

User Manual

PowerWalker SOLAR INVERTER LGT (3600-5600VA) OFF-Grid Charger

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ABOUT THIS MANUAL

Purpose

This manual describes the assembly, installation, operation and troubleshooting of this unit. Please read this manual carefully before installations and operations. Keep this manual for future reference.

Scope

This manual provides safety and installation guidelines as well as information on tools and wiring.

SAFETY INSTRUCTIONS

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

1. Before using the unit, read all instructions and cautionary markings on the unit, the batteries, and all appropriate sections of this manual.
2. **CAUTION** – To reduce risk of injury, charge only deep-cycle lead acid type rechargeable batteries. Other types of batteries may burst, causing personal injury and damage.
3. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
4. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
5. **CAUTION** – Only qualified personnel can install this device with battery.
6. **NEVER** charge a frozen battery.
7. For optimum operation of this inverter/charger, please follow required spec to select appropriate cable size. It's very important to correctly operate this inverter/charger.
8. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.
9. 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.
10. Fuses are provided as over-current protection for the battery supply.
11. **GROUNDING INSTRUCTIONS** -This inverter/charger should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
12. **NEVER** cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
13. **Warning!!** Only qualified service persons are able to service this device. If errors still persist after following troubleshooting table, please send this inverter/charger back to local dealer or service center for maintenance.
14. **WARNING:** Because this inverter is non-isolated, only three types of PV modules are acceptable: single crystalline, poly crystalline with class A-rated and CIGS modules. 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 CIGS modules, please be sure NO grounding.
15. **CAUTION:** It's required to use PV junction box with surge protection. Otherwise, it will cause damage on inverter when lightning occurs on PV modules.

INTRODUCTION

This is a multi-function inverter, combining functions of inverter, solar charger and battery charger to offer uninterruptible power support in a single package. The comprehensive LCD display offers user-configurable and easy-accessible button operations such as battery charging current, AC or solar charging priority, and acceptable input voltage based on different applications.

Features

- Pure sine wave inverter
- Customizable status LED ring with RGB lights
- Touchable button with 4.3" colored LCD
- Built-in Wi-Fi for mobile monitoring (APP is available)
- Supports USB On-the-Go function
- Data log events stored in the inverter
- Built-in anti-dusk kit
- Reserved communication port for BMS
- Battery independent function
- Parallel operation up to 9 units

Basic System Architecture

The following illustration shows basic application for this unit. It also required the following devices to have a complete running system:

- Generator or Utility mains.
- PV modules

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

This inverter can power various appliances in home or office environment, including motor-type appliances such as tube light, fan, refrigerator, and air conditioners.

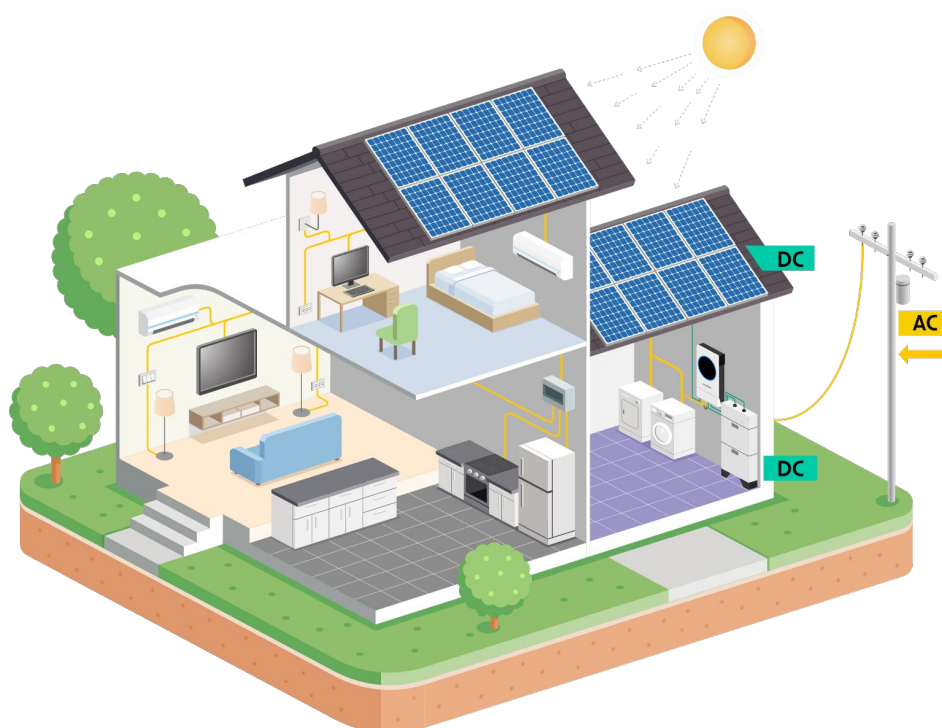
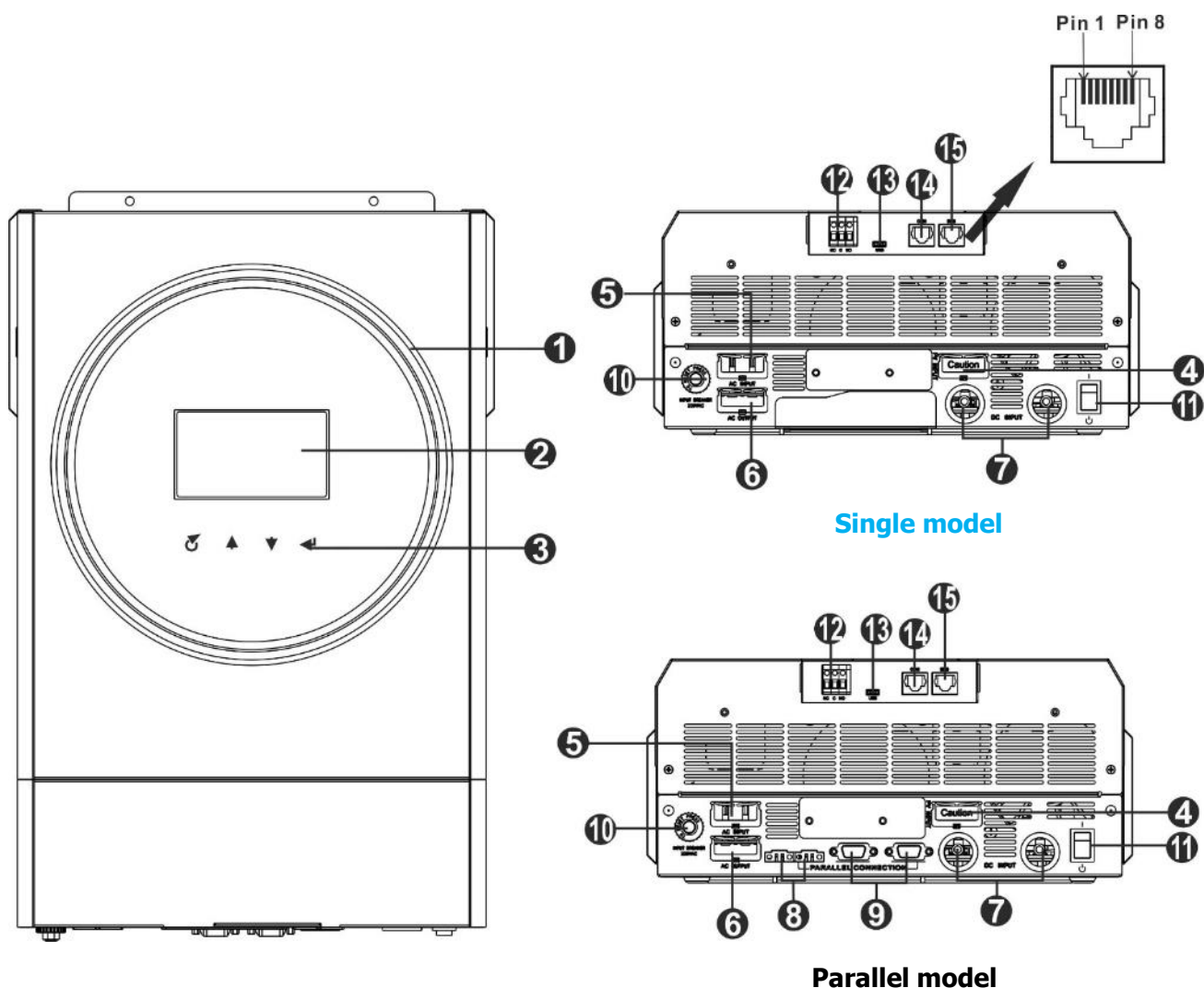


Figure 1 PV System Overview

Product Overview



NOTE: For parallel installation and operation, please check *Appendix I*.

1. RGB LED ring (refer to LCD Setting section for the details)
2. LCD display
3. Touchable Function keys
4. PV connectors
5. AC input connectors
6. AC output connectors (Load connection)
7. Battery connectors
8. Current sharing port
9. Parallel communication port
10. Circuit breaker
11. Power switch
12. Dry contact
13. USB port as USB communication port and USB function port
14. RS-232 communication port
15. BMS communication port: CAN, RS-485 or RS-232

INSTALLATION

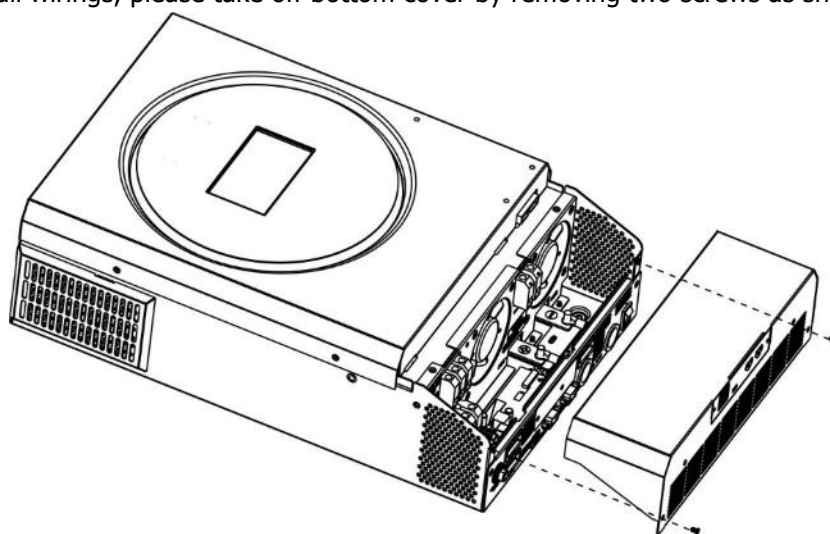
Unpacking and Inspection

Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items inside of package:



Preparation

Before connecting all wirings, please take off bottom cover by removing two screws as shown below.

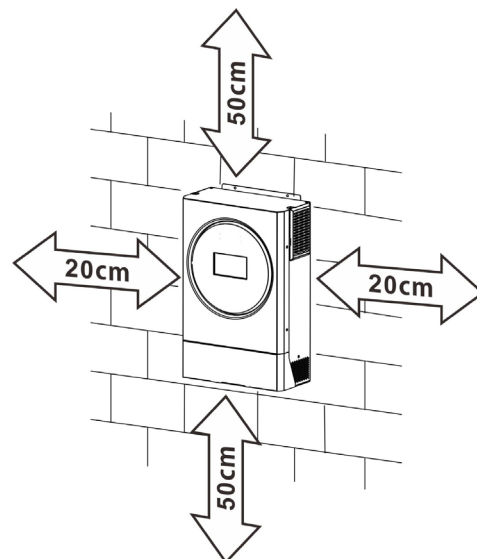


Mounting the Unit

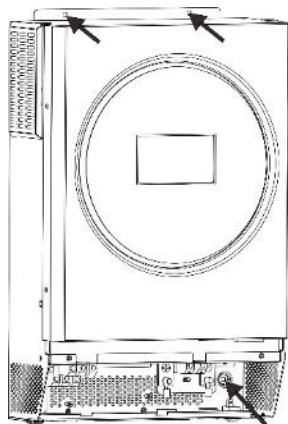
Consider the following points before selecting where to install:

- Do not mount the inverter on flammable construction materials.
- Mount on a solid surface
- Install this inverter at eye level in order to allow the LCD display to be read at all times.
- The ambient temperature should be between -10°C and 50°C to ensure optimal operation.
- The recommended installation position is to be adhered to the wall vertically.
- Be sure to keep other objects and surfaces as shown in the right diagram to guarantee sufficient heat dissipation and to have enough space for removing wires.

 **SUITABLE FOR MOUNTING ON CONCRETE OR OTHER NON-COMBUSTIBLE SURFACE ONLY.**



Install the unit by screwing three screws. It's recommended to use M4 or M5 screws.



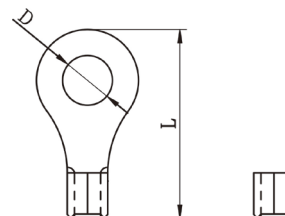
Battery Connection

CAUTION: For safety operation and regulation compliance, it's requested to install a separate DC over-current protector or disconnect device between battery and inverter. It may not be required to have a disconnect device in some applications, however, it's still required to have over-current protection installed. Please refer to typical amperage in below table as required fuse or breaker size.

WARNING! All wiring must be performed by qualified personnel.

WARNING! 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 and terminal size as below.

