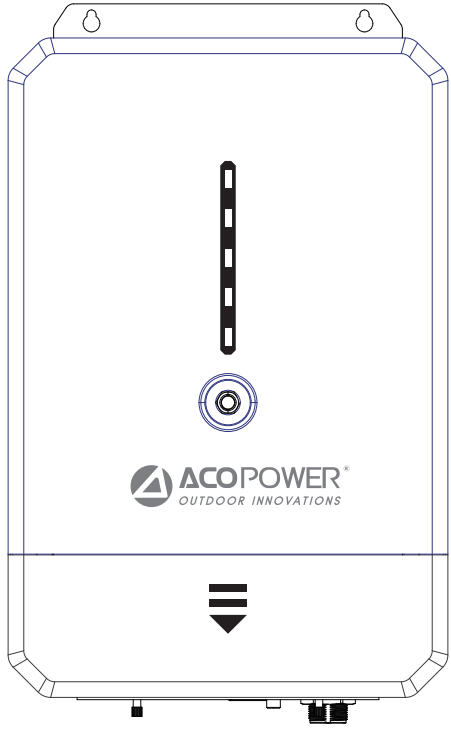
Photovoltaic Inverter

User Manual



Model: SGR-MP30011-2

Contents

INTRODUCTION ---- **01**

Purpose ---- 01
Scope ---- 01

SAFETY INSTRUCTION ---- **01**

OPERATION SECTION ---- **02**

Features ---- 02
Basic System Architecture ---- 02
Product Overview ---- 03

INSTALLATION ---- **04-10**

Unpacking and Inspection ---- 04
Preparation ---- 04
Mounting the Unit ---- 04-05
Battery Connection ---- 05-06
AC Input/Output Connection ---- 07-08
PV Connection ---- 08-09
Final Assembly ---- 10

OPERATION ---- **10-25**

Power ON/OFF ---- 10
Operation and Display Panel ---- 11
LCD Display Icon ---- 12-13
LCD Setting ---- 14-17
Display Setting ---- 18-19
Operating Mode Description ---- 20-22
Battery Equalization Instruction ---- 22-23
Fault Reference Code ---- 24
Warning Indicator ---- 25

SPECIFICATIONS ---- **26-29**

Product Specifications ---- 26-29
Table 4 General Specifications ---- 29

TROUBLE SHOOTING ---- **30-31**

Attachment: Approximate Backup Timetable ---- 31

INTRODUCTION

Purpose

This manual introduces the assembly, installation, operation, and trouble shooting of the unit. Please read this manual carefully before installation and operation. Please keep this manual for future reference.

Scope

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

Safety Instruction

⚠ Warning	**This chapter contains important safety and operating instructions. Please read and keep this manual for future reference.**

1. Before using this unit, please read all instructions and warning labels on the unit, battery, and all relevant chapters of this manual.
2. To reduce the risk of injury, this unit can only charge lead-acid batteries (AGM, GEL, regular water batteries) and lithium batteries. Other types of batteries may burst, causing personal injury and damage.
3. Do not disassemble the unit. When maintenance or repair is required, please bring it to a qualified repair service center. Incorrect reassembly may lead to the risk of electric shock or fire.
4. To reduce the risk of electric shock, please disconnect all wiring before attempting any maintenance or cleaning. Turning off the device will not reduce the risk.
5. Only qualified installation personnel can install this device together with batteries.
6. **Never** charge frozen batteries.
7. In order to achieve optimum operation of the photovoltaic inverter, please select cables with appropriate size according to the required specifications. This is very important to operate the photovoltaic inverter.
8. Be very careful when using metal tools on or around the battery. Falling tools may cause sparks or short circuits in batteries or other electrical components, and may lead to explosions.
9. Please strictly follow the installation procedure when you want to disconnect the AC or DC terminals. For detailed information, please refer to the "Installation" section of this manual.
10. **Grounding Instructions**: This inverter should be connected to a permanent grounded wiring system. Please be sure to comply with local requirements and regulations to install this inverter.
11. Do not cause short circuit in AC output or DC input. Do not connect to the power grid when the DC input is short circuited.
12. Only qualified maintenance personnel can repair this device. If there are still errors after the trouble shooting, please return it to your local dealer or service center for maintenance.

OPERATION SECTION

Preface

This is a multi-function inverter that combining functions of inverter, MPPT solar charger, and battery charger, providing portable uninterruptible power supply support. Its comprehensive large LCD display offers user-configurable and easy-accessible touch button operations, such as battery charging current, AC/solar charging priority, and acceptable input voltage based on different applications.

Features

- Pure sine wave solar inverter.
- Unique top cover design with 6.25 inch LCD display screen and buttons.
- Built-in 150A MPPT (Max PV) solar charger.
- Wide PV input range of 30V-300Vdc.
- Smart battery charger design for optimized battery performance.
- Configurable AC/battery input priority via LCD setting.
- Automatically restart upon PV recovery.
- Overload/over-temperature/output short circuit protection, and cold restart function.
- Built-in lithium battery is automatic activation.
- WiFi monitoring function for communication with RS485 (optional).
- Dust proof kit suitable for harsh environment (optional).
- Restore default settings with one click.

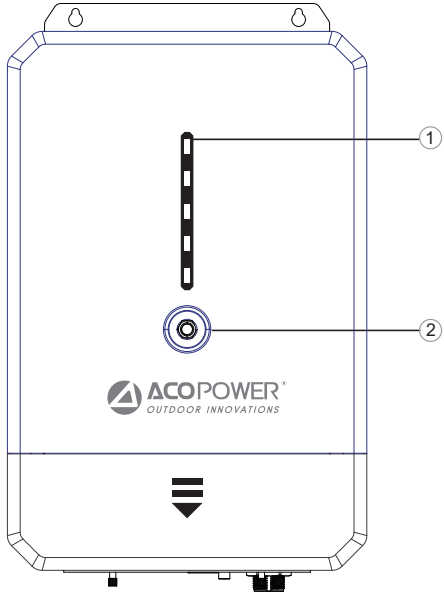
Basic System Architecture

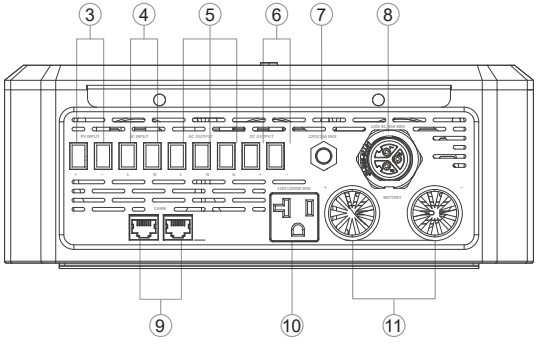
The following figure shows the basic application for this inverter. It also includes the following devices to have a complete operating system.

