Solar Power System

Inverter with built-in controller

User manual

TABLE OF CONTENTS

This manual contains important safety, installation, and operating instructions for the inverter. The following symbols are used throughout the manual:

WARNING

Indicates a potentially dangerous condition. Use extreme caution when performing this task.

CAUTION Indicates a critical procedure for safe and proper operation of the inverter.

NOTE

Indicates a procedure or function that is important to the safe and proper operation of the inverter.

■General Safety Information

• Installation and wiring must comply with the Local and National Electric Codes (NEC) and must be done by a certified technician.

• Read all of the instructions and cautions in the manual before beginning the installation.

• There are no serviceable parts for this inverter. Do NOT disassemble or attempt to repair the inverter.

• Make sure all connections going into and from the inverter are tight. There may be sparks when making connections, therefore, make sure there are not flammable materials or gases near installation.

■Inverter Safety

• Always make sure inverter is in OFF position and disconnect all AC and DC connecting when working on any circuit associated with the inverter.

• Never connect the AC output of the unit directly to an Electrical Breaker Panel/ Load Centre which is also fed from the utility power / generator.

• When connecting battery terminals, ensure the polarity of the battery connections is correct. Incorrect polarity may cause permanent damage to the unit.

• Be careful when touching bare terminals of capacitors as they may retain high lethal voltages even after power is removed.

■ **Battery Safety**

• Do NOT let the positive (+) and negative (-) terminals of the battery touch each other.

• Use sealed Lead-Acid, Flooded, Gel, AGM, Lithium or Calcium batteries which must be deep cycle.

• Explosive battery gases may be present while charging. Be certain there is enough ventilation to release the gases.

• Be careful when working with large lead acid batteries. Wear eye protection and have fresh water available in case there is contact with the battery acid.

• Over-charging and excessive gas precipitation may damage the battery plates and activate material shedding on them. Too high of an equalizing charge or too long of one may cause damage. Please carefully review the specific requirements of the battery used in the system.

■ **Installation Safety**

• The unit should be installed in a well-ventilated, cool, and dry environment. Make sure the fans of the unit and the ventilation holes are not blocked.

• Do not expose the unit to rain, moisture, snow, or liquids of any type.

GENERAL INFORMATION

The WI Series Pure Sine Wave Power Inverter Charger delivers superior performance for remote off-grid applications. The inverter is of pure sine wave capable of producing cleaner, smoother, and more reliable electricity for a user's electronic needs. The inverter is also able to charger the battery bank when AC power is connected to the inverter.

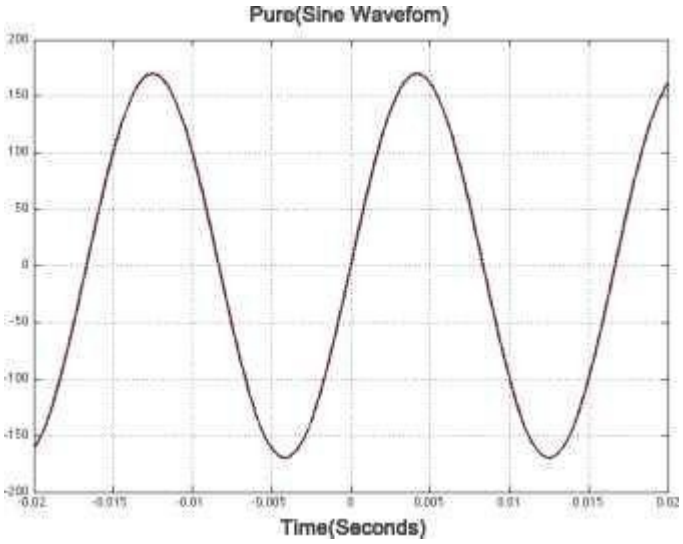
■ **Key Features**

- Robust and sleek design
- LCD and LED display used to view inverter status and programming features
- Offers high quality waveform with little harmonic distortion
- 4-Stage battery charger with configurable charging current
- 4 Pre-Set battery voltages including Lithium; User-defined option available
- Peak efficiency >90%
- Multiple electronic protections

I **Pure Sine Wave**

The WI Series Power Inverters output a pure sine wave similar to the waveform of the grid power.

In a pure sine wave, the voltage rises and falls in a smooth fashion with very low harmonic distortion and cleaner utility-like power.



