AUTOMATIC INSTRUMENT TRANSFORMER TEST SYSTEM

- Fully pre-wired comprehensive turn key test system.
- Suitable for CTs upto 3200A & VTs up to 33kV.
- Precision (0.005 Class) internal multi-ratio standard CT.
- Internal 4kA, 16kVA current source with suitable control units.
- State of the art Instrument Transformer Test Set AITTS-98 / AITTS-PLUS with built-in computer and printer interfaces.
- Current & Potential Burdens.
- CT Demagnetizer.
DESCRIPTION

The CT/VT test system is designed to test CTs over the range of 5 - 3,200 amperes and VTs over the range of 100 - 33,000 volts. The system is self contained and includes all the required power controls to generate the test voltage & current, the appropriate reference CTs and VTs, a set of burdens to load the test CT/VT to the required operating point and an Automatic CT/VT comparator to measure the errors of the test specimen transformer with respect to the reference transformer. CT demagnetizer is provided so that the test CTs can be demagnetized prior to conducting the accuracy tests.

The system arrangement is such that all the controls are provided on the front panel of the cabinet while all the connections to the test including connections for CT specimen/VT are made on the rear of the cabinet. The rear end of the cabinet can be fenced off for safety purposes.

The high voltage power injection kit for the VT test set-up and the Standard Capacitor are provided externally of the cabinet.

The Automatic Instrument Transformer test system can be designed to test CTs over the range of 5 - 6000 amperes and VTs over the range of up to 600kV.

The major components of the test system are:

- An Automatic Instrument Transformer Test Set (AITTS-98 / AITTS-PLUS).
- An adjustable power source.
- An adjustable current source complete with a precision standard CT.
- CT burden set.
- CT demagnetizer.
- A source of adjustable voltage for VT testing.
- An Electronic Potential Divider (EPD).
- A standard capacitor.
- VT burden set.
- Set of leads for CT & VT connections.

AUTOMATIC INSTRUMENT TRANSFORMER TEST SET

The AITTS-98 / AITTS-PLUS is the Instrument Transformer Comparator which is a fully automatic comparator capable of comparing both CTs and VTs. The input ranges of the instrument are 0.5 - 400 volts on the VT side and 0.004 to 20 amperes on the CT side (5 ampere input) or 0.004 to 4.0 amperes (1 ampere input). The comparator has a Ratio Error measuring range of up to 20% for both CTs and VTs. The instrument can be controlled through its keyboard or the RS232 port using PC or laptop. A USB printer port is available to drive a dedicated printer. The comparator is designed to compare CTs/VTs of nominally the same ratio. The AITTS-98 / AITTS-PLUS measures the burden of the entire test set up. It can be made to plot the accuracy curves of CTs or VTs in AITTS-98. Provision to connect external LCD display for AITTS-PLUS. The AITTS-98 / AITTS-PLUS recognizes the accuracy classes of ANSI, IEC, IEC-S, IEC-P, IS, IS-S, IS-P, IS-PR, AS, AS-S, BS, BS-S, Standards for CT & VT.
Available ratios

The CT is equipped with a tapped primary, tapped secondary winding, thus providing a multiplicity of ratios. Using the above current outputs, the following ratios are available: 3200, 3000, 2500, 2400, 2000, 1800, 1600, 1500, 1400, 1300, 1200, 1000, 1250, 900, 800, 750, 700, 650, 625, 600, 500, 450, 400, 375, 350, 325, 320, 300, 250, 240, 200, 180, 160, 150, 140, 130, 125, 120, 100, 90, 80, 75, 70, 65, 62.5, 60, 50, 45, 40, 37.5, 35, 32.5, 32, 30, 25, 24, 20, 18, 16, 15, 14, 13, 12.5, 10, 9, 8, 7.5, 7, 6.5, 6, 5.

Standard CT upto 6000 A with suitable source can also be offered.

STANDARD-CT SECONDARY SELECTION PANEL

Standard CT ratio selection allows the user to select required ratio according to the test CT ratio. Also there is a provision to select the required current using current selection switch which controls the high current contactors connected between high current primary cables. This arrangement allows the user to select pre-wound primary turns starting from 1 to 200 facilitating the user to test any CT of 5A to 3200A ratio without applying primary turns manually on the standard CT.

CT DEMAGNETIZER

CT demagnetizer is provided within the test system. The demagnetizer is suitable for demagnetizing CTs of all ratios, having either 5 or 1 ampere secondary windings.

