USER GUIDE

MIT400/2 and MIT2500 Series

Insulation and continuity testers

MIT400/2 User Guide ➔

Register ➔ megger.com/register

MIT2500 User Guide ➔

Support ➔ megger.com/support

EN ENGLISH

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For Patent information about this instrument refer to the following web site:

megger.com/patents

This manual supersedes all previous issues of this manual. Please ensure that you are using the most recent issue of this document. Destroy any copies that are of an older issue.

Declaration of Conformity

Hereby, Megger Instruments Limited declares that radio equipment manufactured by Megger Instruments Limited described in this user guide is in compliance with Directive 2014/53/EU. Other equipment manufactured by Megger Instruments Limited described in this user guide is in compliance with Directives 2014/30/EU and 2014/35/EU where they apply.

The full text of Megger Instruments EU declarations of conformity are available at the following internet address:

megger.com/eu-dofc

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1. Introduction

Thank you for purchasing the Megger insulation test instrument.

For your own safety and to get the maximum benefit from your instrument, please ensure that you read and understand the following safety warnings and instructions before attempting to use the instruments.

This user guide describes the operation and functions of the MIT400/2 series of insulation and continuity test instruments.

These instruments are designed and manufactured by:

Megger Ltd
Archcliffe Road
Dover Kent CT17 9EN
England

Megger Limited reserves the right to change the specification of these instruments at any time without prior notice.

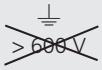
2. Safety warnings

2.1 Safety Warnings

Safety warnings and precautions must be read and understood before the instrument is used. They must be observed during use.

- National Health and Safety Legislation requires users of this equipment and their employers, to carry out valid risk assessments of all electrical work so as to identify potential sources of electrical danger and risk of electrical injury such as inadvertent short circuits. Where the assessments show that the risk is significant then the use of fused test leads may be appropriate.
- The voltage indicator and automatic discharge features must be regarded as additional safety features and not a substitute for normal safe working practice which MUST be followed.
- The circuit under test must be switched off, de-energized, securely isolated and proved dead before test connections are made when carrying out insulation and continuity tests.
- Test voltages greater than 1000 V dc must not be used on capacitive circuits. Capacitive charges can be lethal.
- Circuit connections and exposed-conductive-parts and other metalwork of an installation or equipment and MIT2500 under test must not be touched during testing.
- The Voltmeter function will operate only if the instrument is switched on and working correctly.
- After an insulation test, the instrument must be left connected until the circuit has been discharged to a safe voltage.
- Do not handle test leads above the 1000 V range. (For use in dry conditions only).
- The instrument should not be used if any part of it is damaged.
- All test leads, probes and crocodile clips must be in good order, clean and with no broken or cracked insulation. Verify the integrity of the test leads before making measurements. Only **"Megger"** approved test leads must be used with this product.
- Ensure that hands remain behind finger guards of probes/clips.
- National Safety Authorities may recommend the use of fused test leads when measuring voltage on high-energy systems. Fused Leads must be tested independently before use to ensure fuse integrity.
- Replacement fuses must be of the correct type and rating. Failure to fit the correctly rated fuse may result in a safety hazard and may cause damage to the instrument in the event of an overload.
- All covers must be in place whilst conducting tests.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- The instrument must be used only by suitably trained and competent persons.

2.2 Safety symbols marked on the instrument

	Refer to user instructions.		Equipment protected throughout by Double Insulation.
	Risk of electric shock.		Equipment complies with current EU directives
CATIV 600 V 	600 V AC rms maximum between terminals, and between terminal and earth.		Equipment complies with current UKCA directives.
IP54	Enclosure is dust proof and protected against water splashes.		N13117 Equipment complies with current "C tick" requirements.
	Fuse FF 500 mA 1000 V 30 kA		Do not dispose of batteries in landfill, sewage systems or by fire.

2.3 Safety note:

If greater than 25 V appears on the circuit under test the instrument will default to a voltage measurement and display the supply voltage.

On supply voltages over 50 V the instrument will be prevented from performing an insulation test, protecting your instrument from damage.

NOTE : This limit is increased on MIT481/2 and MIT485/2 to 75 V, but a warning buzzer will indicate voltages above 50 V.

Use extreme care when using or measuring voltages above 30 V, particularly in high energy systems.

Fused test leads are available as an optional accessory for local situations where increased protection is required.

WARNING : Hazardous voltages can exist on the insulation test range all the time the [TEST] button is locked down.

2.4 Installation Category Definitions:

CAT IV - Measurement category IV: Equipment connected between the origin of the low voltage mains supply and the distribution panel.

CAT III - Measurement category III: Equipment connected between the distribution panel and the electrical outlets.

CAT II - Measurement category II: Equipment connected between the electrical outlets and the user's equipment.

Measurement equipment may be safely connected to circuits at the marked rating or lower.

3. General description

3.1 Unpacking the carton

There are important documents that you should read and keep for future reference.

3.2 Case contents (all instruments)

	MIT400/2	MIT405/2	MIT410/2	MIT415/2	MIT417/2	MIT420/2	MIT430/2
Hard carry case	■	■	■	■	■	■	■
Soft carry case							
Red/Black test lead set with clips	■	■	■	■	■	■	■
Red/Green/Black test lead set							
Red/Blue/Black 2.5 kV test lead set							
AA (LR6) batteries fitted	6	6	6	6	6	6	6
Warranty card	■	■	■	■	■	■	■
Calibration certificate	■	■	■	■	■	■	■
Quick start guide	■	■	■	■	■	■	■
SP5 remote switched probe		■	■	■	■	■	■
Download Manager compatible							■
CertSuite Asset compatible							■

MIT480/2 series instrument	MIT481/2	MIT485/2		MIT 2.5 kV series instrument	MIT2500
Hard carry case	■	■		Hard carry case	■
Soft carry case				Soft carry case	
Red/Black test lead set with clips				Red/Black test lead set with clips	■
Red/Green/Black test lead set	■	■		Red/Green/Black test lead set	
Red/Blue/Black 2.5 kV test lead set				Red/Blue/Black 2.5 kV test lead set	■
AA (LR6) batteries fitted	6	6		AA (LR6) batteries fitted	6
Warranty card	■	■		Warranty card	■
Calibration certificate	■	■		Calibration certificate	■
Quick start guide	■	■		Quick start guide	■
SP5 remote switched probe	■	■		SP5 remote switched probe	
Download Manager compatible		■		Download Manager compatible	■
CertSuite Asset compatible				CertSuite Asset compatible	■

IMPORTANT -

To extend your warranty to 3 years, please register your instrument at www.megger.com within one month of purchase.

4. Preparations for use (all instruments)

4.1 Batteries

The Megger MIT400/2 series instruments are supplied with batteries fitted. When batteries become exhausted, *Refer to "14. Battery and fuse replacement" on page 44.*

WARNING : Do not switch the instrument on or connect test leads with the battery cover removed.

4.2 Preliminary test lead check

Functional verification

1. Before each use of the instrument visually inspect the test leads, prods and crocodile clips to confirm that their condition is good, with no damaged or broken insulation.
2. Check continuity of the test leads by firmly shorting the leads together and read the test lead resistance measurement directly from the display, which should be less than 1.0 Ω.

NOTE : Supply voltage

This instrument is designed for use on isolated (dead) circuits. Prior to any testing and using an approved method, ensure the circuit to be tested has been fully disconnected and is securely isolated from the supply prior to using the instrument.

5. Instrument overview

5.1 General functions

5.1.1 Rotary knob position:

Test functions are selected by turning the rotary knob from the OFF position to the desired function. The display will show the initial screen for that function.

Press a black keypad button to change the test mode from the standard measurement, or to select the Backlight and Buzzer ON/OFF.

The rotary knob should always be returned to the OFF position after use. Do not rely on the AUTO OFF function as this unnecessarily wastes battery life.

Symbol	Description
OFF	Instrument OFF – no live circuit warning
V	Trms Voltage AC/DC
500 V	Insulation test range – Press and hold TEST button
500 V	Insulation test range with gate*– Press and hold to enable range when selecting test function with rotary knob (* where available)
Ω	Continuity measurement from 0.01 Ω to 999 kΩ (automatic)
µF	Capacitance measurement (automatic)

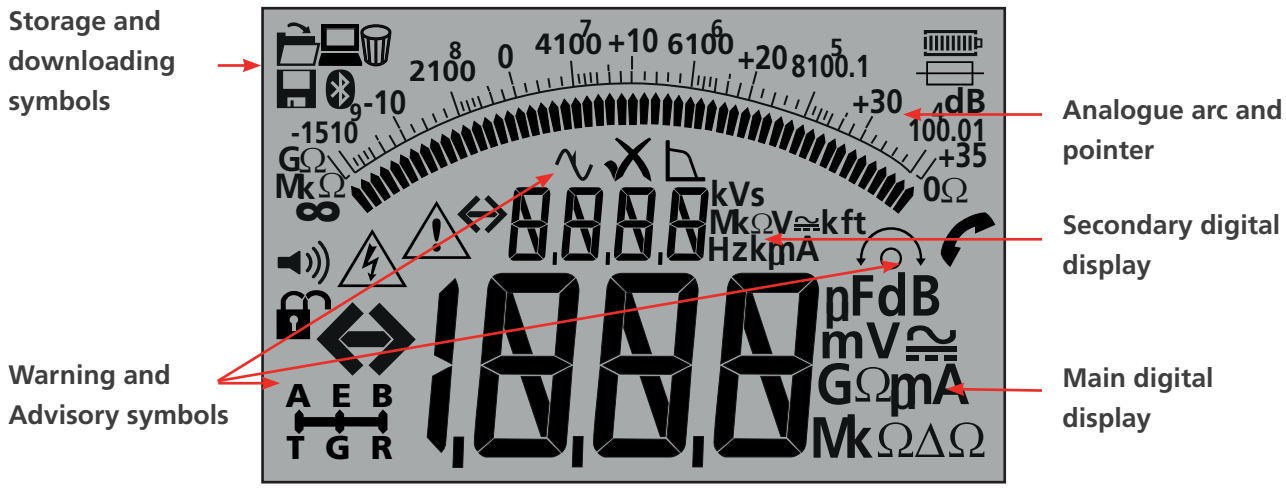
Symbol	Description
	Insulation test lock - Press TEST and to LOCK test ON
TEST	Start insulation test Press and HOLD to start INSULATION test
Ω	+ TEST Nulls test lead resistance to 0.00 Ω when leads short circuit
	Enter SETUP configurator (use ▲▼ and to adjust settings)

