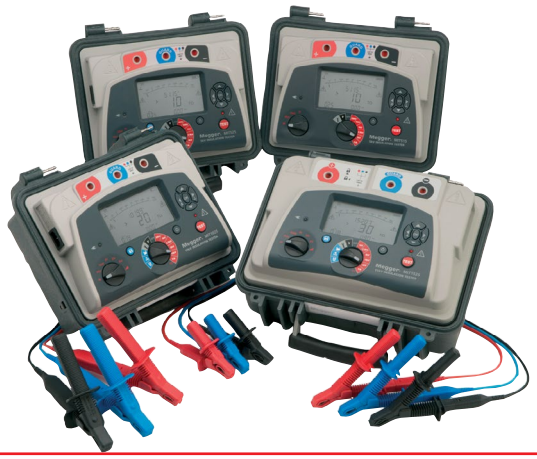
MIT515, MIT525, MIT1025, MIT1525
5 kV, 10 kV, 15 kV DC Insulation Resistance Testers



- **30 TΩ maximum resistance**
- **Unique dual-case design provides additional user protection**
- **Operate from battery or AC source**
- **Rapid charge Li-ion battery**
- **Safety rated CATIV 1000 V to 3000 m (15 kV)**
- **Advanced memory with time/date stamp**

DESCRIPTION

Megger's range of DC insulation testers MIT515, MIT525, MIT1025 and MIT1525 are targeted at original equipment manufacturers and industrial companies. The top of the range MIT1525 performs insulation resistance tests up to 15 kV with a 30 TΩ maximum resistance and an accuracy of ±5% to 3 TΩ. The MIT515 offers IR, DAR and PI functions but has no memory functionality. MIT525, MIT1025 and MIT1525 have a full suite of test modes as well as on-board memory and the ability to stream data/download data to a PC/laptop.

Instrument productivity is a focus of the new MIT range which offers rapid charge batteries and operation from an AC source if the batteries are dead. Rapid charge batteries enable > 60 minutes testing after a 30 minute charge.

Safety is not compromised on the MIT range with all terminals rated to CATIV 600 V to 3000 m (5 kV and 10 kV) or CATIV 1000 V to 3000 m (15 kV). A range of 5 kV and 10 kV test leads are available plus dedicated 15 kV test leads which are double insulated with clips designed for 15 kV creepage paths. The 15 kV leads are supplied in a backpack. Depending on local procedures or the results of a risk assessment, suitably rated HV gloves and other personal equipment may be a requirement while testing.

The MIT range share dual case design which includes a tough outer case to protect the tester from knocks/drops and an inner fire retardant case. The IP rating is IP 65 case closed eliminating moisture and dust ingress.

An intuitive user interface ensures no lost time remembering how to use the tester. Simplicity of operation is achieved with two rotary switches and the large backlight display which enables multiple results to be displayed simultaneously. A graphical quick start guide is provided inside the lid to assist first time users.

Five preset voltage ranges are provided in insulation test mode, plus a user settable lock voltage range. Voltage can be selected in 10-V increments to 1 kV and 25-V increments above 1 kV. Preconfigured diagnostic tests include Polarization Index (PI), Dielectric Absorption Ratio (DAR), dielectric discharge (DD), Step Voltage (SV) and ramp test.

The ramp function gradually increases voltage up to a selected level while graphing current vs. voltage. Graphs can then be downloaded, or streamed real time, to either the Power DB Lite software supplied or the optional Power DB software. Graphs can then be compared to example curves in IEEE 95-2002 to reveal a variety of faults difficult to detect otherwise. Small defects can be easily detected without risking the sudden large voltage increments produced by a Step Voltage test. Monitoring the developing graph during test enables the operator to terminate prior to breakdown, thereby reducing the possibility of damage to already flawed insulation. These units are particularly informative on polyester, asphalt and epoxy-mica insulations. They can also test voltage suppression devices.

Advanced memory storage includes time/date stamping of results, logging of data and recall of results to screen. A fully isolated USB interface is used for safe transfer of data to Megger's asset management software; PowerDB Pro, Advanced and Lite packages.

Test leads are double insulated with clamps rated at 3 kV equivalent to 6 kV single insulation for the medium clip leadset and 5 kV equivalent to 10 kV single insulation for the large clip. The 15 kV leadset is insulated to 15 kV.

