

# ATRT-03 Series 2™

## Automatic Transformer Ratio Tester



**Vanguard Instruments Company**

# Automate

## Transformer Test Plans

The ATRT-03 S2 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 PC software and can be transferred to the ATRT-03 S2 via the available interfaces (RS-232C port, USB port, USB Flash drive port).

## Test Record Storage Capabilities

Up to 112 test records can be stored in the ATRT-03 S2's Flash EEPROM memory. Each test record may contain up to 33 turns-ratio, excitation current, phase angle and name plate voltage readings. Test records can be recalled locally or transferred to a PC via the available interfaces (RS-232C port, USB port, USB Flash drive port).

## USB Flash Drive Interface

A built-in USB Flash drive interface provides a convenient method for transferring test plans and test records to or from a USB Flash drive. The user can store up to 999 transformer test plans on a USB Flash drive. Test plans can be transferred from a PC to a USB Flash drive, and then a specific test plan on the USB Flash drive can be transferred to the ATRT-03 S2's internal Flash memory. Up to 999 test records from the field can be stored on a USB Flash drive. Test records stored in the ATRT-03 S2's internal memory can also be transferred to a USB Flash drive. The supplied PC software can then be used to view the test records stored on the USB Flash drive.

## Computer Interface

In computer-controlled mode, the unit can be controlled via the RS-232C or USB port using the supplied PC software (Transformer Turns-Ratio Analyzer application provided with each ATRT-03 S2). This 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.

## Thermal Printer

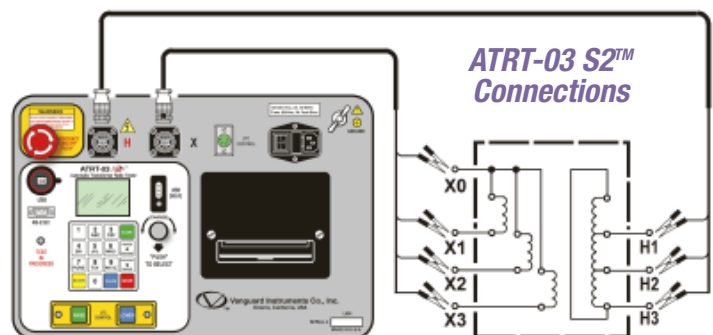
A built-in 4.5-inch wide thermal printer prints test results in a 14 point font for easy viewing. The printer and paper dispenser are mounted under the front panel for protection.

## Transformer Load Tap Changer Control

Transformer tap positions can be changed remotely using the unit's built-in transformer load tap changer. This remote-controlled tap changer feature eliminates the need to manually change a transformer's step-up and step-down taps.

## ATRT-03 S2 Input Power Sources

The ATRT-03 S2 can be powered from a single-phase 100-240 Vac 50/60 Hz power source. A built-in safety ground detection circuit can detect and display a ground fault problem with the AC input source.



# ATRT-03<sup>Series</sup>2

## Automatic 3-Phase Transformer Turns-Ratio Tester

The ATRT-03 S2 is Vanguard's third generation, microprocessor-based, automatic, three phase, transformer turns-ratio tester. This lightweight and rugged portable unit is designed for transformer testing at utility power substations.

The ATRT-03 S2 determines the transformer turns-ratio using the IEEE C57.12.90 measurement method. The ATRT-03 S2 outputs an excitation test voltage to the transformer's primary windings. The induced secondary voltage is sensed and the transformer turns-ratio is calculated. The ATRT-03 S2 can measure turns-ratios from 0.8 to 15,000. The transformer turns-ratio, excitation current, and phase-angle readings are displayed on the large backlit LCD. The built-in transformer type detection feature allows the ATRT-03 S2 to detect and test 130 transformer types defined by ANSI, CEI/IEC and Australian standards.

The ATRT-03 S2 can be used as a stand-alone unit or can be computer-controlled. It can be operated locally using its alpha-numeric keypad and rotary switch. Information is displayed on a backlit LCD screen (64 x 128 dot graphic) that is viewable in both bright sunlight and low-light levels. Test reports can be printed in the field on the unit's built-in 4.5-inch wide thermal printer. The ATRT-03 S2 is capable of storing up to 112 test records and 128 test plans in Flash EEPROM memory. Test records or test plans can be stored or transferred to and from a PC via the available interfaces (RS-232C port, USB port, USB Flash drive port).

## Transformer Test Voltage

To prevent an accidental wrong test-lead hook-up (e.g., when the operator reverses H and X leads), the ATRT-03 S2 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 S2 to test CT's and PT's, as well as power transformers.

