

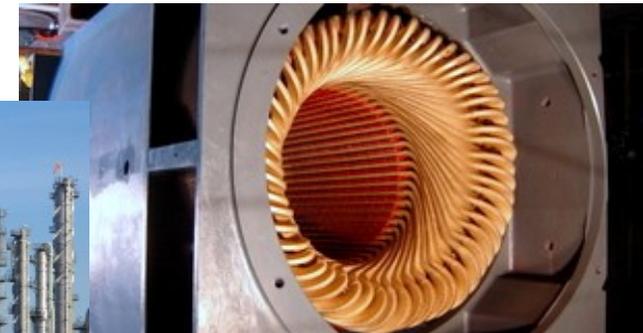
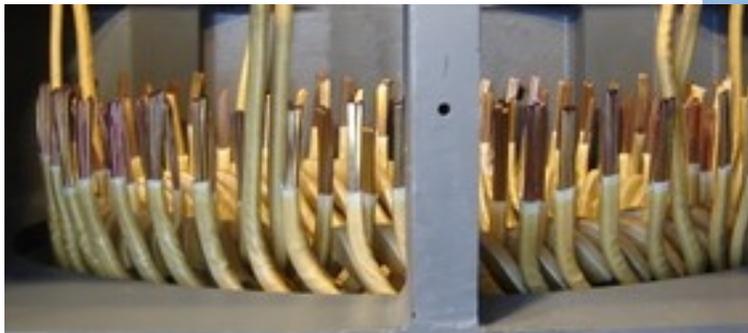
# ***ELECTROM INSTRUMENTS***

**LEADING THE INDUSTRY FOR OVER TWENTY YEARS**

## **INTRODUCING THE iTIG Surge Tester - Winding Analyzer**



**Designed and built rugged and dependable.  
For the electric motor and generator  
manufacturing and repair environment.**



**ELECTROM INSTRUMENTS, LOVELAND, COLORADO USA**  
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*First analyzers built 25 years ago are still supported by Electrom and working in the field*

## ***Test Equipment Built to Last !***

A pioneer in the industry, **Electrom Instruments** produced the first ever digital Winding Analyzer in the early '90s, revolutionizing the industry. Today computers and software contribute to a greater level of performance, flexibility and ease of use. Electrom Instruments continue to support its Winding Analyzers built since the 1980's. We do not give up on repairs even if parts are obsolete.

The **iTIG** is a Winding Analyzer. Its main function is that of a **non-destructive** insulation tester designed to safely detect weak or unstable insulation and shorts at voltages far below what the apparatus being tested is designed to withstand.

**Models can perform a variety of tests on AC and DC motors, generators, transformers and single coils:**

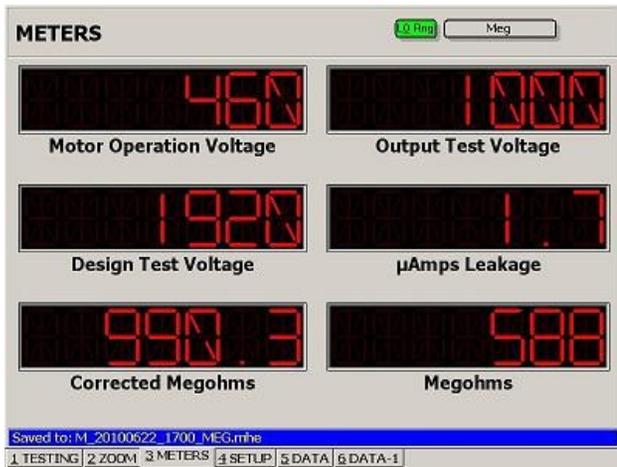
- Megohm (resistance) Tests
- Hipot Tests
- Surge Tests
  - > No need to turn the rotor on assembled motors
- Rotor Bar Tests (Open or cracked AC Rotors)
- Step Voltage Tests
- Polarization Index (PI) Tests
- Dielectric Absorption Tests
- Armature Tests (DC Rotors)
- Form Coil Tests (with up to 2X max rated power)
- Transformer Tests

**Sold worldwide** to companies in a **vast** range of industries: To electric motor repair shops, manufacturers of electric motors, generators and transformers, to utilities and various processing and manufacturing plants.

**Applications** range from diagnosis of problems, quality assurance tests of rewind or new equipment, to preventative and predictive maintenance tests with trend reports.



