

# MIT2500

## CAT IV Insulation Testers



- **Insulation testing up to 2.5 kV (New) and 200 GΩ range in a handheld instrument**
- **Guard terminal for high resistance accuracy (New)**
- **Adjustable insulation test voltage from 50 V to 2500 V (New)**
- **Rechargeable options for ac and car charging (New)**
- **Stabilized insulation test voltage (New)**
- **Single range, faster continuity testing from 0.01 Ω to 1 MΩ (New)**
- **Polarization Index (PI) & Dielectric Absorption Ratio (DAR)**
- **CATIV 600V 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 “dialed 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 2.5 kV 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 or -0% +2% +2 V.
- **Stabilized 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 (New)**
  - The test range is displayed during selection.
- **Measurement voltage display**
  - The measurement voltage is displayed during the test.

■ **Analog arc**

- The display also features an analogue arc to replicate the response of a moving coil display.

■ **PI and DAR**

- Automatic Polarization Index (PI) and Dielectric Absorption Ratio (DAR) functions. Polarization Index (PI): 10 min / 1 minute ratio  
Dielectric Absorption Ratio (DAR): 60 sec / 30 sec ratio.

■ **Timed testing**

- Automatically test to a time limit.

■ **200 GΩ range**

- Insulation testing up to 200 GΩ at  $\geq 1000$  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 buzz if the insulation resistance is above a user adjustable limit, set 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
■ 100 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 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.

■ **Differential measurement (New)**

- Allows the difference between two consecutive continuity tests to be measured

**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 analog arc and a dual digital readout:

**Analog arc:**

- Full display width analog arc.
- Analog 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.

**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)

## 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 to internal charging when used with the optional charging pack.

## STORAGE AND DOWNLOADING RESULTS

Revised Bluetooth® and pairing procedures have made the MIT2500 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, 75 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 the Telecommunications and Cable TV markets
- Insulation testing up to 500 V and 100 GΩ range in a hand held instrument
- 3 wire connection for Tip, Ring and Earth connection (New)
- Gated access to 500 V to prevent accidental damage (New)
- Adjustable insulation test voltage from 10 V to 500 V (New)\*
- Differential measurement capability (New)
- New case design with optional magnetic hanging strap (New)
- Rechargeable options for mains and car charging (New)
- Single range, faster continuity testing from 0.01 Ω to 1 MΩ (New)

## 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

## APPLICATIONS

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

## FEATURES

- 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)
- Stabilized 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)
- Polarization 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® download
- Live circuit detection and protection
- CAT IV 600 V applications
- IP54

## FUNCTIONAL SUMMARY

INSULATION RANGES	
50 V / 100 V / 250 V / 500 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® and software	■
Recharger ready	■
AA alkaline or NiMH	■
CAT IV/600 V	■
ACCESSORIES	
Silicone leads (Red, Black, Blue with probes and clips)	■
2.5 kV silicone croc clip leads	■
OPTIONAL switched probe available	■
OPTIONAL battery charger available	■

## SPECIFICATIONS

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%
1000 V	± 2.0% ± 2d, 100kΩ - 900kΩ	± 11.5%

## Guard terminal performance

&lt;5% error at 500 kΩ parallel circuit resistance with 100 MΩ load

## Display range

Analog: 1 GΩ full scale

## Resolution

0.1 kΩ

## Short circuit/charge current

2 mA +0% -50% to EN61557-2 (2007) [except 2500 V]

## Terminal voltage accuracy

-0% +2% ± 2 V

## Test current

1 mA at min. pass value of insulation to a maximum of 2 mA max  
EN61557 : 0.10 MΩ to 1.0 GΩ

## Operation

## Leakage current display Voltage

10% ±3 digits

±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 range

0.01 Ω to 1.0 MΩ (0 to 1000 kΩ on analog scale)

## Continuity accuracy

± 3% ± 2 digits (0 to 100 Ω)  
±5% ±2 digits (>100 Ω- 500 kΩ)  
Service Error: BS EN 61557-4 (2007) -  
± 2.0%, 0.1 Ω - 2 Ω ± 6.8%

