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La Marche Manufacturing Company

www.lamarchemfg.com

LMC – Sun Series

Hybrid Inverter (Grid-Tied / Off-Grid)



Installation and Operation Manual

This manual is subject to change without notice. You may obtain the newest version of the manual at www.lamarchemfg.com

Important Safety Instructions

Before using this equipment, read all manuals and other documents related to this inverter and other equipment connected to this unit. Always have a copy of an inverter's manual on file nearby, in a safe place; if a replacement copy of a manual is needed, it can be found at www.lamarchemfg.com.

Electrical Safety



WARNING: Hazardous voltages are present at the input of power systems. The output from inverters and batteries may be low in voltage but can have a very high current capacity that may cause severe or even fatal injury.

When working with any live battery or power system, follow these precautions:

- Never work alone on any live power system, someone should always be close enough to come to your aid.
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Wear complete eye protection (with side shields) and clothing protection.
- Always wear gloves and use insulated hand tools.



WARNING: Lethal voltages are present within the power system. Parts inside the unit may still be energized even when the unit has been disconnected from the DC input power. Check with a meter before proceeding. Do not touch any parts that are not insulated.

- A licensed electrician should be used in the installation of any unit.
- Always disconnect the unit from the supply, batteries, and loads before performing maintenance or cleaning.
- If the unit is hot-swappable, simply remove it from the shelf for any maintenance or cleaning.
- Always assume that an electrical connection is live and check the connection relative to the ground.
- Be sure that neither liquids nor any wet material comes in contact with any internal components.
- Do not operate this unit outside the input and output ratings listed on the unit nameplate.
- Do not use this unit for any purpose not described in the operation manual.

Mechanical Safety

- This unit or parts of the unit may get very hot during normal operation, use care when working nearby.
- Do not expose equipment to rain or snow. Always install in a clean, dry location.
- Do not operate the equipment if it has received a sharp blow, been dropped, or otherwise damaged in any way.
- Do not disassemble this unit. Incorrect re-assembly may result in a risk of electric shock or fire.

Battery Safety



WARNING: Follow all of the battery manufacturer's safety recommendations when working with or around battery systems. DO NOT smoke or introduce a spark or open flame in the vicinity of a battery. Some batteries generate explosive gases during normal battery operation.

- To reduce the risk of arc, connect, and disconnect the battery only when the unit is off.
- If it is necessary to remove the battery connections, always remove the grounded terminal from the battery first.
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Always wear rubber gloves, safety glasses, and a rubber-lined vest/apron when working near a battery.
- Have plenty of freshwater and soap nearby in case the battery electrolyte contacts skin, clothing, or eyes.
- If the battery electrolyte contacts skin or clothing, wash immediately with soap and water.
- If the electrolyte enters the eye, immediately flood the eye with running cold water for at least ten (10) minutes and seek medical attention immediately.
- Do not drop metal on a battery. A spark or short-circuit could occur and could cause an explosion.

Unit Location

- Allow at least 6 inches of free air on all vented surfaces for proper cooling.
- Do not operate this unit in a closed-in area or restrict ventilation in any way.
- Do not set any battery on top of this unit.
- Never allow battery electrolyte to drip on this unit when reading the specific gravity or filling the battery.
- Never place this unit directly above a standard flooded battery. Gases from the battery will corrode and damage equipment.
- A sealed maintenance-free or valve-regulated lead-acid (VRLA) battery may be placed below this equipment.

Check for Damages

Before unpacking the product, note any damage to the shipping container and take pictures. Unpack the product and inspect the exterior and interior of the product for damage. If any damage is observed, take pictures and contact the carrier immediately to file a damage claim. Contact La Marche for a Return Material Authorization number to have the inverter sent back for evaluation and repair.



CAUTION: Failure to properly file a claim for shipping damages or provide a copy of the claim to La Marche, may void warranty service for any physical damages reported for repair.

Returns for Service

Save the original shipping container. If the product needs to be returned for service, it should be packaged in its original shipping container. If the original container is damaged/unavailable, make sure the product is packed with at least three inches of shock-absorbing material to prevent shipping damage. *La Marche is not responsible for damage caused by improper packaging of returned products.*

Inspection Checklist

- The enclosure exterior and interior are not marred or dented.
- No visible damage to the components.
- All hardware and connections are tight.
- All wire terminations are secure.
- All items on the packing list have been included.

Handling

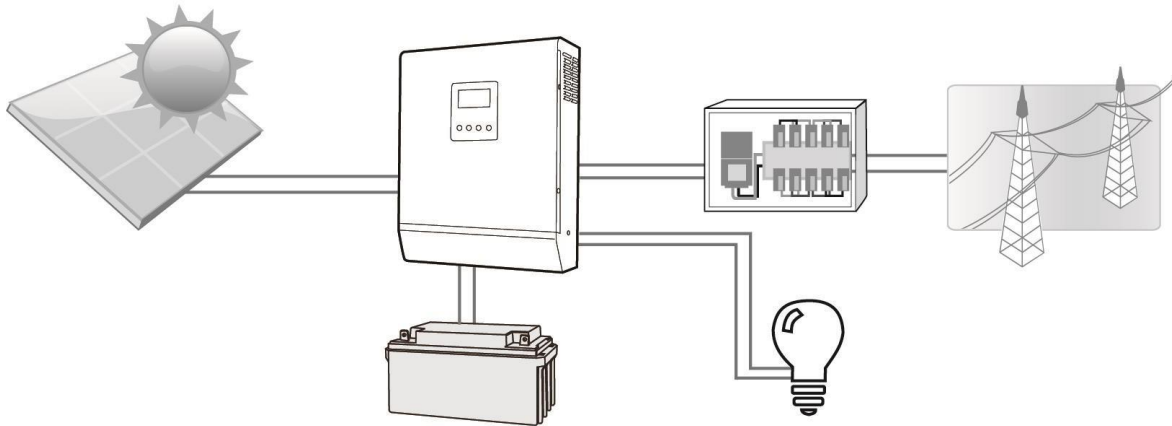
Equipment can be very heavy with uneven distribution of weight. Use adequate manpower or equipment for handling. Until the equipment is securely mounted, care must be used to prevent equipment from being accidentally tipped over or dropped.

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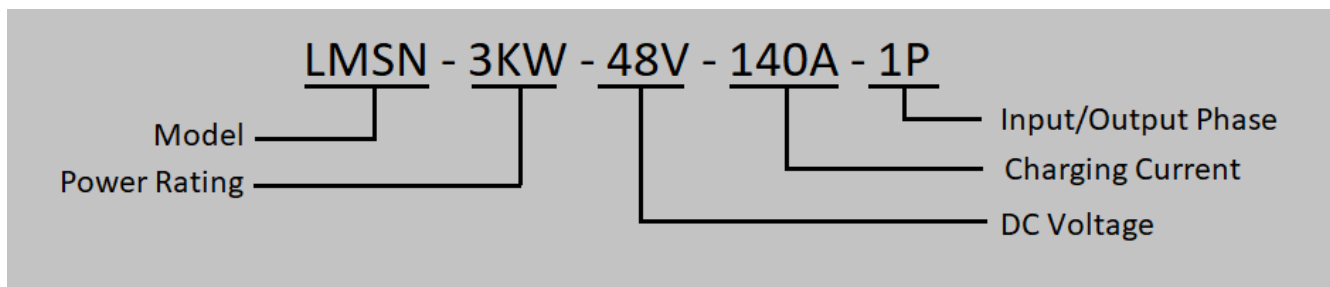
Model Scope/General Description

The LMC SUN Series is an intelligent power conversion and energy storage system combining functions of solar charger, battery charger and inverter. The LMC SUN Series Hybrid operation allows the flexibility to operate as an Off-Grid inverter in the case of utility power loss. In contrast to single function traditional PV inverters; at normal operating conditions the LMC SUN inverter can simultaneously feed in power back to the grid while charging the battery. The LMC SUN inverters allow for cost efficient operation by supporting self-consumption via the battery when PV energy is low. All LMC SUN models are equipped with a powerful and easy to use LCD controller interface and are available with adjustable charging current feature for different battery technologies. The LMC SUN series supports a wide range of applications from electronics, computer and server systems, common appliances to motor-based appliances and loads. The LMC Sun hybrid PV inverter can provide power to connected loads by utilizing PV power, utility power and battery power.



