MIT415/2 and MIT417/2
CAT IV Insulation testers

- **Designed for Electrical and Industrial testing**
- **Insulation testing up to 1000 V and 200 GΩ range**
- **Stabilised insulation test voltage (New)**
- **Single range, faster continuity testing from 0.01 Ω to 1 MΩ (New)**
- **Insulation test voltage from 10 V to 1000 V (New)**
- **600 V Trms AC and DC voltage measurement**
- **Live circuit detection and protection**
- **CAT IV 600 V and IP54**

DESCRIPTION

The MIT415/2 and MIT417/2 insulation and continuity testers are designed not just for Electrical and Industrial, but with an exceptionally wide range of applications from electrical installations, cable testing, motor testing, automotive, ESD, panel building, avionics, maintenance etc.

Insulation testing has been enhanced with feedback controlled test voltages to limit over-voltage to 2%, rather than the industry standard 10-20%.

Continuity testing is now significantly faster, and a single auto-ranging 0.01 Ω to 1.0 MΩ function replaces the "ohms" and "kOhms" ranges. Retained are the 200 mA and 20 mA test options.

Replacing the original MIT400 instruments the new units feature a redesigned case, back-stand, and 6 cell battery compartment with separate fuse access.

All instruments are over-moulded for increased protection and achieve an IP54 weatherproof rating.

The MIT415/2 and MIT417/2 include additional low voltage insulation test voltages at 10 V and 25 V for ESD and low- voltage signal-wire testing as found in elevators. The MIT415/2 also incluses a display option to show 10^5, 10^6, 10^7 instead of the usual KΩ, MΩ, GΩ etc.

THE MIT400 RANGE:

The range consists of 2 instruments:

MIT415/2	10 V, 25 V, 50 V, 100 V, 250 V, 500 V + PI, DAR
MIT417/2	10 V, 25 V, 50 V, 100 V, 250 V, 500 V, 1000 V + PI, DAR

INSULATION RESISTANCE TESTING:

The stabilised insulation test voltage is now accurate to +2% -0%. This compares to the industry standard +20%, providing a more accurate test voltage without the risk of over-voltage damage to circuits or components. The output voltage is maintained between 0 and 2% throughout the test range.

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FEATURES INCLUDE:

- **Test voltages (New) ***
  10 V, 25 V, 50 V, 100 V, 250 V, 500 V and 1000 V.
- **2% test voltage accuracy**
  - The output test voltage is maintained within the tolerance or -0% +2%
- **PASS/FAIL indication (New) ***
  – PASS or FAIL displayed depending on threshold voltage
- **Stabilised test voltage**
  - The voltage is feedback controlled to ensure it remains within specification throughout the full test range
- **Test voltage display (New)**
  - The actual test voltage is displayed on the smaller digital readout, with the measurement 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 ***
  - Polarization Index (PI) and Dielectric Absorption Ratio (DAR) functions
  - PI: 10 min / 1 minute ratio
  - DAR: 60 sec / 15 sec ratio
    60 sec / 30 sec ratio
- **Timed testing ***
  - Automatically test to a time limit
- **High test range**
  - Insulation testing up to 200 GΩ at 1000 V.
- **Silicon leads**
  - High quality flexible silicon test leads are comfortable to use and prevent measurement errors on GΩ ranges above 5 GΩ.
- **Test inhibit**
  - prevents testing if voltages in excess of 25 V, 30 V, 50 V, 75 V 100 V (set by the user) are detected when making insulation tests. (Default is 50 V.)
- **Insulation buzzer**
  - The buzzer can be set to buzz if the insulation resistance is above a user adjustable limit, set in the Setup menu.
- **Test Lock**
  - Holds insulation test on continuously.
- **ESD display option (MIT415/2 only) (New)**
  - Swap display from kΩ, MΩ, GΩ to 10^5, 10^6, 10^7 etc

* Dependent on model

Test ranges extend from 2 GΩ to 200 GΩ depending on test voltage as below:

10 Volts	2GΩ
25 Volts	5 GΩ
50 Volts.	10 GΩ
100 Volts.	20 GΩ
250 Volts.	50 GΩ
500 Volts.	100 GΩ
1000 Volts	200 GΩ

CONTINUITY (RESISTANCE) TESTING:

- **Single resistance range (New)**
  - One range fully automatic from 0.01 Ω to 1.0 MΩ.
- **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 Ωs of resistance.
- **Buzzer**
  - ON/OFF selected by simple push button.
- **Buzzer limit**
  - Continuity buzzer limit alarm provides adjustment of the maximum resistance the continuity buzzer sounds. This is adjustable from 1 Ω to 200 Ω in 12 steps.

