

Grid Tied Solar Inverters

Central Inverters (250 kW to 2.5 MW)

String Inverters (1.1 kW to 255 kW)

Generating
3 GW+

Renewable
Power
in Indian
Solar Sector

 Highly Efficient Conversion Technology

About Hitachi Hi-Rel Power Electronics

Founded & established in 1983 as Hi-Rel Electronics Pvt. Ltd., which later on in year 2015 had become the 100% subsidiary company of Hitachi, Japan which is one of the Global fortune 500 companies with a new name as Hitachi Hi-Rel Power Electronics Private Limited, which is being recognized as one of the pioneers in power electronics domain. Hitachi Hi-Rel, today, is a leading manufacturer of Industrial UPS, IT & Infra UPS, Medium & Low Voltage Variable Frequency Drives, Grid Tied Solar Inverters, Air Compressors and Railway Inverters.

Hitachi Hi-Rel has state-of-the art manufacturing facility at Sanand near Ahmedabad in Gujarat-India. Hitachi Hi-Rel is helping a wide array of industries and organizations to meet the mission critical demands through technologically superior, low polluting and innovative products Solutions and continue to offer world class power electronics products, value added services & customized solutions.

With a vision of “To be recognized as the most trusted Power Electronics Company by supplying superior products and services”, Hitachi Hi-Rel has garnered a significant level of trust in Indian power electronics market segment wherein it serves the entire gamut of Industries, particularly in mission critical applications for Refineries, Petro-Chemicals, Power Generation, Steel & Metals, and Process Industries as well as Critical Data Processing Applications. Besides offering greater energy efficiency & lower carbon footprint, each of the company product streams bears the hallmark of excellence with company accreditations. Hitachi Hi-Rel is an ISO 9001:2015, ISO 14001:2015 & ISO 45001:2008 certified company having export house status. Hitachi Hi-Rel sales network & service infrastructure expands out to the world & with this network, we have made strong inroad in Global markets like South East Asia, Middle East, Africa and Brazil. Also, with a presence of strategically located skilled service engineers in India helps us to score high in terms of customer expectations on service deliverables & uptime of the product.

Hitachi Hi-Rel's UPS and power conditioning back-up systems, the flagship product, works as an exceptional safeguard against power disruption and reflects the industry's ultimate in advanced technology with proven track record in mission critical applications. Its variable frequency drives represent the most energy efficient means of process control and reflect the best in

process control. Hitachi Hi-Rel's Grid Tied Solar Inverters are based on the contemporary technology of Hitachi Ltd, Japan. Currently Hitachi branded Solar Inverters are generating more than 5.5 GW renewable power in Global Solar Domain as well as more than 3 GW+ renewable power in Indian Solar Domain.

Sprawling across an area of 26,000 sq. meter and modelled on Hitachi's Omika Works in Japan, Hitachi Hi-Rel's Sanand manufacturing works is the world class and one of the most modern power electronics manufacturing facility in India. All aspects of manufacturing, testing and quality assurance are supported by highly experienced Japanese Expats stationed at the facility. Sanand Works employs Hitachi Omika Works (Japan) based software tools for engineering and manufacturing and has one of the most advanced product testing facilities in the country. Innovation through research & development has been rooted in its DNA. Hitachi Hi-Rel also has an additional facility at Gandhinagar near Ahmedabad in Gujarat which is sprawled across an area of 5,000 sq. meter. Its new products are developed by the R&D team which are on par with global standards. Along with indigenisation of products from Hitachi, original design of UPS and railway products are done regularly by the in-house R&D team.

With expertise, experience and an efficient product line, Hitachi Hi-Rel will always try to be your power electronics partner. When you choose to do business with Hitachi Hi-Rel, you are partnering with a company who cares.



Hitachi's Presence in Indian Solar Domain

The government of India recognizes the need of sustainable, eco-friendly and innovative recyclable resource based energy solution and with nearly 300 sunny days in India, the government through National Solar Mission is mobilizing infrastructure to create 100 Giga Watts of solar electricity generation capacity by 2022.

Hitachi Solar Inverter is a potent example, which being at the heart of Solar power generating system is bringing Social Innovation in the Indian power sector by providing the critical technological link which enabled conversion of DC to AC to help solar power distribute through the national grid. Thus, promoting clean, renewable energy and reducing the dependency on polluting fossil fuel based power generation.

With over 3 GW installation base in India, Hitachi Grid Tied Solar Inverters are among the best available Grid Tied Solar Inverters which are high performance inverters, highly advanced & reliable, highly efficient, easy to install, safe, helping you achieve better ROI with higher yields and lower maintenance cost.

