

# **Smart Solar IV Series**

# 3.6KW / 6.5KW / 7.2KW SOLAR INVERTER / CHARGER

# **USER MANUAL**

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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**

 $\triangle$  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
- Configurable color with the built-in RGB LED bar
- Built-in Wi-Fi for mobile monitoring (APP is required)
- Supports USB On-the-Go function
- Optional 12V DC output
- Built-in anti-dusk kit
- Detachable LCD control module with multiple communication ports for BMS (RS485, CAN-BUS, RS232)
- Configurable input voltage ranges for home appliances and personal computers via LCD control panel
- Configurable AC/PV output usage timer and prioritization
- Configurable AC/Solar charger priority via LCD control panel
- Configurable battery charging current based on applications via LCD control panel
- Compatible to utility mains or generator power
- Auto restart while AC is recovering
- Overload / Over temperature / short circuit protection
- Smart battery charger design for optimized battery performance
- Cold start function

# **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.

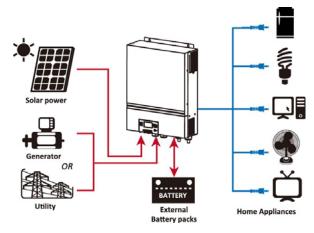
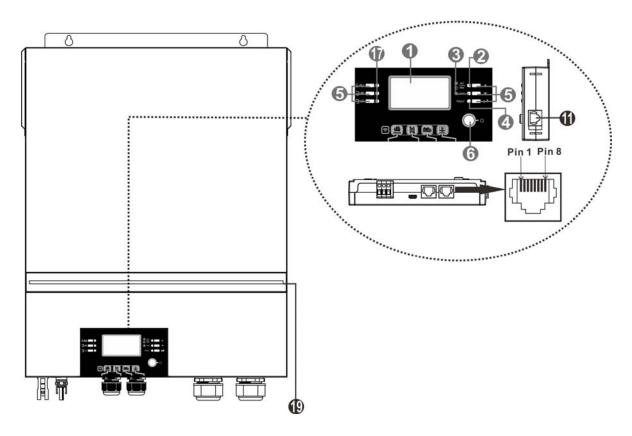
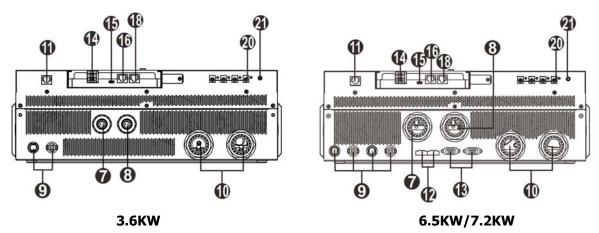


Figure 1 Basic hybrid PV System Overview

### **Product Overview**





NOTE: 6.5KW and 7.2KW are parallel models. For parallel installation and operation, please check Appendix I.

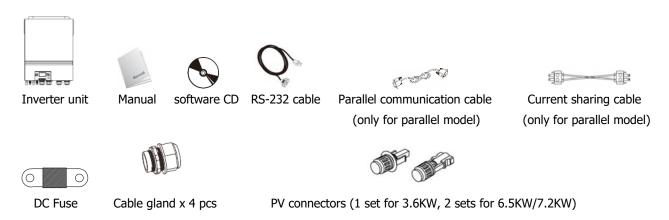
- 1. LCD display
- 2. Status indicator
- 3. Charging indicator
- 4. Fault indicator
- 5. Function buttons
- 6. Power on/off switch
- 7. AC input connectors
- 8. AC output connectors (Load connection)
- 9. PV connectors
- 10. Battery connectors
- 11. Remote LCD module communication Port

- 12. Current sharing port
- 13. Parallel communication port
- 14. Dry contact
- 15. USB port as USB communication port and USB function port
- 16. BMS communication port: CAN, RS-485 or RS-232
- 17. Output source indicators (refer to OPERATION/Operation and Display Panel section for details) and USB function setting reminder (refer to OPERATION/Function Setting for the details)
- 18. RS-232 communication port
- 19. RGB LED bar (refer to LCD Setting section for the details)
- 20. 12V DC output connectors (option)
- 21. Power switch for DC output (option)

### **INSTALLATION**

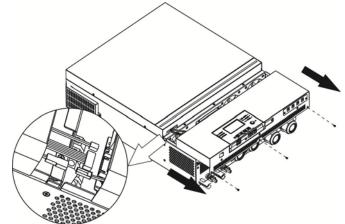
### **Unpacking and Inspection**

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**

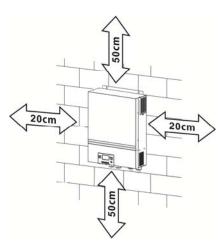
Before connecting all wirings, please take off bottom cover by removing five screws. When removing the bottom cover, be carefully to remove three cables as shown below.



# **Mounting the Unit**

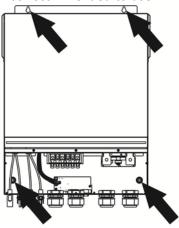
Consider the following points before selecting where to install:

- 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 0°C and 55°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 four screws. It's recommended to use M4 or M5 screws.

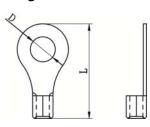


# **Battery Connection**

**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 requested to have a disconnect device in some applications, however, it's still requested to have over-current protection installed. Please refer to typical amperage in below table as required fuse or breaker size. **Ring terminal:** 

**WARNING!** All wiring must be performed by a 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.

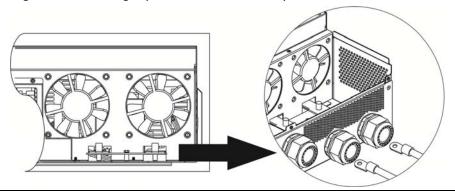


### Recommended battery cable and terminal size:

	Typical	Pattoni		Cable	Ring Te	rminal	Torquo
Model	Typical Amperage	Battery capacity	Wire Size	mm <sup>2</sup>	Dimen	sions	Torque value
	Amperage	capacity		mm-	D (mm)	L (mm)	value
3.6KW	167A		1*1/0AWG	50	8.4	47	
6.5KW	153A	250AH	1*2/0AWG	67	8.4	47	5 Nm
7.2KW	164.8A		1*1/0AWG	50	8.4	47	

Please follow below steps to implement battery connection:

- 1. Assemble battery ring terminal based on recommended battery cable and terminal size.
- 2. Fix two cable glands into positive and negative terminals.
- 3. Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the nuts are tightened with torque of 5 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. Please do NOT mis-connect input and output connectors.

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

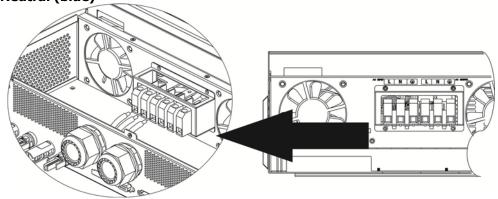
**WARNING!** It's very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable size as below.

### Suggested cable requirement for AC wires

Model	Gauge	Torque Value
3.6KW	12AWG	1.2~ 1.6Nm
6.5KW	4 AWG	1.4~ 1.6Nm
7.2KW	8 AWG	1.4~ 1.6Nm

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. Fix two cable glands into input and output sides.
- 4. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor ( ) first.
  - $\Longrightarrow$  Ground (yellow-green)
  - L→LINE (brown or black)
  - N→Neutral (blue)





#### **WARNING:**

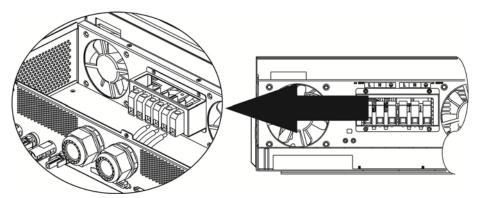
Be sure that AC power source is disconnected before attempting to hardwire it to the unit.

5. 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)



6. 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 requires 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 be trigger 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** DC circuit breakers between inverter and PV modules.

**NOTE1:** Please use 600VDC/30A circuit breaker.

NOTE2: The overvoltage category of the PV input is II.

Please follow the steps below to implement PV module connection:

**WARNING:** Because this inverter is non-isolated, only three types of PV modules are acceptable: single crystalline and 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.

**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.

**Step 1**: Check the input voltage of PV array modules. This system is applied with two strings of PV array. Please make sure that the maximum current load of each PV input connector is 18A.

**CAUTION:** Exceeding the maximum input voltage can destroy the unit!! Check the system before wire connection.

**Step 2:** Disconnect the circuit breaker and switch off the DC switch.

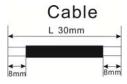
**Step 3**: Assemble provided PV connectors with PV modules by the following steps.

**Components for PV connectors and Tools:** 

Female connector housing					
Female terminal					
Male connector housing					
Male terminal					
Crimping tool and spanner					

#### Prepare the cable and follow the connector assembly process:

Strip one cable 8 mm on both end sides and be careful NOT to nick conductors.



Insert striped cable into female terminal and crimp female terminal as shown below.



Insert assembled cable into female connector housing as shown below.



Insert striped cable into male terminal and crimp male terminal as shown below.



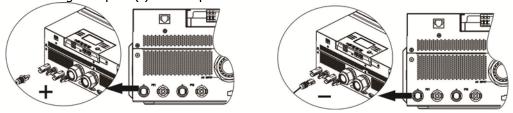
Insert assembled cable into male connector housing as shown below.



Then, use spanner to screw pressure dome tightly to female connector and male connector as shown below.



**Step 4**: 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.



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

To reduce risk of injury, please use the proper cable size as recommended below.					
Conductor cross-section (mm <sup>2</sup> )	AWG no.				
4~6	10~12				

**CAUTION:** Never directly touch the terminals of inverter. It might cause lethal electric shock.

### **Recommended Panel Configuration**

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

1. Open circuit Voltage (Voc) of PV modules not to exceed maximum PV array open circuit voltage of the inverter.

2. Open circuit Voltage (Voc) of PV modules should be higher than the start-up voltage.

INVERTER MODEL	3.6KW	6.5KW	7.2KW
Max. PV Array Power	4000W	8000W	8000W
Max. PV Array Open Circuit Voltage	500Vdc	250Vdc	500Vdc
PV Array MPPT Voltage Range	120Vdc~450Vdc	90Vdc~230Vdc	90Vdc~450Vdc
Start-up Voltage (Voc)	150Vdc	80Vdc	80Vdc

Recommended solar panel configuration for 3.6KW model:

Solar Panel Spec.	SOLAR INPUT	O'ty of panels	Total input power
(reference)	Min in serial: 6 pcs, max. in series: 12 pcs.	Q ty or pariers	Total iliput power
- 250Wp - Vmp: 30.1Vdc	6 pcs in series	6 pcs	1500W
- VIIIp. 30.1VdC - Imp: 8.3A	8 pcs in series	8 pcs	2000W
- Voc: 37.7Vdc	12 pcs in series	12 pcs	3000W
- Isc: 8.4A - Cells: 60	8 pieces in series and 2 sets in parallel	16 pcs	4000W

Recommended solar panel configuration for 6.5KW model:

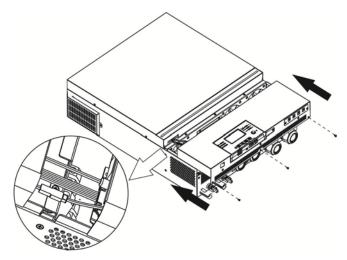
Recommended solar parier configuration for 0.5kW model.								
Solar Panel Spec.	<b>SOLAR INPUT 1</b>	<b>SOLAR INPUT 2</b>						
(reference)	Min in series: 3pcs, p		Q'ty of panels	Total Input Power				
- 330Wp	Max. in series:6pcs, p	per input						
- Vmp: 33.7Vdc	3pcs in series	x	3pcs	990W				
- Imp: 9.79A	Х	3pcs in series	3pcs	990W				
- Voc: 39.61Vdc	6pcs in series	Х	6pcs	1980W				
- Isc: 10.4A	Х	6pcs in series	6pcs	1980W				
- Cells: 60	6pcs in series	6pcs in series	12pcs	3960W				
	6pcs in series, 2 strings	Х	12pcs	3960W				
	Х	6pcs in series, 2 strings	12pcs	3960W				
	6pcs in series, 2 strings	6pcs in series, 2 strings	24pcs	7920W				

