

MIT515, MIT525, MIT1025, MIT1525

5 kV, 10 kV, 15 kV d.c. Insulation Resistance Testers



- **Measures up to 30 TΩ**
- **Safety rated up to CAT IV 1000 V to 3000 m**
- **Unique dual-case design - additional user protection**
- **Operates from battery or a.c. mains supply**
- **Rapid charge Li-ion battery**
- **Advanced memory with time / date stamp**
- **Transit case**

DESCRIPTION

Megger's new range of d.c. 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 $\pm 5\%$ from 1 MΩ up 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 a.c. source if the batteries are flat. Rapid charge batteries enable > 60 minutes testing after a 30 minute charge.

- **MIT515:** 5 kV IRT with PI and DAR but no memory
- **MIT525:** 5 kV IRT with all test modes including a ramp test plus advanced memory functions with recall to screen, RTC for time/date stamp of results and USB cable interface to PC / PowerDB
- **MIT1025:** 10 kV IRT with all test modes including a ramp test plus advanced memory functions with recall to screen, RTC for time/date stamp of results and USB cable interface to PC / PowerDB
- **MIT1525:** 15 kV IRT with all test modes including a ramp test plus advanced memory functions with recall to screen, RTC for time/date stamp of results and USB cable interface to PC / PowerDB

Safety rating is not compromised on the MIT range with all terminals safety rated to CAT IV 600 V to 3000 m (5 kV, 10 kV) or CAT IV 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 holdall. Suitably rated HV gloves and other personal protection equipment are required to be worn when 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 IP65 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 shown 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. Preconfigured diagnostic tests include Polarisation Index (PI), Dielectric Absorption Ratio (DAR), Dielectric Discharge (DD), Stepped Voltage (SV) and Ramp Test.

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.

Advanced memory storage includes time/date stamping of results, logging of data and recall of results to screen. A fully isolated USB device interface (type B) is used for safe transfer of data to Megger's PowerDB / Pro, Advanced and Lite asset management software. (MIT525, MIT1025 and MIT1525 only)

Optional transport case



For an additional cost the instrument can be supplied in a high quality transport case which has enough storage space to store two standard lead sets, fused test leads for voltage measurements and a set of screened test leads.

The new transport case keeps the users required test leads together with the instrument, especially useful when instruments are stored in a vehicle, ensuring everything needed is kept together and ready to test.

See separate Transport Case data sheet (TC_DS_en_V01) for more details.

APPLICATION

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. Common insulation tests are the "spot test", a 1 minute IR test and a 10 minute Polarisation Index (PI) test, where PI is the ratio $R_{10\text{min}} / R_{1\text{min}}$ and is temperature independent.

FEATURES AND BENEFITS

- Insulation resistance up to 30 TΩ @ 15 kV, 20 TΩ @ 10kV, 10 TΩ @ 5 kV
- Measures capacitance of test object (with test voltages over 5000 V)
- IR, Timed IR, DAR, PI, DD, SV and Ramp diagnostic tests
- High current – 3 mA short circuit current
- High noise immunity – 3 mA (5 kV and 10 kV) 6 mA (15 kV) of noise rejection
- Li-ion battery – up to 6 hrs continuous testing @ 5 kV with a 100M load, battery meets IEC 2133
- Large LCD display with backlight
- Dedicated voltmeter function (30 V to 660 V)
- Advanced memory, on screen recall and real time clock for date / time stamped results (MIT525, MIT1025 and MIT1525 only)
- Download of on-board results via USB interface (MIT525, MIT1025 and MIT1525 only)
- Recorded temperature (measured by independent instruments) can be saved with test result (MIT525, MIT1025 and MIT1525 only)
- PowerDB Lite asset management software supplied (MIT525, MIT1025 and MIT1525 only)
- MIT515, MIT525 and MIT1025 safety rated at CAT IV 600 V (maintained to 3000 m altitude)
- MIT1525 safety rated at CAT IV 1000 V (maintained to 3000 m altitude)
- **New** – Transport case option (-TC)

SPECIFICATIONS

a.c. voltage (auto-ranging)

MIT515, MIT525, MIT1025: 90-264 V rms, 47- 63 Hz 100 VA
MIT1525 kV: 90-264 V rms, 47- 63 Hz 200 VA

