VEVOR

Upgrade · The Home Creator Way

GD3024JMH

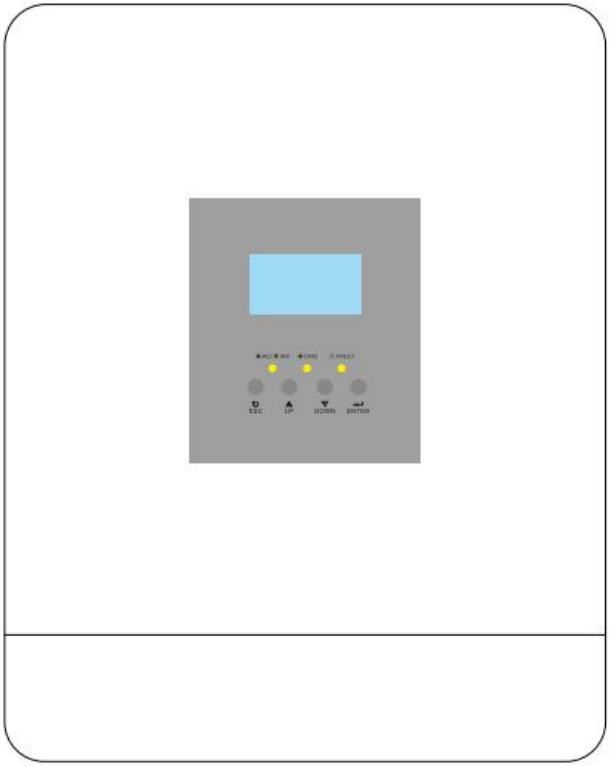
VEVOR Support Center

HYBRID SOLAR INVERTER

MODEL:GD3024JMH

VEVOR | Upgrade
The Home Creator Way

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This is the original instruction, please read all manual instructions carefully before operating. VEVOR reserves a clear interpretation of our user manual. The appearance of the product shall be subject to the product you received. Please forgive us that we won't inform you again if there are any technology or software updates on our product.

	Warning-To reduce the risk of injury, user must read instructions manual carefully.
	This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)This device may not cause harmful interference, and (2)this device must accept any interference received, including interference that may cause undesired operation.
	This product is subject to the provision of European Directive 2012/19/EC. The symbol showing a wheelie bin crossed through indicates that the product requires separate refuse collection in the European Union. This applies to the product and all accessories marked with this symbol. Products marked as such may not be discarded with normal domestic waste, but must be taken to a collection point for recycling electrical and electronic devices

Warning-To reduce the risk of injury, user must read instructions manual carefully.
WARNING: Only use the supply unit provided with this appliance.
1、The product complies with relevant standards and regulations. Installation of this device must comply with all applicable regulations, and it should only be operated in well-ventilated areas. Please read the user manual before installing and using this equipment.
2、This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
3、Children shall not play with the appliance.
4、This appliance is intended to be used in household and similar applications such as:
– farm houses;
5、Please use the product according to the intended use, warn of potential injury from misuse.
6、Please use the product according to the intended use, warn of potential injury from misuse..
7、Switch off the appliance and disconnect from supply before changing accessories or approaching parts that move in use.
8、Always disconnect the appliance from the supply if it is left unattended and before assembling, disassembling or cleaning
9、WARNING: Use only an external supply with the following specifications: See table"Technical datasheet"

1 About This Manual

1.1 Purpose

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

1.2 Scope

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

2 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. One piece of 150A fuse is provided as over - current protection for the battery supply.
11. GROUNDING INSTRUCTIONS - This inverter/ charger should be connected to a permanent grounder 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.

3 Introduction

This is a multi-function Inverter/charger, combining functions of inverter, solar charger and battery charger to offer uninterruptible power support with portable size. Its comprehensive LCD display offers user-configurable and easy-accessible button operation such as battery charging current, AC/solar charger priority, and acceptable input voltage based on different applications.

3.1 Features

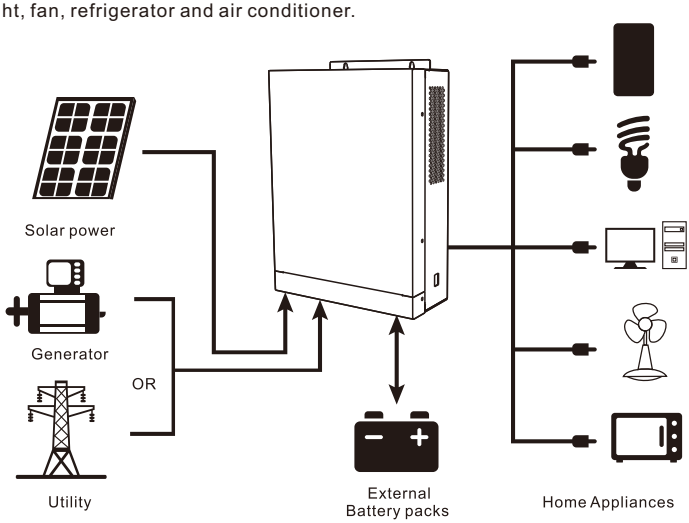
- Pure sine wave inverter
- Configurable input voltage range for home appliances and personal computers via LCD setting
- Configurable battery charging current based on applications via LCD setting
- Configurable AC/Solar Charger priority via LCD setting
- Compatible to mains voltage o rgenerator power
- Auto restart while AC is recovering
- Overload/Over temperature/short circuit protection
- Smart battery charger design for optimized battery performance
- Cold start function

3.2 Basic System Architecture

The following illustration shows basic application for this inverter/charger. It also includes following devices to have a complete running system:

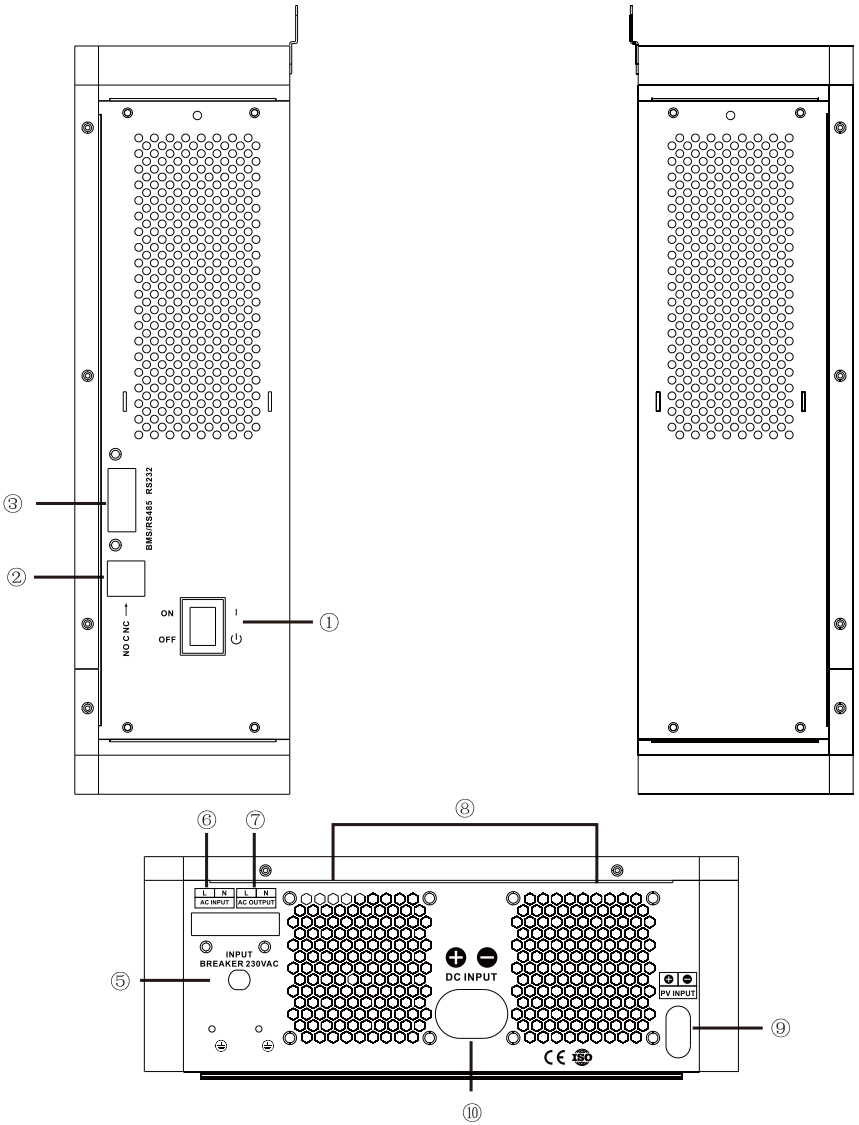
- Generator or Utility
- PV modules

Consult with your system integrator for other possible system architectures depending on your requirements. This inverter can power all kinds of appliances in home or environment, including motor-type appliances such as tube light, fan, refrigerator and air conditioner.



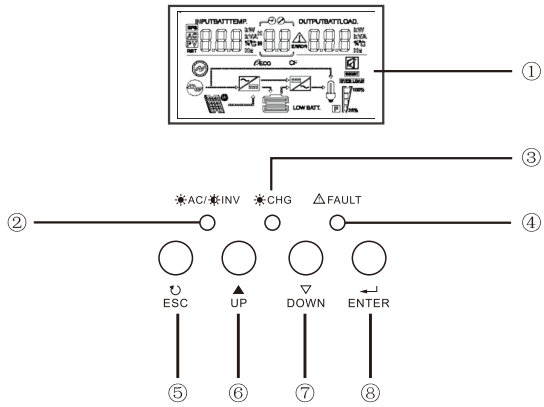
3.3 ProductOverview

3.3.1 Back Panel



1. . Power ON/OFF Switch
2. . Dry Contact
3. . . BMS/RS 485 Communication Port
4. . . RS 232 Communication Port
5. . Input Breaker
7. . AC Input
7. . AC Output
8. . Fan
9. . PVInput
10. BatteryInput

3.3.2 LCD Screen



1·····LCDdisplay	5·····ESC
2. ···Statusindicator	6. ·····UP
3···. Chargingindicator	7. ·····DOWN
4. ·····Faultindicator	8·····ENTER

4 INSTALLATION

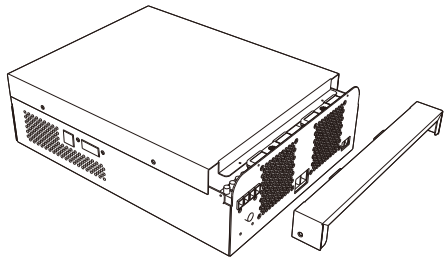
4.1Unpacking and Inspection

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 unitx 1
- User manual 1

4.2 Preparation

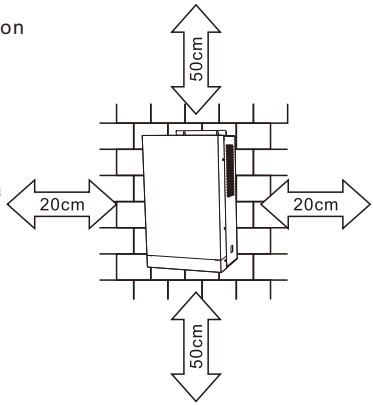
Before connecting all please take off bottom cover by removing two screws as shown below.



4.3 Mounting the Unit

Consider the following points before selecting where to install:

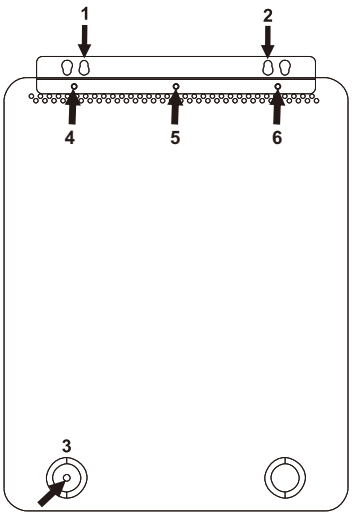
- ※ Do not mount the inverter on flammable construction materials.
- ※ Mount on a solid surface
- ※ Install this inerter at eye level in order to allow the LCD display to be read at all times.
- ※ For proper air circulation to dissipate heat, allow a clearance of approx. 20 cm to the side and approx 50 cm above and below the unit.
- ※ The ambient temperature should be between and to ensure optimal operation.
- ※ The recommended installation position is to be adhered to the wall vertically.
- ※ Be sure to keep other bjects and surfaces as shown in the diagram to guarantee sufficient heat dissipation and to have enough space for removing wires

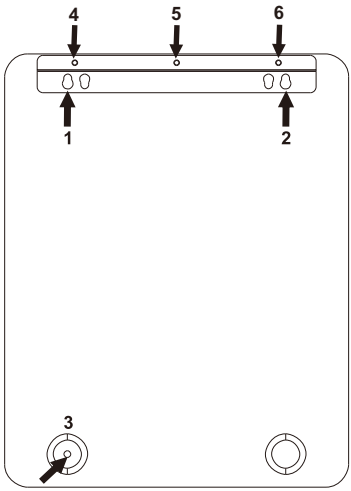


SUITABLE FOR MOUNTING ON CONCRETE OR OTHER NON-COMBUSTIBLE SURFACE ONLY.

Installthe unit by screwing two screws.

