverter.

► **Warning symbol description:**

	Flammability risk.
	Keep the battery away from open flame or ignition sources .
	Danger of high voltages. Risk to life due to high voltages in the energy storage system .
	Danger! Risk of electric shock!
	Do not touch the product for 5 minutes after shutdown.
	CE Certification .
	Please read enclosed documentation carefully before using the product.
	This marking indicates that the product should not be disposed of with other household waste in the EU. To prevent potential harm to the environment or human health from uncontrolled waste disposal, please recycle it responsibly. This will promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can assist with environmentally safe recycling.
	Product is not waterproof.

2. Product Profile

This multifunctional inverter/charger combines an inverter, solar charger, and battery charger into one device, providing stable and reliable uninterrupted power for electrical equipment. Its compact and lightweight design makes it easy to transport and suitable for various applications. The built-in high-definition LCD display not only provides comprehensive operational information but also supports user-friendly button controls for easy customization (such as adjusting battery charging current, prioritizing grid power or solar charging, and selecting input voltage ranges to suit different application scenarios).

2.1 Functional Characteristics

- Pure sine wave output inverter.
- Input voltage range for grid power can be selected according to load requirements (home appliances/personal computers).
- Battery charging current can be set via the LCD screen based on load requirements.
- Grid/solar priority input mode can be set through the LCD display.
- Compatible with both grid power and generator input.
- Automatic restart function when grid power is restored.
- Protection against output overload, high temperature, and output short circuit.
- Intelligent battery charging design for more efficient utilization of the battery.
- Cold start function.
- Wi-Fi communication function: After wireless connection, you can monitor the energy storage system's operation and adjust related parameters. It supports iOS and Android systems.

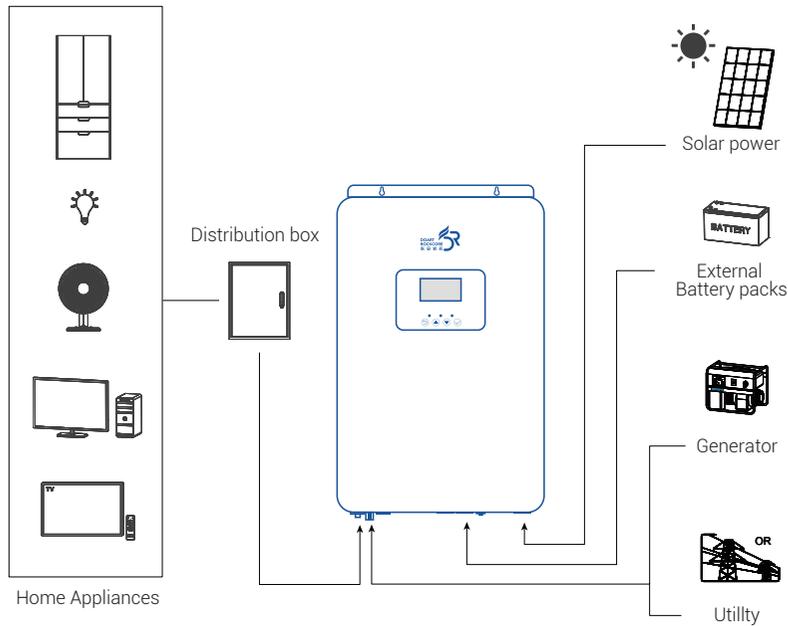
2.2 Basic Structure

The following diagram illustrates the basic framework of the solar inverter in operation. It also includes a complete operational system comprising the following equipment:

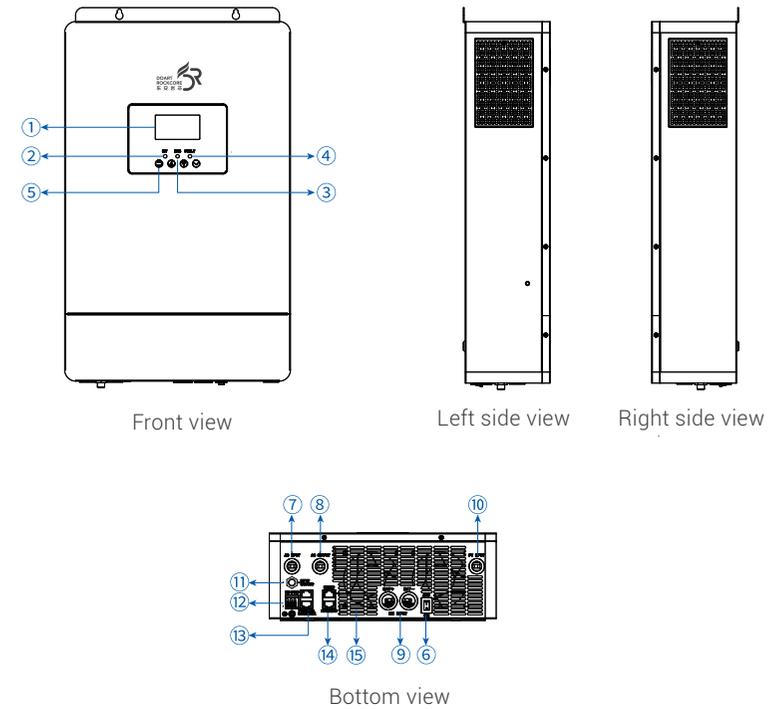
1. Generator or AC
2. Solar Modules
3. Battery Bank

Depending on your needs, you may consult with a system integrator to configure additional feasible system structures.

This type of solar inverter is capable of powering a variety of household appliances and office equipment, such as: fans, lights, air conditioners, refrigerators, computers, and more.



2.3 Product Introduction

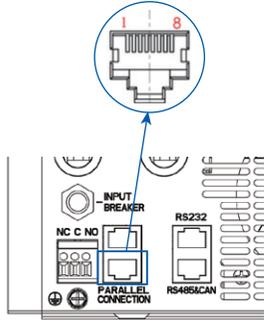
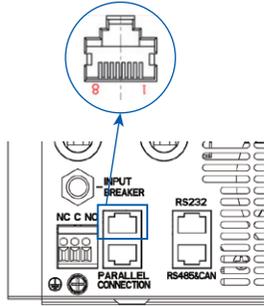


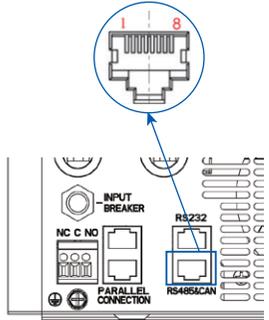
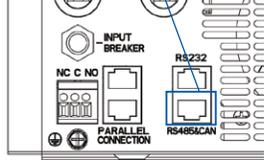
▲ Functional Component Indicator Diagram

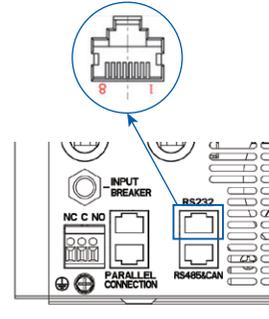
- | | |
|---------------------------|--|
| ① The LCD display screen | ⑨ Battery input |
| ② Status indication | ⑩ Solar energy input |
| ③ Charging indication | ⑪ Circuit breaker |
| ④ Fault indication | ⑫ Dry contact point |
| ⑤ Function key | ⑬ Communication interface (interface only) |
| ⑥ Power supply switch key | ⑭ Bms Communication interface |
| ⑦ AC input | ⑮ RS-232 communication interface |
| ⑧ AC output | |

► Product Ports Function Definition

⑫ Dry Contact			
Item	Pin	Definition	Remarks
Dry Contact	1	NC, Normally closed contact	1, 2PIN
	2	N, Central contact	
	3	NO, Normally open contact	2, 3PIN
Dry Contact Signal: There is a 3-pin dry contact (3A/250VAC) on the panel: Pin 1 and Pin 2 are normally closed, Pin 2 and Pin 3 are normally open, with Pin 2 as the common point. When the battery voltage reaches the alarm threshold, it sends a signal to external devices. A diesel generator start control switch (internal isolation switch) can also be configured.			

