PHENIX TECHNOLOGIES

TRANSFORMER TEST SYSTEMS

TRANSFORMER TEST SYSTEMS FROM PHENIX

Broad Range Covers Most Applications

PHENIX Technologies offers a complete line of Transformer Test Systems, from a small portable unit with a rating of 2.5 kVA to Power Transformer Testing Systems capable of testing transformers with very high voltage and power ratings. The line includes both single and three phase systems for both distribution and power transformers.

The table below lists the kVA rating of the standard systems, and the maximum kVA rating of the transformers that may generally be tested by each system. The maximum kVA rating to be tested is based on a transformer impedance of 6.25%. The power ratings are based on a 25% duty cycle (5 minutes ON/15 minutes OFF). Other duty cycles are available. Please consult Phenix Technologies for your specific requirements.

Custom Built To Your Specifications

All Transformer Test Systems from Phenix Technologies are built in our western Maryland facility. This includes fabrication of the cabinet, winding of the power transformer, regulator construction, assembling the components, programming, and final test. This allows us to maintain positive quality control over each step of the process, resulting in a superior test system with an extended service life.

We have the capability to offer a custom built system to each client. Our design engineers will work with you to develop a test system exactly suited to your requirements.

Each System Performs A Wide Variety of Tests

All Phenix test systems are designed to perform transformer tests in accordance with ANSI C57 and IEC 76 standards, latest edition. These tests include:

- Excitation current measurement
- Excitation loss (core loss)
- Impedance voltage measurement
- Full load current
- Copper loss (load loss)
- Temperature measurement

With the appropriate options additional testing capability includes:

- Applied Potential
- Induced Potential
- Winding Resistance Measurement
- Turns Ratio

Control Panel, Operator Interface

Standard Voltage Outputs

	Input Current		Available Current/Voltage Taps						
			1	2	3	4	5	6	7
Model	**(380V/50 HZ)***	**(480V/60 HZ)***	**240V**	**300V**	**480V**	**600V**	**1000V**	**1600V**	**2400V**
TTS30-1	80A	70A	130A	104A	65A	52A	31A	19A	N/A
TTS50-1	135A	115A	216A	172A	108A	86A	52A	32A	N/A
TTS100-1	265A	225A	433A	346A	216A	173A	104A	65A	N/A
TTS35	55A	50A	86A	69A	43A	34A	20A	13A	8A
TTS65	105A	85A	156A	125A	78A	62A	37A	23A	15A
TTS100	175A	130A	240A	192A	120A	96A	57A	36A	24A
TTS155	240A	200A	375A	300A	187A	150A	90A	56A	37A

*Note: Other input voltages are available.

Dimensions and Weights

Model	Width	Depth	Hieght	Weight
TTS30-1	48"(1,220 mm)	63"(1,600 mm)	73"(1,855 mm)	2,400 lbs.(1,090 kg.)
TTS50-1	48"(1,220 mm)	63"(1,600 mm)	77"(1,960 mm)	2,700 lbs.(1,225 kg.)
TTS100-1	58"(1,474 mm)	84"(2,134 mm)	98"(2,490 mm)	5,400 lbs.(2,455 kg.)
TTS35	48" (1,220 mm)	63"(1,600 mm)	73"(1,855 mm)	2,600 lbs.(1,180 kg.)
TTS65	48"(1,220 mm)	63"(1,600 mm)	77"(1,960 mm)	3,000 lbs.(1,365 kg.)
TTS100	58"(1,474 mm)	84"(2,134 mm)	98"(2,490 mm)	5,400 lbs.(2,452 kg.)
TTS155	58"(1,474 mm)	84"(2,134 mm)	98"(2,490 mm)	6,000 lbs. (2725 kg.)

* Specification subject to change without notification.

Systems Testing Capacity

	Max Testing Capability	
Model	**1-phase**	**3-phase**
TTS30-1	500 kVA	N/A
TTS50-1	833 kVA	N/A
TTS100-1	1,667 kVA	N/A
TTS35	333 kVA	500 kVA
TTS65	580 kVA	1,000 kVA
TTS100	833 kVA	1,500 kVA
TTS155	1,445 kVA	2,500 kVA

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TECHNICAL ADVANTAGES

Flexibility/Reliability

The Phenix Engineering staff has developed transformer test systems that offer the customer reliability and flexibility. By utilizing Programmable Logic Controllers (PLC) in the control system, the Phenix TTS allows the customer the ability to add optional features or change the test sets operating procedures by reprogramming the PLC. This is much more cost effective than rewiring the test set as was required in traditional test systems. Reliability is a top priority for Phenix. We maintain our system's top performance record by adhering to our company's strict quality guidelines. Craftsmanship and the use of top quality materials and components insure the customer years of reliable service from their Phenix transformer test set.