Ring terminal:

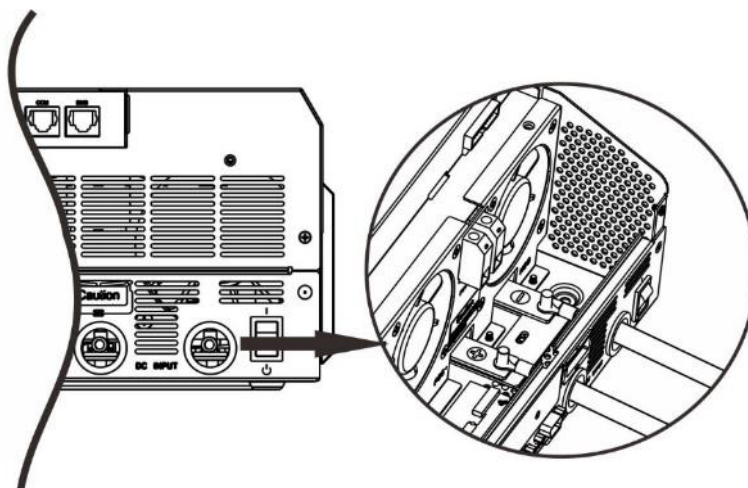


Recommended battery cable and terminal size:

Model	Typical Amperage	Battery Capacity	Wire Size	Ring Terminal			Torque Value
				Cable mm ²	Dimensions		
					D (mm)	L (mm)	
3.6KW	100A	200AH	1*4AWG	22	6.4	33.5	2~3 Nm
5.6KW	137A	200AH	1*2AWG or 2*6AWG	28	6.4	42.7	2~3 Nm

Please follow below steps to implement battery connection:

1. Assemble battery ring terminal based on recommended battery cable and terminal size.
2. Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the nuts are tightened with torque of 2-3 Nm. Make sure polarity at both the battery and the inverter/charge is correctly connected and ring terminals are tightly screwed to the battery terminals.



**WARNING: Shock Hazard**

Installation must be performed with care due to high battery voltage in series.



CAUTION!! Do not place anything between the flat part of the inverter terminal and the ring terminal. Otherwise, overheating may occur.

CAUTION!! Do not apply anti-oxidant substance on the terminals before terminals are connected tightly.

CAUTION!! Before making the final DC connection or closing DC breaker/disconnector, be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).

AC Input/Output Connection

CAUTION!! Before connecting to AC input power source, please install a **separate** AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input.

CAUTION!! There are two terminal blocks with "IN" and "OUT" markings. ENSURE that utility AC input is connected to IN and load AC to OUT and not the wrong way round and also that Line and Neutrals are connected correctly.

WARNING! All wiring must be performed by qualified personnel.

WARNING! It's 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 size as below.

Suggested cable requirement for AC wires

Model	Gauge	Torque Value
3.6KW	12 AWG	1.2~ 1.6 Nm
5.6KW	10 AWG	1.2~ 1.6 Nm

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

1. Before making AC input/output connection, be sure to open DC protector or disconnector first.
2. Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N 3 mm.
3. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws.

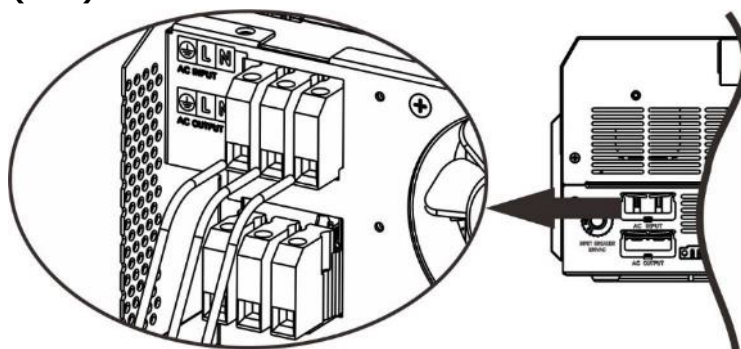
Be sure to connect PE protective conductor (⊕) first.



→ **Ground (yellow-green)**

L → **LINE (brown or black)**

N → **Neutral (blue)**

**WARNING:**

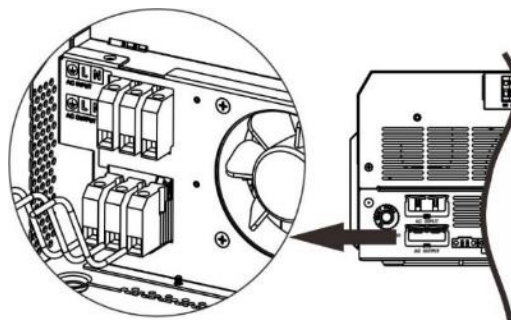
Be sure that AC power source is disconnected before attempting to hardwire it to the unit.

4. Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor (⊕) first.

⊕→**Ground (yellow-green)**

L→**LINE (brown or black)**

N→**Neutral (blue)**



5. Make sure the wires are securely connected.

CAUTION: Important

Be sure to connect AC wires with correct polarity. If L and N wires are connected reversely, it may cause utility short-circuited when these inverters are worked in parallel operation.

CAUTION: Appliances such as air conditioner are required at least 2~3 minutes to restart because it's required to have enough time to balance refrigerant gas inside of circuits. If a power shortage occurs and recovers in a short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check manufacturer of air conditioner if it's equipped with time-delay function before installation. Otherwise, this inverter/charger will trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

PV Connection

CAUTION: Before connecting to PV modules, please install **separately** a DC circuit breaker between inverter and PV modules.

CAUTION: Please install a surge protection device between inverter and PV modules and the recommended voltage is 500V.

WARNING! Do switch off the inverter before connecting to PV modules. Otherwise, it will cause inverter damage.

WARNING! Do NOT connect negative and positive terminal of PV modules to the ground.

WARNING! All wiring must be performed by qualified personnel.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

Model	Typical Amperage	Cable Size	Torque
3.6KW	18A	12AWG	1.2~1.6Nm
5.6KW	27A	10AWG	1.2~1.6Nm

PV Module Selection:

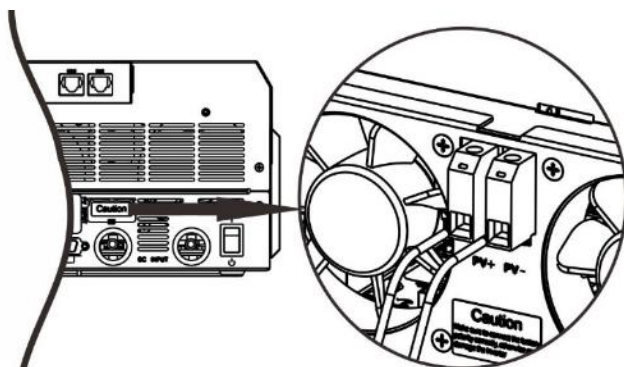
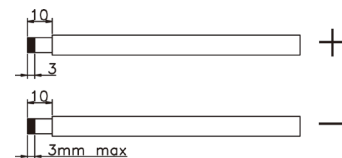
When selecting proper PV modules, please be sure to consider below parameters:

1. Open circuit Voltage (Voc) of PV modules do not exceed max. PV array open circuit voltage of inverter.
2. Open circuit Voltage (Voc) of PV modules should be higher than min. battery voltage.

Solar Charging Mode		
INVERTER MODEL	3.6KW	6.5KW
Max. PV Array Open Circuit Voltage	500 Vdc	450 Vdc
PV Array MPPT Voltage Range	120~430Vdc	
MPP Number	1	

Please follow below steps to implement PV module connection:

1. Remove insulation sleeve 10 mm for positive and negative conductors.
2. Check correct polarity of connection cable from PV modules and PV input connectors. Then, connect positive pole (+) of connection cable to positive pole (+) of PV input connector. Connect negative pole (-) of connection cable to negative pole (-) of PV input connector.

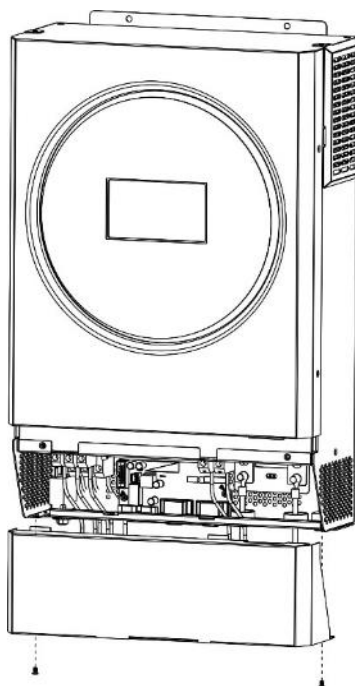


Recommended PV module Configuration

PV Module Spec. (reference)	Total solar input power	Solar input	Q'ty of modules
- 250Wp - Vmp: 30.7Vdc - Imp: 8.15A - Voc: 37.4Vdc - Isc: 8.63A - Cells: 60	1500W	6 pieces in series	6 pcs
	2000W	8 pieces in series	8 pcs
	2750W	11 pieces in series	11 pcs
	3000W	6 pieces in series 2 strings in parallel	12 pcs
	4000W	8 pieces in series 2 strings in parallel	16 pcs
	5000W	10 pieces in series 2 strings in parallel	20 pcs
	6000W	12 pieces in series 2 strings in parallel	24 pcs

Final Assembly

After connecting all wirings, please put bottom cover back by screwing two screws as shown below.



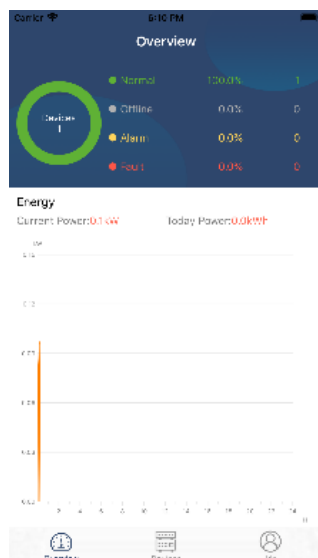
Communication Connection

Serial Connection

Please use the supplied serial cable to connect between the inverter and your PC. Install the monitoring software from the bundled CD and follow the on-screen instructions to complete your installation. For detailed software operation, refer to the software user manual on the bundled CD.

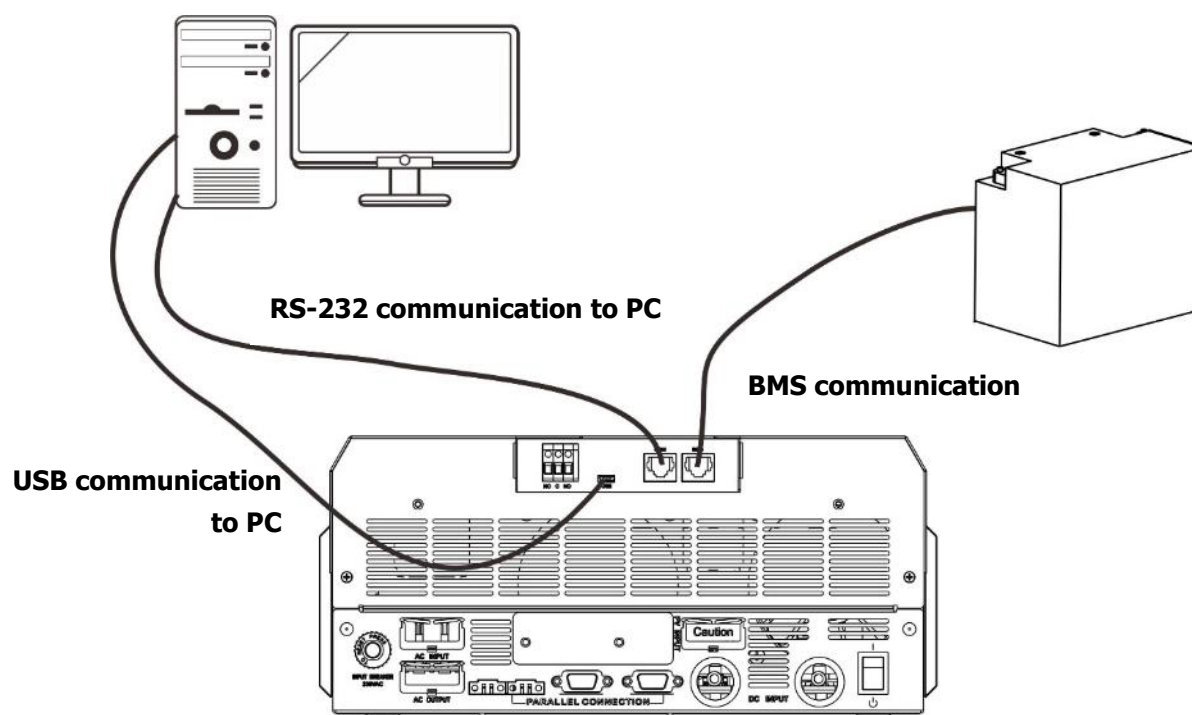
Wi-Fi Connection

This unit is equipped with a Wi-Fi transmitter. Wi-Fi transmitter can enable wireless communication between off-grid inverters and monitoring platform. Users can access and control the monitored inverter with downloaded APP. You may find "WatchPower" app from the Apple® Store or "WatchPower Wi-Fi" in Google® Play Store. All data loggers and parameters are saved in iCloud. For quick installation and operation, please refer to Appendix III - The Wi-Fi Operation Guide for details.



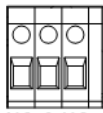
BMS Communication

It is recommended to purchase a special communication cable if you are connecting to Lithium-Ion battery banks. Please refer to Appendix II - BMS Communication Installation for details.



