USER MANUAL

INVERTER / CHARGER
11KW

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ABOUT THIS MANUAL

Purpose

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

Scope

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

SAFETY INSTRUCTIONS

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

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

INTRODUCTION

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

Features

Pure sine wave inverter
Configurable colorwith the built-in RGB LED bar
Built-in Wi-Fi for mobile monitoring (APP is required)
Built-in anti-dusk kit
LCD control module with multiple communication ports foor BMS(RS485,CAN-BUS)
Configurable input voltage ranges for home appliances and personal computers via LCD control panel
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:

1) Generator or Utility mains.
2) 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 andair conditioners.

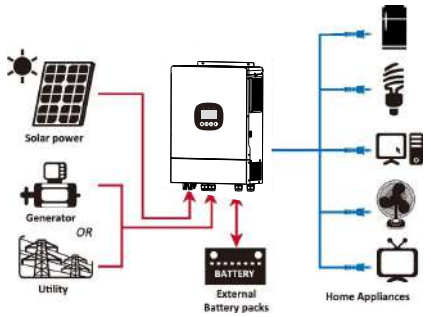
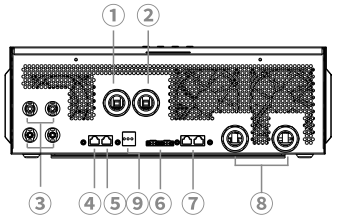
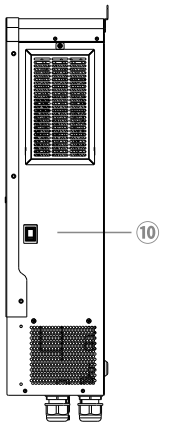


Figure 1 Basic hybrid PV System Overview

Product Overview



11KW



NOTE: 11KW are parallel models. For parallel installation and operation, please check *Appendix I.*

1. AC input connectors
2. AC output connectors (Load connection)
3. PV connectors
4. BMS communication port
5. communication port
6. Current sharing port
7. Parallel communication port
8. Battery connectors
9. Dry contact
10. Power on/off switch

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:

- The unit x 1
- User manual x 1
- Dust cover (optional)
- Parallel communication cable（only for parallel model)
- Current sharing cable（only for parallel model)
- PV connectors (2 sets for 11KW)

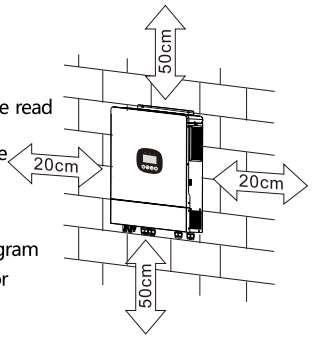
Preparation

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.

Mountingthe 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.



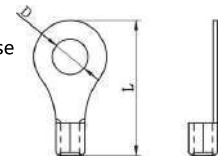
⚠ **SUITABLE FOR MOUNTING ON CONCRETE OR OTHER NON - COMBUSTIBLE SURFACE ONLY**.

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 overcurrent protection installed. Please refer to typical amperage in below table as required fuse or breaker size.

Ring terminal:



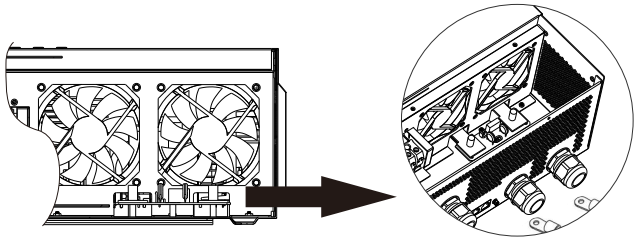
WARNING! All wiring must be performed by a qualified personnel.
WARNING! It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the proper recommended cable and terminal size as below.

Recommended battery cable and terminal size:

Model	Typical Amperage	Battery capacity	Wire Size	Cable mm^2	Ring Terminal Dimensions		Torque value
					D (mm)	L (mm)	
11KW	255A	250AH	1*0AWG	50	8.4	47	5Nm

Please follow below steps to implement battery connection:

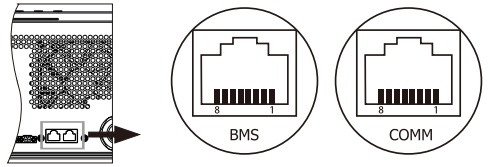
1. Assemble battery ring terminal based on recommended battery cable and terminal size.
2. Fix two cable glands into positive and negative terminals.
3. Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the nuts are tightened with torque of 5 Nm. Make sure 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 (-).

Communication Port



Pin on Rj45-BMS	Description
1	RS485-B
2	RS485-A
3	GND
4	CAN-H
5	CAN-L

Pin on Rj45-COMM	Description
1	RS485-A
2	RS485-B
8	GND

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.

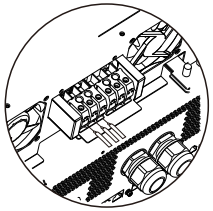
Suggested cable requirement for AC wires

Model	Gauge	Torque Value
11KW	6AWG	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.

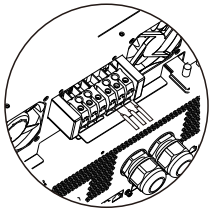
⏚→Ground (yellow-green)
L→LINE (brown or black)
N→Neutral (blue)



⚠	**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 27A.

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.

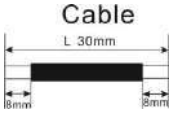
Step 3: Assemble provided PV connectors with PV modules by the following steps.

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 charts.

Insert assembled cable into female connector housing as shown below charts.

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

Insert assembled cable into male connector housing as shown below charts.

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.

Conductor cross-section (mm^2)	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	11KW
Max. PV Array Power	11000W(2x5.5KW)
Max. PV Array Open Circuit Voltage	500Vdc
PV Array MPPT Voltage Range	90Vdc~450Vdc
Start-up Voltage (Voc)	120Vdc

Recommended solar panel configuration for 11 KW model:

Solar Panel Spec. (reference) - 250Wp - Vmp: 30.7Vdc - Imp: 8.3A - Voc: 37.7Vdc - Isc: 8.4A - Cells: 60	**SOLAR INPUT 1** **Min in series: 4pcs, per input** **Max. in series: 12pcs, per input**	**SOLAR INPUT 2**	**Q'ty of panels**	**Total Input Power**
	4pcs in series	x	4pcs	1000W
	x	4pcs in series	4pcs	1000W
	12pcs in series	x	12pcs	3000W
	x	12pcs in series	12pcs	3000W
	6pcs in series	6pcs in series	12pcs	3000W
	6pcs in series, 2 strings	x	12pcs	3000W
	x	6pcs in series, 2 strings	12pcs	3000W
	8pcs in series, 2 strings	x	16pcs	4000W
	x	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

Parallel machine wire connection

Introduction

1. Up to six units connected in parallel.
2. When using the parallel operation function, the following connecting lines (package accessories) shall be firmly and reliably connected:

DB15 Parallel communication line*1: **Current sharing detection line*1:**

Final Assembly

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

Communication Connection

Wi-Fi Connection

This unit is equipped with a Wi-Fi transmitter. Wi-Fi transmitter can enable wireless communication betweer off-grid inverters and monitoring platform. Users can access and control the monitored inverter with downloaded APP. You Please install the"Lucky PV" app. The installation process require storage permission, please agree Users can download apps in the App Store and Play Store respectively. For example, IOS searches for"Lucky PV" in the App Store.

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.

RGB Light(option)

LCD Parameter Sheet(Note:91-98 only for RGB light).

