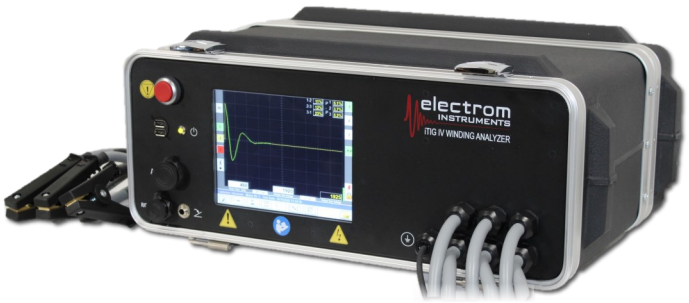
Advanced Test Equipment Corp.

Rentals • Sales • Calibration • Service

iTIG IV
STATIC MOTOR TESTER AND WINDING ANALYZER

4kV



6-15kV

FIND MORE FAULTS WITH ONE INSTRUMENT

electrom INSTRUMENTS

Excellence in motor and coil testers

iTIG IV

The iTIG IV motor tester and winding analyzer is built on the success of the iTIG series, now smaller, faster, and lighter. With a smaller form-factor, faster test sequences, and a lightweight construction, the iTIG IV is designed and tested to be Electrom's most rugged and portable tester to date. Featuring over 20 low-voltage to high-voltage tests, it is ideal for motor service and repair, industrial maintenance and reliability industries, and coil and motor manufacturers. The iTIG IV can be paired with any generation of the Electrom Power Pack for increased testing voltage up to 40kV.

- **High Frequency Surge Test That Finds More Faults**
- **Partial Discharge Test With No Accessories Required**
- **Highly Accurate Leakage Current Measurement**
- **Time Saving Reporting Tools & Powerful Trend Analysis**
- **Lightweight and Rugged Case**
- **Easy-to-use Touch Screen Interface**
- **Fully Automatic Test Sequences**
- **Wireless Connectivity For Data Transfer and Asset Management**

Simulated image

Surge Comparison including
- Phase-to-Phase
- Pulse-to-Pulse
- Coil-to-Coil

Partial Discharge (PD) including
- RPDIV (inception voltage)
- RPDEV (extinction voltage)

DC Hipot including
- Programmable Step Voltage
- Ramp

Insulation Resistance:
- Megohm
- Polarization Index (PI)
- Dielectric Absorption (DAR)

Winding Resistance, 4-wire (μΩ)

Capacitance (C)

Inductance (L)

Impedance (Z)

Phase Angle

Rotor Influence Check (RIC)

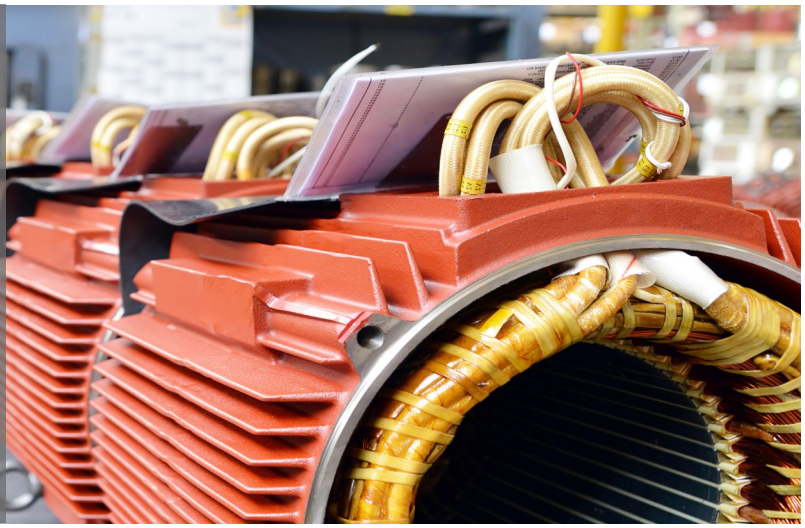
WHO TRUSTS ELECTROM?

Motor Shops

The iTIG IV delivers best-in-class accuracy in measurements and diagnostics to motor service and repair shops. Be confident with your decision to maintain, repair, or recondition a motor. Choose multiple tests to run automatically in sequence or select single tests for advanced diagnosis. Preset test parameters and pass/fail criteria. Conduct multi-coil testing quickly and efficiently. Wireless networking capability lets users generate complete electronic reports on the tester and transfer them to a server for trend analysis and asset management. Put your customers first with the most trusted static motor tester and winding analyzer.

Motor and Coil Manufacturers

On the production floor or in the R&D lab, motor and coil manufactures rely on the iTIG IV for quality assurance and new technology development. Automate your production line testing with bar code scanning, external controls, and automatic uploading of test data. Develop and manufacture state-of-the-art motors, generators, alternators, or coils—large or small—and rest assured you are shipping the most reliable product for your customer's money. Select from Electrom's Production Line Test Automation (PLTA) software options to maximize productivity based on your unique needs.



