



BHARAT HEAVY ELECTRICAL LIMITED

UNIT'S ADDRESS:

**CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL (FROM
PURCHASE DEPTT.)**

Enquiry No. :

Due Date :

Supplier Qtn. No.:

Date :

SPECIFICATION CUM COMPLIANCE CERTIFICATE OF PORTABLE LOSS MEASUREMENT SYSTEM

NOTE:-

1. The "Offered" Column and where applicable, the "Deviations" & "Remarks" Column of this format shall be filled in by the Vendor and submitted along with the offer. 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.

NAME & ADDRESS OF THE SUPPLIER :

NAME & ADDRESS OF THE INDIAN AGENT :

TELEPHONE NOS.:

TELEPHONE NOS.:

FAX NOS.:

FAX NOS.:

E-MAIL ADDRESS :

E-MAIL ADDRESS :

SCOPE: SUPPLY, ERECTION & COMMISSIONING OF PORTABLE LOSS MEASUREMENT SYSTEM COMPLYING WITH SPECIFICATIONS AS BELOW

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
1.0	PURPOSE & WORKPIECE MATERIAL				
1.1	Purpose:				
	Portable loss measuring system which is required for measuring different parameters and loss measurement of power transformers and reactors. The system shall be of state-of-the art technology.	Vendor to confirm			
1.2	Job to be tested : Power Transformers(upto 500 MVA , 800 kV) , Shunt Reactors (upto 110 MVA, 800 kV)	Vendor to note			
1.3	Quantity : 1 set Compring of 1 no. 500 kV, 50 pF Capacitor 1 no. 4000 A, 300 kV Current Transformer 3 nos. portable racks with wheels installed with 3 nos. High voltage divider, 3 nos. Wattmeter and 3 nos. reference capacitor 1 no. system controller installed in portable rack with wheels Set of interconnecting cables to connect the system with existing CTs and PTs and supplied CTs and PTs	Vendor to note			
2.0	SPECIFICATION:				
2.1	Supplied system should be compatible with the existing Current Transformer(300kV,4000Amps and 100kV,2500Amps) and Standard Capacitor(50pF,300kV and 100pF,100kV) of MI make installed at BHEL Bhopal. In case of any further information , vendor may visit the lab for the same.	Vendor to note & confirm			
2.2	Standard Capacitor				
2.2.1	Quantity : 1 no.	Vendor to confirm			
2.2.2	Rated Voltage: 500 kV	Vendor to confirm			
2.2.3	Rated Capacitance : 50 pF	Vendor to confirm			
2.2.4	Tan delta : $\leq 1 \times 10^{-5}$	Vendor to confirm			
2.2.5	Tolerance in Capacitance: $\leq \pm 0.5$	Vendor to confirm			
2.3	High voltage current transformer				
2.3.1	Quantity : 1 no.	Vendor to confirm			
2.3.2	Rating : 4000 A , 300 kV	Vendor to confirm			
2.3.3	Nominal Ratio: 2000/1	Vendor to confirm			
2.3.4	Ratio error & Phase angle error: < 10 ppm	Vendor to confirm			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
2.3.5	Operating Voltage : 300 kV RMS	Vendor to confirm			
2.3.6	Partial discharge: <10 pC at 300 kV	Vendor to confirm			
2.4	High Voltage Divider				
2.4.1	Quantity : 3 nos.	Vendor to confirm			
2.4.1	It should compatible with existing 100 pF, 100 kV Input capacitor and 1000 pF Reference capacitor available at BHEL Bhopal.	Vendor to confirm			
2.4.1.1	Input Voltage (kV): 480, 240, 96, 48, 19.2, 9.6, 4.8	Vendor to confirm			
2.4.1.2	Output Voltage: 120 V	Vendor to confirm			
2.4.2	It should compatible with existing 50 pF, 800 kV Input capacitor and 1000 pF Reference capacitor.	Vendor to confirm			
2.4.2.1	Input Voltage (kV): 960, 480, 192, 96, 38.4, 19.2, 9.6	Vendor to confirm			
2.4.2.2	Output Voltage: 120 V	Vendor to confirm			
2.4.3	Accuracy : < 20 ppm for magnitude Quadrature < 20 ppm	Vendor to confirm			
2.4.4	Frequency: 40 Hz to 400 Hz	Vendor to confirm			
2.5	Wattmeter				
2.5.1	Quantity : 3 nos.	Vendor to confirm			
2.5.2	Voltage range: 120 V and 240 V	Vendor to confirm			
2.5.3	Voltage measurement accuracy : ± 50 ppm	Vendor to confirm			
2.5.4	Current range: 5 A to 0.005A	Vendor to confirm			
2.5.5	Current measurement accuracy : ± 50 ppm for p.f from 0 to 0.5	Vendor to confirm			
2.5.6	Power factor measurement range: 0 to 1	Vendor to confirm			
2.5.7	Basic power accuracy < ± 50 ppm	Vendor to confirm			
2.5.8	Frequency: 12 Hz to 400 Hz	Vendor to confirm			
2.6	Portable Controller & LMS Rack Wheel size : 4 inch, For cooling purpose fans should be mounted inside all the cabinet with running & temp. indicators. All cabinet should have suitable handles and locking system.	Vendor to confirm			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
2.6.1	System should supply with controller with rack mounted PC	Vendor to confirm			
2.6.2	Controller rack can be used with a single instrument rack or with all three racks simultaneously.	Vendor to confirm			
2.6.3	System controller should have rack mounted industrial PC with following specification Processor : 3.1 GHz, dual core, 2 MB cache, 610 UHD graphics or better. Mother Board : 9th gen, i7 or better processor, 2xLAN, 2xHDMI, display board, VGA, 3xUSB(2.0), 3xUSB(3.1), 2xCOM, PCIe slots. Memory: 1.0 TB Hard disk and 8 GB DDR4 RAM. Operating System : Licensed window 10 professional with DVD/USB drive, bootable USB drive	Vendor to confirm			