Understanding the Model Number

The LMC SUN model number is coded to describe the features that are included. Find the model number on the nomenclature nameplate of the enclosure. Follow the chart below to determine the configuration of the inverter.



Optional Accessories Included in the Inverter

This inverter may have been outfitted with a number of optional accessories or option packages. To determine the options included (if any) refer to the cover page of the manual package. If the manual package that is included with the inverter is no longer available, contact La Marche and provide the model or serial number to receive a list of the included accessories.

Product Overview

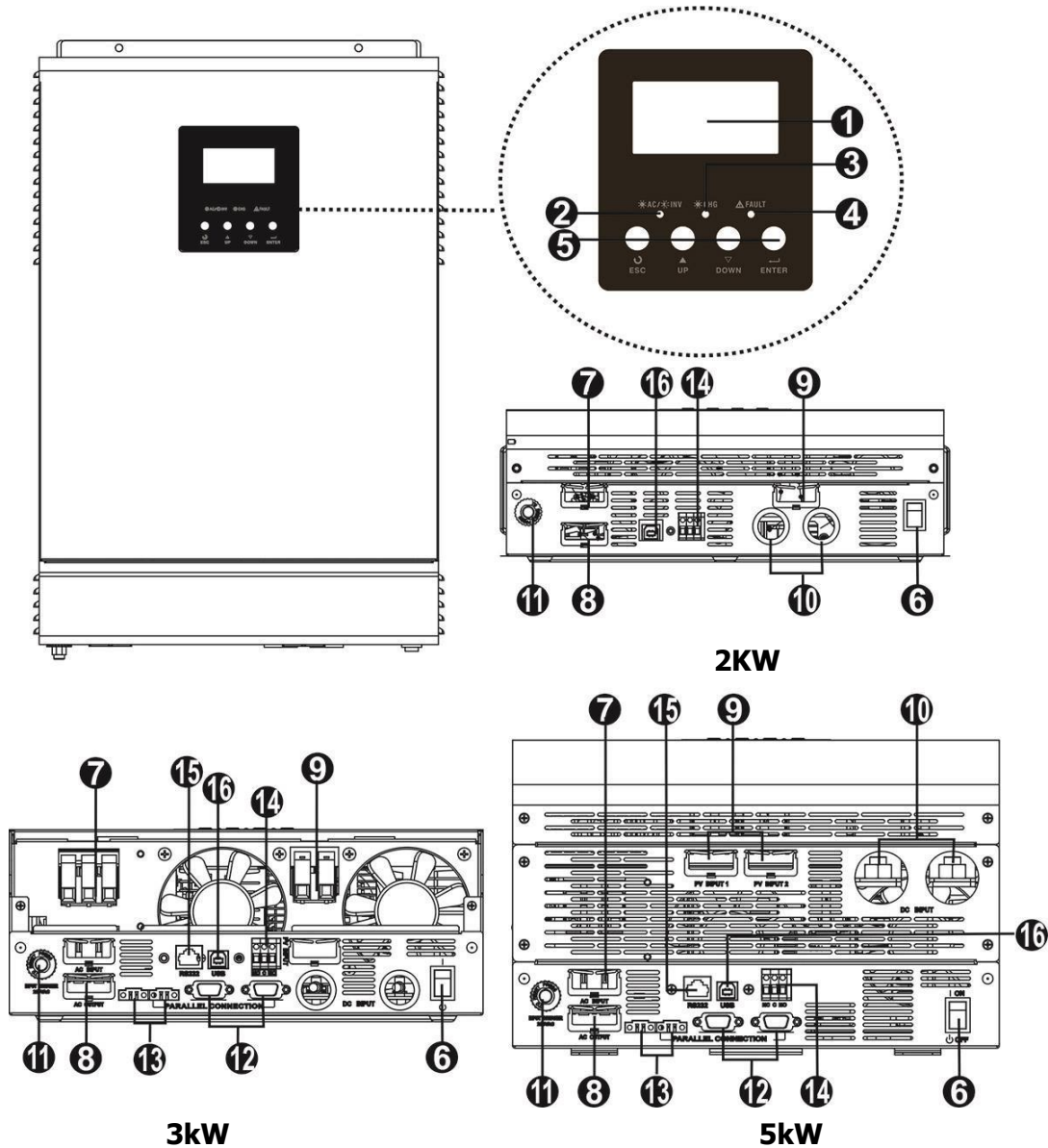


Figure 1: Basic hybrid PV System Overview

NOTE: For parallel model installation and operation, please check separate parallel installation guide for the details.

- | | |
|---|----------------------------------|
| 1. LCD display | 9. PV connectors |
| 2. Status indicator | 10. Battery connectors |
| 3. Charging indicator | 11. Circuit breaker |
| 4. Fault indicator | 12. Parallel communication cable |
| 5. Function buttons | 13. Current sharing cable |
| 6. Power on/off switch | 14. Dry contact |
| 7. Grid connectors | 15. RS-232 communication port |
| 8. AC output connectors (Load connection) | 16. USB communication port |

1.0 Equipment Handling

1.1 Storing the LMC SUN

If the LMC SUN is to be stored for more than a few days after delivery, it should be stored within its shipping container. The location chosen for storage should be within an ambient temperature of 32 to 122° F (0 to 50°C) with a non-condensing relative humidity of 0 to 90%. Storage should not exceed 2 years due to the limited shelf life of the filter capacitors when they are not in service.

1.2 Moving the LMC SUN

After careful inspection and upon verification that the LMC SUN is undamaged, identify the enclosure style and weight of the inverter. Refer to Table 1 below.

	Output Power (kW)	Output Voltage	Output Amps	Input AC Voltage	Input PV Voltage	Dimensions (D x W x H)	Weight (lbs)
LMC SUN	2kW	230VAC	8.7A	170 -280 VAC	30–115 VDC	3.9 x 11.8x 17.3"	17.6
	3kW		13A		60-115 VDC	4.7 x 11.6 x 18.4"	24.2
	5kW		21.7A			7.4 x 11.6 x 19"	35.3

