

BHARAT HEAVY ELECTRICALS LIMITED, JHANSI TRANSFORMER TESTING LABORATORY

SPECIFICATION FOR 500 KV SERIES RESONANT TEST SYSTEM (HV AC SHOOTER) FOR POWER TRANSFORMER

REF. NO. : DEBOTTLENECKING-CAPITAL/SPECS/2018-19/14 REV. 00 DATE: 28.01.19

Note : 1) Vendor must submit complete following information. The offer meeting the following requirements would only be processed.
2) The offered column and Deviation & Remarks column (where ever applicable) of this format shall be filled by the vendor and to be submitted along with the offer. Inadequate / incomplete, ambiguous or unsustainable information against any of the clause of specification/requirement shall be treated as non-compliance.

Sl. No.	DESCRIPTION FOR BHEL REQUIREMENT	TO BE SPECIFIED/ CONFIRMED BY	OFFERED	DEVIATION & REMARK
1.1	Purpose : 500 KV Series Resonant Test System (HV AC Shooter) is required for conducting AC Power frequency withstand test on Power Transformer (Upto 315 MVA, 400 KV, 3 phase), Rectifier transformer, Shunt Reactors and Instrument Transformers etc.	Vendor to Confirm.		
1.2	Quantity : 01 No.	Vendor to Note		
1.3	Applicable Standard : Accredited Calibration as per relevant standard.	Vendor to furnish applicable standard		
2	GENERAL SPECIFICATION :			
2.1.1	500 KV Series Resonant Test System (HV AC Shooter) shall be an integrated system and it include following basic modules modules:- A) High Voltage Reactor B) Exciter Transformer C) Voltage Regulator with built in Low Voltage Filter D) Capacitive Potential Divider E) Control & Measuring System	Vendor to specify		
2.1.2	Rated Capacity : 500KV, 1000 KVA, 50 Hz $\pm$ 3 %	Vendor to confirm		
2.1.3	Input Power Supply Voltage (phase-phase) : 400 V $\pm$ 5 % or better	Vendor to confirm		
2.1.4	Output Voltage : 0 - 500 KV	Vendor to confirm		
2.1.5	Output Current : 0 - 2.0 Amp	Vendor to confirm		
2.1.6	Cooling : ONAN	Vendor to confirm		
2.2	HIGH VOLTAGE REACTOR			
2.2.1	Insulation : High Voltage Reactor to be oil insulated.	Vendor to confirm		
2.2.2	Cooling : High Voltage Reactor should be ONAN Cooled.	Vendor to confirm		
2.2.3	Input Voltage :	Vendor to specify		
2.2.4	Output Voltage : 0 - 500 KV	Vendor to confirm		
2.2.5	Voltage Variation : Smooth step Less	Vendor to confirm		

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(D. N. Yadav)

Sheet 1 of 6

(Pawan Kumar)

(Vinod Jaseja)

Page - 1

23/1/19

b. JARAT HEAVY ELECTRICALS LIMITED, JHANSI
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2.2.6	Output Current : 0 - 2.0 Amp	Vendor to confirm		
2.2.7	Rated Capacity :	Vendor to specify		
2.2.8	Duty Cycle : Minimum 30 Minutes ON followed by 30 minutes OFF	Vendor to specify		
2.3	EXCITER TRANSFORMER			
2.3.1	Rated Capacity :	Vendor to specify		
2.3.2	Cooling : ONAN	Vendor to confirm		
2.3.3	Insulation : Exciter Transformer to be oil insulated.	Vendor to specify		
2.3.4	Input Voltage : To match the regulator output	Vendor to specify		
2.3.5	Output Voltage :	Vendor to specify		
2.3.6	Duty Cycle :	Vendor to specify		
2.3.7	Output of exciter should be protected by surge arrester of suitable rating	Vendor to confirm		
2.4	REGULATING TRANSFORMER			
2.4.1	Rated Capacity :	Vendor to specify		
2.4.2	Cooling : ONAN	Vendor to confirm		
2.4.3	Regulator Input Power Supply Voltage (phase-phase) : 400 V $\pm$ 5 % or better, 50 Hz $\pm$ 3 %	Vendor to confirm		
2.4.4	Regulator Input Current :	Vendor to specify		
2.4.5	Regulator Output Voltage :	Vendor to specify		
2.4.6	Voltage Variation : Smooth step Less, motorized and controlled through control desk.	Vendor to confirm		
2.4.7	Regulator should have input breaker & Output breaker/contact.	Vendor to confirm		
2.4.8	Input breaker & Output breaker/isolator operations to be controlled remotely from control desk.	Vendor to confirm		
2.4.9	Safety arrangements- Backup with over current protection devices	Vendor to confirm		
2.5	CAPACITIVE POTENTIAL DIVIDER			
2.5.1	Potential Divider should be connected to high voltage terminal for voltage measurement purpose.	Vendor to confirm		
2.5.2	Output of capacitor to be provided to measuring system	Vendor to confirm		
2.5.3	Output Voltage Range : 0 - 500 KV Divider Capacitance : 2 nF / Vendor to specify	Vendor to confirm		

