MARSRIVA

User Manual

SOHO INVERTER

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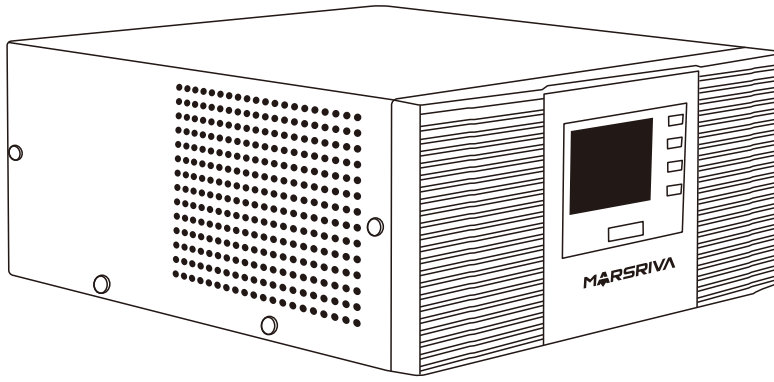
SOHO INVERTER

(600VA-1500VA)



Please read and save this manual!

This manual is important instruction that you should follow during installation and maintenance of the inverter. Please read all instructions before operating the equipment and save this manual for future reference.

1. INTRODUCTION

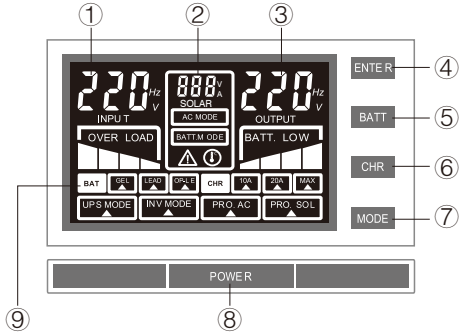
This is an advanced sine wave inverter which provides pure sine wave power to your equipment. Unlike the traditional off-line inverter, this series also provides low harmonic distortion and has a very short transfer time when blackouts occur. It provides an efficiency over 98% under normal power condition. It contains three stage intelligent battery charger to maintain the batteries in best condition.

2. MAIN FEATURES

- Pure sine wave output.
- Microprocessor based design.
- Smart charging.
- Speed control for cooling fan.
- Real time auto-detection for battery condition.
- Protection for overload, short circuit, & over temp.
- Isolation between battery and AC utility.
- Outstanding dynamic performance.

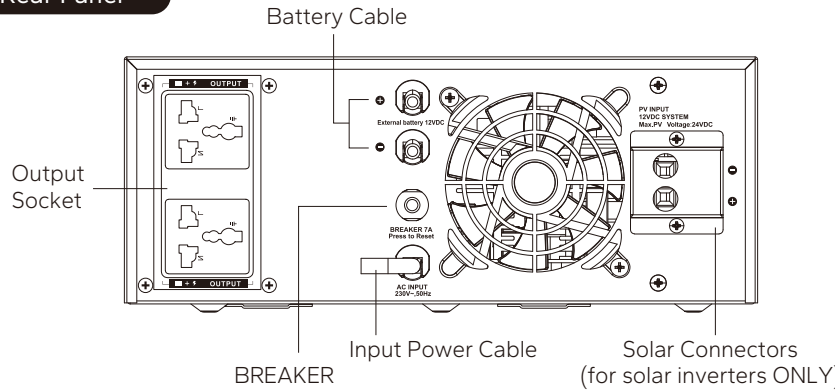
3. DESCRIPTION OF APPEARANCE

Display Panel



① Input voltage
② Solar voltage / Solar current
③ Output voltage
④ Confirm button
⑤ Battery type selection / Previous
⑥ Charging current selection / Neat
⑦ Mode selection
⑧ ON / OFF switch
⑨ Battery type

Rear Panel



4. OPERATION

①. External battery operating procedures

- Please follow the parameter table, series battery and ensure proper battery voltage first.
- Red battery cable connects to positive and blue cable for negative Battery cable and polarity must be connected securely. Do not short the positive and negative of the battery electrode or joint reversely.
- When connecting the battery cable, occurrence of spark in the joints is normal phenomenon.

