BHEL,CORPORATE RESEARCH & DEVELOPMENT CENTER
Vikasnagar,Hyderabad,INDIA.

Specification Compliance Sheet

S. No.	Parameter	Description	Compliance
1	**INPUT**		
1	Maximum DC Voltage for a string	880 V DC	Complied
2	Maximum DC Current for sub-array	84.4 Amps DC	Noted
3	MPP voltage range	450 to 700 volts DC	Complied
4	No. of DC inputs	5 Nos to Inverter through 5 pairs of cables of 95 mm2 each (Provision for proper termination of these cables should be made)	Complied
2	**OUTPUT**		
1	Output Voltage	**Nominal voltage of 415 (line) V AC, 3 Phase, 4 wire, grid tracking**	
		The Inverter output should be provided through an isolation transformer of utility frequency.	Complied
		The inverter output will be connected to a Substation transformer (415 V / 6.6 kV) through 240 mm2 cables. Provision for terminating 240 mm2 cables should be provided	Complied
2	Output Frequency	50 Hz	Complied
3	Output Power	250 kWp @ Unity Power Factor	Complied
4	Grid Specifications	Nominal voltage is 415 (Line) volts, 50 Hz, 3 phase, 4 wire; Tolerance on nominal voltage is: +15% and -20% Tolerance on nominal frequency is +/- 3 Hz	Complied Complied for Tolerance limits.
5	Waveform	**Should be DSP/Microcontroller generated PWM, Sinewave output**	Complied
6	Voltage THD	< 3 %	Complied
7	Maximum Efficiency	> 96% ; The vendor shall specify the conversion efficiency at different loads say 25%, 50%, 75% and 100% in his offer.	Complied. 97.8% at 100% 97.8 at 75% 97.3% at 50% 96.2 at 25% .
3	**PROTECTION**	**Inverter should get disconnected from utility grid**	
1	Over/under voltage; Over/under current at Input	Through Fuses and/ or Circuit breakers/Contactors etc. at Input	Complied.
	Over/under voltage; Over/under current at output	Through Fuses and/ or Circuit breakers/Contactors etc. at output of	Complied.

		Inverter as per specified utility grid tolerance.	Complied.
2	Over/Under frequency at output	As per specified utility grid tolerance	Complied.
2	Ground fault detection	To be provided along with audio/visual alarm	Complied.
3	Insulation monitoring of the PV Array	To be provided along with audio/visual alarm	Not Availaible
4	IGBT stack Heat sink over temperature	To be provided along with audio/visual alarm	Complied
5	Cooling fan failure (if cooling fan is provided for Inverter stack)	To be provided along with audio/visual alarm	Complied
6	**Prevention of DC Power injection into the grid.**	**Inverter output should be through an isolation transformer of utility grid frequency.**	Complied. (415V output provided.)
7	Surge protection	Surge Protection Devices (SPD) should be provided at input/output of the inverter . The make of the SPDs should be **:** Phoienix /Obo Betterman / equivalent	Complied.
8	Provision for Earthing.	Should be provided	Complied.
9	Protection against islanding of grid	Inverter should automatically get disconnected from grid and should get connected to the grid as per IEEE 1547/UL 1741/or equivalent Indian standards	Complied.
4	**OTHER FEATURES**		
1	Modes of operation	Inverter should automatically enter into Sleep mode, standby mode, wake up mode, export mode etc. depending on the operating conditions.	Complied
2	Self Diagnostics	A self diagnostic system check should occur on start up.	Complied
3	Local display	Indication for Inverter status (online or offline);Inverter ok; system fault etc. shall be provided;	Complied
		Instantaneous values of the following parameters shall be displayed: PV voltage ,PV current , PV Power output, Solar KWh	Complied
		AC voltage (all three phases), AC current (all three phases), AC Power summation output, Exported kWh; Hours run	Provided. However, Hours run not available.
		AC output frequency, Power factor	Complied.
		Solar radiation, Wind speed, PV module surface temperature, Ambient temp etc	Complied.
4	Local control	It shall be possible to switch off / or isolate the Inverter MANUALLY from DC side and AC side in case of an emergency.	Complied
		It shall also be possible to test the Inverter in off-grid mode.	NO
		To facilitate testing in off-grid mode , provision shall be made for setting and adjusting the nominal voltage and frequency from local control panel over its range of operation.	NO
4	**OTHER FEATURES**		

5	Remote Display	It shall be possible to display all the parameters mentioned at 4.3 through local LAN/Internet on a PC	ETHERNET & monitoring software can be provided.
6	Remote control	It shall be possible to switch off the Inverter remotely through a PC	Not available.
8	Applicable standards	a. Inverter shall confirm to **IEC 60068-2** standards for environmental testing. b. Inverter shall conform to **IEC 62093** for MPPT Control.	Complied.
4	**OTHER FEATURES**		
9	Instruments for SPV Plant Field environmental monitoring.	For measuring solar radiation, wind velocity/direction, module temperature, ambient temperature etc	Complied. Pyranometer, cell temperature, ambient temperature wind speed sensors will be provided.
5	**INVERTER OPERATING ENVIRONMENT**		
1	Environment temperature	0 to 40 Deg. C	Complied
2	Humidity	95%, Non-condensing	Complied
3	Enclosure	In-door application, IP20	Complied
6	**ANNUAL MAINTENANCE CHARGES**	Supplier should quote for AMC	Noted