



# SOLAR HYBRID PCU

## SunMagic Series



— ENERGY THAT  
DRIVES FUTURE

*Answering All Power Needs*



[www.enertechups.com](http://www.enertechups.com)

**EnerTech**  
*Answering All Power Needs*

# 30 Years Experience In Manufacturing And Development In Cutting Edge Inverter And Converter Technology.

## ABOUT ENERTECH

Enertech® UPS Pvt. Ltd. is a leading fast moving Indian multinational manufacturing company, providing the next generation technology products solutions for the Renewable & Power sectors.

We provide a comprehensive wide range of power management solutions including **Solar hybrid Inverter, Solar UPS, Online UPS, Industrial UPS, Industrial Battery Charger, Static Frequency Converter**. With the in-house R&D setup Enertech strive for constant success in leveraging technological innovation with next generation patented technology solutions.

Enertech® with its head quarter at Pune was established in the year 1989. All operations are at Sigma Level 4.87. The company has purposefully expanded by providing power solutions for **IT, Industrial, Healthcare, Banking, and Infrastructure** over the period and expanded footprints in **Africa, Tanzania, Zambia, Cameroon, Nigeria, Niger, Yemen, Sudan, Zimbabwe, USA**.



Leading Power Solution Provider



35+ Partners Across India



20000+ Esteemed Customers

## OUR GOAL

### VISION

- ◆ To be the most trusted and preferred brand.
- ◆ Best in class customer focused approach.
- ◆ To provide safe, cost effective, quality products.

### VALUES

- ◆ Integrity
- ◆ Commitment
- ◆ Team Work



# Benefit With Next Generation Patented Technology For Your Renewable Energy Needs With Our Solar Hybrid Inverter.

## DESIGN

- ◆ *Patented Techonology.*
- ◆ *Bidirectional Inverter.*
- ◆ *Battery Less Features.*
- ◆ *Modular & Fexibility in Design.*
- ◆ *Grid Utilization.*

## QUALITY

- ◆ *In House Engineering Wrokmanship.*
- ◆ *Every Unit Shipped Fully Tested.*
- ◆ *Utilization of Long Lasting Component.*



## SERVICES

- ◆ *Over 50+ Factory Trained Engineer.*
- ◆ *Pan India Parts Available.*
- ◆ *Industrial Leading Warranty Terms.*

## VALUE

- ◆ *Lowest CTO*
- ◆ *Functionality & Performance Desing for 10+ Y ears Lifetime*

Banking



3000+ System Installed

Defence



2000+ System Installed

Governments



2000+ System Installed

Power Plants



1000+ System Installed

Industry



5000+ System Installed

Institutions

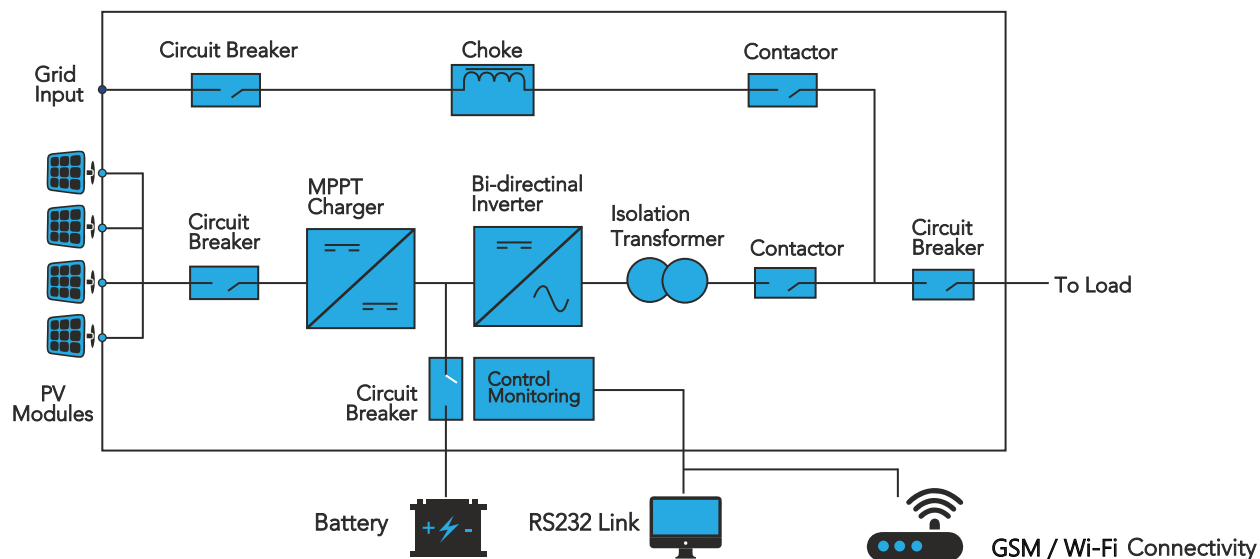


1000+ System Installed

# ABOUT SUNMAGIC SERIES

SunMagic Solar Hybrid Inverter (PCU) design with its Patented Technology delivers the Highest Reliabilities and performance in the industry to go along with the quality that the user are accustomed to when specifying SunMagic.