- 1,2 Use the M6*80mm expansion bolts.
- 3 Use M4 or M5.
- 4,5,6 Use M3*6 large flat triangular screws

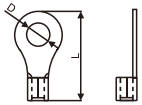




4.4 Battery Connection

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

Ring terminal:

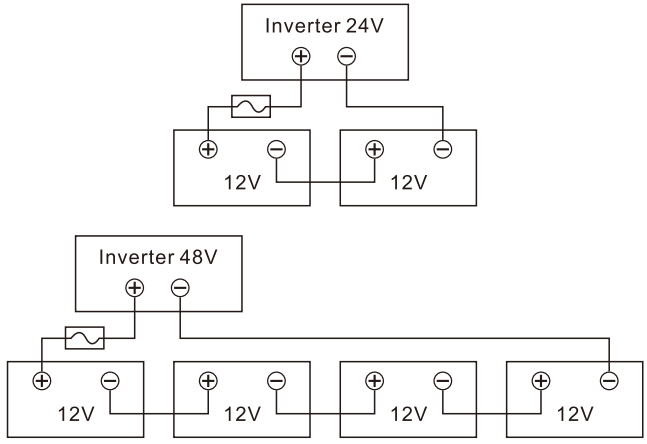


WARNING! All wiring must be performed by be qualified personnel.
WARNING! It's very important for system safety and efficient operation to use appropriate cable for battery connection.To reduce risk of injury, plese use the proper recommended cable and terminal size as below.

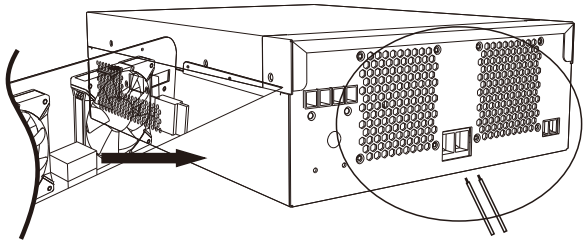
Recommended battery cable and terminal size:

Rated Capacity	Typical Amperage	Battery capacity	Wire Size	Ring Terminal			Torque value
				Cable(mm)²	Dimensions		
					D(mm)	L(mm)	
KVA/2KVA	44A/88A	100AH	1*6AWG	14	6.4	33.2	2~3Nm
			2*10AWG	6	6.4	23.8	
3KVA	132A	100AH	1*4 AWG	22	6.4	33.2	2~3Nm
		200AH	2*8 AWG	9	6.4	29.2	
5KVA	109A	200AH	1*2 AWG	38	6.4	39.2	2~3Nm
			2*6 AWG	28	6.4	33.2	

please follow below steps to implement battery connection:
1.Assemble battery ring terminal based on recommended battery cable and terminal size.



2.Insert the battery wires flatly into battery connectors of inverter and make sure the bolts are tightened with torque of 2 Nm in clockwise direction.Make sure polarity at both the battery and the inverter/charge is correctly connected and conductors are tightly screwed into the battery terminals. Recommended tool:#2 Pozi Screwdriver



⚠	**WARNING:** Shock Hazard Installation must be performed with care due to high battery voltage in series.

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

4.5 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 wil ensure the Inverter can be disconnected during maintenance and fully protected from over current ofAC input. The recommended spec of breaker is 25A for 12Vsystem and breaker is 32A for 24Vsystem.

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 qualified personnel.

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

Suggested cable requirement for ACwires

Rated Capacity	Gauge	Torque value
1KVA	16AWG	0.5~0.6Nm
2KVA	14AWG	0.8~1.0Nm
3KVA	12AWG	1.2~1.6Nm
5KVA	8AWG	1.4~1.6Nm

Please fllow below steps toimplement AC input/output connection

1.Before making AC input/output connection be sure to open DC protector or disconnector first

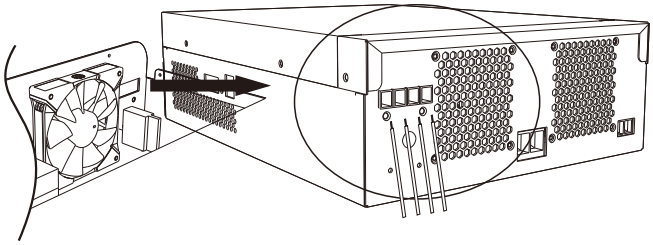
2.Remove insulaton sleeve 10mm for six conductors. And shorten phase Land neutral conductor N3mm.

3. InsertACinput wires according to polaritiesindicated on terminal block and tighten the termin screws. Be sure to connect PE protective conductor(⏚)irst.

⏚→Ground(yellow-green)

L-LINE(brown **or black**

N→Neutral(blue)



⚠	**WARNING:** Be sure that AC powersource is disconnected before attempting to hardwire it to the unit.

4.Make sure the wires are securely connected

CAUTION: Appliances such as air conditioner are required at least 2-3minutes to restart because it's required to have enoughtime to balance refri gerant gas inside of circuits. If a power shortage occurs and recoversin a short time, it will cause damage to your connected appliances. To prevent this kind of damagepleasecheck manufacturer of air conditioner if i'sequipped with time-delay function before installation. Otherwise, this inverter/charger will trig overload fault and cut off output to protect your appliance but sometimes it still causesinterna ldamage to the air

4.6 PVC onnection

PV Connection(Only apply for the model with solar charger)

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

WARNING!All wiring must be performedby a qualifiedpersonnel.
WARNING!It's very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommendedcable size as below.

Typical Amperage	Gauge	Torque Value
10A	12AWG	1.4-1.6Nm

PV module selection:
When choosing the right PVmodule, besure to first consider the followingr equirements: The open circuit voltage(Voc)of the PV modules does not exceed the maximum PV array open circuit voltage of the inverter. The maximum supply voltage of the PV modules should be close to the optimal Pvaccess oltage range of the inverter for best performance. If one PV module cannot meet this requirement, it is necessary to connect multiple Pvmodules in series.

Model	1012EMH	2012EMH	GD3024JMH	5048EMH
PV Charging Mode	MPPT	MPPT	MPPT	MPPT
MAX.PV Input Power	1000W	2000W	3000W	5000W
MPPT Tracking Range	30~450VDC	30-500VDC	30~500VDC	30~500VDC
Best Voltage	300-400VDC	300~400VDC	300-400VDC	300-400VDC
MAX.PV Input Voltage	500VDC	500VDC	500VDC	500VDC
MAX.PV Charging Current	60A	100A	100A	80A
MAX.AC Charging Current	60A	60A	60A	60A
MAX.Charging Current	80A	100A	100A	100A

