MIT2500
CAT IV Insulation testers



- **Insulation testing up to 2.5 kV (New) and 200 GΩ range in a hand held instrument**
- **Guard terminal for high resistance accuracy (New)**
- **Adjustable insulation test voltage from 50 V to 2500 V (New)**
- **Stabilised insulation test voltage (New)**
- **Rechargeable options for mains and car charging (New)**
- **Single range, faster continuity testing from 0.01 Ω to 1 MΩ (New)**
- **Polarisation Index (PI) & Dielectric Absorption Ratio (DAR)**
- **CAT IV 600 V applications**

DESCRIPTION

The MIT2500 insulation and continuity tester has been designed for Electrical and Industrial test applications, where operation voltages exceed 1000 V and higher insulation test voltages are needed.

The MIT2500 offers both fixed range voltages of 50 V, 100V, 250 V, 500 V, 1000 V and 2500 V, as well as a variable range that allows any voltage between 50 V and 2500 V to be "dialled in". This is supported by the new test voltage feedback control, which maintains the output test voltage to within 2% of the selected range, even when under test.

The MIT2500 uses the redesigned case, back-stand, and 6 cell battery compartment, as well as incorporating a Guard terminal to reduce surface tracking currents that reduce accuracy at higher voltages.

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

INSULATION RESISTANCE TESTING

The feedback controlled insulation test voltage is now accurate to +2% -0% compared to the original +20%, providing a more accurate test voltage without the risk of over-voltage damage to circuits.

A variable range allows the exact test voltage to be selected from 50 V to 999 V in 1 V steps, (1KV to 2.5KV in 10 V steps) providing 1100 test voltage options.

FEATURES INCLUDE:

- **Test voltages (New)**
  - 50 V, 100 V, 250 V, 500 V, 1000 V, and 2500 V
- **Guard terminal**
  - Improved performance on higher insulation test ranges
- **2.5 kV Silicone test leads (New)**
  - Purpose designed high 2.5 kV silicone test leads are included as well as standard 1000 V CAT III / 600 V CAT IV general purpose test leads.
- **Variable test voltage (New)**
  - Adjustable test voltage from 50 V to 999 V in 1 V steps, 1000 V to 2500 V in 10 V steps
- **2% Test voltage accuracy**
  - The output test voltage is maintained within the tolerance of -0% +2% +2 V
- **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.
- **Measurement range displayed**
  – The range voltage is displayed during selection.
- **Measurement voltage display (New)**
  - The measurement voltage is displayed during the test.
- **Analogue arc**
  - The display also features an analogue arc to replicate the response of a moving coil display.
- **PI and DAR**
  - Automatic Polarisation Index (PI) and Dielectric Absorption Ratio (DAR) functions. Polarisation Index (PI):10 min / 1 minute ratio Dielectric Absorption Ratio (DAR): 60 sec / 30 sec ratio

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- **Timed testing**
  - Automatically test to a time limit.
- **200 GΩ range**
  - Insulation testing up to 200 GΩ at ≥1000 V.
- **Test inhibit**
  - prevents testing if voltages in excess of 25, 30, 50, 75 or 100 V (set by the user) are detected when making insulation tests. Default is 50 V.
- **Insulation buzzer**
  - The buzzer can be set to sound if the insulation resistance is above a user adjustable limit, configurable in the Setup menu.
- **Test Lock**
  - Holds insulation test on continuously.

Test ranges extend from 10 GΩ to 200 GΩ depending on test voltage as below:

50 Volts	10 GΩ
100 Volts	20 GΩ
250 Volts	50 GΩ
500 Volts	100 GΩ
1000 Volts	200 GΩ
2500 Volts	200 GΩ

The MIT2500 also includes a Guard terminal to prevent errors from stray leakage paths.

VARIABLE INSULATION VOLTAGE (NEW)*

The variable mode provides a unique solution for awkward insulation voltage measurement applications. The range option allows an insulation test voltage from 50 V to 999 V in 1 V steps, 1.0 KV to 2.5 KV in 10 V steps.

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

GUARD TERMINAL

The Guard terminal (G) is a third terminal on the connection panel. Connection of the guard terminal on certain applications provides a return path for parallel leakage currents that could otherwise create significant errors in the insulation measurement. This is especially so for surface contamination of equipment or cables.

