# SOLAR HYBRID HOME INVERTER


Solar Hybrid DSP uses both solar power as well as mains for charging the battery bank according to parameter priority set, providing the users availability of uninterrupted power supply.

## KEY FEATURES

- Smart load sharing compatibility
- Inbuilt solar charge controller with high charging current
- Three stage solar charging (TSSC), suitable for all type of battery charging
- PV availability, battery charging from solar power indication with display on LCD
- Deep discharge battery charging from mains as well as solar
- Battery type charging selection (Tubular /Flat/SMF/GEL)
- Dual modes of operation (EC/NC) Solar + Mains charging current adding in NC mode, Max charging current at below 13.7 V Battery voltage, >13.7 charging current is 15A ± 1A
- Smart grid charging option with enable/disable option
- User selectable UPS and Normal mode
- Resettable AC circuit breaker which reduce service calls
- Generator compatible
- Protections against Short-Circuit ,Mains Fuse Trip, Overload, Reverse Phase, Low Battery, Reverse Battery and Over Temperature (with proper indications with buzzer as well as display on LCD available)
- User friendly, feather touch control and selection switches with LED indication on front panel
- Battery charging even at low voltage
- Comprehensive LCD Display

# TECHNICAL SPECIFICATIONS

- Operate on both solar power as well as grid power
- It is integrated with in-built fully regulated 50Amp PWM Solar Charge Controller for maximum solar power utilization
- Ungradable on 70 Amp PWM Solar Charge Controller
- It senses the availability of solar power, grid power and accordingly gives preference to charging through solar power and switches
- It designed to give you maximum benefit from the solar energy and minimize your electricity bill drastically
- Highly efficient battery charging from the solar energy as a result you will get non-stop power save money, save electricity and protect the environment
- Advanced DSP technology for absolute and stable and 100% pure sine wave output
- Indications for Mains ON, UPS ON, Battery Low, Charging/Discharging, Over Load, Short Circuit, Thermal Trip, Solar Available/Not Available and PV Reverse on LCD Display
- User-Friendly LCD for the display of mode of operation and all parameters

## DUAL MODE OF WORKING UPS AND NORMAL

- UPS Mode : Fast switching input operating range from 180V to 260V
- Normal Mode : Wide Input operating range from 100V to 290V

## DUAL SOLAR MODE HYBRID AND PCU MODE

- Hybrid Mode : Intelligent battery charging though the Solar Power and Grid Power
- PCU Mode : Charge sharing and ability of running load with solar and battery hence saving grid power and utilizing maximum solar power to minimize the electricity bill

## DUAL BATTERY CHARGING MODE: TUBULAR AND SMF BATTERY

- Different battery selection mode to enhance the battery life
- Intelligent overload sensing circuitry with auto retries facility

- Programmable thermal protection cooling fan which operates as needed
- High Power new generation MOSFET cable to handle high in-rush surge current
- Double stage MOSFET Over Current Protection by measuring Rds ON
- Highest efficiency at lower cost
- Pure Sine Wave output with low Total Harmonic Distortion (THD)
- High End ARM Cortex based design of Solar Charge Controller for charging through Solar Power
- Eco friendly operation
- Solar PV Reverse Voltage Protection
- Electronic Over Current Charging Protection
- Reverse Current Flow Protection from Battery to Solar Panel generally during night
- No mechanical contact for charge controller
- Designed for continuous reliable and robust operation

# If solar is available and battery declared as full charged, then Mains will automatic cut till battery discharge upto pre-defined level in PUC mode.

| Model | 900 VA | 1100 VA | 1600 VA | 2100 VA |
|---|---|---|---|---|
| Nominal Battery Voltage | 12 VDC | | 24 VDC | |
| Solar Panel Connected for 50 Amps PWM Charge Controller (Max.) | 850 WP | 850 WP | 1700 WP | 1700 WP |

## AC MAINS MODE

| | | |
|---|---|---|
| Input Voltage Range (Normal Mode) | 100 to 290 VAC ± 5 VAC (Wide Range) | |
| Input Voltage Range (UPS Mode) | 180 to 260 VAC ± 5 VAC | |
| Changeover Time Maximum | < 30 ms (in Normal Mode) and < 10 ms (in UPS | |
| Max. Charging Current | 5A to 18A ± 1A (User Programmable) | |
| Boost Charging Voltage | 14 VDC to 15 VDC ± 0.2 VDC per Battery (User | |
| Boost Charging Voltage (Factory Default) | 14.4 ± 0.2 VDC for Tubular 13.8 ± 0.2 VDC | 28.8 ± 0.4 VDC for Tubular 27.6 ± 0.2 VDC |
| Float Charging Voltage (Factory Default) | 13.7 ± 0.2 VDC for Tubular 13.5 ± 0.2 VDC | 27.4 ± 0.4 VDC for Tubular 27.0 ± 0.2 VDC |

# BATTERY BACKUP MODE

| | | |
|---|---|---|
| Output Voltage at No Load | 220 VAC ± 7 VAC | |
| Output Frequency | 50.0Hz ± 0.5Hz | |
| Output Wave From (AT No Load) | 100% Pure Sine Wave | |
| Battery Low Alarm | 10.6 ± 0.2 VDC | 21.2 ± 0.2 VDC |
| Battery Low Protection | 10.4 ± 0.2 VDC | 20.8 ± 0.2 VDC |
| Overload (Normal/UPS) | 120% (30 Sec.) | |
| Short circuit (Normal/UPS) | 300% | |