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Sheet 2 of 6

(Pawan Kumar)

(Vijay Kumar)

Page-2

13

SHARAT HEAVY ELECTRICALS LIMITED, JHANSI TRANSFORMER TESTING LABORATORY

SPECIFICATION FOR 500 KV SERIES RESONANT TEST SYSTEM (HV AC SHOOTER) FOR POWER TRANSFORMER

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2.5.4	Divider ratio -	Vendor to specify		
2.5.5	System Accuracy : ± 1.50 % of range selected or better	Vendor to confirm		
2.5.6	Frequency range for the measurement : 40 Hz to 200 Hz or better	Vendor to confirm		
2.5.7	Duty : Continuous Without Cooling	Vendor to confirm		
2.5.8	Output Cable Connector : BNC Type	Vendor to confirm		
2.5.9	Base of Coupling Capacitor should be fitted with alloy wheel for easy & frequent movement on the shop floor in all direction. Wheel and structure should be rugged and suitable for oily surface.	Vendor to confirm		
2.6	CONTROL & MEASURING SYSTEM			
2.6.1	Control & Measuring system should be clustered on single desk type cabinet. The control hardware is built in a table /rack combination which is equipped with wheels. The rack holds the Industrial PC unit as well as the control and measuring electronics. The system should be able to withstand high electromagnetic environment.	Vendor to confirm		
2.6.2	Industrial PC having following minimum specification: Operating system WINDOWS 10, processor Intel i7, monitor 19 inch or large TFT/ LED screen, 8GB RAM or more, 250GB or more HDD, Mouse, control software, Set of connection cables (min 20 meters) etc.	Vendor to confirm		
2.6.3	The operation of the control terminal should be done easily over a standard keyboard and mouse.	Vendor to confirm		
2.6.4	Control system should consist of following : a) Switching On/Off of Primary Circuit Breaker b) Switching On/Off of the contractor (High Voltage On/Off) c) Manual variation of the output high voltage d) Automatic Zero start up after switching off the high voltage. e) Timer for switching off the high voltage after a preset time	Vendor to confirm Vendor to confirm Vendor to confirm Vendor to confirm Vendor to confirm		
2.6.5	Control System shall also display following information:- a) Output High Voltage b) Status of the protection system c) Status of safety circuit and emergency trip d) Output voltage and current of the regulating transformer e) Output Voltage and current of the exciter transformer f) Timer	Vendor to confirm Vendor to confirm Vendor to confirm Vendor to confirm Vendor to confirm Vendor to confirm		

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Sheet 3 of 6

(Pawan Kumar)

(Vinothaseja)

Page - 3

BHARAT HEAVY ELECTRICALS LIMITED, JHANSI TRANSFORMER TESTING LABORATORY

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2.6.6	Measuring system should consist of following :- a) Measuring signal shall be taken from Potential Divider. Voltage measurements according to IEC 60060-1 and system should have provision for display the high voltage value as peak value $\sqrt{2}$ or RMS value (user selectable). e) In case of any flashover on test object, the control unit should automatically stores the last voltage measurement. f) System Accuracy of measuring unit : ± 1.50 % of range selected or better	Vendor to confirm		
2.7	Ground Studs to be provided on all modules of the system i.e. Regulating Trfr., High Voltage Trfr, Potential Divider & Control system etc.	Vendor to confirm Vendor to confirm		
2.8	Supplier shall provide all necessary cables for connection between different modules.	Vendor to confirm		
2.9	AMBIENT CONDITION OF AC TEST SYSTEM : System and all supplied items should work trouble free and efficiently under following operating conditions :-			
2.9.1	Operating Temperature of Control Unit- 10 Deg. C to 40 Deg. C	Vendor to confirm		
2.9.2	Storage Temperature - 10 Deg. C to 50 Deg. C	Vendor to confirm		
2.9.3	Relative Humidity : 10% to 85% non condensing	Vendor to confirm		
2.10	The offer will be technically accepted after complying following for price bid opening :- A) Meeting all requirements mentioned in this technical specification B) Technical Discussions of offered equipment at BHEL Jhansi	Vendor to confirm Vendor to confirm		
3	ACCESSORIES : Vendor to furnish list and details of all accessories to be supplied along with offered instrument.	Vendor to specify list of all accessories.		
4	SPARES :			
4.1	Confirmation on availability of all spare items with OEM for at least 5 years trouble free operation.	Vendor to confirm		
4.2	Vendor to furnish list and details of accessories if any.	Vendor to specify		
5	DOCUMENTATION :			
5.1	Vendor to submit the reference list of customers (where offered systems had been supplied) mentioning the customer, Model, major specifications of the supplied system, Year of Supply etc. along with offer.	Vendor to submit along with offer		
5.2	Vendor to submit Detailed catalogues, Electrical scheme along with the offer.	Vendor to submit along with offer		

