



Predictive Maintenance Ltd.

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## **PREDICTIVE MAINTENANCE LTD.'s**

### **INTRODUCTION TO THE INDUKTOR TESTER**

This 11 pound Swedish tester is excellent for detecting both winding and rotor faults. Through versatile design, it also functions as a megohm-meter for moisture, dirt and other contamination, and as a safe 1 kV DC hipot. It has been used and refined in Scandinavia and N. Europe for 18 years and for the last 3 in North America.

The Induktor uses 125 Hz DC pulses to "ring" 2 supposedly identical coils to compare their impedance, quite similar to the action of a surge comparison tester, except at very much lower voltages. The phases or windings are compared by their analog meter readings or "swings". Its ground test function uses 1 kV pulsed DC.

The Induktor is designed primarily to check 3 phase AC motors either in service or in storage. It is also excellent for DC drives, and AC synchronous and wound rotor motors, either directly at the motor leads or at the MCC, fuse box, magnetic starter, or manual starter. The Induktor tests:

1. All types and horsepower of MCC controlled motors
2. All voltages - 110, 220, 440-80, 575, 2.3, 4, 6.9 or 13.8 kV
3. Tough locations like submersible pumps, sealed reefer units, etc.

## DIRECTIONS

The Induktor battery must be fully charged for accurate results, and maintained at 490 mA or more measured by pushing the **NORMAL** button in test position #1 with the grey resistor lead shorting the 2 jacks. A low battery will falsely pass small turn faults. (A built-in battery meter is being added.) Recharge overnight after more than 1 hr. of testing to maintain full charge, but **only** overnight. The Induktor is now ready to check windings, insulation or rotors. **DISCONNECT POWER & ANY PROTECTIVE CAPACITORS IN LINE. IF POSSIBLE, REMOVE FUSES.**

### 3 PHASE MOTORS-TESTING WITH THE ROTOR IN

Attach one lead clip to motor lead #1 or "A" phase motor terminal. Connect second clip to #2 motor lead or "B" phase motor terminal. Press **NORMAL** button. A mid scale reading or swing of anywhere from 200 to 500 mA is best, so turn the voltage level switch starting at #1 setting until a reading is obtained in that range.

### 3 PHASE MOTORS - START WITH A ROTOR BAR CHECK

Turn the shaft keyway to 12 o'clock. Keeping in mind the number of poles in the motor, slowly turn the rotor thru 360 degrees. If this particular rotor couples magnetically with the pole positions, you should count as many swings as there are poles. If so, the rotor iron is sound; one swing less than the number of poles indicates a broken rotor bar. Remember, 2 poles/3600 rpm, 4/1800, 6/1200, 8/900, etc.

### 3 PHASE - CONTINUE WITH A TURN INTEGRITY CHECK

If no swing results from turning the rotor, coupling is not a factor. Anyway, **NOTE THIS READING OR SWING AS YOUR STANDARD FOR COMPARISON.** Hold the **NORMAL** button down only long enough for an accurate reading, otherwise the winding will absorb capacitance, charging the winding and causing the needle to fade slightly. Do not reset voltage level switch (1 thru 6). Leave at this setting to check this motor.

Move clip attached to #1 lead (A) to #3 lead (C). Press **NORMAL** button and note second reading. Move clip attached to #2 motor lead to #1, press **NORMAL** button and note third reading. If all readings are the same, the winding is good. The analog meter is so sensitive that an imbalance of 4-5mA or more indicates a **TURN FAULT**.

### **CHARACTERISTICS OF OTHER FAULTS**

If any combination of leads will not balance (i.e. same swing, or High and Low readings) when rotor is slowly turned (anywhere from 10 to 100 mA is normal) the winding is not usable. The larger the mA deviation, the greater the fault. In delta-wound motors, the 1 high reading of the 3 contains the fault. In wye/star windings, the 2 similarly high readings both include the bad phase.

If meter peaks even at the lowest voltage setting #1, as it will with some low resistance windings, then you must use the grey resistor lead to keep readings on scale. Repeat previous instructions.

For instance, 30mA is typical of **COIL SHORTS**. A "0" zero reading in one position indicates an **OPEN WINDING**. Three widely differing readings indicate a **PHASE-TO-PHASE FAULT**.

### **TO TEST THE STATOR ONLY**

Use the same procedures as with the rotor in except that, obviously, rotor imbalance or coupling with the poles can not be a problem.

**DO NOT USE THE GREY RESISTOR LEAD TO CHECK INSULATION TO GROUND. USE REGULAR TEST LEADS**

### **CHECKING INSULATION TO GROUND**

Attach one clip to lead #1 and second clip to ground or motor case. Set selector switch to 1kV; press both **NORMAL** & **1000 VOLT** buttons together. The lamp left of the voltage selector switch will light up brightly if motor is grounded.

A dim light indicates dust and/or moisture and just under 1 meg/kV. It will be necessary to dry and clean the motor to prevent a solid ground that would cause the winding to fail totally.

To test lamp, attach both clips together and press both **NORMAL** and **1000 VOLT** buttons together. The lamp should light up brightly if it's serviceable.

### **2-Speed 2-Winding Motors**

Test like 3-phase, each winding tested separately. For high speed, connect 4 & 7, 5 & 8, 6 & 9, then attach leads to 1 & 2, 2 & 3, 3 & 1, and compare. For low speed, connect leads 4-9 appropriately and test 1 & 2, 2 & 3, 3 & 1 and compare.

### **2-Speed 1-Winding Motors**

Same as 3-phase, connected for either Hi or Low speed.

### **Wound Rotor Motors**

Like 3 phase, but take your readings at the slip rings.

### **3-Phase Generators**

Same as 3-phase motors. Turn the rotor while testing. All three phases should show the same reading.

### **D.C. Motors and Power Tools**

To test the armature, open the inspection plate and connect the leads to each brush holder. Press **NORMAL** and turn armature slowly. For power tools, connect one lead to each plug prong, close trigger switch and turn chuck. If the reading remains constant or varies only very slightly, the armature is good. If the needle swings strongly during a revolution, the armature has turn faults.

**TO CHECK DC GROUND INSULATION.** Connect one lead to brush holder and one lead to case of tool or motor, press both **NORMAL** and **1000 VOLT** buttons. To test field coils isolate each with the sharp probe and read each coil separately, then repair your pierced point with glyptol or equivalent.