②. Operation Modes

- **Press "POWER" for 3 seconds to turn on or turn off the inverter.**
  Double press "POWER" fast to select "PRO AC" (AC preferred) or "PRO SOL" (solar preferred).
  Default = PRO AC.
  If "PRO AC" is selected, the inverter will be powered by AC after it's fully charged.
  If "PRO SOL" is selected, solar charging will be used as long as it is there. However this may reduce the battery life due to frequent charging and discharging.
- **<< How to settle "BATT"**
  Press "BATT" and ▲ flashes. Keep on pressing it till it reaches the battery type you choose (Default = Lead-Acid battery), then press "ENTER" to set it up. Battery type includes Gel,Lead-Acid and open Lead-Acid battery.
- **<< How to settle "CHR"**
  Press "CHR" and ▲ flashes. Keep on pressing it till it reaches the charging current you want,then press "ENTER" to set it up. You can choose 10A or 20A for standard models. "MAX" is only available for special designed models.
- **<< How to settle "MODE"**
  Press "MODE" and you will see ▲ flashes in turns between "UPS MODE" and "INV MODE" keep on pressing it till it reaches the mode you need, then press "ENTER" to set it up.
- **Press "ENTER" about 4 seconds to enter Advanced Menu**
  Press "BATT" to previous option, press "CHR" to next option, and then Press "ENTER" to select the option temporarily and turn to next page.
  1.The first page is to select the battery voltage of turning off. There are options of 10.0V,10.5V,10.8V and 11.1v
  2.The second page is to select the battery voltage of switching to AC charging. There are options of 11.4V, 11.6V, 11.8V and 12.0V.
  3.The third page is to select the maximum current of solar charger, There are options of 10A, 20A, 30A, 40A and 50A. (for solar inverter model ONLY)
  4.The fourth page is confirmation page, select "YES" to confirm the selection of previous 3 pages, select "NO" to cancel.

5. IMPORTANT SAFETY INSTRUCTIONS

- When replacing the batteries, use the same number and the same type of batteries.
- Do not dispose of batteries in a fire; the battery may explode.
- Do not open or mutilate the battery or batteries, released electrolyte is harmful to the skin and eyes.
- A battery can present a risk of electric shock and high short circuit current. The following precaution should be observed when working on batteries.
- Remove watches, rings or other metal objects.
- Use tools with insulated handles.
- The equipment can be operated by any individuals with no previous experience.
- The socket-outlet shall be installed near the equipment and easily accessible.
- Attention: hazardous through electric shock. Also, with disconnection of this unit from the main, hazardous voltage still may be accessible through supply of battery.
- The battery supply should be therefore disconnected in the plus and minus pole through or from the outer enclosure accessible battery fuses when maintenance or service work inside the inverter is considered.
- The lead acid battery may cause chemical hazard.
- The battery presents a risk of electric shock and energy hazard.
- Batteries will be disposed by the manufacturer or importer. Customers need to send them back with no charge for disposal.

6. SPECIFICATION

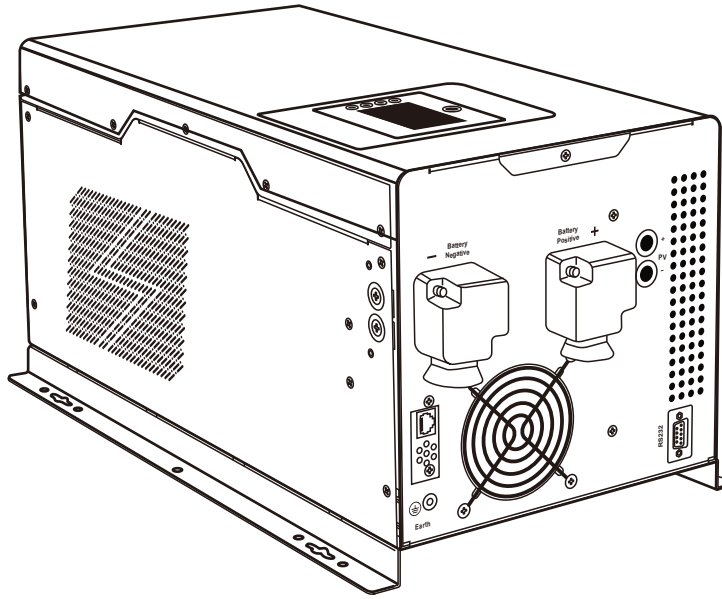
Model	MR-UT600	MR-UT800	MR-UT1000	MR-UT1200	MR-UT1500
Capacity	600VA/500W	800VA/640W	1000VA/800W	1200VA/1000W	1500VA/1200W
Nominal battery voltage	12VDC				24VDC
Input voltage range	UPS mode: 145–270VAC±5VAC INV mode: 100–290VAC±5VAC				
Input freuency	45 – 65Hz				
Output voltage (AC mode)	UPS mode: 203–238VAC±5VAC INV mode: 150–255VAC±5VAC				
Output voltage (battery mode)	220VAC ± 5VAC				
Output frequency (battery mode)	50Hz ± 0.5Hz				
Transfer time	＜10ms				
Chargincurrent (max)	10A / 20A (selectable)				
Output Wave form (battery mode)	Pure sine wave				
Unit dimension (mm)	290 x 257 x 123				
Operating temperature	0 – 40°C				
Humidit	20% to 90% (non condensing)				

7. TROUBLE SHOOTING

Problem	Possible Causes	Action to take
Inverter no reaction while AC is connected	1. Line cord plug is loose. 2. Breaker broken. 3. Dead wall socket.	1. Check the line cord plug. 2. Replace the breaker. 3. Check wall socket with a table lamp.
Power output is normal, inverter emits continuous beep, Load level indicator flickers	Inverter is overloaded	Turn off inverter and unplug excessive loads from inverter.
Inverter does not provide expected run time.	1. Excessive loads connected at inverter's outlets. 2. Battery is weak and can not provide enough.	Do not operate the inverter. Leave the inverter plugged in for 10 hours. Then test it again. If inverter still can not provide expected run time, battery should be replaced.
Button on front panel doesn't work.	1. The CPU inside inverter is not running correctly. 2. Button damaged.	Unplug line cord and battery cord from the inverter to let it shutdown automatically, and plug line cord and battery cord again, if button still fails, please call for service.
Inverter emits urgent beep, Battery capacity indicator flickers	The CPU inside inverter is not running correctly. Button damaged.	1. Charge batteries. 2. Replace batteries. 3. Call for service.
Inverter cannot DC start	1. Battery polarity wrong. 2. Battery wrong (over voltage). 3. Battery exhaustion. 4. Inverter fault.	1. Check battery and connection. 2. Check battery voltage by voltage meter. 3. Connect AC power cord to charge the battery. 4. Call for service.

SOHO INVERTER

(2000VA-3000VA)



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1. PRODUCTS SKETCH MAP

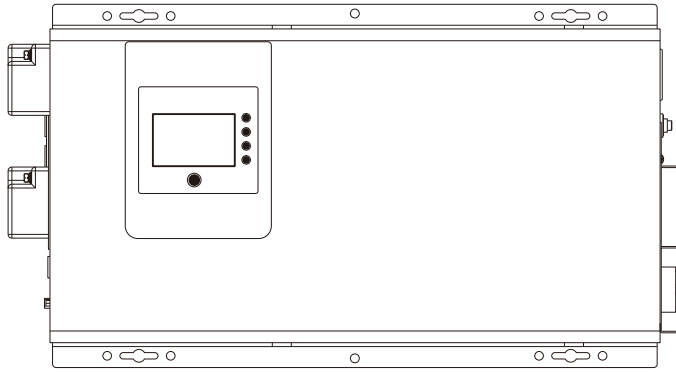


Figure 1 top view

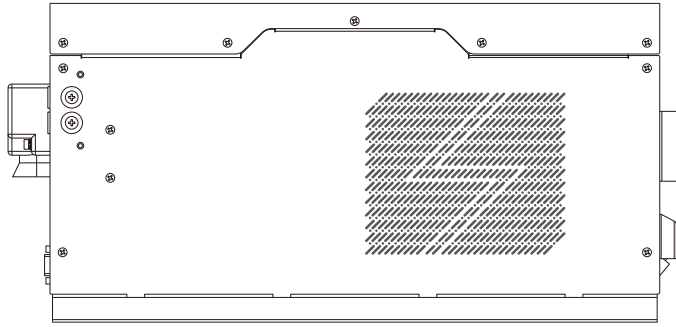


Figure 2 side view

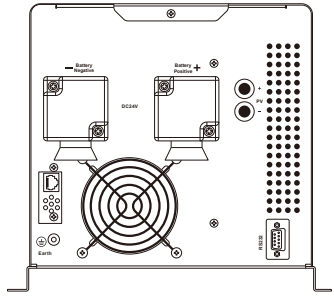


Figure 3 DC side

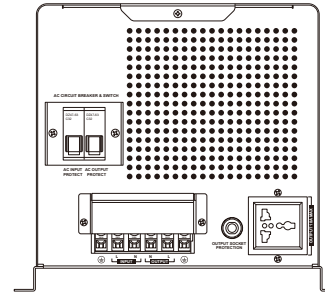
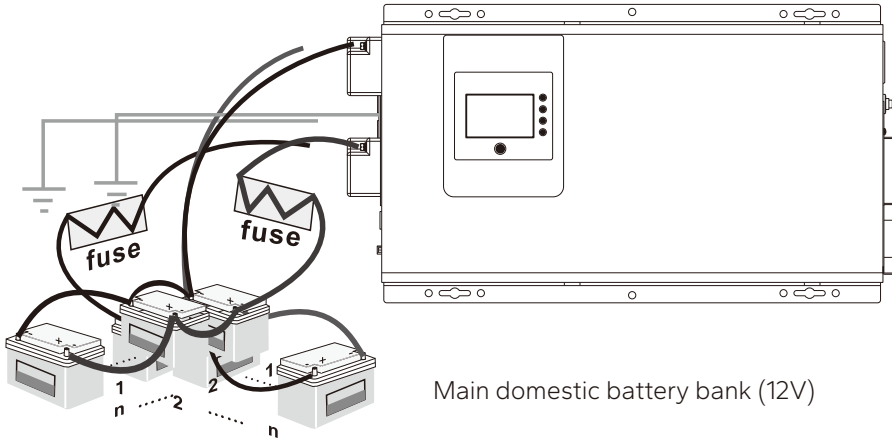


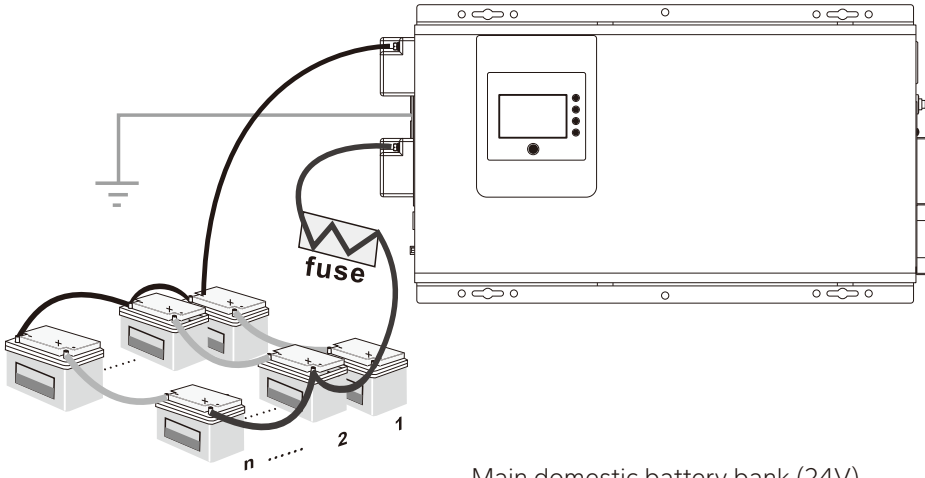
Figure 4 AC side

2. BASIC WIRING

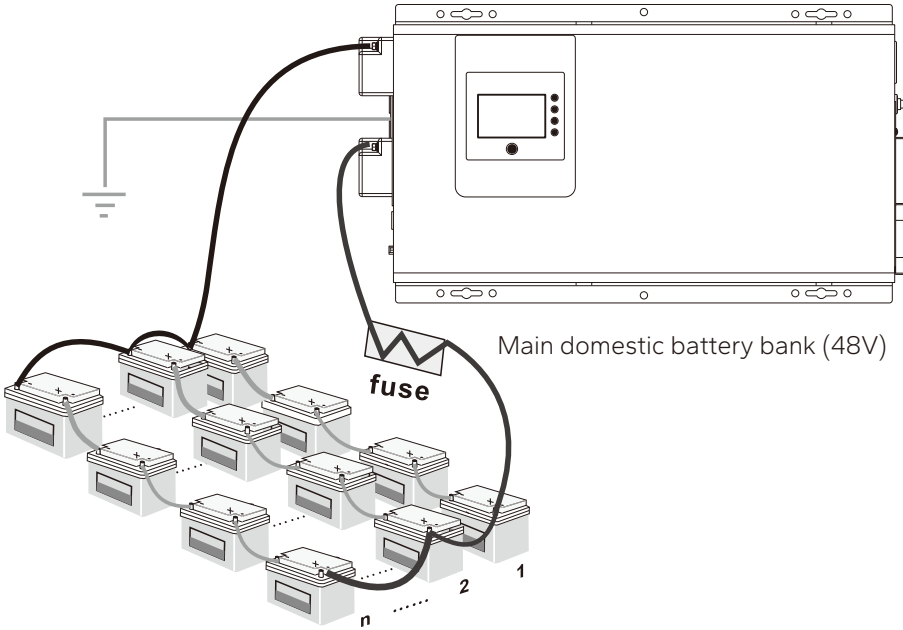
> ⚠ Warning:
> High voltage, do not open unless qualified to do so;
> Please read instructions before working on this product.

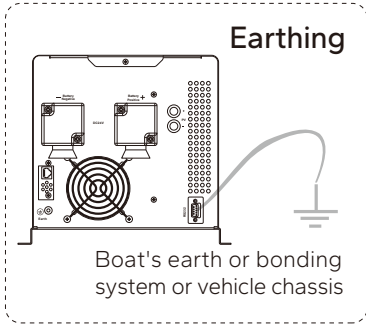


Main domestic battery bank (12V)



Main domestic battery bank (24V)

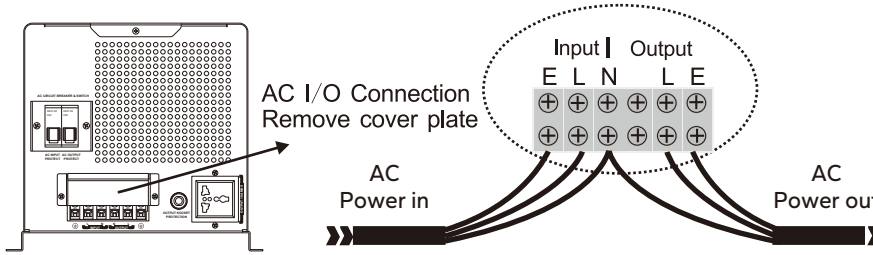




WHAT CABLE TO USE in mm^2:

A charger or inverter	Cable run distance 0 - 1.5m	Cable run distance 1.5 - 4.0m
125-180A	$50mm^2$	$70mm^2$
180-330A	$70mm^2$	$90mm^2$

Please note that if there is a problem obtaining for example $90mm^2$ cable, use $2*50mm^2$, or $3*35mm^2$, One cable is always best but, cables simply copper and all you require is the copper, so it does not matter if it is one cable or 10 cables as long as the square area adds up.Performance of any product can be improved by thicker cable and shorter runs, so please round up and keep the length as short as possible.



3. LINE MODE SPECIFICATION

Model	MR-UT2000	MR-UT3000
Input Voltage Waveform	Sinusoidal (Utility or generator)	
Nominal Input Voltage	230VAC	
Low Line Disconnect	UPS mode: 180VAC±4% INV mode:160VAC±4%	
Low Line Re-connect	UPS mode: 190VAC±4% INV mode:170VAC±4%	
High Line Disconnect	UPS mode: 265VAC±4% INV mode:265VAC±4%	
High Line Re-connect	UPS mode: 255VAC±4% INV mode:255VAC±4%	
Nominal Input Frequency	50Hz / 60Hz (Auto detection)	
Low Line Frequency Re-connect	58±0.3Hz for 60Hz; 45±0.3Hz for 50Hz;	
Low Line Frequency Disconnect	57±0.3Hz for 60Hz; 45±0.3Hz for 50Hz;	
High Line Frequency Re-connect	64±0.3Hz for 60Hz; 54±0.3Hz for 50Hz;	
High Line Frequency Disconnect	65±0.3Hz for 60Hz; 55±0.3Hz for 50Hz;	
Output Voltage Waveform	As same as input wave form	
Over Load Protection (SMPS load)	Circuit breaker	
Output Short Circuit Protection	Circuit breaker	
Efficiency(Line Mode)	＞95%	
Transfer Time(AC to DC)	⩽10ms (Typical)	
Transfer Time(DC to AC)	⩽10ms (Typical)	

4. INVERTER MODE SPECIFICATION

Model	HV MODEL	
	MR-UT2000	MR-UT3000
Output Voltage Waveform	Sine wave	
Rated Output Power (VA)	2000	3000
Rated Output Power (W)	2000	3000
Power Factor	0 - 1.0	
Nominal Output Voltage (V)	230VAC	
Nominal Output Frequency (Hz)	50Hz ± 0.3Hz	
Auto tracking Main Frequency (Hz)	Yes (Following main first connection) 50Hz@45-54Hz / 60Hz@55-64Hz	
Output Voltage Regulation	±10%rms	
Nominal Efficiency	＞80%	
Over Load Protection (SMPS load)	(100%<load<120%)± 10% : Fault (Shutdown output) after 2 minutes; (120%<load<140%)±10% : Fault (Shutdown output) after 1 minutes, Load>140%±10% : Fault (Shutdown output) after 20s	
Surge rating (10s)	6000VA	9000VA
Capable of starting electric motor	1 HP	2HP
Output Short Circuit Protection	Current limit (Fault after 10s)	
Nominal DC Input Voltage	24V	
Min DC Start Voltage	20V	
Low Battery Alarm	21.0VDC ± 0.6VDC for 24V battery	
Low DC Input Shut-down	20.0VDC ± 0.6VDC for 24V battery	
High DC Input Alarm & Fault	32VDC ± 0.6VDC for 24V battery	
High DC Input Recovery	31.0VDC ± 0.6VDC for 24V battery	
Power saver	Load≤25W (Enabled on"P/S auto"setting of Remote control)	

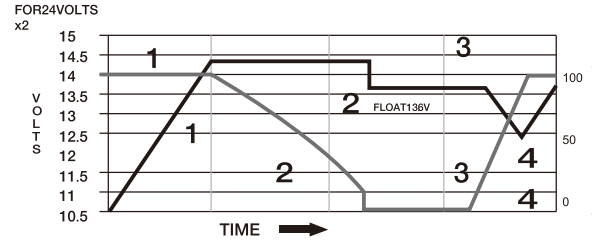
5. CHARGE MODE SPECIFICATION

Model	HV MODEL	
	MR-UT2000	MR-UT3000
Nominal Input Voltage	230VAC	
Input Voltage Range	UPS mode: 180 – 265VAC ± 4% INV mode: 160 – 265VAC ± 4%	
Output Voltage Range	UPS mode: 180 – 265VAC ± 4% INV mode: 160 – 265VAC ± 4%	
Nominal Charge Current	45A (Max.)	
Charge Current Regulation	±5ADC	
Charger Short Circuit Protection	Circuit Breaker	
Over Charge Protection	Bat.V≥ 31.4VDC, beeps 0.5s every 1s & fault after 60s	
Charge Algorithm	**Three stage:** **Boost CC** (Constant current stage) → **Boost CV** (Constant voltage stage) → **Float** (Constant voltage stage)	

6. CHARGE MODE SPECIFICATION

Charge Stage Transition Definitions

- **Boost CC Stage:** If A/C input is applied, the charger will run at full currentin CC mode until the charger reaches the boost voltage.
- **Boost CV Stage:** In this stage,the charger will keep the boost voltage in Boost CV mode.The charging current will reduce, until less than 2A, then drop the voltage down to the float voltage.
- **Float Stage:** In float mode,the voltage will stay at the float voltage. If the A/C is reconnected or the battery voltage drops below 12VDC / 24VDC / 48VDC, the charger wil reset the cycle above.



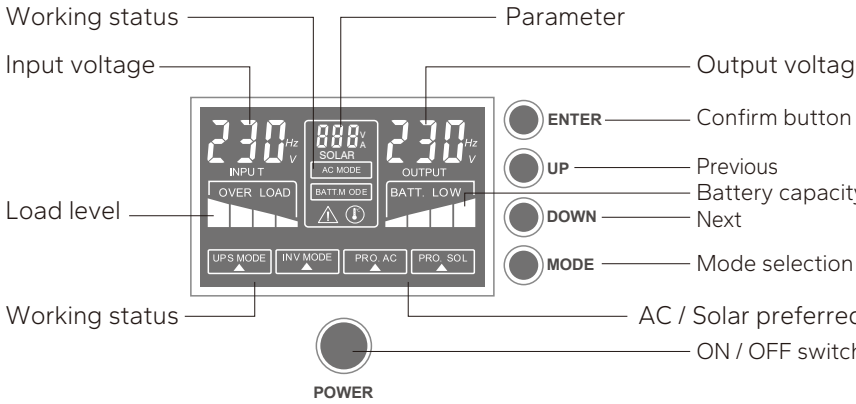
STEP 1=CONSTANT CURRENT CHARGE
STEP 2=ABSORPTTON CHARGE AT 14.4V
STEP 3=FLOAT VOLTAGE AT 13.6 VOLTS
STEP 4=LOW VOLTAE RESET TO STEP 1

Battery Type Setting

⊙ BATTERYTYPE SELECTOR

Switch setting	Description	Boost Voltage			Float Voltage		
		12V	24V	48V	12V	24V	48V
0	To be used by factory for set up	—		—	—		—
1	Gel USA	14.0	28.0	56.0	13.7	27.4	54.8
2	AGM 1	14.1	28.2	56.4	13.4	26.8	53.6
3	AGM 2	14.6	29.2	58.4	13.7	27.4	54.8
4	Sealed lead acid	14.4	28.8	57.6	13.6	27.2	54.4
5	Gel EURO	14.4	28.8	57.6	13.8	27.6	55.2
6	Open lead acid	14.8	29.6	59.2	13.3	26.6	53.2
7	Calcuim	15.1	30.2	60.4	13.6	27.2	54.4
8	De sulphation	15.5	31.0	62.0	4 hours then off		
9	Not used	—		—	—		—

7. DISPLAY & CONTROL



<< Press "POWER" for 3 seconds to turn on or turn off the inverter

Double press "POWER" fast to select "PRO AC" (AC preferred) or "PRO SOL" (Solar preferred).

If "PRO AC" is selected, the inverter will be powered by AC when there is AC input.

If "PRO SOL" is selected, the AC charging will be used when external solar charging is not available and the battery is discharged till the pointed voltage. However this may reduce the battery life due to frequent charging and discharging.

<< How to settle "MODE"

Press "MODE" and you will see ▲flashes in turns between "UPS MODE" and "INV MODE", keep on pressing it till it reaches the mode you need, then press "ENTER" to set it up.

<< Press "ENTER" about 4 seconds to enter Advanced Menu

In Advanced Menu, press "UP" to previous option, press "DOWN" to next option, and then Press 'ENTER' to select the option temporarily and turn to next page.

1. The first page (Bls) is to select the battery low voltage of turning off. There are options of 10.0V (default), 10.5V, 10.8V, 11V and 11.5V.
2. The second page (Utb), inverter is on the AC mode, it turns to DC mode while the battery voltage is charged till the pointed voltage (active function when Solar Priority is set). There are options of 13.2V, 13.6V (default setting), 14.4V, full.
3. The third page (Btu) inveter is on the DC mode, it turns to AC mode while the battery is discharged till the pointed voltage (active function when Solar Priority is set). There are options of 11.6V, 12V, 12.2V(default setting), 12.5V.
4. The fourth page (Scc) is to select the maximum current of solar charger. There are options of 10A, 20A, 30A, 40A, 50A and 60A. (for solar inverter model ONLY)

5. The fifth page (Bat) is to select the battery type. There are options of 1-8 for different type of batteries. (See "Battery Type Setting")
6. The sixth page (Chr) is to select the maximum current of AC charger. There are options of 0A, 5A, 10A, 20A, 30A and 45A. (0A means AC charging is forbidden.)
7. The seventh page is confirmation page, select "YES" to confirm the selection of previous 6 pages, select "NO" to cancel.

Fault recovery	By restart the machine

Fan Operation

Variable speed fan operation is required in invert and charge mode. This is to be implemented in such a way as to ensure high reliability and safe unit and component operating temperatures in an operating ambient temperature up to 50℃.

- Speed to be controlled in a smooth manner as a function of internal temperature and / or current.
- Fan should not start / stop suddenly.
- Fan should run at minimum speed needed to cool unit.
- Fan noise level target<60db.

The fan logic as below

Condition	Entercondition	Leavecondition	Speed
Heat Sink Temperature	T≤60℃	T>65℃	OFF
	65℃≤T<85℃	T≤60℃ or T≥80℃	50%
	T>85℃	T≤80℃	100%
Charge Current	T≤15%	T≥20%	OFF
	20%<T≤50%	T≤15% or T≥50%	50%
	T>50%	T≤40%	100%
Load% (Invert mode)	Load<30%	Load≥30%	OFF
	30%≤Load<50%	Load≤20% or Load≥50%	50%
	Load≥50%	Load≤40%	100%

8. GENERAL SPECIFICATION

Safety Certification	CE (EN 62040 – 1)
EMC Classification	EN 62040 – 2, C2
Operating Temperature Range	0℃ to 40℃
Storage Temperature	-15℃ – 60℃
Operatio Humidity	5% to 95%
Audible Noise	60dB (Max.)
Cooling	Forced air, variable speed fan
Size	526mm * 286mm * 251mm

9. APPENDIX (Indicator and Buzzer setting.)

Status	Item	Buzzer
Line Mode	CC	×
	CV	×
	Float	×
Inverter Mode	Inverter on	×
	Power saver	×
Alarm Mode	Battery low	beep 0.5s every 5s
	Battery high	beep 0.5s every 1s
	Overload on inverter mode	refer to LCD display
	OverTemp on inverter mode	beep 0.5s every 1s
	OverTemp on line mode	beep 0.5s every 1s
	Over charge	beep 0.5s every 1s
Fault Mode	Fan lock	beep continuous
	Battery high	beep continuous
	Inverter mode overload	beep continuous
	Over temp	beep continuous
	Over charge	beep continuous
	Back feed short	beep continuous

MARSRIVA Technology Co., Ltd.
Website: www.marsriva.com
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