FEATURES AND BENEFITS

- Insulation resistance up to 30 TΩ @ 15 kV, 20 TΩ @ 10 kV, 10 TΩ @ 5 kV enables installation testing and long-term trending of higher value apparatus, typically above 1 TΩ.
- High altitude operation up to 3000 m while maintaining CATIV 600 V (5 kV and 10 kV) and CATIV 1000 V (15 kV).
- 5% accuracy all the way up to 1 TΩ @ 5 kV, 2 TΩ @ 10 kV, and 3 TΩ @ 15 kV ensures highest accuracy where it matters most. Note: the majority of measurement in substation environments are typically above 100 GΩ.
- IR, timed IR, DAR, PI, DD, SV and ramp tests maximize diagnostic testing capability.
- 3 mA short circuit current with unique max power regulations technology ensures maximum transfer whatever the load until selected voltage is reached.
- Noise filter rejects up to 3 mA (5 kV and 10 kV) and 6 mA (15 kV) noise for effective operation in electrically noisy environments.
- Li-ion battery allows up to 6 hrs continuous testing @ 5 kV with a 100 MΩ load; battery meets IEC 62133.
- Large backlit LCD, convenient for use in ambient lighting, clearly shows analog and digital readings.
- Dedicated voltmeter function (30 V to 660 V) allows the user to check for induced volages.
- Smaller size and lighter weight allows easier transport and use without compromising performance.
- Unique dual case design allows for fire-retardant protection while maintaining ruggedness.
- High-quality, flexible silicon test leads meet safety regulations of IEC 61010-31:2008 while ensuring measurement accuracy.
- Timed IR plus PI, DAR, DD, SV and ramp tests maximize diagnostic testing capability.
- Operate from line power even if the battery is fully discharged (charges while operating).
- Two and one-half hour full battery charge time (one-half hour charge for one hour testing) significantly increases productivity.
- Up to six hours continuous testing (5 kV) on a single battery charge.
- Industry best guard terminal performance to insure highest accuracy of measured values.
- Enhanced driver technology provides plug-and-play when connected to the internet. No tedious and potentially interruptive setup procedures.
- Rotary switch operation for easy, intuitive field use.
- Locking test leads provide additional safety.
- Date and time-stamped test results reduce the risk of error in result interpretation.

APPLICATIONS

The Insulation Resistance (IR) test is a quantitative test which indicates the effectiveness of a product's electrical insulation. Applications include cables, transformers, motors/generators, circuit breakers and bushings.

The units are designed for testing the insulation of high-voltage electric equipment. Their wide voltage range also allows applications for low-voltage equipment. The test techniques on the instruments provide valuable diagnostic information.

All four instruments test the insulation resistance of:

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

The MIT525, MIT1025 and MIT1525 also perform spot tests, step-voltage tests, dielectric discharge tests, ramp 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.
- QA testing as part of the manufacturing process.
- Diagnostic testing to isolate faulty components for repair.

IEEE Standard 43:2000

With its higher voltage testing capability, the MIT1025 is the perfect everyday work tool for manufacturers, users and maintainers of rotating machinery. Designed in accordance with the requirements of IEEE43:2000, the MIT1025 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.

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 are the testing recommendations from the standard:

- Test voltages up to 10 kV are recommended for windings rated greater than 12 kV.
- Both the insulation resistance and the polarization index tests are recommended.

15 kV Insulation Testing

A 15 kV insulation test is recommended for higher voltage electrical equipment. The Pearl Reconditioning Standard / NETA MTS-1997 defines both the minimum dc test voltage and minimum recommended insulation resistance based on the maximum voltage rating of the equipment being tested. For equipment rated from 35 kV to 69 kV, 15 kV dc test voltage should be used. The minimum recommended insulation resistance is 100 GΩ.

NETA ATS 2007 Section 7.15.1 defines test voltage and minimum insulation resistance for ac induction motors and generators. If the voltage rating of motor's winding is 34.5 kV, a 15 kV dc test voltage should be used. Again, the minimum recommended insulation resistance is 100 GΩ.

The MIT1525 maintains ±5% accuracy up to 3 TΩ, which is well above the minimum recommended insulation resistance level in both standards.