## Auto-Detect Transformer Configuration

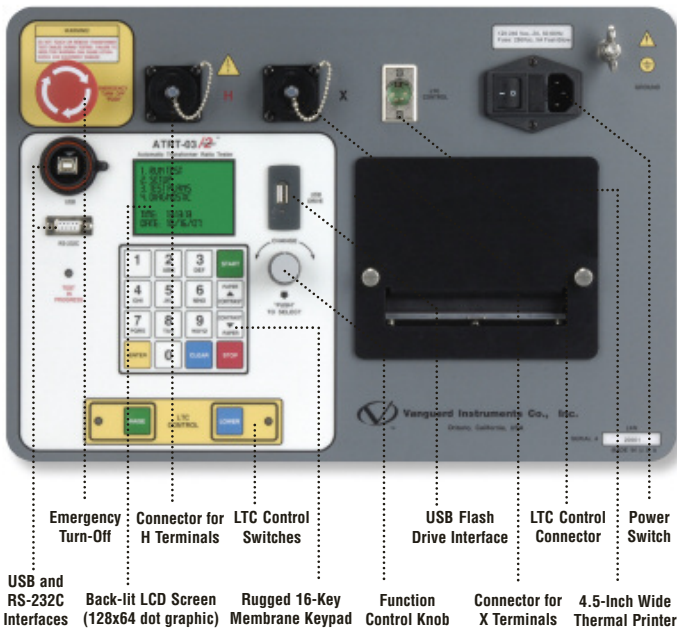
The ATRT-03 S2 can automatically detect 130 specific vector groups for different transformer types defined by ANSI, CEI/IEC, and Australian standards.

## User Interface

The ATRT-03 S2 features a backlit LCD screen (64 x 128 dot graphic) that is viewable in both bright sunlight and low-light levels. The test results screen displays the transformer turns-ratio, excitation current, phase angle, and percentage error. The unit is controlled via a rugged, 16-key, membrane keypad and a digital rotary switch.

# Automatic Three-Phase Turns-

# the Tedious Procedure of Transformer Turns-Ratio Testing



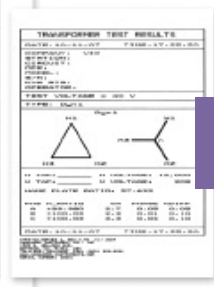
Emergency Turn-Off  
 Connector for H Terminals  
 LTC Control Switches  
 USB Flash Drive Interface  
 LTC Control Connector  
 Power Switch  
 USB and RS-232C Interfaces  
 Back-lit LCD Screen (128x64 dot graphic)  
 Rugged 16-Key Membrane Keypad  
 Function Control Knob  
 Connector for X Terminals  
 4.5-Inch Wide Thermal Printer

## Ordering Information

ATR-03 Series 2, Three Phase Transformer Turns-Ratio Tester  
 ATRT-03 S2, Cables, PC Software  
 ATRT-03 S2 Carrying Case  
 4.5-inch Printer Paper

Part No: ATRT-03S2  
 Part No: ATRT-03S2 Case  
 Part No: Paper - TP4

PC Printer Output



Thermal Printer Output

## SPECIFICATIONS

- TYPE** Portable, lightweight, automatic, 3-phase transformer turns-ratio meter
- PHYSICAL SPECIFICATIONS** 18"W x 7"H x 15"D (45.7 cm x 17.8 cm x 38.1 cm ); Weight: 20 lbs (9.0 kg)
- OPERATING VOLTAGE** 100 – 240 Vac, 50/60 Hz
- MEASUREMENT METHOD** ANSI/IEEE C57.12.90
- URNS-RATIO MEASURING RANGE** 0.8 – 15,000
- URNS-RATIO ACCURACY** 0.8 – 1,999: ±0.1%, 2,000 – 3,999: ±0.25%. 4,000 – 15,000: ±1% @ 8Vac  
 0.8 – 1,999: ±0.1%, 2,000 – 3,999: ±0.20%. 4,000 – 15,000: ±1% @ 40Vac  
 0.8 – 1,999: ±0.1%, 2,000 – 3,999: ±0.15%. 4,000 – 15,000: ±1% @ 100Vac
- TEST VOLTAGES** 8 Vac @ 1Amp, 40 Vac @ 0.2 Amp, 100 Vac @ 0.1 Amp
- EXCITATION CURRENT READING RANGE** 0 – 2 Amperes; Accuracy: ±0.1 mA, ±2% of reading (±1 mA)
- PHASE-ANGLE MEASUREMENT** 0 – 360 Degrees; Accuracy: ±0.2 degree (±1 digit)
- DISPLAY** Back-lit LCD screen (64 x 128 dot graphic display); Viewable in bright sunlight and low-light levels
- PRINTER** Built-in 4.5-inch wide thermal printer
- COMPUTER INTERFACES** One RS-232C port, One USB port
- EXTERNAL DATA STORAGE** One USB Flash drive interface port; Up to 999 transformer test records can be stored on a USB Flash drive (not included)
- PC SOFTWARE** Windows® XP/Vista-based Transformer Turns-Ratio Analyzer application is included with purchase price
- INTERNAL TEST RECORD STORAGE** Can store 112 transformer test records internally. Each record holds the test record header and up to 33 readings.
- INTERNAL TEST PLAN STORAGE** Can store 128 transformer test plans internally. Test plans can be transferred to the unit from the PC via the RS-232C/USB port or via the USB Flash drive interface
- LOAD TAP CHANGER CONTACT** 240 Vac, 2 Amps
- 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 set, One 15-foot 3-phase set, One 25-foot extension set, One safety ground, One USB, One RS-232C, cable bag
- OPTIONS** Transportation Case
- 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.**

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