

Automatic Transformer Ratio Tester



Vanguard Instruments Company

Automate

Transformer Test Plans

The ATRT-03A 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-03A S2 via the available interfaces (RS-232C port, USB port, USB Flash drive port).

Internal Test Record Storage

Up to 112 test records can be stored in the ATRT-03A S2's Flash EEPROM memory. Each test record may contain up to 33 turns-ratio, excitation current, phase angle, and nameplate 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 and test records on a USB Flash drive, and the supplied PC software can be used to view the test records.

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-03A 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

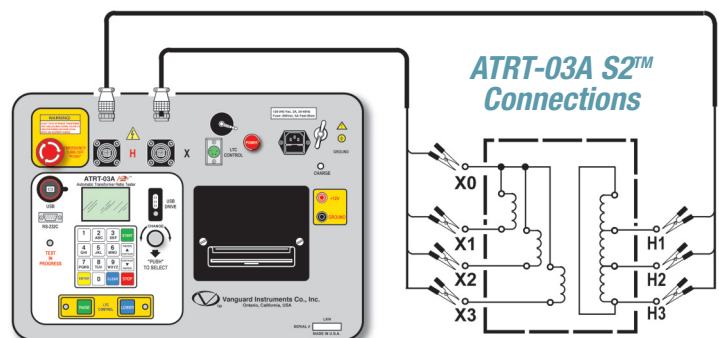
A built-in 4.5-inch wide thermal printer prints test results in a 14 point font for easy viewing. The printer and paper dispenser are mounted under the front panel for protection.

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 the transformer's step-up and step-down taps.

ATRT-03A S2™ Power Sources

The ATRT-03A S2 can be powered from its built-in rechargeable lead acid batteries (3 hours) or from a single-phase 100-240 Vac 50/60 Hz power source. A built-in charger allows the batteries to be charged while in use.



ATRT-03A™ Series 2

Automatic 3-Phase Transformer Turns-Ratio Tester

The ATRT-03A S2 is Vanguard's third-generation, microprocessor-based, automatic, three-phase, transformer turns-ratio tester.

The ATRT-03A S2 determines the transformer turns-ratio using the IEEE C57.12.90 measurement method. The ATRT-03A S2 generates and outputs an excitation test voltage to the transformer's three primary windings. The induced secondary voltage is sensed and the transformer turns ratio is calculated. The ATRT-03A 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 unit's LCD screen. The built-in transformer type detection feature allows the ATRT-03A S2 to detect and test 130 transformer types defined by ANSI, CEI/IEC and Australian standards.

The ATRT-03A 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 back-lit 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 ATRT03A S2 can store up to 112 test records and 128 test plans in Flash EEPROM. 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

The ATRT-03A S2 generates excitation test voltages internally. Three test voltages (8 Vac, 40 Vac, 100 Vac) allow the ATRT-03A S2 to test CT's and PT's, as well as power transformers.

Auto-Detect Transformer Configuration

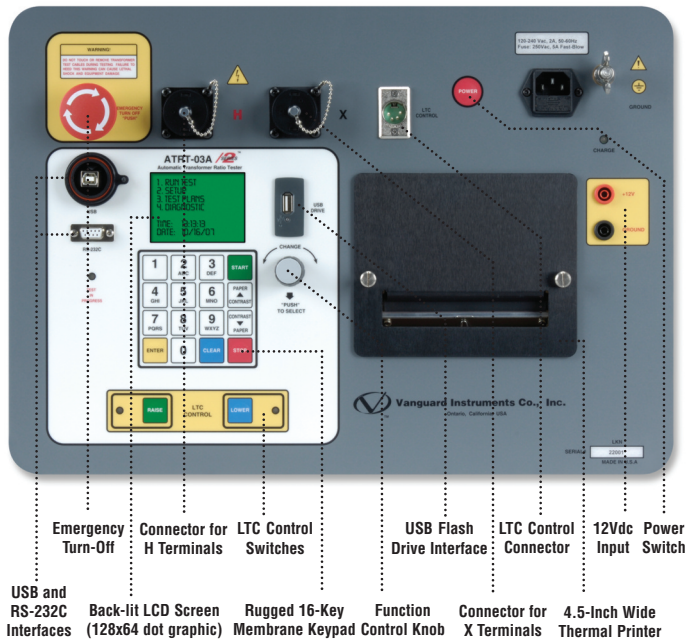
The ATRT-03A S2 can automatically detect 130 different transformer types defined by ANSI, CEI/IEC, and Australian standards.