Generator or Utility
PV Modules (optional)

Please consult your system integrator for other possible system architectures according to your needs.
This inverter can power all kinds of appliances in RV, home, or office environments, including motor type appliances such as down light, fan, refrigerator, and air conditioner.

Product Overview





①	LED
②	ON/OFF
③	PV Input
④	AC Input
⑤	AC Output
⑥	DC Output
⑦	Circuit Breaker
⑧	Charging Port
⑨	RS485 Communication Port
⑩	Output Socket
⑪	Battery Input

INSTALLATION

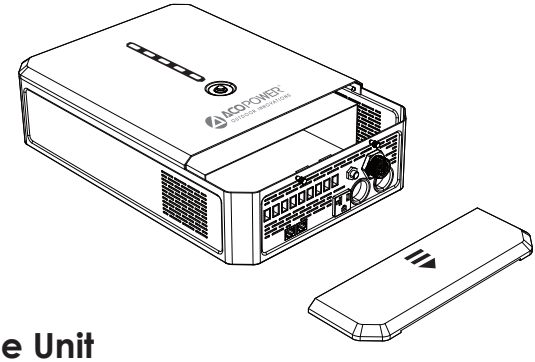
Unpacking and Inspection

Before installation, please check the unit to ensure that there is no damage inside the packaging. You should receive the following items within the package:

- The unit x1
- User manual x1

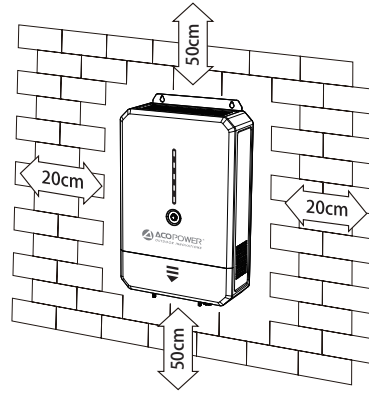
Preparation

Before connecting all wiring, please remove the two self-twisting screws on the front cover, as shown in the following figure.



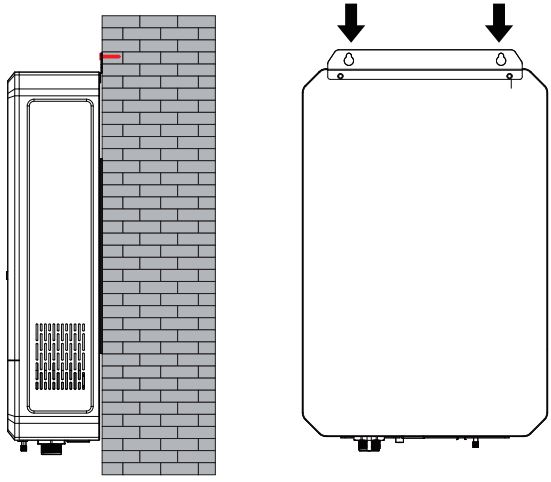
Mounting the Unit

Before selecting the installation location, please consider the following points:
◎Do not install the inverter on flammable structure materials.
◎Installed on a solid surface and able to withstand the weight of the inverter for a long time (see Table 4 for the weight of the inverter).
◎Install this inverter at eyes level for easy access to read the LCD easily.
◎The ambient temperature should be between 0℃ and 55℃ to ensure optimal operation.
◎The recommended installation position is vertically installed on the load-bearing bracket of the RV or on a concrete wall for household use.
◎Make sure that other objects and surfaces shown in the figure are retained to ensure sufficient heat dissipation and enough space for removing wires.



Warning **Suitable for mounting on the bracket of the RV or on concrete or other non-combustible surfaces only.**

Install the unit by screwing two screws

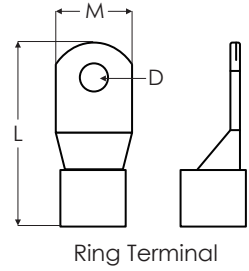


Battery Connection

Caution: For safety operate and regulation compliance, it is required to install a separate DC over current protector or disconnect device between the battery and inverter. A disconnect device may not be required in some applications, but over current protection is still required. Please refer to the typical amperage of the required fuse or circuit breaker size in the table below.

Warning

a) All wiring must be carried out by qualified installation personnel.
b) For the safe system and efficient operation, it is very important to using suitable cables to connect the battery. To reduce the risk of injury, please use the correct recommended cables and terminal sizes, as shown below.



Ring Terminal

Recommended battery cables and terminal sizes

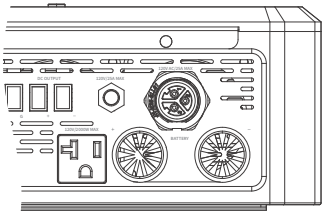
Model	Typical Amperage	Battery Capacity	Wire Size	Ring Terminal				Torque Value
				Cable mm²	Dimensions			
					D(mm)	L(mm)	M(mm)	
SGR-MP30011-2	300A	12V/300AH Or more(Inclusive)	1*2/0 AWG	67	8	44	18.2	2~3Nm

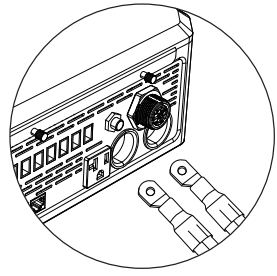
Please follow the steps below to connect the battery:

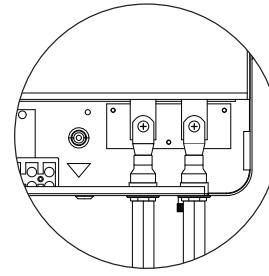
1. Assemble the battery ring terminals according to the recommended battery cables and terminal sizes.
2. Connect all battery packs based on the requirements of the unit.