**iTIG shown on top, optional 30kV Power Pack at the bottom**



**Screen used in Megohm and Hipot test modes.**  
Meg test shown. Design Test Voltage for Hipot is automatically calculated based on a formula easily changed by the user.



## ***Electrom iTIG Advantages:***

- **MORE SENSITIVE AND ACCURATE FAULT DETECTION:** Most surge testers have one surge generator or channel. This means one winding is tested and compared to a stored winding test. The Electrom iTIG uses two independent surge generators operating simultaneously to compare two windings or coils. This produces a live comparison between the two phases under test. It better simulates what motors are subject to during start-up and operation. Comparing two live waveforms makes it easier to see faults that might go undetected using only one live channel.
- **FINDS FAULTS WHERE OTHER TESTERS DO NOT:** Ionization of the air surrounding the windings is necessary for detection of insulation weaknesses in a surge test. The iTIG generates line frequency Surge Pulse Rates (50 / 60Hz). This produces more ionization around fault locations at lower test voltages than instruments with lower pulse rates, such as commonly used 5Hz units. With two surge channels pulsing at line frequency, motor operating conditions are simulated and faults are found where single channel low pulse rate instruments do not see them.
- **PREVENTS DETECTED SURGE TEST FAULTS FROM WORSENING:** Voltage is the “pressure” causing currents to flow. Voltage (pressure) is necessary to detect weaknesses (current leaks) in the insulation of rotating equipment. Leakage current (the flow of electrons crossing a fault) should be kept small to prevent further deterioration of the insulation. The current is a function of the discharge capacitance of the instrument. The higher the capacitance the higher the current. The iTIG’s discharge capacitance is very low at 0.02uF (20nF) per channel.
- **EASY TO USE AND READ:**
  - ◆ Assembled motors can be fully surge tested without turning the rotor ( iTIG AMT option)
  - ◆ Unlimited storage of data available; customer info, motor specs, test data and more (iTIG D)
  - ◆ Easy retrieval of data and reports from TRPro reporting software
  - ◆ Print reports from the iTIG or from a PC.
  - ◆ Transfer equipment info from a PC to the iTIG so the test operator does not have to make any entries
  - ◆ Large color LCD *touch screen* display
  - ◆ Large displays of test and output voltage, resistance (Megohms) and leakage current
  - ◆ Communicate with iTIG through touch screen, remote mini keyboard included, or standard mouse/keyboard
  - ◆ Status messages update the user about the test as it is performed to avoid mistakes
  - ◆ % wave difference is displayed for surge comparison tests (comparison of 2 windings or coils)
  - ◆ Screen pictures stored with test data when wanted - use for training, application support and reports
- **ONLY PURCHASE WHAT YOU NEED NOW, UPGRADE LATER:** The iTIG is upgradeable in the field from a basic non-reporting winding analyzer to one with unlimited data storage and full reporting capability through simple software upgrades.
- **PORTABLE ALL IN ONE INSTRUMENT:** All tests, including the AC Rotor Bar test, are done with one instrument, no extras other than simple accessories (Page 5) . Optional accessories fit in the cover of the rugged case which is designed for harsh environments. Portable Power Packs up to 30kV come in the same size case as the iTIG.
- **BUILT IN SAFETY FEATURES:** Improper power line ground and polarity prevents the iTIG from turning on. Limits on leakage current prevent insulation damage and shuts the test down. Tests are non-destructive.

# Electrom Power Packs from 24kV to 60kV

## WHEN IS A POWER PACK REQUIRED

- The Power Pack is used to test large and high voltage rotating machines and transformers such as slow speed 4,160V to 13,800V electric motors and large power generators.
- The surge test is a load dependent test. Load characteristics are influenced by operating voltage, horse power, rotating speed, frame size, coil type etc. Greater loads may necessitate a Power Pack.
- Assembled motors may limit output voltage because of the magnetic influence of the rotor thus requiring a Power Pack.
- Contact Electrom to discuss your applications and determine if a Power Pack is needed.



iTIG sitting on top of a 30kV PP30 Power Pack



iTIG sitting on top of a 50kV Power Pack

## POWER PACK FEATURES

- Most tests available with the iTIG are standard in Power Packs when used together with an iTIG.
- The iTIG captures, displays and stores hipot data and surge waveforms from the Power Pack.
- Power Packs may be used for Stand Alone DC Hi-Pot Testing. It has meters for output voltage and leakage current.
- The iTIG output leads are not used when testing with a Power Pack.
- 24kV and 30kV Power Packs are portable and have the same rugged case as the iTIG.
- Power Pack PP30 (30kV) specifications: See last page.

