


Ref. No. HY/OP/CAPITAL/2009-10/008, Dated: 24/12/2009

	BHARAT HEAVY ELECTRICAL LIMITED			Enquiry No. :	
	UNIT'S ADDRESS:			Due Date :	
	UNIT'S PHONE NOS.			Supplier Qtn. No.:	
	CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL (FROM PURCHASE DEP'T.)			Date :	

SPECIFICATION CUM COMPLIANCE CERTIFICATE FOR 110KW STAR DELTA STARER CONTROL PANEL

NOTE:-				
1. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance.				
2. The offer and all documents enclosed with offer should be in English language only.				

ADDRESS OF THE SUPPLIER :		ADDRESS OF THE INDIAN	
TELEPHONE NOS.:		TELEPHONE NOS.:	
FAX NOS.:		FAX NOS.:	
E-MAIL ADDRESS :		E-MAIL ADDRESS :	

SCOPE: SUPPLY & COMMISSIONING OF 110KW STAR DELTA STARER CONTROL PANEL WITH SPECIFICATION AS BELOW

SL. NO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED BY	OFFERED	DEVIATIONS	REMARKS
1	PURPOSE				
1.1	Star delta starter is required to operate drive motor for driving a planetary gear box using belt and pulley transmission, essentially to meet starting torque requirement at start up and continuous operation of gear box during No load Mechanical run test of Planetary gear box.	Vendro to Confirm			
1.2	The actual output of the motor will usually be between 10 - 25 kW. The metering should be able to handle even this low load condition accurately.	Vendro to Confirm			
1.3	The motor will be 37 - 50 kW and the necessary complete protection mechanism for this type of underrating should exist.	Vendro to Confirm			
2.0	Technical Specification :				

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2.1	110 KW 3 Phase AC star delta starter shall be of latest design incorporating digital processors / Transducers for measuring active/ reactive power, voltage, current and power factor of the incoming supply using digital indicators for display on the front panel.	Vendro to Confirm			
2.2	The starter panel is such as to withstand large starting torque requirement for a motor capacity ranging from 37KW to 90 KW.	Vendro to Confirm			
2.3	Operating voltage	415±10% V			
2.4	Full Load current	53 to 125 Amps			
2.5	Contact rating	Must withstand currents up to 1000A for 10 sec			
3.0	Drive panel shall have the following fittings as part of total panel Instrumentation				
3.1	Digital active KW indicating instrument with single line display on front panel	Vendro to Confirm			
3.2	Digital Reactive power indicating instrument with single line display on front panel	Vendro to Confirm			
3.3	Emergency stop push button, Local /remote selection switch Coloured RYB live panel indication for Ready/start /stop/on trip etc.	Vendro to Confirm			
3.4	Voltmeter with selector switch ,control fuses (0-500V), Incomer suitable SFU fuses on load type with door interlock facility, Power and control terminal connections with 20% spare control terminals, Ammeter 0-300A, Two earth terminals for earth connection.	Vendro to Confirm			
3.5	Six Nos of 300 /5 Amps CTs with 2 No per phase for connecting to transducers / indicating instruments shall be incorporated in the panel to achieve complete instrumentation as per the specification.	Vendro to Confirm			
4.0	Construction				

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4.1	AC Panels shall be of moderate size and weight, fabricated from 14/16 swg CRCA steel sheet processed through seven Tanks with Siemens grey powder coating to prevent De-rusting and De-phosphating of panel over a period of time.	Vendro to Confirm			
4.2	Panel shall have in built single or combined Transducer modules incorporating CT and PT inputs to generate analogue 4 to 20 mA outputs separately for Current, Voltage and active power .	Vendro to Confirm			
4.3	Digital indicators compatible to analogue input signals shall be incorporated on the front panel for display of active power/ reactive power/power factor.	Vendro to Confirm			
5.0	Control relays and protection circuits				
5.1	All the contactor used for star to delta operation must withstand currents up to 6 times of full load current for at least one sec	Vendro to Confirm			
5.2	Single phase preventer :	Vendro to Confirm			
5.2.1	Relay suitable to operate at 440/220V to be used to give alarm / indication in case of faults occurring in the incoming supply due to single phasing, also it must initiate command to trip motor control circuit abruptly.				
5.3	Overload protection circuit:	Vendro to Confirm			
5.3.1	Relay suitable to operate at 440 or 220 Volts must be incorporated in the incoming supply to sense the overloads up to 4 times with a facility for setting the load currents.	Vendro to Confirm			
5.3.2	Over load settings suitable for 37 KW to 90 KW motor capacities must be provided	Vendro to Confirm			
5.4	The equipment should be in the form of a cubical/ Panel to accommodate all contactors, protective relays and other electrical circuits and electrical transducers fitted in side the panel for measuring electrical parameters like active /reactive power, Voltage /current, Power factor	Vendro to Confirm			
5.5	Indicating and measuring instruments :	Vendro to Confirm			

