MUST®

100% PURE SINE WAVE HOME INVERTER

USER'S MANUAL

SOLAR INVERTER

PV3900TLV 8KW/10KW/12KW

The software supports installation on Windows systems.
Scan the QR code for download or visit the website for downloading: https://sw.mustpower.com

Appliances

4200-030360-0100

Table of Contents

ABOUT THIS MANUAL

Purpose

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

Scope

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

The following cases are not within the scope of warranty

1. Out of warranty.
2. Series number was changed or lost.
3. Battery capacity was declined or external damaged.
4. Inverter was damaged caused of transport shift, remissness, ect external factor
5. Inverter was damaged caused of irresistible natural disasters.
6. Not in accordance with the electrical power supply conditions or operate environment caused damage.

SAFETY INSTRUCTIONS

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

1. Before using the unit, read all instructions and cautionary markings on the unit the batteries and all appropriate sections of this manual.
2. **CAUTION** –To reduce risk of injury, charge only deep-cycle lead acid type rechargeable batteries. Other types of batteries may burst, causing personal injury and damage.
3. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
4. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
5. **CAUTION** --Only qualified personnel can install this device with battery.
6. **NEVER** charge a frozen battery.
7. For optimum operation of this inverter/charger, please follow required spec to select appropriate cable size. It' s very important to correctly operate this inverter/charger.
8. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.
9. Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to INSTALLATION section of this manual for the details.
10. GROUNDING INSTRUCTIONS- This inverter/charger should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
11. NEVER cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
12. **Warning!!** Only qualified service persons are able to service this device. If errors still persist after following troubleshooting table, please send this inverter/charger back to local dealer or service center for maintenance.

INTRODUCTION

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

Features

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

Basic System Architecture

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

- Generator or Utility.
- Battery
- PV modules

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

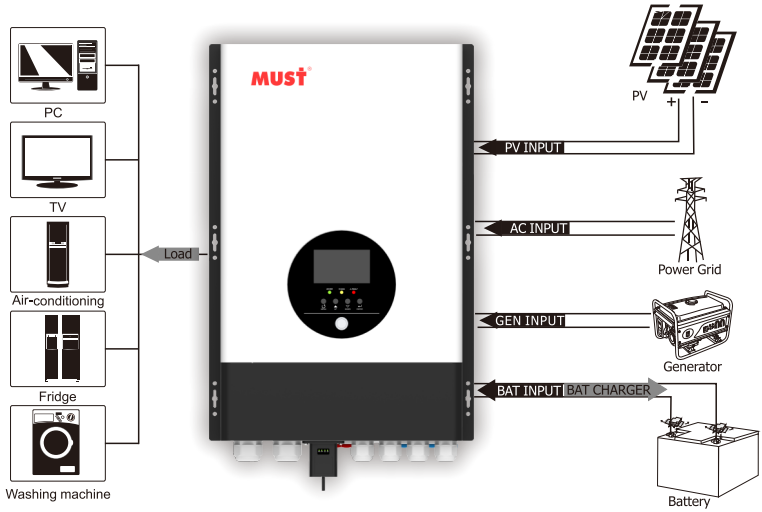
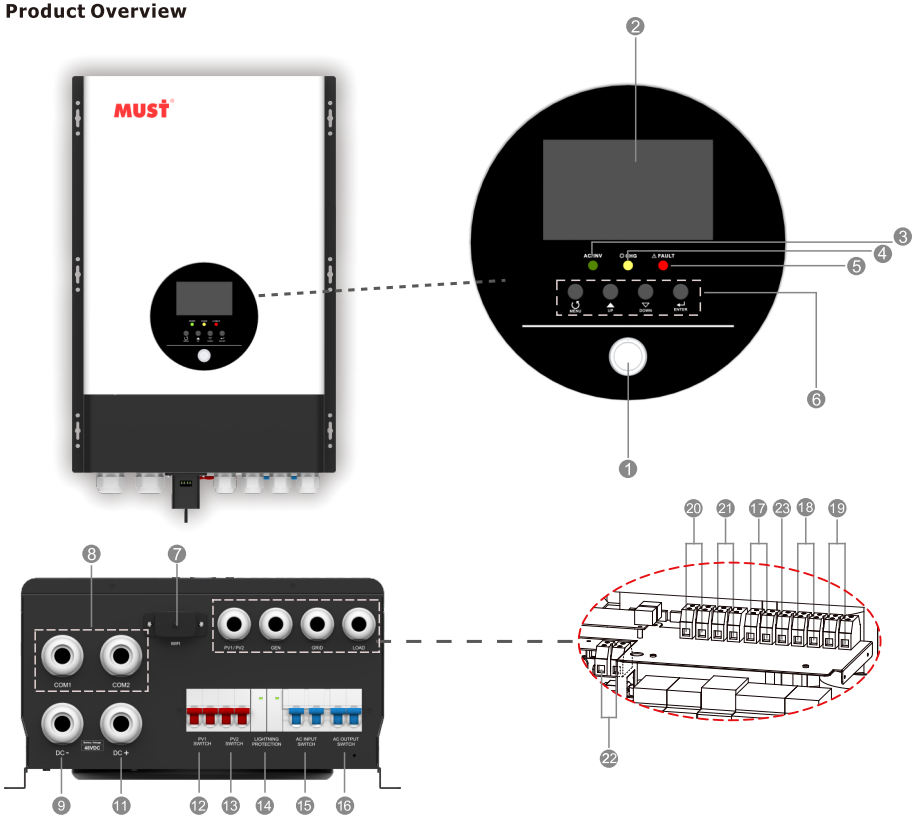
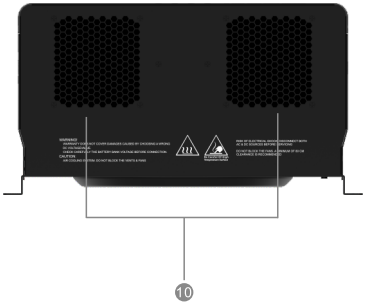