SPECIFICATIONS

Electrical

Voltage input range:	
5 kV, 10 kV	90-264 V rms, 47-63 Hz, 100VA
15 kV	90-264 V rms, 47-63 Hz, 200VA
Battery:	11.1 V, 5.2Ah Li-ion batteries, meet IEC 62133:2003, MIT1525 has 2 battery packs
Battery life MIT515, MIT525:	6 hours (typical) continuous testing at 5 kV with a 100 MΩ load
Battery life MIT1025:	4.5 hours (typical) continuous testing at 10 kV with a 100 MΩ load
Battery life MIT1525:	4.5 hours (typical) continuous testing at 15 kV with a 100 MΩ load
Battery charge time:	2.5 hours from deep discharge, 2 hours normal discharge
Test voltages MIT515, MIT525:	250 V, 500 V, 1000 V, 2500 V, 5000 V, V🔒
Test voltages MIT1025:	500 V, 1000 V, 2500 V, 5000 V, 10,000 V, V🔒
Test Voltages MIT1525:	1000 V, 2500 V, 5000 V, 10,000 V, 15000 V, V🔒
Lock test voltage V🔒:	40 V to 1 kV in 10 V steps, 1 kV to 5 kV in 25 V steps, 5 kV to 15 kV in 25 V steps
Voltage o/p accuracy:	+4%, -0%, ±10 V nominal test voltage at 1GΩ load (0°C to 0°C)
Resistance Range:	10 k to 10 TΩ @ 5 kV 10 k to 20 TΩ @ 10 kV 10 k to 30 TΩ @ 15 kV
Accuracy (23 °C) from 1 MΩ to:	
MIT515, MIT525	±5% to 1 TΩ, ±20% to 10 TΩ
MIT1025	±5% to 2 TΩ, ±20% to 20 TΩ
MIT1525	±5% to 3 TΩ, ±20% to 30 TΩ
Centrally positioned guard ring:	Guard parallel leakage, resistance down to 250 kΩ with a maximum additional resistance error of 1% with a 100 MΩ load.
Display range analog:	100 kΩ to 10 TΩ
Display range digital:	10 kΩ to 30 TΩ
Short circuit current:	3 mA @ 5 kV, 10 kV, 15 kV
Insulation alarm:	100 kΩ to 10 GΩ
Capacitor charge:	< 3 s/µF to 5 kV, < 5 s/µF to 10 kV, < 7.5 s/uF to 15 kV
Capacitor discharge:	5 kV to 50 V :< 120 ms/µF 10 kV to 50 V:< 250 ms/µF 15 kV to 50 V:< 3500 ms/µF
Capacitance range (> 500 V):	10 nF to 50 µF (dependent on measurement voltage)
Capacitance accuracy (23 °C):	±10% ±5 nF
Current measurement range:	0.01 nA to 6 mA
Current measurement accuracy:	±5% ±0.2 nA at all voltages (23 °C)
Interference (noise) rejection:	
MIT515, MIT525	3 mA from 450 V to 5 kV
MIT1025	3 mA from 960 V to 10 kV
MIT1525	6 mA from 2100 V to 15 kV
Voltmeter range:	30 V to 660 V ac or dc, 45Hz – 65Hz
Voltmeter accuracy:	±3%, ±3V
Timer range:	Up to 99 minutes 59 seconds, 15 second minimum setting
Memory capacity:	5.5 hours logging @ 5 sec intervals
Test regimes:	IR, IR(t), DAR, PI, SV, DD, ramp test
Interface:	USB type B (device)
Real time output:	1 Hz output readings (V, I, R)

Environmental

Altitude:	3000 m
Operating temperature:	-4° F to +122° F (-20° C to 50° C)
Storage temperature:	-13° F to +149° F (-25° C to 65° C)
Humidity:	90% RH non-condensing at 40 °C
Ingress protection:	IP65 (lid closed), IP40 (lid open)

Safety

CAT Rating:	CATIV 600 V to 3000 m (5 kV, 10 kV) CATIV 1000 V to 3000 m (15 kV)
EMC:	Meets the requirements of IEC 61010-1 and IEC61326-1