This gives users stable enough power to operate tools, fans, lights, computers, and other electronics without any interference. Pure sine wave inverters are in many cases more efficient, allowing users to use less energy and allow for more device capability. The main advantage to pure sine wave inverters is that they are used to operate sensitive electronic devices that require a high quality waveform with little harmonicdistortion. Almost any electronic device could be powered using a pure sine wave inverter.

INSTALLATION

I AC Wiring

[**WARNING**]

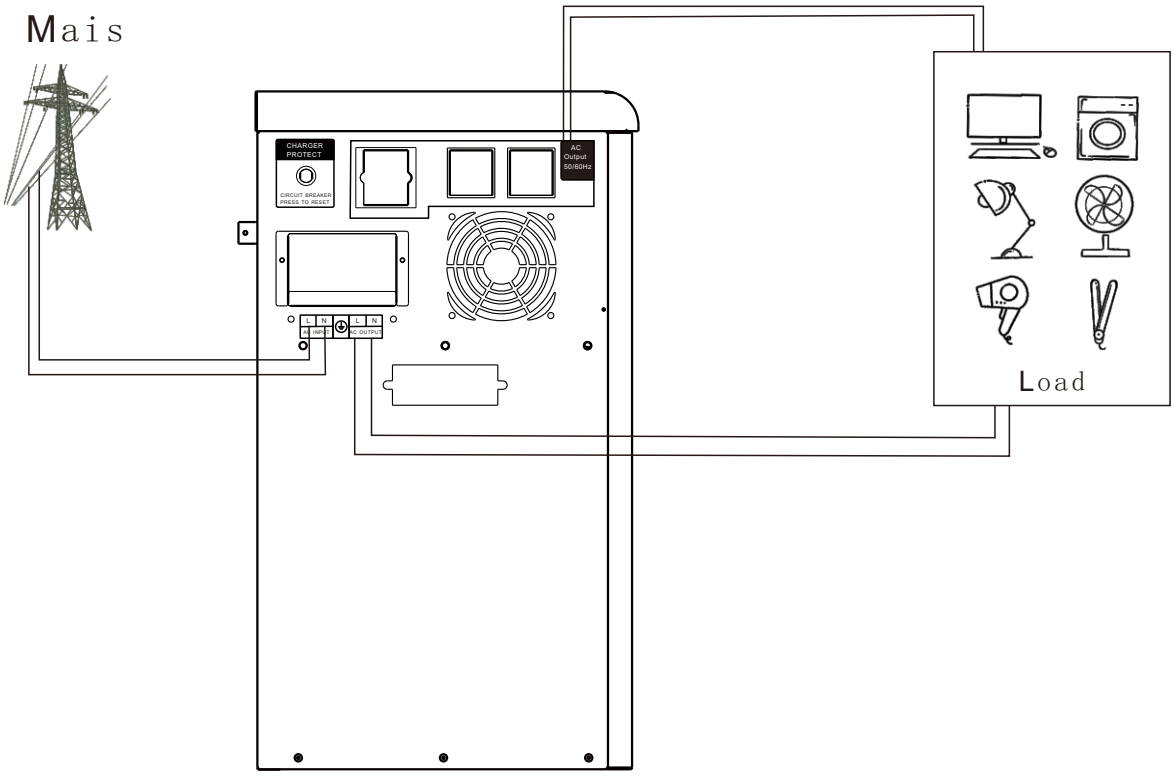
AC Output should NEVER be connected to public power or a generator.

