



BIDDLE® **Single Phase TTR®**

- Used for testing single phase power and distribution transformers
- Design based on precision bridge measuring technique
- Available in hand-cranked or line-operated models
- Unmatched accuracy ($\pm 0.1\%$) in a portable design

Single Phase Transformer Turns Ratio Test Set

DESCRIPTION

The Biddle Single Phase TTR® Transformer Turns Ratio Test Set measures the turns ratio and exciting current of windings in power, potential and current transformers. Deviations in turns ratio readings indicate problems in one or both windings or the magnetic core circuit.

The TTR test set aids in identifying:

- Shorted coils
- Open circuits
- Incorrect connections
- Internal faults or tap-changer defects in step regulators as well as in transformers.

The single phase model is available in either hand-cranked or line-operated versions and measures highly sensitive turns ratios of up to 129.99:1 with accuracy of $\pm 0.1\%$. An optional auxiliary transformer extends the ratio range to 329.99:1.

The TTR set operates on the principle that the voltage ratio of the transformer at no load is practically equal to the true turns ratio.

The major source of error in a transformer is a primary impedance drop due to magnetizing current, which is kept to a minimum by excitation at a fraction of rated voltage. By employing a design that meets both of these condi-

tions along with the use of a null balance system, the turns ratio of a transformer can be determined accurately.

When measuring the turns ratio of distribution and power transformers, the accuracy is well within 0.1%.

APPLICATIONS

The single phase models are primarily used for testing single-phase power and distribution transformers, for low-ratio readings up to 129.99:1, or up to 329.99:1 with an auxiliary transformer.

They also can be used to test three-phase transformers by connecting and testing each phase separately.



This single-phase TTR test set is operated by turning a crank.

FEATURES AND BENEFITS

- Available in hand-cranked or line-operated models, these units provide unmatched accuracy ($\pm 0.1\%$) in a portable design.
- Rack-mounted model is suitable for routine production testing by transformer manufacturers or repair shops. This unit is line-operated.
- Line-operated model for shop or field testing is packaged in a rugged, metal case.
- Measures highly sensitive turn ratios up to 129.99:1. An optional auxiliary transformer extends this ratio range to 329.99:1.

SPECIFICATIONS

Output

8 V, 50/60 Hz

Line-operated models supply up to 5 A for testing specialty power transformers having a high ratio and a low secondary voltage.

Metering: Four decade dials

Auxiliary Transformer

An auxiliary transformer extends the ratio range of single-phase models to 329.99:1. Turns ratio is 100:1 and 200:1, and is accurate to within $\pm 0.1\%$.

The auxiliary transformer includes all the necessary cables for connection

SPECIFICATIONS

Model	Power Source	Range		Accuracy	Dimensions	Weight	CAT. NO.
		Turn Ratio	Exciting Current		H x W x D		
Single-phase field sets	Hand-cranked	0.001 to 129.999	0 to 1 A**	±0.1%	10 H x 10.5 W x 14.5 D in. 250 H x 260 W x 370 D mm	18 lb (8.2 kg)	550005
	Line*		0 to 5 A**		11 H x 15 W x 29 D in. 280 H x 380 W x 737 D mm	26 lb (11.8 kg)	550027
Single-phase rack mounted	Line*				10 H x 10.5 W x 19 D in. 255 H x 267 W x 483 D mm	22 lb (10 kg)	550022

* 120 Vac, 50/60 Hz. To order 240 Vac, 50/60 Hz, add **−47** to Cat. No.

** Divide by 5 switch for increased resolution

to the TTR set and the transformer under test.

Dimensions

8 H x 13 W x 10 D in.
203 H x 330 W x 254 D mm

Weight: 13 lb (5.9 kg)

Calibration Reference Transformer

Calibration reference transformers are available for both single- and three-phase test sets. They provide a reference standard for periodic calibration checks to document proof of calibration.

A Calibration Certificate of Turn Ratio Accuracy traceable to the NIST is furnished with each calibration reference transformer, providing accuracies of ±0.05%.

Dimensions

8 H x 14 W x 10 D in.
203 H x 356 W x 254 D mm

Weight

Single-Phase: 11 lb (5.0 kg) approx



Auxiliary transformer for single-phase TTR



Calibration reference transformer

ORDERING INFORMATION

Item (Qty)	Cat. No.	Item (Qty)	Cat. No.
Single-phase TTR, hand-cranked	550005	Optional Accessories	
Single-phase TTR, line, 120 Vac, 50/60 Hz.....	550027		
Single-phase TTR, line, 240 Vac, 50/60 Hz.....	550027-47		
Single-phase TTR, rack-mounted, line, 120 Vac, 50/60 Hz	550022	Auxiliary transformer, extends the ratio range to 329.99	550030
Single-phase TTR, rack-mounted, line, 240 Vac, 50/60 Hz	550022-47	Calibration reference transformer	550050
Included Accessories		Note: The cables have been designed for use with the TTR test sets. Any substitution may cause errors in reading and may be dangerous to the operator.	
Cable assembly	19494		
With C-clamps for X (low-voltage) winding, 10 ft (3 m) [2]			
With spring clips for H (high-voltage) winding, 13 ft (4 m) [2]			
All cables are permanently connected to the test set.			
Instruction manual	AVTM55JD		