2.6.4	Additional robust laptop for industrial use with similar configuration should also be provided to control the supplied and existing system with all accessories and connectors suitable for heat run test upto 36 hrs.	Vendor to confirm			
2.6.5	Software: Customized software/program required to meet the BHEL requirement. There should be a different window for Shunt Reactor loss measurement. RMS current, avg. current, measured power, corrected power, app. power, power factor(5 digit) and harmonics should be displayed on LMS screen. Provisions to be given to take snap shots of all displayed parameters.	Vendor to confirm			
2.6.6	Report: Laser jet printer should be provided to take the printout of snap shot or test report. Test report should be prepared in excel or doc. formate with BHEL logo.	Vendor to confirm			
2.7	Cables	Vendor to Confirm			
2.7.1	Suitable interconnecting cables to be provided for following 100 kV existing Standard Capacitor to control system of length 40m each- 3 nos. 2500 A existing Current Transformer to control system of length 40m each- 3 nos. 500 kV Standard Capacitor to control system of length 40m - 1 no. 4000 A Current Transformer to control system length 40 m - 1 no.	Vendor to Confirm			
2.8	System should have facility to operate in 1-Phase mode and 3 phase mode. Suitable software to be provided to operate in both mode.	Vendor to Confirm			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
2.9	Testing of Shunt Reactors				
2.9.1	System should operate in single phase operation for measurement of loss on shunt reactor	Vendor to Confirm			
2.9.2	System should be compatible with existing 50 pF, 800 kV Capacitor and 300 kV, 4000 A CT and with supplied capacitor of 50 pF, 500 kV and 300 kV, 4000A CT.	Vendor to Confirm			
2.9.3	Single phase reactor testing software to be provided for reactor loss measurement at all power factors.	Vendor to Confirm			
2.9.4	Voltage accuracy: 0.1% or better Current accuracy: 0.1% or better Power accuracy: 50 ppm or better at full scale	Vendor to Confirm			
2.10	SAFETY ARRANGEMENTS:				
	Following safety features in addition to other standard safety features should be provided on the system:	Vendor to confirm			
	1. System should have adequate and reliable safety interlocks / devices to avoid damage to the system, workpiece and the operator due to the malfunctioning or mistakes.	Vendor to confirm			
	2. All electronics parts are housed in shielded enclosures.	Vendor to confirm			
2.11	ENVIRONMENTAL PERFORMANCE OF THE SYSTEM:				
	The Instrument shall conform to following factors related to environment :				
	(a) If any safety / environmental protection enclosure is required it should be built in the system by the vendor.	Vendor to confirm			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
2.9	Testing of Shunt Reactors				
2.9.1	System should operate in single phase operation for measurement of loss on shunt reactor	Vendor to Confirm			
2.9.2	System should be compatible with existing 50 pF, 800 kV Capacitor and 300 kV, 4000 A CT and with supplied capacitor of 50 pF, 500 kV and 300 kV, 4000A CT.	Vendor to Confirm			
2.9.3	Single phase reactor testing software to be provided for reactor loss measurement at all power factors.	Vendor to Confirm			
2.9.4	Voltage accuracy: 0.1% or better Current accuracy: 0.1% or better Power accuracy: 50 ppm or better at full scale	Vendor to Confirm			
2.10	SAFETY ARRANGEMENTS:				
	Following safety features in addition to other standard safety features should be provided on the system:	Vendor to confirm			
	1. System should have adequate and reliable safety interlocks / devices to avoid damage to the system, workpiece and the operator due to the malfunctioning or mistakes.	Vendor to confirm			
	2. All electronics parts are housed in shielded enclosures.	Vendor to confirm			
2.11	ENVIRONMENTAL PERFORMANCE OF THE SYSTEM:				
	The Instrument shall conform to following factors related to environment :				
	(a) If any safety / environmental protection enclosure is required it should be built in the system by the vendor.	Vendor to confirm			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
3.0	ACCESSORIES:				
3.1	Vendor to furnish list and details of accessories if any	Vendor to specify			
4.0	SPARES (Optional - to be quoted seperately):				
4.1	The vendor to submit list of mandatory spares & all spares for the equipment and quote for the unit price of each spare. Note: The price of the spares will not be considered for the evaluation of the machine cost (L1 criteria).	Vendor to Specify			
5.0	DOCUMENTATION : Following documents in English language should be supplied along with the system				
5.1	Two sets in hard copies of Test certificate and warantee certificate for 12 months from date of commissioning of system.	Vendor to confirm			
5.2	Two sets in hard copies of detailed electrical schematic of the system, Operation and Service Manual for all new supplied parts/item shall be supplied comprise of operating procedure, calibration procedure, maintenance manual with trouble shooting charts and detail circuit diagram and parts list etc for new supplied item.The uploadable software backup to be provided.	Vendor to confirm			