Figure 1 Hybrid Power System

Product Overview





8KW-12KW single model

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

1.Power ON/OFF Switch
2.LCD display
3.Status indicator
4.Discharging/Charging indicator
5.Fault indicator
6.Function buttons
7.WI-FI port
8.communication port
9.BAT -
10.FAN
11.BAT +
12.PV1 input breaker
13.PV2 input breaker
14.Lightning Protection
15.AC input / bypass breaker
16.AC output breaker
17.AC input
18.AC1 output
19.AC2 output
20.PV1 input
21.PV2 input
22.Gen input
23.Ground

INSTALLATION

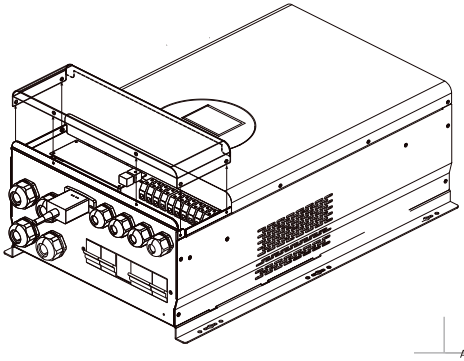
Unpacking and Inspection

Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items inside of package:

The unit x 1
User manual x 1
USB cable x 1
Software CD x 1
BTS Line x 1(Option)
WIFI Key x 1(Option)
Remote Line x 1(Option)

Preparation

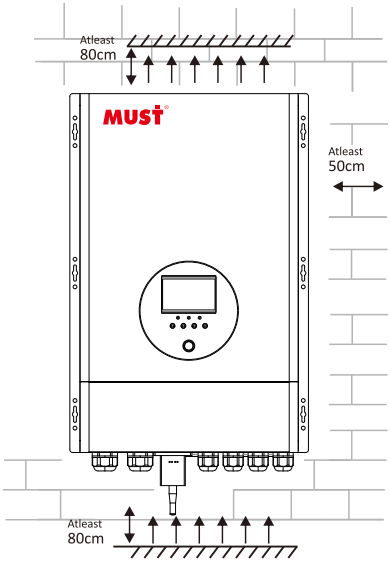
Before connecting all wirings, please take off surface cover by removing six screws as shown below.



Mounting the Unit

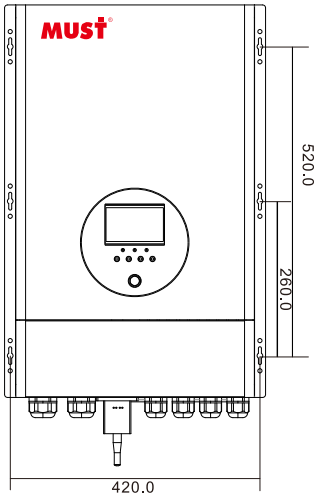
Consider the following points before selecting where to install:

- Do not mount the inverter on flammable construction materials.
- Mount on a solid surface.
- Install this inverter at eye level in order to allow the LCD display to be read at all times.
- For proper air circulation to dissipate heat, allow a clearance of approx. 50cm to the side and 80 cm above and below the unit.
- The ambient temperature should be between 0°c and 40°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 diagram to guarantee sufficient heat dissipation and to have enough space for removing wires



SUITABLE FOR MOUNTING ON CONCRETE OROTHER NON-COMBUSTIBLE SURFACE ONLY.

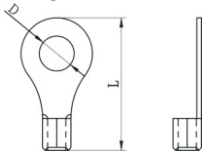
Install the unit by screwing six screws



Battery Connection

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

Ring terminal:



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

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

Recommended battery cable and terminal size:

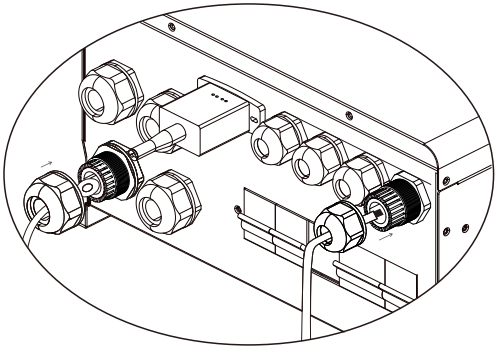
Model	Typical Amperage	Battery Capacity	Wire Size	Torque Value
8048	200A	1000AH	2*2AWG	2~ 3 Nm
10048	250A	1200AH	2*1AWG	2~ 3 Nm
12048	300A	1400AH	3*2AWG	2~ 3 Nm

Please follow below steps to implement battery connection:

1. Assemble battery ring terminal based on recommended battery cable and terminal size.

NOTE: Please only use sealed lead acid battery or sealed GEL/AGM lead-acid battery.

3. Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the bolts are tightened with torque of 2-3 Nm. Make sure polarity at both the battery and the inverter/charge is correctly connected and ring terminals are tightly screwed to the battery terminals.



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

⚠	**CAUTION!!** Do not place anything between the flat part of the inverter terminal and the ring terminal. Otherwise, overheating may occur. **CAUTION!!** Do not apply anti-oxidant substance on the terminals before terminals are connected tightly. **CAUTION!!**Before making the final DC connection or closing DC breaker/disconnector, be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).

AC Input/Output Connection

CAUTION!! Before connecting to AC input power source, please install a separate AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input. The recommended appropriate of AC breaker is 40A for 4KW-6KW, 80A for 8KW-12KW.

CAUTION!! Please don't connect the output wring to "INPUT" terminal or connect the grid wring to the "OUTPUT" terminal.

