MM65 MULTIMETER

Instruction Manual

MARTINDALE ELECTRIC

Keeping You Safe

GENERAL SAFETY INFORMATION: Always read before proceeding.

Warning

These instructions contain both information and warnings that are necessary for the safe operation and maintenance of this product. It is recommended that you read the instructions carefully and ensure that the contents are fully understood. Failure to understand and to comply with the warnings and instructions can result in serious injury, damage or even death.

In order to avoid the danger of electrical shock, it is important that proper safety measures are taken when working with voltages exceeding the extra low voltage (ELV) limit of 50V (25V) RMS AC or 120V (60V) DC. The values in brackets apply to restricted voltage ranges (for example in the medical or agricultural sector).

This product must only be used by a competent person capable of interpreting the results under the conditions and for the purposes for which it has been constructed. Particular attention should be paid to the Warnings, Precautions and Technical Specifications. Always check the unit is in good working order before use and that there are no signs of damage to it. Do not use if damaged.

Where applicable other safety measures such as use of protective gloves, goggles etc. should be employed.

Please keep these instructions for future reference. Updated instructions and product information are available at: www.martindale-electric.co.uk

REMEMBER: SAFETY IS NO ACCIDENT

MEANING OF SYMBOLS:

 **Caution - risk of danger & refer to instructions**

 **Caution - risk of electric shock**

 **Equipment protected by double or reinforced insulation (Class II)**

ELV **Extra low voltage. Voltage below 50V (25V) RMS AC or 120V (60V) DC**

 **Equipment complies with relevant Directives**

 **Equipment complies with relevant UK conformity assessed marking**

 **Direct current (DC)**

 **Alternating current (AC)**

 Earth (ground)

 **End of life disposal of this equipment should be in accordance with relevant directives**

Thank you for using one of our products. For safety and full understanding of its benefits please read this manual before use. Technical support is available from +44 (0)1923 441717 and support@martindale-electric.co.uk

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1. INTRODUCTION

1.1 Inspection

Examine the shipping carton for any sign of damage. Inspect the unit and any accessories for damage. If there is any damage then consult your distributor immediately.

1.2 Description

The MM65 is a 3¾ digit multimeter with the following functions:

- AC & DC voltage to 600V
- AC & DC current to 10A
- Resistance to 34MΩ
- Continuity with audible indication
- Diode testing

Further functions are:

- Auto power off
- Auto ranging
- Data hold
- Incorrect connection warning

1.3 Accessories (included)

- TL16 test leads
- Spare 0.5A / 500V, fast acting ceramic fuse
- 9V battery (installed)
- Instructions

1.4 Battery Installation

Refer to Section 4.1 (Battery Replacement) for the battery installation instructions for the MM65.

2. PRODUCT SPECIFIC SAFETY INFORMATION

Measurement Category III (CAT III) is applicable to test and measuring equipment connected to the distribution part of the building's low-voltage MAINS installation.

Measurement Category IV (CAT IV) is applicable to test and measuring equipment connected at the source of the building's low-voltage MAINS installation.

2.1 Precautions

This product has been designed with your safety in mind, but please pay attention to the following warnings and cautions before use.

⚠ Warning

Before use check the unit for cracks or any other damage. Make sure the unit is free from dust, grease and moisture. Also check any associated leads and accessories for damage. Do not use if damaged.

⚠ Warning

Do not use if the battery / fuse cover is not fitted.

⚠ Warning

When this unit is used in combination with test leads, the measurement category of the combination is the lower measurement category of either this unit or the test leads used. Likewise, if test lead accessories such as crocodile clips are also used, the measurement category will be the lowest measurement category in that combination.

Warning

Always test this unit on an appropriate proving device or known voltage source before and after using it to determine if a hazardous voltage exists in a circuit to be tested.

Warning

When using test leads, always keep your fingers behind the finger guard on the test lead probe.

Warning

Measuring a voltage that exceeds the specified limits of the unit may damage the unit and expose the operator to a shock hazard. Always check the unit's specified limits before use.

Caution

Avoid severe mechanical shock or vibration and extreme temperature.

3. OPERATION

3.1 General

If the multimeter does not measure current on the µA/mA ranges, the internal fuse (F1) may have blown (see section 4.2 Fuse Replacement).

If the multimeter does not measure current on the 10A range the internal fuse (F2) may have blown (see section 4.2 Fuse Replacement).

If the magnitude of a parameter to be measured is unknown, but known to be within the maximum safe limits of the multimeter, then manually set the range to maximum. For example, if measuring DC voltage and the voltage magnitude is unknown, set the range to 600 V, then if required select autoranging for a satisfactory reading.

