

# ATRT-03B Series 2

Automatic Turns Ratio Tester



**Vanguard Instruments Company**

[www.vanguard-instruments.com](http://www.vanguard-instruments.com)



# Automate

## Transformer Test Plans

The ATRT-03B 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-03B 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-03B 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-03B 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-03B 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

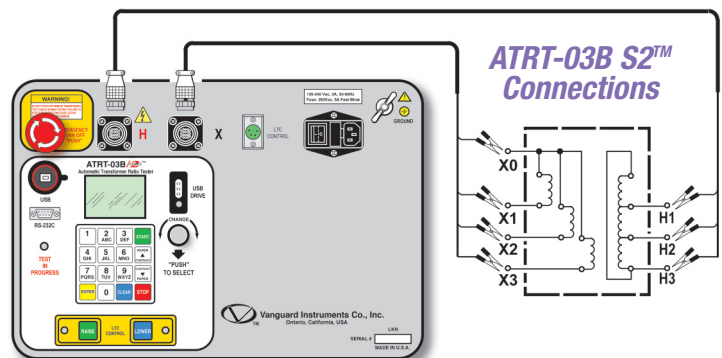
In computer-controlled mode, the unit can be controlled via the RS-232C or USB port using the supplied PC software (Transformer Turns-Ratio Analyzer application provided with each ATRT-03B S2). This Windows® XP/Vista-based software can be used to run a test and to store test results on a PC. Test results can also be exported to Microsoft® Excel.

## 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-03B S2 Input Power Sources

The ATRT-03B 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-03B<sup>TM</sup> / Series 2

## Automatic Three-Phase Transformer Turns-Ratio Tester

The ATRT-03B 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-03B S2 determines the transformer turns-ratio using the IEEE C57.12.90 measurement method. The ATRT-03B 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-03B 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 back-lit LCD. The built-in transformer type detection feature allows the ATRT-03B S2 to detect and test 130 transformer types defined by ANSI, CEI/IEC and Australian standards.

The ATRT-03B 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. The ATRT-03B 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

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

## Auto-Detect Transformer Configuration

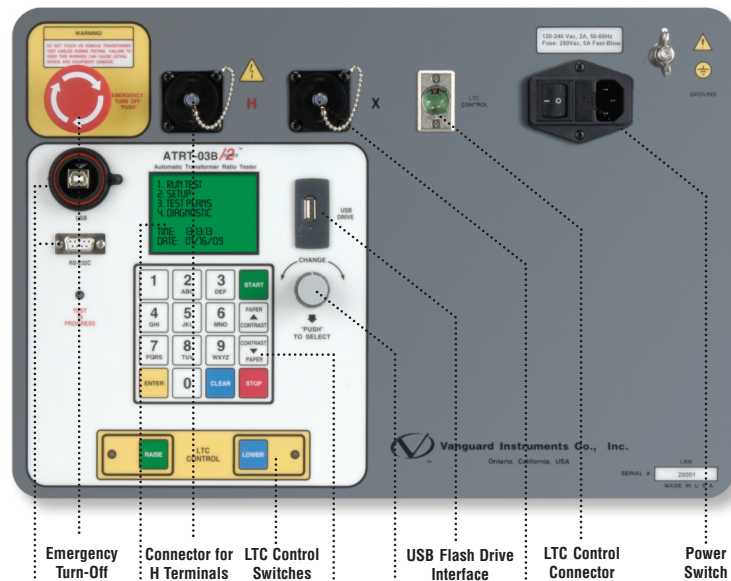
The ATRT-03B S2 can automatically detect 130 specific vector groups for different transformer types defined by ANSI, CEI/IEC, and Australian standards

## User Interface

The ATRT-03B 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



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

## Ordering Information

ATRT-03B Series 2, Three Phase Transformer Turns-Ratio Tester

ATRT-03B S2, Cables, and PC Software  
ATRT-03B S2 Carrying Case

Part No: ATRT-03BS2  
Part No: ATRT-03BS2 Case

Transformer Turns-Ratio Report

Filename: delta to y rev 12 #134 Date: Sep 30, 2007 Time: 04:18 PM Page: 1/2

Company: Delta to Y  
Location: Delta to Y (Dynt)  
Circuit: Delta to Y (Dynt)  
Operator: Delta to Y (Dynt)  
Comment: Delta to Y (Dynt)

