

## BJM CORP ALL-TEST™ Tech Note: Trans02

- ⇒ Basic Knowledge
- Problem Example
- Improvement Example

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### **Theme: Transformer Testing – 1 Phase Pole-Mount Transformers**

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#### Description

The ALL-TEST IV PRO™ 2000 may be used to test any type of 1-Phase pole-mount transformers. The true sine wave generated by the ALL-TEST™ that provides unequalled motor rotor testing, coupled with the type of connections found in transformers, will cause traveling currents that will provide erroneous test results. This can be easily avoided with a test procedure that can be used on any type of single phase pole-mount transformer connection. In many cases, this can be used as a “screening” test prior to performing the specific testing required within many utilities. Avoiding costly test series on a bad transformers will usually pay for the ALL-TEST™.

#### Procedure

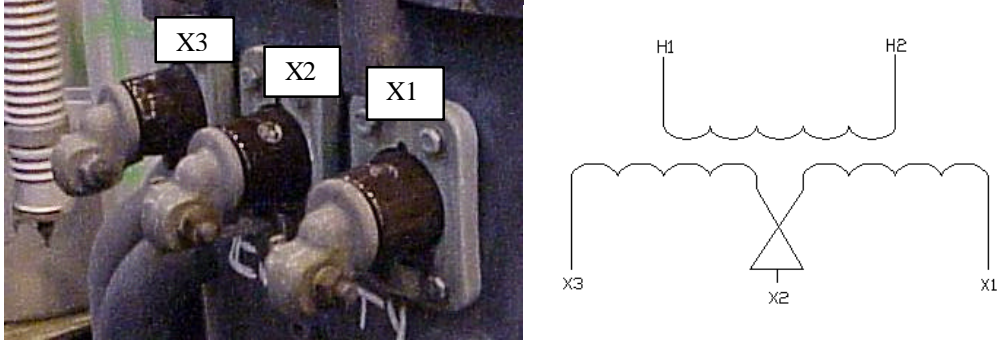
In order to test a single phase pole-mount transformer, you must ground ALL of the leads on the other side of the transformer that you are not testing. This means that you must test the primary, with all of the secondary leads grounded, then the secondary, with the all of the primary leads grounded. If you ground only one lead, you will get poor test results. Ground straps or cables must be sized to handle the output voltage that will be generated due to the output of the ALL-TEST IV PRO™ 2000.

The general procedure is as follows:

1. De-Energize and disconnect primary and secondary of transformer to ensure that stray voltages are not present that will harm the operator nor the ALL-TEST™. The appropriate safety requirements for Lock-Out/Tag-Out and testing de-energized equipment apply.
2. Attach grounding straps to the secondary of the transformer, including the neutral (usually identified as X<sub>0</sub>). Ensure that the grounding straps or cable are attached to a true earth ground.
3. Ensure that the transformer switch, if applicable, and once the transformer has been isolated, is in the “on” or “operating” position.
4. Perform the Auto test per the ALL-TEST IV PRO™ 2000 manual. Ensure that the connection points are as clean as possible. If the ALL-TEST™ shows “Bad Result,” the simple resistance of the circuit is too low. See Tech Note Resist01 for details. Save the results. When testing, the normal sequence is to perform all three phases on the primary [ H1 to H2, H1 to H2, then H1 to H2]. If the readings are not repeatable when remeasured, check the ground connection and retest.
5. Attach the grounding straps or cable to all the primary leads of the transformer then to a true earth ground.

6. Perform the Auto test by placing the black lead on the center post of the secondary and the red lead on the left post (the center post is usually the center tap of both transformer secondary windings). Use the first winding for the ALL-TEST™ winding 1 and winding 2 automatic test. If the readings are not repeatable, within 1%, check the ground connection and re-test. Use the winding 3 test between the center post and the right post. Save the test results. [X2 to X3, X2 to X3, then X2 to X1]

Figure 1: Pole Mount Transformer Test Locations



## Test Results

Because of the lack of an internal comparison on the primary, users with many pole mounted transformers of the same type may wish to compare the primary results with other transformer results. Otherwise, the primary readings would be the I/F (must be between -15 and -50), insulation resistance (>100 M-Ohms), and continuity.

On the secondary, the two windings should have resistance, impedance and inductance readings that are within 5% of each other, a phase angle that is within one degree, and an I/F that is within two points of each other (ie: -44, -45, -44). Usually a failure is indicated by a massive unbalance between the phases.

Table 1: Good Pole-Mount Transformer

Reading	X2-X3	X2-X3	X2-X1
Resistance	0.014	0.014	0.012
Impedance	78	78	77
Inductance	15	15	15
Phase Angle	26	26	27
I/F	-49	-49	-49

