MIT400/2
CAT IV Insulation testers

Group exporter:
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- **Designed for Electrical and Industrial testing**
- **Insulation testing up to 1000 V and 200 GΩ range**
- **Stabilised insulation test voltage (New)**
- **Single range, faster continuity testing from 0.01 Ω to 1 MΩ (New)**
- **Adjustable insulation test voltage from 100V to 1000V (New)**
- **600 V Trms AC and DC voltage measurement**
- **Test result storage and Bluetooth® downloading**
- **Live circuit detection and protection**
- **Rechargeable options for mains and car charging (New)**
- **CAT IV 600 V & IP54**

DESCRIPTION

The MIT400 mk2 series insulation and continuity testers are designed not just for Electrical and Industrial, but with an exceptionally wide range of applications from electrical installations, cable testing, motor testing, automotive, ESD, panel building, avionics, maintenance etc.

Insulation testing has been enhanced with feedback controlled test voltages to limit over-voltage to 2%, rather than the industry standard 10-20%.

A variable range has been added to allow any intermediate voltage from 50 V to 1000 V in 10 V steps, where application specific test voltages are required that do not appear in the standard ranges.

Continuity testing is now significantly faster, and a single auto-ranging 0.01 Ω to 1.0 MΩ function replaces the “ohms” and “kOhms” ranges. Retained are the 200 mA and 20 mA test options.

Replacing the original MIT400 instruments the new units feature a redesigned case, back-stand, and 6 cell battery compartment with separate fuse access.

All instruments are over-moulded for increased protection and achieve an IP54 weatherproof rating.

THE MIT400 RANGE:

The range consists of four instruments:

MIT400/2 250 V, 500 V & 1000 V

MIT410/2 50 V, 100 V, 250 V, 500 V & 1000 V + PI, DAR

MIT420/2 50 V, 100 V, 250 V, 500 V & 1000 V + PI, DAR + VAR (New) & result storage

MIT430/2 50 V, 100 V, 250 V, 500 V & 1000 V + PI + DAR + VAR (New) + Bluetooth download

INSULATION RESISTANCE TESTING:

The stabilised insulation test voltage is now accurate to +2% -0%. This compares to the industry standard +20%, providing a more accurate test voltage without the risk of over-voltage damage to circuits or components. The output voltage is maintained between 0 & 2% throughout the test range.

Where a non-standard test voltage is required, a variable range allows the exact test voltage to be selected from 10 V up to 1000 V. Subject to the same stabilised output control.

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FEATURES INCLUDE:

- **Test voltages (New)**
  - 50 V, 100 V, 250 V, 500 V and 1000 V.
- **Variable test voltage (New)**
  - Adjustable test voltage from 10 V to 1000 V.
- **2% test voltage accuracy**
  - The output test voltage is maintained within the tolerance or -0% +2%
- **PASS/FAIL indication (New)**
  – PASS or FAIL displayed depending on threshold voltage
- **Stabilised test voltage**
  - The voltage is feedback controlled to ensure it remains within specification throughout the full test range
- **Test voltage display (New)**
  - The actual test voltage is displayed on the smaller digital readout, with the measurement on the larger digital display.
- **Measurement range displayed (New)**
  - The test range is displayed during selection
- **Measurement voltage display**
  - The measurement voltage is displayed during the test
- **Analogue arc**
  - The display also features an analogue arc to replicate the response of a moving coil display.
- **PI and DAR**
  - Polarisation Index (PI) and Dielectric Absorption Ratio (DAR) functions
  - Polarisation Index (PI): 10 min / 1 minute ratio
  - Dielectric Absorption Ratio (DAR): 60 sec / 30 sec ratio
- **Timed testing**
  - Automatically test to a time limit
- **High test range**
  - Insulation testing up to 200 GΩs at 1000 V.
- **Silicon leads**
  - High quality flexible silicon test leads are comfortable to use and prevent measurement errors on GΩ ranges above 5 GΩ.
- **Test inhibit**
  - prevents testing if voltages in excess of 30, 50 or 60 V (set by the user) are detected when making insulation tests. Default is 50 V.
- **Insulation buzzer**
  - The buzzer can be set to buzz if the insulation resistance is above a user adjustable limit, set in the Setup menu.
- **Test Lock**
  - Holds insulation test on continuously.
- **ESD display option (New)**
  - Swap display from kΩ, MΩ, GΩ to 10^5, 10^6, 10^7 etc