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

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

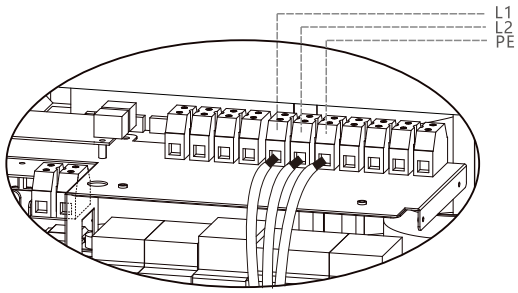
Suggested cable requirement for AC wires

Model	Gauge	Torque Value
8KW	8 AWG	1.4~ 1.6Nm
10KW	2*10 AWG	1.6~ 1.8Nm
12KW	2*10 AWG	1.6~ 1.8Nm

Please follow below steps to implement AC input/output connection:

1. Before making AC input/output connection, be sure to open DC protector or disconnector first.
2. Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N 3mm.
3. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor (⏚) first.

⏚ → Ground (yellow-green)
L1→ LINE (brown or black)
L2→ Neutral (blue)
L1 /L2 :240VAC

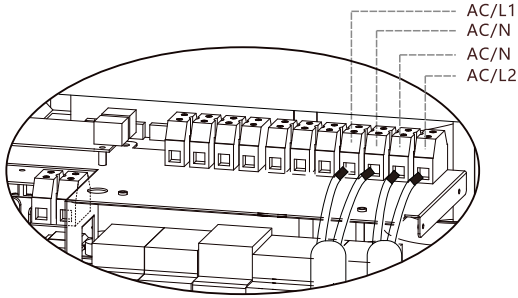


AC INPUT

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

4. Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor (⏚)first.

⏚ → Ground (yellow-green)
L → LINE (brown or black)
N → Neutral (blue)
N /L1 :110-120VAC
N /L2 :110-120VAC
L1 /L2 :220-240VAC



AC OUTPUT

5. Make sure the wires are securely connected.

CAUTION: Important
Be sure to connect AC wires with correct polarity. If L and N wires are connected reversely, it may cause utility short-circuited when these inverters are worked in parallel operation.

CAUTION: Appliances such as air conditioner are required at least 2~3 minutes to restart because it's required to have enough time to balance refrigerant gas inside of circuits. If a power shortage occurs and recovers in a short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check manufacturer of air conditioner if it's equipped with time-delay function before installation. Otherwise, this inverter/charger will trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

PV Connection

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

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

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

Model	Typical Amperage	Cable Size	Torque
8048-100A/200A	100A/200A	6AWG/2*6AWG	1.8~2.0 Nm
10048-100A/200A	100A/200A	6AWG/2*6AWG	1.8~2.0 Nm
12048-100A/200A	100A/200A	6AWG/2*6AWG	1.8~2.0 Nm

PV Module Selection:

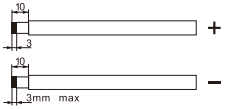
When selecting proper PV modules, please be sure to consider below parameters:

1. Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
2. Open circuit Voltage (Voc) of PV modules should be higher than min. battery voltage.

Solar Charging Mode	
INVERTER MODEL	48V
Max. PV Array Open Circuit Voltage	250Vdc
PV Array MPPT Voltage Range	65~235Vdc
Min. battery voltage for PV charge	Battery voltage +3Vdc

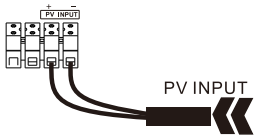
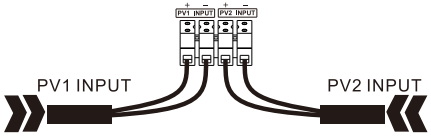
Please follow below steps to implement PV module connection:

1. Remove insulation sleeve 10 mm for positive and negative conductors
2. 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.



3. Make sure the wires are securely connected.

PV Wiring

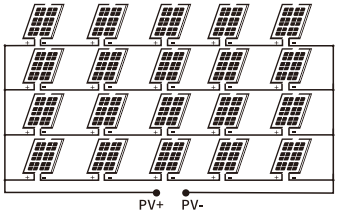
Wiring option 1 8-12KW MPPT 100A PV Input	
Wiring option 2 8-12KW MPPT 200A PV Input	

Recommended PV module configuration

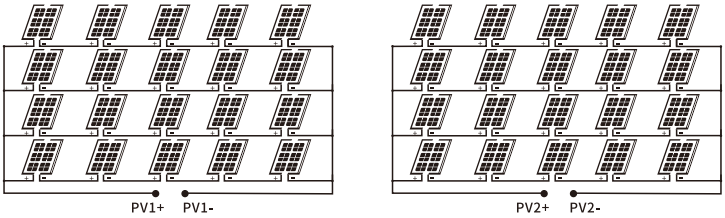
PV Module Spec.(reference)	Inverter Model	Solar Input	Q'ty of modules
-260W -Vmp:30.9Vdc -Imp:8.42A -Voc:37.7Vdc -Isc:8.89A -Cells:60	48V/100A	5S4P	20PCS
	48V/200A	5S4P*2	40PCS

Solar panel installation schematic

48V/100A



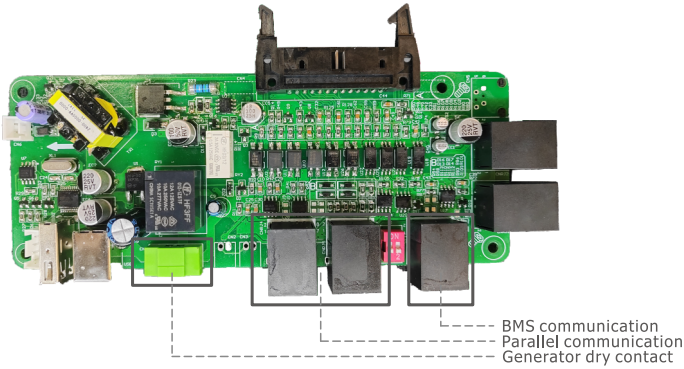
48V/200A



Final Assembly

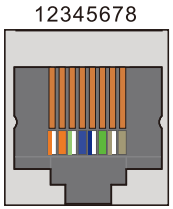
After connecting all wirings, please put bottom cover back by screwing two screws as shown below.

