Traction inverter for testing the Traction Induction motor for electric vehicle Application				
S.No	**Description**	**Rating / Requirement BHEL**	**To be filled by the Supplier**	**Remarks**
1	**Application**	The liquid cooled 3-Ph traction grade inverter is being planed to use In a test setup where the developed induction motor is under test.		
2	**Scope of supply**			
	Traction inverter with DSP Controller	1). Liquid cooled 3-Phase traction inverter system with integrated DSP controller. The system consists of (a). 3-Phase IGBT power module comprises of IGBT connected in 3-Phase inverter topology, DC link capacitor, temperature & current sensors for each phase, DC link voltage sensors, gate drivers and liquid cooled heat sink. (b). TI make DSP based controller.		
		2). The total system should be enclosed in IP67 enclosure with water cooling provision with inlet & outlet for liquid flow.		
		3). The required control & protection signals from or to DSP to other internal sub-system should be wired. The DSP controller should have provision to communicate with other external system through CAN/RS 232		
		4). All the power terminals of DC link (positive and negative) and 3-Ph line terminals shall be brought out on to the enclosure for external connection. The control interface I/O signals which are configured externally with DSP shall be brought out on to the enclosure through a connector. The detailed list of signals are given in table-1.		
3	**Quantity of supply**	Traction Inverters with DSP Controller - 2 No's		
4	**Continuous Power**	170 kVA		
5	**Peak Power Output**	220 kVA for 10 sec for every 5 minutes duration.		
6	**Input DC Voltage range**	500 VDC to 750 VDC		
7	**Operating frequency Range**	5 Hz to 500Hz		
8	**Type of Cooling**	Liquid Cooling		
9	**Switching frequecny**	operating switching frequency is 6 kHz		
10	**DC Capacitance**	minimum of 1.25 mF		
11	**Enclosure**	IP67		
12	**Control supply for electronics**	18- 32 V		
13	**Communication to external world**	The DSP controller should have CAN Interface communication and RS-232.		

14	**DSP programming**	The DSP controller shall have the provision of developing a software for drive control application by the user.		
15	**Hydraulic & Temperature data of cooling system**	The supplier should mention the hydraulic data like flow rate, pressure, pressure drop and temperature details like input temperature, temperature gradient etc. The cooling system arrangement is given in annexure-1.		
16	**Protection features**	The inverter system shall have the protection functions against the DC overvoltage, over current, temperature and gate driver circuits with dv/dt and di/dt protections.		
	General			
1	**Size and weight of the inverters**	The inverters size and weight shall be as less as possible. The weight should be less than 35 kG and the size should fit into 500 x 500 x 200 mm (LxBxH).		
2	**Instruction Manual**	The supplier shall provide the hard copy of the instruction, troubleshooting and commissioning manuals		
3	**Warranty**	The supplier shall provide the warranty of 18 Months from the date of supply or 12 months from the date of commissioning, whichever is earlier.		
4	**Tools for maintenance**	If any special tools are required for assembly and maintenance purpose, the same shall be offered seperately.		
5	**Test reports**	Prior to Inspection, test reports of the inverter testing has to be submitted, based on the submitted test reports the BHEL will decide whether to carry out the inspection or not.		
6	**Inspection**	Inspection shall be carried out to witness the inverter thermal design. If the facility is not available, the same shall be carried out at BHEL R&D, Hyderabad.		