Unit Status	Condition		Dry contact port: NC C NO	
			NC&C	NO&C
Power off	Unit is off and no output is powered.		Close	Open
Power on	Program 01 set as SUB	Battery votage<Low DC warning voltage	Open	Close
		Battery votage>Setting value in Program 13 or battery charging reaches floating stage	Close	Open
	Program 01 set as SBU	Battery votage<Setting value in Program 12	Open	Close
		Battery votage>Setting value in Program 13 or battery charging reaches floating stage	Close	Open

OPERATION

Power ON/OFF

Side view of unit

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

Operation and Display Panel

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

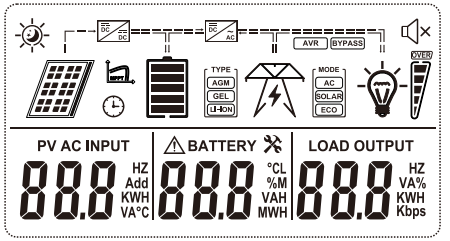
LED Indicator

LED Indicator			Messages
INV/AC	Green	Solid On	Output is powered by utility in Line mode.
		Flashing	Output is powered by battery or PV in battery mode.
CHG	Green	Solid On	Battery is fully charged.
		Flashing	Battery is charging.
FAULT	Red	Solid On	Fault occurs in the inverter.
		Flashing	Warning condition occurs in the inverter.

Function Keys

Function Key	Description
ESC	To exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode or enter setting mode

LCD Display Icons



Icon	Function Description
Input Source Information	
AC INPUT	Indicates the AC information
PV INPUT	Indicates the SOLAR information
PV AC INPUT 88.8 HZ Add KWH VA°C	Indicates input voltage, input voltage, solar voltage
Output Information	
LOAD OUTPUT 88.8 HZ VA% KWH Kbps	Indicates output voltage, output frequency, load percentage, VA in load, load watts and discharge current
Battery Information	
BATTERY 88.8 °CL %M VAH MWH	Indicates battery voltage and charging current
	The battery capacity status is 0-10%, 10-30%, 30-50%, 50-70%, 70-90% and 90~ 100%
	0%~10% / 10%~30% / 30%~50% / 50%~70% / 70%~90% / 90%~100%

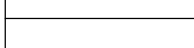
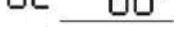
Load Information					
OVER	Indicates overload				
	Indicates load				
	0%~25%	25%~45%	45%~65%	65%~85%	85%~100%

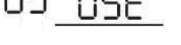
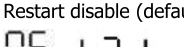
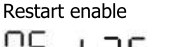
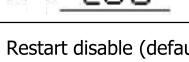
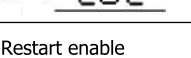
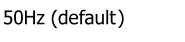
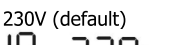
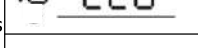
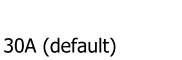
Mode Operation Information	
	Indicates unit connects to PV
	Indicates unit connects to AC
	Indicates MPPT
	Indicates the DC/DC inverter circuit is working
	Indicates the DC/AC inverter circuit is working
Buzzer Information	
	Indicates buzzer on
	Indicates buzzer off

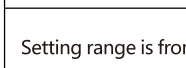
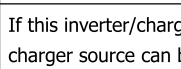
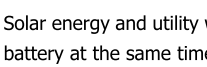
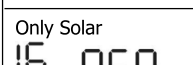
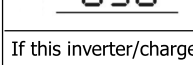
LCD Setting

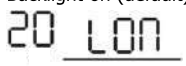
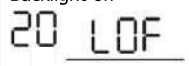
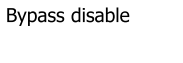
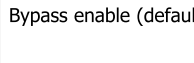
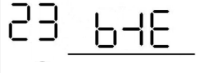
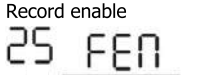
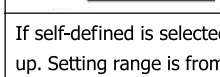
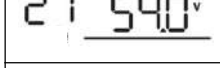
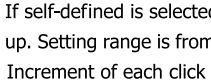
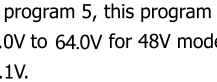
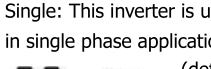
After pressing and holding ENTER button for 3 seconds, the unit will enter setting mode. Press "UP" or "DOWN" button to select setting programs. And then, press "ENTER" button to confirm the selection or ESC button to exit.

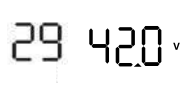
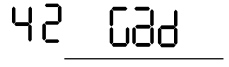
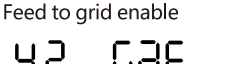
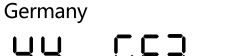
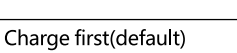
Setting Programs:

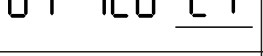
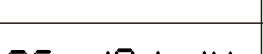
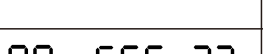
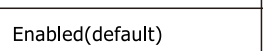
Program	Description	Selectable option	
01	Output source priority To configure load power source priority	Solar first (default) 	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, utility will supply power to the loads at the same time.
		SBU priority 	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time. Utility provides power to the loads only when battery voltage drops to either low-level warning voltage or the setting point in program 12.
02	Maximum charging current: To configure total charging current for solar and utility chargers. (Max. charging current = utility charging current + solar charging current)	60A (default) 	Setting range is from 10A to 160A Increment of each click is 10A.
03	AC input voltage range	Appliances (default) 	If selected, acceptable AC input voltage range will be within 90-280VAC.
		UPS 	If selected, acceptable AC input voltage range will be within 170-280VAC.

05	Battery type	AGM (default) 	Flooded
		User-Defined 	If "User-Defined" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 26, 27 and 29.
		Pylontech battery 	If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting.
06	Auto restart when overload occurs	Restart disable (default) 	Restart enable 
07	Auto restart when over temperature occurs	Restart disable (default) 	Restart enable 
09	Output frequency	50Hz (default) 	60Hz
10	Output voltage *available when the inverter is in standby mode(Switch off)	220V 	230V (default) 
		240V 	
11	Maximum utility charging current Note: If setting value in program 02 is smaller than that in program in 11, the inverter will apply charging current from program 02 for utility charger.	30A (default) 	Setting range is 2A,then from 10A to 120A for 11KW model.Increment of each click is 10A.
12	Setting voltage point back to utility source when selecting "SBU priority" or "Solar first" in program 01.	Available options for 48V model:	
		46V (default) 	Setting range is from 44V to 51V. Increment of each click is 1V.

13	Setting voltage point back to battery mode when selecting "SBU priority" or "Solar first" in program 01.	Available options for 48V model:	
		Battery fully charged 	54V (default)
		Setting range is from 48V to 58V. Increment of each click is 1V.	
16	Charger source priority: To configure charger source priority	If this inverter/charger is working in Line, Standby or Fault mode, charger source can be programmed as below:	
		Solar first 	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.
		Solar and Utility (default) 	Solar energy and utility will charge battery at the same time.
		Only Solar 	Solar energy will be the only charger source no matter utility is available or not.
		If this inverter/charger is working in Battery mode, only solar energy can charge battery. Solar energy will charge battery if it's available and sufficient.	
18	Alarm control	Alarm on (default) 	Alarm off 
19	Auto return to default display screen	Return to default display screen (default) 	If selected, no matter how users switch display screen, it will automatically return to default display screen (Input voltage /output voltage) after no button is pressed for 1 minute.
		Stay at latest screen 	If selected, the display screen will stay at latest screen user finally switches.