## POWER CONDITIONING UNIT



## UNIQUE FEATURES



**Bidirectional Inverter**



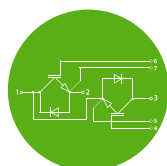
**Flexibility in Design**



**Grid Utilization**



**Battery Less Operation**



**IGBT Based Rectifier**



**Advanced Multiple DSP**



**Support Multiple Input**



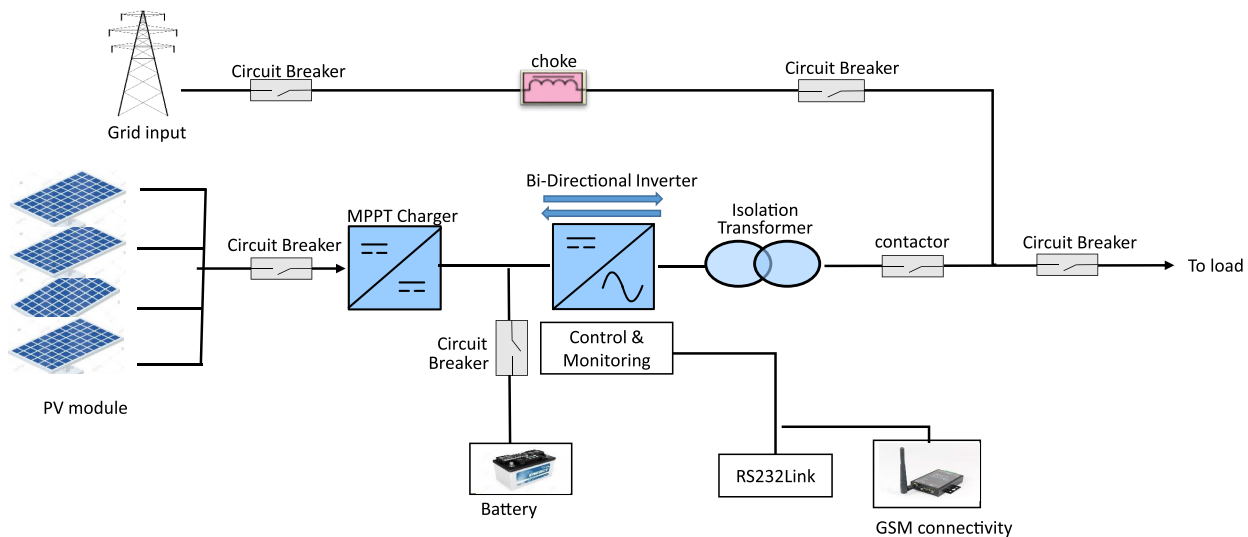
**Monitoring Features**

# Key Design Differentiating Features for Maximum Performance & Reliability

## 1 Bidirectional Power Conversion Technology With Inbuilt Isolation Transformer

Innovative Circuit Design Concept-Developed with Load current feed forward. Load current feed forward gets rid of the influence of the **load characteristics, no-load, on-load, regenerative load, in output voltage control**.

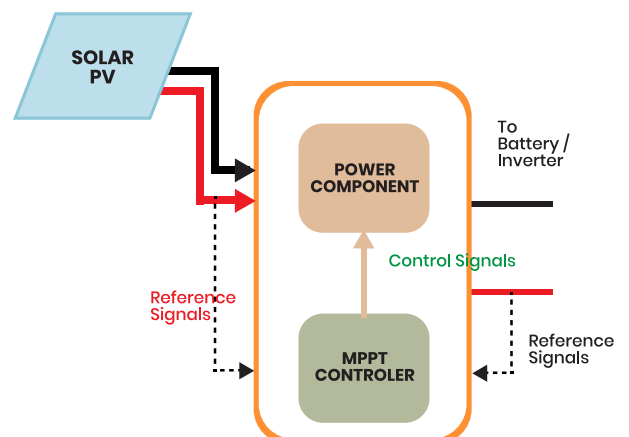
Enertech® Power Converters (Rectifier and Inverter) acts as bidirectional power converters to convert and pass the quality Power on either side.



## 2 Innovative MAXIMUM POWER POINT TRACKER (MPPT) Solar Power Conversion Technology.

MPPT is an electronic system, Integrated with SunMagic Series Hybrid Inverter provided the voltage at which the Photovoltaic (PV) modules is able to produce maximum power. The actual charge current increase varies with operating conditions.

- ◆ Design with Next generation technology to provide high efficiency & performance.
- ◆ Custom Size MPPT capacity availability & higher loading of MPPT up to 120%.

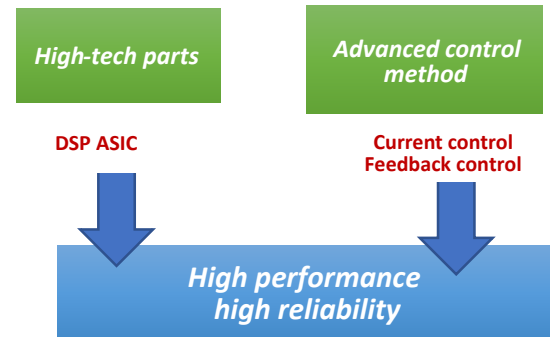


### 3 High Performance All Digital Control

It is not enough to mainly provide IGBT's, but it is also the digital signal processor (DSP) device, which is the key.

Enertech® SunMagic Series Hybrid Inverter design uses 32-bit DSP technology to optimize high speed of PWM in inverter (DC-AC) & rectifier (AC-DC) control circuit to realize the high-performance of Inverter.

