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 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

<table>
<thead>
<tr>
<th>Measured Ratio</th>
<th>Excitation Current Reading</th>
<th>Turn-ratio Error in Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>+17.308 0001</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>+17.306 0001</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>+17.308 0001</td>
<td>0.08</td>
<td></td>
</tr>
</tbody>
</table>

Connection to Transformer Bushing

Instructions: ATRT-01 Cable Connection

ATRT-01 Test Probes

Simplify
the Tedious Procedure of Transformer Turns-Ratio Testing

**ATRT-01 S2**

**ATRT-01 S2 Features**
- Stand-alone or computer-controlled
- Inexpensive
- Displays turn-ratio in percentage
- 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)

**ATRT-01B S2**

**ATRT-01B S2 Features**
- Stand-alone or computer-controlled
- Battery or AC powered
- Displays turn-ratio in percentage
- 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)

**ATRT-01D S2**

**ATRT-01D S2 Features**
- Stand-alone or computer-controlled
- Battery powered (D-cells)
- Displays turn-ratio in percentage
- 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)

**Ordering Information**

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

**Vanguard Instruments Company**

Reliability Through Instrumentation

RVFeb10

**SPECIFICATIONS**

- **Input Power**
  - ATRT-01 S2: 120/240Vac (Selectable), 50/60Hz
  - ATRT-01B S2: SLA battery (90-240Vac, 50/60Hz), Delivers up to 6-hours of operation.
  - ATRT-01D S2: 120/240Vac (Selectable), 50/60Hz

- **Measurement Method**
  - ATRT-01 S2: ANSI/IEEE C57.12.90
  - ATRT-01B S2: ANSI/IEEE C57.12.90
  - ATRT-01D S2: ANSI/IEEE C57.12.90

- **Ratio-Measuring Range**
  - ATRT-01 S2: 0.8 – 15,000 (5-digit resolution)
  - ATRT-01B S2: 0.8 to 15,000 (5-digit resolution)
  - ATRT-01D S2: 0.8 to 15,000 (5-digit resolution)

- **Turns-Ratio Accuracy**
  - ATRT-01 S2: ±1 Milli-amp, ±2% of reading (+1-digit)
  - ATRT-01B S2: ±1 Milli-amp, ±2% of reading (+1-digit)
  - ATRT-01D S2: ±1 Milli-amp, ±2% of reading (+1-digit)

- **Test Voltages**
  - ATRT-01 S2: 6 Vac @ 1.0 Amp, 40 Vac @ 0.6 Amp
  - ATRT-01B S2: 6 Vac @ 1.0 Amp, 40 Vac @ 0.6 Amp
  - ATRT-01D S2: 6 Vac @ 1.0 Amp, 40 Vac @ 0.6 Amp

- **Excitation Reading Range**
  - ATRT-01 S2: 0 – 2 Amperes
  - ATRT-01B S2: 0 – 2 Amperes
  - ATRT-01D S2: 0 – 2 Amperes

- **Current Reading Accuracy**
  - ATRT-01 S2: ±1 Milli-amp, ±2% of reading (+1-digit)
  - ATRT-01B S2: ±1 Milli-amp, ±2% of reading (+1-digit)
  - ATRT-01D S2: ±1 Milli-amp, ±2% of reading (+1-digit)

- **Computer Interface**
  - ATRT-01 S2: One RS-232C (19,200 baud) port
  - ATRT-01B S2: One RS-232C (19,200 baud) port
  - ATRT-01D S2: One RS-232C (19,200 baud) port

- **PC Software**
  - ATRT-01 S2: Windows® XP/Vista-based, included with purchase price
  - ATRT-01B S2: Windows® XP/Vista-based, included with purchase price
  - ATRT-01D S2: Windows® XP/Vista-based, included with purchase price

- **Safety**
  - ATRT-01 S2: Designed to meet IEC61010 (1995), UL61010A-1, CSA-C22.2 standards
  - ATRT-01B S2: Designed to meet IEC61010 (1995), UL61010A-1, CSA-C22.2 standards
  - ATRT-01D S2: Designed to meet IEC61010 (1995), UL61010A-1, CSA-C22.2 standards

- **Environment**
  - ATRT-01 S2: Operating: -10˚C to 50˚C (15˚F to 122˚F); Storage: -30˚C to 70˚C (-22˚F to 158˚F)
  - ATRT-01B S2: Operating: -10˚C to 50˚C (15˚F to 122˚F); Storage: -30˚C to 70˚C (-22˚F to 158˚F)
  - ATRT-01D S2: Operating: -10˚C to 50˚C (15˚F to 122˚F); Storage: -30˚C to 70˚C (-22˚F to 158˚F)

- **Altitude**
  - ATRT-01 S2: 2,000m (6,562 ft) to full safety specifications
  - ATRT-01B S2: 2,000m (6,562 ft) to full safety specifications
  - ATRT-01D S2: 2,000m (6,562 ft) to full safety specifications

- **Humidity**
  - ATRT-01 S2: 90% RH @ 40˚C (104˚F) non-condensing
  - ATRT-01B S2: 90% RH @ 40˚C (104˚F) non-condensing
  - ATRT-01D S2: 90% RH @ 40˚C (104˚F) non-condensing

- **Warranty**
  - ATRT-01 S2: One year on parts and labor
  - ATRT-01B S2: One year on parts and labor
  - ATRT-01D S2: One year on parts and labor

Note: The above specifications 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.

Vanguard products are available from:

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