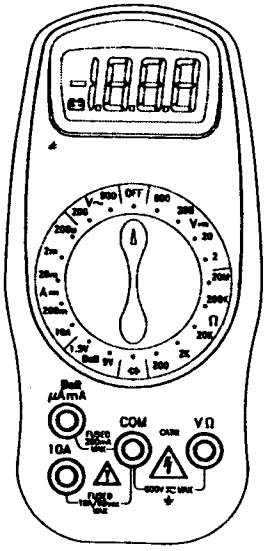
HHM33 OMEGAETTE™

OPERATING INSTRUCTIONS
DIGITAL MULTIMETER

CE



User's Guide

OMEGA
An OMEGA Technologies Company
http://www.omega.com
e-mail: info@omega.com

WARRANTY

OMEGA warrants this unit to be free of defects in materials and workmanship and to give satisfactory service for a period of **13 months** from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal one (1) year product warranty to cover handling and shipping time. This ensures that our customers receive maximum coverage on each product. If the unit should malfunction, it must be returned to the factory for evaluation. Our Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. However, this WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear or which are damaged by misuse are not warranted. These include contact points, fuses, and triacs.

We are glad to offer suggestions on the use of our various products. Nevertheless, OMEGA only warrants that the parts manufactured by it will be as specified and free of defects.

OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

LIMITATION OF LIABILITY: The remedies of buyer set forth herein are exclusive and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

Every precaution for accuracy has been taken in the preparation of this manual; however, OMEGA ENGINEERING, INC. neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damages that result from the use of the products in accordance with the information contained in the manual.

SPECIAL CONDITION: Should this equipment be used in or with any nuclear installation or activity, buyer will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the equipment in such a manner.

RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA ENGINEERING Customer Service Department. Call toll free in the USA and Canada: 1-800-622-2378, FAX: 203-359-7811; International: 203-359-1660, FAX: 203-359-7807.

BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, YOU MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OUR CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems you are having with the product.

FOR **NON-WARRANTY** REPAIRS OR **CALIBRATION**, consult OMEGA for current repair/calibration charges. Have the following information available BEFORE contacting OMEGA:

1. P.O. number to cover the COST of the repair/calibration,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems you are having with the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

OMEGA is a registered trademark of OMEGA ENGINEERING, INC.

SAFETY INFORMATION

The following safety information must be observed to insure maximum personal safety during the operation at this meter:

Always inspect your meter, test leads and accessories for any sign of damage or abnormality before every use. If any abnormal conditions exist (eg-broken test leads, cracked cases, display not reading, etc.), do not attempt to take any measurements. Do not expose the instrument to direct sun light, extreme temperature or moisture.

Never ground yourself when taking electrical measurements. Do not touch exposed metal pipes, outlets, fixtures, etc., which might be at ground potential. Keep your body isolated from ground by using dry clothing, rubber shoes, rubber mats, or any approved insulating material.

To avoid electric shock use CAUTION when working with voltages above 40Vdc or 20Vac. Such voltages pose a shock hazard. Never exceed the maximum allowable input value of any function when taking a measurement. Refer to the specifications for maximum inputs. Never touch exposed wiring, connections or any live circuit when attempting to take measurements.

When Using the probes, keep your fingers behind the finger guards on the probes.

Measuring voltage which exceeds the limits of the multimeter may damage the meter and expose the operator to a shock hazard. Always recognize the meter voltage limits as stated on the front of the meter.

SPECIFICATIONS

Display: 3½ digit liquid crystal display (LCD) with a maximum reading of 1999.

Polarity: Automatic, positive implied, negative polarity indication.

Overrange: (1) or (-1) is displayed.

Zero: Automatic.

Low battery indication: The "⊏" is displayed when the battery voltage drops below the operating level.

Measurement rate: 2.5 times per second, nominal.

Operating environment: 0°C to 50°C at < 70% relative humidity.

Storage temperature: -20°C to 60°C, 0 to 80% R.H. with battery removed from meter.

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

Altitude: 6561.7 Feet (2000M).

Power: Single standard 9-volt battery, NEDA 1604, JIS 006P, IEC 6F22.

Battery life: 300 hours typical with carbon-zinc.

Dimensions (H)×(W)×(D): 143mm× 68mm× 47mm (5.63×2.68×1.85 inches).

Weight: Approx. 206g(7.27oz) including battery.

Accessories: One pair test leads, 9V battery (installed) and Operating Instructions.