Battery charge time 2.5 hours deep discharge,
2 hours normal discharge

Battery life 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

MIT1025: 4.5 hours (typical) continuous
testing at 10 kV with a
100 MΩ load

MIT1525: 4.5 hours (typical) continuous
testing at 15 kV with a
100 MΩ load

Test voltage

MIT515, MIT525: 250 V, 500 V, 1000 V, 2500 V,
5000 V, V_⊕

MIT1025: 500 V, 1000 V, 2500 V, 5000 V,
10000 V, V_⊕

MIT1525: 1000 V, 2500 V, 5000 V, 10000 V,
15000 V, V_⊕

Lock test voltage

100 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

Test voltage accuracy

+4%, -0%, ±10 V nominal test
voltage at 1 GΩ load (0°C to 30°C)

Resistance range

10 kΩ to 15 TΩ @ 5 kV,
10 kΩ to 20 TΩ @ 10 kV,
10 kΩ to 30 TΩ @ 15 kV

Accuracy

MIT515, MIT525 accuracy (23 °C)

| | 5000 V | 2500 V | 1000 V | 500 V | 250 V |
|---------------------------|--------|--------|--------|--------|-------|
| ±5% from 1MΩ to 1 TΩ | | 500 GΩ | 200 GΩ | 100 GΩ | 50 GΩ |
| ±20% from 1MΩ to 10 TΩ | 5 TΩ | 2 TΩ | 1 TΩ | 500 GΩ | |

MIT1025 accuracy (23 °C)

| | 10 kV | 5000 V | 2500 V | 1000 V | 500 V |
|---------------------------|-------|--------|--------|--------|--------|
| ±5% from 1MΩ to 2 TΩ | | 1 TΩ | 500 GΩ | 200 GΩ | 100 GΩ |
| ±20% from 1MΩ to 20 TΩ | 10 TΩ | 5 TΩ | 2 TΩ | 1 TΩ | |

MIT1525 accuracy (23 °C)

| | 15 kV | 10 kV | 5000 V | 2500 V | 1000 V |
|---------------------------|-------|-------|--------|--------|--------|
| ±5% from 1MΩ to 3 TΩ | | 2 TΩ | 1 TΩ | 500 GΩ | 200 GΩ |
| ±20% from 1MΩ to 30 TΩ | 20 TΩ | 10 TΩ | 5 TΩ | 2 TΩ | |

Guard terminal performance

Guards out parallel leakage resistance
down to 250 kΩ with a maximum
additional resistance error of 1% with
a 100 MΩ load

Display analogue: 100 kΩ to 10 TΩ

Digital: 10 kΩ to max. a above

| | |
|---|--|
| Short circuit / charge current | 3 mA @ 5 kV, 10 kV, 15 kV |
| Insulation test alarm: | 100 kΩ to 10 GΩ |
| Capacitor charge | |
| MIT515, MIT525 | <3 s/μF at 3 mA to 5 kV |
| MIT1025 | <5 s/μF at 3 mA to 10 kV |
| MIT1525 | <7.5 s/μF at 3 mA to 15 kV |
| Capacitor discharge | |
| | <120 ms/μF to discharge from 5000 V to 50 V (MIT515 and MIT525) |
| | <250 ms/μF to discharge from 10000 V to 50 V (MIT1025) |
| | <3500 ms/μF to discharge from 15000 V to 50 V (MIT1525) |
| Capacitance range | |
| With test voltage set above 500 V | |
| MIT515, MIT525, MIT1025: | 10 nF to 25 μF |
| MIT1525: | 10 nF to 50 μF |
| Capacitance measurement accuracy | ±10% ±5 nF |
| Current range | 0.01 nA to 6 mA |
| Current accuracy | ±5% ±0.2 nA at all voltages (23 °C) |
| Interference | |
| 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 a.c. or d.c., 45Hz – 65Hz |
| Voltmeter accuracy | ±3%, ±3 V |
| Timer range | Up to 99 minutes 59 seconds, 15 second minimum setting |
| Memory capacity | 5.5 hours logging @ 5 sec intervals (MIT525, MIT1025 and MIT1525 only) |
| Test modes | |
| MIT515: | IR, IR(t), DAR, PI |
| MIT525, MIT1025, MIT1525: | IR, IR(t), DAR, PI, SV, DD, Ramp test |
| Interface | USB type B (device) (MIT525, MIT1025 and MIT1525 only) |
| Real time output | 1 Hz output readings (V, I, R) (MIT525, MIT1025 and MIT1525 only) |
| ENVIRONMENTAL | |
| Maximum altitude | 3000 m (5 kV, 10 kV) 3000 m (15 kV) |
| Operating temperature range | -20 °C to 50 °C |
| Storage temperature range | -25 °C to 65 °C |
| Humidity | 90% RH non-condensing at 40 °C |
| IP rating | IP65 (lid closed), IP40 (lid open) |
| Safety | |
| MIT515, MIT525 MIT1025: | CAT IV 600 V to 3000 m altitude |
| MIT1525: | CAT IV 1000 V to 3000 m altitude |
| | Meets the requirements of IEC 61010-1. |