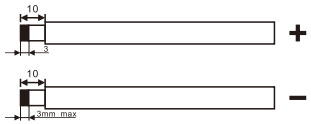
PV Module Wire Connection

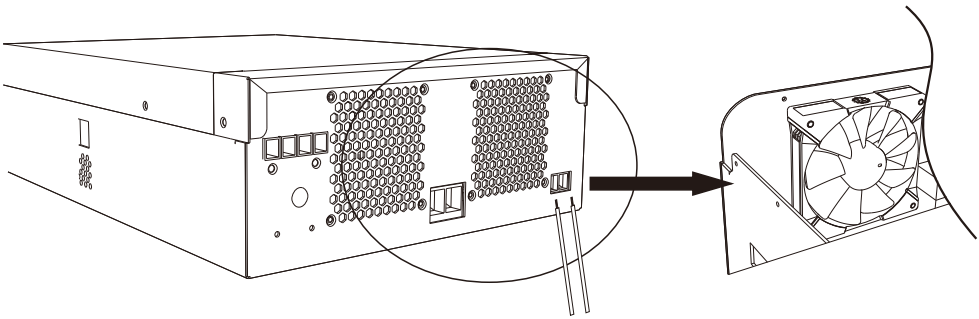
Please follow below steps toimplement PV module conne ction

1.Remove insulation sleeve 10mm for positive and negative conductors

2.Suggest to put bootlace ferrules on the end of positive and negative wires with a proper crimping tool

3.Fix wire coverto the inverter with supplied screws as shown in below chart

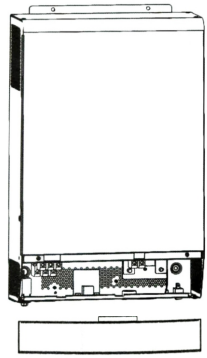




4.Check correct polarity of wire from PVmodules and PVinput connectors.Then,connect positive pole(+)of connection wire to positive pole(+)of PVinput connector. Conn ect negative pole(-)of connection wire to negative pole(-)of PVinput connector. Screw two wires tightly in clockwise direction.Recommende d tool: 4mm blade screwdriver

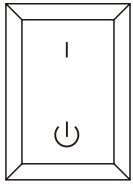
4.7 Fina Assembly

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



5 OPERATION

5.1 Power ON/OFF



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

5.1.1S teps to start up

Connect the battery that meets the requirements(battery voltage needs to beyond 23V) orAC(AC needs to confirm the suitable input range depend on the output mode), then you can start up the inverter.

➢ **Mains** power on

Connect to normal AC power,press the switch,the system will automatical ly turn on.f you set AC putput power priority.after waiting for a period of time,the panel will display AC mode that represents turn on the machine successfully,then will enter the AC mode

➢ Battery **boot**

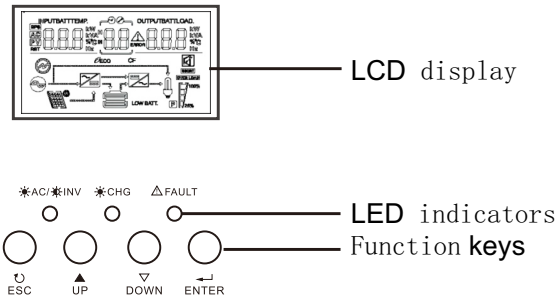
Connect to battery.press the power-on button to establish a working power source.
The system will automaticallyturn on,after waiting for a period of time,the panel will display battery mode that represents turn on the machine successfully,then will ente r the battery mode.

5.1.2 Shutdown steps

When the system is in battery mode orACmode output,press the switch again,then the system will be turned off.

5.2 Operation and Display Panel

The operation and display panel, shownin below chart, is on the front pane of the inverter. It in cludes three indicators, fourfunction keys and a LCD display, indicating the operating status and input/output power information.

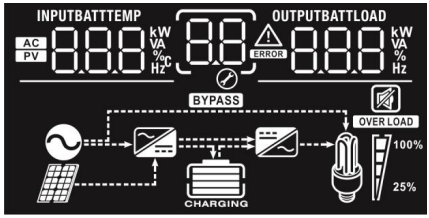


LED Indicator

LED Indicator			Messages
☀AC ☀INV	Green	Solid **On**	**Output** is powered by utity in Line mode.
		Flashing	**Output** is powered by battery or PV in battery mode.
☀CHG	Yellow	Solid **On**	**Battery** is fully charged.
		Flashing	**Battery** is charging
⚠FAULT	Red	Solid **On**	**Fault** occurs in the inverter.
		Flashing	**Warming** 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 selecion in setting mode o renter setting mode



Icon	Function description
Input Source Information	
AC	Indicates the AC input
PV	Indicates the PV input
INPUTBATT 888 kW VA %C Hz	Indicate input voltage, input frequency, PV voltage,charger current, charger power,battery voltage.
Configuration Program and Fault Information	
88	Indicates the setting programs.
88 ERROR	Indicates the warning and fault codes Warning: 88 flashing with warning code Fault: 88 ERROR lighting with fault code
Output Information	
OUTPUTBATTLOAD 888 kW VA % Hz	Indicate output voltage, output frequency, load percent, load in VA, load in Watt and discharging current.
Battery Information	
CHARGING	Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.

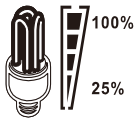
In AC mode,it will present battery charging status

Status	Battery voltage	LCD Display
Constant Current mode/ Constant Voltage mode	<2V/cell	4 bars will flash in turns.
	2~ 2.083V/cell	Bottom bar will be on and the other three bars will flashin turns
	2.083~2.167V/cell	Bottom two bars will be on and the other two bars will flash in turns.
	> 2.167 V/cel	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
Load>50%	<1.85V/cell	
	1.85V/cell~1.933V/cell	
	1.933V/cell~ 2.0.17V/cell	
	›2.017V/cell	
Load<50%	<1.892V/cell	
	1.892V/cell~1.975V/cell	
	1.975V/cell~2.058V/cell	
	›2.058V/cell	

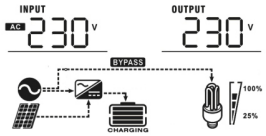
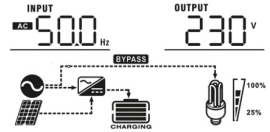
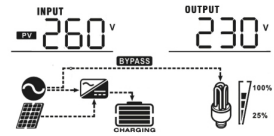
Load Information

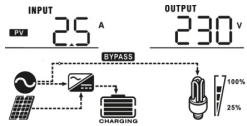
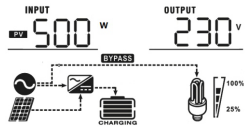
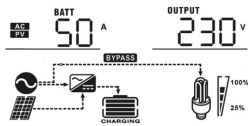
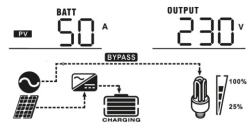
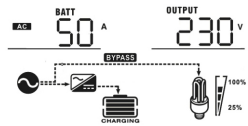
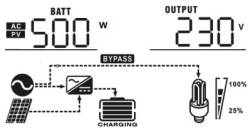
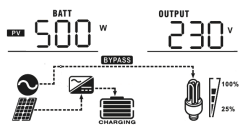
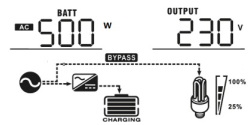
OVER LOAD	Indicatesoverload .			
	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.			
	0%~24%	25%~49%	50%~74%	75%~100%
				