Page - 4

(Satish Soni)

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Sheet 4 of 6

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5.3	Vendor to submit soft copy of Operating/Maintenance manual along with circuit diagrams and schematics for trouble shooting along with offer and subsequently two hard copies of manual along with the supply.	Vendor to confirm and submit as per requirement		
5.4	Vendor to submit soft copy of applicable software in a separate CD along with the supply.	Vendor to confirm and submit along with supply.		
5.5	Calibration certificate to be submitted from laboratory having traceability to National / International standards: Vendor to submit Valid Calibration certificate from OEM / NABL accredited laboratory of offered instrument along with the supply.	Vendor to confirm and submit along with supply.		
5.6	Vendor to seek approval on OGA Drawing and Electrical scheme from BHEL prior to start manufacturing.	Vendor to confirm.		
6	SYSTEM INSPECTION:			
6.1	Inspection by BHEL at Supplier works before dispatch.	Vendor to confirm		
6.2	All routine & operational tests to verify this specification and demonstration of all features of system (including accessories) as per PO specification shall be carried out at supplier's works/any other test lab/calibration agency in presence of BHEL representative before their dispatch and submit the test report along with supply. Vendor to specify list of tests to be carried out on system and applicable standard for its acceptance.	Vendor to confirm		
6.3	Demonstration of all controls, operation & measurement performance at supplier's works/any other test lab/calibration agency in presence of BHEL representative.	Vendor to confirm		
6.4	Transportation, boarding & loading upto supplier's works for inspection activities shall be in vendor scope.	Vendor to confirm		
7	TRAINING AT BHEL WORKS :			
7.1	Training to BHEL testing engineer & maintenance person shall be provided at BHEL Jhansi for following : (a) Use of all system Features, programming of Measuring Systems & supplied accessories etc. (b) Electrical, Electronic & maintenance for system & other supplied equipments	Vendor to confirm Vendor to confirm		
8	INSTALLATION & COMMISSIONING AT BHEL WORKS :			
8.1	Supplier to take full responsibility for carrying out the start up and commissioning. Commissioning to be done in presence of technical expert from OEM.	Vendor to confirm		
8.2	Successful proving by demonstration on BHEL Transformer by the supplier shall be considered as part of commissioning. All operational tests deemed necessary for system acceptance and demonstration of all features shall form part the commissioning activity.	Vendor to confirm		

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8.3	Demonstration by actual use of all supplied components and accessories to their full capacity.	Vendor to confirm		
8.4	Commissioning tools, required for commissioning of the system within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to confirm		
8.5	Schedule of delivery, installation & commissioning shall be submitted with the offer.	Vendor to submit along		
9	SAFETY ARRANGEMENTS:			
9.1	System should have adequate and reliable safety interlocks / devices in line with applicable standards with the latest revision.	Vendor to confirm		
9.2	All electronics parts shall be housed in enclosures.	Vendor to confirm		
10	PACKING: 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 despatched in containers, all small loose items shall be suitably packed in boxes.	Vendor to confirm		
11	GUARANTEE/WARRANTY : 24 Months from the date of commissioning at BHEL works & acceptance by BHEL irrespective of date of supply. Warranty may be extended to further period of 24 month in case of major rectification/repair after commissioning from the date of rectification/ repair.	Vendor to confirm		
12	QUALIFYING REQUIREMENTS:			
12.1	Following documents are required to be submitted along with offer :-			
12.2	The supplier should either be an Original Equipment Manufacturer(OEM) or an authorised dealer/system house/channel partner of the OEM. Only those vendors who have supplied at least 5 Nos. of the offered equipment or higher rating within last 10 years from the date of tender opening shall be eligible for participating in the tender.	Vendor to submit along with offer		
12.3	Performance certificates of at least 2 Nos. of the offered equipment or higher rating, certifying 1 year or more of satisfactory performance. Performance certificate and purchase order issued by the user in the name of OEM or Authorised dealer of OEM are acceptable.	Vendor to submit along with offer		
12.4	Technical discussion on offered equipment at BHEL Jhansi works during Technical evaluation of offer.	Vendor to confirm		
13	BHEL reserves the right to verify information submitted by vendor. In case, information is found false / incorrect, the offer shall be rejected	Vendor to confirm		

Note: Supplier shall submit the technical compliance/comments against each point in above format. Technical bid without complete technical compliance sheet will not be considered for technical evaluation.

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Sheet 6 of 6

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Page-6