TEST LEADS SUPPLIED

The MIT515, MIT525, MIT1025 and the MIT1525 are all supplied with test leads that are compliant with the requirements of IEC61010-031:2008.

The 5 kV models are supplied with one 3 m lead-set with medium sized clips.

The 10 kV models are supplied with two 3 m lead-sets, one with medium sized clips and the other with large clips with insulation suited to 10 kV use.

The 15 kV models supplied with a 3 m lead-set, with large clips with insulation suited to 15 kV use.

These leads are designed based on Megger's extensive knowledge of insulation testing using the latest technology. The leads are in compliance with IEC61010-31:2008, which requires a fully insulated clip design.

MEDIUM INSULATED TEST CLIP 3 M X 3 LEADSET - 5 KV AND 10 KV

These test leads are supplied as standard on MIT515, MIT525 and the MIT1025.

These clips are designed for clamping on larger diameter test pieces but where space is at a premium.

The insulation is designed only to protect the user from the output of Megger 5 kV and 10 kV (set below 6 kV) insulation resistance testers. The clips cannot in any circumstance be relied on to protect the user from live a.c. systems above 600 V a.c., r.m.s. in an CAT IV environment.

Cable insulation rating: 12 kV d.c. (marked on cable)

Cable type: Flexible dual insulated silicon (inner insulation layer coloured white to highlight damage)

MEDIUM INSULATED TEST CLIP 3 M X 3 LEADSET - 15 KV

These test leads are supplied as an option on the MIT1525.

These clips are designed for clamping on larger diameter test pieces but where space is at a premium.

The insulation is designed only to protect the user from the output of Megger 15 kV (set below 6 kV) insulation resistance testers.

The clips cannot in any circumstance be relied on to protect the user from live a.c. systems above 1000 V a.c., r.m.s. in an CAT IV environment.



Cable insulation rating: 15 kV d.c. (marked on cable)

Cable type: flexible dual insulated silicon (inner insulation layer coloured white to highlight damage)

These test leads may also be supplied in none standard lengths to suit a particular application. Please contact Megger for a quotation. Minimum order quantities may apply.

LARGE INSULATED TEST CLIP 3 M X 3 LEADSET

These test leads are supplied as standard on MIT1025 and MIT1525 models (different leadset dependant on model).

These clips are designed for clamping on to larger diameter test pieces.

The insulation is designed only to protect the user from the output of Megger 5 kV, 10 kV and 15 kV insulation resistance testers.

The clips cannot in any circumstance be relied on to protect the user from live a.c. systems above 600 V a.c., r.m.s. in an CAT IV environment.



10 kV lead set Cable insulation rating: 12 kV d.c. (marked on cable) Cable type: flexible dual insulated silicon (inner insulation layer coloured white to highlight damage)



15 kV lead set Cable insulation rating: 18 kV d.c. (marked on cable)

Cable type: Flexible dual insulated silicon (inner insulation layer coloured white to highlight damage)

The design of the lead sets is intended to facilitate connection to a variety of de-energized systems for the purpose of making insulation resistance measurements. In all cases it is the responsibility of the user to employ safe working practices and verify that the system is safe before connection. Even isolated systems may exhibit significant capacitance, which will become highly charged during the application of the insulation test. This charge can be lethal and connections, including the leads and clips, should never be touched during the test. The system must be safely discharged before touching connections.

DESIGNED FOR EVERYDAY USE

Test leads are a key component of any precision instrument and safety, long life, and the ability to provide reliable connections to a variety of test pieces found in everyday applications are of the utmost importance. Megger design test leads for both safety and practical operation.