- ◆ Reduced Output Voltage Fluctuation
- ◆ Reduced Output Voltage Distortion
- ◆ Unbalanced Load Capability
- ◆ Eliminate Input Current Harmonics
- ◆ Self Diagnostic Function



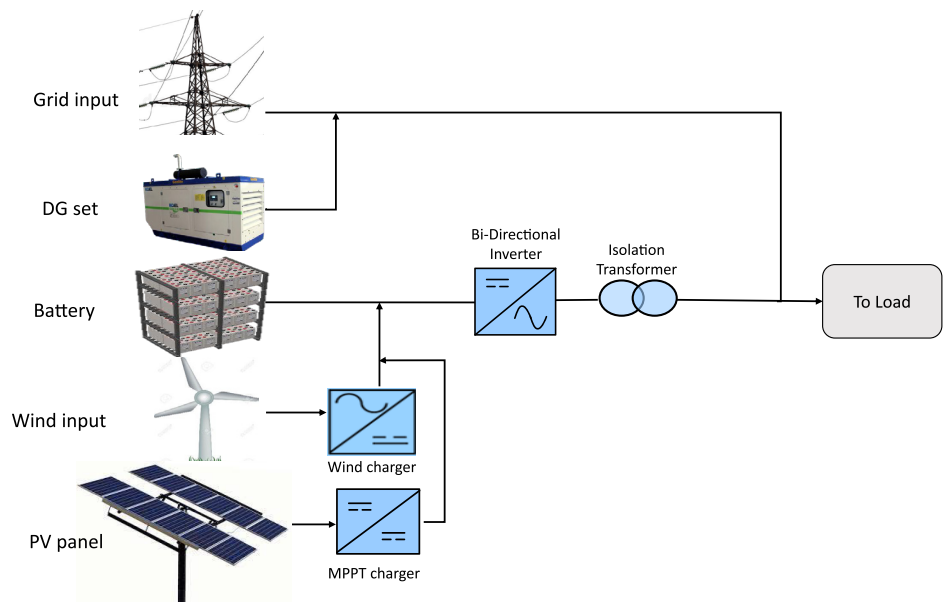
Full DDC(Direct Digital control) using High Speed DSP(Digital signal Processor) and Specially Developed ASIC chips(application Specified IC)

### 4 SunMagic PCU with Multiple Charging Sources Availability

SunMagic Series is the ultimate combination of streamlined flexibility availability & sustainability to provide the solution through Single PCU.

- ◆ Solar Hybrid PCU can be configured to handle multiple charging sources intelligently.
- ◆ Priorities of these charging sources can also be decided by the control algorithm. It's not only the present but also the futuristic needs in the same PCU which Hybrid PCU can handle allowing multiple charging sources.

- ◆ 1. Grid
- 2. DG set
- 3. Solar
- 4. Wind
- 5. Biogas Plant (Gasifier)

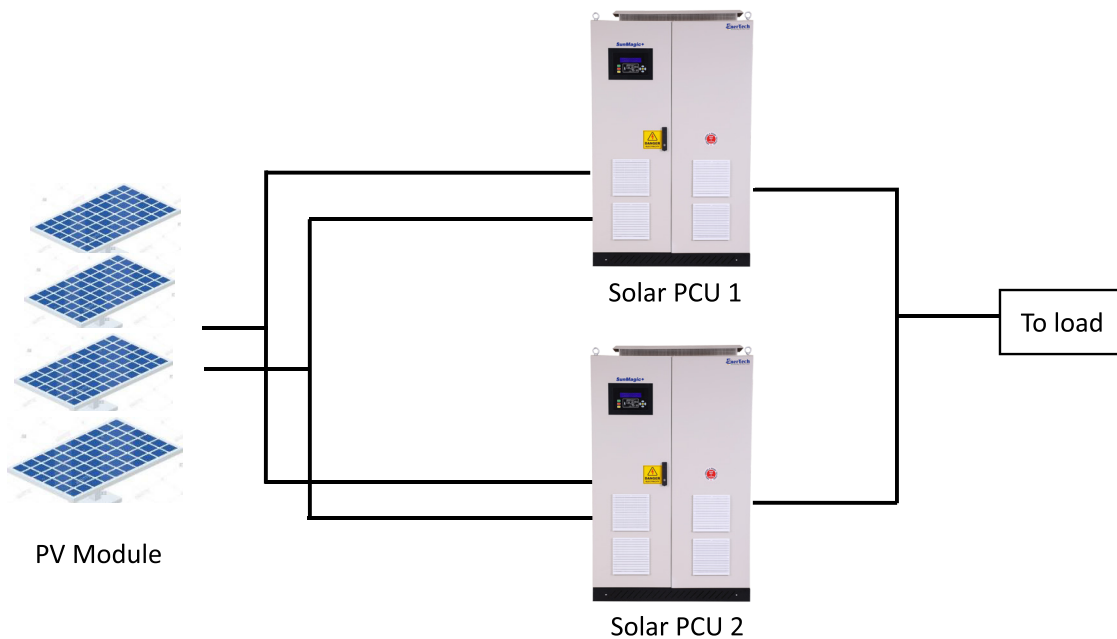


## 5 Paralleling Solar PCU: Load Sharing-System Flexibility (Optional)

Enertech® SunMagic Series is the most efficient, performing & reliable Solar Hybrid Inverter (PCU) in the market with less space per kilowatt than any similar capacity PCU.

The Enertech® Multi-Module System (MMS) Configuration incorporates individual parallel control circuitry in each independent PCU Module.

It delivers the utmost in design flexibility and can provide the ideal solution, offers complete system redundancy, reliability and flexibility with cost saving scalability and a reduced footprint.



## 6 Battery Management

### MAXIMUM BATTERY CARE

Normally the batteries are kept charged through Solar, grid or other source as per the priority set in SunMagic Hybrid Inverter by the user.

The Enertech® SunMagic Series battery care system consists of a series of functions designed to achieve the best performance and operating life possible.

