MIT400 CAT IV
Industrial Insulation Testers

- **CAT IV 600 V applications**
- **TRMS & DC Voltage measurement**
- **Insulation testing up to 1000 V and 200 GΩ**
- **Continuity testing at 200 mA or 20 mA down to 0.01 Ω**
- **Pass/Fail limit alarms**
- **Combined Analogue and dual digital display**
- **PI/DAR and Timer function**
- **Test result storage (MIT420)**
- ***Bluetooth*® wireless data transfer (MIT430)**

DESCRIPTION

The new Megger MIT400 series insulation and continuity testers has been designed for electrical testing by the utilities, industrial, commercial and domestic electricians. The wide range of features also makes the MIT400 series ideal for the maintenance and service/repair engineer.

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

The range

The range consists of five instruments:

MIT400 250 V, 500 V and 1000 V

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

MIT420 50 V, 100 V, 250 V, 500 V & 1000 V + PI, DAR and result storage

MIT430 50 V, 100 V, 250 V, 500 V & 1000 V + Bluetooth download

MIT40X 10 V to 100 V in 1 V steps

INSULATION TESTING

- **Test voltages** - 250 V to 1000 V or 50 V to 1000 V insulation test voltages available
- **Test Lock** - Locks insulation test on continuously.
- **Test voltage display** - The actual test voltage is displayed on the smaller digital readout, with the insulation result on the larger digital display.
- **Analogue arc** - The display also features an analogue arc to replicate the response of a moving coil display.
- **PI and DAR** - Polarisation Index (PI) and Dielectric Absorption Ratio (DAR) functions
- **200 GΩ** - Insulation testing from 20 GΩ (MIT400) to 200 GΩ (MIT420 and MIT430).
- **Silicone leads** - High quality flexible silicone test leads are comfortable to use and prevent measurement errors on higher GΩ ranges.
- **Test inhibit** - prevents testing if voltages in excess of 50 V are detected when making insulation tests.
- **Insulation buzzer** - The buzzer can be set to buzz if the insulation resistance is above a preset limit, set via the Setup menu.

CONTINUITY TESTING

- **Auto-test** - Auto test on circuit contact enables real two handed operation without the need to press the test button.
- **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 9.99 Ω 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 20 Ω in 5 steps.

- kΩ range extends resistance measurement to 1 MΩ.

DISPLAY

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

Analogue arc:

- Full display width analogue arc.
- Patented 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.
- Logarithmic display for better low insulation value measurements.

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).

  Test mode eg. PI, DAR or TI (Timed mode).

MIT40X - VARIABLE INSULATION VOLTAGE TESTER.

The MIT40X provides a unique solution for awkward insulation voltage measurement applications. The MIT40X has a variable insulation test voltage from 10 V to 100 V in 1 V steps, selectable in the "Set-Up" menu. Once selected this can only be changed by re-configuring in the Setup menu.

Typical applications include:

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

STORAGE & DOWNLOADING RESULTS

MIT420

The MIT420 is capable of saving test results for recall to the screen. A simple storage structure allows for a test number and screen results to be recalled individually.

MIT430

The MIT430 supports both test result storage and down-loading.

Test results can be stored in the instrument and subsequently downloaded to a computer with the Megger download manager software.

Data transfer is by Bluetooth, with the MIT485 Bluetooth transmitter being enabled when the Download mode is selected on the instrument.

NOTE: The receiving PC needs to have Bluetooth capability or a USB port fitted a Bluetooth receiver. Class II (10m) is acceptable.

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 IEC1010-2 and EN61557.
- Live circuit detection inhibits insulation testing on circuits above 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.

600 V CAT IV

All MIT400 instruments are designed to meet the safety requirements for use on CAT IV 600 V.