If a test lead is connected to the wrong input socket when a voltage range is selected then a warning buzzer will sound.

If the multimeter displays OL or -OL then the measurement limits of the range have been exceeded.

3.2 Low Battery Indication

If the  symbol is displayed then the battery needs replacing (see section 4.1 Battery Replacement).

3.3 Description of Terminals

µA mA	Input terminal for AC & DC current measurements to 340mA
10A	Input terminal for AC & DC current measurements to 10A
COM	Common terminal for all measurements
VΩ	Input terminal for AC & DC voltage, resistance, continuity and diode measurements

3.4 Description of Press Buttons

RANGE	Switches between auto and manual ranging
HOLD	Turns on/off the data hold function

3.5 Description of LCD Symbols

APO	Auto power off is active
HOLD	Data hold function is selected
RANGE	Manual ranging is selected
	Continuity function is selected
	Diode testing function is selected **mV, V, µA, mA**
A, Ω, kΩ, MΩ	Unit of measurement being displayed
	Indicates battery is low
DC	Indicates DC measurement
AC	Indicates AC measurement

3.6 Auto Power Off

The MM65 will auto power off after approximately 10 minutes. Pressing any button will turn the MM65 back on.

To deactivate the auto power off function press and hold the **RANGE** button while simultaneously turning the MM65 function switch from **OFF** to any position. The APO annunciator will no longer be displayed.

3.7 Manual Range Selection

The MM65 powers up in autoranging mode.

To manually select a range press the **RANGE** button to hold the present range, then continue to press the **RANGE** button until the required range is selected. The sequence is lowest range to highest then directly back to lowest.

To return to autoranging hold the **RANGE** button for 2 seconds.

3.8 Data Hold
To hold a displayed value press the **HOLD** button. The LCD will display **HOLD**.

To exit data hold press the **HOLD** button again.

3.9 AC & DC Voltage Measurement
Connect the black test lead to the COM terminal and the red test lead to the VΩ terminal.

Set the rotary switch to either AC V or DC V and if required manually set the range.

Taking all necessary safety precautions connect the test leads to the circuit being measured and read the measured voltage from the display.

3.10 AC & DC Current Measurement
Connect the black test lead to the COM terminal and the red test lead to the µA mA or 10A terminal depending on the magnitude of current to be measured.

Set the rotary switch to the required AC or DC current range and if required manually set the range.

Taking all necessary safety precautions connect the test leads in series with the circuit being measured and read the measured current from the display.

3.11 Resistance Measurement

Connect the black test lead to the COM terminal and the red test lead to the VΩ terminal.

Set the rotary switch to Ω and if required manually set the range.

Taking all necessary safety precautions connect the test leads to the circuit being measured and read the measured resistance from the display.

3.12 Continuity Testing

Connect the black test lead to the COM terminal and the red test lead to the VΩ terminal.

Set the rotary switch to  .

Taking all necessary safety precautions connect the test leads to the circuit being tested.

The buzzer will sound if the resistance is <35Ω.

3.13 Diode Testing

If the diode to be tested is in circuit be sure the circuit power is switched off.

Connect the black test lead to the COM terminal and the red test lead to the VΩ terminal.

Set the rotary switch to  . .

Taking all necessary safety precautions connect the test leads to the diode being tested.

If the diode is good a forward bias will give a display reading of around 0.6 V (silicon diode) and a reverse bias will give a display of OL. If the diode is shorted or open circuit the display will indicate approx 0V or OL respectively for both forward and reverse bias.

4. MAINTENANCE

4.1 Battery Replacement

⚠ To avoid shock or injury, disconnect the multimeter from any external circuits or components and remove the test leads before proceeding.

Replace the battery by removing the two screws from the battery cover and lifting the battery cover.

Fit a new 9V, NEDA 1604, JIS006P, IEC 6F22 battery and replace the battery cover and screws.

4.2 Fuse Replacement

⚠ To avoid shock, injury or damage to the multimeter, disconnect the multimeter from any external circuits or components and remove the test leads before proceeding.

⚠ Replace only with the fuse specified.

Replace the fuses by removing the three screws securing the rear casing, and lift off the rear casing.

Replace F1 only with the original type 0.5A/500V, fast acting ceramic fuse and replace F2 only with the original type 10A/500V, fast acting ceramic fuse.

Replace the rear casing and screws.

4.3 Test Lead Replacement

If the test leads become damaged they should be replaced.

⚠ The replacement test leads must have the same (or better) overvoltage category rating as the TL16 leads supplied

4.4 Calibration

To maintain the integrity of measurements made using your instrument, Martindale Electric recommends that it is returned at least once a year to an approved Calibration Laboratory for recalibration and certification.