⑬ Parallel Communication Interface (Parallel Operation Only)			
Item	Pin	Definition	Remarks
	1	PARA_CAN_H	
	2	PARA_CAN_L	
	3,6	NC	
	4	SYN	
	5	GND_S1	
	7	SHARE_I-	
	8	SHARE_I+	
		1	PARA_CAN_H
2		PARA_CAN_L	
3,6		NC	
4		SYN	
5		GND_S1	
7		SHARE_I-	
8		SHARE_I+	

⑭ BMS Communication Interface			
Item	Pin	Definition	Remarks
	1,8	RS485_B	Not for public use
	2,7	RS485_A	
	4	CAN_H	Not for public use
	5	CAN_L	
	3,6	GND_S1	

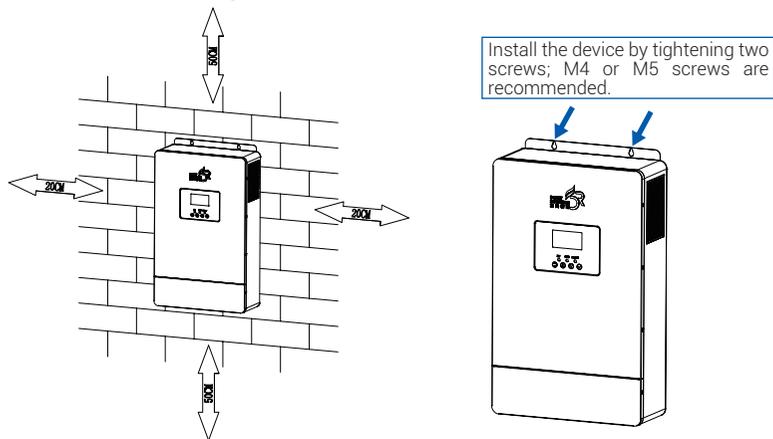
⑮ RS-232 Communication Interface			
Item	Pin	Definition	Remarks
	1	RXD	Connect to WIFI collector
	2	TXD	
	3,5,6,7	NC	
	4	VCC	12Vdc
	8	GND_S1	

3. Installation

3.1 Equipment Installation

Before installing the equipment, please consider the following points and precautions:

- Do not install the inverter on flammable building materials.
- Install it on a solid surface.
- The inverter should be installed at a height accessible to the user's line of sight, allowing easy monitoring of the product's operating status.
- Leave a gap of 20–50 cm to allow for ventilation and heat dissipation.
- The operating temperature of the equipment should be between -10°C and 50°C.
- The installation location should ideally be mounted vertically on a wall, leaving space between the inverter and the floor.
- All wiring must be securely tightened to prevent disconnection.
- Ensure that the polarity of the photovoltaic and battery connections to the product is correct.
- Circuit breakers should be installed on public utilities, batteries, and PV inputs to ensure safety.
- The inverter must not share the same solar panel array.
- The connections between the battery and solar panels must be within the product's specified parameter range.
- SPD (Surge Protective Device) should be installed on public utilities and PV inputs to protect the equipment.
- Do not disconnect the battery during system operation.
- In dusty environments, regular cleaning is necessary to prevent excessive dust buildup from affecting heat dissipation.



ATTENTION Suitable for installation in concrete or other non-combustible walls.

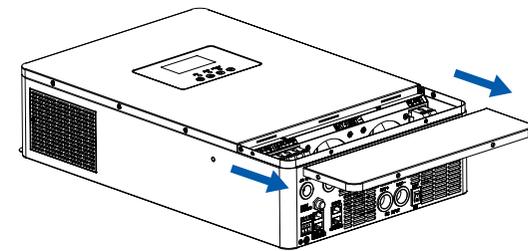
3.2 Unpacking Inspection

Before installation, carefully check the package for damage and see if the items is complete.

- Inverter x 1
- Specification x 1
- Parallel Cable (parallel only) x 1

3.3 Installation Preparation

Before connecting all wiring, Please remove the four screws on both sides and the bottom. as shown in the following below.



3.4 Battery Connection

Before connecting all wiring, Please remove the four screws on both sides and the bottom. as shown in the following below.

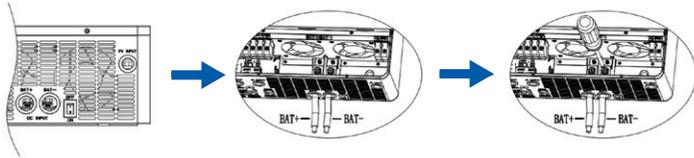
CAUTION For safe operation and regulatory compliance, it is required to install a separate DC over voltage protection switch or disconnect the equipment between the battery and the inverter. Even for some appliances that do not require a circuit breaker, an over current protection switch should still be installed. For the required fuse and switch sizes, please refer to the typical current (A) data in the table below.

CAUTION It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the proper recommended cable, stripping length(L2) and tinning length(L1) as below.

Model	Maximum Amperage	Wire Size	Cable (mm ²)	L1(mm)	L2(mm)	Torque Value (max)
5.5KW	137A	1x2AWG	38	3	18	2~3Nm

► Please follow the steps below to connect the battery:

- Step1: Remove 18 mm of insulation from the positive and negative conductors.
- Step2: It is recommended to use the correct crimping tool to attach the cable lugs to the ends of the positive and negative wires.
- Step3: Connect all the battery modules according to the table below.



- Step4: Smoothly insert the battery wires into the inverter's battery connectors and ensure that the bolts are tightened. The torque should be 2~3 Nm in a clockwise direction. Make sure that the polarity of the battery and inverter/charger is correctly connected, and that the conductors are securely screwed into the battery terminals.

Recommended tool: M6 hexagonal socket.

WARNING Risk of electric shock. Due to the high battery voltage, careful installation is required.

ATTENTION Before making the final DC connection or closing the DC circuit breaker/Disconnect Switch, ensure that the positive (+) is connected to the positive (+) terminal, and the negative (-) is connected to the negative (-) terminal.

3.5 AC Input / Output Connection

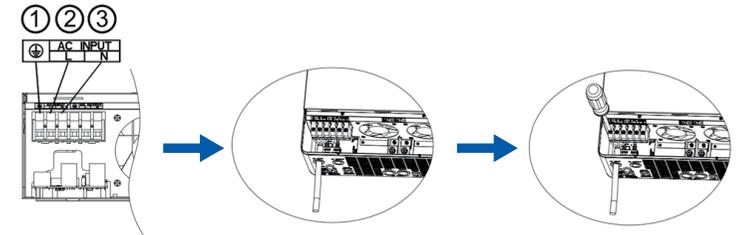
CAUTION

- Before connecting to the AC input power, please install an independent circuit breaker between the inverter and the AC input power source. This will ensure that the inverter can be safely disconnected during maintenance and fully protected from AC input over current. The recommended specification for the AC circuit breaker is 5.5 kW with a 50A rating.
- The two terminals are labeled "IN" and "OUT." Please ensure that the input and output connectors are not reversed.
- All wiring work must be carried out by qualified technical personnel.
- To reduce the risk of use, please select the cable specifications specified in the table below.

Model	Wire Size	Cable(mm ²)	Torque Value(max)
5.5KW	10 AWG	6	1.2 Nm

► Please follow the steps below to connect the battery:

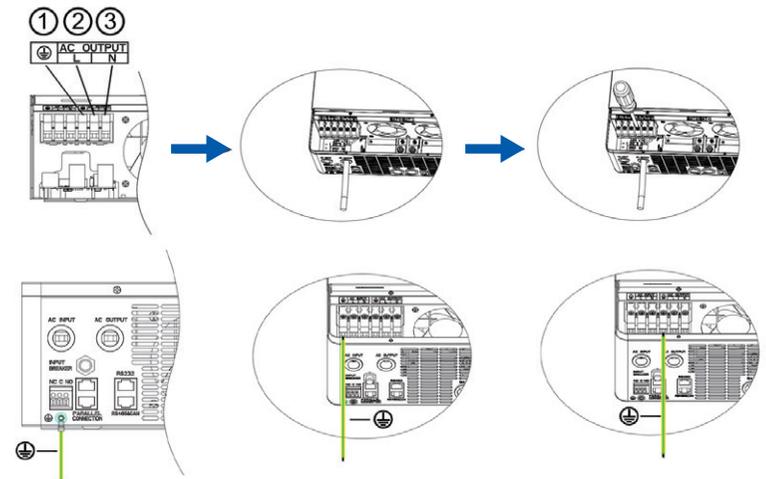
- Step1: Before making the AC input/output connection, first open the DC circuit protector or disconnecting switch.
- Step2: Remove 10 mm of insulation from the six wires. Shorten the L-phase and neutral conductor (N) by 3 mm.
- Step3: Connect the AC input wires according to the terminal polarity markings, and tighten with screws. Be sure to install the PE (Protective Earth) conductor first. ⊕



WARNING Before connecting the equipment with hard wiring, ensure that the AC power is disconnected.

