

# MIT480/2 Series Insulation Testers



- Insulation testing up to 500 V and 100 GΩ range in a handheld instrument
- 3-wire connection for A, B and E (Tip, Ring and Ground) connection (NEW)
- Gated access to 500 V to prevent accidental damage (NEW)
- Rechargeable options for ac and car charging (NEW)
- Single range, faster continuity testing from 0.01 Ω to 1 MΩ (NEW)
- Differential measurement capability (NEW)
- Stabilized insulation test voltage (NEW)
- 600 V Trms AC and DC voltage measurement
- Test result storage & Bluetooth® downloading
- CATIV 600V and IP54

## DESCRIPTION

The MIT480/2 series insulation and continuity testers replace the original MIT480 range and are designed specifically for the Telecommunications and Cable testing markets.

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.

## THREE TERMINAL CONNECTION (NEW)

Three terminal measurement permits the connection of all three test leads for A, B and E (or Tip, Ring and Ground). The measurement pair is selected from the A-B-E (T-R-G) button on the front panel. (New). Selection is confirmed in the display. No disconnection of test leads to measure individual pairs are required.

Alternatively the units can be used as a conventional Two Terminal instrument. section of this user guide.

## THE MIT480/2 RANGE (FOR TELECOMMUNICATIONS, REFER TO THE MIT480 DATASHEET)

The range consists of two instruments:

MIT481/2 50 V, 100 V, 250 V, 500 V\* + Storage

MIT485/2 50 V, 100 V, 250 V, 500 V\* + Storage + Download + recharge ready

\* Gated access – prevents accidental selection

## 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 10 V up to 500 V.

## FEATURES INCLUDE:

- Test voltages (New)
  - 50 V, 100 V, 250 V, and 500 V.
- Variable test voltage (New)
  - Adjustable test voltage from 10 V to 500 V.
- 2% test voltage accuracy
  - The output test voltage is maintained within the tolerance or -0% +2% +2 V.
- PASS/FAIL (✓/✗) indication (New)
  - PASS or FAIL (✓/✗) displayed depending on threshold voltage.
- 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.

- **Test range**
  - Insulation testing up to 100 GΩ \* @ 500 V.
- **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.
- **Timed testing**
  - Automatically test to a time limit.
- **Silicone leads**
  - High quality flexible silicone 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, 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.

\* Gated access – prevents accidental selection.

Test ranges extend from 10 GΩ to 100 GΩ depending on test voltage as below:

- 50 Volts up to 10 GΩ
- 100 Volts up to 20 GΩ
- 250 Volts up to 50 GΩ
- 500 Volts up to 100 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.
- **Differential measurement (New)**
  - Allows the difference between two consecutive continuity tests to be measured
- **REN (New)**
  - Displays the appropriate REN value for the circuit under test.
- Available on 100 V ins or continuity range

## 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
- Analog arc measurement to 600 V ac/dc
- Automatic display of frequency during voltage measurement. Input impedance is 10 MΩ to prevent loading the circuit and reporting low voltages. (New)

## CURRENT MEASUREMENT

- ∅ - 400 mA AC/DC

## 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).
  - Differential measurement result display

## 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 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 500 V.

## VARIABLE INSULATION VOLTAGE TESTER \*

The variable mode provides a unique solution for awkward insulation voltage measurement applications. The range option allows an insulation test voltage from 10 V to 500 V in 1 V steps.

\* Dependent on model

## STORAGE AND DOWNLOADING RESULTS

Revised Bluetooth® and pairing procedures have made the MIT480/2s 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.\*

\* Dependent on model

**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.

\* Dependent on model

**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 Ground 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  $\Omega$  to 1 M $\Omega$  (New)
- Feedback controlled insulation test voltage (New)
- Stabilized insulation test voltage (New)
- 600 V Trms AC and DC voltage measurement
- Test result storage and Bluetooth® downloading\*
- Live circuit detection and protection
- CAT IV 600 V and IP 54

\* Dependent on model

**SPECIFICATION SUMMARY TABLE**

INSULATION RANGES	MIT481/2	MIT485/2
<b>50 V / 100 V / 250 V / 500 V</b>	■	■
<b>Variable 10 V to 500 V</b>		■
<b><math>\mu</math>A button (Leakage)</b>	■	■
<b>Lock button on M<math>\Omega</math></b>	■	■
<b>REN telephone count (discharge)</b>	■	■
<b>&gt; 500 V Gated operation</b>	■	■
<b>OHMS RANGES</b>		
<b>Continuity 0.01 <math>\Omega</math> - 10 M<math>\Omega</math></b>	■	■
<b>Isc: 200 mA R <math>\leq</math> 4<math>\Omega</math></b>	■	■
<b>Isc 20 mA</b>	■	■
<b>Difference measurement [REL]</b>	■	■
<b>Lead null (&lt;10 <math>\Omega</math>)</b>	■	■
<b>VOLTAGE FUNCTION</b>		
<b>AC/DC Volts 600 V</b>	■	■
<b>mV AC/DC range</b>	■	■
<b>TRMS</b>	■	■
<b>Frequency measurement 15-400 Hz</b>	■	■
<b>Input impedance</b>	10 M $\Omega$	10 M $\Omega$
<b>CAPACITANCE</b>		
<b>Capacitance 0.1 nF - 10 <math>\mu</math>F</b>	■	■
<b>Distance by <math>\mu</math>F (open loop)</b>	■	■
<b>REN calculation</b>	■	■
<b>OTHER FEATURES</b>		
<b>Current measurement mA AC/DC</b>	■	■
<b>PASS/FAIL on limit alarms</b>		■
<b>A/B/E or T/R/G switching</b>	■	■
<b>Number of terminals</b>	3	3
<b>On-board memory</b>	■	■
<b>Bluetooth® and software</b>		■
<b>Recharger ready</b>		■
<b>AA alkaline or NiMH</b>	Both	Both
<b>CAT IV/600 V</b>	■	■
<b>ACCESSORIES</b>		
<b>Silicone leads (R,B,G)</b>	■	■
<b>Switched probe supplied</b>	■	■

