

**1.0 Automatic Insulation Analyzer : (Capacitance and Tan delta test set) :
 Make : Doble, USA, Type : M 4000**

The operation of Capacitance and Tan delta test set is fully controlled by Laptop and supervised by versatile software. This software controls the application of voltage, collects the test data, analyses the data, display the same in tabular and graphical format. The test data for respective HT capital equipments are stored for establishing the trend periodically, which is very important for any condition monitoring testing.



- 1.1 Laptop with latest configuration with all licensed software.
- 1.2 User friendly windows Software for operation, data collection.
- 1.3 Measuring range of bridge for Tan δ : 0 to 100 %, Resolution 0.001% accuracy \pm 1% of the reading.
- 1.4 Measuring range for capacitance: 1pF to 5 μ F and Resolution 0.01pF on lowest range and accuracy \pm 0.25 % of the reading.
- 1.5 Calibration unit for validating accuracy at site.
- 1.6 Induction cancellation unit for energized switchyard operation.
- 1.7 0-12kV AC, 300mA.
- 1.8 Resonating Inductor with current rating up to 5Amps. (Satisfies the rating to test up to 600MW machine).
- 1.9 Test set with Temperature and Humidity measurement facility.
- 1.10 In built charts for Tan delta value correction.

**2.0 Tan delta, Dielectric Constant and Resistivity measurement test set with
 Oil Cell and Oil cell Heater for insulating oils**

- 2.1 Output with 0-2 KVAC,0-1KVDC output
- 2.2 Oil test cell as per BIS standards
- 2.3 Heater for Temp, up to 150 °C

3.0 Partial Discharge Measurement equipment :

- 3.1 The test Instrument detects Partial Discharges in the high voltage insulation.
- 3.2 The Unit of measure is apparent charge pico coulomb (pC).
- 3.3 The ndb make XDPIIB test instrument can be used :
 - To check the insulation quality of HT equipment at the time of manufacture
 - To have the base foot print values before commissioning
 - To check the discharge values during every maintenance cycle to check the ageing of the insulation.
- 3.4 Depending upon the measured values every six or twelve months to trend monitor the insulation.:
 - Detailed description of this test can be viewed at : www.powerlinker.org/htm/SFRA.htm



4.0 Sweep Frequency Response Analyzer (SFRA) : For Transformer Core and Winding Movement Diagnosis.

Make : Doble , Type : M5200

- 4.1 The best diagnostic instrument for detecting "hidden" transformer defects
- 4.2 The M5200 detects mechanical failure or movement of windings due to short circuits, mechanical stresses, or transportation. Used to ensure transformer performance, reduce maintenance cost, reliability and increase the service life of transformers.
- 4.3 The M5200 can "see" inside transformers and can



detect problems early, before they become costly failures. This test is used ;

- To improve the quality of your regular inspection program
- To eliminate unnecessary detanking and costly internal inspections
- To check new transformers to verify good condition on site

- To inspect for damage if the 'transformer' has experienced mechanical stress during transportation or in service
- In case of system problems, like short-circuit faults that can damage transformers
- After earthquakes, lightning, or other environmental events

4.4 The entire set is operated with a software which can be used for analyzing SFRA plots.

Detailed description of this test can be viewed at :

www.powerlinker.org/htm/SFRA.htm

5.0 HV / MV Power Cables testing by : Very Low Frequency (VLF) test method

5.1 The new test method for testing cables by AC sinusoidal waveform.

5.2 Achieved by reducing test frequency to 0.2 Hz.

5.3 The VLF test set detects ageing of the cable insulation, defects in insulation, by measuring the dielectric loss of the insulation.

5.4 The test set can carry out following tests :

- Insulation Resistance measurement.
- Polarization Index measurement.
- Leakage current measurement.
- Capacitance value measurement. Tan delta value measurement.
- DC (+ and - Polarity) HV testing.



5.5 This test is used ;

- To check the cable insulation during manufacturing stage.
- As a routine maintenance test to check the insulation health.
- To check the condition of joints.

5.6 The detailed description of this test can be viewed at ;

www.powerlinker.org/htm/VLF.htm

6.0 Lightning Arrester Test Set : For ON line health check up of Lightning Arresters

Make : ISA, Italy, Type : SCAR 10

6.1 Lightning arresters are tested online

6.2 Online testing of Lightning Arrester is carried out by harmonic analysis of leakage current. The harmonic analysis is used as a tool to diagnose the health / reliability of the Lightning Arrester in online.

6.3 This test set has an inbuilt voltage compensation circuit which is useful in charged switchyards where 3rd harmonic voltages if present will cause error in harmonic current measurement.

6.4 Detailed description of this test can be viewed at

<http://www.powerlinker.org/htm/SCAR-10.htm>



7.0 RSO Test Set : For main rotor winding Earth fault and Inter turn fault detection.

The testing instrument used is,

Rotor Reflectometer, Type : TDR 100,

Make : Convex Design Ltd., Bristol, England.

- 7.1 This is a world renowned, highly accurate Rotor Reflectometer for Recurrent Surge Oscillograph test.
- 7.2 There are several modes in which the Reflectometer can be used. These are,
- Testing of stationary rotor within generator,
 - Testing of rotor at speed within generator (unexcited) and
 - Testing of rotor when removed from generator
- 7.3 Testing set can be used for,
- Fault between winding and rotor body (earth fault).
 - Inter turn fault.
 - High resistance joint in rotor.
 - Inter winding fault.
- 7.4 Detailed description of this test can be viewed at : <http://www.powerlinker.org/htm/RSO.htm>



8.0 Digital Dual Channel Storage oscilloscope
Make : Tektronix, USA with PC communication software.
This equipment is used in conjunction with RSO test instrument and partial discharge measurement for storage, transfer of measured wave form.



9.0 Motorized digital megger having 500, 1000, 2500 & 5000V DC output ranges with high accuracy
Insulation Resistance value and Polarization Index measurement.



10.0 Winding Resistance Meter :

This meter is designed on the principle of Kelvins bridge method. It is used for measuring winding resistance of Alternator, Transformer, HT motor, Current transformer secondary winding, circuit breaker power contact resistance etc.

10.1 Output : 1 Amp and 10 Amp DC

10.2 Range : 0 - 19.999 ohm

10.3 Accuracy : $\pm 0.1\%$ of range



Special features of winding Resistance meter are as follows

- a. High stability, high voltage compliance and extremely low ripple source.
- b. Totally protected against inductive load and ranges
- c. Test current can be selected
- d. Suitable for live switchyard
- e. Fast and stable readings for inductive loads
- f. True four wire system of measurement
- g. High resolution
- h. Direct readout of resistance on 4.5 digit LCD display with backlight
- i. Works on 230V AC mains