- Step4: Then, connect the AC output wires according to the terminal polarity markings and tighten the screws. Ensure that the PE (Protective Earth) conductor is installed first. Ensure that the wire connections are secure.

⊕→PE→Ground wire (yellow or green) L→ Live wire (red or brown) N→Neutral wire (blue)





WARNING

- Ensure that the polarity of the AC wiring is correctly connected. Incorrect connection of the live and neutral wires will cause a short circuit when the inverter is operating in grid-tied mode.
- Appliances such as air conditioners require at least 2–3 minutes to restart. This time is needed to balance the refrigerant gas within the system. Immediate restart after a power short circuit can cause damage to the appliance. To prevent this damage, verify with the air conditioner manufacturer whether the appliance has a delay function before installation. Otherwise, the inverter may experience an overload fault and cut off the output to protect the appliance, which could inevitably cause some damage to the air conditioner.

3.6 Solar Energy Connection



CAUTION

- Before connecting the solar module, install a separate switch between the inverter and the solar module.
- All wiring work must be operated by special technical personnel.
- To reduce the operational risk, please select the cable specification specified in the table below.

Model	Gauge	Cable(mm ²)	Torque Value(max)
5.5KW	1x12AWG	4	1.2 Nm

Before selecting the appropriate solar module, please refer to the following requirements:

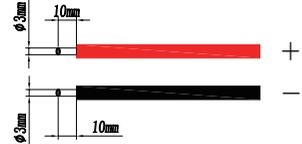
- The open-circuit voltage (VOC) of the solar module should not exceed the maximum photovoltaic open-circuit voltage.
- The open-circuit voltage (VOC) of the solar module should be higher than the minimum photovoltaic open-circuit voltage.

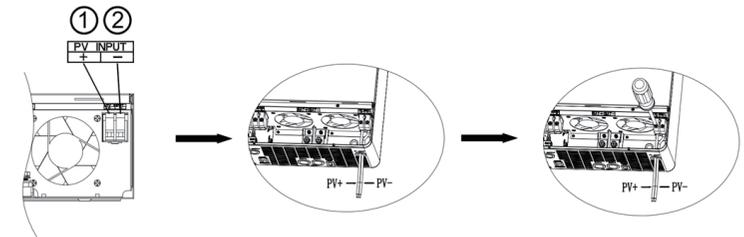
Maximum solar-energy open-circuit voltage	500Vdc
MPPT for the optimal operating voltage	160Vdc~450Vdc

The following is an example of a solar panel configuration system. After considering the above two parameters, the recommended configuration is shown in the following table:

Solar panel parameters	Solar Panel Access Mode Range (6 plates in series-12 plates in series)	Required Solar Panels(PCS)	Output Power
-250Wp -Vmp:30.1Vdc -Imp:8.3A Voc:37.7Vdc -Isc:8.4A Cells:60	6 plates in series	6	1500W
	8 panels in series	8	2000W
	12 Plate series	12	3000W
	8 String 2 and	16	4000W
	10 String 2 and	20	5000W

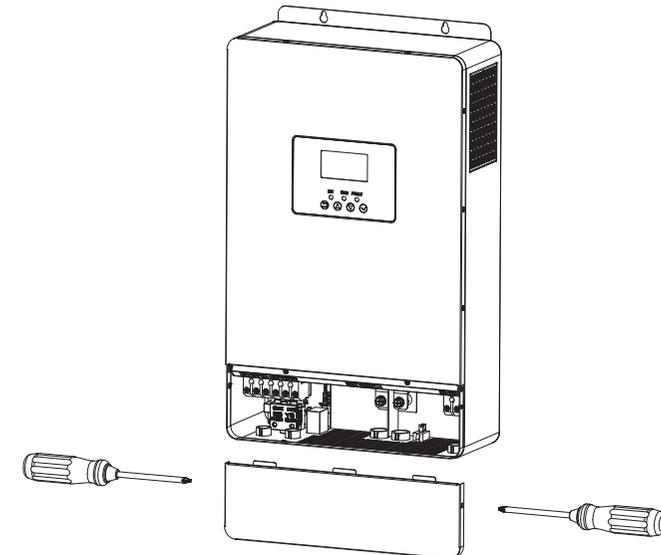
Follow the following steps to implement the PV module connection:

- Step1:** Remove the positive and negative conductor insulation sleeve for 10 mm.
- 
- Step2:** Check that the polarity of the wiring from the PV modules to the PV input connectors is correct. Then, connect the positive (+) lead to the positive (+) terminal of the PV input connector, and the negative (-) lead to the negative (-) terminal of the PV input connector. Tighten both wires in a clockwise direction.



3.7 Equipment Assembly

After all of the wiring is connected, Tighten the bottom cover with the four screws of side and bottom.



4. Equipment Operation

4.1 Power Supply Switch

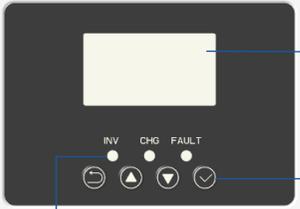
Once the device is installed, the battery is connected and the device can be opened by pressing the power switch button.



▲ Bottom view

4.2 Operation and Display Panels

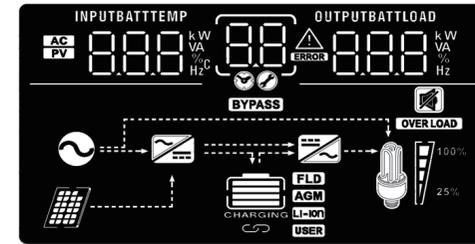
As shown in the diagram, the operating display panel is located on the front panel of the inverter. It includes three indicator lights, four function keys, and an LCD screen used to display the device's operational status, input/output power information, and other details.



Function Key	
	Exit Setup Mode
	Choose the previous item
	Choose the next item
	Confirm to select or enter the setting mode in the setting mode

LED pilot lamp		Deictic information	
AC /*INV	Green light	Bright solid	The output is powered by the AC electricity.
		Flashing	The output is powered by the battery or PV
●CHG	Green light	Bright solid	The battery is fully charged.
		Flashing	The battery is being charged
△FAULT	Red light	Bright solid	The inverter fails.
		Flashing	Warning status appears in the inverter,

4.3 Description of the Display Screen Icon



Item	Icon	Functional Description
Input Message	AC	Tips for AC input
	PV	Tips for solar input
Configure items and fault information	INPUTBATTT 888 kV VA %Hz	Indicates the input voltage, input frequency, PV voltage, charger current, PV charging status, charger power, and battery voltage.
	88 ⊙	Indicate the configuration item setting code.
Output Message	88△	Indicate the warning or fault coding 88△ The warning code is displayed when flashing
	88-	The fault code is displayed when flashing
Battery Information	OUTPUTBATLOAD 888 kV VA %Hz 	Indicate the output voltage, output frequency, load quantity, load voltage, and discharge current
Battery Information		Indicate the battery level in battery mode: 0-24%, 25-49%, 50-74%, 75-100%, and the charging status in AC mode.

In AC mode, it will be battery charged status.

Status	Battery voltage	LCD Display
Constant current mode / constant pressure mode	<2V / section	The 4 batteries flash alternately.
	2~2.083V/ Section	When only the bottom battery has one capacity bar remaining, the other three flash alternately.
	2.083~2.167V/ Section	When the bottom battery has two capacity bars remaining, the other two flash alternately
	> 2.167V / section	When the bottom battery has three capacity bars remaining, the top battery flashes.
Floating charge mode, and the battery is fully charged		

In the battery mode, display the battery capacity

Load Percentage	Battery voltage	LCD Display
Load > 50%	<1.85V / section	
	1.85V / section ~1.933V / section	
	1.933V / section ~2.017V / section	
	> 2.017V / section	
Load < 50%	<1.892V / section	
	1.892V / section ~1.975V / section	
	1.975V / section ~2.058V / section	
	> 2.058V / section	

Load Information				
OVER LOAD	Indicate overload			
 100% 25%	Indicate load capacity: 0~24%, 25~50%, 50%~75%, 75% -100%			
	0%~24%	25%~49%	50%~74%	75%~100%
Mode Operation Information				
	Indicates the device connection to the AC			
	Indicates that the device is connected to the solar panel			
BYPASS	Indicates that the load is powered by the AC electricity			
	Indicates that the load charger circuit is working			
	Indicates that the DC / AC inverter circuit is working			
Mode Operation Information				
	Indicates that the device alarm is disabled			

4.4 LCD Settings

LCD display information switching is achieved by pressing the UP or Down keys. The optional information switching commands are as follows:

Hold down the key for 3 seconds, and the device enters the Settings mode. Press either the UP or Down keys to select the Settings items.

