MIT400 Series CAT IV
Insulation Resistance and Continuity Testers

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- **Insulation testing up to 1000 V and 200 GΩ**
- **Patented analog arc and dual digital display**
- **CAT IV 600 V rating**
- **TRMS & DC Voltage measurement**
- **Continuity testing at 200 mA or 20 mA down to 0.01**
- **Pass/Fail limit alarms**
- **PI/DAR and Timer function**
- **Test result storage (MIT Models 420, 430, 481 and 485)**
- ***Bluetooth*® wireless data transfer (MIT Models 430 and 485)**
- **Measurement of capacitance and distance by capacitance (MIT Models 481 and 485)**
- **User selectable test voltage in 1V increments from 10V to 100V (MIT Model 40X)**
- **Three year product warranty**
- **IP54 rated**

DESCRIPTION

The new Megger MIT400 Series insulation and continuity testers has been designed for electrical testing by power utilities, industrials, telecommunication companies, commercial/domestic electricians and anyone with unique test voltage requirements. The wide range of features also makes the MIT400 Series ideal for maintenance technicians and engineers.

They replace the well-established BM400 insulation tester range, giving greater functionality with simplified operation, greater application range and increased safety.

The range

The range consists of eight instruments:

MIT400 250 V, 500 V and 1000 V

MIT410 50 V, 100 V, 250 V, 500 V and 1000 V plus PI and DAR

MIT420 Same as Model 410 plus result storage and download

MIT430 Same as Model 420 plus Bluetooth® download

MIT480 50 V, 100 V

MIT481 50 V, 100 V, 250 V, 500 V, 1000 V plus PI, DAR and result storage

MIT485 Same as Model 481, plus Bluetooth® download

MIT40X 10 V to 100 V in 1 V steps

Panelboard testing is faster, easier and safer with the new MIT400 Series.

APPLICATIONS

MIT Models 400, 410, 420 and 430

Industrial and Power Electrical Installation Testing:

These models include all the features required for electricians, technicians and engineers working in a range of industries. Available features are selected to make testing easy and fast in a range of situations. Typical applications include:

- Building/Campus electrical maintenance
- Large and small scale electrical installations
- Periodic electrical systems inspection and testing
- Cable testing

Service, Repair and Maintenance:

The MIT Models 410, 420 and 430 add additional features required for technicians and engineers working on more demanding applications. Functions such as PI and DAR, capacitance measurement and a higher insulation range increase the suitability for applications such as:

- Plant maintenance and production testing
- Panelboard testing
- Railway and other transportation maintenance and testing
- Motor testing
- Cable inspection/quality control
- Street lighting maintenance
- Avionics ground testing and maintenance
- Military hardware and facility maintenance

MIT Models 480, 481 and 485

Telecommunication Testing

Designed to cope with the additional requirements of the telecommunications industry, MIT Models 480, 481 and 485 include 50 V and 100 V range insulation testing as standard, plus higher voltages as required.

In addition, the voltage detection test inhibit feature has been raised to 75 V (from 50 V), to allow testing of cables with coactivity coupled induced voltages, which would normally inhibit such testing with a 50 V protected instrument.

Finally the MIT481 and MIT485 models include measurement of cable distance by capacitance, providing a convenient cable length without the need to use TDR technology, with adjustable cable capacitance from 40 nF/Km to 60 nF/Km (default is 50 nF/Km).