Industrial Services & End Users

In the field or on site, the iTIG IV is the most portable and rugged high voltage tester for industrial maintenance and reliability professionals. With automated test sequences, the iTIG IV has you covered for your field testing needs on site or service calls. For high-voltage motors, add the Power Pack III, the only truly portable external power pack on the market with output up to 40kV. Avoid costly downtime and unplanned outages with industry leading sensitivity that finds more faults. Take advantage of powerful trend capturing capabilities for data-driven predictive maintenance programs.

Low, Medium, and High Voltage Tests That Find More Faults

The iTIG IV uses low voltage measurements such as capacitance, inductance, impedance, and phase angle to find “hard” failures and critical changes in the windings.

Medium voltage measurements such as Megohm, Dielectric Absorption (DAR), and Polarization Index (PI) are used to test the ground-wall insulation resistance. The megohm (IR) test is known as the dirt test and mainly indicates how contaminated the windings are. The DAR and especially the PI test provides additional information about the insulation condition when the insulation is weak.

High voltage tests are required to find an insulation weakness above operating voltages. High Voltage testing stresses the insulation but is not destructive due to the low energy available for an arc. DC Hipot, Step Voltage and Ramp tests will find the voltage at which the ground insulation starts to break down.

The high voltage surge test is the only test that finds turn-to-turn weaknesses. It can also find shorts and weaknesses phase-to-phase, coil-to-coil and in many cases finds wrong connections. Catastrophic insulation faults, such as ground-wall failures, often start as a turn-to turn weakness that progresses to a blowout.

Partial Discharge (PD) tests can find insulation weaknesses earlier than any other test for both high and low voltage motors. It is used for QA, maintenance and diagnostic purposes. PD is an important test for motors used in VFD power applications since VFDs can generate PD leading to failures if the power system is misapplied.

Low Voltage

- Winding Resistance
- Capacitance (C)
- Inductance (L)
- Impedance (Z)
- Phase Angle
- Rotor Influence Check (RIC)

Medium Voltage

- Insulation Resistance (IR)
- Megohm
- DAR
- PI

High Voltage

- DC Hipot
- Step Voltage/Ramp
- Surge Comparison
- Partial Discharge

Know Your Motor—Why Surge Testing Is Important For Motor and Maintenance Professionals

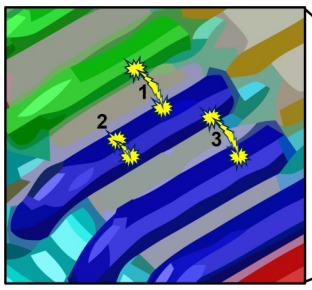
The surge test, or surge comparison test, is essential for motor maintenance and reliability professionals. Most maintenance programs are already using digital multimeters and megohmmeters. They conduct low and medium voltage tests such as the megohm test (sometimes called a megger test), winding resistance and others. But, the surge test can find faults these other tests cannot.

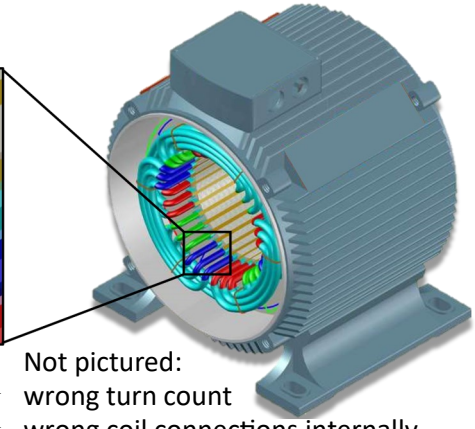
The surge test is the only test that can find turn-to-turn insulation weakness. These weaknesses cannot be found with insulation resistance/megohm, low-voltage measurements or high-voltage high-potential (hipot) tests. The surge test stresses the motor-winding’s turn-to-turn insulation at a voltage above operating voltage so that both weaknesses and hard shorts can be found.

Surge test results are valuable data for predictive maintenance professionals. Pass/fail determinations are easy to make in most cases so data-driven decisions can be clearly defined for the type of motors or generators in use. If weaknesses are found above operating voltage, most likely the motor can continue to run while remedial actions are scheduled.

What Motor Problems Can a Surge Test Find?