5.3	Complete Soft copy of manuals mentioned in clause 4.2 - 3 sets	Vendor to confirm			
5.4	Ghost backup of HDD of the PC based system and Laptop	Vendor to confirm			
5.5	Backup of all installed software (including OS) with key/ licence	Vendor to confirm			
5.6	Calibration certificate of all components. Calibration to be done with the lab having accreditation as per ISO 17025.	Vendor to confirm			
6.0	SYSTEM INSPECTION:				
6.1	Inspection at suppliers works before dispatch	Vendor to Confirm			
6.2	All routine tests and component calibration should be carried out at supplier's works as per ISO 17025 before dispatch in presence of BHEL representatives.	Vendor to specify & confirm			
6.3	Functional demonstration of all features of the portable loss measuring system and all Accessories.	Vendor to Confirm			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
7.0	TRAINING:				
7.1	BHEL testing engineer and maintenance person should be trained at supplier's Works for mutually agreed period in the area of (a) Use of all system Features, programming for Measuring Systems & supplied accessories etc. (b) Electrical, Electronic & maintenance for system & other supplied equipments	Vendor to Confirm			
7.2	Air-fare, boarding & lodging for the trainees shall be borne by BHEL.	Vendor to Confirm			
7.3	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel.	Vendor to Confirm			
8.0	INSTALLATION & COMMISSIONING				
8.1	Supplier to take full responsibility for carrying out the start up and commissioning	Vendor to Confirm			
8.2	Successful proving of supplied components by the supplier shall be considered as part of commissioning. Operational tests to be done for system acceptance shall form part of the commissioning activity.	Vendor to Confirm			
8.3	Demonstration of all features of the portable power loss measuring system & all accessories to the satisfaction of BHEL for their efficient and effective use.	Vendor to confirm			
8.4	Demonstration by actual use of all supplied components and accessories to their full capacity.	Vendor to confirm			
8.5	Commissioning spares, required for commissioning of the system within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to confirm			
8.6	Schedule of Commissioning shall be submitted with the offer.	Vendor to confirm			
8.7	Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor to confirm			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
9.0	AMBIENT CONDITIONS & THERMAL STABILITY :				
9.1	<p>Total System and all supplied items should work trouble free and efficiently under following operating conditions and should give specified accuracies.</p> <p>Power Supply: Voltage: 230 V - 10%, +10% Frequency: 50 Hz \pm 1.5 Hz No. of phases = 1 Ambient Conditions: Temperature = 18 to 30 degree celsius(For control system) = 10 to 45 degree celsius (for CTs , High Voltage Capacitor and other components) Relative Humidity = 10% to 80% max. (Vendor to confirm that system is suitable for above and details of provisions on the system to be arranged by Vendor. The ambient conditions mentioned above for control system will be made available with suitable air-conditioning at works.)</p>	Vendor to specify & confirm			
9.2	<p>Thermal Stability of the complete system keeping in view specified Ambient Conditions and accuracy requirements of BHEL components and trouble free operation of the system should be ensured by vendor.</p> <p>(Vendor to confirm that system is suitable for above and details of provisions on the system for the same should be furnished by Vendor)</p>	Vendor to confirm			
10.0	PACKING:				
10.1	Air worthy/Sea worthy & rigid packing for all items of complete system, all Accessories and other supplied items to avoid any damage/loss in transit. When system is dispatched in containers, all small loose items shall be suitably packed in boxes.	Vendor to confirm			
11.0	Warrantee				
11.1	12 months from the date of commissioning of the system.	Vendor to confirm			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
12.0	GENERAL: The vendor should submit the following information:				
12.1	Detailed catalogues , drawings / photographs of the supplied parts/item and accessories/ attachments should be submitted with the offer.	Vendor to confirm and submit			
12.2	Vendor to submit detailed scope of supply along with the bid.	Vendor to confirm & furnish			
12.3	Vendor to give point wise confirmation of this specification without which the offer is liable to be rejected.	Vendor to confirm & furnish			
12.4	BHEL reserves the right to verify information submitted by vendor. In case the information is found false / incorrect, the offer shall be rejected	Vendor to confirm			
13	POINTWISE CONFIRMATION:				
13.1	Vendor should confirm/clarify pointwise (all the points) as per specification and provide technical leaflet, technical details, photographs, scope of supply etc. at the first instance.	Vendor to confirm			