Ratio: 1.0000  
Ratio Error: 0.00  
Test Voltage: 40V

TEST	H-VOLT	X-TAP	X-VOLT	X-TAP	C-RATIO	H-RATIO	DIFF	PF	PHASE	DEGREE	RES
1	10000	1	200	200	50.0000	50.0000	0.00	1.00	0.00	0.00	0.00
						R = 100.00	0.11	F	2.0	0.10	
						C = 100.00	0.11	F	2.0	0.10	
2	10000	2	200	200	50.0000	50.0000	0.00	1.00	0.00	0.00	0.00
						R = 100.00	0.10	F	2.0	0.10	
						C = 100.00	0.10	F	2.0	0.10	
3	10000	3	200	200	50.0000	50.0000	0.00	1.00	0.00	0.00	0.00
						R = 100.00	0.10	F	2.0	0.10	
						C = 100.00	0.10	F	2.0	0.10	
4	10000	4	200	200	50.0000	50.0000	0.00	1.00	0.00	0.00	0.00
						R = 100.00	0.10	F	2.0	0.10	
						C = 100.00	0.10	F	2.0	0.10	
5	10000	5	200	200	50.0000	50.0000	0.00	1.00	0.00	0.00	0.00
						R = 100.00	0.10	F	2.0	0.10	
						C = 100.00	0.10	F	2.0	0.10	
6	10000	6	200	200	50.0000	50.0000	0.00	1.00	0.00	0.00	0.00
						R = 100.00	0.10	F	2.0	0.10	
						C = 100.00	0.10	F	2.0	0.10	
7	10000	7	200	200	50.0000	50.0000	0.00	1.00	0.00	0.00	0.00
						R = 100.00	0.10	F	2.0	0.10	
						C = 100.00	0.10	F	2.0	0.10	
8	10000	8	200	200	50.0000	50.0000	0.00	1.00	0.00	0.00	0.00
						R = 100.00	0.10	F	2.0	0.10	
						C = 100.00	0.10	F	2.0	0.10	
9	10000	9	200	200	50.0000	50.0000	0.00	1.00	0.00	0.00	0.00
						R = 100.00	0.10	F	2.0	0.10	
						C = 100.00	0.10	F	2.0	0.10	
10	10000	10	200	200	50.0000	50.0000	0.00	1.00	0.00	0.00	0.00
						R = 100.00	0.10	F	2.0	0.10	
						C = 100.00	0.10	F	2.0	0.10	

PC Printer Output

## SPECIFICATIONS

<b>TYPE</b>	Portable, lightweight, automatic, 3-phase transformer turns-ratio meter
<b>PHYSICAL SPECIFICATIONS</b>	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)
<b>OPERATING VOLTAGE</b>	100 – 240 Vac, 50/60 Hz
<b>MEASUREMENT METHOD</b>	ANSI/IEEE C57.12.90
<b>URNS-RATIO MEASUREMENT RANGE</b>	0.8 – 15,000
<b>URNS-RATIO ACCURACY</b>	0.8 – 1,999: ±0.1%, 2,000 – 3,999: ±0.25%, 4,000 – 15,000: ±1% @ 8 Vac 0.8 – 1,999: ±0.1%, 2,000 – 3,999: ±0.20%, 4,000 – 15,000: ±1% @ 40 Vac 0.8 – 1,999: ±0.1%, 2,000 – 3,999: ±0.15%, 4,000 – 15,000: ±1% @ 100 Vac
<b>TEST VOLTAGES</b>	8 Vac @ 1Amp, 40 Vac @ 0.2 Amp, 100 Vac @ 0.1 Amp
<b>EXCITATION CURRENT READING RANGE</b>	0 – 2 Amperes; Accuracy: ±0.1 mA, ±2% of reading (±1 mA)
<b>PHASE-ANGLE MEASUREMENT</b>	0 – 360 Degrees; Accuracy: ±0.2 degree (±1 digit)
<b>DISPLAY</b>	Back-lit LCD screen (64 x 128 dot graphic display); Viewable in bright sunlight and low-light levels
<b>COMPUTER INTERFACES</b>	One RS-232C port, One USB port
<b>EXTERNAL DATA STORAGE</b>	One USB Flash drive interface port; Up to 999 transformer test records can be stored on a USB Flash drive (not included)
<b>PC SOFTWARE</b>	Windows® XP/Vista-based Transformer Turns-Ratio Analyzer application is included with purchase price
<b>INTERNAL TEST RECORD STORAGE</b>	Can store 112 transformer test records internally. Each record holds the test record header and up to 33 readings.
<b>INTERNAL TEST PLAN STORAGE</b>	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
<b>LOAD TAP CHANGER CONTACT</b>	240 Vac, 2 Amps
<b>SAFETY</b>	Designed to meet UL 61010A-1 and CAN/CSA C22.2 No. 1010.1-92 standards
<b>ENVIRONMENT</b>	Operating: -10° to 50° C (15° to +122° F); Storage: -30° C to 70° C (-22° to +158° F)
<b>CABLES</b>	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
<b>OPTIONS</b>	Transportation case
<b>WARRANTY</b>	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.



## **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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