Then press ENTER to confirm the selection or press ESC to exit.

► Set items:

Program	Description	Option			
00	Exit Set Mode	Exit (Escape) ESC			
01	Output source priority: Configure load power supply priority	Us priority (default)	The AC supplies power to the load as the priority. Solar energy or the battery will supply power only when the AC is unavailable.		
		UT1			
		Solar priority	Solar energy prioritizes powering the load. If the solar energy is insufficient to supply the connected load, both the AC and solar energy will supply power to the load simultaneously. The battery will provide energy under the following conditions: --When both solar energy and the AC are unavailable. --When solar energy is insufficient, and the AC is not available.		
		SOL			
		Solar energy, followed by the AC, as the power supply priority.	Solar energy prioritizes powering the load. If solar energy is insufficient, the battery will supply power. The AC will supply power to the load only when the battery voltage drops to the low-voltage warning point or the threshold set in Program 12.		
		SBW			
02	Maximum Solar Charging Current (Note: Maximum charging current = AC charging current + Solar charging current) Note: If setting Program 28, the output mode is parallel mode, with a maximum charging current of 60A.	10A	10	20A	20
		30A	30	40A	40
		50A	50	60A	60
		70A	70	80A	80

03	AC input voltage range	Electrical appliances (Default)	03 <u>APL</u>	The acceptable input voltage range is 90-280VAC.	
		UPS	03 <u>UPS</u>	The acceptable input voltage range is 170-280VAC.	
05	Battery Type	AGM(give tacit consent to)	05 <u>AGM</u>	Flooded	05 <u>FLd</u>
		LIB	05 <u>LIb</u>	User-defined	05 <u>USE</u>
			05 <u>USE</u>	User Custom	
		If the battery type is lithium or user-defined, the battery charging voltage and low DC cutoff voltage can be set in Program 26, 27, and 29.			
06	Automatic Restart on Overload		06 <u>Lfd</u>	Restart available	06 <u>LFE</u>
07	Automatic Restart on Over temperature		07 <u>tfd</u>	Restart available	07 <u>tFE</u>
09	Output Frequency	50Hz (Default)	09 <u>50.</u>	60Hz	09 <u>60.</u>
10	Output Voltage	220V	10 <u>220.</u>	230V (Default)	10 <u>230.</u>
		240V	10 <u>240.</u>		
11	Max AC charging current Note: If the set value in Program 02 is less than the value in Program 11, the inverter will apply the charging current from Program 02 for the utility charger	2A	11 <u>2A</u>	10A	11 <u>10A</u>
		20A	11 <u>20A</u>	30A (Default)	11 <u>30A</u>
		40A	11 <u>40A</u>	50A	11 <u>50A</u>
		60A	11 <u>60A</u>		
12	When "SBU Priority" or "Solar Priority" is selected in Program 01, set the voltage threshold for switching back to AC mode.	44V	12 <u>44.</u>	45V	12 <u>45.</u>
		46V (default)	12 <u>46.</u>	47V	12 <u>47.</u>
		48V	12 <u>48.</u>	49V	12 <u>49.</u>
		50V	12 <u>50.</u>	51V	12 <u>51.</u>

13	When selected in Program 01 "SBU, priority" or Solar First sets the voltage threshold back to battery mode	Battery charge	13 <u>FUL</u>	48V	13 <u>480.</u>	
			49V	13 <u>490.</u>	50V	13 <u>500.</u>
			51V	13 <u>510.</u>	52V	13 <u>520.</u>
			53V	13 <u>530.</u>	54V (default)	13 <u>540.</u>
			55V	13 <u>550.</u>	56V	13 <u>560.</u>
			57V	13 <u>570.</u>	58V	13 <u>580.</u>
16	Power supply charging priority Configure power supply charging as priority	If the inverter is online, bypass mode, the charging power supply can be configured with the following items:				
		Solar priority	16 <u>CS0</u>	Solar energy charges the batteries first. Battery is charged by the AC when solar power is not available.		
		Solar power and AC power	16 <u>SNV</u>	Solar power and AC power charge the battery simultaneously.		
		Only solar energy	16 <u>OS0</u>	Solar energy is the only charging power source, regardless of whether AC power is available or not.		
		If the inverter / charger is operating in battery mode, the solar energy can charge the battery only. If the solar energy is available and sufficient, it will charge the battery.				
18	Alarm Control	Alarm start (Default)	18 <u>60N</u>	Alarm closed	18 <u>60F</u>	
19	Auto returns to the default display	Return to the default display screen(Default)	19 <u>ESP</u>	No matter how the user switches the display screen, it will automatically return to the default display interface (input / output voltage)		
		Stay on to the latest screen	19 <u>TEP</u>	The display will stay on the user's last switch interface		
20	Backlight Control	Backlight Control Start (Default)	20 <u>LON</u>	Backlight control closed	20 <u>LOF</u>	
22	When the main power source is interrupted, a beep sound will occur.	Alarm start (Default)	22 <u>RON</u>	Alarm closed	22 <u>ROF</u>	
23	Overload bypass: If overload occurs in battery mode, the device will be switch to AC mode	Bypass is disabled (Default)	23 <u>BYd</u>	Bypass start	23 <u>BYE</u>	

26	Maximum charging voltage	Default setting: 56.4V		CU 26 56.4 ^{MT}	
		If 'custom' is selected in program 5, the setting range for this program range can be adjusted from 48.0V to 61.0V,with an increment of 0.1V per click.			
27	Floating charge voltage	Default setting: 54V		FLU 27 54.0 ^{MT}	
		If 'custom' is selected in program 5, the setting range for this program range can be adjusted from 48.0V to 61.0V,with an increment of 0.1V per click.			
28	Output mode	Standalone (Default)	28 51G	Parallel: inverter single-phase parallel operation (requires hardware support)	28 PAL
		If you selected "Use" in program 05, you can set the program.			
29	Low DC cut-off voltage	Default setting: 42V		COU 29 42.0 ^{MT}	
		If "Custom" is selected in Program 05, this program can be configured. The setting range is from 42.0V to 48.0V, with an increment of 0.1V per click. Regardless of the connected load percentage, the low DC cutoff voltage will be fixed at the set value.			
30	Battery balancing	Battery balancing	30 EEN	Battery balancing is not available (default)	30 EDS
		If 'Flooded' or 'User Defined' is selected in Program 05, the settings for the program can be set.			
31	Battery balancing voltage	Default setting: 58.4V		EU 31 58.4 ^{MT}	
		Set range is from 48.0V to 61.0V. Each click is 0.1V increasing.			
33	Battery balancing time	60 min (default)	33 60	Setting range is from 5 minutes to 900 minutes by increasing 5 minutes for each click	
34	Battery balancing timeout	120 minutes (Default)	34 120	The settings range is from 5 minutes to 900 min by increasing 5 minutes per click.	
35	Balancing Interval	30 days (Default)	35 30d	Set range is from 0 to 90 days. + 1 day per click	
36	Activate balancing immediately	Available	36 AEN	Disable (default)	36 ADS
		If the balancing function is enabled in Program 30, the program settings can be set accordingly. When 'Enable' is selected, battery balancing is immediately activated, and the homepage will display ' '. If 'Disable' is chosen, the balancing function will be canceled until the next activation time based on the settings in Program 35. Then ' ' will no longer be displayed on the homepage.			

