ATRT-03

Automatic Turns Ratio Tester

Vanguard Instruments Company

www.vanguard-instruments.com

ATRT-03

Automatic, Three-Phase Turns-Ratio Testing

The ATRT-03 is Vanguard's second generation, microprocessor-based, automatic, three phase, transformer turns-ratio tester. This lightweight, portable unit is designed for testing transformers at utility power substations.

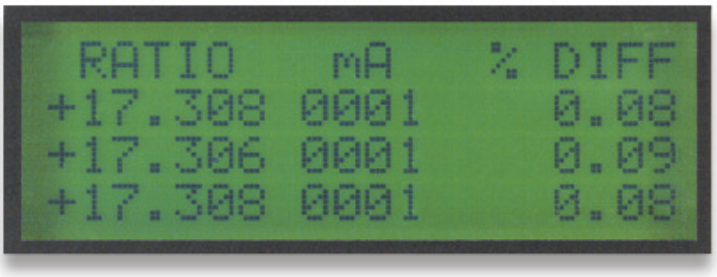
The ATRT-03 determines the transformer turns-ratio using the IEEE C57.12.90 measurement method. The transformer turns-ratio (ranging from 0.8 to 15,000) is determined by precisely measuring the voltages across the unloaded transformer windings. To ensure accuracy, the ATRT-03's measuring circuitry self-calibrates before each measurement. It requires neither adjustment nor temperature compensation. The ATRT-03's turns-ratio measurement accuracy is 0.1% or better.

The ATRT-03 can perform a specific test for each transformer type (such as single phase, delta to Y, Y to delta, delta to delta, or Y to Y) without the need to switch test hookup cables. Also, the unit's automatic transformer phase detection feature can detect different transformer vector diagrams. The ATRT-03 can automatically detect and test 67 transformer types defined by ANSI, CEI/IEC and Australian standards.

To prevent an accidental wrong test-lead hook-up (e.g., when the operator reverses H and X leads), the ATRT-03 outputs a low-level test voltage to verify the hook-up condition before applying the full test voltage to the transformer. Three test voltages (8 Vac, 40 Vac, 100 Vac) allow the ATRT-03 to test CT's and PT's, as well as power transformers.

In addition to measuring a transformer's turns-ratio, the ATRT-03 can also measure a transformer's excitation current (in milli-amperes) and its winding phase angle.

Automate



The ATRT-03 can also calculate the turns-ratio percentage error if the transformer's nameplate voltages are provided. The baseline turns-ratio is calculated using the nameplate voltages, and the test results are compared to the baseline turns-ratio. The percentage error is then calculated from the difference between the baseline and test turns-ratios.

User Interface

The ATRT-03 features a back-lit LCD screen (20 characters by 4 lines) that is viewable in both bright sunlight and low-light levels. The test results screen displays the transformer turns-ratio, excitation current, and turns-ratio accuracy. The unit is controlled via a rugged, 16-key, membrane keypad.

Thermal Printer

A built-in 4.5-inch wide thermal printer prints test results in a 14 point font for easy viewing. The printer and paper dispenser are mounted under the front panel for protection.

Internal Test Record Storage

Up to 200 test records can be stored in the ATRT-03's Flash EEPROM memory. Each test record may contain up to 99 turns-ratio, excitation current, phase angle, and nameplate voltage readings. Test records can be recalled locally or transferred to a PC via the RS-232C interface.

Transformer Test Plan Storage

The ATRT-03 can store up to 128 transformer test-plans in its Flash EEPROM. A test plan is comprised of the transformer nameplate voltages for each tap setting. The calculated turns-ratio based on the nameplate voltages is compared with the measured turns-ratio. By recalling a test plan, a transformer can be quickly tested and turns-ratio Pass/Fail reports can be reviewed. Test plans can be created with the included PC software and can be transferred to the ATRT-03 via the RS-232C interface.

Computer Interface

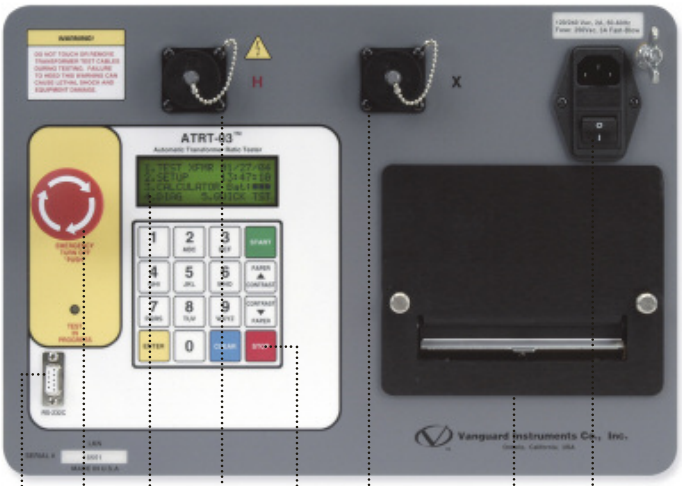
The ATRT-03 can be computer-controlled via the RS-232C interface using the supplied PC software. The Windows® XP/Vista-based software can be used to run a test and to store test results on a PC. Test results can also be exported to Microsoft® Excel.

Transformer Load Tap Changer Control

An optional Tap-Changer Remote Control Box can be used to remotely change transformer taps. This remote-controlled tap-changer box eliminates the need to manually change the transformer's step-up and step-down taps.