Table 1 - Case and Weight

2.0 Installation

2.1 Preparation

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

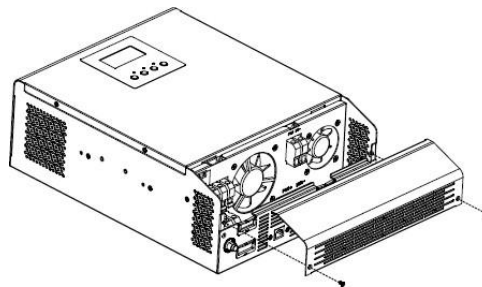


Figure 2: Open bottom cover by removing screws

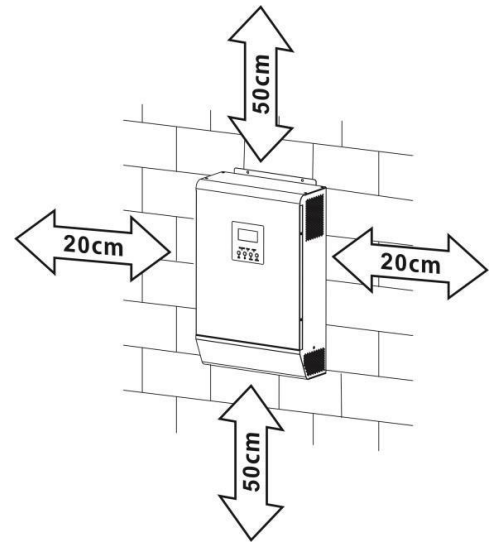
2.2 Mounting the LMC SUN

LMC SUN has wall mounting bracket installation. When mounting the LMC SUN, consider the size and weight of the Inverter. The solid surface must be able to support the weight of the inverter, as well as an additional safety factor. Refer to Table 1 to verify the weight of the inverter. The location chosen for the inverter should be within an ambient temperature range of 32°F to 122°F (0°C to 50°C) with a non-condensing relative humidity no higher than 90%. The inverter should be mounted in an area free of explosive materials and away from any liquids. Avoid using equipment in a location with corrosive gases (e.g., over flooded Lead Acid batteries) and dust.

2.2.1 Wall Mounting the LMC SUN

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 50°C to ensure optimal operation.
- The recommended installation position is to be adhered to the wall vertically.
- Be sure to keep other objects and surfaces as shown in the right diagram to guarantee sufficient heat dissipation and to have enough space for removing wires.



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

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

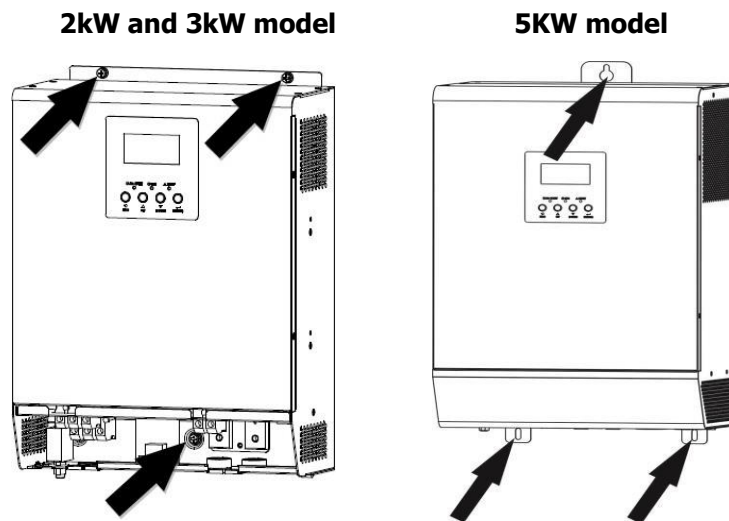


Figure 3: Mounting holes per unit

2.3 Electrical Connections

Before beginning any work on the inverter, ensure that all incoming and output power is de-energized. Verify that no voltage is present by using a voltmeter at all input and output terminals. Check that the voltage and frequency match the inverter front nameplate specifications.

2.3.1 Battery Connection



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



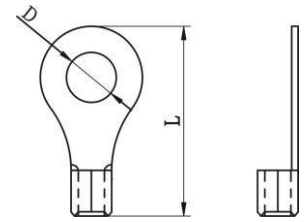
WARNING: All wiring must be performed by qualified personnel. It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the proper recommended cable and terminal size as below.

Recommended battery cable and terminal size:

Model	Typical Amperage	Battery Capacity	Wire Size	Ring Terminal			Torque Value
				Cable mm ²	Dimensions		
					D (mm)	L (mm)	
2KW and 3KW	140A	200AH	1*2AWG	38	6.4	39.2	2-3 Nm
			2*6AWG	28	6.4	33.2	
5KW	180A	600AH	2*4AWG	44	10.5	55	10-12 Nm

Table 2: Recommended battery cable and terminal size

Ring terminal:



User should follow below steps to implement battery connection:

Assemble battery ring terminal based on recommended battery cable and terminal size. Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the bolts are tightened with mention torque in above table. Make sure polarity at both the battery and the inverter's charger is correctly connected and ring terminals are tightly screwed to the battery terminals.

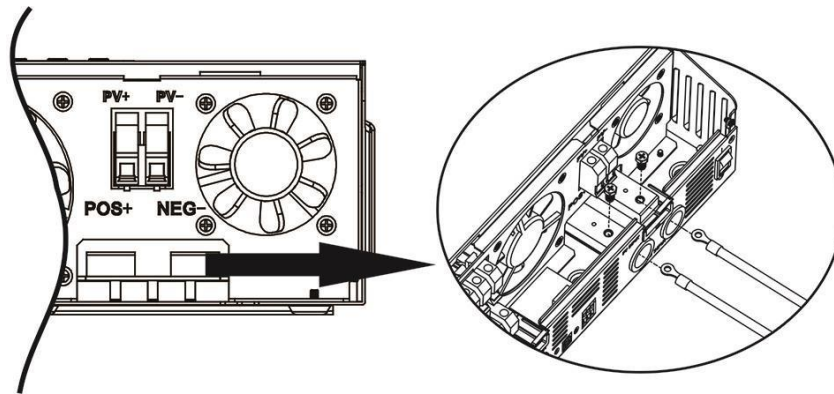


Figure 4: Battery connection to the inverter

2.3.2 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. There are two terminal blocks with "INPUT" and "OUTPUT" markings. Please do NOT mis-connect input and output connectors.



WARNING: All wiring must be performed by qualified personnel. 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 AC input/output cable size:

Model	Gauge	Torque Value
2KW	14 AWG	0.8-1.0 Nm
3KW	12 AWG	1.2-1.6 Nm
5KW	10 AWG	1.4-1.6Nm

Table 2: Recommended AC input/output cable size

User should follow below steps to implement AC input/output connection:

Before making AC input/output connection, open DC breaker first. Remove insulation sleeve 10mm for six conductors. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor (⊕) first.

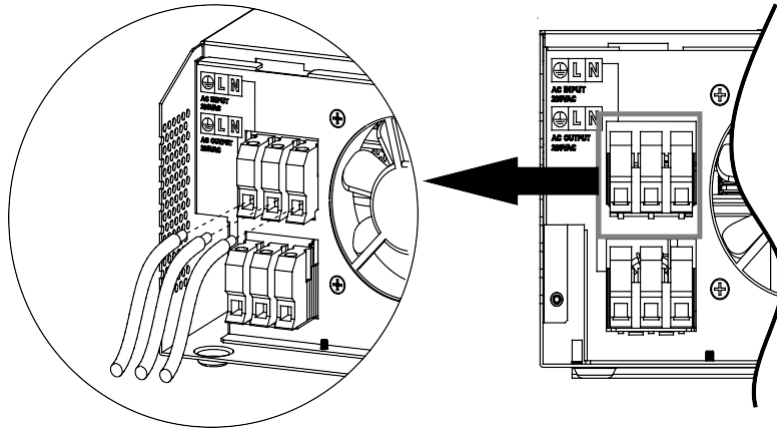


Figure 5: AC Input connection to the inverter

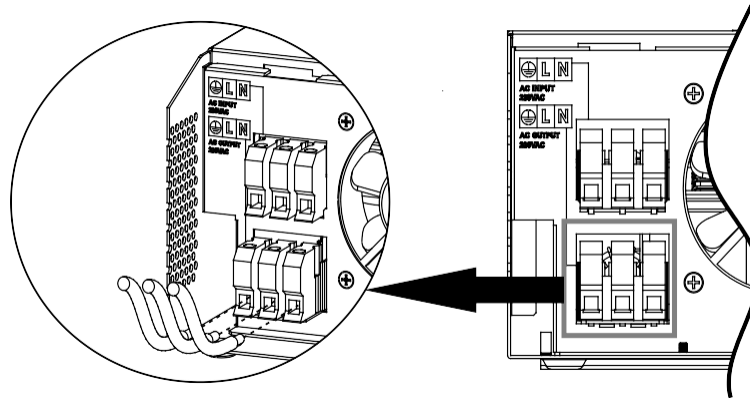


Figure 6: AC Output connection to the inverter



CAUTION: 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.