14.0	QUALIFYING CONDITIONS :				
14.1	The supplier should either be an Original Equipment Manufacturer(OEM) or an authorised dealer of the OEM for the offered equipment. Dealers have to submit along with the offer, a valid Certificate of Authorisation from OEM for quoting the equipment, alongwith declaration for support from OEM for erection & commissioning, after sales service & necessary spares.	Vendor to specify & submit			
14.2	The OEM or its dealer must have supplied at least one equipment for transformer /reactor loss measurement (meeting specification as per clause 2.1 to 2.5) in the past ten years (on the date of opening of Tender) and the equipment is working satisfactorily for more than one year after commissioning.	Vendor to confirm			
14.3	Following documents/information should be submitted by the vendor in reference to supplied equipment, this is required from all the vendors for qualification of their offer.	Vendor to submit			
14.3.1	One copy of Purchase Order in name of OEM or any Dealer/Vendor for equipment supplied in line with Clause 14.2.	Vendor to submit			
14.3.2	Complete postal address and contact details of customer where above equipment is installed/supplied.	Vendor to Specify			
14.3.3	The PO copy to clearly mention name of item, type, make and model no. including other details.	Vendor to submit			
14.3.4	Performance certificate (issued within 5 years of tender opening date) from the customers regarding satisfactory performance of the equipment supplied to them vide the Purchase Order as per clause 14.2 & 14.3.1. <u>Note:</u> Vendor to ensure that; PO. No., PO date and commissioning date should be clearly indicated on performance certificate.	Vendor to submit			
14.3.5	Average annual T/O of the Vendor/ Bidder for the last three financial years should be at least Rs. 1.2 Crores, P/L statements for the years ending 2018-19, 2019-20 & 2020-2021 to be provided. For micro and small enterprises in line with GOI circular 1(2)(1)/2016-MA 10/03/2016 relaxation permitted for prior turnover criteria only however prior experience is mandatorily required and no relaxation in this regard shall be given.	Vendor to submit			
14.3.6	BHEL reserves the right to verify information submitted by vendor. In case the information is found to be false/incorrect, the offer shall be rejected.	Vendor to note			