5.1.2 Keypad button functions:

Symbol	Description
TRMS	Selects AC-Trms or DC mode
DAR PI t	Insulation testing - Selects DAR, PI, Timed test (t) or standard measurement (INS)
µA s V	Insulation testing – Press during test for; leakage (uA), test voltage (V) or timer (t)
	Buzzer ON/OFF – not warning functions
	Backlight ON/OFF
	SETUP – Change setup value / After test – SAVE result
	SETUP – Select setup function

Symbol	Description
▲▼	SETUP – Change function value
A+E+B T+G+R	Swaps measurement connection between A-B, A-E and B-E (T-R, T-G and R-G)
	Continuity testing – Press after "Continuity measurement" to make "difference measurement"
Ω	Insulation testing – Measures REN value during insulation test
	Capacitance testing – Measures REN value during capacitance test

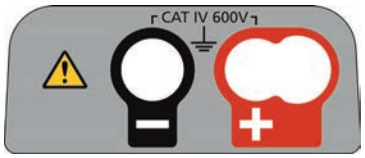
5.2 Display contents



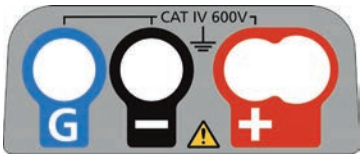
Symbol	Description	Symbol	Description
GΩ, MΩ, kΩ, Ω, V, mV, A, mA, Hz, nF, uF	Units of measurement		Measurement FAIL / PASS
	Primary digital readout		3 Terminal selection status
	Secondary digital readout		REN measurement function enabled
	Analogue readout with needle		Transfer data to PC
	Buzzer is enabled		Save test measurement to memory
	Lock enabled / disabled		Test result recall to screen
	Hazard voltage warning		Delete test results
	Warning - Read user manual		Bluetooth® enabled
	Lead Null is enabled		Battery condition
ΔΩ	Difference between two resistance measurements		Fuse fail warning

5.3 Terminal Overview

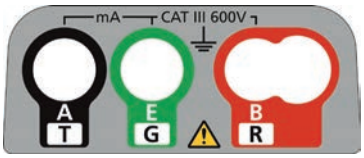
2 terminal connection



2 terminal connections + Guard



3 terminal connections



6. Input terminals

Test leads connections are as indicated in below, which shows the test lead sockets at the top of the instrument, as well as the switched probe socket and test lead.

6.1 Two terminal test lead connection

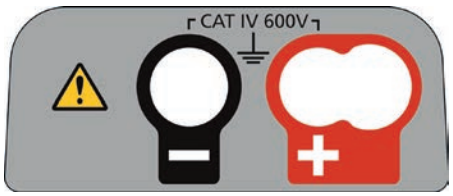


Fig 1: *Terminal layout - two terminal instruments:*

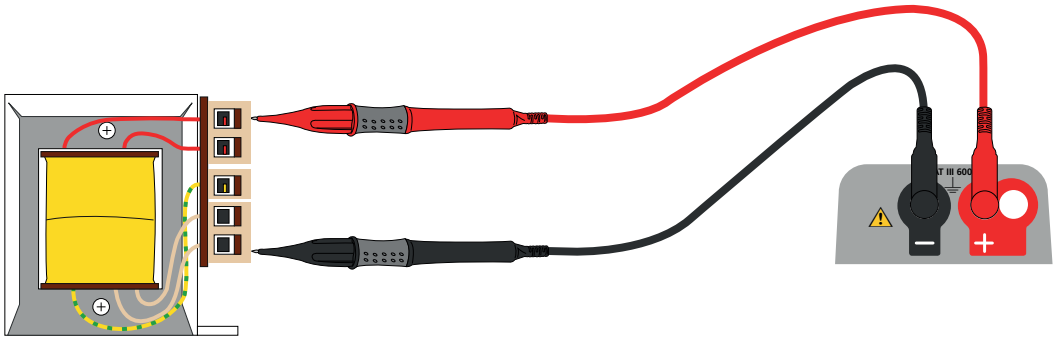


Fig 2: *Two terminal connection examples:*

For two terminal instruments (Figure 1), the Red and Black test lead set should be connected to the appropriate sockets on the top of the instrument marked + and –, respectively. (see Figure 1).

The RED terminal accepts the standard RED test lead or the Switch Probe lead where supplied.

6.2 Two terminal and Guard (MIT2500)

The MIT2500 is fitted with a GUARD terminal. The GUARD terminal is used to conduct leakage currents away from the measured circuit to reduce errors.

The GUARD terminal is ONLY used for insulation testing. *Refer to "9. Continuity testing Ω" on page 30.*.

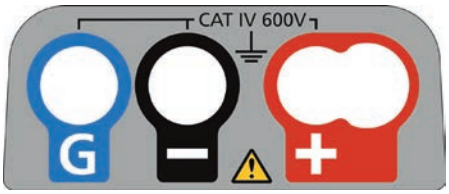


Fig 3: *Terminal layout - two Terminal instrument + Guard:*

For instruments with connection (Figure 3) above, the Red / Black test lead set should be connected to the appropriate sockets on the top of the instrument marked + and –, respectively. (see Figure 3).

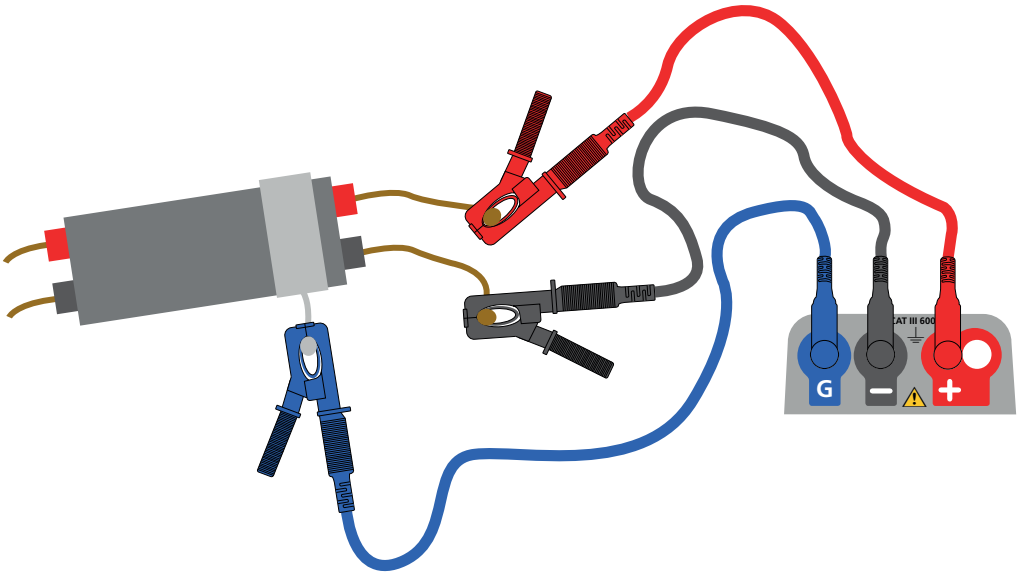


Fig 4: *Two terminal and Guard connection example:*

The GUARD lead (G) - refer to section 9 Insulation testing - is optional. When used, it should be connected to the Guard conductor, screen, steel wire armoured conductor, or "user added" conductive wire or wrapper, such as foil. This "Guard" conducts the unwanted surface or "leakage current" away from the measured conductors.

6.3 Three terminal test lead connection

Three terminal connection provides measurement between the three pairs of a telecommunication cable (A-B, A-E and B-E) or between single or three phase conductors (L-N, L-E, N-E) and (L1-L2, L1-L3 and L2-L3).

Alternatively, only a single pair can be used (default Red and Black) for conventional 2 wire measurement.

6.3.1 How three terminal connection works

The three terminal connections allow measurements to be made across any three terminals:

A-B, A-E or B-E (T-R, T-G, R-G)

This reduces the number of connections necessary to a circuit, especially where live working has been authorised. Once all three leads are connected, measurements between the three terminals can be made.

For example:

Electrical testing:

- Where two conductors need to be measured to a screen or shield
- Where Live, Neutral and Earth need measuring
- Comparing continuity of conductors to a ground terminal for difference measurements
- Testing centre tapped electrical installations.

Telecommunications:

- Testing voltage, continuity and Insulation between A, B and E or Tip Ring and Ground, without having to disconnect test leads.

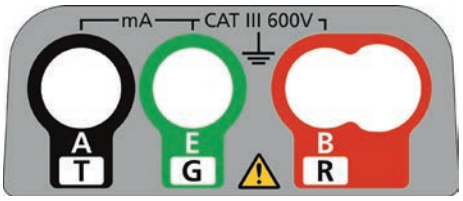


Fig 5: *Terminal layout - Three Terminal instrument:*

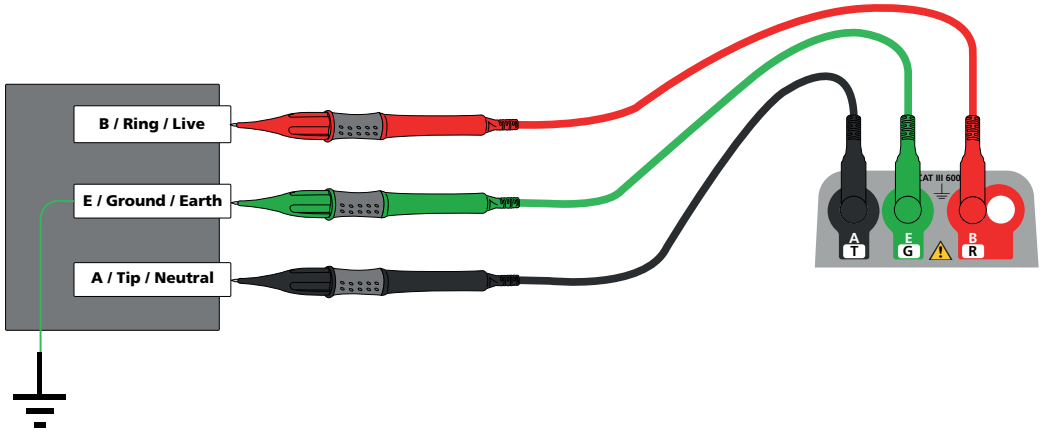
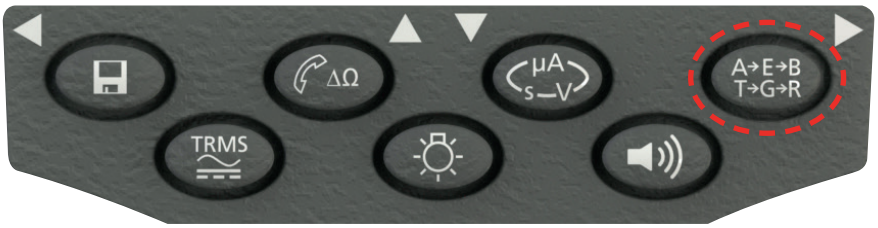


Fig 6: *3 Terminal connection example:*

6.3.2 3 terminal operation:

By pressing the A-E-B button on the keypad the active measuring pair on the Instrument changes as per the indication on the display, as below:



With each press, the display will change from:

Or, if 'T-G-R' is enabled in setup:

For example, in VOLTS mode, the voltages on the A-B pair, the A-E pair and the B-E pair can all be measured without having to disconnect the test leads from the A, B and E conductors.

