



# 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 Technology.*
- ◆ *Bidirectional Inverter.*
- ◆ *Battery Less Features.*
- ◆ *Modular & Flexibility in Design.*
- ◆ *Grid Utilization.*

## QUALITY

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



## SERVICES

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

## VALUE

- ◆ *Lowest TCO*
- ◆ *Functionality & Performance Design for 10+ Years Lifetime*

Banking



3000+ System Installed

Defense



2000+ System Installed

Governments



2000+ System Installed

Power Plants



1000+ System Installed

Industry



5000+ System Installed

Institutions



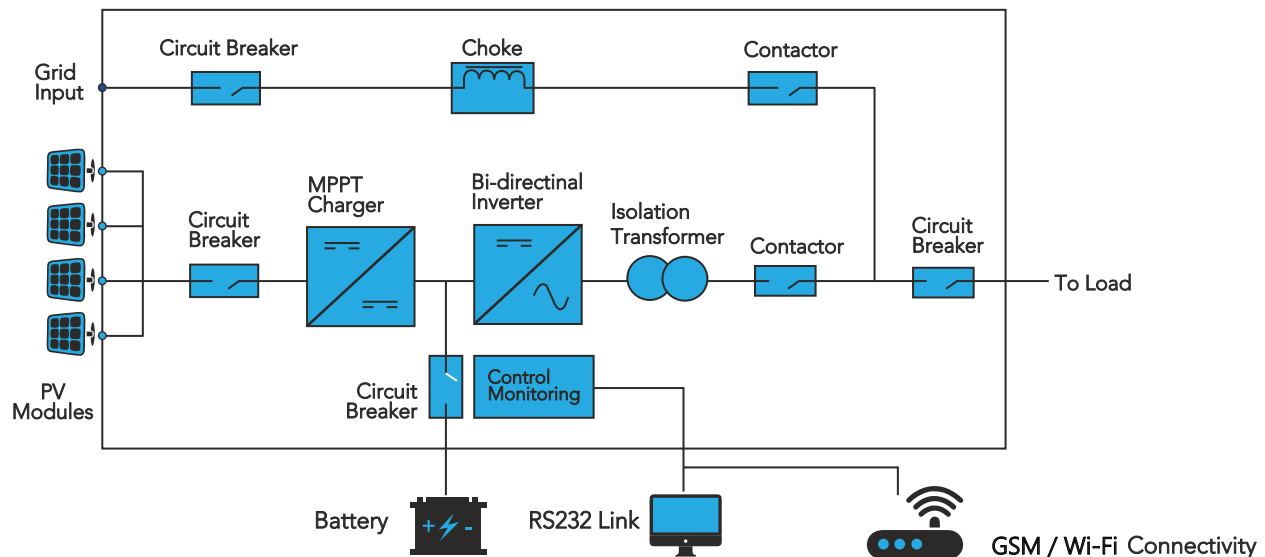
1000+ System Installed



# 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**



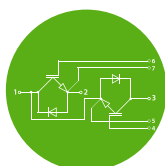
