



BHARAT HEAVY ELECTRICALS LTD.,
CORPORATE R&D DIVISION
VIKAS NAGAR, HYDERABAD-500093 (INDIA)

Enquiry No. :

Date :

dd/ mm/ 2009

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SPEC.NO

HVE:S&T: DOOR:09:20/00

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR ADVANCED PARTIAL DISCHARGE MEASUREMENT SYSTEM

Important

1. Vendor must submit complete information against clauses Nos 33.0 and 34.0. The offer meeting these clauses would only be processed.
2. The offer and all documents enclosed with offer should be in English language only.
3. BHEL reserves the right to verify the information submitted by the vendor. The offer with false/ incorrect/incomplete information may be rejected.
4. Vendor shall sign and stamp all sheets
5. Offers submitted shall be valid for a period of minimum 8(eight) months from date of commercial bid.
6. Revised technical bid may be necessary should the specification needs up gradation/ modification on technical scrutiny.
7. Vendor shall only give conformation to all points in the specification.No deviation is acceptable. Any additional details shall be separately provided.

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

SCOPE: Design, supply, erection, commissioning and training of Advanced partial discharge measurement system.

Quantity required:	ONE				
Serial No.	DESCRIPTION OF REQUIREMENT	DESIRED ACTION	OFFERED BY THE VENDOR	DEVIATIONS (IF ANY, ELSE PRINT NONE)	REMARKS(Only on deviations)
1.0	Purpose : This facility will be used in the laboratory to measure and analyse partial discharges (PD) as apparent charges in various equipment and samples. The equipment shall be computer aided and capable of measuring , recording, storing , monitoring, analysis of PD Pulses. It should also for fundamental PD studies in research and development of high voltage insulation. Simultaneous acquisition of test voltage and PD data.	Vendor to conform			
2.0	Relevant standard: IEC 60270	Vendor to conform			
3.0	PD test facility: The indenter has the faraday cage test room, PD free voltage source and hence they are not in the scope of supply.	Vendor to note			
4.0	Environment condition: TEMPERATURE: 50°C (Maximum) HUMIDITY: 95%, (Non Condensation) EMC: EMC compatibility as per relevant standard is required. Details shall be given in the technical specification.	Vendor to conform			
5.0	Input power supply: 230 volts, single phase, 50 Hz.	Vendor to note			
6.0	Measurement Sensitivity: 1 pC or less with 50 ohm cables.	Vendor to conform			

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7.0	Measuring range: Auto range up to 100000 pC	Vendor to conform			
8.0	Display and measurement : All displays shall be in digital form. Traditional PD pulses in an elliptical/ Straight line time base. Phase resolved PD plots, Graphical representation of different functions like q-n, q-φ, n-φ and q-φ-n 3 D display, continuous monitoring in real mode and finger print analysis. Display of apparent charge, pulse repetition rate, pulse repetition frequency, average discharge current as a function of phase and time, Quadratic charge rate and preferably discharge power. Two window gates one in positive half cycle and the second in negative half cycle of the sine wave shall be provided for noise separation..	Vendor to conform			
9.0	Display expansion: Up to full screen	Vendor to conform			
10.0	Statistical parameters evaluation: Following phase and polarity resolved statistical parameters shall be measured: Maximum, Minimum, Mean, Std. deviation, Distribution, Skewness, Variance, Kurtosis, etc.	Vendor to conform			
11.0	External calibration: An external calibrator with a voltage pulse of rise time less than 60 n sec along with a suitable series capacitor. Accuracy +/- 1 pC. Calibration range < / = 1 pC to 500 pC.	Vendor to conform			
12.0	Amplifier band width: Minimum frequency < / = 100 kHz ; Maximum frequency limit > / = 500 kHz. Suitable pre amplifier, HF and LF filters are to be provided. Gain settings in steps and attenuator (0 to 80 dB) shall also be provided.	Vendor to conform			
13.0	Digital acquisition: Minimum No. of channels =2, one for voltage and the second for PD signals. The voltage signal shall be taken for reference to all plots. Vertical resolution is required minimum 12 bits. The sampling rate of PD signal acquisition shall be adequate and specified by the vendor.	Vendor to conform			
14.0	Communication: GPIB and RS 232 and internal modem	Vendor to conform			
15.0	Calibration: The system shall be calibrated to meet the requirements of IEC 60270 preferably at internationally accredited laboratory.	Vendor to conform			
16.0	Pattern recognition and data base: The available software shall be able to identify the PD failure recognition and identification. A data base shall be covering classical PD failures may preferably be provided.	Vendor to conform			
17.0	Accessories: Two sets of PD input cables i) 10 m long and ii) 20 m long shall be provided. PD measurement impedance system shall meet IEC 60270. Necessary over voltage protection shall also be provided.	Vendor to conform			
18.0	RIV measurement: It shall be possible to measure RIV in parallel to the apparent charge measurement as per relevant international standard. Frequency range 800 kHz- 1.2 MHz Vendor shall give the full details including the standard adopted in the technical specification sheet.	Vendor to conform			