- ◆ *3 Stage Charger – quick charging and full top up.*
- ◆ *Temp compensated charger.*
- ◆ *Battery Charging from Grid can be set from 0 to 100% of PCU rating as per site requirement.*
- ◆ *Automatic and manual battery test with adjustable period and duration.*

## 7 Enertech® SunMagic Series is compatible with Different Battery Technologies

VRLA AGM, Gel, NiCad, and Lithium-ion Batteries.

- ◆ MODBUS based communication
- ◆ Charging profile modification
- ◆ Compatibility with BMS controllers
- ◆ 0.5C / 1C charging currents



**Enertech PCU**

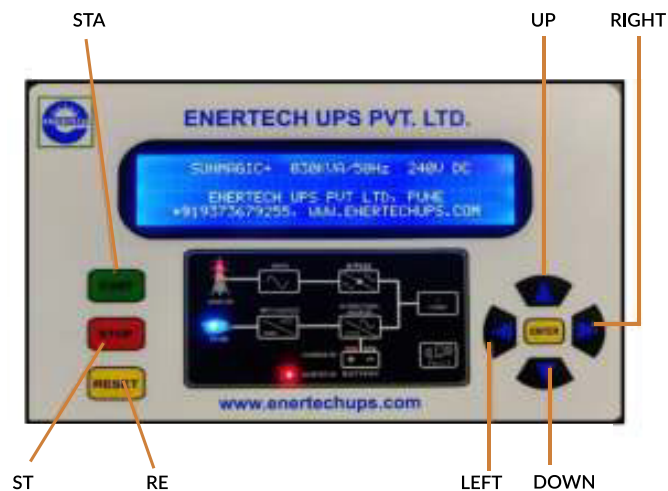


**Lithium Cabinet**

## 8 LCD Display

User Selectable Configuration Setting From Front Screen

- ◆ Operation Settable Mode
- ◆ Charging current
- ◆ Low Battery Voltage
- ◆ High Battery Voltage
- ◆ Float/Boost voltage
- ◆ Export control
- ◆ Fault Log



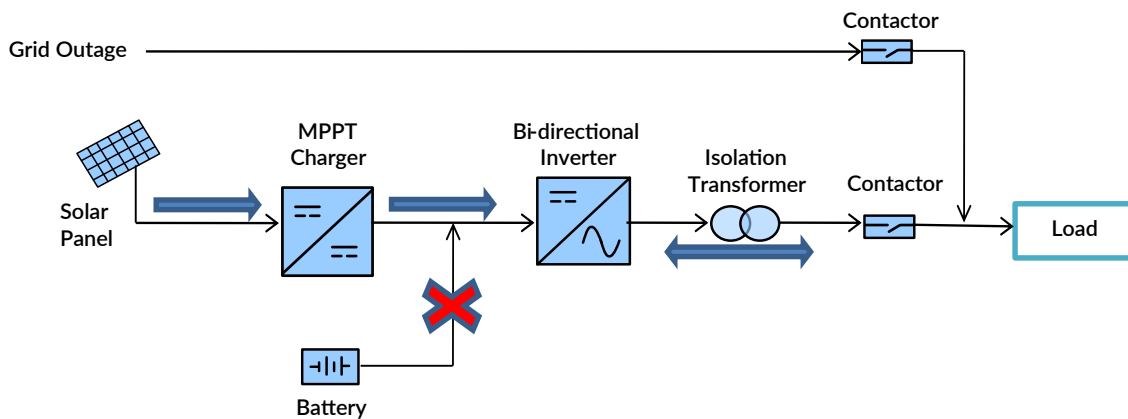


## 9 Battery Less Features

SunMagic Series PCU is having an unique Innovative optional feature Battery Less Mode. to configure and operate the PCU without batteries (Energy Storage)

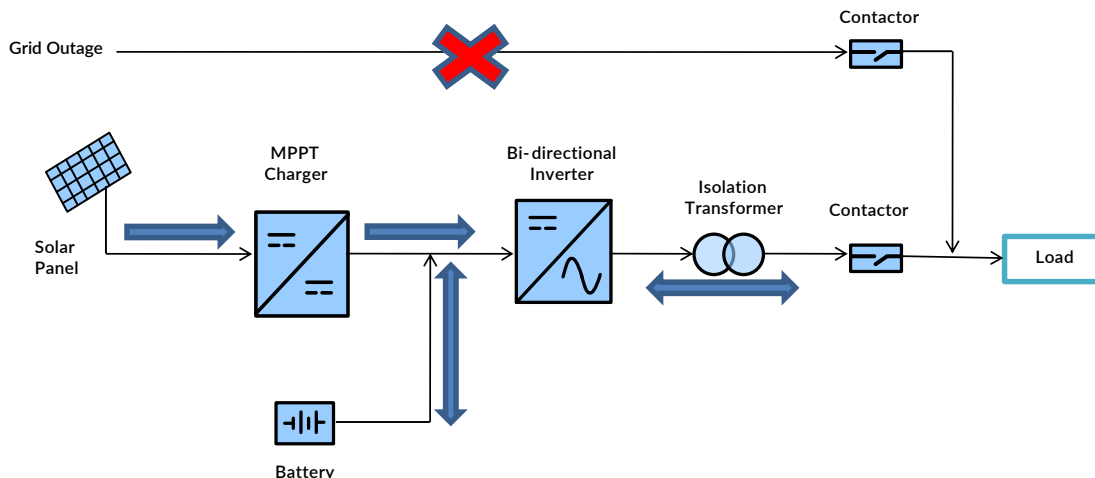
- ◆ In Battery less Mode PCU will get sync with Solar power Or Grid supply completely, Supply power to the load and It also exports the excess power to the grid.
- ◆ If the solar energy is sufficient then total output load will operate on PCU using Solar Power.
- ◆ When the solar energy is weak then the PCU will take balance power from AC source grid and supply to load.

