MIT510, MIT520 and MIT1020

5-kV and 10-kV Insulation Resistance Testers

- **Line supply or battery operated**
- **Digital/analog backlit display**
- **Measurement range to 15 TΩ (MIT510 and MIT520) and 35 TΩ (MIT1020)**
- **Automatic insulation resistance tests**
- **Automatic dielectric absorption ratio, polarization index, step voltage, and dielectric discharge tests (MIT520 and MIT1020)**
- **RS232 or USB download of results (MIT520 and MIT1020)**
- **Ingress protection to IP65**
- **3 mA short circuit current**

DESCRIPTION

The new MIT510 and 520 5kV and MIT1020 10kV insulation resistance testers are all designed specifically to assist the user with the testing and maintenance of high voltage equipment. The instruments are designed in a landscape style which is more familiar and user friendly.

The measurement ranges have been increased significantly for all three units. The MIT510 and MIT520 measurement range has been expanded to 15 TΩ, replacing the ambiguous “infinity” reading with an actual number that can be used for predictive/preventive trending on the highest quality insulation.

The MIT510 has the facility to set the test voltage in steps from 250 V to 5000 V and the MIT520 has the ability to set the test voltage from 50 V to the maximum output voltage.

The MIT1020 offers an increased measurement range to 35 TΩ in order to provide trending values for the best of insulating materials used on the higher capitalized equipment. The model features an expanded test voltage range from 50 V to 10 kV, in 10 V increments to 1 kV and 25 V increments above.

All three instruments have a large, easy-to-read backlit LCD making them equally suitable for use in both bright sunlight and poorly lit environments. Information displayed includes resistance, voltage, leakage current, capacitance, battery status and time constant. In addition, the elapsed time is displayed constantly, removing the need for separate timers. The MIT520 and MIT1020 allow up to 3 timed measurement positions to be set, which simplifies DAR testing.

A built-in integral timer starts automatically at the beginning of a test, and displays in minutes and seconds. At the end of any test, capacitive loads are automatically discharged and the decaying voltage displayed. The timer enables the performance of an automatic IR test with the MIT510, while the MIT520 and MIT1020 add the capability of preprogrammed DAR, PI, SV and DD. The MIT520 and MIT1020 include a selectable breakdown or burn mode and an alarm mode, which allows the operator to preset a specific resistance level. The unit will beep until the limit is exceeded. The controls of the instruments are clear and unambiguous, and a “quick start” guide is included in the lid, eliminating the need to carry manuals to site locations.

Redundant safety features make the instruments fully amenable to safe operation in the more demanding high voltage environment. Instrument design is in conformance with EN61010 for arc-flash protection. If the instrument is accidentally connected to a live test item, external voltage will be automatically displayed and testing inhibited above 50 V (80 V on MIT1020). At the conclusion of a test, dangerous static voltage on the test item is automatically discharged and monitored on the display. All three models are fitted with a guard terminal to enhance accuracy. The guard test lead is included as standard with each instrument.

APPLICATIONS

All three models are designed for testing the insulation of high-voltage electric equipment. Their wide voltage range also allows applications for low-voltage equipment. Generators, motors, transformers, cables and switchgear all require effective maintenance. The test techniques on the instruments provide valuable diagnostic information.

All three instruments test the insulation resistance of:

- High-voltage power cables and high-voltage buses
- Large motor/generator windings
- Line and substation transformers

The MIT520 and MIT1020 also perform spot tests, step-voltage tests, dielectric discharge tests and dielectric absorption tests for the following applications:

- Acceptance testing at installation to check conformance to specifications.
- Routine preventive/predictive maintenance testing after installation.
- Quality assurance testing as part of the manufacturing process.
- Diagnostic testing to isolate faulty components for repair.

With its higher voltage testing capability, the MIT1020 is the perfect every day work tool for manufacturers, users and maintainers of rotating machinery. Designed in accordance with the requirements of IEEE43:2000 the MIT1020 is ideal for measuring the insulation resistance of armature and field windings in rotating machines rated 1hp (750 W) or greater. The standard applies to synchronous, induction and dc machines as well as synchronous condensers.

