

MIT415 Insulation Tester



- 10 V and 100 V ESD testing
- 25 V & 50 V signal cable insulation testing
- 250 V & 500 V Insulation testing up to 50 GΩ (500 V)
- Continuity testing at 200 mA or 20 mA from 0.01 Ω to 999 kΩ
- DC and TRMS AC voltage measurement
- Large backlit display
- Combined analogue and dual digital readout
- Weatherproof to IP54
- Supplied with AA alkaline cells

DESCRIPTION

The new Megger MIT415 insulation and continuity tester has been designed for electrical testing by utilities, industrial, commercial and domestic electricians. The wide range of test voltages makes the MIT415 series ideal for the engineer or technician involved with combined applications of both communications circuits and power circuits such as would be found in elevator service/repair and routine maintenance. The low test voltage insulation ranges also makes the MIT415 ideal for ESD testing.

The MIT415 replaces the well-established BMM2000ESD insulation tester, gives greater functionality with simplified operation, greater application range and an ergonomically designed case.

INSULATION TESTING

- **Test voltages** - 10 V, 25 V, 50 V, 100 V, 250 V and 500 V
- **Test Lock** - Locks insulation test on continuous.
- **Test voltage display** - The actual test voltage is displayed on the smaller digital readout, with the insulation result on the larger digital display.
- **Analogue arc** - The display also features an analogue arc to replicate the response of a moving coil display.
- **PI and DAR** - Polarisation Index (PI) and Dielectric Absorption Ratio (DAR) functions
- **50 GΩ** - Insulation testing from 1 GΩ to 50 GΩ
- **Silicone leads** - High quality flexible silicone test leads are comfortable to use and prevent measurement errors

on higher GΩ ranges.

- **Test inhibit** - prevents testing if system voltages in excess of 50 V are detected when making insulation tests.
- **Insulation buzzer** - The buzzer can operate if the insulation resistance is above a preset limit, set via the Setup menu.

CONTINUITY TESTING

- **Auto-test** - Auto test on circuit contact enables real two handed operation without the need to press the test button.
- **200 mA or 20 mA** - Either 200 mA or 20 mA continuity test currents are available. 20 mA test current will considerably increase battery life.
- **Lead null** - Lead resistance compensation (NULL) operates up to 10 Ω of resistance.
- **Buzzer** - ON-OFF selected by simple push button.
- **Buzzer limit** - Continuity buzzer limit alarm provides adjustment of the maximum resistance at which the continuity buzzer sounds. This is adjustable from 1 Ω to 20 Ω in 5 steps.
- **Resistance** - kΩ range extends continuity measurement to 1 MΩ.

DISPLAY

The display offers a combination of analogue arc and a dual digital readout:

Analogue arc:

- Full display width analogue arc.
- Patented arc display shows essential charge and discharge characteristics not visible on a digital numeric only display.
- Single pointer “needle” response is similar to a moving coil meter.
- Logarithmic display for better low insulation value measurements.

Dual digital display:

- Large main digital readout for good visibility of all main measurement results
- **Second digital display for additional data such as:**
 - Insulation test voltage.
 - Insulation leakage current.
 - Supply frequency (when measuring volts).
 - Test mode eg. PI, DAR or TI (Timed mode).

OTHER FEATURES

Weathproof - Every tester is sealed to IP54, providing a weatherproof case to reduce the chances of water ingress, including the battery and fuse compartment.

Tough housing - Rubber over moulding combines the tough shock absorbing outer protection with excellent grip, on a strong modified ABS housing, providing an almost indestructible case.

Batteries - Battery requirements are 5 AA batteries of either standard Alkaline or Nickel Metal Hydride (NiMH) rechargeable type, providing a minimum of 2200 insulation tests at 500V.

SAFETY

Designed to be exceptionally safe to use, fast detecting circuitry prevents damage to the instruments if accidentally connected to live circuits or across phases. Specifically, all instruments:

- Meet the international requirements of IEC1010-2 and EN61557.
- Live circuit detection inhibits insulation testing on circuits above 50 V.
- Live circuit detection and test inhibit on continuity measurements.
- Default display of live circuit voltage on all ranges.
- Detection and inhibit functions even if the protection fuse has failed.
- Suitable for use on CAT IV applications and supply voltages (of up to) 600 V to ground.