Dry Contact Signal

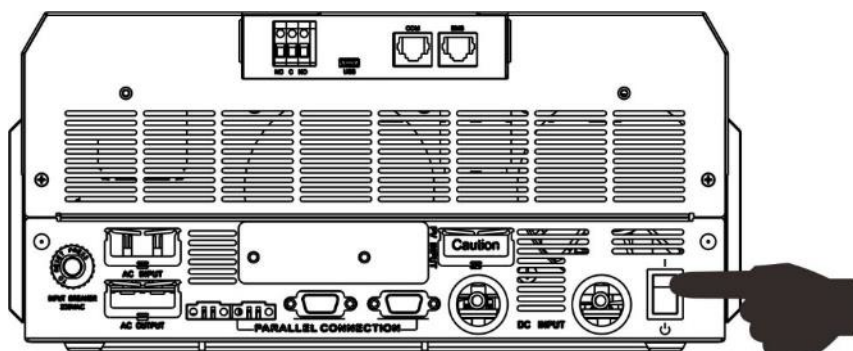
There is one dry contact (3A/250VAC) available on the rear panel. It could be used to deliver signal to external device when battery voltage reaches warning level.

Unit Status	Condition			Dry contact port: 	
				NC & C	NO & C
Power Off	Unit is off and no output is powered.			Close	Open
Power On	Output is powered from Battery power or Solar energy.	Program 01 set as USB (utility first) or SUB (solar first)	Battery voltage < Low DC warning voltage	Open	Close
			Battery voltage > Setting value in Program 13 or battery charging reaches floating stage	Close	Open
		Program 01 is set as SBU (SBU priority)	Battery voltage < Setting value in Program 12	Open	Close
			Battery voltage > Setting value in Program 13 or battery charging reaches floating stage	Close	Open

OPERATION

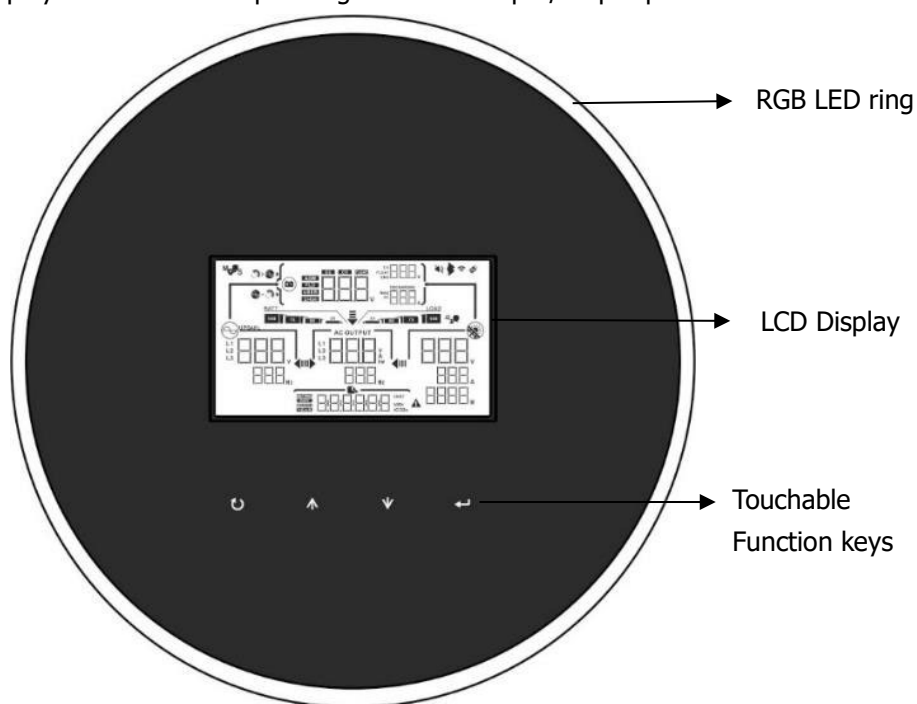
Power ON/OFF

Once the unit has been properly installed and the batteries are connected well, simply press On/Off switch to turn on the unit.



Operation and Display Panel

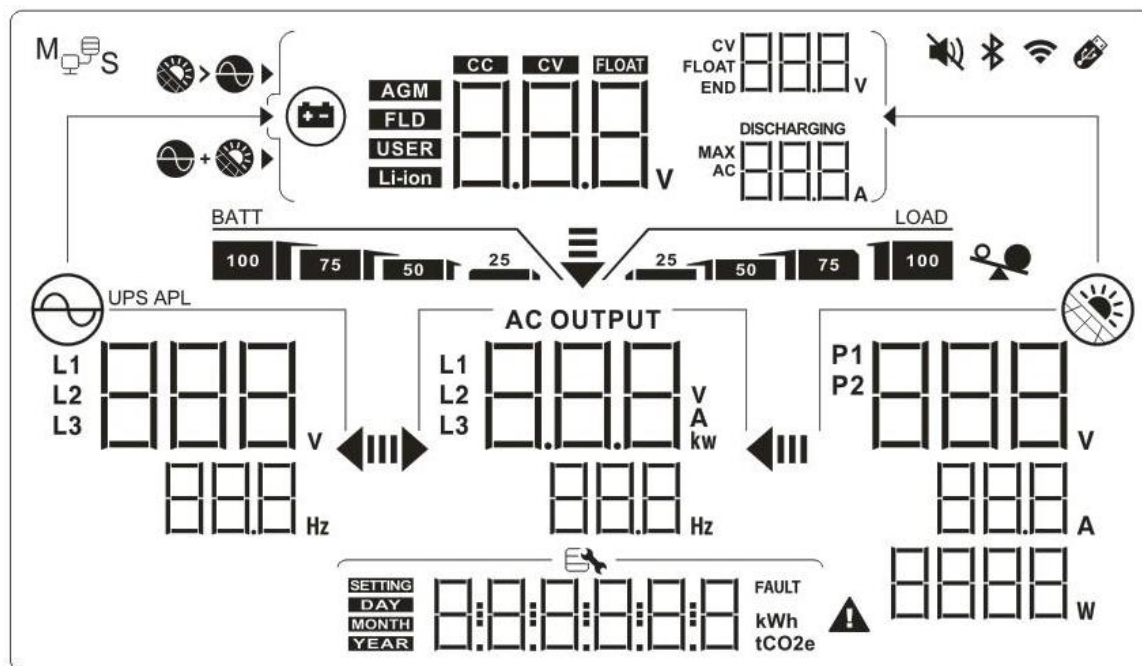
The operation and the LCD module, shown in the chart below, includes one RGB LED ring, four touchable function keys and a LCD display to indicate the operating status and input/output power information.



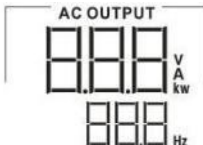
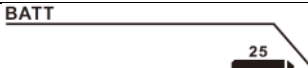
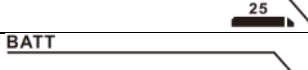
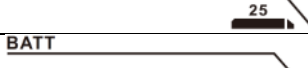
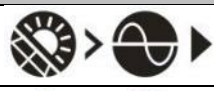
Touchable Function Keys

Function Key		Description
	ESC	To exit the setting
	USB function selector	To enter USB function setting
	Up	To last selection
	Down	To next selection
	Enter	To confirm/enter the selection in setting mode

LCD Display Icons



Icon	Function description
Input Source Information	
	Indicates the AC input voltage and frequency.
	Indicates the PV voltage, current and power.
	Indicates the battery voltage, charging stage, configured battery parameters, charging or discharging current.
Configuration Program and Fault Information	
	Indicates the setting programs.
	Indicates the warning and fault codes. Warning: flashing with warning code. Fault: lighting with fault code.

Output Information		
	Indicate the output voltage, load in VA, load in Watt and output frequency.	
Battery Information		
	Indicates battery level in battery mode and charging status in line mode by 0-24%, 25-49%, 50-74% and 75-100%.	
When battery is charging, it will present battery charging status.		
Status	Battery voltage	LCD Display
Constant Current mode / Constant Voltage mode	<2V/cell	4 bars will flash in turns.
	2 ~ 2.083V/cell	The right bar will be on and the other three bars will flash in turns.
	2.083 ~ 2.167V/cell	The right two bars will be on and the other two bars will flash in turns.
	> 2.167 V/cell	The right three bars will be on and the left bar will flash.
Floating mode. Batteries are fully charged.		4 bars will be on.
In battery mode, it will present battery capacity.		
Load Percentage	Battery Voltage	LCD Display
Load >50%	< 1.85V/cell	
	1.85V/cell ~ 1.933V/cell	
	1.933V/cell ~ 2.017V/cell	
	> 2.017V/cell	
Load < 50%	< 1.892V/cell	
	1.892V/cell ~ 1.975V/cell	
	1.975V/cell ~ 2.058V/cell	
	> 2.058V/cell	
Load Information		
	Indicates overload.	
	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.	
	0%~24%	25%~49%
		
	50%~74%	75%~100%
		
Charger Source Priority Setting Display		
	Indicates setting program 16 "Charger source priority" is selected as "Solar first".	
	Indicates setting program 16 "Charger source priority" is selected as "Solar and Utility".	

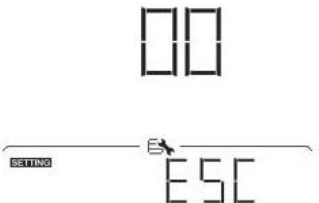
	Indicates setting program 16 "Charger source priority" is selected as "Solar only".
Output source priority setting display	
	Indicates setting program 01 "Output source priority" is selected as "Utility first".
	Indicates setting program 01 "Output source priority" is selected as "Solar first".
	Indicates setting program 01 "Output source priority" is selected as "SBU".
AC Input Voltage Range Setting Display	
UPS	Indicates setting program 03 is selected as "UPS". The acceptable AC input voltage range will be within 170-280VAC.
APL	Indicates setting program 03 is selected as "APL". The acceptable AC input voltage range will be within 90-280VAC.
Operation Status Information	
	Indicates unit connects to the mains.
	Indicates unit connects to the PV panel.
AGM FLD USER Li-ion	Indicates battery type.
	Indicates parallel operation is working.
	Indicates unit alarm is disabled.
	Indicates Wi-Fi transmission is working.
	Indicates USB disk is connected.

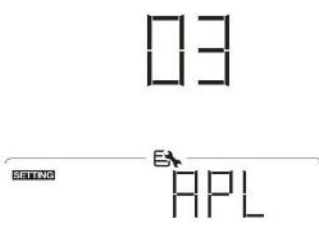
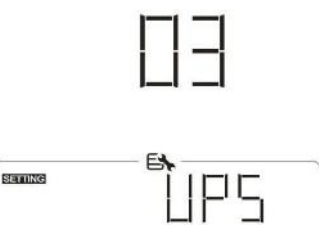
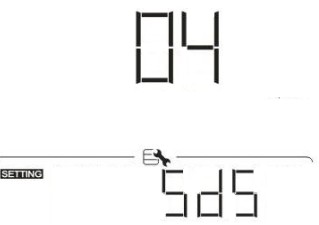
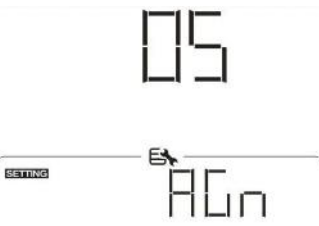
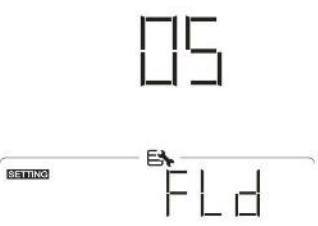
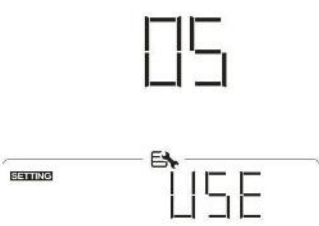
LCD Setting

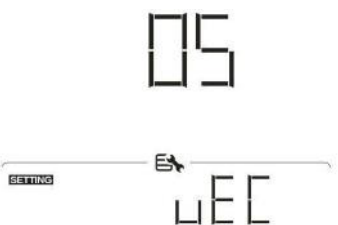
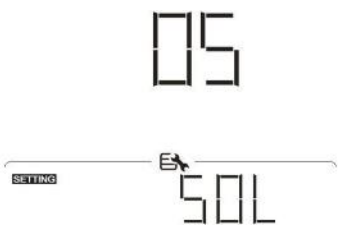
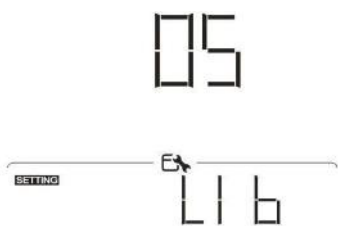
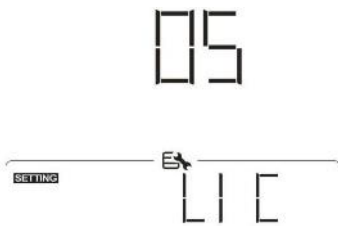
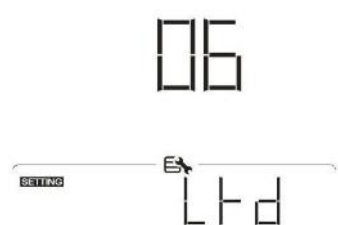
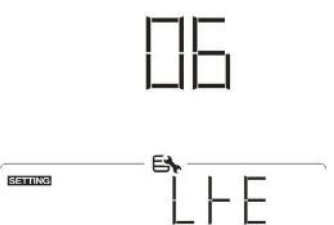
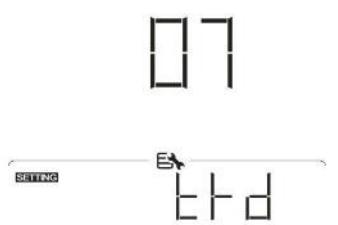
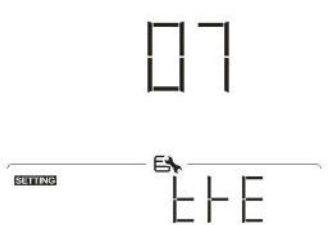
General Setting

