

# MS-RE Solar Inverter

User Manual  
MS-RE 1 and MS-RE 2





# MS-RE Solar Inverter

The MS-RE Solar Inverter range, is designed for locations having unreliable or limited access to electricity, to provide a reliable and affordable energy access solution. It is designed to supply continuous energy from solar and grid based on availability.

The Inverter is customized to prioritize solar energy over grid supply. This helps to extract maximum energy from solar making it a sustainable energy access solution for homes, micro enterprises, health centers, schools, and offices.



## Do's and Don'ts

### MS-RE Solar Inverter

	
<ul style="list-style-type: none"><li>■ Switch OFF and unplug the MS-RE Solar Inverter before touching or cleaning the surface.</li><li>■ Unplug the MS-RE Solar Inverter from the wall outlet during lightning storm.</li></ul>	<ul style="list-style-type: none"><li>■ Do not block the side ventilation slots by cloth or other material; it may result in fire hazard.</li><li>■ Do not place the MS-RE Solar Inverter near heat radiation or heat source.</li><li>■ Do not install the MS-RE Solar Inverter near kitchen sink, laundry, wash bowl and bathtub.</li></ul>

## Battery

For optimal Inverter usage, consider the following battery recommendations:

	
<ul style="list-style-type: none"><li>■ Wear safety gloves and goggles.</li><li>■ Use only battery grade water for battery refilling.</li><li>■ Install the battery in proper ventilated area.</li><li>■ Apply petroleum jelly to terminals of the battery.</li><li>■ Place battery horizontally and handle with care.</li><li>■ Keep out of reach of children.</li><li>■ Connect correct polarity of wires from MS-RE Solar Inverter to the battery.</li></ul>	<ul style="list-style-type: none"><li>■ Do not use impure or mineral water for battery refilling.</li><li>■ Do not add acid to the battery as it can damage the battery.</li><li>■ Do not place the battery in the vicinity of water source or under direct sunlight.</li><li>■ Do not leave the battery's cell caps open.</li><li>■ Do not increase the length of the battery wire.</li><li>■ Do not place the battery at a height.</li><li>■ Never short the terminals of the battery.</li><li>■ Do not over fill the battery cells.</li><li>■ Keep flammable substance away from the battery.</li><li>■ Do not dispose the batteries in fire.</li><li>■ Do not open or mutilate the batteries.</li><li>■ Do not keep tools or metal parts on the top surface of the battery.</li></ul>

# MS-RE Solar Inverter

## Front Panel Description: MS-RE 1



### 1. ON-OFF SWITCH

Press and hold for 2 seconds for the device ON/OFF function.

### 2. MAINS ON

Indicates mains status.

### 3. SOLAR CHARGING

Indicates charging through solar panel.

### 4. MAINS CHARGING

Indicates charging through mains.

### 5. POWER SAVER

Indicates the power saver mode status.

### 6. BATTERY LOW

Indicates low battery status.

### 7. OVER LOAD

Indicates overload condition.

### 8. SYSTEM ON

Indicates inverter status.

### 9. QR CODE

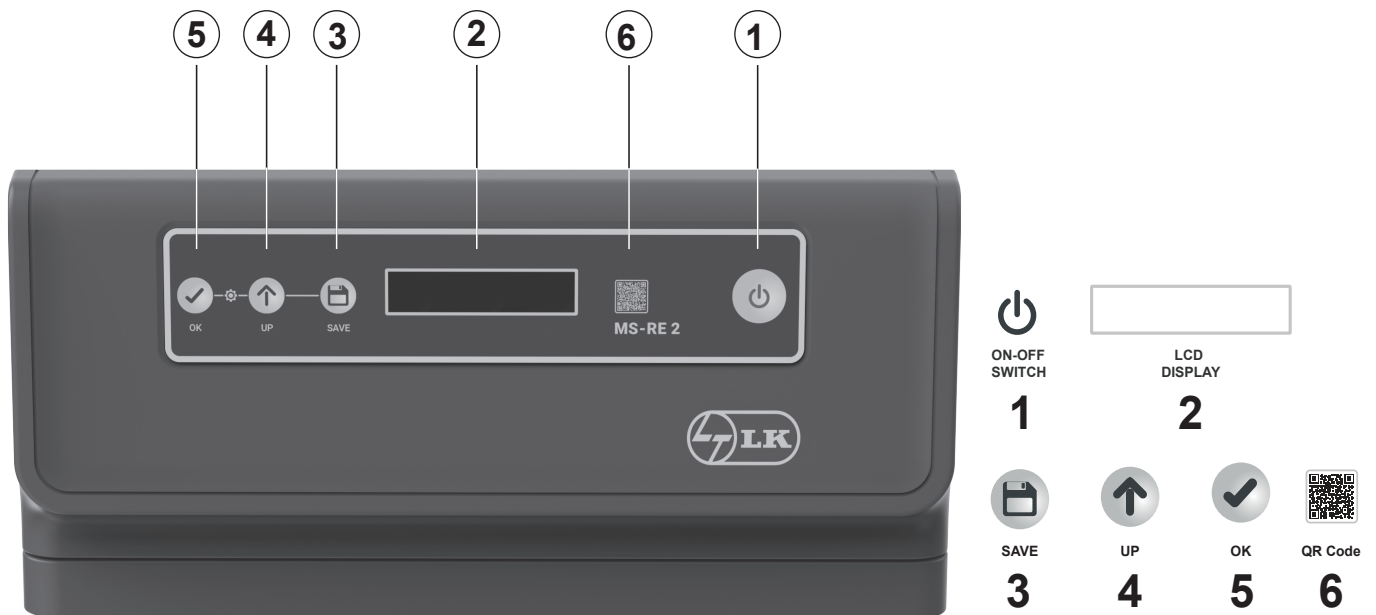
Scan QR code for more product details

## LED Indication

	Description	LED ON	LED Blinking
1.	ON/OFF SWITCH	-	-
2.	MAINS ON	Mains available	-
3.	SOLAR CHARGING	Solar power available	Charging through solar panel
4.	MAINS CHARGING	Battery charging through mains	-
5.	POWER SAVER	Power saver is active	-
6.	BATTERY LOW	Battery low trip	Battery low pre-alarm
7.	OVER LOAD	Over load trip	Over load alarm (slow blink), Short circuit (fast blink)
8.	SYSTEM ON	Inverter activated	-

# MS-RE Solar Inverter

## Front Panel Description: MS-RE 2



### 1. ON-OFF SWITCH

Press and hold for 2 seconds for the device ON/OFF function and the backlight ON/OFF function.

### 2. LCD DISPLAY

Displays the various parameters on the LCD screen.

### 3. SAVE

Press to save the settings.

### 4. UP

Switch to change the value.

### 5. OK

Press to enter the selected setting.

### 6. QR Code

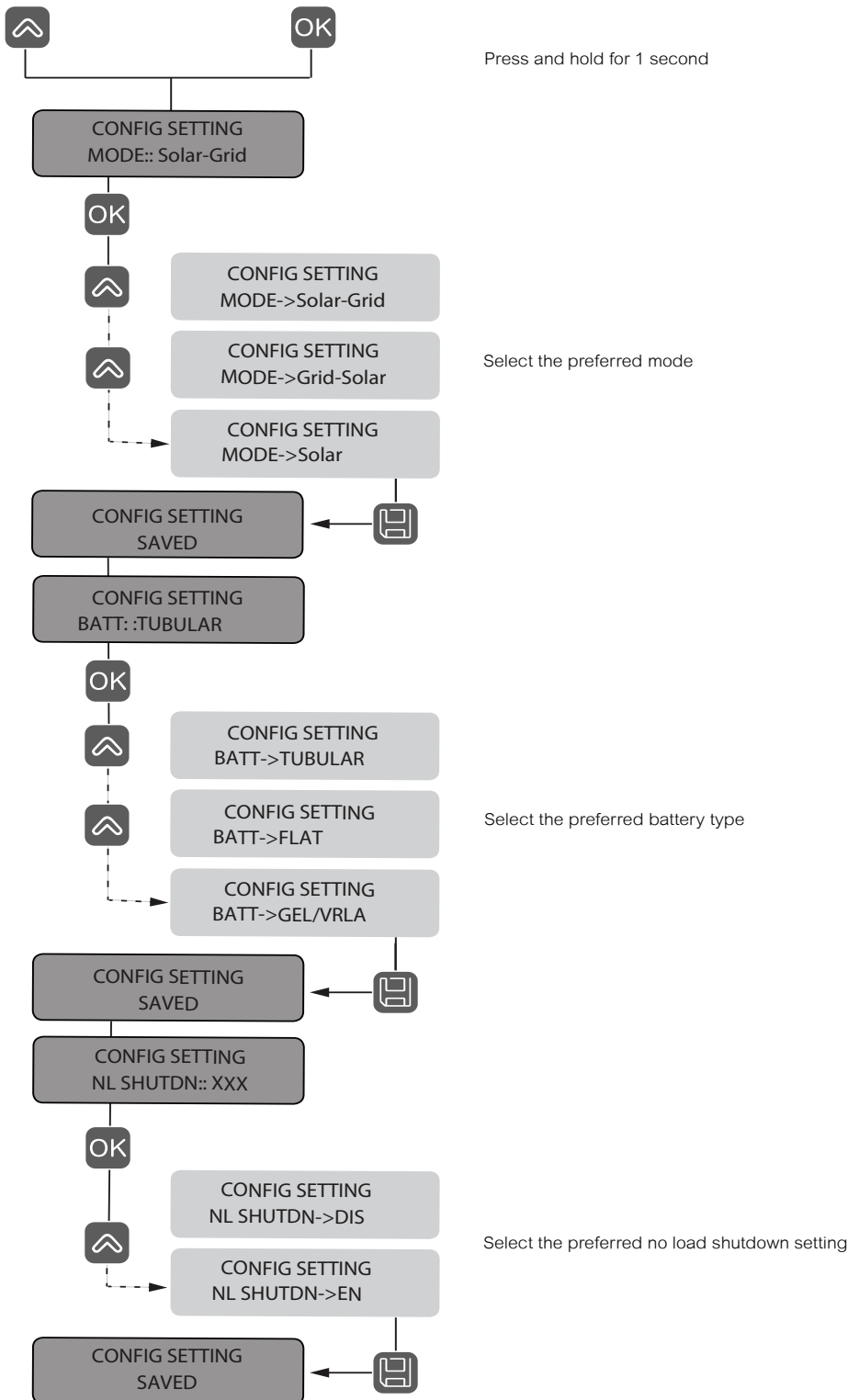
Scan QR code for more product details.

# MS-RE Solar Inverter

## Configuration Settings: MS-RE 2

To change the settings using LCD and switches:

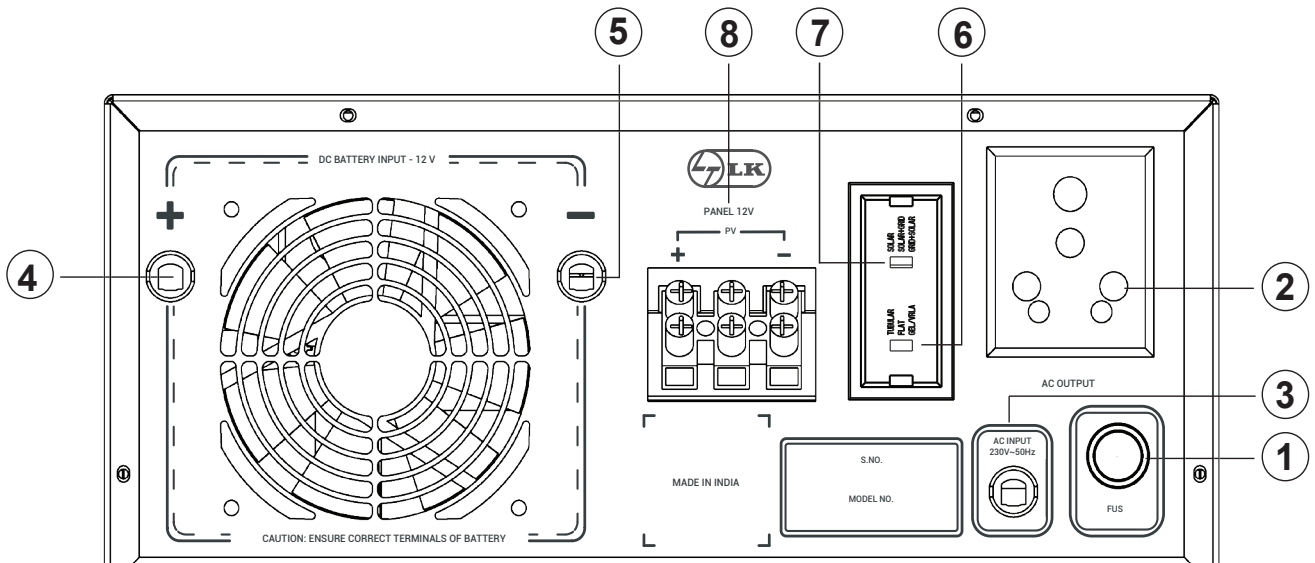
1. Press **OK** and **UP** at the same time for 1 second to enter settings.
2. Use **UP** switch to navigate to the required setting.
3. Press **OK** to view the parameter setting options.
4. Use **UP** switch to scroll to the required option.
5. Press **Save** to confirm the option.
6. Press **Save** again to save the settings.
7. Press **OK** and **UP** at the same time for 1 second to exit settings.



<b>BATT:</b>	Battery
<b>I/P V:</b>	Grid input voltage
<b>A:</b>	Ampere
<b>PV POWER:</b>	Solar power
<b>CUM KWh:</b>	Cumulative solar energy
<b>SOL-GRID:</b>	Selected charging mode (Solar-Grid)
<b>NL SHUTDN:</b>	No load shutdown
<b>O/P V:</b>	AC output voltage
<b>SW:</b>	ON-OFF switch
<b>LD %:</b>	Load percentage
<b>FRQ:</b>	Output AC frequency
<b>FL:</b>	Grid input fail

# MS-RE Solar Inverter

## Back Panel Description: MS-RE 1



### 1. Mains Fuse

Connects to the input of the MS-RE Solar Inverter.

**NOTE:** In Mains mode, this fuse trips in case of short-circuit or overload at the output.

### 2. Universal Output Socket

Connects load through solar inverter.

### 3. Mains Input Cable (Input 230 V~ 50 Hz)

Connects input AC supply (the commercial supply) to the solar inverter.

### 4. Positive Battery Lead

Connects to the positive terminal of the battery.

### 5. Negative Battery Lead

Connects to the negative terminal of the battery.

### 6. Battery Type Selection Switch

Select the battery type (Tubular/Flat/Gel or VRLA) connected to the solar inverter.

### 7. Mode Selection Switch

Select the battery charging current profile (Solar/Solar+Grid/Grid+Solar). Refer to the technical specification section.

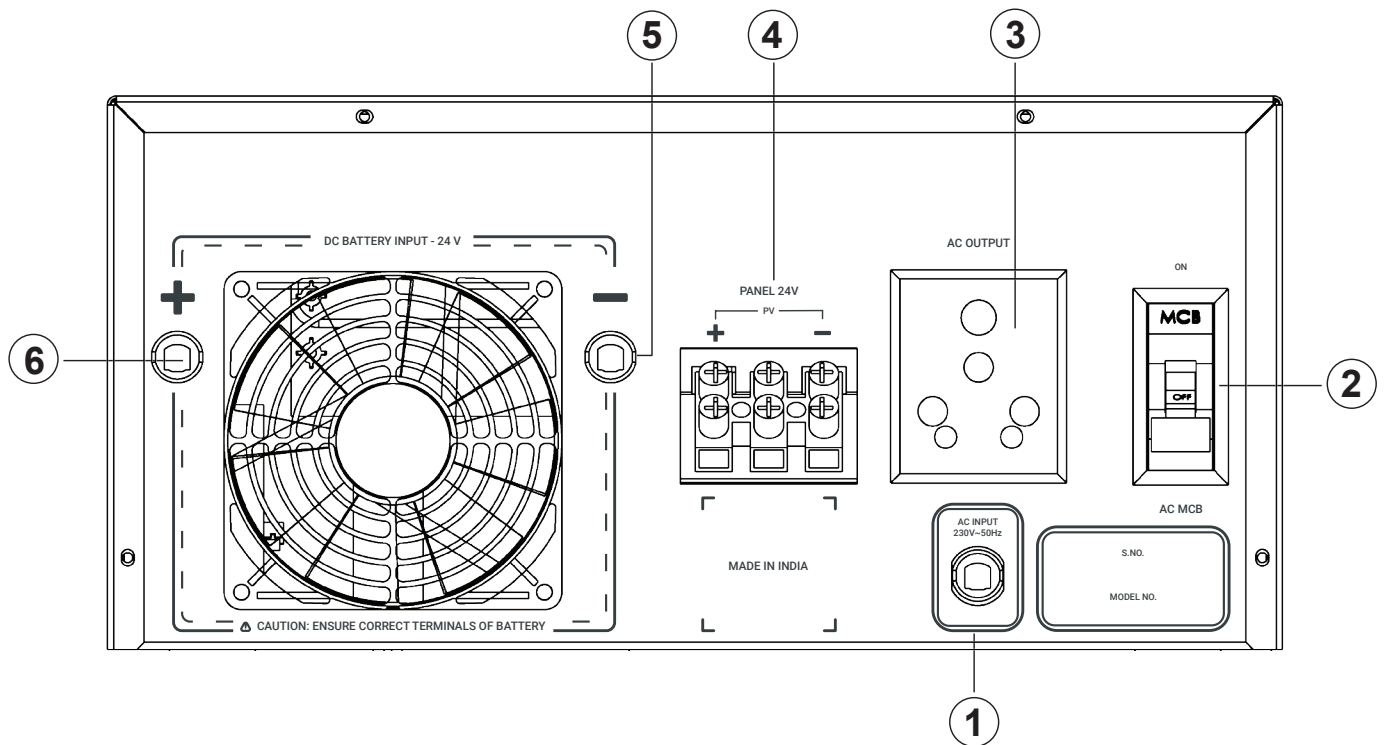
### 8. Terminal Block - PV Input

Connects to the PV panel input.

**NOTE:** Ensure the connections are as per the polarity markings and the screws tightened.

# MS-RE Solar Inverter

## Back Panel Description: MS-RE 2



### 1. Mains input Cable (Input 230 V~ 50 Hz)

Connects input AC supply (the commercial supply) to the solar inverter.

### 2. AC Miniature Circuit Breaker

Connects to input of the Mains.

**NOTE:** In Mains mode, this breaker trips in case of short-circuit or overload at the output.

### 3. Universal Output Socket

Connects load through solar inverter.

### 4. Terminal Block - PV Input

Connects to the PV panel input.

**NOTE:** Ensure the connections are as per the polarity markings and the screws tightened.

### 5. Negative Battery Lead

Connects to the negative terminal of the battery.

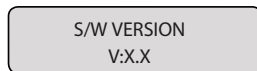
### 6. Positive Battery Lead

Connects to the positive terminal of the battery.

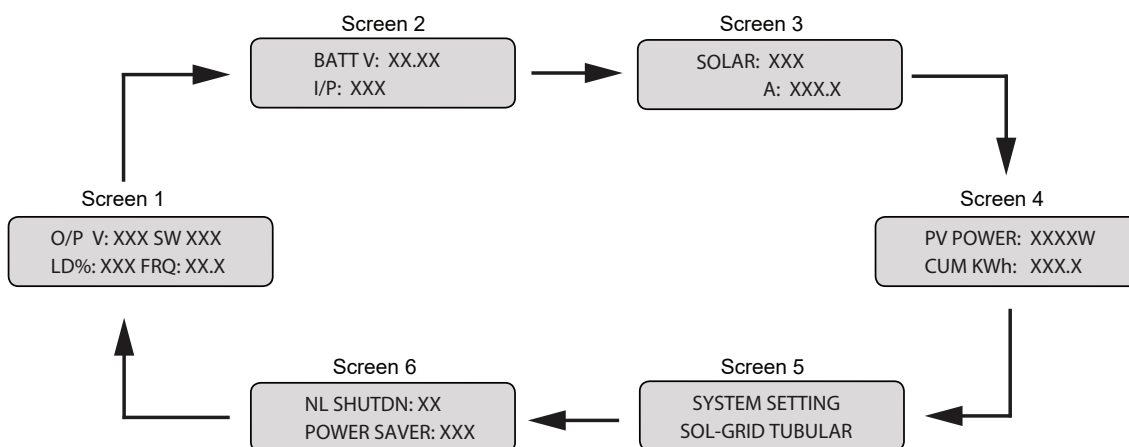
# MS-RE Solar Inverter

## Display Parameter: MS-RE 2

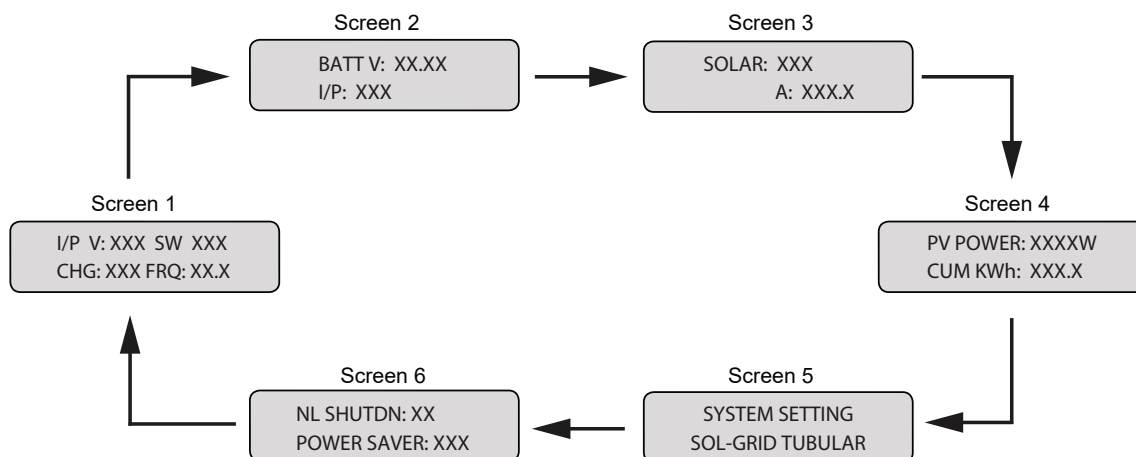
### Power On Screen



### UPS Mode Screen Loop



### Mains Mode Screen Loop

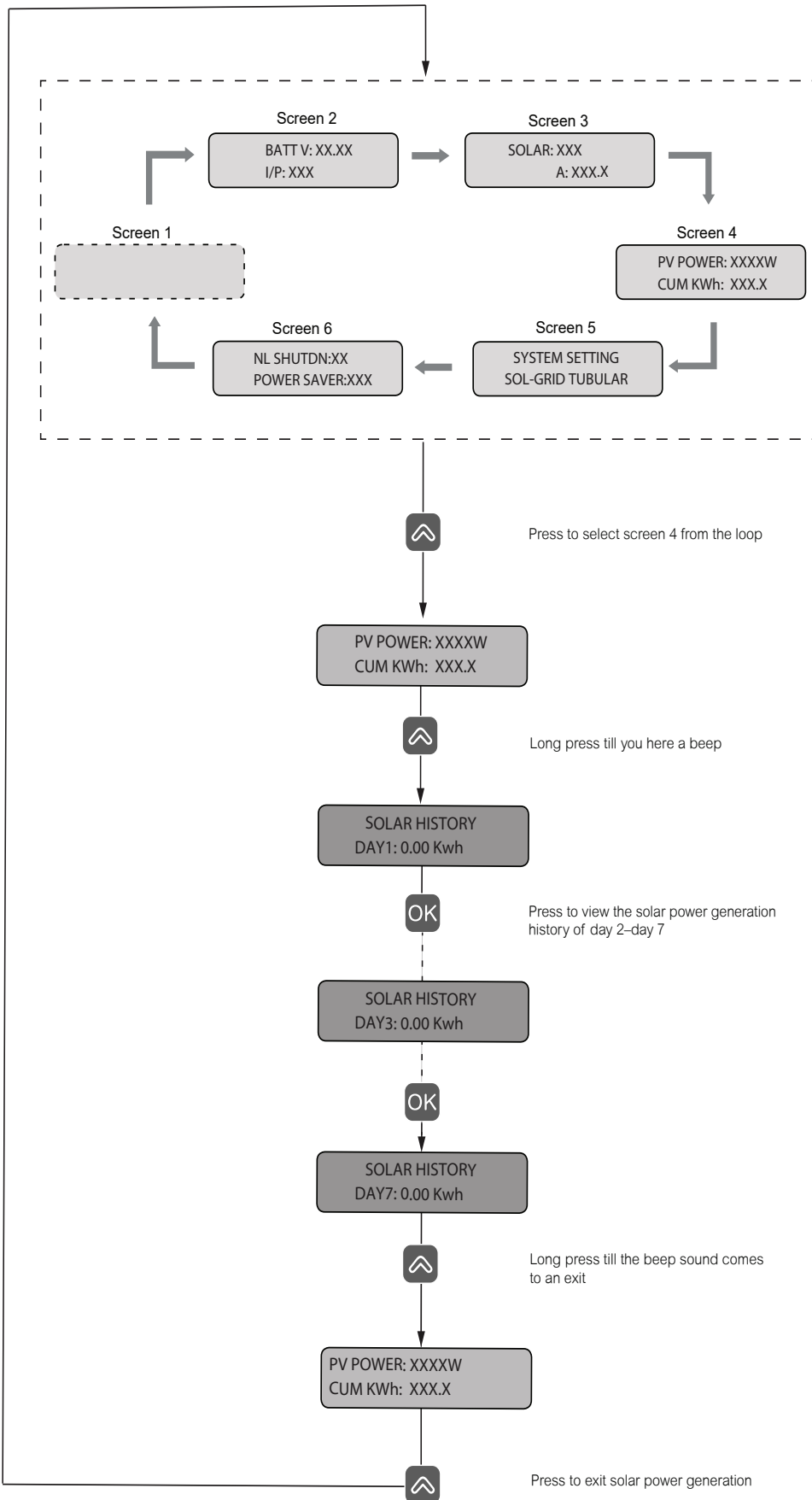


- BATT:** Battery
- I/P V:** Grid input voltage
- A:** Ampere
- PV POWER:** Solar power
- CUM KWh:** Cumulative solar energy
- SOL-GRID:** Selected charging mode (Solar-Grid)
- NL SHUTDN:** No load shutdown
- O/P V:** AC output voltage
- SW:** ON-OFF switch
- LD %:** Load percentage
- FRQ:** Output AC frequency
- FL:** Grid input fail



# MS-RE Solar Inverter

## Solar Generation History

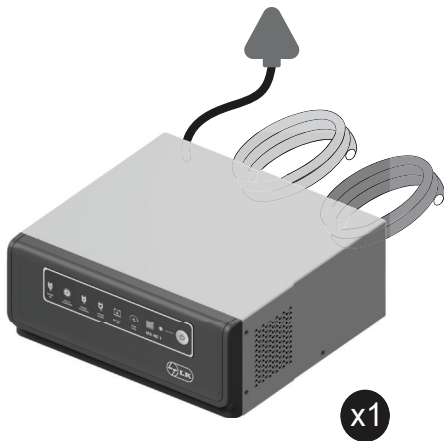


- BATT:** Battery
- I/P V:** Grid input voltage
- A:** Ampere
- PV POWER:** Solar power
- CUM KWh:** Cumulative solar energy (Solar-Grid)
- SOL-GRID:** Selected charging mode (Solar-Grid)
- NL SHUTDN:** No load shutdown
- O/P V:** AC output voltage
- SW:** ON-OFF switch
- LD %:** Load percentage
- FRQ:** Output AC frequency
- FL:** Grid input fail

# MS-RE Solar Inverter

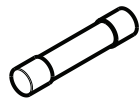
## Packaging Contents and Product Dimensions

### MS-RE 1 Solar Inverter



MS-RE 1 Solar inverter

x1



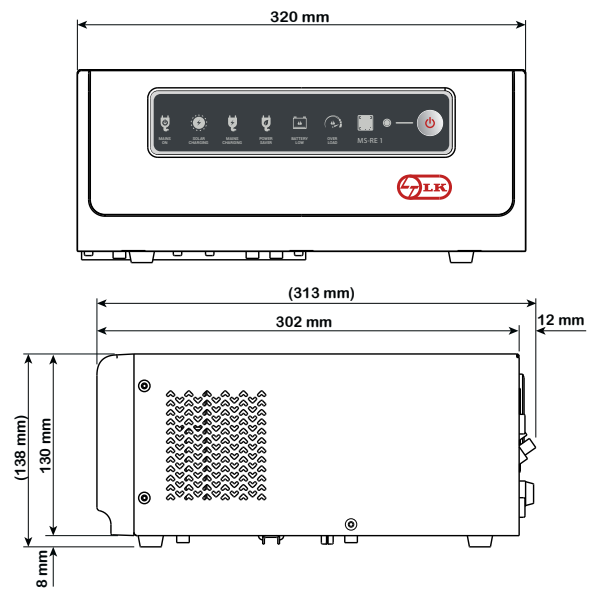
Spare fuse (10 A)

x1

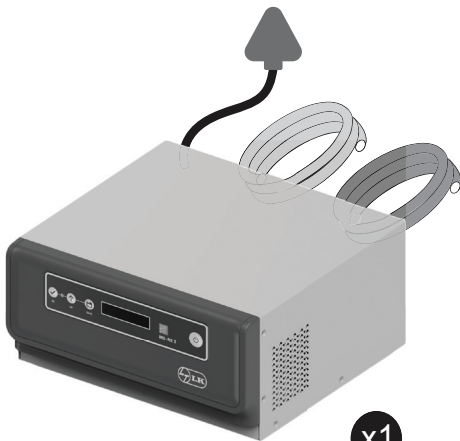


Warranty card

x1

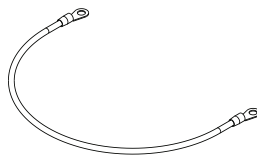


### MS-RE 2 Solar Inverter



MS-RE 2 Solar inverter

x1



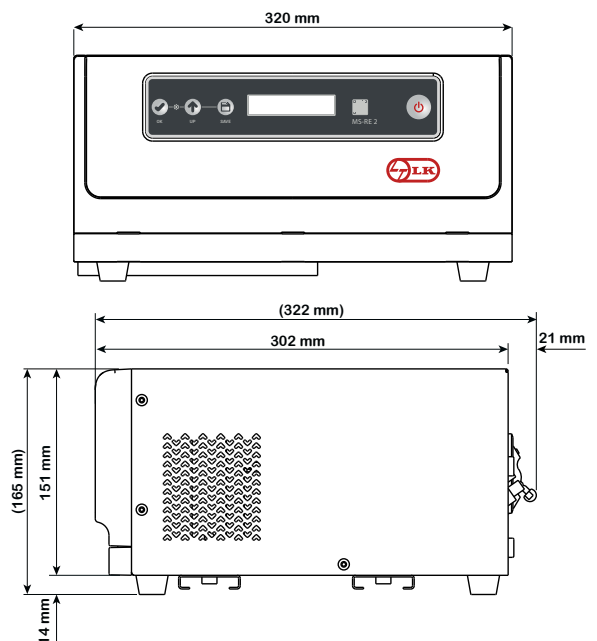
Battery Jointer Cable

x1



Warranty card

x1



**NOTE:** Battery, solar panel and AC input socket are not included in the package.

## Unpacking and Placement

On receiving the MS-RE Solar Inverter, unpack the inverter and check for physical damages that may have occurred to the inverter during transport. Also, ensure the warranty card is available in the package.

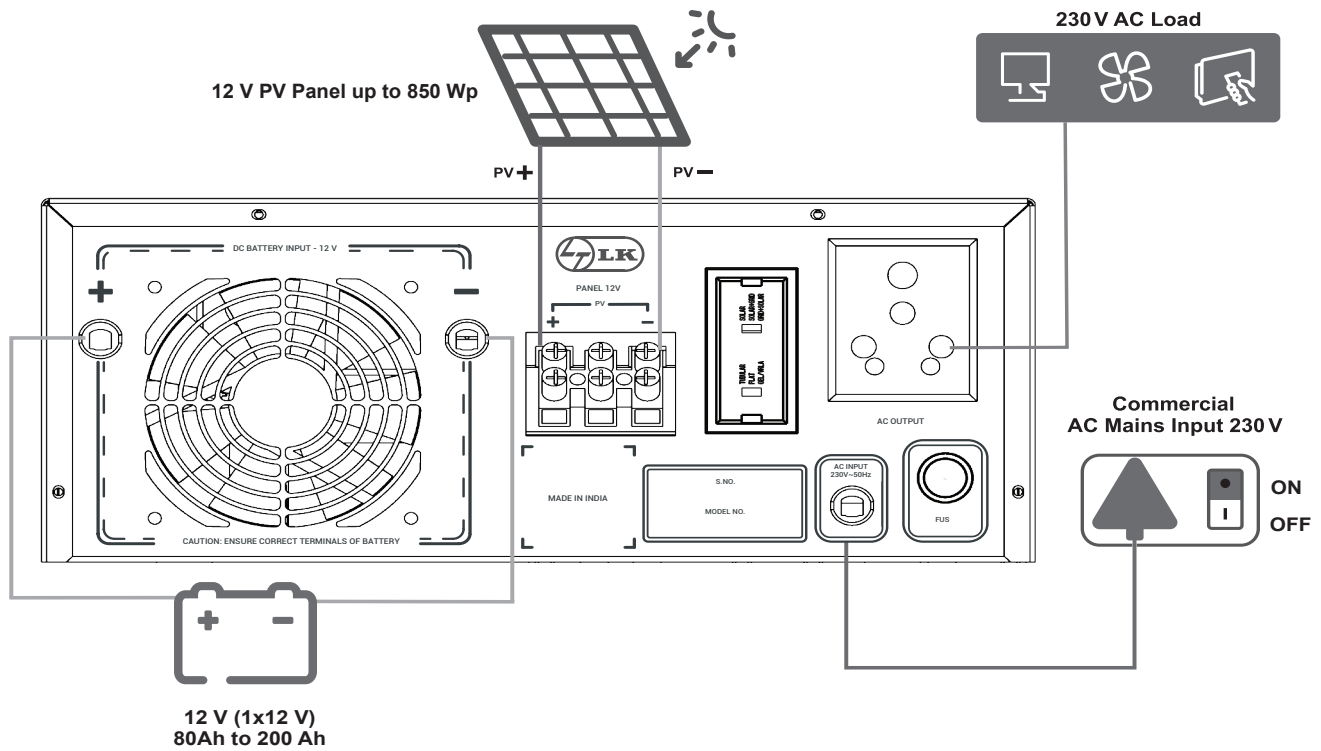
After unpacking the MS-RE Solar Inverter, ensure:

- The mains power input cable of the solar inverter is fixed by a LTLK approved installer.
- The battery connector cables from the solar inverter is fixed by a LTLK approved installer.
- The date of installation and seal of the installer is mentioned on the warranty card.

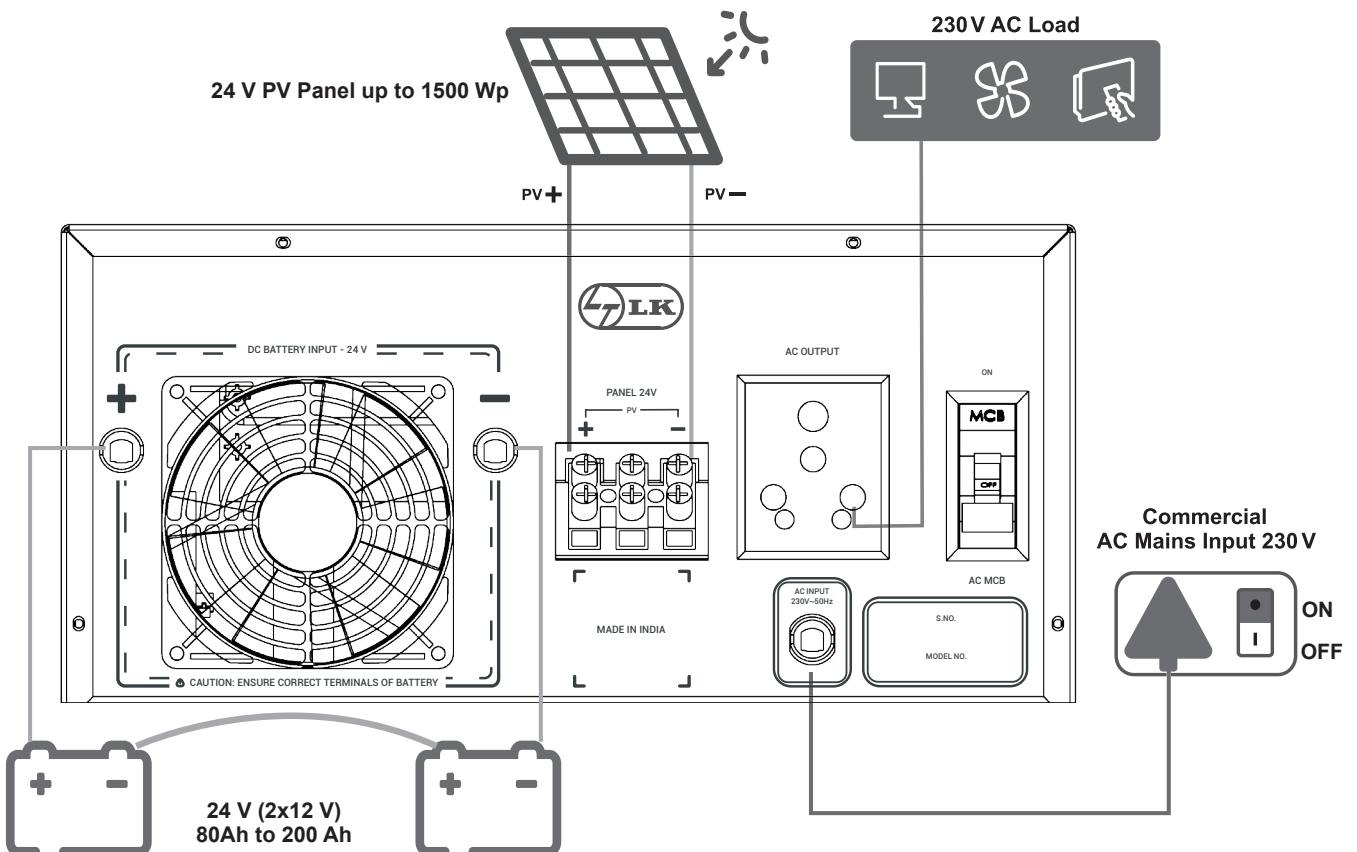
Place the MS-RE Solar Inverter in an area that is protected from dust, water, heat, humidity, and away from flammable objects. Avoid inclined planes for installation.

# MS-RE Solar Inverter

## Product Typical Installation: MS-RE 1



## Product Typical Installation: MS-RE 2



# MS-RE Solar Inverter

## Battery Installation

### Installation Diagrams

#### NOTE

Battery connections should be performed by qualified personnel with appropriate training. No responsibility is assumed by LTLK for consequences arising due to noncompliance.

#### **⚠ ⚠ DANGER**

##### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Ensure correct polarity of batteries are connected to the terminals.

**Failure to follow these instructions will result in death or serious injury.**

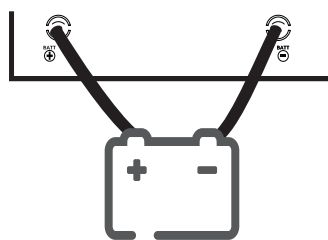
#### **⚠ ⚠ DANGER**

##### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

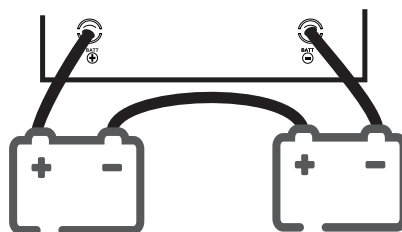
- Follow safe electrical work practices while connecting the battery cable to the battery post to avoid short circuit.
- Battery terminals and thimble has to be cleaned and correctly fastened to avoid false indications of battery charge, and low battery trips.

**Failure to follow these instructions will result in death or serious injury.**

### Battery connection with MS-RE 1 Solar Inverter

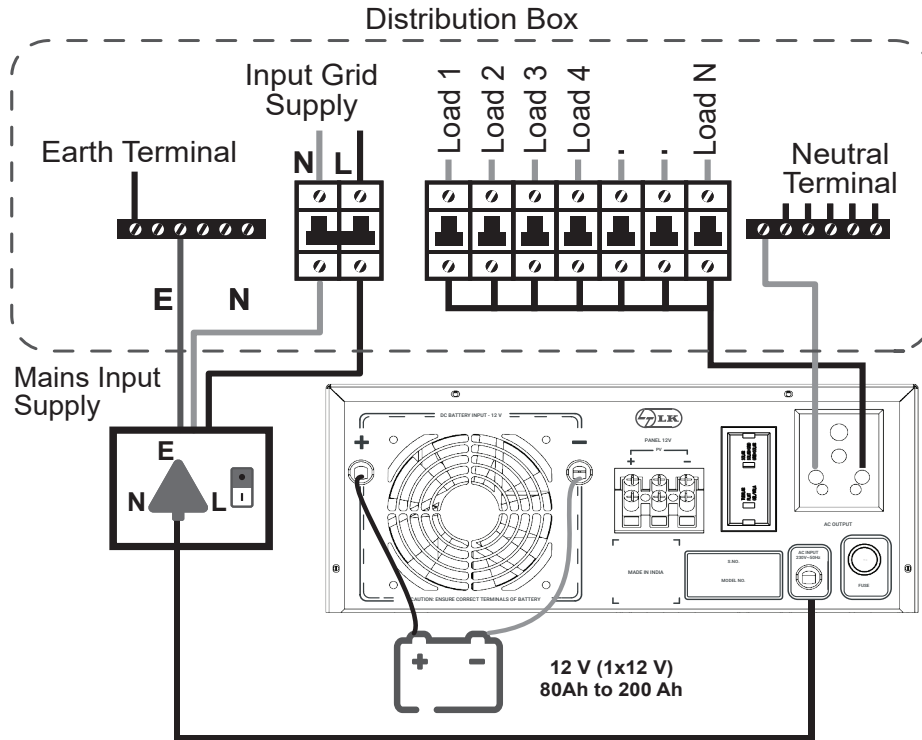


### Battery connection with MS-RE 2 Solar Inverter



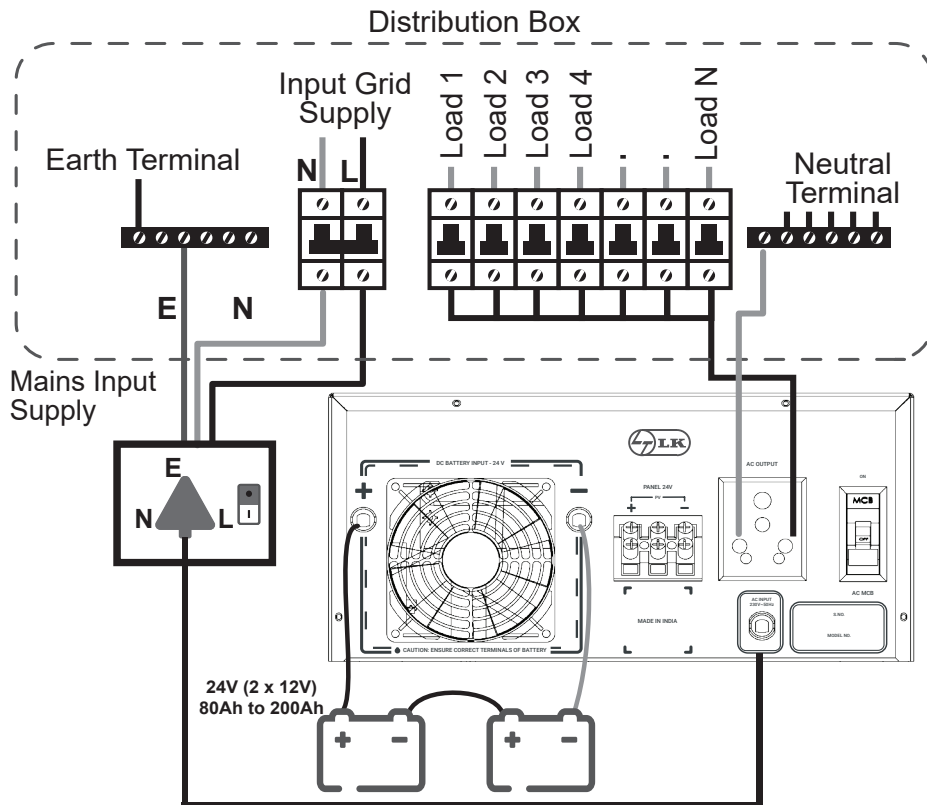
# MS-RE Solar Inverter

## Connection Diagram with Grid supply for MS-RE 1 Solar Inverter



**Load Connection (should not be greater than system capacity)**

## Connection Diagram with Grid supply for MS-RE 2 Solar Inverter



**Load Connection (should not be greater than system capacity)**

# MS-RE Solar Inverter

## Installation Steps

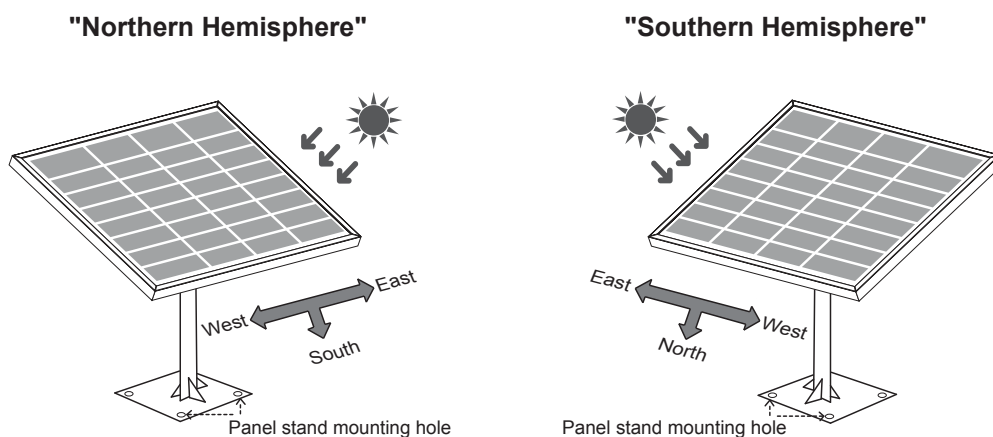
- Switch OFF the power supply to the distribution point where the MS-RE Solar Inverter has to be connected.
- Check the building wiring.  
**NOTE:** Improper wiring may not prevent the MS-RE Solar Inverter from operating but may limit its protection capability. Also, improper building wiring may result in equipment damage that is not covered under warranty.
- Connect the battery/batteries to the inverter as per the polarity.
- Switch ON the front switch and measure the output voltage at the output socket to ensure it is as per the specification and switch OFF the MS-RE Solar Inverter.
- Connect the load wire to the line point (right hole) of the output plug and insert the output plug into the socket located on the rear panel of inverter.
- Switch ON the front switch of the MS-RE Solar Inverter.
- Gradually apply load on MS-RE Solar Inverter.
- Connect input wires to the commercial mains socket.

**NOTE:**

Reconfigure the battery type and mode selection whenever the battery is disconnected and reconnected.

# MS-RE Solar Inverter

## Recommended Solar Panel Mounting Orientation



Always Keep in Mind for Best Performance and Safety	
Panel direction	True south
Panel angle tilt	As per site latitude
Panel to inverter wire length	Up to 10 meters
Panel installation area	Outdoor without any shadow
Panel maintenance	Regular washing with clean water
Battery installation area	Well ventilated, away from flame
Panel Wire Size	
500 Wp panel of 12 V	6 sq. mm
850 Wp panel of 12 V	10 sq. mm
1100 Wp panel of 24 V	6 sq. mm - 10 sq. mm
1500 Wp panel of 24 V	10 sq. mm - up to 16 sq. mm

## Solar Panel and Battery Selection Chart

Inverter Model	Solar Panel		Battery		Approx. Roof Top Area Required (Sq. ft)
	Wp	Configuration	Ah	Configuration	
MS-RE 1	105Wp * 2 No.	2 in parallel	100Ah * 1 No.	-	25
	170Wp * 2 No.	2 in parallel	150Ah * 1 No.	-	35
	170Wp * 3 No.	3 in parallel	200Ah * 1 No.	-	50
	105Wp * 4 No.	4 in parallel			40
MS-RE 2	300Wp * 2 No.	2 in parallel	100Ah * 2 No.	2 in Series	60
	330Wp * 2 No.	2 in parallel	150Ah * 2 No.	2 in Series	70
	330Wp * 3 No.	3 in parallel	200Ah * 2 No.	2 in Series	100

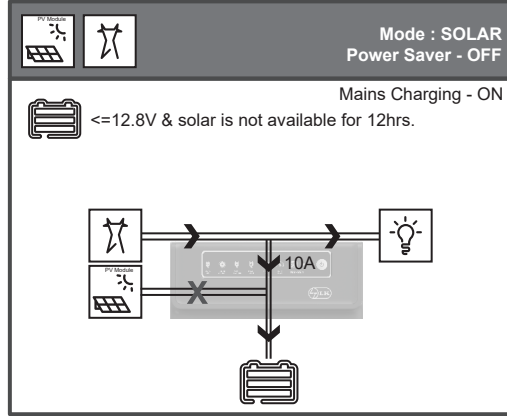
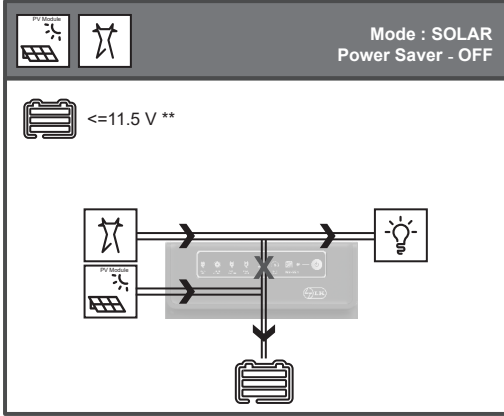
**NOTE:**

Minimum recommended configuration, user can customize within the specified maximum limit depending on energy needs and local availability of solar panel and battery.

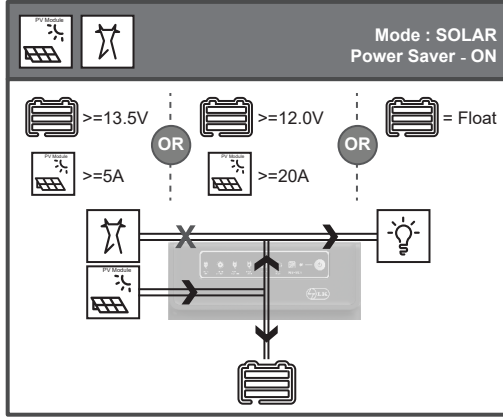
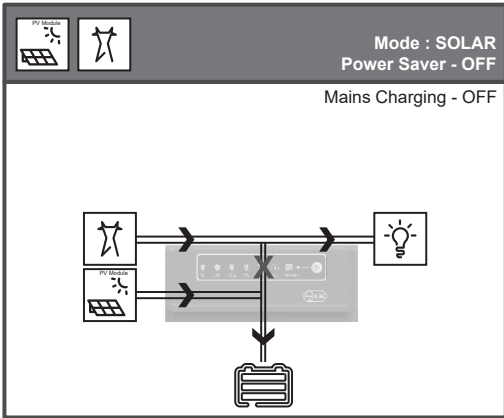
# MS-RE Solar Inverter

## Power Flow Diagrams for MS-RE 1 Solar Inverter

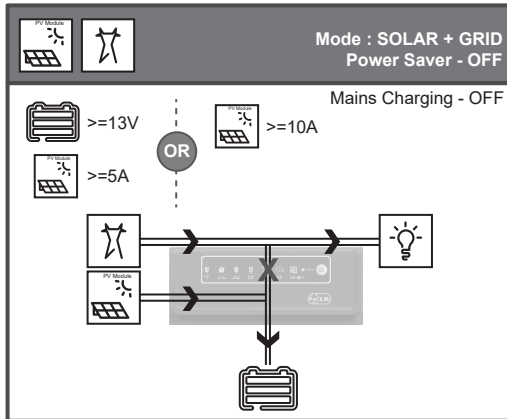
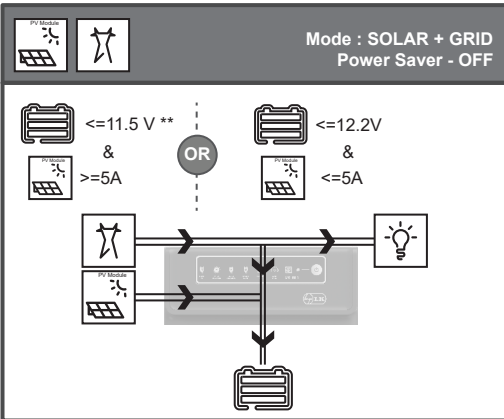
### Solar Mode



\*\*In case of a tubular battery under power saver OFF condition, battery is less than or equal to 11.0 V.



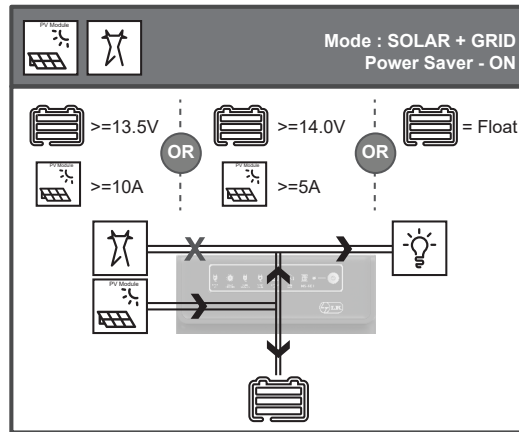
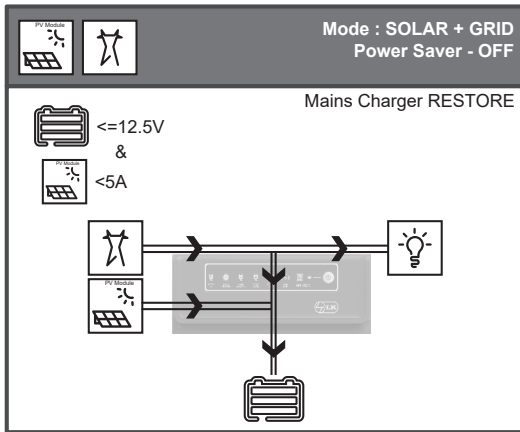
### Solar + Grid Mode



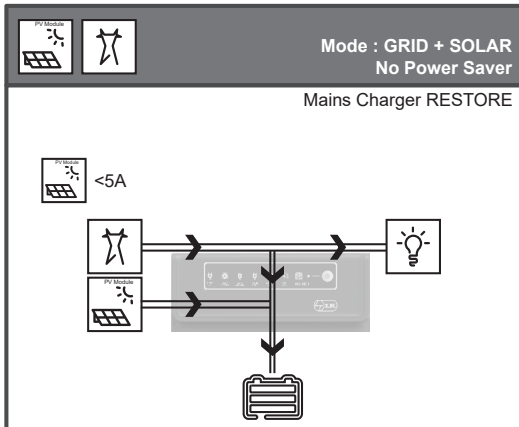
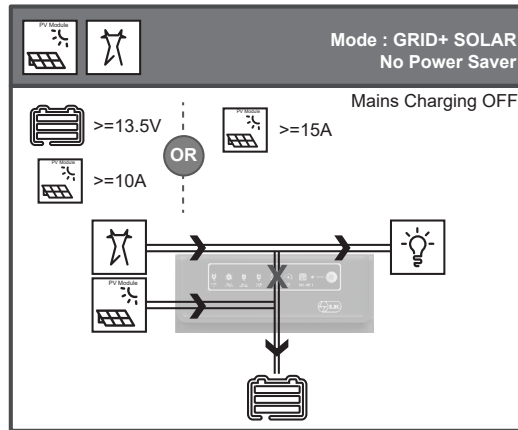
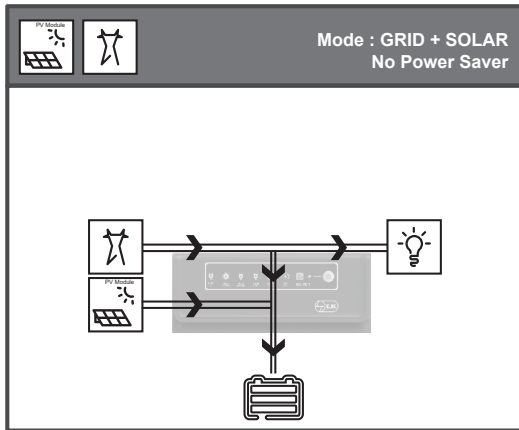
\*\*In case of a tubular battery under power saver OFF condition, battery is less than or equal to 11.0 V.



# MS-RE Solar Inverter



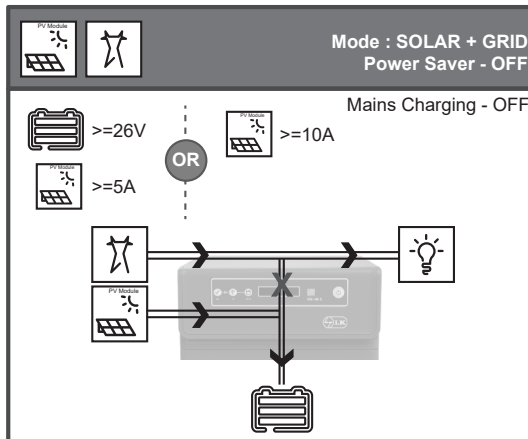
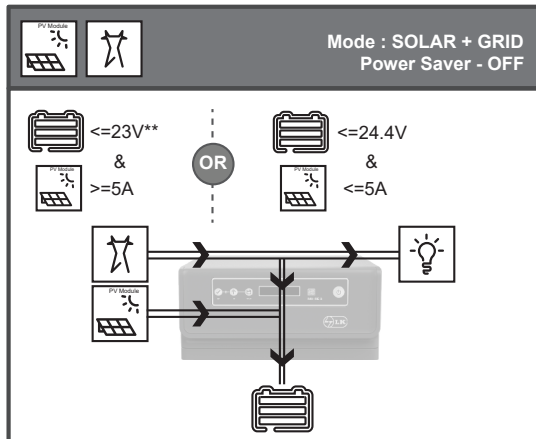
## Grid + Solar Mode



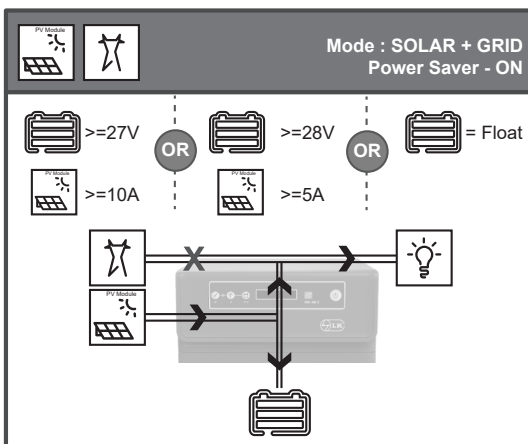
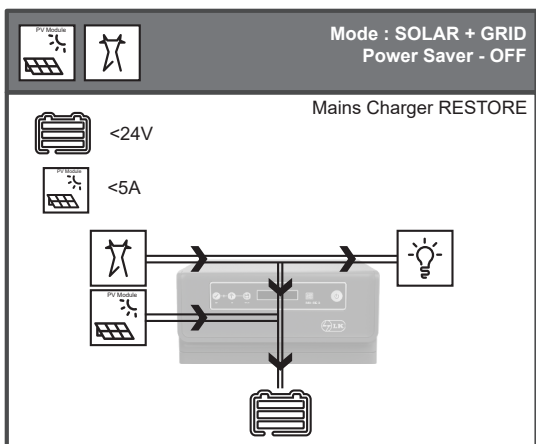
# MS-RE Solar Inverter

## Power Flow Diagrams for MS-RE 2 Solar Inverter

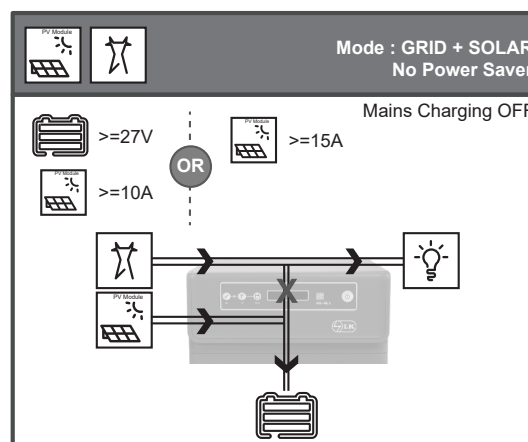
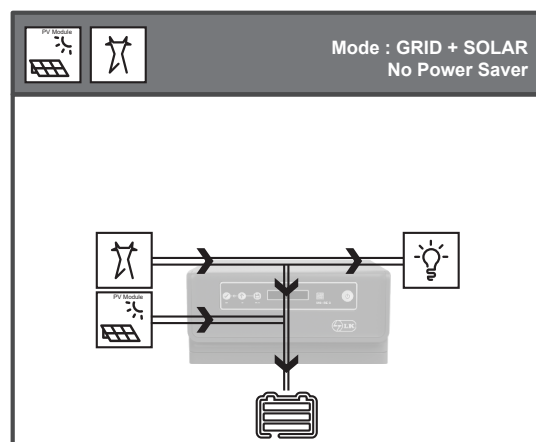
### Solar + Grid Mode



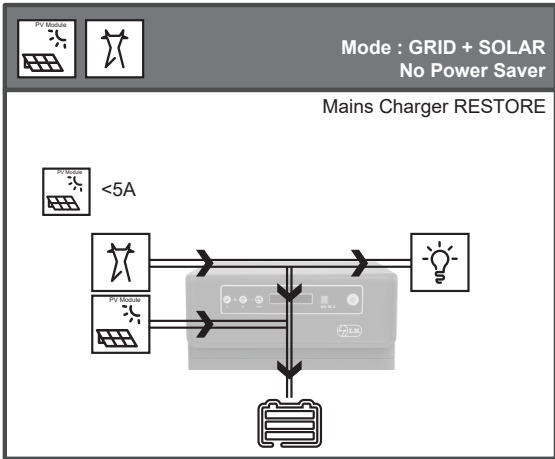
\*\*In case of a tubular battery under power saver OFF condition, battery is less than or equal to 22.0 V.



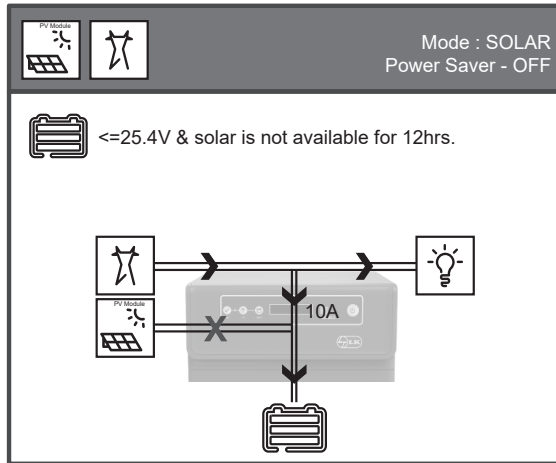
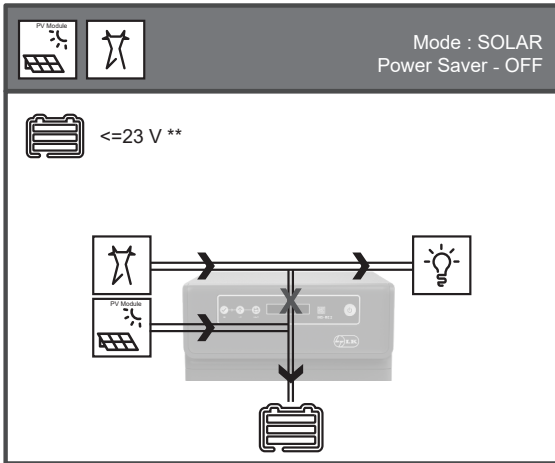
### Grid + Solar Mode



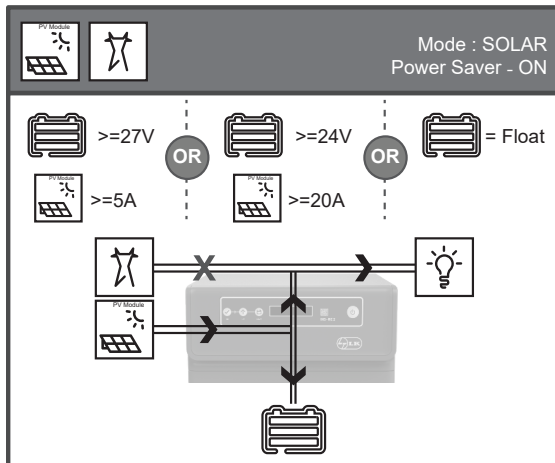
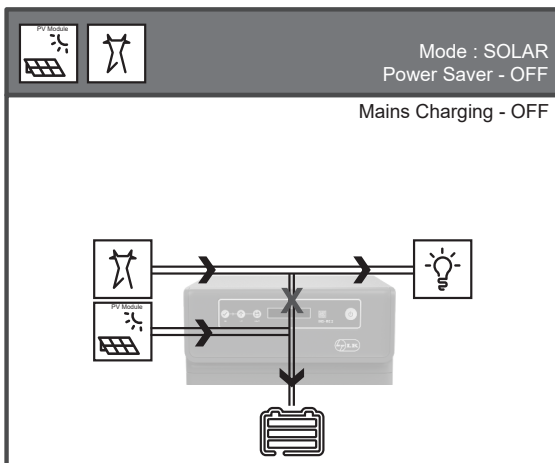
# MS-RE Solar Inverter



## Solar Mode



\*\*In case of a tubular battery under power saver OFF condition, battery is less than or equal to 22.0 V.



# MS-RE Solar Inverter

## Troubleshooting

### MS-RE 1 Solar Inverter

Problem	Possible Cause (s)	Action Recommended
The mains supply is normal but: <ul style="list-style-type: none"> <li>■ The <b>Mains ON</b> indicator is OFF. The solar inverter is either working on battery (<b>Mains ON</b> indicator is glowing) or battery has exhausted (<b>Battery Low</b> is glowing).</li> </ul>	Line cord plug is not connected correctly.	Connect the line cord plug correctly.
	Dead wall socket.	Check the socket.
	Mains input voltage is out of range.	Wait for mains to normalize.
The <b>Mains ON</b> indicator is glowing, but no output is available.	Output plug is not connected correctly.	Connect the output plug correctly.
	Output relay is not working.	Contact your system installer.
No output. In the battery mode, all indicators are OFF but the <b>Battery Low</b> LED glows.	The battery is discharged from recent use.	Recharge the battery after mains restoration or by solar during daytime.
	The battery connections are disconnected or corroded.	Check and clean all battery connections.
In the battery mode, all indicators are OFF but the <b>Over Load</b> LED is ON.	The solar inverter has tripped due to an overload condition.	Reduce the load and then switch OFF and switch ON (on the front panel) the inverter once.
Backup not satisfactory with PV connected.	PV wire is not connected correctly to the input terminal.	Connect the PV wires to the correct terminals with correct polarities as per the markings.
	PV panel position is not as recommended.	Remount the PV panel with correct angle of tilt and position.
	PV panel rating is not adequate.	Contact dealer.

### MS-RE 2 Solar Inverter

Problem	Possible Cause (s)	Action Recommended
The mains supply is normal but: <ul style="list-style-type: none"> <li>■ The <b>Mains ON</b> indicator does not display on LCD. The solar inverter is either working on battery or battery has exhausted (<b>Battery Low</b> is glowing).</li> </ul>	Line cord plug is not connected correctly.	Connect the line cord plug correctly.
	Dead wall socket.	Check the socket.
	Mains input voltage is out of range.	Wait for mains to normalize.
In the battery mode: <ul style="list-style-type: none"> <li>■ Display indicates battery low</li> <li>■ Display indicates over temperature protection</li> </ul>	The battery is discharged from recent use.	Recharge the battery after mains restoration or by solar during daytime.
	The solar inverter has tripped due to overheating condition.	Contact your system installer.
<ul style="list-style-type: none"> <li>■ Display indicates overload protection</li> <li>■ Display indicates short circuit protection</li> </ul>	The solar inverter has tripped due to overload condition.	Reduce the load and then switch OFF and switch ON (on the front panel) the inverter once.
	The solar inverter has tripped due to short circuit.	Reduce the loads and then switch the loads ON one by one. Contact your system installer if the short circuit condition persists.
Backup not satisfactory with PV connected.	PV wire is not connected correctly to the input terminal.	Connect the PV wires to the correct terminals with correct polarities as per the markings.
	PV panel position is not as recommended.	Remount the PV panel with correct angle of tilt and position.
	PV panel rating is not adequate.	Contact dealer.

# MS-RE Solar Inverter

## Protection Screens: MS-RE 2

Display Screen	Possible Cause (s)	Action Recommended
PROTECTION BATTERY LOW	Battery low	Recharge the battery
PROTECTION BATTERY HIGH	Abnormal battery function	Contact installer
PROTECTION OVERLOAD	Inverter overload	Reduce the connected load
PROTECTION SHORT CIRCUIT	Inverter output short circuit	Check the load for short circuit
PROTECTION HIGH TEMPERATURE	High temperature	Contact installer
PROTECTION NO LOAD SHUTDOWN	Inverter shutdown due to no load	Switch ON the inverter
PROTECTION REF ERROR	Reference error	Contact installer
PROTECTION FEEDBACK OPEN	Feedback open	Contact installer
PROTECTION BATT SENSE FAIL	Battery sensing failed	Contact installer
PROTECTION TEMP SENSE FAIL	Temperature sensing failed	Contact installer
PROTECTION SELF CHARGING	-	-
PROTECTION NO CHARGING	-	-
PROTECTION BACK FEED	-	-
SOLAR OVERLOAD	-	Check solar panel configuration
PRE ALARM BATTERY LOW	Battery low	Recharge the battery

# MS-RE Solar Inverter

## Technical Specifications

Product	MS-RE 1	MS-RE 2
Product VA Rating	850 VA	1500 VA
<b>Input</b>		
Battery Voltage	12 V	24 V
Solar Panel	850 Wp, 18 V - 25 V VOC	1500 Wp, 36 V - 60 VOC
<b>Mains Mode</b>		
Mains High Voltage Disconnect	290 V ± 10 V	
Mains High Voltage Reconnect	280 V ± 10 V	
Mains Low Voltage Disconnect	90 V ± 5 V	
Mains Low Voltage Reconnect	105 V ± 5 V	
<b>Battery Voltage During Charging</b>		
Battery Boost Voltage	14 V ± 0.2 V	29.2 V ± 0.2 V
Battery Float Voltage	13.60 V ± 0.2 V	27.2 V ± 0.2 V
<b>Mains Charging Current (Solar Mode)</b>		
Battery Charging	0A*	0A**
<b>Maximum Mains Charging Current (Solar + Grid Mode)</b>		
Battery Charging	15 A ± 2 A	
<b>Maximum Mains Charging Current (Grid + Solar Mode)</b>		
Battery Charging	20 A ± 2 A	
<b>Output (Inverter Mode)</b>		
No Load Output Voltage	230 V ± 10 V	
Output Frequency	50 Hz ± 0.5 Hz	
Output Waveform	Sine wave	
Overload	> 105%	> 102%
Protections	Short circuit, Overload, High temperature, Low battery	
<b>Front Panel Display Indication</b>		
Switch ON indication	<b>System ON</b> LED steady	-
Low Battery Pre Alarm Indication	<b>System ON</b> LED steady + <b>Battery Low</b> LED blinking	-
Low Battery Indication	<b>Battery Low</b> LED steady	-
Mains ON Indication	<b>Mains ON</b> LED steady	-
Charging ON Indication	<b>Mains ON</b> LED steady + <b>Mains Charging</b> LED steady	-
Battery Charged Indication	<b>Mains ON</b> LED steady + <b>Mains Charging</b> LED OFF	-
Overload Indication	<b>Over Load</b> LED steady	-
Short Circuit Indication in UPS Mode	<b>Over Load</b> LED blinking/ <b>Mains ON</b> and <b>Over Load</b> LED blinking	-

# MS-RE Solar Inverter

Product	MS-RE 1	MS-RE 2
<b>Front Panel Display Indication</b>		
Thermistor Open/Short Indication	<b>Mains ON LED and Over Load LED steady</b>	-
Output Feedback Open/Reverse	<b>Mains ON LED and Over Load LED blinking</b>	-
DC Over Voltage Indication	<b>Mains ON LED and Mains Charging LED blinking</b>	-
Battery Charging Through Solar	<b>Solar Charging LED blinking</b>	-
Mains Power Saving Mode***	<b>Power Saver steady + Solar Charging LED blinking/steady</b>	-
Battery Charging Through Solar + Mains	<b>Mains ON LED ON + Mains Charging LED steady + Solar charging LED blinking</b>	-
NO Load Shutdown	<b>System ON LED blinking</b>	-
Solar Over Current	<b>Solar Charging LED blinking faster</b>	-
<b>Buzzer Sound Indication</b>		
System ON	2 beeps	
Pre-Alarm ON	1 Beep at every 30s interval	
Battery Low	10s steady beep	
Overload	10s steady beep	
Short Circuit	10s steady beep	
DC Over Voltage	Beeps every second	
Output Feedback Open/Reverse	10s steady beep	
Mains to UPS Change Over	2 beeps	
<b>User Selectable Switches</b>		
Battery Type	Tubular/Flat/Gel or VRLA	
Mode Selections	Solar/Solar+Grid/Grid+Solar	
No Load Shutdown	-	Enable/Disable
<b>Physical</b>		
Net Weight (Kg.)	12.1 Approx.	16.8 Approx.
Gross Weight (Kg.)	13.3 Approx.	18.2 Approx.
Dimensions (LxWxH) (mm)	320x313x138 mm	320x322x165 mm
<b>Environmental</b>		
Operating Temperature	0 - 45 °C (32 - 104 °F)	0 - 45 °C (32 - 104 °F)
Humidity	0 - 95 % RH non-condensing	0 - 95 % RH non-condensing

\* In case the inverter is in Battery Low (**Battery  $\leq$  12.8 V**) and solar energy is not available for 12 hours then the mains charge will remain at 10 A until solar is restored.

\*\* In case the inverter is in Battery Low (**Battery  $\leq$  25.4 V**) and solar energy is not available for 12 hours then the mains charge will remain at 10 A until solar is restored.

\*\*\* The power saver mode is activated only in Solar and Solar+Grid mode with the front switch ON.