600 V CAT IV

All MIT415 instruments are designed to meet the safety requirements for use on CAT IV 600 V.

APPLICATIONS

(A) Electrical installations testing:

The MIT415 includes all the features required for electricians and engineers working in a range of industries. Available features are selected to make testing easy and fast in a range of situations. Typical industries include:

- Electrical supply companies
- Large and small scale electrical installation
- Periodic inspection and testing
- Cable testing

(B) Combined power and communications applications:

Typically power circuits are tested at 250V or 500V, whereas communications circuits for signalling are tested at lower voltages such as 25V or 50V. Both systems can be tested with the MIT415. Typical applications would include:

- Elevator service engineers
- Street lighting (pedestrian controls)
- Machinery and safety interlock commissioning/service
- Heating, ventilation and air conditioning systems
- Robotic power and controls

(C) Electrostatic Discharge testing

The 10V and 100V insulation test voltage ranges are ideal for ESD testing, including servicing of equipment and routine maintenance of ESD conductive flooring, bench mats and grounding systems etc. Typical industries include:

- Electronic manufacturing
- Electronic servicing and repair
- Calibration houses

Insulation range

| | | |
|--|-------------------|----------|
| 10 V | Maximum reading = | > 1.00 G |
| 25 V | Maximum reading = | > 2.00 G |
| 50 V | Maximum reading = | > 5.00 G |
| 100 V | Maximum reading = | > 10.0 G |
| 250 V | Maximum reading = | > 20 G |
| 500 V | Maximum reading = | > 50 G |
| Leakage current display | | ✓ |
| INS test voltage display | | ✓ |
| Continuity | | |
| 200 mA | (0.01 to 99.9 Ω) | ✓ |
| Variable Current Limit. 200 mA / 20 mA | | ✓ |
| Fast buzzer- Selectable threshold | | ✓ |
| K Ω range to 999 K | | ✓ |
| Voltage | | |
| TRMS & DC Measurement to 600 V | | ✓ |
| Default voltmeter on other ranges | | ✓ |
| Measurement ranges | | ✓ |
| Frequency Hz- 15 to 450 Hz | | ✓ |
| Safety | | |
| Live circuit warning at 25 V | | ✓ |
| Testing inhibit at 50 V | | ✓ |
| IEC61010 compliant | | ✓ |
| Installation Category IV 600 V to ground | | ✓ |
| Features | | |
| Backlight | | ✓ |
| Battery condition display | | ✓ |
| Insulation Timed - PI – DAR Tests | | ✓ |
| Test button plus lock button | | ✓ |
| Auto power down | | ✓ |
| Remote switch probe (SP5) | | ✓ |
| Calibration certificate with product | | ✓ |

SPECIFICATION

All quoted accuracies are at +20°C.

Insulation

Nominal test voltages

MIT415 10 V, 25 V, 50 V, 100 V, 250 V, 500 V

Insulation resistance range (see note 1)

| | |
|-------|-------|
| 10 V | 1 GΩ |
| 25 V | 2 GΩ |
| 50 V | 5 GΩ |
| 100 V | 10 GΩ |
| 250 V | 20 GΩ |
| 500 V | 50 GΩ |
| Ω | |

Range Full Scale Accuracy

All ranges ±2% ±2 digits up to 100 MΩ.

Then:

| | |
|-------|--------------------------------|
| 500 V | ±3% ±2 digits ±0.4% per GΩ |
| 250 V | ±3% ±2 digits ±0.8% per GΩ |
| 100 V | ±3% ±2 digits ±2.0% per GΩ |
| 50 V | ±3% ±2 digits ±4.0% per GΩ |
| 25 V | ±3% ±2 digits ±2.0% per 100 MΩ |
| 10 V | ±3% ±2 digits ±2.0% per 100 MΩ |

Analogue range: 1 GΩ full scale

Resolution: 0.01 MΩ

Short circuit current: 2 mA +0% -50%

Open circuit terminal voltage: -0% + 20% ±1 V

Test current on load:

1 mA at min. pass value of insulation specified in BS7671, HD384 and IEC364, 2 mA max.

