For the Shop | For the Field | Industrial Maintenance | Manufacturing

iTIG IV+

MOTOR TESTER AND WINDING ANALYZER BROCHURE

Excellence in motor and coil testers

electrom INSTRUMENTS

Find more faults with one instrument.

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Contents

TESTS THAT FIND MORE FAULTS

Low, Medium, and High Voltage Tests

Low voltage measurements such as capacitance, inductance, impedance, and phase angle are used by the iTIG IV+ 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.

High voltage tests are required to find insulation weaknesses in the ground wall, not only hard shorts. Step Voltage and Ramp tests find the voltage at which the insulation starts to break down.

Surge Tests are the only tests that find turn-to-turn weaknesses. They can also find shorts and weaknesses phase-to-phase, coil-to-coil and wrong connections. Ground-wall failures usually start as a turn-to turn weakness that progresses to a blowout.

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 (L-L, P-P)
- Partial Discharge (PD)

Partial Discharge (PD) tests find insulation weaknesses earlier than other tests and are used for QA and diagnostics of high and low voltage motors. The test is particularly valuable for motors powered by a VFD.

iTIG IV+

iTIG IV+ Motor Tester and Winding Analyzer

The iTIG IV+ 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, and coil and motor manufacturing. The iTIG IV+ can be paired with the Electrom Power Pack for increased testing voltage up to 40kV.

- **Surge Comparison**
  - Phase-to-Phase
  - Pulse-to-Pulse
  - Coil-to-Coil
- **Partial Discharge (PD)**
  - RPDIV (inception voltage)
  - RPDEV (extinction voltage)
- **DC Hipot**
  - 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)**

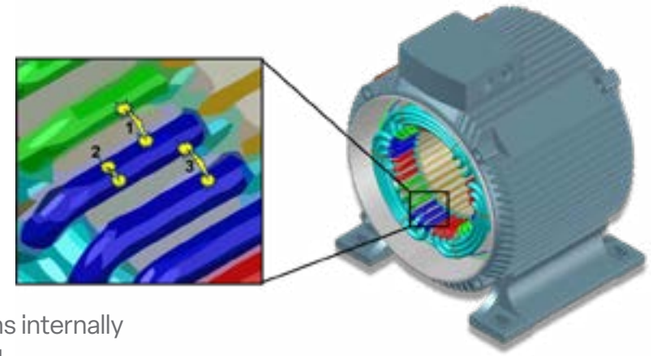
Why Surge Testing is Important

The surge comparison test is essential for motor repair techs and reliability professionals. Most maintenance programs use digital multimeters and megohm meters mainly to conduct low voltage tests such as winding resistance and relatively low voltage megohm tests. But the surge test is the only test that can find turn-to-turn insulation weaknesses. These weaknesses cannot be found with any other measurement or test.

The surge test is the only test that stresses the turn-to-turn insulation in the winding. If the test voltage is above the operating voltage, weaknesses that may not have shown up yet can be found. Pass/fail determinations are usually easy to make, so data-driven decisions can be made for any type of motor, generators, or other rotating equipment. When weaknesses are found above peak operating voltage, the motor can often 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

iTIG IV+ Technologies

- **Surge Test with high pulse repetition rate finds more faults.**
- **Partial Discharge (PD) Test with no accessories required.**
- **Automatic Test sequences including low-voltage and high-voltage tests.**
- **Highly accurate Leakage Current Measurement means PI Tests can be conducted on motors with very low leakage.**

iTIG IV+ Features

- **New miniaturized design; lightweight and compact form-factor.**
- **Time saving reporting tools and powerful trend analysis**
- **Very easy-to-use touch screen user interface.**
- **Wireless connectivity to a server or the cloud for reports and use in asset management.**
- **Portable Power Packs up to 40kV.**

WHO TRUSTS ELECTROM?

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 AND 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 Electrom Power Pack, 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.

