

ATRT-03B

Automatic Turns Ratio Tester



WARNING
DO NOT TOUCH OR REMOVE
TRANSFORMER TEST CABLES
DURING TESTING. FAILURE
TO HEED THIS WARNING CAN
CAUSE FATAL INJURY AND
EQUIPMENT DAMAGE.

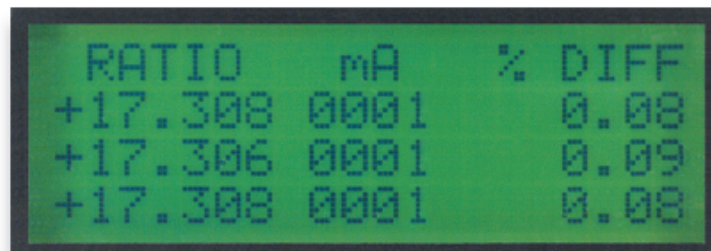
Vanguard Instruments Co., Inc.
Oxnard, California, USA

RS-232C
SERIAL #
LNK
14072
MADE IN U.S.A.



Vanguard Instruments Company

Automate the



ATRT-03B

Automatic, Three-Phase Turns-Ratio Testing

The Vanguard Instruments Co. Model ATRT-03B is a second generation, microprocessor-based, automatic, three-phase, transformer, turns-ratio meter. The Model ATRT-03B is lightweight, rugged, portable, and is designed for transformer testing at utility power substations.

The Model ATRT-03B determines the transformer turns ratio by accurately measuring the voltages across the unloaded transformer windings and then displaying the ratio of these voltages (ratios range from 0.8 to 15,000). The ATRT-03B calibrates each measurement to ensure the turns-ratio accuracy. The ATRT-03B needs neither adjustment nor temperature compensation. The turns ratio display accuracy is 0.1% or better.

The Model ATRT-03B will run a specific test for each transformer type (i.e., single phase, delta to Y, Y to delta, delta to delta, or Y to Y) without the need to switch test hookup cables. The ATRT-03B is programmed to automatically test 67 transformer types defined by ANSI, CEI/IEC and Australian standards.

To prevent an accidental wrong test-lead hook up (e.g., when operator reverses X and H cables), the ATRT-03B uses a low-level test voltage to verify the hook up condition before applying a full test voltage to the transformer. Three test voltages (8Vac, 40Vac, 100Vac) allows the ATRT-03B to test CTs, PTs, besides power transformers.

In addition to measuring a transformer's turns ratio, the ATRT-03B also measures a transformer's excitation current (in milli-amperes) and its winding phase angle. Test results are displayed simultaneously on a backlit LCD (4 lines by 20 characters) panel readout.

Operator Interface and Display

The Model ATRT-03B displays messages and test results on a 4-line by 20-character, sunlight-viewable LCD panel readout. A test-result display includes turns ratio, excitation current, and turns-ratio accuracy. A full test result (3-phase) is displayed at the end of each test (see display figure). The ATRT-03B lets users enter a transformer's nameplate voltages for the turns-ratio calculation. This feature eliminates any error otherwise caused by an operator's manual calculation. The ATRT-03B also compares the test result with the calculated ratio and prints out the % of error for each test.

Test-Result Storage Capacity

The ATRT-03B can store 200 transformer test records in Flash EEPROM. Each test record may contain up to 99 ratio, excitation current, phase angle, and name plate voltage readings. Test records can be recalled and downloaded to an IBM-compatible PC.

Transformer Test Plan

Up to 128 transformer test plan can be stored in the ATRT-03B Flash EEPROM. The test plan comprises transformer nameplate voltages for each tap setting. Computed turns ratio is based on nameplate voltages and used later to compare with measured turn-ratio. By recalling a test plan, the user can instantly test a transformer and view the ratio pass/fail report. Test plans can be created by the PC software and downloaded to the ATRT-03B via the RS-232C port.