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5.5.1	Wall mounted panel instruments for indicating 3 Phase voltage and current with selection switch to read current in different phase and Voltage selector switch to read line- line voltage in 3 different combination other than zero position.	Vendro to Confirm			
5.5.2	Digital KW / KVAR Indicators using either inputs from CT & PT directly or driven by analogue signals 4 to 20 mA from the transducers shall be used for display directly in KW / KVAR units on the front panel	Vendro to Confirm			
5.6	Inter-connection	Vendro to Confirm			
5.6.1	Interconnection between the contactor for connecting star and delta must be by using copper bars of suitable capacity to withstand currents up to 6 times of normal rated full load current.	Vendro to Confirm			
5.7	Switching operation and panel annunciation:	Vendro to Confirm			
5.7.1	Front panel should be fitted with the push button each for stop / start / reset functions of the starter. Indicating lamps for power on status, separate indicators for RYB phases.	Vendro to Confirm			
5.7.2	Indication for healthiness of incoming supply with reset push button to showing the status of the control circuit for faults annunciation and resetting button for clearing the faults.	Vendro to Confirm			
6.0	VOLTAGE / CURRENT / POWER measurement:				
6.1	AC drive panels so supplied shall have Active & reactive power, panel mounted measuring instrument fitted on front panel to accurately monitor active Power (KW) & Reactive Power (KVAR) during operation.	Vendro to Confirm			
6.2	Active & Reactive Power measuring display instruments shall derive their inputs 4-20 ma or 1-5V from respective Transducers fitted inside the panel.	Vendro to Confirm			
6.3	Separate set of transducers for Voltage /current/active power with 4 to 20 mA outputs separately or combinely shall be provided.	Vendro to Confirm			

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6.4	Same Transducer output shall be used for connecting directly to data logger and DCS wherever necessary to convert them in to desired engineering units for measurement and recordings.	Vendro to Confirm			
6.5	Digital KW/KVAR display Accuracy :	Display accuracy shall be 0.5% with min scale division of 0.05 kw			
6.6	Mode of display :	LED 3½ or 4 digit 0.5"Height			
6.7	Allowable Power Range :	0 - 216 KW			
6.8	Power read out accuracy of digital indicator:	0.5% resolution 0.05 KW			
7.0	Testing				
7.1	The 110 KW Star delta starter control panel shall be tested in accordance with applicable Standard.	Vendor to specify applicable Standard.			
7.2	Additional tests, if any shall be specified in the offer & vendor to include these tests in the offer	Vendor to Confirm			
7.3	Test reports of all the tests to be carried out on the 110 KW Star delta starter control panel shall be furnished .	Vendor to Confirm			
7.4	All the above tests should be demonstrated to BHEL engineers during pre-acceptance at Suppliers works and during Erection & Commissioning at BHEL Works. Test certificates and calibration reports for the active test instruments/transducers shall be submitted along with the documentation of the equipment.	Vendor to Confirm			
8.0	AMBIENT CONDITIONS & THERMAL STABILITY :				
8.1	Total equipment should work trouble free and efficiently under following operating / Ambient conditions : Temperature = 5 to 55 degree Celsius, Relative Humidity = 95% max.	Vendor to Confirm			

