

Grid Tied Solar Central Outdoor Inverters
2.5 MW (1500 VDC)

Generating

3 GW+

Renewable
Power
in Indian
Solar Sector

**HIVERTER
NP-215L 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 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

- Rated output power 2500 kW @ 50°C ambient and 2700 kW @ 25°C ambient
- 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

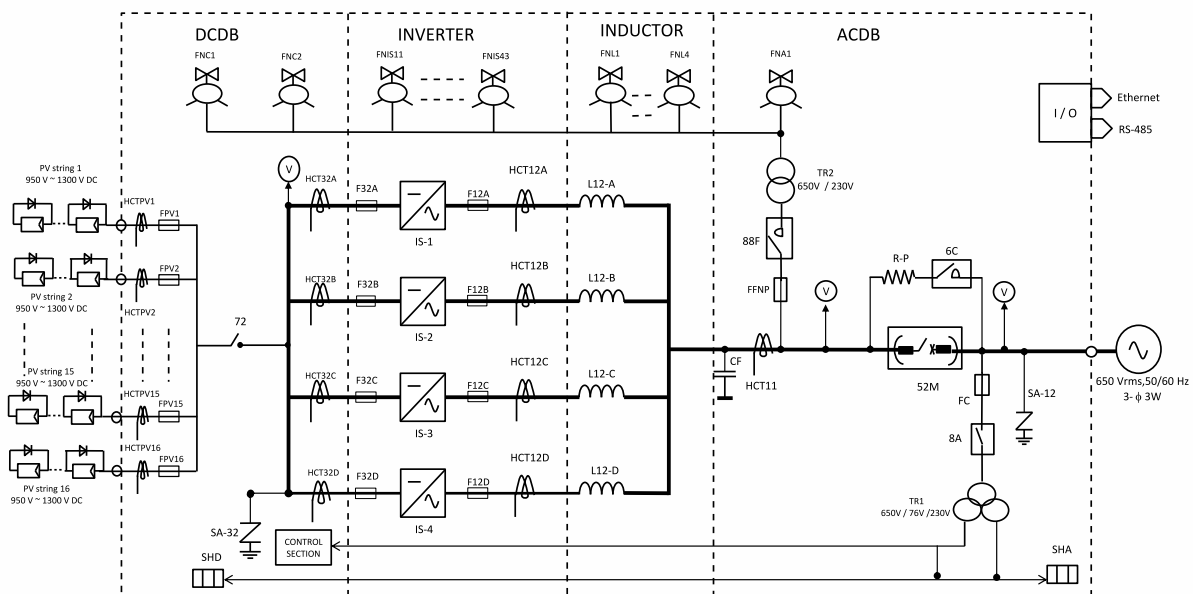
Run/stop Function

- 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)		2500 kW
DC-AC Conversion System		3 Level High Frequency PWM Inverter
Control System		MPPT and AC Current Control
Grid Data		
Power Rating		2500 kW @50 °C degree ambient 2700KW @ 25 °C degree ambient
AC Grid Connection		Three Phase
Maximum AC Current		2223 A @50 °C degree ambient 2474 A @ 25 °C degree 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		99% at Min DC Input Voltage
Euro Efficiency		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)		2535 kW (min.)
MPPT Voltage Range (2)		DC 950 to 1300 V
Maximum DC Input Voltage (OC)		1500 V
Minimum DC Input Voltage		950 V
Maximum Input Current DC		2668 A
No of MPPT functions		1
Auxiliary Power Supply		
Control Power in Operation		Internal 200W during operation
Cooling Fan Power		Internal 4000W (max) during full load operation at 50 degree C. 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
DC Reverse Polarity 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		
Weight (kg)		3500 (approx.)
Environmental Limits		
Enclosure Protection		IP 54 with Electronics IP65
Operating Temperature range		(-)0° C to (+) 60° C
Relative Humidity		15% to 95% (Non Condensing)
Maximum Noise Level		85 dBA at a distance of 1 meter
Altitude		0 to 1000 meters
Standards		
Compliance		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 200%. Same can be discussed during detail engineering. (2) EPC/Plant designer should select MPPT voltage range within mentioned DC voltage range.