PHENIX TECHNOLOGIES

SINGLE PHASE TRANSFORMER LOSS EVALUATION SYSTEMS

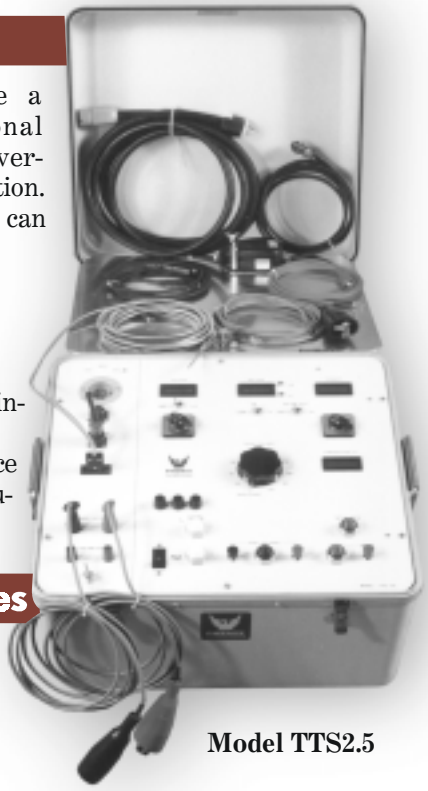
Application

In recent years, more and more utilities have implemented Loss Evaluation programs to determine the actual full cost of using a particular distribution transformer. This has lead to increasing interest in reliable, accurate and easy-to-use loss evaluation systems. PHENIX Technologies manufactures a complete line of loss evaluation systems for single and three-phase distribution transformers and for more power transformers.

The three models described here are self-contained, movable test systems designed for testing single-phase distribution transformers. Their size makes them particularly well-suited for use in the field or transformer yard, as well as in the shop. Each contains all the features necessary for quick, accurate and reliable testing.

Minimum set-up time is required for these units. Each features digital metering with a "Holding Reading" feature. Safety features include a footswitch, an additional interlock circuit, and overload/short circuit protection. The following parameters can be easily measured:

- Excitation Current
- No-Load Losses
- Impedance Voltage
- Load Losses
- Turns Ratio (optional instrument)
- Efficiency and impedance percentage can be calculated from the data taken.



Model TTS2.5

Distribution Transformer Testing

Losses on utility systems are real and expensive. In fact, the rapid escalation of system costs has made loss costs more significant than initial costs in many cases. This is why there is a determined effort in most utilities to recognize sources of these losses and implement programs to reduce them.

Because of the utilities' increased interest in reducing losses, some transformer manufacturers are producing high efficiency distribution transformers. Increased efficiency transformers usually require higher grade materials and are sold at higher prices than standard, lower efficiency transformers. However, the operating savings of these more efficient transformers usually more than offset their higher initial costs.

When a decision is made to purchase these higher efficiency distribution transformers, utilities usually require the transformer manufacturer to guarantee these minimum losses. Utilities that purchase distribution transformers on this basis should be in a position to perform loss tests to assure manufacturer's compliance.

In most utilities the practice of repairing, rewinding, or rebuilding older distribution transformers is a standard procedure. Most of these reconditioning programs were started prior to present day emphasis on loss reduction and may not consider a transformer's serviceability based on its efficiency. After a transformer is processed through one of these repair facilities, loss tests should be performed to establish the transformer's efficiency. If a loss reduction program is in process or anticipated, then a decision can be made to reuse or retire the transformer. Recognition of realistic system investment and energy costs is necessary to make a sound decision on retirement economics.

Standard Features

- Portable, rugged carrying case with handles and cable storage provision (TTS2.5 only)
- Roll-around cabinet with 5" (130mm) diameter wheels and cabin hook (TTS5M and TS10M only)
- MAIN POWER circuit breaker with indicator light
- ON/OFF push buttons with indicator light
- Foot switch for operator safety
- Additional external interlock provision with indicator light
- EMERGENCY OFF mush-room switch (TTS5M and TTS10M)
- ZERO-START interlock
- Resettable overload protection
- Three constant kVA taps
- Multi-range digital meters with LCD or LED displays
- Recalibration provisions for all meters
- Digital temperature meter with 15 ft. (4.5m) thermocouple
- HOLD READING switch for all meters
- Four-wire measurement system for accurate readings
- HIGH VOLTAGE ON warning lamp (TTS5M and TTS10M)
- 10 ft. (3m) leads with clips for output power and metering
- 15 ft. (4.5m) input cable, ground cable
- Two operation/maintenance manuals with schematics and parts list

