

USER MANUAL

V2.0

Alpha ESS 6KW Energy Storage System

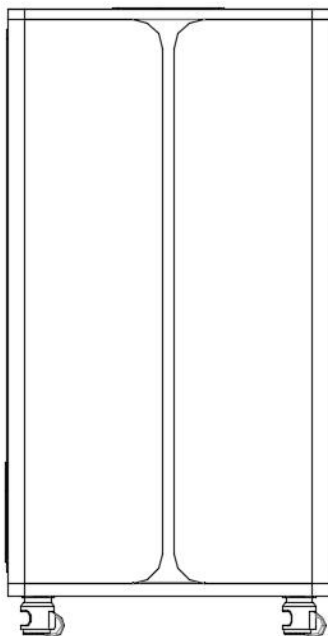


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ABOUT THIS MANUAL

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 LiFePO₄ lithium ion 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 wires 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. 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.

7. 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.

8. 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. **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.

11. **NEVER** cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.

12. **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.

13. **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.

INSTRODUCTION

This energy storage system can provide power to connected loads by utilizing PV power, utility power and battery power and store surplus energy generated from PV solar modules for use when needed. When the sun has set, energy demand is high, or there is a black-out, you can use the energy stored in this system to meet your energy needs at no extra cost. In addition, this energy storage system helps you pursue the goal of energy self-consumption and ultimately energy-independence.

Features

- Pure sine wave inverter
- Touchable button with 4.2" colored LCD.
- Built-in remote Wi-Fi for mobile monitoring (APP is required).
- AC output can be single-phase parallel or three-phase parallel.
- Built-in anti-dusk kit.
- Built-in RS485 communication ports for BMS.
- Configurable input voltage ranges for home appliances and personal computers via LCD control panel.
- Configurable output usage timer and prioritization.
- Configurable charger source priority via LCD control panel.
- Configurable battery charging current based on applications via LCD control panel.
- Compatible to utility mains or generator power.

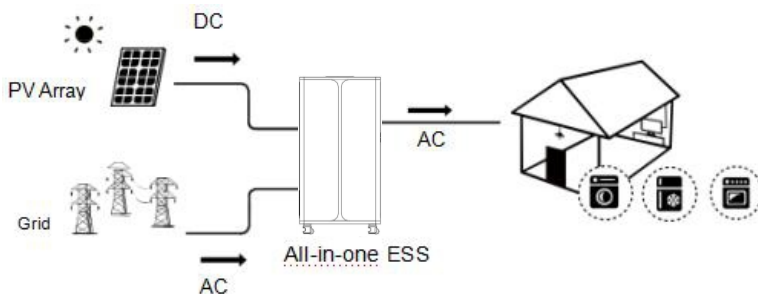
Basic System Architecture

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

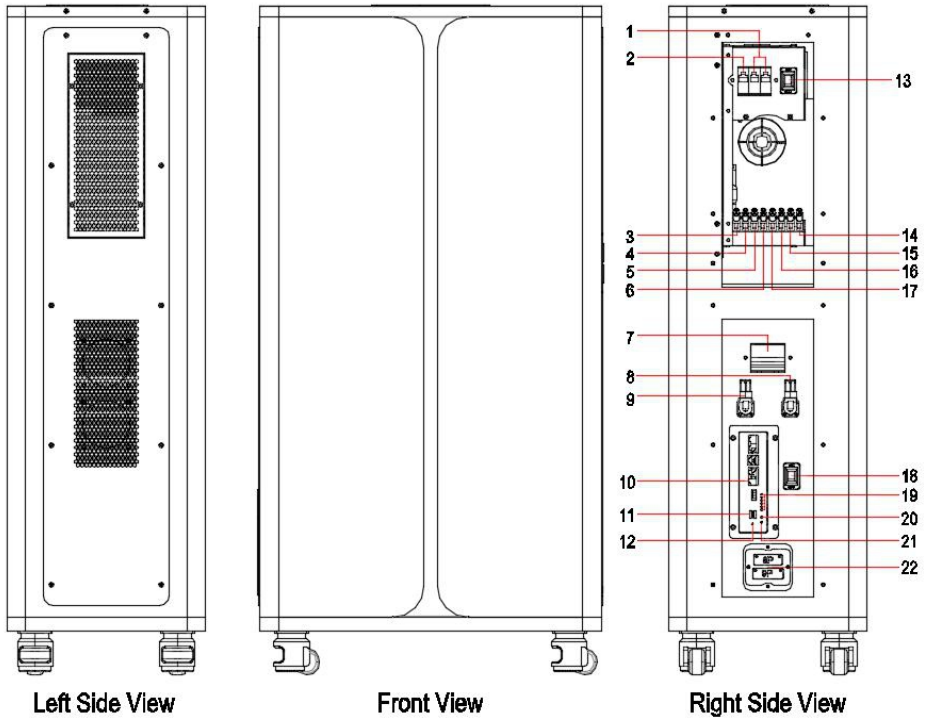
- Generator or Utility mains.
- PV modules

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.



Product Overview



- | | |
|--------------------------------|--|
| 1. AC input breaker | 12. Battery program reset button |
| 2. PV input breaker | 13. Inverter power on/off switch |
| 3. PV input positive connector | 14. Second AC output N connector |
| 4. PV input negative connector | 15. Second AC output L connector |
| 5. AC input L connector | 16. Main AC output N connector |
| 6. AC input N connector | 17. Main AC output L connector |
| 7. Battery input breaker | 18. Battery power on/off switch |
| 8. Battery negative connector | 19. Battery capacity status indicators |
| 9. Battery positive connector | 20. Battery alarm status indicators |
| 10. BMS communication port | 21. Battery run status indicators |
| 11. BMS device address | 22. External maintenance port |

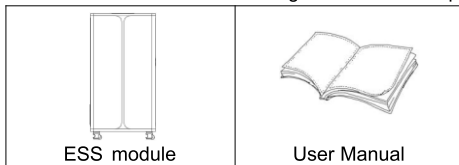
INSTALLATION

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:

Package

You should receive the following items inside of package:



Mounting the Unit

Selecting Mounting Location

Consider the following points to install the energy storage system:

- Do not mount the unit on flammable construction materials.
- Mount on a solid surface
- This unit might make noises during operation which may be perceived as a nuisance in a living area.
- Install this unit at eye level in order to allow the readability of LCD display at all times.
- For proper air circulation to dissipate heat and further maintenance, allow a clearance of approx. 75 cm to the sides of the unit.
- To avoid battery falling, be sure to leave around 30cm distance between battery modules installed in parallel.
- Dusty conditions on the unit may impair the performance of this inverter.
- The ambient temperature should be between 0°C and 40°C and relative humidity should be between 5% and 85% to ensure optimal operation.
- The recommended installation is vertical adherence.
- For proper operation of this unit, please use appropriate cables for grid connection.
- The pollution degree of the energy storage system is PD2. Select an appropriate mounting location.
- Install the inverter and battery modules in a protected area that is dry, free of excessive dust and with adequate air flow. Do NOT operate it in the place where the temperature and humidity is beyond the specific limits. (Please check the specs for the limitations.)
- The inverter should be installed in the position where the disconnection means is easily accessible.
- This unit is designed with IP20 protection for indoor applications only.
- Regularly clean the fan filter.

Mounting the Unit

WARNING!! Remember that this inverter is heavy so please be careful when removing it from the package.

The unit can only operate in a CLOSED ELECTRICAL OPERATING AREA.

Only service personnel can enter this area.

WARNING!! FIRE HAZARD.

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

PV Connection

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 shown below.

Wire	Cable (mm ²)	Torque (Max.)
10 AWG	6	1.4~ 1.6Nm

WARNING: Because this inverter is non-isolated, only two types of PV modules are accepted, single crystalline, poly crystalline with class A-rated and CIGS modules. To avoid any malfunctions, 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 connection.