2.3.3 PV Connection



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



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

Recommended PV connection cable size:

Model	Typical Amperage	Cable Size	Torque
2KW and 3KW	80A	6AWG	2.0-2.4Nm
5KW	PV 1	60A	8AWG
	PV 2	60A	8AWG

Table 3: Recommended PV connection cable size

PV Module Selection:

When selecting proper PV modules, please be sure to consider open circuit Voltage (Voc) of PV modules not exceeds maximum. PV array open circuit voltage of inverter. Open circuit Voltage (Voc) of PV modules should be higher than minimum battery voltage.

Solar Charging Mode			
INVERTER MODEL	2KW	3KW	5KW
Max. PV Array Open Circuit Voltage	145Vdc		
PV Array MPPT Voltage Range	30 - 115Vdc	60 - 115Vdc	
MPP Number	1	1	2

User should follow below steps to implement PV module connection:

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

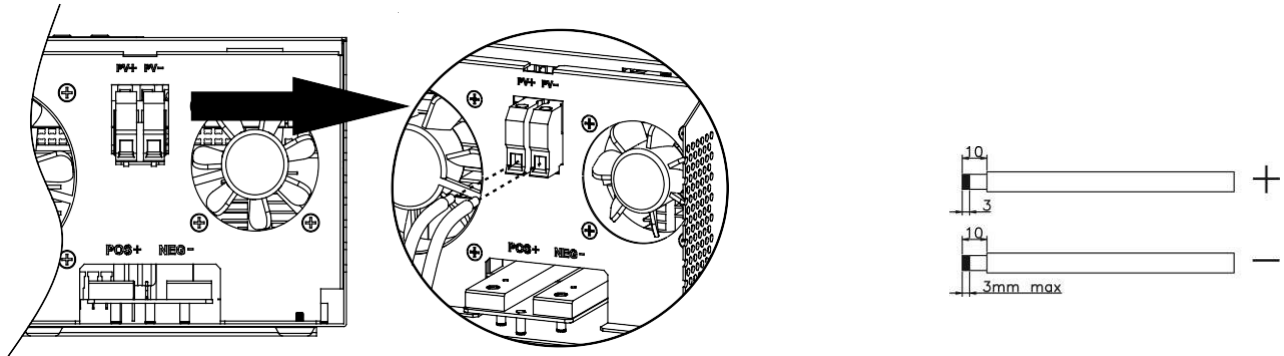


Figure 7: PV connection to the Inverter

Recommended PV module Configuration

PV Module Spec. (reference)	Inverter Model	SOLAR INPUT 1	SOLAR INPUT 2	Q'ty of modules
- 250Wp Vmp: 30.7Vdc - Imp: 8.15A Voc: 37.4Vdc - Isc: 8.63A - Cells: 60	2KW	2S4P	N/A	8pcs
	3KW	2S8P	N/A	16pcs
		3S5P	N/A	15pcs
	5KW	2S6P	2S6P	24pcs
		3S4P	3S4P	24pcs

Table 4: Recommended PV module configuration

2.3.4 Communication Connection

Use supplied communication cable to connect to inverter and PC. Insert bundled CD into a computer and follow on-screen instruction to install the monitoring software. For the detailed software operation, please check user manual of software inside of CD. There is one dry contact (3A/250VAC) available on the rear panel. It could be used to deliver signal to external device when battery voltage reaches warning level.

Unit Status	Condition		Dry contact port:		
			NC & C	NO & C	
Power Off	Unit is off and no output is powered.		Close	Open	
Power On	Output is powered from Utility.		Close	Open	
	Output is powered from Battery or Solar.	Program 01 set as SUB	Battery voltage < Low DC warning voltage	Open	Close
			Battery voltage > Setting value in Program 21 or battery charging reaches floating stage	Close	Open
	Output is powered from Battery or Solar.	Program 01 is set as SBU	Battery voltage < Setting value in Program 20	Open	Close
Battery voltage > Setting value in Program 21 or battery charging reaches floating stage			Close	Open	

3.0 OPERATION

3.1 Power ON/OFF:

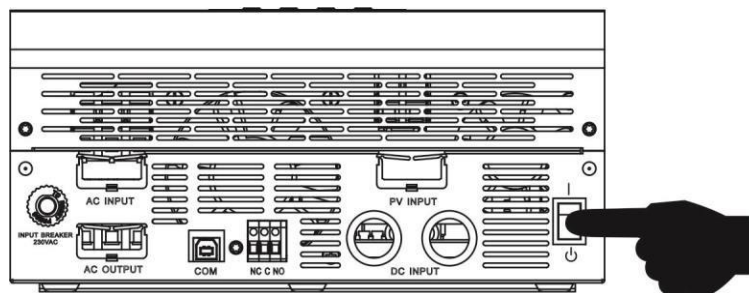
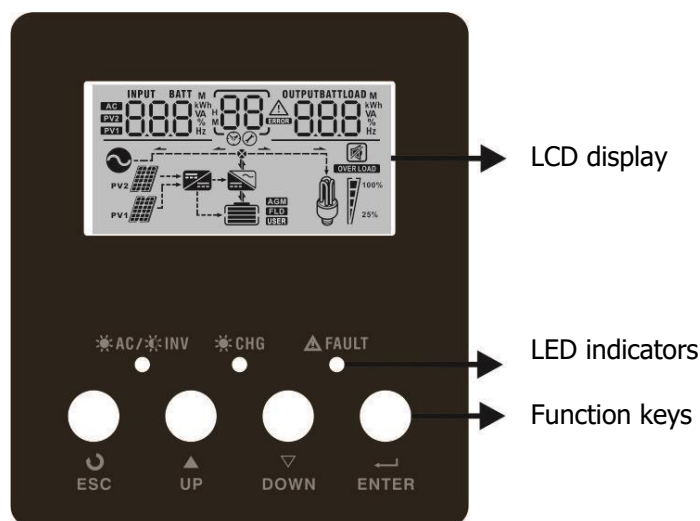


Figure 7: Power On/Off switch of the inverter

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.

3.2 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 LCD display, indicating the operating status and input/output power information.