Caution: Please use sealed lead-acid batteries (AGM, GEL, Flooded) or lithium batteries only.

3. Insert the ring terminals of the battery cable flatly into the battery connectors of the inverter and ensure that the bolts are tightly screwed with a torque of 2-3 Nm. Ensure that the polarities of the battery and photovoltaic inverter are correctly connected, and the ring terminals and battery terminals are tightly screwed.







Warning

a) When using multiple lithium batteries in parallel, ensure that each lithium battery is compatible with parallel usage. Parallel usage of lithium batteries that do not support it may lead to battery damage and potential safety incidents

b) Do not place anything between the flat part of the inverter terminal and the ring terminal. Otherwise, overheating may occur.

c) Do not apply antioxidants to the terminals before they are tightly connected.

d) Before making the final DC connection or closing the DC circuit breaker/isolation switch, ensure that the positive (+) must be connected to the positive (+) and the negative (−) must be connected to the negative (−).

AC Input/Output Connection

Attention

1.There are two terminals marked with "L" and "N". Please do not misconected the input and output connectors.
2.All wiring must be carried out by qualified installer.
3.For the safe system and efficient operation, it is very important to using suitable cables to connect the battery.
4.To reduce the risk of injury, please use proper cables with the following recommended sizes.

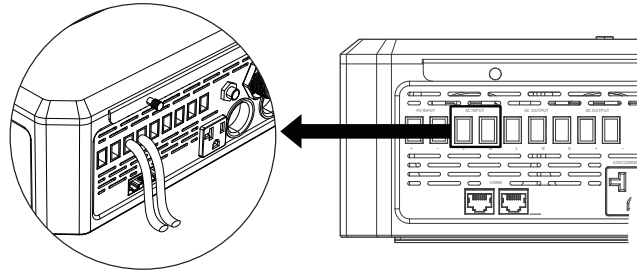
Recommended AC cable requirements

Model	Gauge	Torque Value
SGR-MP30011-2	8 AWG	1.2~1.6Nm

Please follow the steps below to achieve AC input/output connection:
1. Before making AC input/output connections, be sure to disconnect the DC protector or switch.
2. Remove the insulation skins of six wires by 10mm and shorten the L and N lines by 3mm.
3. Insert the AC input cable according to the polarity indicated on the wiring board and tighten the terminal screws.

L →Live (Black)

N→Neutral (White)

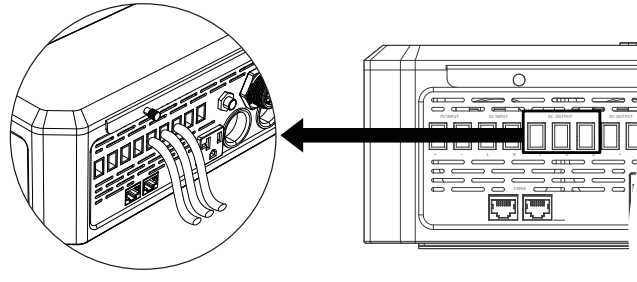


4.Then, insert the AC output cable according to the polarity indicated on the wiring board and tighten the terminal screws.
5.Make sure to connect PE ⏚ ground protection first.

⏚→Ground (Yellow-Green)

L →Live (Black)

N→Neutral (White)



6.Be ensure that the wires are securely connected.

Caution
Ensure that the AC power wires are connected with the correct polarity. Reversing the L (Line) and N (Neutral) wires may lead to potential safety hazards.

Caution
Air conditioner and other equipment require at least 2 to 3 minutes to restart, as sufficient time is required to balance the refrigerant gas in the circuit. If there is a power shortage and it is restored in a short period of time, it will cause damage to the equipment you are connected to. To prevent such damage, please check whether the air conditioner manufacturer is equipped with a delay function before installation. Otherwise, this photovoltaic inverter will trigger an overload fault and cut off the output to protect your equipment, but sometimes it can still cause internal damage to the air conditioner.

PV Connection

Warning

All wiring must be performed by qualified installation personnel.
For the safe system and efficient operation, it is very important to using suitable cables to connect the battery. To reduce the risk of injury, please use the proper cables with the following recommended sizes.

Model	Wire Size	Calbe(mm²)	Torque Value(Max)
SGR-MP30011-2	10AWG	5	1.2Nm

PV Module Selection:

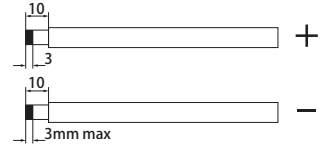
When selecting proper PV modules, please be sure to consider below parameters:
1.The open circuit voltage (Voc) of the PV module does not exceed 300V.
2. The operating voltage (Voc) of the PV module should be higher than 30V.

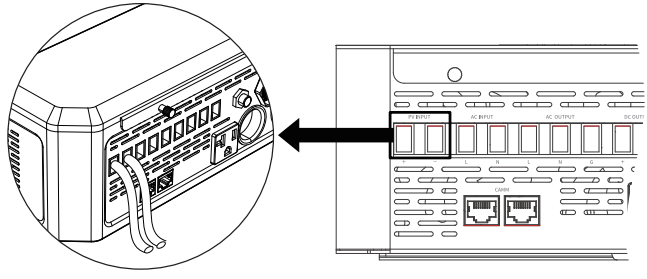
Inverter Model	3.0KW
Max. PV Array Open Circuit Voltage	300Vdc
PV Array MPPT Voltage Range	30~300Vdc

Take 250Wp PV module as an example. After considering above two parameters, the recommended module configurations are listed as below table.

Solar Panel Spec (Reference) -250Wp -Vmp: 30.1Vdc -Imp: 8.3A -Voc: 37.7Vdc -Isc: 8.4A -Cell: 60	SOLAR INPUT (Min in sreial:2pcs,Max in serial:9pcs	Qty of Panels	Total Input
	4PCS in serial	4PCS	1000W
	6PCS in serial	6PCS	1500W
	8PCS in serial	8PCS	2000W
	6PCS in serial and 2 sets in parallel	12PCS	3000W

Please follow the steps below to connect PV modules:
1. Remove the insulation skins of positive and negative conductors by 10 mm.
2. Check correct polarity of connection cable between PV modules and PV input connectors. Then, connect positive pole (+) of connection cable to positive pole (+) of PV input connector, and connect negative pole (-) of connection cable to negative pole (-) of PV input connector.