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

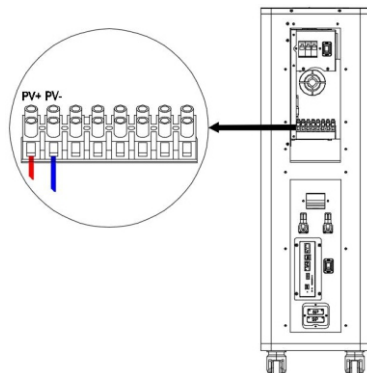
CAUTION: Before connecting to PV modules, please disconnect the PV input breaker between inverter and PV modules.

Take 410W PV module as an example. After considering above two parameters, the recommended module configurations listed as below table.

PV maximum power (Pmax)	410W	6K: 8 pieces in serial and 2 sets in parallel
Maximum Power Voltage (Vmpp)	39.0V	
Maximum power current (Imp)	11.54A	
PV open circuit voltage (Voc)	46.7V	
PV short circuit current (Isc)	12.4A	

Step1: Remove insulation sleeve 10 mm for PV positive and negative conductors.

Step2: Insert the PV cable flatly into PV connectors of inverter and make sure the bolts are tightened with torque of 1.2 Nm in clockwise direction. Make sure polarity at both the PV is correctly connected and conductors are tightly screwed into the PV connector.



AC Input/Output Connection

CAUTION: Before connecting to AC input power source, please install a **separate** AC circuit breaker between inverter module 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. Please do NOT mis-connect input and output connectors.

WARNING! All wiring must be performed by a qualified personnel.

WARNING! For safety and efficiency, it's very important to use appropriate cables for AC input and output connection. To reduce risk of injury, please use the proper cable size recommended below.

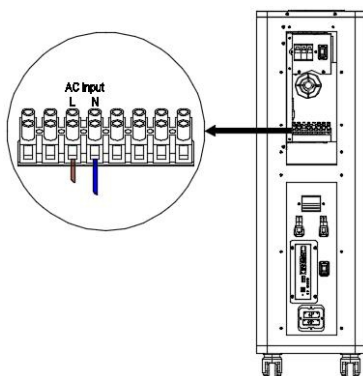
Suggested cable requirement for AC wire:

Wire	Cable (mm ²)	Torque (Max.)
10 AWG	6	1.4~ 1.6Nm

CAUTION: Before connecting to Utility, please disconnect the AC input breaker between inverter and AC input cable.

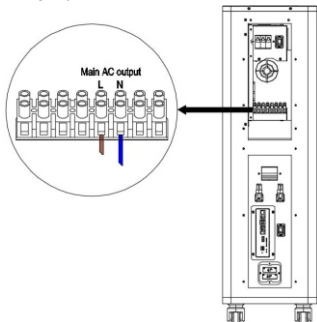
Step1: Remove insulation sleeve 10 mm for AC live line and null line conductors.

Step2: Insert the AC input cable flatly into AC input connectors of inverter and make sure the bolts are tightened with torque of 1.2 Nm in clockwise direction. Make sure polarity at both the PV is correctly connected and conductors are tightly screwed into the AC input connector.



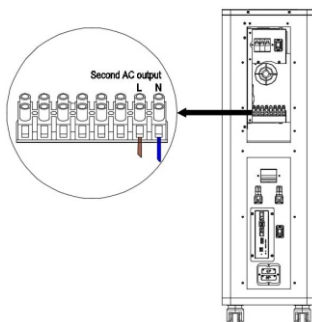
Step3: Remove insulation sleeve 10 mm for AC live line and null line conductors.

Step4: Insert the main AC output cable flatly into main AC output connectors of inverter and make sure the bolts are tightened with torque of 1.2 Nm in clockwise direction. Make sure polarity at both the PV is correctly connected and conductors are tightly screwed into the main AC output connector.



Step5: Remove insulation sleeve 10 mm for AC live line and null line conductors.

Step6: Insert the second AC output cable flatly into second AC output connectors of inverter and make sure the bolts are tightened with torque of 1.2 Nm in clockwise direction. Make sure polarity at both the PV is correctly connected and conductors are tightly screwed into the second AC output connector.



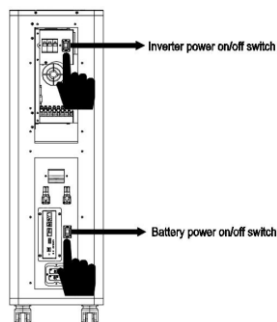
OPERATION

Power ON/OFF

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

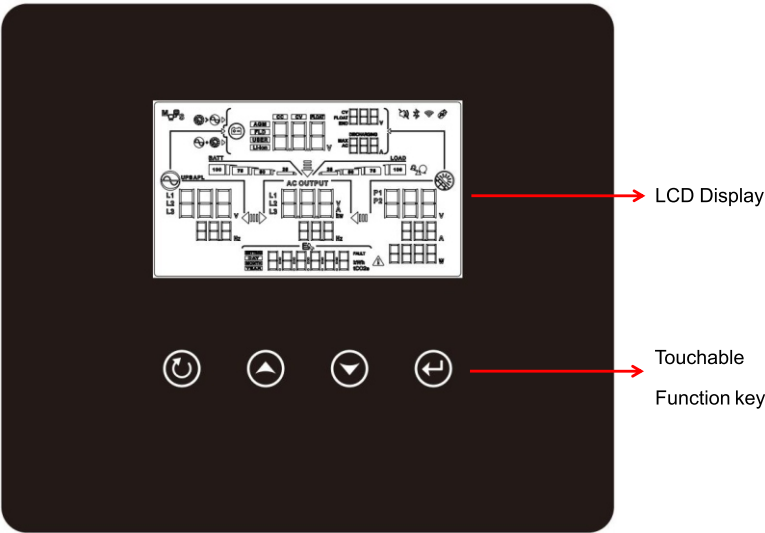
Setp1: Turn on the battery power on/off switch, then the battery status indicator is light.

Sept2: Then turn on the inverter power on/off switch.



Operation and Display Panel

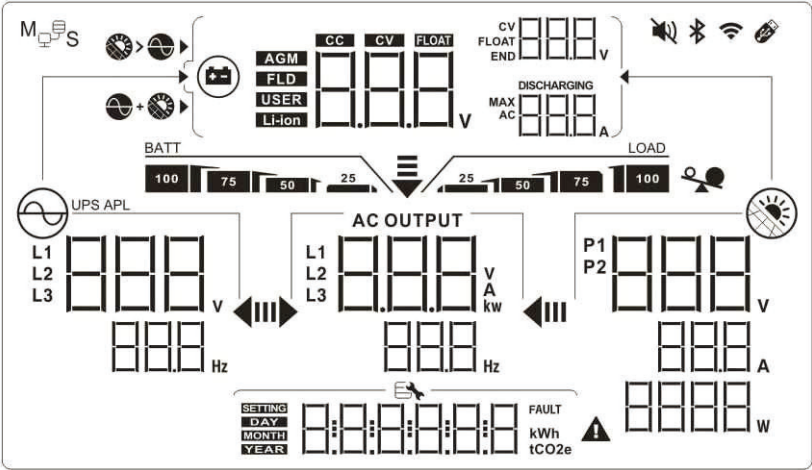
The operation and display panel, shown in below chart, is on the front panel of the inverter. It includes one RGB LED ring, four touchable function keys and a LCD display, indicating the operating status and input/output power information.