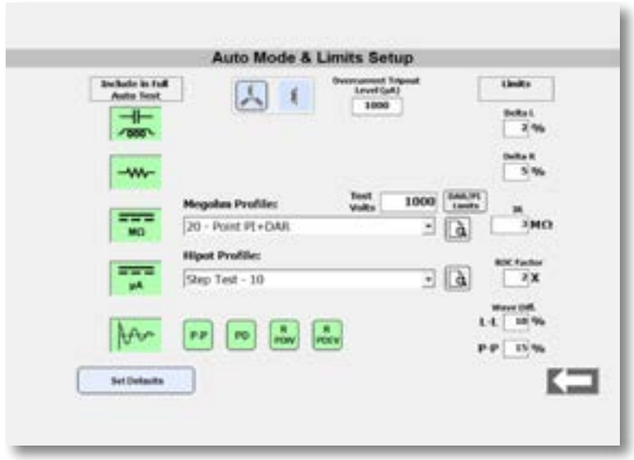
MOTOR SHOPS

Best-in-class accuracy for measurements and diagnostics used by motor service and repair shops. Be confident with your decision to replace, repair, or recondition a motor.

Run multiple tests automatically in sequence or single tests for advanced diagnosis. Preset test parameters and pass/fail criteria. Conduct multi-coil testing quickly and efficiently. Generate complete electronic reports on the tester then wirelessly transfer them to a server for trend analysis and asset management.

ADVANCED TEST TECHNOLOGIES

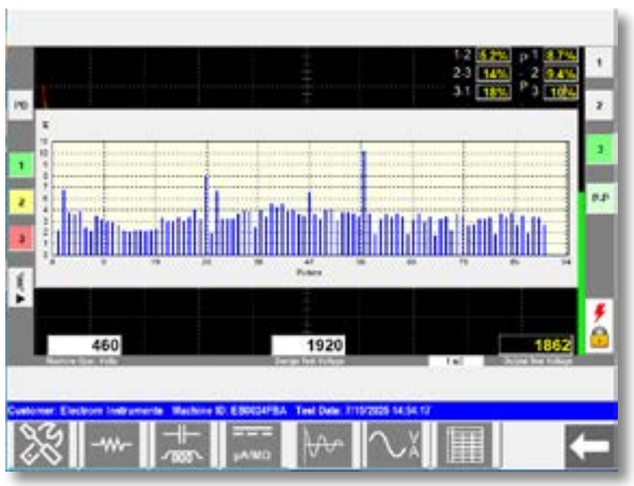
Find more faults and insulation weaknesses with the iTIG IV+'s highly sensitive and accurate range of tests. It's easy to use. Simply enter information by making a selection from your test configuration list or copy settings from another motor and do an automatic sequence of tests. No PD accessories needed, No manual adjustments.



No need to set PD noise/signal threshold limits. Use the Auto Mode & Limits Setup screen to run select tests automatically, saving operators time and preventing errors.

The iTIG IV+ High Frequency Surge Test Finds More Faults

The iTIG IV+ generates surge voltage pulses at a repetition rate up to 50Hz in compliance with IEEE 522. This high frequency surge test eliminates ionization dissipation seen with low frequency testers. High frequency testers find more insulation weaknesses than low frequency testers.

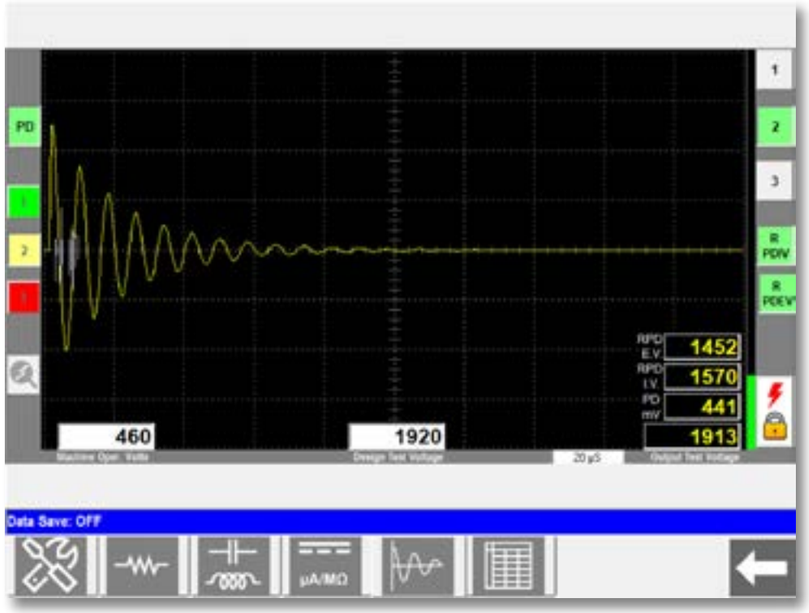


Conduct pulse-to-pulse surge tests which can eliminate the need to turn rotors by hand during testing of an assembled motor. The surge test can also be used on motors with normal differences in phases such as those with concentric windings, and on single phase motors and coils when there are no other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