- For voltages of 1000 V and above, or expected insulation values over 100 MΩ the guard terminal should be considered to reduce measurement error.

CONTINUITY (RESISTANCE) TESTING

- **Single resistance range (New)**
  - One range fully automatic from 0.01 Ω to 1.0 MΩ.
- **Auto test current selection**
  - Automatically uses the preferred test current for the load resistance under test.
- **Bi-directional testing (New)**
  - Option for automatic bi-directional testing without reconnecting leads.
- **Fast response time (New)**
  - Response time on contact buzzer has been reduced
- **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 the continuity buzzer sounds. This is adjustable from 1 Ω to 200 Ω in 12 steps.
- **Display PASS/FAIL (✓/✖) warnings (New)**
  - For use where buzzer indication may be disruptive.

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
- 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.
- Arc display shows essential charge and discharge characteristics not visible on a digital display.
- Single pointer "needle" response has a similar response to a moving coil meter.

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

Setup functions:

Allow control of:

- Continuity buzzer limit alarms,
- Insulation buzzer limit alarms,
- Insulation LOCK
- Insulation test timer duration
- Backlight ON duration
- Sleep timer
- Continuity test currents,
- Factory reset

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

The MIT2500 is enabled for internal charging when used with the optional charging pack.

STORAGE & DOWNLOADING RESULTS

Revised Bluetooth® and pairing procedures have made the MIT2500s far easier to pair and download data. The test results are downloaded to a CSV file which can then be opened as an Excel® spreadsheet.

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, 30, 50 74 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.

MIT2500 INCLUDED ACCESSORIES:

Silicone test leads:

2.5 kV rated test leads fitted with medium size Croc clips

1 x Red, 1 x Black, 1 x Blue (Guard)

1 kV rated standard test leads with Probes and clips

1 x Red, 1 x Black

OPTIONAL ACCESSORIES

Battery charger:

A charging pack is available to charge the MIT2500 when fitted with NiMH AA batteries.

Remote Switch Probe

APPLICATION

- Single and three phase rotating machinery
- Single and multi-core cable testing
- Motor testing

FEATURES AND BENEFITS

- Designed for the Electrical and Industrial markets
- Insulation testing up to 2.5 kV (New) and 200 GΩ range in a hand held instrument
- Guard terminal for high resistance accuracy (New)
- Adjustable insulation test voltage from 50 V to 2500 V (New)
- Stabilised insulation test voltage (New)
- Rechargeable options for mains and car charging (New)
- Single range, faster continuity testing from 0.01 Ω to 1 MΩ (New)
- Polarisation Index (PI) & Dielectric Absorption Ratio (DAR)
- 600 V Trms AC and DC voltage measurement
- New case design with optional magnetic hanging strap (New)
- Test result storage and review and Bluetooth downlaod
- Live circuit detection and protection
- CAT IV 600 V applications
- IP54

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FUNCTIONAL SUMMARY

INSULATION	
50 V / 100 V	■
250 V / 500 V / 1000 V	■
2500 V	■
VARIABLE voltage from 50 V to 2500 V	■
PI- / DAR / timed	■
Lock button on MΩ	■
Guard terminal	■
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	250 kΩ
CAPACITANCE	
Capacitance 0.1 nF - 10 µF	■
OTHER FEATURES	
PASS/FAIL on limit alarms	■
Auto power down (setup)	■
On board memory	■
Bluetooth® Download and Software	■
AA Alkaline or NiMH	■
Recharger ready	■
CAT IV 600 V	■
ACCESSORIES	
Silicone leads (Red/Black/Blue with probes and clips)	■
2.5 kV Silicone croc clip leads	■
OPTIONAL Switched probe supplied	■
OPTIONAL Battery charger available	■

SPECFICATIONS

All quoted accuracies are at +20 °C.

