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HARNESSING LIGHT. HARVESTING ENERGY.

**MORE POWER
MORE REVENUE
MORE INSIGHT**



Highest
SP 1A
Solar Grading

Solar Off Grid Catalogue
Solar Power Conditioning Unit
1kW to 10kW Single Phase Grid Support





QRG TOWERS



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LLOYD

STANDARD

Crabtree

promptec

QRG Medicare

Havells

Havells India Limited is a leading Fast Moving Electrical Goods (FMEG) Company and a major power distribution equipment manufacturer with a strong global presence. Havells enjoys enviable market dominance across a wide spectrum of products, including Industrial & Domestic Circuit Protection Devices, Cables & Wires, Motors, Fans, Modular Switches, Home Appliances, Air Conditioners, Electric Water Heaters, Power Capacitors, CFL Lamps, Luminaires for Domestic, Commercial and Industrial Applications. Today, Havells owns some of the most prestigious brands like Havells, Lloyd, Crabtree, Standard and Promptec. Its network constitutes of 6500 professionals, over 7650 dealers and 40 branches in the country.

Our products are available in over 50 countries. The company has twelve state-of-the-art manufacturing plants in India located at Haridwar, Baddi, Sahibabad, Faridabad, Assam, Alwar and Neemrana, manufacturing globally acclaimed products, synonymous with excellence and precision in the electrical industry. The company pioneered the concept of exclusive brand showroom in the electrical industry with 'Havells Galaxy'. Today over 500 Havells Galaxies across the country are helping customers, both domestic and commercial, to choose from a wide variety of products for different applications. Havells became the first FMEG Company to offer door step service via its initiative 'Havells Connect'. Thanks to the quality of products and quicker service, it has minimum customer complaints and highest customer satisfaction. Today, Havells alongwith its brands, has earned the distinction of being the preferred choice of electrical products for discerning individuals and industrial consumers, both in India and abroad. Havells offers same quality products for both Indian and International markets. It is committed to keep powering the world with its state-of-the-art innovations and energy-efficient solutions. Currently over 90% of its product offerings are energy efficient and manufactured in-house. Social and environmental responsibility has been at the forefront of Havells Operating Philosophy and as a result the company consistently contributes to socially responsible activities. For instance, the company is providing mid-day meal in government schools in Alwar district, covering more than 58000 students per day.

The group company, QRG Healthcare, runs a 140 bed hospital in Faridabad. In the past, the company has generously contributed to the society during various national calamities like the Bihar Flood, Tsunami and Kargil National Relief Fund. The essence of Havells' success lies in the expertise of its fine team of professionals, strong relationships with associates and the ability to adapt quickly & efficiently, coupled with the vision to always think ahead.

SOLAR POWER CONDITIONING UNIT - 1 to 3 kW

Single Phase Grid Support



SPECIAL FEATURES

- Multiple 16 bit DSP controllers
- MOSFET / IGBT based power stage for Higher Power Inverter
- KW (Solar) = KW (Load) Load capacity same as SPV module capacity
- 2/3 Channel Interleaved PWM MPPT for efficient charging
- Wide range MPPT input suitable for 36, 60 & 72 cell Solar PV Module
- MPPT achieved through Perturb & Observe Algorithm
- Higher Open Circuit Voltage for better charging efficiency
- Auto Selectable Priority mode (Solar/ Grid Priority mode) for uninterrupted power & savings on Grid power
- **Pure Sine Wave technology**- recommend for better life of Industrial/ Commercial equipment
- Intelligent battery charging- 3 Stage (Bulk, absorption & float) charging for enhanced battery life
- Compatible charger to support all type of batteries i.e Flooded Lead Acid Tubular/VRLA/GEL
- **Automatic transfer** from grid to solar when battery full & Solar available
- Twin DC Fan for optimum thermal management
- Noiseless inverter operation
- Sleek & Aesthetic design
- Works as standalone Solar Inverter in case of no grid
- LED/LCD Display for showing monitoring & instantaneous system data display

OPERATION MODULE

- **Solar Priority Mode:** Under this mode, solar power is used to charge the batteries and run the daytime load directly from the solar power available depended upon the load which helps in saving the electricity.
- **Grid Priority Mode:** Under this mode, solar power is used to charge the batteries and load is normally powered by grid available at site. In case of grid failure the load is supported by batteries. Batteries are charged from the grid in case the batteries are in low condition. This mode is suitable for non sunny days or where more power back-up is required.

