# MIT480/2
# Insulation testers




- **Insulation testing up to 500 V and 100 GΩ range in a hand held instrument**
- **3 wire connection for A, B and E (Tip, Ring and Earth) connection (New)**
- **Gated access to 500 V to prevent accidental damage (New)**
- **Rechargeable options for mains and car charging (New)**
- **Single range, faster continuity testing from 0.01 Ω to 1 MΩ (New)**
- **Differential measurement capability (New)**
- **Stabilised insulation test voltage (New)**
- **600 V Trms AC and DC voltage measurement**
- **Test result storage and Bluetooth® downloading**
- **CAT IV 600 V and IP 54**

## DESCRIPTION

The MIT480 mk2 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.

## 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
- **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.
- **Test range**
  - Insulation testing up to 100 GΩ * @ 500 V.
- **Measurement range displayed (New)**
  - The test range is displayed during selection

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- **Measurement voltage display**
  - 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.
- **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.
- Avaliable 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
- Analogue 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

- ø - 400 mA AC/DC

## DISPLAY

The display offers a combination of Analogue arc and a dual digital readout:

**Analogue arc:**

- Full display width analogue arc.
- Analogue 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

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## 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 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)
- Feedback controlled insulation test voltage (New)
- Stabilised 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

## SPECFICATION SUMMARY TABLE

| 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 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 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 / 600V** | ■ | ■ |
| **ACCESSORIES** | | |
| **Silicone leads (R,B,G)** | ■ | ■ |
| **Switched probe supplied** | ■ | ■ |

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## SPECIFICATION:

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** | Analogue: 1 GΩ full scale |
| **Resolution** | 0.1 kΩ |
| **Short circuit/charge current** | 2 mA +0% -50% to EN 61557-2 (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.<br>EN61557 Operating range:<br>0.10 MΩ to 1.0 0GΩ |
| **Leakage Current** | 10% ±3 digits |
| **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)<br>±5% ±2 digits (>100 Ω- 500 kΩ)<br>(>500 kΩ - 1 MΩ unspecified)<br>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)<br>(0.01 Ω to 4 Ω) |
| **Lead resistance** | Nulling up to 10 Ω |

### Voltage range:

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

### Frequency:

| | |
|---|---|
| **Frequency measurement range** | 15 Hz - 400 Hz |
| **Frequency measurement accuracy** | ±0.5% ± 1 digit |

### Capacitance measurement:

| | |
|---|---|
| **Capacitance range** | 0.1 nF to 10 µF |
| **Accuracy** | ± 5.0% ± 2 digits ( 1 nF-10 µF) |
| **Cable coefficient** | 40n F/ km to 70nF / km<br><br>**Unit of measure:**<br>50nF / km |

### Result storage:

| | |
|---|---|
| **Storage capacity** | >1000 test results |
| **Data download** | Bluetooth® wireless Bluetooth® Class II |
| **Range** | up to 10 m |

### Power supply:

| | |
|---|---|
| **Power supply** | 6 x 1,5 V cells<br>type IEC LR6 (AA, MN1500, HP7, AM3 R6HP) Alkaline<br>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 500 kΩ<br>Charger (Optional): 12-15 V dc (accessory interface) |

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| | |
|---|---|
| **Dimensions** | 228 mm x 108 mm x 63 mm (9.00 in x 4.25 in x 2.32 in) |
| **Weight** | 800 g |
| **Weight (instrument and case)** | 1.75 kg (3.86 lb) |
| **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 IEC 61326 including amendment No.1 |
| **Temperature co-efficient** | <0,1% per °C up to 1 GΩ<br><0,1% per °C per GΩ above 1 GΩ |

## Environmental

| | |
|---|---|
| **Operating temperature range and humidity** | -10 to +55 °C<br><br>90% RH at 40 °C max. |
| **Storage temperature range** | -25 to +70 °C |
| **Calibration temperature** | +20 °C |
| **Maximum altitude** | 2000 m |
| **IP rating** | IP 54 |

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## ORDERING INFORMATION

| Description | Order Code |
|---|---|
| **Language group 1 - English - French - German - Dutch** | |
| MIT481/2 - 3 terminal 50 V to 500 V + storage and recall | 1004-741 |
| MIT485/2 - as MIT481/2 + Bluetooth® download | 1004-742 |
| **Language group 2 - English - Spanish - Italian - Portuguese** | |
| MIT481/2 - 3 terminal 50 V to 500 V + storage and recall | 1006-752 |
| MIT485/2 - as MIT481/2 + Bluetooth® download | 1006-758 |
| **Language group 3 - English - Arabic - Turkish - French** | |
| MIT481/2 - 3 terminal 50 V to 500 V + storage and recall | 1006-753 |
| MIT485/2 - as MIT481/2 + Bluetooth® download | 1006-759 |
| **Language group 4 - English - Czech - Slovak - Polish** | |
| MIT481/2 - 3 terminal 50 V to 500 V + storage and recall | 1006-754 |
| MIT485/2 - as MIT481/2 + Bluetooth® download | 1006-760 |
| **Language group 5 - English - Chinese - Japanese - Korean** | |
| MIT481/2 - 3 terminal 50 V to 500 V + storage and recall | 1006-755 |
| MIT485/2 - as MIT481/2 + Bluetooth® download | 1006-761 |
| **Language group 6 - English - Hungarian - Romanian - Russian** | |
| MIT481/2 - 3 terminal 50 V to 500 V + storage and recall | 1006-756 |
| MIT485/2 - as MIT481/2 + Bluetooth® download | 1006-762 |
| **Language group 7 - English - Finnish - Norwegian - Swedish** | |
| MIT481/2 - 3 terminal 50 V to 500 V + storage and recall | 1006-757 |
| MIT485/2 - as MIT481/2 + Bluetooth® download | 1006-763 |

| Description | Order Code |
|---|---|
| **Included accessories** | |
| Red/Black silicone test leads with prods and clips | |
| SP5 Switched probe (not MIT400/2) | |
| Owners Information CD | |
| Batteries 6 x AA Alkaline | |
| Hard carry case | |
| **Optional accessories** | |
| Mains Charger kit (MIT485/2 only) | 1007-464 |
| 12 V DC battery 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 |

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