For electrical applications the test leads can be connected to Live (B), Neutral (A) and Earth (E) and the voltages measured and stored without having to disconnect the test leads from the three conductors.

Test probes and crocodile clips are supplied for connection to the circuit under test.

Fused test leads are available as an optional accessory.

6.4 SP5 Switched probe (not MIT400/2, MIT405/2)

The SP5 switch probe allows the user to start a test by pressing the test button on the probe, instead of on the instrument. This allows for complete hands-free testing and increases user safety as below:

1. Connect the SP5 probe to the instrument using the special three-pole +ve socket (this replaces the RED test lead).
2. Select a suitable insulation resistance range.
3. Press and hold down the SP5 probe button. The instrument will start an insulation resistance test.
4. To end the test, release the probe test button.

7. Voltage and frequency measurements

NOTE : Measured voltage must not exceed 1000 V phase to earth or phase to phase.

Exceeding this voltage could cause damage or electric shock hazard. Frequency measurement is not available on MIT400/2 and MIT405/2 model.

NOTE : TRMS measurement: In TRMS mode the MIT will measure both AC and DC components of the supply voltage and display the Trms value. In DC mode only the DC component is measured.

7.1 For two terminal instruments and MIT2500

7.1.1 AC Trms Voltage - Test procedure

1. Connect test leads to the RED and BLACK test sockets on the instrument.
2. Select the VOLTAGE measurement mode using the range knob [V].
3. Connect the test leads to the circuit to be measured.
4. The instrument will display the voltage across the test leads, as below:

8.1.2 DC Voltage measurement

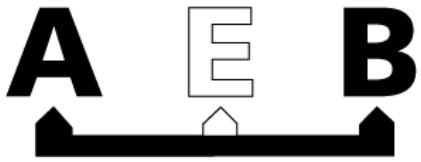
1. Repeat steps (1) to (4) above
2. Press the Trms AC/DC test button (below) to switch to DC measurement.

The display will show a DC measurement as below:

7.2 For three terminal instruments (MIT481/2, MIT485/2 only)

7.2.1 Using two test leads

1. Ensure instrument is in the A-B mode indicated in the display, as below:

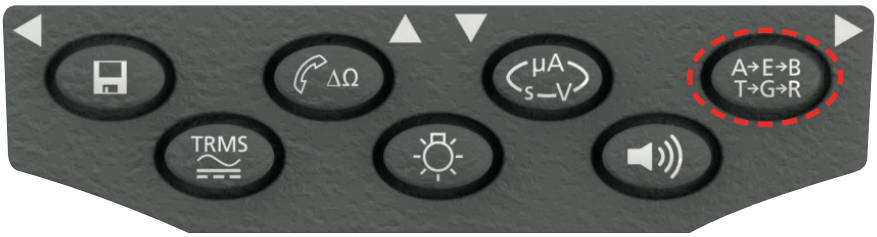


For details of changing the configuration *Refer to "6.3 Three terminal test lead connection" on page 15.*.

2. Connect test leads to the RED/BLACK (B/A) test sockets only.
3. Select the VOLTAGE measurement mode on the range knob [**V**] range).
4. Connect the test leads to the circuit to be measured.
5. The instrument will display the voltage across the test leads as below.

NOTE : the display shows the A-B terminals are active.

6. If the display does not show the A-B option, press the A-E-B (T-G-R) button to change this mode, as below:



7. With each press, the display will change from:

Or, if 'T-G-R' is enabled in setup:

7.2.2 Using three test leads

All three connections can be connected to the circuit under test, for example:

Electrical testing	Telecommunications USA	Telecommunications EU
A = Neutral	T = Tip	A = A
B = Live	R = Ring	B = B
E = Earth	E = Earth	E = E

The measurement should default to Live - Neutral (A-B) when the instrument is switched on.

Pressing the A-E-B (T-G-R) button will cycle through the voltages on each part of the circuit, *Refer to "7.2 For three terminal instruments (MIT481/2, MIT485/2 only)" on page 19.*

7.3 Result storage

For MIT420/2, 430/2, 481/2, 485/2 and the MIT2500, the measured result may be stored (if required) by pressing the 'STORE' button for > 1sec. Refer to Section 12 for further information.

WARNING : Where the A-E-B (T-G-R) symbol disappears, a voltage is present on a pair not currently selected. Press A-E-B (T-G-R) to locate the live pair or pairs.

8. Insulation resistance testing

8.1 Safety notes:

Danger of electric shock: Insulation resistance testing is performed at high DC voltages and is hazardous if touched. Always observe the safety precautions when performing an insulation resistance test, and ensure all necessary health and safety precautions are observed.

On the MIT2500 only use the 2.5 kV test lead set on test ranges above 1 kV.

Never hold test leads when using test ranges above 1 kV.

Circuit Isolation: The circuit under test **must** be completely **de-energised and securely isolated before** test connections are made.

Circuit capacitance inhibit: On tests above 1 kV the instrument will prevent testing on circuits above 15 nF to prevent hazardous charge developing on the circuit under test.

Automatic Discharge: Capacitive circuits are automatically discharged when the test button is released following an insulation test. This is a safety feature to prevent hazardous voltages remaining on test circuits after testing is completed.

Live circuit detection:

Insulation tests must only be conducted on dead, isolated circuits. However, occasionally a live circuit may be connected by accident or isolated circuits have a voltage present through coupling to an adjacent circuit.

If a voltage below 50 V appears on the circuit under test the instrument will complete a measurement.

On circuit voltages over 50 V the instrument will sound a warning buzzer and display the circuit voltage on test ranges that are not designed to measure voltage, such as the insulation test. The instrument will be prevented from performing an insulation test. *Refer to "12. SETUP Configuration options" on page 40.*

Note: The test disable limit is increased on MIT481/2 and MIT485/2 to 75 V, but a warning buzzer will indicate voltages above 30 V.

Use extreme care when using or measuring voltages above 30 V, particularly in high energy systems.
Fused test leads are available as an optional accessory for local situations where increased protection is required. *Refer to "12. SETUP Configuration options" on page 40.*

Hazardous voltages can exist on the insulation test range all the time the [TEST] button is locked down.

8.2 Measurement for two terminal instruments and MIT2500

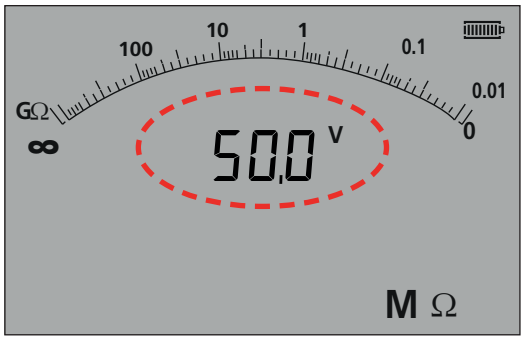
Note: For all insulation tests up to 1000 V, the RED test lead can be replaced by the SP5 switched test probe.

On the MIT2500 on tests above 1 kV the test will be inhibited if the circuit capacitance exceeds 15 nF. A HI-CAP warning will be displayed.

The SP5 switch probe button operates the test functions in exactly the same way as the TEST button on the instrument, but without having to look away from the equipment being tested.

8.2.1 Insulation testing

1. Connect test leads to the RED / BLACK test sockets on the instrument.
2. Select one of the test voltages on the insulation (MΩ) measurement mode using the range knob [MΩ].
   The instrument will display the range voltage selected in the display as below:



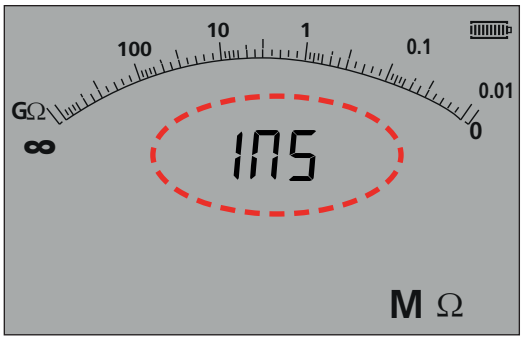
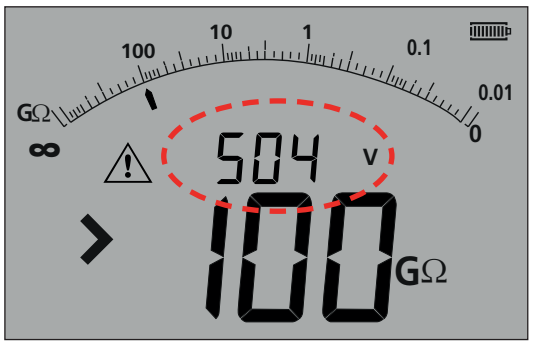


Fig 7: *MIT420/2 and MIT430/2.* *MIT400/2 and MIT410/2*

3. Connect the test leads to the circuit to be measured.

4. Press the TEST button. The display will show the measured insulation value in both the analogue arc and large digital readout. The test voltage at which the measurement was made is displayed on the small digital readout), as highlighted below:



5. Release the TEST button on completion of the test. The instrument will now discharge the circuit, ensuring it is left in a safe condition at the end of the test.

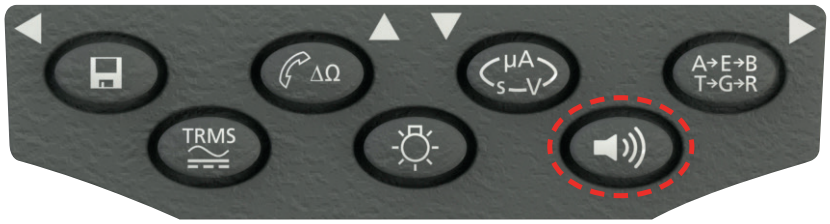
WARNING : Locking on the insulation test, or disconnecting the leads before the test has completed can leave the circuit is a dangerously charged condition, with risk of electric shock.