- World class and most modern manufacturing works at Sanand in Gujarat, India
- Gandhinagar Facility
- Successful track record of about 40 years in designing and manufacturing of highly efficient power electronics products
- Commissioned >3 GW grid tied solar inverters in India and >5 GW Globally
- Generating unmatched energy yield through 3 level advance PWM technology
- Prompt availability of spares and components locally in India
- Most acclaimed service support through branch offices across the country

Hitachi envisions a very green future, a future where by 2022, solar power can indeed form the backbone of India's energy security and independence and we help light up millions of lives by progressively contributing to the renewable energy vision of 'power for all' vision of the Indian government.

Let's Solarize...for a better brighter world



Grid Tied Solar Central Inverters

HIVERTER NP201i Series



kW Scale Central Inverter



MW Scale Central Inverter

With over 3 GW installations in India, Hitachi Grid Tied Central Inverters are among the best available Grid Tied Solar Inverters which is suitable for multi megawatt and utility-scale PV power plants. It is a critical balance of system (BOS) component in a solar photovoltaic system. It converts DC Power generated by the Photovoltaic (Solar) array to AC Power that is fed to the Utility Power Grid System.

This highly acclaimed Hitachi Solar Inverters are being developed at Sanand based manufacturing facility near Ahmedabad in India based on the contemporary technology of Hitachi Ltd, Japan, ably supporting Government of India's 'Make in India' initiative. It has been thoughtfully designed keeping all the critical parameters and challenges faced by project developers in terms of better grid compliance & most importantly CAPEX Vs. YIELD factor.

With reactive power control, 3 Level IGBT technology and wider MPPT range, Hitachi solar inverters deliver considerably maximum power generation. Its compact design and lower weight offers ease of installation, repair & maintenance. Its large touch screen display collects the real-time data and provides fault detection diagnostics; ensure faster retrieval of Information for corrective action. It is also suitable for high ambient temperature.

Product Range

- kW Scale: 250 kW, 500 kW, 630 kW, 670 kW, 715 kW
- MW Scale: 1 MW, 1.25 MW, 1.34 MW, 1.43 MW, 2.5 MW

Highlights

- 3 Level PWM Inverter technology resulting in reduction of losses, low harmonic output current (< 3%) & improved efficiency
- Reactive power control (night time)
- Suitable for handling DC overloading capacity up to 140%
- Widest MPPT range
- Flexible output AC voltage suitable for retrofitting jobs.
- Low current harmonic distortion
- Lowest auxiliary consumption
- Rated power @ 0.95 pt at 50°C
- Provision of air circuit breaker at o/p at each MW scale inverter
- 2.5 MW containerized solution
- Reactive power control (night time)
- Suitable for handling DC overloading capacity up to 140%
- Widest MPPT range
- Flexible output AC voltage suitable for retrofitting jobs.

Hitachi Milestone Projects in India

Grid Tied Central Inverters (1.25 MW Model)

	Location	Adani Kamuthi		Location	NTPC Mandsaur
	Project Volume	360 MW		Project Volume	230 MW
	Commissioned	April 2016		Commissioned	July 2017

	Location	NTPC Bhadla		Location	GIPCL
	Project Volume	195 MW		Project Volume	155 MW
	Commissioned	November 2017		Commissioned	April 2017

	Location	NTPC Anantapur		Location	Adani Punjab
	Project Volume	150 MW		Project Volume	90 MW
	Commissioned	April 2015		Commissioned	September 2017

	Location	NLC		Location	Renew Power
	Project Volume	65 MW		Project Volume	50 MW
	Commissioned	August 2017		Commissioned	March 2016

	Location	Rays Infra		Location	ACME
	Project Volume	50 MW		Project Volume	25 MW
	Commissioned	April 2018		Commissioned	March 2014