Insulation

Insulation accuracy

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
2500 Volts	200 GΩ	± 2%	± 2 digits ± 0.2% per GΩ

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

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

Guard terminal performance <5% error at 500 kΩ parallel circuit resistance with 100 MΩ load

Display range Analogue: 1 GΩ full scale

Resolution 0.1 kΩ

Short circuit/charge current 2 mA +0% -50% to EN 61557-2 (2007) (except 2500 V)

Terminal voltage accuracy -0% +2% ± 2V

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

Operation EN61557 : 0.10 MΩ to 1.0 GΩ

Leakage current display 10% ±3 digits

Voltage ±3% ±2 digits ±0.5% of rated voltage

Timer control Countdown timer 60 second (adjustable to 10 minutes)

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

Continuity:

Continuity measurement 0.01 Ω to 1 MΩ (0 to 1000 kΩ on analogue scale)

Continuity accuracy ± 3% ± 2 digits (0 to 100 Ω)
± 5% ± 2 digits (100 Ω - 500 k Ω)
Service Error: BS EN 61557-4 (2007) -
± 2.0%, 0.1Ω - 2Ω ± 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 10 Ω

Voltage range:

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

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Volt range accuracy	DC: ± 2% ± 2 digits AC: ± 2% ± 2 digits Service Error: BS EN 61557-1 (2007) - ± 2.0% ± 2d, 0V - 300Vac/dc ± 5.1%
Waveform	Non-sinusoidal: ± 3% ± 2 digits >100 mV to 600 V TRMS ± 8% ± 2 digits 10 mV to 100 mV TRMS
Default voltmeter	± 0.5% ± 1digit (100 Hz to 400 Hz) unspecified

Frequency:

Frequency measurement range	15 Hz - 400 Hz
Frequency measurement accuracy	± 0.5% ± 1 digits

Capacitance measurement:

Capacitance range	0.1 nF to 10 µF
Accuracy	± 5.0% ± 2 digits (1 nF-10 µF)

Results storage:

Storage capacity	>1000 test results
Data download	Bluetooth® wireless Bluetooth® Class II
Range	up to 10 m
Power supply	6 x 1.5 V cells type IEC LR6 (AA, MN1500, HP7, AM3 R6HP) Alkaline 6 x 1.2 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 Charger (Optional): 12-15 V dc (accessory interface)
Dimensions	Instrument: 228 mm x 108 mm x 63 mm (9.00 in x 4.25 in x 2.32 in)
Weight	815 g, (1.8 lb)
Weight (instrument and case)	1.75 kg (3.86 lb)
Fuse	Use only 2 x 500 mA (FF) 1000 V 32 x 6 mm ceramic fuse of high breaking capacity HBC 30 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	-10 °C to +55 °C
Humidity	90% RH at 40 °C max
Storage temperature range	-25°C to +70 °C
Calibration temperature	+20 °C
Maximum altitude	2000 m
IP rating	IP 54

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ORDERING INFORMATION

Description	Order Code
Language group 1 - English - French - German - Dutch	
MIT2500 - 50 V to 2500 V Insulation tester + Store and Download	1004-745
Language group 2 - English - Spanish - Italian - Portuguese	
MIT2500 - 50 V to 2500 V Insulation tester + Store and Download	1006-764
Language group 3 - English - Arabic - Turkish - French	
MIT2500 - 50 V to 2500 V Insulation tester + Store and Download	1006-765
Language group 4 - English - Czech - Slovak - Polish	
MIT2500 - 50 V to 2500 V Insulation tester + Store and Download	1006-766
Language group 5 - English - Chinese - Japanese - Korean	
MIT2500 - 50 V to 2500 V Insulation tester + Store and Download	1006-767
Language group 6 - English - Hungarian - Romanian - Russian	
MIT2500 - 50 V to 2500 V Insulation tester + Store and Download	1006-768
Language group 7 - English - Finnish - Norwegian - Swedish	
MIT2500 - 50 V to 2500 V Insulation tester + Store and Download	1006-769

Description	Order Code
Included Accessories	
Red/Black/Blue silicone test leads with prods and clips	
2.5 kV Red/Black/Blue silicone test leads with clips	
Owners Information CD	
Batteries 6 x AA Alkaline	
Carry Case	
Optional Accessories	
Mains Charger kit	1007-464
12 V DC car charger (requires mains charger kit)	1004-183
Switched probe SP5	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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