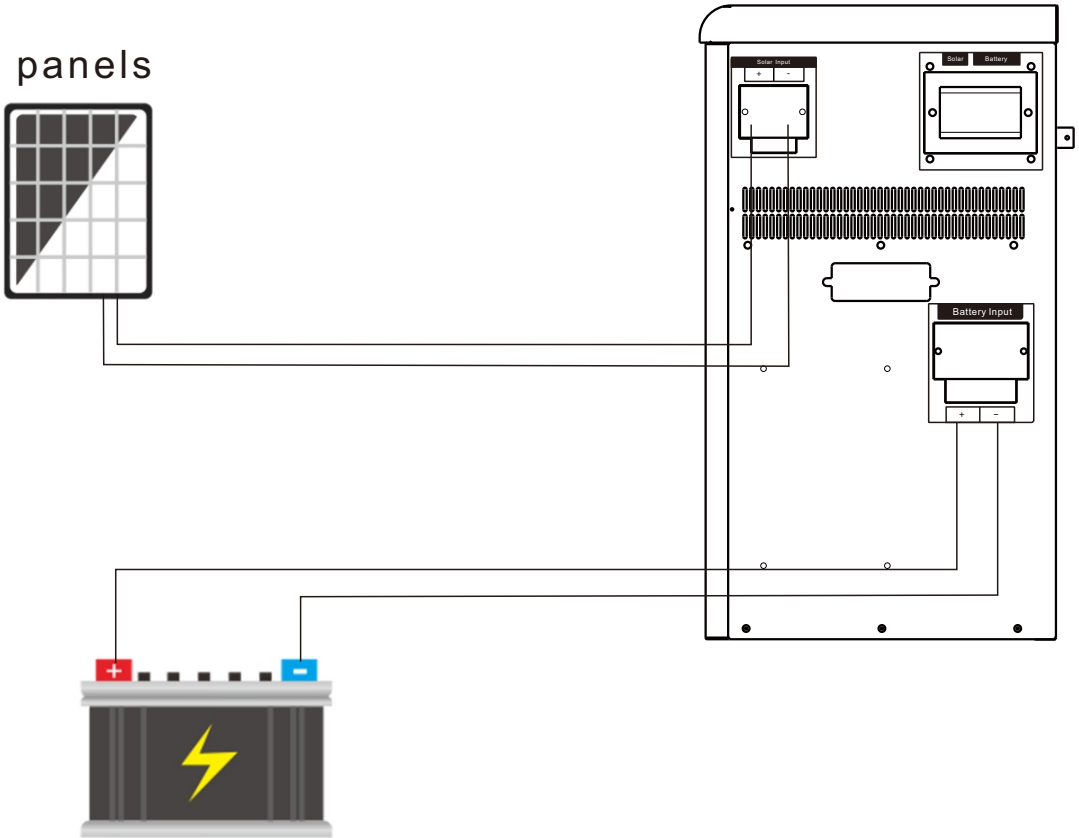
CAUTION

When connecting to an AC source we recommend using appropriate wire size for each model and wiring just like the picture below. (220V Single Phase Wiring Only). Consult a qualified electrician about specific wire gauge in terms of material and inverter power.