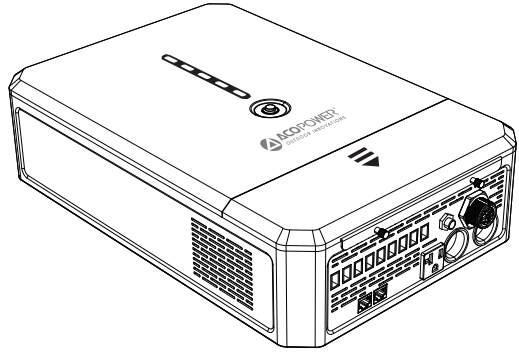




3.Make sure the wires are securely connected.

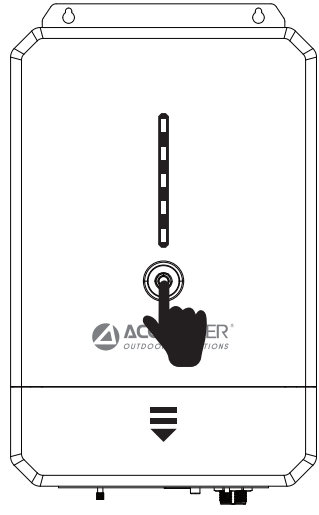
Final Assembly

After connecting all wires, please put bottom cover back and tighten two screws, as shown below:



OPERATION

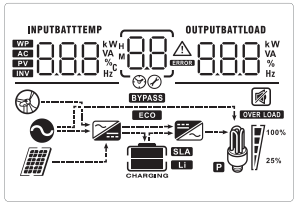
Power ON/OFF



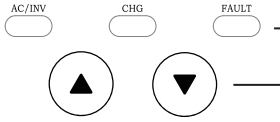
Once the unit has been properly installed and the batteries are connected well, simply press ON/OFF switch(located on the button of the case) to turn on the unit.

Operation and Display Panel

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



LCD Screen



LED Indicators

Function Keys

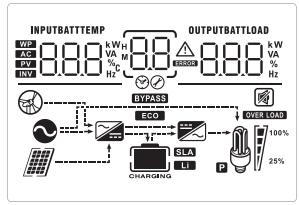
LED Indicator

LED Indicator			Information
☀ AC ☀ INV	Green	Ever-brightening	The output is powered by utility..
		Flashing	The output is powered by battery or PV in Battery Mode.
☀ CHG	Green	Ever-brightening	Battery is fully charged.
		Flashing	Battery is charging.
⚠ FAULT	Red	Ever-brightening	Fault occurs in the inverter.
		Flashing	Warning occurs in the inverter.

Function Key

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

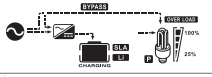
LCD Display Icon



Icon	Function Description
Input Source Information	
AC	Indicates the AC input.
PV	Indicates the PV input.
INPUTBATTTEMP	Indicates input voltage, input frequency, PV voltage, battery voltage and charger current.
Configuration Program and Fault Information	
	Indicates the program setting.
ERROR	Indicates the warning and fault codes.
	Warning: ERROR Flashing with warning code.
	Fault: ERROR Lighting with fault code.
Output Information	
OUTPUTBATTLOAD	Indicates output voltage, output frequency, load percentage, VA load, Watt load and discharging current.
Battery Information	
CHARGING	The battery icon indicates battery level by 0-20%, 20-40%, 40-60% and 80-100% in battery mode and indicates charging status in AC or PV input mode.

It will present battery charging status while in AC status		
Status	Battery Voltage	LCD Display Screen
Constant Current Mode / Constant Voltage Mode	<2V/cell	4 cells will flash in turns.
	2～2.083V/cell	The bottom cell will be on and the other three cells will flash in turns.
	2.083~2.167v/cell	The bottom two cells will be on and the other two cells will flash in turns.
	>2.167 V/cell	The bottom three cells will turn on and the top cell will blink.
Floating mode. Batteries are fully charged.		4 cells will be turn on.

It will present battery capacity while in Battery Mode		
Load Percentage	Battery Voltage	LCD Screen Display
Load > 50%	<1.717V/cell	
	1.717V/cell～1.8V/cell	
	1.8～1.883V/cell	
	>1.883 V/cell	
50% > Load > 20%	<1.817V/cell	
	1.817V/cell ～ 1.9V/cell	
	1.9～1.983V/cell	
	>1.983	
Load < 20%	<1.867V/cell	
	1.867V/cell ～ 1.95V/cell	
	1.95～2.033V/cell	
	>2.033	

Load Information	
	Indicates overload.
	The right-side flashing strip and load icon indicate the load level by 0-24%, 25-50%, 50-75% and 75-100%.
Mode Operation Information	
	Indicates the unit connected to power.
	Indicates the unit connected to PV panel.
	Indicates that the AC power supply is charging the battery while the mains power is being supplied to the load via the bypass function.
	Indicates that the photovoltaic power source (PV) is charging the battery and the PV is also supplying power to the load.
	Indicates that the DC/AC inverter circuit is operating.
Silent operation	
	Indicates the alarm of the unit is disabled.

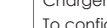
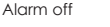
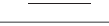
LCD Setting

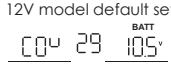
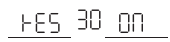
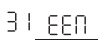
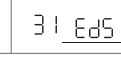
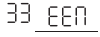
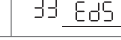
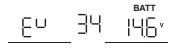
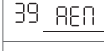
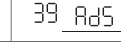
After holding the ENTER button for 3 seconds, the unit will enter the setup mode. Press the 'UP' or 'DOWN' buttons to select the configuration program. Then press the 'ENTER' button to confirm your selection or ESC button to exit.