In this mode PCU is also treated as a grid tie inverter. In future, these feature can be disable and connected with any energy storage system to use solar power after day time with battery bank.



## 10 Anti-Islanding IEC 62116 & IEC 61727 compliance

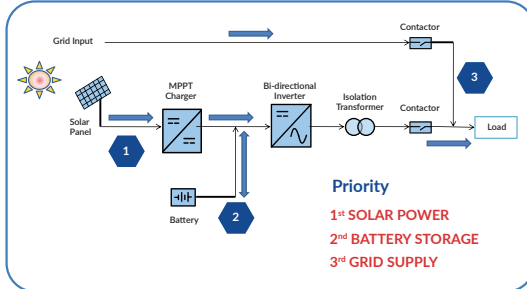
- ◆ Grid Export stops on Grid Failure / Grid out of range
- ◆ Dedicated load will be served with battery power
- ◆ Harmonic injection at reached level in compliance with IEC61727



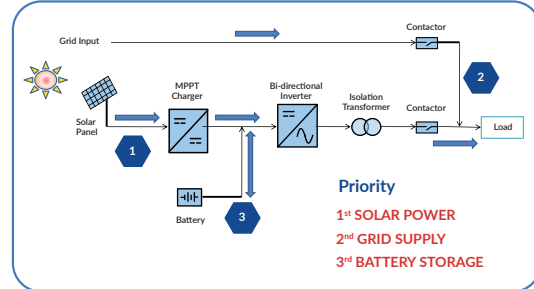
# Possible Operating mode

User Selecting Any Mode From Below Mode lec61727

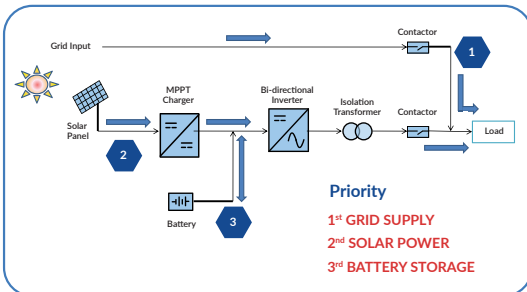
## Solar -> Batteries -> Grid



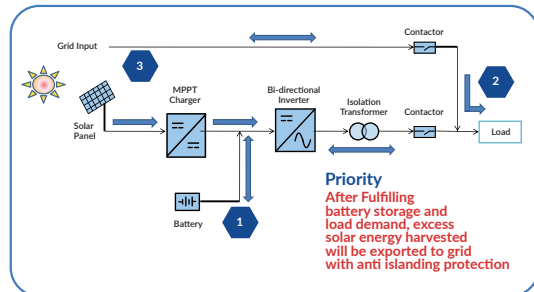
## Solar -> Grid -> Batteries



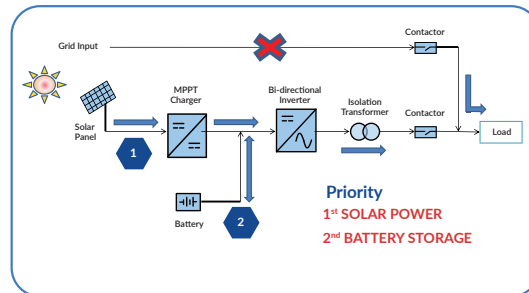
## Grid -> Solar -> Batteries



## Grid Feed Mode



## INVERTING Mode



# Remote Monitoring Solution

## MONITORING ON THE GO & AT YOUR DESK !!!

Suitable Protocol: RS-232/MODBUS/RS-485

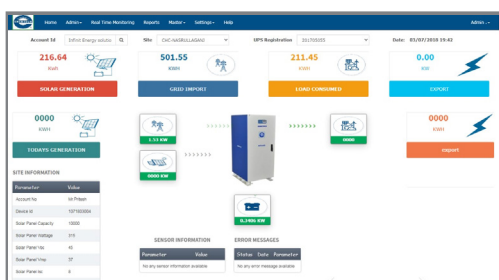
IOT based monitoring system- to enable customer to monitor critical PCU systems at their desk or phone. By using remote monitoring equipment at your sites, you'll now have the visibility you need to monitor and control your Systems.

- ◆ All PCU systems in a facility is connected to Enertech® RMS Interface to collect data and transfer to network system / cloud to process data
- ◆ Remote PC , mobile is configured with RMS Software for PCU monitoring on the GO and always at your desk.



## BENEFITS

- ◆ Continuous PCU monitoring and access to data.
- ◆ Load trend and graphs in your mobile.
- ◆ Data on power failures in a day / week / month.
- ◆ PCU Alerts on email /SMS.
- ◆ Daily/weekly/monthly reports
- ◆ 24x7 remote monitoring – Peace of mind.
- ◆ Connectivity Via GSM/Wi-fi.
- ◆ Report with pop-up alarms.



