

Grid Tied Solar Central Outdoor Inverters 3125 kVA & 2500 kVA (1500VDC)

Generating

3 GW+

Renewable
Power
in Indian
Solar Sector

HIVERTER NP215L Series



Highly Efficient Conversion Technology

About Grid Tied Solar Central Outdoor Inverters

Highly Advanced | Reliable | Highly Efficient | High Performance

Hitachi, with more than 100 years of legacy worldwide and with installation base of Grid Tied Solar Central Inverters in India, brings to you the 3.125 MW & 2.5 MW 1500 VDC Solar Central Outdoor Inverters to maximize the energy yield for multi megawatt & utility scale power plants, available with highly efficient conversion technology. It is a critical BOS (Balance of System) component in a solar photovoltaic system, which converts DC power generated by photovoltaic (solar) array to AC power that is fed to the utility power grid system.

Highlights

- Outdoor IP54 unit: Savings on outdoor civil construction or containerized solution
- 3 level PWM technology to achieve Euro Efficiency @98.6% at Min. DC Input Voltage considering similar outdoor category
- Night time reactive power compensation function
- MPPT controllers having voltage range 950 to 1300 V
- Latest FRT
- Easy to install & maintain
- Low auxiliary power consumption due to variable fan speed control according to power feeding
- DC over power loading up to 200%

Compliance

Safety Testing	IEC 62109-1	Safety of power converters to use in photovoltaic power systems
	IEC 62109-2	Safety of power converters to use in photovoltaic power systems
	IEC 62116	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention
Enclosure Protection	IEC 60529	IP protection
Performance	IEC 61683	Power conditioners: Procedure for efficiency measurements.
EMC	IEC 61000-6-2	Emission requirements
	IEC 61000-6-4	Immunity requirements
Environmental Testing	60068-2-1	Cold test
	60068-2-2	Dry heat test
	60068-2-14	Change of temperature
	60068-2-30	Damp heat cyclic test
Electroacoustic	IEC 61672-1	Sound level meters part-1
LVRT	IEC 62910-2015	LVRT
Harmonics Control	IEEE-519	Recommended practice and requirements for harmonic control in electrical power system
Indian Grid Connectivity	CEA	Technical standard for the connectivity to the grid - for India only (Hitachi PCS can follow the updated CEA guidelines with the available flexible features to meet future grid protection demand)

Control Functions

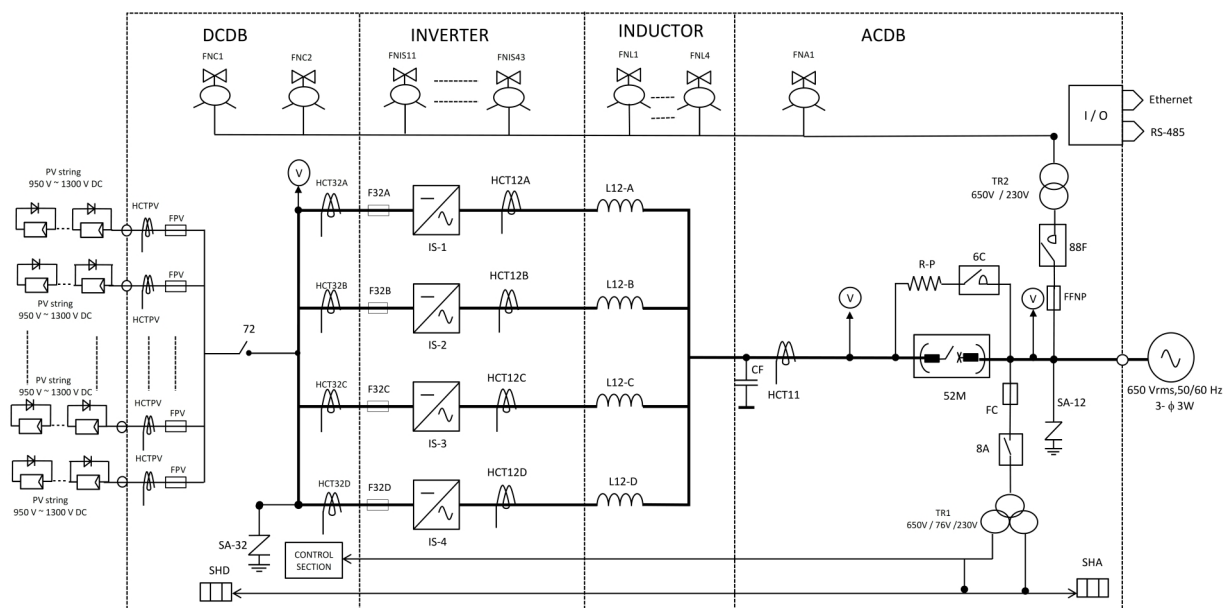
Run/stop Function

- PCS RUN switch / STOP switch or contact input signal to PCS: PCS runs or stops by making a contact input signal to the RUN/STOP switch.
- Operating spot is selected by “Direct/Remote switch” in PCS. Direct control: PCS can be controlled by using RUN and STOP switches Remote control: PCS can be remotely controlled by using contact input signal as RUN/STOP switch.

Active/reactive Power Adjusting Function

- PCS can limit the active power generation of inverter through external command from the control system.
- PCS can adjust the reactive power generation of inverter through internal command from the control system and external signal of SCADA system.
- PCS can adjust the power factor of inverter through internal command from the control system and external signal of SCADA system.