- phase-to-phase weaknesses and shorts (1)
- turn-to-turn weaknesses and shorts (2)
- coil-to-coil weaknesses and shorts (3)



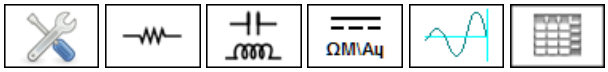


Not pictured:

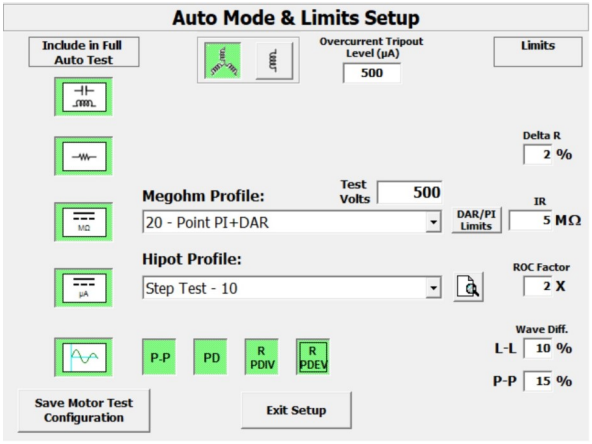
- wrong turn count
- wrong coil connections internally
- weaknesses to ground

ADVANCED TEST TECHNOLOGIES

Find more faults and insulation weaknesses with the iTIG IV's highly sensitive and accurate range of tests. It's easy to use. Simply enter information using default settings, copy settings from other motors, or import motor nameplate information and automatically conduct a full range of tests. No PD accessories or manual lead switching are required on the Model D. No need to manually adjust voltage range and sweep. No need to set PD noise/signal threshold limits. Use the Auto Mode & Limits Setup screen (right) to run select tests automatically, saving operators time and errors.



Auto Mode Setup Screen



High Frequency Surge Test Finds More Faults

The iTIG IV generates fully automatic software controlled surge voltage pulses at a repetition rate up to 50Hz in compliance with IEEE 522. This high frequency surge test eliminates ionization dissipation typically seen with low frequency testers. As a result, the iTIG IV finds more cases of weak insulation than low frequency surge testers.

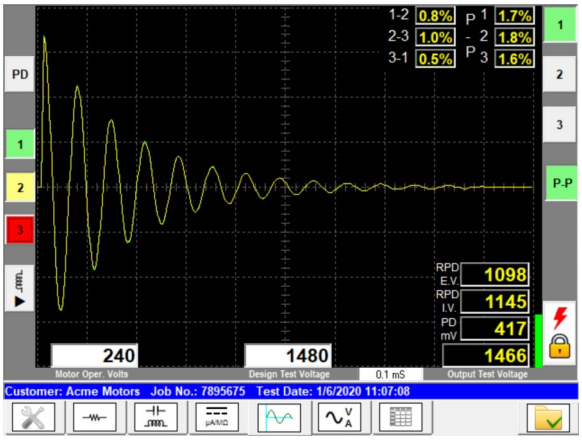
Conduct pulse-to-pulse surge tests which can eliminate the need to turn rotors by hand during testing of an assembled motor. The surge test can also be used on motors with normal differences in phases such as those with concentric windings, and on single phase motors and coils when there are no other phases to compare to.

Partial Discharge Testing Has Never Been Easier

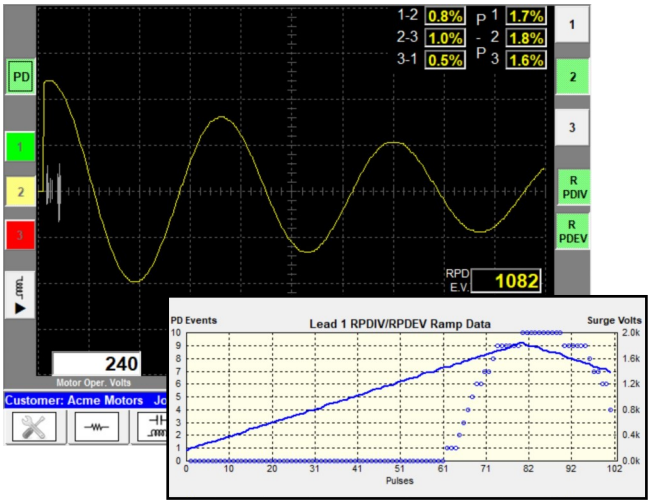
The iTIG IV is free of internal PD so no adjustments to the signal/noise threshold limit is necessary as the test voltage increases. Electrom offers two levels of PD hardware and output leads for tests to 6kV and 15kV. Without the need to add accessories, partial discharge testing is easy. The partial discharge measurements are highly sensitive and can detect insulation breakdown in an electric motor before surge tests, hipot test and online monitoring.

The partial discharge screen displays repetitive PD inception voltage (RPDIV), extinction voltage (RPDEV), and maximum partial discharge levels in mV in compliance with IEC 61934. View RPDIV/RPDEV Ramp Data showing the pulse voltage & number of PD events that occurred.