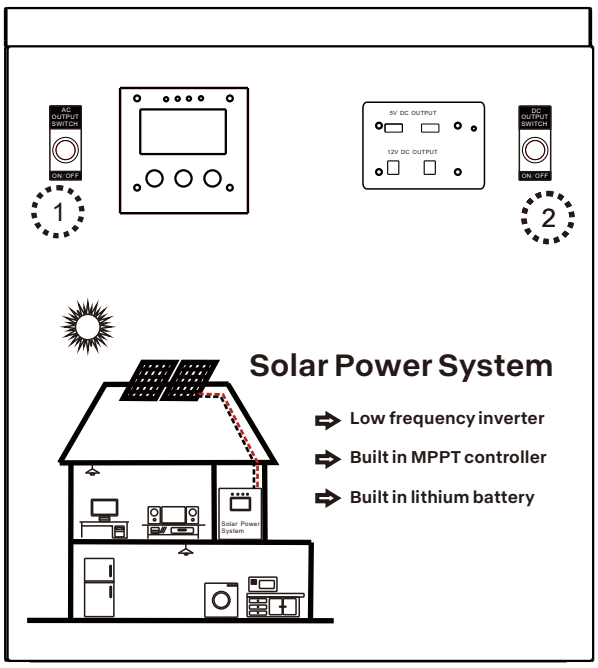
AC Input: Ground-Hot Line-Neutral

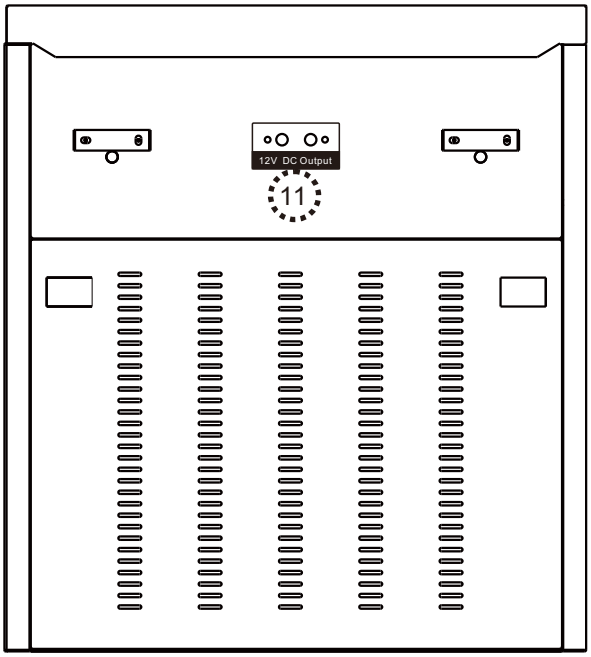
AC Output: Hot Line-Neutral-Ground

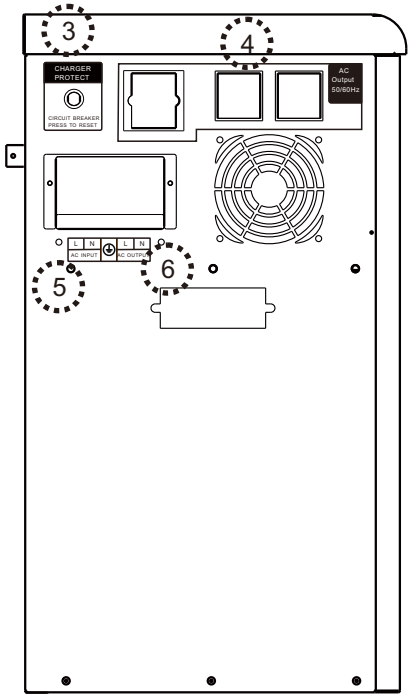


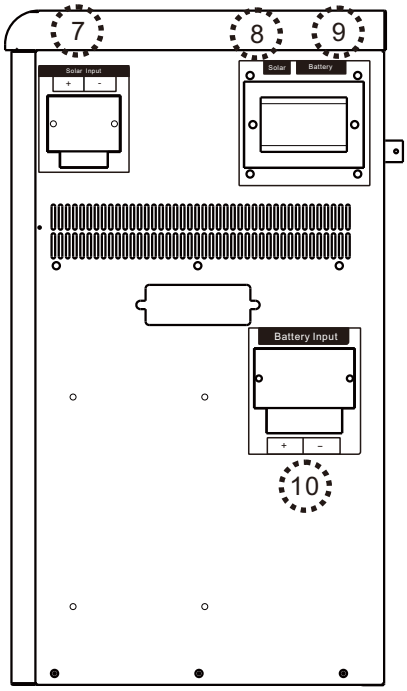


Extended battery pack







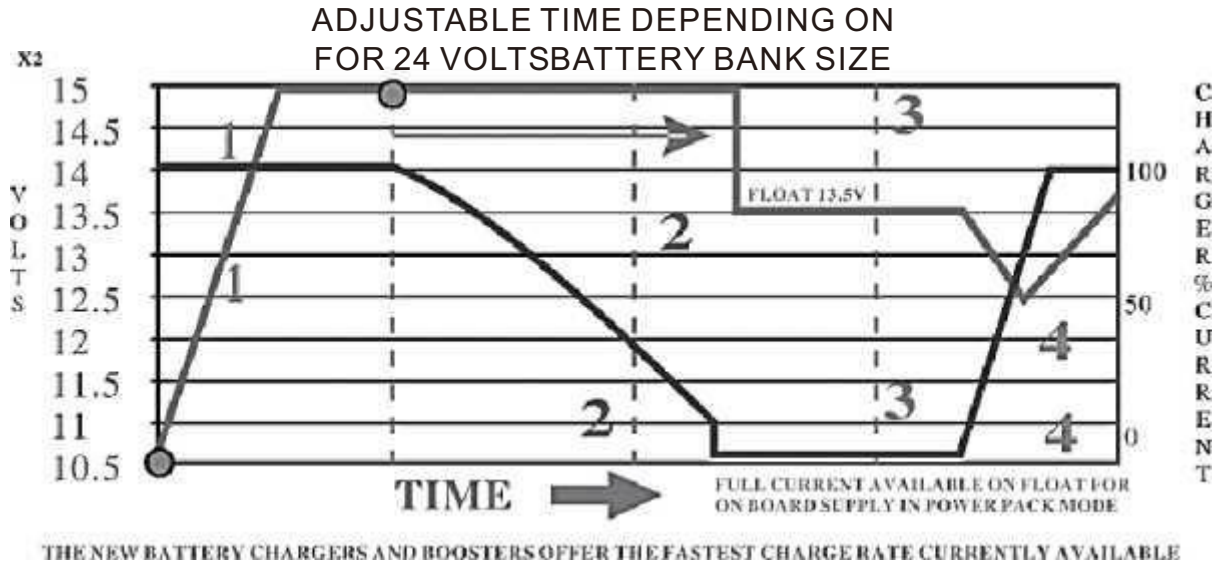


1 ON/OFF 2 DC Output 3 AC input reset fuse 4 AC output socket

5 AC INPUT 6 AC OUTPUT 7 PV INPUT 8 PV Switch

9 Battery switch 10 Extended battery pack 11 12Vdc Output

OPERATION



STEP I = CONSTANT CURRENT CHARGE ; STEP 2 = ABSORPTION CHARGE AT 14.4/14.&V
STEP 3 = CONSTANT VOLTAGE AT 13.5 VOLTS ; STEP 4 = LOW VOLTAGE RESET TO STEP 1

I Battery Charging Stages

Bulk Stage: The charger will supply constant current until the battery voltage reaches the boost voltage. The software will calculate the time charging began up until the battery voltage reaches 0.3V below the boost voltage. It uses this time to as TO and T0X1 0 = T1.

Boost Stage: The charger will supply constant voltage and reduce the current slowly through this stage. The charger will stay in this stage until T1 has run out. After this time the charger will enter the float stage. This stage will last between 1 hour and 12 hours depending on T1.

Float Stage: During this stage the charger will supply a constant voltage which is determined by the battery selected and will keep current at a minimum. This stage acts as a trickle charger.

The following steps need to be taken to properly set the charge current

1.Press and hold the SET key to enter the setting screen.

2.Press the down arrow key until CHA SET shown.

3.Press the SET key to select charge current.

■ UTILITY PRIORITY & BATTERY PRIORITY

