

True Three Phase Turns Ratio Tester

TR 300



- Selectable test Voltages: 4, 12, 40, 100 & 250 VAC (optional)
- Measurement range 0.75 – 50 000 with 0.1% accuracy
- Built in 3.5" thermal printer (optional)
- True three-phase voltage measurement
- Stores up to 128 test results with up to 99 readings for each test
- Magnetic Balance Test (optional)
- Automatic vector group detection
- Built-in tap changer control
- Battery backup for up to 3 hours of operation (optional)
- Records excitation current, phase angle & Polarity
- IP-67 weatherproof Enclosure

Introduction:

The TR 300 is a true three-phase transformer turns ratio test instrument designed to test any type of transformer. It performs turns ratio tests per the IEEE C57.12.90 & IEC 60076-1 measurement standard for three phase or single phase oil filled transformers. TR300 is also suitable for testing dry type transformers single or three phase transformers per Standards IEEE C57.12.91 and IEC 60076-1 for Measuring ratios, polarity, phase angle and vector group of Single phase and Three-phase. The TR 300 generates its own three-phase excitation test voltage which is applied to the three phases of the transformer's primary windings. The three-phase secondary voltages are measured to calculate the turns ratio. The TR 300's measuring range is 0.75-50,000. In addition to measuring turns ratio, the TR 300 can also measure excitation current, winding polarity and phase angle difference between the primary and secondary voltages. The test results can be displayed on the unit's built in touch color display.

Higher Test Voltages for increased accuracy

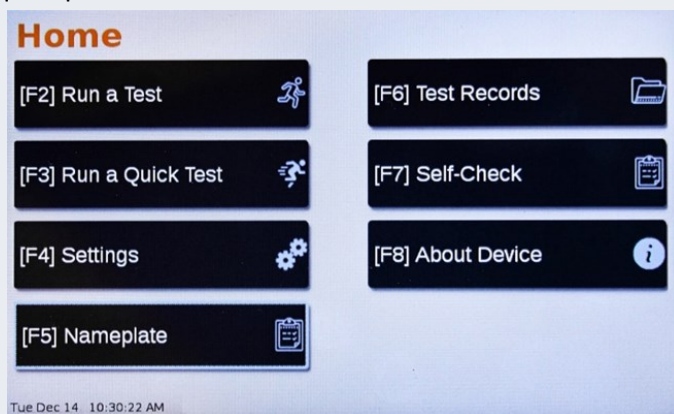
The TR 300 offers selectable test voltages of 4V, 40V, and 100V. Optionally, user defined test voltage up to 250V is available for testing in electrically noisy environments. The higher test voltages increase the accuracy, especially at high turns ratios. To prevent an accidental wrong test lead hookup, such as when the operator reverses H and X leads, the TR 300 outputs a low-level test voltage to verify the hookup condition before applying the full test voltage.

TR 300 performs the following tests.

- Turns Ratio, Phase angle & Excitation current measurement
- Deviation from expected TR
- Automatic Vector group detection
- Magnetic Balance test

User Interface

The unit's back-lit color LCD touchscreen (800 x 480 pixels) is viewable in bright sunlight and low-light and provides an intuitive menu structure where running a test is just few taps away. The full-sized industrial keyboard makes data entry quite easy for information such as nameplate and setting information. The TR300 features a built-in 3.5" thermal printer for quick printout of results in the field.



Data Storage and Analysis

The TR300 can store up to 128 test results internally. Test results can be transferred to a PC via the unit's USB Flash drive interface (Flash drive not included) or directly via the USB 2.0 PC interface. The provided PC software can be used for analysis and report generation.

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TR 300 Technical Spec.

Physical Specifications	
Dimensions	21" w x 8" H x 17" D (53 cm x 20.5 cm x 43 cm) weatherproof IP-67 Enclosure
Weight	Weight without Battery: 34 lbs. (15 Kg), Weight with Battery: 36 lbs.. (16 Kg)
Operating Voltage	90 – 240 Vac, 50/60 Hz
Measuring Method	ANSI/IEEE C57.12.90, C57.12.91 and IEC 60076-1
Battery Back up (Built in)	10 Ah 12 V LiFePo4 for 3 hours of operation
Turns Ratio Accuracy	
	4 Vac & 12 Vac: 0.75– 3000 : Typ. $\pm 0.05\%$ typ (0.1% max) , 3,000 - 50,000: $\pm 0.25\%$ typ (max 0.4%) Resolution : 0.0001
	40 Vac: 0.75– 10,000 : $\pm 0.05\%$ typ (0.1% max), 10,000 - 50,000: $\pm 0.25\%$ typ (max 0.4%) Resolution : 0.0001
	100 Vac: 0.75– 10,000 : $\pm 0.05\%$ typ (0.1% max), 10,000 - 50,000: $\pm 0.25\%$ typ (max 0.4%) Resolution : 0.0001
	250 Vac: 0.75– 10,000 : $\pm 0.05\%$ typ (0.1% max), 10,000 - 50,000: $\pm 0.25\%$ typ (max 0.4%) Resolution : 0.0001
Excitation Current Range	0 – 2 Ampere; Accuracy: ± 0.1 mA, $\pm 1\%$ of reading (± 1 mA)
Phase Angle Measurement	
Range	0 – 360 degrees
Accuracy	± 0.1 degree Resolution : 0.01 degree
Polarity Reading	In-phase or out-of-phase indication
Tap Changer Contacts	240 V AC, 2A
Display	Touch enabled 800 x 480 pixels back-lit color LCD; viewable in direct sunlight
Printer	3.5" Thermal paper printer (optional)
Keyboard	Full-sized "QWERTY"-style industrial keyboard
OPERATING/STORAGE TEMPERATURES	
Temperature	Operating: -10°C to $+50^{\circ}\text{C}$ ($+15^{\circ}\text{F}$ to $+122^{\circ}\text{F}$) Storage: -30°C to $+70^{\circ}\text{C}$ (-22°F to $+158^{\circ}\text{F}$)
Humidity	90% RH @ $+40^{\circ}\text{C}$ ($+104^{\circ}\text{F}$)
DATA STORAGE AND ANALYSIS	
Internal Test Record Storage	Up to 128 records with max 99 results per record
External Test Record Storage	USB Flash drive interface and firmware updates
Included Cables	One 15' (4.57 m) 3-phase cable set for HV & LV side, one 10' (3.3 m) safety ground cable, one USB cable, one power cord, one 10' (3.3m) LTC control cable & cable bag
Optional Cables	25' extension cable for HV and LV side