20	Backlight control	Backlight on (default) 	Backlight off 
22	Beeps while primary source is interrupted	Alarm on (default) 	Alarm off
23	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable 	Bypass enable (default) 
25	Record Fault code	Record enable 	Record disable (default) 
26	Bulk charging voltage (C.V voltage)	48V model default: 56.4V 	
		If self-defined is selected in program 5, this program can be set up. Setting range is from 48.0V to 64.0V for 48V model. Increment of each click is 0.1V.	
27	Floating charging voltage	48V model default: 54.0V 	
		If self-defined is selected in program 5, this program can be set up. Setting range is from 48.0V to 64.0V for 48V model. Increment of each click is 0.1V.	
28	AC output mode *This setting is only available when the inverter is in standby mode (Switch off).	Single: This inverter is used in single phase application.  (default)	Parallel: This inverter is operated in parallel system.
		When the inverter is operated in 3-phase application, set up inverter to be operated in specific phase.	
		L1 phase: 	L2 phase: 
		L3 phase: 	

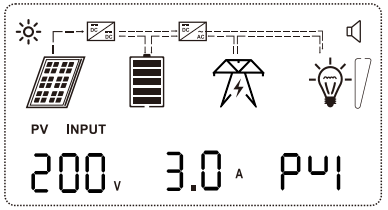
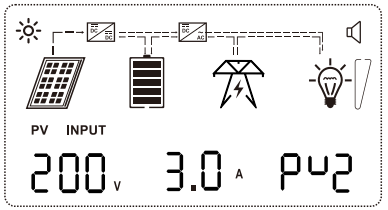
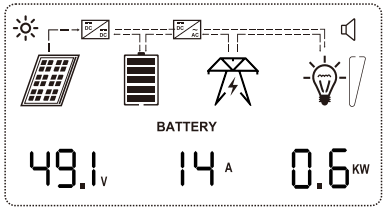
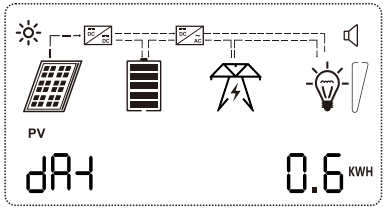
29	Low DC cut-off voltage ● If battery power is only power source available, inverter will shut down. ● If PV energy and battery power are available, inverter will charge battery without AC output. ● If PV energy, battery power and utility are all available, inverter will transfer to line mode and provide output power to loads.	48V model default: 42.0V  	
		If self-defined is selected in program 5, this program can be set up. Setting range is from 40.8V to 48.0V for 48V model. Increment of each click is 0.1V.Low DC cut-off voltage will be fixed to setting value no matter what percentage of load is connected.	
42	Solar energy feed to grid configuration	Feed to grid disable(default)  	Solar energy feed to grid disable.
		Feed to grid enable  	Solar energy feed to grid enable.
44	Set country customized regulations *Modify and restart *Reference program 09 and 10	India（Default) 	If selected,acceptable feed-in grid voltage range will be 195.5~253VAC.Acceptable feed-in grid frequency range will be 49~51Hz.
		Germany  	If selected,acceptable feed-in grid voltage range will be 184~264.5VAC.Acceptable feed-in grid frequency range will be 47.5~51.5Hz.
		South America 	If selected,acceptable feed-in grid voltage range will be 184~264.5VAC.Acceptable feed-in grid frequency range will be 57~62Hz.
47	Solar supply priority	Charge first(default)  	Solar energy provides power to charge battery as first priority.
		Load first 	Solar energy provids power to the loads as frist priority.

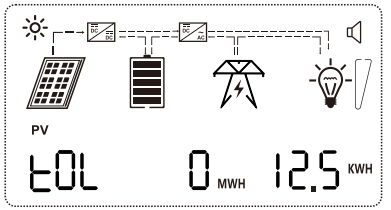
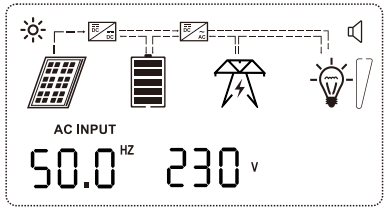
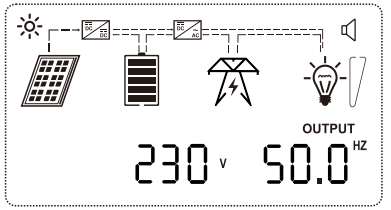
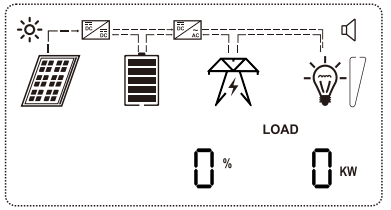
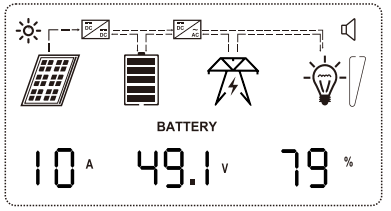
84	Real time setting--Year	 	Default 2024,range 2024~2099
85	Real time setting--Month	 	Default 01,range 01~12
86	Real time setting--Date	 	Default 01,range 01~31
87	Real time setting--Hour	 	Default 01,range 00~23
88	Real time setting--Minute	 	Default 01,range 00~59
89	Real time setting--Second	 	Default 01,range 00~59
91	On/Off control for RGB LED It's necessary to enable this setting to activate RGB LED lighting function.	Enabled(default)  	Disable
94	RGB LED effect	Solid on(default)  	Breathing
95	Data Presentation of data color Energy source(Grid-PV-Battery)and battery charge/discharge status.	Energy source(Grid-PV-Battery) (default) 	If selected,the LED color will be background color setting in #96 in AC mode.If PV power is active,the LED color will be data color setting in #97.If the remaining status,the LED color will be set in #98.
		Battery charge/discharge status 	If selected,the LED color will be background color setting in #96 in battery charging status.The LED color will be data color setting in #97 in battery discharging status.

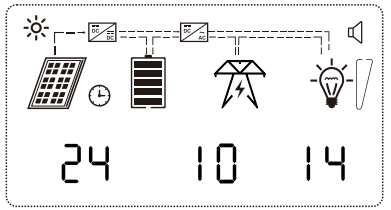
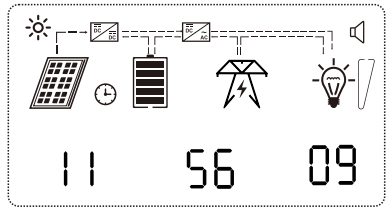
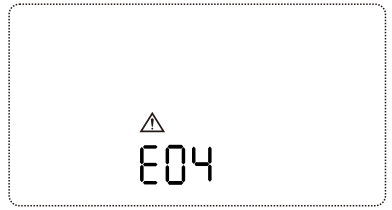
96	Data 1 color of RGB LED ▲ Invalid when RGB LED effect is set to"breathing".	Sky blue 96 SbL	Blue 96 bLU
		Green 96 UdE	Yellow 96 YEL
		Purple 96 PUd	
97	Data 2 color of RGB LED ▲ Invalid when RGB LED effect is set to"breathing".	Sky blue 97 SbL	Blue 97 bLU
		Green 97 UdE	Yellow 97 YEL
		Purple 97 PUd	
98	Data 3 color of RGB LED ▲ Invalid when RGB LED effect is set to"breathing".	Sky blue 98 SbL	Blue 98 bLU
		Green 98 UdE	Yellow 98 YEL
		Purple 98 PUd	

Display Settings

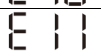
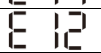
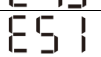
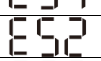
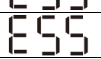
By pressing the "UP" or "DOWN", the LCD display information will be switched in turn.