VOLTAGE MEASUREMENT:

True RMS voltage measurement to 600 V ac or dc with resolution from 0.1 mV.

- Digital voltage measurement up to 600 V AC/DC
- Analogue arc measurement to 600 V AC/DC
- Automatic display of frequency during voltage measurement.

DISPLAY:

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

Analogue arc:

- Full display width analogue arc.
- Analogue arc display shows essential charge and discharge characteristics not visible on a digital display.
- Single pointer "needle" response is similar to a moving coil meter.
- Setup functions allow control of Buzzer limit alarms, Continuity test currents, KΩ/MΩ/GΩ or 10^4 /10^5 /10^6 etc **(New)**

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 t (t = Timer mode).

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OTHER FUNCTIONS AND FEATURES

Weatherproof - 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 molding 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 6 AA batteries of either standard Alkaline or Nickel Metal Hydride (NiMH) rechargeable type, providing a minimum of 3000 insulation tests at 1000 V.

TYPICAL APPLICATIONS INCLUDE:

- Commercial Avionics
- Military Land, Marine and Air communications
- Manufacturing/production line goods
- Electrostatic measurement
- Component testing
- Battery powered traction and lifting equipment
- Elevator control and power circuits

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 IEC61010 and EN61557.

Live circuit detection inhibits insulation testing on circuits above 25 V, 30 V, 50 V, 75 V or 100 V (default 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 to 600 V.

FEATURES AND BENEFITS

- Designed for Electrical and Industrial testing
- Insulation testing up to 1000 V and 200 GΩ range
- Stabilized insulation test voltage **(New)**
- Single range, faster continuity testing from 0.01 Ω to 1 MΩ **(New)**
- Adjustable insulation test voltage from 10 V to 1000 V **(New)**
- 600 V Trms AC and DC voltage measurement
- New case design with optional magnetic hanging strap **(New)**
- Live circuit detection and protection
- Rechargeable options for mains and car charging **(New)**
- CAT IV 600 V and IP54

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SPECIFICATION SUMMARY TABLE

INSULATION	MIT415/2	MIT417/2
10 V / 25 V / 50 V / 100 V / 250 V / 500 V	■	■
1000 V		■
PI- / DAR / Timed	■	■
Lock button on MΩ	■	■
µA Leakage	■	■
CONTINUITY		
Continuity 0.01 Ω - 1 MΩ	■	■
Auto reverse polarity (setup ON-OFF)	■	■
Lead null (< 10 Ω)	■	■
VOLTAGE		
AC / DC Volts 600 V	■	■
mV AC / DC range	■	■
Frequency measurement 15 - 400 Hz	■	■
Input impedance	0.25 mΩ	0.25 mΩ
OTHER FEATURES		
Auto power down (setup)	■	■
AA Alkaline or NiMH	Alk	Alk
CAT IV 600 V	■	■
ACCESSORIES		
Silicone leads (red/black)	■	■
Switched probe supplied	■	■

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SPECIFICATION

All quoted accuracies are at +20 °C

Insulation:

Test voltage

Nominal:

MIT415/2	10 V, 25 V, 50 V, 100 V, 250 V, 500 V,
MIT417/2	10 V, 25 V, 50 V, 100 V, 250 V, 500 V, 1000 V

Insulation accuracy

10 Volts.	2 GΩ	± 2% ± 2 digits ± 2.0% per 100 MΩ
25 Volts.	5 GΩ	± 2% ± 2 digits ± 0.8% per 100 MΩ
50 Volts.	10 GΩ	± 2% ± 2 digits ± 4.0% per GΩ
100 Volts.	20 GΩ	± 2% ± 2 digits ± 2.0% per GΩ
250 Volts.	50 GΩ	± 2% ± 2 digits ± 0.8% per GΩ
500 Volts.	100 GΩ	± 2% ± 2 digits ± 0.4% per GΩ
1000 Volts.	200 GΩ	± 2% ± 2 digits ± 0.2% per GΩ

Service Error: BS EN 61557-2 (2007).