User Interface

The ATRT-03A S2 features a back-lit 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



Ordering Information

ATR-03A Series 2, Three Phase Transformer Turns-Ratio Tester

ATR-03A S2, Cables, PC Software

ATR-03A S2 Carrying Case

4.5-inch Printer Paper

Part No: ATRT-03AS2

Part No: ATRT-03AS2 Case

Part No: Paper - TP4

TRANSFORMER TURNS RATIO REPORT

Filename: delta to y rev 12 #1.txt

Date: Sep 20, 2007 Time: 04:18 PM Page (1/2)

Company:
Location:
Client:
Operator:
Comment:

Device: Transformer
Type: Delta to Y (Dynt1)
Ratio:
Serial #:
Max Deviation %: 0.5
Test Voltage: 40V

TEST	H-VOLT	TAP	R-TAP	C-RATIO	M-RATIO	DEV (%)	PF	SWR	DISCREP	RES
1	10000	1	200	99.9999	A = 100.00 0.10 F 3.0 0.10 B = 100.00 0.11 F 2.0 0.10 C = 100.00 0.11 F 4.0 0.10					
2	10000	3	200	99.9999	A = 100.00 0.10 F 3.0 0.10 B = 100.00 0.12 F 2.0 0.10 C = 100.00 0.10 F 4.0 0.10					
3	10000	3	200	99.9999	A = 100.00 0.10 F 3.0 0.10 B = 100.00 0.12 F 2.0 0.10 C = 100.00 0.10 F 4.0 0.10					
4	10000	3	200	99.9999	A = 100.00 0.10 F 3.0 0.10 B = 100.00 0.12 F 2.0 0.10 C = 100.00 0.10 F 4.0 0.10					
5	10000	3	200	99.9999	A = 100.00 0.10 F 3.0 0.10 B = 100.00 0.12 F 2.0 0.10 C = 100.00 0.10 F 4.0 0.10					
6	10000	3	200	99.9999	A = 100.00 0.10 F 3.0 0.10 B = 100.00 0.12 F 2.0 0.10 C = 100.00 0.10 F 4.0 0.10					
7	10000	3	200	99.9999	A = 100.00 0.10 F 3.0 0.10 B = 100.00 0.12 F 2.0 0.10 C = 100.00 0.10 F 4.0 0.10					
8	10000	3	200	99.9999	A = 100.00 0.10 F 3.0 0.10 B = 100.00 0.12 F 2.0 0.10 C = 100.00 0.10 F 4.0 0.10					
9	10000	3	200	99.9999	A = 100.00 0.10 F 3.0 0.10 B = 100.00 0.12 F 2.0 0.10 C = 100.00 0.10 F 4.0 0.10					
10	10000	3	200	99.9999	A = 100.00 0.10 F 3.0 0.10 B = 100.00 0.12 F 2.0 0.10 C = 100.00 0.10 F 4.0 0.10					

PC
Printer
Output

Thermal
Printer
Output

SPECIFICATIONS

TYPE Portable, lightweight, automatic, 3-phase transformer turns-ratio meter

PHYSICAL SPECIFICATIONS 20"W x 7.5"H x 15.5"D (50 cm x 19 cm x 39.6 cm); Weight: 27 lbs (12 kg)

OPERATING VOLTAGE 100 – 240 Vac, 50/60 Hz

BATTERIES Two lead acid batteries (12V, 2 AH) provide up to 3 hours of operation

MEASUREMENT METHOD ANSI/IEEE C57.12.90

URNS-RATIO MEASURING RANGE 0.8 – 15,000

URNS-RATIO ACCURACY 0.8 – 1,999: $\pm 0.1\%$, 2,000 – 3,999: $\pm 0.25\%$, 4,000 – 15,000: $\pm 1\%$ @ 8 Vac

0.8 – 1,999: $\pm 0.1\%$, 2,000 – 3,999: $\pm 0.20\%$, 4,000 – 15,000: $\pm 1\%$ @ 40 Vac

0.8 – 1,999: $\pm 0.1\%$, 2,000 – 3,999: $\pm 0.15\%$, 4,000 – 15,000: $\pm 1\%$ @ 100 Vac

TEST VOLTAGES 8 Vac @ 350 mA, 40 Vac @ 70 mA, 100 Vac @ 20 mA

EXCITATION CURRENT READING RANGE 0 – 2 Amperes; Accuracy: ± 0.1 mA, $\pm 2\%$ 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 The unit can store 112 transformer test records. Each record holds the test record header and up to 33 readings

INTERNAL TEST PLAN STORAGE The unit can store 128 transformer test plans. 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, 1 Amp

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 $+122^{\circ}$ F); Storage: -30° C to 70° C (-22° to $+158^{\circ}$ F)

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-232, One LTC cable, 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 $+25^{\circ}$ C ($+77^{\circ}$ 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.



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