Icon	Parameter Interface	LCD Display
①	Pv1 voltage=200V Pv1 current=3.0A	
②	Pv2 voltage=200V Pv2 current=3.0A	
③	Battery voltage=49.1V Charging current=14A Charging power=0.6KW	
④	Daily power generation =0.6KWH	

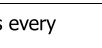
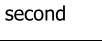
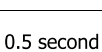
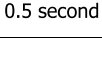
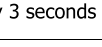
Icon	Parameter Interface	LCD Display
⑤	Total power generation =12.5KWH	
⑥	AC input frequency=50.0Hz AC input voltage=230V	
⑦	AC output voltage=230V AC output frequency=50.0Hz	
⑧	Load percentage=0% Load power=0KW	
⑩	Discharging current=10A Battery voltage=49.1V Battery capacity=79%	

Icon	Parameter Interface	LCD Display
⑩	Date Display	
⑪	Date Display	
⑫	Accident Details (Refer to Fault Reference Code)	

Faults Reference Code

Fault Code	Fault Event	Icon on
01	Fan is locked when inverter is off.	
02	Over temperature	
03	Battery voltage is too high	
04	Battery voltage is too low	
05	Output short circuited.	
06	Output voltage is too high.	
07	Overload time out	
08	Bus voltage is too high	
09	Bus soft start failed	
10	PV over current	
11	PV over voltage	
12	DCDC over current	
13	Battery discharge over current	
51	Over current	
52	Bus voltage is too low	
53	Inverter soft start failed	
55	Over DC voltage in AC output	
57	Current sensor failed	
58	Output voltage is too low	

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	
03	Battery is over-charged	Beep once every second	
04	Low battery	Beep once every second	
07	Overload	Beep once every 0.5 second	
10	Output power derating	Beep twice every 3 seconds	
15	PV energy is low.	Beep twice every 3 seconds	
16	High AC input (>280VAC) during BUS soft start	None	
32	Communication failure between inverter and dispaly panel	None	
bP	Battery is not connected	None	

SPECIFICATIONS

Table 1 Line Mode Specifications

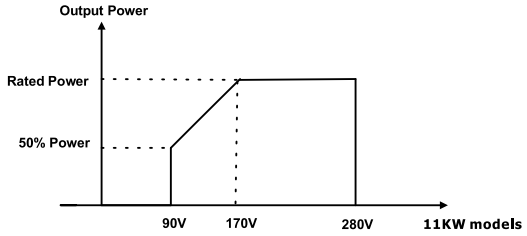
MODEL	11KW
Input Voltage Waveform	Sinusoidal (utility or generator)
Nominal Input Voltage	230Vac
Low Loss Voltage	170Vac±7V (UPS) 90Vac±7V (Appliances)
Low Loss Return Voltage	180Vac±7V (UPS); 100Vac ±7V (Appliances)
High Loss Voltage	280Vac±7V
High Loss Return Voltage	270Vac±7V
Max AC Input Voltage	300Vac
Max AC Input Current	80A
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 11KW models, when AC input voltage under 170V the output power will be de-rated.	

Table 2 Inverter Mode Specifications

MODEL	11KW
Rated Output Power	11000W
Output Voltage Waveform	Pure Sine Wave
Output Voltage Regulation	230Vac±5%
Output Frequency	60Hz or 50Hz
Peak Efficiency	93%
Overload Protection	100ms@≥205% load;3s@≥150% load; 5s@110%~150% load
Surge Capacity	2* rated power for 5 seconds
High DC Cut-off Voltage	66Vdc
Low DC Cut-off Voltage	44Vdc
Nominal DC Input Voltage	48Vdc
Cold Start Voltage	46.0Vdc
Low DC Warning Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	 46.0Vdc 42.8Vdc 40.4Vdc
Low DC Warning Return Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	 48.0Vdc 44.8Vdc 42.4Vdc
Low DC Cut-off Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	 44.0Vdc 40.8Vdc 38.4Vdc
High DC Recovery Voltage	64Vdc
High DC Cut-off Voltage	66Vdc
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

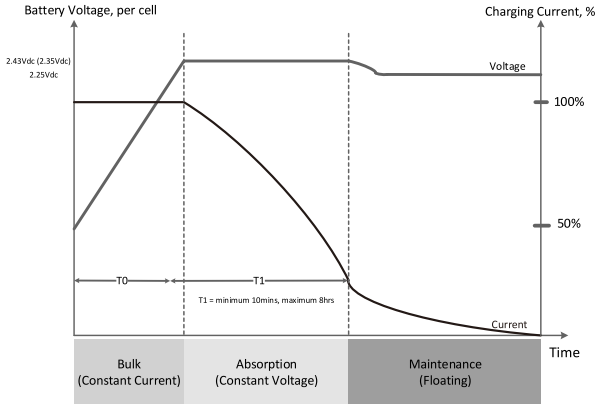
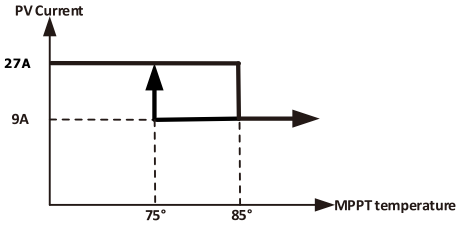
Utility Charging Mode		
MODEL		**11KW**
Charging Current (UPS) @ Nominal Input Voltage		120A
Bulk Charging Voltage	**Flooded Battery**	58.4Vdc
	AGM / Gel Battery	56.4Vdc
Floating Charging Voltage		54Vdc
Overcharge Protection		66Vdc
Charging Algorithm		3-Step
Charging Curve		
Solar Input		
MODEL		**11KW**
Rated Power		5500Wx2
Max. PV Array Open Circuit Voltage		500Vdc
PV Array MPPT Voltage Range		90Vdc~450Vdc
Max. Input Current		27Ax2
Start-up Voltage		120Vdc+/-5Vdc
Maximum Charging Current		80Ax2
Power Limitation		

Table 4 General Specifications

MODEL	**11KW**
Safety Certification	CE
Operating Temperature Range	-10°Cto40°C
Storage temperature	-15°C~ 60°C
Humidity	5% to 95% Relative Humidity (Non-condensing)
Product size(D.W.H)	430mm*618mm*152mm
Packing size(D.W.H)	525mm*700mm*225mm
N.W(kg)	18.3KG
G.W(kg)	20.7KG

Table 5 Parallel Specifications (Parallel model only)

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

Appendix I: Parallel function (Only for parallel models)

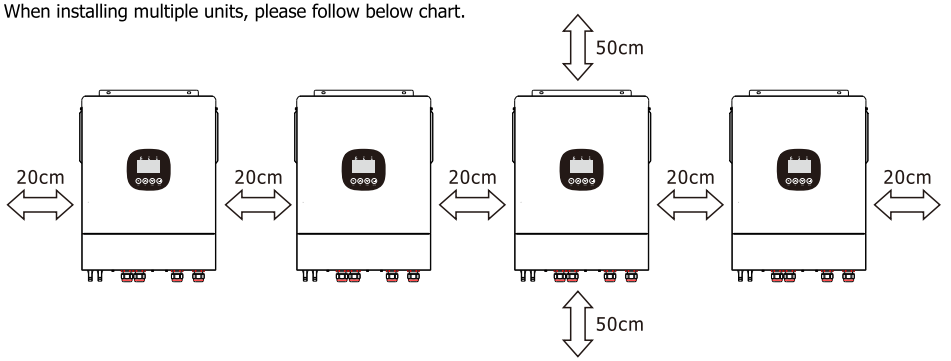
1. Introduction

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 11KW model is 66KW/66KVA.
2. Maximum six units work together to support three-phase equipment. Maximum four units support one phase.