The voltage regulating system of Phenix transformer test sets will vary between three different variable transformer types. The power rating of the test system is the determining factor. The smaller systems utilize a toriodal type regulation system while the larger systems use the Phenix column type regulator. For extremely large applications a THOMA type regulator is utilized. Detailed information on all of these units can be found in brochure #70105 titled "Voltage Regulators."

Safety Features

- Zero-start interlock
- Slow- and fast-acting protective devices on power transformer, regulator, measurement system, and other critical components
- Foot switch
- Provision for External Security Circuit with indicator
- Flashing red warning light
- EMERGENCY OFF mushroom switch
- External interlock provision
- Recessed jacks for output leads

Instrumentation

Voltmeter
Three 4½ digit LED displays switch selectable between RMS and Average readings.
Accuracy: ± 0.5% of reading + least significant digit

Ammeter
Three 4½ digit LED displays.
Ranges: 0-1.00/10.00/100.0/1000A.
Accuracy: ± 0.5% of reading + least significant digit

Wattmeter
One 4¾ digit LED display with six to eight ranges.
Accuracy: ± 0.5% of reading + least significant digit at 1.0 power factor
± 1.5% of reading + least significant digit at 0.3 power factor
± 3.0% of reading + least significant digit at 0.1 power factor

Thermometer
One 4½ digit display
Range: 0-199.99 degrees C
Accuracy: ± 1 degree C

For transformers that operate at very low power factors, Phenix offers high accuracy measurement systems. For these types of systems consult your Phenix Representative.

Standard Design Features

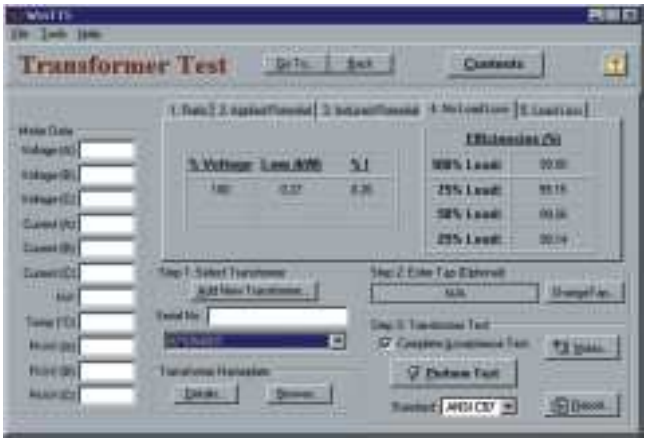
- Control power key switch with indicator
- Main and control power circuit breakers
- Duty cycle 5 minutes ON/15 minutes OFF at rated power
- Motor-driven tap switch with indicators
- Motorized control of output voltage
- Adjustable rate of rise
- Raise and lower pushbuttons with OFF ZERO indicator
- Test mode selector switch with indicator
- Semi-automatic ranging of wattmeter and voltmeter with direct readout
- Hold feature to freeze all meter displays for recording
- RMS and Average responding voltmeters
- 3-wattmeter method of power measurement
- Voltage sensing leads
- Fork truck and overhead lifting provisions

Transformer Test System with Control Console

OPTIONAL FEATURES AVAILABLE

Data Acquisition

Phenix Technologies has designed a complete data acquisition system to record all test data and perform the necessary correction calculations per ANSI C57 and IEC 76 standards. The system calculates corrected losses, efficiency, regulation and percent impedance. Time saved by eliminating manual data recording and calculation results in rapid pay back of the system. Computer aided data acquisition is increasingly becoming the standard as customers demand computer generated reports that reduce operator error. The system features Windows®-based testing software which builds a data base of transformer test results and creates accurate final test reports. The software offers easy step by step instructions to guide the operator through each test procedure. Setup maps for each test are provided to reduce costly connection mistakes. The options section allows the software to be easily customized to any hardware the customer may have.



Operator Interface Display (OID)

The OID is available for clear display of all instrumentation (OID pictured in custom control console on pg. 4). An OID offers complete programming flexibility. This allows customization for automated testing and the ability to program more safety interlocks to protect the test set as well as the test specimen. Optional tests, such as applied or induced potential can more easily be added to an OID equipped system. The OID offers the ability for computer control of the test set. Utilizing the computer control feature reduces the function of the operator to selecting a test, connecting the leads to the test specimen (instructions for lead hook up displayed by software) and initiating the test. The system takes over from there, running the test, recording results and turning the test set off. Easy data transfer to a computer for acquisition and data storage is accomplished via a COM port, not through computer interface cards. As OID equipped system uses a microprocessor based calibration procedure and all key functions of the system are monitored, alerting the operator with written messages if there is a problem with testing. Overall reliability, functionality and flexibility are increased with the use of an Operator Interface Display.

