

ATRT-01

Transformer Turns-Ratio Tester



Vanguard Instruments Company

www.vanguard-instruments.com

Simplify

viewable in both bright sunlight and low-light levels. Displayed test results include turns-ratio, winding polarity, excitation current, and percentage error calculation. The ATRT-01 S2's rugged, 16-key membrane keypad is used to select a test and enter the nameplate voltages for turns-ratio percentage error calculation.

Computer Interface

The ATRT-01 S2, ATRT-01B S2 and the ATRT-01D S2 can be used with a PC via the RS-232C interface. Windows® XP/Vista-based software is provided with each unit and can be used to test transformers and to store the test results on the computer. The test results can be retrieved later, in the office for example, for analysis and for printing on an office printer. The test results can also be exported in text or Microsoft® Excel format, thus allowing the results to be used with other PC applications.

The included PC software can also be used to create test plans for specific transformers. A test plan is comprised of the transformer nameplate voltages for each tap setting. Computed turns-ratio is based on the nameplate voltages which can be compared to the measured ratio to derive percentage error.

Battery Power for Exceptional Portability

The ATRT-01B S2 is powered by a 6-Volt, 7 Ampere-hour, lead-acid battery. The high capacity battery, coupled with the ATRT-01B S2's low power consuming circuitry, allows the unit to be used continuously for up to 6 hours between re-charges. A built-in charger lets the unit be used while the battery is being charged.

The ATRT-01D S2 uses 6 D-cell batteries. Up to 250 tests can be performed with one set of D-cell batteries.

Typical Test Results

Measured Ratio	Excitation Current Reading	Turn-ratio Error in Percentage
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RATIO	mA	% DIFF
+17.308	0001	0.08
+17.306	0001	0.09
+17.308	0001	0.08

CABLE	PHS-A	XFMR
X1,X2	to	X1,X0
H1,H2	to	H1,H3
"START"	TO	RUN TEST

ATR-01 Test Probes

Connection to Transformer Bushing

Instructions: ATRT-01 Cable Connection



ATR-01^{Series}2

Three Models Deliver Maximum Flexibility

The ATRT-01 S2 is Vanguard's third-generation micro-processor-based, single-phase, automatic, transformer-turns-ratio tester. This portable test equipment is offered in three models: the ATRT-01 S2, ATRT-01B S2, and ATRT-01D S2. The ATRT-01 S2 is ac-line powered; the ATRT-01B S2 is ac-line or rechargeable-battery powered, and the ATRT-01D S2 is powered by six D-cells.

The ATRT-01 S2 determines the transformer turns-ratio using the IEEE C57.12.90 measurement method. The transformer turns-ratio is determined by precisely measuring the voltages across the unloaded transformer windings. The ATRT-01 S2's measuring circuitry self calibrates before each measurement to ensure turns-ratio accuracy.

The ATRT-01 S2 measures turns-ratios ranging from 0.800 to 15,000 and can be used to test voltage regulators, power transformers, current transformers (CT), and Potential Transformers (PT). The ATRT-01 S2 also measures and displays transformer-winding excitation current, and winding polarity. Test results are displayed on a back-lit LCD screen (4 lines by 20 characters).

In addition to measuring a transformer's turns-ratio, nameplate voltages can also be entered via the keypad, and the ATRT-01 S2 will then display the turns-ratio error as a percentage. This convenient feature eliminates any user-calculation error when testing transformers.

If a 3-phase transformer is being tested, the ATRT-01 S2 will also provide connection information (H and X test probes to transformer bushings) for phases A, B, and C tests. Three-phase test results (turns-ratio, excitation current, winding polarity, and percentage error) are displayed on the LCD screen at the end of each test.

User Interface

The ATRT-01 S2 features a back-lit LCD screen (4 lines by 20 characters) that is

Single Phase Transformer Turns-

the Tedious Procedure of Transformer Turns-Ratio Testing

ATRT-01 S2



ATRT-01 S2 Features

Stand-alone or computer-controlled
Inexpensive
Displays ratio from 0.8 - 15,000
Calculates turn-ratio in percentage
Displays winding polarity
Displays excitation current
Size: 12"W x 9"H x 8"D
(30.5 cm x 22.9cm x 20.3cm)
Weight: 8 lbs. (3.6 kg)