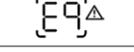
37	Lithium-battery communication protocol	37 PLY 37 HLE 37 Jdb			
		If the battery type is set to Lithium Battery (Lib) in Program 5, the corresponding battery communication protocol must be selected to enable communication with the Battery Management System (BMS). The default communication protocol is the Doart BMS protocol, which includes both RS485 and CAN.			
38	Battery alarm enabling	Battery alarm is disabled (Default)	38 bAD	Battery alarm enabling	38 bAE
39	Discharge cut off SoC	6% (Default)	39 6		
		When the lithium battery is selected in program 5, the discharge cut-off Soc is set, with the setting range of 1% -97% and less than the charging cut-off Soc.			
40	Charging off SoC	97% (Default)	40 97		
		When the lithium battery is selected in program 5, the charging stop Soc is set with a range of 100% -30% and greater than the discharge cut Soc.			
41	Restart Soc	20% (Default)	41 20		
		When lithium battery is selected in program 5, if the battery discharges to the cut-off level and shuts down, PV power alone must recharge the battery to the set point before output power is restored. If AC power is restored, output power will resume immediately. Set the restart SoC range from 10% to 99%, which must be no less than the discharge cut-off SoC and no greater than the charge cut-off SoC.			
42	Running mode	Off-grid (Default)	42 FGN		

4.5 Fault Reference Code

Fault Reference Code		
Fault Code	Fault Event	Icon
01	The fan is locked when the inverter is disconnected	
02	Over-Temperature	
03	The battery voltage is too high	
04	The battery voltage is too low	
05	The internal conversion components detects a short circuit or high temperature	
06	The output voltage is too high	
07	Overload timeout	
08	Bus Over-voltage	
09	Bus soft start failed	
51	Over current or surge	
52	The bus voltage is too low	
53	Inverter soft startup failed	
55	The DC voltage in the AC output is too high	
57	Current sensor fails	
58	The output voltage is too low	
59	Solar voltage over limit	
71	The software versions is discontinuous	
72	Current Balancing Fault	

73	Output voltage difference exceeds the limit	
80	CAN communication failure	
81	The host is lost	
82	Synchronous signal is lost	
83	Battery voltage detection difference exceeds the limit	
84	The AC input voltage amplitude frequency difference exceeds the limit	
85	Output mode settings are inconsistent	

4.6 Alarm Indicator

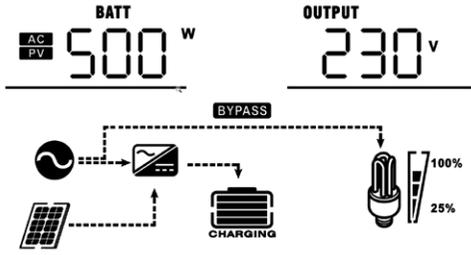
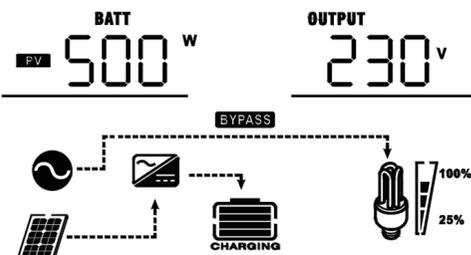
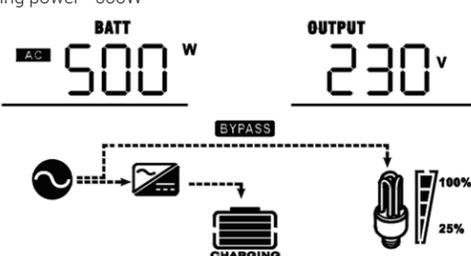
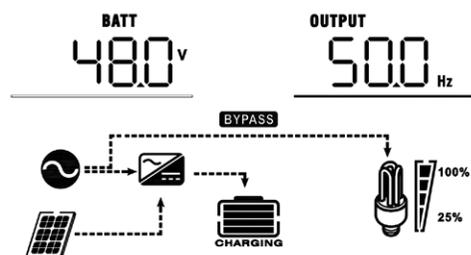
Alarm Reference Code			
Warning code	Warning events	Sound alarm	icon
01	The fan is locked when the inverter starts	The buzzer sounds once every three seconds	
02	Over temperature alarm	The buzzer sounds once every three seconds	
03	Battery overcharge	The buzzer rings every second	
04	Low battery	The buzzer sounds once every three seconds.	
07	Overload	The buzzer rings twice every three seconds	
10	AC input power reduction	No buzzwords	
13	Bms alarm or abnormal battery communication	The buzzer sounds once every three seconds	
15	Solar voltage low	No buzzwords	
E9	Battery balancing	No buzzwords	
d9	Battery is not connected	No buzzwords	

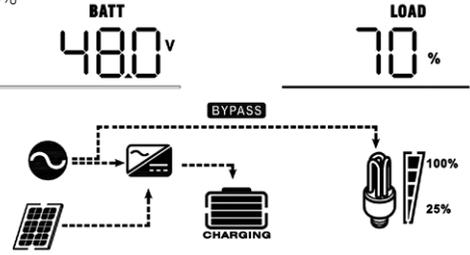
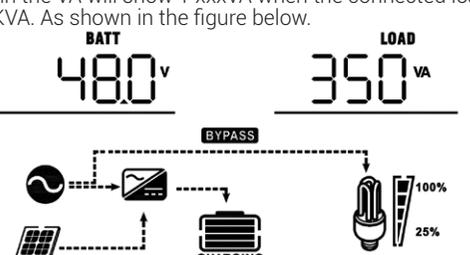
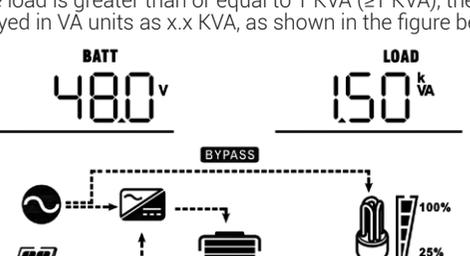
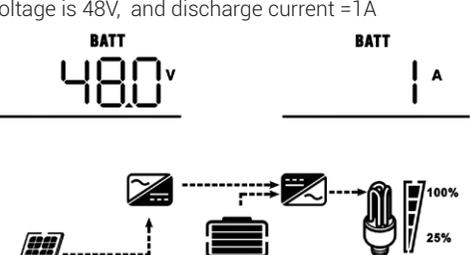
4.7 Display Settings

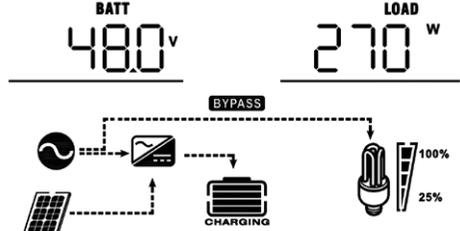
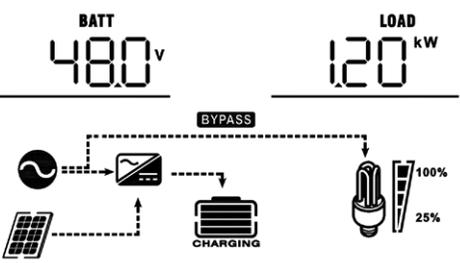
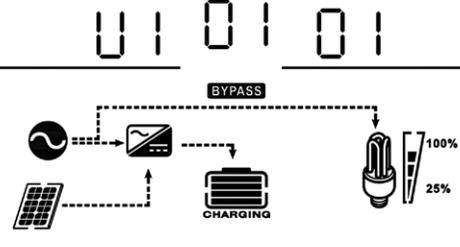
The LCD display information will switch sequentially by pressing the 'Up' or 'Down' button. The available information will cycle in the following order: Input Voltage, Input Frequency, Solar Voltage, Charging Current, Charging Power, Battery Voltage, Output Voltage, Output Frequency, Load Percentage, Load Power, Load Voltage, DC Discharge Current, CPU Main Version.

Optional information	L C D Display
Input / output voltage (Default display)	Input voltage = 230V; Output voltage = 230V
Input frequency	Input frequency = 50 HZ
Solar voltage	Solar voltage = 260V
Solar current	Solar current = 2.5A

Optional information	L C D Display
Solar power	Solar power = 500W
Charging current	AC and solar charging currents = 50A
	Solar charging current = 50A
	AC charging current = 50A
	AC charging current = 50A

Optional information	LCD Display
Charging power	<p>AC and PV charging power =500W</p> 
	<p>PV charging power =500W</p> 
	<p>AC charging power =500W</p> 
Output frequency	<p>Output frequency =50Hz</p> 

Optional information	LCD Display
Load percentage	<p>Load =70%</p> 
Load in VA units	<p>The load in the VA will show 1 xxxVA when the connected load is below 1 KVA. As shown in the figure below.</p> 
	<p>When the load is greater than or equal to 1 KVA (≥ 1 KVA), the load will be displayed in VA units as x.x KVA, as shown in the figure below.</p> 
Battery voltage / DC discharge current	<p>Battery voltage is 48V, and discharge current =1A</p> 

Optional information	LCD Display
Load (Watt)	<p>When the load is below 1KW, the load in W will present xxxW, as shown in the figure below.</p> 
	<p>When the load is higher than 1KW ($\geq 1KW$), the load in the kW will present x.xxx W.As shown in the figure below.</p> 
The CPU version checking	<p>Primary CPU version 000011.0</p> 

4.8 Description of the Operation Mode

▶ Standby Mode:

The inverter does not provide output but can still charge the battery.