Recommended solar panel configuration for 7.2KW model:

Solar Panel Spec.	SOLAR INPUT 1	SOLAR INPUT 2		
(reference)	Min in series: 4pcs, p Max. in series: 12pcs	-	Q'ty of panels	Total Input Power
- 250Wp - Vmp: 30.7Vdc	4pcs in series	X	4pcs	1000W
- Imp: 8.3A	X	4pcs in series	4pcs	1000W
- Voc: 37.7Vdc	12pcs in series	X	12pcs	3000W
- Isc: 8.4A	X	12pcs in series	12pcs	3000W
- Cells: 60	6pcs in series	6pcs in series	12pcs	3000W
	6pcs in series, 2 strings	Х	12pcs	3000W
	Х	6pcs in series, 2 strings	12pcs	3000W
	8pcs in series, 2 strings	Х	16pcs	4000W
	Х	8pcs in series, 2 strings	16pcs	4000W
	9pcs in series, 1 string	9pcs in series, 1 string	18pcs	4500W
	10pcs in series, 1 string	10pcs in series, 1 string	20pcs	5000W
	12pcs in series, 1 string	12pcs in series, 1 string	24pcs	6000W
	6pcs in series, 2 strings	6pcs in series, 2 strings	24pcs	6000W
	7pcs in series, 2 strings	7pcs in series, 2 strings	28pcs	7000W
	8pcs in series, 2 strings	8pcs in series, 2 strings	32pcs	8000W

# **Final Assembly**

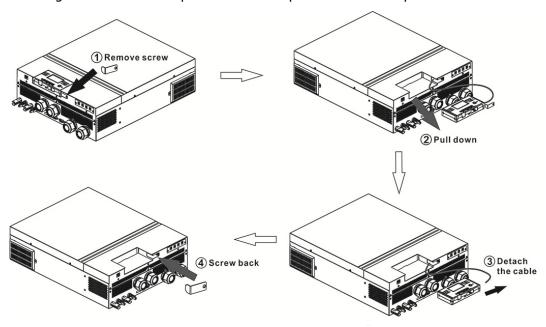
After connecting all wirings, re-connect three cables and then put bottom cover back by screwing five screws as shown below.



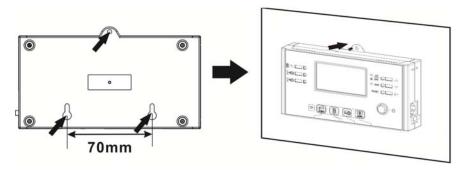
# **Remote Display Panel Installation**

The LCD module can be removable and installed in a remote location with an optional communication cable. Please take the follow steps to implement this remote panel installation.

**Step 1.** Remove the screw on the bottom of LCD module and pull down the module from the case. Detach the cable from the original communication port. Be sure to replace the retention plate back to the inverter.



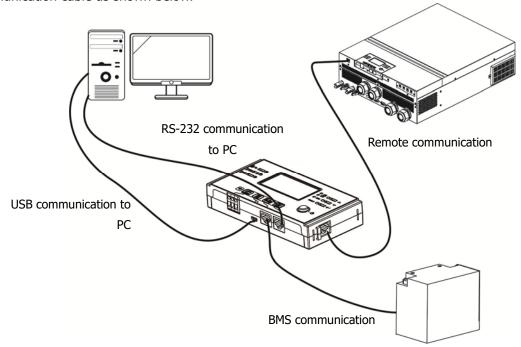
**Step 2.** Prepare your mounting holes in the marked locations as shown in the illustration below. The LCD module then can be securely mounted to your desired location.



Note: Wall installation should be implemented with the proper screws to the right.



**Step 3.** After LCD module is installed, connect LCD module to the inverter with an optional RJ45 communication cable as shown below.



# **DC Output Connectors (Optional)**

These DC output connectors are used to provide emergency power backup to all kinds of DC-powered equipment such as routers, modems, set-top box, VOIP phone systems, surveillance system, alarm system, access control system and many critical telecom equipment. There are 4 channels (current limit at 3A for each channel), which could be activated/disabled manually either through LCD operation or power switch beside the DC jacks.

Supplied dimension of DC jack (male) is OD 5.5mm, ID 2.5mm.

### **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 check Appendix III.



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

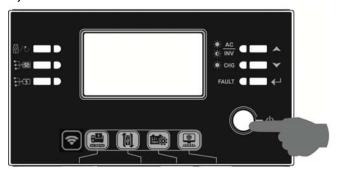
### **BMS Communication**

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.

### **OPERATION**

### **Power ON/OFF**

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



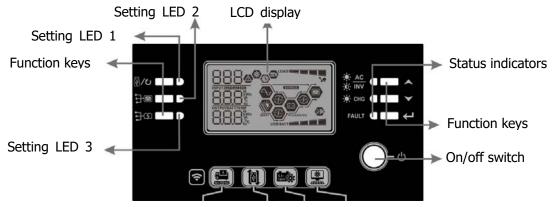
### **Inverter Turn-on**

After this inverter is turned on, WELCOME light show will be started with RGB LED BAR. It will slowly cycle through entire spectrum of nine colors (Green, Sky blue, Royal blue, Violet, Pink, Red, Honey, Yellow, Lime yellow) about 10-15 seconds. After initialization, it will light up with default color.

RGB LED BAR can light up in different color and light effects based on the setting of energy priority to display the operation mode, energy source, battery capacity and load level. These parameters such as color, effects, brightness, speed and so on can be configured through the LCD panel. Please refer to LCD settings for the details.

# **Operation and Display Panel**

The operation and the LCD module, shown in the chart below, includes six indicators, six function keys, on/off switch and a LCD display to indicate the operating status and input/output power information.



#### **Indicators**

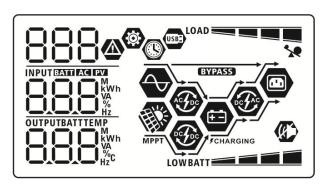
LED Ind	licator	Color	Solid/Flashing	Messages
Setting	LED 1	Green	Solid On	Output powered by utility
Setting	LED 2	Green	Solid On	Output powered by PV
Setting	LED 3	Green	Solid On	Output powered by battery
	<b>★</b> AC Green	Solid On	Output is available in line mode	
Status	→ INV	Green	Flashing	Output is powered by battery in battery mode
indicators	× aua	Solid On	Battery is fully charged	
	-☆- CHG	Green	Flashing	Battery is charging.

	<b>FAULT</b> Red	Pod	Solid On	Fault mode
	FAULI	r Rea	Flashing	Warning mode

# **Function Keys**

Function Key		Description	
∰/ <b>ʻ</b> O	ESC	Exit the setting	
(F)	USB function setting	Select USB OTG functions	
	Timer setting for the Output source priority	Setup the timer for prioritizing the output source	
<del>]</del> \$	Timer setting for the Charger source priority	Setup the timer for prioritizing the charger source	
+	<del>]</del> \$	Press these two keys at the time to switch RGB LED bar for output source priority and battery discharge/charge status	
<b>^</b>	Up	To last selection	
~	Down	To next selection	
<b>←</b>	Enter	To confirm/enter the selection in setting mode	

# **LCD Display Icons**



Icon	Function description		
Input Source Information			
AC	Indicates the AC input.		
PV	Indicates the PV input		
INPUT BATTI ASI PVI	Indicate input voltage, input frequency, PV voltage, charger current,		
0.0.0%	charger power, battery voltage.		
Configuration Program and F	ault Information		
<			
888	Indicates the setting programs.		
Indicates the warning and fault codes.			
888@	Warning: Graph Marning with warning code.		
	Fault: 🗀 🗀 lighting with fault code		
Output Information			
OUTPUTBATTTEMP M KWh	Indicate output voltage, output frequency, load percent, load in VA,		
	load in Watt and discharging current.		
Battery Information			



Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.

When battery is charging, it will present battery charging status.

Status	Battery voltage	LCD Display
	<2V/cell	4 bars will flash in turns.
Constant	2 ~ 2.083V/cell	Bottom bar will be on and the other three bars will flash in turns.
Current mode / Constant	2.083 ~ 2.167V/cell	Bottom two bars will be on and the other two bars will flash in turns.
Voltage mode	> 2.167 V/cell	Bottom three bars will be on and the top 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
	< 1.85V/cell	LOWBATT
Land > 500/	1.85V/cell ~ 1.933V/cell	BATT
Load >50%	1.933V/cell ~ 2.017V/cell	BATT
	> 2.017V/cell	BATT
	< 1.892V/cell	LOWBATT
L d . F00/	1.892V/cell ~ 1.975V/cell	BATT
Load < 50%	1.975V/cell ~ 2.058V/cell	BATT
	> 2.058V/cell	BATT

Load Information			
*	Indicates overload.		
LOAD	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.		
	0%~24%	25%~49%	
_	LOAD	LOAD	
	50%~74%	75%~100%	
	LOAD	LOAD	

	LUAU	LUAD		
Mode Operation Information				
lack	Indicates unit connects to the mains.			
MPPT	Indicates unit connects to the PV panel.			
BYPASS	Indicates load is supplied by utilit	y power.		
A GOO	Indicates the utility charger circuit is working.			
	Indicates the solar charger circuit is working.			
o Pa	Indicates the DC/AC inverter circuit is working.			
	Indicates unit alarm is disabled.			
USBE	Indicates USB disk is connected.			
	Indicates timer setting or time display			

# **LCD Setting**

# **General Setting**

After pressing and holding "\" button for 3 seconds, the unit will enter the Setup Mode. Press "\" or "\" button to select setting programs. Press "\" button to confirm you selection or "\" button to exit.

**Setting Programs:** 

Program	Description	Selectable option	
		Escape	
00	Exit setting mode		
		ESC	
		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.
		US6	when dulity power is not available.
		Solar first	Solar energy provides power to the
			loads as first priority.
			If solar energy is not sufficient to
01	Output source priority:		power all connected loads, Utility
01	To configure load power source priority	SUb	energy will supply power to the loads at the same time.
			Solar energy provides power to the
		SBU priority	loads as first priority.  If solar energy is not sufficient to
			power all connected loads, battery
		0.	energy will supply power to the
			loads at the same time.
		560	Utility provides power to the loads only when battery voltage drops to
		200	either low-level warning voltage or
			the setting point in program 12.
	Maximum charging current:	60A (default)	
	To configure total charging current for solar and utility	85 💩	Setting range is from 10A to 120A for 6.5KW model and from 10A to
02	chargers. (Max. charging current =		80A for 3.6KW/7.2KW model.
	utility charging current +	co.	Increment of each click is 10A.
	solar charging current)	<b>5</b>   U^	

			Tre
		Appliances (default)	If selected, acceptable AC input
			voltage range will be within
			90-280VAC.
		APL	
03	AC input voltage range		
		UPS	If selected, acceptable AC input
			voltage range will be within
			170-280VAC.
		UPS	
		AGM (default)	Flooded
		85 🚳	85 👦
			1000 100 100 100 100 100 100 100 100 10
			_
		86n	FLU
		User-Defined	If "User-Defined" is selected,
			battery charge voltage and low DC
		85 🚳	cut-off voltage can be set up in
			program 26, 27 and 29.
		USE	
		Pylontech battery	If selected, programs of 02, 26, 27
			and 29 will be automatically set
		0.0	up. No need for further setting.
OF.	Patton, type		
05	Battery type	OC.	
		rgi_	
		WECO battery (only for 48V	If selected, programs of 02, 12,
		model)	26, 27 and 29 will be
		<u> </u>	auto-configured per battery
		00	supplier recommended. No need
			for further adjustment.
		υEC	
		Soltaro battery (only for	If selected, programs of 02, 26, 27
		48V model)	and 29 will be automatically set
		85 🚳	up. No need for further setting.
		SOL	