SPECIFICATIONS

Input Power	120/240Vac (Selectable), 50/60Hz
Measurement Method	ANSI/IEEE C57.12.90
Ratio-Measuring Range	0.8 – 15,000 (5-digit resolution)
Turns-Ratio Accuracy	0.800–1,999 ($\pm 0.1\%$), 2,000–3,999 ($\pm 0.25\%$), 4,000–15,000 ($\pm 1\%$)
Test Voltages	8 Vac @ 1.0 Amp, 40 Vac @ 0.6 Amp
Excitation Reading Range	0 – 2 Amperes
Current Reading Accuracy	± 1 milli-amp, $\pm 2\%$ of reading (± 1 -digit)
Display	Back-lit LCD screen (4 lines by 20 characters), viewable in bright sunlight & low-light levels
Computer Interface	One RS-232C (19,200 baud) port
PC Software	Windows® XP/Vista-based, included with purchase price
Safety	Designed to meet IEC61010 (1995), UL61010A-1, CSA-C22.2 standards
Environment	Operating: -10°C to 50°C (15°F to 122°F); Storage: -30°C to 70°C (-22°F 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, one cable-carrying duffel bag included
Options	Transportation case
Warranty	One year on parts and labor

ATRT-01B S2



ATRT-01B S2 Features

Stand-alone or computer-controlled
Battery or AC powered
Displays ratio from 0.8 - 15,000
Calculates turn-ratio in percentage
Displays winding polarity
Displays excitation current
Size: 12"W x 9"H x 8"D
(30.5 cm x 22.9cm x 20.3cm)
Weight: 9.5 lbs (4.3 kg)

SPECIFICATIONS

Input Power	SLA battery (90–240Vac, 50/60Hz). Delivers up to 6-hours of operation.
Measurement Method	ANSI/IEEE C57.12.90
Ratio-Measuring Range	0.8 to 15,000 (5-digit resolution)
Turns-Ratio Accuracy	0.800–1,999 ($\pm 0.1\%$), 2,000–3,999 ($\pm 0.25\%$), 4,000–15,000 ($\pm 1.5\%$)
Test Voltages	8 Vac @ 350 mA, 40 Vac @ 70 mA
Excitation Reading Range	0 – 2 Amperes
Current Reading Accuracy	± 1 Milli-amp, $\pm 2\%$ of reading (± 1 -digit)
Display	Back-lit LCD screen (4 lines by 20 characters), viewable in bright sunlight & low-light levels
Computer Interface	One RS-232C (19,200 baud) port
PC Software	Windows® XP/Vista-based, included with purchase price
Safety	Designed to meet IEC61010 (1995), UL61010A-1, CSA-C22.2 standards
Environment	Operating: -10°C to 50°C (15°F to 122°F); Storage: -30°C to 70°C (-22°F 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, one cable-carrying duffel bag included
Options	Transportation case
Warranty	One year on parts and labor

ATRT-01D S2



ATRT-01D S2 Features

Stand-alone or computer-controlled
Battery powered (D-cells)
Displays ratio from 0.8 - 15,000
Calculates turn-ratio in percentage
Displays winding polarity
Displays excitation current
Size: 12"W x 9"H x 8"D
(30.5 cm x 22.9cm x 20.3cm)
Weight: 9.5 lbs (4.3 kg)

SPECIFICATIONS

Input Power	6 D Cells (250-test capacity)
Measurement Method	ANSI/IEEE C57.12.90
Ratio-Measuring Range	0.8 to 15,000 (5-digit resolution)
Turns-Ratio Accuracy	0.800–1,999 ($\pm 0.1\%$), 2,000–3,999 ($\pm 0.25\%$), 4,000–15,000 ($\pm 1.5\%$)
Test Voltages	8 Vac @ 350 mA, 40 Vac @ 70 mA
Excitation Reading Range	0 – 2 Amperes
Current Reading Accuracy	± 1 Milli-amp, $\pm 2\%$ of reading (± 1 -digit)
Display	Back-lit LCD screen (4 lines by 20 characters), viewable in bright sunlight & low-light levels
Computer Interface	One RS-232C (19,200 baud) port
PC Software	Windows® XP/Vista-based, included with purchase price
Safety	Designed to meet IEC61010 (1995), UL61010A-1, CSA-C22.2 standards
Environment	Operating: -10°C to 50°C (15°F to 122°F); Storage: -30°C to 70°C (-22°F 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, one cable-carrying duffel bag included
Options	Transportation case
Warranty	One year on parts and labor

Note: The above specifications are valid at nominal voltage and ambient temperature of $+25^{\circ}\text{C}$ ($+77^{\circ}\text{F}$). Specifications are subject to change without notice.

Ordering Information

ATRT-01/01B/01D S2, Single Phase Transformer Turns-Ratio Testers

ATRT-01 S2, Cables, PC Software
ATRT-01B S2, Cables, PC Software
ATRT-01D S2, Cables, PC Software
ATRT-01/01B/01D S2 Carrying Case
ATRT-01/01B/01D S2 Test Cable, 15-ft

Part No. ATRT-01 S2
Part No. ATRT-01B S2
Part No. ATRT-01D S2
Part No. ATRT-01 Case
Part No. ATRT-01 Cable-15ft

-Ratio Tester

Vanguard Instruments Company
Reliability Through Instrumentation

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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