Martindale Electric is pleased to offer you this service. Please contact our Service Department for details.
Email: service@martindale-electric.co.uk
Tel: +44 (0)1923 650660

4.5 Cleaning

⚠ To reduce the risk of surface leakage, this instrument must be kept in a clean condition.

Prior to cleaning, ensure that the instrument is disconnected from any voltage source.

If contamination is found, clean with a damp soft cloth and if necessary, a mild detergent. Do not use abrasives, abrasive solvents, or detergents which can cause damage to the unit. If a mild detergent is used, the unit should subsequently be thoroughly cleaned with a water dampened soft cloth. After cleaning, dry and allow to remain in a dry environment for 2 hours before use.

4.6 Repair & Service

There are no user serviceable parts in this unit other than those that may be described in section 3. Return to Martindale Electric if faulty. Our service department will quote promptly to repair any fault that occurs outside the guarantee period.

Before the unit is returned, please ensure that you have checked the unit, batteries, fuses, poor connections and leads.

4.7 Storage Conditions

The instrument should be kept in warm dry conditions away from direct sources of heat or sunlight, and in such a manner as to preserve the working life of the unit. It is strongly advised that the unit is not kept in a tool box where other tools may damage it.

5. WARRANTY AND LIMITATION OF LIABILITY

This Martindale product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is 2 years and begins on the date of receipt by the end user. This warranty extends only to the original buyer or end-user customer, and does not apply to fuses, disposable batteries, test leads or to any product which, in Martindale's reasonable opinion, has been misused, altered, neglected, contaminated, or damaged by accident or abnormal conditions of operation, handling or storage.

Martindale authorised resellers shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of Martindale.

Martindale's warranty obligation is limited, at Martindale's option, to refund of the purchase price, free of charge repair, or replacement of a defective product which is returned to Martindale within the warranty period.

This warranty is the buyer's sole and exclusive remedy and is in lieu of all other warranties, expressed or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. Martindale shall not be liable for any special, indirect, incidental or consequential damages or losses, including loss of data, arising from any cause or theory.

Since some jurisdictions do not allow limitation of the term of an implied warranty, or exclusion or limitation of incidental or consequential damages, the limitations and exclusions of this warranty may not apply to every buyer. If any part of any provision of this warranty is held invalid or unenforceable by a court or other decision-maker of competent jurisdiction, such holding will not affect the validity or enforceability of any other provision or other part of that provision.

Nothing in this statement reduces your statutory rights.

MEASUREMENT CATEGORIES

CAT Ratings

BS EN61010-1 Installation Categories (CAT ratings) define the risks from hazardous transient impulses and potentially lethal short circuit currents on the mains supply system based on where you are working.

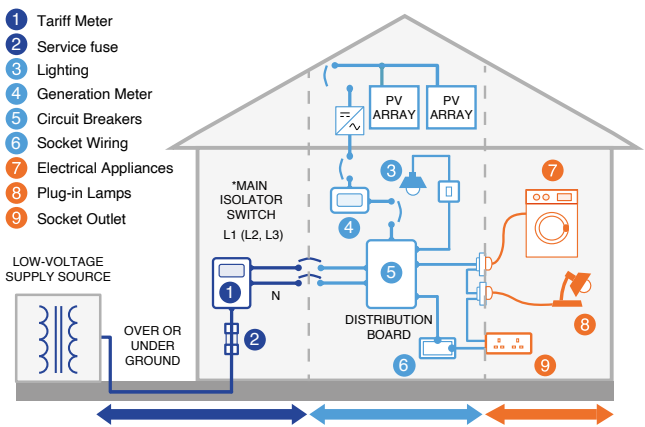
Voltage Ratings

Test equipment used for measuring mains circuits will have a CAT rating to show where it can be used. Each category also has a voltage rating to show the maximum safe phase to earth system voltage, normally 50V, 100V, 150V, 300V, 600V or 1000V.

Stay safe - Match your test equipment safety rating to the installation category.

CAT II: Socket outlets and similar points of the mains installation.
CAT III: The distribution part of the building's mains installation.
CAT IV: The supply side source of the building's mains installation.

Testers, leads and accessories all need safety ratings equivalent to, or higher than the installation category and voltage rating for the location to be safe.



MARTINDALE ELECTRIC
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Specification
MM65
Digital Multimeter

All specified accuracies are at 23°C ± 5°C, <75% RH for 1 year

Temperature coefficient: 0.1 x (specified accuracy) per °C (0°C to 18°C, 28°C to 50°C)

DC VOLTAGE

Ranges: 340mV, 3.4V, 34V, 340 V, 600V

Resolution: 0.1mV, 0.001V, 0.01V, 0.1V, 1V

Accuracy: ± (1.0 % of rdg + 2 dgts)

Input impedance: 340mV: >100 MΩ;
3.4V: 10 MΩ; 34V to 600V: 9.1MΩ.

