USER'S MANUAL

Portable photovoltaic energy storage power station

600W / 1200W

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

Scan QR code for manual

Appliances

| PC | TV | Air-conditioning | Fridge | Washing machine |

Contents

ABOUT THE MANUAL

Purpose

This manual describes the operation and troubleshooting of the equipment. Please read this manual carefully before operation.

Retain this manual for future reference.

Scope

This manual provides safety guidelines and information on tools and wiring.

The following situations are not covered by the warranty :

(1) Overdue the warranty period .

(2) The serial number has been changed or lost.

(3) The battery capacity is the lowest or the appearance of the device is damaged.

(4) External factors such as transportation,negligence,etc.

(5) This equipment has been damaged by an irresistible natural disaster .

(6) Damage caused by not following the power supply conditions or operating environment .

SAFETY NOTICE

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

1. Before using this unit , please read all instructions and precautions on this unit , understand all relevant chapters in this manual to Prevent explosion which may lead to personal injury and battery damage.

2. Do not disassemble the unit . When service or repair is required , send it to a professional service center . Incorrect assembly may result in electric shock or fire.

3. To reduce the risk of electric shock , disconnect all wiring before attempting any maintenance or cleaning . Turning off the device does not reduce this risk.

4. Caution - Only professionals should install this device.

5. Grounding Instructions - This equipment should be connected to a permanently grounded wiring system. Be sure to comply with local requirements and regulations to use this device.

INTRODUCTION

This is a multi-functional photovoltaic energy storage power station, integrated with battery, MPPT solar charge controller, high frequency pure sine wave inverter and UPS function module into one , which is suitable for outdoor backup electric compartment and spontaneous self-use system .

MPPT solar charge controller adopts advanced MPPT method and intelligent battery management design, which ensures the acquisition of maximum energy ;High frequency pure sine wave inverter adopts high frequency design , achievement high rate density , small size , simple operation and other advantages; The whole machine has high efficiency and the empty load loss is small ,which uses large capacity basket and high-density hammer pool to improve portability of the system.

Features

- Pure sine Wave AC Output Inverter with 600W/1000W/1200W rated power and power factor 1.
- High power density with universal wheels and high portability.
- Setting input voltage and voltage range on the LCD Screen.
- 5V USB and 12V DC output supported.
- AC/PV input and battery priority level configurable on LCD.
  Protection functions such as overload, over temperature and short circuit.

Basic System Structure
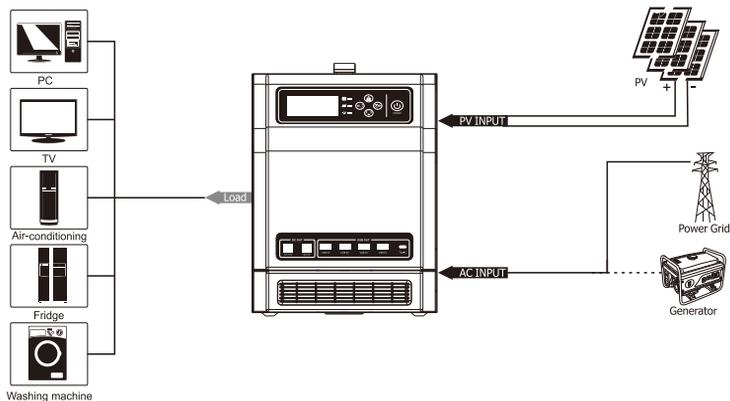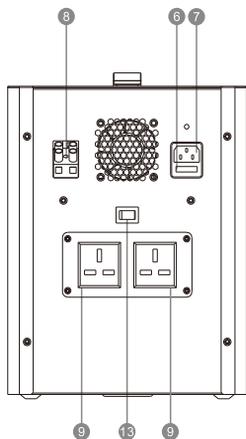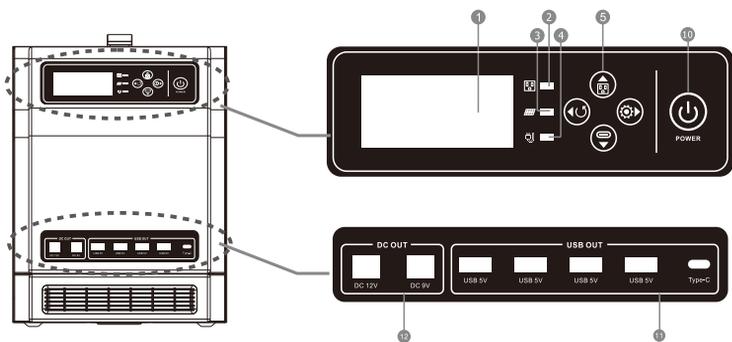

Figure I Hybrid power generation system

Product Overview

1. LCD display
2. AC Output Indicator
3. PV Input Indicator
4. Grid AC Input Indicator
5. Function Button
6. AC input over-current protection
7. AC input
8. PV input
9. AC output
10. Power ON / OFF Button
11. USB 5V output
12. DC 9V / 12V output
13. Main Switch

PART LIST

Make sure nothing in the package is damaged. You should have received the following items inside the package.
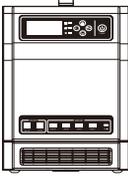
Machine X 1	User manual X 1	Mains input line X 1

OPERATION

Before turning on the device, please reserve a distance of more than 300mm above the device and 200mm to the left and right to ensure for heat dissipation,To ensure the best operation, the ambient temperature should be between 0-50 ° C.
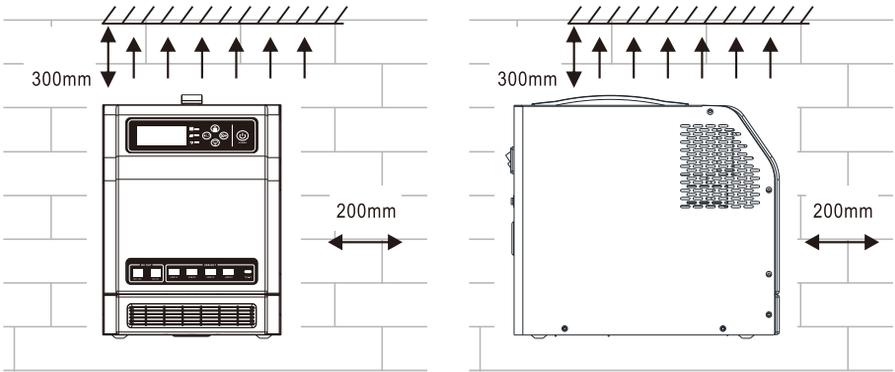
PV Panel Selection

When choosing the right PV module, be sure to consider the following parameters:

1. The open-circuit voltage (VOC) of the PV module does not exceed the maximum open-circuit voltage of the PV array of the inverter.

2. The open circuit voltage (VOC) of the PV module should be higher than the minimum value of the cell voltage.

3. The maximum power point voltage of the photovoltaic array should be close to the MPPT optimal working voltage of the inverter or within the MPPT working voltage range. If a photovoltaic module cannot meet this requirement, it is necessary to connect the photovoltaic modules in series to meet the requirements. See the table below.

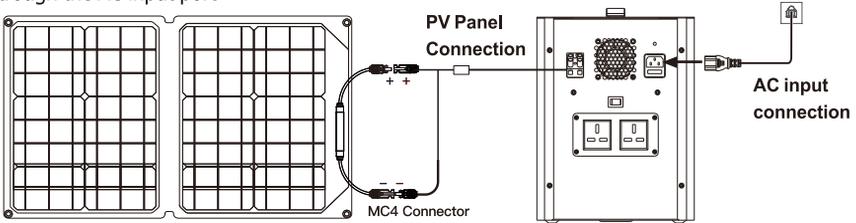| power	600W	1200W
Maximum charging current	40A	
PV open circuit voltage	105VDC	
Photovoltaic MPPT voltage range cut	15-75VDC	30-75VDC
System battery voltage	12.8VDC	25.6VDC

PV Panel Connection

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 Value
600W DC12V/1.2KW DC24V	20A	8 - 10AWG	1.2~1.6Nm

AC input connection

Use the mains input line witch is contained in the package to charge the battery . Connect the unit to the grid trough the AC input port.

Line Mode Specifications

| Input Voltage Waveform	Sinusoidal (utility or generator)
Nominal Input Voltage	230Vac
Low Loss Voltage	176Vac ± 7V(UPS,DEF) , 90Vac± 7V(APL), 186Vac± 7V(VDE)
Low Loss Return Voltage	186Vac ± 7V(UPS,DEF) , 100Vac± 7V(APL), 196Vac± 7V(VDE)
High Loss Voltage	280Vac ± 7V(UPS,DEF,APL), 253Vac± 7V(VDE)
High Loss Return Voltage	270Vac ± 7V(UPS,DEF,APL), 250Vac± 7V(VDE)
Max AC Input Voltage	300Vac
Nominal Input Frequency	50Hz / 60Hz (Auto detection)
Low Loss Frequency	40Hz ± 1Hz(DEF,APL,UPS),47.5Hz ± 0.1Hz(VDE)
Low Loss Return Frequency	42Hz ± 1Hz(DEF,APL,UPS),47.5Hz ± 0.1Hz(VDE)
High Loss Frequency	65Hz ± 1Hz(DEF,APL,UPS),51.5Hz ± 0.1Hz(VDE)
High Loss Return Frequency	63Hz ± 1Hz(DEF,APL,UPS),50.1Hz ± 0.1Hz(VDE)
Output power and charging current derating: When AC input voltage drops to 170V depending on models, the output power will be derated, the Grid AC charging current will be derated.	

Power ON/OFF and Functions ON /OFF

The unit could be turned on or turned off by pressing the Power button for 2 seconds. After power on, press (☝) botton for 2 seconds to turn on or turn off. (default is on after power on)

press (☟) botton for 2 seconds to turn on or turn off. (default is off after power on)

Note

OFF [□] ON

Before used,please switch on the main switch back of the machine, so that all the functions enable suchlike power on/off,battery actived.
when the machine is not used for a long time, switch off the main switch for low-power consumption.
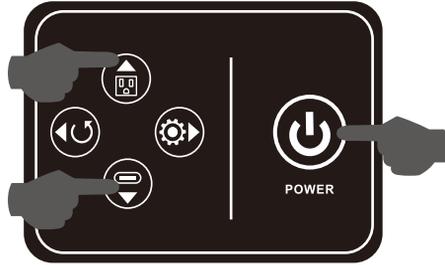
Operation and Display Panel

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

LCD display   AC output

Grid AC input   PV input
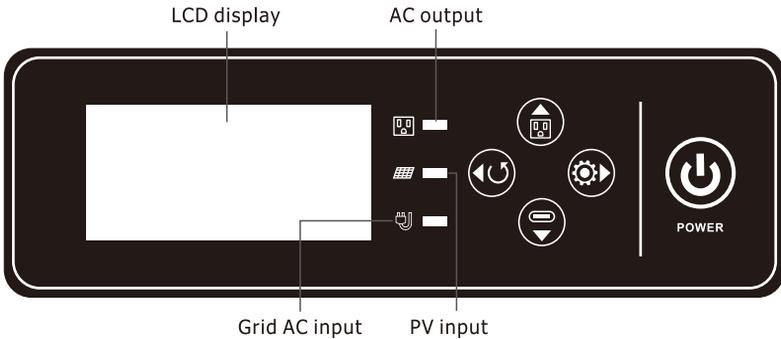
LED Indicator

LED Indicator			Messages
▦ PV input	Green	Solid On	PV input is link and state is OK.
		Flashing	PV input is link but state is fault.
▦ AC output	Green	ON	Output AC sockets is ON.
▦ Grid AC input	Green	Solid On	Grid AC input link and state is OK.
		Flashing	Grid AC input is link but state is fault.

Function Keys

KEY / Operation	◀↻	☝	☟	⚙▶
Normal Page Short Press	Page Up	First Page	First Page	Page Down
Normal Page Long Press	------------	AC Output ON / OFF	DC Output ON / OFF	Enter Setting Page
Setting Page Short Press	Page Up	Adjust +	Adjust -	Page Down
Setting Page Long Press	Exit No Save Setting	Recover Default Set	Recover Default Set	Exit Save Setting

LCD Display
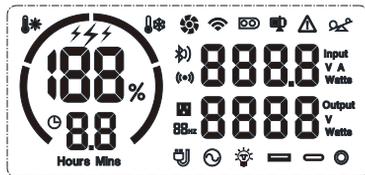
Icon Indicate Information

	Indicate unit work in utility Bypass mode, load is supplied by utility power.
	Indicate unit work in backup mode, load is supplied by battery inverter.
	Indicate unit connected to the PV panel input.
	Indicate LED light output.
	Indicate USB type A output.
	Indicate USB type C output.
	Indicate DC socket output.
	Indicate battery fault occur.
	Indicate machine fault occur.
	Indicate load output overload or short circuit.
	Indicate Fan work state, when fan is work, cycle display.
	Indicate temperature over low.
	Indicate temperature over high
	Indicate battery charging state.
	Indicate AC output is enable.
	Indicate AC output frequency.
	Indicate lithium battery pack SOC percent and battery energy level.
	Indicate unit load output remain time (clock icon flash) or charging full remain time, if hours and mins both not disp, it means seconds.
	Indicate unit working state page, setting page.

Battery SOC and Remain Time Display

when battery is discharging,
indicate discharging remain time.
(the clock icon will flash indicate)

when battery is charging, indicate charging
remain time.
(the clock icon display all the time)

when battery is over low and no charging,
machine will auto counting 30 seconds,
signed on state and power off, after PV or
Grid AC input, auto power up charging some
times and auto power on restore output.

indicate charging, if charging
is fast, display 3 lighting, or
display 1 lighting flash.

indicate battery energy level.
if charging, the level cycle
will flash display level process.

indicate battery SOC Percent,
if battery BMS communicate is
down, it will display "- - %"
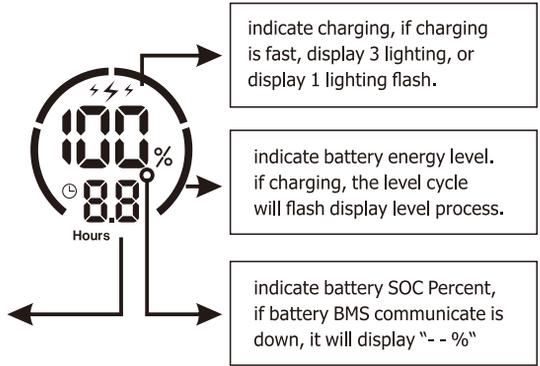
Machine Display Page
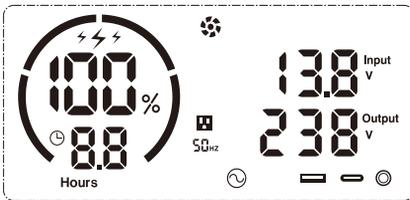
Indicate battery Voltage / output AC voltage

Indicate total charging current / output power
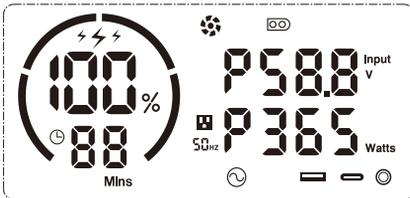
Indicate PV input voltage / PV input power

Indicate input power / output power
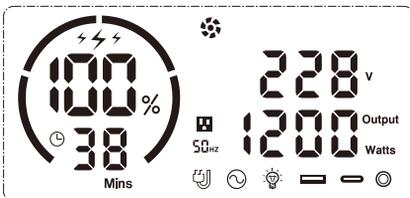
Indicate output voltage / output power

Indicate input utility voltage / output voltage

LCD Setting

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

Setting Programs:

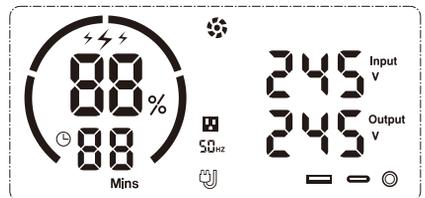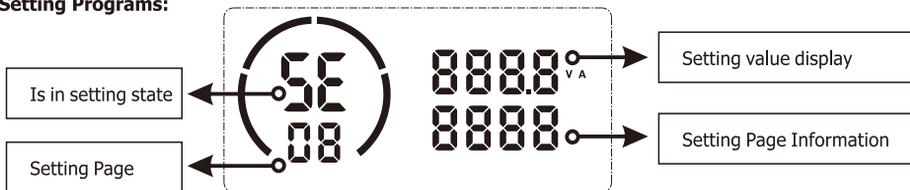| Is in setting state | | |
Setting Page		
		Setting value display
		Setting Page Information

Program	Description	Selectable option	
01	Output source priority: To configure load power source priority **oUtF**	Solar first **01 SOL**	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 any one condition happens: - Solar energy is not available. - Battery voltage drops to low-level cut-off voltage or the setting point in program 07.
		Utility first (default) **01 Uti**	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.
		SBU priority **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 cut-off voltage or the setting point in program 07.
02	Setting after power on, default AC output sockets on or off. **ACUP**	ON(default) **02 On**	OFF **02 OF**
03	Setting after power on, default DC output on or off. **dCUP**	ON **03 On**	OFF(default) **03 OF**
04	Setting battery SOC low auto power off percent. **SoC**	10% (default) **04 10P**	0% ~ 30% (default value 10%) if setting 0%, SOC low protection is disable.

05	AC input voltage range **ACI n**	Appliances **02 APL** ⊘	If selected, acceptable AC input voltage range will be within 90-280VAC.
		UPS **02 UPS** ⊘	If selected, acceptable AC input voltage range will be within 170-280VAC.
		VDE **02 VdE** ⊘	If selected, acceptable AC input voltage range will conform to VDE4105(184VAC-253VAC) Program 13 will auto set 50Hz.
		DEF (default) **02 dEF** ⊘	If selected, acceptable AC input voltage range will be within 170-280VAC.
06	Charger source priority: To configure charger source priority **CXrF**	If this inverter/charger is working in Line, Standby or Battery mode, charger source can be programmed as below:	
		05 CUt ⊘	Utility will charge battery as first priority. Solar energy will charge battery only when utility power is not available.
		Solar first **05 CSO** ⊘	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.
		Only solar **05 OSO** ⊘	Solar energy will be the only charger source no matter utility is available or not.
		Utility + Solar (default) **05 SNU** ⊘	Max. charging current = utility charging current + solar charging current
		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.	
07	Low DC cut-off voltage **bLoF**	11.5V (default) **06 11.5** ⊘ BATT v	10.0~12.0V (default value LI is 11.5V)
		21.0V (default) **06 21.0** ⊘ BATT v	20.0~24.0V (default value LI is 23.0V)
		Setting range is from 10.0V to 12.0V for 12V model, 20.0V to 24.0V For 24V model. Increment of each click is 0.1V@12V / 0.2V@24V step up/down for setting.	
08	Setting voltage point back to utility source when selecting "SBU priority" or "Solar first" in program 01 **PUbL**	Available options in 12VDC model:	
		12.0V (default) **07 12.0** ⊘ BATT v	11.0~12.5V (default value is 12.0V)
		Available options in 24VDC model:	
		23.0V (default) **07 23.0** ⊘ BATT v	22.0~25.0V (default value LI is 24.0V)

09	Setting voltage point back to battery mode when selecting "SBU priority" or "Solar first" in program 01 `PUbr`	Available options in 12VDC model:
		13.5V **BATT** `08 13.5` V (default) 12.0~14.0V (default value is 13.5V)
		Available options in 24VDC model:
		27.0V **BATT** `08 27.0` V (default) 24.0~28.0V (default value is 27.0V)
10	Backlight control `di SP`	Backlight on `09 LON`	Backlight off (default) `09 LOF`
11	Alarm control `bEEP`	Alarm on (default) `10 bOn`	Alarm off `10 bOF`
12	Auto overload restart `LrSt`	Not restart (default) `11 Lr0`	Note: Lr3:Auto restart 3 times Lr9:Auto restart 9 times LrA:Auto restart always **The Setting Only for output overload restart,if output short circuit,do not restart**
13	Output frequency `oFrE`	50Hz `13 50.0` Hz	60Hz `13 60.0` ACI(default) `13 ACI` ACI: Output frequency is auto set by AC input frequency

Fault Reference Code

Fault Code	Fault Event	Error No.	LCD Error Message
00	Output short circuit	⚠ E-00	`5r`
01	Over load	⚠ E-01	`oP`
02	Inverter temperature too high	⚠ E-02	`tI`
03	Output voltage too high	⚠ E-03	`UH`
04	Output voltage too low	⚠ E-04	`UL`
05	Solar charging temperature too high	⚠ E-05	`tP`
06	Battery voltage too high	⚠ E-06	`bH`
07	Fan fault	⚠ E-07	`FE`
08	Input Solar Voltage too high	⚠ E-08	`PH`
09	Input battery is protected or unlink	⚠ E-09	`bn`
10	Battery Soc percent low	⚠ E-10	`CL`
11	Output Lock,Need to manual restart	⚠ E-11	`LS`
15	Battery voltage low	⚠ E-15	`bL`

PS: Auto overload restart Error Num Display
if setting is Lr0, when load output overload occur, the error num is E - 11 "LS", Load is not reset.
if setting is Lr3, when load output overload occur lower 3 times, Load auto reset, the error num is E - 01 "OP", over 3 times, not auto reset, and the error num is E - 11 "LS". Need to restart the machine.

SPECIFICATIONS

	MODEL	0612	1012	1224
	Nominal Battery System Voltage	12VDC	12VDC	24VDC
INVERTER OUTPUT	Rated Power	600W	1000W	1200W
	Waveform	Pure Sine Wave		
	Nominal Output Voltage RMS	230V		
	Output Voltage Regulation	+10/-18%		
	Output Frequency	50Hz / 60Hz ± 1Hz		
	Inverter Efficiency (Peak)	>90%		
	Line Mode Efficiency	>95%		
	Typical Transfer Time	Typical 10ms(UPS,VDE) , Typical 20ms(APL,DEF)		
AC INPUT	Voltage Nominal	230VAC		
	Voltage Range	90 ~ 280VAC ± 3%		
	Frequency Range	40 ~ 65Hz ± 2Hz		
	Frequency Nominal	50Hz / 60Hz (Auto Detection)		
SOLAR CHARGER & AC CHARGER	Maximum AC Charge Current	20A		15A
	Maximum PV Charge Current	40A (max)		
	Maximum Charge Current AC+PV	40A (max)		
	Maximum PV Array Power	600W		1200W
	MPPT Operating Voltage Range	15 ~ 75VDC		30 ~ 75VDC
	Maximum PV Array Open Voltage	105VDC		
	Maximum Efficiency	> 95%		
DC OUTPUT	USB Output	TypeA:5V 2.1A * 4ch TypeC:5V 1A * 1ch		
	DC Output	9V 1A + 12V 1A		
PROTECTION	Input Output Protection	FUSE		
	Bypass Fuse Rating	6.3A	10A	
Lithium BATTERY	Battery Energy	See the label for details		
	Nominal Input Voltage	12.8VDC (4 Series LiFePO4)		25.6VDC (8 Series LiFePO4)
	Low Battery Cutoff — LOAD<20%	11.5VDC		23.0VDC
	20%≤LOAD<50%	11.3VDC		22.6VDC
	50%≤LOAD	11.1VDC		22.2VDC
	Low Battery Alarm — LOAD<20%	12.0VDC		24.0VDC
	20%≤LOAD<50%	11.8VDC		23.6VDC
	50%≤LOAD	11.6VDC		23.2VDC
	Low Battery Voltage Recover	12.8VDC		25.6VDC
	High Battery Voltage Recover	14.5VDC		29.0VDC
	High Battery Voltage Cutoff	15.0VDC		30.0VDC
MECHANICAL SPECIFICATIONS	Machine Dimensions (W*H*D)	225 x 304 x 335		225 x 304 x 335
	Operation Temperature Range	0°C to 45°C		

TROUBLE SHOOTING

Problem	LCD/LED/Buzzer	Explanation / Possible cause	What to do
Unit shuts down automatically during startup process.	LCD/LEDs and buzzer will be active for 30 seconds and then complete off.	The battery voltage is too low or the Soc Percent is low.	1. Re-charge battery. 2. Return to repair center.
No response after power on.	No indication.	1. The battery voltage is far too low. 2. Battery polarity is connected reversed. Input protector is tripped	1. Check if the battery breaker is ON. 2. Re-charge battery. 3. Return to repair center.
Mains exist but the unit works in battery mode.	Input voltage is displayed as 0 on the LCD.	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 the bettery breaker in ON.
Buzzer beeps continuously and red LED is on.	Fault code 01/11	Overload error. The inverter is overload 110% and time is up.	Reduce the connected load by switching off some equipment.
	Fault code 00	Output short circuited.	Check if wiring is connected well and remove abnormal load.
	Fault code 02	Internal temperature of inverter component is over high.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code 06	Battery is over-charged.	Return to repair center.
	Fault code 07	Fan fault	Replace the fan.
	Fault code 03/04	Output abnormal (Inverter voltage below than 190Vac or is higher than 253Vac)	1. Reduce the connected load. 2. Return to repair center
	Fault code 09	Battery is not connected well or fuse is burnt.	If the battery is connected well, please return to repair center.

MUST

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		