PROTECTIONS

*Protection against battery high/low, overload, short circuit, Array reverse, battery reverse and over temperature.

*Additional protection in the battery line via fuse. Grid & output protected via MCB.

SOLAR POWER CONDITIONING UNIT - 1 to 3 kW

Single Phase Grid Support

Solar PCU Specifications:

Model No.	SI1000 PRO	SI2000 PRO	SI3000 PRO
PCU Capacity (KVA)	1.25 KVA	2.5 KVA	3.75 KVA
Nominal Battery Voltage (V dc)	24	48	

SOLAR PHOTOVOLTAIC INPUT			
Maximum PV Power Recommended	1KW	2 KW	3 KW
Solar Charger Type	Maximum Power Point Tracking (MPPT)		
Maximum PV Power Recommended	1KW	2 KW	3 KW
Maximum DC link Voltage (Voc)	90	150	
MPPT Voltage Range (V)	35 - 69	70 - 125	70 - 125

GRID INPUT	
Voltage	220V - 2% Single phase
Mode	Solar Priority or Grid Priority - User selectable

INPUT VOLTAGE RANGE

Acceptable Voltage Range	110-290Vac
Low Voltage Cutoff	110±10Vac
Low Voltage Recovery	120±10Vac
High Voltage Cutoff	290±10Vac
High Voltage Recovery	275±10Vac
Frequency	Same as Mains input (47-53Hz)

OUTPUT VOLTAGE RANGE

Voltage Regulation on Mains	Same as Mains input
Voltage Regulation in Battery mode	220V AC Nominal +/-2% (Range 210-240V selectable)
Frequency Battery Mode	0Hz±0.1Hz
Wave Form	Pure Sine Wave
Power Factor	0.8
THD	≤3%
Efficiency	≥85%

SOLAR POWER CONDITIONING UNIT - 1 to 3 kW

Single Phase Grid Support

Solar PCU Specifications:

Model No.	SI1000 PRO	SI2000 PRO	SI3000 PRO
PROTECTIONS			
Over Load	At 100% Load, Audible Indication. > 101% Load Trips. Retry for 4 times. If the load is not reduced, inverter will shut down after 4 retry. (Manual restart required)		
Output Short Circuit	Circuit Breaker on Mains, Shutdown on Inverter		
Battery Reverse Protection	Fuse		
Low Battery	Load Disconnection		
Thermal Shutdown	Unit inside Temperature at 90°C		
Lightening/Surge Protection	4KV / 6KA		
Solar Reverse	Blocking Diode is provided to Prevent reverse flow of current		
Current Limiting for battery \ Charging	Available		
Battery Charging Current	Optional Battery current limit during low load on solar panel		

ENVIRONMENT	
Operating Ambient Temperature	Circuit Breaker on Mains, Shutdown on Inverter
Relative Humidity	Fuse
Change Over Time	Load Disconnection

DISPLAY	
LED Display	Circuit Breaker on Mains, Shutdown on Inverter
LCD Display	Batter Voltage; I/P Voltage; I/P Frequency; O/P Voltage; Grid Charging Current; Solar Voltage; Solar Charging Current; Solar Units Saved KWH (upto 999.9 Units); Load%, Over Load; Battery Low; UPS/INV Mode

DIMENSIONS		
Model No.	SI1000 PRO	SI2000 / SI3000 PRO
L*W*H (mm)	305*215*340	365*240*425
Weight (Kg)	19	41

SOLAR POWER CONDITIONING UNIT - 5 to 10 kW

Single Phase Grid Support



SPECIAL FEATURES

- $\text{KW (Solar)} = \text{KW (Load)}$ - Load capacity same as SPV module capacity
- MPPT Solar Charge Controller – For efficient charging
- 120 % Panel Over loading
- Wide Range MPPT Suitable for 60 & 72 Cell Solar PV Module
- Selectable Priority mode (Solar / Grid Priority mode) – for uninterrupted power & savings on Grid power
- Pure Sine Wave Technology – recommended for better life of Industrial / Commercial equipment
- Intelligent Battery Charging- 3 Stage (Bulk, absorption & float) Charging- enhance battery life
- Integrated manual bypass switch and separate MCB/ MCCB for battery, solar array, grid and – for 5 kW to 10 kW
- Compatible charger to support all type of batteries i.e. Flooded Lead acid Tubular/VRLA/GEL.
- Automatic transfer from grid to solar when battery full & Solar available
- Twin Fan for Temperature Control
- Alarm for excess load, short circuit, automatic low battery protection
- Compact and light weight
- Works as standalone Solar Inverter in case of no electricity
- LED Indication and LCD Display for showing monitoring instantaneous system data and Indications.
- Changeover - Static Switch and Manual Bypass