Surge Test Screen



Partial Discharge Screen



ADVANCED TEST TECHNOLOGIES

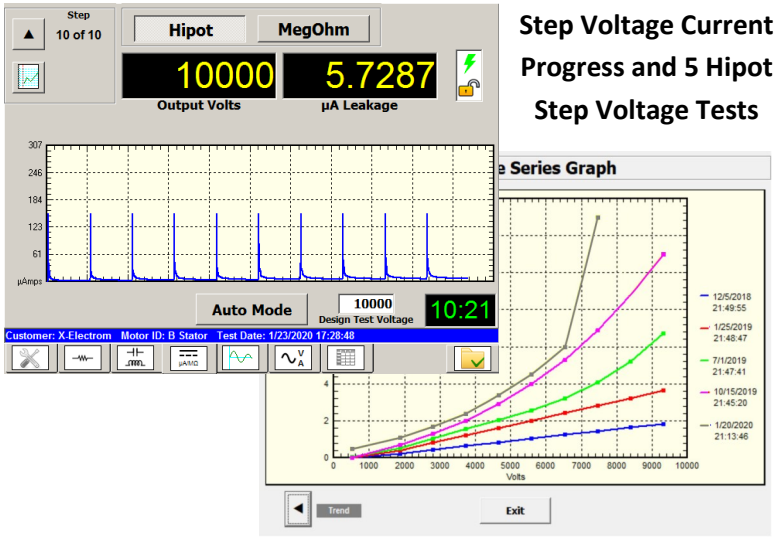
Leave The Single Purpose Megohm Tester At Home

The iTIG IV measures leakage current with 10 pA resolution and a highly accurate measurement down to 500 pA. The resulting IR range at 15kV is up to 30 TΩ. This means PI tests can be done accurately on motors with very low leakage current. PI results from multiple tests can be graphed, similar to the picture below.

Together the DC Hipot and MegOhm (IR) tests provide information on several ground-wall weaknesses and faults. For medium and high voltage equipment the Hipot Step Voltage or Ramp test should always be used.

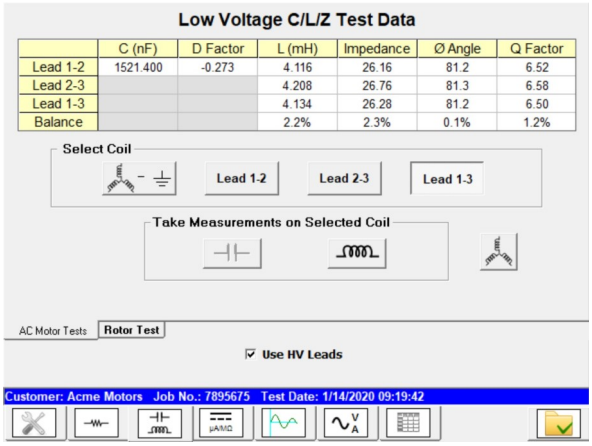
CLZ Measurements

The iTIG IV measures capacitance (C), inductance (L), and impedance (Z) which are used to check for imbalances, track results over time, and in conjunction with other tests diagnose problems. CLZ measurements can be part of automatic sequences of tests through the high voltage leads. Squirrel cage rotors in assembled motors can be tested with the CLZ option for broken rotor bars using the RIC test.



Step Voltage Current Progress and 5 Hipot Step Voltage Tests

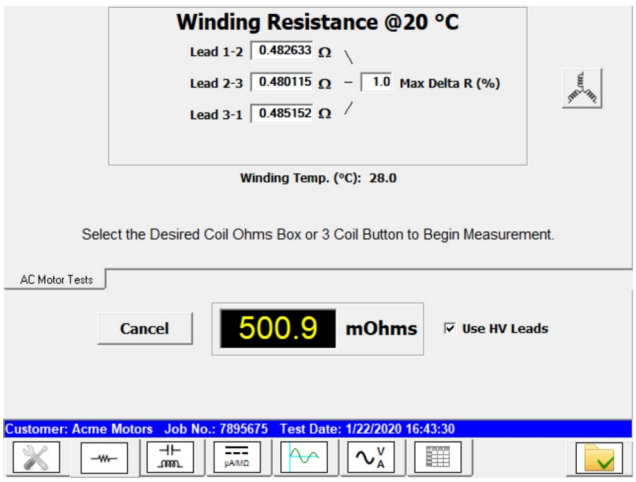
CLZ Measurements Screen



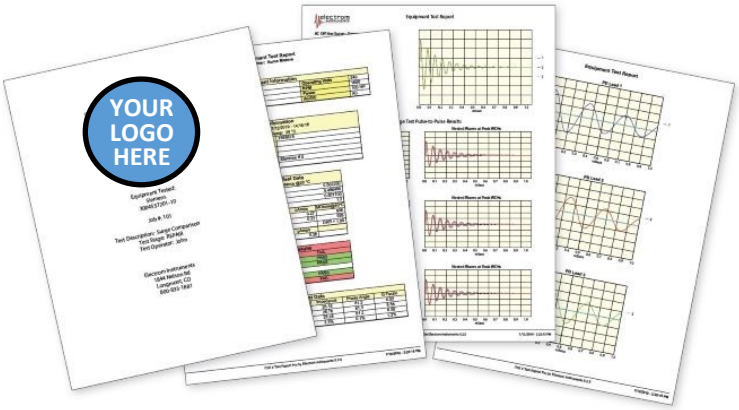
Accurate Winding Resistance with 1 µΩ Resolution

This test is used to find several faults such as open windings, shorts to ground, resistive connections, connection errors, resistance imbalance between phases, and more. The iTIG IV features 4-wire Kelvin clamp systems for highly accurate measurements. They can be done directly through the high voltage leads. Test results are temperature corrected and reported in milli or micro-ohms. The micro-ohm measurement can be used to measure resistance bar-to-bar on armatures and to find broken equalizers. See Accessories.