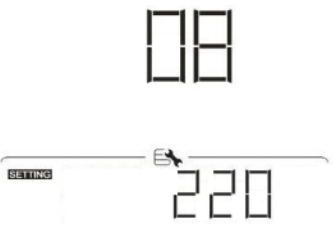
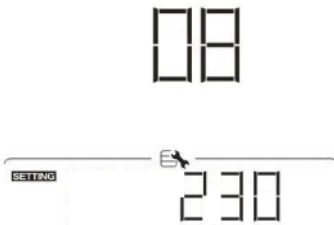
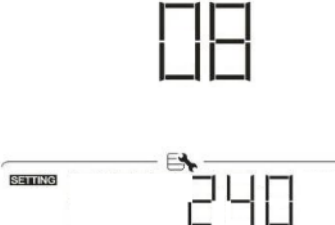
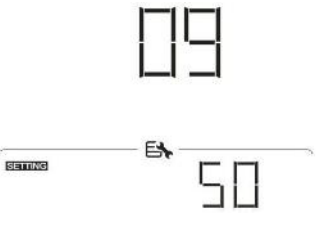
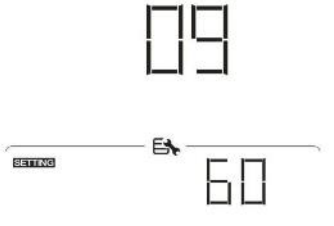
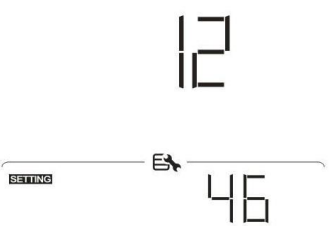
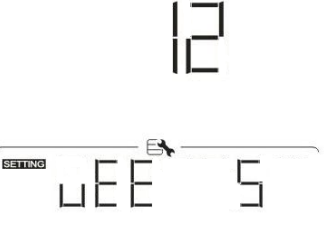
After pressing and holding "←" button for 3 seconds, the unit will enter the setting mode. Press "▲" or "▼" button to select setting programs. Press "←" button to confirm your selection or "↺" button to exit.

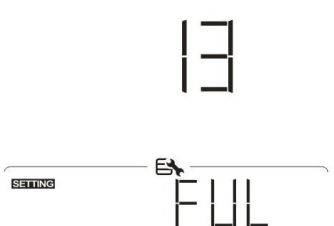
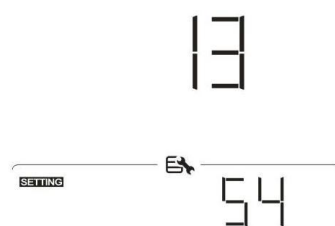
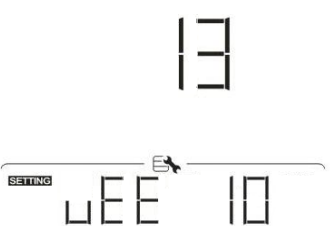
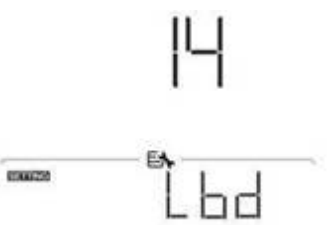
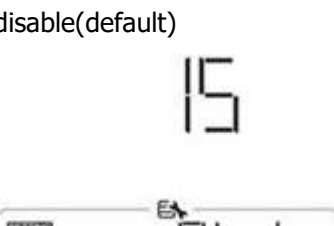
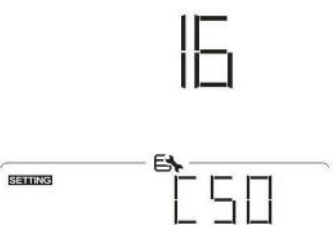
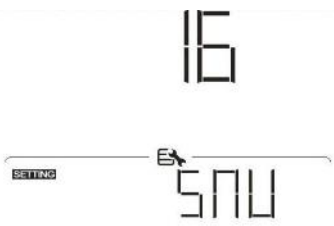
Setting Programs:

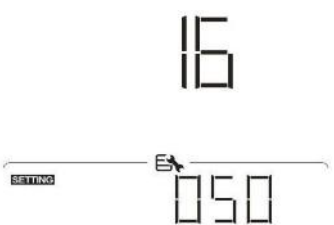
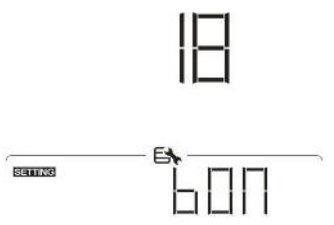
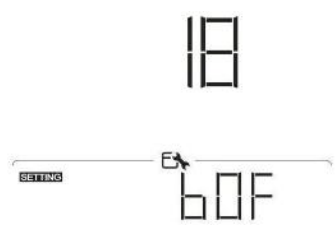
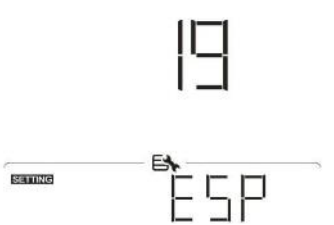
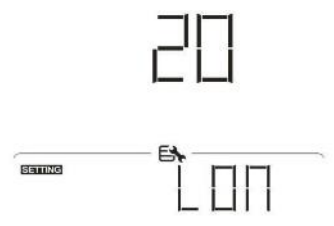
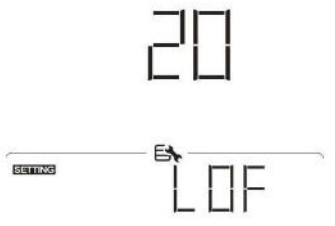
Program	Description	Selectable option	
00	Exit setting mode	Escape 	
01	Output source priority: To configure load power source priority	Utility first (default)	Utility will provide power to the loads as first priority. Solar and battery energy will provide power to the loads only when utility power is not available.
		Solar first	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, Utility energy will supply power to the loads at the same time.
		SBU priority	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time. Utility provides power to the loads only when battery voltage drops to either low-level warning voltage or the setting point in program 12.
02	Maximum charging current: To configure total charging current for solar and utility chargers. (Max. charging current = utility charging current + solar charging current)	60A (default)	Setting range is from 10A to 100A for 3.6kw model and from 10A to 120A for 5.6kw model. Increment of each click is 10A.

03	AC input voltage range	Appliances (default) 	If selected, acceptable AC input voltage range will be within 90-280VAC.
		UPS 	If selected, acceptable AC input voltage range will be within 170-280VAC.
04	Power saving mode enable/disable	Saving mode disable (default) 	If disabled, no matter connected load is low or high, the on/off status of inverter output will not be effected.
		Saving mode enable 	If enabled, the output of inverter will be off when connected load is pretty low or not detected.
05	Battery type	AGM (default) 	Flooded 
		User-Defined 	If "User-Defined" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 26, 27 and 29.

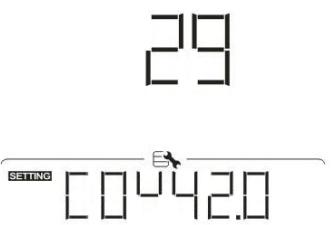
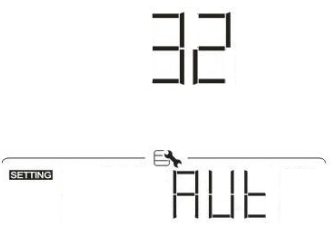
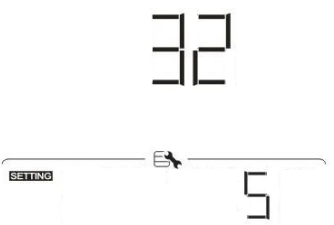
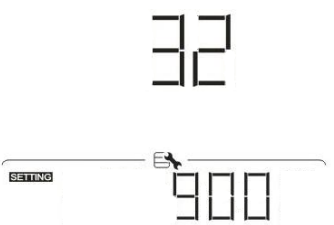
05	Battery type	Pylontech battery 	If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting.
		WECO battery 	If selected, programs of 02, 12, 26, 27 and 29 will be auto-configured per battery supplier recommended. No need for further adjustment.
		Soltaro battery 	If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting.
		Lib-protocol compatible battery 	Select "LIB" if using Lithium battery compatible to Lib protocol. If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting.
		3 rd party Lithium battery 	If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting. Please contact the battery supplier for installation procedure.
06	Auto restart when overload occurs	Restart disable (default) 	Restart enable 
07	Auto restart when over temperature occurs	Restart disable (default) 	Restart enable 

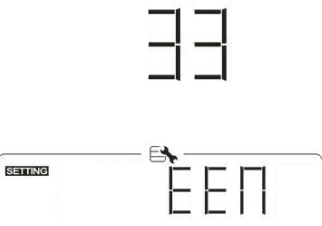
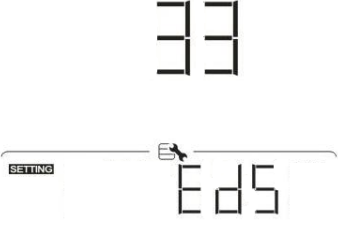
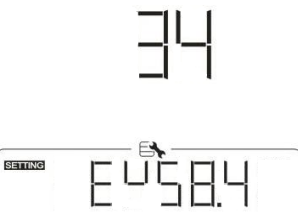
08	Output voltage	220V 	230V(default) 
		240V 	
09	Output frequency	50Hz (default) 	60Hz 
11	Maximum utility charging current Note: If setting value in program 02 is smaller than that in program in 11, the inverter will apply charging current from program 02 for utility charger.	30A (default) 	For 3.6K model, setting range is from 2A, then 10A to 100A. For 5.6K model, setting range is from 2A, then 10A to 120A. Increment of each click is 10A.
12	Setting voltage point back to utility source when selecting "SBU" (SBU priority) in program 01.	46V (default) 	Setting range is from 44V to 57V. Increment of each click is 1V.
		5% (default) 	If "WECO battery" is selected in program 05, the setting value will be fixed at 5% of connected battery capacity.

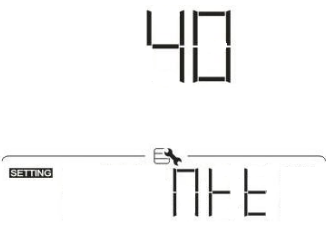
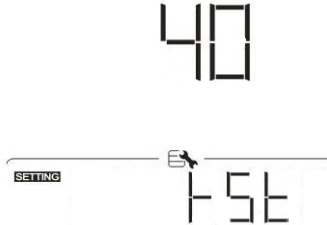
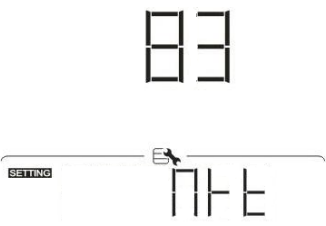
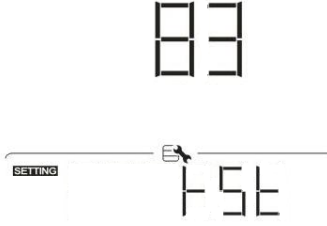
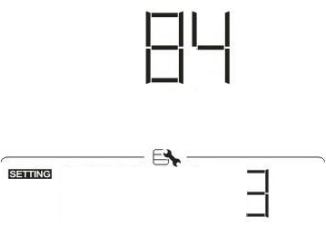
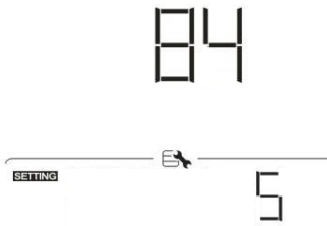
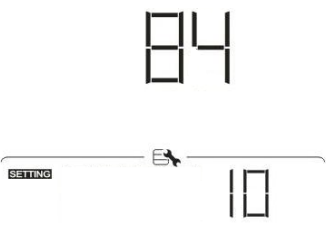
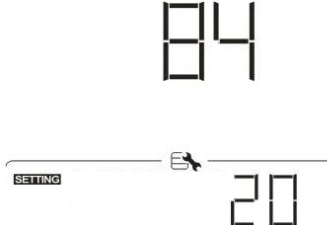
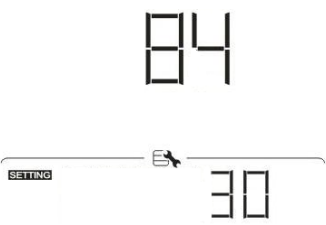
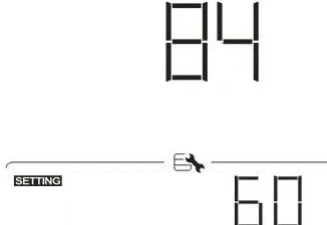
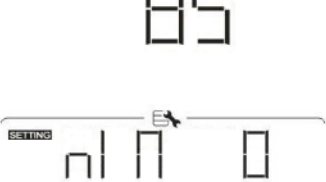
13	Setting voltage point back to battery mode when selecting "SBU" (SBU priority) in program 01.	Setting range is FUL and from 48V to 64V. Increment of each click is 1V.	
		Battery fully charged 	54V (default) 
		10% (default) 	If "WECO battery" is selected in program 5, this parameter value will be displayed in percentage and value setting is based on battery capacity percentage. The setting range is from 10% to 100%. Increment of each click is 5%.
14	Lithium battery turn-on when the device is powered on.	Auto turn-on disable(default) 	Auto turn-on enable 
		Turn-on immediately disable(default) 	Turn-on immediately enable 
15	Lithium battery turn-on immediately NOTE: This setting is effective only when program 14 is set as "enable".		
16	Charger source priority: To configure charger source priority	If this inverter/charger is working in Line, Standby or Fault mode, charger source can be programmed as below:	
		Solar first 	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.
		Solar and Utility (default) 	Solar energy and utility will charge battery at the same time.