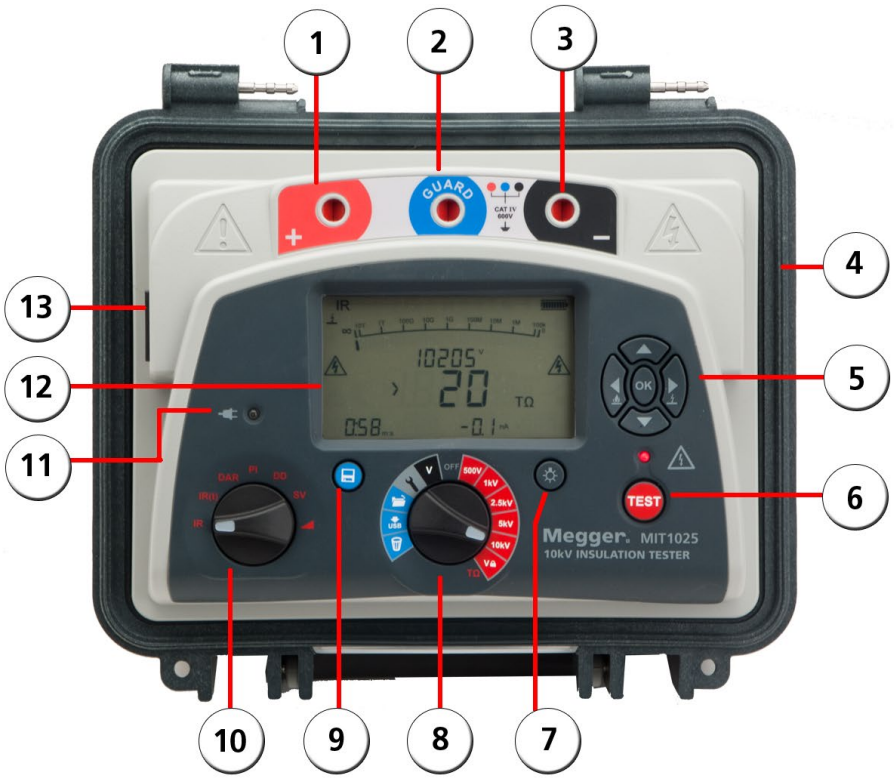
Dimensions

MIT515, MIT525, MIT1025	12 in. L x 11 in. W x 7 in. H (315 mm L x 285 mm W x 181 mm H)
MIT1525	14 in. L x 12 in. W x 8 in. H (360 mm L x 305 mm W x 194 mm H)

Weight

MIT515, MIT525, MIT1025	10 lb (4.5 kg)
MIT1525	14 lb 6.5 kg

Model MIT1025 Panel



1. Positive (+) terminal
2. GUARD terminal
3. Negative (-) terminal
4. USB device interface
5. Four arrow buttons and OK button
6. TEST button with associated HV warning lamp
7. Backlight button
8. Operational rotary switch
9. Save button on MIT525 and MIT1025
10. Test mode rotary switch
11. LED indicated line power / mains
12. Display
13. Power socket

Product Comparison Guide for 5/10/15-kV Insulation Testers					
	Model Number	**MIT515-US**	**MIT525-US**	**MIT1025-US**	**MIT1525-US**
	Cat. Number	**1001-936**	**1001-940**	**1001-944**	**1002-909**
Display	Analog/Digital	■	■	■	■
Power Supply	Line power	■	■	■	■
	Rechargeable	■	■	■	■
Lock test voltage VL		■	■	■	■
Test Voltage	15.0 kV				■
	10.0 kV			■	■
	5.0 kV	■	■	■	■
	2.5 kV	■	■	■	■
	1.0 kV	■	■	■	■
	500 V	■	■	■	
	250 V	■	■		
	10 V steps 40 V to 1 kV 25 V steps 1 kV to max test voltage 1 kV to 15 kV in 25 V steps for 15 kV				■
	10 V steps 100 V to 1 kV 25 V steps 1 kV to max test voltage	■	■	■	
Measurements	Max. reading	10 TΩ	10 TΩ	20 TΩ	30 TΩ
	Min. reading	10 kΩ	10 kΩ	10 kΩ	10 kΩ
	Voltage	■	■	■	■
	Capacitance and time constant	■	■	■	■
	Leakage current	■	■	■	■
Test Types	Auto IR	■	■	■	■
	Auto PI	■	■	■	■
	Auto SV		■	■	■
	Auto DD		■	■	■
	Auto DAR	■	■	■	■
	Auto ramp test		■	■	■
Other Features	Safety rating	CAT IV 600 V	CAT IV 600 V	CAT IV 600 V	CAT IV 1000 V
	Timer control	■	■	■	■
	Timer display	■	■	■	■
	3mA short circuit currents	■	■	■	
	USB output (cable included)		■	■	■
	Calibration certificate included	■	■	■	■
	IP65 rating case closed	■	■	■	
	Alarm limit mode	■	■	■	■
	Compatible with Power DB		■	■	■
	User programmable lock voltage range	■	■	■	■
	Real time clock		■	■	■
	Battery charge time max (hours)	2.5	2.5	2.5	2.5
	Noise rejection	3 mA	3 mA	3 mA	6 mA
	Guard terminal performance	2% error guarding 500 kΩ leakage with a 100 MΩ load			