Communication Connection

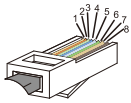


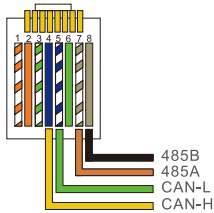
Please use supplied communication cable to connect to inverter and PC. Insert bundled CD into a computer and follow on-screen instruction to install the monitoring software. For the detailed software operation, please check user manual of software inside of CD.

CAN communication port difinition



（RJ11）terminals

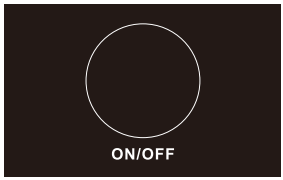




Port	Difinition	
CAN communication port difinition	PIN 1	NC(Empty)
	PIN 2	NC(Empty)
	PIN 3	GND
	PIN 4	CAN-H
	PIN 5	CAN-L
	PIN 6	GND
	PIN 7	485A
	PIN 8	485B

OPERATION

Power ON/OFF/Power Saver



There are 3 different status for inverter: "ON(Power Saver)""INVERTER OFF" and "ON"
When power switch is in "INVERTER OFF" position, the inverter is powered off.
When power switch is turned to either of "ON(Power Saver)"or "ON", the inverter is powered on.
Power saver function is designed to conserve battery power when AC power is not or rarely required by the loads. In this mode, the inverter pulses the AC load . Whenever an AC load(greater than 80 watts) is turned on, the inverter recognizes the need for power and automatically starts inverting and output goes to full voltage. When there is no load (or less than 30 watts) detected, the inverter automatically goes back into search mode to minimize energy consumption from the battery bank. In "ON(Power Saver)" mode, the inverter will draw power mainly in sensing moments, thus the idle consumption is significantly reduced.

Remote control

Apart from the switch panel on the front of the inverter, an switch panel connected to the RJ 11 port at the DC side of the inverter thru a standard telephone cable can also control the operation of the inverter. If an extra switch panel is connected to the inverter via "remote control port" together with the panel on the inverter case, the two panels will be connected and operated in parallel.

Whichever first switches from "OFF" to "Power saver off' or "Power saver on" it will power the inverter on. If the commands from the two panels conflict, the inverter will accept command according to the following priority:

Power saver on/Power saver off/Power off, Only when both panels are turned to "Unit Off' position will the inverter be powered off.

The Max length of the cable is 10 meters.

⚠ **WARNING!**

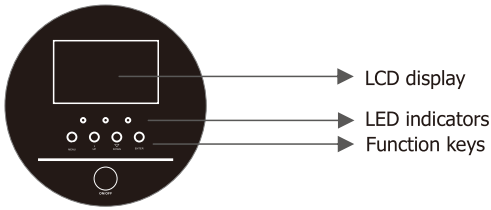
Never cut the telephone cable when the cable is attached to inverter and battery is connected to the inverter. Even if the inverter is turned off. It will damage the remote PCB inside if the cable is short circuited during cutting.

Auto generator start (AGS)

There is an extra connector in front of the inverter used to start the generator. If the utility power is abnormal and single battery discharges below setting point in program 19,the inverter will send out a signal to the cable of the connector which is cascaded to the control circuit of the generator, owing to this the control circuit will get through and then generator will be started. if single battery is charged higher than 13.5Vdc,the signal will disappear to make the generator keeping closed again.

Operation and Display Panel

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



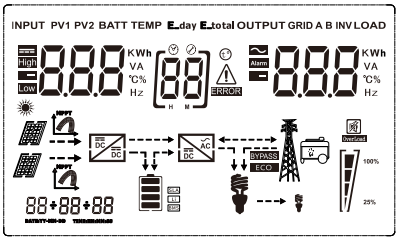
LED Indicator

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

Function Keys

Function Keys	Description.
MENU	Enter or exit setting mode or go to previous selection.
UP	Increase the setting data.
DOWN	Decrease the setting data.
ENTER	Enter setting mode and Confirm the selection in setting mode go to next selection.

LCD Display Icons



Icon	Function description
Input Source Information and Output Information	
	Iindicates the AC information
	Indicates the DC information
KW VA ℃% Hz	Indicate input voltage, input frequency, PV voltage, battery voltage and charger current. Indicate output voltage, output frequency, load in VA, load in Watt and discharging current.
Configuration Program and Fault Information	
	Indicates the setting programs
ERROR	Iindicates the warning and fault codes. Warning: ⚠ flashing with warning code. Fault: ERROR lighting with fault code.
Battery Information	
SLA LI CHARGING	Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.

In AC mode, it will present battery charging status.

Status	Battery voltage	LCD Display
Constant Current mode/Constant Voltage mode	<2V/cell	4 bars will flash in turns
	2v/cell~2.083v/cell	Bottom bar will be on and the other three bars will flash in turns.
	2.083v/cell~2.167v/cell	Bottom two bars will be on and the other two bars will flash in turns.
	>2.167V/cell	Bottom three bars will be on and the top bar will flash.
Batteries are fully charged.		4 bars will be on.