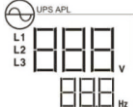
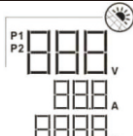
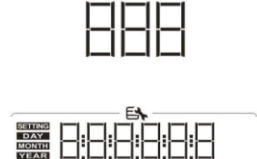


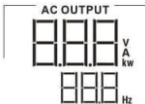
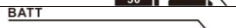
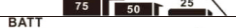
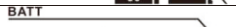
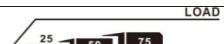
Touchable function key

Function keys		Description
	ESC	Exit the setting
	Access USB setting mode	To enter USB setting mode
	Up	To last selection
	Down	To next selection
	Enter	To confirm/enter the selection in setting mode

LCD Display Icons



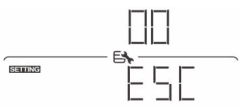
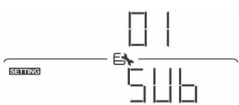
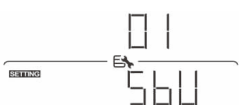
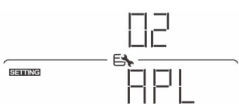
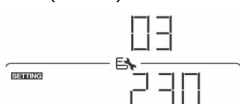
Icon	Function description
Input Source Information	
	Indicates the AC input voltage and frequency.
	Indicates the PV voltage, current and power.
	Indicates the battery voltage, charging stage, configured battery parameters, charging or discharging current.
Configuration Program and Fault Information	
	Indicates the setting programs.
	Indicates the warning and fault codes. Warning: 00.0 FAULT flashing with warning code. Fault: 00.0 FAULT lighting with fault code.
Output Information	

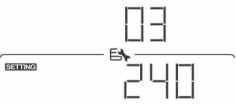
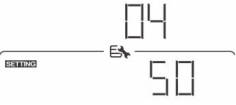
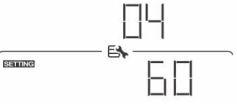
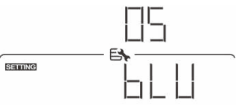
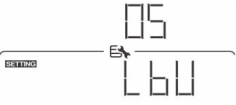
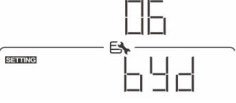
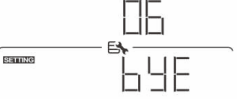
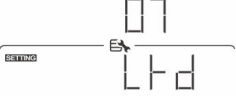
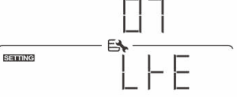
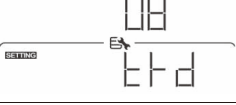
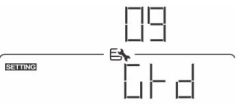
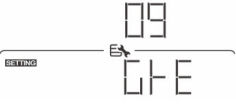
	Indicate the output voltage, load in VA, load in Watt and output frequency.	
Battery Information		
	Indicates battery level in battery mode and charging status in line mode by 0-24%, 25-49%, 50-74% and 75-100%.	
When battery is charging, it will present battery charging status.		
Status	Battery voltage	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 10 "Charger source priority" is selected as "Solar first".	
	Indicates setting program 10 "Charger source priority" is selected as "Solar and Utility".	
	Indicates setting program 10 "Charger source priority" is selected as "Solar only".	

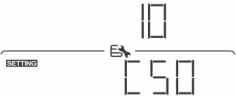
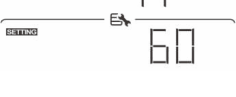
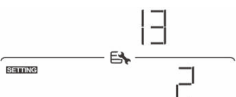
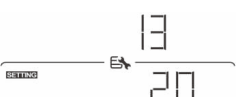
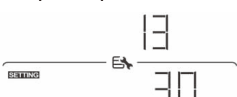
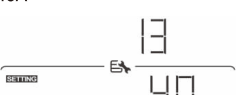
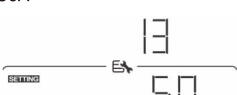
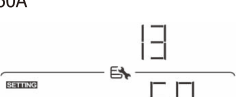
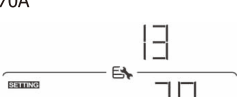
Output source priority setting display	
	Indicates setting program 01 "Output source priority" is selected as "SUB".
	Indicates setting program 01 "Output source priority" is selected as "SBU".
AC Input Voltage Range Setting Display	
UPS	Indicates setting program 02 is selected as "UPS". The acceptable AC input voltage range will be within 170-280VAC.
APL	Indicates setting program 02 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.
M 	Indicates parallel operation is working.
	Indicates unit alarm is disabled.
	Indicates Wi-Fi transmission is working.
	Indicates USB disk is connected.

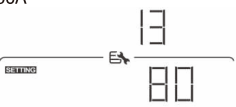
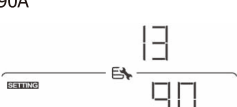
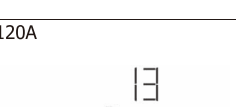
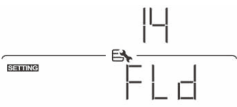
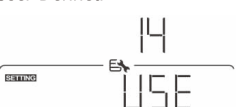
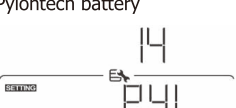
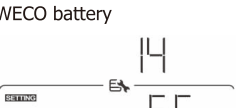
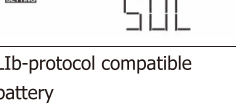
LCD Setting

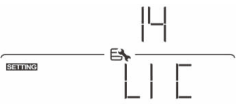
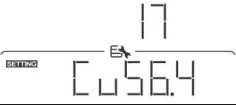
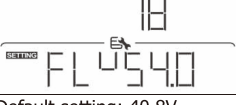
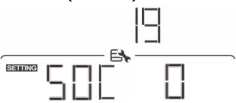
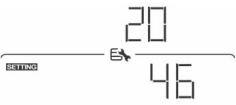
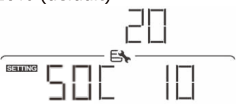
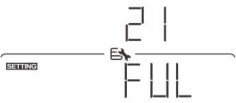
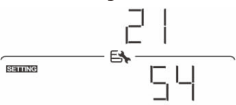
After pressing and holding ENTER button for 3 seconds, the unit will enter setting mode. Press “UP” or “DOWN” button to select setting programs. And then, press “ENTER” button to confirm the selection or ESC button to exit.

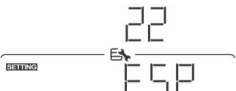
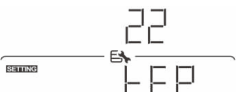
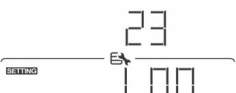
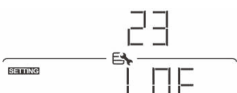
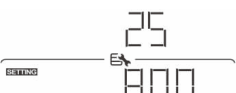
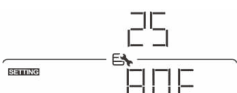
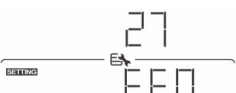
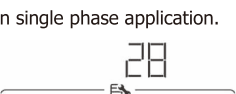
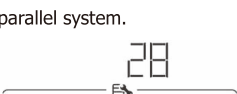
Program	Description	Selectable option	
00	Exit setting mode	Escape 	
01	Output source priority selection	SUB(default) 	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, Utility energy will supply power to the loads at the same time.
		SBU 	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 20 or solar and battery is not sufficient.
02	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.
03	Output voltage	220Vac 	230V (Default) 

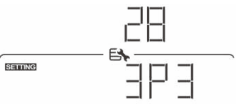
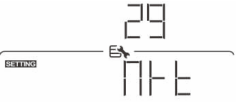
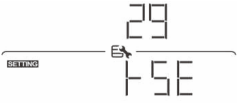
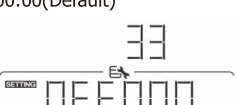
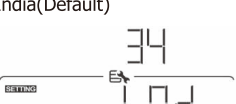
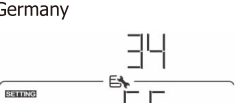
		240Vac 	
04	Output frequency	50Hz (default) 	60Hz 
05	Solar supply priority	Charge battery first (default) 	Solar energy provides power to charge battery as first priority.
		Power the loads first 	Solar energy provides power to the loads as first priority.
06	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable 	Bypass enable (default) 
		Restart disable (default) 	Restart enable 
08	Auto restart when over temperature occurs	Restart disable (default) 	Restart enable 
		Feed to grid disable (default) 	If selected, solar energy is not allowed to feed to the grid.
09	Solar energy feed to grid configuration	Feed to grid enable 	If selected, solar energy is allowed to feed to the grid.