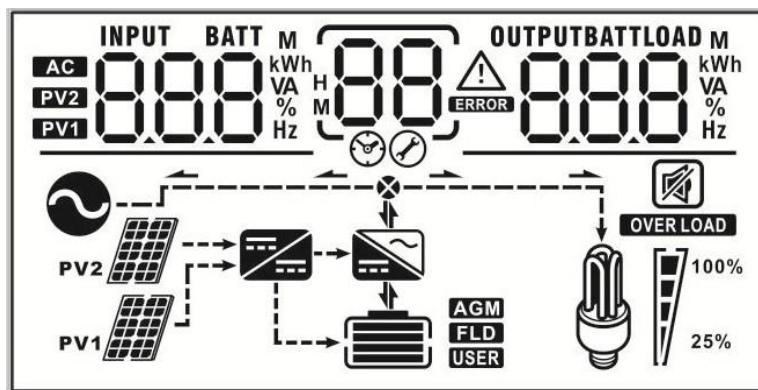
LED Indicator

LED Indicator		Description	
☀️ AC / 🌙 INV	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

3.3 LCD Display Icons

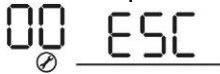





Icon	Function			
Input source information				
	Indicates the AC input			
	Indicates the 1 st PV panel input			
	Indicates the 2 nd PV panel input			
Left digital display information				
	Indicate input voltage, input frequency, battery voltage, PV1 voltage, PV2 voltage, charger current			
Middle digital display information				
	Indicates the setting programs.			
	Indicates the warning and fault codes. Warning: Flashing with warning code Fault: display with fault code			
Right digital display information				
	Indicate the output voltage, output frequency, load percent, load VA, load W, PV1 charger power, PV2 charger power, DC discharging current.			
Battery information				
	Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% and charging status.			
	Indicates the battery type: AGM, Flooded or User-defined battery.			
Load information				
	Indicates overload.			
	Indicates the load level by 0-24%, 25-50%, 50-74%, and 75-100%.			
	0%-24%	25%-50%	50%-74%	75%-100%

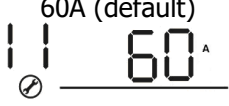
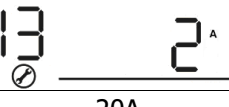
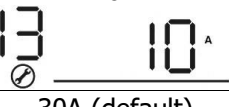
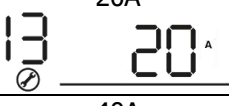
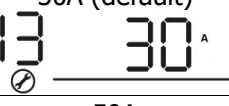
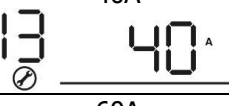
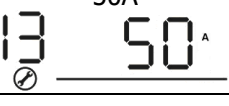
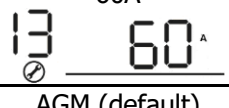
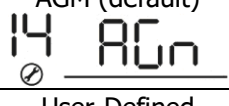
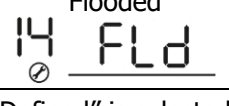
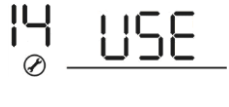
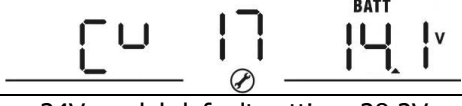


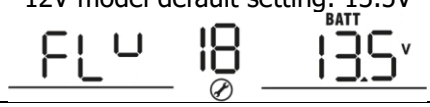
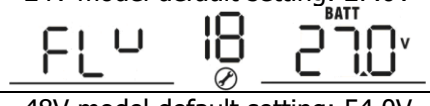
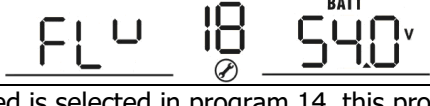
Mode operation information	
	Indicates unit connects to the mains.
	Indicates unit connects to the 1 st PV panel
	Indicates unit connects to the 2 nd PV panel
	Indicates the solar charger is working
	Indicates the DC/AC inverter circuit is working.
Mute operation	
	Indicates unit alarm is disabled.

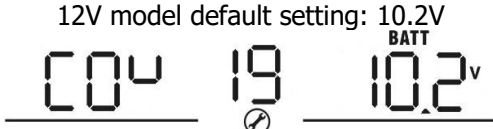
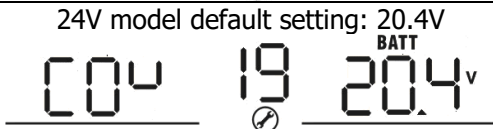
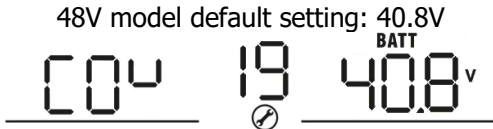
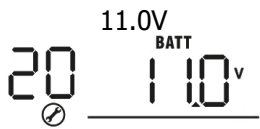
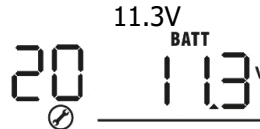
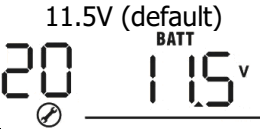
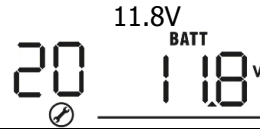
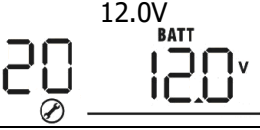
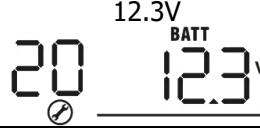

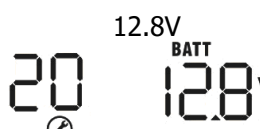
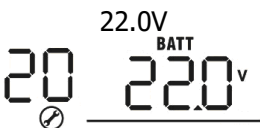
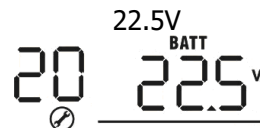
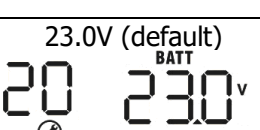
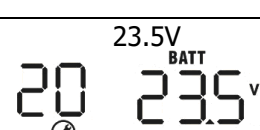
3.4 LCD Setting

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

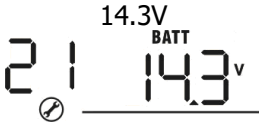
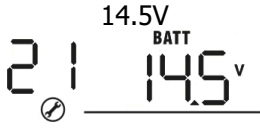

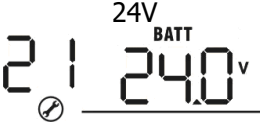
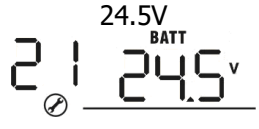
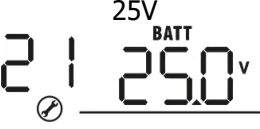
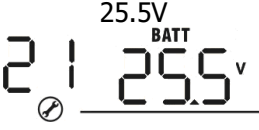
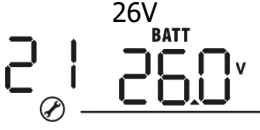
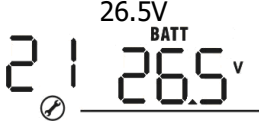
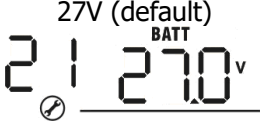

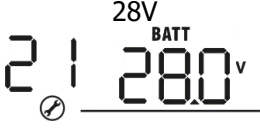
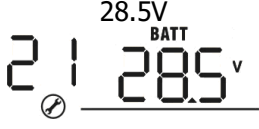
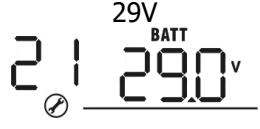
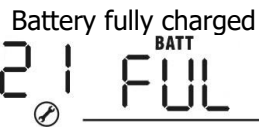
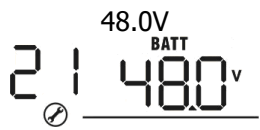
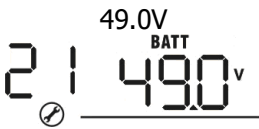
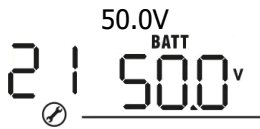

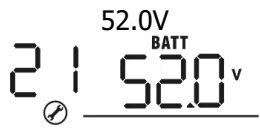
Program	Description	Selectable option	
00	Exit setting mode	Escape 	
01	Output source priority selection		Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, Utility energy will supply power to the loads at the same time.
			Solar 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 20 or solar and battery is not sufficient.
02	AC input voltage range	Appliances (default) 	If selected, acceptable AC input voltage range will be within 90-280VAC.