## POWER PACKS WITH OUTPUTS OF 40, 50 AND 60KV

- Same features as the 30kV Power pack.
- Comes in a larger enclosure as pictured to the left and right.
- Often used for testing new very high voltage equipment when the recommended test voltage exceeds 30kV.



Power Packs can be used as stand-alone Hipot Testers



60kV Surge and Hipot Power Pack

## Electrom iTIG Models

**iTIG A:** Basic Winding Analyzer with no storage or reporting capability.

**iTIG B:** Stores one Surge Test. Can do AC rotor tests. Faster when testing DC motors.

**iTIG C:** Same as B but stores 10 test sets. Tests can be transferred to Excel. JPG pictures of the LCD screen can be stored.

**iTIG D:** Stores unlimited amounts of customer, motor and test data. Comes with **Test Report Pro** reporting software.

**iTIG A, B, & C are upgradable** in the field to any higher level model.

Data is stored in the iTIG computer's 4G byte flash drive memory.

iTIG B to D calculates the % Wave Difference between surge waves.

Status messages about the tests in progress, mistakes and performance issues are displayed.

Please contact us for more information about the models.

## Test Report Pro

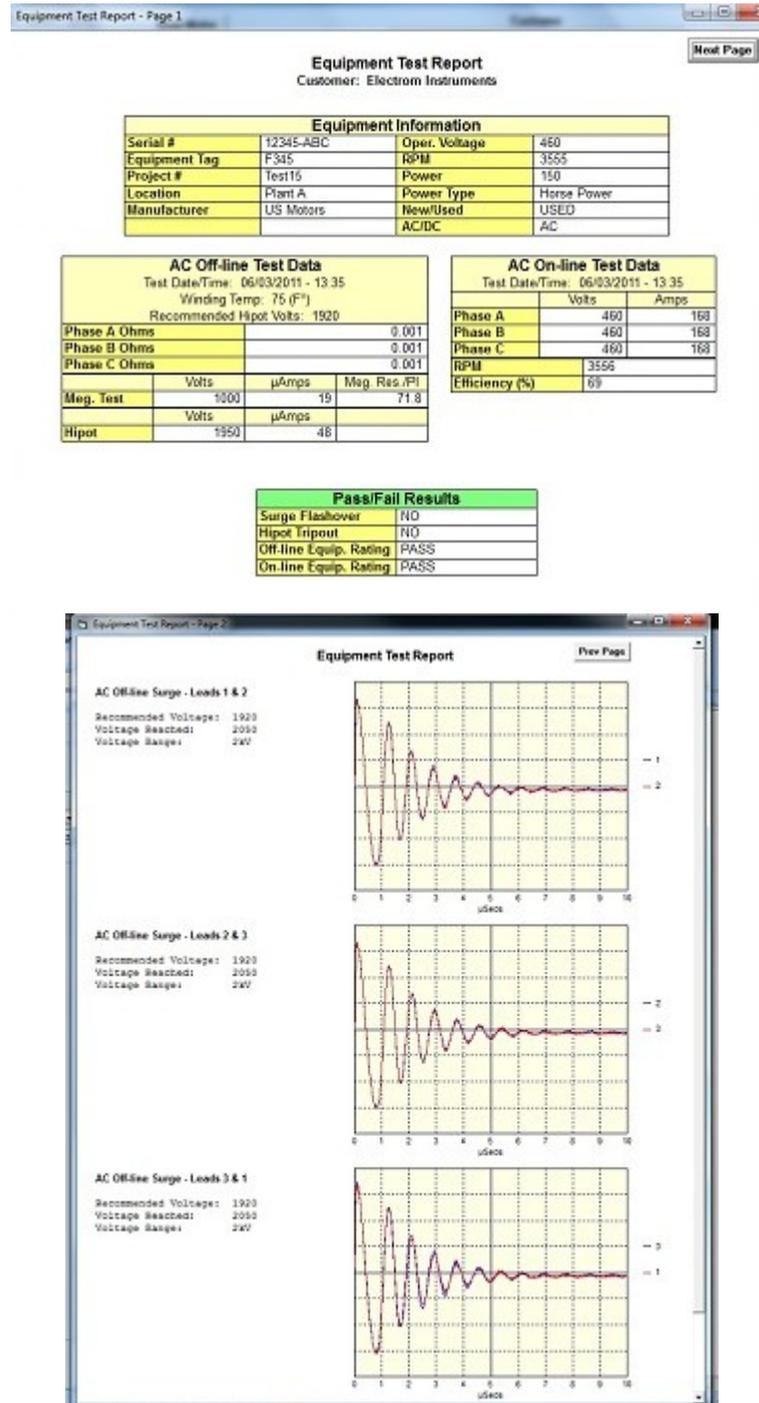
Test Report Pro or TRPro is a test report software. It runs on the iTIG Model D so reports can be printed directly from the iTIG D.