8.2.2 Buzzer PASS/FAIL threshold

The MIT will sound a buzzer if the measured value is greater than the threshold configured in SETUP. *Refer to "12. SETUP Configuration options" on page 40.*

8.2.3 Buzzer ON/OFF

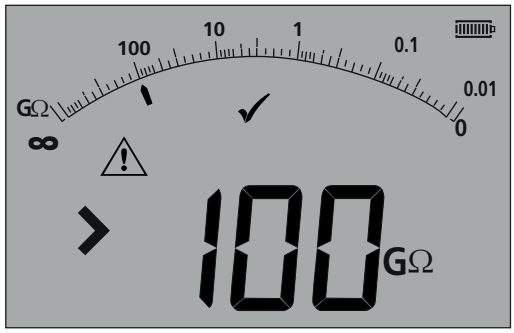
The buzzer can be disabled by pressing the BUZZER button on the keypad as below:



NOTE : Switching OFF the buzzer will disable the buzzer function but NOT the warning alarms.

8.2.4 Measurement PASS/FAIL

The display can show PASS or FAIL when the measurement is above or below the threshold in Setup when enabled. *Refer to "12. SETUP Configuration options" on page 40.*. This supersedes the test voltage display.



NOTE : This function is independent of the Buzzer ON/OFF mode.

8.2.5 Insulation test LOCK

To lock the insulation ON:

1. Select one of the test voltages on the MΩ measurement mode using the range knob MΩ .
2. Connect the test leads to the circuit to be measured.
3. Press and hold down the TEST button. Whilst the test is running, press the LOCK button. Release the LOCK and TEST buttons. The LOCK symbol should be displayed and the test will continue to run.

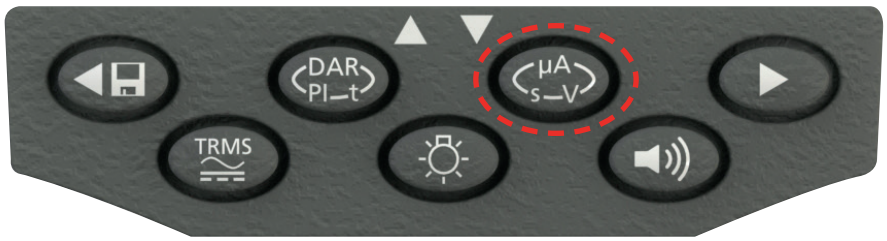
WARNING : DO NOT DISCONNECT THE TEST LEADS WHILST THE TEST IS LOCKED ON AS THE CIRCUIT CAN BE LEFT IN A CHARGED AND HAZARDOUS CONDITION.

To unlock the insulation test, press the TEST button.

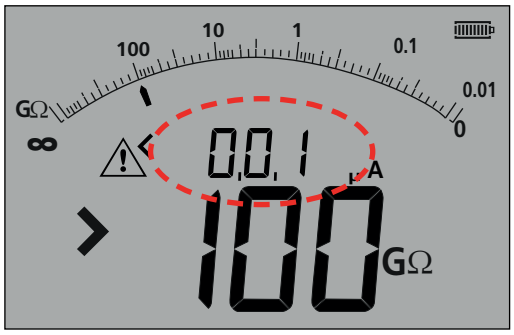
8.2.6 Leakage current

To display the insulation test value as a leakage current:

1. Select one of the test voltages on the MΩ measurement mode using the range knob [MΩ].
2. Connect the test leads to the circuit to be measured.
3. Press and hold down the TEST button. Whilst the test is running also press the uA/s/v button as shown below:



The display will replace the insulation test voltage with the leakage current during the insulation test, as below:



NOTE : Smaller readout displays leakage current.

Press the uA/s/v button again to return to test voltage display.

8.2.7 500 V access (MIT481/2 and MIT485/2)

To access 500 V with a lock symbol:

1. Press and hold the red lock button;
2. Turn rotary knob to 500 V;
3. Release lock button.

NOTE : testing on the lock range has now been enabled.

8.3 Variable voltage insulation testing (MIT420/2, MIT430/2, MIT485/2, MIT2500)

The MIT420/2, MIT430/2, MIT485/2 and MIT2500 have a variable voltage mode of insulation testing.
Indicated by the symbol V.
The voltage can be selected between the bottom and top test voltages on the instrument.
This value can be changed in 1 V increments to 100 V and 10 V increments above 100 V
The test voltage is configured in SETUP, see section 13.
All insulation test functions work for this test mode as they do for a standard test voltage.

Measurement range and accuracy is as per the lower standard test voltage, for example

- Range and accuracy @ 76 V = 50 V test range accuracy
- Range and accuracy @ 350 V = 250 V test range accuracy

The set voltage is retained when the instrument is switched off.

8.4 Polarisation Index (PI) and Dielectric Absorption Ratio (DAR) (Only MIT410/2, MIT420/2 MIT430/2, MIT2500, MIT415/2 and MIT417/2.)

These are fully automatic tests that require no user intervention after the test has started.

Three types of timed test are possible:

(a) Standard count down timer (t)

Timed tests are performed after a timed period defined by parameter 't' (*Refer to "12. SETUP Configuration options" on page 40.*)

(b) Polarization Index (PI)

PI is the ratio between the insulation resistance values recorded at 1 minute (assigned t1) and at 10 minutes interval (assigned t2). i.e. after 1 minute and 10 minutes.

PI = 1 minute value / 10 minute value

(c) Dielectric Absorption Ratio (DAR)

DAR is the ratio between the insulation resistance values at 15 or 30* seconds (assigned t1) and at 60 second interval (assigned t2), i.e. after 30 seconds and 60 seconds.

DAR = 15 or 30 (default)* second value / 60 second value

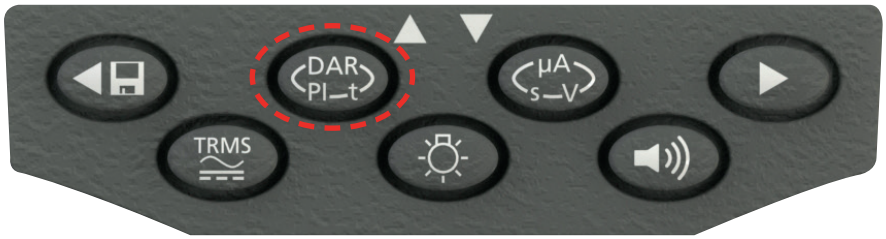
**Refer to "12. SETUP Configuration options" on page 40.*.

During all insulation tests the symbol ⚠ will flash indicating that a test voltage is present.

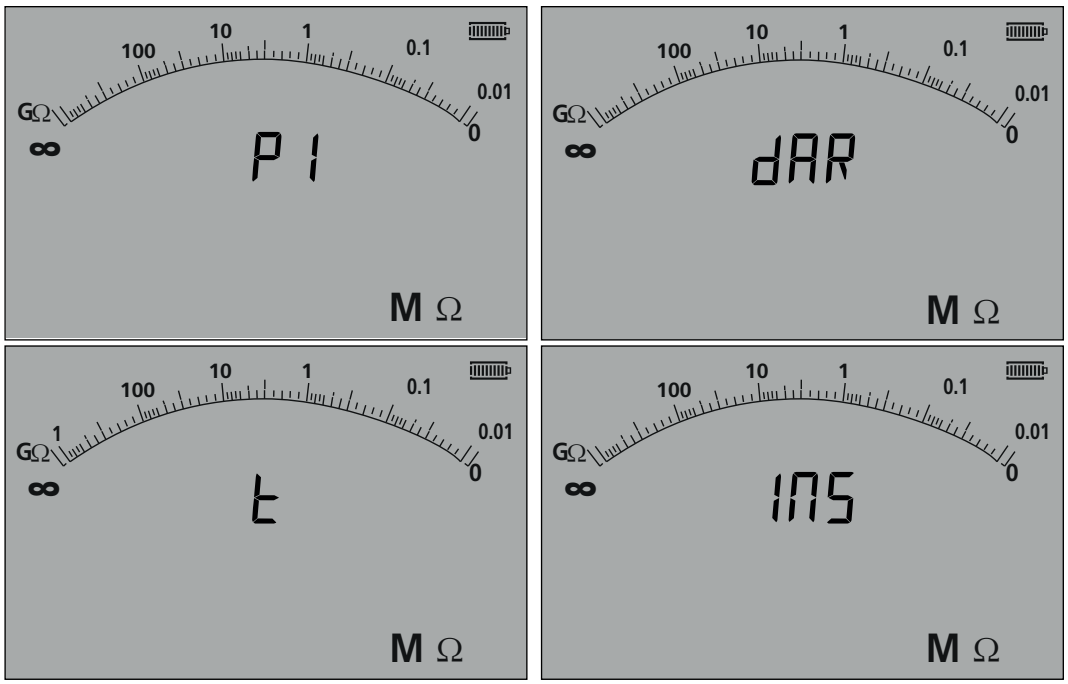
8.4.1 DAR

Make sure that the t1 time is set as required (15 or 30 seconds), *Refer to "12. SETUP Configuration options" on page 40.*.

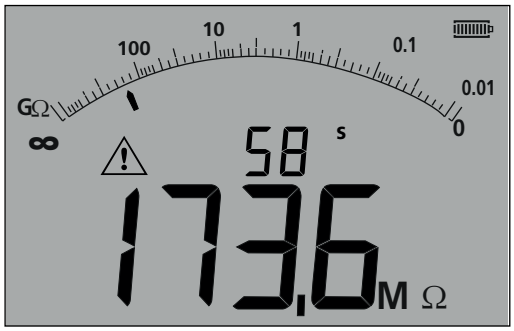
1. Select one of the test voltages on the MΩ measurement mode using the range knob [MΩ].
2. Connect the test leads to the circuit to be measured.
3. Press the DAR-PI-T button on the keypad as below:



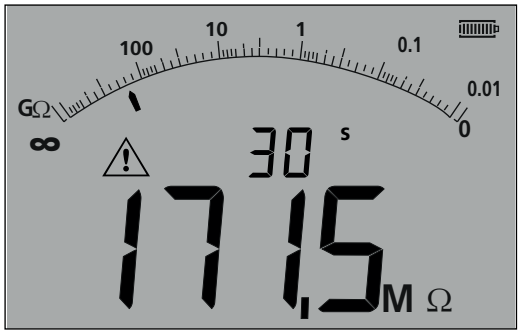
The small digital readout should change from displaying the selected test range (in Volts) to PI, to DAR, T and INS, as below:



4. Select the DAR function.
5. Press and release the TEST button to start the test. The display will show a count-down timer and the current insulation value, as above:



6. At the first measurement interval the MIT will display the measured value and log this in temporary memory.



NOTE : At the selected 15 or 30 seconds the measurement is logged internally. This value is not stored in memory unless the "SAVE" button is pressed AFTER the DAR measurement is complete.