The inverter charger comes equipped with two working modes that can be changed using setting 01.

Utility Priority

The default setting is Utility Priority (AC). Under this setting, once the inverter charger is connected to the utility, it will power the loads using the electricity from shore supply.

The inverter charger will start charging the battery bank using the AC source, if necessary. In case of power outage, the system automatically switches to battery-powered mode.

Battery Priority

The second setting is Battery Priority (DC). Under this setting the inverter charger will provide power using the connected battery bank even when it detects an AC source.

When the battery voltage reaches the low voltage set point, the inverter charger will power the loads using the connected AC source but will not charge the battery bank.

The following steps need to be taken to properly set the inverter charger to Battery Priority (DC)

1.Press and hold the SET key to enter the setting screen.
2.Press the down arrow key until MODE SET shown.
3.Press the SET key to select DC.
Taking these steps will set the inverter charger to Battery Priority (DC)

Audible Alarm

Inverter Charger Failure (Low-voltage Shutdown, High-voltage Shutdown, Overheating Protection, Overload Protection)	The buzzer will keep beeping
Pressing Function Keys	The buzzer will beep for 0.5s
Working Mode Transfer	The buzzer will beep for 0.5s
Overheating/Overload Alarm	The buzzer will beep for 0.3s every 1s
Low-voltage/High-voltage Alarm	The buzzer will beep for 0.2s every 0.5s

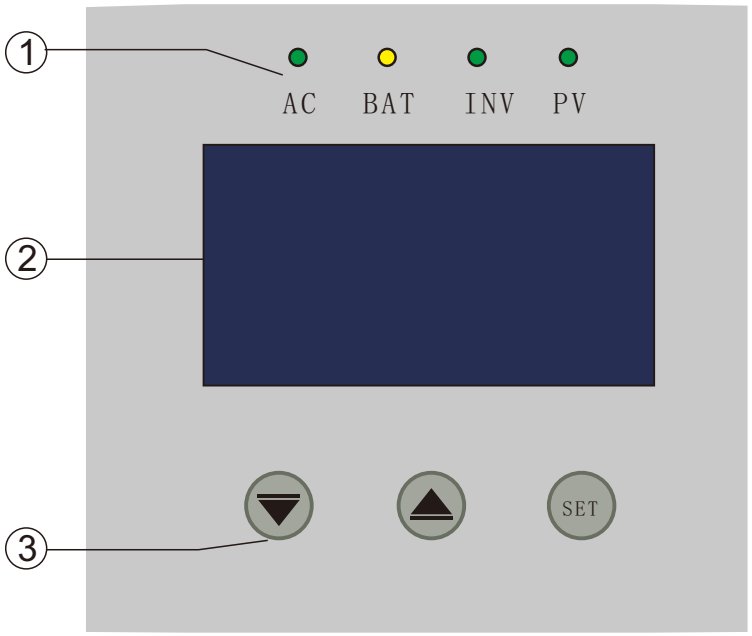
I FAN Operation

The fan will work for 1 minute every 30 minutes. The operation of the fan is controlled by the following logic.