OPERATION MODULE

- **Solar Priority Mode:** Under this mode, solar power is used to charge the batteries and run the daytime load directly from the solar power available depended upon the load which helps in saving the electricity.
- **Grid Priority Mode:** Under this mode, solar power is used to charge the batteries and load is normally powered by grid available at site. In case of grid failure the load is supported by batteries. Batteries are charged from the grid in case the batteries are in low condition. This mode is suitable for non sunny days or where more power back-up is required.

SOLAR POWER CONDITIONING UNIT - 5 to 10 kW

Single Phase Grid Support

Solar PCU Specifications:

Model No.	NSI5000 PRO	NSI6000 PRO	NSI8000 PRO	NSI10000 PRO
PCU CAPACITY (kW)	5 kW	6 kW	8 kW	10 kW
PCU CAPACITY (kVA)	6.25 kVA	7.5 kVA	10 kVA	12.5 kVA
Nominal Battery Voltage (V dc)	96	120		180
SOLAR PHOTOVOLTAIC INPUT				
Maximum PV Power Recommended	5 kW	6 kW	8 kW	10 kW
Control Type	Maximum Power Point Tracking (MPPT)			
Voc	400V			
MPPT Range (V)	150-320	170-320		250-320
Capacity	50 Amp Single Channel			
Switching By	IGBT			
GRID				
Voltage	230 volts \pm 2% Single phase			
Mode	Solar Priority Mode or Grid Priority Mode			
GRID VOLTAGE RANGE				
Acceptable Voltage Range	130-270Vac			
Low Voltage Cutoff	130Vac			
Low Voltage Recovery	135Vac			
High Voltage Cutoff	270Vac			
High Voltage Recovery	265Vac			
Frequency	Same as Mains input(47-53Hz)			
OUTPUT VOLTAGE RANGE				
Output Voltage Regulation On Mains	Same as Mains input			
Voltage Regulation in Battery mode	220V AC Nominal \pm 2%			
System Bypass	Manual Bypass using Rotary Switch			
Frequency Battery Mode	50Hz \pm 0.1HZ			
Wave Form	Pure Sine Wave			
THD	\leq 3%			
Efficiency	\geq 85%			
PROTECTIONS				
Over Load	For 100% Load Buzzer Indication, 110% for 30 Sec. 150% for 3 Sec. Instant shutdown			
Short Circuit	Circuit Breaker On Mains, Shutdown on Inverter			
Battery Reverse Protection	Breaker			
Low Battery	Inverter Trip			
Thermal Shutdown	70° C			
Lightening/Surge Protection	In PV input			
Solar Reverse	Blocking Diode is provided to Prevent reverse flow of current			
Current Limit for Charging	Available			
Battery Charging Current	Optional Battery current limit during low load on solar panel			

SOLAR POWER CONDITIONING UNIT - 5 to 10 kW

Single Phase Grid Support

Solar PCU Specifications:

Model No.	NSI5000 PRO	NSI6000 PRO	NSI8000 PRO	NSI10000 PRO
	ENVIRONMENT			
Operating Ambient Temperature	-10 C to 50 C			
Relative Humidity	0-95%			
Change Over time	< 20ms			
	DISPLAY			
LED Indications	Array ON, Load On Grid, Inverter ON/Charger On, Battery Status, Load status/Fault			
LCD Display	Welcome display – System Information,			
LCD Display	I/P Voltage, I/P Current, I/P Power, O/P voltage, O/P current, O/P power, Load %, Battery Voltage, Battery current, Battery status, PV Voltage, PV Current, PV Power, Status : Load On : Grid/Inverter, H.S. Temperature, Priority : Solar/Grid,			