LOCKING HV INSULATED PLUGS / NON-REMOVABLE TEST CLIPS

All Megger 5 kV, 10 kV and 15 kV insulation testing test leads are fitted with unique locking HV plugs and non-removable test clips.

This reduces the likelihood of a plug or clip inadvertently losing electrical connection and the capacitance of a long cable remaining lethally charged.

With the arrows on the plug finger guard horizontal on the instrument as shown to lock. Twist 90° to unlock. In addition, for the same reason, the test clips are not removable from the test lead.



PRACTICAL INSULATION DESIGN

Moving jaw fingers maintain the clips touch proof safety when the clip is closed but flex back to allow the metal teeth of the clip to contact test piece unimpeded when in use.



Megger clip being tested with IEC standard test finger for creepage and clearance.



PRACTICAL JAW DESIGN

Curved jaws allow reliable connection around test pieces and flat jaw tips provide excellent connection and gripping of individual wires.



More detailed information can be found on the 5 kV, 10 kV and 15 kV insulation tester lead sets application note. This document can be downloaded from: www.megger.com

| | MIT515 | MIT525 | MIT1025 | MIT1525 |
|--|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Max. output voltage | 5 kV | 5 kV | 10 kV | 15 kV |
| Max. resistance | 10 TΩ | 10 TΩ | 20 TΩ | 30 TΩ |
| Accuracy from 1 MΩ to | ±5% ≤ 1 TΩ ±20% to 10 TΩ | ±5% ≤ 1 TΩ ±20% to 10 TΩ | ±5% ≤ 2 TΩ ±20% to 20 TΩ | ±5% ≤ 3 TΩ ±20% to 35 TΩ |
| Short circuit output current | 3 mA | 3 mA | 3 mA | 3 mA |
| Max. noise rejection | 3 mA | 3 mA | 3 mA | 6 mA |
| Four averaging filters | | | | |
| Safety rating (to max. altitude) | CAT IV 600 V | CAT IV 600 V | CAT IV 600 V | CAT IV 1000 V |
| Max. altitude | 3000 m | 3000 m | 3000 m | 3000 m |
| Battery charge | 2.5 hrs | 2.5 hrs | 2.5 hrs | 2.5 hrs |
| Battery life single charge | 6 hrs | 6 hrs | 4.5 hrs | 4.5 hrs |
| Remote control via USB | | * | * | * |
| USB interface | | ■ | ■ | ■ |
| Bluetooth® memory download and live stream | | | | |
| On-board memory | | ■ | ■ | ■ |
| Temperature value stored | | ■ | ■ | ■ |
| Humidity value stored | | * | * | * |
| Time / date stamped results | | ■ | ■ | ■ |
| Compact / lightweight | 4.5 kg | 4.5 kg | 4.5 kg | 6.5 kg |
| Easy rotary switch operation | ■ | ■ | ■ | ■ |
| Digital / analogue display | ■ | ■ | ■ | ■ |
| Display backlight | ■ | ■ | ■ | ■ |
| Voltage output measurement | ■ | ■ | ■ | ■ |
| Dedicated voltmeter | ■ | ■ | ■ | ■ |
| Default voltmeter function | ■ | ■ | ■ | ■ |

* Features available on S1 range only.

ORDERING INFORMATION

| Description | Part number | Description | Part number |
|--------------|-------------|---------------|-------------|
| MIT515-UK | 1001-935 | MIT1025-UK | 1001-943 |
| MIT515-US | 1001-936 | MIT1025-US | 1001-944 |
| MIT515-EU | 1001-937 | MIT1025-EU | 1001-945 |
| MIT515-AU | 1001-938 | MIT1025-AU | 1001-946 |
| MIT515-TC-UK | 1009-712 | MIT1025-TC-UK | 1009-720 |
| MIT515-TC-US | 1009-713 | MIT1025-TC-US | 1009-721 |
| MIT515-TC-EU | 1009-714 | MIT1025-TC-EU | 1009-722 |
| MIT515-TC-AU | 1009-715 | MIT1025-TC-AU | 1009-723 |
| MIT525-UK | 1001-939 | MIT1525 UK | 1002-907 |
| MIT525-US | 1001-940 | MIT1525 US | 1002-909 |
| MIT525-EU | 1001-941 | MIT1525 EU | 1002-908 |
| MIT525-AU | 1001-942 | MIT1525 AU | 1002-910 |
| MIT525-TC-UK | 1009-716 | MIT1525-TC-UK | 1009-724 |
| MIT525-TC-US | 1009-717 | MIT1525-TC-US | 1009-725 |
| MIT525-TC-EU | 1009-718 | MIT1525-TC-EU | 1009-726 |
| MIT525-TC-AU | 1009-719 | MIT1525-TC-AU | 1009-727 |