TRPro also runs on PCs. Data and information can be transferred back and forth between the iTIG and a PC.

Data stored includes customer information, equipment information, specs, job no. etc, as well as test data, analysis, notes and more.

TRPro is a valuable tool for predictive and preventative maintenance when test results are compared over time.

Customer and motor/equipment information can be entered on a PC and transferred to the iTIG.



## EXAMPLES of TRPro SCREENS

When test results are to be stored, a customer (or equipment owner) name and the equipment s/n must be entered at a minimum. This information is permanently stored in the iTIG, so it only has to be entered once.

If the information is already in the iTIG, the operator selects the s/n and proceeds with the test.

## FLEXIBILITY

All information can be entered in a PC and transferred to the iTIG in advance.

All information except customer name, s/n and equipment operating voltage can also be entered in the iTIG or in TRPro on a PC after the test.

Pass/Fail/Marginal results can be selected/edited in the iTIG or in TRPro on a PC.

Notes can be added in TRPro.

## WAVES FROM A GOOD SURGE COMPARISON TEST (Left picture)

Electrom uses two surge generators so two phases are compared live for better fault finding. In each of the 3 tests, waveforms from the two "live" phases of a stator overlap and show up as one.

If the waves are unstable, the insulation is weak.

If the two waves have different frequencies, there is a short.

# Electrom's AMT Option - Eliminates Need to Turn the Rotor in Assembled Motors

When testing assembled motors, the rotor dampens the ringing waves. A wave like the one shown in **P1** below is often produced.

**P1:** Shows a slight separation of the waves. This could be the result of a turn-to-turn fault in the windings, or it could be the position of the rotor versus the

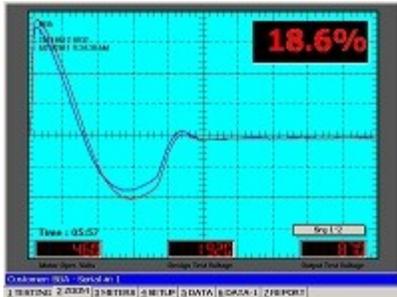
poles of the stator.

Therefore, the rotor has to be turned to determine if it is a fault or not. This can be especially difficult if the motor is connected to what it drives,

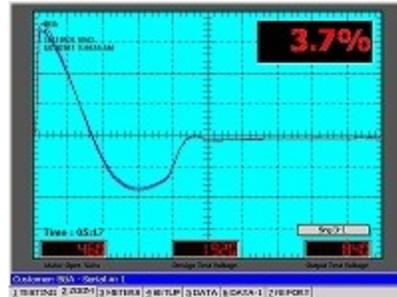
**P2:** For good windings the waves overlap when the rotor and the poles are aligned.

**P3:** The AMT option produces better ringing waves and the test is independent of the rotor position. The rotor is in the same position as in P1.

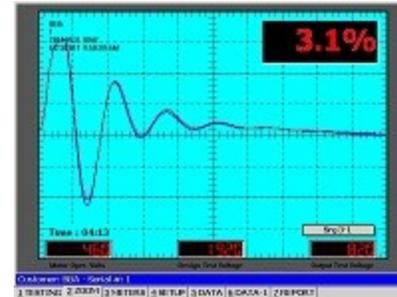
**P4:** A test with the AMT where two adjacent wires in a winding are shorted.



**P1:** Shifted waves. Good or Bad result? Turn the rotor to find out - if it can be turned.



**P2:** Rotor now aligned with the stator poles. Windings are good. Notice % Wave Difference.



**P3:** Test with AMT, independent of Rotor position.



**P4:** Test with AMT, one turn-to-turn short produces significant shift.

## Accessories

### ROTOR BAR CLAMP

The RTR-03 is a clamp-on current transformer specifically designed to monitor the 50/60Hz signal on one phase of an induction motor. Its purpose is to find an open or broken bar in the rotor. This is done by detecting a fluctuation in the sine wave produced by a rotating motor when compared to another phase. The RTR-03 works with the iTIG B, C and D.



iTIG shown with Rotor Bar Clamp

### ARMATURE TEST FIXTURE (ATF) FOR DC MOTORS

The ATF is a one size fits all fixture used to test large and small DC Armatures. The test spans an adjustable number of bars. Only two span tests are needed to find out if the armature is good or bad. It should be used together with the Foot Switch.