# CHARGING MODE - SOLAR CHARGE CONTROLLER - 50 AMP

| | |
|---|---|
| Max. Charging Current | 5A to 30Amp. ± 1.5Amp. (User Programmable) |
| Charge Controller Efficiency | >98% |

# DISPLAY PARAMETERS

Ac Mains Voltage
Output Voltage
O/P Load in % on Battery
O/P Load in % on Solar
Actual O/P Wattage
Battery Voltage
Charging Mode
Grid Charging Current
Solar Charging Current
Solar Load Current
Solar Kwh (Saving)

**Faults Status**

Overload
PV Reverse
PV High
Short Circuit
Mains Fuse Trip
Overload Temp
Low Battery
High Battery
Grid Overload
Inverter Status
Solar Availability Status

# DESCRIPTION OF SWITCHES ON FRONT PANEL

| S.No. | Switch | Function(s) | Switch Led Status |
|---|---|---|---|
| 1 | POWER | ON/OFF the UPS Output | System ON - Led ON<br>System OFF - Led ON |
| 2 | INV/UPS | When it is Short Pressed it Enables UPS/Inverter Mode Selection<br>When it is Long Pressed Enables the UPS Parameter Setting :<br>The LCD Displays : "Edit Parameters Setting"<br>The Switches function now Change to :<br>POWER - Enter/OK Switch<br>INV/UPS - Increment Value<br>SMF/TUB - Decrement Value<br>HYBRID/PCU - Back/Exit Switch | |
| 3 | SMP/TUB | When it is Short Pressed it Enable TUBULAR or SMF Battery Selection | |
| 4 | HYBRID/PCU | When it Short Pressed it Enable the Hybrid PCU Mode Selection | |

## PROTECTIONS

PV Reverse, Reverse Current Flow (to PV Module), Battery Voltage Low (3 Auto Retries), Over Load (6 Auto Retries), Battery Full Charge, Over Temperature, Short Circuit.

## DESCRIPTION OF LED ON FRONT PANEL

| S.No. | LED | Describtion |
|---|---|---|
| 1 | GREEN | LED ON - Full Solar Used<br>LED Blinking - Partial Solar Used<br>LED OFF - No Solar Used |
| 2 | RED | LED ON - PV Reverse Protection<br>LED OFF - No Protection Selected |

## UPS PARAMETER SETTING

Default Values & Limits:

- Maximum Battery Voltage

  SMF Battery: 13.8V (Cannot be Changed)

  Tubular Battery: Min: 14.0V Default: 14.4V Max: 15.0V

- Battery Low Cut Voltage

  Min: 10.4V Default: 10.6V (PCU Mode), 11.0V (HYBRID Mode) Max: 11.5V

- Maximum Grid Charging Current

  Min: 05A Default: 15A Max: 18A

- Maximum Solar Charging Current

  Min: 05A Default: 30A Max: 50A

**Solar Charging Current cannot be set less then Maximum Grid Charging.

- Grid Reconnect Voltage

  Tubular Battery: Min: 11.5V  Default: 12.0V  Max: 12.5V

  SMF Battery:  Min: 12.0V  Default: 12.0V  Max: 12.2V

**Grid Reconnect Voltage is always greater then Battery Low Cut Voltage by 0.5V.

## SETTING PROCESS

Step 1: Long press the INV/UPS Switch until LCD Display: "Edit Parameter Settings"

Step 2: Press POWER Switch (Enter/OK in Setting Mode) then "MAX BATT VOLTAGE Setting Screen will appear if TUBULAR Battery Selected else "BATT LOW CUT" Setting Screen appear

Step 3: To Change the Maximum Battery Voltage Value press INV/UPS Switch (Increment Value in Setting Mode) or SMF/TUB Switch (Decrement Val Setting Mode)

Step 4: After Setting Maximum Battery Voltage Now press POWER Switch (Enter/OK in Setting Mode) then "BATT LOW CUT" Setting screen will appear

Step 5: To Change the Battery Low Cut Voltage Value press INV/UPS Switch (Increment Value in Setting Mode) or SMF/TUB Switch (Decrement Value in Setting Mode)

Step 6: After Setting Battery Low Cut Voltage Now press POWER Switch (Enter/OK in Setting Mode) then "MAX GRID CHG" Setting Screen will appear

Step 7: To Change the Maximum Grid Charging Current Value press INV/UPS Switch (Increment Value in Setting Mode) or SMF/TUB Switch (Decrement Value in Setting Mode)

Step 8: After Setting Maximum Grid Charging Current Now press POWER Switch (Enter/OK in Setting Mode) then "MAX SOL CHG" Setting screen will appear

Step 9: To Change the Maximum Solar Charging Current value press INV/UPS Switch (Increment Value in Setting Mode) or SMF/TUB Switch (Decrement Value in Setting Mode)

Step 10: After Setting Maximum Solar Charging Current Now press POWER Switch (Enter/OK in Setting Mode) then "GRID RECONNECT" Setting Screen will appear

Step 11: To Change the Grid Reconnect Voltage Value press INV/UPS Switch (Increment Value in Setting Mode) or SMF/TUB Switch (Decrement Value in Setting Mode)