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19.0	Measurement and processing unit: It may either integrated or a basic PD detection unit with an external computer. In case the system is a modular type, it must include a laptop computer. The system shall meet the latest specifications, which are to be mentioned by the vendor. Minimum requirement by the indenter is a dual core processor with 1 GB RAM, 80 GB HDD, DVD read / write, USB, Key board in English, SVGA(1280x1024) with minimum 17 inch LCD colour monitor. The computer should have been marketed and available in India and have service centres in India. In case of integrated system, the screen size shall be colour and ≥ 14 inches. The unit shall also have over-voltage and short circuit protection facilities.	Vendor to conform			
20.0	Software tools: Necessary software for PD acquisition and analysis as detailed else where in the present specifications have to be installed in the computer. Dedicated software must be supplied as originals in CDs so that it can be re-loaded in the computer, in case the software is corrupted. In case it is necessary, the operation of the software may be linked with the hardware lock.	Vendor to Conform			
21.0	Hardware and software maintenance: The vendor shall able to attend the operational problems as and when required by the indenter at least for five years after installation.	Vendor to conform			
22.0	Coupling capacitor: A 4000 pF coupling capacitor is available with BHEL. The vendor has to provide a suitable circuit to realise high voltage acquisition for phase resolved plots. The vendor has to calibrate the voltage signal based on the existing voltage measuring circuit of the HV transformer.	Vendor to conform			
23.0	CALIBRATOR: Calibrator for external calibration of the PD measuring circuit in pC of apparent charge. The calibrator shall have external terminals for measurement of series capacitance & magnitude of the calibrating pulse input to the series capacitor. A voltage pulse of low rise time along with a suitable series capacitor shall be used. Accuracy ± 1 pC. Calibration range ≤ 500 pC.	Vender to conform.			
24.0	Cables and connectors: Vendor shall provide suitable connecting cables and connectors based on the signal frequency and shall give the details in the technical specifications.	Vender to conform.			
25.0	SAFETY: Shock proof, Vibration proof and Safety requirements as per relevant international Standards	Vender to conform.			
26.0	DOCUMENTATION: Four sets of following documents (Hard Copies) in English should be supplied along with the machine. 1. Operating manuals for system and related Accessories. 2. Detailed Maintenance manual with all drawings, circuit diagrams. All Assembly / Sub Assembly Drawings shall also be supplied including part list. 3. Test and Guarantee certificates 4. Catalogues of all bought out items including drawings where ever applicable. 5. SOFT COPY of all above documentation on CD ROM, wherever applicable	Vendor to conform			

Serial No.	DESCRIPTION OF REQUIREMENT	DESIRED ACTION	OFFERED BY THE VENDOR	DEVIATIONS (IF ANY, ELSE PRINT NONE)	REMARKS(Only on deviations)
27.0	Training: BHEL engineers to be trained for acquaintance on operation and maintenance of supplied equipment at the indenter's premises, persons shall be trained for mutually agreed period in area of use of all features, operating instructions, warnings and precautions, location and functions of control instrumentation, interlocks, preventive and periodic maintenance, operating limitations, any unique or potentially hazardous condition which could affect safe operation, supplied accessories, etc.	Vendor to conform			
28.0	COMMISSIONING/ DEMONSTRATION : Required items for the commissioning of equipment within stipulated time shall be brought by vendor on the returnable basis. Charges, for commissioning and demonstration shall also be included in the offer.	Vendor to conform			
29.0	SPARES AND SERVICE : Spares for trouble free operation for 2 years to be supplied along with main equipment. List of back up spares if any for additional two year shall be provide	Vendor to conform			
30.0	PACKING : Air / Sea worthy rigid packing for all items of complete equipment, all accessories and other supplied items to avoid any loss / damage in transit. When equipment is dispatched in containers, all small loose items shall be suitably packed in boxes.	Vendor to conform			
31.0	PERFORMANCE GUARANTEE : 12 months from the date of commissioning and acceptance of equipment.	Vendor to conform			
32.0	Machine Model No: To be mentioned.	Vendor to conform			
33.0	Detailed catalogue, sketch / photographs of the equipment and accessories / attachments should be submitted with the offer	Vendor must supply			
34.0	Qualification Requirements: The vendor shall submit a reference list of international users. The vendor should be of International repute. The design of the equipment must be proven and in operation for three years without any technical problems. The supplier must have service outlets/ service personnel in India to support the equipment as and when required by BHEL.	Vendor to conform			