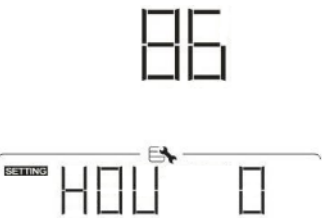
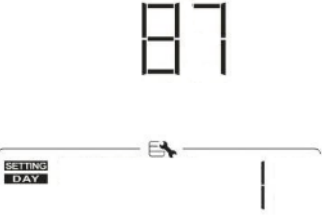
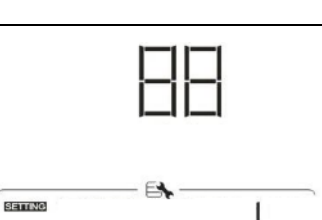
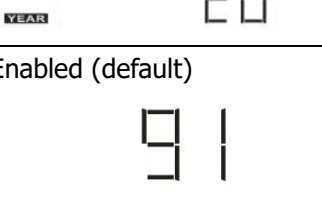
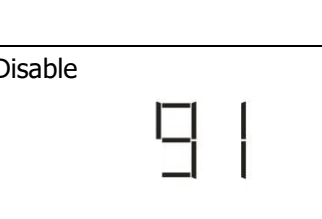
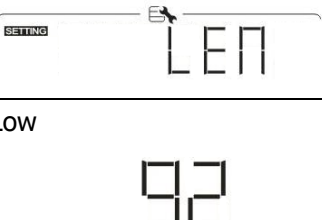
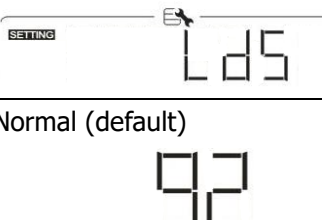
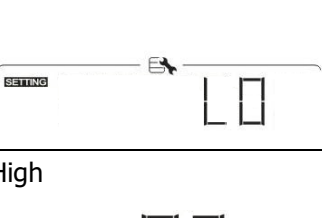
		Only Solar 	Solar energy will be the only charger source no matter utility is available or not.
18	Alarm control	Alarm on (default) 	Alarm off 
19	Auto return to default display screen	Return to default display screen (default) 	If selected, no matter how users switch display screen, it will automatically return to default display screen (Input voltage /output voltage) after no button is pressed for 1 minute.
		Stay at latest screen 	If selected, the display screen will stay at latest screen user finally switches.
20	Backlight control	Backlight on (default) 	Backlight off 
22	Beeps while primary source is interrupted	Alarm on (default) 	Alarm off 

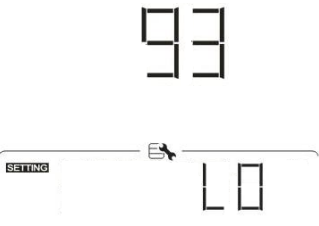
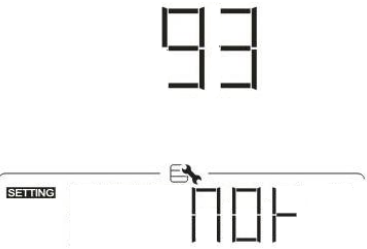
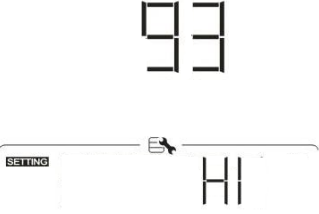
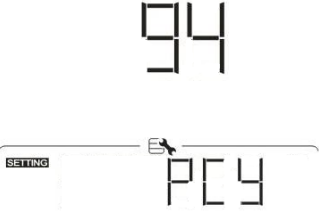
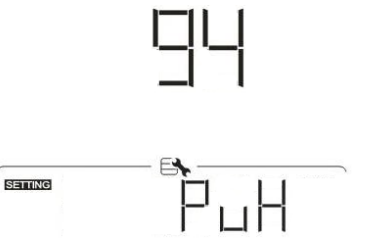
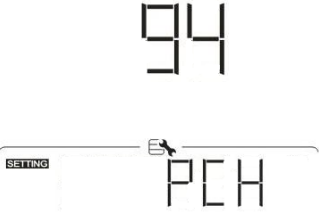
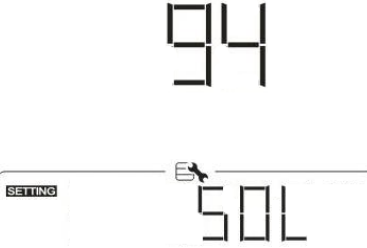
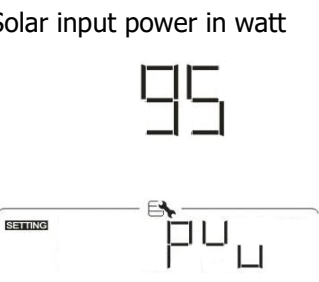
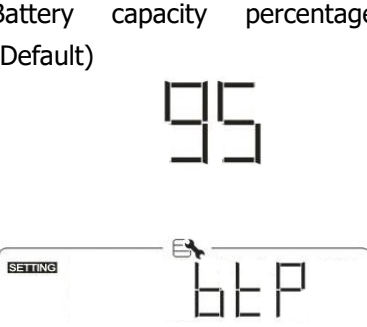
23	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable (default) 23 	Bypass enable 23 
25	Record Fault code	Record enable (default) 25 	Record disable 25 
26	Bulk charging voltage (C.V voltage)	56.4V (default) 26 	If "User-Defined" is selected in program 5, this program can be set up. Setting range is from 48.0V to 64.0V. Increment of each click is 0.1V.
27	Floating charging voltage	54V (default) 27 	If User-Defined" is selected in program 5, this program can be set up. Setting range is from 48.0V to 64.0V. Increment of each click is 0.1V.
28	AC output mode *This setting is only available when the inverter is in standby mode (Switch off).	Single: This inverter is used in single phase application. 28 	Parallel: This inverter is operated in parallel system. 28 
		L1 phase: 28 	L2 phase: 28 

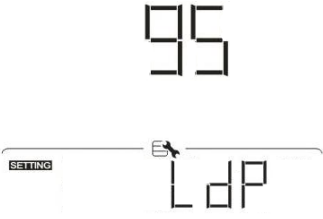
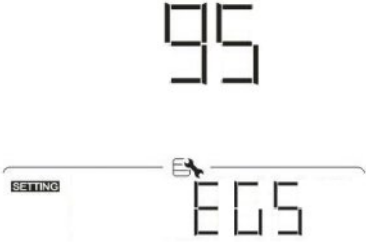
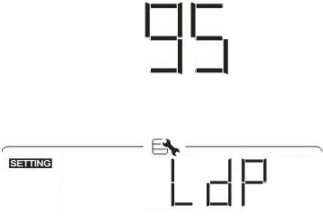
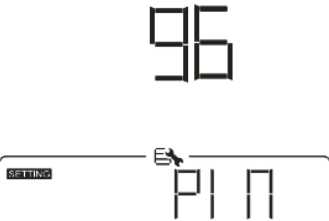
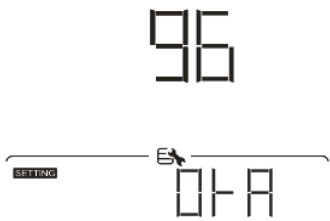
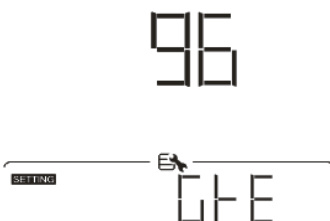
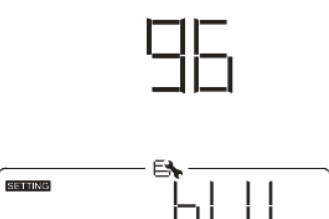
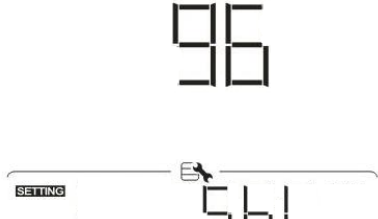
		L3 phase: 	
29	Low DC cut-off voltage	42.0V (default) 	If "User-Defined" is selected in program 5, this program can be set up. Setting range is from 40.0V to 54.0V. Increment of each click is 0.1V. Low DC cut-off voltage will be fixed to setting value no matter what percentage of load is connected.
32	Bulk charging time (C.V stage)	If "User-Defined" is selected in program 05, this program can be set up.	
		Automatically (Default): 	If selected, inverter will judge this charging time automatically.
		5 min  900 min 	The setting range is from 5 min to 900 min. Increment of each click is 5 min.

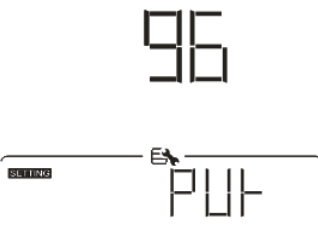
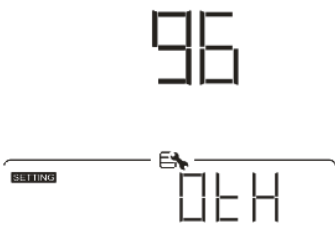
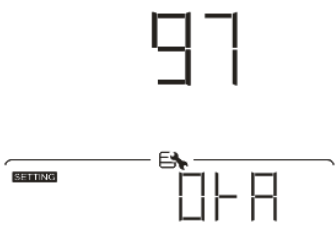
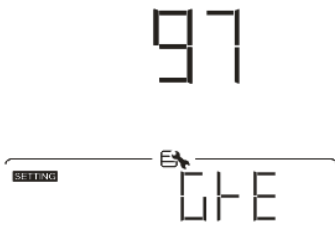
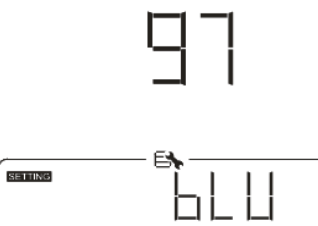
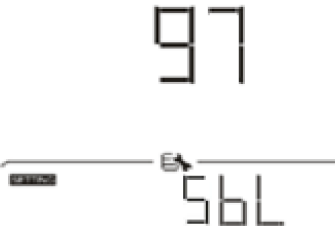
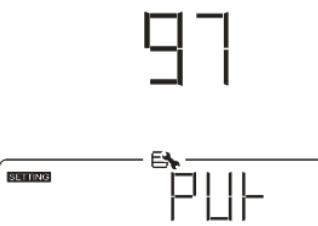
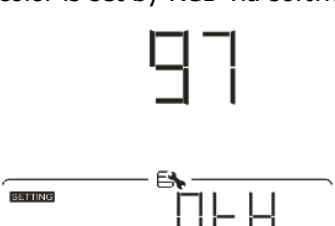
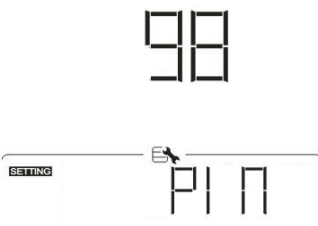
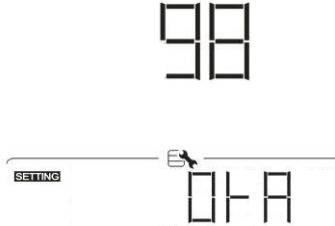
33	Battery equalization	If "Flooded" or "User-Defined" is selected in program 05, this program can be set up.	
		Battery equalization 	Battery equalization disable (Default) 
34	Battery equalization voltage	58.4V (Default) 	Setting range is from 48V to 64V. Increment of each click is 0.1V.
35	Battery equalized time	60min (Default) 	Setting range is from 5min to 900min. Increment of each click is 5min.
36	Battery equalized timeout	120min (Default) 	Setting range is from 5min to 900 min. Increment of each click is 5 min.
37	Equalization interval	30days (Default) 	Setting range is from 0 to 90 days. Increment of each click is 1 day
39	Equalization activated immediately	Enable 	Disable (Default) 

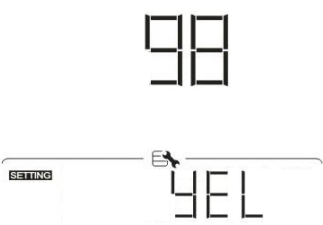
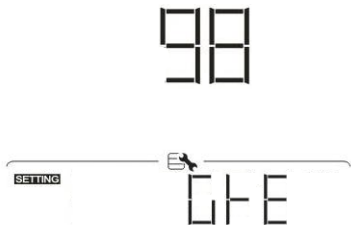
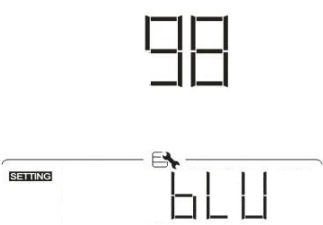
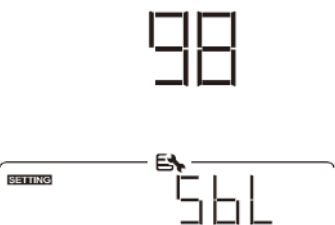
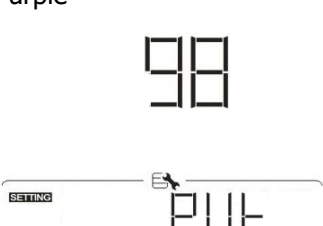
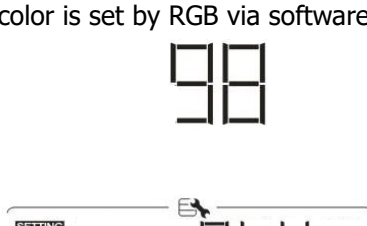
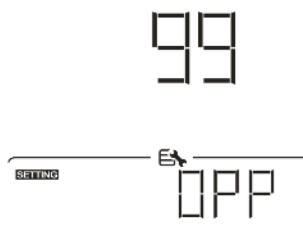
		If equalization function is enabled in program 33, this program can be set up. If "Enable" is selected in this program, it's to activate battery equalization immediately and LCD main page will shows "E9". If "Disable" is selected, it will cancel equalization function until next activated equalization time arrives based on program 37 setting. At this time, "E9" will not be shown in LCD main page.	
40	Reset all stored data for PV generated power and output load energy	Not reset (Default) 	Reset 
83	Erase all data log	Not reset (Default) 	Reset 
84	Data log recorded interval *The maximum data log number is 1440. If it's over 1440, it will re-write the first log.	3 minutes 	5 minutes 
		10 minutes (default) 	20 minutes 
		30 minutes 	60 minutes 
85	Time setting – Minute		For minute setting, the range is from 0 to 59.