Three Phase Transformer Turns Ratio Test Set

Turns-Ratio Testing

Phenix offers both single and three phase transformer turns-ratio testing equipment. Each may be rack mounted for installation in the test system or stand alone for versatility (three-phase unit pictured above).

The single phase test set features a simple to operate, compact, portable, battery operated design. This unit will supply up to 8 hours of continuous testing on a full charge.

The automatic three-phase turns-ratio tester features microprocessor-based control, built in printer, and a RS-232 computer interface in a rugged one piece design.

For complete specifications on Phenix Technologies Turns Ratio Testers reference brochure #20402.

Transformer Resistance Measurement

Phenix offers a digital transformer-winding resistance ohmmeter which will quickly and accurately measure winding resistance on all types of transformers.

Control Console

Phenix offers a remote console to contain all instrumentation and controls. This option will allow the controls to be mounted in a protected area or climate controlled room.

For complete specifications on Phenix Technologies Control Consoles, reference brochure #90102.

Induced Potential Testing

Phenix can incorporate a motor generator with the test system to increase the output frequency to allow induced testing.

This option is used when detection of turn-to-turn insulation integrity is to be verified

Applied Potential Testing

Phenix offers a complete line of AC dielectric transformers which may be incorporated with the system controls for a complete hipotential test station. A variety of ratings are available to meet any need.

Applied potential testing is necessary to verify insulation integrity in reference to ground.

For complete specifications on Phenix Technologies AC Dielectrics, reference brochure #60401.

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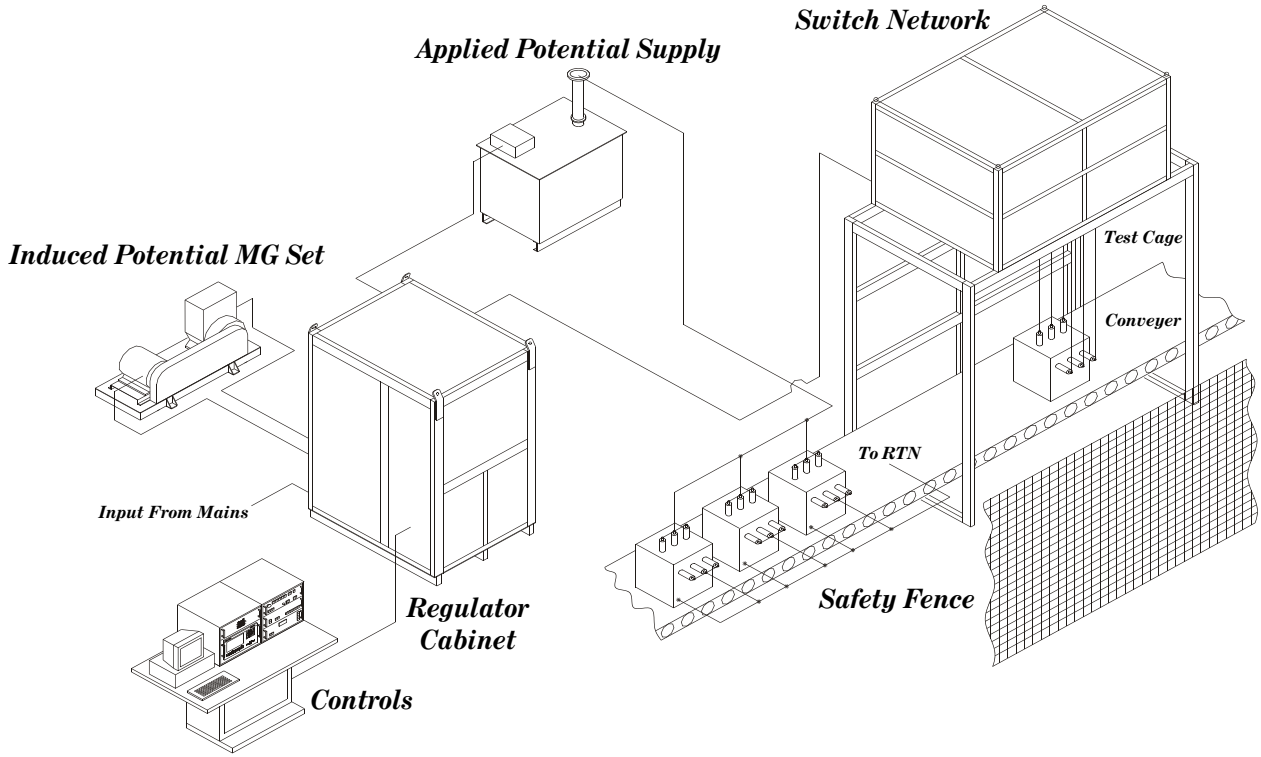