**Flexibility in  
Design**



**Grid Utilization**



**Battery Less  
Operation**



**IGBT Based  
Rectifier**



**Advanced  
Multiple DSP**



**Support  
Multiple Input**



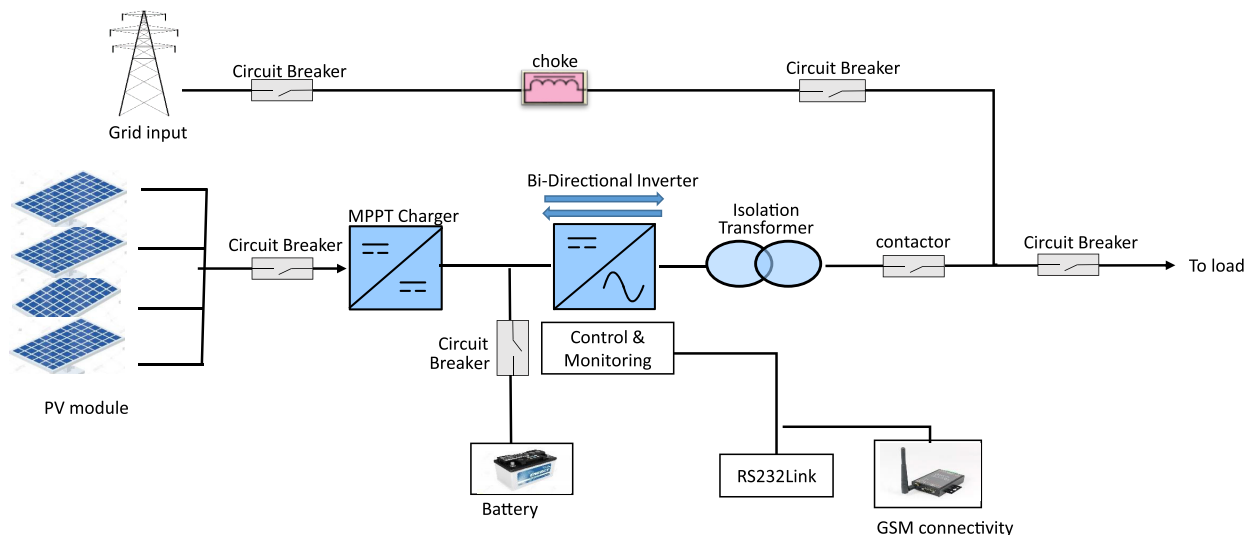
**Monitoring  
Features**

# 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**.

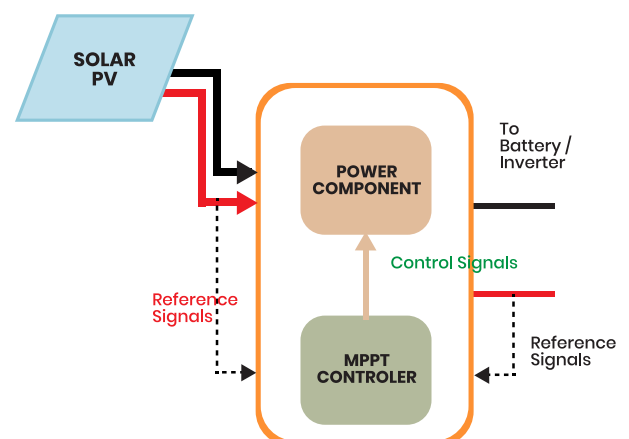
Enertech® Power Converters (Rectifier and Inverter) acts as bidirectional power converters to convert and pass the quality Power on either side.



## 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%.

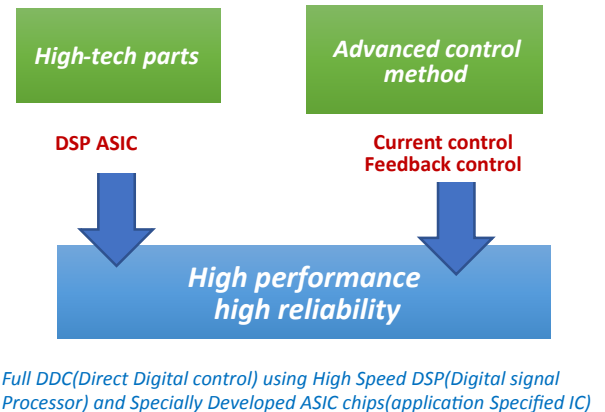


### 3 High Performance All Digital Control

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.