		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.
05	Battery type	3 <sup>rd</sup> 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
		LFd	L+E
07	Auto restart when over temperature occurs	Restart disable (default)	Restart enable
		논노성	<b>Ł</b> +E
09	Output frequency	50Hz (default for 3.6KW/7.2KW models)	60Hz (default for 6.5KW)
		Available options for 3.6KW/7	22KW models 230V (default)
10	Output voltage	220v 240v  [] 🐵	230,

		Available options for 6.5KW n	nodel
		110V	120V (default)
		🚳	
		LIO.	150,
10	Output voltage		ICU'
		.0	
		¦,⊃ ¬,	
	Maximum utility charging	30A (default)	
	current	I Ø	Setting range is 2A, then from 10A
11	Note: If setting value in program 02 is smaller than		to 120A for 6.5KW model and from 10A to 80A for 3.6KW/7.2KW
	that in program in 11, the	UEI	model. Increment of each click is
	inverter will apply charging current from program 02 for	30.	10A.
	utility charger.	Available options for 24V mod	 
		23.0V (default)	Setting range is from 22V to 25.5V.
			Increment of each click is 0.5V.
	Setting voltage point back	BATT	
12	to utility source when	<u>८५८</u> °	
12	selecting "SBU" (SBU priority) in program 01.	Available options for 48V model:	
	process, an program of	46V (default)	Setting range is from 44V to 51V.  Increment of each click is 1V.
		1C "	Therement of each click is 1v.
		2000000	
		SATT SATT SATT SATT SATT SATT SATT SATT	
		Available options for 24V model:	
		Battery fully charged	27V (default)
	Setting voltage point back to battery mode when		
13	selecting "SBU" (SBU		
	priority) in program 01.	I BATT	n hart
		Cotting represents to 12 (1)	21/ Ingresses of a state of the Control
1		Secting range is from 24V to .	31V. Increment of each click is 0.5V.

		Available options for 48V mod	lel:
		Battery fully charged	54V (default)
	Setting voltage point back	! □ 🔞	!⊐ <b>②</b>
	to battery mode when	- L	'
13	selecting "SBU" (SBU		
	priority) in program 01.	BATT	BATT
		│ <del>├</del> ╏╏╏╻ <sup>╵</sup>	54 <sup>,</sup>
		Setting range is from 48V to 6	62V. Increment of each click is 1V.
		If this inverter/charger is wor	king in Line, Standby or Fault mode,
		charger source can be progra	mmed as below:
		Solar first	Solar energy will charge battery as
		!⊑ <b>®</b>	first priority.
		.0	Utility will charge battery only
			when solar energy is not available.
		CS0	
		Solar and Utility (default)	Solar energy and utility will charge
	Charger course priority	ib 📽	battery at the same time.
16	Charger source priority:  To configure charger source		
10	priority		
	priority	ISNU	
		Only Solar	Solar energy will be the only
		!⊑ 🚳	charger source no matter utility is
		10	available or not.
		oco	
		020	
			king in Battery mode, only solar
			plar energy will charge battery if it's
		available and sufficient.	Alarm off
		Alarm on (default)	AIGITI OII
		¦ <b>⊝ ⊗</b>	! <b>₽ </b> ❷
18	Alarm control		,)
		P0U	60F
		Return to default display	If selected, no matter how users
		screen (default)	switch display screen, it will
		ப்⊓ க	automatically return to default
19	Auto return to default	ij 💆	display screen (Input voltage
	display screen		/output voltage) after no button is
		cco	pressed for 1 minute.
		ESP	
	1		

		Stay at latest screen	If selected, the display screen will
		¦Q 🚳	stay at latest screen user finally
		'	switches.
		F68	
		Backlight on (default)	Backlight off
		58 <b>®</b>	28 <b>@</b>
20	Backlight control		
		LOU	LOF
		Alarm on (default)	Alarm off
		22 🚳	22 🚳
22	Beeps while primary source is interrupted		
	is interrupted		
		R00	ROF
		Bypass disable (default)	Bypass enable
	Overload bypass:	23 <b>@</b>	<b>₽</b> ₽ <b>◎</b>
23	When enabled, the unit will transfer to line mode if		
	overload occurs in battery mode.		
		<b>649</b>	1698
		Record enable (default)	Record disable
			25 @
25	Record Fault code		
		FEN	FdS
		24V model default: 28.2V	48V model default: 56.4V
		26 <b>®</b>	25 <b>®</b>
			CU
26	Bulk charging voltage	BATT	BATT
	(C.V voltage)	28.2	5 <u>6</u> 4
		If self-defined is selected in p	rogram 5, this program can be set
			OV to 31.0V for 24V model and 48.0V
		to 62.0V for 48V model. Inc	rement of each click is 0.1V.

		24V model default: 27.0V	48V model default: 54.0V
		27 🚳	ې ۲ح
		Ç! U	Ci O
27	Floating charging voltage	BATT	BATT
		C ijij'	240,
			rogram 5, this program can be set VV to 31.0V for 24V model and 48.0V
		to 62.0V for 48V model. Incre	ement of each click is 0.1V.
		Single: This inverter is used in single phase application.	Parallel: This inverter is operated in parallel system.
		28 🚳	28 👨
		St G	28L
			d in 3-phase application, set up
		inverter to be operated in spectrum. L1 phase:	ecific phase. L2 phase:
		28 🚳	28 ❷
			-0
		3P :	385
	AC output mode	L3 phase:	
	(only for 6.5KW/7.2KW model)	58 💩	
28	*This setting is only available when the inverter		
	is in standby mode (Switch off).	323	
		When the inverter is operation inverter to be operated in spe	n in split phase application, set up
		L1 for split phase:	L2 for split phase:
		28 <b>®</b>	(120° phase difference)
		2P :	150
		126 19 1	285
		L2 for split phase: (180° phase difference)	
		28 <b>®</b>	
		180	
		265	
		<u> </u>	

	Low DC cut-off voltage:	24V model default: 22.0V	48V model default: 44.0V
	<ul> <li>If battery power is only power source available,</li> </ul>	29 <b>@</b>	2 <b>0 ®</b>
	<ul><li>inverter will shut down.</li><li>If PV energy and battery</li></ul>	rnu	LUO
	power are available, inverter will charge	BATT	BATT
29	battery without AC output.	c'c',i,	낙닉U'
	<ul> <li>If PV energy, battery</li> </ul>	If self-defined is selected in p	rogram 5, this program can be set
	power and utility are all available, inverter will	, , , , ,	V to 24.0V for 24V model and 42.0V ment of each click is 0.1V. Low DC
	transfer to line mode and provide output		setting value no matter what
	power to loads.	percentage of load is connect	
		Battery equalization	Battery equalization disable (default)
20	B	J0	50
30	Battery equalization		
		EEN	692
			" is selected in program 05, this
		program can be set up.  24V model default: 29.2V	48V model default: 58.4V
		<b>∃¦</b> ⊗	<b>∃¦</b>
		CO	Ωυ
31	Battery equalization voltage	BATT	BATT COLUMN
		62.0V for 48V model. Increme	o 31.0V for 24V model and 48.0V to ent of each click is 0.1V.
		60min (default)	Setting range is from 5min to
		33 👁	900min. Increment of each click is 5min.
33	Battery equalized time		Sitiiti.
		60	
		120min (default)	Setting range is from 5min to 900
		34 ❷	min. Increment of each click is 5
34	Battery equalized timeout		min.
		100	
		120 30daya (dofault)	Cotting range is from 0 to 00 days
		30days (default)	Setting range is from 0 to 90 days.  Increment of each click is 1 day
35	Equalization interval		, ,
		304	

		Enable	Disable (default)
			Disable (default)
		35 🚳	36 <b>8</b>
	Equalization activated	REN .	885
36	Equalization activated immediately		bled in program 30, this program can
	,		ted in this program, it's to activate
		battery equalization immediat	tely and LCD main page will show
		"とЧ". If "Disable" is selected	I, it will cancel equalization function
		untii next activated equalization	on time arrives based on program 35
		setting. At this time, "트닉" w	vill not be shown in LCD main page.
		Not reset(Default)	Reset
	D	<b>⊒</b> 7 ❷	77 ❷
37	Reset all stored data for PV generated power and	_ ·	_ ·
3,	output load energy		13 1 1 1
		ՈԻԵ	LCL
		N COR NOTED IN	If colored battom, disaborate
		Disable (Default)	If selected, battery discharge protection is disabled.
			·
		1.10	
		ddS	
		30A	The setting range is from 30 A to
		1116	150 A. Increment of each click is 10A.
	Maximum discharging	i w	If discharging current is higher
41	current		than setting value, battery will stop
	(only for 7.2KW model)		discharging. At this time, if the utility is available, the inverter will
		130	operate in bypass mode. If no
			utility is available, the inverter will
		150A	shut down output for 5 minutes.
		니 ! 🐵	
		' '	
		ico	
		ISO	
		Enabled (default)	Disable
	On/Off control for RGB LED		⊂ ! <b>®</b>
	*It's necessary to enable		
51	this setting to activate RGB		
	LED lighting function.		
		լլեր	LdS

		Low <b>52 ®</b>	Normal (default)
52	Brightness of RGB LED	<b>L</b> []	NOH
		52 <b>®</b>	
		H I	Name (defects)
		53 <b>®</b>	Normal (default)
53	Lighting speed of RGB LED	LO :	NOH
	J S S S S S S S S S S S S S S S S S S S	High	
		H I	
		Scrolling	Breathing
		SCH	h-E
54	RGB LED effects	Solid on (Default)	
		SOL	

55	Color combination of RGB LED to show energy source and battery charge/discharge status:  Grid-PV-Battery Battery charge/discharge status	C01: (Default)  Violet-White-Sky blue  Pink-Honey	C02:  • White-Yellow-Green • Royal blue-Lime yellow  55   CO2
92	On/Off control for 12V DC output	Enable (default)  92 🍩	Disable 92 ®
93	Erase all data log	Not reset (Default)  33 ♥  □ □ □	Reset 93 🍅
94	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 3 minutes 3 minutes 4	5 minutes  S 4 ©  20 minutes  C 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
95	Time setting – Minute	For minute setting, the range	is from 0 to 59.

		For hour setting, the range is from 0 to 23.
96	Time setting – Hour	HOU N
		For day setting, the range is from 1 to 31.
97	Time setting- Day	889 :
		For month setting, the range is from 1 to 12.
		98 🗞
98	Time setting- Month	-0∩
		For year setting, the range is from 17 to 99.
		77 <b>%</b>
99	Time setting – Year	YER
		19

# **Function Setting**

There are three function keys on the display panel to implement special functions such as USB OTG, Timer setting for output source priority and timer setting for charger source priority.

### 1. USB Function Setting

Insert an OTG USB disk into the USB port ( ). Press and hold " button for 3 seconds to enter USB Setup Mode. These functions including inverter firmware upgrade, data log export and internal parameters re-write from the USB disk.

Procedure	LCD Screen
Step 1: Press and hold "\"/U" button for 3 seconds to enter USB function setting mode.	പറ്റെ അ അ
Step 2: Press " or " button to enter the selectable setting programs (detail descriptions in Step 3)	1UPC ♥ ● 1588 100

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

Program#	Operation Procedure	LCD Screen
₩/℧	This function is to upgrade inverter firmware. If firmware upgrade is needed, pl	ease check with
Upgrade	your dealer or installer for detail instructions.	
firmware		

<del>]</del> <u> </u>	This function is to over-write all parameter settings (TEXT file) with settings in	the On-The-Go
:	USB disk from a previous setup or to duplicate inverter settings. Please check	with your dealer
Re-write	or installer for detail instructions.	
internal		
parameters		
	By pressing "Dy" button to export data log from the inverter to USB disk. If	
	the selected function is ready, LCD will display "Lal". Press " button to	
	confirm the selection again.	F83
<b>→</b>	Press "     button to select "Yes", LED 1 will flash once every second	[05 <b>6 6</b>
Export data log	during the process. It will only display LOG and all LEDs will be on after	985
	this action is complete. Then, press "優/ひ" button to return to main screen.	Π0
	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 for USB On-the-Go functions:**

<b>Error Code</b>	Messages
UO 1	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 three seconds, it will automatically return to display screen.

