

## ALL-TEST PRO 31

### Electric Motor, Generator and Transformer Trouble Shooter

**Trouble Shooting** – Know in a few minutes what the problem is: electrical or mechanical, coil or rotor, internal fault or ground fault.

**Start-up** – Make sure all electrical motors are working in top condition.

**Quality Assurance** – Test all incoming motors.

**Light PdM** – Also suited for limited, manual, Predictive Maintenance.

#### REVOLUTIONARY TESTER GOES FAR BEYOND WHAT YOU CAN SEE WITH ONLY A MEG-OHM-METER!

- Safe: De-energized testing
- Easy: As easy to use as any meg-ohm-meter
- Light: One lb., handheld
- Batteries last for up to 10 hours of testing
- Best Value: Doesn't cost more than a good meg-ohm- meter. Quick return on investment

#### WHAT YOU WILL FIND WITH THE AT PRO 31:

- Turn to turn & coil to coil faults\*
  - Contaminated windings; grease, dirt & liquids
  - Phase Unbalance; Z-unbalance = higher electrical bill & shorter motor life
  - Open windings; no conductivity
  - Rotor faults; broken bars, air-gaps, casting voids, etc\*\*
  - Insulation to ground faults; Chose 500 or 1000 volt test, read 0.0 - 500 M
  - EMI numbers in mV shows whether readings are reliable, or not
- \* Surpasses surge tester sensitivity! See AEMPM Study  
\*\*A fast, easy and effective way to find broken rotor bars, eccentric rotors and casting voids

#### STOP GUESSING – GET YOUR OWN ALL-TEST PRO!

#### PLANT AND SERVICES TEST ALL INCOMING MOTORS BEFORE INSTALLING

Save tons of money by catching any faults before installing a new or repaired motor.

#### TROUBLE SHOOT

Know what the trouble is in a few minutes; Electric or mechanical? Turn-to-turn fault? Rotor problem? Phase unbalance? Bad connections? Dirty windings? Short to ground? Stop Guessing! Know the problem before sending motor out for repair.

#### TEST ALL ELECTRIC MOTORS & CONNECTIONS AT START-UP

Avoid unnecessary start-up labor and material costs. Use test results to create a professional bill of health report and avoid future warranty claims.

#### LIGHT PREDICTIVE MAINTENANCE

By performing quick tests periodically on your most critical motors, and by using our Condition Calculator 3.0 Software, which is programmed manually, you can see any changes early and take action before a critical breakdown. Ask for our ALL-TEST PRO MD kit for a complete PdM program.

#### REPAIR SHOPS

##### • SORT YOUR INCOMING REPAIRS

No need to wash and bake before determining the fault(s). Save hours of work per day and see your costs go down and profits go up!

##### • GIVE YOUR CUSTOMERS TOP QUALITY SERVICE

Take the ALL-TEST PRO 31 with you when picking up repairs or making a sales call. Help your customer (and yourself) by trouble shooting or by settling a warranty claim on site.



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#### ALL-TEST PRO™ MEASUREMENT TECHNOLOGY

##### EPRI Statistics

Based on statistical data compiled by the Electric Power Research Institute (EPRI), 47% of motor failures are due to electrical faults/failures. The 47% can be further broken down into rotor problems (10%) and winding problems (37%). Mechanical faults may sometimes have root causes that are electrical in nature. Winding defects can occur due to insulation age, contamination, power surges, thermal overload, damaged wire/materials, vibration, and other causes. They begin as energy crossing an insulation fault (such as moisture or contamination), which isolates at least one turn. This generates additional stress and heat across the defect, which progresses until an arc is drawn and the winding fails.

##### About Winding Faults

There are four basic types of winding faults.

- Between turns in a coil
- Between coils in a phase
- Between coils in different phases
- Between a coil or phase and ground

Only about 5% of electrical faults begin as a fault to ground. The other three fault types may or may not propagate into a ground fault as the failure becomes advanced. The short-term result of these faults is reduced efficiency (and higher operating costs). Symptoms include higher operating temperatures, perhaps nuisance tripping, and reduced motor life. As faults advance, power and torque may decrease. The longer-term result is always motor failure.

##### Testing Options

Megohm Insulation testing will only detect faults to ground. Since only 5% of motor faults begin as ground faults, the majority of faults will go undetected using this method alone. Surge testing requires the application of high voltages and currents, and can be a destructive test, actually generating faults.

This aspect, combined with the size of surge testing equipment makes it inappropriate for troubleshooting and predictive maintenance testing. Resistance and inductance-only (RLC) test methods don't provide enough information for reliable fault detection and troubleshooting.

The ALL-TEST PRO™ is your best choice for fault detection and troubleshooting.



*This winding fault was caused by a voltage surge.  
An insulation test will not detect it!*

In a healthy 3-phase motor, the windings are electrically "balanced". These balanced electrical characteristics include passive properties, such as resistance, and active properties, such as inductive reactance and impedance. As faults develop, one or more of these electrical properties will change, depending on the type and magnitude of the fault.

ALL-TEST PRO™ 31 is unique in that it performs a series of impedance-based tests, (phase angle, impedance, and a current / frequency ratio) on each winding. These measurements and their balance across the three phases provide a clear picture of the condition of the motor circuit. This test and analysis method will quickly indicate the presence of a fault, even at its earliest stages. The tests are performed at low AC voltages, so there is no stress to the windings.

ALL-TEST PRO™ measurements are taken on de-energized motors. Windings and rotors can be tested from control panel without disassembly, a great benefit especially when troubleshooting larger motors.

ALL-TEST PRO™ instruments are effective in testing all types of motors: three-phase, single-phase, and DC. Even traction motors and machine tool servos can be effectively tested without removal or disassembly. In addition, small and large generators and transformers can be tested quickly and accurately.

Turn, coil, and phase shorts, broken rotor bars, casting voids, winding contamination, poor connections, phase imbalances... you can identify or eliminate them all when you troubleshoot with an ALL-TEST PRO™.

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#### HOW DOES THE ALL-TEST PRO 31 WORK?

##### Phase Balance:

Looks for differences in Impedance readings between phases in ohms and %.



##### Turn-to-Turn Faults:

Compares test-values between phases. Engineering units for Impedance and Phase Angle. Quick I/F test measures size of turn-to-turn faults.



##### Fault to Ground:

Chose 500 or 1000V test. Reads from 0.00 – 500 M.



##### EMI:

Units are shown in mV and tells you if any electric interference is present, which could affect your test results.



##### ROTOR TESTS, Pat. Pending:

When turning the rotor an horizontal bar is showing on the screen. This bar extends and contracts between maximum and minimum measured values. A fault shows up as a break in the pattern, which is easily observed. For deeper analysis an "auto-test" is incorporated. It creates a sine-wave as the rotor is turned and locks in on a fault.



#### The ALL-TEST PRO 31 kit includes:

- ALL-TEST PRO 31
- Test Harness with Clips
- Battery Charger
- Carrying Pouch for belt and shoulder
- User Manual on CD



#### Available accessories:

- Software: Condition Calculator 3.0
- AFT11 DC clamp
- M2000 Training Motor
- Motor Circuit Analysis Book



#### Specifications:

- Size: 7.5" L, 4"W, 1"D
- Weight: 1.0 lb.
- Batteries: 6 pack, 1.2V – 1000 mAh. Rechargeable NiMH

CE listed  
GSA Schedule Supplier