		UPS 02 <u>UPS</u>	If selected, acceptable AC input voltage range will be within 170-280VAC.
03	Output voltage	220Vac 03 <u>220</u> ^v	230V (Default) 03 <u>230</u> ^v
		240Vac 03 <u>240</u> ^v	
04	Output frequency	50Hz (default) 04 <u>50</u> _{Hz}	60Hz 04 <u>60</u> _{Hz}
05	Solar supply priority	05 <u>BLU</u>	Solar energy provides power to charge battery as first priority.
		05 <u>LBU</u>	Solar energy provides power to the loads as first priority.
06	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable (default) 06 <u>byd</u>	Bypass enables 06 <u>byE</u>
07	Auto restart when overload occurs	Restart disable (default) 07 <u>ltd</u>	Restart enables 07 <u>lTE</u>
08	Auto restart when over temperature occurs	Restart disable (default) 08 <u>ltd</u>	Restart enables 08 <u>lTE</u>
09	Solar or battery energy feed to grid configuration	09 <u>ltd</u>	Solar or battery energy feed to grid disable.
		09 <u>lTE</u>	Solar or battery energy feed to grid enable.
10	Charger source priority: To configure charger source priority	If this inverter/charger is working in Line, Standby or Fault mode, charger source can be programmed as below:	
		Solar first 10 <u>CSO</u>	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.
		Solar and Utility (default) 10 <u>SNU</u>	Solar energy and utility will charge battery at the same time.
		Only Solar 10 <u>OSO</u>	Solar energy will be the only charger source no matter utility is available or not.
If this inverter/charger is working in Battery mode or Power saving mode, only solar energy can charge battery. Solar energy will charge battery if it's available and sufficient.			





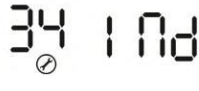




11	Maximum charging current: To configure total charging current for solar and utility chargers. (Max. charging current = utility charging current + solar charging current)	<p>60A (default)</p> 	For 2kW and 3kW models, setting range is from 10A to 140A. For 5KW model, setting range is from 10A to 180A. Increment of each click is 10A.
13	Maximum utility charging current	<p>2A</p> 	<p>10A</p> 
		<p>20A</p> 	<p>30A (default)</p> 
		<p>40A</p> 	<p>50A</p> 
		<p>60A</p> 	
14	Battery type	<p>AGM (default)</p> 	<p>Flooded</p> 
		<p>User-Defined</p> 	If "User-Defined" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 17, 18 and 19.
17	Bulk charging voltage (C.V voltage)	<p>12V model default setting: 14.1V</p> 	
		<p>24V model default setting: 28.2V</p> 	
		<p>48V model default setting: 56.4V</p> 	
		<p>If self-defined is selected in program 14, this program can be set up. Setting range is from 12.0V to 14.6V for 12Vdc model, 24.0V to 29.2V for 24Vdc model and 48.0V to 58.4V for 48Vdc model. Increment of each click is 0.1V.</p>	
18	Floating charging voltage	<p>12V model default setting: 13.5V</p> 	
		<p>24V model default setting: 27.0V</p> 	
		<p>48V model default setting: 54.0V</p> 	
		<p>If self-defined is selected in program 14, this program can be set up. Setting range is from 12.0V to 14.6V for 12Vdc model, 24.0V to 29.2V for 24Vdc model and 48.0V to 58.4V for 48Vdc model. Increment of each click is 0.1V.</p>	



19	Low DC cut off battery voltage setting	12V model default setting: 10.2V 	
		24V model default setting: 20.4V 	
		48V model default setting: 40.8V 	
		If self-defined is selected in program 14, this program can be set up. Setting range is from 10.2V to 12.0V for 12Vdc model, 20.4V to 24V for 24Vdc model and 40.8V to 48.0V for 48Vdc 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.	
20	Battery stop discharging voltage when grid is available	Available options for 12V models:	
			
			
			
			
		Available options for 24V models:	
			
			

20	Battery stop discharging voltage when grid is available	24.0V BATT 20 24.0v	24.5V BATT 20 24.5v
		25.0V BATT 20 25.0v	25.5V BATT 20 25.5v
		Available options for 48V models:	
		44.0V BATT 20 44v	45.0V BATT 20 45v
		46.0V (default) BATT 20 46v	47.0V BATT 20 47v
		48.0V BATT 20 48v	49.0V BATT 20 49v
		50.0V BATT 20 50v	51.0V BATT 20 51v
21	Battery stop charging voltage when grid is available	Available options for 12V models:	
		Battery fully charged BATT 21 FUL	12.0V BATT 21 12.0v
		12.3V BATT 21 12.3v	12.5V BATT 21 12.5v
		12.8V BATT 21 12.8v	13.0V BATT 21 13.0v
		13.3V BATT 21 13.3v	13.5V (default) BATT 21 13.5v
		13.8V BATT 21 13.8v	14.0V BATT 21 14.0v

21	Battery stop charging voltage when grid is available		
		Available options for 24V models:	
			
			
			
			
			
			
		Available options for 48V models:	
			
			
			
		53.0V	54.0V



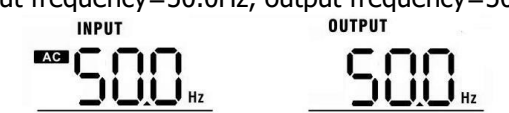
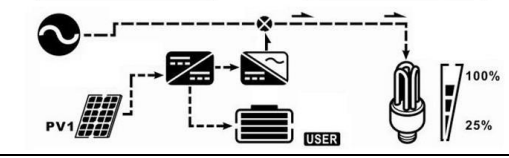
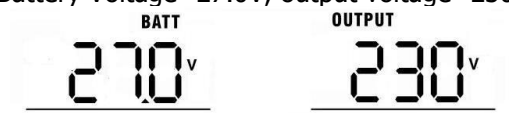
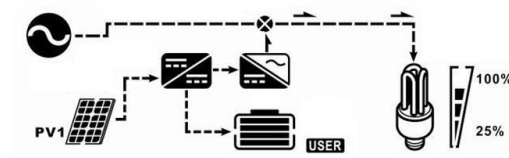
21	Battery stop charging voltage when grid is available	55.0V BATT 21 55.0 v	56.0V BATT 21 56.0 v
		57.0V BATT 21 57.0 v	58.0V BATT 21 58.0 v
22	Auto return to default display screen	Return to default display screen (default) 22 ESP	If selected, no matter how users switch display screen, it will automatically return to default display screen (Input voltage/output voltage) after no button is pressed for 1 minute.
		Stay at latest screen 22 FEP	If selected, the display screen will stay at latest screen user finally switches.
23	Backlight control	Backlight on (default) 23 LON	Backlight off 23 LOF
24	Alarm control	Alarm on (default) 24 BON	Alarm off 24 BOF
25	Beeps while primary source is interrupted	Alarm on (default) 25 AON	Alarm off 25 AOF
27	Record Fault code	Record enables(default) 27 FEN	Record disable 27 FDS
28	AC output mode *This setting is only available when the inverter is in standby mode (Switch off).	28 OUTPUT 28 S1G	28 OUTPUT 28 PAL
		28 OUTPUT 28 3P1	28 OUTPUT 28 3P2
		28 OUTPUT 28 3P3	
29	Reset PV energy storage	Not reset (Default)	Reset