50V,	± 2.0% ± 2d, 100 kΩ - 900 kΩ ± 10.5%
100V,	± 2.0% ± 2d, 100 kΩ - 900 kΩ ± 10.3%
250V,	± 2.0% ± 2d, 100 kΩ - 900 kΩ ± 10.3%
500V,	± 2.0% ± 2d, 100 kΩ - 900 kΩ ± 10.3%
1000V,	± 2.0% ± 2d, 100 kΩ - 900 kΩ ± 11.5%

Display range Analogue: 1 GΩ full scale

Resolution 0.1 kΩ

Short circuit/charge current
2 mA +0% -50% to EN 61557-2 (2007)

Open circuit voltage insulation
-0% +2% ± 2V

Test current 1 mA at min. pass value of insulation to a maximum of 2 mA max.

Leakage 10% ±3 digits

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

Timer control 60 second countdown timer

Note Above specifications only apply when high quality silicone leads are being used.

Continuity:

Continuity measurement
0.01 Ω to 999 kΩ
(0 to 1000 kΩ on analogue scale)

Continuity accuracy ± 3% ± 2 digits (0 to 100 Ω)
± 5% ±2 digitis (>500 kΩ- 1MΩ)

Service Error: BS EN 61557-4 (2007) - ± 2.0%, 0.1 Ω - 2 Ω ± 6.8%

Open circuit voltage 5 V ± 1 V

Test current 200 mA (–0 mA +20 mA)
(0.01 Ω to 4 Ω)

Polarity Single polarity (Default) / Dual polarity (configurable on setup).

Lead resistance Null up to 9.00 Ω

Voltage:

Voltage range AC: 10 mV to 600 V TRMS sinusoidal (15 Hz to 400 Hz)
DC: 0 to 600 V

Volt range accuracy AC: ±2% ±1 digit
DC: ±2% ±2 digit

Service Error: BS EN 61557-1 (2007) - ± 2.0% ± 2d, 0 V - 300 V AC/DC ± 5.1%

Waveform Unspecified range:
0 – 10 mV (15 to 400 Hz)
For non-sinusoidal waveforms additional specifications apply
Non-sinusoidal waveforms:
±3% ± 2 digits >100 mV to 600 V TRMS
±8% ± 2 digits 10 mV to 100 mV TRMS

Frequency:

Frequency measurement range
15 Hz - 400 Hz

Frequency measurement accuracy
±0.5% ± 1digit (100 Hz to 400 Hz unspecified)

Power supply 6 x 1.5 V cells
type IEC LR6 (AA, MN1500, HP7, AM3 R6HP) Alkaline
6 x 1.2 V NiMH rechargeable cells may be used

Battery life 3000 insulation tests with duty cycle of 5 sec ON /55 sec OFF @ 1000 V into 1 MΩ

Dimensions Instrument 228 mm x 108 mm x 63 mm (9.00 in x 4.25 in x 2.32 in)

Weight 600 g (MIT415/2 & MIT417/2), (1.32 lb)

Weight (instrument and case)
1.75 kg (3.86 lb)

Fuse Use only 1 x 500 mA (FF) 1000 V 32 x 6 mm ceramic fuse of high breaking capacity HBC 10 kA minimum. Glass fuses MUST NOT be fitted.

Safety protection The instruments meet EN 61010-1 (1995) to 600 V phase to earth, Category IV. Refer to safety warnings supplied.

EMC In accordance with IEC 61326 including amendment No.1

Temperature co-efficient
<0,1% per °C up to 1 GΩ
<0,1% per °C per GΩ above 1 GΩ

Environmental:

Operating temperature range and humidity
-10 to +55 °C
90% RH at 40 °C max.

Storage temperature range
-25 to +70 °C

Calibration temperature
+20 °C

Maximum altitude 2000 m

IP rating IP 54

ORDERING INFORMATION

Included Accessories
Red/Black Silicone test leads with Probes + Clips
SP5 remote switch probe (not MIT415/2)
Owners information CD
Batteries 6 x AA Alkaline
Hard carry case

Description	Order Code
Language Pack 1 - English - French - German - Dutch	
MIT415/2 Insulation tester	1006-738
Language Pack 2 - English - Spanish - Italian - Portuguese	
MIT415/2 Insulation tester	1006-739
Language Pack 5 - English - Chinese - Japanese - Korean	
MIT417/2 Insulation tester	1004-738
Optional Accessories	
UKAS calibration certificate	1000-085
Mains Charger kit (MIT430/2 only)	1007-464
12 V DC car charger (requires mains charger kit)	1004-183
SP5 remote switch probe (not MIT415/2)	1007-157
Test lead set and crocodile clips	1002-001
2 wire 500 mA fused test lead set	1002-015
Batteries (6 x NiMH)	1002-735

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