E1622 MILLIOHM METER

INSTRUCTION MANUAL

Metrohm®

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 30V AC RMS, 42V AC peak or 60V DC.

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:

CE **Equipment complies with relevant EU Directives**

Caution - refer to accompanying documents

Caution - risk of electric shock

equipment protected by double or reinforced insulation (Class II)

End of life disposal of this equipment should be in accordance with relevant Local Directives

Thank you for buying one of our products. For safety and full understanding of its benefits please read this manual before use. Technical support is available from 01923 441717 and support@martindale-electric.co.uk.

CONTENTS

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

To install or replace batteries refer to section 3.1

2. PRODUCT SPECIFIC SAFETY INFORMATION

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.

3. OPERATION

3.1 Installing or Replacing Batteries

The battery compartment is underneath the unit and can be accessed by undoing the 2 screws. This unit takes 8 x 1.5V Alkaline Batteries LR6/AA.

3.2 Replacing Fuses

Always ensure that the instrument is disconnected from any items under test, and the batteries are removed, before changing the fuse, to ensure safety at all times.

Power supply fuse

This fuse is located in the battery compartment. Replace with a fuse of the same type (0.5A, 250Vac slow blow).

Current and potential circuit fuse

These fuses are internal and should only be replaced by qualified service personnel as opening the instrument case may invalidate the warranty.

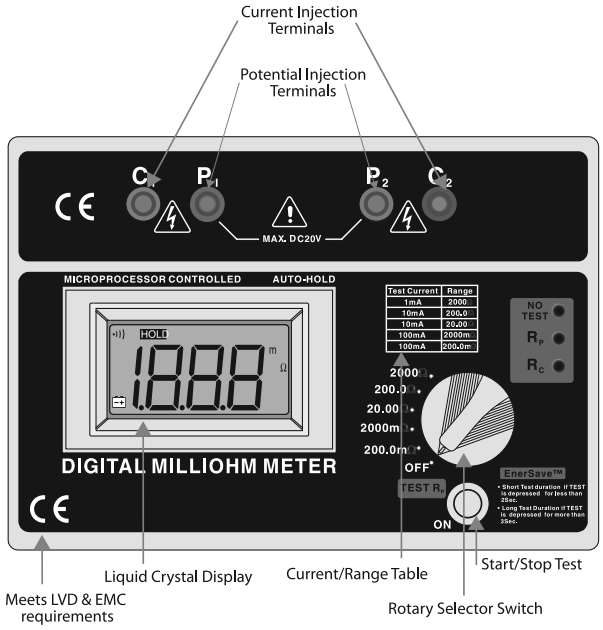
Input limits and protection

The maximum continuous voltage which can be applied across the potential and current leads is around 10.7V. Applying any more than that will blow the respective fuses.

3.3 How it Works

Preliminary Checks

Turn on the instrument by turning the rotary dial to one of the resistance range selections and if the battery symbol comes on replace the batteries. When not performing a test the NO TEST light will be on.



Always ensure the instrument is off before connecting any test leads.

Check the Current Injection Terminal

Connect C_1 and C_2 together and select a resistance range. Press the test button for less than 2 seconds to do a short test. The NO TEST light will go off and the Rc light will illuminate briefly. The instrument will then perform the test and will beep whilst doing it (tone changes dependent on range and audio symbol shows on LCD). When finished, the result will show on the LCD, and will hold until either the test is run again or the instrument is switched off. Dependent on the range selected, you will see a resistance

displayed, which will be the resistance of the leads and possibly some environmental interference. This can be eliminated by using screened leads.

Check the Potential Injection Terminals:
With C_1 and C_2 connected together, connect P_1 and P_2 and select a resistance range. Short P_1 and P_2 together. This should eliminate the lead resistance and the LCD should display 000 Ohms (dependent on range selected). Remove shorts from the leads and then short C_1 and P_1, and P_2 to C_2 and the Rp light should come on. This is the over voltage/range indicator.

If the LCD shows -1, check the leads are connected correctly as this indicates a polarity error and if you try to do a test the Rc indicator will light.

Connect all the leads together and the LCD display should show close to 000 dependent on how well the leads are connected together.

Applications

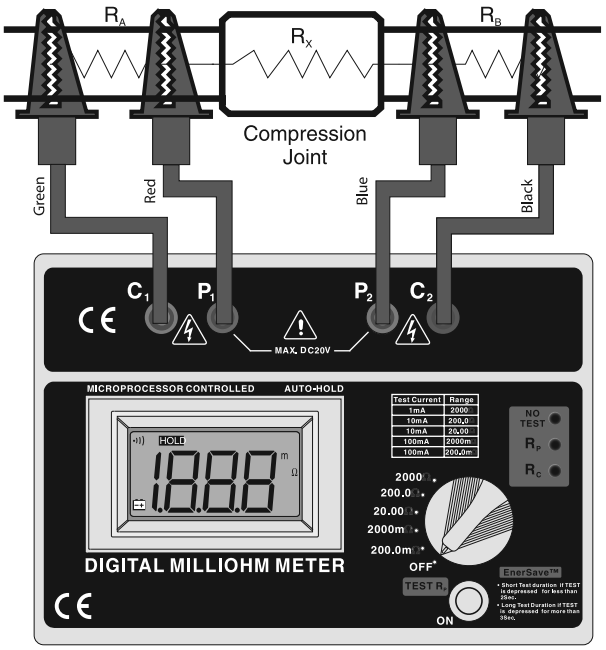
Suitable for a wide range of applications such as:

- Measuring the winding resistance of electric motors, generators and transformers.
- Bond testing in mines, aircraft, railways, ships, domestic and industrial wiring installations.
- Measuring the ring main continuity in industrial and domestic wiring installations.
- Measuring resistance in electronic equipment such as shunts, PCB tracks, switches and relays.
- Checking compression joints.
- Test and maintenance of switchboard and sub-station equipment on such items as fuses, joints, contacts and bonding.