Single Line Diagram



Protection Functions

Functions for Circuit Protection

- In case the PCS keeps an operating, warning alarms ring, light failure occurs, messages will get displayed and will be written in the system log file.
- In case of heavy failure which requires the PCS to stop, the PCS will get turns off and the DC disconnecting switches (72) and AC ACB (52) gets open.
- Once the failure gets remedied, push “FAILURE RESET” and “START” buttons on PCS.
- Individual Input Disconnecter to save Maintenance Time.

Grid Connection Protection

- Hitachi PCS can follow the updated CEA guidelines with the available flexible features to meet future grid protection demand.
- In case PCS detects an abnormal behaviour like over/under voltage, over/under frequency in the power grid, PCS will get turned off. The detection level and detection time can be set as per the local grid requirement.
- When the normal behaviour in the power grid gets restored for one second, the PCS restarts automatically.
- If the normal behaviour continues for more than one second, the AC ACB (52) also will get opened.
- Recovery and restart are as follows.
 - After recovery from abnormal behaviour in the power grid, start the PCS manually by pushing the SYSTEM ABNORMAL RESET button and START button.
 - ABNORMAL RESET” button and “START” button.
 - After the confirmation time from an abnormal behaviour in the power grid, the PCS restarts automatically

Technical Specifications

Model		HIVERTER NP215L	
Solar PCS Rating (AC)	3125 kVA	2500 kVA	
DC-AC Conversion System	3 Level High Frequency PWM Inverter		
Control System	MPPT and AC Current Control		
Grid Data			
Power Rating	3125 kVA @50 °C ambient 3375 kVA @25 °C ambient	2500 kVA @50 °C ambient 2700 kVA @25 °C ambient	
AC Grid Connection	Three Phase		
Maximum AC Current	2775 A @50 °C ambient 2997 A @25 °C ambient	2223 A @50 °C ambient 2400 A @25 °C ambient	
Output Waveform THDI	<3% at rated current		
Nominal Output Voltage (Rated voltage)	650 V AC		
Output Voltage Range	650 V ± 10%		
Output Frequency Range	50/60 Hz ± 2 %		
Transformer	Transformer-less Design		
Peak Efficiency	98.7% at Min DC Input Voltage	99% at Min DC Input Voltage	
Euro Efficiency	98.3% at Min DC Input Voltage	98.6% at Min DC Input Voltage	
Power Factor (Adjustable)	0.80 Lead to 0.80 Lag (with in Max. kVA limited at maximum Ampere rating)		
PV Side			
Maximum DC Power loading (1)	4.062 MW	3.25 MW	
Start Up Voltage(4)	950 V		
MPPT Voltage Range (2)	DC 950 to 1300V		
Maximum DC Input Voltage (OC)	1500 V		
Minimum DC Input Voltage	950 V		
Maximum DC Input Current	3335 A @50 °C ambient 3625 A @25 °C ambient	2668 A @50 °C ambient 2900 A @25 °C ambient	
No of String Inputs	20	16	
No of MPPT functions	1		
Auxiliary Power Supply			
Control Power in Operation	AC 230V 1Φ (Internal 200 W during operation)		
Cooling Fan Power	AC 230V 1Φ (Internal 5000 W (max) during full load operation at 50 °C ambient. Consumption will reduce according to load and ambient temperature)		
Cooling control			
Cooling Type	Heavy Duty fans with variable speed & high service life (Each Inverter)		
Protections			
Islanding Protection	Yes		
Temperature Protection	Yes		
Ground Fault detector	Yes		
Grid Monitoring	Yes		
AC Short Circuit and Over Current	Yes		
AC & DC Over Voltage and Temperature	Yes		
Reactive Power Control	Yes		
Automatic Wake-up and Shut-down	Yes		
Breaker on AC Side	Air Circuit Breaker (ACB) at output		
LVRT	Yes		
Switch on DC Side	DC Disconnect Switch		
Negative grounding	Yes (Optional)		
Communication			
Visual Display	Colour LCD Display with Touch Screen (5.7 inch)		
SCADA Interface	Rs485 Modbus / Modbus TCP-IP / TC P-IP over Ethernet		
Data Logging	Yes		
Access Interface / Field Bus Connectivity	RS 485 or TCP-IP (Ethernet)		
Digital Input / Relay Output	8 (Optional)		
Mechanical			
Dimensions (H x W x D) mm	2214 x 3482 x 1406 (Including Air duct)		
Weight (kg)	4000 (approximate)	3500 (approximate)	
Environmental Limits			
Installation	Outdoor		
Enclosure Protection	IP 54 with Electronics IP65		
Operating Temperature range (3)	(-)0° C to (+) 60° C		
Relative Humidity	15% to 95% (Non Condensing)		
Maximum Noise Level	<= 90 dBA at a distance of 1 meter		
Altitude	0 to 2000 meters		
Standards			
Applicable Standard	IEC-62109-1, IEC-62109-2, IEC-62116, IEC-61683, IEC 61000-6-2, IEC 61000-6-4, IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-14, IEC 60068-2-30, CEA.		

Notes: (1) Maximum DC power can be loaded up to 30%. Same can be discussed during detail engineering. (2) EPC/Plant designer should select MPPT voltage range within mentioned DC voltage range. (3) 10 % de-rating per degree rise in temperature from 50° C to 60° C. (4) Start up voltage can be adjusted at site based on site condition.

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