Technical Specifications

Solar Central Inverter - 250 kW to 715 kW

Solar Inverter Rating		250 kW	500 kW	630 kW	670 kW	715 kW
AC-DC Conversion System		3 level high frequency PWM Solar Inverter				
Control System		MPPT and AC current control				
Grid Data	Power Rating	250 kW	500 kW	630 kW	670 kW	715 kW
	AC Grid Connection	Three phase				
	Maximum AC Current	554 A	1049 A	1107 A	1107 A	1107 A
	Output Waveform THDi	< 3% at rated current				
	Nominal Output Voltage	300 V ±10 %	300 V ±10 %	350 V ±10 %	370 V ±10 %	400 V ±10 %
	Output Frequency Range	50 Hz or 60 Hz ± 5%				
	Transformer	Transformer-less design				
	Peak Efficiency	98.7%				
	EURO Efficiency	98.4%				
	Power Factor (adjustable)	0.80 Lead to 0.80 Lag within max. kVA limit				
PV Side	Maximum DC Power	300 kW	600 kW	756 kW	806 kW	858 kW
	MPPT Voltage Range	DC 460 to 900 V	DC 460 to 900 V	DC 525 to 900 V	DC 550 to 900 V	DC 600 to 900 V
	Maximum DC Input Voltage (OC)	1000 V (heavy failure protection level)				
	Minimum DC Input Voltage	460 V	460 V	525 V	550 V	600 V
External Auxiliary Power Supply	Maximum Input Current DC	600 A		1200 A		
	Control Power in Operation	AC 230V, 1Φ, 300W, Max. 6.9A				
	Control Power in Stand-by Mode	< 100 W				
Protections	Cooling Fan Power	AC 415V 3Φ, 400W				
	Islanding Protection	Yes				
	Temperature Protection	Yes				
	Ground Fault Monitoring	Yes				
	Grid Monitoring	Yes				
	AC & DC Short Circuit and Over Current	Yes				
	AC & DC Over Voltage and Temperature	Yes				
	Cooling (controlled)	Forced cooling				
	Fault Ride Through (FRT)	Available operation will be continued in case of momentary voltage dip of residual positive phase.				
	Reducing Grid Voltage Fluctuation Control	Voltage fluctuation due to power change at inter-connecting point will be reduced to within 2%				
Communication	Automatic Wake-up and Shut-down	Yes				
	Breaker on AC Side	MCCB at output				
	Switch on DC Side	Motorized DC Switch at Input				
	Visual Display	LCD display with touch screen				
	Wired Local Monitoring	1 x RS 485 or TCP/IP				
	Unit-wise Integrated Data Logging	Yes				
Mechanical	Access Interface / Field Bus Connectivity	RS 485 or TCP-IP (ethernet)				
	Analogue Input / Output	3 (optional)				
Environmental Limits	Digital Input / Relay Output	4				
	Dimensions (H x W x D) mm (approximate)	1900 x 1400 x 1000				
	Weight (kgs) (approximate)	800	1200	1200	1200	1200
	Enclosure Protection	IP 20 (IP 21 optional)				
	Temperature Range	(-) 20° C to (+) 50° C				
Environmental Limits	Relative Humidity	15% to 95% (non condensing)				
	Maximum Noise Level	75 dBA at a distance of 1 mtr (JIS C 1509 class 2-A characteristic)				
	Altitude	0 to 1000 Mtrs. (option: 2000 mtrs.)				
	Cooling Air Flow	3760 M³/Hr.				