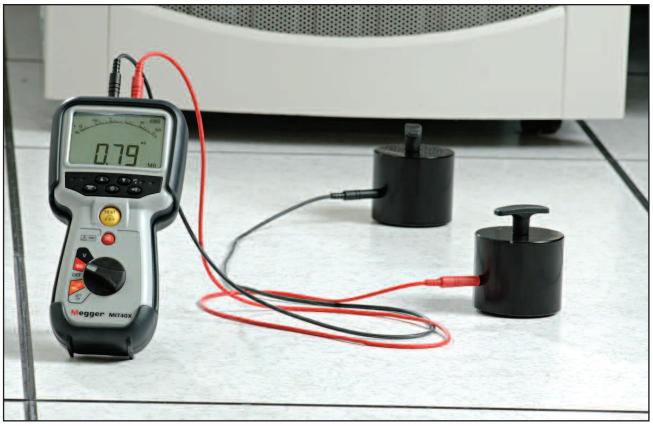
MIT Model 40X

Special Applications Testing

The MIT40X provides a new solution for unique insulation voltage measurement requirements. The MIT40X has a variable insulation test voltage from 10 V to 100 V **in 1 V steps**, selectable in the "Set-Up" menu.

Typical applications include:

- Commercial avionics testing
- Military land, marine and air communications testing
- Manufacturing/production line testing
- Electrostatic test and measurement
- Component testing
- Battery powered traction and lifting equipment testing



MIT40X shown measuring electrostatic charge in a computer control room.

FEATURES AND BENEFITS

- **CAT IV 600 V rating** – provides greater safety when testing at higher voltage levels
- **Adjustable insulation test voltages** – provides 250 V to 1000 V or 50 V to 1000 V. The special applications instrument (Model MIT40X) offers test voltages from 10 V to 100 V in 1 V steps.
- **Dual digital display readout** – allows display of complimentary test information simultaneously (for example: MΩ plus test voltage or MΩ plus leakage current)
- **Digital and analog arc display** – includes not only the digital readout but also Megger's patented analog arc to replicate the response of a moving coil display
- **Exceptional measurement range from 20 GΩ to 200 GΩ** - highest insulation test range available on the market, providing a superior range of measurement applications.
- **Choice of 20 mA or 200 mA continuity testing** – allows user to select lower continuity range thus increasing battery life considerably
- **Continuity auto-test capability** – enables real two-handed operation without the need to press the test button
- **Adjustable continuity limit alarm** – allows pass/fail limits to be sent to speed testing
- **Automatically perform PI and DAR tests** – user is able to quickly perform two important diagnostic tests. . . Polarization Index (PI) and Dielectric Absorption Ratio (DAR)
- **True RMS voltage measurement** – allows accurate voltage measurement on noisy lines
- **Auto ranging voltage measurement** – automatically adjusts range from millivolts to 600 V AC or DC, eliminating the need to keep changing ranging
- **Live circuit warning** – automatically warns of contact to a live circuit, voltage is displayed and testing is inhibited
- **Auto fuse warning** – warns of fuse failure automatically. No need to test the fuse manually.
- **Buzzer select button** – enable or disable buzzer as required with resistance also displayed on the screen

Megger

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Instrument Comparison Chart

	Industrial and Power Applications				Telcommunications Applications			Special Application
Insulation Voltage range	**400**	**410**	**420**	**430**	**480**	**481**	**485**	**40X**
10-100 V variable (2 GΩ - 20 GΩ)								■
50 V		■	■	■	■	■	■	
100 V		■	■	■	■	■	■	
250 V	■	■	■	■		■	■	
500 V	■	■	■	■		■	■	
1000 V	■	■	■	■		■	■	
Insulation range	20 GΩ	100 GΩ	200 GΩ	200 GΩ	100 GΩ	200 GΩ	200 GΩ	2-20 GΩ
Leakage current display		■	■	■		■	■	■
INS test voltage display	■	■	■	■	■	■	■	■
Continuity measurement								
0.01 to 100 Ω	■	■	■	■	■	■	■	■
Variable current limit. 200 mA/20 mA	■	■	■	■	■	■	■	■
Fast buzzer- selectable threshold	■	■	■	■	■	■	■	■
k Ω range to 999 k Ω	■	■	■	■		■	■	
Other functions and features								
Live circuit warning at 50 V	■	■	■	■				■
Live circuit warning at 75 V					■	■	■	
Default voltmeter	■	■	■	■	■	■	■	■
TRMS measurement to 600 V	■	■	■	■	■	■	■	■
Frequency Hz - 40 to 400 Hz		■	■	■		■	■	■
Capacitance (0.1 nf to 10 µF)			■	■		■	■	
mV/transducer (0.1 to 19.99 V)	■	■	■	■	■	■	■	■
Backlight	■	■	■	■	■	■	■	■
Battery condition display	■	■	■	■	■	■	■	■
Insulation Timed - PI – DAR Tests		■	■	■		■	■	
Test button plus lock button	■	■	■	■	■	■	■	■
Limit alarm pass band on INS			■	■				■
Auto power down	■	■	■	■	■	■	■	
Other functions and features								
Result storage			■	■		■	■	
Bluetooth downloading				■			■	
Included accessories								
Red/black silicone lead set with clips	■	■	■	■	■	■	■	■
Protective rubber boot with built-in stand	■	■	■	■	■	■	■	■
Remote switch probe		■	■	■	■	■	■	
Calibration certificate with product	■	■	■	■	■	■	■	
Batteries	■	■	■	■	■	■	■	■
3 Year warranty	■	■	■	■	■	■	■	■