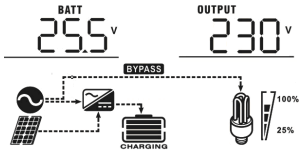
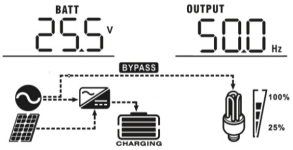
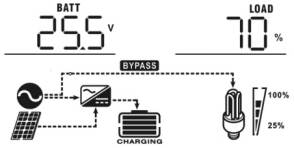
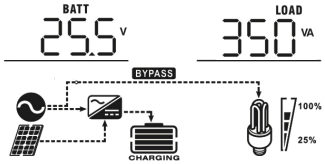
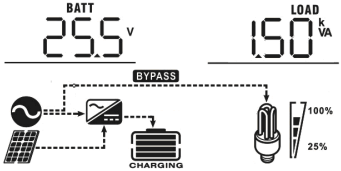
Mode Operation Information	
	Indicates unit connects to the mains .
	Indicates unit connects to the PV panel
BYPASS	Indicates load is supplied by utility power
	Indicates the utility charger circuit is working .
	Indicates the DC/AC inverter circuit is working .
Mute Operation	
	Indicates unit alarm is disabled .

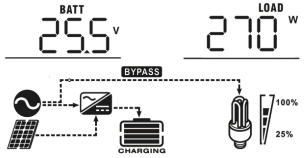
Display Setting

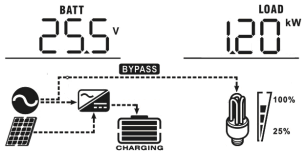
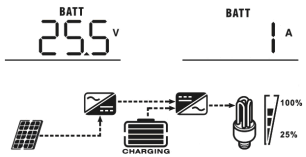
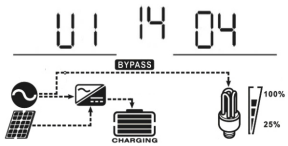
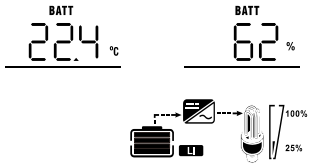
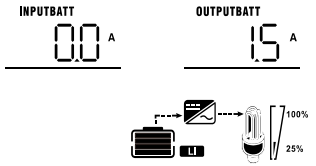
The L CD display information will be switched in turns by pressing "UP"or"DoWN" key. The selectable information is switched as below order input voltage，input frequency，PV voltage，charging current，charging power battery voltage, output voltage，output frequency, load percentage，load in Watt, load in VA, load in Watt, DC discharging current，main CPU Version

Selectable information	LCD display
Input voltage / Output voltage (Default Display Screen)	Input Voltage=230V, output voltage=230V 
Input frequency	Input frequency =50 Hz 
PV voltage	PVvoltage=260V 

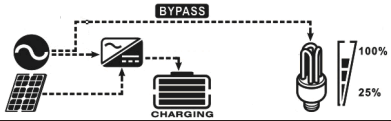
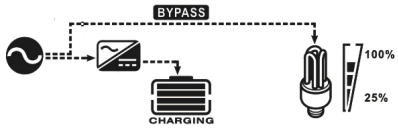
	PV current = 2.5A 
PV power	PV power=500W 
Charging current	AC and PV charging current=50A  PV charging current=50A  AC charging current=50A 
Charging power	AC and PV charging power=500W  PV charging power=500W  AC charging power=500W 

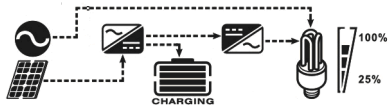
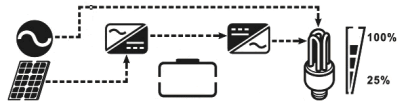
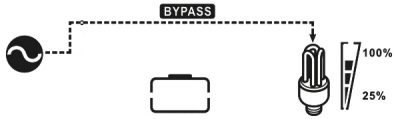
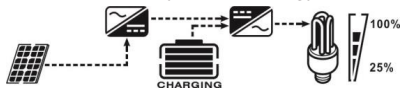
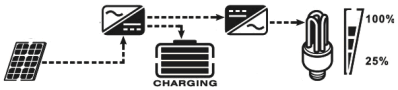
Battery voltage and output voltage	Battery voltage =25.5V, output voltage=230V 
Output frequency	Output frequency=50 Hz 
Load percentage	Load percent=70% 
Load in VA	When connected load is lower than 1kVA, load in VA will present xxxVA like below chart.  When load is larger than 1kVA(≥1KVA), load in VA will present x.xkVA like below chart. 

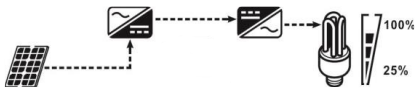
<table>
<tr><td>Load in Watt</td><td>When loadis lower than 1 kW, load in W will present xxxW like below chart.


When load is larger than 1kW(≥1 KW),load in W will present x.xkW like below chart.

</td></tr>
<tr><td>Battery voltage/DC discharging current</td><td>Battery voltage=25.5V, discharging current= 1A

</td></tr>
<tr><td>Main CPU version checking</td><td>Main CPU version 00014.04

</td></tr>
<tr><td rowspan="2">Setting B MS communication success display</td><td>The left side shows the lithium battery temperature and the right side shows the lithium battery capacity.

</td></tr>
<tr><td>The input current of the lithium battery is displayed on the left side, and the output current of the lithium battery is displayed on the right side.

</td></tr>
</table>

Operating Mode Description

Operation mode	Description	LCD display
Standby mode **Note:** ***Standby mode: The inverter is not turned on yet but at this time, the inverter can charge battery without AC output.**	**No output is supplied by the unit but it still can charge batteries.**	Charging by utility and PV energy. 
		Charging by utility 
		Charging by PV energy. 
		No charging 
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 and PV energy. 
		Chargingby utility. 
		Charging by PV energy. 
		No charging. 
LineMode	**The unit will provide output power from the mains. It wili also charge the battery at line mode.**	Charging by utility and PV energy. 
		Charging by utility . 

<table>
<tr><td rowspan="3">Line Mode</td><td rowspan="3">The unit will provide output power from the mains. It will also charge the battery at line mode.</td><td>If “solar first" is selected 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.

</td></tr>
<tr><td>If “solar first" is selected as output source priority and battery is not connected, solar energy and the utility will provide the loads.

</td></tr>
<tr><td>Power from utility.

</td></tr>
<tr><td rowspan="3">Battery Mode</td><td rowspan="3">The unit will provide output power from battery and PV power.</td><td>Power from battery and PV energy.

</td></tr>
<tr><td>PV energy will supply power to the loads and charge battery at the same time.

</td></tr>
<tr><td>Power from battery only.