Model No.	NSI5000 PRO	NSI6000 PRO	NSI8000 PRO	NSI10000 PRO
L x W x H (mm)	675 x 300 x 610	675 x 300 x 610	755 x 400 x 810	755 x 400 x 810
Weight Kg	85 Kg	88 Kg	144 Kg	148 Kg

SOLAR POWER CONDITIONING UNIT

Single Phase Grid Support

SYSTEM CONFIGURATION – LOAD WISE										
Sr. No.	System	System Voltage	Solar PV Module	Solar PCU		Load	Battery Qty	Battery Size & Backup		
				MPPT (kW)	Inverter (kVA)			12 V 120 Ah	12 V 150 Ah	12 V 200 Ah
1	1 kW	24	325 Wp x 3 nos	1 kW	1.25 kVA	600 W	2 nos	3.5 Hours	4.5 Hours	NA
						800 W	2 nos	2.5 Hours	3 Hours	NA
						1000 W	2 nos	2 Hours	2.5 Hours	NA
2	2 kW	48	325 Wp x 6 nos	2 kW	2.5 kVA	1200 W	4 nos	3.5 Hours	4.2 Hours	NA
						1500 W	4 nos	2.75 Hours	3.5 Hours	NA
						2000 W	4 nos	2 Hours	2.5 Hours	NA
3	3 kW	48	325 Wp x 9 nos	3 kW	3.75 kVA	2000 W	4nos	2 Hours	2.5 Hours	3.75 Hours
						2500 W	4nos	NA	2 Hours	3 Hours
						3000 W	4nos	NA	1.75 Hours	2.5 Hours
4	4 kW	96	325 Wp x 12 nos	4 kW	5 kVA	2500 W	8nos	NA	4 Hours	NA
						3000 W	8nos	3 Hours	3.25 Hours	NA
						4000 W	8nos	2 Hours	NA	NA
5	5 kW	96	325 Wp x 16 nos	5 kW	6.25 kVA	3000 W	8 nos	3.5 Hours	4 Hours	NA
						4000 W	8 nos	2.5 Hours	3 Hours	NA
						5000 W	8 nos	2 Hours	2.5 Hours	NA
6	6 kW	120	325 Wp x 18 nos	6 kW	7.5 kVA	4000 W	10 nos	3.5 Hours	NA	NA
						5000 W	10 nos	2.5 Hours	3 Hours	NA
						6000 W	10 nos	NA	2.5 Hours	NA
7	8 kW	120	325 Wp x 24 nos	8 kW	10 kVA	5000 W	10 nos	2.75 Hours	3.25 Hours	3.75 Hours
						6000 W	10 nos	2.25 Hours	2.75 Hours	3 Hours
						8000W	10 nos	1.5 Hours	2 Hours	2.3 Hours
8	10 kW	180	325 Wp x 32 nos	10 kW	12.5 kVA	5000W	15 nos	3 Hours	5 Hours	NA
						7500 W	15 nos	2.25 Hours	3.25 Hours	NA
						10000 W	15 nos	NA	2.5 Hours	NA


SOLAR POWER CONDITIONING UNIT

Single Phase Grid Support

SOLAR MODULE	
Solar Module (330 Wp)	
Maximum Power (Wp)	330 Wp
Operating Power Voltage (Vmp)	37.67 V
Optimum Operating current (Imp)	08.79 A
Open circuit voltage Voc	46.24 V
Short circuit current Isc	09.31 A
Module Efficiency (in %)	17.02
Tolerance wattage	0 + 3%
NOCT	45 °C (±2)
Module dimension	1958 mm x 987 mm x 35 mm
Number of cells	72 cells
Weight (in kg)	21.2 kg
Front cover	3.2mm thickness, Low Iron Tempered glass
Frame Material	Anodized Aluminium Alloy



SOLAR BATTERY – TUBULAR LMLA	
Tubular LMLA (Lead Acid Low Maintenance)	
Battery Range 12 V 150 Ah @C10	
Unique tubular positive plates designed for longer life.	
Plate designed with active material to get quick recovery from deep discharge.	
Superior active material and special alloy used for low maintenance of the battery	
Cycle life of 1000 cycles at 75 % DOD	
Battery Container made up of PPCP (Polypropylene Co-Polymer) material	
Compliance - IS 13369 / 1651	



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