Winding Resistance Test Screen

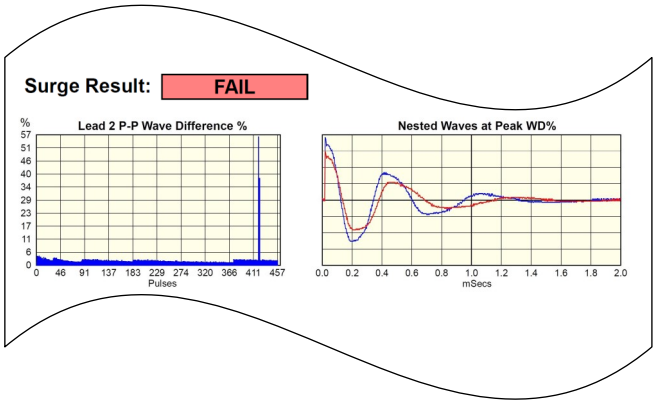


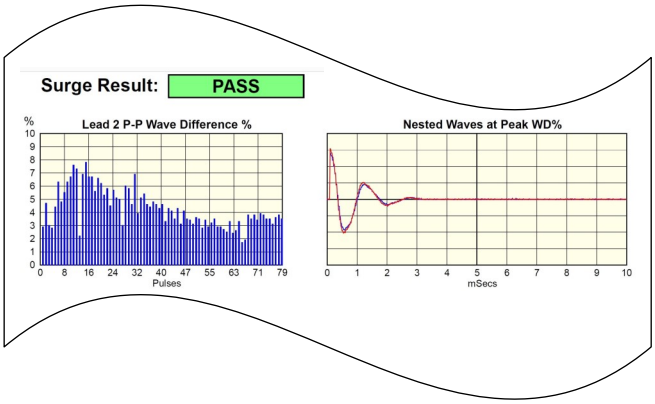
TEST REPORTING



TRPro Report & Analysis Software

Save time with the iTIG IV-Models B, C, and D by generating complete reports with the click of a button. Millions of tests can be saved and charts, tables, and trend capturing multi-test Hipot and PI graphs generated. TRPro report and analysis software for PCs imports test data and like the iTIG IV can also generate advanced reports.





Motor Data Import for Asset Management

Information about individual motors or coils to be tested is entered using the touch screen or a USB keyboard. In some applications such as industrial manufacturing or processing plants, data on large groups of individual motors are known. In this case, Motor and/or customer information can be loaded on the tester from an Excel or CSV motor database file at the time of purchase or later. This eliminates entry mistakes and duplication of entries. It allows the test operator to search for a serial number or asset tag and start testing without entering motor information.

USB Flash Drive

Ethernet

Wi-Fi

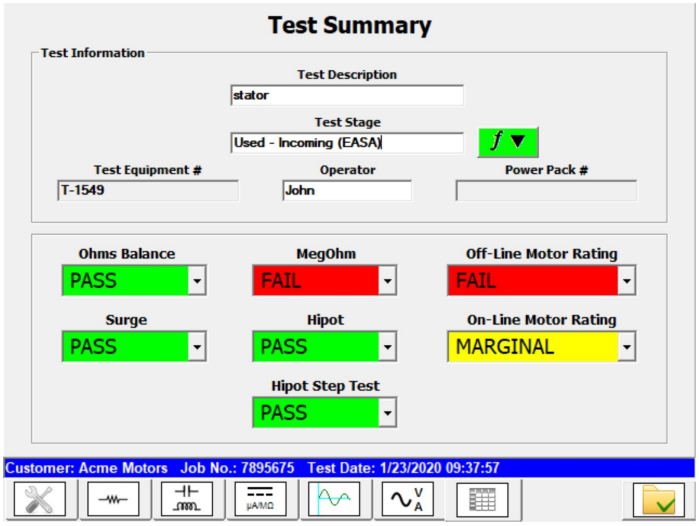
Data Transfer

Motor data, test data, and reports can be transferred from the iTIG IV with one click using a USB Flash Drive, Ethernet, or Wi-Fi. Transfer reports to a local or cloud based server. Reports can be automatically transferred by job number to database systems like MotorBase® and ACS/Traverse®.