## Open circuit voltage

5 V ± 1 V

## Polarity

Single polarity (default) / dual polarity (configurable on setup)

## Test current

200 mA (-0 mA +20 mA)  
(0.01 Ω to 4 Ω)

## Lead resistance

Null up to 10 Ω

## Voltage

<b>Voltage range</b>	AC: 10 mV to 600 V TRMS sinusoidal (15 Hz to 400 Hz) DC: 0 to 600 V Unspecified: 0 - 10 mV (150 to 400 Hz)
<b>Volt range accuracy</b>	AC: $\pm 2\% \pm 2$ digits DC: $\pm 2\% \pm 2$ digits Service Error: BS EN 61557-1 (2007) - $\pm 2.0\% \pm 2d$ , 0V - 300Vac/dc $\pm 5.1$
<b>Waveform</b>	Non-sinusoidal waveforms: $\pm 3\% \pm 2$ digits >100 mV to 600 V TRMS $\pm 8\% \pm 2$ digits 10 mV to 100 mV TRMS
<b>Default voltmeter</b>	$\pm 0.5\% \pm 1$ digit (100 Hz to 400 Hz) unspecified

## Frequency

<b>Frequency measurement range</b>	15 Hz - 400 Hz
<b>Frequency measurement accuracy</b>	$\pm 0.5\% \pm 1$ digit

## Capacitance measurement

<b>Capacitance range</b>	0.1 nF to 10 $\mu$ F
<b>Capacitance accuracy</b>	$\pm 5.0\% \pm 2$ digits ( 1 nF-10 $\mu$ F)

## Result storage

<b>Storage capacity</b>	>1000 test results
<b>Data download</b>	Bluetooth® wireless Bluetooth® Class II

<b>Range</b>	Up to 10 m (33 ft)
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## 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 @  
500 V into 1000 k $\Omega$   
Charger (Optional): 12-15 V dc  
(accessory interface)

## Dimensions

9.00 in x 4.25 in x 2.32 in  
(2.28 mm x 108 mm x 63 mm)

## Weight

1.8 lb (815 g)

## Weight (instrument and case)

3.86 lb (1.75 kg)

## 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 600V  
phase to earth, Category  
IV. Refer to safety warnings  
supplied.

## EMC

In accordance with IEC61326  
including amendment No. 1.

## Temperature coefficient

<0,1% per °C up to 1 G $\Omega$   
<0,1% per °C per G $\Omega$   
above 1 G $\Omega$

## Environmental

<b>Operating temperature</b>	14° F to 131° F (-10° C to +55 °C)
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<b>Humidity</b>	90% RH at 40 °C
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<b>Storage temperature</b>	-13° F to +158° F (-25° C to +70 °C)
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<b>Calibration temperature</b>	-8° F (+20° C)
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<b>Maximum altitude</b>	6560 ft (2000 m)
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<b>IP rating</b>	IP54
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license.

### ORDERING INFORMATION

Description	Order Code	Description	Order Code
MIT2500 - 50 V to 2.5 kV testings with guard, result storage, recall and downloading of results	1006-764		
<b>Included accessories</b>		<b>Optional accessories</b>	
Red/Black/Blue 1 kV silicone test leads with probes and clips	1007-781	Replacement Red/Black/Blue 1 kV silicone test leads with probes and clips	1007-781
Red/Black/Blue 2.50 kV silicone test leads with clips	1007-637	Red/Black/Blue 2.50 kV silicone test leads with clips	1007-637
Owners Information CD	download at <a href="http://www.megger.com">www.megger.com</a>	AC charger kit	1007-464
Batteries 6 x AA Alkaline	1002-753	12 V DC battery charger (requires AC charger kit)	1004-183
Hard carry case	2006-649	SP5 Switched probe	1007-157
Download manager software	download at <a href="http://www.megger.com">www.megger.com</a>	Test lead set and crocodile clips	1002-001
		2 wire 500 mA fused test lead set	1002-015
		Batteries (6 x NiMH)	1002-753