# SOLAR HYBRID PCU SUNMAGIC

SINGLE PHASE  
5kVA - 30kVA



Settable Mode

Batteryless Feature

32 Bit DSP

# Specifications

STANDARD SPECIFICATION	SUNMAGIC - 5kVA to 30kVA									
INVERTER CAPACITY (kVA)	5	6	8	10	12.5	15	20	25	30	
<b>INPUT</b>										
Input Voltage Range	170 to 260 (± 5V) 1Phase									
Nominal Frequency	50 Hz (± 6%)									
Input Power Factor	≥ 0.92									
Input Fault Level	10 kA									
Self-Consumption	<4%									
DG / Grid Compatibility	YES (Double of Inverter Capacity)									
<b>SOLAR</b>										
Charger Type	MPPT									
Max PV Voltage (VOC)	250	250	250 / 300	300	300	300 / 500	300 / 500	500	500	
MPPT Voltage Range	130 - 200V for 96VDC / 165 -250V for 120VDC / 280-450V for 240VDC									
MPPT Modes Available	2 (Selectable)									
No. Of Channels	1									
Max I/P Amps per Channel (Amps)	52	63	83 / 66	83	104	125 / 63	166 / 83	104	125	
Panel Reverse Protection	Yes									
Solar Charger Efficiency	>95%									
<b>BATTERY</b>										
Nominal Battery Voltage (VDC)	96	96	96 / 120	120	120	120 / 240	120 / 240	240	240	
Grid Charging Current	Selectable as 5A Steps									
Input Power Factor (Grid Charging)	Near to Unity									
Battery Charging Voltage	Selectable from LCD Display									
Type & No. Of Cells	Lead Acid / VRLA / Ni-Cd/Lithium									
<b>OUTPUT</b>										
Load Power Factor	0.8 lag									
Output Voltage (Inverter Mode)	230V AC ± 2 %									
Voltage Regulation	± 2 %									
Output Frequency (Free Running)	50 Hz ± 0.5%									
Output Waveform	Pure Sine wave									
Peak Inverter Efficiency (Full Load)	>90% (as per IEC 61683)									
Total Harmonic Distortion	≤ 3% at Linear Load									
Overload Capacity	125% for 60Sec, 150% for 5 Sec									
Changeover Time (Full load)	20 msec									
DC to AC Isolation	In built Isolation Transformer at Inverter Output									
Anti-Islanding Function	Available, In Compliance with IEC 62116									
Duty	Continuous									
<b>CONFIGURATION</b>										
Modes Available	Hybrid, Grid Export, Standalone									
Battery Buffer Setting	Selectable for 25%, 50%, 75%									
GRID feed mode	Enable / Disable option Available									
<b>ENVIRONMENTAL</b>										
Acoustic Noise Level from 1 m distance (Ref: ISO 3746)	≤ 65 dB									
Operating Temperature	0 to 40 Deg C									
Storage Temperature	-10 Deg C to 60 Deg C									
Relative Humidity	Up to 95 % (Non-Condensing)									
Altitude	< 1000 meter above sea level									
<b>PHYSICAL</b>										
Enclosure Protection Grade	IP 20 Compatible to IEC 60529:2001-02- As per MNRE Requirement									
Enclosure thickness	Frame 2.0mm & all covers 1.6mm									
Cooling	Forced Air									
Color	RAL 7032 / RAL 7016									
Cable Entry	Bottom									

PARAMETERS DISPLAYED ON LCD MIMIC									
General Group	System Rating, Date & Time, Current Status, Configuration, Fault Log								
Input Group	Input Voltage, Input Current, Input Frequency								
Output Group	Output Voltage, Output Current, Output Frequency								
Battery Group	Battery Voltage, Charging Current, Discharging Current, Battery Status								
Solar Group	Solar Voltage, Solar Current, Solar Power (KW), Solar Energy (KWh)								
Fault Log	Recent 9 fault log since last time								
Inverter Group	Voltage, Current								
Configuration	SGB, SBG, GSB, GFM, INVERTER								
Indication of Mimic	Fault, PV On, Grid On, Load On Mains, Inverter On, Charger On, Load On Battery								
Message Display On LCD	Output Under Voltage, Output Over Voltage, Output Overload, Short-Circuit, Standby Mode, Battery Low								
Reset	Buzzer reset (Manual), Overload, Short Circuit, Battery Low								
PROTECTIONS									
ALARMS ARE PROVIDED FOR IMPORTANT PROTECTIONS									
Input Group	Input MCB/MCCB, Input Under Voltage, Input Over Voltage, Charger Over voltage, MOV Card								
Output Group	temperature								
Battery Group	Battery MCB/MCCB, Battery Low, Battery Over voltage								
Solar Group	Solar MCB/MCCB, Solar Fuse, MOV Card								
CONNECTIVITY									
Communication	RS 232, (Modbus RS485, GSM Connectivity - Optional)								
Monitoring	ENERLOG (Remote Monitoring Solution) - Optional								
Testing Standard	IEC -61683:1999, IEC- 60068-2-1, IEC-60068-2-2, IEC-60068-2-14, IEC-60068-2-30- As per MNRE Requirement								
Safety Factor	1 for electronic devices, 1 for electrical								
Earthing Connection (Ref. IS 3043)	Earth Stud								
DIMENSIONS (STANDARD/OPTIONAL)									
Dimensions (in mm)	(Approx.)								
KVA Rating	5	6	8	10	12.5	15	20	25	30
Width (W)	650	650	650	800	800	800	800	850	850
Depth (D)	800	800	800	800	800	800	800	800	800
Height (H)	450	450	450	450	450	450	450	450	450
Weight (Kg)									