Setting Programs

Program Code	Description	Selection Option	
00	Exit setting mode	escape 00 ESC	
01	Output source priority: To configure load power source priority	01 SUb	Solar energy provides power to the loads as first priority.If solar energy is out sufficient to power all connected loads,utility energy will supply power to the loads at the same time.
		01 SbU	Solar energy provides power to the loads as first priority.If solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time. Utility provides power to the loads only when battery voltage drops to either low-level warning voltage or the setting point in program 12.
02	Maximum charging current To configure total charging current for solar and utility chargers.(Max. charging current =utility charging current +solar charging current) **Warning:** Charging current settings must be configured according to the battery's charging specifications, otherwise it may result in personal safety incidents.	10A 02 10A	20A 02 20A
		30A 02 30A	40A 02 40A
		50A 02 50A	60A 02 60A
		70A 02 70A	80A 02 80A
		90A 02 90A	100A 02 100A
		110A 02 110A	150A 02 150A
03	AC input voltage range	UPS(default) 03 UPS	If selected, acceptable AC input voltage range will be within 90-145VAC
04	Power saving mode enable/disable	Saving mode disable(default) 04 SdS	If disabled, no matter connected load is low or high, the on/off status of inverter output will not be effected.
		Saving mode enable 04 SEn	If enabled, the output of inverter will be off when connected load is pretty low or not detected.

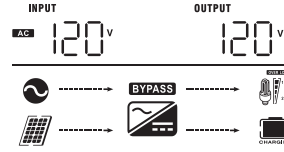
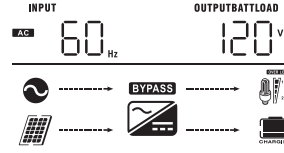
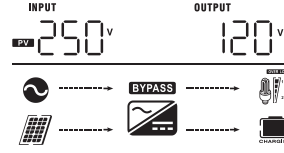
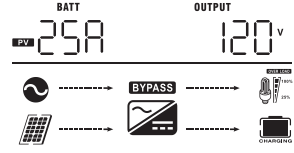
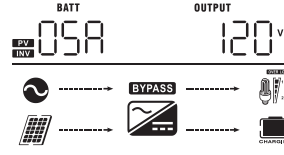
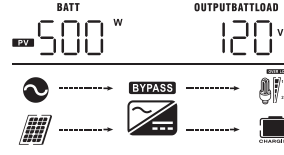
05	Battery type	AGM (default) 05 AGn	Flooded 05 FLd	
		lithium battery 05 LI8		
		User-Defined 05 USE	If "User-Defined"is selected, battery charge voltage and low DC cut-off voltage can be set up in program 26,27 and 29.	
06	Auto restart when overload occurs	Restart disable (default) 06 LrD	Restart enable 06 LrE	
07	Auto restart when over temperature occurs	Restart disable 07 LrD	Restart enable (default) 07 LrE	
08	Output voltage	110V 08 110v	120V(default) 08 120v	130V 08 130v
09	Output frequency	60Hz(default) 09 60Hz	50Hz 09 50Hz	
11	Maximum utility charging current **Warning:** Charging current settings must be configured according to the battery's charging specifications, otherwise it may result in personal safety incidents.ts.	150A 11 150A	10A 11 10A	
		20A 11 20A	30A 11 30A	
		40A 11 40A	50 11 50A	
		60A 11 60A	70A 11 70A	
		80A 11 80A		
13	Setting voltage point back to utility source when selecting "SBU priority"	Available options in 12V models:		
		10.5V 13 10.5v	11.0V 13 11.0v	
		11.5V 13 11.5v	12.0V 13 12.0v	
		12.5V 13 12.5v	13.0V 13 13.0v	
		13.5V 13 13.5v	14.0V 13 14.0v	

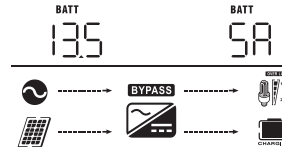
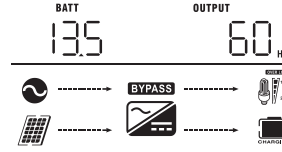
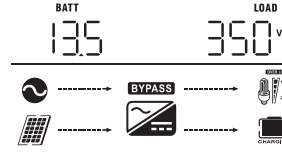
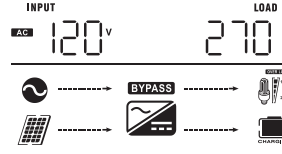
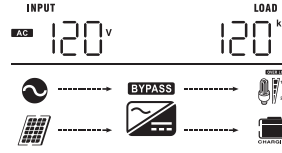
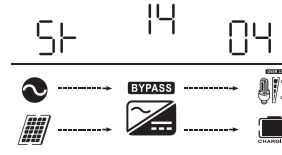
<table>
<tr><td rowspan="4">16</td><td rowspan="4">Charger source priority: To configure charger source priority</td><td colspan="2">If this inverter/charger is working online, Standby or Fault mode, charger source can be programmed as below:</td></tr>
<tr><td>Solar first
</td><td>Solar energy will charge battery as first priority.Utility will charge battery only when solar energy is not available.</td></tr>
<tr><td>Solar and Utility
  </td><td>Solar energy and utility will charge battery at the same time.</td></tr>
<tr><td>Only Solar
</td><td>Solar energy will be the only charger source no matter utility is available or not.</td></tr>
<tr><td colspan="3">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.</td></tr>
<tr><td>18</td><td>Alarm control</td><td>Alarm on (default)
  </td><td>Alarm off
  </td></tr>
<tr><td rowspan="2">19</td><td rowspan="2">Auto return to default display screen</td><td>Return to default display screen (default)
</td><td>If selected, regardless of how the user switches the display, it will automatically return to the default screen (input voltage/output voltage) if no buttons are pressed within 1 minute.</td></tr>
<tr><td>Stay at latest screen
  </td><td>If selected, the display will remain on the last screen the user switched to.</td></tr>
<tr><td>20</td><td>Backlight control</td><td>Backlight on (default)
  </td><td>Backlight off
</td></tr>
<tr><td>22</td><td>Beeps while primary source is interrupted</td><td>Alarm on
  </td><td>Alarm off (default)
  </td></tr>
<tr><td>25</td><td>Record Fault code</td><td>Record enable (default)
</td><td>ecord disable
</td></tr>
<tr><td rowspan="2">26</td><td rowspan="2">Bulk charging voltage (C.V voltage)</td><td colspan="2">12V model default setting: 14.6V
  </td></tr>
<tr><td colspan="2">If self-defined is selected in program 5, this program can be set up. Setting range is from 12.0V to 14.6V for 12V model. Increment of each click is 0.1V.</td></tr>
<tr><td rowspan="2">27</td><td rowspan="2">Floating charging voltage</td><td colspan="2">12V model default setting to 13.5V
  </td></tr>
<tr><td colspan="2">If self-defined is selected in program 5, this program can be set up. Setting range is from 12.0V to 14.6V for 12V model. Increment of each click is 0.1V.</td></tr>
</table>

