ATRT-03A
automatic, 3-phase transformer turns ratio tester
The ATRT-03A is a battery-powered, microprocessor-based, automatic, three phase, transformer turns-ratio tester. This lightweight, portable, battery-powered unit is designed for testing transformers at utility power substations.

The ATRT-03A determines the transformer turns-ratio using the IEEE C57.12.90 measurement method. The transformer turns-ratio (ranging from 0.8 to 15,000) is determined by precisely measuring the voltages across the unloaded transformer windings. To ensure accuracy, the ATRT-03A’s measuring circuitry self-calibrates before each measurement. It requires neither adjustment nor temperature compensation. The ATRT-03A’s turns-ratio measurement accuracy is 0.1% or better.

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

In addition to measuring a transformer’s turns-ratio, the ATRT-03A can also measure a transformer’s excitation current (in milli-amperes) and its winding phase angle. The ATRT-03A can also calculate the turns-ratio percentage error if the transformer’s nameplate voltages are provided. The baseline turns-ratio is calculated using the nameplate voltages, and the test results are compared to the baseline turns-ratio. The percentage error is then calculated from the difference between the baseline and test turns-ratios.

User Interface
The ATRT-03A features a back-lit LCD screen (20 characters by 4 lines) that is viewable in both bright sunlight and low-light levels. The test results screen displays the transformer turns-ratio, excitation current, and turns-ratio accuracy. The unit is controlled via a rugged, 16-key, membrane keypad.

Transformer Load Tap Changer Control
An optional Tap-Changer Remote Control Box can be used to remotely change transformer taps. This remote-controlled tap-changer box eliminates the need to manually change the transformer’s step-up and step-down taps.

Transformer Test Plans
The ATRT-03A 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 to derive the percentage error and Pass/Fail results. By using 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 included PC software and can be transferred to the ATRT-03A via the RS-232C interface.

Internal Test Record Storage
Up to 200 test records can be stored in the ATRT-03A’s Flash EEPROM memory. Each test record may contain up to 99 turns-ratio, excitation current, phase angle, and nameplate voltage readings. Test records can be recalled locally or transferred to a PC via the RS-232C interface.

Computer Interface
The ATRT-03A can be computer-controlled via the RS-232C interface using the supplied PC software. The Windows®-based software can be used to run a test and to store test results on a PC. Test results can also be exported to Excel, PDF, and XML formats for further analysis.

Built-in Thermal Printer
The ATRT-03 features a convenient built-in 4.5-inch wide thermal printer that can be used to print test results.

Input Power Sources
The ATRT-03A is powered by two 12Vdc/2AH rechargeable SLA batteries that provide three hours of continuous operation. The ATRT-03A features a built-in charger that charges the batteries while in use. The unit can be operated from a 100 – 240 Vac power source or a 12 Vdc car battery.

ordering information

Part number ATRT-03A
ATRT-03A, cables, and PC software

Part number ATRT-03A CASE
ATRT-03A shipping case

Part number Paper-TP4
Thermal printer paper
ATRT-03A Controls & Indicators

Connector for X terminals

Connector for H terminals

Emergency turn-off switch

Back-lit LCD screen

Rugged membrane keypad

RS-232C PC interface

Power switch

12 Vdc input

4.5-inch wide thermal printer

ATRT-03A specifications

type
Portable, automatic, three-phase transformer turns-ratio meter

physical specs
19”W x 7”H x 15”D (48.2 cm x 17.8 cm x 38.1 cm); Weight: 25 lbs (11.3 kg)

input power
1 amp, 100 – 240 Vac or 12 Vdc

batteries
Two 12Vdc/2AH, rechargeable SLA batteries (up to 3-hours operation)

measurement method
ANSI/IEEE C57.12.90

ratio measuring range
0.8 – 15,000 (5-digit resolution)

turns ratio accuracy
0.8 – 1999: ±0.1%, 2,000 – 3,999: ±0.25%, 4,000 – 15,000: ±1% @ 8 Vac
0.8 – 1999: ±0.1%, 2,000 – 3,999: ±0.20%, 4,000 – 15,000: ±1% @ 40 Vac
0.8 – 1999: ±0.1%, 2,000 – 3,999: ±0.15%, 4,000 – 15,000: ±1% @ 100 Vac

test voltages
8 Vac @ 350 mA, 40 Vac @ 70 mA, 100 Vac @ 20 mA

excitation current
0 – 2 Amperes; Accuracy: ±1mA, ±2% of reading (+1 digit)

reading range
phase angle
0 – 360 degrees; Accuracy: ±0.2 degrees (+1 digit)

measurement

display
Back-lit LCD screen (20 Characters by 4 Lines); Viewable in bright sunlight and low-light levels

printer
Built-in 4.5-inch wide thermal printer

computer interface
One RS-232C port

pc software
Windows®-based Transformer Turns-Ratio Analyzer application is included

internal test record
Stores 200 complete transformer test records. Each test record includes name-plate voltage, winding turns-ratios, excitation current, and winding phase angle

internal test plan
Stores up to 128 transformer test plans

safety
Designed to meet UL 61010A-1 and CAN/CSA C22.2 No. 1010.1-92 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
2,000 m (6,562 ft) to full safety specifications

cables
one 15-foot single-phase cable set, one 15-foot 3-phase cable set, one 25-foot extension cable set, one RS-232C cable, cable carrying bag

options
transportation case, transformer load tap-changer remote control device

warranty
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.
Instruments designed and developed by the hearts and minds of utility electricians around the world

Vanguard Instruments Company, (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 circuitbreaker analyzer, which was a resounding success. It became the forerunner of an entire series of circuitbreaker 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, transformer winding-resistance meters, mega-ohm 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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