

## MIT2500 CAT IV Insulation Testers



- Insulation testing up to 2.5 kV (New) and 200 G $\Omega$  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  $\Omega$  to 1 M $\Omega$  (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**  
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**  
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**  
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**  
The actual test voltage is displayed on the smaller digital readout, with the measurement on the larger digital display.

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- **Measurement range displayed (**  
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 ≥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

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**  
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**  
Option for automatic bi-directional testing without reconnecting leads.
- **Fast response time**  
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**  
Allows the difference between two consecutive continuity tests to be measured

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### 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, k $\Omega$ /M $\Omega$ /G $\Omega$ .

#### 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 G $\Omega$  range in a hand held instrument
- 3 wire connection for Tip, Ring and Earth connection
- Gated access to 500 V to prevent accidental damage
- Adjustable insulation test voltage from 10 V to 500 V \*
- Differential measurement capability (New)
- New case design with optional magnetic hanging strap
- Rechargeable options for mains and car charging
- Single range, faster continuity testing from 0.01  $\Omega$  to 1 M $\Omega$

## MIT2500 CAT IV Insulation Testers

### FUNCTIONAL SUMMARY

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

### 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

<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 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 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%, 0.1Ω - 2Ω ± 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

## MIT2500 CAT IV Insulation Testers

### 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

#### Operating temperature

14° F to 131° F  
(-10° C to +55 °C)

#### Humidity

90% RH at 40 °C

#### Storage temperature

-13° F to +158° F  
(-25° C to +70 °C)

#### Calibration temperature

-8° F (+20° C)

#### Maximum altitude

6560 ft (2000 m)

#### IP rating

IP54

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

### SALES OFFICE

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### MIT2500\_DS\_US\_V02

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