Partial Discharge Testing Has Never Been Easier

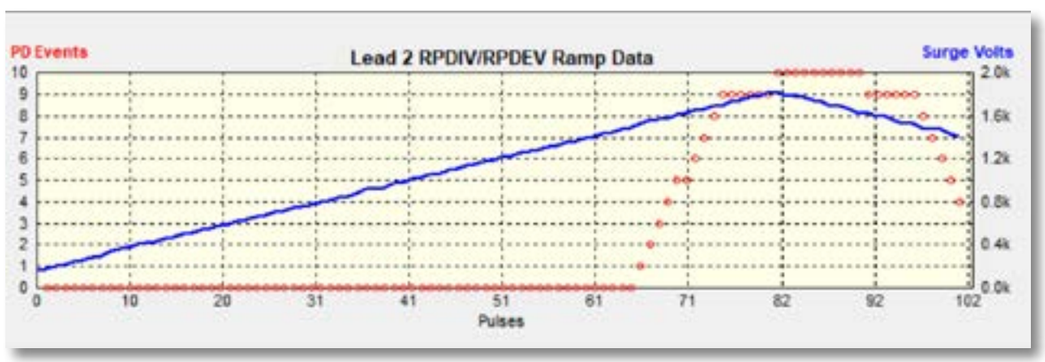
The iTIG IV+ is free of internal PD so no adjustments to the signal/noise threshold limit are usually necessary. Electrom offers two levels of PD hardware and output leads for highly sensitive PD tests with 6kV and 15kV. No PD accessories are required. Insulation weaknesses can be detected before other tests and online monitoring.

For low voltage motors powered by VFDs, diagnosis is easy because they should have no PD at normal test voltages. If PD is found, the VFD is likely fine, and the power system is likely misapplied (missing correct wiring, filters etc.).



The partial discharge screen, above, displays repetitive PD inception voltage (RPDIV), extinction voltage (RPDEV), and maximum partial discharge levels in mV in compliance with IEC 61934.

The graph below shows the surge voltage (blue) and the number of pulses with PD events for the last 10 pulses (red).



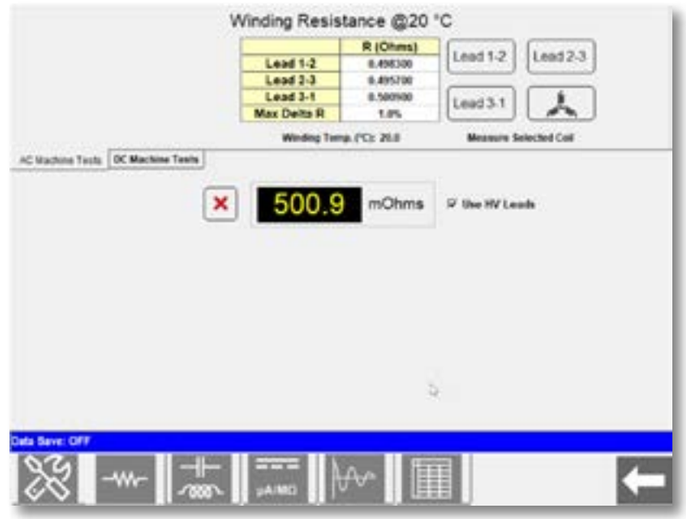
Leave the Single Purpose Megohm Tester at Home

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.