Computer Interface

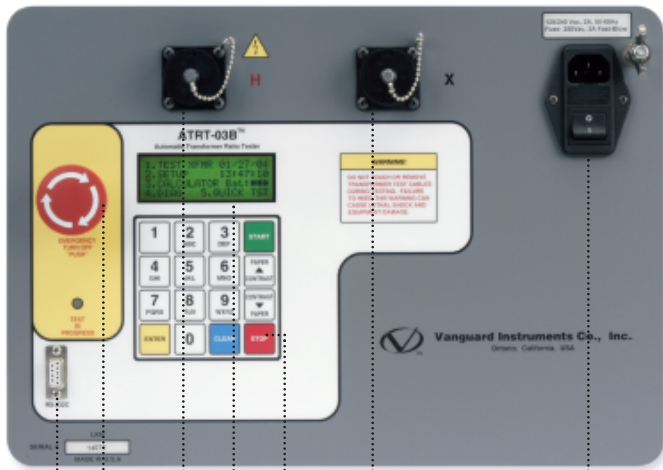
The ATRT-03B can be used in the stand alone or computer interface mode. Under computer control, the user can operate the ATRT-03B from a PC (via the RS-232C port). A Windows® 95/98/NT/2000/XP-based software application (provided with the ATRT-03B) lets users test and store test results along with transformer data stored on the hard drive. The test results can be retrieved later at your office for analysis, and printed on an office printer. Test results can be made available to users in an ASCII format to be used with other data-base software applications.

Transformer Tap-Changing Remote Control

An optional, Tap-Changer Remote-Control Box permits users to change transformer taps remotely. This remote-controlled tap-changer box eliminates the need to change the transformer's step-up and step-down taps by hand.

Automatic Three-Phase Turns-Ratio

Tedious Procedure of Transformer Turns-Ratio Testing



RS 232-C Interface Emergency Turn-Off 4x20 Backlit LCD Display Connector for X Terminals Power Switch

Connector for H Terminals Rugged 16-Key Membrane Keypad-Allows User to Enter Test Parameters

Computer Test Report

Test Results - Page 01 of 2

Date: Aug 05, 2000 Time: 07:08 PM
 Device Type: Transformer
 Company: WAPA
 Location: ALCRUB
 Operator: RAJ NARAYAN
 Comment:
 Test Info:

Label: 001
 Type: V in Delta
 Model: OER31733
 Serial #: 0176
 Max Deviation %: 5
 File Name: ARCRUB2.TST

WIND	WIND	N VOLT	N TAP	X VOLT	X TAP	UNGL. RATIO	INDU. RATIO	IMP. %	WY	PH	PHASE
1	A 01-00/01-01	216,000	3	14,400	3	0.667	0.668	0.00	F	15.00	0.01
	B 02-00/02-01						0.668	0.00	F	15.00	0.01
	C 03-00/03-01						0.668	0.00	F	15.00	0.01
2	A 01-00/01-02	216,000	3	14,400	3	0.668	0.671	0.03	F	15.00	0.01
	B 02-00/02-02						0.670	0.00	F	15.00	0.01
	C 03-00/03-02						0.670	0.00	F	15.00	0.01
3	A 01-00/01-03	216,000	3	14,400	3	0.670	0.674	0.02	F	15.00	0.01
	B 02-00/02-03						0.674	0.00	F	15.00	0.01
	C 03-00/03-03						0.674	0.00	F	15.00	0.01
4	A 01-00/01-04	216,000	3	14,400	3	0.674	0.679	0.03	F	15.00	0.01
	B 02-00/02-04						0.680	0.00	F	15.00	0.01
	C 03-00/03-04						0.680	0.00	F	15.00	0.01
5	A 01-00/01-05	216,000	3	14,400	3	0.679	0.685	0.03	F	15.00	0.01
	B 02-00/02-05						0.686	0.00	F	15.00	0.01
	C 03-00/03-05						0.686	0.00	F	15.00	0.01
6	A 01-00/01-06	216,000	3	14,400	3	0.685	0.692	0.03	F	15.00	0.01
	B 02-00/02-06						0.694	0.00	F	15.00	0.01
	C 03-00/03-06						0.694	0.00	F	15.00	0.01
7	A 01-00/01-07	216,000	3	14,400	3	0.692	0.699	0.03	F	15.00	0.01
	B 02-00/02-07						0.702	0.00	F	15.00	0.01
	C 03-00/03-07						0.702	0.00	F	15.00	0.01
8	A 01-00/01-08	216,000	3	14,400	3	0.699	0.707	0.03	F	15.00	0.01
	B 02-00/02-08						0.710	0.00	F	15.00	0.01
	C 03-00/03-08						0.710	0.00	F	15.00	0.01
9	A 01-00/01-09	216,000	3	14,400	3	0.707	0.716	0.03	F	15.00	0.01
	B 02-00/02-09						0.718	0.00	F	15.00	0.01
	C 03-00/03-09						0.718	0.00	F	15.00	0.01
10	A 01-00/01-10	216,000	3	14,400	3	0.716	0.726	0.03	F	15.00	0.01
	B 02-00/02-10						0.728	0.00	F	15.00	0.01
	C 03-00/03-10						0.728	0.00	F	15.00	0.01

