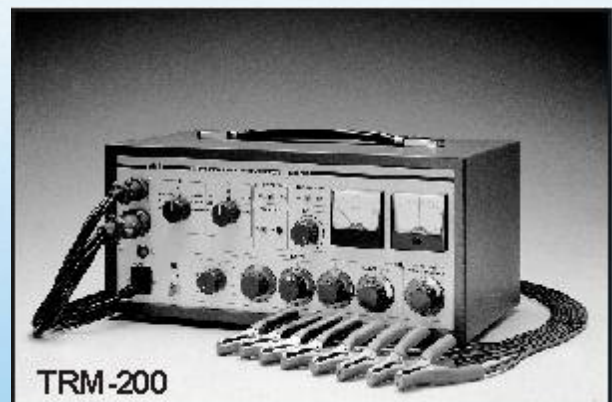


Transformer Ratiometers



TRM-150



TRM-200

FEATURES

- ◆ Measure : Ratio, phase angle deviation, percent deviation, excitation current
- ◆ Numeric readout
- ◆ High ratio upto 2021 : 1 on TRM-200 upto 2022.21:1 on TRM-150
- ◆ Two isolated test voltages, 120V/12V
- ◆ True four terminal measurement
- ◆ Phase sensitive synchronous null detector with gain control
- ◆ Three Phase lead switching built-in (TRM-200)
- ◆ Checks for correct polarity
- ◆ Resettable, fast acting MCB and fuse for input protection
- ◆ High accuracy
- ◆ Built in excitation current Meter

PHASE ANGLE DEVIATION : ELTEL's are the pioneers in manufacturing ratiometers which facilitates balancing of phase angle deviation. The phase angle difference between primary and secondary voltage gives clues to whether the power transformer under test has shorted turns or whether the windings has an unequal number of turns connected in parallel. All these factors change the phase angle between primary & secondary voltage. The phase angle deviation is also important in evaluating CTs for shorted turns.

TEST VOLTAGES : There are two isolated test voltages, 120V/12V, which enable testing of both power transformers (120V) and Voltage transformers. Large CTs can also be tested provided the CTs do not get saturated at 12V / 120V.

TRUE 4 TERMINAL MEASUREMENT : The leads that are supplied allow for a true four terminal measurement which eliminates errors caused by lead length and errors due to circulating currents.

PHASE SENSITIVE NULL DETECTOR : The electronic, synchronous and phase sensitive null detector with a 100:1 gain control permits fast and precise balance with the capability of discerning 1 turn in 2000.

LEAD SWITCHING : ELTEL's TRM-200 has a built-in three phase switching Rotary Switch to assist the operator and eliminate the time consuming task of climbing to the top of power transformers to change the leads. Measurement continues to be performed in single phase method and the front panel Rotary Switch allows the selection of any phase combination.

POLARITY CHECK : The polarity indicator comes 'ON' when the connections between the instrument and the transformer under test are not properly made or the phase angle difference between the primary and the secondary of the transformer is greater than 10 degrees. There is a polarity reversal switch marked " REV" with a LED indication provided. When the LED glows the switch position has to be changed before balancing. The heart of the instrument is a special, precise multi-tap toroidal transformer, which is used as a standard transformer in the comparator circuit. Transformer ratios from 0.8:1 upto 2021 : 1 ; can be measured. Electronic circuitry in the detector makes ratio and phase deviation measurements precise.

FULLY PROTECTED : It frequently happens that the ratiometer is connected to the transformer incorrectly stepping up the test voltage instead of stepping down. The input terminals have high speed electronic protection which shorts out the input and causes the fast acting resettable MCB to trip and turn off the instrument.

REPLACEABLE PCB : All electronics is focussed on to a single plug-in-type PCB which is easily field replaceable.

POWERLINE FILTERS : This is provided at the power input to reduce effect of RF interference.

EXCITATION CURRENT : There is a built-in milliammeter to measure excitation current. This will help in detecting a shorted turn on a parallel winding of power transformer if readings from previous measurements are available. TRM-150 provides additional resolution and accuracy for those that wind coils of many turns. This allows them to measure turns/turns ratio down to one turn. Manufacturers of higher voltage PTs would tend to benefit the most from this instrument.

RESOLUTION : TRM-150 provides a minimum resolution of 0.0013% (1 turn in 80,000) on dials.

DESCRIPTION

This compact and portable ELTEL instrument measures the no-load transformer ratio, i.e., ratio of high voltage winding to low voltage winding of a transformer in a bridge circuit and at low flux density in a core. Besides ratio, the ELTEL ratiometer is used to measure percent deviation of ratio, phase angle deviation and excitation current. It can also be used as a transformer comparator. The instrument provides a selectable excitation voltage, either 120V AC, or 12V AC, which is isolated from the main supply. When balanced, the ratio of the transformer is read directly in numerical form from the dials on the front panel. The balancing procedure is simplified by an internal synchronous and phase sensitive detector, which can be made sensitive to either the ratio or the phase angle adjustments.

SPECIFICATIONS

Circuits	: Transformer-arm bridge
Power	: 230V, $\pm 10\%$ 50Hz, 20VA or 115 $\pm 10\%$, 60Hz
Test voltage	: 120V and 12V AC at 1A isolated
Ratio Range	: 0.8:1 to 2022.21:1 for TRM-150 0.8:1 to 2021:1 for TRM-200
Ratio Resolution	: 0.0013% for TRM-150, 0.01% for TRM-200
Accuracy	: Better than $\pm 0.1\%$ of ratio at 120V test voltage
Deviation dials	: Ratio deviation $\pm 0.55\%$ of ratio with a resolution of 0.02 ; $\pm 0.5\%$ of ratio ± 5.5 CR for TRM-150
Phase angle deviation	: 2 ranges of ± 0.55 CR and ± 5.5 CR
Dimensions	: 450mm x 230mm x 200mm (LxBxH)
Weight	: 15 kgs approx

Amphenol MIL standard connectors are provided for output connection.

ELTEL ratiometers are supplied with AC line cord, instruction manual and spare fuses.

Cables : Set of 10 meter cable (optional 15meters cable). OR

25mts. (10mts. + 15mts. extension cable) are supplied separately.

APPLICATIONS

- Power Transformers
- Distribution Transformers
- Potential Transformers

OPTIONAL ACCESSORIES

- Spare PCB
- Range Extension 5:1
- CVT Range Extension 40:1

OTHER PRODUCTS

- Automatic Transformer Ratio Meter. ■ Manual & Automatic Transformer Winding Resistance & On Load Tap Changer Test Sets.
- Automatic CT/VT Test Sets & Systems. ■ Semi Automatic 12KV & Automatic 12KV & 5KV Capacitance & Tan Delta Test Sets.
- Manual & Automatic Tan Delta & Resistivity Test sets for Transformer Oil. ■ Manual & Automatic Portable LV Capacitance & Tan Delta Test Sets. ■ Digital Micro Ohm Meters with built in 100A. Source ■ Relaying Current Transformer Analyser.



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