- **MIT Models 480, 481 and 485 for telecommunication testing applications also include:**
  - 75 V live circuit inhibit
  - Cable length by capacitance measurement (Model 481 & 485)
  - Cable distance in feet or km (Model 481 & 485)
- **Extensive results storage capability** – store test date for later recall (Models MIT420, 430, 481 and 485)
- **Bluetooth download capability** – wireless transfer of stored results to a PC (Models MIT430 and 485)
- **Stylish tapered design and center button placement** – easy to use with either hand
- **Each instrument comes complete with:**
  - New flexible, long-lasting silicone leads
  - Rugged instrument rubber boot
  - Calibration certificate
  - High-impact polypropylene carry case
  - Three year product warranty

Instrument Safety

The MIT400 Series instruments are designed to meet all of the requirements of IEC1010-2 and EN61557 and meets the safety requirements for use on CAT IV 600 V.

Specific safety features include:

- Any live circuit detection inhibits any insulation testing on circuits above 50 V (75 volts on Telecom models)
- Any live circuit detection and test inhibit on continuity measurements
- Default display of live circuit voltage on all ranges
- Detection and inhibit features function even if the protections fuse has failed

Also, fast detection circuitry prevents damage to the instruments if accidentally connected to live circuits or across phases.

Included with every instrument

Each MIT400 Series instrument comes complete with the following:

- Set of silicone test leads – Flexible and long lasting, these leads prevent errors from test lead leakage on high resistance type of insulation testing. They also provide increased accuracy above 10 GΩ.
- Rugged instrument rubber boot with built-in stand– Protects the instrument from dings and drops and provides an easier, better grip of the instrument.
- Plug-in switch probe – Allows the user to remotely perform insulation tests, reducing the time taken to perform a test. Not included with the MIT400 and 40X.
- High-impact polypropylene carry case – Further protects the instrument and provides space for the leads, switch probe, etc.
- Free calibration certificate (not included with the MIT40X).
- Owner information CD.
- Three year product warranty.

SPECIFICATIONS

All quoted accuracies are at +20° C.

Insulation

Nominal test voltages

MIT400	250 V, 500 V, 1000 V
MIT410, 420, 430	50 V, 100 V, 250 V, 500 V, 1000 V
MIT480	50 V, 100 V
MIT481, 485	50 V, 100 V, 250 V, 500 V, 1000 V
MIT40X	10 V to 100 V variable (1 V increments)

Insulation resistance range

MIT400	20 GΩ
MIT410	100 GΩ
MIT420, 430	200 GΩ
MIT480	100 GΩ
MIT481, 485	200 GΩ
MIT40X	20 GΩ

Range Full Scale Accuracy

1000 volts	±3% ±2 digits ±0.2% per GΩ
500 volts	±3% ±2 digits ±0.4% per GΩ
250 volts	±3% ±2 digits ±0.8% per GΩ
100 volts	±3% ±2 digits ±2.0% per GΩ
50 volts	±3% ±2 digits ±4.0% per GΩ
10 volts	±3% ±2 digits ±2.0% per 100 MΩ

Analog range: 1 GΩ full scale

Short Circuit Current: 2 mA +0% -50%
Terminal voltage: -0% +20% ±1 V

Test Current on load:
1 mA at min. pass value of insulation specified in BS7671, HD384 and IEC364, 2 mA max.