APPLICATIONS

(A) Electrical installations testing:

The MIT400 includes all the features required for electricians and engineers working in a range of industries. Available features are selected to make testing easy and fast in a range of situations. Typical industries include:

Electrical supply companies
Large and small scale electrical installation
Periodic inspection and testing
Cable testing

(B) Service, repair and maintenance:

The MIT410 and MIT420 add additional features required for engineers working on more demanding applications. Functions such as PI and DAR, capacitance measurement and higher insulation range increase the suitability for applications such as:

Manufacturing/production testing
Panel building
Railway and other transportation
Motor testing
Cable inspection/quality control
Street lighting maintenance
Avionics ground testing and maintenance
Military applications

	Industrial				Special Apps
Insulation Voltage range	**400**	**410**	**420**	**430**	**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	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	■	■	■	■	■
Default voltmeter	■	■	■	■	■
TRMS measurement to 600 V	■	■	■	■	■
Frequency Hz - 40 to 400 Hz		■	■	■	■
Capacitance (0.1 nf to 10 μF)			■	■	
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	■	■	■	■	■
Remote switch probe		■	■	■	
Calibration certificate with product	■	■	■	■	■
Batteries	■	■	■	■	■
3 Year warranty	■	■	■	■	■

SPECIFICATION

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
MIT40X	10 V to 100 V variable (1 V increments)

Insulation resistance range

MIT400	20 GΩ
MIT410	100 GΩ
MIT420, 430	200 GΩ
MIT40X	200 GΩ

Range Full Scale Accuracy

All ranges ±2% ±2 digits up to 100 MΩ.

Then:

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

Analogue range: 1 GΩ full scale

Short Circuit Current: 1 mA ±0.2 mA
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 range 10 μA 2000 μA

Leakage current: 10% ±3 digits

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

Polarisation Index (PI): 10 min / 1minute 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 analogue scale)
Accuracy: ±2% ±2 digits (0 to 100 Ω)
Open circuit voltage: 5 V ±1 V

Test current: 205 mA (±5 mA) (0.01 Ω to 9.99 Ω)
20mA (±1 mA) (10.0 Ω to 99.9 Ω)

Zero offset at probe tips: 0,10 Ω typical
Lead resistance zeroing: Up to 9.99 Ω

Buzzer: Variable limit 1 Ω, 2 Ω, 5 Ω, 10 Ω, 20 Ω

Resistance

Measurement: 0.01 kΩ to 1000 kΩ (0 to 1 MΩ on analogue scale)
Accuracy: ±3% ±2 digits up to 50 kΩ then ±5% ±2 digits
Open circuit voltage: 5 V ±1 V
Short circuit current: 1.5 mA ±0.2 mA

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 Analogue 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

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

Distance by capacitance:
MIT420, MIT430
Arithmetic conversion from capacitance measurement on
Default capacitance measurement: 50nF/km

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

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 + case: 456 x 178 x 89 mm (18 in. x 7 in. x 3.5 in.)

Weight

Instrument only: 590 gms, 775 gms with boot (20.73 oz. 27.22 oz.)
Instrument plus 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:	-20 to +55°C
Operating humidity:	95% RH at 0°C to +35°C, 70% RH @ +35°C to +55°C
Storage temperature range:	-30°C to +80°C
Calibration Temperature:	+20°C
Maximum altitude:	2000 m

Dust and water protection:
IP54 Protected against dust and splashing water

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ORDERING INFORMATION

Item (Qty)	Order No.
Basic CATIV 600 V with 250 V/500 V/1000 V insulation	MIT400-EN
As MIT400 + 50 V, 100 V, PI and DAR	MIT410-EN
As MIT410 + result storage and recall	MIT420-EN
Bluetooth downloading version of MIT420	MIT430-EN
Special selectable voltage 10-100 V	MIT40X-EN
Included accessories	
Hard case	
Test leads: 2 wire lead set to CAT IV 600 V, consisting of :	
1 x Red lead 1.25m complete with probe	
1 x Black lead 1.25m complete with probe	
1 x Red croc clip	
1 x Black croc clip	
1 x instrument rubber boot	
1 x Calibration certificate (not included with MIT40X)	
1 x Switched probe (not included with MIT400 and MIT40X)	
Owners information CD	
Accessories	
Replacement lead set	6220-813
SP5 remote switch probe	6220-812
Rubber boot with stand	6231-802
Hard case	5410-420

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