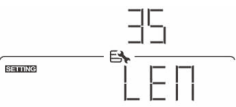
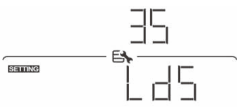
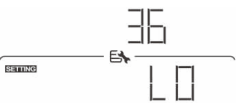
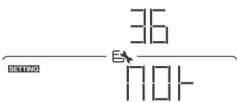
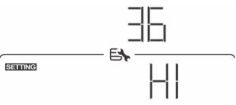
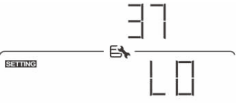
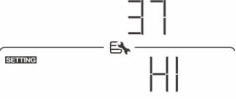
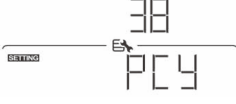
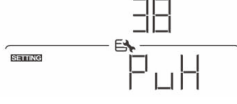
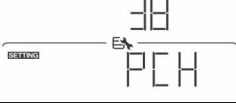
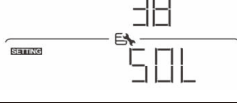
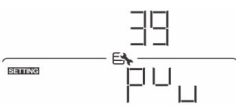
10	Charger source priority: To configure charger source priority	If this inverter/charger is working in Line, Standby or Fault mode, charger source can be programmed as below:	
		Solar first 	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not 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.
11	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 120A. Increment of each click is 10A.
13	Maximum utility charging current	2A 	10A 
		20A 	30A (default) 
		40A 	50A 
		60A 	70A 

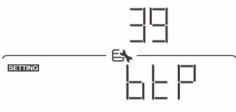
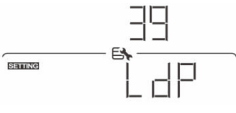
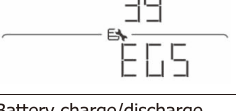
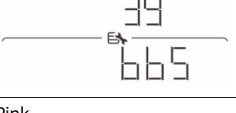
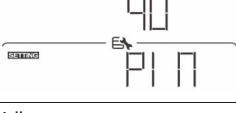
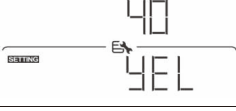
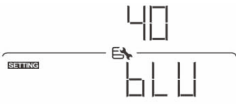
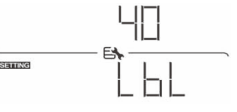
		80A 	90A 
		100A 	110A 
		120A 	
14	Battery type	AGM (default) 	Flooded 
		User-Defined 	If "User-Defined" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 17, 18 and 19.
		Pylontech battery 	If selected, programs of 11, 17, 18 and 19 will be automatically set up. No need for further setting.
		WECO battery 	If selected, programs of 11, 17, 18, 19 and 20 will be auto-configured per battery supplier recommended. No need for further adjustment. Programs of 20 and 21 parameters refer to SOC of battery.
		Soltaro battery 	If selected, programs of 11, 17, 18 and 19 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 11, 17, 18 and 19 will be automatically set up. No need for further setting.

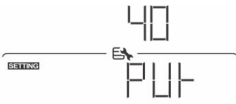
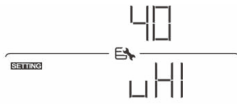
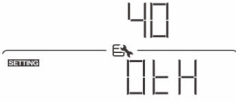
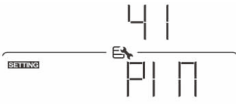
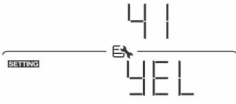
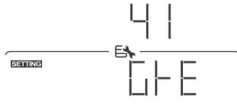
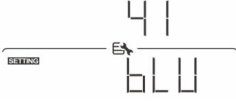
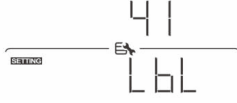
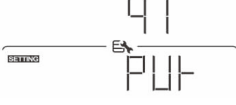
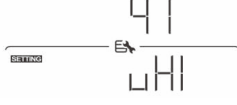
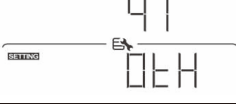
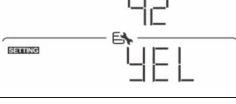
		3 rd party Lithium battery 	If selected, programs of 11, 17, 18 and 19 will be automatically set up. No need for further setting. Please contact the battery supplier for installation procedure.
17	Bulk charging voltage (C.V voltage)	Default setting: 56.4V 	If self-defined is selected in program 14, this program can be set up. Setting range is from 48.0V to 64.0V. Increment of each click is 0.1V.
18	Floating charging voltage	Default setting: 54.0V 	If self-defined is selected in program 14, this program can be set up. Setting range is from 48.0V to 60.0V. Increment of each click is 0.1V.
19	Low DC cut off battery voltage setting	Default setting: 40.8V 	If self-defined is selected in program 14, this program can be set up. Setting range is from 40.8V to 48.0V. 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.
		SOC 0%(default) 	If any type of lithium battery is selected in program 14, this program can be set up. Setting range is from 0% to 80%
20	Battery stop discharging voltage when grid is available	default setting: 46V 	Setting range is from 44V to 51V and increment of each click is 1V.
		10% (default) 	If any type of lithium battery is selected in program 14, this setting will change to SOC automatically. Adjustable range is from 5% to 95%.
21	Battery stop charging voltage when grid is available	Battery fully charged 	The setting range is from 48V to 54V and increment of each click is 1V.
		Default setting: 54V 	
		15% (default) 	If "WECO battery" is selected in program 14, this parameter will refer to the SOC of battery and adjustable from 15 to 100%. Increment of each click is 5%.

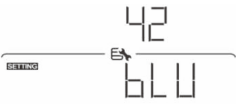
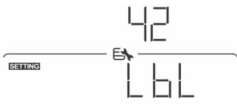
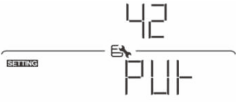
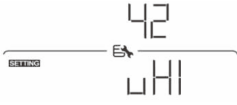
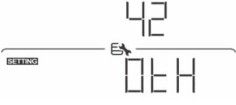
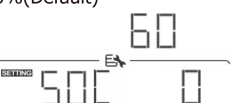
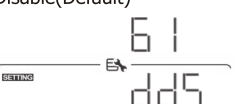
22	Auto return to default display screen	Return to default display screen (default) 	If selected, no matter how users switch display screen, it will automatically return to default display screen (Input voltage /output voltage) after no button is pressed for 1 minute.
		Stay at latest screen 	If selected, the display screen will stay at latest screen user finally switches.
23	Backlight control	Backlight on (default) 	Backlight off 
24	Alarm control	Alarm on (default) 	Alarm off 
25	Beeps while primary source is interrupted	Alarm on (default) 	Alarm off 
27	Record Fault code	Record enable 	Record disable (default) 
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. 	Parallel: This inverter is operated in parallel system. 
		L1 phase 	The inverter is operated in L1 phase in 3-phase application.
		L2 phase 	The inverter is operated in L2 phase in 3-phase application.

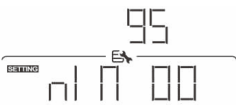
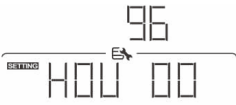
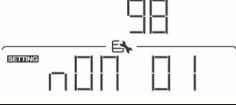
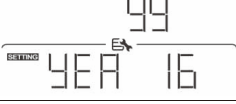
		L3 phase 	The inverter is operated in L3 phase in 3-phase application.
29	Reset PV energy storage	Not reset(Default) 	Reset 
30	Start charging time for AC charger	00:00 (Default) 	The setting range of start charging time for AC charger is from 00:00 to 23:00, increment of each click is 1 hour.
31	Stop charging time for AC charger	00:00 (Default) 	The setting range of stop charging time for AC charger is from 00:00 to 23:00, increment of each click is 1 hour.
32	Scheduled time for AC output on	00:00 (Default) 	The setting range of scheduled Time for AC output on is from 00:00 to 23:00, increment of each click is 1 hour.
33	Scheduled time for AC output off	00:00(Default) 	The setting range of scheduled Time for AC output off is from 00:00 to 23:00, increment of each click is 1 hour.
34	Set country customized regulations	India(Default) 	If selected, acceptable feed-in grid voltage range will be 195.5~253VAC. Acceptable feed-in grid frequency range will be 49~51Hz.
		Germany 	If selected, acceptable feed-in grid voltage range will be 184~264.5VAC. Acceptable feed-in grid frequency range will be 47.5~51.5Hz.
		South America 	If selected, acceptable feed-in grid voltage range will be 184~264.5VAC. Acceptable feed-in grid frequency range will be 57~62Hz.