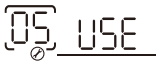
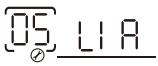
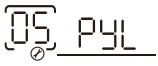
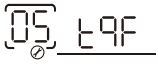
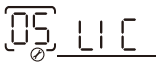
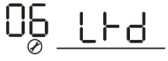
</td></tr>
<tr><td>Battery free mode</td><td>The device will provide output power from the PV power supply.</td><td>
</td></tr>
</table>

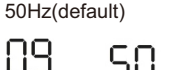
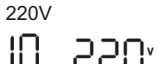
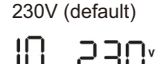
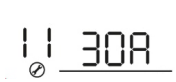
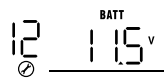
5.3 LCD Setting

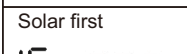
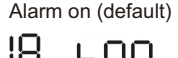
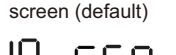
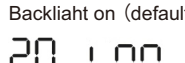
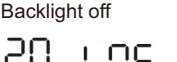
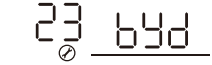
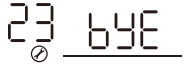
After pressing and holding ENTER button for 3 seconds, the unit will enter setting mode. Press “UP" or “DOWN” button to select setting programs. And then, press “ENTER” button to confirm the selection or ESC button exit.

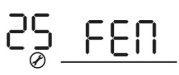
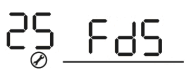
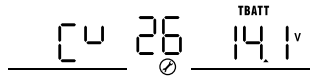
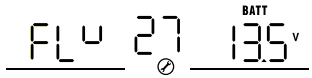
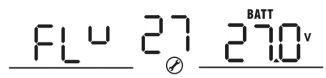
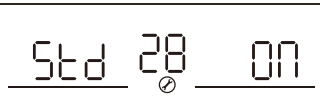
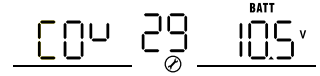
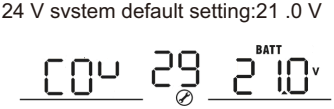
Setting Programs:

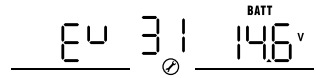
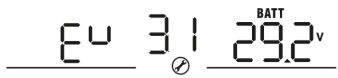
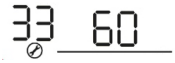
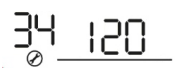
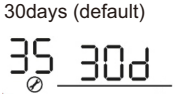
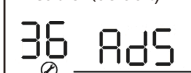
Program	Description	Selectable option	
00	Exit setting mode	Escape 	
01	Output source priority selection		Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, Utility energy will supply power to the loads at the same time.
			Solar 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 or solar and battery is not sufficient.
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 maximum charging current. 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, low DC cut-off voltage and dual cut -off voltage can be set up in program 24,26,27,29 and 61.
		LIA-protocol compatible battery 	If selected,programs of 24,26,27 and 29 will be automatically set up. No-need-for-further-setting.
		Pylontech battery 	
		Techfine battery 	
		Growatt battery 	
		LIB-protocol compatible battery 	Select " LiB if using Lithium battery compatible to Lib protocol. If selected, programs of 26,27 and 29 will be automatically se up. No meed for further setting .
		3 rd party lithium battery 	If selected, programs of 26,27 and 29 will be automatically set up. No need for further setting. Please contact the battery supplier for installation procedure.
06	Auto restart when overload occurs	Restart disable(default) 	Restart enable 
07	Auto restart when over temperature occurs	Restart disable (default) 	Restart enable 

<table>
<tr><td rowspan="2">08</td><td rowspan="2">ECO function:
System will temporarily stop when the load is low in battery mode .</td><td colspan="2">disable(default)
</td></tr>
<tr><td colspan="2">enable
</td></tr>
<tr><td>09</td><td>Output frequency</td><td>50Hz(default)
</td><td>60Hz
</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">Output voltage</td><td>220V
</td><td>230V (default)
</td></tr>
<tr><td>240V
</td><td></td></tr>
<tr><td>11</td><td>Maximum utility charging current
Note: If setting value in program 02 is smaller thanthat in program in 11, the inverter will apply charging current from program 02 for utility charger.</td><td>30A (default)
</td><td>Setting range is 2A, then from 10A to max.AC charging current.
Increment of each click is 10A.</td></tr>
<tr><td rowspan="4">12</td><td rowspan="4">Setting voltage point back to utility source when selecting"SBU priority" in program 01.</td><td colspan="2">Available options in 12V system:</td></tr>
<tr><td>11 .5 V (default)
</td><td>Setting range is from 11 V to 12.5 V.
Increment of each click is 0.5V .</td></tr>
<tr><td colspan="2">Available options in 24V system:</td></tr>
<tr><td>23. 0V (default)
</td><td>Setting range is from 22V to 25.5V.
Increment of each click is 0.5V.</td></tr>
<tr><td rowspan="5">13</td><td rowspan="5">Setting voltage point back to battery mode when selecting"SBU priority"in program 01.</td><td colspan="2">Available options in 12V system:</td></tr>
<tr><td>Battery fully charged
</td><td>13.5 V (default)
</td></tr>
<tr><td colspan="2">Setting range is from 12 V to14.5 V. Increment of each click is 0.5V.</td></tr>
<tr><td colspan="2">Available options in 24V system:</td></tr>
<tr><td>Battery fully charged
</td><td>27V(default)
</td></tr>
<tr><td colspan="2">Setting range is from 24 V to 29 V. Increment of each click is 0.5V.</td></tr>
</table>

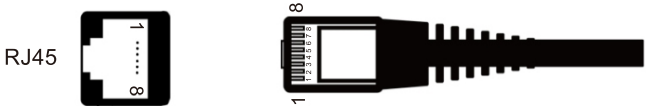
16	Charger source priorit: To configure charger source priority	If this inverter/charger is working in Line, Standby or Fault mode,charger source can be programmed as below：	
		Utility first 	Utility will charge battery as first priority. Solar energy will charge battery only when utility power is not available.
		Solar first 	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is notavailable.
		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.energywill.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 wil automatically return to defaultl 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	Backliaht on（default) 	Backlight off 
22	Beeps while primary source is interrupted	Alarm on (default) 	Alarm off 
23	Overload bypass: When enabled，the unit wil transfer to line mode if overload occurs in battery mode.	Bypass disable (default) 	Bypass enable 

24	Battery low voltage •If battery power is only power sourcea vail ableinverter will alarm.	Battery low voltage 10.0V 
		Setting range is from 10.0V-13.5V for 12V system and 20.0V-27.0V for 24V system
25	Record Fault code	Record enab le（default）  Record disable 
26	Bulk charging voltage (C. V voltage)	**12** V system default setting:14.1 V 
		24 V svstem default setting:28.2 V 
		If self-defined -is setected in program 5 , this program can be set up. Setting range is from 12.0V to 15.0V for 12V system and 24.0V to 30.0V for 24V system. Increment of each clickis 0.1V.
27	Floating charging voltage	12 V svstem default setting:13.5 V 
		24V system default setting:27.0V 
28	Reset factory setting	default: 
		