7. At the end of the test period the MIT will make a second measurement and display the results as a ratio of the 1st and 2nd measured values, as below:

NOTE : Second measurement is logged at 0 seconds. Again, this is not stored in memory unless the "SAVE" button is pressed at the completion of the test.

8. The display can show results as detailed in the table below. Press the  button repeatedly to scroll through the results:

Secondary Display	Primary Display
dAR	Ratio selected
t1	Resistance at t1
Test voltage (at t1)	Resistance at t1
t2	Resistance at t2
Test voltage (at t2)	Resistance at t2
dAR or PI	Ratio selected

8.4.2 Polarisation Index

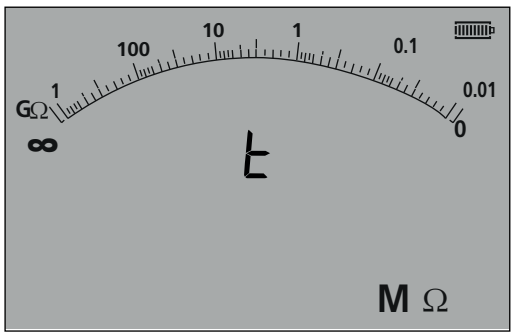
Use the same procedure detailed for DAR (*Refer to "8.4.1 DAR" on page 25.*) above. Note the test times can not be modified.

8.4.3 Timed tests:

Timed tests run a countdown timer and make a measurement at the end of the timed period.

1. Select one of the test voltages on the MΩ measurement mode using the range knob MΩ .
2. Connect the test leads to the circuit to be measured.

Press the DAR-PI-T button on the keypad until the display shows "t" on the small digital readout, as below:



3. Press the TEST button. A count down from the limit configured In the SETUP menu will start. At the end of the count down, the MIT will make a measurement and display the result as a resistance.

8.4.4 Storing Insulation test results

For MIT420/2, MIT430/2, MIT481/2, MIT485/2 and the MIT2500. At the end of the measurement, press the STORE button on the keypad. The results will be stored in memory. *Refer to "11.4 Downloading test results" on page 37.*.

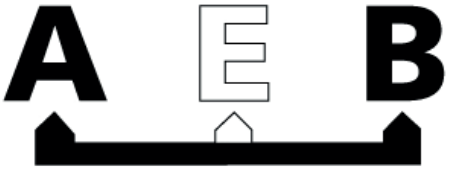
8.5 For three terminal instruments (MIT481/2 and MIT485/2 only)

Insulation tests can be made using the three terminal, for example terminal connection, or just two terminals. As default, the measurement is made across the RED/BLACK (B-A) pair, but can be changed, as below:

8.5.1 Using two test leads on a three terminal instrument

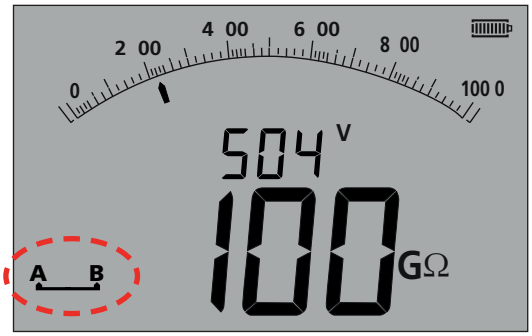
A measurement can be made across any of the three pairs, as long as the pair is displayed in the screen.

1. Ensure instrument is in the A-B mode indicated in the display, as below:



For details of changing the configuration,*Refer to "6.3 Three terminal test lead connection" on page 15.*.

1. Connect test leads to the RED/BLACK test sockets only.
2. Select one of the INSULATION measurement voltages on the range knob MΩ .
3. Connect the test leads to the circuit to be measured.
4. The instrument will display the voltage across the test leads as below.
5. If the display does not show the A-B option, press the A-E-B (T-G-R) button to change this mode.



With each press, the display will change from:

Or, if 'T-G-R' is enabled in setup:

8.5.2 Using three test leads

All three connections can be connected to the circuit under test, for example:

Electrical testing	Telecommunications USA	Telecommunications EU
A (T) = Neutral	T = Tip	A = A
B (R) = Live	R = Ring	B = B
E (G) = Earth	E = Earth	E = E

The measurement should default to Live - Neutral (B-A) when the instrument is switched on.

Pressing the A-E-B (T-G-R) button will cycle through the voltages on each part of the circuit, *Refer to "6.1 Two terminal test lead connection" on page 14.*.

8.6 ESD testing mode (MIT415/2)

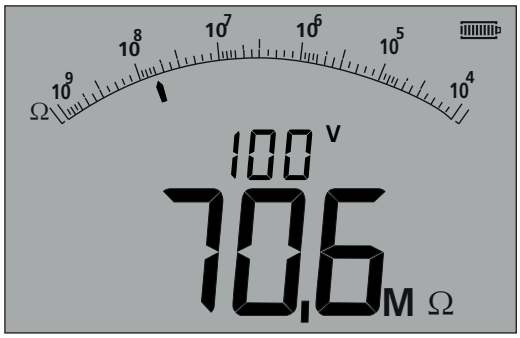
The MIT415/2 can be configured in SETUP to display an analogue arc with 104, 105, 106 etc. on the analogue arc rather than the kΩ, MΩ, GΩ.

The mode also enables a PASS/FAIL limit bar, which stops at 106 to indicate a PASS threshold without setting a limit alarm. A limit alarm can also be set in SETUP if required.

8.6.1 Testing in ESD mode

To enable the ESD mode, refer to *Refer to "12. SETUP Configuration options" on page 40.*.

1. Connect test leads to the RED/BLACK test sockets only.
2. Select one of the INSULATION measurement voltages on the range knob [MΩ] range.
3. Connect the test leads to the appropriate test weights and place the test weights on the surface of the material to be measured, as per the relevant test standard requirements.
4. Press and hold the test button. The instrument will display the resistance across the test leads as below:



NOTE : To LOCK the insulation test ON, *Refer to "8.2.5 Insulation test LOCK" on page 23.*.

8.6.2 Leakage current display

Whilst the test is running it is possible to display the leakage current, rather than the test voltage in the smaller digital readout. To display the LEAKAGE CURRENT during the test, *Refer to "8.2.6 Leakage current" on page 23.*

8.7 REN mode

REN measurement is available on two measurement modes, the capacitance mode and 100 V Insulation mode. The difference is that the capacitance uses a low voltage test (typically 4 V) and the insulation test uses a high voltage test (100 V).

Both measurements return a capacitance value when the telephone button is pressed, displaying the capacitance of the circuit on the large display and the REN count on the small display.

The REN value can be adjusted in SETUP if necessary using the "HuF" setup option.

To make a REN measurement:

1. Select either CAPACITANCE or 100 V INSULATION range.
2. Perform the measurement as in the relevant section in this user guide.
3. Press the REN telephone button . The display will show a calculation or the REN number based on the result of the measurement.

NOTE : Selection of the method depends on circuit design. A known circuit should be tested to establish which method is applicable to the type of installation being tested.

9. Continuity testing Ω

Continuity testing operates over the range 0.01 Ω to 999 kΩ.

The MIT will auto-range across the full range from 0.01 Ω to 1 MΩ.

The analogue arc will auto range as below:

0 - 10 Ω	0 - 100 Ω
0 - 1000 Ω	0 - 1000 kΩ

Test current automatically adjusts for the range selected by the instrument. Test currents adjust as below:

0.01 to 3.49 Ω	= 200 mA (or 20 mA depending on settings - *Refer to "12. SETUP Configuration options" on page 40.*)
3.50 to 999 kΩ	= 20 mA to 2 µA

The test operates at 4.5 V DC and is a single polarity test by default, as below, but can be set to a bi-directional test in setup, *Refer to "12. SETUP Configuration options" on page 40.*.

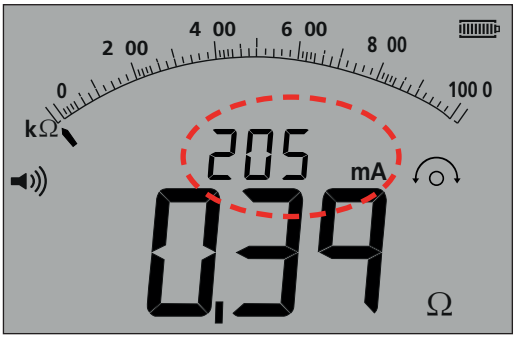
i.e. Red terminal = 4.5 V DC Black terminal = 0 V DC.

The continuity test is automatic. The test starts on detection of a circuit of <1 MΩ.

9.1 Measurement for two terminal instruments and MIT2500

9.1.1 Continuity testing Ω

1. Connect test leads to the RED/BLACK test sockets on the instrument.
2. Select the Ω measurement mode using the range knob.
3. Connect the test leads to the circuit to be measured. The instrument will check for a live circuit prior to making a measurement.
4. On circuits of less than 1.0 MΩ, measurement starts automatically. The display will show the continuity value in both the analogue arc and large digital readout. The test current at which the measurement was made is displayed on the small digital readout, as highlighted below:



9.2 Single or bi-directional testing

The default setting is for a single direction continuity test. This can be changed to a bi-directional test in SETUP. *Refer to "12. SETUP Configuration options" on page 40.*.

First test:	Red terminal = 4.5 V DC Black terminal = 0 V DC.
Second test:	Red terminal = 0 V DC Black terminal = 4.5 V DC.

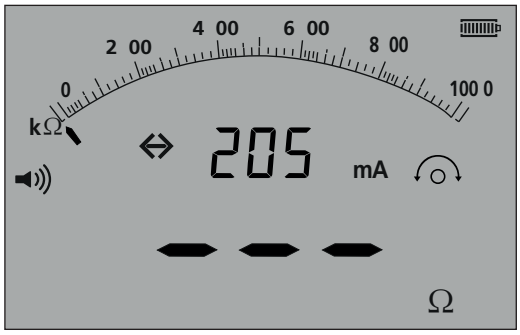
As with the single test, the bi-directional test measurement is automatic. The measurement displayed is the higher of the two directional measurements.