Automated Transformer Test Systems

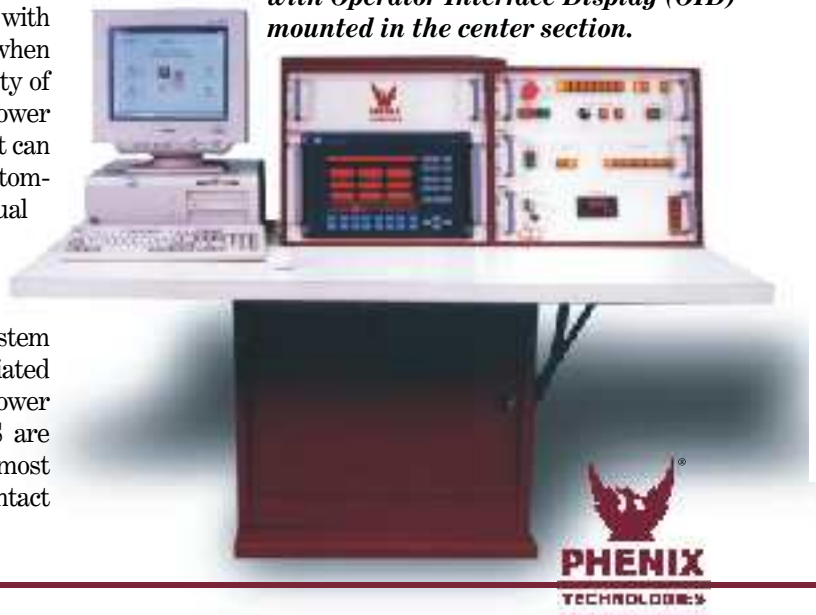
For the customer interested in increasing production while decreasing labor cost, Phenix Technologies can provide fully automated transformer test systems. Available for distribution class and small power transformers, the automated test systems are custom designed and built for the individual needs of the customer. Pictured above are all the components necessary to do automated transformer testing to ANSI C57 and IEC 76 standards. Also shown in the diagram is an AC dielectric test set for applied potential testing and a motor generator for induced potential testing. The basic diagram is one of many ways a test system could be configured to suit the individual needs of a facility's testing procedures and the facility's physical floor space requirements. Multiple test stations with single connection hook-ups can be configured to simultaneously perform the customers desired testing protocol on each transformer. The computer controlled test system with the Operator Interface Display proves to be more reliable and can be operated by individuals with minimal training. Both manufacturers and repair facilities benefit greatly from the efficiency of automated test systems. Total test time can be reduced to as low as ninety seconds or less per transformer depending on the tests being performed and the testing sequence.

Large Power Transformer Testing

Manufacturers and repair facilities that work with large power transformers face unique challenges when testing is required. Phenix Technologies offers a variety of components such as THOMA-type regulators, power supplies and high accuracy measurement systems that can be designed as a complete test system to meet the customers needs. These units can also be built as individual components to compliment or upgrade an existing test facility.

The Phenix Technologies Transformer Measurement System (TMS) is a highly accurate system designed and built for the stringent demands associated with testing specimens which operate at low AC power factors. All of the components in the Phenix TMS are calibrated to NIST/NRC standards assuring the most accurate overall test system available. Please contact Phenix Technologies for specific requirements.

Custom triple wide control console with Operator Interface Display (OID) mounted in the center section.



Company Profile

PHENIX TECHNOLOGIES is a leading manufacturer of high voltage, high current, and high power test systems and components. Our test systems are in operation around the world satisfying the testing requirements of our customers.

Our 65,000 square foot headquarters is a modern manufacturing facility where all the major components of our systems are produced. All aspects of electrical and mechanical design, software design, and actual production are performed in this facility and controlled by an ISO9001 quality program. Our engineers offer a unique blend of theoretical knowledge and practical experience. Our ever-expanding Service and Calibration Department stands ready to assist you during and after installation to insure years of trouble-free service.

Our engineering resources, manufacturing capability, and commitment to flexibility have earned us the reputation as the supplier of choice. From portable test equipment to large, cutting edge automated test systems, Phenix Technologies provides solutions for your testing needs. You owe it to yourself to discuss your testing requirements with Phenix Technologies today.

The PHENIX Technologies Product Line

- High Voltage AC Dielectric Test Sets
- Resonant Test Sets
- Variable Frequency Resonant Test Sets
- DC Hipots and Insulation Test Sets
- Automatic Insulating Material Testers (D149)
- Microhmmeters
- 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
- Frequency Response Analyzer
- High Current/Circuit Breaker Test Sets
- 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

ISO 9001 CERTIFIED

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