



# Three-phase Transformer Turns Ratio Tester TRT33B

- Test voltages 1 V, 10 V, 40 V, 100 V AC
- Ratio range 0,8 – 15 000
- Measurement of turns ratio
- Measurement of phase shift
- Measurement of excitation current
- True three-phase and single-phase test
- Verifies winding configurations



## Three phase Turns Ratio Tester

TRT33B is a true three-phase, fully automatic, test set specially designed for turns ratio, phase shift and excitation current measurement of power, distribution and instrument transformers. TRT33B determines the transformer turns ratio by accurately measuring the voltages across the unloaded transformer windings and then displaying the ratio of these voltages (ratios range from 0,8 to 15 000).

## Description

TRT33B is based on state of the art technology, using the most advanced technique available today. The test set can be used to test single-phase and three-phase transformers, both with and without taps in accordance with the requirements of the IEC 60076-1 standard.

For three-phase measurement, the test set is connected to all three phases of the transformer to be tested. If specific vector diagrams for different types of transformers are selected, the TRT33B will run a specific test for each transformer type (i.e., single phase, Delta to y, Y to delta, Delta to delta, or Y to y) without the need to switch test hookup cables. Turns ratio, phase shift and excitation current are displayed on the display obtained with true three-phase and single-phase tests.

TRT33B lets users enter a transformer's nameplate voltages for the turns-ratio calculation. This feature eliminates any error otherwise caused by an operator's manual calculation. The TRT33B also compares the test result with the calculated ratio and prints out the % of error for each test. It is easy to read display and easy to follow menu. View the result on the display. There is enough memory in TRT33B to store 100 test records and each record consists of 100 test readings. All measurements are time and date stamped. The measurements can be printed on a built-in thermal printer using the Print button.

Transformer excitation current as well as phase shift angles helps to detect transformers shorted turns or unequal number of turns connected in parallel. Operating conditions messages or error messages identify incorrect test conditions, abnormal operating condition or winding problems.

TRT33B has very high ability to cancel electrostatic and electromagnetic interference in HV electric fields. It is achieved by very efficient filtration. The filtration is made utilizing appropriate hardware and software.

## DV-Win software

All measurements can also be exported to a PC with the DV-Win software. The software connects a PC to TRT33B with USB cable. Using the DV-Win it is possible to report and analyze results. Also TRT33B can be controlled and test status could be viewed using the DV-Win software.

## Typical application

TRT33B is programmed to automatically test turns ratio, phase shift and excitation current of power, distribution and instrument transformer types defined by CEI/IEC standards.

## Standard accessories

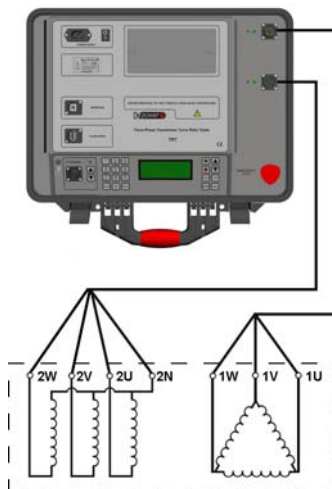
- ✓ DV-Win PC software including USB cable
- ✓ Built-in Tap Changer Control Unit
- ✓ Tap Changer Control cable set 5m
- ✓ Mains power cable
- ✓ Ground (PE) cable

## Optional accessories

- ✓ H winding test cable 5 m, three-phase connection, clip-end terminated
- ✓ H winding test cable extension, 5 m, shielded
- ✓ X winding test cable, 5 m, three-phase connection, clip-end terminated
- ✓ X winding test cable extension, 5 m, shielded
- ✓ H winding test cable extension, 10 m, shielded
- ✓ X winding test cable extension, 10 m, shielded
- ✓ H winding test lead, 3 m, single-phase connection, clip-end terminated
- ✓ X winding test lead, 3 m, single-phase connection, clip-end terminated
- ✓ Built-in thermal printer
- ✓ USB flash drive
- ✓ Cable bag
- ✓ Cable plastic case

Tap-Changer Control Unit permits users to change transformer taps remotely. This remote-controlled tap-changer unit eliminates the need to change the transformer's step-up and step-down taps by hand.

## Connecting a Test Object to TRT33B



## Technical Data

### Mains Power Supply

- Connection according to IEC/EN60320-1; UL498, CSA 22.2
- Voltage single phase 110 V – 240 V AC, +10 % – -15 %
- Frequency 50 / 60 Hz

### Output Data

- Test voltage 1 V, 10 V AC, 40 V AC, 100 V AC  
3x(1, 10, 40, 100) $\sqrt{3}$  V AC
- Ratio measuring range 0,8 to 15 000 (5-digit Resolution)
- Typical Ratio Accuracy:

0,8 - 999: $\pm 0,05$ %	1000 - 3999: $\pm 0,1$ %	4000 - 15000: $\pm 0,2$ %	@100 V AC
0,8 - 999: $\pm 0,05$ %	1000 - 3999: $\pm 0,1$ %	4000 - 15000: $\pm 0,2$ %	@40 V AC
0,8 - 999: $\pm 0,05$ %	1000 - 3999: $\pm 0,1$ %	8000 - 15000: $\pm 0,2$ %	@10 V AC
0,8 - 999: $\pm 0,05$ %	1000 - 1999: $\pm 0,1$ %	@1 V AC	
- Excitation current Range 0 – 2 A
- Typical Excitation current Accuracy  $\pm 1$  mA
- Excitation current Resolution 0,1 mA
- Phase Angle Range 360 Degrees
- Typical Phase Angle Accuracy  $\pm 0,05$  Degrees
- Phase Angle Resolution 0,01 Degree

### Display

- LCD Screen: 20 Characters by 4 Lines; LCD display with backlight, viewable in bright sunlight.

### Interface

- TRT33B is equipped with an USB port to connect to an external computer.

### Test Result Storage

- TRT33B can store 100 transformer test records; each test record can store 100 test readings.

### Environmental Conditions

- Operating temperature  $-10^{\circ}\text{C} - +55^{\circ}\text{C} / 14^{\circ}\text{F} - +140^{\circ}\text{F}$
- Storage temperature  $-40^{\circ}\text{C} - +70^{\circ}\text{C} / -40^{\circ}\text{F} - +158^{\circ}\text{F}$
- Humidity 5 % – 95 % relative humidity, non condensing

### Dimensions and Weight

- Dimensions 450 x 175 x 320 mm (W x H x D)  
17,72 x 6,89 x 12,6 in
- Weight 8 kg / 17,5 lbs

### Safety Standards

- European standards EN 61010-1  
LVD 73/23/EEC
- International standards IEC 61010-1  
UL 3111-1  
CAN/CSA-C22.2 No 1010.1-92

### Electromagnetic Compatibility (EMC)

- CE conformity EMC standard 89/336/EEC
- Emission EN 50081-2, EN 61000-3-2/3
- Interference Immunity EN 50082-2

All specifications herein are valid at ambient temperature of + 25 °C and standard accessories.  
Specifications are subject to change without notice.



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