Ordering Information

ATR-03B, Three Phase Transformer Turns-Ratio Tester
 ATR-03B, with Cables, PC Software Part No: ATR-03B
 ATR-03B Carrying Case Part No: ATR-03B Case
 Load Tap Changer Controller Part No: LTC Controller

SPECIFICATIONS

TYPE	Portable, Lightweight, Automatic, 3-Phase Transformer Turns-Ratio Meter
PHYSICAL SPECIFICATIONS	17"L x 13"W x 7"H (43.2cm x 33.0 cm x 17.8 cm); Weight: 13 lbs (5.9 kg)
INPUT POWER	3 amps, 90-130Vac or 200-240 Vac (selectable), 50/60 Hz
MEASUREMENT METHOD	ANSI/IEEE C57.12.90
RATIO-MEASURING RANGE	0.8 to 15,000 (5-digit Resolution)
TURNS-RATIO ACCURACY	0.8 – 1999: ±0.1%, 2,000 – 3,999: ±0.25%, 4,000 – 15,000: ±1% @ 8Vac 0.8 – 1999: ±0.1%, 2,000 – 3,999: ±0.20%, 4,000 – 15,000: ±1% @ 40Vac 0.8 – 1999: ±0.1%, 2,000 – 3,999: ±0.15%, 4,000 – 15,000: ±1% @ 100Vac
ADJUSTMENT	None Required
TEST VOLTAGE	8Vac @ 1 amp, 40 Vac @ 0.6 amp, 100Vac @ 0.1 amp
EXCITATION CURRENT READING RANGE	0 to 2 Amperes
CURRENT READING ACCURACY	±1mA, ±2% of Reading (±1 Digit)
PHASE-ANGLE MEASUREMENT	0-360 Degrees
PHASE-ANGLE ACCURACY	±0.2 Degree (±1 Digit)
DISPLAY	LCD Screen: 20 Characters by 4 Lines; viewable in bright sunlight
COMPUTER INTERFACE	RS-232C, 19,200 Baud
PC SOFTWARE	Windows 95/98/NT/2000/XP-based, included with purchase price
TEST RECORD STORAGE	Stores 200 complete transformer test records. Each test record includes nameplate voltage, winding turns ratios, excitation current, and winding phase angle. Data can be retained for two years.
TEST PLAN STORAGE	Stores 128 transformer test plans
SAFETY	Designed to meet UL 61010A-1 Certification and CAN/CSA C22.2 No. 1010.1-92 Certification
ENVIRONMENT	Operating: -10° to 50° C (15° to +122° F); Storage: -30° C to 70° C (-22° to +158° F)
CABLES	One 15' single-phase cable set, One 15' 3-phase cable set, One 25' extension cable set One cable-carrying duffel bag included
OPTIONS	Transportation Case, Transformer Tap-Changer Remote Control Device
WARRANTY	One-Year on Parts and Labor; Post Warranty Service Contract is Available

Note: The above specifications are valid at nominal voltage and ambient temperature of +25°C (+77°F). Specifications are subject to change without notice.

Ratio Tester

Vanguard Instruments Company
Reliability Through Instrumentation