35	On/Off control for RGB LED *It's necessary to enable this setting to activate RGB LED lighting function.	Enabled (default) 	Disable 
36	Brightness of RGB LED	Low 	Normal (default) 
		High 	
37	Lighting speed of RGB LED	Low 	Normal (default) 
		High 	
38	RGB LED effect	Power cycling 	Power wheel 
		Power chasing 	Solid on (Default) 
39	Data Presentation of data color	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.

39	Data Presentation of data color *Energy source (Grid-PV-Battery) and battery charge/discharge status only available when RGB LED effect is set to "Solid on".	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.
		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.
40	Background color of RGB LED	Pink 	Orange 
		Yellow 	Green 
		Blue 	Sky blue 

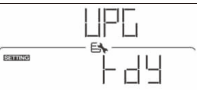
40	Background color of RGB LED	Purple 	White (Default) 
		Other 	If "other" is selected, the background color is set by RGB via software.
41	Data Color for RGB LED	Pink 	Orange 
		Yellow 	Green 
		Blue 	Sky blue 
		Purple 	White (Default) 
		Other 	If "other" is selected, the data color is set by RGB via software.
42	Background color of RGB LED only available when data Presentation of data color is set to Energy source (Grid-PV-Battery).	Pink 	Orange 
		Yellow 	Green 

42	Background color of RGB LED only available when data Presentation of data color is set to Energy source (Grid-PV-Battery).	Blue 	Sky blue 
		Purple 	White (Default) 
		Other 	If "other" is selected, the background color is set by RGB via software.
60	Low DC cut off voltage on second output	Default setting:40.8V 	Setting range is from 40.8V to 48.0V. Increment of each click is 0.1V. This low DC cut-off voltage will be fixed to setting value no matter what percentage of load is connected.
		0%(Default) 	If any type of lithium battery is selected in program 14, this parameter value will be displayed in percentage and value setting is based on battery capacity percentage. Setting range is from 0% to 95%. Increment of each click is 5%.
61	Setting discharge time on the 2nd output	Disable(Default) 	Setting range is disable and then from 0 min to 990 min, Increment of each click is 5min. *If the battery discharge time achieves the setting time in program 61 and the program 60 function is not triggered, the output will be turned off.
62	Scheduled time for 2nd AC output on	00:00(Default) 	Setting range is from 00:00 to 23:00 Increment of each click is 1 hour Within scheduled on/off time setting in program 62 and 63, 2nd AC output will be turned off based on the setting value in program 60 or 61.
63	Scheduled time for 2nd AC output off	00:00(Default) 	Setting range is from 00:00 to 23:00 Increment of each click is 1 hour Within scheduled on/off time setting in program 62 and 63, 2nd AC output will be turned off based on the setting value in program 60 or 61.

95	Time setting Minute		For minute setting, the range is from 00 to 59.
96	Time setting Hour		For hour setting, the range is from 00 to 23.
97	Time setting Day		For day setting, the range is from 00 to 31.
98	Time setting Month		For month setting, the range is from 01 to 12.
99	Time setting Year		For year setting, the range is from 16 to 99.

USB Function Setting

Follow below steps to upgrade firmware.

Procedure	LCD Screen
Step 1: Insert an USB disk into the USB port (⑤ in product overview). Press and hold "↺" button for 3 seconds to enter USB Function Setting Mode. It will show "U01" on the right corner and "UPG" in LCD.	
Step 2: Press "↵" button to read the file from the USB disk. If there is no burning file, the LCD will alert "U01". Otherwise it will enter the next step.	
Step 3: Press "▲" button choose "yes" to start the firmware upgrade. Or press "↺" or "▼" button to return to main screen.	
Step 4: If "yes" is select, it will start the firmware upgrade. The LCD will display "YES" and complete progress in percentage on the right. "88" represents 88% completion progress. Once 100% is complete, press "↺" button to return to main screen.	

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

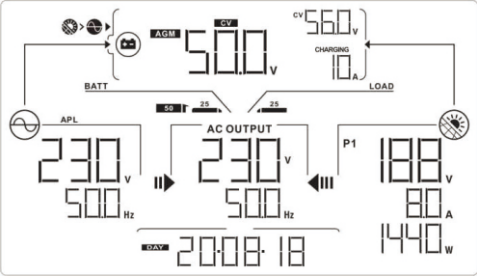
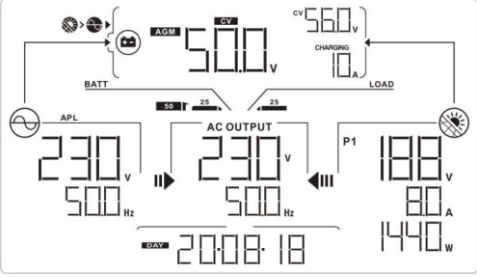
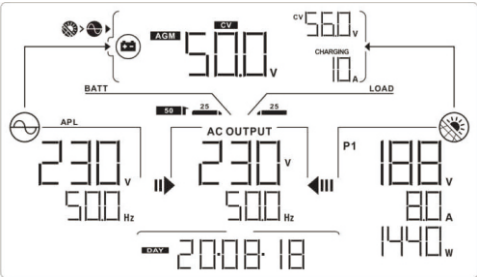
Error message for USB On-the-Go functions:

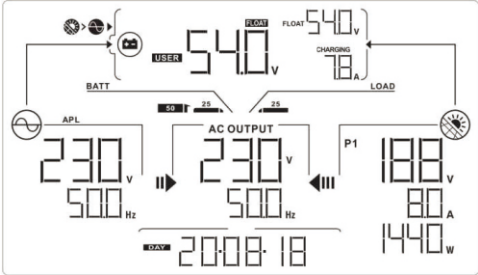
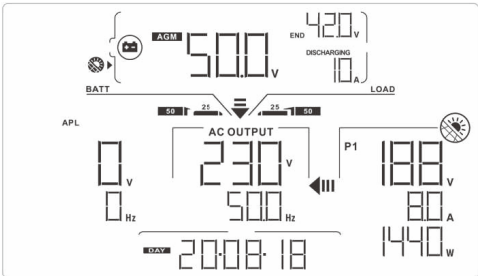
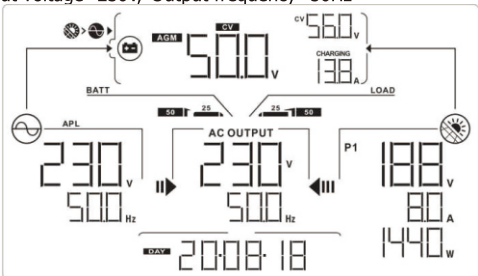
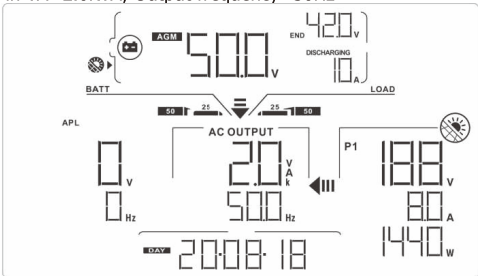
Error Code	Messages
U01	No USB disk is detected.
U02	USB disk is protected from copy.
U03	Document inside the USB disk with wrong format.