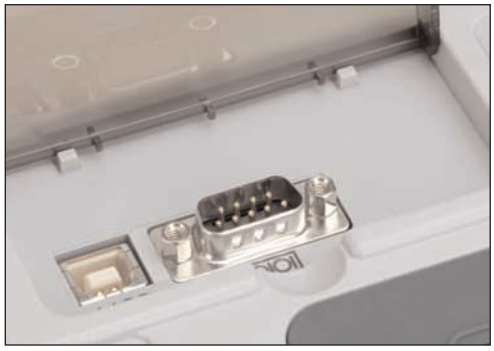
The MIT1020 in use at an industrial complex substation

FEATURES AND BENEFITS

- Improved operating flexility provides the user with the choice of using these instruments via line or battery operation. Line operation also affords enhanced charging capabilities for high-capacitance test samples.
- High measurement range enables installation testing and long-term trending of higher value apparatus.
- 3 mA short circuit current allows for faster charging and testing of large capacitive and inductive loads.
- Results storage and downloading enables state-of-the-art record keeping free of transposition errors.
- Five industry-standard tests can be performed automatically, freeing operator from time-consuming manual operations.
- Backlit display enables ease of testing in poorly lit areas.
- Rugged, lightweight polypropylene case and IP65 rating make all of the instruments adaptable for all field conditions.
- A variety of measurements including applied test voltage, leakage current and capacitance, affords enhanced capabilities to diagnose insulation condition and problems.
- Redundant safety features includes automatic discharge of test item, test inhibition in presence of external voltage, and design to EN61010.
- The MIT1020 incorporates the ability to apply test voltage up to 10 kV, making it fully conformable to the requirements of IEEE43:2000.
- A “quick start” guide is included in the lid, eliminating the need to carry bulky manuals to site locations.
- For greater ease of use and downloading, an RS232 or USB interface is available (MIT520 and MIT1020 only).
- Alarm limit mode (MIT520 and MIT1020 only) allows for faster testing and less ambiguous result interpretation.

Delta wye transformer being testing with a MIT520

These unique features improve insulation testing efficiency and effectiveness



Extra data storage and download capability
Run more tests and save more test data. Download results using either an RS232 or USB style connection (MIT520 and MIT1020 only).

Line or battery operation
The operating flexibility you need when site conditions are unknown or long term testing is required.

Multiple built-in safety features
Designed to meet the most stringent operator safety requirements, including EN61010. Includes live voltage warning, safety lockout over 50 V on 5-kV testers and 80 V on 10-kV testers, and automatic energy discharge.

Improved enclosure
It's virtually indestructible, yet ergonomic and lightweight. It features an oversized rubber handle and removable lid for effective use in tight places. A lid mounted lead storage bag is also included.

Easier operation
Use a "Quick Start" guide conveniently located in the lid, always there for easy reference.

SPECIFICATIONS

Test Voltage
MIT510: 250 V, 500 V, 1000 V, 2500 V, 5000 V
MIT520: 50 V to 1 kV in 10 V steps, 1 kV to 5 kV in 25 V steps
MIT1020: 50 V to 1 kV in 10 V steps, 1 kV to 10 kV in 25 V steps

Insulation Resistance Range
Digital display:
MIT510/MIT520: 10 kΩ to 15 TΩ
MIT1020: 10 kΩ to 35 TΩ
Analog display:
MIT510/MIT520/MIT1020: 100 kΩ to 1 TΩ

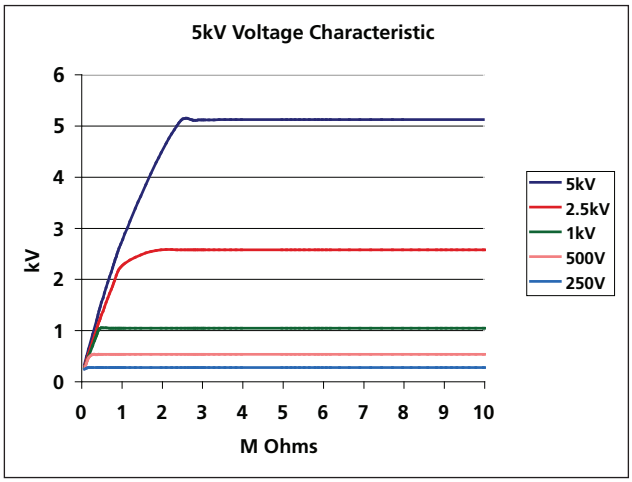
Accuracy (23° C)
±5% to 1 TΩ
±20% to 10 TΩ (MIT520)
±20% to 20 TΩ (MIT1020)