Note: The inverter is not yet turned on, but at this time the inverter can charge the battery without AC output.



AC and Solar Power Charging

AC Charging

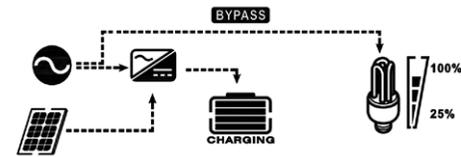


Solar charging

No charging

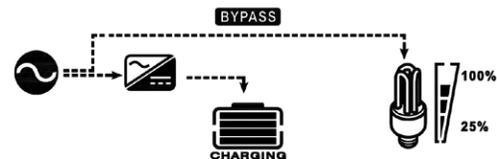
▶ Bypass Mode

A: The inverter will provide the output power from the power supply. It will also charge the battery in the bypass mode.

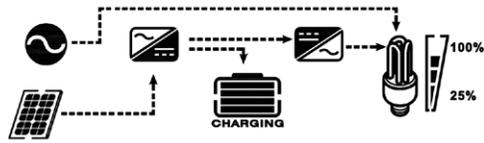


Grid and Solar Charging

B: The device will provide the output power from the main power source. It will also charge the battery in line mode.

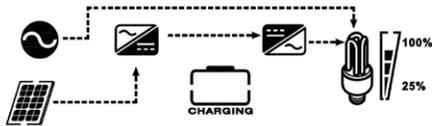


Grid and Solar Charging

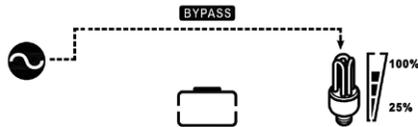


If you choose "Solar First" as the output source priority.

But solar energy is not enough to provide the load, solar and AC will both power the load and charge the battery



If "Solar First" is selected as the output source priority but the battery is not connected to the inverter, the solar and AC will supply power to the load



The AC electricity shall supply power to the load

► **Battery Mode**

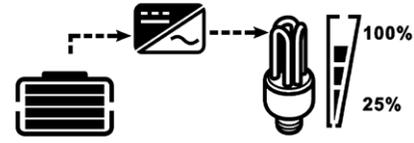
The inverter will provide the output power of both the battery and the solar power supply.



The battery and solar power supply the load



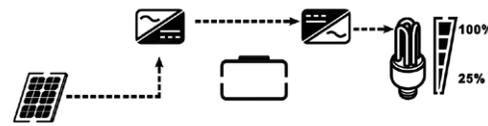
Solar power can supply power to the load while charging the battery.



Powered by the battery only

► **Solar Mode**

It will provide the output power of both the battery and the solar power supply.



Powered by the battery only

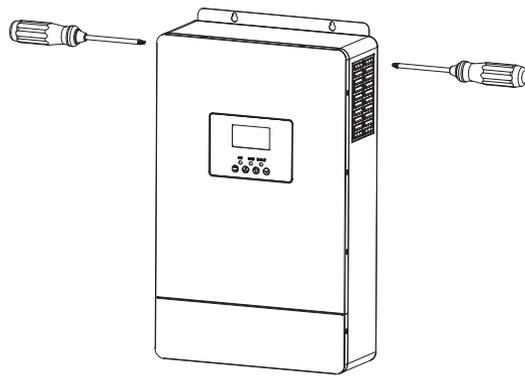
5. Cleaning and Maintenance of the Dust Cover

5.1 Overview

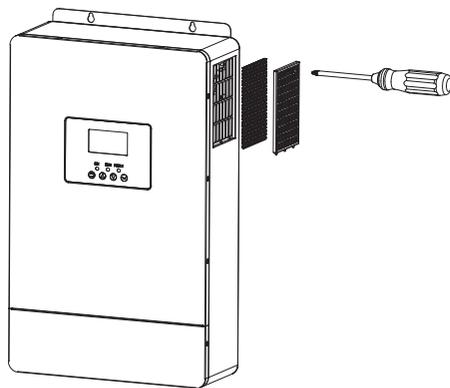
Each inverter is already equipped with a dust control kit (not standard). The inverter will automatically detect this kit and activate the internal heat sensor to adjust the internal temperature. This kit protects your inverter and improves the safety and reliability of use in harsh environments.

5.2 Cleaning and Maintenance

Step1: Release the screw counterclockwise at the top of the inverter.



Step2: As shown in the figure, remove the dust box and the air filter.



Step3: Clean the air filter foam and dust proof box. After cleaning, reassemble the dust kit back into the inverter.

Note: The dust proof kit should be cleaned once every month.

6. Battery Balance Description

The charging controller includes a balancing function that reverses the accumulation of negative chemical effects, such as stratification, where the acid concentration at the bottom of the battery is higher than at the top. Balancing also helps eliminate sulfate crystals that may accumulate on the plates. If left uncontrolled, this condition, known as sulfation, can reduce the overall capacity of the battery. Therefore, periodic battery balancing is recommended.

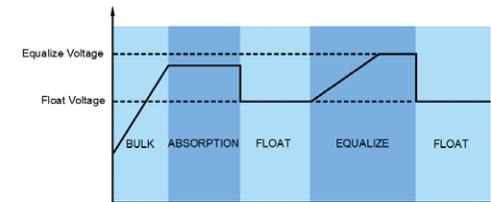
6.1 How to apply the equilibrium function

In the LCD display settings of Program 30, the battery balancing function must first be enabled. Then, the function can be applied to the device in one of the following ways:

1. Set the balancing interval in Program 35.
2. Perform immediate active balancing in Program 36.

6.2 When to balanced

During the floating phase, when the set balancing interval (battery balancing cycle) is reached, or when immediate balancing is activated, the controller will enter the balancing phase.



6.3 Balanced charging time and timeout

During the balancing phase, the controller will charge the battery as much as possible until the battery voltage rises to the battery balancing voltage. Afterward, a constant voltage regulation (V/set) will be applied to maintain the battery voltage at the balancing voltage level. The battery will remain in the balancing phase until the balancing time is reached. (Figure 1)

However, during the balancing phase, if the battery balancing time expires and the battery voltage has not risen to the battery balancing voltage level, the charging controller will extend the battery balancing time until the battery voltage reaches the balancing voltage. When the battery balancing timeout setting is reached, if the battery voltage is still lower than the balancing voltage, the charging controller will stop the balancing process and return to the floating phase. (Figure 2)

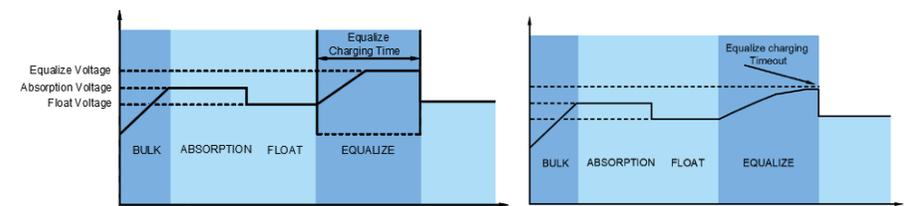


Figure 1

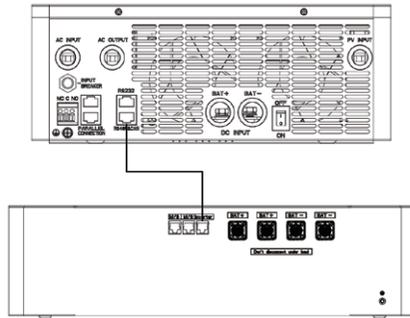
Figure 2

7. Lithium Battery Connection and Settings

7.1 Lithium Battery Connection

If the battery type is selected as Lithium, first ensure that the battery and inverter are compatible. Then, follow the steps below to connect the lithium battery:

1. Install the power cable between the battery and the inverter.
2. Connect the communication cable between the battery and the inverter.