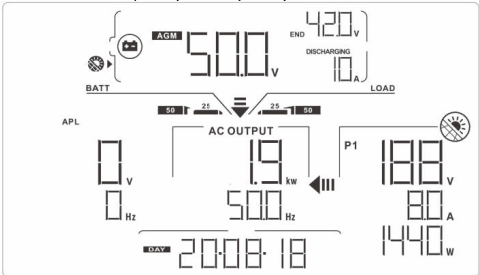
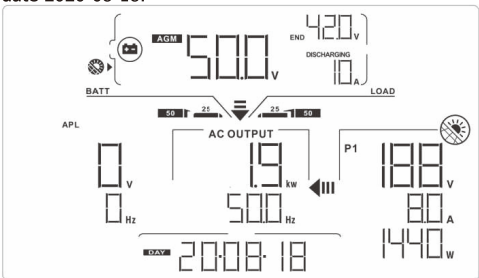
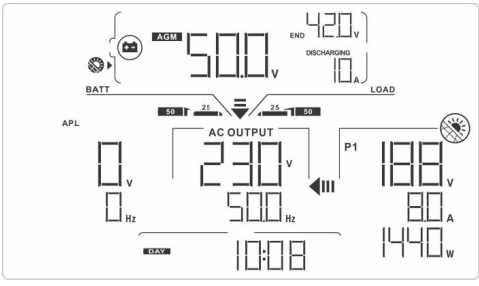
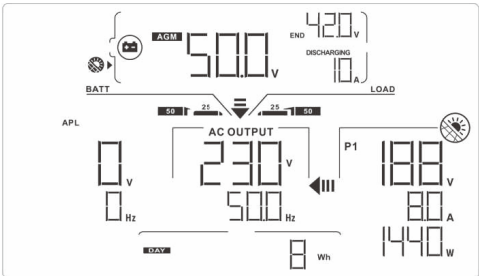
If any error occurs, error code will only show 3 seconds. After 3 seconds, it will automatically return to display screen.

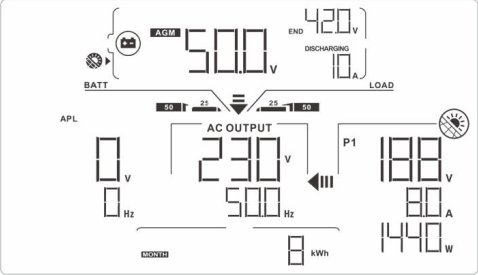
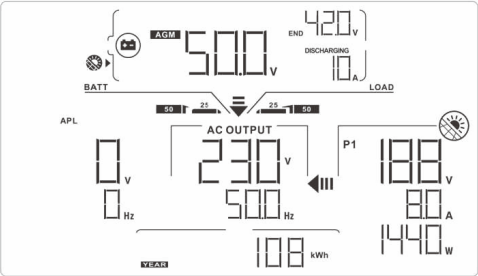
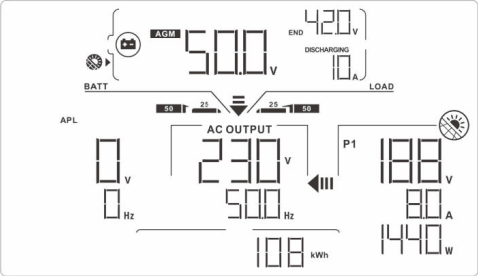
Display Setting

The LCD display information will be switched in turns by pressing “▲” or “▼” key. 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	PV1 voltage=180V, PV1 current=8.0A, PV1 power=1440W 
	Battery voltage, charging stage/ Configured battery parameters/ Charging or discharging current	Battery voltage=50.0V, Bulk charging voltage=56.0V, Charging current=10A 

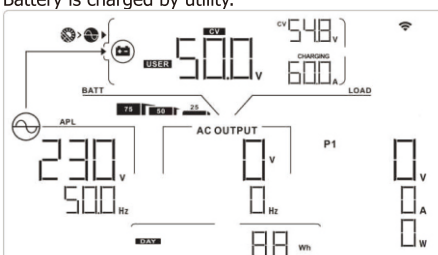
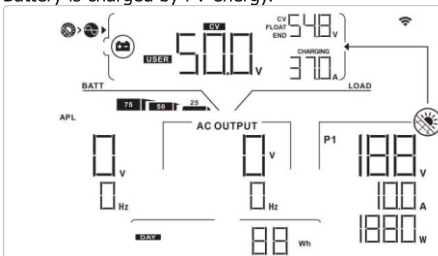
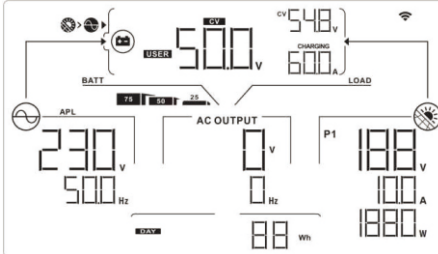
Selectable information		LCD display
Default Display Screen	Battery voltage, charging stage/ Configured battery parameters/ Charging or discharging current	Battery voltage=54.0V, Floating charging voltage=54.0V, Charging current=7.8A  Battery voltage=50.0V, Low DC cut-off voltage=42.0V, Discharging current=10A 
	Output voltage, load in VA, load in Watt switch every 5 second/ Output frequency	Output voltage=230V, Output frequency=50Hz  Load in VA=2.0KVA, Output frequency=50Hz 

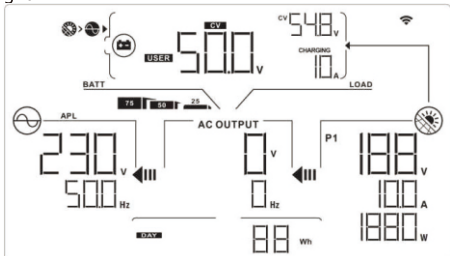
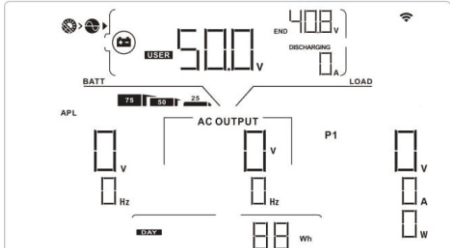
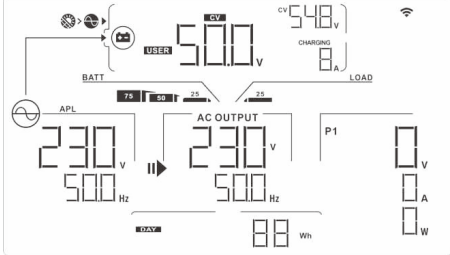
Selectable information	LCD display	
Default Display Screen		Load in Watt=1.9KW, Output frequency=50Hz
	Output voltage, load in VA, load in Watt switch every 5 second/ Output frequency	
	Real date.	Real date 2020-08-18.
		
Real time.	Real time 11:31.	
PV energy generated today.	This PV Today energy =8Wh.	

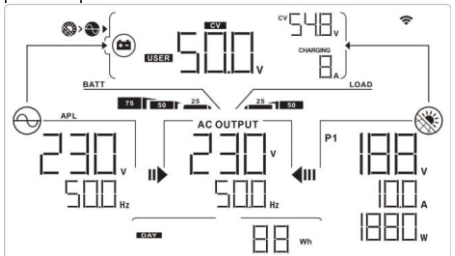
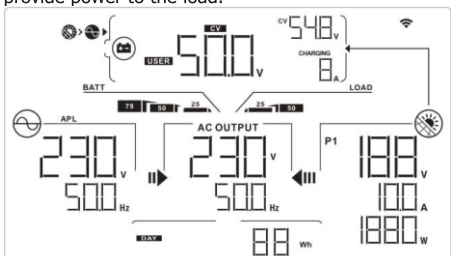
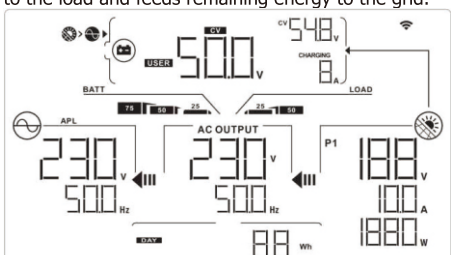
Selectable information	LCD display
PV energy generated this month.	This PV month energy = 8kWh. 
PV energy generated this year.	This PV year energy = 108kWh, 
PV energy generated totally.	PV Total energy = 108kWh. 
Main CPU version checking.	Main CPU version 00050.72. 

