

OMEGA

HHM15
Digital Multimeter



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It is the policy of OMEGA to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification. The information contained in this document is believed to be correct but OMEGA Engineering, Inc. accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, patient connected application.

SAFETY INFORMATION

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

1. Do not use the meter if the meter or test leads look damaged, or if you suspect that the meter is not operating properly.
2. This meter is not recommended for high voltage industrial use; for example, not for measurements of 440 VAC or 600 VAC industrial power mains. The unit is intended for use with low energy circuits to 1000VDC or 750VAC or high energy circuit to 250 VAC or DC. Accidental misuse by connection across a high voltage, high energy power source when the meter is set up for mA measurement may be very hazardous.
3. Turn off power to the circuit under test before cutting, unsoldering, or breaking the circuit. Small amounts of current can be dangerous.
4. Use caution when working above 60V dc or 30V ac rms. Such voltages pose a shock hazard.
5. When Using the probes, keep your fingers behind the finger guards on the probes.
6. 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.
7. If the equipment is used in a manner not specified by the manufacturer, the protection provided the equipment may be impaired.

SPECIFICATIONS

Display: 3¾ digit liquid crystal display (LCD) with a maximum reading of 3999.

Polarity: Automatic, positive implied, negative polarity indication.

Overrange: (OL) or (-OL) 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 40°C at < 70% relative humidity.

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.

Safety: According to EN61010-1 protection class II overvoltage category (CAT II 1000V, CAT III 600V) pollution degree 2.

Power: single standard 9-volt battery.

Battery life: 150 hours typical.

Dimensions: 200mm (H) x 90mm (W) x 40mm (D).

Weight: Approx. 14 oz. (400g) including battery.

Accessories: One pair test leads, One spare fuse installed, 9V battery and Operating Instructions.

DC VOLTS

Ranges: 400mV,4V,40V,400V,1000V

Resolution: 100 μ V

Accuracy: $\pm(0.5\%rdg + 1dgt)$

Input impedance: 10M Ω

Overload protection: 500VDC or AC rms on 400mV range
1000VDC or 750VAC rms on all other ranges

AC VOLTS (50Hz - 500Hz)

Ranges: 400mV,4V,40V,400V,750V

Resolution: 100 μ V

Accuracy: $\pm(1.0\%rdg + 4dgts)$ on 400mV to 400V ranges
 $\pm(2.0\%rdg + 4dgts)$ on 750V range

Input impedance: 10M Ω

Overload protection: 500VDC or AC rms on 400mV range
1000VDC or 750VAC rms on all other ranges

DC CURRENT

Ranges: 40mA,400mA,10A

Accuracy: $\pm(1.0\%rdg + 1dgt)$ on mA ranges
 $\pm(3.0\%rdg + 1dgt)$ on 10A range

Input protection: 0.5A / 250V fast blow fuse
10A / 600V fast blow ceramic fuse

AC CURRENT (50Hz-500Hz)

Ranges: 40mA,400mA,10A

Accuracy: $\pm(1.5\%rdg + 4dgts)$ on mA range

$\pm(3.5\%rdg + 4dgts)$ on 10A range

Input protection: 0.5A / 250V fast blow fuse

10A / 600V fast blow ceramic fuse

RESISTANCE

Ranges: 400 Ω ,4K Ω ,40K Ω ,400K Ω ,4000K Ω ,40M Ω ,4000M Ω

Accuracy: $\pm(0.8\%rdg + 4dgts)$ on 400 Ω range

$\pm(0.8\%rdg + 2dgts)$ on 4K Ω to 4M Ω ranges

$\pm(3.0\%rdg + 4dgts)$ on 40M Ω range

$\pm[(5.0\%rdg - 20dgts) + 10dgts]$ on 4000M Ω range

Open circuit volts: 0.6Vdc (3.0Vdc on 400 Ω and 4000M Ω ranges)

Overload protection: 500VDC or AC rms

CONTINUITY

Audible indication: less than 40 Ω \pm 20 Ω

Overload protection: 500VDC or AC rms

DIODE TEST

Test current: 1.0mA \pm 0.6mA

Accuracy: $\pm(3.0\%rdg + 3dgts)$

Open circuit volts: 3.0Vdc typical

Overload protection: 500VDC or AC rms

CAPACITANCE

Ranges: 4nF,40nF,400nF,4 μ F,400 μ F

Accuracy: $\pm(5.0\% \text{rdg} + 10 \text{dgts})$ on all ranges
 $\pm(8.0\% \text{rdg} + 10 \text{dgts})$ above 100 μ F

Test frequency: 4nF,40nF ranges 1kHz
400nF, μ F ranges 270Hz
400 μ F range 27Hz

INDUCTANCE

Ranges: 4mH,40mH,400mH,4H,40H

Accuracy: $\pm(5.0\% \text{rdg} + 20 \text{dgts})$ on 4mH range
 $\pm(5.0\% \text{rdg} + 10 \text{dgts})$ on other ranges

Test frequency: 4mH, 40mH ranges 1kHz
400mH 4H ranges 270Hz
40H range 27Hz

Test conditions: quality factor > 5 in 270Hz

FREQUENCY (Autoranging)

Ranges: 4KHz,40KHz,400KHz,4000KHz

Accuracy: $\pm(0.1\% \text{rdg} + 1 \text{dgt})$

Sensitivity: 1V RMS min

Overload protection: 500VDC or AC rms

LOGIC TEST

Threshold: Logic Hi ($2.8 \pm 0.8V$)

Logic Lo ($0.8 \pm 0.5V$)

Indication: 40 msec beep at logic low

Frequency response: 20MHz

Detectable pulse width: 25nS

Pulse limits: >30% & <70% duty

Overload protection: 500VDC or AC rms

TRANSISTOR hFE

Ranges: 0 - 1000

Base current: $10\mu A$ dc approx. ($V_{ce}=3.3V_{dc}$)

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.