Polarity of the primary result is shown in the display as an arrow:

-> = Forward polarity

<- = reverse polarity

Both the single and bi-polar tests are automatic, starting as soon as the test leads contact the circuit to be tested.



9.2.1 Entering bi-directional mode

1. *Refer to "12. SETUP Configuration options" on page 40.* - SETUP REV=ON
2. Display will show <- and -> as the measurement changes polarity.

NOTE : When enabled, the buzzer will sound and stop the bi-directional test. To resume bi-directional testing, press the buzzer button.

9.3 Test lead NULL

Enabling the lead NULL value

The test lead resistance can be removed from the displayed measurement. This "NULL" is restricted to to 9.99 Ω

The "NULL" value is retained when an instrument is switched off.

It is recommended the "Null" value is checked or re-nulled periodically as the resistance of test leads and/or their connections can change over time or after disconnection and reconnection.

1. Whilst in continuity mode, short the test leads together.
2. When the value settles, press the TEST button. The MIT will subtract the value of the test leads for all future measurements, until the NULL value has been removed.

The NULL symbol will be displayed when the NULL function is active.

Typical test lead values per pair:

- Standard unfused 1.2 m test leads = 0.05 Ω
- 10 A fused 1.2 m test leads = 0.07 Ω
- 500 mA fused 1.2 m test leads = 1.80 Ω

These are only a guide and can change significantly between manufacturers.

9.3.1 Removing the lead NULL value

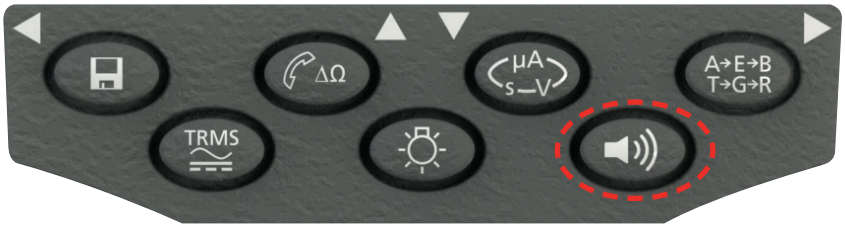
1. With the test leads open circuit, press the TEST button. The NULL value should disappear and the display should show the test lead resistance.

9.4 Buzzer PASS/FAIL threshold

The MIT will sound a buzzer if the measured value is less than the threshold configured in SETUP. *Refer to "12. SETUP Configuration options" on page 40.*

9.4.1 Buzzer ON/OFF

The buzzer can be disabled by pressing the BUZZER button on the keypad as below:

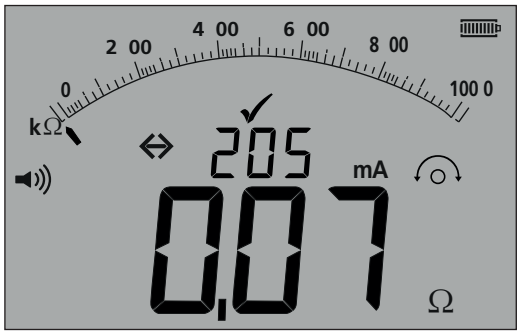


NOTE : This will disable the buzzer sound but NOT the warning alarms.

9.5 PASS / FAIL limit alarm

A Pass/Fail threshold can be configured in setup, such that the buzzer sounds when the value is below a selected value. This value is stored in SETUP and retained until it is modified by the user or the instrument is reset to factory defaults.

The display will show a TICK or CROSS when the measured value is below or above the threshold set.



9.6 Test current - 20 mA / 200 mA

The continuity test current can be changed from 200 mA to 20 mA where extended battery life is the priority, *Refer to "12. SETUP Configuration options" on page 40.* (ISc).

9.7 Measurement for three terminal instruments

Refer to "6.3 Three terminal test lead connection" on page 15..

9.8 Visual fast continuity (silent buzzer) mode

This function sets the MIT481/2 and MIT485/2 into silent mode, but retains the PASS/FAIL option and displays the PASS threshold as per the "buzzer" mode.

The display also shows the addition of a cross (X) or a tick (✓) if the result is a FAIL or a PASS, replacing the BUZZER threshold alarm.

To enter "Silent Buzzer" mode:

1. Select the continuity (Ω) range;
2. Press the buzzer button twice. The display will now show a buzzer icon without the curves and show a cross or tick depending on the value being measured;
3. To disable the "silent buzzer" mode, press the BUZZER button.

9.9 REL mode

REL (relative resistance measurement) works by logging a measured value then displaying the difference compared to the subsequent measurement.

REL operates on circuit resistances above 100 Ω.

To make a REL measurement:

1. Select the continuity (Ω) range;
2. Make a measurement on a circuit above 100 Ω;
3. Press the ΔΩ button. The measured value transfers to the small digital display. The large display now shows the difference (ΔΩ) value;
4. Make another continuity measurement. The display will show the difference between the two values.
5. To clear the REL value press the ΔΩ button again.

NOTE : The REL function works across all three terminal configurations.

10. Capacitance measurements

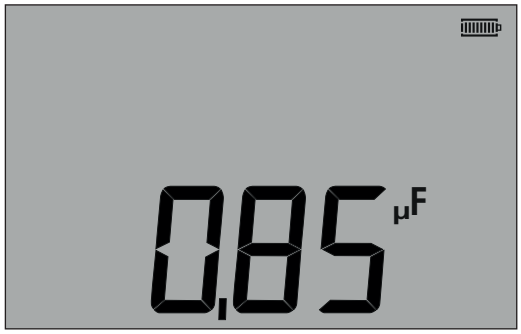
(Except MIT400/2 and MIT410/2)

The MIT400/2 and MIT410/2 can measure circuit or component capacitance.

The test is automatic and starts the test immediately on connection of a circuit. If capacitance is large the circuit can take time to charge. During this charge time the display will show "- - -". On completion of the test, the display will show the measured capacitance, and under range symbol "0.1 nf" or an over range symbol ">10 uF".

10.1 Capacitance measurement procedure (two terminals)

1. Connect test leads to the RED/BLACK test sockets on the instrument.
2. Select the uF measurement mode using the range knob.
3. Connect the test leads to the circuit to be measured. The instrument will check for a live circuit prior to making a measurement.
4. The display will show the capacitance value of the circuit or component under test, as below:



10.2 Distance measurement by capacitance

For the MIT481/2 and MIT485/2 instrument, it is possible to measure cable length by capacitance in either feet or km, depending on the SETUP status.

This is an automatic function and is calculated from the stored capacitance value based on the default value of 50 nF/km). This can be adjusted in SETUP between 40 nF/km and 70 nF/km.

The result is displayed as below:

10.3 Capacitance measurement procedure (three terminals)

Refer to "6.3 Three terminal test lead connection" on page 15..

11. Saving, recalling and downloading test results.

(Only MIT420/2, MIT430/2, MIT481/2, MIT485/2 and MIT2500)

11.1 Saving test results

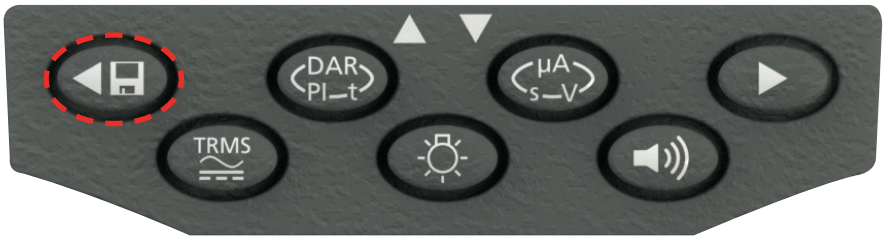
After completing any test, the result remains displayed on the screen for one minute. During this time the result may be saved in memory and recalled later.

Procedure for storing test results:

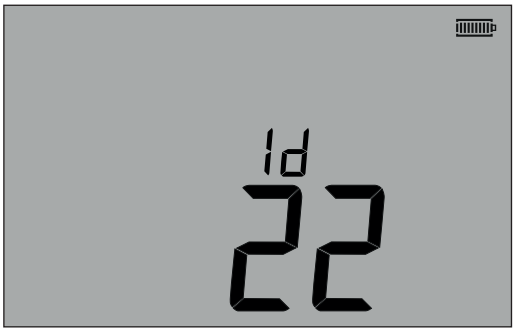
1. After completion of a particular measurement, ensure the test result is displayed on the instrument display, as below:

Example of continuity result;

2. The test result will remain displayed for one minute during which time the result may be stored;
3. Press the STORE key to record the test result.



A unique identification number is allocated to each test result which is displayed for 2 seconds before returning to the test result.



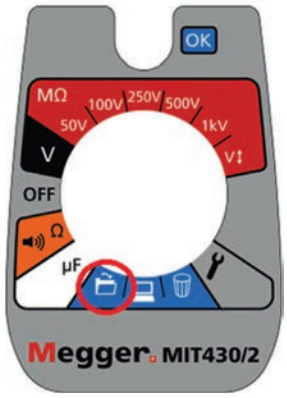
Result is now stored.

11.2 Test results recall

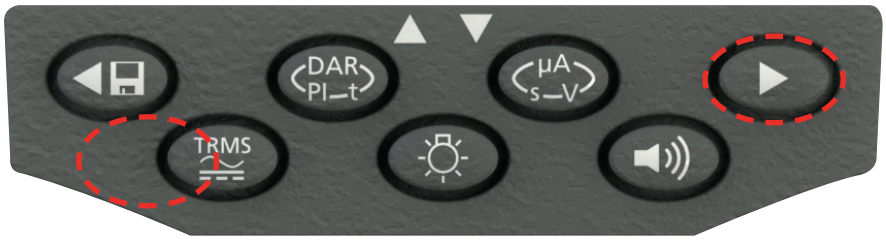
(MIT420/2, MIT430/2, MIT481/2, MIT485/2 and MIT2500)

All stored test results may be recalled to the screen.

1. Turn the instrument 'ON' by rotating the selector switch to the recall (RCL) position.



2. The latest unique test result identification number will be displayed.
   Where no results have previously been stored, the display will indicate this by three dashes.
3. Press [OK] to display last stored result, or select the particular test result identification number by using the LEFT and RIGHT buttons as below:



   Then press 'OK' to select.
4. The test result will be displayed. Additional information stored with the test result may be viewed using the relevant button. For example on the insulation test, µA can be recalled using the µA/S/V key. The TRMS key will operate on voltage results.

11.2.1 PI and DAR recall

Additional recall information is available if the result stored was a PI or DAR test, as the result is a ratio of two measured values.