DC VOLTS

Ranges: 2V, 20V, 200V, 600V
Resolution: 1mV
Accuracy: ±(2.0% rdg + 1 dgt)
Input impedance: 10MΩ
Overload protection: 600VDC or AC rms

AC VOLTS (50Hz - 500Hz)

Ranges: 200V, 600V
Resolution: 100mV
Accuracy: ±(2.5% rdg + 4 dgts)
Input impedance: 4.5MΩ
Overload protection: 600VDC or AC rms

DC CURRENT

Ranges: 200µA, 2mA, 20mA, 200mA, 10A
Resolution: 0.1µA
Accuracy:
±(2.5% rdg + 2 dgts) on 200µA to 200mA r
±(3.5% rdg + 4 dgts) on 10A range
Input protection:
0.5A/250V fast blow fuse
10A/600V fast blow ceramic fuse

RESISTANCE

Ranges: 200Ω, 2kΩ, 20kΩ, 200kΩ, 20MΩ
Resolution: 100mΩ
Accuracy:
±(2.0% rdg + 3 dgts) on 200Ω range
±(2.0% rdg + 1 dgt) on 2kΩ to 200kΩ ran
±(3.5% rdg + 4 dgts) on 20MΩ range
Open circuit volts: 0.3Vdc (3.0Vdc on 200Ω
Overload protection: 500VDC or AC rms

DIODE TEST

Test current: 1.0mA ±0.6mA
Accuracy: ±(3.0% rdg + 1 dgt)
Open circuit volts: 3.0Vdc typical
Overload protection: 500VDC or AC rms

BATTERY TEST

Ranges: 1.5V, 9V
Resolution: 1mV, 10mV
Accuracy: ±(3.5% rdg + 2 dgts)
Loaded current:
150mA typical for 1.5V range
6mV typical for 9V range

OPERATION

Before taking any measurements, read the Safety Information Section. Always examine the instrument for damage, contamination (excessive dirt, grease, etc.) and defects. Examine the test leads for cracked or frayed insulation. If any abnormal conditions exist do not attempt to make any measurements.

Voltage Measurements

1. Connect the red test lead to the "VΩ" jack and the black test lead to the "COM" jack.
2. Set the Function/Range switch to the desired Voltage type (AC or DC) and range. If magnitude of voltage is not known, set switch to the highest range and reduce until a satisfactory reading is obtained.
3. Connect the test leads to the device or circuit being measured.
4. For dc, a (-) sign is displayed for negative polarity; positive polarity is implied.

Current Measurements

1. Set the Function/Range switch to the desired current range.
2. For current measurements less than 200mA, connect the red test lead to the μA/mA jack and the black test lead to the COM jack.
3. For current measurements of greater 200mA, connect the red test lead to the 10A jack and the black test lead to the COM jack.
4. Remove power from the circuit under test and open the normal circuit path where the measurement is to be taken. Connect the meter in series with the circuit.
5. Apply power and read the value of the display.

Resistance Measurements

1. Set the Function/Range switch to the desired resistance range.
2. Remove power from the equipment under test.
3. Connect the red test lead to the "VΩ" jack and the black test lead to the "COM" jack.
4. Connect the test leads to the points of measurements and read the value from the display.

Diode Tests

1. Connect the red test lead to the "VΩ" jack and the black test lead to the "COM" jack.
2. Set the Function/Range switch to the "→|←" position.
3. Turn off power to the circuit under test. External voltage across the components causes invalid readings.
4. Touch probes to the diode. A forward-voltage drop is about 0.6V (typical for a silicon diode).
5. Reverse probes. If the diode is good, "1" is displayed. If the diode is shorted, ".000" or another number is displayed.
6. If the diode is open, "1" is displayed in both directions.

Battery Test

1. Connect the red test lead to the "μA/mA" jack and the black test lead to "COM" jack.
2. Set the Function/Range switch to the desired 1.5V or 9V battery test range.
3. Connect the test leads to the 1.5Vdc battery under test. Normally, a good 1.5Vdc battety will read above 1.25Vdc. Consult the battery manufacturer for complete battery specifications to determine actual battery life remaining and condition of battery.

MAINTENANCE

Maintenance consists of periodic cleaning and battery replacement. The exterior of the instrument can be cleaned with a dry clean colth to remove any oil, grease or grime. Never use liquid solvents or detergents.

Repairs or servicing not covered in this manual should only be performed by qualified personnel.

Battery Replacement

WARNING

TO AVOID ELECTRICAL SHOCK, DISCONNECT THE TEST LEADS AND ANY INPUT SIGNALS BEFORE REPLACING THE BATTERY. REPLACE ONLY WITH SAME TYPE OF BATTERY.

This meter is powered by a NEDA type 1604 or equivalent 9-volt battery. When the meter displays the "⊏+" the battery must be replaced to maintain proper operation. To replace the battery, remove the three screws from the back of the meter and open the bottom case, remove the battery from battery room.

Fuse Replacement

If no current measurements are possible, check for a blown overload protection fuse. There are two fuses; F1 for the μA/mA jack and F2 for the 10A jack. For access to fuses, remove the three screws from the back of the meter and open the bottom case. Replace F1 only with the original type 0.5A/250V, fast acting fuse. Replace F2 only with the original type 10A/600V, fast acting ceramic fuse.

NOTE

The instrument complies with classII, overvoltage CAT.III of the IEC1010-1(EN61010-1) standard. Pollution degree 2 in accordance with IEC-664 indoor use. If the equipment is used in a manner not specified, the protection provided by the equipment may be impaired.