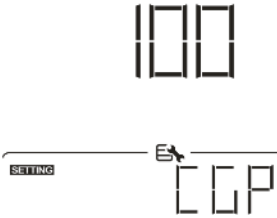
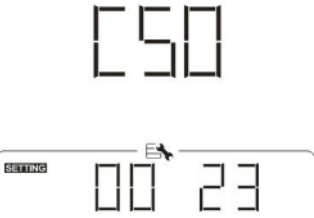
86	Time setting – Hour		For hour setting, the range is from 0 to 23.
87	Time setting– Day		For day setting, the range is from 1 to 31.
88	Time setting– Month		For month setting, the range is from 1 to 12.
89	Time setting – Year		For year setting, the range is from 17 to 99.
91	On/Off control for RGB LED *It's necessary to enable this setting to activate RGB LED lighting function.	Enabled (default) 	Disable 
92	Brightness of RGB LED	Low 	Normal (default) 
		High 	

93	Lighting speed of RGB LED	Low 	Normal (default) 
		High 	
94	RGB LED effects	Power cycling 	Power wheel 
		Power chasing 	Solid on (Default) 
95	Data presentation for data color *Energy source (Grid-PV-Battery) and battery charge/discharge status only available when RGB LED effects is set to Solid on.	Solar input power in watt 	LED lighting portion will be changed by the percentage of solar input power and nominal PV power. If "Solid on" is selected in #38, LED ring will light up with background color setting in #40. If "Power wheel" is selected in #38, LED ring will light up in 4 levels. If "cycling" or "chasing" is selected in #38, LED ring will light up in 12 levels.
		Battery capacity percentage (Default) 	LED lighting portion will be changed by battery capacity percentage. If "Solid on" is selected in #38, LED ring will light up with background color setting in #40. If "Power wheel" is selected in #38, LED ring will light up in 4 levels. If "cycling" or "chasing" is selected in #38, LED ring will light up in 12 levels.

95	Data presentation for data color *Energy source (Grid-PV-Battery) and battery charge/discharge status only available when RGB LED effects is set to Solid on.	Load percentage. 	LED lighting portion will be changed by load percentage. If "Solid on" is selected in #38, LED ring will light up with background color setting in #40. If "Power wheel" is selected in #38, LED ring will light up in 4 levels. If "cycling" or "chasing" is selected in #38, LED ring will light up in 12 levels.
		Energy source (Grid-PV-Battery) 	If selected, the LED color will be background color setting in #40 in AC mode. If PV power is active, the LED color will be data color setting in #41. If the remaining status, the LED color will be set in #42.
		Battery charge/discharge status 	If selected, the LED color will be background color setting in #40 in battery charging status. The LED color will be data color setting in #41 in battery discharging status.
96	Background color of RGB LED	Pink 	Orange 
		Yellow 	Green 
		Blue 	Sky blue (Default) 

		Purple 	Other: If selected, the background color is set by RGB via software. 
97	Data Color for RGB LED	Pink 	Orange 
		Yellow 	Green 
97	Data Color for RGB LED	Blue 	Sky blue 
		Purple (Default) 	Other: If selected, the background color is set by RGB via software. 
98	Background color of RGB LED *Only available when program 95 is set as "EGS" Energy source (Grid-PV-Battery).	Pink 	Orange 

98	Background color of RGB LED *Only available when program 95 is set as "EGS" Energy source (Grid-PV-Battery).	Yellow 	Green 
		Blue 	Sky blue (Default) 
		Purple 	Other: If selected, the background color is set by RGB via software. 
99	Timer Setting for Output Source Priority 	Once access this program, it will show "OPP" in LCD. Press "←" button to select timer setting for output source priority. There are three timers to set up. Press "▲" or "▼" button to select specific timer option. Then, press "←" to confirm timer option. Press "▲" or "▼" button to adjust starting time first and the setting range is from 00 to 23. Increment of each click is one hour. Press "←" to confirm starting time setting. Next, the cursor will jump to right column to set up end time. Once end time is set completely, press "←" to confirm all setting.	
		Utility first timer 	Solar first timer 
		SBU priority timer 	

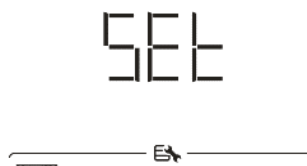
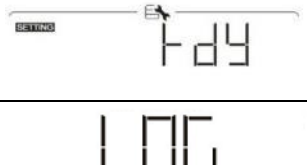
100	Timer Setting for Charger Source Priority 	Once access this program, it will show "CGP" in LCD. Press "←" button to select timer setting for charger source priority. There are three timers to set up. Press "▲" or "▼" button to select specific timer option. Then, press "←" to confirm timer option. Press "▲" or "▼" button to adjust starting time first and the setting range is from 00 to 23. Increment of each click is one hour. Press "←" to confirm starting time setting. Next, the cursor will jump to right column to set up end time. Once end time is set completely, press "←" to confirm all setting.	
		Solar first 	Solar and utility 
		Only solar 	

USB Function Setting

There are three USB function setting such as firmware upgrade, data log export and internal parameter re-write from the USB disk. Please follow below procedure to execute selected USB function setting.

Procedure	LCD Screen
Step 1: Insert an OTG USB disk into the USB port (L).	
Step 2: Press "↶" button to enter USB function setting.	

Step 3: Please select setting program by following the procedure.

Program#	Operation Procedure	LCD Screen
Upgrade firmware	After entering USB function setting, press "↶" button to enter "upgrade firmware" function. This function is to upgrade inverter firmware. If firmware upgrade is needed, please check with your dealer or installer for detail instructions.	
Re-write internal parameters	After entering USB function setting, press "▼" button to switch to "Re-write internal parameters" function. This function is to overwrite all parameter settings (TEXT file) with settings in the USB disk from a previous setup or to duplicate inverter settings. Please check with your dealer or installer for detail instructions.	
Export data log	After entering USB function setting, press "▼" button twice to switch to "export data log" function and it will show "LOG" in the LCD. Press "↶" button to confirm the selection for export data log.	
	If the selected function is ready, LCD will display "f.dy". Press "↶" button to confirm the selection again. - Press "▲" button to select "Yes" to export data log. "YES" will disappear after this action is complete. Then, press "↶" button to return to main screen. - Or press "▼" button to select "No" to return to main screen.	  

If no button is pressed for 1 minute, it will automatically return to main screen.

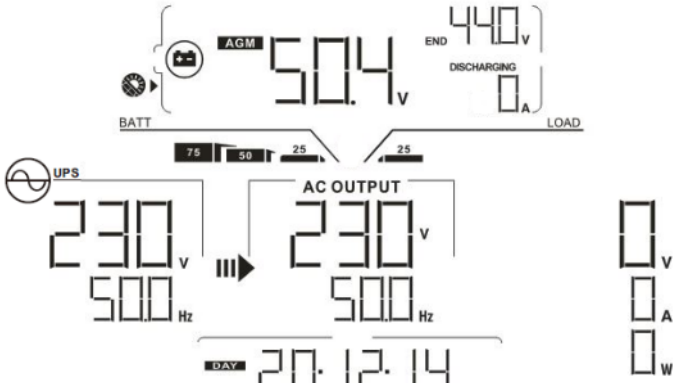
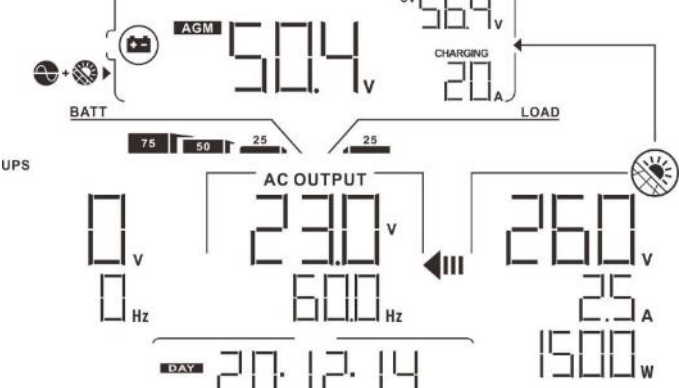
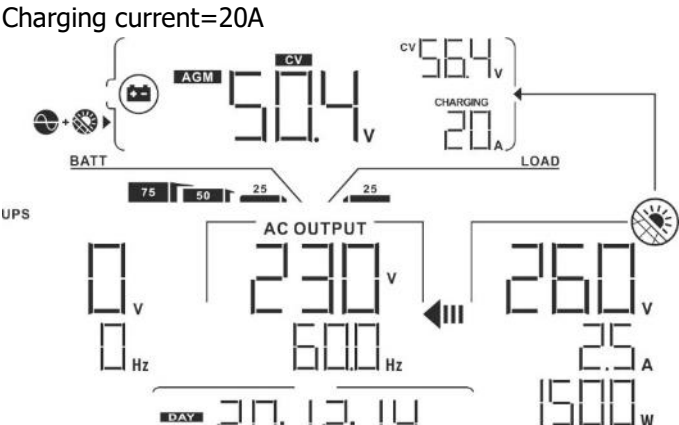
Error message:

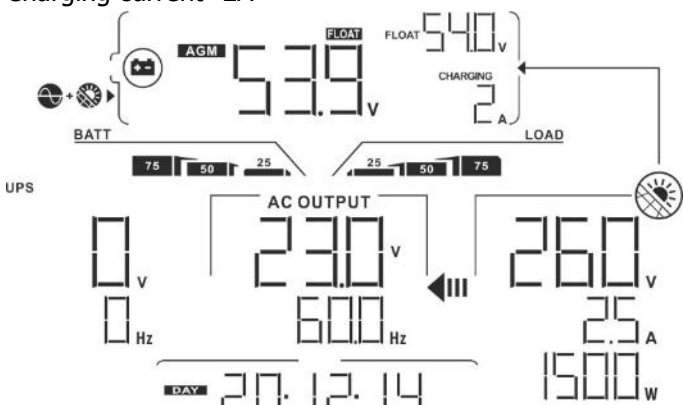
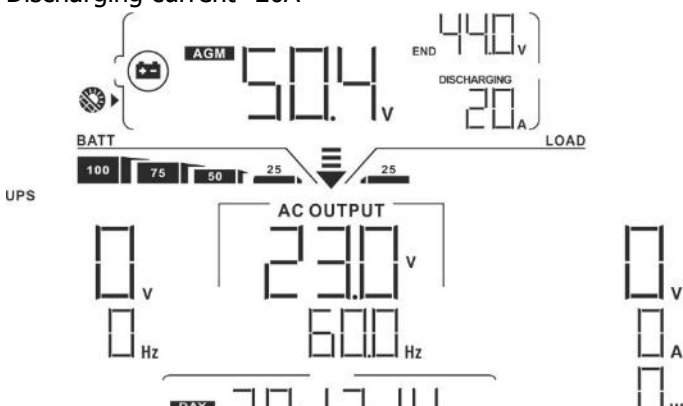
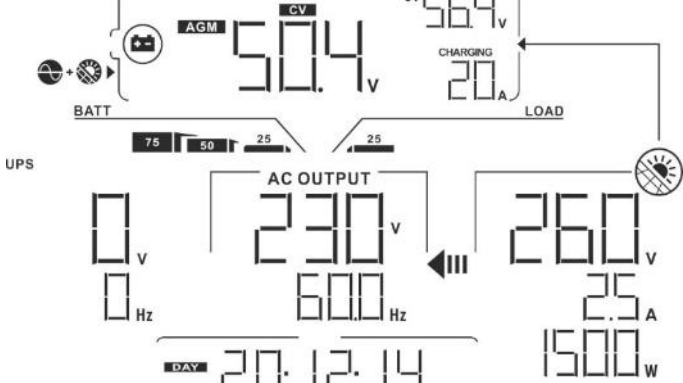
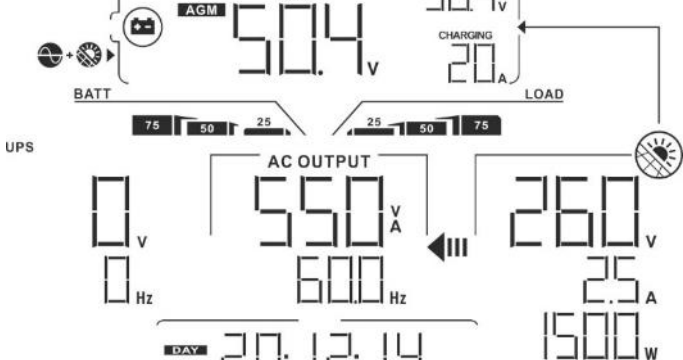
Error Code	Messages
U01	No USB disk is detected.
U02	USB disk is protected from copy.
U03	Document inside the USB disk with wrong format.