To recall a PI or DAR result:

1. Rotate the selector switch to the recall position and observe the latest unique test result identification number displayed;
2. Locate the particular test result identification number by using the UP and DOWN buttons, then press 'OK' to select;
3. The test result will be displayed. To scroll through the different measurements used in calculating the PI or DAR ratio, use the DOWN only button.

11.3 Deleting test results

(Only MIT420/2, MIT430/2, MIT481/2 and MIT485/2)

Stored test results may be deleted singularly or all together.

11.3.1 Procedure for deleting a single test result

1. Turn the instrument 'ON' by rotating the selector switch to the delete position.
2. The latest test result will be displayed. Where no results have previously been stored, the display will indicate this by three dashes.
3. Press 'OK' to delete the displayed test result.
4. Observe the 'new' last test result identification number, which may be deleted as previously described.

11.3.2 Procedure for deleting all test results

1. Turn the instrument 'ON' by rotating the selector switch to the delete position. The latest test result will be displayed. Where no results have previously been stored, the display will indicate this by three dashes.
2. Press the LEFT or RIGHT ARROW button. Note that the display now indicates 'ALL'.
3. Press 'OK' to delete all the test results. Note: for large amounts of data, the progress bar decays as the contents of memory are deleted.
4. On completion of the deletion progress, the display indicates three dashes signifying that no result remains stored.

11.4 Downloading test results

11.4.1 Bluetooth connections

To prepare your MIT430/2, MIT485/2 or MIT2500 for Bluetooth® Communications, the MIT must be paired to the PC/ mobile device. *Refer to "11.5 Procedure for pairing your MIT to a PC or mobile device via Bluetooth®" on page 38.*

To download data to a PC or mobile device, there are two options.

11.4.2 CertSuite Asset

CertSuite Asset is a simple and easy way to transfer test results from portable test instruments to a mobile device, when testing electrical assets. It stores the data on secure cloud storage and can generate reports with images and graphs. *Refer to "11.6 Sending test results to CertSuite Asset" on page 39.*

11.4.3 Megger Downloader

The Megger Downloader software transfers test results from the MIT to a computer, saving the results as a .csv file which can be used in most spreadsheet software. A computer with Bluetooth® is required to communicate with MIT430/2 and MIT485/2 instruments.

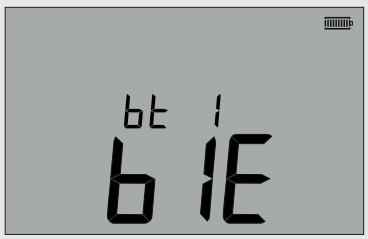
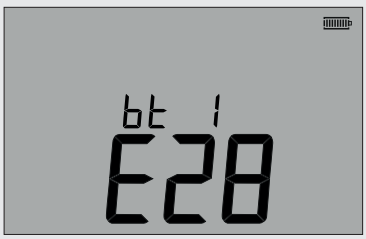
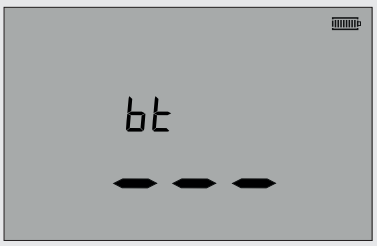
The following stages need to be implemented before the MIT can download data to a PC:

1. The MIT must be paired to a PC using a Bluetooth® wireless network. *Refer to "11.5 Procedure for pairing your MIT to a PC or mobile device via Bluetooth®" on page 38.*
2. Megger Downloader software must be installed on the destination PC.

Visit Megger.com to download the Megger Downloader software, or scan the QR code ➔

11.5 Procedure for pairing your MIT to a PC or mobile device via Bluetooth®

1. Switch the MIT range knob to the PC position. if the screen shows the message **BLE**, then your MIT will appear in available devices on your mobile device - *Refer to "11.6 Sending test results to CertSuite Asset" on page 39.*
   If **BLE** is not displayed, follow the connection instructions below.
2. If there is a device already being paired, the last three characters of its MAC address will be shown (**E28** example below). If the instrument has never been paired with a device, the display will show **"---"** as below:

		
BLE - Bluetooth® active screen	Paired with a Blutooth® device	Not paired with a Bluetooth® device

The MIT can pair with up to 12 devices, after which further pairing will over write the currently displayed pair.
To select a different paired device from that shown, use the UP/DOWN arrow keys.
If the MIT is already paired to the device, *Refer to "11.6 Sending test results to CertSuite Asset" on page 39.*.

1. Press and hold the yellow TEST button for longer than 1 second to start the pairing process.

1. The instrument will search for Bluetooth® devices nearby. Once the search has been completed, the partial address of the first detected device will be shown on the top part of the display and number 1, the index of it, on the bottom part of the display.
2. Use the ▲ and ▼ buttons to scroll through the partial address until one matches the Bluetooth® device ID that you want to connect to.
3. Pair the instrument by pressing and holding the TEST button until the alternating symbols appear on the display.
4. On your device, a message bubble may appear, showing that a Bluetooth® device is trying to connect.
5. Click on this message and enter the passkey '1234' to accept the connection. When complete, the instrument display will return to the Bluetooth® home screen, showing the partial address of the device being paired with.
6. Press the TEST button to send the data to the paired device, or press and hold it for longer than one second to do pairing again.
7. To delete a pair, press and hold down the LOCK [OK] button for two seconds.

11.6 Sending test results to CertSuite Asset

Once the MIT and CertSuite Asset are connected, results can be transferred to the mobile device.

The following MIT units can connect to CertSuite Asset:

Model	Android app	iOS app	Chrome or Edge internet browser
MIT485/2	Bluetooth	Bluetooth	Bluetooth
MIT430/2	Bluetooth	Bluetooth	Bluetooth
MIT2500	Bluetooth	Bluetooth	Bluetooth

If necessary, follow guidance on the CertSuite website **CertSuite.info** to learn how to use CertSuite Asset.

Visit Certsuite.info for more information on CertSuite Asset and for your FREE 30 day trial ➔

To send a result follow the example below:

1. Log in to CertSuite Asset and select a job, or create a job. Add the asset and test details.
   An instructional video can be found at **CertSuite.info** on the CertSuite Asset page.
2. Perform the test normally on the instrument, as explained in the insulation test section (*Refer to "8. Insulation resistance testing" on page 21.*).
3. On successful completion of the test a popup will display in CertSuite Asset and the test results will be saved.

11.7 Re-sending test results to CertSuite Asset

If the test result that have been entered into the schedule needs to be changed the measurement can be repeated and re-sent to the same location in the schedule.

In this case CertSuite Asset will warn that a saved value Is being over-written and ask for permission.

Only one value can be entered into a single location in CertSuite Asset.

11.8 Further CertSuite information and support

Further information on how to use CertSuite™ is available from the website:

www.CertSuite.info

12. SETUP Configuration options

Operator SETUP allows the MIT to be customised to suit application or operator preferences. To enter SETUP, select the spanner with the rotary knob. The following options are available:

12.1 SETUP navigation

1. Press the TEST button to scroll through the SETUP options.
2. When the display shows the required SETUP option, press the UP or DOWN arrows to change the value for that option. The LOCK symbol will flash to indicate the value has been changed from the saved setting.
3. Press the LOCK button to store the new value.
4. When all SETUP functions have been configured to the desired values, turn the rotary knob away from the SETUP setting.

Display message	Function	Options	Factory setting
bu2	Buzzer threshold < Limit = buzz	1, 2, 3, 4, 5, 10, 20, 30, 40, 50, 100, 200	2 Ω
Loc	Insulation Lock enable/disable	On = INS lock enabled OFF = INS lock disabled	On
ISc	Continuity short circuit current	200 mA = (up to 3.5 Ω) 20 mA	200 mA
InS	Insulation limit alarm threshold	BM50/4, MIT410TC/3, MIT405/2, MIT415/2, MIT417/2:	0.5 MΩ
		0.5, 10, 20, 50, 100, 200, 500, 1000 MΩ	
		MIT400/2, MIT410/2, MIT420/2, MIT430/2, MIT481/2, MIT485/2, MIT2500: 0.5, 1, 2, 3, 4, 5, 10, 20, 30, 40, 50, 100, 200, 300, 400, 500, 1000 MΩ	
SEtV	Variable insulation test voltage	MIT485/2 :- 50 V - 500 V	10 V
		MIT420/2 and MIT430/2 :- 50 V - 1000 V	10 V
		MIT2500 :- 50 V - 2500 V	100 V
dAR	Set t1 start time	15 / 30 Seconds	30
t	INS count down timer	1,2,3,4,5,6,7,8,9,10 minutes	1 min.
CAb	Cable capacitance / km / miles	40 to 60 nF/km	50 nF/km 80.5 nF/mile
bLt	Backlight timer	20, 60, OFF (OFF = no auto off)	20 secs
SLt	Sleep timer	10, 20, 30, 60, OFF (OFF = no auto off)	10 mins
HuF	REN (Telephone handset) calculator	0.5, 0.6, 0.7, 0.8, 0.9, 1.0,1.1, 1.2, 1.3 uF	1.0 uF
tLu	Terminal Lockout voltage	25, 30, 50, 75	50 volts
REV	Auto reversal of continuity	On/OFF	OFF
ESd	Enable the 104, 105, 106 etc display range	MIT400ESD:- On/OFF	OFF
bAt	Battery voltage	1.2 V / 1.5 V (All Models)	1.5 V
RSt	Restore factory settings	Restore	No
LAng	Display of either Tip-Ground-Ring or A-E-B LCD symbology	US, EU	US
dis	Distance by uF	m, ft	m

13. Technical Specifications

All quoted accuracies are at +20 °C.

