MAKE IN INDIA INITIATIVE
RECOGNISED WORLDWIDE

AUTOMATIC INSTRUMENT TRANSFORMER TEST SYSTEM

CT/VT TEST SYSTEM

- Fully pre-wired comprehensive turnkey Test System.
- Suitable for CTs up to 6000A & VTs up to 600kV.
- Precision (0.005 class) internal multi-ratio Standard CT (includes inbuilt Current Source upto 4000A for testing medium voltage CTs).
- Combined CT/ VT Comparator with "Industry class leading" Accuracy of measurement.
- Meets latest IS 16227, IEC 61869-2, 3, 4, TPX, TPY, TPZ, ANSI C57.13-2008, ANSI C57.13.7-2018 (Class 0.15 & 1.5) testing requirements.
- Current & Potential Burdens with switch selectable elements as per Standards.
- Inbuilt CT Demagnetizer.
- Motorised with Joystick control for Voltage and Current adjustments.
- Different System configurations for IS/ IEC / ANSI testing available.

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/VT specimen 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 setup 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 upto 600kV.

As compared to using individual Test Sets in the testing setup, our Rack systems have several advantages as below.

The Standard CT along with source, CT Demagnetizer are offered only in our CT, CT/ VT rack systems. They are not offered as individual stand alone units. The racks also include a CT Ratio selection panel, Digital Displays of -Input Voltage & Current (Current and voltage being fed to the Current source), source Voltage & Current (Line Voltage/ Current), High current Contactors and safety devices. The racks are fully pre-wired and ready for testing.

In-buit CT Demagnetizer with LED indicator can be used for both 1A & 5A CTs.

CT Ratio selection panel included only in our rack systems enabling selection of CT ratios provided by the standard CT without the need for applying external primary turns. This eliminates the need to apply external primary turns while testing CTs.

The Standard CT included in the rack system has a 5A secondary. Using the AITTS-98/ Plus Comparators and the in-built 5A Standard CT, we can test CTs of both 1A and 5A secondary. So there is no need to have a second 1A Standard CT.

The Standard CT secondary selection are now made Binary to provide max ratios. Primary connections are by clamps for easy connection. The Standard CT ratio selection Table is already included in the comparator (AITTS Plus) menu for easier selection of CT ratios.

In-built current source (16kVA rating) is suitable for testing LT CTs & Medium Voltage CTs.

Joy stick controls for easy operation (instead of separate knobs) for increase and decrease of test current from inbuilt source & from our included voltage source.

Separate Current & Potential Burdens with individual Inputs. The Burden elements are updated to meet the IS/ IEC/ ANSI Standard requirements.The individual Burden elements are switch selectable and can be used in combination to arrive at additional values thereby providing greater flexibility.

The independent Current & Potential Burdens are passive units not needing any Input Power Supply. Burden values selected are displayed on the Front panel of the Comparator. Front panel switch selectable elements are not dependent on any electronic controls thereby ensuring un-interrupted testing over a period of time.

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.

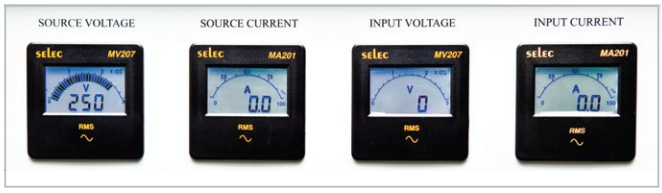
AUTOMATIC INSTRUMENT TRANSFORMER TEST SET

AITTS-98

AITTS-PLUS

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 upto 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, IS-P, IS-PR, AS-M, AS-ME, BS and BS-S Standards for CT and VT.



POWER SOURCE

Power Input : The Input to the system is 440 volts ±10% 50/60 Hz,16 kVA max.

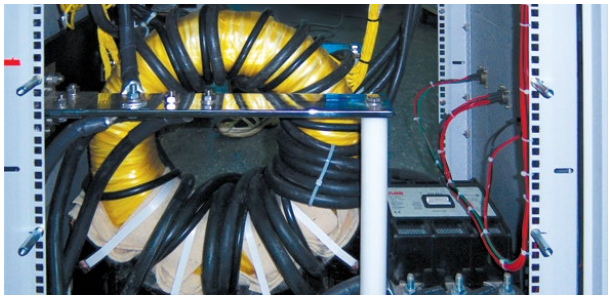
OPERATING CONTROLS & INDICATORS

- Digital voltmeter and ammeter indicating line supply.
- Digital voltmeter and ammeter indicating output.
- Indicators for line and output.
- Control circuit breaker.
- Power circuit breaker.
- Function switch - CT Hi, CT Lo, PT & OFF.
- Fine and coarse controls for adjusting test voltage/current (Motorised controls for Fine and Coarse adjustments).
- Standard CT ratio selection switches.
- Burden selection switches.
- CT Demagnetizer indicator & initiate switch.
- Start and Stop switch with indication.

PROTECTION

- Overload protection on line and regulator.
- Zero Start indication for safety.
- Safety interlock switch for HV barrier with HV indicator lamp.

CT SECTION

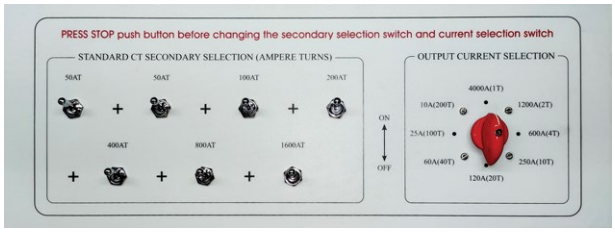


Available ratios

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 6000A with suitable Source can also be offered.

STANDARD CT SECONDARY SELECTION PANEL

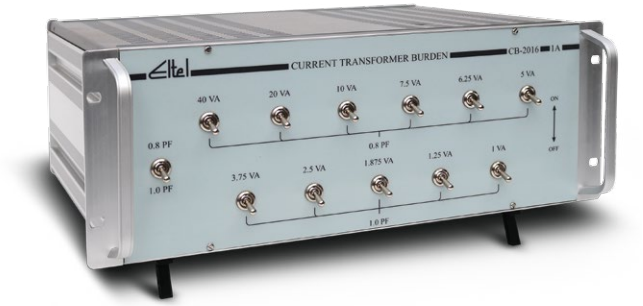


Standard CT ratio selection allows the user to select required ratio according to the test CT ratio. Also there is a provision to select the required current using current selection switch which controls the high current contactors connected between high current primary cables. This arrangement allows 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 Burdens CB-2016 are IEC 5 &1 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.

VT SECTION

REFERENCE VT

ELECTRONIC POTENTIAL DIVIDER

Electronic Potential Divider (EPD) is an amplifier aided capacitive divider 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

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 (upto 280 volts with range extension) down to 50 volts.

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

ADJUSTABLE VT OUTPUT SOURCE

An adjustable output of 0 – 50kV (single or three phase), 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 a three terminal design and is insulated with pressurised Sulphur Hexaflouride (SF6) gas.

C	=	200 pF.
Rated Voltage	=	33 kV.
D F	=	<1x10-4.
Test Voltage	=	39 kV.
Accuracy	=	1%.

POTENTIAL TRANSFORMER BURDENS

Potential Transformer Burdens PB-2016 are IEC, 110 volt & 63.5 volt are rated for 0 to 228.75VA. Burden Power Factor is maintained at 0.8 over the range of 1.25 to 228.75VA and @ 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 setup (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 bus bar 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.

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(Specifications subject to change without notice)