<table>
<tr><td rowspan="2">29</td><td rowspan="2">Low DC cut-off voltage</td><td colspan="2">12V model default setting: 10.5V
  </td></tr>
<tr><td colspan="2">If self-defined is selected in program 5, this program can be set up. Setting range is from 10.0V to 12.0V (12V 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.</td></tr>
<tr><td rowspan="2">30</td><td rowspan="2">Restore default settings</td><td colspan="2">Restore default settings
  </td></tr>
<tr><td colspan="2">If this option is selected, the Inverter will restore the default settings.</td></tr>
<tr><td rowspan="2">31</td><td rowspan="2">Battery equalization</td><td>Battery equalization
  </td><td>Battery equalization Disable(default)
  </td></tr>
<tr><td colspan="2">If "Flooded"or"User-Defined" is selected in program 05, this program can be set up.</td></tr>
<tr><td rowspan="2">33</td><td rowspan="2">Battery equalization</td><td>  </td><td>  </td></tr>
<tr><td colspan="2">If "Flooded" or "User-Defined" is selected in program 05, this program can be set up.</td></tr>
<tr><td rowspan="2">34</td><td rowspan="2">Battery equalization voltage</td><td colspan="2">3KVA default setting:14.6V
  </td></tr>
<tr><td colspan="2">Setting range is from 12.5V to 15V. Increment of each click is 0.1V.</td></tr>
<tr><td>35</td><td>Battery equalized time</td><td>60 min (default)
  </td><td>Setting range is from 5 min to 900 min.
Increment of each click is 5 min.</td></tr>
<tr><td>36</td><td>Battery equalized timeout</td><td>120 min (default)
  </td><td>Setting range is from 5 min to 900 min.
Increment of each click is 5 min.</td></tr>
<tr><td>37</td><td>Equalization interval</td><td>30 days (default)
  </td><td>Setting range is from 0 to 90 days.
Increment of each click is 1 day</td></tr>
<tr><td rowspan="2">39</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 LCD main page will shows “E9”. 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“E9”in LCD main page.</td></tr>
</table>

Display Setting

The LCD display information will be switched in turns by pressing "UP" or "DOWN" button. The selectable information is switched as below order: input voltage, input frequency, PV voltage, MPPT charging current, MPPT charging power, battery voltage, output voltage, output frequency, load percentage, 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=120V, output voltage=120V	
Input frequency	Input frequency=60Hz	
PV voltage	PV voltage=250V	
MPPT Charging current	Current ≥10A	
	Current＜10A	
MPPT Charging power	MPPT Charging power=500W	

Battery voltage/ DC discharging current	Battery voltage=13.5V, discharging current=5A	
Output frequency	Output frequency=60Hz	
Load percentage	Load percentage=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, load in VA will present x.xkVA like below chart.	
Load in Watt	When load is lower than 1kW, load in W will present xxxW like below chart.	
	When load is larger than 1kW , load in W will present x.xkW like below chart.	
Main CPU version checking	Main CPU version 00014.04	

Operating Mode Description

<table>
<tr><th>Operating Mode Description</th><th>Description</th><th>LCD display</th></tr>
<tr><td rowspan="4">Standby mode / Power saving mode

Note:
*Standby mode: The inverter is not turned on yet but at this time, the inverter can charge battery without AC output.
*Power saving mode: If enabled, the output of inverter will be off when connected load is pretty low or not detected.</td><td rowspan="4">No output is supplied by the unit but it still can charge batteries.</td><td>Charging by utility and PV energy.
 
</td></tr>
<tr><td>Charging by utility.
 
</td></tr>
<tr><td>Charging by PV energy.
 
</td></tr>
<tr><td>No charging.
  </td></tr>
<tr><td rowspan="3">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.</td><td rowspan="3">PV energy and utility can charge batteries.</td><td>Charging by utility and PV energy.
 
</td></tr>
<tr><td>Charging by utility.
 
</td></tr>
<tr><td>Charging by PV energy.
 
</td></tr>
</table>

<table>
<tr><td></td><td></td><td>No Charging
  </td></tr>
<tr><td rowspan="4">By pass mode</td><td>The unit will provide output power from the mains. It will also charge the battery in by pass mode.</td><td>Charging by utility and PV energy.
  </td></tr>
<tr><td rowspan="3">The unit will provide output power from the mains. It will also charge the battery in by pass mode.</td><td>Charging by utility.
  </td></tr>
<tr><td>If " SUB " is selected as output source priority and solar energy is not sufficient to provide the load, solar energy and the utility will provide the loads and charge the battery at the same time.
  </td></tr>
<tr><td>If "SUB" 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>
</table>

Battery Mode	The unit will provide output power from battery and PV power.	Power from battery and PV energy. 
		PV energy will supply power to the loads and charge battery at the same time. 
		Power from battery only. 
		Power from PV energy only. 

Battery Equalization Description

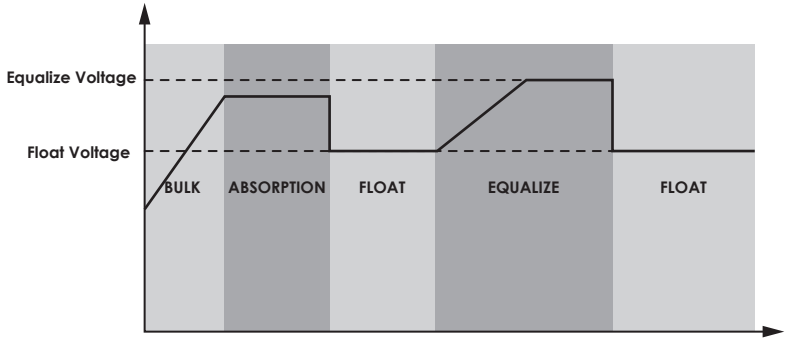
Equalization function is added into charge controller, it reverses the buildup of negative chemical effects like stratification, a condition where acid concentration is greater at the bottom of the battery than at the top.Equalization also helps to remove sulfate crystals that might have built up on the plates.
If left unchecked, this condition which 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.