Condition	Turn on Condition	Turn off Condition
Inverter Charger Uptime	Uptime M 1 minute	Uptime > 1 minute
Inverter Mode Load Percentage	Load 2 35%	Load < 35%
DC Input Current	Current 2 10A	Current < 6A
Inverter Heat Sink Temperature	Temperature 250C	Temperature < 45C

Display Panel

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



① LED indicators

② LCD display

③ Function keys

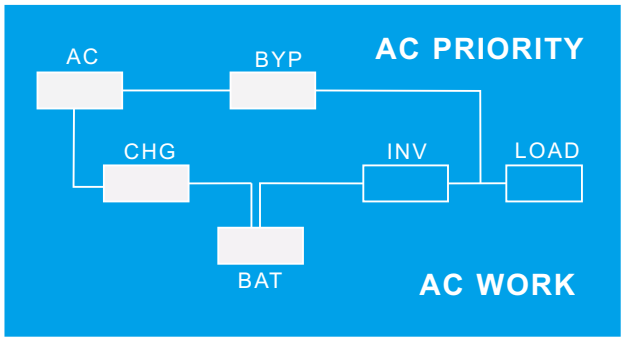
LED Indicator

LED Indicator	Color	Off	Solid On	Flashing
AC	Green	Utility is disconnecte	Output is powered by utility	Utility is detected
BAT	Orange	Battery power off	Output is powered by utility	Battery is charging
INV	Green	No AC output	Covert DC to AC	/
PV	Green	PV no input	Fully charged	PV is charging

Function Keys

Function Key	Description
SET	To exit setting mode
	To go to previous selection
	To go to next selection

LED Display Icons

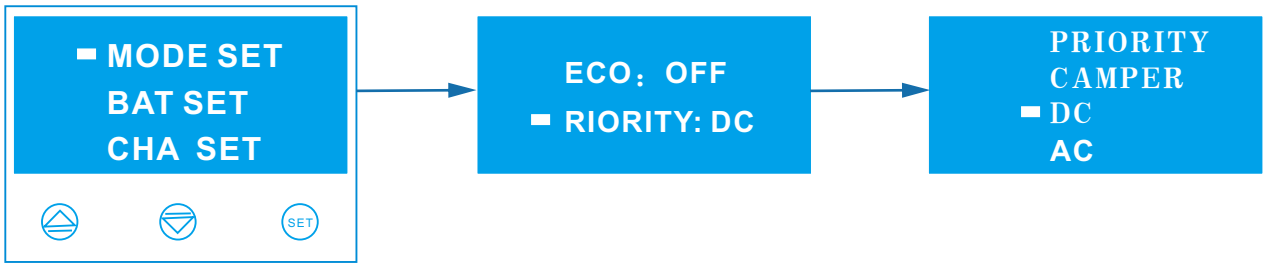


Icon	Function description
AC	Indicates the AC input
BYP	Indicates bypass function
CHG	Indicates battery charging
BAT	Indicates battery

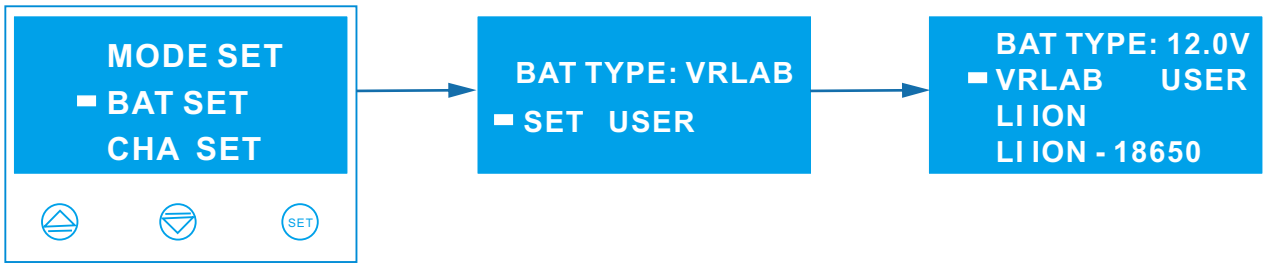
LCD Setting

After pressing and holding “SET” button for 3 seconds, the unit will enter setting mode. Press "UP" or ''DOWN" button to select setting programs. Then, press "SET" button to confirm the selection or wait to exit.