Max. Hold Feature

Press "MAX" to toggle in and out of the Maximun Hold mode.(holding the highest reading.) In the MAX mode, the MAX annunciator is displayed and maximun reading are stored in display register, If the new reading is higher than the reading being displayed, the higher reading is transferred to the display register. A "higher" reading is defined as the reading with the higher absolute value.

The MAX hold function is also available in the frequency count mode. The counter autoranging feature is disable when MAX hold is selected.

Voltage Measurements

1. Connect the red test lead to the "V ω " jack and the black test lead to the "COM" jack.
2. Set the Function/Range switch to the desired voltage range and press the "AC/DC" switch to toggle between the desired voltage type. 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 and press the "AC/DC" switch toggle between to the desired current type.
2. For current measurements less than 400mA, connect the red test lead to the mA jack and the black test lead to the COM jack.
3. For current measurements over 400mA or greater, 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. Use caution when measuring 10 amps on 10A range for 60s, please waiting for 10 minutes for next measurement of 10 amps for safety reason.

Resistance and Continuity Measurements

1. Set the Function/Range switch to the desired resistance range or continuity position.
2. Remove power from the equipment under test.
3. Connect the red test lead to the "V Ω " jack and the black test lead to the "COM" jack.
4. Touch the probes to the test points. In ohms, the value indicated in the display is the measured value of resistance. In continuity test, the beeper sounds continuously, if the resistance is less than $40\Omega \pm 20\Omega$.

5. When using 4000M Ω Range ; The 4000M Ω range has a fixed 20 \pm 1-count offset in the reading. When the test leads are shorted together in this ranges, the meter will display 020. The residual reading must be subtracted from the reading obtained in step 4 when this range is used. For example, when measuring 1100M Ω on the 4000M Ω range, the display will read 1120, from which the 20 residual is subtracted to obtain the actual resistance of 1100M Ω .

WARNING

The accuracy of the functions might be slightly affected, when exposed to a radiated electromagnetic field environment, eg, radio, telephone or similar.

Transistor Gain Measurements

1. Set the Function/Range switch to the desired hFE range (PNP or NPN type transistor).
2. Never apply an external voltage to the hFE sockets. Damage to the meter may result.
3. Plug the transistor directly into the hFE socket. The sockets are labeled E, B and C for emitter, base, and collector.
4. Read the transistor hFE (dc gain) directly from the display.

Capacitance & Inductance Measurements

1. Set the Function/Range switch to the desired F (capacitance) or H(inductance) range.
2. Never apply an external voltage to the Cx Lx sockets. Damage to the meter may result.
3. Insert the capacitor or inductance leads directly into the Cx Lx socket.
4. Read the capacitance or inductance directly from the display.

Frequency Measurements

1. Set the Function/Range switch to the KHz position.
2. Connect the red test lead to the "V_w" jack and the black test lead to the "COM" jack.
3. Connect the test leads to the point of measurement and read the frequency from the display.

Logic Measurements

1. Set the Function/Range switch to the LOGIC position.
2. Connect the red test lead to the "V_w" jack and the black test lead to the "COM" jack.
3. Connect the red test lead to the test point and the black lead to the common buss of the logic circuit.
4. A " ▲ " on the display indicates TTL logic high and a " ▼ " indicates a TTL logic low. Both indicators are on when the point of measurement is toggling high and low.

Diode Tests

1. Connect the red test lead to the "V ω " jack and the black test lead to the "COM" jack.
2. Set the Function/Range switch to the " \rightarrow " 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, display will be between 2.800V and 3.200V. If the diode is shorted, ".000" or another number is displayed.
6. If the diode is open, display will be between 2.800V and 3.200V, 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 1k ω . In this case the diode must be disconnected from the circuit for accurate testing.

MAINTENANCE

WARNING

Remove test leads before changing battery or fuse or performing any servicing.

Battery Replacement

Power is supplied by a 9 volt "transistor" battery. (NEDA 1604, IEC 6F22). The "🔋" appears on the LCD display when replacement is needed. To replace the battery, remove the two screws from the back of the meter and lift off the battery case. Remove the battery from battery contacts.

Fuse Replacement

If no current measurements are possible, check for a blown overload protection fuse. There are two fuses; F1 for the "mA" jack and F2 for the "10A" jack. For access to fuses, remove the two screws from the back of the meter and lift off the battery 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.

Cleaning

Periodically wipe the case with a damp cloth and detergent, do not use abrasives or solvents.

WARRANTY / DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship 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 OMEGA's customers receive maximum coverage on each product. If the unit should malfunction, it must be returned to the factory for evaluation. OMEGA's 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. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. 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 are not warranted, including but not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only 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 purchaser 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.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY / DISCLAIMER language, and additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S 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.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

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 relative to the product.

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

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

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