Technical Specifications

Solar Central Inverter - 1000 kW to 2500 kW

Solar Inverter Rating	1000 kW	1250 kW	1340 kW	1430 kW	2500 kW
DC - AC Conversion System	3 Level High Frequency PWM Inverter				
Control System	MPPT and AC Current Control				
Grid Data					
Power Rating	1000 kW	1250 kW	1340 kW	1430 kW	2500 kW (2 x 1.25 MW)
AC Grid Connection	Three Phase				
Maximum AC Current	2214 A			4428 A - Dual Output Each @ 2214 A	
Output Waveform THD ⁽¹⁾	< 3% at Rated Current				
Nominal Output Voltage (rated voltage)					
Output Voltage Range	300 V ± 10%	350 V ± 10%	370 V ± 10%	400 V ± 10%	350 V ± 10%
Output Frequency Range	50 Hz or 60 Hz ± 5%				
Transformer	Transformer-less Design				
Peak Efficiency	98.6% at Min DC Input Voltage			98.4% at Min DC Input Voltage	
Euro Efficiency	98.4% at Min DC Input Voltage			98.1% at Min DC Input Voltage	
Power Factor (adjustable)	0.95 Lead to 0.95 Lag 0.80 Lead to 0.80 Lag (within max. kVA limited at maximum ampere rating)				
PV Side					
Maximum DC Power Loading ⁽¹⁾	1200 kW	1500 kW	1610 kW	1716 kW	3000 kW
MPPT Voltage Range ⁽²⁾	DC 460 to 900 V	DC 525 to 900 V	DC 550 to 900 V	DC 600 to 900 V	DC 525 to 900 V
Maximum DC Input Voltage (OC)	1000 V (Heavy Failure Protection Level)				
Minimum DC Input Voltage	460 V	525 V	550 V	600 V	525 V
Maximum Input Current DC	2400 A			2 x 2400 A	
No of MPPT Functions	Single				Dual / 2 MPPT
External Auxiliary Power Supply					
Control Power in Operation	AC 230 V, 1φ, 160 W, Inrush Current up to 20 Amp for 2 Cycle			AC 230 V, 1φ, 320 W, Inrush Current up to 40 Amp for 2 Cycle	
Control Power in Stand-by Mode	< 100 W				< 200 W
Cooling Fan Power	AC 415 V 3φ, 800 W			AC 415 V 3φ, 1600 W	
Cooling Control					
Forced Cooling	Two Heavy Duty Fans with High Service Life			Two Heavy Duty Fans (each PCS) with High Service Life	
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				
Fault Ride Through (FRT) (also known as Low Voltage Ride Through (LVRT) as per CEA guideline 2007 - Amendment of 2013)	Yes				
Reactive Power Control	Yes				
Automatic Wake-up and Shut-down	Yes				
Breaker on AC Side	Air Circuit Breaker (ACB) at Output				
Switch on DC Side	Motorized DC Switch at Input				
Negative Grounding	Yes (optional)				
Night Time Reactive Power Compensation	Yes (optional)				
Communication					
Visual Display	Colour LCD Display with Touch Screen (5.7 inch)				
SCADA Interface	RS 485 Modbus / Modbus TCP-IP / TCP-IP Over Ethernet				
Data Logging	Yes				
Access Interface / Field Bus Connectivity	RS 485 or TCP-IP (ethernet)				
Analogue Input / Output	3 (optional)				
Digital Input / Relay Output	4				
Mechanical					
Dimensions (H x W x D) mm ⁽³⁾	2082 x 3202 x 1000 (including DC input terminal and AC termination Panel)			2 x (2082 x 3202 x 1000) (including DC termination and AC termination panel)	
Weight (kgs)	2200 (approximate)			4400 (approximate)	
Environmental Limits					
Enclosure Protection ⁽⁴⁾	IP 20			IP 20 (PCS) / IP 54	
Operating Temperature Range ⁽⁵⁾	(-) 0°C to (+) 50°C				
Relative Humidity	15% to 95% (non condensing)				
Maximum Noise Level	75 DBA at a distance of 1 Meter (JIS C 1509 class 2 - a characteristic)				
Altitude ⁽⁶⁾	0 to 1000 Meters				
Cooling Air Flow	7520 m ³ / hr			15040 m ³ / hr for 2.5 MW Power	

Notes:

- (1) Maximum DC power can be loaded up to 140%. Same can be discussed during detail engineering.
 (2) Flexible output AC voltage suitable for retrofitting jobs.
 (3) EPC / Plant designer should select MPPT voltage range within mentioned DC voltage range.

- (4) Dimensions will be depended on final engineering and design. DC IP box with 12 Input at positive side only (350Amp PV fuse).
 (5) IP 21 optional.
 (6) No de-rating up to 50° C, 1.5% de-rating per degree rise in temperature from 50° C to 60° C.
 (7) Optional: 2000 meters.

Grid Tied Solar Central Outdoor Inverters

HIVERTER NP215L Series

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%

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.