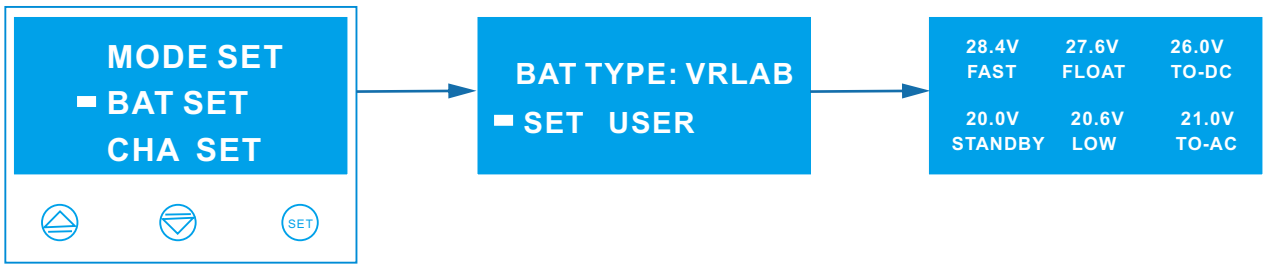
1、Working mode setting



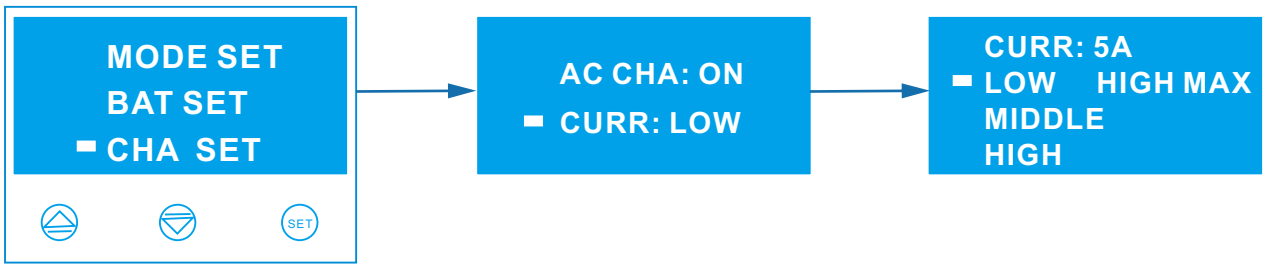
2、Selection of Battery type



3、User defined battery type



4、Selection of charge current



Fault Reference

Warning	Reason	Solution
Turn on	Battery low voltage	Charging battery
	DC high voltage	Discharging battery
No output	Battery over-low voltage	Charging battery
	Battery over-high voltage	Discharging battery
	Overload	Turn off some loads
	Output short circuit	Turn off AC loads

System setting parameters

This series of inverters and the integrated reverse control machine have low-voltage protection, low-voltage protection, overshoot protection, over discharge protection, etc. the following table is the factory default parameter table of the machine:

System setting parameter table I [lead acid battery]:

	12Vmachine	24Vmachine	48Vmachine
Overvoltage protection	16. 5V	33.0V	66.0V
Overvoltage recovery	15. 5V	31.0V	62.0V
Undervoltage protection	10. 0V	20.0V	40.0V
Low pressure alarm	10. 3V	20.6V	41.2V
Battery equalizing voltage	14. 2V	28.4V	56.8V
Battery float voltage	13. 8V	27.6V	55.2V
Battery low voltage to mains	10. 5V	21.0V	42.0V
Restore battery power	13. 0V	26.0V	52.0V

System setting parameter table 2: [gel cell]

	12Vmachine	24Vmachine	48Vmachine
Overvoltage protection	16. 5V	33.0V	66.0V
Overvoltage recovery	15. 5V	31.0V	62.0V
Undervoltage protection	10. 0V	20.0V	40.0V
Low pressure alarm	10. 3V	20.6V	41.2V
Battery equalizing voltage	14. 4V	28.8V	57.6V
Battery float voltage	13. 8V	27.6V	55.2V
Battery low voltage to mains	10. 5V	21.0V	42.0V
Restore battery power	13. 0V	26.0V	52.0V

System setting parameter table 3: [lithium iron phosphate battery with nominal voltage of 12.8v]