### 2. Timer Setting for Output Source Priority

This timer setting is to set up the output source priority per day.

Procedure	LCD Screen
<b>Step 1:</b> Press and hold "button for 3 seconds to enter Timer Setup Mode for output source priority.	USb 🛛
Step 2: Press " or " or " button to enter the selectable programs (detail	SUb SbU
descriptions in Step 3).	200

**Step 3:** Please select setting program by following each procedure.

Program#	Operation Procedure	LCD Screen
∰/₺	Press "button to set up Utility First Timer. Press "button to select staring time. Press "a" or "v" button to adjust values and press "d" to confirm. Press "button to select end time. Press "a" or "v" button to adjust values, press "d" button to confirm. The setting values are from 00 to 23, with 1-hour increment.	USЬ <b>◎</b> 00 23

<del>]</del> 9	Press "D" button to set up Solar First Timer. Press "D" button to select staring time. Press "A" or "V" button to adjust values and press "H" to confirm. Press "D" button to select end time. Press "A" or "V" button to adjust values, press "H" button to confirm. The setting values are from 00 to 23, with 1-hour increment.	23 00 •
<b>7</b> 4	Press ""button to set up SBU Priority Timer. Press "button to select staring time. Press "or "v" button to adjust values and press "d" to confirm. Press "button to select end time. Press "d" or "v" button to adjust values, press "d" button to confirm. The setting values are from 00 to 23, with 1-hour increment.	23 00 <b>©</b>

Press " button to exit the Setup Mode.

# 3. Timer Setting for the Charger Source Priority

This timer setting is to set up the charger source priority per day.

Procedure	LCD Screen
Step 1: Press and hold "button for 3 seconds to enter Timer Setup Mode for charging source priority.	(SO ♥ SOU
Step 2: Press ** でで、・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・	050
descriptions in Step 3).	

**Step 3:** Please select setting program by following each procedure.

Program#	Operation Procedure	LCD Screen
∰/₺	Press "button to set up Solar First Timer. Press "button to select staring time. Press "a" or "v" button to adjust values and press "d" to confirm. Press "button to select end time. Press "a" or "v" button to adjust values, press "d" button to confirm. The setting values are from 00 to 23, with 1-hour increment.	©SO ©
<del>]</del> 30	Press "button to set up Solar & Utility Timer. Press "button to select staring time. Press "or "v" button to adjust values and press "d" to confirm. Press "button to select end time. Press "or "v" button to adjust values, press "d" button to confirm. The setting values are from 00 to 23, with 1-hour increment.	SNU <b>◎</b> 00 23
<del>}</del> \$	Press ""button to set up Solar Only Timer. Press "button to select staring time. Press "a" or "v" button to adjust values and press "d" to confirm. Press "button to select end time. Press "a" or "v" button to adjust values, press "d" button to confirm. The setting values are from 00 to 23, with 1-hour increment.	050 <b>©</b> 00 23

Press " button to exit the Setup Mode.

# **LCD Display**

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

Selectable information	LCD display
	Input Voltage=230V, output voltage=230V
	LOAD
Input voltage/Output voltage	INPUT AC BYPASS
(Default Display Screen)	
	OUTPUT MPPT SCHARGING
	BATT
	Input frequency=50Hz
	LUAD
Input frequency	INPUT IXE
	OUTPUT III
	MPPT OCCUPATIONS
	PV voltage=260V
	LOAD
	INPUT PV BYPASS
	OUTPUT SCHARGING
	C S L BATT
	PV1 voltage=260V (dual input model)
PV voltage	INPUT EXY
- · · · · · · · · · · · · · · · · · · ·	<u>CbU'</u>
	OUTPUT MPPT CHARGING
	BATT BATT
	PV2 voltage=260V (dual input model)
	INPUT PY OYPASS
	OUTPUT CONTROL OF THE PROPERTY
	V MPPT CHARGING
	PV current = 2.5A
	LOAD
PV current	INPUT BYPASS
rv current	
	OUTPUT MPPT SCHARGING
	BAIT

	PV1 current = 2.5A (dual input model)
	OUTPUT  WEYPASS  OUTPUT  WEYPASS  OUTPUT  WEYPASS  FCHARGING
	BATT
	PV2 current = 2.5A (dual input model)
	INPUT BYPASS  OUTPUT  MPPT  MPPT  MARGING  BATT
	PV power = 500W
	LOAD
	OUTPUT W MPPT CHARGING
	PV1 power = 500W (dual input model)
	[DI]
PV power	OUTPUT  W  OUTPUT  W  MPPT  MPPT  BATT
	PV2 power = 500W (dual input model)
	LOAD
	INPUT EXT W OUTPUT
	MPPT OF SCHARGING

	AC and PV charging current=50A
	LOAD LOAD
	OUTPUT  OUTPUT  PV charging current=50A  LOAD
Charging current	OUTPUT  OUTPUT  AC charging current=50A  LOAD
	OUTPUT  OUTPUT
	AC and PV charging power=500W
	OUTPUT  OUTPUT  W  OUTPUT  W  MPPT  SCHARGING  BATT  BATT  LOAD  D  LOAD
Charging power	OUTPUT  W  W  W  W  W  W  W  AC charging power=500W  LOAD
	OUTPUT CHARGING
	Battery voltage=25.5V, output voltage=230V
Battery voltage and output voltage	OUTPUT WIPPT SCHOOL SCHOOL STATE OF SCHOOL STATE OF SCHOOL SCHOOL SCHOOL SCHOOL STATE OF SCHOOL SCHO

	Output frequency=50Hz
Output frequency	DOUBLE HEQUEINCY - SOLIZ
	Load percent=70%
Load percentage	OUTPUT  WIPPT  SCHARGING
	When connected load is lower than 1kVA, load in VA will present xxxVA like below chart.
Load in VA	When load is larger than 1kVA (≥1KVA), load in VA will present x.xkVA like below chart.
	OUTPUT BYPASS OUTPUT  BYPASS  OUTPUT  BATT  BATT  BYPASS  PARGING  BATT
	When load is lower than 1kW, load in W will present xxxW like below chart.
Load in Watt	When load is larger than 1kW (≥1KW), load in W will present x.xkW like below chart.
	Battery voltage=25.5V, discharging current=1A
Battery voltage/DC discharging current	LOAD
battery voltage, be discharging current	BATT BATT

PV energy generated today and Load output energy today	This PV Today energy = 3.88kWh, Load Today energy= 9.88kWh.
PV energy generated this month and Load output energy this month.	This PV month energy = 388kWh, Load month energy = 988kWh.  LOAD  LOAD  OUTPUT  KWH  MPPT
PV energy generated this year and Load output energy this year.	This PV year energy = 3.88MWh, Load year energy = 9.88MWh.
PV energy generated totally and Load output total energy.	PV Total energy = 38.8MWh, Load Output Total energy = 98.8MWh.  LOAD  OUTPUT  MMPPT  MAPPT  M
Real date.	Real date Nov 28, 2020.  LOAD  STATE OF THE PROPERTY OF THE PR
Real time.	Real time 13:20.

Main CPU version checking.	Main CPU version 00014.04.
Secondary CPU version checking.	Secondary CPU version 00012.03.
Wi-Fi version checking.	Wi-Fi version 00000.24. LOAD  SYPASS  MPPT  CHARGING  BATT

# **Operating Mode Description**

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

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.  BYPASS  Power from utility.
Battery Mode	The unit will provide output power from battery and/or PV power.	PV energy will supply power to the loads and charge battery at the same time. No utility is available.  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.	F8
02	Over temperature	F82
03	Battery voltage is too high	F83
04	Battery voltage is too low	1584
05	Output short circuited.	F85
06	Output voltage is too high.	F88
07	Overload time out	F87
08	Bus voltage is too high	F88
09	Bus soft start failed	F88
10	PV over current	F 18
11	PV over voltage	F } }
12	DCDC over current	F 15
13	Battery discharge over current	F 13
51	Over current	FS
52	Bus voltage is too low	852
53	Inverter soft start failed	FS3
55	Over DC voltage in AC output	F <u>5</u> 5
57	Current sensor failed	887
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	
02	Over temperature	None	02@
03	Battery is over-charged	Beep once every second	□ 3
04	Low battery	Beep once every second	□ \\ \_
07	Overload	Beep once every 0.5 second	LOAD
10	Output power derating	Beep twice every 3 seconds	H□ <b>⊗</b>
15	PV energy is low.	Beep twice every 3 seconds	!5 <b>&amp;</b>
16	High AC input (>280VAC) during BUS soft start	None	164
32	Communication failure between inverter and remote display panel	None	32@
E9	Battery equalization	None	E9 <b>&amp;</b>
62	Battery is not connected	None	<b>60</b>

# **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.

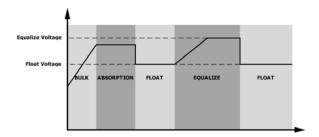
# How to Apply Equalization Function

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.

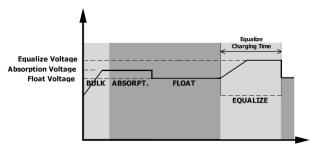
#### When to Equalize

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.

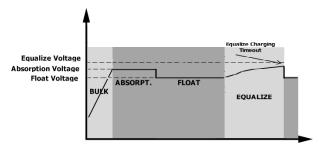


# • Equalize charging time and timeout

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

MODEL	3.6KW	7.2KW	6.5KW
Input Voltage Waveform	Sinusoidal (utility or generator)		
Nominal Input Voltage	230	Vac	120Vac
Low Loss Voltage	170Vac±7V (UPS) 90Vac±7V (Appliances)		90Vac±7V (UPS) 80Vac±7V (Appliances)
Low Loss Return Voltage		7V (UPS); (Appliances)	100Vac±7V (UPS); 90Vac±7V (Appliances)
High Loss Voltage	280Va	ac±7V	140Vac±7V
High Loss Return Voltage	270Va	ac±7V	135Vac±7V
Max AC Input Voltage	300	Vac	150Vac
Max AC Input Current	40A	60A	60A
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 de-rating: For 3.6KW/7.2KW models, when AC input voltage under 170V the output power will be de-rated. For 6.5KW model, when AC input voltage under 105V the output power will be de-rated.	Output Power  Rated Power  50% Power  90V 170V 280V 3.6K/7.2K models		

Table 2 Inverter Mode Specifications

MODEL	3.6KW	7.2KW	6.5KW	
Rated Output Power	3600W	7200W	6500W	
Output Voltage Waveform	Pure Sine Wave			
Output Voltage Regulation	230Vac±5%	230Vac±5%	120Vac±5%	
Output Frequency		60Hz or 50Hz		
Peak Efficiency	91%	93%	91%	
Overload Protection	100ms@≥205% load;5s	@≥150% load; 10s@1	110%~150% load	
Surge Capacity	2* rate	d power for 5 seconds	5	
Optional 12V DC Output	1			
DC Output	12	VDC ± 7%, 100W		
High DC Cut-off Voltage	33Vdc	66Vdc 66Vdc		
Low DC Cut-off Voltage	22Vdc	44Vdc	44Vdc	
Nominal DC Input Voltage	24Vdc	48Vdc		
Cold Start Voltage	23.0Vdc	46.0Vdc		
Low DC Warning Voltage				
@ load < 20%	23.0Vdc	46.0Vdc		
@ 20% ≤ load < 50%	21.4Vdc	42.8Vdc		
@ load ≥ 50%	20.2Vdc	dc 40.4Vdc		
Low DC Warning Return Voltage				
@ load < 20%	24.0Vdc	48.0Vdc		
@ 20% ≤ load < 50%	22.4Vdc	44.8\	Vdc	
@ load ≥ 50%	21.2Vdc	42.4\	Vdc	
Low DC Cut-off Voltage				
@ load < 20%	22.0Vdc	44.0Vdc		
@ 20% ≤ load < 50%	20.4Vdc	40.8Vdc		
@ load ≥ 50%	19.2Vdc	19.2Vdc 38.4Vdc		
High DC Recovery Voltage	32Vdc	32Vdc 64Vdc		
High DC Cut-off Voltage	33Vdc 66Vdc		dc	
DC Voltage Accuracy	+/-0.3V@ no load			
THDV	<5% for linear load,<10% for non-linear load @ nominal voltage			
DC Offset	≦100mV			