In battery mode, it will present battery capacity.		
Load Percentage	Battery Voltage	LCD Display
Load >50%	<1.717V/cell	
	1.717V/cell~1.8V/cell	
	1.8V/cell~1.883V/cell	
	>1.883 V/cell	
50%> Load>20%	<1.817V/cell	
	1.817V/cell~1.9V/cell	
	1.9 V/cell ~1.983V/cell	
	>1.983 V/cell	
Load<20%	<1.867V/cell	
	1.867V/cell~1.95V/cell	
	1.95V/cell~2.033V/cell	
	>2.033 V/cell	

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

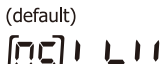
Mode Operation Information	
	Indicates unit connects to the mains.
	Indicates unit connects to the PV panel.
BYPASS	Indicates load is supplied by utility power.
	Indicates the solar charger circuit is working.
	Indicates the DC/AC inverter circuit is working.
Mute Operation	
	Indicates unit alarm is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

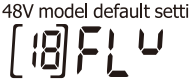
LCD Setting

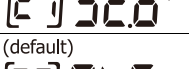
After pressing and holding "ENTER" button for 2 seconds, the unit will enter setting mode. Press "UP" or "DOWN" button to select setting programs. And then, press "ENTER" or "MENU" button to confirm the selection and exit.

Setting Programs:

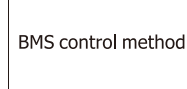
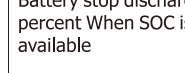
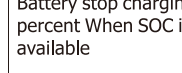
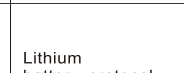
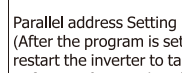
Program	Description	Selectable option	
00	Exit setting mode	Escape 	
01	Output source priority selection		Solar energy provides power to the loads as first priority. If battery voltage has been higher than the setting point in program 21 for 5 minutes, the inverter will turn to battery mode, solar and battery will provide power to the load at the same time. When the battery voltage drops to the setting point in program 20, the inverter will turn to bypass mode, utility provides power to the load only, and the solar will charge the battery at the same time.
			Solar energy provides power to the loads as first priority. If battery voltage has been higher than the setting point in program 21 for 5 minutes, and the solar energy has been available for 5 minutes too, the inverter will turn to battery mode, solar and battery will provide power to the load at the same time. When the battery voltage drops to the setting point in program 20, the inverter will turn to bypass mode, utility provides power to the load only, and the solar will charge the battery at the same time.
		(default) 	Utility will provide power to the loads as first priority. Solar and battery energy will provide power to the loads only when utility power is not available.

02	AC input voltage range	Appliances (default) 	If selected, acceptable AC input voltage range will be within90-280VAC.
		UPS 	If selected, acceptable AC input voltage range will be within 170-280VAC.
		GEN 	When the user uses the device to connect the generator, select the generator mode.
03	Output voltage		Set the output voltage amplitude, (220VAC-240VAC)
04	Output frequency	50HZ(default) 	60HZ 
05	Solar supply priorit		Solar energy provides power to charge battery as first priority.
		(default) 	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 	Bypass enable (default) 
07	Auto restart when overload occurs	Restart disable(default) 	Restart enable 
08	Auto restart when over temperature occurs	Restart disable(default) 	Restart 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 	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.
		Solar and Utility(default) 	Solar energy and utility will charge battery at the same time.
		Only Solar 	Solar energy will be the only charger source no matter utility is available or not
		If this inverter/charger is working in Battery mode, only solar energy can charge battery. Solar energy will charge battery if it's available and sufficient.	

<table>
<tr><td rowspan="3">11</td><td rowspan="3">PV charging current setting</td><td rowspan="3">100A (default)
  </td><td>8KW 48V</td><td>1-100A</td><td>1-200A</td></tr>
<tr><td>10KW 48V</td><td>1-100A</td><td>1-200A</td></tr>
<tr><td>12KW 48V</td><td>1-100A</td><td>1-200A</td></tr>
<tr><td rowspan="3">13</td><td rowspan="3">Maximum utility charging current</td><td rowspan="3">30A (default)
  </td><td>8KW 48V</td><td colspan="2">1-100A</td></tr>
<tr><td>10KW 48V</td><td colspan="2">1-120A</td></tr>
<tr><td>12KW 48V</td><td colspan="2">1-140A</td></tr>
<tr><td rowspan="4">14</td><td rowspan="4">Battery type</td><td>AGM (default)
  </td><td colspan="3">Flooded
  </td></tr>
<tr><td>GEL
  </td><td colspan="3">LEAD
  </td></tr>
<tr><td>Lithium Ion
  </td><td colspan="3">User-Defined
  </td></tr>
<tr><td colspan="4">If "User-Defined" LI is selected, battery charge voltage and low DC cut-off voltage can be set up in program 17, 18 and 19.</td></tr>
<tr><td rowspan="4">17</td><td rowspan="4">Bulk charging voltage
(C.V voltage)</td><td colspan="4">24V model default setting: 28.2V
  </td></tr>
<tr><td colspan="4">If "User-Defined" LI is selected in program 14,this program can be set up. Setting range is from 24.0V to 29.2V for 24Vdc model.
Increment of each click is 0.1V</td></tr>
<tr><td colspan="4">48V model default setting: 56.4V
  </td></tr>
<tr><td colspan="4">If self-defined is selected in program 14, this program can be set up. Setting range is from 48.0V to 58.4V for 48Vdc model.
Increment of each click is 0.1V.</td></tr>
<tr><td rowspan="4">18</td><td rowspan="4">Floating charging voltage</td><td colspan="4">24V model default setting: 27.0V
  </td></tr>
<tr><td colspan="4">If "User-Defined" LI is selected in program 14, this program can be set up, Setting range is from 24.0V to 29.2V for 24Vdc model.
Increment of each click is 0.1V</td></tr>
<tr><td colspan="4">48V model default setting: 54.0V
  </td></tr>
<tr><td colspan="4">If self-defined is selected in program 14, this program can be set up, Setting range is from 48.0V to 58.4V for 48Vdc model.
Increment of each click is 0.1V.</td></tr>
</table>

<table>
<tr><td rowspan="5">19</td><td rowspan="5">Low DC cut off battery voltage setting</td><td>24V model default setting: 20.4V
  </td></tr>
<tr><td>If "User-Defined" LI is selected in program 14, this program can be set up. Setting range is from 20.0V to 24.0V for 24Vdc 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>48V model default setting: 40.8V
  </td></tr>
<tr><td>If self-defined is selected in program 14, this program can be set up. Setting range is from 40.0V 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.</td></tr>
<tr><td>SOC 10% (default)
  </td></tr>
<tr><td colspan="2">If"User-Defined" LI is selected in program 14,and the SOC percentage method is selected in program 37 ,the low DC cut-off SOC percentage will be able to be set.Low DC cut-off SOC percentage will be fixed to setting value no matter what percentage of load is connected
Setting range is from 0%-90%.
Increment of each click is 1%</td></tr>
<tr><td rowspan="3">20</td><td rowspan="3">Battery stop discharging voltage when grid is available</td><td colspan="2">Available options for 24V models:</td></tr>
<tr><td>23.0V (default)
  </td><td>Setting range is from 22.0V to 29.0V.
Increment of each click is 0.1V.</td></tr>
<tr><td colspan="2">Available options for 48V models:
46.0V (default)
 
Setting range is from 44.0V to 58.0V.
Increment of each click is 0.1V.</td></tr>
<tr><td rowspan="3">21</td><td rowspan="3">Battery stop charging voltage when grid is available</td><td colspan="2">Available options for 24V models:</td></tr>
<tr><td>27.0V (default)
  </td><td>Setting range is from 22.0V to 29.0V.
Increment of each click is 0.1V.</td></tr>
<tr><td colspan="2">Available options for 48V models:
54.0V (default)
 
Setting range is from 44.0V to 58.0V.
Increment of each click is 0. 1V.</td></tr>
<tr><td rowspan="2">22</td><td rowspan="2">Auto turn page</td><td>(default)
  </td><td>If selected, the display screen will auto turn the display page.</td></tr>
<tr><td>  </td><td>If selected, the display screen will stay at latest screen user finally switches.</td></tr>
</table>

23	Backlight control	Backlight on 	Backlight off (default) 
24	Alarm control	Alarm on (default) 	Alarm off 
25	Beeps while primary source is interrupted	Alarm on 	Alarm off (default) 
27	Record Fault code	Record enable(default) 	Record disable 
28	Solar power balance: When enabled, solar input power will be automatically adjusted according to connected load power.	Solar power balance enable 	If selected, the solar input power will be automatically adjusted according to the following formula: Max. Input solar power = Max.battery charging power + Connected load power when the machine in OffGrid workstate.
		Solar power balance disable (default) 	If selected, the solar input power will be the same to max. Battery charging power no matter how much loads are connected. The max.battery charging power will be based on the setting current in program 11 (Max. solar power = Max.battery charging power)
30	Battery equalization	Battery equalization 	Battery equalization disable(default) 
31	Battery equalization voltage	Available options for 24V models:28.8V 	
		Available options for 48V models:57.6V 	
		Setting range is from 24.0V to 29.2V for 24V model and 48.0V to 58.4V for 48V model. Increment of each click is 0.1V.	
33	Battery equalization time	60min(default) 	Setting range is from 5 min to 900min. Increment of each clink is 5min.
34	Battery equalization timeout	120min(default) 	Setting range is from 5 min to 900min. Increment of each clink is 5min.
35	Equalization interval	30days(default) 	Setting range is from 0 to 90days. Increment of each clink is 1 day.

<table>
<tr><td rowspan="2">36</td><td rowspan="2">Equalization activated immediately</td><td>Enable
</td><td>Disable(default)
  </td></tr>
<tr><td colspan="2">If equalization function is enabled in program 30, this program can be set up. If “Enable”is selected in this program, it’s to activate battery equalization immediately and LCD main page will shows“ ”. If “Disable”is selected, it will cancel equalization function until next activated equalization time arrives based on program 35 setting. At this time, “ ” will be shown in LCD main page too.</td></tr>
<tr><td>37</td><td>BMS control method</td><td>Voltage method(default)
  </td><td>SOC Percent method
  </td></tr>
<tr><td>38</td><td>Battery stop discharging percent When SOC is available</td><td>20 % (default)
  </td><td>Setting range is from 5 % to 95 %
Increment of each click is 1 % .</td></tr>
<tr><td>39</td><td>Battery stop charging percent When SOC is available</td><td>95 % (default)
  </td><td>Setting range is from 10 % to 100 %
Increment of each click is 1 % .</td></tr>
<tr><td rowspan="2">40</td><td rowspan="2">BMS communication</td><td>(default)
</td><td>when the communication between BMS and converter is faulted ,the converter still charge or discharge from the battery .</td></tr>
<tr><td></td><td>when the communication between BMS and converter is faulted ,the converter stop charging or discharging from the battery ,but this only works in SOC mode .</td></tr>
<tr><td rowspan="2">41</td><td rowspan="2">Lithium
battery protocol</td><td colspan="2"> 
Setting range is from 0 to 31
Increment of each click is 1</td></tr>
<tr><td colspan="2">If LI is selected in program 14, program 41 can be set. After the program 41 is set,please restart the inverter to take effect.For example,if you set the program 41 to 0,the inverter can communicate with the must lithium battery.</td></tr>
<tr><td rowspan="3">42</td><td rowspan="3">Parallel address Setting
(After the program is set□please restart the inverter to take effect. Before confirming that the settings are in effect ,please disconnect the connection between the machine outputs)</td><td>Single:This inverter is used in single phase application
  </td><td>Parallel:This inverter is operated in parallel system (you can set the first machine to 1,the second machine to 2,the third machine to 3)
  </td></tr>
<tr><td colspan="2">When the inverter is operated in 3-phase application,set up inverter to be operated in specific phase</td></tr>
<tr><td>Single:This inverter is used in 3-phase application
  </td><td>Parallel:This inverter is operated in 3-phase system (you can set the first machine to 5,the second machine to 6,the third machine to 7)
  </td></tr>
</table>

After pressing and holding "MENU" button for 6 seconds, the unit will enter reset model. Press "UP" and "DOWN" button to select programs. And then, press "ENTER" button to exit.

SEt	(default) 	Reset setting disable
		Reset setting enable

Fault Reference Code

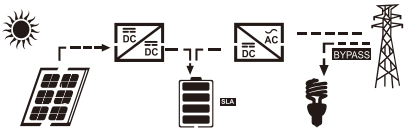
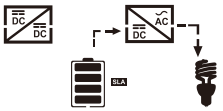
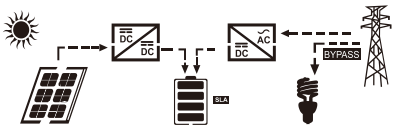
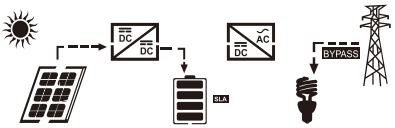
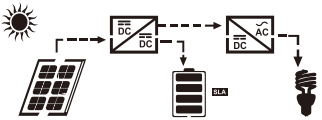
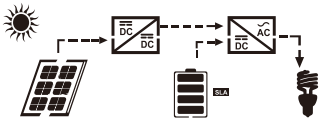
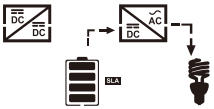
Fault Code	Fault Cause	LCD Indication
01	Fan is locked when inverter is off	
02	Inverter transformer over temperature	
03	Battery voltage is too high	
04	Battery voltage is too low	
05	Output short circuited	
06	Inverter output voltage is high	
07	Overload time out	
08	Inverter bus voltage is too high	
09	Bus soft start failed	
11	Main relay failed	
21	Inverter output voltage sensor error	

22	Inverter grid voltage sensor error	
23	Inverter output current sensor error	
24	Inverter grid current sensor error	
25	Inverter load current sensor error	
26	Inverter grid over current error	
27	Inverter radiator over temperature	
31	Solar charger battery voltage class error	
32	Solar charger current sensor error	
33	Solar charger current is uncontrollable	
41	Inverter grid voltage is low	
42	Inverter grid voltage is high	
43	Inverter grid under frequency	
44	Inverter grid over frequency	
51	Inverter over current protection error	
52	Inverter bus voltage is too low	
53	Inverter soft start failed	
55	Over DC voltage in AC output	
56	Battery connection is open	
57	Inverter control current sensor error	
58	Inverter output voltage is too low	

Warning Indicator

Warning Code	Warning Event	Icon flashing
61	Fan is locked when inverter is on.	
62	Fan 2 is locked when inverter is on.	
63	Battery is over-charged.	
64	Low battery	
67	Overload	
70	Output power derating	
72	Solar charger stops due to low battery	
73	Solar charger stops due to high PV voltage	
74	Solar charger stops due to over load	
75	Solar charger over temperature	
76	PV charger communication error	
77	Parameter error	

Operating State Description

Operation state	Description	LCD display
Utility-Tie state	PV energy is charger into the battery and utility provide power to the AC load.	PV is on 
		PV is off 
Charge state	PV energy and grid can charge batteries.	
Bypass state	Error are caused by inside circuit error or external reasons such as over temperature, output short circuited and so on.	
Off-Grid state	The inverter will provide output power from battery and PV power.	Inverter power loads from PV energy 
		Inverter power loads from battery and PV energy 
		Inverter power loads from battery only 
Stop state	The inverter stop working if you turn off the inverter by the soft key or error has occurred in the condition of no grid.	

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: battery voltage, battery current, inverter voltage, inverter current, grid voltage, grid current, load in Watt, load in VA, grid frequency, inverter frequency, PV voltage, PV charging power, PV charging output voltage, PV charging current.

Selectable information	LCD display
Battery voltage/DC discharging current	
Inverter output voltage/Inverter output current	
Grid voltage/Grid current	
Load in Watt/VA	
Grid frequency/Inverter frequency	
PV voltage and power	
PV charger output voltage and PV charging current	

SPECIFICATIONS

Table 1 Line Mode Specifications

INVERTER MODEL	8KW 48V	10KW 48V	12KW 48V
Input Voltage Waveform	Sinusoidal (utility or generator)		
Nominal Input Voltage	230Vac		
Low Loss Voltage	90Vac±7V(APL,GEN);170Vac±7V(UPS);		
Low Loss Return Voltage	100Vac±7V(APL,GEN);180Vac±7V(UPS);		
High Loss Voltage	280Vac±7V(UPS,APL,GEN);		
High Loss Return Voltage	270Vac±7V(UPS,APL,GEN);		
Max AC Input Voltage	300Vac		
Nominal Input Frequency	50HZ/60HZ(Auto detection)		
Low Loss Frequency	40HZ±1HZ(UPS,APL,GEN);		
Low Loss Return Frequency	42HZ±1HZ(UPS,APL,GEN);		
High Loss Frequency	65HZ±1HZ(UPS,APL,GEN);		
High Loss Return Frequency	63HZ±1HZ(APL,GEN,UPS);		

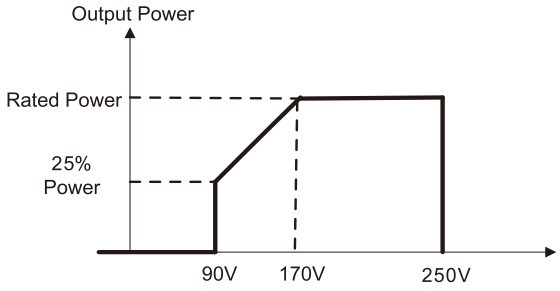
Output Short Circuit Protection	Line mode: Circuit Breaker Battery mode: Electronic Circuits
Efficiency (Line Mode)	>95%(Rated R load, battery full charged)
Transfer Time	10ms typical (UPS) 20ms typical (APL)
Output power derating: When AC input voltage drops to 95V or 170V depending on models, the output power will be derated.	230Vac model: 

Table 2 Inverter Mode Specifications

INVERTER MODEL	8KW 48V	10KW 48V	12KW 48V
Rated Output Power	8KW	10KW	12KW
Output Voltage Waveform	Pure Sine Wave/same as input (bypass mode)		
Output Voltage Regulation	120Vac/240Vac		
Output Frequency	60Hz or 50Hz		
Peak Efficiency	>90%		
Overload Protection	10s@>110% load or Inverter current>rated current(54.5A)*1.0625; 5s@>150% load or Inverter current>rated current(54.5A)*1.5; 400ms@>200% load or Inverter current>rated current(54.5A)*2;		
Surge Capacity	2* rated power for 500 millisecond		
Nominal DC Input Voltage	48Vdc		
Cold Start Voltage	46.0Vdc		
Low DC Warning Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	 44.0Vdc 42.8Vdc 40.4Vdc		
Low DC Warning Return Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	 46.0Vdc 44.8Vdc 42.4Vdc		

Low DC Cut-off Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	 42.0Vdc 40.8Vdc 38.4Vdc
High DC Recovery Voltage	57Vdc for 48mode
High DC Cut-off Voltage	60Vdc for 48 mode
No Load Power Consumption (Power Saver Auto)	<50W

Table 3 Charge Mode Specifications

Utility Charging Mode				
INVERTER MODEL		8KW 48V	10KW 48V	12KW 48V
Charging Current @ Nominal Input Voltage		10~100A	10~120A	10~140A
Absorption Voltage	**AGM / Gel/LEAD Battery**	50Vdc		
	Flooded battery	50Vdc		
Refloat Voltage	**AGM / Gel/LEAD Battery**	54.8Vdc		
	Flooded battery	54.8Vdc		
Float Voltage	**AGM / Gel/LEAD Battery**	57.6Vdc		
	Flooded battery	56.8Vdc		
Charging Algorithm		3-Step(Flooded Battery, AGM/Gel/LEAD Battery), 4-Step(LI)		
Solar Charging Mode				
INVERTER MODEL		8KW 48V	10KW 48V	12KW 48V
Charging Current (MPPT)		100A/200A		
System DC Voltage		48Vdc		
Operating Voltage Range		60~235Vdc		
Max.PV Array Open Circuit Voltage		250Vdc max		
Standby Power Consumption		2W		
Battery Voltage Accuracy		+/-0.4%		
PV Voltage Accuracy		+/-2V		
Charging Algorithm		3-Step(Flooded Battery, AGM/Gel/LEAD Battery), 4-Step(LI)		

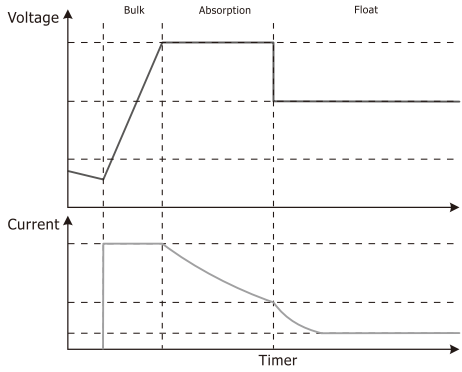
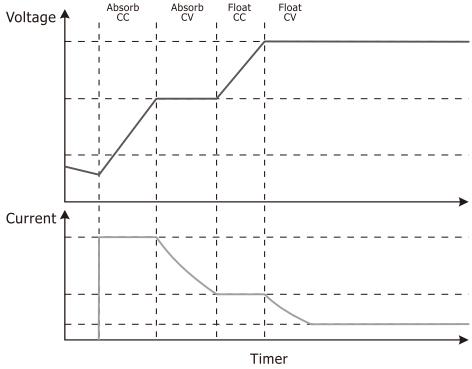
Charging algorithm for lead acid battery	
Charging algorithm for Lithium battery	

Table 4 General Specifications

INVERTER MODEL	8KW 48V	10KW 48V	12KW 48V
Safety Certification	CE+UL		
Operating Temperature Range	0°C to 50°C		
Storage temperature	-15°C~ 60°C		
Dimension (D*W*H), mm	233.2x439x660.5		
Net Weight, kg	69		
Gross Weight, kg	87		

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)	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. Input protector is tripped	1. Check if batteries the wiring are connected and well. 2. Re-charge battery. 3. Replace battery.
Mains exist but the unit works in battery mode.	Input voltage is displayed as 0 on the LCD and green LED is flashing.	Input protector is tripped	Check if AC breaker is tripped and AC wiring is connected well.
	Green LED is flashing.	Insufficient quality of AC power (Shore or Generator)	1. Check if AC wires are too thin and/or too long. 2. Check if generator (if applied) is working well or if input voltage range setting is correct.(Appliance=>wide)
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.
	Fault code 02	Internal temperature of inverter component is over 90°C.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	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	Fan fault
	Fault code 06/58	Output abnormal (Inverter voltage below than 202Vac or is higher than 253Vac)	1. Reduce the connected load. 2. Return to repair center
	Fault code 08/09/53/57	Internal components filed.	Return to repair cente
	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.

GUARANTEECERTIFICATE

Serial No.: _____

Customer`s Name				Contact Person	
Address				Telephone No.	
Product/Model:		Post Code		Fax No.	
Date of purchase			Expire Date		
Dealer Signature			Customer Signature		

GUARANTEECERTIFICATE

Serial No.: _____

Customer`s Name				Contact Person	
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Product/Model:		Post Code		Fax No.	
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