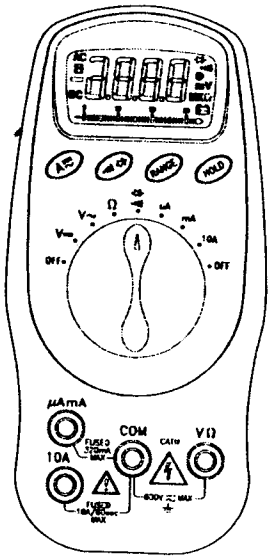
HHM35 OMEGAETTE™

OPERATING INSTRUCTIONS
DIGITAL MULTIMETER

CE



User's Guide

OMEGA

http://www.omega.com
e-mail: info@omega.com

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) 283912
• P.O. Box 7, Omega Drive, Irlam,
Manchester, M44 5EX, England
Tel: 44 (161) 777-6611 FAX: 44 (161) 777-6622
Toll Free in England: 0800-488-488
e-mail: uk@omega.com

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 3200.

Analog bar graph: 34 segments with measurements 12 times per second.

Polarity: Automatic, (-) negative polarity indication.

Overrange: "OL" mark indication.

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

Auto power off: Meter automatically shuts down after approx. 10 minutes of inactivity.

Measurement rate: 2 times per second, nominal.

Operating environment: 0°C to 50°C at < 70% R.H.

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

Accuracy: Stated accuracy at 23°C ±5°C, <75% relative humidity.

Temperture 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: 500 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.

	Range	DC Accuracy	AC Accuracy		Input impedance	Maximum input
Voltage	320mV	±1.2% rdg + 1d	N/A		> 1000MΩ	600VDC or 600VAC rms
	3.2V	±0.8% rdg + 1d	±2.0% rdg + 4d	50-200Hz	11MΩ	
	32V	±1.2% rdg + 1d				
	320V			50-60Hz	10MΩ	
	600V					
	Range	DC Accuracy	AC Accuracy		Voltage burden	Input protection
Current	320μA	±2.0% rdg + 1d	±2.5% rdg + 4d (50 - 200Hz)		0.2V	0.5A/250V fuse
	3200μA				2V	
	32mA				0.2V	
	320mA				2V	
	10A	±3.0% rdg + 3d	±3.5% rdg + 4d		2V	10A/600V fuse
OHM	Range	Resolution	Accuracy		Test current	Input protection
	320Ω	100mΩ	±2.0% rdg + 3d		< 0.7mA	500VDC or 500VAC rms
	3.2kΩ	1Ω	±1.5% rdg + 3d		< 0.13mA	
	32kΩ	10Ω			< 13μA	
	320kΩ	100Ω			< 1.3μA	
	3.2MΩ	1kΩ	±2.5% rdg + 3d		< 0.13μA	
	30MΩ	10kΩ	±5.0% rdg + 5d			
Diode Test	0-2000	1mV	±10% rdg + 2d		0.5mA (Vf = 0.6V)	500V DC or AC rms
Continuity Check	Range	Resolution	Audible indication		Test current	Input protection
	320Ω	100mΩ	< approx. 20Ω		< 0.7mA	500V DC or AC rms

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.

Manually Selecting a Range

The meter also has a manual range mode. In manual range, you select and lock the meter in a range. To manually select a range:

Press [RANGE] button to hold the selected range. Subsequently pressing the [RANGE] button will select each range in sequence from the lowest to highest range. Hold the button for 2 seconds to return to the Autorange Mode.

Hold Button

Press(HOLD) button to toggle in and out of the Data Hold mode. In the Data Hold mode, the "HOLD" annunciator is displayed and the last reading is frozen on the display. Press the (HOLD) button again to exit and resume readings.

Mode Switch A

Press this switch to toggle between DC and AC in the current measurements.

Mode Switch •))/⊣⊢

If the function switch is set to •))/⊣⊢ position, Press this switch to toggle be tween the continuity/diode modes.

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.
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.Turn off any power to the resistor to be measured. Discharge any capacitors. Any voltage present during a resistance measurement will cause inaccurate readings and could damage the meter if exceeding the overload protection of 500VDC or AC.
2. Insert the BLACK and RED test leads into the COM and Ω input terminals respectively.
3. Select the desired ohms (Ω) range.
4. Connect the BLACK and RED test probe tips to the circuit or device under test, making sure it is de-energised first.
5. Open circuits will be displayed as an overload condition.
6. Test lead resistance can interfere when measuring low resistance readings and should be subtracted from resistance measurements for accuracy. Select lowest resistance range and make the test leads short together. The display value is the test lead resistance to be subtracted.

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.
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, "OL" is displayed. If the diode is shorted, ".000" or another number is displayed.
6. If the diode is open, "OL" is displayed in both directions.
7. If the junction is measured in a circuit and a low reading is obtained with both lead connections, the junction may be shunted by a resistance of less than 1kΩ. In this case the diode must be disconnected from the circuit for accurate tesing.

Continuity Measurements

1.Set the Funtion/Range switch to the •))/→+ position.
2. Connect the red test lead to the "VΩ" jack and the black test lead to the "COM" jack.
3. Turn off power to the circuit under test. External Voltage across the components causes invalid reading.
4. Connect the test leads to the two points at which continuity is to be tested. The buzzer will sound if the resistance is less than approximately 100Ω.

Non-Contact Voltage Indicator

1. Remove the test leads from the meter. Push the "NC" button at any selected Function/Range. Then the display will be shut down and LED flashes with a short "chirp" sound for self-test.
2. Aim the sensor of the meter (the position where a "S" label adheres) to the object to be detected.
3. If a signal is detected, a continuous chirp sound is audible and the LED lights up at the same time.

MAX Maximum Recording Mode

This measurement function is used to measure the maximum value of a signal. It is usable with AC/DC voltage, AC/DC current, resistance, and capacitance measurements. To use this function, select the function and range and press the MAX button. When this is done, the "MAX" annunciator will appear in the display. Next, by inputting a signal, the MAX function operates. This maximum (MAX) value is held in digital memory for a long period. To exit the MAX mode,press the MAX button once again.

Hold Button

Press(HOLD) button to toggle in and out of the Data Hold mode. In the Data Hold mode, the "HOLD" annunciator is displayed and the last reading is frozen on the display. Press the (HOLD) button again to exit and resume readings.

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.

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.

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-3272

P/N: 7000-1547