29	Low DC cut-off voltage: • If battery power is only power source availableinverter will shut down. • If PV energy and battery power are available,inverter will charge battery without AC output.	12 V system default setting:10.5 V 
		24 V svstem default setting:21 .0 V 

<table>
<tr><td>29</td><td></td><td colspan="2">If self-defined is selected in program 5, this program can be set up. Setting range is from 10.0V to 13.0V for 12V system and 20.0V to 26.0V for 24V system.
Increment of each click is O.1V Low DC cut-off voltage will be fixed to setting value no matter what percentage of load is connected.</td></tr>
<tr><td rowspan="2">30</td><td rowspan="2">Battery equalization</td><td>Battery equalization
</td><td>Batteryalization disab le（default）
</td></tr>
<tr><td colspan="2">If "Flooded" or "User Defined ” is selec ted in program05, this program can be set up.</td></tr>
<tr><td rowspan="3">31</td><td rowspan="3">Battery equalization voltage</td><td colspan="2">12 V system default setting:14.6 V
</td></tr>
<tr><td colspan="2">24V system default setting:29.2V
</td></tr>
<tr><td colspan="2">Setting range is from 12.0V to 15.0V for 12V system and 24.0V to 30.0V for 24V system. Increment of each click is 0. 1V.</td></tr>
<tr><td>33</td><td>Battery egualized time</td><td>60min（default）
</td><td>Setting range is from 5min to 900min
Increment of each click is 5min.</td></tr>
<tr><td>34</td><td>Battery equalized timeout</td><td>120min（default）
</td><td>Setting range is from 5min to 900min
Increment of each click is 5min</td></tr>
<tr><td>35</td><td>Egualization interval</td><td>30days (default)
</td><td>Setting range is from 0 to 90 days.
Increment of each click is 1 day.</td></tr>
<tr><td rowspan="2">36</td><td rowspan="2">Equalization activated immediately</td><td>Enable
</td><td>Disable（default）
</td></tr>
<tr><td colspan="2">If equalization function is enabled in program 30, this program can be set up. If "Enable" is selected in this program, it's to activate battery equalization immediately and L CD main page will shows "", If "Disable" is selected, it will cancel equalization function until next activated equalization time arrives based on program 35 setting. At this time, "" will not be shown in L CD main page.</td></tr>
</table>

37	BMS Function Switch	off(default)  	Whether to enable the BMS communication function
38	Bat Soc Under Lock		If any type of lithium battery is selected in program 5. BMS low voltage SOC value,if the BMS SOC value is lower than the set value，the inverter will shut down to protect the battery.
39	Bat Soc Turn To Ac		If any type of lithium battery is selected in program 5. When the working mode of the inverter is set to the battery priority mode, the inverter will be forced to enter the mains charging when the SoC of the BMSis lower than the set value.
40	Bat Soc Turn To Dc		If any type of lithium battery is selected in program 5. When the working mode of the inverter is set to the battery priority mode, the inverter resumes the DC working mode when the SOC of the BMS is higher than the set value
41	Bat Restart Soc		If any type of lithium battery is selected in program 5. When the inverter is turned on, the SOC must be higher than the set value to work normally.

When the BMS/485 communication interface is externally connected, as shown in the following figure:



1----------485B
2----------485A
3/4/5/6/7/8--NC

Communication Connection

Please use supplied communication cable to connect to inverter and PC. Please install a monitoring software on the computer.

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	NC & C
Power Off	Unit is off and nooutput isoowered.			Close	Open
Power On	Output is powered from battery or solar.	Normal mode	Battery voltage< Low DC warning voltage	Open	Close
			Battery voltage> Float charging voltage	Close	Open
		Solar first mode	Battery voltage< Solar to AC voltage	Open	Close
			Battery voltage> AC to DC voltage	Close	Open

5.4 Battery Equalization Description

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

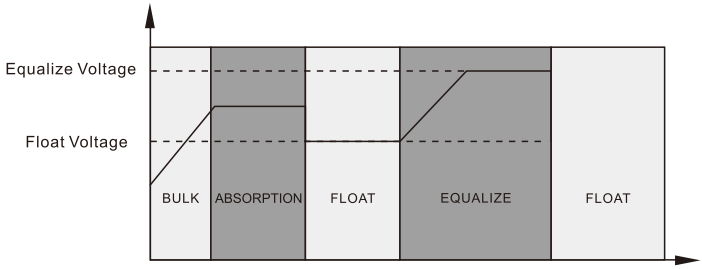
You must enable battery equalization function in monitoring LCD setting program 30 first. Then, you may apply this function in device by either one of following methods:

1.Setting equalization interval in program 35.

2.Active equalization immediately in program 36.

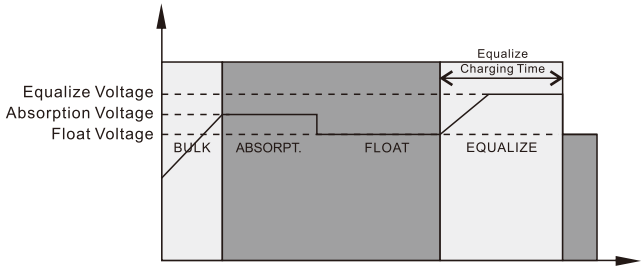
※ **When to Equalize**

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

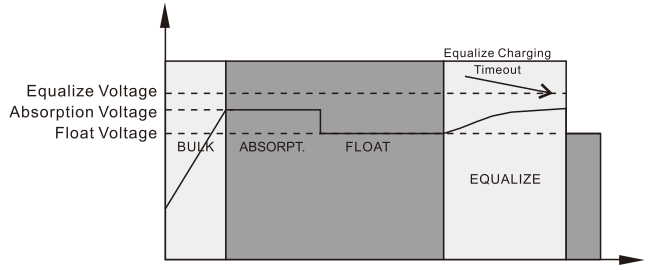


※ **Equalize charging time and timeout**

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 pattery 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.