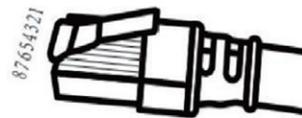
When using a lithium battery to power the system, ensure that the communication link between the inverter and the Battery Management System (BMS) is functioning properly to enable information exchange between the inverter and the BMS. The following information is involved:

- Reset the maximum charging voltage, discharge cut-off voltage, and limit the maximum charging current according to the lithium battery parameters.
- Control the inverter's charging and discharging start/stop based on the real-time status and alarm information of the lithium battery.

7.2 Battery Communication Cable Port Definition

Ensure that the Rj 45 communication port pin definition between the lithium battery and the inverter is defined as follows:

Pin	Function Definition
PIN1、PIN8	RS485-B
PIN2、PIN7	RS485-A
PIN3	NC
PIN4	CAN-H
PIN5	CAN-L
PIN6	GND



7.3 LCD Set Up

After the cable between the inverter and the lithium battery is connected, the corresponding setting items should be set on the screen:

Program	Description	Option
05	Battery type	05 <u>AGn</u> AGM(Default)
		05 <u>FLd</u> Flooded
		05 <u>Li b</u> Li-battery
		05 <u>USE</u> User Defined
37	Communicating protocol	37 <u>PLY</u> Support 'Doart' BMS Communication Protocol (default)
		37 <u>HLt</u> Support 'Ruida' 485 protocol V1.7
		37 <u>Jdb</u> Support 'Jiabaida' 485 generalprotocolV4
39	Discharge cut-off Soc	39 <u>6</u> Default: 6%, adjustable between 1% and 97%, must be lower than the charge cut-off Soc.
40	Charge cut-off Soc	40 <u>97</u> Default 97%, 30%~100% can be set, must be higher than discharge off Soc.
41	Restart Soc	41 <u>20</u> Default 20%, 10%~99% can be set, limited between charge cut Soc and discharge cut-off Soc.

7.4 LCD Display

If the communication connection is successful, the icon "Li" on the screen will stay lit; otherwise, the icon will flash.

Program	Description	Option
1	Communication success icon	
2	Li-battery Soc	

8. Description of the Operation Mode

8.1 Table 1 : AC Model Specification

Item	Data
Input voltage waveform	Sine wave (AC / generator)
Rated input voltage	230Vac
Input Under voltage	170Vac±7V(UPS);90 Vac ± 7V (electrical appliance)
Input Under voltage Recovery	180Vac±7V(UPS);100 Vac ± 7V (electrical appliance)
Input over voltage	295Vac±5V
Input over voltage recovery	285Vac±5V
Maximum AC input voltage	300Vac
Rated input frequency	50Hz / 60Hz (Auto detection)
Under Frequency protection	40±1Hz
Under frequency protection recovery	42±1Hz
Over frequency protection	65±1Hz
Over frequency protection recovery	63±1Hz
Transfer Time	<20ms
Output Power Derating: When the AC input voltage drops to 210V ±5V, the output power will decrease.	<p>The graph illustrates the output power derating characteristic. The x-axis represents Input Voltage with markers at 90V, 210V, and 280V. The y-axis represents Output Power. A horizontal dashed line indicates the Rated Power level. At an input voltage of 210V, the output power is reduced to 39% of the rated power. From 210V to 280V, the output power remains constant at the rated level.</p>

8.2 Table 2 : Inverter Mode Specification

Item	Data	
Output Power	5.5KW	
Output voltage waveform	Sine Wave	
Rated output voltage	230Vac±5%	
Output frequency	50Hz	
Power factor	0.99 (0.8 leading ~ -0.8 lagging adjustable)	
Peak efficiency @ battery inverter	93%	
Peak efficiency @PV inverter	96%	
Overload Protection	10s@110%~150% load	
Surge Capability	2 x rated power for 5 seconds	
Battery voltage range	43-60Vdc	
Rated DC input voltage	48.0V dc	
Maximum discharge current	100A	
Cold start voltage	46.0Vdc	
Low DC warning voltage	Load <50%	46.0Vdc
	Load ≥ 50%	44.0Vdc
Low DC warning return voltage	Load <50%	47.0Vdc
	Load ≥ 50%	46.0Vdc
Low DC cut-off voltage	Load <50%	43.0Vdc
	Load ≥ 50%	42.0Vdc
High DC recovery voltage	62.0Vdc	
High DC cut-off voltage	63.0Vdc	
No-load power consumption	<75W	

8.3 Table 3 : Charging Mode Specification

AC (Grid) Charging Mode		
Charging mode	3-stage	
AC charging current (Max)	60Amp(@VI/P=230Vac)	
Charging voltage	Flooded Battery	58.4Vdc
	AGM / Gel battery	56.4Vdc
Float charging voltage	54.0Vdc	
Charging curve		
MPPT Solar Mode		
Maximum PV array power	6000W	
Maximum PV Open Circuit Voltage	500VDC	
Rated operational voltage	390VDC	
MPPT operating voltage range	120~450VDC	
Starting voltage	130VDC	
Maximum input current	15A	
Short-circuit current	18.7A	
Maximum Solar Charging Current	80A	

8.4 Table 4 : General Mode Specifications

Item	Data
Safety Certifications	IEC 61000, IEC 61683, IEC 62109
Operating temperature range	-10 C to 50 C
	High Temperature Derating: When ambient temperature reaches 50°C, the power derates to 3300W. Note: If an over-temperature derating alarm occurs, reduce the connected load to avoid over-temperature protection activation.
Storage temperature	-15 C ~60 C
Humidity	5%~95% Relative humidity (nocondensation)
Machine Dimensions: L * W * H (mm)	509*310*118(±2mm)
Net weight (Kg)	10±0.2kg

8.5 Trouble shooting

Fault/Issue	LCD / LED buzzer	Cause	Solution
Device shuts down automatically during startup.	LCD/LED and buzzer respond, then shut off after 3 seconds	Battery voltage too low (<1.91V/cell)	1. Recharge the battery 2. Replace the battery
No response after startup	No indication.	1. Battery voltage too low (<1.4V/cell) 2. Battery polarity reversed	1. Check battery cable connection 2. Recharge the battery 3. Replace the battery or contact after-sales support
AC is present, but device runs in battery mode	Input voltage displays 0 on the LCD, green LED flashes.	Input protection triggered	1. Check if the AC switch is turned on 2. Ensure cable connections are secure.
	The green LED flashes	Poor AC Power Quality (Generator)	1. Check if AC cable is too narrow or too long 2. If using a generator, check its operation and confirm input voltage settings (UPS Appliance) are correct
	The green LED flashes	Set "Solar Priority"	Change the output source priority to "AC/Grid Priority"
When the device is powered on, the internal relay repeatedly opens or closes.	LCD display, LED flashing	Battery disconnected	Check battery cable connection for secure connection
The buzzer keeps sounding, and the LED red light is on.	Fault code 07	Overload fault. Inverter overload at 110% and overload time limit reached	Reduce the connected load Turn off some electrical devices
	Fault code 05	Output short circuit	Check cable connections Remove abnormal load
	Fault code 02	Check cable connections Remove abnormal load	1. Check device ventilation 2. Reduce connected load
	Fault code 03	Battery voltage too high	Check if the battery quantity and specifications meet the requirements.
	Fault code 01	Fan fault	Replace the fan.
	Fault code: 06 / 58	Output abnormal (inverter voltage below 190 Vac or above 260 Vac)	Reduce load connection

	Fault code 08	Bus voltage too high	Restart device, check parallel cable connection; if fault recurs, contact after-sales support
	Fault code: 09 / 53 / 57	Internal components failure	please contact after-sales service.
	Fault code 51	Over-current or surge	Restart the equipment. If the fault occurs again, please contact the after-sales service.
	Fault code 52	Bus voltage too low	
	Fault code 55	Output voltage imbalance	
	Fault code 80	Communication Error	Check the parallel cable connection and restart the device. If the fault still occurs, please contact the after-sales service

9. Appendix: The corresponding backup schedule

Model	Load (VA)	Backup time @48VDC 100AH (minutes)	Backup time @48VDC 200AH (minutes)
5.5KW	500	490	1030
	1000	214	490
	1500	126	322
	2000	89	217
	2500	72	172
	3000	61	146
	3500	52	113
	4000	40	90
	4500	35	80
	5000	32	72

Note: The backup time depends on the battery quality, battery aging, and battery type. Battery specifications may vary depending on the manufacturer.