If the Armature can sit on the floor or a bench with the commutator up, no other fixture is required to hold it. This almost eliminates set-up time.



### FOOT SWITCH

The FS-01 is a Foot Switch used to energize the iTIG hands free in Surge Mode instead of using the Function Switch on the front panel of the iTIG.



Foot Switch and Armature Test Fixture

# Functions & Specifications, iTIG Series Winding Analyzers

## iTIG FUNCTIONALITY:

- Surge test
  - ◆ Two Surge Generators
  - ◆ Line frequency (50/60Hz) Surge Pulse Rate
  - ◆ AMT option eliminates need to turn rotor for assembled motors
  - ◆ Computer controlled and automated scope functions
  - ◆ Displays % Wave Difference between Surge waves
  - ◆ Meets IEEE 522-1992 and IEC 34-15 Standards for surge rise time
- Rotor Bar Test - Open or cracked AC rotors
- DC Megohm Test - High and Low range
- DC HiPot Test
- DC Step Voltage Test
- Polarization Index (PI) Test
- Dielectric Absorption Test
- Form Coil Test
- Some models produce test and trending reports as well as screen pictures
- Multiple screens for various tests, settings and data entry

iTIGs come in sizes with max outputs from 3kV to 12kV. Functionality varies by Model. Contact us for more information.

### Electrom Instruments

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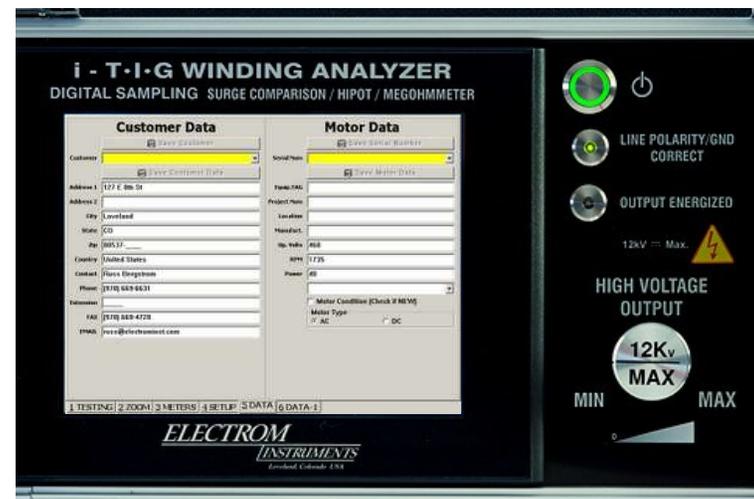
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**ELECTROM**  
**INSTRUMENTS**

## SPECIFICATIONS:

|                           | iTIG A-D                              | iTIG/PP30           |
|---------------------------|---------------------------------------|---------------------|
| <b>Surge Test</b>         |                                       |                     |
| Output Voltage            | 0 - 12 kV                             | 0 - 30 kV           |
| Maximum Current           | 800 A                                 | 2000 A              |
| Maximum Energy            | 2.8 J                                 | 18 J                |
| Pulse rate                | 50/60 Hz                              | 5 Hz                |
| Discharge Capacitance     | 0.02 $\mu$ F                          | 0.02 $\mu$ F        |
| <b>DC Hi-Pot / Megohm</b> |                                       |                     |
| Output Voltage            | 0 - 12 kV                             | 0 - 30 kV           |
| Maximum Current           | 5 mA                                  | 5 mA                |
| Micro-Amp Display         | 0.1 - 2,000 $\mu$ A                   | 0.1 - 2,000 $\mu$ A |
| Max Over-Current Trip     | 5 mA                                  | 5 mA                |
| Max Resistance            | 100,000 M $\Omega$                    | 100,000 M $\Omega$  |
| <b>Input Voltage</b>      | 120 or 230 V AC $\pm$ 10%, 50 or 60Hz |                     |
| <b>Max Power</b>          | 600 W                                 | 1000W               |
| <b>Weight</b>             | 52 lbs - 24kg                         | 70 lbs - 32kg       |
| <b>Dimensions</b>         | ~20" x 8" x 20 or 51x22x50 cm         |                     |



Shown with one of the data entry screens