EN61557 Operating range: 0.10 MΩ to 1.00 GΩ

Leakage Current: 10% ±3 digits

Voltage display: 3% ±3 digits ±0.5% of rated voltage

Polarization Index (PI): 10 min/1 minute ratio

Dielectric Absorption Ratio (DAR): 60 sec/30 sec ratio

Notes:
(1) All ranges measure from 0.00 MΩ upwards.

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

Continuity

Measurement: 0.01 Ω to 99.9 Ω (0 to 100 Ω on analog scale)
Accuracy: ±3% ±2 digits (0 to 100 Ω)
Open circuit voltage: 5 V ±1 V

Test current: 200 mA (–0 mA +20 mA)
(0.01 Ω to 9.99 Ω)
20mA (±1 mA)
(10.0 Ω to 99.9 Ω)

Zero offset at probe tips: 0.10Ω typical
Lead resistance zeroing: Up to 9.00 Ω
Buzzer: Variable limit 1Ω, 2Ω, 5Ω, 10Ω, 20Ω

Resistance

Measurement: 0.01 kΩ to 1000 kΩ (0 to 1 MΩ on analog scale)
Accuracy: ±3% ±2 digits
Open circuit voltage: 5 V ±1 V
Short circuit current: 20 µA ± 5 µA

Voltage range

0 to 600 V d.c. ±2% ±2 digits
10 mV to 600 V TRMS sinusoidal (40 to 400 Hz) ±2% ±2 digits
0 to 1000 V on Analog scale
Unspecified input level 0 - 10 mV (40 to 400 Hz)

For non-sinusoidal waveforms additional specification apply:
±3% ±2 digits 101 mV to 600 V TRMS and ±8% ±2 digits 10 mV to 100 mV TRMS

Default Voltmeter: Operates at >25 V a.c. or d.c. on any range except OFF

Frequency: 40 - 450 Hz (40 Hz - 99.9 Hz) ±0.5% ±1 digit (100 Hz to 450 Hz)

Capacitance measurement

MIT420, MIT430, MIT481 and MIT485

Measurement range: 100 pF to 10 µF
Accuracy: ± 5.0% ±2 digits

Distance by capacitance:
MIT481 and MIT485
Arithmetic conversion from capacitance measurement on Default capacitance measurement: 50 nF/m

Capacitance range: 40 nF/m to 60 nF/m

Result storage

Capacity: >1000 test results
Download: Bluetooth wireless
Bluetooth Class: Class II
Range: up to 10 m

Power Supply:
5 x 1.5 V cells type IEC LR6 (AA, MN1500, HP7, AM3 R6HP) Alkaline NiMH rechargeable cells may be used.

Battery life: 2200 insulation tests with duty cycle of 5 sec ON /55 sec OFF @ 1000 V into 1 MΩ

Dimensions

Instrument: 220 x 92 x 50 mm (8.66 in. x 3.63 in. x 1.97 in.)
Instrument and case: 456 x 178 x 89 mm (18 in. x 7 in. x 3.5 in.)

Weight

Instrument only: 590 gms (20.73 oz.), 775 gms (27.22 oz.) with boot
Instrument and case: 1.75kg (3.86 lb)

Fuse

Use only a 500 mA (FF) 1000 V 32 x 6 mm ceramic fuse of high breaking capacity HBC 50 kA minimum. Glass fuses **MUST NOT** be fitted.

Safety Protection

The instruments meet EN 61010-1 (1995) to 600 V phase to earth, Category IV. Refer to safety warnings supplied.

E.M.C.