30	Start charging time for AC charger	<p style="text-align: center;">00:00 (Default)</p>  <p>The setting range of start charging time for AC charger is from 00:00 to 23:00, increment of each click is 1 hour.</p>	
31	Stop charging time for AC charger	<p style="text-align: center;">00:00 (Default)</p>  <p>The setting range of stop charging time for AC charger is from 00:00 to 23:00, increment of each click is 1 hour.</p>	
32	Scheduled Time for AC output on	<p style="text-align: center;">00:00 (Default)</p>  <p>The setting range of scheduled Time for AC output on is from 00:00 to 23:00, increment of each click is 1 hour.</p>	
33	Scheduled Time for AC output off	<p style="text-align: center;">00:00(Default)</p>  <p>The setting range of scheduled Time for AC output off is from 00:00 to 23:00, increment of each click is 1 hour.</p>	
34	Set Country Customized Regulations	<p style="text-align: center;">India(Default)</p> 	<p>If selected, acceptable feed-in grid voltage range will be 195.5~253VAC. Acceptable feed-in grid frequency range will be 49~51Hz.</p>
		<p style="text-align: center;">Germany</p> 	<p>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.</p>
95	Time Setting – Minute	 <p>For minute setting, the range is from 00 to 59.</p>	
96	Time Setting – Hour	 <p>For hour setting, the range is from 00 to 23.</p>	
97	Time Setting– Day	 <p>For day setting, the range is from 00 to 31.</p>	

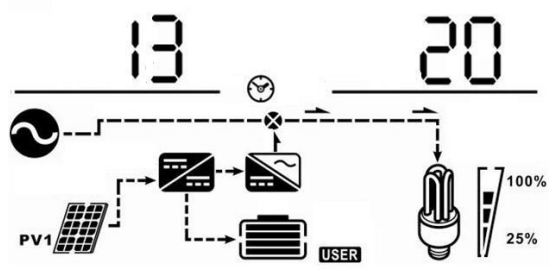
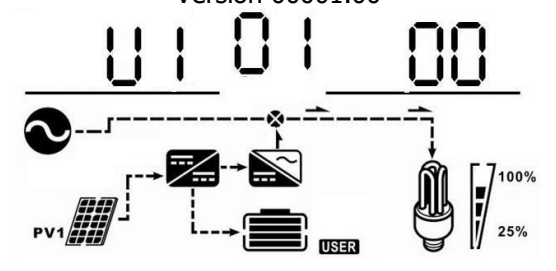
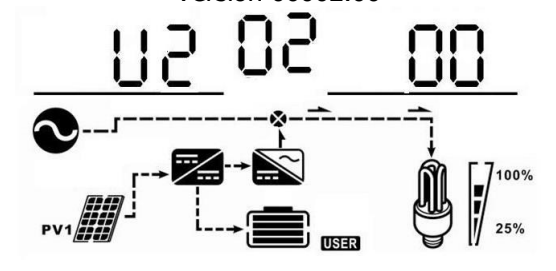
98	Time Setting– Month	 <p>For month setting, the range is from 01 to 12.</p>
99	Time Setting – Year	 <p>For year setting, the range is from 16 to 99.</p>

3.5 Display Setting

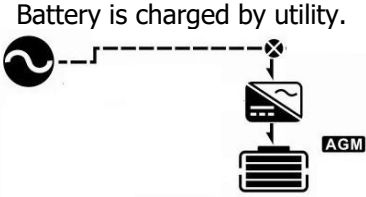
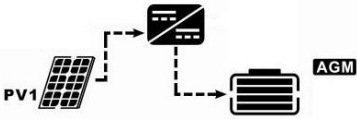
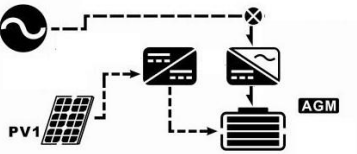


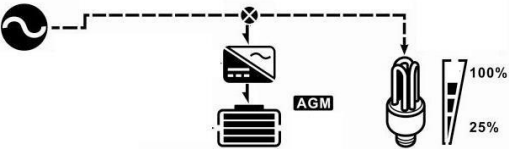

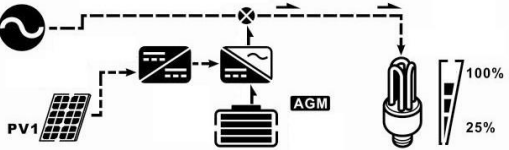

The LCD display information will be switched in turns by pressing “UP” or “DOWN” key. The selectable information is switched as below order: input voltage, input frequency, PV voltage, charging current, battery voltage, output voltage, output frequency, load percentage, load in Watt, load in VA, load in Watt, DC discharging current, main board firmware version and SCC firmware version.

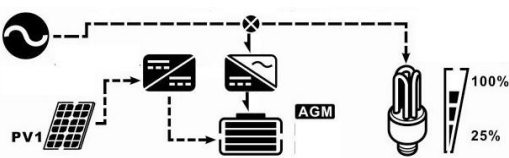
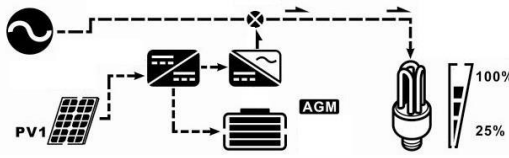
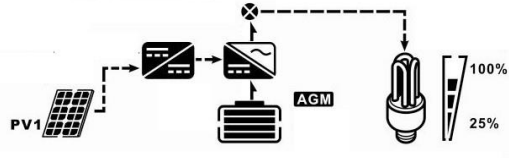
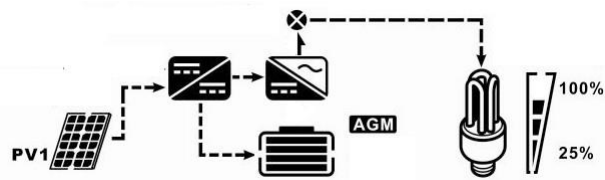
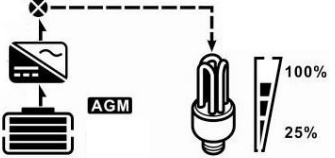

Select item	LCD display
Input voltage and output voltage (Default Display Screen)	<p>Input Voltage=230V, output voltage=230V</p> <p>INPUT OUTPUT</p>  
Input frequency and output frequency	<p>Input frequency=50.0Hz, output frequency=50.0Hz</p> <p>INPUT OUTPUT</p>  
Battery voltage and output voltage	<p>Battery Voltage=27.0V, output voltage=230V</p> <p>BATT OUTPUT</p>  

<p>Battery voltage and load percentage</p>	<p>Battery Voltage=27.0V, load percentage = 68%</p>
<p>Battery voltage and load in VA</p>	<p>Battery Voltage=27.0V, load in VA=1.08kVA</p>
<p>Battery voltage and load in Watt</p>	<p>Battery Voltage=27.0V, load in Watt=1.88kW</p>
<p>PV1 voltage and PV1 charger power</p>	<p>PV1 Voltage=69V, charging power=1.58kW</p>
<p>PV2 voltage and PV2 charger power</p>	<p>PV2 Voltage=69V, charging power=1.58kW</p>