Insulation:

Test voltage	Nominal:
MIT400/2	250 V, 500 V, 1000 V
MIT410/2, 420/2,430/2	50 V, 100 V, 250 V, 500 V, 1000 V
MIT2500	50 V, 100 V, 250 V, 500 V, 1000 V, 2500 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 1000 Volts 200 GΩ ± 2% ± 2 digits ± 0.2% per GΩ 2500 Volts 200 GΩ ± 2% ±2 digits ±0.2% per GΩ (MIT 2500) Service Error: BS EN 61557-2 (2007) 50 V, ± 2.0% ±2d, 100 kΩ - 900 kΩ ± 10.5% 100 V, ± 2.0% ±2d, 100 kΩ - 900 kΩ ± 10.3% 250 V, ± 2.0% ±2d, 100 kΩ - 900 kΩ ± 10.3% 500 V, ± 2.0% ±2d, 100 kΩ - 900 kΩ ± 10.3% 1000 V, ± 2.0% ±2d, 100 kΩ - 900 kΩ ± 11.5%
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 MIT2500: 1 mA into 2.5 MΩ)
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.
Leakage	10% ± 3 digits
Voltage	3% ± 3 digits ± 0.5% of rated voltage
Timer control	60 second countdown timer

NOTE : Above specifications only apply when high quality silicone leads are being used.
Max. capacitive load. 15 nF on tests above 1000 V (only available on MIT2500)

Continuity:

Continuity measurement	0.01 Ω to 999 kΩ (0 to 1000 kΩ on analogue scale)
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%, 0.1 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 9.00 Ω
mA range and accuracy	AC: 10.0 mA - 500 mA: +/-5%, +/-2 digits (15 Hz - 400 Hz, sinusoidal) DC: 0.0 mA - 500 mA: +/-5%, +/-2 digits

Voltage:

Voltage range	AC: 10 mV to 600 V TRMS sinusoidal (15 Hz to 400 Hz) DC: 0 to 600 V
Voltage range accuracy	AC: ±2% ±1 digit DC: ±2% ±2 digit Service Error: BS EN 61557-1 (2007) - ±2.0% ±2d, 0 V – 300 V AC/DC ± 5.1%
Waveform	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

Frequency:

Frequency measurement range	15-400 Hz
Frequency measurement accuracy	±0.5% ± 1 digit (100 Hz to 400 Hz) unspecified

Capacitance measurement:

MIT420/2, MIT430/2, MIT2500

Capacitance measurement:	1 nF to 10 µF
Capacitance measurement accuracy	± 5.0% ± 2 digits (0.1 - 1 nF unspecified) ± 5.0% ± 2 digits (0.1 - 1 nF unspecified, MIT2500: 1 nF - 10 µF)

Storage:

Result storage (MIT420/2 & MIT430/2):

Storage capacity	>1000 test results
Data download	Bluetooth® wireless Bluetooth® Class II
Range	up to 10 m
Power supply	6 x 1.5 V cells type IEC LR6 (AA, MN1500, HP7, AM3 R6HP) 6 x 1.2 V NiMH (HR6) 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 d.c. (accessory interface)
Dimensions Instrument	228 mm x 108 mm x 63 mm (9.00 in x 4.25 in x 2.32 in)
Weight	600 g (MIT400/2), (28.74 oz) 815 g (MIT2500) (27.22 oz)
Weight (instrument and case)	1.75 kg (3.86 lb)
Fuse	Use only 500 mA (FF) 1000 V (1 OR 2 depending on variant) 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: (2015) to 600 V phase to earth, Category IV.. Refer to safety warnings supplied.
EMC	In accordance with IEC 61326 amendment 1.
Temperature co-efficient	<0,1% per °C up to 1 GΩ <0,1% per °C per GΩ above 1 GΩ

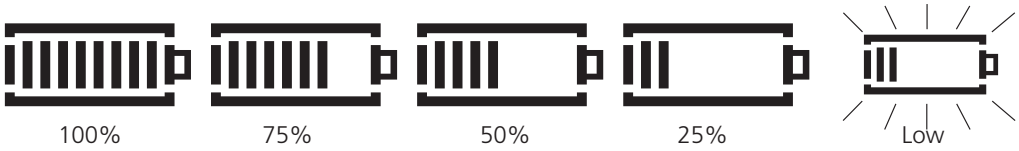
Environmental:

Operating temperature range and humidity	-10 to +55 °C 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

14. Battery and fuse replacement

14.1 Battery condition and replacement

The battery condition indicator is displayed at all times that the instrument is switched on, as below: 100%, 75%, 50%, 25% and low, as below:



Replacement battery types are:

6 x LR6 (AA), 1.5 V Alkaline, or 6 x 1.2 V NiMH

WARNING : Do NOT use AA size LiON (Lithium Ion) rechargeable cells as these are 3.4 V each and could permanently damage the instrument.

NOTE : NiMH rechargeable batteries show a lower charge than Alkaline batteries and may not give much warning before becoming exhausted.

14.2 Battery Charging

WARNING : ONLY NiMH battery cells are rechargeable.

The MIT cannot be used when the battery is being charged.

When charging NiMH rechargeable battery cells, only use the power supply provided by Megger as an optional extra. Other power supplies will not function with the MIT. The Megger power supply is designed to preserve the functions and accuracy of the MIT.

The MIT can be charged while switched on or off. When charging the MIT while the instrument is ON, "Chg" will display on the screen. The battery segments, on screen, will cycle showing the current level of charge. Once the battery is fully charged the screen will display a "bat OK" indication.

14.3 Procedure to replace batteries

1. Switch off the instrument and disconnect the instrument from any electrical circuits.
2. Disconnect all test leads from the instrument.
3. To remove the rear cover, undo the screw on the rear of the battery cover, lift the cover off.
4. Remove the dead cells and refit new batteries, observing the correct polarity as marked on the battery compartment.
5. Replace the cover and retaining screw.
6. Dispose of the cells appropriately.

WARNING : Incorrect battery cell polarity can cause electrolyte leakage and damage to the instrument. If the battery condition indicator does not show a full charge, a cell may be reversed.

Charging with a reversed cell can cause localised heating and possible damage to the case.

Battery cells should not be left in an instrument which may remain unused for an extended period.

14.3.1 Battery Voltage

Battery voltage should be changed to 1.2 V if NiMH are used. *Refer to "12. SETUP Configuration options" on page 40.*

15. Repair and warranty

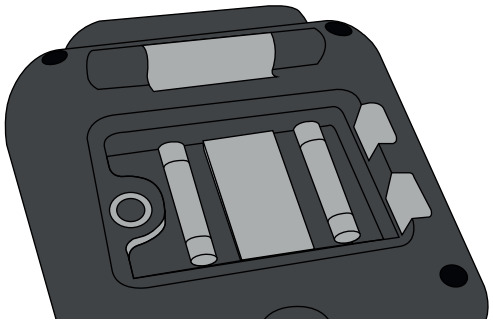
15.1 Blown fuse indicator

The blown fuse indicator is shown below:

This symbol operates on the continuity [Ω] range. The symbol indicates that one of the fuses in the instrument has failed.

15.2 Fuse replacement procedure

1. Switch off the instrument and disconnect the instrument from any electrical circuits.
2. Disconnect all test leads from the instrument.
3. Remove the rear fuse cover. To remove the rear cover, undo the screw on the rear of the small fuse cover and lift the cover off, as below:



4. Both fuses should be checked for failure and replaced if faulty. A replacement fuse must be of the correct type and rating: i.e. 500 mA (FF) H.B.C.30 kA min 1000 V (32 mm x 6 mm).
5. Replace the cover and retaining screw.

15.3 Preventive maintenance

The MIT400/2 series instruments require very little maintenance.

Test leads should be checked before use to ensure there is no damage.

Ensure batteries are removed if the instrument is left unused for an extended period.

When necessary, the instrument can be cleaned with a damp cloth.

Do not use alcohol based cleaners as these may leave a residue.

15.4 Repair and warranty

Megger operate fully traceable calibration and repair facilities to make sure your instrument continues to provide the high standard of performance and workmanship that is expected. These facilities are complemented by a worldwide network of approved repair and calibration companies, which offer excellent in-service care for your Megger products.

For service requirements for Megger instruments contact:

Megger Limited Archcliffe Road Dover Kent CT17 9EN **U.K.** Tel: +44 (0) 1304 502 243 Fax: +44 (0) 1304 207 342	OR	**Megger Valley Forge** 400 Opportunity Way Phoenixville PA 19460 **U.S.A.** Tel: +1 610 676 8579 Fax: +1 610 676 8625

If the protection of an instrument has been impaired it should not be used, but sent for repair by suitably trained and qualified personnel. The protection is likely to be impaired if, for example, the instrument shows visible damage, fails to perform the intended measurements, has been subjected to prolonged storage under unfavourable conditions, or has been exposed to severe transport stresses.

New instruments are covered by a two year warranty from the date of purchase by the User, the second year being conditional on the free registration of the product on **www.megger.com**. You will need to log in, or first register and then login to register your product. The second year warranty covers faults, but not recalibration of the instrument which is only warranted for one year. Any unauthorised prior repair or adjustment will automatically invalidate the warranty.

These products contain no User repairable parts and if defective should be returned to your supplier in original packaging or packed so that it is protected from damage during transit. Damage in transit is not covered by this warranty and replacement / repair is chargeable.

Megger warrants this instrument to be free from defects in materials and workmanship, where the equipment is used for its proper purpose. The warranty is limited to making good this instrument (which shall be returned intact, carriage paid, and on examination shall disclose to their satisfaction to have been defective as claimed).
Any unauthorised prior repair or adjustment will invalidate the warranty. Misuse of the instrument, from connection to excessive voltages, fitting incorrect fuses, or by other misuse is excluded from the warranty. The instrument calibration is warranted for one year.

This Warranty does not affect your statutory rights under any applicable law in force, or your contractual rights arising from a sale and purchase contract for the product. You may assert your rights at your sole discretion.

15.5 Calibration, Service and Spare Parts

For service requirements for Megger Instruments contact **Megger** or your local distributor or authorised repair centre.

Megger operates fully traceable calibration and repair facilities, to make sure your instrument continues to provide the high standard of performance and workmanship you expect. These facilities are complemented by a worldwide network of approved repair and calibration companies to offer excellent in-service care for your Megger products.

See the **last page** of this User Guide for Megger contact details.

To find your local Authorised Service Centre email Megger on **ukrepairs@megger.com** and give details of your location.

16. Decommissioning

16.1 WEEE Directive

The crossed out wheeled bin symbol placed on Megger products is a reminder not to dispose of the product at the end of its life with general waste.

Megger is registered in the UK as a Producer of Electrical and Electronic Equipment. The Registration No is WEE/ HE0146QT.

For further information about disposal of the product consult your local Megger company or distributor or visit your local Megger website.

16.2 Battery disposal

The crossed out wheeled bin symbol placed on a battery is a reminder not to dispose of batteries with general waste when they reach the end of their usable life.

For disposal of batteries in other parts of the EU contact your local Megger branch or distributor.

Megger is registered in the UK as a producer of batteries (registration No.: BPRN00142).

For further information see www.megger.com

17. Worldwide Sales Offices

Sales Office	Telephone	Email
UK	T. +44 (0)1 304 502101	E. UKsales@megger.com
USA – Dallas	T. +1 214 333 3201	E. USsales@megger.com
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USA – Dallas	T. +1 214 333 3201	E. USsales@megger.com
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