Table 3 Charge Mode Specifications

	Mode				
MODEL		3.6KW	7.2KW	6.5KW	
Charging Current	t (UPS)	224	204	1201	
@ Nominal Input Voltage		80A	80A	120A	
	Flooded	20 2Vda	F0.	4) /da	
Bulk Charging Battery		29.2Vdc	56.	4Vdc	
Voltage	AGM / Gel	28.2Vdc	56.4Vdc		
Battery		20.2 vuc	36.4VuC		
Floating Chargin	g Voltage	27Vdc	54	Vdc	
Overcharge Prote	ection	33Vdc	66	Vdc	
<b>Charging Algorit</b>	hm		3-Step		
Charging Curve		2.43vdc (2.35vdc) 2.25vdc		- 100% - 50%  Current  Time	
Solar Input					
Solar Input MODEL		3.6KW	7.2KW	6.5KW	
MODEL		<b>3.6KW</b> 4000W	<b>7.2KW</b> 8000W	<b>6.5KW</b> 8000W	
	oen Circuit	<b>3.6KW</b> 4000W 500Vdc	<b>7.2KW</b> 8000W 500Vdc	<b>6.5KW</b> 8000W 250Vdc	
MODEL Rated Power Max. PV Array Op		4000W	8000W	8000W	
MODEL Rated Power Max. PV Array Op Voltage	oltage Range	4000W 500Vdc	8000W 500Vdc 90Vdc~450Vdc	8000W 250Vdc	
MODEL Rated Power Max. PV Array Op Voltage PV Array MPPT V	oltage Range ent	4000W 500Vdc 120Vdc~450Vdc	8000W 500Vdc 90Vdc~450Vdc	8000W 250Vdc 90Vdc~230Vdc	

Table 4 General Specifications

MODEL	3.6KW	7.2KW	6.5KW
Safety Certification	CE		UL
Operating Temperature Range	-10°C to 50°C -10°C to 40°C		-10°C to 40°C
Storage temperature	-15°C~ 60°C		
Humidity	5% to 95% Relative Humidity (Non-condensing)		
Dimension (D*W*H), mm	147.4x 432.5 x 553.6		
Net Weight, kg	14.1 18.4		

Table 5 Parallel Specifications (Parallel model only)

	17
Max parallel numbers	6
Circulation Current under No Load Condition	Max 2A
Power Unbalance Ratio	<5% @ 100% Load
Parallel communication	CAN
Transfer time in parallel mode	Max 50ms
Parallel Kit	YES

Note: Parallel feature will be disabled when only PV power is available

# **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)	Re-charge battery.     Replace battery.
No response after power on.	No indication.	<ol> <li>The battery voltage is far too low. (&lt;1.4V/Cell)</li> <li>Battery polarity is connected reversed.</li> </ol>	<ol> <li>Check if batteries and the wiring are connected well.</li> <li>Re-charge battery.</li> <li>Replace battery.</li> </ol>
	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.
Mains exist but the unit works in battery mode.	Green LED is flashing.	Insufficient quality of AC power. (Shore or Generator)	<ol> <li>Check if AC wires are too thin and/or too long.</li> <li>Check if generator (if applied) is working well or if input voltage range setting is correct. (UPS→Appliance)</li> </ol>
	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.
and on repeatedly.	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.
	rault code 03	Temperature of internal converter component is over 120°C. (Only available for 1-3KVA models.)	Check whether the air flow of the unit is blocked or whether the ambient temperature is
	Fault code 02	Internal temperature of inverter component is over 100°C.	too high.
		Battery is over-charged.	Return to repair center.
Buzzer beeps continuously and	Fault code 03	The battery voltage is too high.	Check if spec and quantity of batteries are meet requirements.
red LED is on.	Fault code 01	Fan fault	Replace the fan.
	Fault code 06/58	Output abnormal (Inverter voltage below than 190Vac or is higher than 260Vac)	<ol> <li>Reduce the connected load.</li> <li>Return to repair center</li> </ol>
	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
	Fault code 52	Bus voltage is too low.	happens again, please return
	Fault code 55	Output voltage is unbalanced.	to repair center.
	Fault code 56	Battery is not connected well or fuse is burnt.	If the battery is connected well, please return to repair center.

# **Appendix I: Parallel function (Only for parallel models)**

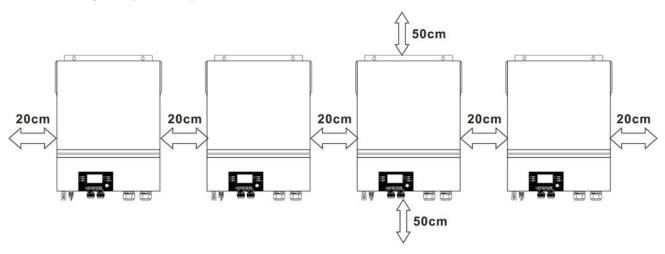
#### 1. Introduction

This inverter can be used in parallel with three different operation modes.

- 1. Parallel operation in single phase is with up to 6 units. The supported maximum output power for 7.2KW model is 43.2KW/43.2KVA. The supported maximum output power for 6.5KW model is 39KW/39KVA.
- 2. Maximum six units work together to support three-phase equipment. Maximum four units support one phase.
- 3. Maximum six units work together to support split-phase equipment only available for 6.5KW model. 5 units support one phase maximum. The supported maximum output power is 39KW/39KVA and one phase can be up to 32.5KW/32.5KVA.

# 2. Mounting the Unit

When installing multiple units, please follow below chart.



**NOTE:** For proper air circulation to dissipate heat, allow a clearance of approx. 20 cm to the side and approx. 50 cm above and below the unit. Be sure to install each unit in the same level.

#### 3. Wiring Connection

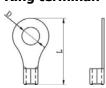
**WARNING:** It's REQUIRED to connect battery for parallel operation.

The cable size of each inverter is shown as below:

#### Recommended battery cable and terminal size for each inverter:

			Ring To	erminal	
Model	Wire Size	Cable mm <sup>2</sup>	Dime	nsions	Torque value
			D (mm)	L (mm)	
6.5KW	1*2/0AWG	67	8.4	47	5 Nm
7.2KW	1*1/0AWG	50	8.4	47	5 Nm





**WARNING:** Be sure the length of all battery cables is the same. Otherwise, there will be voltage difference between inverter and battery to cause parallel inverters not working.

#### Recommended AC input and output cable size for each inverter:

Model	AWG no.	Torque
6.5KW	4 AWG	1.4~ 1.6 Nm
7.2KW	8 AWG	1.4~ 1.6 Nm

You need to connect the cables of each inverter together. Take the battery cables for example: You need to use a connector or bus-bar as a joint to connect the battery cables together, and then connect to the battery terminal. The cable size used from joint to battery should be X times cable size in the tables above. "X" indicates the number of inverters connected in parallel.

Regarding AC input and output, please also follow the same principle.

**CAUTION!!** Please install the breaker at the battery and AC input side. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of battery or AC input.

# Recommended breaker specification of battery for each inverter:

Model	1 unit*
6.5KW	250A/70VDC
7.2KW	250A/70VDC

<sup>\*</sup>If you want to use only one breaker at the battery side for the whole system, the rating of the breaker should be X times current of 1 unit. "X" indicates the number of inverters connected in parallel.

# Recommended breaker specification of AC input with single phase:

Model	2 units	3 units	4 units	5 units	6 units
6.5KW	120A/230VAC	180A/230VAC	240A/230VAC	300A/230VAC	360A/230VAC
7.2KW	120A/230VAC	180A/230VAC	240A/230VAC	300A/230VAC	360A/230VAC

**Note 1:** Also, you can use 60A breaker for 7.2KW and 6.5KW models with only 1 unit and install one breaker at its AC input in each inverter.

**Note 2:** Regarding three-phase system, you can use 4-pole breaker directly and the rating of the breaker should be compatible with the phase current limitation from the phase with maximum units

# **Recommended battery capacity**

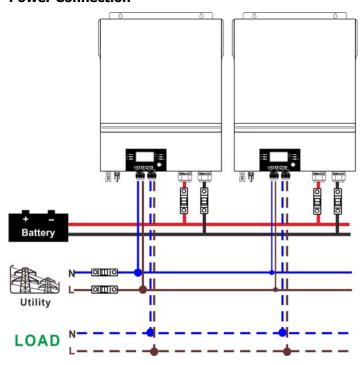
Inverter parallel numbers	2	3	4	5	6
Battery Capacity	200AH	400AH	400AH	600AH	600AH

**WARNING!** Be sure that all inverters will share the same battery bank. Otherwise, the inverters will transfer to fault mode.

# 4-1. Parallel Operation in Single phase

Two inverters in parallel:

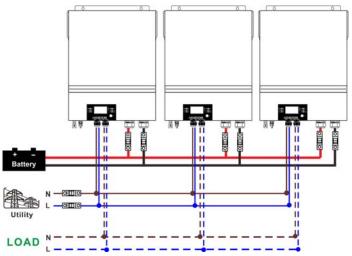
#### **Power Connection**





# Three inverters in parallel:

#### **Power Connection**

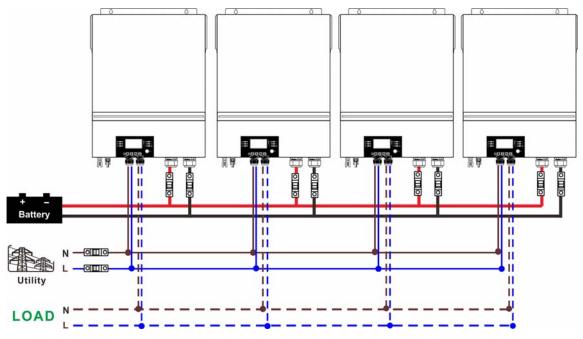


# **Communication Connection**



# Four inverters in parallel:

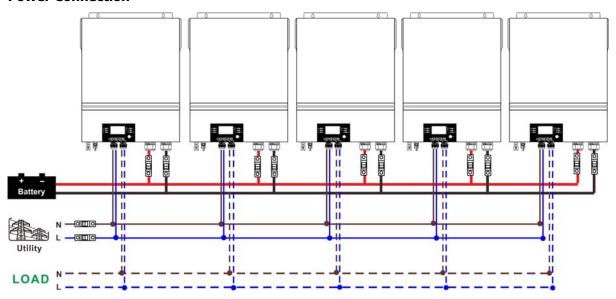
# **Power Connection**



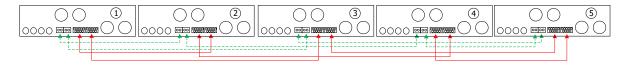


# Five inverters in parallel:

# **Power Connection**

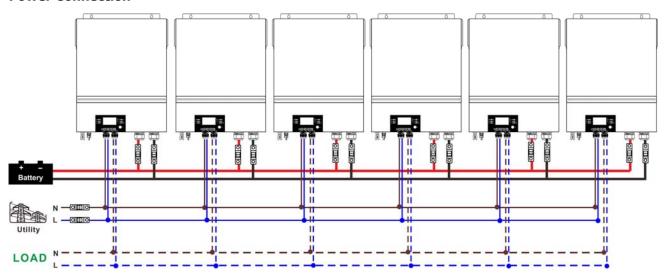


# **Communication Connection**



# Six inverters in parallel:

# **Power Connection**

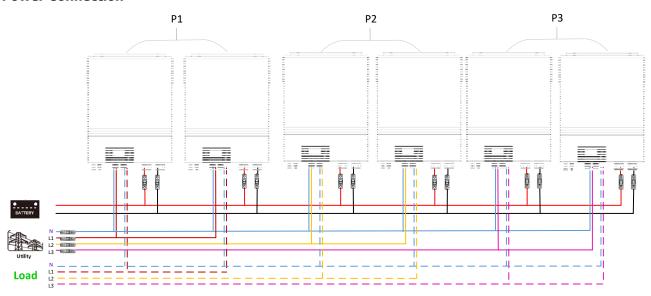




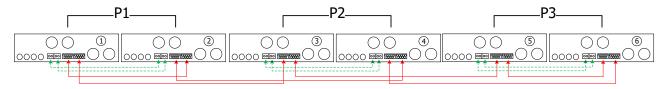
# 4-2. Support 3-phase equipment

# Two inverters in each phase:

# **Power Connection**

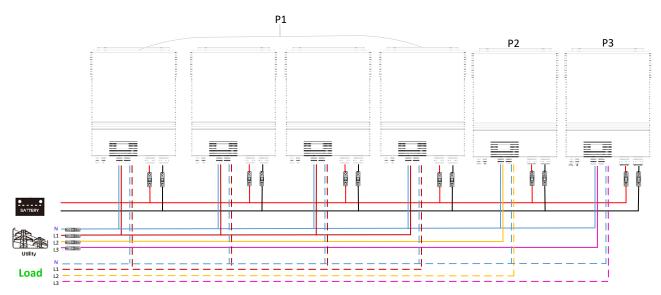


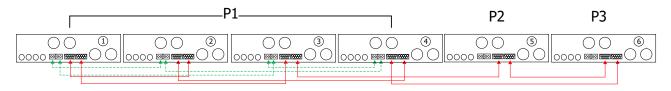
# **Communication Connection**



# Four inverters in one phase and one inverter for the other two phases:

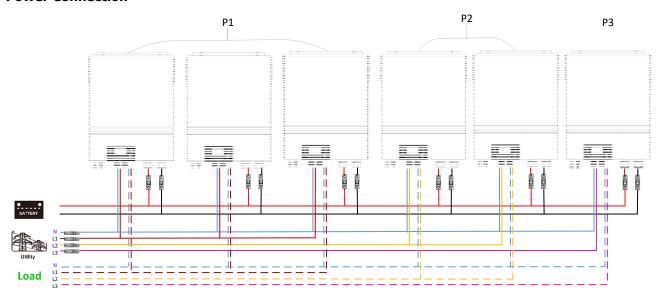
#### **Power Connection**



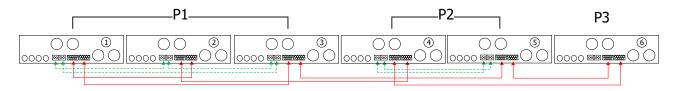


Three inverters in one phase, two inverters in second phase and one inverter for the third phase:

# **Power Connection**

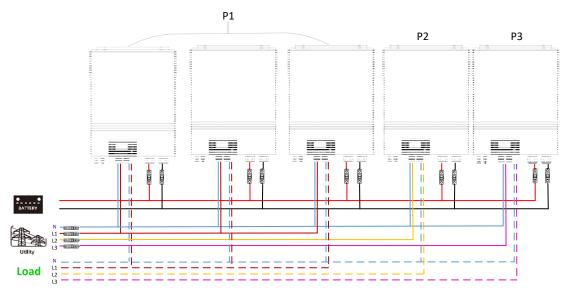


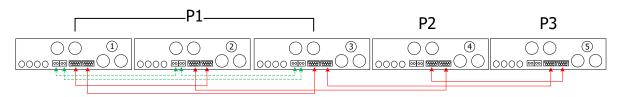
# **Communication Connection**



Three inverters in one phase and only one inverter for the remaining two phases:

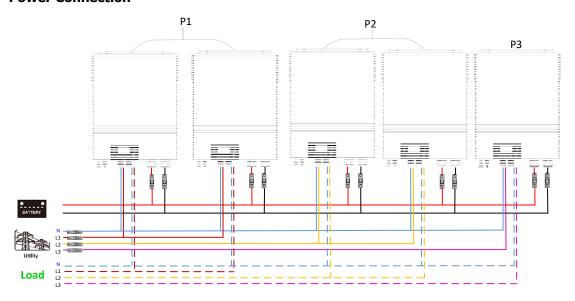
# **Power Connection**



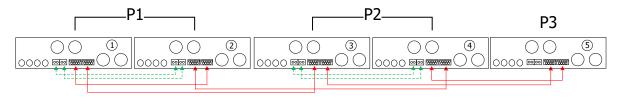


# Two inverters in two phases and only one inverter for the remaining phase:

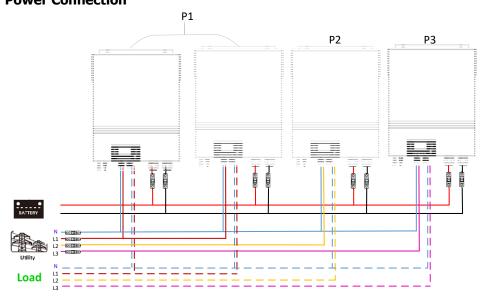
#### **Power Connection**

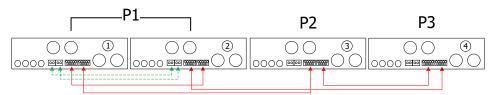


# **Communication Connection**



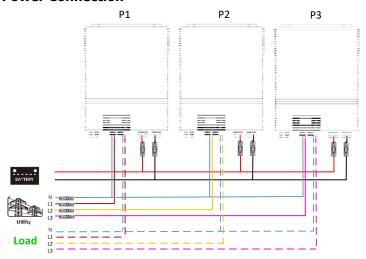
# Two inverters in one phase and only one inverter for the remaining phases: **Power Connection**



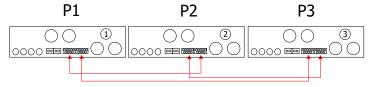


# One inverter in each phase:

#### **Power Connection**



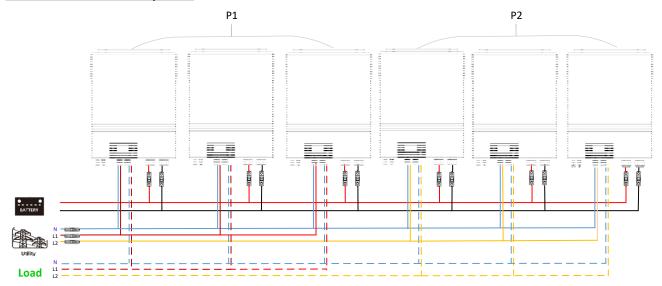
# **Communication Connection**

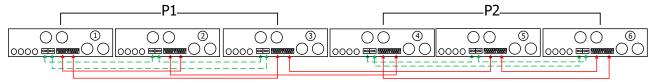


**WARNING:** Do not connect the current sharing cable between the inverters which are in different phases. Otherwise, it may damage the inverters.

# 4-3. Support split-phase equipment (only for 6.5KW model)

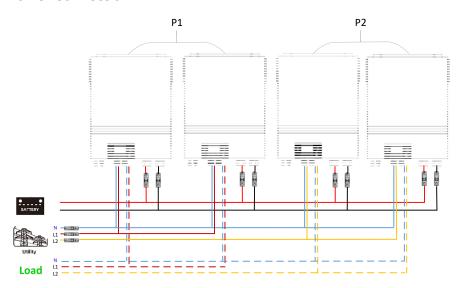
Three inverters in each phase:



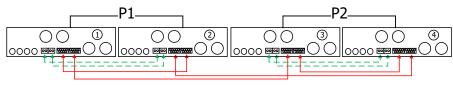


# Two inverters in each phase:

#### **Power Connection**

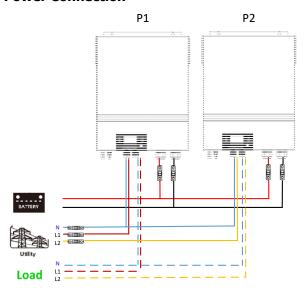


# **Communication Connection**

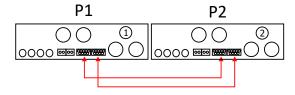


# One inverter in each phase:

#### **Power Connection**



# **Communication Connection**



# 5. PV Connection

Please refer to user manual of single unit for PV Connection.

**CAUTION:** Each inverter should connect to PV modules separately.

# 6. LCD Setting and Display

**Setting Program:** 

Program	Description	Selectable option	
		Single 28 ©	When the unit is operated alone, please select "SIG" in program 28.
		SI G	
		Parallel 😵	When the units are used in parallel for single phase application, please select "PAL" in program 28. Please refer to 5-1
		PAL	for detailed information.
		L1 phase:	When the units are operated in 3-phase application, please choose "3PX" to define each inverter. It is required to have at least 3 inverters or
		3P I	maximum 6 inverters to support three-phase equipment. It's required to
	AC output mode *This setting is able to set up only when the inverter is in standby mode. Be sure that on/off switch is in "OFF" status.	L2 phase:	have at least one inverter in each phase or it's up to four inverters in one phase.  Please refers to 5-2 for detailed information.  Please select "3P1" in program 28 for the
		3P2 L3 phase:	inverters connected to L1 phase, "3P2" in program 28 for the inverters connected to L2 phase and "3P3" in program 28 for the inverters connected to L3 phase.
28		28 🛮	Be sure to connect share current cable to units which are on the same phase.
		323	Do NOT connect share current cable between units on different phases.
		L1 for split phase:	When the units are encueted in anlit where
			When the units are operated in split phase application, please choose "2PX" to define each inverter.
		2P I	It is required to have at least 2 inverters or maximum 6 inverters to support
		L2 for split phase: (120° phase difference)	split-phase equipment. It's required to have at least one inverter in each phase or it's up to three inverters in one phase.
		58 <b>@</b>	Please refers to 5-2 for detailed information. Please select "2P1" in program 28 for the
		120   292	inverters connected to L1 phase, "2P2" in program 28 for the inverters connected to
		L2 for split phase:	L2 phase. And it can choose 120° or 180° phase difference for "2P2".
		(180° phase difference)	Be sure to connect share current cable to units which are on the same phase.
		180	Do NOT connect share current cable between units on different phases.
		265	

# Fault code display:

Fault Code	Fault Event	Icon on
60	Power feedback protection	F68
71	Firmware version inconsistent	F 7 }
72	Current sharing fault	F 72
80	CAN fault	F88
81	Host loss	F8
82	Synchronization loss	F82
83	Battery voltage detected different	F83
84	AC input voltage and frequency detected different	F84
85	AC output current unbalance	F8S
86	AC output mode setting is different	F86

#### **Code Reference:**

Code	Description	Icon on
NE	Unidentified unit master or slave	 
HS	Master unit	X
SL	Slave unit	

# 7. Commissioning

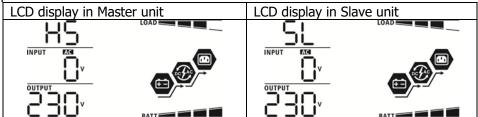
# Parallel in single phase

Step 1: Check the following requirements before commissioning:

- Correct wire connection
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

Step 2: Turn on each unit and set "PAL" in LCD setting program 28 of each unit. And then shut down all units. **NOET:** It's necessary to turn off switch when setting LCD program. Otherwise, the setting cannot be programmed.

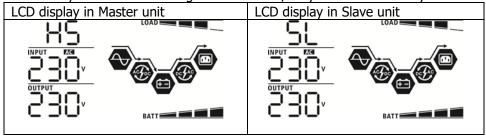
Step 3: Turn on each unit.



**NOTE:** Master and slave units are randomly defined.

Step 4: Switch on all AC breakers of Line wires in AC input. It's better to have all inverters connect to utility at the same time. If not, it will display fault 82 in following-order inverters. However, these inverters will

automatically restart. If detecting AC connection, they will work normally.



Step 5: If there is no more fault alarm, the parallel system is completely installed.

Step 6: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.