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

| ORDERING INFORMATION | | | |
|---|-------------|-------------|-------------|
| Description | Part number | Description | Part number |
| Included accessories | | | |
| Power lead | | | |
| USB cable (MIT525, MIT1025, MIT1525) | | | |
| PowerDB Lite software (MIT525, MIT1025, MIT1525) | | | |
| Product information CD | | | |
| Included accessories (5 kV, 10 kV, 15kV) | | | |
| Lead set 3kV 3x3 m medium clips (MIT515 and MIT525 only) | 1008-022 | | |
| Lead set HV 3x3 m large clips (MIT1025 only) | 1002-534 | | |
| 3 m leadset x 3, large 15 kV insulated clips (MIT1525 only) | 1008-223 | | |
| Optional accessories 1 kV test lead sets (MIT515, MIT525, MIT1025 only) | | | |
| Fused test probe and clip lead set | 1002-913 | | |
| Control circuit test set | 6220-822 | | |
| Optional accessories – 1 kV test lead sets (MIT1525 only) | | | |
| 2 x 1.25 m Fused test lead set with probes and clips | 1005-265 | | |
| 2 x 3 m Control circuit test lead set | 1005-264 | | |
| HV test leads sets (MIT515, MIT525, MIT1025 only) | | | |
| These test leads may also be supplied in non-standard lengths to suit a particular application / requirement. Contact Megger for a quotation, minimum order quantities may apply. | | | |
| 3 x 5 m with large insulated clips | 1002-645 | | |
| 3 x 8 m with large insulated clips | 1002-646 | | |
| 3 x 10 m with large insulated clips | 1002-647 | | |
| 3 x 15 m with large insulated clips | 1002-648 | | |
| 3 x 5 m with medium insulated clips | 1002-641 | | |
| 3 x 8 m with medium insulated clips | 1002-642 | | |
| 3 x 10 m with medium insulated clips | 1002-643 | | |
| 3 x 15 m with medium insulated clips | 1002-644 | | |
| HV test lead sets (MIT1525 only) | | | |
| 3 x 5 m lead set, large size insulated clips | | 1005-259 | |
| 3 x 10 m lead set, large size insulated clips | | 1005-260 | |
| 3 x 15 m lead set, large size insulated clips | | 1005-261 | |
| 3 x 3 m lead set, medium size insulated clips | | 1005-262 | |
| 3 x 10 m lead set, medium size insulated clips | | 1005-263 | |
| Screened - HV test lead sets (MIT515, MIT525, MIT1025 only) | | | |
| 1 x 15 m, with 5 kV screened uninsulated small clips | | 6311-080 | |
| 3 m, 10 kV screened uninsulated small clips | | 6220-834 | |
| 10 m, 10 kV screened uninsulated small clips | | 6220-861 | |
| 15 m, 10 kV screened uninsulated small clips | | 6220-833 | |
| Screened HV test lead sets (MIT1525 only) | | | |
| 3 m, 15 kV screened, large size insulated clips, supplied in carry holdall | | 1005-266 | |
| 10 m, 15 kV screened, large size insulated clips, supplied in carry holdall | | 1005-267 | |
| 15 m, 15 kV screened, large size insulated clips, supplied in carry holdall | | 1005-268 | |
| 20 m, 15 kV screened, large size insulated clips, supplied in carry holdall | | 1005-269 | |
| Other | | | |
| CB101 5 kV Calibration Box | | 6311-077 | |
| Calibration certificate - CB101 | | 1000-113 | |
| UKAS calibration certificate CB101 | | 1000-047 | |
| Transport case | | 1009-744 | |

SALES OFFICE

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MIT515--MIT525--MIT1025--MIT1525_DS_en_V11

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