<p>Real time</p>	<p>Real time 13:20.</p>  <p>The diagram shows a digital display of '13' and '20' separated by a colon. Above the display is a clock icon. Below the display is a schematic diagram of a power system. It includes a power source (circle with a sine wave), a PV1 panel, a battery, a 'USER' load, and a light bulb. A vertical bar on the right indicates 100% and 25% levels. Dashed lines represent power flow between components.</p>
<p>Main board firmware version</p>	<p>Version 00001.00</p>  <p>The diagram shows a digital display of '01', '01', and '00' separated by spaces. Above the display is the text 'Version 00001.00'. Below the display is the same schematic diagram as in the first row, showing power source, PV1, battery, USER, and light bulb with 100% and 25% indicators.</p>
<p>SCC firmware version</p>	<p>Version 00002.00</p>  <p>The diagram shows a digital display of '02', '02', and '00' separated by spaces. Above the display is the text 'Version 00002.00'. Below the display is the same schematic diagram as in the first row, showing power source, PV1, battery, USER, and light bulb with 100% and 25% indicators.</p>

3.6 Operating Mode Description

Operating mode	Behaviors	LCD display
<p>Standby mode</p> <p>Note:</p> <p>*Standby mode: The inverter is not turned on yet but at this time, the inverter can charge battery without AC output.</p> <p>*Power saving mode: If enabled, the output of inverter will be off when connected load is pretty low or not detected.</p>	<p>No output power, solar or utility charger available</p>	<p>Battery is charged by utility.</p> 
		<p>Battery is charged by PV energy.</p> 
		<p>Battery is charged by utility and PV energy.</p> 
		<p>Battery is charged by PV energy and feed PV energy to grid.</p> 
		<p>No charging.</p> 
<p>Line mode</p>	<p>Output power from utility. Charger available</p>	<p>Utility charges battery and provides power to load.</p> 
		<p>Utility and battery power provide power to load.</p> 
		<p>PV energy, battery power and utility provide power to load.</p> 
		<p>PV energy and utility charge battery, and utility provides power to load.</p> 

		 <p>PV energy charges battery, utility and PV energy provide power to the load.</p>  <p>PV energy charges battery, PV energy provides power to the load and feeds remaining energy to the grid.</p>
<p>Battery mode</p>	<p>Output power from battery or PV</p>	<p>PV energy and battery energy supply power to the load.</p>  <p>PV energy charges battery and provides power to the load.</p>  <p>Battery provides power to the load.</p> 
<p>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.</p>	<p>No output, no charging.</p>	<p>No charging.</p> 

3.7 Warning Indicator

Warning Code	Warning Event	Icon flashing
01	Fan locked	
03	Battery over charged	
04	Low battery	
07	Overload	

3.8 Faults Reference Code

Fault Code	Fault Event	Icon on
01	Fan locked	
02	Over temperature	
03	Battery voltage is too high	
04	Battery voltage is too low	
05	Output short circuited	
06	Output voltage abnormal	
07	Over load time out	
08	Bus voltage is too high	
09	Bus soft start failed	
51	Over current or surge	
52	Bus voltage is too low	
53	Inverter soft start failed	
55	Over DC offset in AC output	
56	Battery disconnected	
57	Current sensor failed	
58	Output voltage is too low	

Specifications

MODEL	2KW	3KW	5KW
RATED OUPUT POWER	2000 W	3000W	5000W
PV INPUT (DC)			
Max. PV Power	2000W	4000W	6000W
Max. PV Array Open Circuit Voltage	145 VDC	145 VDC	145 VDC
MPPT Range @ Operating Voltage	30 VDC-115 VDC	60 VDC-115 VDC	60 VDC-115 VDC
Number of MPP Tracker	1	1	2
GRID-TIE OPERATION			
GRID OUTPUT (AC)			
Nominal Output Voltage	220/230/240 VAC		
Feed-in Grid Voltage Range	195.5-253 VAC @India 184 - 264.5 VAC @Germany		
Feed-in Grid Frequency Range	49-51Hz @India 47.5 - 51.5Hz @Germany		
Nominal Output Current	8.7A	13A	21.7A
Power Factor Range	>0.99		
Maximum Conversion Efficiency (DC/AC)	90%		
OFF-GRID, HYBRID OPERATION			
GRID INPUT			
Acceptable Input Voltage Range	90 - 280 VAC or 170 - 280 VAC		
Frequency Range	50 Hz/60 Hz (Auto sensing)		
Rating of AC Transfer Relay	30A	40A	
BATTERY MODE OUTPUT (AC)			
Nominal Output Voltage	220/230/240 VAC		
Output Waveform	Pure Sine Wave		
Efficiency (DC to AC)	93%		
BATTERY & CHARGER			
Nominal DC Voltage	24 VDC	48 VDC	48 VDC
Maximum Charging Current (from Grid)	60A		
Maximum Charging Current (from PV)	80A	80A	120A
Maximum Charging Current	140A	140A	180A
GENERAL			
Dimension, D X W X H (mm)	440 x 300 x 100	120 x 295 x 468	190 x 295 x 483
Net Weight (kgs)	8	11	16
INTERFACE			
Parallel-able	N/A	Yes	Yes
External Safety Box (Optional)	Yes		
Communication	USB or RS232/Dry-Contact		
ENVIRONMENT			
Humidity	0 - 90% RH (No condensing)		
Operating Temperature	0 to 50°C		

Trouble Shooting

Problem	LCD/LED/Buzzer	Explanation / Possible cause	What to do
Unit shuts down automatically during startup process.	LCD/LEDs and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low (<1.91V/Cell)	Re-charge battery. Replace battery.
No response after power on.	No indication.	The battery voltage is far too low. (<1.4V/Cell) Battery polarity is connected reversed.	Check if batteries and the wiring are connected well. Re-charge battery. 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)	Check if AC wires are too thin and/or too long. Check if generator (if applied) is working well or if input voltage range setting is correct.
	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)	Reduce the connected load. 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.	

Manufacturer's Warranty

All La Marche Manufacturing Co. equipment has been thoroughly tested and found to be in proper operating condition upon shipment from the factory and is warranted to be free from any defect in workmanship and material that may develop within two year from date of purchase.

Should a piece of equipment require major component replacement or repair during the first year of the warranty period, these can be handled in one of two ways:

1. The equipment can be returned to the La Marche factory to have the inspections, parts replacements and testing performed by factory personnel. Should it be necessary to return a piece of equipment or parts to the factory, the customer or sales representative must obtain authorization from the factory. If upon inspection at the factory, the defect was due to faulty material or workmanship, all repairs will be made at no cost to the customer during the first year. Transportation charges or duties shall be borne by purchaser.
2. If the purchaser elects not to return the equipment to the factory and wishes a factory service representative to make adjustments and/or repairs at the equipment location, La Marche's field service labor rates will apply. A purchase order to cover the labor and transportation cost is required prior to the deployment of the service representative.

In accepting delivery of the equipment, the purchaser assumes full responsibility for proper installation, installation adjustments and service arrangements. Should minor adjustments be required, the local La Marche sales representative should be contacted to provide this service only.

All sales are final. Only standard LaMarche units will be considered for return. A 25% restocking fee is charged when return is factory authorized. Special units are not returnable.

In no event shall La Marche Manufacturing Co. have any liability for consequential damages, or loss, damage or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with other equipment or materials, or from any other cause. In addition, any alterations of equipment made by anyone other than La Marche Manufacturing Co. renders this warranty null and void.

La Marche Manufacturing Co. reserves the right to make revisions in current production of equipment, and assumes no obligation to incorporate these revisions in earlier models.

The failure of La Marche Manufacturing Co. to object to provisions contained in customers' purchase orders or other communications shall not be deemed a waiver of the terms or conditions hereof, nor acceptance of such provisions.

The above warranty is exclusive, supersedes and is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness. No person, agent or dealer is authorized to give any warranties on behalf of the Manufacturer, nor to assume for the Manufacturer any other liability in connection with any of its products unless made in writing and signed by an official of the manufacturer.

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