Overload protection: 600V DC or AC rms

AC VOLTAGE (50Hz to 500Hz)

Ranges: 3.4V, 34V, 340V, 600V

Resolution: 0.001V, 0.01V, 0.1V, 1V

Accuracy: ± (2.0 % of rdg + 5 dgts)

Input impedance: 3.4V: 10MΩ: 34V to 600V: 9.1MΩ

Overload protection: 600V DC or AC rms

DC CURRENT

Ranges: 340µA, 3400µA, 34mA, 340mA, 10A *

Resolution: 0.1µA, 1µA, 0.01mA, 0.1mA, 0.01A

Accuracy: 340µA to 340mA ranges ± (2.0 % of rdg + 2 dgts)
10A range ± (3.0 % of rdg + 3 dgts)

*Current on 10A range applied for 60 seconds max followed by a 10 minute cooling period

Input protection: 0.5A/500V fast blow ceramic fuse
10A/500V fast blow ceramic fuse

AC CURRENT (50Hz to 500Hz)

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Ranges: 340µA, 3400µA, 34mA, 340mA, 10A *

Resolution: 0.1µA, 1µA, 0.01mA, 0.1mA, 0.01A

Accuracy: 340µA to 340mA ranges ± (2.5% of rdg + 5 dgts)
10A range ± (3.5 % of rdg + 5 dgts) *
* Current on 10A range applied for 60 seconds max followed by a 10 minute cooling period

Input protection: 0.5A/500V fast blow ceramic fuse 10A/500V fast blow ceramic fuse

RESISTANCE

Ranges: 340Ω, 3.4kΩ, 34kΩ, 340kΩ, 3.4MΩ, 34MΩ

Resolution: 0.1Ω, 0.001kΩ, 0.01kΩ, 0.1kΩ, 0.001MΩ, 0.01MΩ

Accuracy: 340Ω to 340kΩ ranges ± (1.5% of rdg + 4 dgts)
3.4MΩ range ± (2.5% of rdg + 4 dgts)
34MΩr range ± (5.0% of rdg + 5 dgts)

Open circuit voltage: -0.45V DC (-1.2V DC on 340 range)

Overload protection: 500V DC or AC rms

CONTINUITY

Audible indication: < 35Ω

Response time: 500ms

Overload protection: 500V DC or AC rms

DIODE TEST

Test current: 1.0mA approx

Resolution: 10mV

Accuracy: ± (3.0% rdg + 3 dgts)

Audible indication: <0.25 V

Open circuit voltage: 3.0V DC typical

Overload protection: 500V DC or AC rms

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Specification
MM65
Digital Multimeter

GENERAL

Display: 3¾ digit liquid crystal display with a maximum reading of 3400

Analog bargraph: 34 segments with measurement 12 times per second

Polarity: Automatic, positive implied, negative polarity indication

Overrange: (OL) or (-OL) is displayed

Zero: Automatic.

Low battery indication:  symbol is displayed when the battery voltage drops below the operating level

Measurement rate: 2 times per second, nominal

Auto power off: After approx 10 minutes

Operating environment: 0°C to 50°C at < 70% RH

Storage temperature: -20°C to 60°C at < 80% RH

Altitude: Up to 2000m

Power: Single standard 9 volt battery, NEDA 1604, JIS006P, IEC 6F22

Battery Life: 200 hours typical with carbon-zinc

Dimensions: 165mm (H) x 78mm (W) x 42.5mm (D)

Weight: Approx. 285g

Includes: TL16 test leads, 1 x spare fuse, 9V battery (installed) and instructions.

SAFETY:

Conforms to BS EN 61010-1, CAT III 600 V.

Class II Double Insulation.

Pollution Degree: 2 for indoor use.

TL16 test leads conform to BS EN 61010-031 CAT III 1000V, CAT IV 600V, 10A.

EMC: Conforms to BS EN 61326.

Check out what else you can get from Martindale:

- 18th Edition Testers
- Accessories
- Cable Locators
- Calibration Equipment
- Continuity Testers
- Digital Clamp Meters
- Digital Multimeters
- Electricians' Kits
- Environmental Products
- Full Calibration & Repair Service
- Fuse Finders
- Microwave Leakage Detectors
- Multifunction Testers
- PAT Testers & Accessories
- Phase Rotation Testers
- Proving Units
- Safe Isolation Kits
- Socket Testers
- Specialist Drummond Testers
- Thermometers & Probes
- Test Leads
- Voltage Indicators

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