\*Specifications are subject to change without prior notice

## Application of Single Phase Solar Hybrid Inverter



Home



Farm House



Petrol Pump



Hospital



Institution



Rural Bank



Police Station



Shop



ATM



Railway Station



Microgrid



Primary Health Care Center

# SOLAR HYBRID PCU SUNMAGIC+

THREE PHASE  
5kVA - 600kVA



Settable Mode

Batteryless Feature

32 Bit DSP

# Specifications

STANDARD SPECIFICATION	SUNMAGIC+ 5kVA to 300kVA																
INVERTER CAPACITY (kVA)	5	10	15	20	25	30	40	50	60	80	100	120	150	200	250	300	
<b>INPUT</b>																	
Input Voltage Range	360 to 450 ± 5V																
Nominal Frequency	50 Hz (± 6%)																
Input Power Factor	≥ 0.92																
Input Fault Level	10 kA																
Self-Consumption	<4%																
DG / Grid Compatibility	Yes (Double of Inverter Capacity)																
<b>SOLAR</b>																	
Charger Type	MPPT																
Max PV Voltage (VOC)	250V	300V	500V	500V	500V	500V/700V	500V/700V	500V/700V	500V/700V	500V/700V	500V/700V	500V/700V	500V/700V	700V	900V	1200V	1200V
MPPT Voltage Range	120-180V	160-250V	300-450V for 240VDC / 450-600V for 360VDC										800-1100V				
MPPT Modes Available	4 (Selectable)																
No. of MPPT Channel											3	3	3	4	4	4	
Max I/P Amps per Channel (Amps)	52	83	125	83	104	125/83	166/111	208/138	250/166	333/222	138/92	166/111	138	104	104	125	
Panel Reverse Protection	Yes																
Solar Charger Efficiency	>95%																
<b>BATTERY</b>																	
Nominal Battery Voltage (VDC)	96	120	120	240	240	240/360	240/360	240/360	240/360	240/360	240/360	240/360	240/360	360	480	600	600
Grid Charging Current	Selectable as 5A Steps																
Input Power Factor (Grid Charging)	Near to Unity																
Battery Charging Voltage	Selectable From LCD Display																
Type & No. of Cells	Lead Acid / VRLA / Ni-Cd / Lithium																
<b>OUTPUT</b>																	
Load Power Factor	0.8 lag																
Output Voltage (Inverter Mode)	415V AC ± 2%																
Voltage Regulation	± 2%																
Output Frequency (Free Running)	50 Hz ± 0.5%																
Output Waveform	Pure Sine Wave																
Peak Inverter Efficiency (Full Load)	>90%																
Total Harmonic Distortion	≤ 3% at Liner Load																
Overload Capacity	125% for 60 Sec, 150% for 5 Sec																
Changeover Time (Full Load)	20 msec																
DC to AC Osolation	In Built isolation Transformer at Inverter Output																
Anti Islanding Function	Available in Compliance with IEC 62116																
Duty	Continuous																
<b>CONFIGURATION</b>																	
Modes Available	Hybrid, Grid Export, Standalone																
Battery Buffer Setting	Selectable for 25%, 50%, 75%																
GRID Feed Mode	Enable / Disable Option Available																
<b>ENVIRONMENTAL</b>																	
Acoustic Noise Level From 1m distance (Ref : ISO 3746)	≤ 65 dB																
Operating Temperature	0 to 40 Deg C																
Storage Temperature	-10 Deg C to 60 Deg C																
Relative Humidity	Up to 95% (non condensing)																
Altitude	<1000 meter above sea level																
Basic Seismic Qualification	0.5g (the test inspection shall be with extra cost)																
<b>PHYSICAL</b>																	
Enclosure Protection Grade	IP 20 Compatible to IEC 60529:2001-02- As per MNRE Requirement																
Enclosure Thickness	Frame 2.0mm & all covers 1.6mm																
Cooling	Forced Air																
Colour	RAL 7032 / RAL 7016																
Cable Entry	Bottom																