* Dependent on model

Test ranges extend from 2 GΩ to 200 GΩ depending on test voltage as below:

- 50 Volts. 10 GΩ
- 100 Volts. 20 GΩ
- 250 Volts. 50 GΩ
- 500 Volts. 100 GΩ
- 1000 Volts 200 GΩ
- Variable 50 V to 1000 V dependent on test voltage

CONTINUITY (RESISTANCE) TESTING:

- **Single resistance range (New)**
  - One range fully automatic from 0.01 Ω to 1.0 MΩ.
- **Bi-directional testing (New)**
  - Option for automatic bi-directional testing without reconnecting leads.
- **200 mA or 20 mA**
  - Either 200 mA or 20 mA continuity test currents are available. 20 mA test current will considerably increase battery life.
- **Lead null**
  - Lead resistance compensation (NULL) operates up to 10 Ωs of resistance.
- **Buzzer**
  - ON/OFF selected by simple push button.
- **Buzzer limit**
  - Continuity buzzer limit alarm provides adjustment of the maximum resistance the continuity buzzer sounds. This is adjustable from 1 Ω to 100 Ω in 5 steps.

VOLTAGE MEASUREMENT:

True RMS voltage measurement to 600 V ac or dc with resolution from 0.1 mV.

- Digital voltage measurement up to 600 V ac/dc
- Analogue arc measurement to 1000 V ac/dc
- Automatic display of frequency during voltage measurement.

DISPLAY:

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

Analogue arc:

- Full display width analogue arc.
- Analogue arc display shows essential charge and discharge characteristics not visible on a digital display.
- Single pointer “needle” response is similar to a moving coil meter.

Setup functions allow control of Buzzer limit alarms, Continuity test currents, KΩ/MΩ/GΩ or 104 /105 /106 (New)

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 t (t = Timer mode).

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OTHER FUNCTIONS AND FEATURES

Weatherproof - Every tester is sealed to IP54, providing a weatherproof case to reduce the chances of water ingress, including the battery and fuse compartment.

Tough housing - Rubber over moulding combines the tough shock absorbing outer protection with excellent grip, on a strong modified ABS housing, providing an almost indestructible case.

Batteries - Battery requirements are 6 AA batteries of either standard Alkaline or Nickel Metal Hydride (NiMH) rechargeable type, providing a minimum of 3000 insulation tests at 1000 V.

VARIABLE INSULATION VOLTAGE TESTER *

The variable mode provides a unique solution for awkward insulation voltage measurement applications. The range option allows an insulation test voltage from 10 V to 100 V in 1 v steps, and 100 V to 2500 V in 10 V steps.

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

* Dependent on model

STORAGE & DOWNLOADING RESULTS

Revised Bluetooth and pairing procedures have made the MIT400s far easier to pair and download data. The test results are downloaded to a CSV file which can then be opened as an Excel ® spreadsheet.

SAFETY

Designed to be exceptionally safe to use, fast detecting circuitry prevents damage to the instruments if accidentally connected to live circuits or across phases. Specifically, all instruments:

Meet the international requirements of IEC61010 and EN61557.

Live circuit detection inhibits insulation testing on circuits above 30, 50 or 60 V default (30 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.

FEATURES AND BENEFITS

- Designed for Electrical and Industrial testing
- Insulation testing up to 1000 V and 200 GΩ range
- Stabilised insulation test voltage **(New)**
- Single range, faster continuity testing from 0.01 Ω to 1 MΩ **(New)**
- Adjustable insulation test voltage from 100V to 1000V **(New)**
- 600 V Trms AC and DC voltage measurement
- New case design with optional magnetic hanging strap **(New)**
- Test result storage and Bluetooth® downloading
- Live circuit detection and protection
- Rechargeable options for mains and car charging **(New)**
- CAT IV 600 V & IP54