Voltage Output Accuracy (0°C to 30°C)
0 to +4% ±1 V of nominal test voltage at 100 MΩ load
±25 V for test voltages less than 500 V

Short Circuit/Charge Current
3 mA

Current Measurement
Range: ±0.01 nA to ±5 mA
Accuracy (23°C): ±5% ±0.2 nA at all voltages

Capacitance Measurement
Range: 10 nF to 50 µF (for voltages > 500 V)
Accuracy (23°C): ±5% ±5 nF



Test Voltage Output Characteristics Over Insulation Resistance Range

Capacitor
Charge Time: 5 seconds per µF at 3 mA
Discharge Time: 5 seconds per µF to discharge from:
MIT510/MIT520: 5000 V to 50 V
MIT1020: 10,000 to 50 V

Display
Analog/digital 3 digits

Timer Range
Count up to 99 minutes and 59 seconds from start of test

Memory Capacity (MIT520 and MIT1020)
32 kB

Industry-Standard Tests
MIT510: Auto IR
MIT520: Auto IR, PI, DAR, SV, and DD
MIT1020: Auto IR, PI, DAR, SV, and DD

Interference Rejection
2 mA rms at 200 V and above

Guard Terminal
2% error guarding 500 kΩ leakage with 100 mΩ load

Voltage Input Range
95 to 240 V, ±10% rms 50/60 Hz and dc

Battery Life
6 hours continuous testing at 5 kV
4 hours continuous testing at 10 kV

Safety
Meets the requirements of EN61010-1: 2001 CAT 111 600 V

EMC
Meets the requirements of EN61326-1:1998 for use in heavy industrial areas

Ingress Protection
IP65 (lid closed)

Temperature Range
Operating: 14°F to 122°F (-10°C to +50°C)
Storage: -13°F to +149°F (-25°C to +65°C)

Humidity Range
90% RH @ 104°F (40°C)

Dimensions
12 in. x 7.6 in. x 14.2 in. (305 mm x 194 mm x 360 mm)

Weight
15 lb. (6.75 kg)

Product comparison guide.
A look at each instrument's features.



		MIT510	MIT520	MIT1020
Display	Analog/Digital	■	■	■
Power Supply	Mains power	■	■	■
	Rechargeable	■	■	■
Test Voltage	10.0 kV			■
	5.0 kV	■	■	■
	2.5 kV	■	■	■
	1.0 kV	■	■	■
	500 V	■	■	■
	250 V	■	■	■
	10 V steps 50 V to 1 kV, 25 V steps 1 kV to max test voltage		■	■
Measurements	Max reading	15 TΩ	15 TΩ	35 TΩ
	Min reading	10 kΩ	10 kΩ	10 kΩ
	Voltage	■	■	■
	Capacitance and time constant	■	■	■
	Leakage current	■	■	■
Test Types	Auto IR	■	■	■
	Polarization index		■	■
	Step voltage		■	■
	Dielectric discharge		■	■
	Dielectric absorption ratio		■	■
Other Features	Timer control		■	■
	Timer display	■	■	■
	3mA test currents	■	■	■
	USB output		■	■
	RS232 output		■	■
	Free calibration certificate	■	■	■
	IP65 rating	■	■	■
	Alarm limit mode		■	■