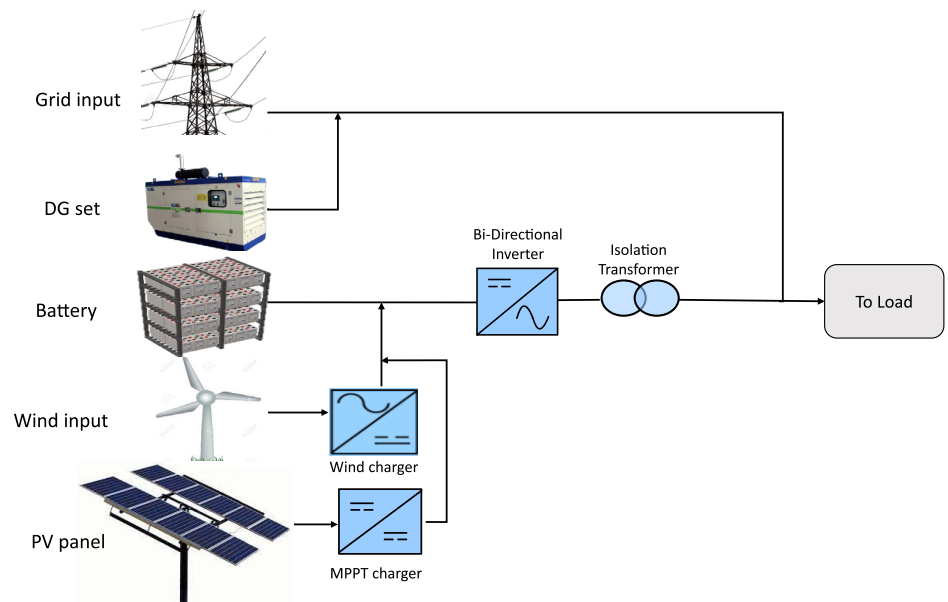
- ◆ Reduced Output Voltage Fluctuation
- ◆ Reduced Output Voltage Distortion
- ◆ Unbalanced Load Capability
- ◆ Eliminate Input Current Harmonics
- ◆ Self Diagnostic Function