In accordance with IEC 61326 including amendment No.1

Temperature effects

Temperature coefficient: <0.1% per °C up to 1 GΩ

Environmental

Operating range: -10 to +55° C
Operating humidity: 90% RH at 40° C max.
Storage temperature range: -25 to +70° C
Calibration Temperature: +20° C
Maximum altitude: 2000 m
Dust and water protection:
IP54 Protected against dust and splashing water

Instrument Dual Digital Display Example

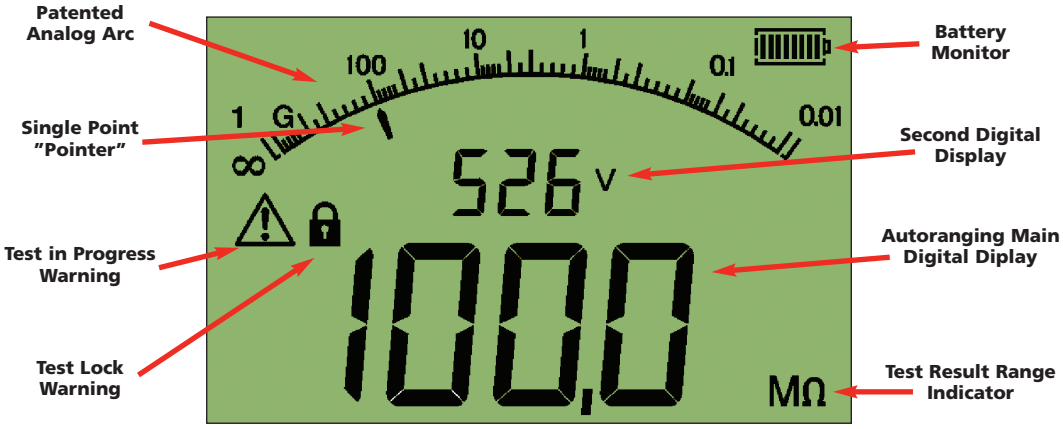
The MIT400 Series offers an impressive dual digital display readout. It allows complimentary information to be displayed simultaneously such as:

- MΩ plus test voltage
- MΩ plus leakage current
- Capacitance plus cable length (a test measurement for telecom applications)

The following display example shows the key elements of the first digital display:

The second digital display simultaneously displays the following information, depending upon the mode of operation or function chosen:

- Insulation voltage being delivered
- INS test modes
- Leakage current
- Test current
- Timer modes
- Countdown times
- Cable length



ORDERING INFORMATION

Item (Qty)		Order No.
Model MIT400	250 V, 500 V and 1000 V Insulation & Continuity Tester	MIT400EN
Model MIT410	50 V, 100 V, 250 V, 500 V and 1000 V Insulation and Continuity Tester with PI, DAR and switch probe	MIT410EN
Model MIT420	Same as Model MIT410 PLUS capacitance and data storage/download	MIT420EN
Model MIT430	Same as Model MIT420 PLUS wireless Bluetooth® download	MIT430EN
Model MIT40X	10 V to 100 V (in 1 V steps) Insulation and Continuity Tester	MIT40XEN
Model MIT480	50 V and 100 V Insulation and Continuity Tester	MIT480EN
Model MIT481	50 V, 100 V, 250 V, 500 V and 1000 V Insulation and Continuity Tester with capacitance, cable length measurement, data storage/download and switch probe	MIT481EN
Model MIT485	Same as Model MIT481 PLUS wireless Bluetooth® download	MIT485EN

Included Accessories

- Red/Black silicone test lead set with crocodile clips
- Hard carry case
- Instrument rubber boot with built-in stand
- Calibration certificate (not included with Model MIT40X)
- SP5 remote switch probe (not included with MIT400 and MIT40X)
- Owner information CD

Optional Accessories

Replacement lead set	6220-813
SP5 remote switch probe	6220-812
Instrument rubber boot with built-in stand	6231-802
Hard carry case	5410-420

Registered to ISO 9001:2000 Cert. no. Q 09290 Registered to ISO 14001-1996 Cert. no. EMS 61597

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