

PRODUCT PURCHASING SPECIFICATION
TRANSFORMER ENGINEERING DEPARTMENT
BHEL BHOPAL

Specification No.
TRE- 085B
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Rev. 01 Dt: 24-10-2000

SPECIFICATION FOR AUTOMATIC CAPACITANCE & TAN DELTA
MEASURING EQUIPMENT

1. GENERAL:

This specification governs the supply of all necessary equipments, accessories and connecting cables etc. required for measurement of capacitance and tan delta of EHV class transformer winding, condenser bushings, shunt reactor winding, bus and line CVTs and grading capacitors of circuit breakers at site automatically in a charged switch yard upto 800 kV A.C. and 520 kV D.C. The equipment shall be complete with measuring bridge, HV power supply unit of 10 kV standard capacitor. The effects of included voltage on instrument during testing for getting null point should be compensated.



2. EQUIPMENT SPECIFICATIONS:

Capacitance & tan delta measuring bridge for EHV class transformer, condenser bushing, shall meet the following technical requirements:-

- a) Voltage selection : 0 to 10 kV
- b) Test Range:
- i) Capacitance : 1 pF to 0.1 Micro-farads
 - ii) Tan delta : 1×10^{-4} to 2.0
- c) Accuracy:
- i) Capacitance : $\pm 0.1\%$ of measured value
resolution ± 1 pf.
 - ii) Tan delta : $\pm 1\%$ of measured value
resolution $\pm 1 \times 10^{-4}$
- d) Output voltage : 0 to 10kV in continuously adjustable range.

3. EQUIPMENTS:

- 3.1 The instrument should contain all standard accessories including test leads of 20 meters with suitable clamps/connectors and carrying case.
- 3.2 The instrument should have been proven for repeatability of test results in charged switch yard conditions. Documentary evidence shall be furnished alongwith offer.

Rev	Date	ALT	Rev	Date	ALT	Rev 00	Name	Sign	Date
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						Ckd & Appd	T.K.GANGULI		24.10.00

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- 3.3 Input supply of kit shall be 230 volts Ac, 50 Hz variations $\pm 15\%$ and $\pm 5\%$ in voltage & frequency respectively.
- 3.4 The kit shall be compatible for EMI/EMC environment.
- 3.5 Measurement of kit shall be automatic for both tan delta and capacitance without balancing any decades.
- 3.6 One set of descriptive leaflet, outline drawing etc shall be Submitted alongwith the offer.

4. DEVIATION:

Any deviation from the specification may be clearly indicated alongwith proper justification.

5. TRAINING:

The supplier shall provide training to powergrid engineers at site on intimation by BHEL for using and maintaining the equipment for a maximum 3 mandays and shall obtain certificate from powergrid regarding impart of training. Supplier should quote the charges, if any, in the offer seperately.

6. TESTING & DISPATCH

- 6.1 The Capicatanace and tan delta measuring bridge shall be inspected and calibrated at manufacturer's works in presence of M/S Powergrid representative. Equipment shall be despatched only after clear cut CIP (Customer Inspection Point) and MICC (Material Inspection clearance Certificate) from Powergrid.

Four sets of inspection and calibration reports, operation and maintenance manual shall be sent alongwith despatch document. One set shall be kept inside the equipment.

- 6.2 The supplier shall furnish a list of all fittings and components in the despatch details giving description and quantity of each item (Quantity of each item shall be mentioned). All items shall be properly packed in wooden boxes/gunny bags so as to avoid scratches/damage in transit.