5.5 Fault and alarm description

5.5. 1 F aults Descriptions

➢**Fault:** The inverter enters the fault mode, the red LED light is always on and the LCD displays the fault code

Fault Reference Code

Fault Code	Fault Event	Icon on
01	Fan is locked when inverter is off.	
02	Over temperature or N T C is not connected well.	
03	Battery voltage is too high.	
04	Battery voltage is too low.	
05	Output short circuited or over temperature isdetected by internal converter components.	
06	Output voltage is too high.	
07	Over load time out.	
08	Bus voltage is too high.	
09	Bus soft start failed.	
51	Over currents or urge	
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	
59	PV voltage is over limitation	

5.5.2 Alarm Descriptions

Alarm: The red LED flashes, and the LCD displays an alarm code, the inverter does not enter the failure mode

Alarm Indicator

Alarm Code	Alarm Event	Audible Alarm	Icon flashing
01	Fan is locked when inverter is on.	Beep three times every second	
02	Over temperature	None	
03	Batery 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	
E9	Battery equalization	None	
bP	Battery is not connected	None	

5.5.3 Code Reference

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

Code	Description
60 ⚠	If battery status is not allowed to charge and discharge after the communication between the inverter and battery is successful, it will show code 60 to stop charging and discharging battery.
61 ⚠	Communication lost • After batteryis connected, communication signal is not detected for 1 minutes, buzzer will beep. • Communication lost occurs after the inverter and battery is connected successfully, buzzer beeps immediately.
69 ⚠	If battery status is not allowed to charge after the communication between the inverter and batteryis successful, it will show code 69 to stop charging battery.
70 ⚠	If battery status must to charge after the communication between the inverter and battery is successful, it will show code 70 to charge battery.
71 ⚠	If battery status is not allowed to discharge after the communication between the inverter and battery is successful, it will show code 71 to stop discharge battery.

6.Trouble removeal

Problem	LCD/LED/Buzzer	Explanation/Possible cause	What to do
Unit shuts down automatically during startup process.	LCD/LEDs and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low (<1.91V/Cell)	1.Re-charge battery. 2.Replace battery.
No response after power on.	No indication.	1. The battery voltage is far toolow.(<1.4V/Cell) 2.Internal fuse tripped.	1.Contact repair center for replacing the fuse. 2.Re-charge battery. 3.Replace battery. Check ifAC breaker is tripped and AC wiring is connected well.
Mains exist but the unit works in battery mode.	Input voltage is displaved as 0 on the LCD and green LED is flashing.	Input protector is tripped	
	Green LED is flashing	Insufficient quality of AC power.(Shore or Generator)	1. Check ifAC 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.(UP-->sppliance)
	GreenLED 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	Batteryis 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 105% and time is Up.	Reducethe connected load by switching off some equipment.
		If PV input voltage is higher than specification, the output power will be derated.At this time, if connected loads is higher than derated output power, it will cause overload.	Reduce the number of PV modules in series or the connected load.
	Fault code 05	Output short circuited.	Check if wiring is connected well and remove abnormal load.
		Temperature internal converter component is over 120'C.	Check whether the air flow of the unit is blocked or whether theambient tem perature is too high.
	Fault code 02	Internal temperature of inverter component is over 100°C	
	Fault code 03	Batteryis 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 59	PV input voltage is beyond the specification.	Reduce the number ofPV modules in series.

7.Technical datasheet

Model		1012EMH	2012EMH	GD3024JMH	5048EMH
Input	Input Sources	L+N+PE			
	Rated Input Voltage	220/230/240VAC			
	Voltage Range	90-280VAC+3V(APL Mode)170-280VAC+3V(UPS Mode)			
	Fregency	50Hz/60Hz(Auto Adaptive)			
Output	Rated Capacity	1000W	1600W	3000W	5000W
	Output Voltage	220/230/240VAC+5%			
	Output Frequency	50/60Hz+0.1%			
	Waveform	Pure Sine Wave			
	Transfer Time (Adjustable)	Computers(UPS Mode)10ms,Appliance(APL Mode)20ms			
	Peak Power	2000VA	3200VA	6000VA	10000VA
	Peak Efficiency (Battery Mode)	>94%	>94%	>94%	>94%
Battery	Battery Votage	12VDC	12VDC	24VDC	48VDC
	Constant Charging Voltage(Adjustable)	14.1VDC	14.1VDC	28.2VDC	56.4VDC
	Floate Charging Voltage(Adjustable)	13.5VDC	13.5VDC	27VDC	54VDC
Chargers	PV Charging Mode	MPPT	MPPT	MPPT	MPPT
	MAX.PV Input Power	1000W	2000W	3000W	5000W
	MPPT Tracking Range	30-450VDC	30-500VDC	30-500VDC	30-500VDC
	Best Voltage	300-400VDC	300-400VDC	300-400VDC	300-400VDC
	MAX.PV Input Voltage	500VDC	500VDC	500VDC	500VDC
	MAX.PV Charging Current	60A	100A	100A	80A
	MAX.AC Charging Current	60A	80A	60A	60A
	MAX. Charging Current	80A	100A	100A	100A
Display	LCD Display	Display Running Mode/Loads/Input/Output etc.			
Interface	Rs232	Baud Rate2400			
	Communication Port	Lithium Battery BMS Communication Card Wifi Card, Dry Contact			
	Parallel Connect Interface	Without Parallel Connect			
Environments	Operating Temperature	-10~50°C			
	Humidity	20%~95% (Non-condensing)			
	Storage Temperature	-15~60°°C			
	Altitude	Altiude Not Over 1000m,Derating over 1000m,Max 4000m, Refer to IEC62040			
	Noise	≤50db			

DANGER: Risk of high voltage electric shock! The equipment contains high voltage inside. Capacitors may remain charged even after power off. Disconnect all power and allow sufficient time for discharge before installation, wiring, tuning or maintenance. Never work live.
WARNING:Installation, wiring, tuning and maintenance must be performed by qualified electricians. Untrained personnel are strictly prohibited from operation.Before wiring, confirm that supply voltage, phase sequence match rated values. Never connect incorrectly, reversely or over voltage.Housing, heat sink, motor and cables may become hot during operation. Do not touch to prevent burns.Do not open cover or touch circuit boards and high voltage
parts during starting, operation or fault condition.Do not start/stop frequently by force; do not bypass protection circuits, which may cause equipment damage and safety incidents.Motor, load and transmission must have reliable protection to prevent rotating, crushing or impact injury.Grounding must be firm and reliable. Do not operate without proper grounding.Do not use in flammable, explosive, corrosive, humid or dusty environment.Do not modify, disassemble or replace components without authorization, otherwise warranty will be void and danger may occur.
CAUTION:Set parameters correctly according to manual. Wrong parameters may cause abnormality, out of control or damage. Keep ventilation clear without blocking or dust; clean heat sink and filter regularly.Input power must be stable. Suitable circuit breaker, fuse, reactor or filter are recommended.Before starting, check motor
insulation, wiring, load and mechanical condition for no jamming or short circuit.If abnormal noise, vibration, overheating, odor, smoke or fault alarm occurs, stop and disconnect power immediately for inspection.Cable specification, length and wiring must meet requirements; keep away from interference sources to prevent EMI .Disconnect power, clean, protect from moisture and dust before long-term storage, transportation or idling.This equipment is only for matched load. Do not use for other purposes.

Manufacturer: Guangdong Huahu New Energy Technology Co., Ltd.
Address: 3rd Floor, No.1 Yongyi 3rd Road, Yongxing Industrial Zone, Henglan Town, Zhongshan City.
E-mail: support@vevor.com