⚠ ▣ When servicing, use only specified replacement parts or equivalent.

The symbols used on this instrument are:

⚠ Caution, risk of electric shock
⚠ Caution, refer to accompanying documents
▣ Equipment protected throughout by Double insulation (Class II)
~ Alternating current
⎓ Direct current
⏚ Ground

CE

This product complies with the requirements of the following European Community Directives: 89/336/EEC (Electromagnetic Compatibility) and 73/23/EEC (Low Voltage) as amended by 93/68/EEC (CE Marking).

However, electrical noise or intense electromagnetic fields in the vicinity of the equipment may disturb the measurement circuit. Measuring instruments will also respond to unwanted signals that may be present within the measurement circuit. Users should exercise care and take appropriate precautions to avoid misleading results when making measurements in the presence of electromagnetic interference.

omega.com™

OMEGAnet™ On-Line Service http://www.omega.com	Internet e-mail info@omega.com

Servicing North America:

USA: ISO 9001 Certified
One Omega Drive, Box 4047
Stamford, CT 06907-0047
Tel: (203) 359-1660
FAX: (203) 359-7700
e-mail: info@omega.com

Canada:
976 Bergar
Laval (Quebec) H7L 5A1
Tel: (514) 856-6928
FAX: (514) 856-6886
e-mail: canada@omega.com

For immediate technical or application assistance:

USA and Canada:
Sales Service: 1-800-826-6342 / 1-800-TC-OMEGA™
Customer Service: 1-800-622-2378 / 1-800-622-BEST™
Engineering Service: 1-800-872-9436 / 1-800-USA-WHEN™
TELEX: 996404 EASYLINK 62968934 CABLE: OMEGA

Mexico and Latin America:
Tel: (95) 800-TC-OMEGA™
FAX: (95) 203-359-7807
En Español: (203) 359-1660 ext: 2203
e-mail: espanol@omega.com

Servicing Europe:

Benelux:
Postbus 8034, 1180 LA Amstelveen,
The Netherlands
Tel: (31) 20 6418405 FAX: (31) 20 6434643
Toll Free in Benelux: 06 0993344
e-mail: nl@omega.com

Czech Republic:
Ostravska 767, 733 01 Karvina
Tel: 42 (69) 6311899 FAX: 42 (69) 6311114
e-mail: czech@omega.com

France:
9, rue Denis Papin, 78190 Trappes
Tel: (33) 130-621-400 FAX: (33) 130-699-120
Toll Free in France: 0800-4-06342
e-mail: france@omega.com

Germany/Austria:
Daimlerstrasse 26, D-75392
Deckenpfronn, Germany
Tel: 49 (07056) 3017 FAX: 49 (07056) 8540
Toll Free in Germany: 0130 11 21 66
e-mail: germany@omega.com

United Kingdom: ISO 9002 Certified
- 25 Swannington Road, Broughton Astley,
  Leicestershire, LE9 6TU, England
  Tel: 44 (1455) 285520 FAX: 44 (1455) 28391
- P.O. Box 7, Omega Drive, Irlam,
  Manchester, M44 5EX, England
  Tel: 44 (161) 777-6611 FAX: 44 (161) 777-66

Toll Free in England: 0800-488-488
e-mail: uk@omega.com

OMEGA... Your Source for Process Measurement and Control

TEMPERATURE
- Thermocouple, RTD & Thermistor Probes,Connectors, Panels & Assemblies
- Wire: Thermocouple, RTD & Thermistor
- Calibrators & Ice Point References
- Recorders, Controllers & Process Monitors
- Infrared Pyrometers

PRESSURE/STRAIN FORCE
- Transducers & Strain Gages
- Load Cells & Pressure Gauges
- Displacement Transducers
- Instrumentation & Accessories

FLOW/LEVEL
- Rotameters, Gas Mass Flowmeters & FlowComputers
- Air Velocity Indicators
- Turbine/Paddlewheel Systems
- Totalizers & Batch Controllers

pH/CONDUCTIVITY
- pH Electrodes, Testers & Accessories
- Benchtop/Laboratory Meters
- Controllers, Calibrators, Simulators & Pumps
- Industrial pH & Conductivity Equipment

DATA ACQUISITION
- Data Acquisition and Engineering Software
- Communications-Based Acquisition Systems
- Plug-in Cards for Apple, IBM & Compatibles
- Datalogging Systems
- Recorders, Printers & Plotters

HEATERS
- Heating Cable
- Cartridge & Strip Heaters
- Immersion & Band Heaters
- Flexible Heaters
- Laboratory Heaters

ENVIRONMENTAL MONITORING AND CONTROL
- Metering & Control Instrumentation
- Refractometers
- Pumps & Tubing
- Air, Soil & Water Monitors
- Industrial Water & Wastewater Treatment
- pH, Conductivity & Dissolved Oxygen Instruments

M-3270

P/N: 7000-1545