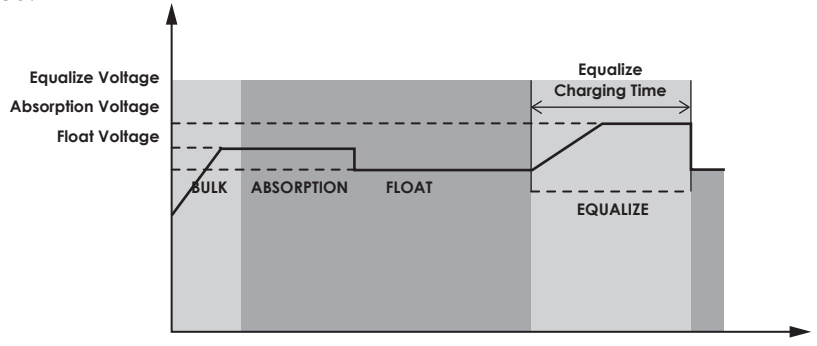
● When to Equalize

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

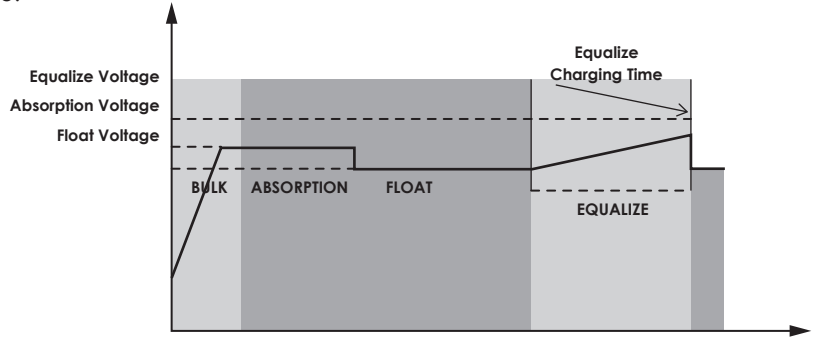


Equalize charging time and time out

In Equalize stage, the controller will supply power to charge battery as much as possible until battery voltage raises to battery equalization voltage. Then, constant-voltage regulation is applied to maintain battery voltage at the battery equalization voltage, The battery will remain in the Equalize stage until setting battery equalized time is arrived.



However, in Equalize stage, when battery equalized time is expired and battery voltage doesn't rise to battery equalization voltage point,the charge controller will extend the battery equalized time until battery voltage achieves battery equalization voltage. If battery voltage is still lower than battery equalization voltage when battery equalized timeout setting is over, the charge controller will stop equalization and return to float stage.



Fault Reference Code

Fault Code	Fault Event	Icon On
01	Fan locking protectiona	
02	Over temperature	
03	Battery voltage is too high	
04	Battery voltage is too low	
05	Output short circuited or over temperature is detected by internal converter components.	
06	Output voltage is too high.	
07	Overload time out	
08	Bus voltage is too high	
09	Bus soft start failed	
11	Main relay failed	
51	Over current or surge	
52	Bus voltage is too low	
53	Inverter soft start failed	
55	Over DC voltage in AC output	
56	Battery connection is open	
57	Current sensor failed	
28	Output voltage is too low	

Warning Indicator

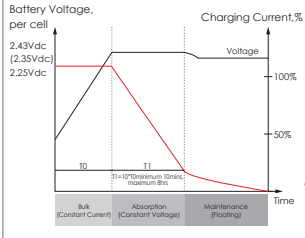
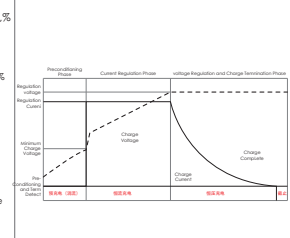
Warning Indicator	Warning Event	Audible Alarm	Icon flashing
01	Fan is locked when inverter is on.	Beep twice every second	
03	Battery is over-charged	Beep twice every second	
04	Low battery	Beep twice every second	
07	Overload	Beep twice every second	
10	Output power derating	Beep twice every second	
12	Solar charger stops due to low battery.		
13	Solar charger stops due to high PV voltage.		
14	Solar charger stops due to overload.		
15	PV is weak		

SPECIFICATIONS

1. SPECIFICATION	
Rated Output Power	3000VA/W
Solar Panel Input	PV 30~300V/20A 3000VA/W Max
AC/Generator Input	AC 90~145V 55~65HZ charging power 3000VA/W MAX AC 90~145V Frequency55~65HZ Charging Power 3000VA/W MAX
AC Input Bypass Function	Have
AC Output	Pure Sine Wave Output; AC Continuous Output: 3000VA/W Max AC Max Output: 3600W@5 seconds AC Voltage: 120VAC±10% Output Frequency: 60Hz±5%
DC(Battery)Input	DC(Battery)Input Voltage: 10.5~15.5Vdc DC(Battery)Max. Inverter Output Current: 300A DC(Battery)Max. Inverter Input Current: 150A
Multi Safety Protections	a. Short-circuit protection b. Over-current protection c. Over-voltage protection d. Low-voltage protection e. Over-load Protection f. Over-temperature protection AC output leakage protection
Cooling Way	Forced cooling with variable fan speed
PV input and AC input charge simultaneously	PV priority
PV input and AC input inverter simultaneously	PV priority
Battery Charging&Battery Inverter	Battery Charging priority