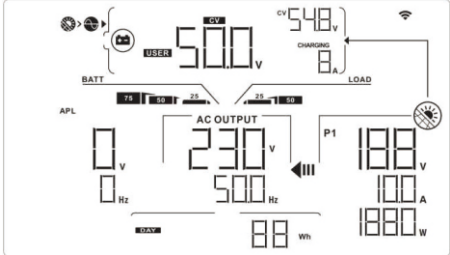
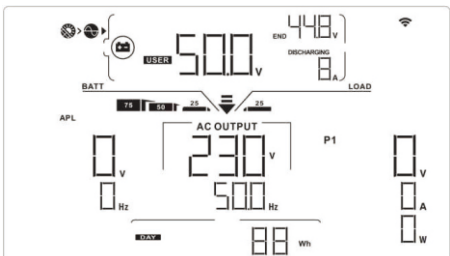
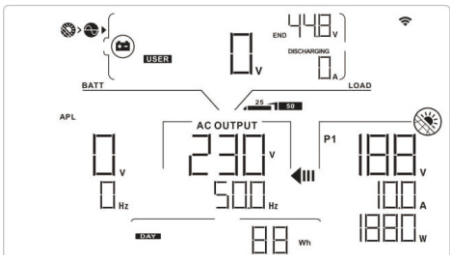
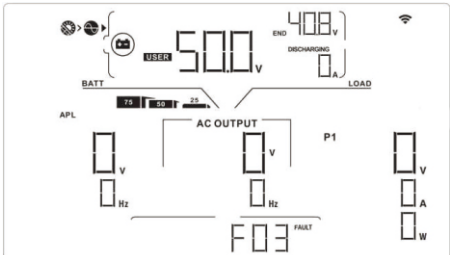
Selectable information	LCD display
Secondary CPU version checking.	Secondary CPU version 00022.01. 

Operating Mode Description

Operating mode	Behaviors	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 power, solar or utility charger available	Battery is charged by utility. 
		Battery is charged by PV energy. 
		Battery is charged by utility and PV energy. 

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 power, solar or utility charger available	Battery is charged by PV energy and feed PV energy to grid.  No charging. 
Line mode	Output power from utility. Charger is available	Utility charges battery and provides power to load.  PV energy, battery power and utility provide power to load. 

		PV energy and utility charge battery, and utility provides power to load. 
Line Mode	Output power from utility. Charger is available	PV energy charges battery, utility and PV energy provide power to the load.  PV energy charges battery, PV energy provides power to the load and feeds remaining energy to the grid. 
Battery mode	Output power from battery or PV	PV energy and battery energy supply power to the load. 

Battery mode	Output power from battery or PV	PV energy charges battery and provides power to the load.  Battery provides power to the load. 
Only PV mode	Output power from PV	PV provides power to the load. 
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, no charging.	No charging. 

Warning Indicator

Warning Code	Warning Event	Icon flashing
01	Fan locked	01 
02	Over temperature	02 
03	Battery over charged	03 
04	Low battery	04 
07	Overload	07  
10	Inverter power derating	10 
bP	Battery is not connected	bP 
32	Communication lost between com. port and control board	32 

Faults Reference Code

Fault Code	Fault Event	Icon on
01	Fan is locked.	F01
02	Over temperature	F02
03	Battery voltage is too high.	F03
05	Output is short circuited.	F05
06	Output voltage is abnormal.	F06
07	Overload time out.	F07
08	Bus voltage is too high.	F08
09	Bus soft start failure.	F09
10	PV current is over.	F10
11	PV voltage is over.	F11
12	Charge current is over.	F12
51	Over current or surge	F51
52	Bus voltage is too low.	F52
53	Inverter soft start failure.	F53
55	Over DC offset in AC output	F55
57	Current sensor failure.	F57
58	Output voltage is too low.	F58

SPECIFICATIONS

Table 1 Line Mode Specifications

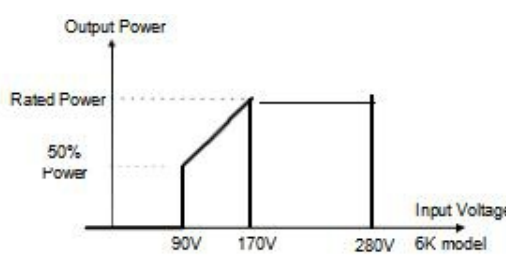
Inverter Power Rating	6KW
Input Voltage Waveform	Sinusoidal (utility or generator)
Nominal Input Voltage	230Vac
Low Loss Voltage	170Vac± 7V (UPS) 90Vac± 7V (Appliances)
Low Loss Return Voltage	180Vac± 7V (UPS); 100Vac± 7V (Appliances)
High Loss Voltage	280Vac± 7V
High Loss Return Voltage	270Vac± 7V
Max AC Input Voltage	300Vac
Max AC Input Current	40A
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); 20 ms typical (Appliances)
Output power de-rating: When AC input voltage under 170V the output power will be de-rated.	 The graph illustrates the output power de-rating characteristics for the 6K model. The vertical axis represents Output Power, with markers for 50% Power and Rated Power. The horizontal axis represents Input Voltage, with markers at 90V, 170V, and 280V. The power starts at 50% at 90V, rises linearly to 100% (Rated Power) at 170V, and remains constant at Rated Power up to 280V.

Table 2 Inverter Mode Specifications

Utility Inverter Mode	
Rated Output Power	6000W
Output Voltage Waveform	Pure Sine Wave
Output Voltage Regulation	230Vac $\pm$ 5%
Output Frequency	60Hz or 50Hz
Peak Efficiency	93%
Overload Protection	100ms@ $\geq$ 205% load;5s@ $\geq$ 150% load; 10s@110%~150% load
Surge Capacity	2* rated power for 5 seconds
Low DC Warning capacity	Setting of Program 29 + 10%
Low DC Cut-off level	Setting of Program 29
High DC Recovery Voltage	56.0Vdc
High DC Cut-off Voltage	57.6Vdc
DC Voltage Accuracy	+/-0.3V@ no load
THDV	<5% for linear load,<10% for non-linear load @ nominal voltage
DC Offset	= 100 mV
No Load Power Consumption	<75W

Table 3 Charge Mode Specifications

Utility Charging Mode	
Charging Current (UPS) @ Nominal Input Voltage	30A (@V _{IF} =230Vac)
Bulk Charging Voltage	57.6Vdc
Floating Charging Voltage	56.0Vdc
Overcharge Protection	58.4Vdc
Charging Algorithm	3-Step

