



- 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
- Gated access to 500 V to prevent accidental damage
- Rechargeable options for ac and car charging
- Single range, faster continuity testing from 0.01 Ω to 1 MΩ
- Differential measurement capability
- Stabilized insulation test voltage
- 600 V Trms AC and DC voltage measurement
- Test result storage & Bluetooth<sup>®</sup> 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

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. 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** - 50 V, 100 V, 250 V, and 500 V.
- **Variable test voltage**
  - 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** - 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**

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

**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, 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).
  - 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
- Gated access to 500 V to prevent accidental damage
- Adjustable insulation test voltage from 10 V to 500 V\*
- Differential measurement capability
- 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 $\Omega$
- Feedback controlled insulation test voltage
- Stabilized insulation test voltage
- 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

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

## 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%

#### Display range

Analog: 1 GΩ full scale

#### Resolution

0.1 kΩ

#### Short circuit/ charge current

2 mA +0% -50% to EN61557-2 (2007)

#### Open circuit voltage insulation

-0% +2% ± 2 V

#### Test current

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

10% ±3 digits

#### Leakage current

#### Timer control

Countdown timer 60 second

#### NOTE

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

### CONTINUITY:

#### Continuity range

0.01 Ω to 1.0 MΩ

#### Continuity accuracy

± 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%

#### Open circuit voltage

5 V ± 1 V

#### Test current

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

#### Lead resistance

Nulling up to 10 Ω

### MA RANGE:

#### DC

0.0 mA - 500 mA  
± 5%, ± 2 digits

#### AC

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)<br>DC: 10 mV to 600 V  |
| <b>Volt range accuracy</b> | AC: $\pm 2\% \pm 2$ digits<br>DC: $\pm 2\% \pm 2$ digits<br>Service Error: BS EN 61557-1 (2007) - $\pm 2.0\% \pm 2d$ ,<br>0 V – 300 V AC/DC $\pm 5.1$   |
| <b>Waveform</b>            | Unspecified range:<br>0 – 10 mV (15 to 400 Hz)<br>For non-sinusoidal waveforms additional specifications apply:<br>Non-sinusoidal waveforms:<br>$\pm 3\% \pm 2$ digits >100 mV to 600 V TRMS<br>$\pm 8\% \pm 2$ digits 10 mV to 100 mV TRMS |
| <b>Default voltmeter</b>   | Operates at > 25 volts ac or dc on any range except OFF   |

**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) |
| <b>Cable coefficient</b>    | 40nF/ km to 70nF / km                       |
| <b>Unit of measure</b>      | 50nF/ km                                    |

**RESULT STORAGE:**

|                         |   |
|-------------------------|---|
| <b>Storage capacity</b> | >1000 test results  |
| <b>Data download</b>    | Bluetooth <sup>®</sup> wireless<br>Bluetooth <sup>®</sup> 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<br>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 k $\Omega$<br>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 $^{\circ}$ C up to 1 G $\Omega$<br><0,1% per $^{\circ}$ C per G $\Omega$ above 1 G $\Omega$                                      |

**ENVIRONMENTAL**

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

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# MIT480/2 Insulation Testers

## ORDERING INFORMATION

| Description  | Order Code   | Description  | Order Code |
|--|--|--|------------|
| MIT481/2 - 3 terminal 50 V to 500 V + storage and recall | MIT481/2   | <b>Optional accessories</b>  |            |
| MIT485/2 - as MIT481/2 + Bluetooth® download             | MIT485/2   | Replacement Red/Black 1 kV silicone test leads with probes and clips | 1007-780   |
| <b>Included accessories</b>                              |  | AC charger kit (MIT485/2 only)                                       | 1007-464   |
| Red/Black 1 kV silicone test leads with probes and clips | 1007-780   | 12 V DC battery charger (requires AC charger kit)                    | 1004-183   |
| SP5 Switched probe                                       | 1007-757   | SP5 Switched probe   | 1007-157   |
| Batteries 6 x AA Alkaline                                | 1002-753   | Test lead set and crocodile clips                                    | 1002-001   |
| Hard carry case  | 2006-649   | 2 wire 500 mA fused test lead set                                    | 1002-015   |
| Download manager software                                | download at <a href="http://www.megger.com">www.megger.com</a> | Batteries (6 x NiMH)   | 1002-753   |
|  |  | Magnetic Strap   | 1010-013   |
|  |  | Carry Pouch MIT400/2 Series  | 1007-887   |

### SALES OFFICE

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### MIT480\_2 Series\_DS\_US\_V04

[www.megger.com](http://www.megger.com)

ISO 9001

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