### 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)

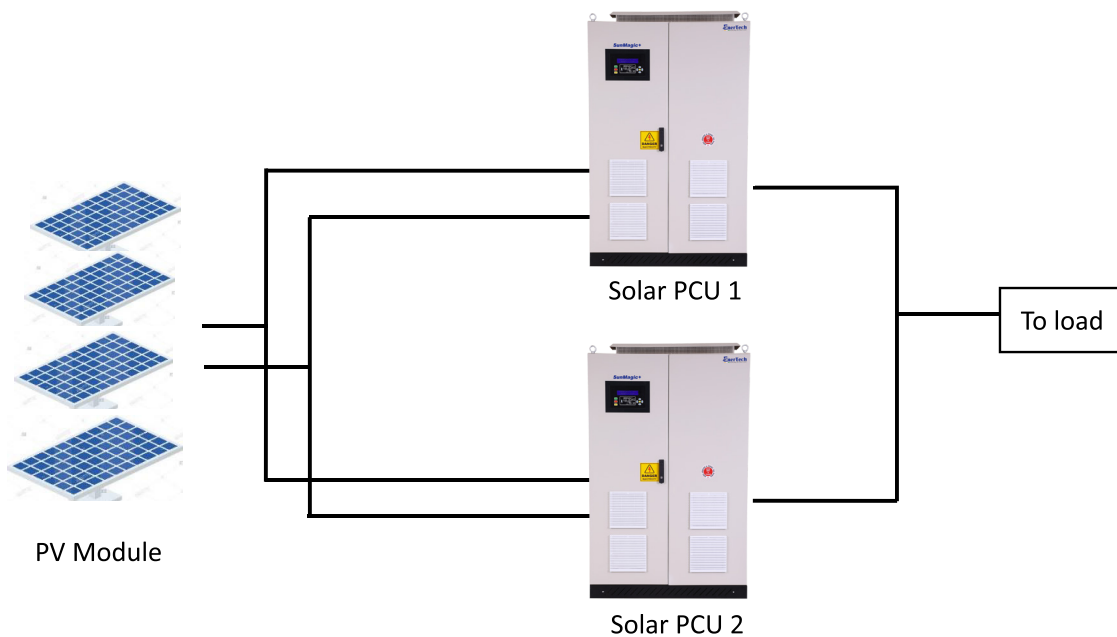


## 5 Paralleling Solar PCU: Load Sharing-System Flexibility (Optional)

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

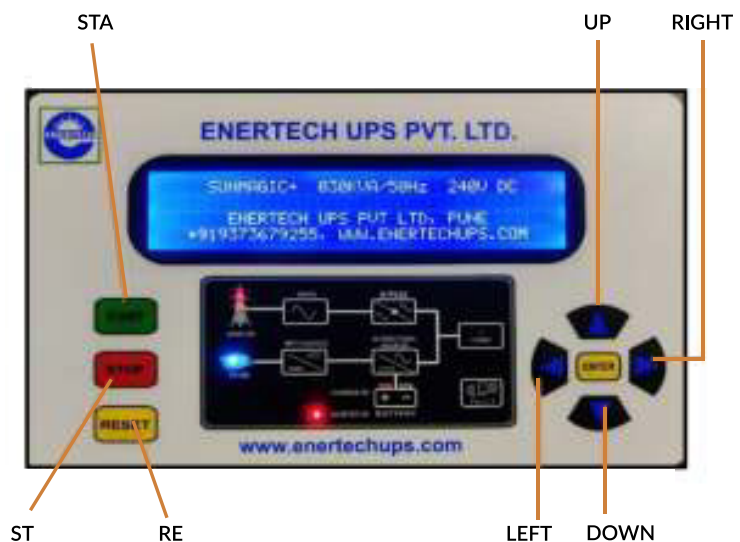


Lithium Cabinet

## 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



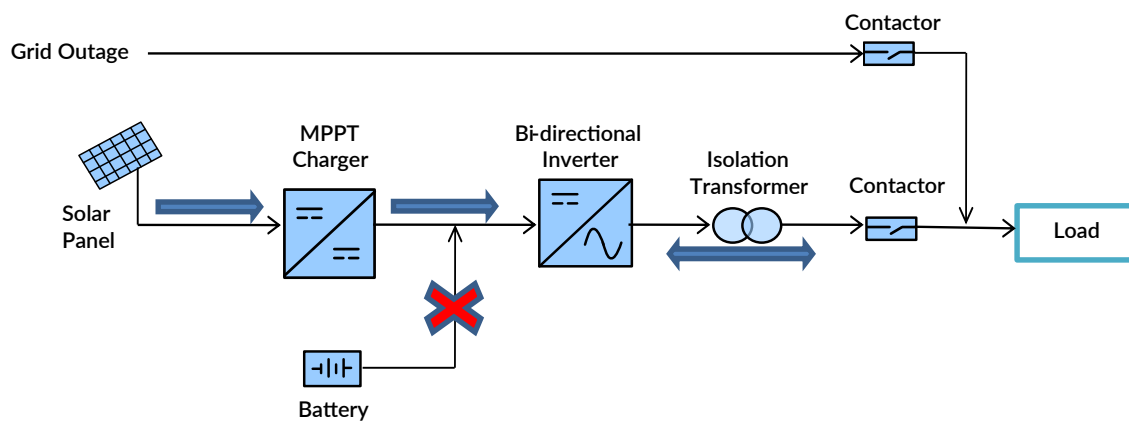


## 9 Battery Less Features

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

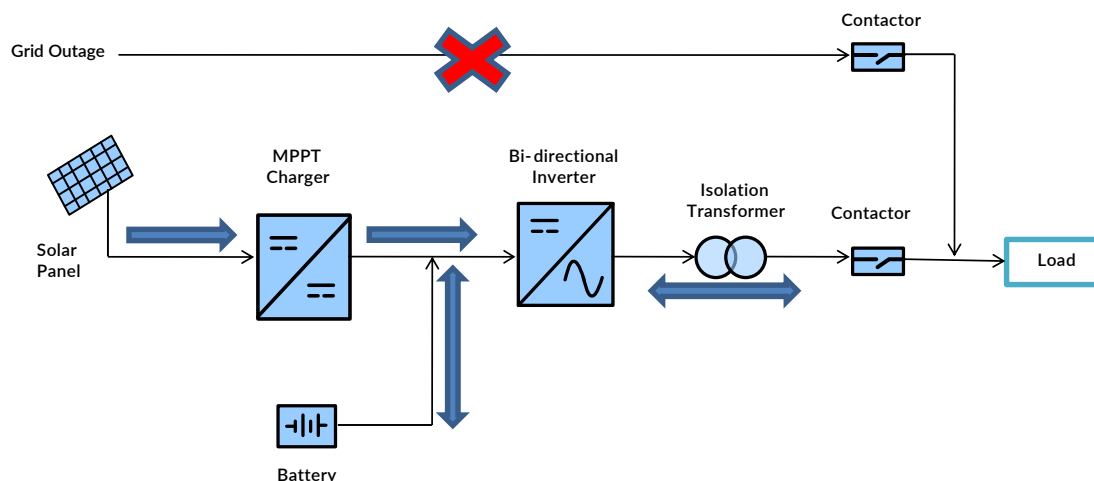
- ◆ In Battery less Mode PCU will get sync with Solar power Or Grid supply completely, Supply power to the load and It also exports the excess power to the grid.
- ◆ If the solar energy is sufficient then total output load will operate on PCU using Solar Power.
- ◆ When the solar energy is weak then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

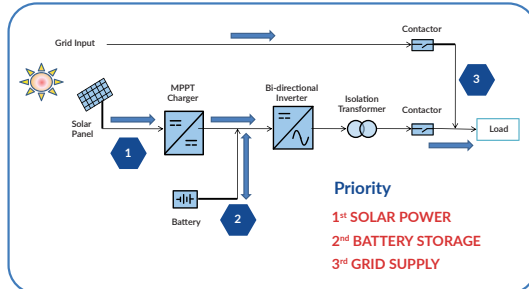
- ◆ Grid Export stops on Grid Failure / Grid out of range
- ◆ Dedicated load will be served with battery power
- ◆ Harmonic injection at reached level in compliance with IEC61727