### SPECIFICATIONS

All quoted accuracies are at +20 °C

#### Insulation.

##### Test voltage

Nominal:

MIT481/2 and MIT485/2

50 V, 100 V, 250 V, 500 V

##### 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

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%

<b>Display range</b>	Analog: 1 GΩ full scale
<b>Resolution</b>	0.1 kΩ
<b>Short circuit/ charge current</b>	2 mA +0% -50% to EN61557-2 (2007)
<b>Open circuit voltage insulation</b>	-0% +2% ± 2 V
<b>Test current</b>	1 mA at min. pass value of insulation to a maximum of 2 mA max. EN61557 Operating range: 0.10 MΩ to 1.0 GΩ
<b>Leakage current</b>	10% ± 3 digits
<b>Timer control</b>	Countdown timer 60 second
<b>NOTE</b>	Above specifications only apply when high quality silicone leads are being used.
<b>Continuity:</b>	
<b>Continuity range</b>	0.01 Ω to 1.0 MΩ
<b>Continuity accuracy</b>	± 3% ± 2 digits (0 to 100 Ω) ± 5% ± 2 digits (>100 Ω - 500 kΩ) (>500 kΩ - 1 MΩ unspecified) Service Error: BS EN 61557-4 (2007) - ± 2.0%, 0.1Ω - 2Ω ± 6.8%
<b>Open circuit voltage</b>	5 V ± 1 V
<b>Test current</b>	200 mA (-0 mA +20 mA) (0.01 Ω to 4 Ω)
<b>Lead resistance</b>	Nulling up to 10 Ω

#### mA range:

<b>DC</b>	0.0 mA - 500 mA ± 5%, ± 2 digits
<b>AC</b>	0.0 mA - 10 mA: unspecified 10.0 mA - 500 mA: ± 5%, ± 2 digits (15 Hz - 400 Hz sinusoidal)

#### Voltage:

<b>Voltage range</b>	AC: 10 mV to 600 V TRMS sinusoidal (15 Hz to 400 Hz) DC: 10 mV to 600 V
<b>Volt range accuracy</b>	AC: ± 2% ± 2 digits DC: ± 2% ± 2 digits Service Error: BS EN 61557-1 (2007) - ± 2.0% ± 2d, 0V - 300Vac/dc ± 5.1
<b>Waveform</b>	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
<b>Default voltmeter</b>	Operates at > 25 volts ac or dc on any range except OFF
<b>Frequency:</b>	
<b>Frequency measurement range</b>	15 Hz - 400 Hz
<b>Frequency measurement accuracy</b>	± 0.5% ± 1 digit
<b>Capacitance measurement:</b>	
<b>Capacitance range</b>	0.1 nF to 10 μF
<b>Capacitance accuracy</b>	± 5.0% ± 2 digits (1 nF-10 μF)
<b>Cable coefficient</b>	40nF/ km to 70nF / km
<b>Unit of measure</b>	50nF/ km
<b>Result storage:</b>	
<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)
<b>Power supply</b>	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.
<b>Battery life</b>	3000 insulation tests with duty cycle of 5 sec ON /55 sec OFF @ 500 V into 500 kΩ Charger (Optional): 12-15 V dc (accessory interface)

<b>Dimensions</b>	9.00 in x 4.25 in x 2.32 in (2.28 mm x 108 mm x 63 mm)
<b>Weight</b>	1.76 lb (800 g)
<b>Weight (instrument and case)</b>	3.86 lb (1.75 kg)
<b>Fuse</b>	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 <b>MUST NOT</b> be fitted.
<b>Safety protection</b>	The instruments meet EN 61010-1 (1995) to 600V phase to earth, Category IV. Refer to safety warnings supplied.
<b>EMC</b>	In accordance with IEC61326 including amendment No. 1.
<b>Temperature coefficient</b>	<0,1% per °C up to 1 GΩ <0,1% per °C per GΩ above 1 GΩ

**Environmental**

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

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**ORDERING INFORMATION**

<b>Description</b>	<b>Order Code</b>	<b>Description</b>	<b>Order Code</b>
MIT481/2 - 3 terminal 50 V to 500 V + storage and recall	1006-752		
MIT485/2 - as MIT481/2 + Bluetooth® download	1006-758		
<b>Included accessories</b>		<b>Optional accessories</b>	
Red/Black 1 kV silicone test leads with probes and clips	1007-780	Replacement Red/Black 1 kV silicone test leads with probes and clips	1007-780
SP5 Switched probe	1007-757	AC charger kit (MIT485/2 only)	1007-464
Owners Information CD		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
		2 wire 500 mA fused test lead set	1002-015
		Batteries (6 x NiMH)	1002-753

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