Automatic Three-Phase Turns-

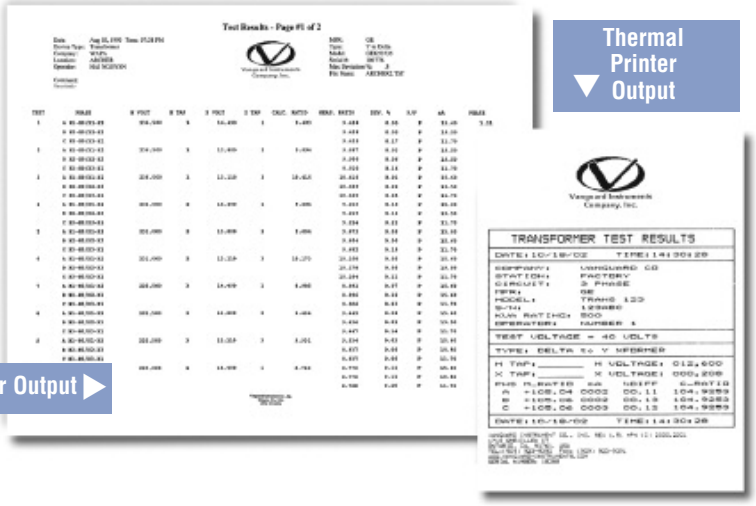
the Tedious Procedure of Transformer Turns-Ratio Testing



Ordering Information

ATRT-03, Three Phase Transformer Turns-Ratio Tester

ATRT-03, Cables, PC Software	Part No: ATRT-03
ATRT-03 Carrying Case	Part No: ATRT-03 Case
Load Tap Changer Controller	Part No: LTC Controller
4.5-inch Printer Paper	Part No: Paper - TP4



SPECIFICATIONS

TYPE	Portable, lightweight, automatic, three-phase transformer turns-ratio meter
PHYSICAL SPECIFICATIONS	17"W x 7"H x 13"D (43.2cm x 17.8 cm x 33.0 cm); Weight: 14 lbs (6.4 kg)
INPUT POWER	3 amps, 100 – 120 Vac or 200 – 240 Vac (selectable), 50/60 Hz
MEASUREMENT METHOD	ANSI/IEEE C57.12.90
RATIO-MEASURING RANGE	0.8 – 15,000 (5-digit resolution)
TURNS-RATIO ACCURACY	0.8 – 1999: ±0.1%, 2,000 – 3,999: ±0.25%, 4,000 – 15,000: ±1% @ 8 Vac 0.8 – 1999: ±0.1%, 2,000 – 3,999: ±0.20%, 4,000 – 15,000: ±1% @ 40 Vac 0.8 – 1999: ±0.1%, 2,000 – 3,999: ±0.15%, 4,000 – 15,000: ±1% @ 100 Vac
ADJUSTMENT	None required
TEST VOLTAGES	8 Vac @ 1 amp, 40 Vac @ 0.6 amp, 100 Vac @ 0.1 amp
EXCITATION CURRENT READING RANGE	0 – 2 Amperes; Accuracy: ±1mA, ±2% of reading (±1 digit)
PHASE-ANGLE MEASUREMENT	0 – 360 degrees; Accuracy: ±0.2 degrees (±1 digit)
DISPLAY	Back-lit LCD screen (20 Characters by 4 Lines); Viewable in bright sunlight and low-light levels
PRINTER	Built-in 4.5-inch wide thermal printer
COMPUTER INTERFACE	RS-232C (19,200 baud) port
PC SOFTWARE	Windows® XP/Vista-based Transformer Turns-Ratio Analyzer application is included with purchase price
INTERNAL TEST RECORD STORAGE	Stores 200 complete transformer test records. Each test record includes nameplate voltage, winding turns-ratios, excitation current, and winding phase angle
INTERNAL TEST PLAN STORAGE	Stores up to 128 transformer test plans
SAFETY	UL Certified (UL 61010A-1), CAN/CSA Certified (C22.2 No. 1010.1-92)
ENVIRONMENT	Operating: -10° to 50° C (15° to +122° F); Storage: -30° C to 70° C (-22° to +158° F)
HUMIDITY	90% RH @ 40°C (104°F) non-condensing
ALTITUDE	2,000m (6,562 ft) to full safety specifications
CABLES	One 15-foot single-phase cable set, One 15-foot 3-phase cable set, One 25-foot extension cable set, One cable-carrying duffel bag included
OPTIONS	Transportation case, transformer tap-changer remote control device
WARRANTY	One year on parts and labor

Note: All specifications herein are valid at nominal voltage and ambient temperature of +25°C (+77°F). Specifications are subject to change without notice.

-Ratio Tester

Vanguard Instruments Company

Reliability Through Instrumentation

RVFeb10

Vanguard Instruments Company, Inc.

Vanguard Instruments Co., (VIC), was founded in 1991. Currently, our 28,000 square-foot facility houses Administration, Design & Engineering, and Manufacturing operations. From its inception, VIC's vision was, and is to develop and manufacture innovative test equipment for use in testing substation EHV circuit breakers and other electrical apparatus.

The first VIC product was a computerized circuit-breaker analyzer, which was a resounding success. It became the forerunner of an entire series of circuit-breaker test equipment. Since its beginning, VIC's product line has expanded to include microcomputer-based, precision micro-ohmmeters, single and three-phase transformer winding turns-ratio testers, winding-resistance meters, transformer tap-changing controllers, megaohm resistance meters, and a variety of other electrical utility maintenance support products.

VIC's performance-oriented products are well suited for the utility industry. They are rugged, reliable, accurate, user friendly, and most are computer controlled. Computer control, with innovative programming, provides many automated testing functions. VIC's instruments eliminate tedious and time-consuming operations, while providing fast, complex, test-result calculations. Errors are reduced and the need to memorize long sequences of procedural steps is eliminated. Every VIC instrument is competitively priced and is covered by a liberal warranty.

Vanguard products are available from:

Vanguard Instruments Company, Inc.

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www.vanguard-instruments.com