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8.2	Weather conditions are tropical, Atmosphere may be dust laden during some part of the year. Equipment shall be kept in the normal shop floor condition. Max. temperature variation is 25 deg Celsius in 24 hours.	Vendor to Confirm			
8.3	Thermal Stability of the complete equipment keeping in view specified Ambient Conditions and accuracy requirements of BHEL and trouble free operation of the equipment should be ensured by vendor.	Vendor to Confirm			
8.4	If any safety / environmental protection enclosure is required it should be built in the equipment by the vendor.	Vendor to Confirm			
9.0	ELECTRICAL :				
9.1	415V $\pm 10\%$, 50HZ ± 3 Hz, 3 Phase AC (4 wire system) Power Supply will be provided by BHEL at a single point near the equipment, as recommended by Vendor. All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the machine/control cabinets, shall be the responsibility of vendor. Requirement of grounding/earthing with required material details should be informed by vendor well in advance so that same could be incorporated during construction of foundation.				
9.2	Tropicalization: All electrical / electronic equipment shall be tropicalized	Vendor to Confirm			
10.0	SAFETY ARRANGEMENTS:				
10.1	The Equipment should have adequate and reliable safety interlocks / devices to avoid damage to the equipment due to the malfunctioning or mistakes. Equipment functions should be continuously monitored and warning indications through lights with messages (On display panels) should be available.	Vendor to Confirm			
10.2	A detailed list of all indications provided on the equipment should be submitted by the supplier.	Required			
11.0	SPARES:				

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11.1	Itemized breakup of electrical and electronic spares used on the equipment in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation should be offered by vendor. (Unit price of each item of spare should be offered)	Specify			
11.2	Procurement of spares along with the equipment is optional	Specify			
11.3	All types of spares for 110 KW Star delta starter control panel and its accessories should be available for at least ten years after supply of the system. If the equipment or its control is likely to become obsolete in this period, the vendor should inform BHEL sufficiently in advance and provide drawings of parts / Details of spares and suppliers to enable BHEL to procure them in advance if required.	Vendor to Confirm			
12.0	DOCUMENTATION : Five sets of following documents (Hard copies) <u>in English</u> language should be supplied along with the equipment.	Vendor to Confirm			
12.1	Operating and maintenance manuals of the Equipment	Vendor to Confirm			
12.2	Detailed Maintenance manual of the equipment with all drawings of assemblies / sub-assemblies / parts including Electrical / Electronic circuit diagrams. All Assembly / Sub Assembly Drawings shall be supplied with part list also.	Vendor to Confirm			
12.3	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.	Vendor to Confirm			
13.0	PROVE OUT OF THE EQUIPMENT :				

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13.1	Complete prove out of the equipment shall be done at BHEL works to the BHEL requirements. Vendor shall be responsible for any deviations that may be observed during proveout of the equipment & failure of input / output data.	Vendor to Confirm			
14.0	COMMISSIONING OF THE EQUIPMENT				
14.1	Supplier to take full responsibility for carrying out the commissioning, start up, testing of the equipment and it's controls etc. Service requirement like power etc. shall be provided by BHEL.	Vendor to Confirm			
14.2	Successful proving of the equipment for BHEL components by the supplier shall be considered as part of commissioning. All tests, as mentioned at clause 15 (Equipment Acceptance) shall form part of the commissioning activity.	Vendor to Confirm			
15.0	EQUIPMENT ACCEPTANCE: (Tests/Activities should be Performed by Vendor)	Vendor to Confirm			
15.1	Tests/Activities should be carried out at supplier's works on the equipment before dispatch :	As per Cl. No. 7			
15.2	Tests/Activities should be carried out at BHEL works while commissioning the equipment :	As per Cl. No. 7			
15.2.1	Demonstration of all features of the equipment & accessories to the satisfaction of BHEL for efficient and effective use of the equipment.	Vendor to Confirm			
15.2.2	Prove out of the equipment for the BHEL components as per Cl. No. 13.0	Vendor to Confirm			
15.2.3	Training of BHEL personnel in operation of complete equipment & accessories etc by the supplier's experts / engineers during their stay at BHEL works	Vendor to Confirm			
16.0	GUARANTEE :				
16.1	24 months from the date of acceptance of the equipment.	Vendor to Confirm			

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7.0	REFERENCE LIST / QUALIFYING CONDITIONS :				
17.1	The vendor shall be inline of manufacture of similar equipments atleast for the last 5 years. Furnish details of experience in manufacture of similar equipments and reference of customers to whom such items were supplied earlier. However, if such equipment(s) has/ had been supplied to BHEL, then such equipment should be presently working satisfactorily for more than six months after its commissioning and acceptance in BHEL.	Vendor to Confirm and submit			
8.0	Delivery	Specify			