

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) and 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, 100 V, 250 V, 500 V, 1000 V and 2500 V, and 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 six 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-molded 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, (1 kV to 2.5 kV in 10 V steps) providing 1100 test voltage options.

FEATURES AND BENEFITS

- **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 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.

■ 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.

- 15 nF capacitance inhibit where testing above 1000 V to prevent hazardous charge developing on the circuit under test.

■ 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, or 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).

OTHER FUNCTIONS AND FEATURES

Setup functions:

Allow control of:

- Continuity buzzer limit alarms;
- Insulation buzzer limit alarms;
- Insulation LOCK;
- Insulation test timer duration;
- Back-light 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

Smooth Bluetooth® and pairing procedures make the MIT2500s easy 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;
- Automatic capacitance detection to prevent hazardous charge.

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)
- 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) and 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	
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	■

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).

50 V, ± 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%

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% ±2 V
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
Max. capacitive load	15 nF on tests above 1000 V (only available on MIT2500)
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 kΩ) 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 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)

Volt range accuracy	AC: $\pm 2\%$ ± 2 digits Service Error: BS EN 61557-1 (2007) - $\pm 2.0\%$ $\pm 2d$, 0 V - 300 V AC/DC $\pm 5.1\%$	Weight	815 g (1 lb 13 oz)
Waveform	Non-sinusoidal: $\pm 3\%$ ± 2 digits >100 mV to 600 V TRMS $\pm 8\%$ ± 2 digits 10 mV to 100 mV TRMS	Weight (instrument and case)	1.75 kg (3 lb 14 oz)
Default voltmeter	$\pm 0.5\%$ ± 1 digit (100 Hz to 400 Hz) unspecified	Fuse	Use only 2 x 500 mA (FF) 1000 V 32 x 6 mm ceramic fuse of high breaking capacity HBC 30 kA minimum.
Frequency:		Safety protection	The instruments meet EN 61010-1:2010 and EN 61010-2-030:2010 to 600 V phase to earth, Category IV. Refer to safety warnings supplied
Frequency measurement range	15 Hz - 400 Hz	EMC	In accordance with IEC 61326 including amendment No.1
Frequency measurement accuracy	$\pm 0.5\%$ ± 1 digits	Temperature co-efficient	<0.1% per °C up to 1 GΩ <0.1% per °C per GΩ above 1 GΩ
Capacitance measurement:		Environmental:	
Capacitance range	0.1 nF to 10 μF	Operating temperature range	-10 °C to +55 °C
Accuracy	$\pm 5.0\%$ ± 2 digits (1 nF - 10 μF)	Humidity	90% RH at 40 °C max
Results storage:		Storage temperature range	-25 °C to +70 °C
Storage capacity	>1000 test results	Calibration temperature	+20 °C
Data download	Bluetooth [®] wireless Bluetooth [®] Class II	Maximum altitude	2000 m
Range	up to 10 m	IP rating	IP 54
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)		

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ORDERING INFORMATION

Description	Order Code	Description	Order Code
Language group 1 - English - French - German - Dutch		Included Accessories	
MIT2500 - 50 V to 2500 V insulation tester + store and download	1004-745	Red/Black/Blue silicone test leads with prods and clips	
		2.5 kV Red/Black/Blue silicone test leads with clips	
		Owner's Information CD	
		Batteries 6 x AA Alkaline	
		Carry Case	
Language group 2 - English - Spanish - Italian - Portuguese		Optional Accessories	
MIT2500 - 50 V to 2500 V Insulation tester + store and download	1006-764	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
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		

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