Technical Data

Model	Input (Note 1)	Output Voltage (Note 2)	Output Current 5 min. On/ 15 min. Off	Continuous
TTS2.5	120VAC	0-125 VAC	30 AAC	20 AAC
	30AAC	0-250	15	10
		0-50	7.5	5
TTS5M	208/230VAC	0-150 VAC	50 AAC	33 AAC
	40AAC	0-300	25	16.5
		0-600	12.5	8.25
TTS10M	208/230VAC	0-150 VAC	100 AAC	67 AAC
	80AAC	0-300	50	33.5
		0-600	25	16.5

Note 1: All inputs are single-phase, 50/60Hz. Consult factory for optional inputs.
Note 2: Other outputs can be provided. Consult factory for details.

Dimensions

Model	Width	Depth	Height	Weight
TTS2.5	22.5in/572mm	21in/533mm	16in/406mm	148lbs./67kg
TTS5M	24 in/610mm	24in/610mm	40in/1016mm	500lbs/230kg
TTS10M	24in/610mm	24in/610mm	40in/1016mm	750lbs/340kg

Load Loss Test Capability

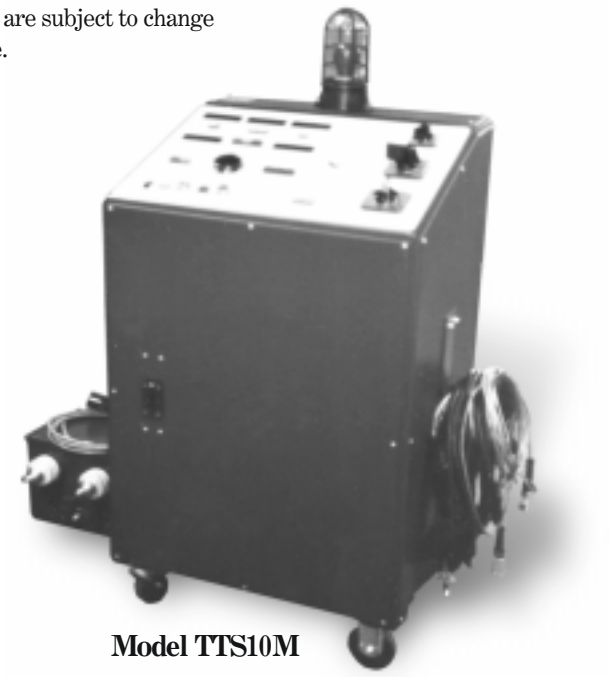
	2% kVA/kV	3% kVA/kV	4% kVA/kV	5% kVA/kV	6% kVA/kV
TTS2.5	187.5/25	125/16.7	94/12.5	75/10	62.5/8.3
TTS5M	375/30	250/20	188/15	150/12	125/10
TTS10M	750/30	500/20	376/15	300/12	250/10

Instrumentation

Note: Meter accuracy is +/- 0.5% F.S. except temperature is +/- 1°C.

	TTS2.5	TTS5M	TTS10M
Voltmeter (selectable True RMS or average)	0-125.0/250/500V	0-150.0/300/600V	0-150.0/300/600V
Currentmeter (True RMS)		0-1.999/19.99/199.9A	
Wattmeter		0-1.999W/1999W/19.99kW	
Thermometer		0-100°C	
Meters	LCD, 3½ digit	LED, 4½ digit	LED, 4½ digit

Specifications are subject to change without notice.



Model TTS10M

The PHENIX Technologies Product Line

- AC Dielectric Test Sets
- Resonant Test Sets
- DC Hipots and Insulation Test Sets
- Automatic Insulating Material Testers (D149)
- Liquid Dielectric Test Sets
- Megohmmeters
- Vacuum/Oil Interrupter Testers
- Bucket Truck Testers
- High-Frequency Cable Aging Test Sets
- Heat Cycling Test Sets
- Rubber Goods—Protective Equipment Testers
- Core Loss Testers
- AC, DC and AC/DC Motor Test Sets
- Transformer Test Systems
- Computerized Circuit Breaker Test Sets
- Computerized Recloser Test Sets
- DC Power Supplies
- High Voltage DC Cable Thumpers
- High Voltage Terminations
- High Power Column-Type Variable Transformers
- High Power Thoma-Type Variable Transformers
- Voltage and Current Stabilizers

Your local representative is

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