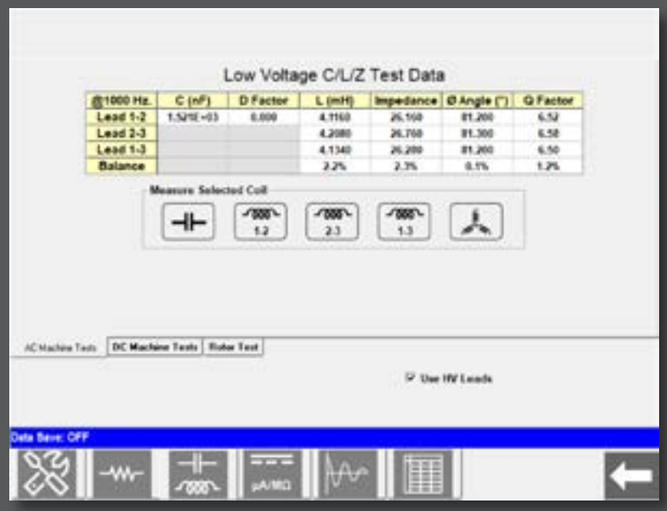
Accurate Winding Resistance with 1 µΩ Resolution

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-ohms 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.



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.



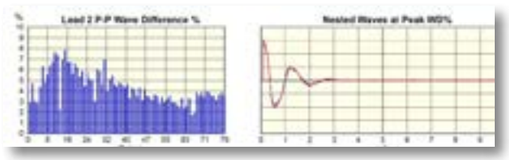
- Capacitance (C)
- Inductance (L)
- Impedance (Z)

TEST REPORTING

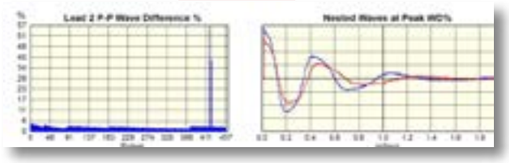
TRPro Report & Analysis Software

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.

PASS



FAIL



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 Motor-Base® and ACS/Traverse®.

USB Flash Drive

Feature

Ethernet

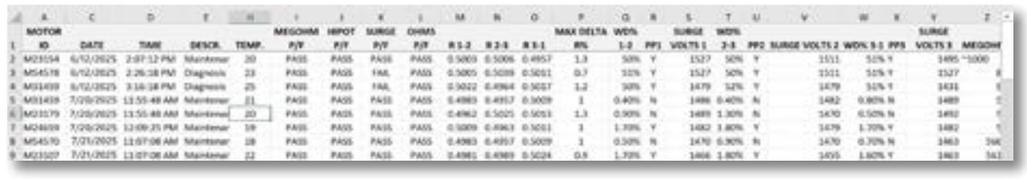
Option

Wi-Fi

Option

TREND ANALYSIS

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

Compare Test Results

Use TRPro and the Test Summaries file to identify problematic motors, motors used in the wrong application, or motor types not performing in certain areas. Or compare test results for motors with the same or similar specifications.

View Summary from Tester or PC

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.

DC MOTOR TESTING ACCESSORIES

ABT: Armature Bar-to-Bar Surge Test Accessory

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.

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

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

BBP: Bar-to-Bar Probe

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

ASP: Armature Surge Probes

The ASP alternative to the BBP 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. The SCS connects directly to the ABT.

ARMATURE TESTING ACCESSORIES

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 multicoil (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.

INSTRUMENT AND POWER PACK ACCESSORIES

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 iTIG IV+ models.

WARNING LIGHT

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

Rugged Carry Case

The Power Pack carry case is rugged and stackable for maximum space savings.

40kV (left) and 18kV-30kV (right) Power Pack Cases shown below.

Optional Shipping Case

Ship instruments and Power Packs in an optional custom Pelican® case. Custom foam inserts protect the contents. Roller wheels and an extendable handle make transport easy and convenient.

ELECTROM POWER PACK

Boost iTIG IV+ instrument outputs to 18kV, 24kV, 30kV, and 40kV using the Electrom Power Pack. 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.

Automated Tests

All models of the Electrom Power Pack have an automatic surge test.

For other tests, the Power Pack 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 model D.

Independent Calibration

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

iTIG IV+ Features

iTIG IV+ TEST FEATURES BY VOLTAGE

SURGE TEST	4kV-H	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	**4kV-H**	**6kV**	**12kV**	**12kV-H**	**15kV-H**
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