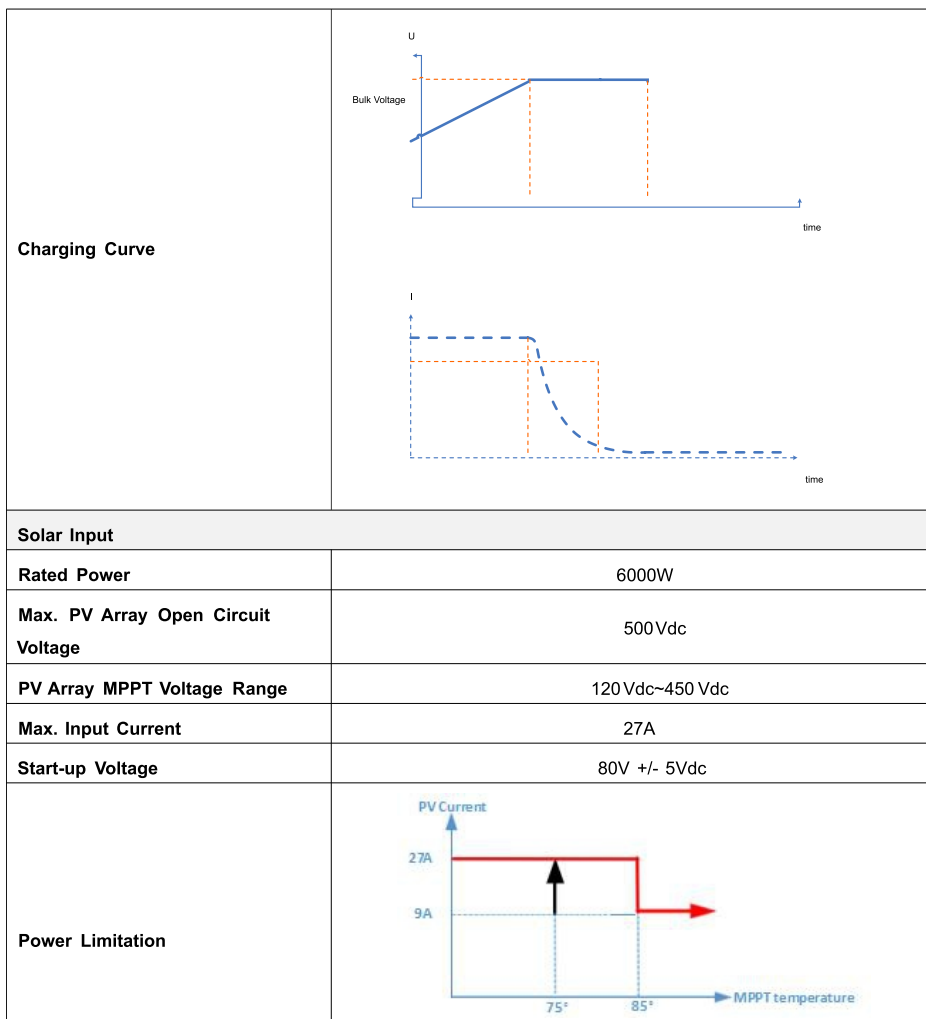


Table 4 General Specifications

Mode	Alpha ESS-6K 10KWh	Alpha ESS-6K 15KWh
Operating Temperature Range	-10°C to 50°C	
Storage temperature	-15°C~ 60°C	
Humidity	5% to 95% Relative Humidity (Non-condensing)	
Dimension, D X W X H (mm)	550 x 320 x 1078	692 x 330 x 1078
Net Weight (kgs)	130	157

Table 5 Module Specifications

Nominal Voltage	51.2 VDC
Typical Capacity	200 Ah
Max Discharging Current	150A
Max Charging Current	120A
Protection	BMS, breaker

Table 6 Module Specifications

Nominal Voltage	51.2 VDC
Typical Capacity	300 Ah
Max Discharging Current	200A
Max Charging Current	150A
Protection	BMS, breaker

TROUBLE SHOOTING

Problem	LCD/LED/Buzzer	Explanation / Possible cause	What to do
Unit shuts down automatically during startup process.	LCD/LED and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low (<2.5V/Cell)	1.Re-charge battery. 2.Replace battery.
No response after power on.	No indication.	1.The battery voltage is far too low. (<2.5V/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 LED 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.
		Temperature of internal converter component is over 120 °C. (Only available for 1-3 KVA models.)	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code 02	Internal temperature of inverter component is over 100 °C.	
	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 190 Vac or is higher than 260 Vac)	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 display:

Fault Code	Fault Event	Icon on
60	Power feedback protection	F60
71	Firmware version inconsistent	F71
72	Current sharing fault	F72
80	CAN fault	F80
81	Host loss	F81
82	Synchronization loss	F82
83	Battery voltage detected different	F83
84	AC input voltage and frequency detected different	F84
85	AC output current unbalance	F85
86	AC output mode setting is different	F86

Trouble shooting

Situation		Solution
Fault code	Fault Event Description	
60	Current feedback into the inverter is detected.	1.Restart the inverter. 2.Check if L/N cables are not connected reversely in all inverters. 3.For parallel system in single phase, make sure the sharing are connected in all inverters.For supporting three-phase system, make sure the sharing cables are connected in the inverters in the same phase, and disconnected in the inverters in different phases. 4.If the problem remains, please contact your installer.
71	The firmware version of each inverter is not the same.	1.Update all inverter firmware to the same version. 2.Check the version of each inverter via LCD setting and make sure the CPU versions are same. If not, please contact your installer to provide the firmware to update. 3.After updating, if the problem still remains, please contact your installer.
72	The output current of each inverter is different.	1.Check if sharing cables are connected well and restart the inverter 2.If the problem remains, please contact your installer.
80	CAN data loss	1.Check if communication cables are connected well and restart the inverter. 2.If the problem remains, please contact your installer.
81	Host data loss	
82	Synchronization	
83	The battery voltage of each inverter is not the same.	1.Make sure all inverters share same groups of batteries together. 2.Remove all loads and disconnect AC input and PV input. Then, check battery voltage of all inverters. If the values from all inverters are close, please check if all battery cables are the Same length and same material type. Otherwise,please contact your installer to provide SOP to calibrate battery voltage of each inverter. 3.If the problem still remains, please contact your installer.
84	AC input voltage and frequency are detected different.	1.Check the utility wiring connection and restart the inverter. 2.Make sure utility starts up at same time. If there are breakers installed between utility and inverters, please be sure all breakers can be turned on AC input at same time. 3.If the problem remains, please contact your installer.
85	AC output current unbalance	1.Restart the inverter. 2.Remove some excessive loads and re-check load information from LCD of inverters. If the values are different, please check if AC input and output cables are in the same length and material type. 3.If the problem remains, please contact your installer.

86	AC output mode setting is different.	1.Switch off the inverter and check LCD setting #28. 2.For parallel system in single phase, make sure no 3P1, 3P2 or 3.P3 is set on #28. For supporting three-phase system, make sure no “PAL” is set on #28. 4.If the problem remains, please contact your installer.
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Code Reference

Related information code will be displayed on LCD screen. Please check inverter LCD screen for the operation.

Code	Description
60 	If battery status is not allowed to charge and discharge after the communication between the inverter and battery is successful, it will show code 60 to stop charging and discharging battery.
61 	Communication lost (only available when the battery type is not setting as “AGM”, “Flooded” or “User-Defined”.) After battery is connected,communication signal is not detected for 3 minutes, buzzer will beep.After 10 minutes,inverter will stop charging and discharging to lithium battery. Communication lost occurs after the inverter and battery is connected successfully,buzzer beeps immediately.
62 	Internal communication failure of batteries.
69 	If battery status is not allowed to charge after the communication between the inverter and battery is successful, it will show code 69 to stop charging battery.
70 	If battery status must to be charged after the communication between the inverter and battery is successful, it will show code 70 to charge battery.
71 	If battery status is not allowed to discharge after the communication between the inverter and battery is successful, it will show code 71 to stop discharging battery.

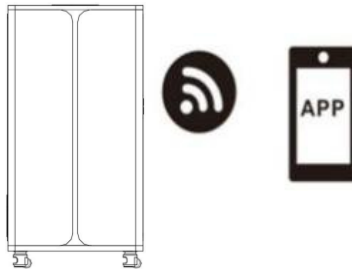
Appendix I: The Wi-Fi Operation Guide in Remote Panel

1. Introduction

Wi-Fi module can enable wireless communication between off-grid inverters and monitoring platform. Users have complete and remote monitoring and controlling experience for inverters when combining Wi-Fi module with Our Cloud APP, available for both iOS and Android based device. All data loggers and parameters are saved in cloud server.

The major functions of this APP:

- Delivers device status during normal operation.
- Allows to configure device setting after installation.
- Notifies users when a warning or alarm occurs.
- Allows users to query inverter history data.



2. Our Cloud App

2-1. Download and install APP

Operating system requirement for your smartphone:

🍏 iOS system supports iOS 11.0 and above

🤖 Android system supports Android 5.0 and above

Please scan the following QR code with your smart phone and download Our Cloud App.



2-2. Initial Setup

Download APP and After the installation, please tap the shortcut icon



to access this APP on your mobile .

For details,reading the Our Cloud APP quick installation guide.