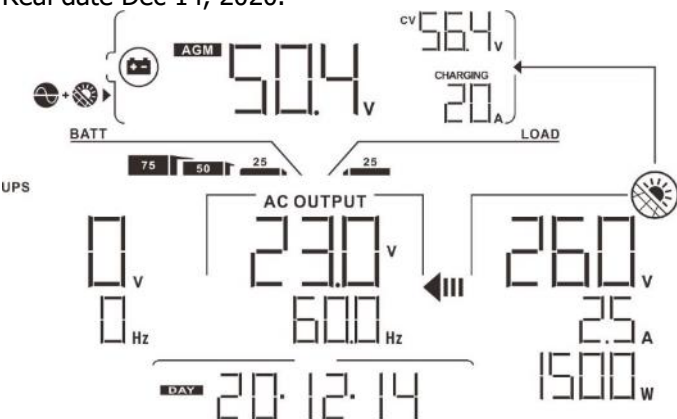
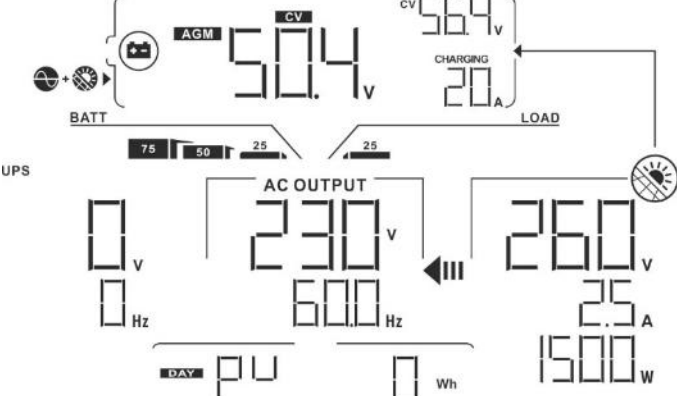
If any error occurs, error code will only show 3 seconds. After 3 seconds, it will automatically return to display screen.

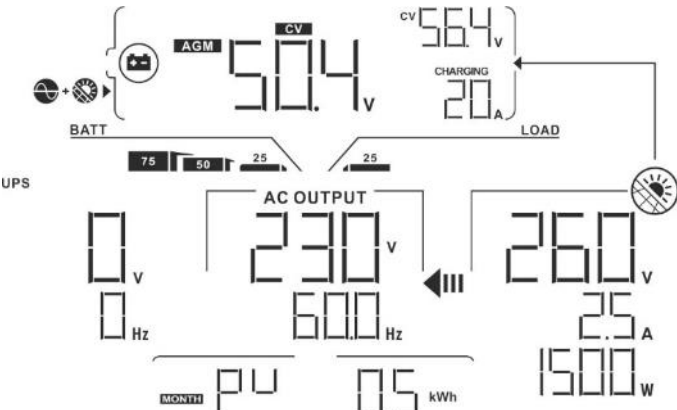
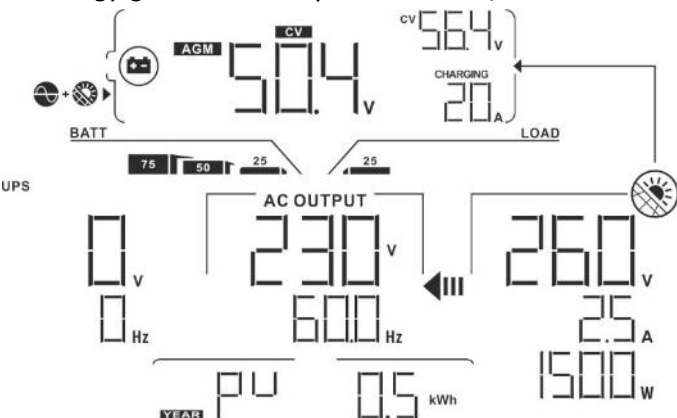
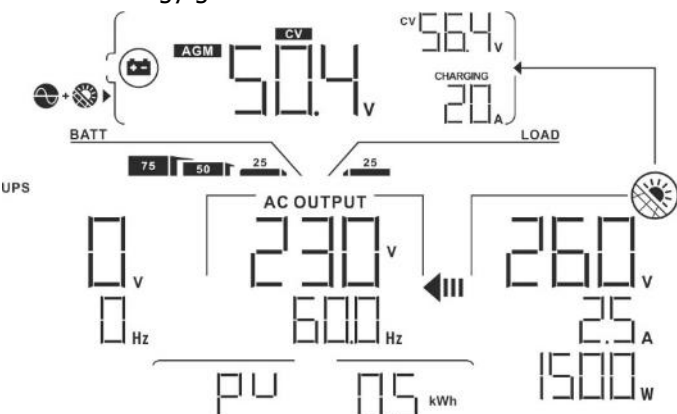
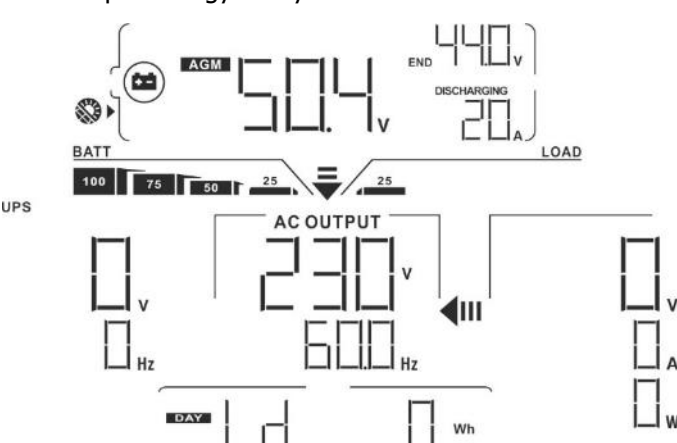
LCD Display

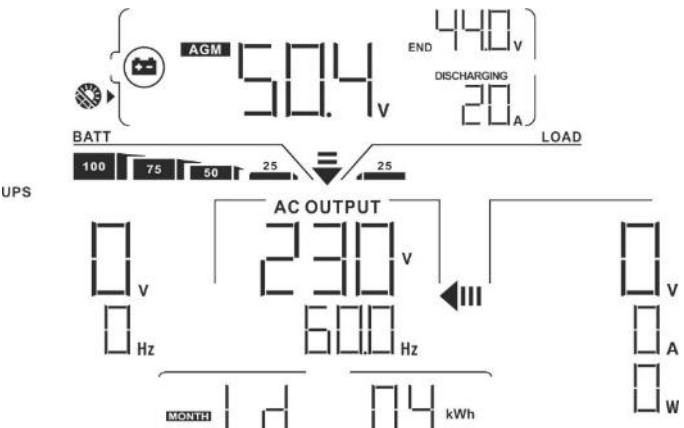
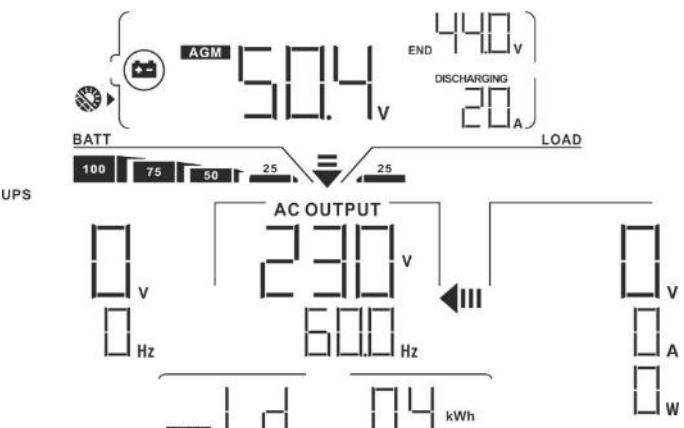
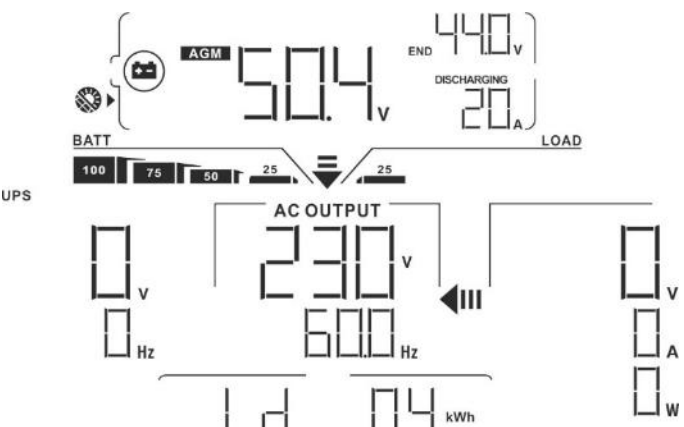
The LCD display information will be switched in turn by pressing the "▲" or "▼" button. The selectable information is switched as the following table in order.

	Selectable information	LCD display
Default Display Screen	Utility voltage/ Utility frequency	Input Voltage=230V, Input frequency=50Hz 
	PV voltage/ PV current/ PV power	PV voltage=260V, PV current=2.5A, PV power=1500W 
	Battery voltage, charging stage/ Configured battery parameters/ Charging or discharging current	Battery voltage=50.4V, Bulk charging voltage=56.4V, Charging current=20A 

Default Display Screen		Battery voltage=53.9V, Floating charging voltage=54.0V, Charging current=2A 
	Battery voltage, charging stage/ Configured battery parameters/ Charging or discharging current	Battery voltage=50.4V, Low DC cut-off voltage=44.0V, Discharging current=20A 
	Output voltage, load in VA, load in Watt switch every 5 second/ Output frequency	Output voltage=230V, Output frequency=60Hz 
	Output voltage, load in VA, load in Watt switch every 5 second/ Output frequency	Load in VA=550VA, Output frequency=60Hz 

Default Display Screen	Output voltage, load in VA, load in Watt switch every 5 second/ Output frequency	Load in Watt=600W, Output frequency=60Hz 
Real date.	Real date.	Real date Dec 14, 2020. 
Real time.	Real time.	Real time 11:31. 
PV energy generation today	PV energy generation today	PV energy generation today = 0Wh. 

PV energy generation this month	PV energy generation this month = 0.5kWh. 
PV energy generation this year	PV energy generation this year = 0.5kWh, 
Total PV energy generation	Total PV energy generation = 0.5kWh. 
Load output energy today	Load output energy today = 0Wh 

Load output energy this month	Load output energy this month = 0.4kWh 
Load output energy this year	Load output energy this year = 0.4kWh 
Load output total energy.	Load Output Total energy = 0.4kWh. 
Main CPU version checking.	Main CPU version 00050.72. 

Secondary CPU version checking.

Secondary CPU version 00022.01.



Wi-Fi version checking.

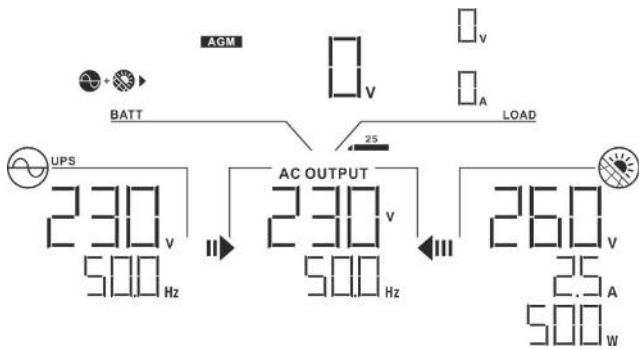
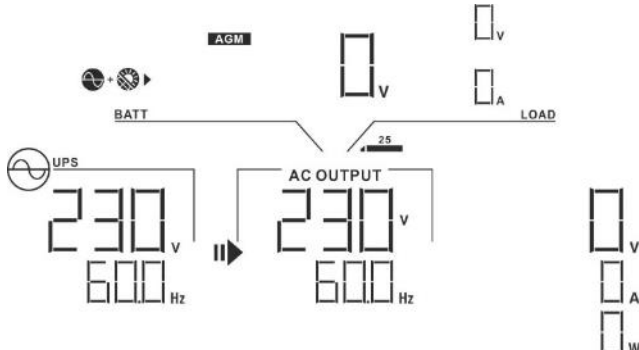
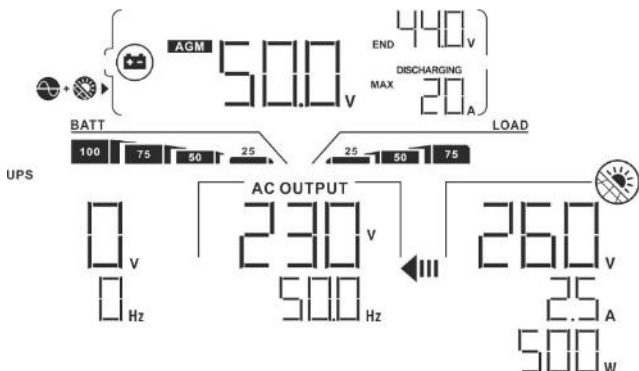
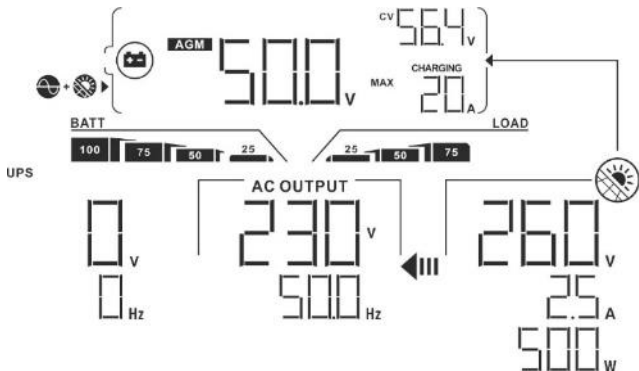
Wi-Fi version 00088.88.