CURRENT TRANSFORMER BURDENS

Current Transformer burden CB-96 are IEC 5 & I ampere, 50 or 60Hz, are rated from 1VA to 3.75VA at 1.0 power factor and from 5VA to 40VA of total VA of 88.75VA at 0.8 Power factor. Current transformer burdens that meet the ANSI specifications can also be provided.

REFERENCE VT

ELECTRONIC POTENTIAL DIVIDER

Electronic Potential Divider (EPD) is an amplifier aided capacitive divider’s designed to operate at high voltages. The EPD uses loss-free high voltage reference capacitor for the high voltage arm of the divider. Unlike other similar dividers, the EPD provides an isolated output whose output is related to the ratio setting. EPDs are used for accurate voltage measurement in metering circuits as well as for VT calibration.

The voltage ratios on the EPD are set by two switches, a three digit dial, and a multiplier. A range of ratios of 600 – 1 to 1:1 are provided. Given below is a list of the various ranges and ratios that are available.

Multiplier of 5, provides ratios of 600.0 – 200.0 to 1.
Multiplier of 2.5, provides ratios of 300.0 – 100.0 to 1.
Multiplier of 1, provides ratios of 120.0 – 40.0 to 1.
The low voltage input gives a multiplier of 0.05, providing ratios of 1 – 6 to 1.

Accuracy: The accuracy of the EPD is IEC class 0.05% ± 2mins
The Standard capacitor is an extremely stable, low-loss capacitor designed for use in laboratories and testing departments. The model is of three-terminal design and is insulated with pressurised Sulphur Hexafluoride (SF6) gas.

C = 200 pF.
Rated Voltage = 33 kV.
D F = <1 x 10^-4.
Test Voltage = 36 kV.
Accuracy = 1%.

Standard Capacitors of 50kV can also be provided for testing VTs up to 66kV.

Advantages of EPD
- Provides flexibility of various VT ratios.
- Eliminates the need to have several Standard VTs.
- High Accuracy of measurement – 0.05% ± 2 mins.

Operating Range
The EPD is designed to operate over an output range of 140 volts down to 50 volts (120% of 120 volts and 80% of 110/3).

EPDs with suitable ratios for operating with 600kV Standard Capacitors are available.

ADJUSTABLE VT OUTPUT SOURCE
An adjustable output of 0 – 50kV, is provided for energizing the test PT and the reference divider (EPD). The 50kV supply transformer & standard capacitor are kept outside the rack.

STANDARD CAPACITOR
The Standard capacitor is a extremely stable, low-loss capacitor designed for use in laboratories and testing departments. The model is of three-terminal design and is insulated with pressurised Sulphur Hexafluoride (SF6) gas.

C = 200 pF.
Rated Voltage = 33 kV.
D F = <1 x 10^-4.
Test Voltage = 36 kV.
Accuracy = 1%.

Potential transformer burdens PB-96 IEC, 110 volt & 63.5 volt are rated for 0 to 232.5VA. Burden Power Factor is maintained at 0.8 over the range of 2.5 to 232.5VA & @ 1.0PF from 1VA to 10VA. Potential transformer burdens that meet the ANSI specifications can also be provided.

POWER LEADS AND CONNECTING CABLES
The equipment is intended to be wired to a 3 Phase, 440V source with neutral capable of supplying 50A. It comes complete with a 5 meter, four-wire power cable for this purpose.

The equipment includes all the typical leads required to connect CTs or PTs and conduct tests. Such leads include the following:
- VT secondary leads, 4 conductor arrangement for avoiding lead drop in the test set up (10 meters).
- VT primary leads (2 x 1 meters).
- Test CT burden measurement leads of 3 meters.
- Test CT secondary cable of 3 meters.
- 6 nos. of 120 Sq. mm cable of 400A each for CT primary connection.
- Clamps for fastening primary connections.
- Holes are provided in Bushbar to connect the primary cables.
- Safety switch.

PHYSICAL INFORMATION
Size: The equipment is housed in two 19-inch racks. The overall console is approximately 1.6 meters long, 1.9 meters high and 1.1 meters deep. The 50kV voltage source & standard capacitor are placed outside (behind) the console.

Weight: The weight of the System is approximately 1500 kgs. (Shipped in Wooden & carton boxes).

The CT/VT Test System can be modified as per customer specifications. Separate CT and VT Test Systems are also available.