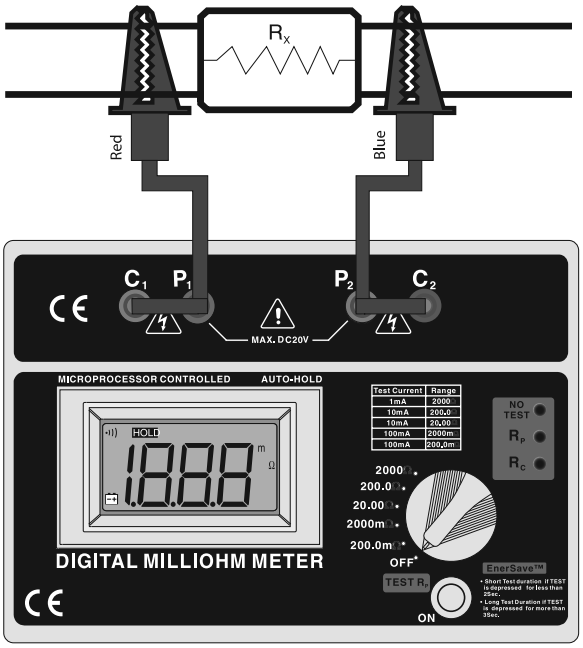
Measuring methods

4 Wire method:
Connect the colour coded test leads and connect them to the item under test as shown.

Using the 4 wire method removes errors due to the resistance of the test leads as well Ra and Rb.



2 Wire Method:
When using a high resistance range such as 2000Ω it is not necessary to use the 4 wire method as the 2 wire method should be accurate enough.



Test leads
The test leads supplied are suitable for most applications and for connection to conductors up to 17mm in diameter. They are connected using standard 4mm banana safety plugs and are terminated in crocodile clips. If using other test leads please remember the length of the potential leads should be as short as possible and be of the same length to minimise inaccuracies due to imbalance. The leads should be 16/0.2mm insulated tinned copper wire.

Thermal effects
Temperature can have a significant effect on the performance of this instrument due to the temperature coefficient of the resistance under test and thermal EMF across dissimilar conductors.

Most conductors have a large temperature coefficient of resistance. For example 0.4%°C for copper. So a copper conductor that has a resistance of 10mΩ at 20°C will increase to 10.4mΩ at 30°C. This change should be taken into account when making measurements.

When passing a current through a resistance it will generate heat so the duration of the test can also change the resistance value.

For items such as current shunts, which have joints of dissimilar conductors, the thermal EMF can affect the accuracy of the measurement. This condition can be detected if the reading alters when then leads are reversed. To compensate for this, do the test in both directions and the average of the two readings should be taken as the true measurement.

4. MAINTENANCE

Metrohm products are manufactured by Martindale Electric.

4.1 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: 01923 650660

4.2 Cleaning
The unit may be cleaned using a soft dry cloth. Do not use moisture, abrasives, solvents, or detergents, which can be conductive.

4.3 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.

4.4 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
Metrohm products are manufactured by Martindale Electric.

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 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.

Metrohm®

Specification
E1622
Milliohm Meter

ELECTRICAL
Measuring Ranges:
- 0-200mΩ in steps of 100μΩ
- 0-2000mΩ in steps of 1mΩ
- 0-20Ω in steps of 10mΩ
- 0-200Ω in steps of 100mΩ
- 0-2000Ω in steps of 1Ω

Accuracy:
±0.5% of reading ±2 digits over the operating temperature range (-15°C to +55° C) with the supplied test leads.

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Specification
E1622
Milliohm Meter

Test Current:
2000Ω range - 1mA
200/20Ω ranges - 10mA
2000mΩ/200mΩ ranges - 100mA
Accuracy ± 1%

Protection fuses:
0.5A 5x20mm DIN

MECHANICAL
110mm x 250mm x 190mm
Weight 1.563 kg
Safety Standards:
EN 61010-1
EN 61326-1
EN 61326-2-1
EN 61326-2-2

ENVIRONMENTAL CONDITIONS
- Indoor use
- Pollution Degree 2
- Altitude up to 2000 meters
- Relative Humidity 80% max
- Ambient temperature 0 – 40 degrees Centigrade

Check out what else you can get from Martindale:

- 18th Edition Testers
- Accessories
- Calibration Equipment
- Continuity Testers
- Electricians' Kits
- Environmental Products
- Full Calibration & Repair Service
- Fuse Finders
- Digital Clamp Meters
- Digital Multimeters
- Labels
- Microwave Leakage Detectors
- Motor Maintenance Equipment
- Multifunction Testers
- Non-trip Loop Testers
- Pat Testers & Accessories
- Phase Rotation Testers
- Proving Units
- Socket Testers
- Thermometers & Probes
- Test Leads
- Voltage Indicators
- Specialist Metrohm Testers (4 & 5kV)
- Specialist Drummond Testers

Metrohm®

Metrohm products are manufactured by Martindale Electric

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