2. Charger Output PARAMETERS

Note: Test ambient temperature 25℃±3℃

Item \ Outputs	Parameters				
Input source for charging state	PV input and AC mains or generator input/(default PV priority)				
Charging current	150A(Max)				
PV input current	20A(Max)				
AC Input Current	30A(Max)				
Charge efficiency	≥90%				
PF Value	≥0.997				
Over-Load Protection	Locked with a warning sound, recover when loads removed and reconnection				
Short-Circuit Protection	Locked with a warning sound, recover when loads removed and reconnection				
Charging Way	Storage Battery			LiFePo4 Battery	
	Charging Algorithm：3-Step3			Charging Algorithm：2-Step2	
	BULK Charging Voltage (Vdc)	Flooded	14.6	Constant current charging first	14.6
		AGM/Gel Battery	14.1	constant voltage charge	
	Floating Charging Voltage （Vdc）		13.5		
					
	Equalization mode		Have		

3. INVERTER PARAMETERS

Note: Test ambient temperature 25℃±3℃

Item \ Range		Min	Typical	Max	Unit	Remark
Output Voltage Range(V)		110	120	130	V	In Bypass Mode, the output voltage follows the mains voltage.
Output Frequency		60±5Hz			Hz	In Bypass Mode, the output frequency follows the mains frequency.
Output Waveform		Pure Sine wave				
Rated Power	Resistive load	3000W MAX			W	
	Inductive load	≥2400W				PF≥0.8
	capacitive load	≥2400W				
Surge power (Resistive load)		3600W@5s			W	
Standby power		≤35W			W	
Efficiency (Resistive load)		>85%			%	Port Efficiency
Over-load power (Resistive load)		3000±100W@Continuous ≥4500W@0.5S			W	
AC Bypass conversion time		10~20MS			MS	
Battery Under-voltage warning		11±0.2Vdc			Vdc	Port Voltage
Battery Under-voltage protection		10.5±0.2Vdc			Vdc	Port Voltage
Battery Over-voltage warning		15±0.2Vdc			Vdc	Port Voltage
Battery Over-voltage protection		15.5±0.2Vdc			Vdc	Port Voltage
Overload Protection Mode		Locks up with warning beep, need to reduce load and restart switch to activation.				
short circuit protection Mode		Locks up with warning beep, need to remove short circuit and restart switch activation.				
AC output leakage protection mode		Locked, need to release the leakage and restart the switch activation.				
Over Temperature protection Mode		Locked, needs to be activated by restarting the switch after the temperature is lowered.				
Heat-Dissipating Method		Built-in Cooling Fan				

	Collecting temperature		PV input current		Inverter Output Power	
	Temperatures	Fan Speed	PV input current	Fan Speed	Output Power	Fan Speed
Starting cooling fan conditions	≥55℃	30%	≥5A	30%	≥300W	20%
	≥65℃	60%	≥10A	60%	≥600W	40%
	≥75℃	100%	≥15A	100%	≥1200W	60%
	≥75℃	100%	≥15A	100%	≥1800W	80%
					≥2400W	100%

Table 4 General

Inverter Model	**3KW/120VAC/12VDC**
Safety Certification	ETL
Protective Class/Device Electrical Shock Protection Safety Rating	Class I
Protection grade (waterproof and dustproof)	IP20
Work Temperature	32 to 131℉ (0℃ to 55℃)
Storage Temperature	5 to 140℉ (-15℃~60℃)
Product Size(mm)	10.6*18.2*4.2in (462*270*107mm)L*W*H
Product Net Weight(KG)	16.5 lb(7.5 kg)

TROUBLE SHOOTING

Problem	LCD/LED/Buzzer	Explanation/ Possible cause	What to do
Unit shuts down automatically during start up.	LCD/LED and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low(<1.91V/Cell)	1. Re-charge battery. 2. Replace battery.
No response after power on.	No indication.	1. The battery voltage is far too low.(<1.4V/Cell) 2. Battery polarity is connected reversed.	1. Check if batteries and the wiring are connected well. 2.Re-charge battery. 3. Replace battery.
Mains-powered but the unit works in battery mode.	Input voltage is displayed as 0 on the LCD and green LED is flashing.	Input protector is tripped.	Check if AC breaker is tripped and AC wiring is connected well.
	Green LED is flashing.	Insufficient quality of AC power(Shore or Generator).	1. Check if AC wires are tooth in and/or too long. 2. Check if generator (if applied) is working well or if input voltage range setting is correct. (UPS→Appliance)
	Green LED is flashing.	Set "Solar First" as the priority of output source.	Change output source priority to Utility first.
When the unit is turned on, internal relay is switched on and off repeatedly.	LCD display and LED are flashing	Battery is disconnected.	Check if battery wires are connected well.
Buzzer beeps continuously and red LED is on.	Fault code 07	Overload error. The inverter is overload 110% and time is up.	Reduce the connected load by switching off some equipment.
	Fault code 05	Output short circuited.	Check if wiring is connected well and remove abnormal load.
		Temperature of internal converter component is over 120°C.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code 02	Internal temperature of inverter component is over 100°C.	
	Fault code 03	Battery is over-charged.	Return to repair center.
		The battery voltage is too high.	Check if spec and quantity of batteries are meet requirements.
	Fault code 01	Fan fault	Replace the fan.

	Fault code 06/58	Output abnormal (Inverter voltage below than 190Vac or is higher than 260Vac)	1. Reduce the connected load. 2. Return to repair center
	Fault code 08/09/53/57	Internal components failed.	Return to repair center.
	Fault code 51	Over current or surge.	Restart the unit, if the error happens again,please return to repair center.
	Fault code 52	Bus voltage is too low.	
	Fault code 55	Output voltage is unbalanced.	
	Fault code 56	Battery is not connected well or fuse is burnt.	If the battery is connected well, please return to repair center.

Appendix: Approximate Back-up Time Table

Model	Load(W)	Backup Time @12Vdc 100Ah(min)	Backup Time @12Vdc 200Ah(min)
3.0KW	300	225	550
	600	111	263
	900	62	152
	1200	48	114
	1500	34	82
	1800	28	63
	2100	24	54
	2400	18	47
	2700	16	37
	3000	14	34

Note: Backup time depends on the quality of the battery, age of battery and type of battery.
Specifications of batteries may vary depending on different manufacturers.
* The product technical specifications are subject to change without prior notice.