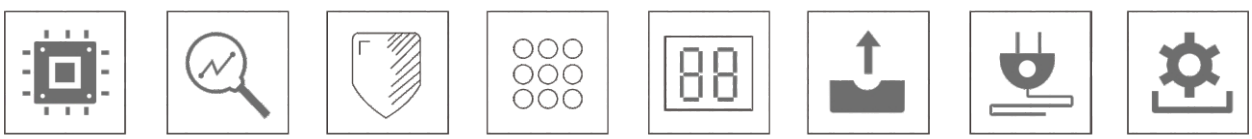
	12Vmachine	24Vmachine	48Vmachine
Overvoltage protection	16. 5V	33.0V	66.0V
Overvoltage recovery	15. 5V	31.0V	62.0V
Undervoltage protection	10. 0V	20.0V	40.0V
Low pressure alarm	10. 6V	21.2V	42.4V
Battery equalizing voltage	14. 6V	29.2V	58.4V
Battery float voltage	14. 6V	29.2V	58.4V
Battery low voltage to mains	11. 0V	22.0V	44.0V
Restore battery power	13. 6V	27.2V	54.4V

System setting parameter table 4: [ternary lithium 18650 battery with nominal voltage of 11.1v]

	12Vmachine	24Vmachine	48Vmachine
Overvoltage protection	16. 5V	33.0V	66.0V
Overvoltage recovery	15. 5V	31.0V	62.0V
Undervoltage protection	8. 0V	16.0V	32.0V
Low pressure alarm	9. 0V	18.0V	36.0V
Battery equalizing voltage	12. 6V	25.2V	50.4V
Battery float voltage	12. 6V	25.2V	50.4V
Battery low voltage to mains	9. 5V	19.0V	38.0V
Restore battery power	10. 6V	21.2V	42.4V

Inverter with built-in controller Specification parameter

Rated Power		1000W	1500W	2000W	3000W	4000W	5000W	6000W
Bat. Voltage		12V	12V/24V	24V/48V	24V/48V	48V	48V	48V
Inside Solar		30A	30A OR 60A	30A OR 60A		30A OR 60A		
Size(L*W*H)		440*20*555mm		523*320*658mm		642*378*758mm		
Packing Size(L*W*H)								
AC Input	Voltage Range	165VAC-265VAC						
	Frequency Range	45Hz-65Hz						
AC Output	Voltage Range	220Vac±5%						
	Frequency Range	50Hz/60Hz±1%						
Inside Solar Controller	Charging Mode	PWM		MPPT				
	Charging Current	30A		30A OR 60A				
	PV Input Voltage Range	12V-45V		24V System:36V-130V ; 48V System:65V-130V				
	Max PV Input Voltage	45V		24V System:130V ; 48V System:130V				
	PV Array Max Power	12V:400W/24V:800W		750W/1440W/2800W				
Output Wave		Pure Sine Wave						
Total Harmonic Distortion		≤ 3%(Linear load)						
Transfer Time		≤4ms						
Efficiency		⩾85%						
Working Mode	Battery First	when Converting:Battery voltag:11V turn mains mode						
	AC First	Giving priority to the use of electricity,mains first with AC charging						
	Saving energy mode	Load power ≤10% machine turns off , ⩾11%-100% machine turns on						
AC Charging Current		15A/25A/45A(Three stalls are available)						
Battery Type		Lead acid battery/lithium battery/Iron lithium battery						
Display		lcd						
Thermal method		Cooling fan in intellingent control						
Communication		RS485(Selection)						
Protection	Bat. low voltage alarm	Yes [see Chapter 6 of this manual for specific values]						
	Bat. low voltage	Yes [see Chapter 6 of this manual for specific values]						
	Bat. over voltage	Yes [see Chapter 6 of this manual for specific values]						
	Bat. over voltage alarm	Yes [see Chapter 6 of this manual for specific values]						
	Over Power Protection	Yes [see Chapter 6 of this manual for specific values]						
	Temperature Protection	85℃ alarm ,⩾90℃ machine shut off						
	AC Output short circuit	YES						
Environment	Noise	55dB						
	Temperature	-10℃-40℃						
	Humidity	0%-95%,No condensation						
Note	1. Specifications are subject to change without notice							
	2.Special voltage power requirements,can e customized according to the actual situation of users							



DSP engine chip | MPPT controller | Multiple protection | Simple operation | Display intuition | Multiple output ports | mains input | Easy to install

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates , uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

•Reorient or relocate the receiving antenna.
•Increase the separation between the equipment and receiver.
•Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
•Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation