ASHAPOWER
INNOVATING TOMORROW

SOLAR MPPT ESS

BATTERY	INVERTER	MPPT	GRID CHARGER
51.2V/30AH(1.5KWH)	1.5KVA/1200W	40AMP/165Voc 1500W PV PANEL	Max.8 AMP

MODEL: SOLAR MPPT ESS 1548

HIGH PERFORMANCE WITH LOW ENERGY CONSUMPTION

- *Pure Copper transformer with high grade lamination*
- *Inbuilt Lithium Ferrophosphate (LiFePO4) battery*
- *70 Micron High grade PCB*
- *PV Panel Voc upto 165 Volt*
- *0.8 Constant output power factor(1500VA = 1200W max.O/P load)*
- *Constant output Voltage(222V) even on heavy loads*
- *Charging Priority control facility*
  Grid charging ON-OFF control,
  Grid priority,Solar priority
- *Maximum MPPT tracking Efficiency up to 98.9%*
- *Pick & Place type circuit Design for quick service and upgradation*
- *User configurable Function settings*
- *Kwh (Unit) based load shifting facility*
- *High PV Panel load capacity*

USER MANUAL **Vers.6.3**

ASHAPOWER

HIGH PERFORMANCE WITH LOW ENERGY CONSUMPTION

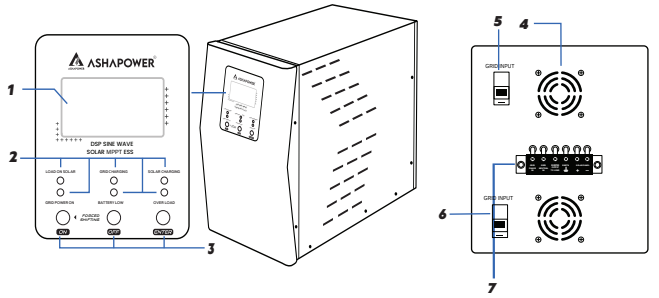
Thank you for purchasing **ASHAPOWER SOLAR MPPT ESS.** It is a premium quality solar energy saver for home/office having connected load of fans LED lights,TV, computer, refrigerator, laser printer, and a low HP induction motor pump when used with 1500 watts solar PV panels.The integration of a highly efficient MPPT SCC (165Voc/40AMP), 1.5KVA DSP sine wave inverter with high power grid charger and easy customer control over function settings makes it unique in its class.

UNIQUE FEATURES

- High power inverter and MPPT integration
  165Voc-40Amp-1500kw PV load and 1.2Kw Inverter combination assure continuous load operation without disturbance to batteries
- CRGO Laminated Pure Copper Transformer
  Ensure minimum no load DC current (0.8 PF) and saves generated solar power
- Constant noise free DSP pure sine wave output
  Ensures best life and flicker free working of digital equipments
- User selectable solar priority and grid priority charging modes
  Helps customer to select charging mode as per the power conditions of the site
- Customer control over grid charging ON/OFF option.
  Blocks battery charging from grid power saving electricity
- Large 4Line multifunctional LCD front panel display
  Gives detailed and clear system information at a look
- Soft front panel all function control switches
  Helps easy finger tip system control and function settings
- Standby zero grid power consumption
  Once the battery is fully charged frequent relay controlled isolation of grid power from charging transformer ensures standby zero grid power consumption saving electricity
- Intelligent true multi stage smart solar and grid charging
  Bulk,Absorption,Float (User selectable battery charging voltage)
  Ensures prolonged battery backup and life
- Battery grid charging even at low grid voltage
  Suitable for places with low grid voltage areas
- High over load and surge load handling capacity
  Trouble free running of loads with initial heavy input surge
- MCB short circuit protection for grid power
  Ensures system safety and avoids frequent fuse changing
- Over load,surge and short circuit protection
  Protection for internal component failure
- Unique ZMPT based isolated grid sensing
  Reduces chances of MOSFET failure on lightning and external surges
- Forced grid to solar mode shifting facility
  Helps customer to use maximum harvested solar energy

KNOW YOUR DEVICE

ASHAPOWER SOLAR MPPT ESS MODEL : ESS 1548



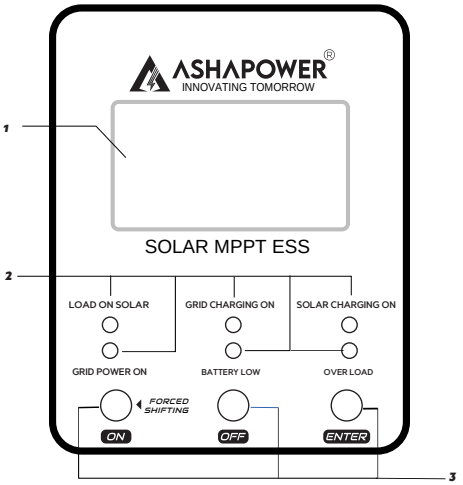
1	4x16 LCD DISPLAY
2	LED INDICATORS
3	FUNCTION KEYS
4	COOLING FAN
5	AC MAINS MCB
6	BATTERY MCB
7	CONNECTION TERMINAL BLOCK

SOLAR MPPT ESS GENERAL SPECIFICATIONS

MODEL: ESS 1548

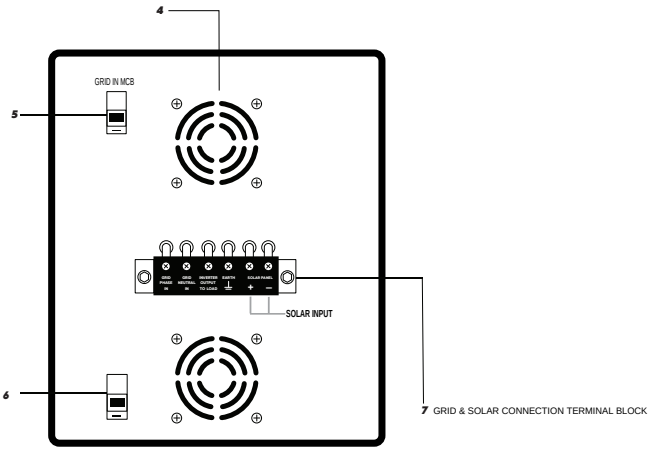
Nominal Battery Voltage	51.2V
Max. Applicable PV Panel Load on MPPT	1500WP/2000WP
Max. Applicable PV Panel Voc	165VOC/110VOC
Maximum solar Charging Current	40Amps (selectable)
Solar MPPT battery charging stages	Bulk-Absorption-Float
Maximum MPPT tracking efficiency	98.9%
No load battery Power Consumption	0.7AMP ±.3
Grid power battery charging stages	Bulk,Absorption,Float
Maximum grid battery charging current	4 AMP TO **8** AMP **(selectable)**
Standby grid Power Consumption	Zero at idle stage
Humidity	0 to 90% RH (No dew)
Operating temperature	-20 degree to 65 degree C
Storage temperature	-30 degree to 80 degree C
Overload Protection From PV Panel	YES
Over Charge Protection from grid and solar	YES
Panel Reverse Polarity Protection	YES
Dimensions – L x W x H (cm)	56x44x22.5cm
Net Weight (Kgs) / Gross Weight (Kgs)	38kg/40kg
Connectors	6Way Input/Output Terminal block
Display	4line LC Display

FRONT PANEL INDICATIONS



1	4x16 LCD DISPLAY
2	LED INDICATORS
3	FUNCTION KEYS

BACK PANEL CONNECTORS

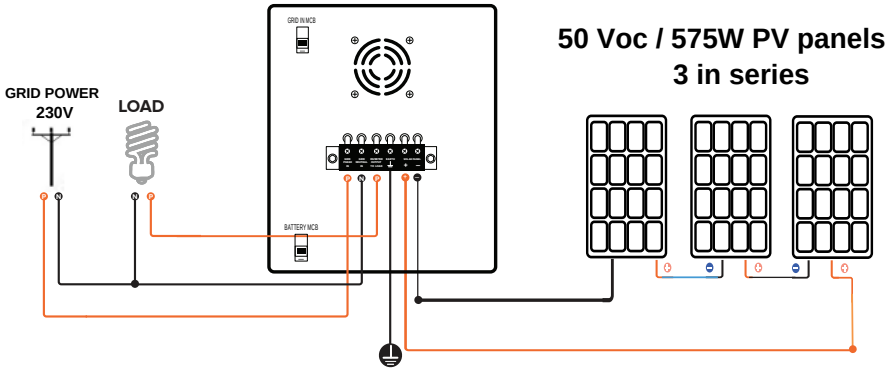


4	COOLING FAN
5	GRID POWER MCB
6	BATTERY MCB
7	CONNECTION TERMINAL BLOCK

ASHAPOWER SOLAR MPPT ESS MODEL : ESS 1548

CONNECTION DIAGRAM

EXAMPLE FOR PV PANEL GROUPING



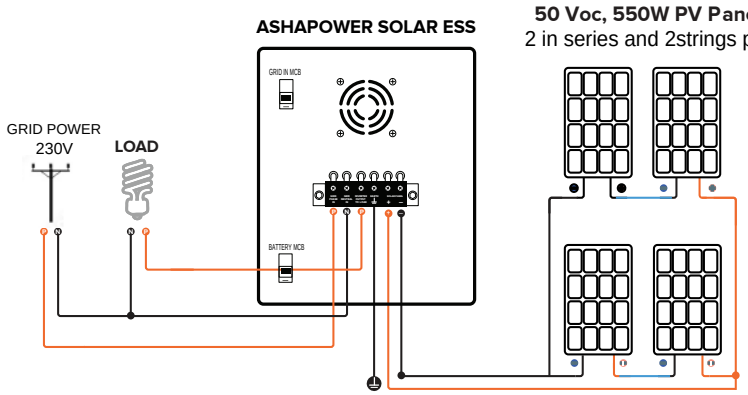
Total PV Panel Voc	150V
Total PV Panel Load	1725W

Inbuilt with Lithium FerroPhosphate Battery

Max PV.Panel Applicable in Watts : 1500W If Voc 165V

Max PV.Panel Applicable in Watts : 2000W If Voc below 110V

EXAMPLE FOR PV PANEL GROUPING



Total PV Panel Voc	100V
Total PV Panel Load	2200W

Inbuilt with Lithium FerroPhosphate Battery

Max PV.Panel Applicable in Watts : 1500W If Voc 165V

Max PV.Panel Applicable in Watts : 2000W If Voc below 110V

ASHAPOWER SOLAR MPPT ESS MODEL : ESS 1548

INVERTER (BATTERY) MODE PARAMETERS

Inverter Output Volage	222Volt
Inverter Output Wave form	DSP pure sine wave
Inverter Power factor	0.8
Inv Output Frequency	50 Hz
Inverter Surge Rating for 3 Second	200 %
Battery high voltage trip	68 Volt
Battery Low Warning Level	49.6 Volt
Battery Low Trip Level	48 Volt
Overload Warning Level	95 %
Overload Trip Level	100 %
Inverter mode audio alarm	Buzzer beep

AC MAINS MODE PARAMETERS

Grid input voltage range	100V-280V Volt
Grid input requency	50 Hz
Typical transfer time	≤20m second
Mains detection delay	10 Seconds
Input mains high cut voltage (Wide input)	280V (Selectable)
Input mains low cut voltage (Wide input)	80V (Selectable)
Input mains high restore voltage (Narrow input)	270V
Input mains low restore voltage (Narrow input)	180V
Input mains high cut voltage (UPS mode)	270V (Selectable)
Input mains low cut voltage (UPS mode)	190V (Selectable)

GRID (AC MAINS) MODE BATTERY CHARGING PARAMETERS

Battery Charging Algorithm	Bulk, Float
Constant Charging Current	6 AMP (Selectable)
Solar /Grid Priority	Solar priority (default)
Float Charging Voltage	3.4VX16 cells = 54.4V Volt
Battery Bulk charging voltage	3.44VX16 cells = 55.04V
Float Charging Voltage	3.4VX15 cells = 54.4V Volt
Battery Bulk charging voltage	3.44VX15 cells = 51.6V

MPPT SOLAR CHARGING CURRENT PARAMETERS

MPPT Max Voc	165 Volt
MPPT Max PV Panel load	1600wp
MPPT Max Output Current	40 AMP
Battery Charging Algorithm	Bulk,Absorption,Float
Default solar float charging voltage	3.38VX16 cells = 54.08V
Default solar Absorption charging voltage	3.4VX16 cells = 54.4V
Default solar Bulk charging voltage	3.44VX16 cells =55.04V
Default solar float charging voltage	3.38VX15 cells = 50.7V
Default solar Absorption charging voltage	3.4VX15 cells = 51V
Default solar Bulk charging voltage	3.44VX15 cells =51.6V

LED INDICATIONS

Grid power presence	Red Grid power LED ON
Solar charging	Blue LED ON and steady
Battery grid charging	Yellow Grid Charger LED ON
INV Stand by on Mains	Green Inverter ON LED Blink
INV load on Battery	Green Inverter ON LED steady
Over load Warning	Red Overload LED ON
Overload Trip	Red Battery low LED ON
Battery Low Warning	Red Battery low LED ON
Solar ready (load on solar)	Green load on solar LED ON and steady (Red grid power ON LED blinking)

LCD DISPLAY INDICATIONS

Battery bank Voltage
Mains input Voltage
Inverter output Voltage
Inverter Output Load in %
Battery charging current from grid
Grid bypass status
Inverter ON/OFF Status
Warning Messages Bat low/Overload
Trip Messages
Grid charging ON/OFF status
Solar charging Amp
Solar PV Input Amp
Solar PV Panel voltage

Battery charging/discharging Amp (BAT- A)
Total energy in Kwh from backup (LOD- Kwh)
Solar energy production today (TDY-Kwh)
Total solar energy up to date (SOL-Kwh)

IMPORTANT GENERAL ELECTRICAL SAFETY PRECAUTIONS

1) Never use a flame or any kind of spark producing device near fully charged batteries as it may cause an explosion of the batteries and fire hazard.

2) Maintenance of PV panel array at regular intervals make the solar power system trouble free and fresh.

3) Solar panels should be grouped in such a way that the maximum Open Circuit Voltage (Voc) of the panels connected in series should not exceed the Maximum PV panel voltage recommended for internal Lithium battery.

4) Safety precautions must be taken while grouping and connecting PV panels to the charge controllerwith high Voc input. (500 Volt DC current from the PV panel is highly dangerous. Never touch theterminals without safety glows).

5) Extreme care should be taken while connecting High voltage solar power systems.

6) Earthing and wiring of high power solar system must be done under the supervision of a qualified electrical engineer.

7) Never connect any of the grid line to any of the **DC (PV)** connection terminals.

8) The installation and use must comply with the local safety instructions and standards in force.

9) We disclaim all responsibility and liability for damage, costs or losses resulting from an installationthat does not comply with the instructions, a faulty operation or inadequate maintenance.

10) The use of Solar MPPT ESS is in any case under the responsibility of the customer.

11) This equipment is neither designed nor guaranteed to installations used for vital medical care nor any other critical installation entailing potential risks of damage to people or to the environment.

ASHAPOWER SOLAR MPPT-ESS INSTALLATION & OPERATION GUIDE LINES

MODEL : ESS 1548

1) **PV panel grouping:** Group the PV panel array using standard solar MC4 connectors and parallel connectors as to the recommended grouping example chart provided. Good quality weather proof solar DC cables must be used (6sqmm,10sqmm)

2) Place of Installation : Place the solar Mppt ESS on a fixed stand in a well ventilated area keeping a 6 inch distance from the wall. Avoid exposure to rain, dusty area, direct sun light or in area having high temperature.

4) DCDB / ACDB & Surge protectos : It is recommended to connect DCDB / ACDB & lightning surge protectors in the circuit of off grid power plant, under the guidance of a qualified electrical engineer/electrician for safety and long life of the power plant. Never use substandard electrical materials for wiring. Then connect the battery wires with correct polarity to the connection terminal block of the device (Reverse polarity will spoil the device) LCD display shows battery voltage and default function parameters.

Connect the cables from PV panels to the solar positive and negative terminals of the solar ESS. If the PV panel voltage and polarity is correct then solar charging starts by indicating solar charging LED glowing ON.

When the connected battery voltage reaches GRID to SOLAR preset voltage (default 3.41V) **LOAD ON SOLAR** indicator LED glows ON indicating the battery is nearly full charge and ready to use the connected inverter load.

When phase and neutral of grid power is connected to the concerned grid terminals, GRID POWER ON indicator glows ON.

GUIDE LINES FOR QUICK CUSTOMER SETTINGS AND MAIN TECHNICAL SETTINGS

Quick customer settings menu is provided with 6 options

1) UPS / INVERTER mode ON/OFF selection

2) Grid Charging ON/OFF selection and Grid and solar charging priority selection.

Customer can select grid charging OFF option to avoid all kinds of grid power charging.

Two priority charging options are given.

Solar charging priority and grid charging priority

If **Solar priority** is selected, battery charging will be from solar power.If the battery terminal volt is below the inverter low warning level (3.1 default) grid power is also used for boosting the batteries.
When solar power is not available battery charging will be fully from grid power in 4 amps (default)

If **Grid priority** is selected device charges the battery both from grid and solar power simultaneously giving priority to grid.eg.If the grid charger is preset to 8 amps and solar charging current is available above this value system charges battery drawing10 amps fully from grid power and available current from solar.

3) Grid bypass ON/OFF Selection and Automatic grid to solar shifting selection

Three options are givn. If **BV+PV+GRID** option is selected system shifts to solar mode only if there is the presence of grid supply,high battery terminal volt and solar PV presence.

If **BV+PV** option is selected system shifts to solar mode only if there is the presence of solar PV and high battery terminal volt. If **BV** option is selected system shifts to solar mode whenever the battery terminal volt becomes high from any charging source.

4) Gri - solar-V (grid to solar shifting volt selection)

5) Sol - grid-V (solar to grid shifting volt selection)

6) Sol - grid-Kwh (solar to grid shifting based on Kwh) (for Lithium batteries)

How to enter Quick customer settings menu

Press OFF button on the front panel

Press and hold ENTER button for 3 seconds.Device enters Quick settings mode displaying UPS mode ON/OFF selection option.Cooling fan starts functioning.

Select the required option by pressing ON/OFF button

Press ENTER button again to go to next menu

To exit Quick settings menu go through all menu or keep the device idle for 8 seconds

What is UPS mode in Quick settings menu.

UPS mode is to shift the connected load on inverter from grid power to battery power when grid power drops below 190V.
Fluctuations on grid power badly affect digital equipments as computers.
When the device is used for digital equipments as computers select UPS mode in ON position. In this mode device automatically shifts from grid mode to inverter mode when AC mains voltage drops below 190V preventing frequent computer system restarting.

What is INVERTER mode

In this mode device shifts the load to inverter when the mains voltage drops below 100V

Which mode is better for house hold equipments

If UPS mode is activated in low grid power voltage areas (below 190V) load will be working on battery backup , resulting more grid energy consumption for charging.So it is better to activate INVERTER mode for normal house hold equipments as fans LED lights,mixer grinder washing machines etc.

What is CHARGER ON/OFF in quick settings menu

This option helps the customer to control charging of batteries (ON/OFF) from grid power saving electricity.When solar power availability is weak grid charging option must be kept in ON mode to avoid battery deep discharging.

What is SOL-GRD-Kwh in quick settings menu

When Lithium batteries are connected, solar to grid mode shifting is better to control on the basis of average harvestable units per day instead of battery terminal volt based shifting.

MAIN TECHNICAL SETTINGS GUIDE LINES

How to enter main customer settings menu

Before entering settings menu ensure to OFF the device by pressing OFF button

Press OFF button again and press ENTER button also without releasing OFF button for 3 seconds.With a beep sound device enters main settings mode.Cooling fan starts functioning

Consecutive pressing of the ENTER button helps to go to next menu.If kept for 5 seconds system saves the changes and exits from settings menu.

Follow the settings table given below.Refer battery user guide lines also before changing the settings.Remember blind settings will spoil the device and batteries.

13 MENU CUSTOMER RELATED SETTINGS ARE PROVIDED.

OTHER ADVANCED SYSTEM SETTINGS ARE PASSWORD PROTECTED.

	MENU	TYPE OF SETTINGS	DESCRIPTION	RANGE		
				MIN	DEFAULT	MAX
1	**BAT-TYPE** BATTERY TYPE SELECTION (Lithium (1) MARKED	**CUSTOMER SETTINGS**	Select option "1" for Lithium Ashapower recommends to change the charging parameters of this device to make it compatible for LiFePO4 battery charging Ensure to connect LiFePO4 battery with the help of the battery supplier. Always use branded Lithium batteries with BMS. Never enable Equalization charging for Lifpo4 batteries.	-	"1"	-
2	**BAT-AH** BATTERY Ah. SETTING	**CUSTOMER SETTINGS**	Set the Ah of the connected battery bank to limit the bulk charging **time**	10Ah	30Ah	300Ah
3	**INV-OP-VOLT** OUTPUT VOLT OF THE INVERTER	**CUSTOMER SETTINGS**	Limit the output voltage of the inverter.	210V	222V	230V
4	**INV-M--LOW V** INV. GRID LOW VOLT	**CUSTOMER SETTINGS**	Minimum AC mains voltage limit for inverter operation Below this limit system goes to inverter mode to protect the load	80V	100V	180V
5	**INV-M-HIGH** INV.MAINS HIGH VOLT	**CUSTOMER SETTINGS**	Maximum AC mains voltage limit for inverter operation Above this limit system goes to inverter mode to protect the load	240V	280V	280V
6	**INV-U-LOW-V** INV-UPS MODE LOW VOLT	**CUSTOMER SETTINGS**	When AC mains voltage goes below the preset value system goes to inverter mode from grid mode to protect the load	100V	180V	200V
7	**INV-U--HIGH** INV-UPS MODE HIGH VOLT	**CUSTOMER SETTINGS**	When AC mains voltage goes above the set value system goes to inverter mode from grid mode protecting connected load	240V	270V	280V

	MENU	TYPE OF SETTINGS	DESCRIPTION	RANGE		
				MIN	DEFAULT	MAX
8	**INV-OVR-WRN** INV-OVER LOAD WARNING LEVEL	CUSTOMER SETTINGS	When connected load on inverter goes above 95% system gives overload warning sound to limit the load	50%	95%	95%
9	**INV-CHG-AMP** BATTERY GRID CHG AMP	CUSTOMER SETTINGS	Limit the charging current to the battery if needed. Inverters are always connected to grid power and long time low amp charging ensures good gravity and backup.	4AMP	6MP	20AMP
10	**SOL-MAX-AMP** LIMIT TOTAL OUTPUT AMP	CUSTOMER SETTINGS	Limit the total output current from the charge controller to the battery and connected load	10 A	40A	40A
11	**BAT-MAX-AMP** LIMIT CHG. AMP TO BATTERY	CUSTOMER SETTINGS	Limit the charging current to the battery if needed.	0A	20A	50A
12	**IP - TOLERANCE**	CUSTOMER SETTINGS	Input power frequency variation alters shifting time of the device from grid to bac k- up power. (When input power is from a generator) So the default value may be changed by varying the default value. (from 3 to 80)	3	7	80
13	**CAL-PSWD-0** **CAL-PSWD-1** **CAL-PSWD-2** **CAL-PSWD-3**	TECHNICIAN SETTINGS	For password related technician settings contact ASHAPOWER technical team			
30	**FACT-RESET** RESTORE FACTORY SETTINGS	CUSTOMER SETTINGS	To reset all settings to factory settings change the default value from "0" to "1"	—	0	1

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