#### Support three-phase equipment

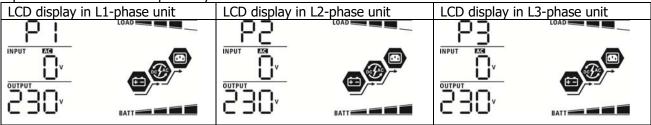
Step 1: Check the following requirements before commissioning:

- Correct wire connection
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

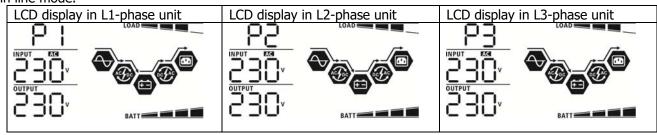
Step 2: Turn on all units and configure LCD program 28 as P1, P2 and P3 sequentially. And then shut down all units.

**NOET:** It's necessary to turn off switch when setting LCD program. Otherwise, the setting cannot be programmed.

Step 3: Turn on all units sequentially.



Step 4: Switch on all AC breakers of Line wires in AC input. If AC connection is detected and three phases are matched with unit setting, they will work normally. Otherwise, the AC icon will flash and they will not work in line mode.



Step 5: If there is no more fault alarm, the system to support 3-phase equipment is completely installed.

Step 6: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.

Note 1: To avoid overload occurring, before turning on breakers in load side, it's better to have whole system in operation first.

Note 2: Transfer time for this operation exists. Power interruption may happen to critical devices, which cannot bear transfer time.

#### Support split-phase equipment

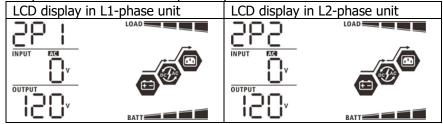
Step 1: Check the following requirements before commissioning:

- Correct wire connection
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

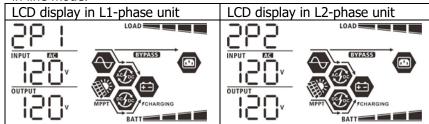
Step 2: Turn on all units and configure LCD program 28 as 2P1 and 2P2 sequentially. And then shut down all units.

**NOET:** It's necessary to turn off switch when setting LCD program. Otherwise, the setting cannot be programmed.

Step 3: Turn on all units sequentially.



Step 4: Switch on all AC breakers of Line wires in AC input. If AC connection is detected and split-phases are matched with unit setting, they will work normally. Otherwise, the AC icon will flash and they will not work in line mode.



- Step 5: If there is no more fault alarm, the system to split-phase equipment is completely installed.
- Step 6: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.
- Note 1: To avoid overload occurring, before turning on breakers in load side, it's better to have whole system in operation first.
- Note 2: Transfer time for this operation exists. Power interruption may happen to critical devices, which cannot bear transfer time.

8. Trouble shooting

J. 110	Situation	
Fault		Solution
Code	Fault Event Description	36/440/1
60	Current feedback into the inverter is detected.	<ol> <li>Restart the inverter.</li> <li>Check if L/N cables are not connected reversely in all inverters.</li> <li>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.     </li> <li>If the problem remains, please contact your installer.</li> </ol>
71	The firmware version of each inverter is not the same.	<ol> <li>Update all inverter firmware to the same version.</li> <li>Check the version of each inverter via LCD setting and make sure the CPU versions are same. If not, please contact your instraller to provide the firmware to update.</li> <li>After updating, if the problem still remains, please contact your installer.</li> </ol>
72	The output current of each inverter is different.	<ol> <li>Check if sharing cables are connected well and restart the inverter.</li> <li>If the problem remains, please contact your installer.</li> </ol>
80	CAN data loss	Check if communication cables are connected well and restart the
81	Host data loss	inverter.
82	Synchronization data loss	2. If the problem remains, please contact your installer.
83	The battery voltage of each inverter is not the same.	<ol> <li>Make sure all inverters share same groups of batteries together.</li> <li>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.</li> <li>If the problem still remains, please contact your installer.</li> </ol>
84	AC input voltage and frequency are detected different.	<ol> <li>Check the utility wiring connection and restart the inverter.</li> <li>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.</li> <li>If the problem remains, please contact your installer.</li> </ol>
85	AC output current unbalance	<ol> <li>Restart the inverter.</li> <li>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.</li> <li>If the problem remains, please contact your installer.</li> </ol>
86	AC output mode setting is different.	<ol> <li>Switch off the inverter and check LCD setting #28.</li> <li>For parallel system in single phase, make sure no 3P1, 3P2 or 3P3 is set on #28.</li> <li>For upporting three-phase system, make sure no "PAL" is set on #28.</li> <li>If the problem remains, please contact your installer.</li> </ol>

# **Appendix II: BMS Communication Installation**

#### 1. Introduction

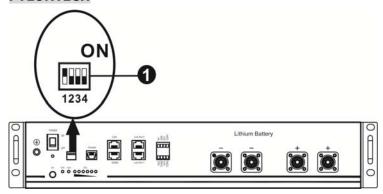
If connecting to lithium battery, it is recommended to purchase a custom-made RJ45 communication cable. Please check with your dealer or integrator for details.

This custom-made RJ45 communication cable delivers information and signal between lithium battery and the inverter. These information are listed below:

- Re-configure charging voltage, charging current and battery discharge cut-off voltage according to the lithium battery parameters.
- Have the inverter start or stop charging according to the status of lithium battery.

# 2. Lithium Battery Communication Configuration

# **PYLONTECH**



①Dip Switch: There are 4 Dip Switches that sets different baud rate and battery group address. If switch position is turned to the "OFF" position, it means "0". If switch position is turned to the "ON" position, it means "1".

Dip 1 is "ON" to represent the baud rate 9600.

Dip 2, 3 and 4 are reserved for battery group address.

Dip switch 2, 3 and 4 on master battery (first battery) are to set up or change the group address.

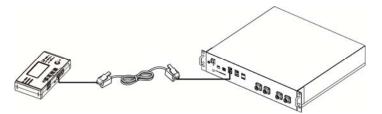
**NOTE:** "1" is upper position and "0" is bottom position.

Dip 1	Dip 2	Dip 3	Dip 4	Group address		
	0	0	0	Single group only. It's required to set up master battery with this		
	U	U	U	setting and slave batteries are unrestricted.		
	1	0	0	Multiple group condition. It's required to set up master battery on the		
1: RS485	1	U	U	first group with this setting and slave batteries are unrestricted.		
baud	_			Multiple group condition. It's required to set up master battery on the		
rate=9600	0 1	0	second group with this setting and slave batteries are unrestricted.			
	1 1 0	1	0	Multiple group condition. It's required to set up master battery on the		
Restart to		U	third group with this setting and slave batteries are unrestricted.			
take effect			0 0 1		1	Multiple group condition. It's required to set up master battery on the
	U	$\begin{bmatrix} 0 & 0 & 1 \end{bmatrix}$		fourth group with this setting and slave batteries are unrestricted.		
			4	Multiple group condition. It's required to set up master battery on the		
	1	0	1	fifth group with this setting and slave batteries are unrestricted.		

**NOTE:** The maximum groups of lithium battery is 5 and for maximum number for each group, please check with battery manufacturer.

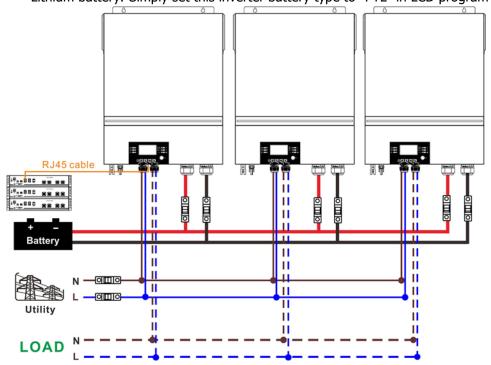
# 3. Installation and Operation

After configuration, please install LCD panel with inverter and Lithium battery with the following steps. Step 1. Use custom-made RJ45 cable to connect inverter and Lithium battery.

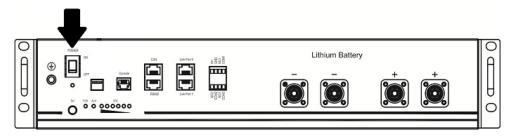


# Note for parallel system:

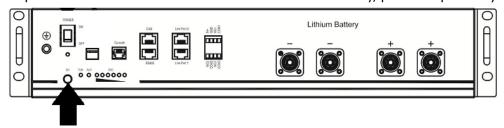
- 1. Only support common battery installation.
- 2. Use custom-made RJ45 cable to connect any inverter (no need to connect to a specific inverter) and Lithium battery. Simply set this inverter battery type to "PYL" in LCD program 5. Others should be "USE".



Step 2. Switch on Lithium battery.



Step 3. Press more than three seconds to start Lithium battery, power output ready.



Step 4. Turn on the inverter.



Step 5. Be sure to select battery type as "PYL" in LCD program 5.



# PYL

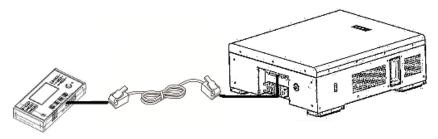
If communication between the inverter and battery is successful, the battery icon on LCD display will flash. Generally speaking, it will take longer than 1 minute to establish communication.

#### **Active Function**

This function is to activate lithium battery automatically while commissioning. After battery wiring and commissioning is successfully, if battery is not detected, the inverter will automatically activate battery if the inverter is powered on.

#### **WECO**

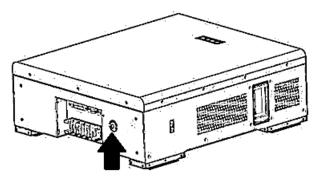
Step 1. Use a custom-made RJ45 cable to connect inverter and Lithium battery.



#### Please take notice for parallel system:

- 1. Only support common battery installation.
- 2. Use one custom-made RJ45 cable to connect any inverter (no need to connect to a specific inverter) and Lithium battery. Simply set battery type of this inverter to "WEC" in LCD program 5. The remaining inverters are set as "USE".

Step 2. Switch on Lithium battery.



Step 3. Turn on the inverter.



Step 4. Be sure to select battery type as "WEC" in LCD program 5.

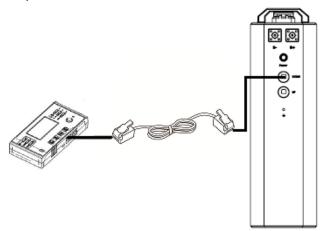




If communication between the inverter and battery is successful, the battery icon on LCD display will "flash". Generally speaking, it will take longer than 1 minute to establish communication.

# **SOLTARO**

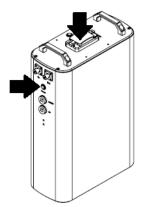
Step 1. Use a custom-made RJ45 cable to connect inverter and Lithium battery.



# Please take notice for parallel system:

- 1. Only support common battery installation.
- 2. Use one custom-made RJ45 cable to connect any inverter (no need to connect to a specific inverter) and Lithium battery. Simply set battery type of this inverter to "SOL" in LCD program 5. The remaining inverters are set as "USE".

Step 2. Open DC isolator and switch on Lithium battery.



Step 3. Turn on the inverter.



Step 4. Be sure to select battery type as "SOL" in LCD program 5.



# 50L

If communication between the inverter and battery is successful, the battery icon on LCD display will "flash". Generally speaking, it will take longer than 1 minute to establish communication.

# 4. LCD Display Information

Press "\rightar" or "\rightar" button to switch LCD display information. It will show battery pack and battery group number before "Main CPU version checking" as shown below.

 driber before Main er o version enceding as shown below.					
Selectable information	LCD display				
Battery pack numbers & Battery	Battery pack numbers = 3, battery group numbers = 1				
group numbers	DOAD  LOAD  BATT  BATT  BATT				

# **5. Code Reference**

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

Code	Description	Action
50 <b>ø</b>	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.	7 KOCK
5 l <b>a</b>	Communication lost (only available when the battery type is setting as "Pylontech Battery", "WECO Battery" or "Soltaro Battery".)  • 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 <b>ø</b>	Battery number is changed. It probably is because of communication lost between battery packs.	Press "UP" or "DOWN" key to switch LCD display until below screen shows. It will have battery number re-checked and 62 warning code will be clear.
5 <b>3a</b>	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.	
	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.	
	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 III: 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 WatchPower APP, available for both iOS and Android based device. All data loggers and parameters are saved in iCloud.