TREND ANALYSIS

Test Summaries File

Make trend analysis easy with the Test Summaries file. This file is generated by the iTIG IV-Model D. At the conclusion of each test set, the file is appended with date/time-stamped data containing test results and other info. The Test Summary file is a comma separated values (.csv) file and can be viewed, sorted and filtered in Excel or other spreadsheet formats. Users can graph multiple tests of the same motor over time to spot tends clearly.

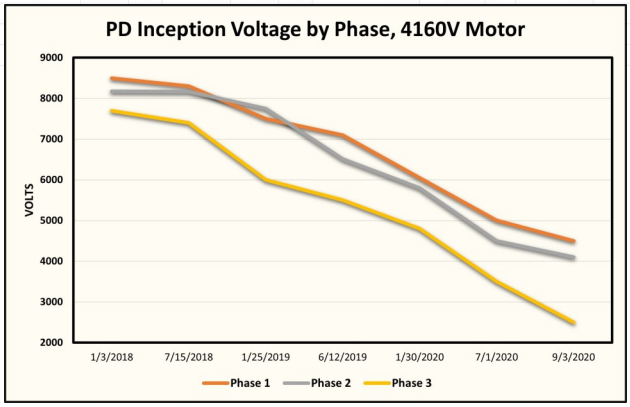


The Test Summary screen (left) is viewable on the iTIG IV and in TRPro. It displays pass/fail test results. Click tabs along the bottom row to view each test. Repeat any individual test before the test set is finalized.

The TRPro report software has powerful filtering tools that help to identify weak motors, motors that are in the wrong application, brands that do not perform well in certain applications, etc. For example, compare test results for motors with the same or similar specifications, such as: Brand X, 4160V, 1000HP, 1775RPM, Frame#XYZ123.

Using TRPro report software, filters can be set on any information in the user's motor database and automatically applied to the Test Summary File to determine which motors to include in a group. Furthermore, information in the user's motor database that is not in the Test Summary File can be selected and automatically added to the filtered Test Summary by TRPro.

	A	C	D	E	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	MOTOR ID	DATE	TIME	DESCR.	TEMP.	MEGOHM P/F	HIPOT P/F	SURGE P/F	OHMS P/F	R 1-2	R 2-3	R 3-1	MAX DELTA R%	WD% 1-2	PP1	SURGE VOLTS 1	WD% 2-3	PP2	SURGE VOLTS 2	WD% 3-1	PP3	SURGE VOLTS 3	MEGOHI
2	M23154	7/12/2019	2:07:12 PM	Maintenar	20	PASS	PASS	PASS	PASS	0.5003	0.5006	0.4957	1.3	50%	Y	1527	50%	Y	1511	51%	Y	1495	~1000
3	M54578	7/12/2019	2:26:18 PM	Diagnosis	23	PASS	PASS	FAIL	PASS	0.5005	0.5039	0.5011	0.7	51%	Y	1527	50%	Y	1511	51%	Y	1527	8
4	M31459	7/12/2019	3:16:18 PM	Diagnosis	25	PASS	PASS	FAIL	PASS	0.5022	0.4964	0.5017	1.2	50%	Y	1479	52%	Y	1479	51%	Y	1431	9
5	M31459	8/20/2019	11:55:48 AM	Maintenar	21	PASS	PASS	PASS	PASS	0.4983	0.4957	0.5009	1	0.40%	N	1486	0.40%	N	1482	0.80%	N	1489	5
6	M23179	8/20/2019	11:55:48 AM	Maintenar	20	PASS	PASS	PASS	PASS	0.4962	0.5025	0.5013											5
7	M24659	8/20/2019	12:09:25 PM	Maintenar	19	PASS	PASS	PASS		0.5009	0.4963	0.5011											5
8	M54570	8/21/2019	11:07:08 AM	Maintenar	18	PASS	PASS	PASS		0.4983	0.4957	0.5009											566
9	M23107	8/21/2019	11:07:08 AM	Maintenar	22	PASS	PASS	PASS		0.4981	0.4989	0.5024											561



The Test Summary File contains over fifty columns of data and can be customized to include information from the user's motor database.

KEY FEATURES & SPECIFICATIONS

The iTIG IV is modular and configurable to meet your testing needs. Please inquire with Electrom Sales for tester upgrade, data output, report printing, shipping box, Power Pack, and accessories options. **See the iTIG IV Data Sheet for more specifications and ordering information.**

iTIG IV: Key Features	Model A	B	C	D
Surge Test	●	●	●	●
DC Hipot Test	●	●	●	●
Insulation Resistance	●	●	●	●
Reporting		●	●	●
Winding Resistance (mΩ)		●	●	●
Micro-ohm Winding Resistance			○	●
Impedance/Inductance		○	○	○
Advanced Multi-Coil (MC) Tests		○	○	●
Partial Discharge (PD)		○	○	○
Automatic IR & Hipot Tests			●	●
Fully Automatic Testing				●
Production Line Test Automation				○

