Testing Applications

Ensure that a transformer’s performance is met for life

- verifying a manufacturer’s test and design data prior to installation
- after repair or upgrade
- when a major disruptive event occurs, such as a lightning strike
- for preventive/predictive maintenance

Specifications are subject to change without notice.

Brochure No. 20106
SAFETY and DESIGN FEATURES

- Circuit breaker protection
- High voltage On/Off pushbuttons with indicator
- External interlock provision
- Slow- and fast-acting overload protection
- Zero Start interlock
- Output overload indicator with reset switch
- Multi-range metering
- Temperature meter with 15 foot (4.5 meter) thermocouple
- Four-wire measurement system for accurate readings
- Surge protection devices on all meters and relays
- Recalibration provisions for all meters
- Foot switch for operator safety
- Flashing red warning lamp
- Two copies of operation/maintenance manual

Phenix Technologies’ Single-phase Transformer Test Systems are designed to provide voltages and currents to test single-phase distribution transformers.

The size of transformers which can be tested will vary with impedance. Test systems equipped with optional high voltage taps will allow testing of transformers with higher impedances and/or higher secondary voltages.

The precision metering system complies with DOE efficiency and international transformer standards.

Testing will ensure that a transformer meets purchase specifications and will perform adequately after installation.

Perform the following tests in accordance with ANSI / IEEE C57 and IEC60076 standards:

- Excitation Current Measurement
- Excitation Loss (No-Load or Core Loss)
- Impedance Voltage Measurement
- Copper Loss (Load Loss)
- Temperature Measurement
- Temperature Measurement (Heat Run) (via models TTS20-1, TTS30-1, TTS50-1 only)

Additional testing can be performed when the following options are added:

- Applied Potential Test with the addition of an AC Hipot
- Induced Potential Test with the addition of a Motor Generator Set
- Turns Ratio Test with the addition of a Transformer Turns Ratio Test Set
- Winding Resistance Measurement with the addition of a Winding Resistance Meter

Unique to Models TTS5M & TTS10M

- Manual control of output voltage
- Hold function for all meters
- Three constant kVA taps
- Casters for ease of mobility
- Cable storage hooks

Unique to Models TTS20-1, TTS30-1, TTS50-1

- The Human Machine Interface (HMI) allows the programming of automation features of the test set. All output meters are displayed on the LCD screen. Data acquisition and report generation of the test results are performed via computer and WIN TTS testing software with all required interface cables included. The HMI eliminates a large number of relays and meter wiring which increases reliability. All calibration functions are performed and component self-checks are achieved which aid a service technician in locating malfunctioning components in the event of a failure.
- Zero Start interlock with auto return of regulator to zero position
- Raise and Lower pushbuttons with Off Zero indicator
- Motorized control of output voltage with adjustable rate of rise
- Control power key switch with indicator
- EMERGENCY OFF mushroom switch
- Motorized tap selector with indicators
- Auto-ranging wattmeter and voltmeter with direct readout
- 15 foot (4.5 meter) output leads with boots and clips (separate power and measurement leads). Jacks for output leads are recessed for operator safety; leads are removable for operator convenience
- Fork truck and overhead lifting provisions.

ENVIRONMENTAL CONDITIONS

- 10-40°C, indoor/outdoor in fair weather
- Humidity <95% non-condensing
- Altitude <3300 ft (1000 meters)

10-40°C, indoor/outdoor in fair weather
Humidity <95% non-condensing
Altitude <3300 ft (1000 meters)
## APPRX. MAXIMUM TEST CAPABILITY

<table>
<thead>
<tr>
<th>Metric</th>
<th>TSS5M</th>
<th>TSS10M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impedance</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>Load Loss</td>
<td>375 kVA</td>
<td>188 kVA</td>
</tr>
<tr>
<td>Primary Voltage of Transformer</td>
<td>30 kV</td>
<td>15 kV</td>
</tr>
</tbody>
</table>

### APPRX. MAXIMUM TEST CAPABILITY

<table>
<thead>
<tr>
<th>Voltage/Current</th>
<th>208/230 VAC, 40 A, single phase</th>
<th>208/230 VAC, 80 A, single phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>50 or 60 Hz (one must be specified)</td>
<td>50 or 60 Hz (one must be specified)</td>
</tr>
</tbody>
</table>

(Other input voltages are available; consult factory)

### OUTPUT

<table>
<thead>
<tr>
<th>TAP</th>
<th>Voltage</th>
<th>Current Voltage</th>
<th>Current Current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Voltage</td>
<td>Continuous</td>
<td>5 min ON/15 min OFF</td>
</tr>
<tr>
<td>1</td>
<td>0-150 VAC</td>
<td>33 AAC</td>
<td>50 AAC</td>
</tr>
<tr>
<td>2</td>
<td>0-300 VAC</td>
<td>16.5 AAC</td>
<td>25 AAC</td>
</tr>
<tr>
<td>3</td>
<td>0-600 VAC</td>
<td>8.3 AAC</td>
<td>12.5 AAC</td>
</tr>
</tbody>
</table>

### METERING

- **Voltmeter**: 4 1/2 digit with LED display, ±0.5% of reading +0.2% of range
- **Currentmeter**: 0-150/300/600 VAC, selectable True RMS or Average
- **Wattmeter**: 0.1-199.9 A, True RMS
- **Temperature**: 0-100°, Accuracy ±1° C

### APPROXIMATE DIMENSIONS & WEIGHTS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>TSS20-1</th>
<th>TSS30-1</th>
<th>TSS50-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>32” (813 mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>29” (737 mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>52” (1321 mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wt</td>
<td>455 lbs (206 kgs)</td>
<td>510 lbs (231 kgs)</td>
<td></td>
</tr>
</tbody>
</table>
OPTIONS

• Applied Potential Testing Capability via AC Hipot, cylinder-type
• Induced Potential Testing Capability via Motor Generator Set includes ON/OFF controls and frequency meter built into the control panel
• Transformer Turns Ratio Test Set, Type ATTR-01 or Type PATTR-03A
• Transformer Winding Resistance Meter, Type WRM-10P
• Laptop Computer
• External Printer

OPTIONS Available for Models TTS5M and TTS10M

• Computer Interface and Testing Software
  Includes RS232 output for interfacing all metering of the test system to a computer. The software performs all loss calculations (including correction for temperature and sine wave basis), records all test data, and generates reports.

OPTIONS Available for Models TTS20-1, TTS30-1, TTS50-1

• Variable Frequency / Electronic Power Supply
  – Replaces variable transformer and motor generator
  – Adds 50 Hz testing capability (selectable 50/60/400 Hz)
  – Less than 2% Total Harmonic Distortion (THD)
  – Main input requirement changes to 3 phase
• Remote Control Console with writing desk and 25 foot (7.6 m) interconnect cables (longer cables are available upon request)