



# Three-phase Transformer Turns Ratio Tester TRT30

- Test voltages 8 V, 40 V, 100 V AC
- Ratio range 0,8 – 15 000
- Measurement of turns ratio
- Measurement of phase shift
- Measurement of excitation current
- Vector group detection



## Three phase Turns Ratio Tester

TRT30 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. TRT30 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

TRT30 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. TRT30 is designed to detect specific vector diagrams for different types of transformers TRT30 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 a backlit LCD (4 lines by 20 characters) display.

TRT30 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 TRT30 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 TRT30 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.

TRT30 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.

## TRTWin software

All measurements can also be exported to a PC with the TRTWin software. The software connects a PC to TRT30 with USB cable. Using the TRTWin it is possible to report and analyze results. Also TRT30 can be controlled and test status could be viewed using the TRTWin software.

## Typical application

TRT30 is programmed to automatically test turns ratio, phase shift, excitation current and vector group of power, distribution and instrument transformer types defined by CEI/IEC standards.

## Standard accessories

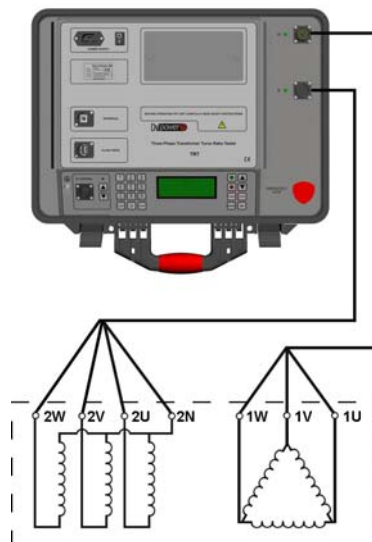
- ✓ H winding test cable 5 m, three-phase connection, clip-end terminated
- ✓ H winding test cable extension, 5 m, shielded
- ✓ X winding test cable, 5 m, three-phase connection, clip-end terminated
- ✓ X winding test cable extension, 5 m, shielded
- ✓ TRTWin PC software including USB cable
- ✓ Built-in Tap Changer Control Unit
- ✓ Tap Changer Control cable set 5m
- ✓ Mains power cable
- ✓ Ground (PE) cable
- ✓ Cable bag

## Optional accessories

- ✓ 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
- ✓ Inverter, 12 V DC to 230 V AC, 50 Hz

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 TRT30



## 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 8 V AC, 40 V AC, 100 V AC @ 1 A
- Ratio measuring range 0,8 to 15 000 (5-digit Resolution)
- Ratio Accuracy 0,8 – 2 000:  $\pm 0,08$  %, 2 001 – 4 000:  $\pm 0,1$  %, 4 001 – 15 000:  $\pm 0,3$  % @ 100 VAC  
0,8 – 2 000:  $\pm 0,08$  %, 2 001 – 4 000:  $\pm 0,1$  %, 4 001 – 15 000:  $\pm 0,3$  % @ 40 V AC  
0,8 – 2 000:  $\pm 0,15$  %, 2 001 – 4 000:  $\pm 0,22$  %, 4 000 – 15 000:  $\pm 0,5$  % @ 8 V AC
- Excitation current Range 0 – 2 A
- Excitation current Accuracy  $\pm 1$  mA
- Excitation current Resolution 0,1 mA
- Phase Angle Range  $\pm 90$  or 360 Degrees
- Phase Angle Accuracy  $\pm 0,05$  Degrees
- Phase Angle Resolution 0,01 Degree

### Display

- LCD Screen: 20 Characters by 4 Lines; viewable in bright sunlight.

### Interface

- TRT30 is equipped with an USB port to connect to an external computer.

### Test Result Storage

- TRT30 can store 100 transformer test records; each test record can store 100 test readings.

### Environmental Conditions

- Operating temperature  $-10^{\circ}\text{C}$  -  $+60^{\circ}\text{C}$  /  $14^{\circ}\text{F}$  -  $+140^{\circ}\text{F}$
- 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

Specifications are subject to change without notice.



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