● = Included ○ = Option

iTIG IV: Product and Shipping Weight	Product Weight	Shipping Weight
4kV	16-18 lbs. 7.3-8.2 kg	26-28 lbs. 11.8-12.7 kg
6-15kV	42-46 lbs. 19-21 kg	52-56 lbs. 23-25 kg

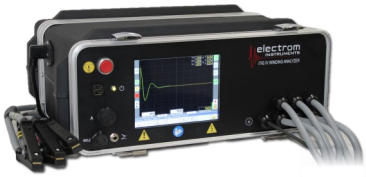
iTIG IV: Dimensions	Length (L)	Width (W)	Height (H)
4kV; Lid Off	8.87 in. 22.5 cm	15.70 in. 39.9 cm	8.66 in. 22.0 cm
4kV; Lid On	13.14 in. 33.4 cm	15.70 in. 39.9 cm	8.66 in. 22.0 cm
6-15kV; Lid Off	14.46 in. 36.7 cm	21.21 in. 53.9 cm	9.12 in. 23.2 cm
6-15kV; S Lid	18.40 in. 46.7 cm	21.21 in. 53.9 cm	9.12 in. 23.2 cm
6-15kV; M Lid	20.09 in. 51.0 cm	21.21 in. 53.9 cm	9.12 in. 23.2 cm
6-15kV; XL Lid	22.56 in. 57.3 cm	21.21 in. 53.9 cm	9.12 in. 23.2 cm

iTIG IV: Shipping Box Dimensions	Length (L)	Width (W)	Height (H)
4kV	20 in. 51 cm	18 in. 46 cm	13 in. 34 cm
6-15kV; S Lid	27 in. 68.6 cm	14 in. 36 cm	26 in. 67 cm
6-15kV; M Lid	27 in. 68.6 cm	14 in. 36 cm	26 in. 67 cm
6-15kV; XL Lid	28 in. 71.1 cm	14 in. 36 cm	26 in. 67 cm

L to R:
4kV,
6-15kV S Lid,
6-15kV M Lid,
6-15kV XL Lid

4kV; Lid Off

4kV; Lid On



6-15kV; Lid Off

6-15kV; M Lid On

KEY FEATURES & SPECIFICATIONS

iTIG IV: Test Specifications					
Surge Test	4kV	6kV	12kV	12kV-H	15kV-H
Max Output Voltage	4.25 kV	6 kV	12 kV	12 kV	15 kV
Pulse Repetition Rate	50 Hz	50 Hz	50 Hz	25 Hz	17 Hz
Surge Voltage Accuracy	10%	10%	10%	10%	10%
Discharge Capacitance	100 nF	40 nF	40 nF	100 nF	100 nF
Max Surge Energy	0.90 J	0.72 J	2.9 J	7.2 J	11.3 J
DC IR and Hipot					
Max Resistance	8 TΩ	12 TΩ	24 TΩ	24 TΩ	30 TΩ
Min Resistance	0.25 MΩ	0.25 MΩ	0.25 MΩ	0.25 MΩ	0.25 MΩ
Max Output Voltage	4.25 kV	6 kV	12 kV	12 kV	15 kV
Voltage Accuracy	2%	2%	2%	2%	2%
Current Resolution	10 pA	10 pA	10 pA	10 pA	10 pA
Current Accuracy	2%	2%	2%	2%	2%
Current Trip-out	10-2,000 µA	10-2,000 µA	10-2,000 µA	10-2,000 µA	10-2,000 µA
Winding Resistance					
Resolution (Model C & D)	1µΩ	1µΩ	1µΩ	1µΩ	1µΩ
Accuracy 100µΩ - 2kΩ	0.5%-0.1%	0.5%-0.1%	0.5%-0.1%	0.5%-0.1%	0.5%-0.1%
Resolution (Model B)	1mΩ	1mΩ	1mΩ	1mΩ	1mΩ
Accuracy 1mΩ - 2kΩ	0.1%±0.5mΩ	0.1%±0.5mΩ	0.1%±0.5mΩ	0.1%±0.5mΩ	0.1%±0.5mΩ
Impedance					
Accuracy from 0.001 Ω to 2 MΩ	<1%	<1%	<1%	<1%	<1%
Inductance					
Accuracy from 0.01 mH to 20 H	<1%	<1%	<1%	<1%	<1%
Capacitance					
Accuracy from 0.1 nF to 10 mF	<1%	<1%	<1%	<1%	<1%

Instrument Ratings	Value
Operating Temperature Range	41-104° F (5-40° C)
Storage Temperature Range	32-140° F (0-60° C)
Maximum Storage Humidity	95% non-condensing
Input Power	100–240 VAC, 50–60 Hz
Fuse Size (250V)	5A

System Specifications	Value
Internal Storage (ROM)	256 GB SSD Drive
Display	8-inch Color Resistive Touch Screen
Platform	Windows
Languages Supported	English, Spanish, Italian, Portuguese
Wi-Fi	IEEE 802.11 n/b/g
USB	2.0

See the iTIG IV Data Sheet for more specifications and ordering information.