EN61557 Operating range: 0,10 MΩ to 1,00 GΩ

Leakage current range 10 μA 2000 μA

Leakage current: 10% ±3 digits

Voltage display: 3% ±3 digits ± 0.5% of rated voltage

Polarisation Index (PI): 10 min / 1 minute ratio

Dielectric Absorption Ratio (DAR): 60 sec / 30 sec ratio

Timer: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 minute countdown in seconds

Notes:

(1) All ranges measure from 0,00 MΩ upwards.

(2) Above specifications only apply when high quality silicone leads are being used.

Continuity

Measurement: 0,01 Ω to 99,9 Ω (0 to 100 Ω on analogue scale)

Accuracy: ± 2% ± 2 digits (0 to 100 Ω)

Open circuit voltage: 5 V ± 1 V

Test current: 200 mA (±1 mA) (0.01 Ω to 9.99 Ω)
20 mA (±1 mA) (10.0 Ω to 99.9 Ω)

Zero offset at probe tips: 0,10 Ω typical

Lead resistance zeroing: Up to 9.00 Ω

Buzzer: Variable limit 1 Ω , 2 Ω , 5 Ω , 10 Ω , 20 Ω

Resistance Measurement: 0.01 k Ω to 1000 k Ω (0 to 1 M Ω on analogue scale)

Accuracy: $\pm 3\% \pm 2$ digits

Open circuit voltage: 5 V ± 1 V

Short circuit current: 20 μ A ± 5 μ A

Voltage range
0 to 600 V d.c. $\pm 2\% \pm 2$ digits
10 mV to 600 V TRMS sinusoidal (40 to 400 Hz) $\pm 2\% \pm 1$ digit
0 to 1000 V on analogue scale
Unspecified input level 0 - 10 mV (40 to 400 Hz)

For non-sinusoidal waveforms additional specification apply:
 $\pm 3\% \pm 2$ digits 101 mV to 600 V TRMS and $\pm 8\% \pm 2$ digits 10 mV to 100 mV TRMS

Default Voltmeter: Operates at > 25 V a.c. or d.c. on any range except OFF

Frequency: 40-450 Hz (40 Hz - 99.9 Hz) $\pm 0.5\% \pm 1$ digit (100 Hz to 450 Hz)

Power Supply: 5 x 1,5 V cells type IEC LR6 (AA, MN1500, HP7, AM3 R6HP) Alkaline NiMH rechargeable cells may be used.

Battery life: 2200 insulation tests with duty cycle of 5 sec ON /55 sec OFF @ 1000 V into 1 M Ω

Dimensions
Instrument: 220 x 92 x 50 mm (8.66 in. x 3.63 in. x 1.97 in.)
Instrument + case: 456 x 178 x 89 mm (18 in. x 7 in. x 3.5 in.)

Weight
Instrument only: 590 gms, 775 gms with boot (20.73 oz. 27.22 oz.)
Instrument plus case: 1.75kg (3.86 lb)

Fuse
Use only a 500 mA (FF) 1000 V 32 x 6 mm ceramic fuse of high breaking capacity HBC 50 kA minimum. Glass fuses **MUST NOT** be fitted.

Safety Protection
The instruments meet IEC 61010-1 to 600 V phase to earth, Category IV. Refer to safety warnings supplied.

E.M.C.
In accordance with IEC 61326-1

Temperature effects
Temperature coefficient: < 0,1% per $^{\circ}$ C up to 1 G Ω
< 0,1% per $^{\circ}$ C above 1 G Ω

Environmental
Operating range: -10 to +55 $^{\circ}$ C
Operating humidity: 90% RH at 40 $^{\circ}$ C max.
Storage temperature range: -25 $^{\circ}$ C to +70 $^{\circ}$ C
Calibration Temperature: +20 $^{\circ}$ C
Maximum altitude: 2000 m
Dust and water protection: IP54 Protected against dust and splashing water

ORDERING INFORMATION

| Item (Qty) | Order No. | Item (Qty) | Order No. |
|---|-----------|-----------------------------|-----------|
| Insulation and continuity tester | MIT415-EN | Optional accessories | |
| Included accessories | | Replacement lead set | 6220-813 |
| Red/Black silicone test leads with probes and clips | | SP5 remote switch probe | 6220-812 |
| SP5 remote switch probe | | Rubber boot with stand | 6231-802 |
| Rubber boot with stand | | Hard case | 5410-420 |
| Owners information CD | | | |
| Batteries | | | |
| Hard carry case | | | |