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

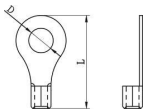
WARNING: It's REQUIRED to connect battery for parallel operation.

The cable size of each inverter is shown as below:

Recommended battery cable and terminal size for each inverter:

Model	Wire Size	Cable mm²	Ring Terminal Dimensions		Torque value
			D (mm)	L (mm)	
11KW	1x0AWG	50	8.4	47	5 Nm

Ring terminal:



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
11KW	6 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*
11KW	250A/70VDC

*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
11KW	160A/230VAC	240A/230VAC	320/230VAC	400A/230VAC	480A/230VAC

Note 1: Also, you can use 80A breaker for 11KW 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

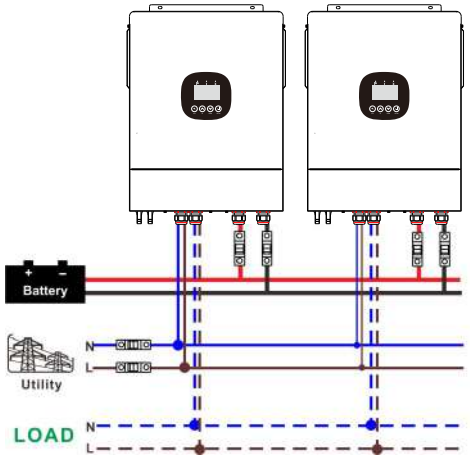
Inverter parallel numbers	2	3	4	5	6
Battery Capacity	400AH	400AH	600AH	600AH	600AH

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

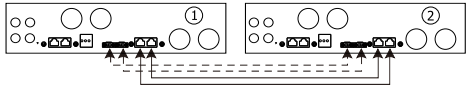
4-1. Parallel Operation in Single phase

Two inverters in parallel:

Power Connection

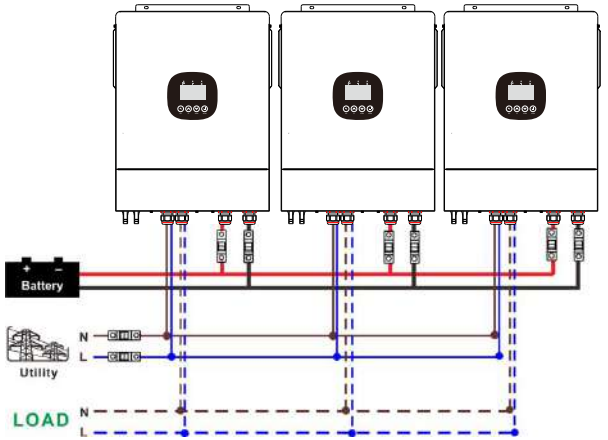


Communication Connection

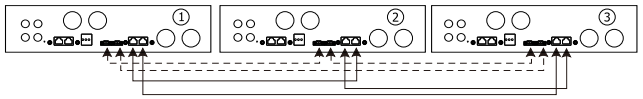


Three inverters in parallel:

Power Connection

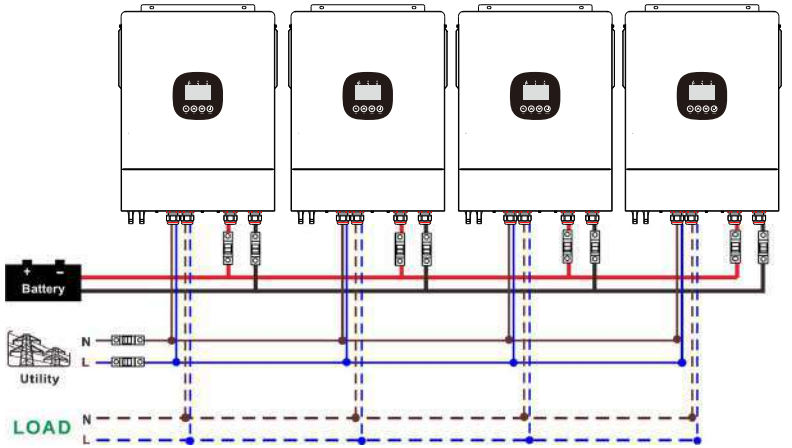


Communication Connection

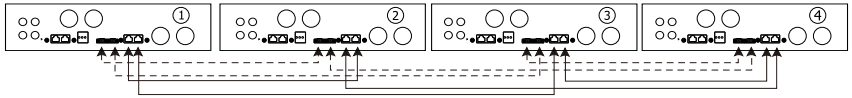


Four inverters in parallel:

Power Connection

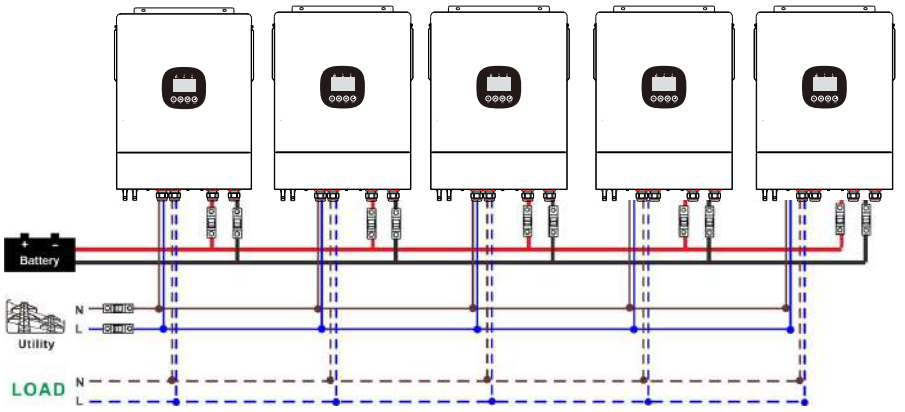


Communication Connection

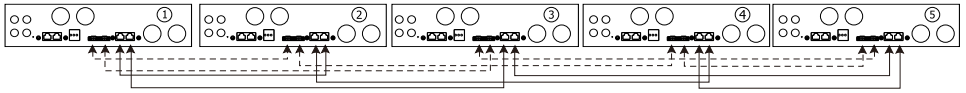


Five inverters in parallel:

Power Connection

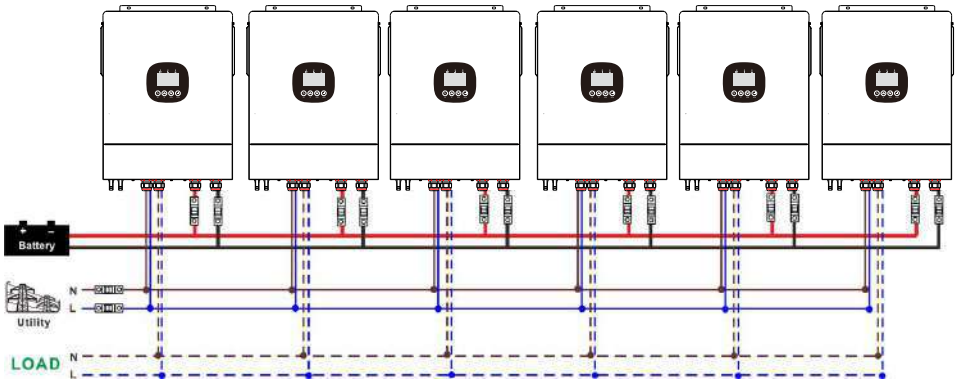


Communication Connection

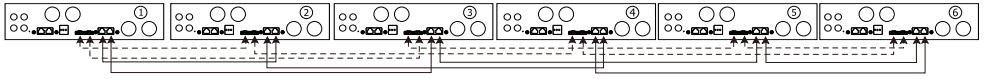


Six inverters in parallel:

Power Connection



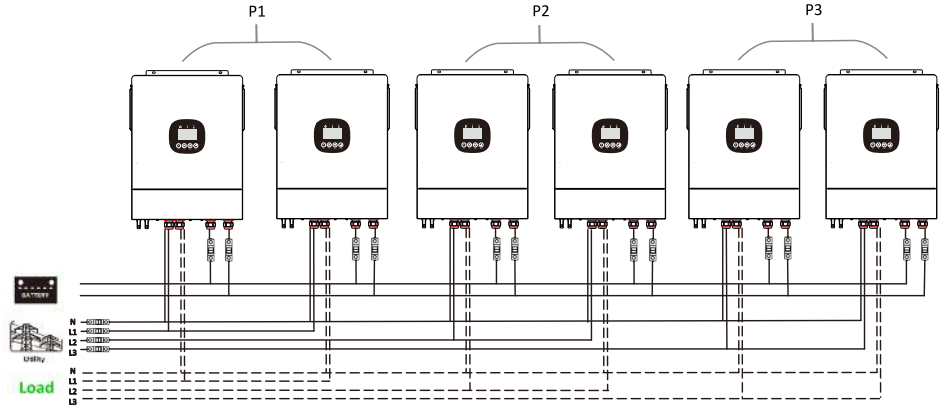
Communication Connection



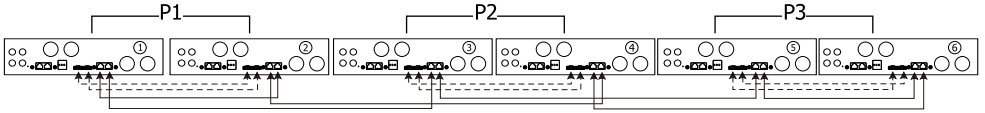
4-2. Support 3-phase equipment

Two inverters in each phase:

Power Connection

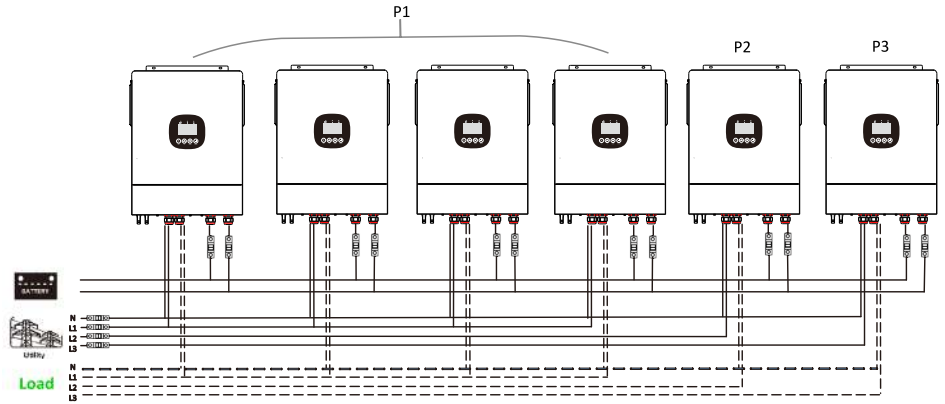


Communication Connection

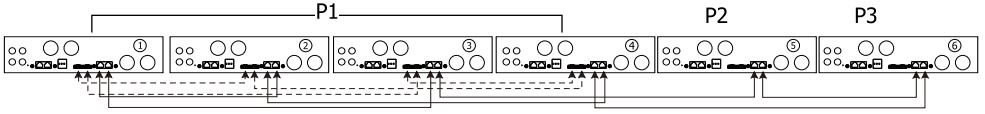


Four inverters in one phase and one inverter for the other two phases:

Power Connection

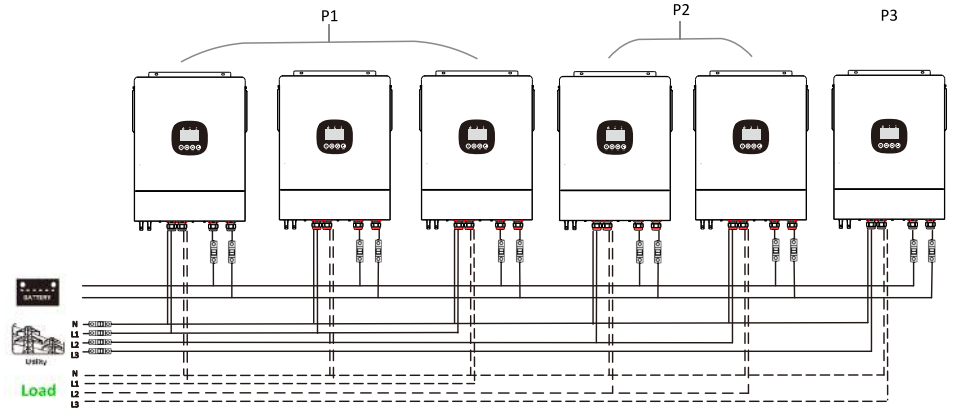


Communication Connection

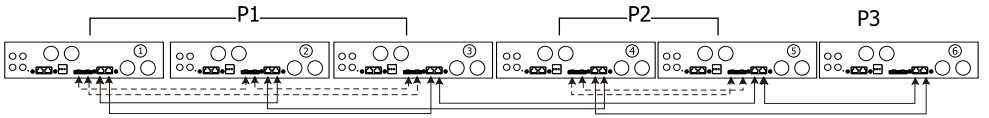


Three inverters in one phase, two inverters in second phase and one inverter for the third phase:

Power Connection

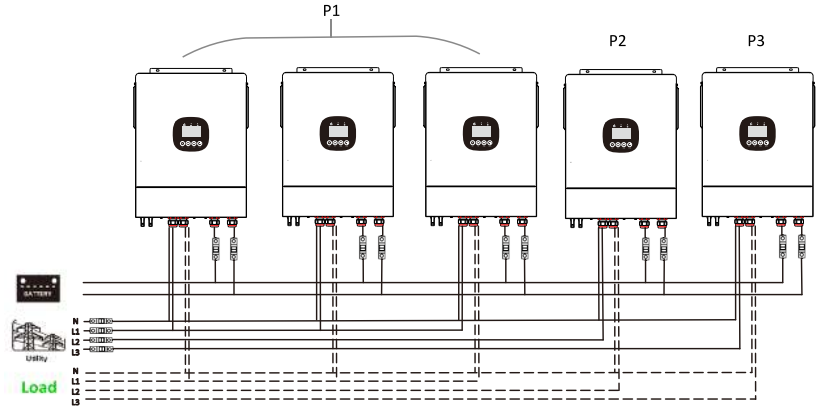


Communication Connection

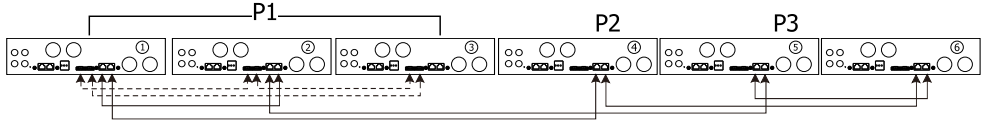


Three inverters in one phase and only one inverter for the remaining two phases:

Power Connection

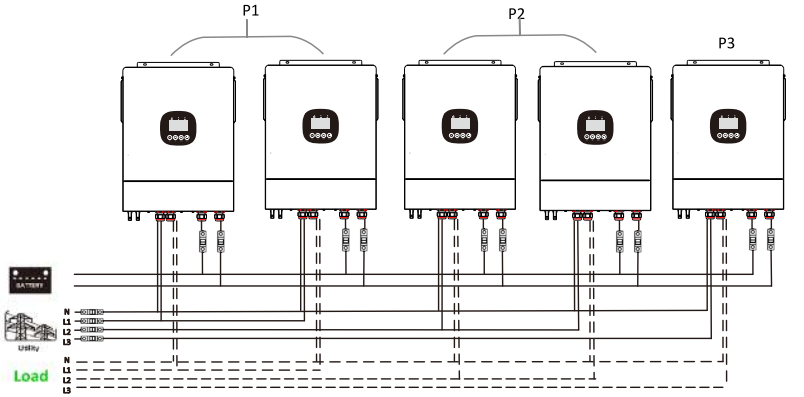


Communication Connection

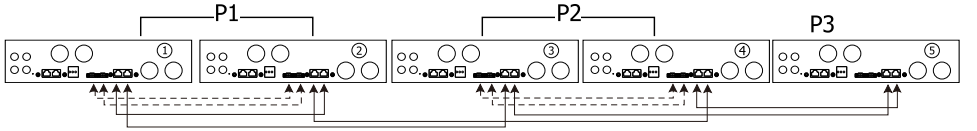


Two inverters in two phases and only one inverter for the remaining phase:

Power Connection

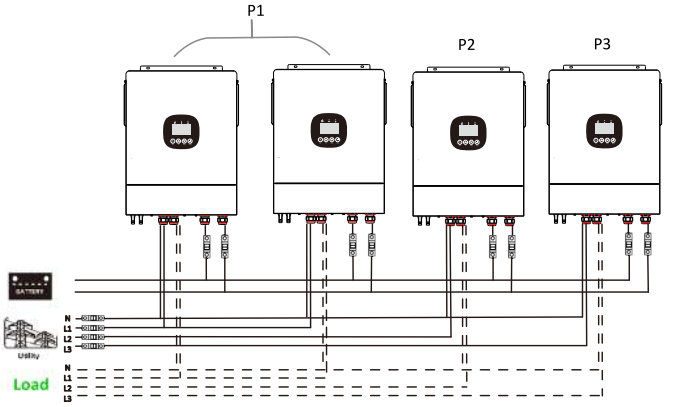


Communication Connection

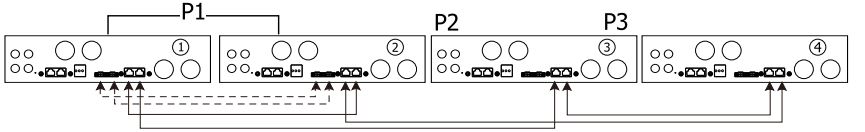


Two inverters in one phase and only one inverter for the remaining phases:

Power Connection

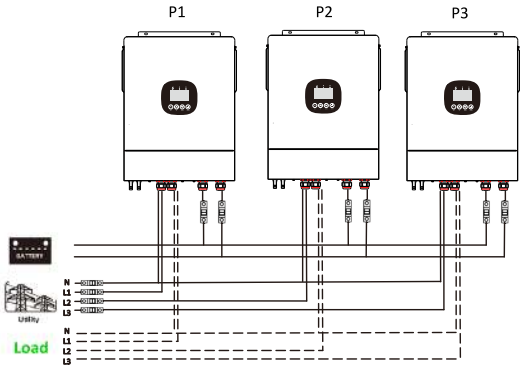


Communication Connection

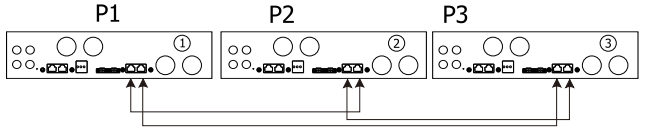


One inverter in each phase:

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.

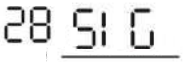
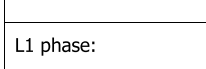
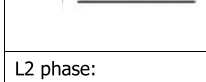
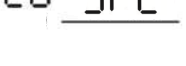
5. PV Connection

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	
28	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.	Single 	When the unit is operated alone, please select "SIG" in program 28.
		Parallel 	When the units are used in parallel for single phase application, please select "PAL" in program 28. Please refer to 4-1 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 maximum 6 inverters to support three-phase equipment. It's required to have at least one inverter in each phase or it's up to four inverters in one phase. Please refers to 4-2 for detailed information. Please select "3P1" in program 28 for the 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. Be sure to connect share current cable to units which are on the same phase. Do NOT connect share current cable between units on different phases.
		L2 phase: 	
		L3 phase: 	

Fault code display:

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

Code Reference:

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

7. Commissioning

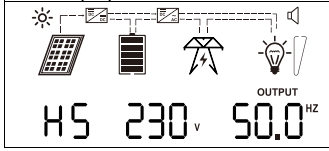
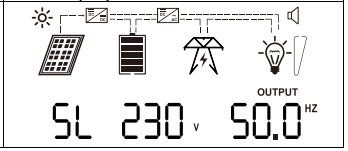
Parallel in single phase

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.

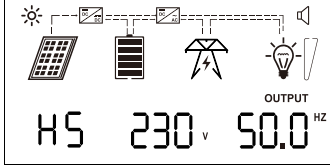
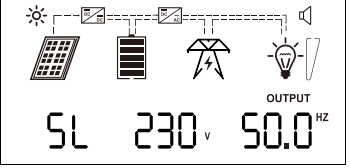
Step 3: Turn on each unit.

LCD display in Master unit	LCD display in Slave 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.

LCD display in Master unit	LCD display in Slave unit
	

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

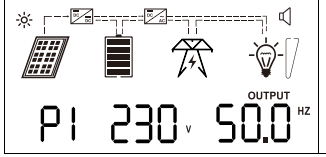
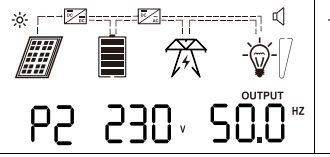
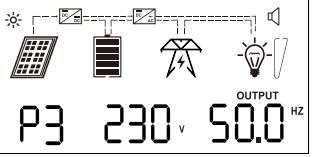
Step 1: Check the following requirements before commissioning:

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

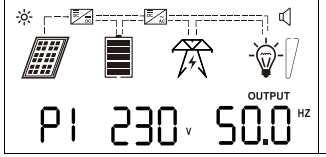
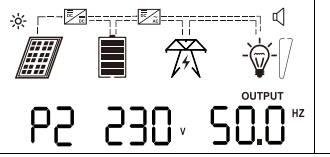
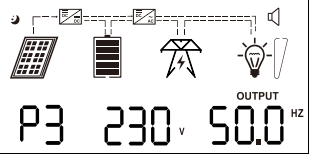
Step 2: Turn on all units and configure LCD program 28 as P1, P2 and P3 sequentially. And then shut down all units.

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.

LCD display in L1-phase unit	LCD display in L2-phase unit	LCD display in L3-phase unit
		

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, they will not work in line mode.