Operating Mode Description

Operation mode	Description	LCD display
Standby mode Note: *Standby mode: The inverter is not turned on yet but at this time, the inverter can charge battery without AC output.	No output is supplied by the unit but it still can charge batteries.	Charging by utility and PV energy.
		Charging by utility.
		Charging by PV energy.
		No charging.

Operation mode	Description	LCD display
Fault mode Note: *Fault mode: Errors are caused by inside circuit error or external reasons such as over temperature, output short circuited and so on.	No output is supplied by the unit.	No charging.
Line Mode	The unit will provide output power from the mains. It will also charge the battery at line mode.	Charging by utility and PV energy. Charging by utility. If "SUB" (solar first) is selected as output source priority and solar energy is not sufficient to provide the load, solar energy and the utility will provide the loads and charge the battery at the same time.

Operation mode	Description	LCD display
Line Mode	The unit will provide output power from the mains. It will also charge the battery at line mode.	If either "SUB" (solar first) or "SBU" is selected as output source priority and battery is not connected, solar energy and the utility will provide the loads.  Power from utility 
		Power from battery and PV energy.  PV energy will supply power to the loads and charge battery at the same time. No utility is available. 
Battery Mode	The unit will provide output power from battery and/or PV power.	

Operation mode	Description	LCD display
Battery Mode	The unit will provide output power from battery and/or PV power.	Power from battery only.
		Power from PV energy only.

Faults Reference Code

Fault Code	Fault Event	Icon on
01	Fan is locked when inverter is off.	F01
02	Over temperature	F02
03	Battery voltage is too high	F03
05	Output short circuited.	F05
06	Output voltage is too high.	F06
07	Overload time out	F07
08	Bus voltage is too high	F08
09	Bus soft start failed	F09
10	PV over current	F10
11	PV over voltage	F11
12	DCDC over current	F12
51	Over current	F51
52	Bus voltage is too low	F52

53	Inverter soft start failed	F53
55	Over DC voltage in AC output	F55
57	Current sensor failed	F57
58	Output voltage is too low	F58

Warning Indicator

Warning Code	Warning Event	Audible Alarm	Icon flashing
01	Fan is locked when inverter is on.	Beep three times every second	01 
02	Over temperature	None	02 
03	Battery is over-charged	Beep once every second	03 
04	Low battery	Beep once every second	04 
07	Overload	Beep once every 0.5 second	07  
10	Output power is derated	Beep twice every 3 seconds	10 
32	Communication failure between inverter and display panel	None	32 
E9	Battery equalization	None	E9 
bP	Battery is not connected	None	bP 

BATTERY EQUALIZATION

Equalization function is added into charge controller. It reverses the buildup of negative chemical effects like stratification, a condition where acid concentration is greater at the bottom of the battery than at the top. Equalization also helps to remove sulfate crystals that might have built up on the plates. If left unchecked, this condition, called sulfation, will reduce the overall capacity of the battery. Therefore, it's recommended to equalize battery periodically.

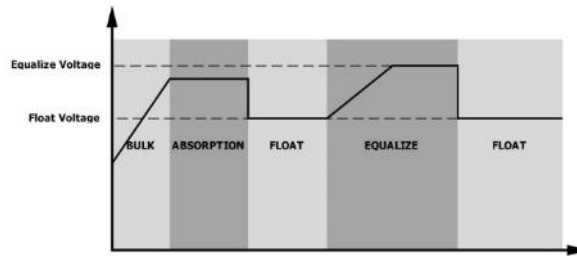
● How to Apply Equalization Function

You must enable battery equalization function in monitoring LCD setting program 33 first. Then, you may apply this function in device by either one of following methods:

1. Setting equalization interval in program 37.
2. Active equalization immediately in program 39.

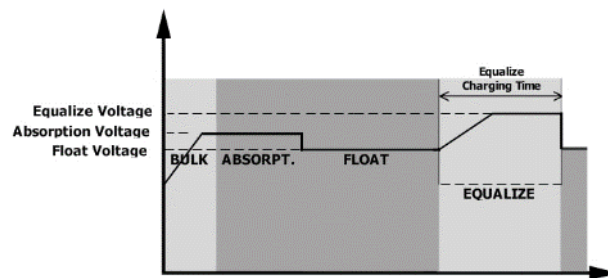
● When to Equalize

In float stage, when the setting equalization interval (battery equalization cycle) is arrived, or equalization is active immediately, the controller will start to enter Equalize stage.

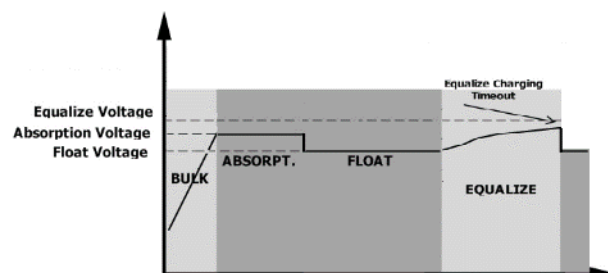


● Equalize charging time and timeout

In Equalize stage, the controller will supply power to charge battery as much as possible until battery voltage raises to battery equalization voltage. Then, constant-voltage regulation is applied to maintain battery voltage at the battery equalization voltage. The battery will remain in the Equalize stage until setting battery equalized time is arrived.



However, in Equalize stage, when battery equalized time is expired and battery voltage doesn't rise to battery equalization voltage point, the charge controller will extend the battery equalized time until battery voltage achieves battery equalization voltage. If battery voltage is still lower than battery equalization voltage when battery equalized timeout setting is over, the charge controller will stop equalization and return to float stage.



SPECIFICATIONS

Table 1 Line Mode Specifications

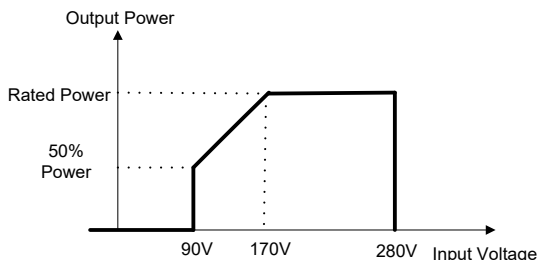
Solar Inverter LGT MODEL	3.6KW	5.6KW
Input Voltage Waveform	Sinusoidal (utility or generator)	
Nominal Input Voltage	230Vac	
Low Loss Voltage	170Vac±7V (UPS) 90Vac±7V (Appliances)	
Low Loss Return Voltage	180Vac±7V (UPS); 100Vac±7V (Appliances)	
High Loss Voltage	280Vac±7V	
High Loss Return Voltage	270Vac±7V	
Max AC Input Voltage	300Vac	
Nominal Input Frequency	50Hz / 60Hz (Auto detection)	
Low Loss Frequency	40±1Hz	
Low Loss Return Frequency	42±1Hz	
High Loss Frequency	65±1Hz	
High Loss Return Frequency	63±1Hz	
Output Short Circuit Protection	Line mode: Circuit Breaker Battery mode: Electronic Circuits	
Efficiency (Line Mode)	>95% (Rated R load, battery full charged)	
Transfer Time	10ms typical (UPS); 20ms typical (Appliances)	
Output power derating: When AC input voltage drops to 95V or 170V depending on models, the output power will be derated.	 The graph illustrates the output power derating characteristics of the solar inverter. The vertical axis represents Output Power, with specific markers for 50% Power and Rated Power. The horizontal axis represents Input Voltage, with markers at 90V, 170V, and 280V. The power remains constant at a low level until 90V, then increases linearly to reach the Rated Power at 170V. From 170V to 280V, the output power remains constant at the Rated Power level.	

Table 2 Inverter Mode Specifications

Solar Inverter LGT MODEL	3.6KW	5.6KW
Rated Output Power	3.6KVA/3.6KW	5.6KVA/5.6KW
Output Voltage Waveform	Pure Sine Wave	
Output Voltage Regulation	230Vac±5%	
Output Frequency	60Hz or 50Hz	
Peak Efficiency	90%	
Overload Protection	5s@≥150% load; 10s@110%~150% load	
Surge Capacity	2* rated power for 5 seconds	
Nominal DC Input Voltage	48Vdc	
Cold Start Voltage	46.0Vdc	
Low DC Warning Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	44.0Vdc 42.8Vdc 40.4Vdc	
Low DC Warning Return Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	46.0Vdc 44.8Vdc 42.4Vdc	
Low DC Cut-off Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	42.0Vdc 40.8Vdc 38.4Vdc	
High DC Recovery Voltage	64Vdc	
High DC Cut-off Voltage	66Vdc	

Table 3 Charge Mode Specifications

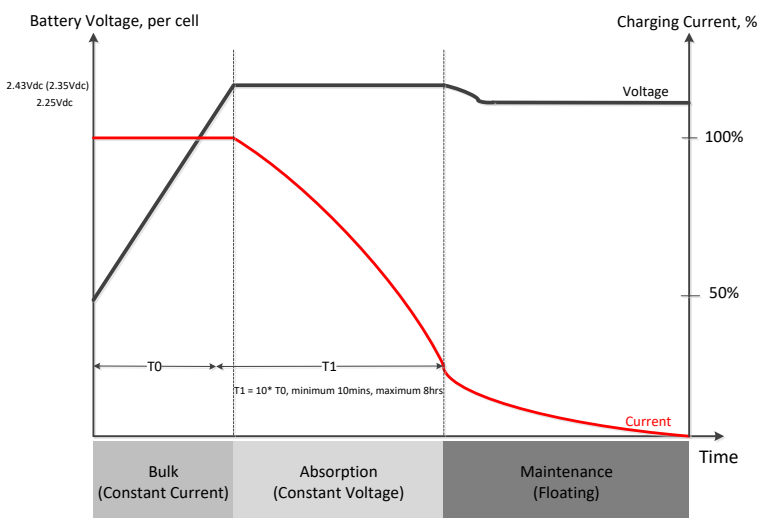
Utility Charging Mode		
Solar Inverter LGT MODEL	3.6KW	5.6KW
Charging Current (UPS) @ Nominal Input Voltage	100A	120A
Bulk Charging Voltage	Flooded Battery	58.4
	AGM / Gel Battery	56.4
Floating Charging Voltage	54Vdc	
Overcharge Protection	66Vdc	
Charging Algorithm	3-Step	
Charging Curve		
Solar Charging Mode (MPPT type)		
INVERTER MODEL	3.6KW	5.6KW
Rated Power	5000W	6000W
Max. Charging Current	100A	120A
Max. PV Array Open Circuit Voltage	500Vdc	450Vdc
PV Array MPPT Voltage Range	120Vdc~430Vdc	
Max. Input Current	18A	27A

Table 4 General Specifications

INVERTER MODEL	3.6KW	5.6KW
Safety Certification	CE	
Operating Temperature Range	-10°C to 50°C	
Storage temperature	-15°C~ 60°C	
Humidity	5% to 95% Relative Humidity (Non-condensing)	
Dimension (D*W*H), mm	140 x 295 x 468	
Net Weight, kg	11	12

TROUBLE SHOOTING

Problem	LCD/LED/Buzzer	Explanation / Possible cause	What to do
Unit shuts down automatically during startup process.	LCD/LEDs and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low (<1.91V/Cell)	1. Re-charge battery. 2. Replace battery.
No response after power on.	No indication.	1. The battery voltage is far too low. (<1.4V/Cell) 2. Battery polarity is connected reversed.	1. Check if batteries and the wiring are connected well. 2. Re-charge battery. 3. Replace battery.
Mains exist but the unit works in battery mode.	Input voltage is displayed as 0 on the LCD and green LED is flashing.	Input protector is tripped	Check if AC breaker is tripped and AC wiring is connected well.
	Green LED is flashing.	Insufficient quality of AC power. (Shore or Generator)	1. Check if AC wires are too thin and/or too long. 2. Check if generator (if applied) is working well or if input voltage range setting is correct. (UPS→Appliance)
	Green LED is flashing.	Set "Solar First" as the priority of output source.	Change output source priority to Utility first.
When the unit is turned on, internal relay is switched on and off repeatedly.	LCD display and LEDs are flashing	Battery is disconnected.	Check if battery wires are connected well.
Buzzer beeps continuously and red LED is on.	Fault code 07	Overload error. The inverter is overload 110% and time is up.	Reduce the connected load by switching off some equipment.
	Fault code 05	Output short circuited.	Check if wiring is connected well and remove abnormal load.
	Fault code 02	Internal temperature of inverter component is over 100°C.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code 03	Battery is over-charged.	Return to repair center.
		The battery voltage is too high.	Check if spec and quantity of batteries are meet requirements.
	Fault code 01	Fan fault	Replace the fan.
	Fault code 06/58	Output abnormal (Inverter voltage below than 190Vac or is higher than 260Vac)	1. Reduce the connected load. 2. Return to repair center
	Fault code 08/09/53/57	Internal components failed.	Return to repair center.
	Fault code 51	Over current or surge.	Restart the unit, if the error happens again, please return to repair center.
	Fault code 52	Bus voltage is too low.	
	Fault code 55	Output voltage is unbalanced.	
	Fault code 56	Battery is not connected well or fuse is burnt.	If the battery is connected well, please return to repair center.