10. Parallel Connection

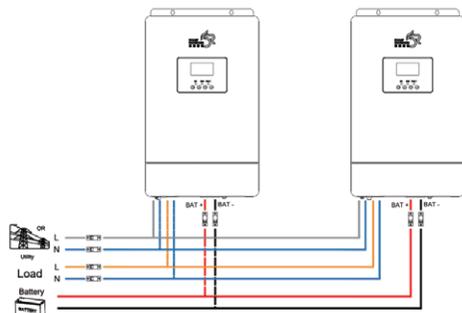
10.1 Precautions for Parallel Connection:

- The system supports a maximum of 3 inverters connected in parallel.
- The inverters must share the same battery, and the parallel connection must be connected to the battery.
- Each inverter must be independently connected to its own solar panel; solar panels should not be shared.
- The cables connected to each inverter should be of the same length to avoid affecting the current balancing between inverters.
- Set the parameters for each inverter separately, including output mode, etc. When operating in parallel mode, the working mode, output frequency, and other settings of the parallel inverters must be identical.

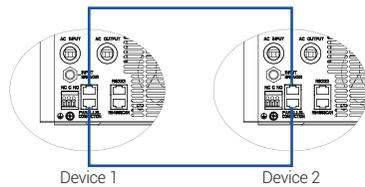
Note: The following image is for illustrative purposes only. The actual device may differ from the illustration due to structural upgrades

10.2 Single-phase Parallel Connection

▶ Two units in parallel:



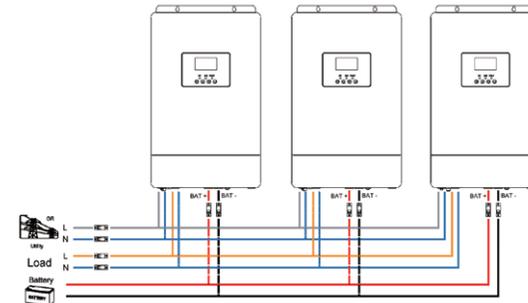
▲ Power Connection



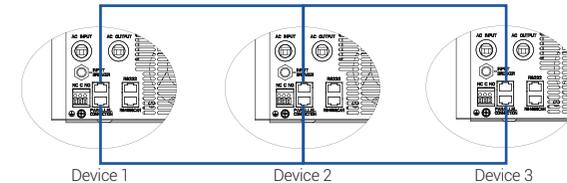
Device 1 Device 2

▲ Communication Junction

▶ Three units in parallel:



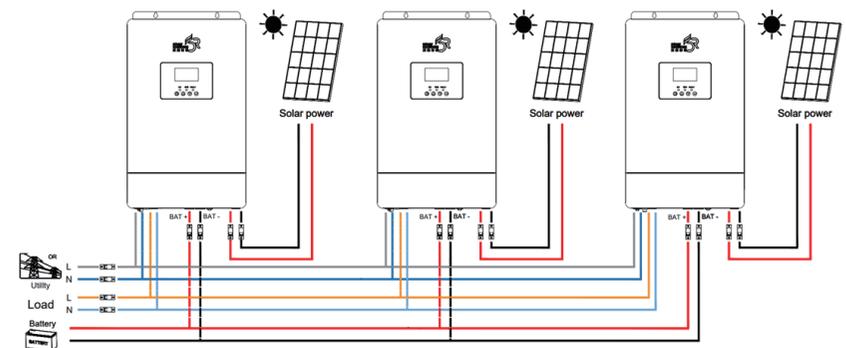
▲ Power Connection



▲ Communication Junction

Note: N max = 3, Supports a maximum of 3 units in parallel.

10.3 PV Connection



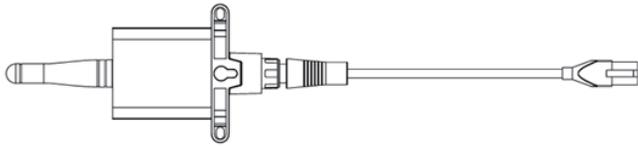
Note: Each inverter shall be connected to the PV separately.

11. Data Collector - WiFi Stick

11.1 WiFi Stick

If users need WiFi communication function (mobile APP), they need to buy the accessories from Doart.

APP download instructions please refer to:12.App Download

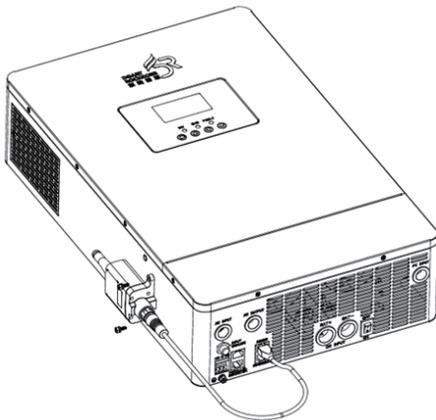


▲ The diagram of the communication stick

11.2 Installation Diagram of WiFi Rod:

Use M3*12 combination screws with a recommended torque of 0.4 Nm to secure the side of the inverter casing.

Insert the RJ45 communication cable into the RS-232 communication port.



▲ Installation Diagram of WiFi Rod

12. APP Download

Method 1: Download and install the APP by searching.

Open the App Store or Google Play, enter "doart" on the search page and click the "search" button. The search result will be displayed on the page. Click the download button to download the mobile APP.

Method 2: Download and install the APP by scanning the QR code.

Open the mobile browser, click the scan/photo icon on the right of the search input box, scan the QR code corresponding to your mobile device type, and download the installation file.



Android users can scan the "Android" or "Google store" to download and Apple user can scan the "Apple" QR code search from "Apple store" to download.

After the software is downloaded, locate the downloaded installation package on the Download page and click Install.

After the installation is complete, click the "Finish" button. The app icon will then appear on your phone's home screen.

Next, you can go to WWW.DOART-ENERGY.COM to check the APP operation guide.

13. Specification

Model	DR-PCS5520N2FL02
Rated Output Power	5500VA/5500W
AC INPUT (GRID)	
Rated Voltage	230Vac
Optional Voltage Range	170-280 Vac (PC) 90-280 Vac (household appliances)
Frequency Range	50Hz / 60Hz (Adaptive)
MAX AC Input Current	28A
AC OUTPUT (EPS)	
Rated Output Voltage	230Vac±5%
Output Voltage Range	220~240VAC
Rated Output Frequency	50/60H
Rated Output Current	230Vac@23.9A
Surge Power	11KVA
Peak Efficiency @ Battery Inverter	93%
Peak Efficiency @PV Inverter	96%
Transfer Time	≤20ms
Waveform	Pure Sine Wave
Output Overload Capacity	10s@110%~150% load
Battery	
Battery Type	Lead Acid + Lithium Battery
Battery Voltage Range	43-60V
Charging Curve	Three-Stage
Lithium-battery Charging Strategy	Adaptive to Lithium Batteries
Max. Solar Energy Charging Current	80A
Max. AC Charging Current	60A
Max. Discharge Current	100A

PV INPUT	
PV Input String	1 String
Max. PV Array Power	6000W
Max. MPPT Efficiency	99.5%
Max. PV Open Circuit Voltage	500VDC
MPPT Operating Voltage Range	120~450VDC
Starting Voltage	130VDC
Max. Input Current	15A
Short Circuit Current (ISC)	18.7A
Protection Feature	
Protection Class	IP20
AC Input	Over/Under Voltage, Over/Under Frequency, Input Derating Alarm
PV Input	Photovoltaic Over/Under Voltage, Reverse Connection
EPS Output	Short Circuit, Overload
Battery	Over/Under Voltage, Low Voltage Alarm (Note: No short circuit protection; otherwise it may be damaged)
Other Protections	Over Temperature Protection, Over Temperature Derating Pre-Alarm
General Parameters	
Machine Dimension	509*310*118±2mm
Packing Dimensions	582*396*190±2mm
Net weight	10±0.2kg
Gross weight	11.8±0.2kg
Communication Interface	RS232 / RS485 / CAN / Dry Contact / WIFI
Relative Humidity	5%to95% Relative humidity (non-condensing)
Operating Temperature	-10 C to 50 C
Storage Temperature	-15 C to 60 C
Max. Operating Altitude	≤2000m
Cooling Method	Forced Air Cooling

Warranty Card	
Product Name	Production Date
Product Bar Code	
Dealer Name	Sales Date
Dealer Address	
Customer Information	
Customer Name	Purchase Date
Customer Tel.	Customer Fax
Customer Address	