Megger

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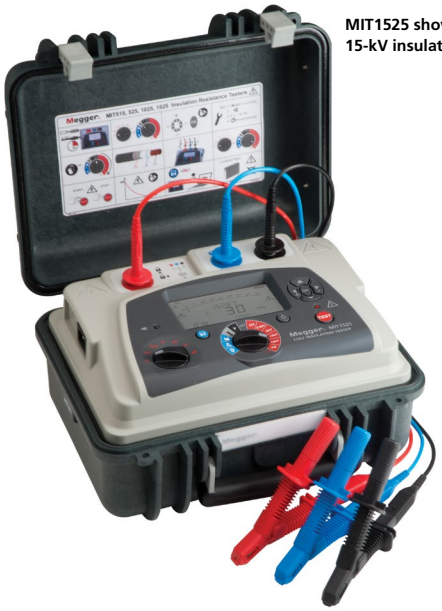
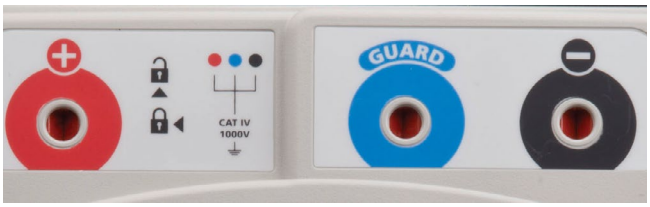


MIT1525 shown with 15-kV insulated clip leadset



CATIV 1000 V rating on MIT1525 unit's terminals, shown above. The MIT515, MIT525, and MIT025 are rated CATIV 600 on all terminals.

Easy-to-read rotary switch buttons for intuitive field use.

Large backlit LCD shows multiple parameters simultaneously.

ORDERING INFORMATION

Item (Qty)	Cat. No.
MIT515-US	1001-936
MIT525-US	1001-940
MIT1025-US	1001-944
MIT1525-US	1002-909
Included Accessories	
Power lead	
USB cable	
PowerDB Lite software	
Product Information CD	
3 m leadset x 3, medium insulated clips	1002-531
3 m leadset x 3, large insulated clips (MIT1025 only)	1002-534
3m leadset x 3, large 15 kV insulated clips (MIT1525 only)	1002-949
Optional Accessories	
1 kV test lead sets	
Fused test probe and clip lead set	1002-913
Control circuit test lead set	6220-822

Item (Qty)	Cat. No.
HV test lead sets 5kV, 10kV	
5 m leadset x 3, large insulated clips*	1002-645
8 m leadset x 3, large insulated clips	1002-646
10 m leadset x 3, large insulated clips	1002-647
15 m leadset x 3, large insulated clips	1002-648
5 m leadset x 3, medium insulated clips*	1002-641
8 m leadset x 3, medium insulated clips	1002-642
10 m leadset x 3, medium insulated clips	1002-643
15 m leadset x 3, medium insulated clips	1002-644
3 m leadset x 3, bare compact clips	8101-181
8 m leadset x 3, bare compact clips	8101-182
15 m leadset x 3, compact bare clips	8101-183
**** These test leads may also be supplied in non-standard lengths to suit a particular application / requirement. Please contact Megger for a quotation; minimum order quantities may apply.***	
Screened HV test lead sets	
3 m, 5 kV screened un-insulated small clips	6220-835
15 m, 5 kV screened un-insulated small clips	6311-080
3 m, 10 kV screened un-insulated small clips	6220-834
10 m, 10 kV screened un-insulated small clips	6220-861
15 m, 10 kV screened un-insulated small clips	6220-833
Other	
CB101, 5 kV Calibration Box	6311-077
Calibration Certificate - CB101	1000-113

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