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SPECFICATION SUMMARY TABLE

INSULATION	MIT400/2	MIT410/2	MIT420/2	MIT430/2
50 V / 100 V		■	■	■
250 V / 500 V / 1000 V	■	■	■	■
2500 V				
Variable			■	■
Pi- / DAR / Timed		■	■	■
Lock button on MΩ	■	■	■	■
Guard terminal				
CONTINUITY				
Continuity 0.01 Ω - 10 MΩ	100 Ω	■	■	■
Auto reverse polarity (setup ON-OFF)		■	■	■
Lead null (<10 Ω)	■	■	■	■
VOLTAGE				
AC / DC Volts 600 V	■	■	■	■
mV AC / DC range	■	■	■	■
Frequency measurement 15 - 450 Hz		■	■	■
Input impedance	0.25 mΩ	0.25 mΩ	0.25 mΩ	0.25 mΩ
CAPACITANCE				
Capacitance 1 nF - 10 µF			■	■
OTHER FEATURES				
Combined continuity and volts			■	■
PASS/FAIL on limit alarms		■	■	■
Auto power down (setup)	■	■	■	■
On board memory			■	■
Bluetooth® download + software				■
AA Alkaline or NiMH	Both	Both	Both	Both
Recharger ready				■
CAT IV 600 V / CAT III 1000 V	■	■	■	■
ACCESSORIES				
Silicone leads (red/black)	■	■	■	■
Switched probe supplied		■	■	■
OPTIONAL Battery charger available				■

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SPECFICATION

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

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

Service Error: BS EN 61557-2 (2007).

50V,	± 2.0%	± 2d, 100 kΩ - 900 kΩ	± 10.5%
100V,	± 2.0%	± 2d, 100 kΩ - 900 kΩ	± 10.3%
250V,	± 2.0%	± 2d, 100 kΩ - 900 kΩ	± 10.3%
500V,	± 2.0%	± 2d, 100 kΩ - 900 kΩ	± 10.3%
1000V,	± 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% ± 2V
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
Guard terminal performance	<5% error at 500 kΩ
Note	(1) Above specifications only apply when high quality silicone leads are being used.

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) Service Error: BS EN 61557-4 (2007) - ± 2.0%, 0.1Ω - 2Ω ± 6.8%
Open circuit voltage	5 V ± 1 V
Test current	200 mA (–0 mA +20 mA) (0.01 Ω to 4 Ω)
Polarity	Single polarity (Default) / Dual polarity (configurable on setup).
Lead resistance	Null up to 9.00 Ω

Voltage:

Voltage range	AC: 10 mV to 600 V TRMS sinusoidal (40 Hz to 400 Hz) DC: 0 to 600 V
Volt range accuracy	AC: ±2% ±1 digit 0 to 1000 V on Analogue scale DC: ±2% ±2 digit Service Error: BS EN 61557-1 (2007) - ± 2.0% ± 2d, 0V - 300Vac/dc ± 5.1%
Waveform	Unspecified range: 0 – 10 mV (40 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	45 Hz - 450 Hz
Frequency measurement accuracy	±0.5% ± 1digit (100 Hz to 450 Hz) unspecified

Capacitance measurment:

MIT420, MIT430

Capacitance measurement	100 pF to 10 µF
Capacitance measurement accuracy	± 5.0% ± 2 digits

Storage:

Result storage (MIT420 & MIT430):

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) Alkaline NiMH 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 dc (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), (28.74 oz) 815 g (MIT2500) (27.22 oz)

Weight (instrument and case)	1.75 kg (3.86 lb)
Fuse	Use only 2 x 500 mA (FF) 1000 V 32 x 6 mm ceramic fuse of high breaking capacity HBC 10 kA minimum. Glass fuses MUST NOT be fitted.
Safety protection	The instruments meet EN 61010-1 (1995) to 600V phase to earth, Category IV. Refer to safety warnings supplied.
EMC	In accordance with IEC 61326 including amendment No.1
Temperature co-efficient	<0,1% per °C up to 1 GΩ <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

ORDERING INFORMATION

Description	Order Code
MIT400 - 250V, 500V 1000V Insulation tester	1004-731
MIT410 - as MIT400 + 50 V & 1000 V, PI, DAR and timed testing	1004-735
MIT420 - as MIT410 + variable voltage test, storage & recall	1004-739
MIT405	1004-734
MIT415 - 10 V, 25 V, 50 V, 100 < 250 V, 500 V I nsulation tester	1006-738
Included Accessories	
Red/Black Silicone test leads with Probes + Clips	
SP5 remote switch probe (not MIT400)	
Owners information CD	
Batteries 6 x AA Alkaline (MIT420 & 430 MiMH)	
Hard carry case	

Description	Order Code
Optional Accessories	
UKAS calibration certificate	
Mains Charger kit (MIT420 & 430 only)	1007-464
DC battery charger	1004-183
Switched probe SP5	1007-157
Test lead set and crocodile clips	1002-001
2 wire 500 mA fused test lead set	1002-015
Batteries (6 x NiMH)	1002-753

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