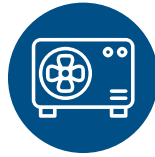
	General Group	Input Group	Output Group	Battery Group	Solar Group											
Parameters Displayed on LCD MIMIC	1. System Rating	1. Input Voltage	1. Output Voltage	1. Battery Voltage	1. Solar Voltage											
	2. Date & Time	2. Input Current	2. Output Current	2. Charging Current	2. Solar Current											
	3. Current Status	3. Input Frequency	3. Output Frequency	3. Discharging Current	3. Solar Power (kW)											
	4. Configuration	4. kW	4. kW	4. Battery Status	4. Solar Energy (kWh)											
	5. Fault Log	5. KVA	5. KVA													
	Fault Log	DG Group	Power Group	Inverter Group	Configuration Group											
	Recent 9 Fault Log Since Last Reset	1. DG Power (kW)	1. Total Input (kW)	1. Voltage	1. SBG											
		2. Power (KVA)	2. Total Output (kW)	2. Current	2. SGB											
		3. Energy (kWh)	3. Input PF	3. Frequency	3. GSB											
		4. Output PF	4. Power (kW)	4. GFM												
			5. Power (KVA)	5. INVERTER												
Fault	PV ON	Inverter ON	Load on Battery													
Indications on MIMIC	Grid ON	Charger ON														
	Load on Mains															
	* Flashing LED Indicates fault condition in respective group *															
Message Displayed on LCD		Output Under Voltage	Battery Low Voltage													
		Output Over Current	Battery Over Voltage													
		Output Overload														
		Short-Circuit														
		Stand By Mode														
Reset	Buzzer Reset (Manual)	Overload	Battery Low													
		Short Circuit														
PROTECTIONS	* Alarms are provided for all important protections.															
	1. Input MCCB	1. Output Under Voltage	1. Battery MCCB	1. Solar MCCB												
	2. Input Under Voltage	2. Output Over Voltage	2. Battery Low	2. Solar Fuse												
	3. Input Over Voltage	3. Output Overload	3. Battery Over Voltage	3. MOV Card												
	4. Charger Over Voltage	4. Output Short Circuit	4. Battery Charging Current Limit													
	5. MOV Card	5. Inverter Over Temperature														
CONNECTIVITY																
Communication	RS 232, (Modbus RS 485, GSM Connectivity) - Optional															
Monitoring	ENERLOG (Remote Monitoring Solution) - Optional															
PFCs																
	Grid Trip															
	Inverter Trip															
	Load on Battery															
	Battery Low Prealarm															
	Load on Static Bypass															
	Common Fault															
	One Relay Contact for Each (Rating : (1A/ 230 VAC or 2A / 12V DC)															
Testing Standard	IEC - 61683 : 1999, IEC - 60068-2-1, IEC - 60068-2-2, IEC - 60068- 2-14, IEC - 60068-2-30- As per MNRE Requirement															
Safety Factor	1 for Electronic Devices, 1 for Electrical															
Earthing Connection	25- 40 kVA : 3 x 25 mm GI (Earth bus bar running along the panel)															
(Ref. is 3043)	45- 150 kVA : 6 x 50 mm GI (Earth bus bar running along the panel)															
	200- 300 kVA : 6 x 50 mm GI (Earth bus bar running along the panel)															
Illumination Lamp	11 W CFL															
Gland Plate	3 mm MS C.R.C.A															
Utility Socket	5A / 230 VAC															
DIMENSIONS (STANDARD/OPTIONAL)																
Dimensions (in mm)	(Approx.)															
KVA Rating	5	10	15	20	25	30	40	50	60	80	100	120	150	200	250	300
Width (W)	800	800	800	800	950	950	950	950	950	950	1100	1100	1570	1570	2900	2900
Depth (D)	450	450	450	450	550	550	550	850	850	850	800	800	850	850	800	850
Height (H)	800	800	800	800	1000	1000	1000	1700	1700	1700	2000	2000	2000	2000	2000	2000
Weight (Kg)	125	150	150	350	350	350	600	600	600	800	800	800	1000	1000	1000	1000

\*Specifications are subject to change without prior notice

# Application of Three Phase Solar Hybrid Inverter



Petrol Pump



AC Unit



Cold Storage



ATM



Farm House



Rural Bank



Government Offices



Primary Health Care Center



Hostel of School & College



Microgrid



Factory & Dairy Equipment



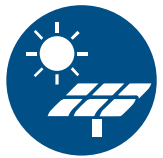
Water Pump



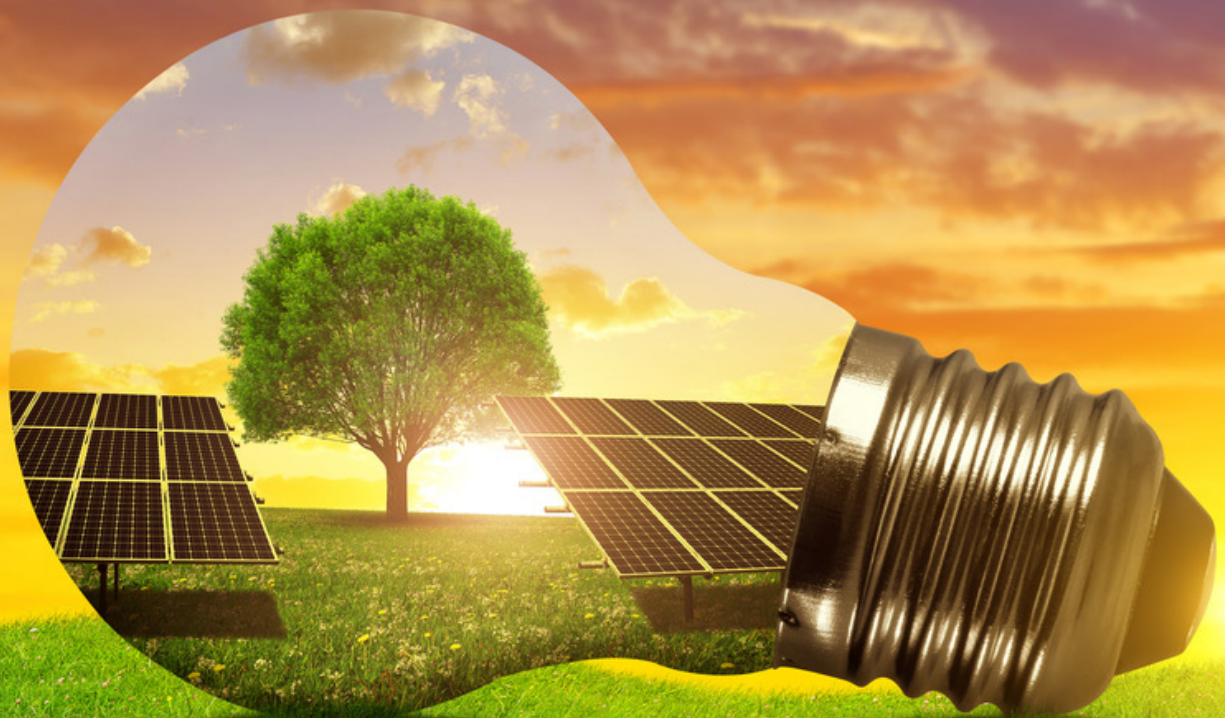
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