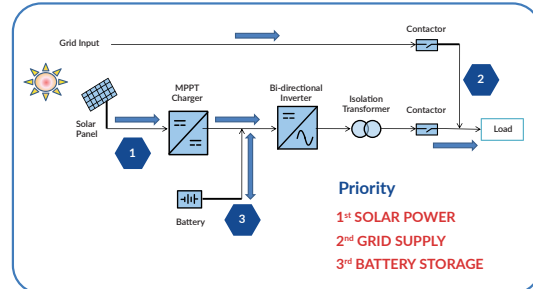
# Possible Operating mode

User Selecting Any Mode From Below Mode IEC61727

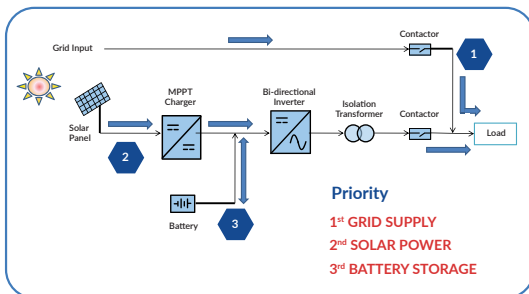
## Solar -> Batteries -> Grid



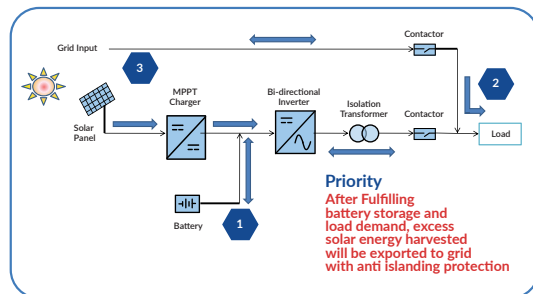
## Solar -> Grid -> Batteries



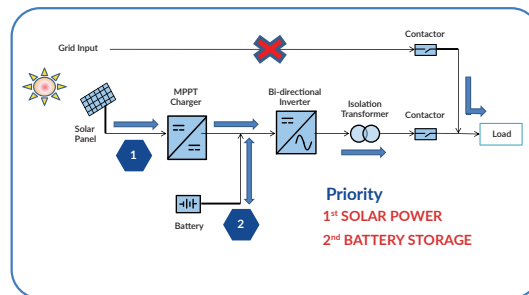
## Grid -> Solar -> Batteries



## Grid Feed Mode



## INVERTING Mode



# Remote Monitoring Solution

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

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

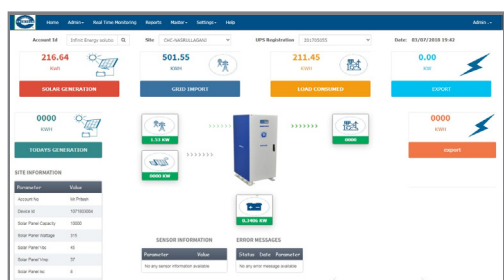
IOT based monitoring system- to enable customer to monitor critical PCU systems at their desk or phone. By using remote monitoring equipment at your sites, you'll now have the visibility you need to monitor and control your Systems.

- ◆ *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
INPUT									
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)								
SOLAR									
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%								
BATTERY									
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								
OUTPUT									
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								
CONFIGURATION									
Modes Available	Hybrid, Grid Export, Standalone								
Battery Buffer Setting	Selectable for 25%, 50%, 75%								
GRID feed mode	Enable / Disable option Available								
ENVIRONMENTAL									
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								
PHYSICAL									
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, SGB, 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	
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
INPUT																
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)															
SOLAR																
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	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%															
BATTERY																
Nominal Battery Voltage (VDC)	96	120	120	240	240	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															
OUTPUT																
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															
CONFIGURATION																
Modes Available	Hybrid, Grid Export, Standalone															
Battery Buffer Setting	Selectable for 25%, 50%, 75%															
GRID Feed Mode	Enable / Disable Option Available															
ENVIRONMENTAL																
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)															
PHYSICAL																
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															

Parameters Displayed on LCD MIMIC	General Group	Input Group	Output Group	Battery Group	Solar Group											
	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. Confuguration	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															
Safty Factor	1 for Electronic Devices, 1 for Electrical															
Earthing Connction	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
Depth (D)	800	800	800	800	950	950	950	950	950	950	1100	1100	1570	1570	2900	2900
Width (W)	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



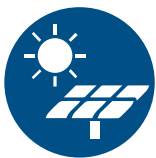
Water Pump



Lift In Society



Railway Platform



Solar Farming  
Centre





# Enertech® highly reliable and efficient products are backed by A highly responsive and dependable Field and Factory Services

Your business runs around the clock, and so does Enertech. With 24x7 technical support coverage, including weekends and holidays, the Technical Support team at Enertech is dedicated to protecting your investments

With factory trained engineers positioned throughout the India, rapid response times can significantly reduce downtime and loss of revenue.

Highly skilled Technical Support representatives are available to troubleshoot by phone and, if necessary, can dispatch the expert Service engineer to your site.



50+ Service  
Personnel Pan-India



Pan-India  
Spare Parts Operations



Wide Repair  
Network

## SERVICES

- ◆ *Start-up / Installation*
- ◆ *Factory and On-site Testing*
- ◆ *Preventive Maintenance*
- ◆ *Extended Warranty*

Please call for  
Technical Support  
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