LCD display in L1-phase unit	LCD display in L2-phase unit	LCD display in L3-phase unit
		

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.

8. Trouble shooting

Situation		Solution
Fault Code	Fault Event Description	
60	Current feedback into the inverter is detected.	1. Restart the inverter. 2. Check if L/N cables are not connected reversely in all inverters. 3. For parallel system in single phase, make sure the sharing are connected in all inverters. For supporting three-phase system, make sure the sharing cables are connected in the inverters in the same phase, and disconnected in the inverters in different phases. 4. If the problem remains, please contact your installer.
71	The firmware version of each inverter is not the same.	1. Update all inverter firmware to the same version. 2. Check the version of each inverter via LCD setting and make sure the CPU versions are same. If not, please contact your installer to provide the firmware to update. 3. After updating, if the problem still remains, please contact your installer.
72	The output current of each inverter is different.	1. Check if sharing cables are connected well and restart the inverter. 2. If the problem remains, please contact your installer.
80	CAN data loss	1. Check if communication cables are connected well and restart the inverter. 2. If the problem remains, please contact your installer.
81	Host data loss	
82	Synchronization data loss	
83	The battery voltage of each inverter is not the same.	1. Make sure all inverters share same groups of batteries together. 2. Remove all loads and disconnect AC input and PV input. Then, check battery voltage of all inverters. If the values from all inverters are close, please check if all battery cables are the same length and same material type. Otherwise, please contact your installer to provide SOP to calibrate battery voltage of each inverter. 3. If the problem still remains, please contact your installer.
84	AC input voltage and frequency are detected different.	1. Check the utility wiring conncetion and restart the inverter. 2. Make sure utility starts up at same time. If there are breakers installed between utility and inverters, please be sure all breakers can be turned on AC input at same time. 3. If the problem remains, please contact your installer.
85	AC output current unbalance	1. Restart the inverter. 2. Remove some excessive loads and re-check load information from LCD of inverters. If the values are different, please check if AC input and output cables are in the same length and material type. 3. If the problem remains, please contact your installer.
86	AC output mode setting is different.	1. Switch off the inverter and check LCD setting #28. 2. For parallel system in single phase, make sure no 3P1, 3P2 or 3P3 is set on #28. For upporting three-phase system, make sure no "PAL" is set on #28. 3. If the problem remains, please contact your installer.

Appendix II: BMS Communication Installation

1. Introduction

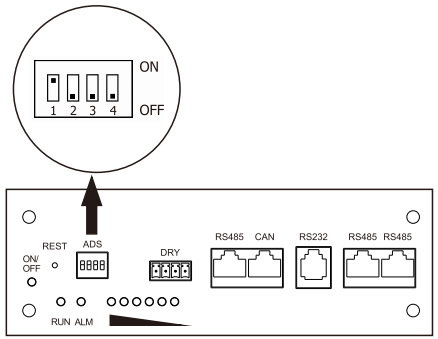
If connecting to lithium battery, it is recommended to purchase a custom-made RJ45 communication cable. Please check with your dealer or integrator for details.

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

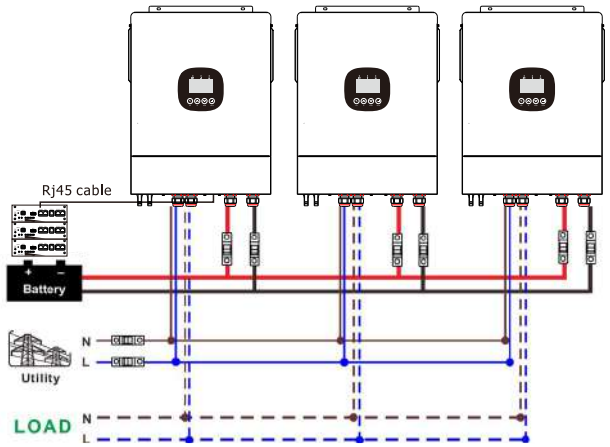
PYLONTECH



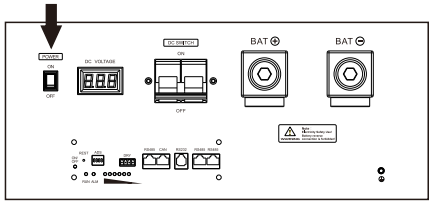
When the PACK is used in parallel, the address can be set by the DIP switch on the BMS to distinguish different PACKS, and the address needs to be avoided to be set to the same, and the definition of the BMS DIP switch is referred to the following table.

3. Note for parallel system:

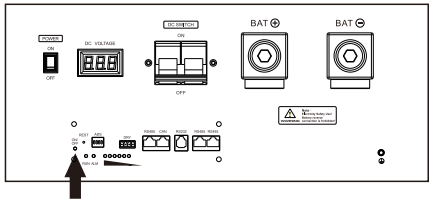
1. Only support common battery installation.
2. Use custom-made RJ45 cable to connect any inverter (no need to connect to a specific inverter) and Lithium battery. Simply set this inverter battery type to "PYL" in LCD program 5. Others should be "USE".



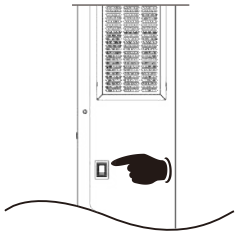
Step 2. Switch on Lithium battery.



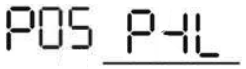
Step 3. Press more than three seconds to start Lithium battery, power output ready.



Step 4. Turn on the inverter.



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



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

4. Code Reference

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

Code	Description
40	If battery status is not allowed to charge and discharge after the communication between the inverter and battery is successful, it will show code 40 to stop charging.
41	Communication lost (only available when the battery type is setting as "pylontech Battery”). ● After battery is connected, communication signal is not detected for 3 minutes,buzzer will beep. ● Communication lost occurs after the inverter and battery is connected successfully,buzzer beeps immediately.
42	If battery status is not allowed to charge after the communication between the inverter and battery is successful, it will show code 42 to stop charging battery.
43	If battery status must to be charged after the communication between the inverter and battery is successful, it will show code 43 to charge battery.
44	If battery status is not allowed to discharge after the communication between the inverter and battery is successful, it will show code 44.

Parameter setting list:

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.

Item		Description
Output setting	Output source priority	To configure load power source 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 parameter setting	Battery type:	To set connected battery type.
	Battery cut-off voltage	To set the battery stop discharging voltage. Please see product manual for the recommended voltage range based on connected battery type.
	Back to grid voltage	When "SBU" or "SUB" is set as output source priority and battery voltage is lower than this setting voltage, unit will transfer to line mode and the grid will provide power to load.
	Back to discharge voltage	When "SBU" or "SUB" is set as output source priority and battery voltage is higher than this setting voltage, battery will be allowed to discharge.
	Charger source priority:	To configure charger source 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 Activate Battery Equalization	It's real-time action to 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 Functions	LCD Auto-return to Main screen	If enable, LCD screen will return to its main screen after one minute automatically.
	Fault Code Record	If enabled, fault code will be recorded in the inverter when any fault 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 Temperature Auto Restart	If disabled, the unit won't be restarted after over-temperature fault is solved.
	Overload Auto Restart	If disabled, the unit won't be restarted after overload occurs.
	Buzzer	If disabled, buzzer won't be on when alarm/fault occurred.
RGB LED Setting	Enable/disable	Turn on or off RGB LEDs
	Effects	Change the light effects
	Color selection	Adjust color combination to show energy source an battery status