Protection Functions

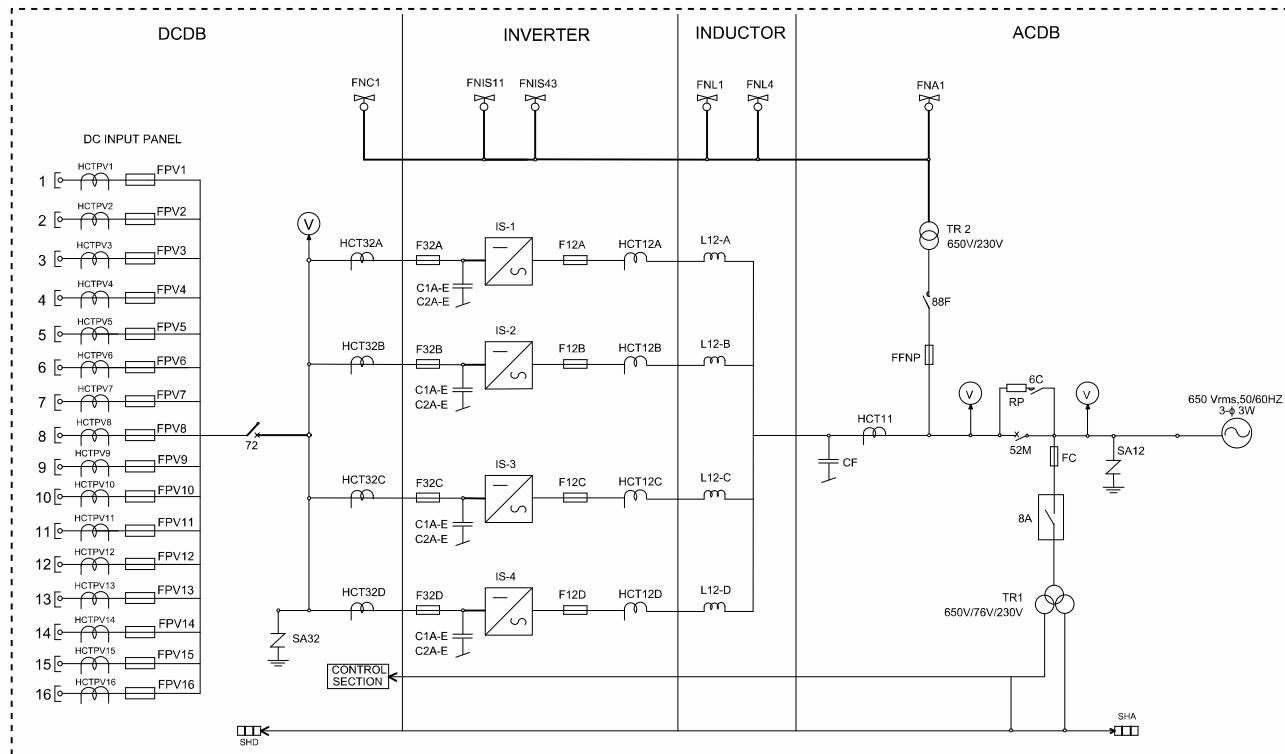
Functions For Circuit Protection

- 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 turned off and the DC disconnecting switches (72) and AC ACB (52) gets open.
- Once the failure gets remedied, push "FAILUREREFRESH" and "START" buttons on PCS.
- "Individual Input Disconnector 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

Single Line Diagram



Technical Specifications

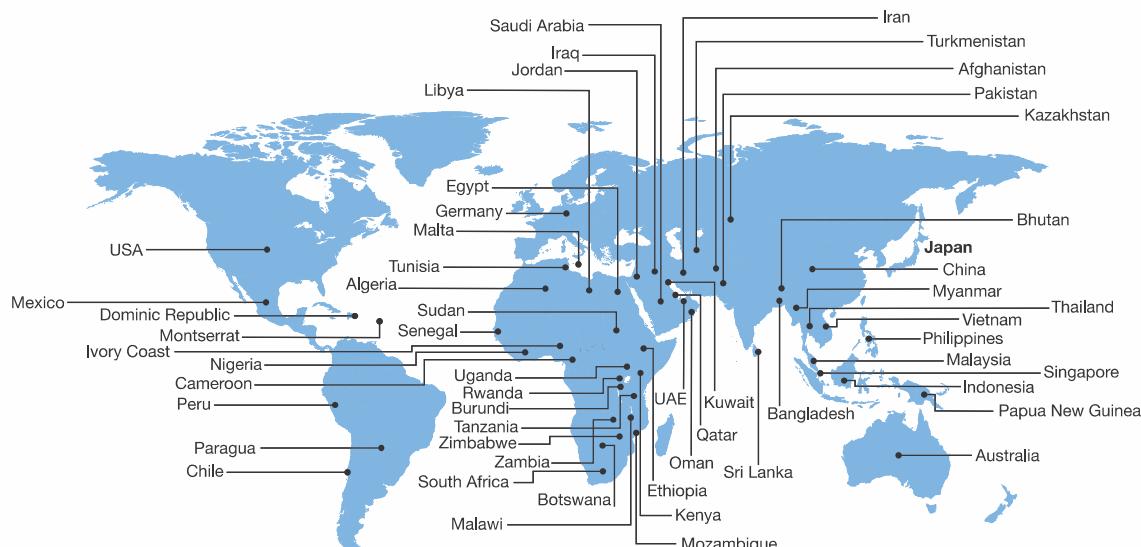
Solar Central Outdoor Inverter - 2.5 MW (1500 VDC)

Model	HINVERTER 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 Disconnector 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	(-)° 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	
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 200%. Same can be discussed during detail engineering. (2) EPC/Plant designer should select MPPT voltage range within mentioned DC voltage range.



Worldwide Presence



 Pan India Presence



Contact us

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