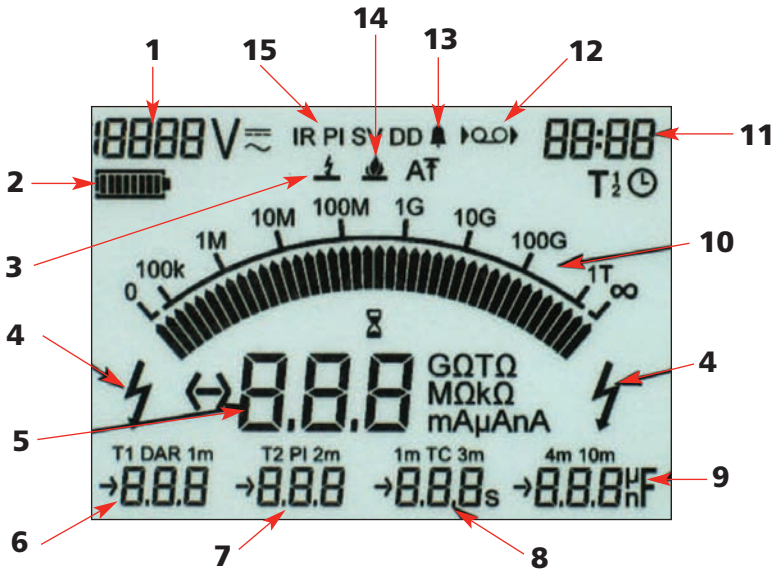
What is the IEEE Standard 43-2000?

In March 2000, the IEEE-SA Standards Board approved a revision of IEEE Std 43-1974 by the Electric Machinery Committee of the IEEE Power Engineering Society. This revision is IEEE Std 43-2000, the "IEEE Recommended Practice for Testing Insulation Resistance of Rotating Machinery."

Following is a brief summary of the highlights of IEEE Standard 43-2000:

- Test voltages up to 10 kV are recommended for windings rated greater than 12 kV.
- Both the insulation resistance and the polarization index test are recommended.
- Test results should be compared to historical values to identify changes.
- In lieu of historical records, minimum acceptable values (based on the type of equipment) for both tests are indicated.
- Depending on the machine rating, the readings for one or both tests should exceed the minimum acceptable values.
- If the readings are below the minimum acceptable values, the winding is not recommended for an over-voltage test or for operation.

MIT520/MIT1020 DISPLAY EXAMPLE



1. **Voltage at terminals** — Displays amount of voltage present at the terminal.
2. **Battery level** — Indicates the level of battery operation available.
3. **Breakdown indicator** — Indicates that breakdown mode is in operation
4. **High-voltage indicator** — Indicates the presence of high voltage during operation.
5. **Digital display** — Displays the reading during a test.
6. **Dielectric absorption ratio (DAR)**
7. **Polarization index (PI)**
8. **Time constant**
   6 through 8 — Displays the ratio value or the resistance measured at the indicated time.
9. **Capacitance display** — Indicates the capacitance of the test sample.
10. **Analog display** — Unique, patented analog display shows resistance with real-time pointer movement.
11. **Timer** — Displays the elapsed time of test. Displayed constantly, eliminating the need for a separate timer.
12. **Data recording** — Indicates if data is being recorded during the test.
13. **Alarm** — Indicates that alarm has been set.
14. **Burn indicator** — Indicates that burn mode is in operation.
15. **Test modes** — Shows which pre-programmed test is being run.

ORDERING INFORMATION

Item [Qty]	Cat. No.
5-kV Insulation Resistance Tester	MIT510
5-kV Insulation Resistance Tester	MIT520
10-kV Insulation Resistance Tester	MIT1020
Included Accessories	
10 ft (3 m) lead set [3]	210968
RS232 cable (MIT520 and MIT1020)	EV25955-025
USB cable (MIT520 and MIT1020)	25970-041

Item	Cat. No.
Line cord	17032
Pouch	6320-244
MIT510 User guide, CD version	6172-929
MIT520/MIT1020 User guide, CD version	6172-960
Optional Accessories	
10 ft (3 m) lead set with straight jaw clamps	EV6220-797
50 ft (15 m) lead set	EV6121-452

UK
Archcliffe Road, Dover
CT17 9EN England
T (0) 1 304 502101
F (0) 1 304 207342

UNITED STATES
4271 Bronze Way
Dallas, TX 75237-1019 USA
T 1 800 723 2861
T 1 214 333 3201
F 1 214 331 7399

OTHER TECHNICAL SALES OFFICES
Norristown USA, Toronto CANADA, Mumbai INDIA, Trappes FRANCE, Sydney AUSTRALIA, Madrid SPAIN and The Kingdom of BAHRAIN.

ISO STATEMENT
Registered to ISO 9001:2000 Reg no. Q 09250
Registered to ISO 14001 Reg no. EMS 61597

MIT510_520_1020_DS_en_V03
www.megger.com