iTIG IV+ TEST FEATURES BY VOLTAGE

WINDING RESISTANCE	4kV-H	6kV	12kV	12kV-H	15kV-H
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%±0.5 mΩ	0.1%±0.5 mΩ	0.1%±0.5 mΩ	0.1%±0.5 mΩ	0.1%±0.5 mΩ
Impedance	**4kV-H**	**6kV**	**12kV**	**12kV-H**	**15kV-H**
Accuracy from 5mΩ to 125kΩ	<1%	<1%	<1%	<1%	<1%
Inductance	**4kV-H**	**6kV**	**12kV**	**12kV-H**	**15kV-H**
Accuracy at 1kHz: 1µH to 20H	<1%	<1%	<1%	<1%	<1%
Accuracy at 100/120Hz: 10µH to 20H	<1%	<1%	<1%	<1%	<1%
Capacitance	**4kV-H**	**6kV**	**12kV**	**12kV-H**	**15kV-H**
Accuracy from 1nF to 100µF	<1%	<1%	<1%	<1%	<1%

ITIG IV+ INSTRUMENT RATINGS

RATING	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 Input	5A

iTIG IV+ SYSTEM SPECIFICATIONS

SPECIFICATION	VALUE
Internal Storage (ROM)	256 GB SSD Drive
Display Type	10.4-inch Color Resistive Touch Screen
Operating System Platform	Microsoft Windows 11
User Interface Languages Supported	English, Spanish, French, Italian, Portuguese
Wi-Fi Protocol	IEEE 802.11 n/b/g

iTIG IV+ Specifications

iTIG IV+ DIMENSIONS US

VOLTAGE	LENGTH (L)	WIDTH (W)	HEIGHT (H)
4kV A-D; Lid Off	8.9 in	15.7 in	8.7 in
4kV A-D; Lid On	13.1 in	15.7 in	8.7 in
6-12kV A-D; Lid Off	11.2 in	17.0 in	8.7 in
6-12kV A-D; Lid On	15.4 in	17.0 in	8.7 in
12kV C&D PD; Sm Lid Off	11.2 in	17.0 in	8.7 in
12kV C&D PD; Sm Lid On	18.0 in	17.0 in	8.7 in
12H/15kV PD A&B; Md Lid Off	14.4 in	21.2 in	9.1 in
12H/15kV PD A&B; Md Lid On	20.1 in	21.2 in	9.1 in
12H/15kV PD C&D; Lg Lid Off	14.4 in	21.2 in	9.1 in
12H/15kV PD C&D; Lg Lid On	22.6 in	21.2 in	9.1 in

iTIG IV+ PRODUCT WEIGHT WITH LID

MODEL	US	METRIC
4kV; A-B	19 lbs	9 kg
4kV; C-D	20 lbs	9 kg
6-12kV; A-B	27 lbs	12 kg
6-12kV; C-D	28 lbs	13 kg
12kV; C-D	31 lbs	14 kg
12H/15kV; A-B Md Lid	43 lbs	20 kg
12H/15kV; C-D Lg Lid	45 lbs	20 kg

iTIG IV+ Specs Continued

iTIG IV+ DIMENSIONS METRIC

VOLTAGE	LENGTH (L)	WIDTH (W)	HEIGHT (H)
4kV A-D; Lid Off	22.6 cm	39.9 cm	22.1 cm
4kV A-D; Lid On	33.3 cm	39.9 cm	22.1 cm
6-12kV A-D; Lid Off	28.5 cm	43.1 cm	22.1 cm
6-12kV A-D; Lid On	39.1 cm	43.1 cm	22.1 cm
12kV C&D PD; Sm Lid Off	28.5 cm	43.1 cm	22.1 cm
12kV C&D PD; Sm Lid On	45.7 cm	43.1 cm	22.1 cm
12H/15kV PD A&B; Md Lid Off	36.6 cm	53.3 cm	23.1 cm
12H/15kV PD A&B; Md Lid On	51.1 cm	53.3 cm	23.1 cm
12H/15kV PD C&D; Lg Lid Off	36.6 cm	53.3 cm	23.1 cm
12H/15kV PD C&D; Lg Lid On	57.4 cm	53.3 cm	23.1 cm

iTIG IV+ MODELS WITH PARTIAL DISCHARGE (PD) FEATURE

MODEL	PD FEATURE	LID SIZE
6kV; A-D	Available Option	Small
12kV; B	Standard Feature	Small
12kV; C-D	Standard Feature	Medium
12kV-H; A-D	Standard Feature	Medium
15kV-H; B	Standard Feature	Medium
15kV-H; C-D	Standard Feature	Large

An iTIG IV+ Built for You

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 accessory options.

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