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. WatchPower App

#### 2-1. Download and install APP

#### Operating system requirement for your smart phone:

- iOS system supports iOS 9.0 and above
- Android system supports Android 5.0 and above

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





Android system

iOS system

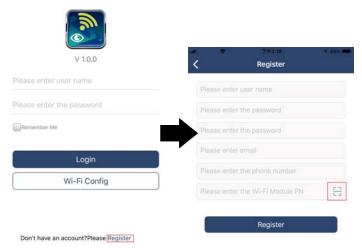
Or you may find "WatchPower" app from the Apple® Store or "WatchPower Wi-Fi" in Google® Play Store.



#### 2-2. Initial Setup

Step 1: Registration at first time

After the installation, please tap the shortcut icon to access this APP on your mobile screen. In the screen, tap "Register" to access "User Registration" page. Fill in all required information and scan the remote box PN by tapping icon. Or you can simply enter PN directly. Then, tap "Register" button.

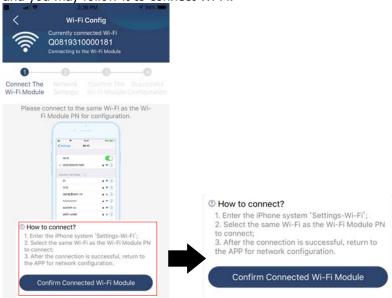


Then, a "Registration success" window will pop up. Tap "Go now" to continue setting local Wi-Fi network connection.

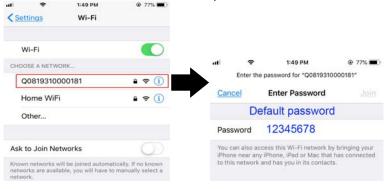


Step 2: Local Wi-Fi Module Configuration

Now, you are in "Wi-Fi Config" page. There are detailed setup procedure listed in "How to connect?" section and you may follow it to connect Wi-Fi.



Enter the "Settings→Wi-Fi" and select connected Wi-Fi name. The connected Wi-Fi name is the same to your Wi-Fi PN number and enter default password "12345678".



Then, return to WatchPower APP and tap "Confirm Connected Wi-Fi Module of button when Wi-Fi module is connected successfully.

#### Step 3: Wi-Fi Network settings

Tap 🛜 icon to select your local Wi-Fi router name (to access the internet) and enter password.



Step 4: Tap "Confirm" to complete the Wi-Fi configuration between the Wi-Fi module and the Internet.

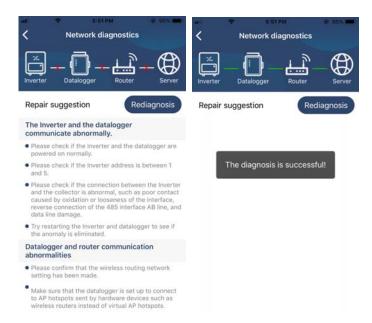


If the connection fails, please repeat Step 2 and 3.



#### Diagnose Function

If the module is not monitoring properly, please tap "Diagnosis" on the top right corner of the screen for further details. It will show repair suggestion. Please follow it to fix the problem. Then, repeat the steps in the chapter 4.2 to re-set network setting. After all setting, tap "Rediagnosis" to re-connect again.



# 2-3. Login and APP Main Function

After finishing the registration and local Wi-Fi configuration, enter registered name and password to login. Note: Tick "Remember Me" for your login convenience afterwards.



# Overview

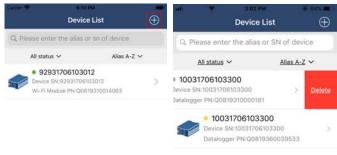
After login is successfully, you can access "Overview" page to have overview of your monitoring devices, including overall operation situation and Energy information for Current power and Today power as below diagram.



#### Devices

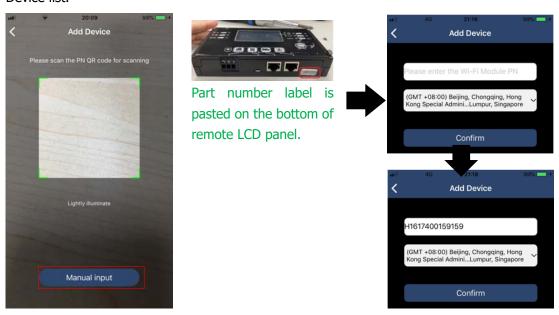
Tap the icon (located on the bottom) to enter Device List page. You can review all devices here by adding or deleting Wi-Fi Module in this page.

Add device Delete device





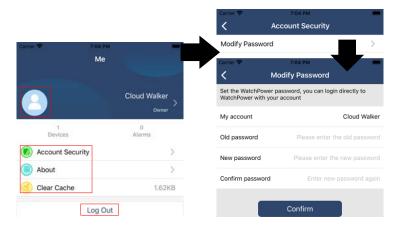
Tap icon on the top right corner and manually enter part number to add device. This part number label is pasted on the bottom of remote LCD panel. After entering part number, tap "Confirm" to add this device in the Device list.



For more information about Device List, please refer to the section 2.4.

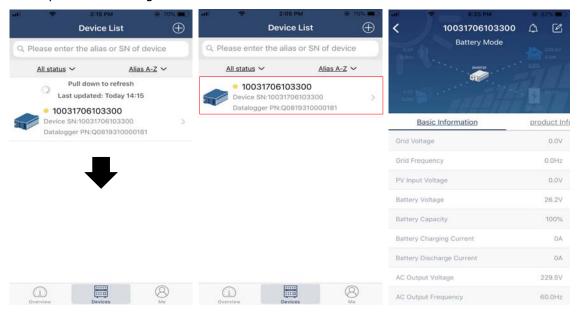
#### ME

In ME page, users can modify "My information", including [User's Photo], [Account security], [Modify password], [Clear cache], and [Log-out], shown as below diagrams.



#### 2-4. Device List

In Device List page, you can pull down to refresh the device information and then tap any device you want to check up for its real-time status and related information as well as to change parameter settings. Please refer to the parameter setting list.



# Device Mode

On the top of screen, there is a dynamic power flow chart to show live operation. It contains five icons to present PV power, inverter, load, utility and battery. Based on your inverter model status, there will be [Standby Mode], [Line Mode], [Battery Mode].

**[Standby Mode]** Inverter will not power the load until "ON" switch is pressed. Qualified utility or PV source can charge battery in standby mode.



**[Line Mode]** Inverter will power the load from the utility with or without PV charging. Qualified utility or PV source can charge battery.

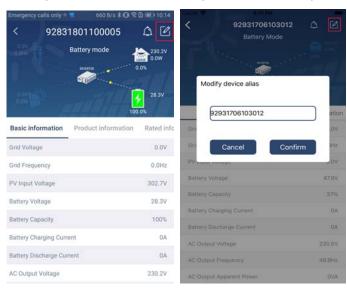


**[Battery Mode]** Inverter will power the load from the batter with or without PV charging. Only PV source can charge battery.



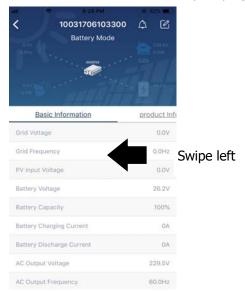
# **Device Alarm and Name Modification**

In this page, tap the icon on the top right corner to enter the device alarm page. Then, you can review alarm history and detailed information. Tap the icon on the top right corner, a blank input box will pop out. Then, you can edit the name for your device and tap "Confirm" to complete name modification.



#### **Device Information Data**

Users can check up [Basic Information], [Product Information], [Rated information], [History], and [Wi-Fi Module Information] by swiping left.



**[Basic Information]** displays basic information of the inverter, including AC voltage, AC frequency, PV input voltage, Battery voltage, Battery capacity, Charging current, Output voltage, Output frequency, Output apparent power, Output active power and Load percent. Please slide up to see more basic information.

**[Production Information]** displays Model type (Inverter type), Main CPU version, Bluetooth CPU version and secondary CPU version.

**[Rated Information]** displays information of Nominal AC voltage, Nominal AC current, Rated battery voltage, Nominal output voltage, Nominal output frequency, Nominal output current, Nominal output apparent power and Nominal output active power. Please slide up to see more rated information.

**[History]** displays the record of unit information and setting timely.

[Wi-Fi Module Information] displays of Wi-Fi Module PN, status and firmware version.

# Parameter Setting

This page is to activate some features and set up parameters for inverters. Please be noted that the listing in "Parameter Setting" page in below diagram may differ from the models of monitored inverter. Here will briefly highlight some of it, [Output Setting], [Battery Parameter Setting], [Enable/ Disable items], [Restore to the defaults] to illustrate.



There are three ways to modify setting and they vary according to each parameter.

- a) Listing options to change values by tapping one of it.
- b) Activate/Shut down functions by clicking "Enable" or "Disable" button.
- c) Changing values by clicking arrows or entering the numbers directly in the column. Each function setting is saved by clicking "Set" button.

Please refer to below parameter setting list for an overall description and be noted that the available parameters may vary depending on different models. Please always see the original product manual for detailed setting instructions.

# **Parameter setting list:**

Item		Description
Output setting	Output source	To configure load power source priority.
	priority	
	AC input range	When selecting "UPS", it's allowed to connect personal computer.
		Please check product manual for details.
		When selecting "Appliance", it's allowed to connect home appliances.
	Output voltage	To set output voltage.
	Output frequency	To set output frequency.
Battery	Battery type:	To set connected battery type.
parameter	Battery cut-off	To set the battery stop discharging voltage.
setting	voltage	Please see product manual for the recommended voltage range based
		on connected battery type.
	Back to grid	When "SBU" or "SOL" is set as output source priority and battery
	voltage	voltage is lower than this setting voltage, unit will transfer to line mode
		and the grid will provide power to load.
	Back to discharge	When "SBU" or "SOL" is set as output source priority and battery
	voltage	voltage is higher than this setting voltage, battery will be allowed to

		discharge.
	Charger source	To configure charger source priority.
	priority:	
	Max. charging	
	current	It's to set up battery charging parameters. The selectable values in different inverter model may vary.  Please see product manual for the details.
	Max. AC charging	
	current:	
	Float charging	
	voltage	
	Bulk charging voltage	It's to set up battery charging parameters. The selectable values in different inverter model may vary. Please see product manual for the details.
	Battery equalization	Enable or disable battery equalization function.
	Real-time	It's real-time action to activate battery equalization.
	Activate Battery	·
	Equalization	
	Equalized Time Out	To set up the duration time for battery equalization.
	Equalized Time	To set up the extended time to continue battery equalization.
	Equalization Period	To set up the frequency for battery equalization.
	Equalization Voltage	To set up the battery equalization voltage.
Enable/Disable	LCD Auto-return	If enable, LCD screen will return to its main screen after one minute
Functions	to Main screen	automatically.
	Fault Code	If enabled, fault code will be recorded in the inverter when any fault
	Record	happens.
	Backlight	If disabled, LCD backlight will be off when panel button is not operated for 1 minute.
	Bypass Function	If enabled, unit will transfer to line mode when overload happened in battery mode.
	Beeps while primary source interrupt	If enabled, buzzer will alarm when primary source is abnormal.
	Over	If disabled, the unit won't be restarted after over-temperature fault is
	Temperature	solved.
	Auto Restart	
	Overload Auto	If disabled, the unit won't be restarted after overload occurs.
	Restart	
	Buzzer	If disabled, buzzer won't be on when alarm/fault occurred.
RGB LED Setting	Enable/disable	Turn on or off RGB LEDs
	Brightness	Adjust the lighting brightness
	Speed	Adjust the lighting speed
	Effects	Change the light effects
	Color selection	Adjust color combination to show energy source an battery status
Restore to the default	This function is to r	restore all settings back to default settings.