DC MOTOR TESTING ACCESSORIES

Use the iTIG IV to test DC motor armatures, stator coils, and other coils with very low inductance or impedance. The instrument screen features a dedicated user interface for DC motor testing and is easy to use for quick and accurate testing.

ABT: Armature Bar-to-Bar Surge Test Accessory

Use the ABT to surge test armatures (DC rotors) bar-to-bar, or to surge test single coils with very low inductance. The bar-to-bar Probe (BBP) comes with 4-wire test voltage measurement which is not load dependent. The ABT includes a foot switch (FS-12) and your choice of probe set. Use the Armature Surge Probe (ASP) set as an alternative to the BBP. The Surge Clamp Set (SCS) is for low inductance coils.

Probe set connection port is located in the back of the ABT.

Foot switch (FS-12) is included with the ABT.

Choose from 3 surge test probe options to connect to the ABT:

BBP: Bar-to-Bar Probe

The Bar-to-Bar Probe (BBP) comes with a 4-wire test voltage measurement which is not load dependent.

ASP: Armature Surge Probes

The ASP is an alternate to the BBP bar-to-bar probe. It can be used for both bar-to-bar tests and span tests. The voltage measurement is 2-wire and load dependent.

SCS: Surge Clamp Set

Use the Surge Clamp Set (SCS) for low inductance coils. It connects directly to the ABT.

TESTING ACCESSORIES

Use the iTIG IV to conduct span surge tests of DC motor armatures. Choose from the 3 probe sets below to connect directly to the iTIG IV.

ATF-11: Armature Test Fixture

The ATF-11 is used to conduct span surge tests of DC motor armatures. The test voltage measurement is 2-wire and load dependent. With an adjustable design from 0.5 in (1.3 cm) to 7.1 in (18 cm), the ATF-11 covers a wide range of bars. Use with the iTIG IV Model D and the multi-coil (MC) test feature and advanced reports for fast and easy testing and reporting. The MC feature is an option for Models B & C.

ASP-22: Armature Surge Probes

The ASP-22 option connects directly to the iTIG IV high voltage leads as an alternate to the ATF-11 for span surge tests. The test voltage measurement is 2-wire and load dependent. Connect iTIG leads directly to the connection box.

ARP: Armature Resistance Probes

The ARP-02 is a 4-wire resistance probe set that measures the bar-to-bar resistance on armatures. Compatible with iTIG IV models C and D with micro-Ohm measurement and multi-coil (MC) test feature.

Add other accessories for safe and easy operation:

Bar Code Scanner

Scan barcodes for easy data input. Compatible with iTIG IV Model B,C,D. Use with Model D PLTA-3 function.

FS-12: Foot Switch

Use the FS-12 for hands-free operation. Compatible with all models of the iTIG IV.

Warning Lights

Safety first: Indicate when testing is underway for a safer workplace environment.

ELECTROM POWER PACK

Use the Electrom Power Pack with the iTIG IV instrument to boost outputs to 18kV, 24kV, 30kV and 40kV. The Power Pack is compatible with the iTG IV and most iTIG II & III-Series configurations and generations. The lightest and most portable power pack on the market is easy to use with automatic settings provided by the iTIG IV via a low voltage communication cable. The Electrom Power Pack is built for the shop and the field with rugged, stackable cases for maximum space savings.

Electrom Power Pack 18kV-30kV

Electrom Power Pack 40kV

Automated Tests

All models of the Electrom Power Pack have an automatic surge test. For other tests, the Power Pack III has the same level of automation as the iTIG IV model it is connected to. For example, hipot tests can be automatic with model C and D but not model A and B. See product configurations on page 14.

Independent Calibration

The Electrom Power Pack is calibrated independently of the iTIG IV. This means that it can be added to an iTIG IV at any time without the instruments coming back to the factory for calibration. It also means it can be used with multiple iTIG IVs at the shop or in the field. This is a big cost saving for companies with multiple iTIG IV motor testers.

Rugged Carry Case

The Power Pack is the most portable high voltage power pack available. For high voltage testing in the field, no other power pack is as small, lightweight and easy to carry by hand. The carry case is rugged and stackable for maximum space savings.

Carry Cases:
40kV (left)
18kV-30kV (right)

Optional Shipping Case

Ship instruments and power packs in an optional custom Pelican® case. Custom foam inserts protect the contents. A branded decal let's you know what's inside. Roller wheels and an extendable handle make transport easy and convenient.

Pelican© Shipping Case pictured with the 40kV Power Pack are branded with an Electrom decal.

Electrom provides world-class customer service

from our headquarters in Longmont, Colorado.

Get in touch for legacy product support, product

rentals, consulting, and one-on-one training.

We always answer the phone.

1844 Nelson Rd, Unit B

Longmont, CO 80501

USA

+1 720-491-3580

info@electrominst.com

www.electrominst.com