

ATRT-03A

Automatic Turns Ratio Tester



Vanguard Instruments Company

www.vanguard-instruments.com

Automate



ATRT-03A

Automatic, Three-Phase Turns-Ratio Testing

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

The ATRT-03A 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-03A's measuring circuitry self-calibrates before each measurement. It requires neither adjustment nor temperature compensation. The ATRT-03A's turns-ratio measurement accuracy is 0.1% or better.

The ATRT-03A 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-03A 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-03A 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-03A to test CT's and PT's, as well as power transformers.

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

The ATRT-03A 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-03A 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-03A'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-03A 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-03A via the RS-232C interface.

Computer Interface

The ATRT-03A 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.

ATRT-03A Input Power Sources

The ATRT-03A is powered by two 12Vdc/2AH rechargeable SLA batteries. The high capacity, low power consuming circuitry allows the ATRT-03A to be used continuously for up to three hours between charges. The ATRT-03A features a built-in charger allowing the batteries to be charged while in use. The unit can be operated from a wide range of voltages and power sources such as 85 – 264 Vac, 110 – 370 Vdc, or a 12 Vdc car battery.

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



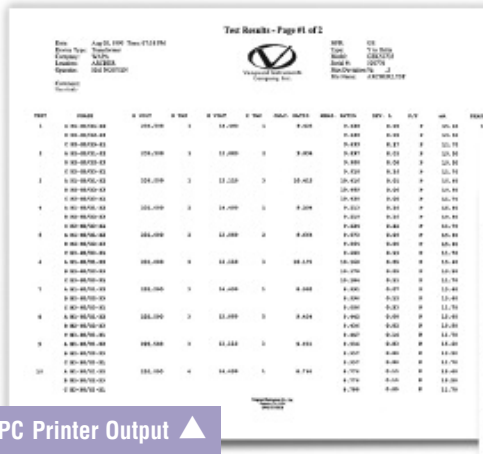
- Emergency Turn-Off
- Connector for H Terminals
- Connector for X Terminals
- 4.5-Inch Wide Thermal Printer
- 12 VDC Cigarette Lighter Input
- Power Switch
- Rugged 16-Key Membrane Keypad
- Back-lit LCD Screen (20 characters by 4 lines)
- RS-232C Interface

Ordering Information

ATRT-03A, Three Phase Transformer Turns-Ratio Tester

- ATRT-03A, Cables, PC Software
- ATRT-03A Carrying Case
- Load Tap Changer Controller
- 4.5-inch Printer Paper

- Part No. ATRT-03A
- Part No. ATRT-03A Case
- Part No. LTC Controller
- Part No: Paper - TP4



PC Printer Output ▲

Thermal Printer Output ▼



SPECIFICATIONS

TYPE	Portable, lightweight, automatic, battery-powered three-phase transformer turns-ratio meter
PHYSICAL SPECIFICATIONS	19"W x 7"H x 15"D (48.2cm x 17.8 cm x 38.1 cm); Weight: 25 lbs (11.3 kg)
INPUT POWER	3 amps, 85 – 264 Vac or 110 – 370 Vdc or 12 Vdc
BATTERIES	Two 12Vdc/2AH, rechargeable Sealed Lead Acid batteries (up to 3-hours operation)
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	Designed to meet UL 61010A-1 and CAN/CSA C22.2 No. 1010.1-92 standards
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

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.

1520 S. Hellman Ave. • Ontario, California 91761 USA • P 909-923-9390 • F 909-923-9391
www.vanguard-instruments.com