

1 YEAR
WARRANTY

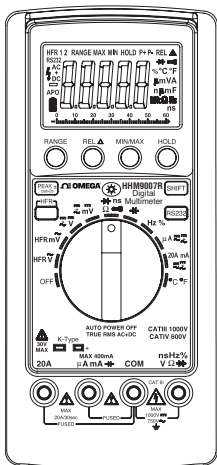


OMEGA® User's Guide

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HHM9007R Digital Multimeter



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WARNING: These products are not designed for use in, and should not be used for, human applications.

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

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INTRODUCTION

This manual contains information and warnings that must be followed to ensure safe operation and retain the meter in safe condition.

WARNING

**READ "SAFETY INFORMATION" BEFORE
USING THE METER.**

This Digital Insulation Clamp Meter is a handheld 6000-count instrument that is designed for use in the laboratory, field servicing, at home, and any circumstance where high current measurement is required. The clamp meter is built with a design of finger guard which ensures users operating the instrument under a safety situation; a rugged case that is shock resistant and fire-retardant; and electronic overload protection for all functions and ranges. In addition, a carrying case (optional accessory) is available for easy portability of the meter and avoiding damage.

UNPACKING AND INSPECTION

Upon removing your new Digital Insulation Clamp Meter from it's packing, you should have the following items:

- 1. Digital Multimeter*
- 2. Test Lead Set (one black, one red)*
- 3. 9-volt Battery*
- 4. Type-K thermocouple*
- 5. CD software, USB cable (on RS232 function model)*
- 6. Instruction Manual*

SAFETY PRECAUTIONS:

The following safety precautions must be observed to ensure maximum personal safety during the operation, service and repair of this meter:

- 1. Read these operating instructions thoroughly and completely before operating your meter. Pay particular attention to WARNINGS that will inform you of potentially dangerous procedures. The instructions in these warnings must be followed.**
- 2. 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.**
- 3. Do not expose the instrument to direct sunlight, extreme temperature or moisture.**
- 4. 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.**
- 5. To avoid electric shock use CAUTION when working with voltages above DC60V or AC30V rms. Such voltages pose a shock hazard.**
- 6. Never exceed the maximum allowable input value of any function when taking a measurement. Refer to the specifications for maximum inputs.**
- 7. Never touch exposed wiring, connections or any live circuit when attempting to take measurements.**
- 8. Do not attempt to operate this instrument in an explosive atmosphere (i.e. in the presence of flammable gases or fumes, vapor or dust).**
- 9. When testing for the presence of voltage, make sure the voltage function is operating properly by reading a known voltage in that function before assuming that a zero reading indicates a no-voltage condition. Always test your meter before and after taking measurements on a known live circuit.**

SAFETY INFORMATION

Cleaning

Wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents. Dirt or moisture in the terminals can affect readings.



Safety: *Conforms to IEC/EN 61010-1, IEC/EN 61010-2-033, CAT III 1000V, CAT IV 600V, Class II, Pollution degree 2 Indoor use.*


CAT III: *Is for measurements performed in the building installation.*


CAT IV: *Is for measurements performed at the source of the low-voltage installation.*

EMC: *Conforms to EN 61326-1.*

The symbols used on this instrument are:

 **Dangerous voltage.**

 **Caution, refer to accompanying documents**

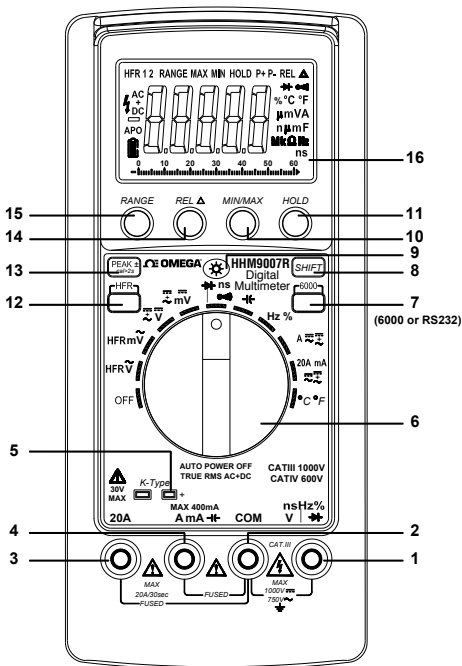
 **Equipment protected throughout by Double insulation (Class II)**

 **Alternating current**

 **Direct current**

 **Ground**

INSTRUMENT LAYOUT



1. **V Ω Hz%ns \rightarrow *, Voltage, Ohms, Frequency, Duty cycle, Conductance, Diode Input Terminal**
This is the positive input terminal for Voltage, Ohms, Frequency, Duty cycle, Conductance, Diode measurements. Connection is made to it using the red test lead.
2. **COM Common Terminal**
This is the negative (ground) input terminal for all measurement modes. Connection is made to it using the black test lead.
3. **μ A Current, Input Terminal**
This is the positive input terminal for μ A Current measurements. Connection is made to it using the red test lead. Input warning detects wrong.
4. **mA/20A Current, Input Terminal**
This is the positive input terminal for mA/20A Current measurement. Connection is made to it using the red test lead.
5. **Temperature Input Jacks**
Remove leads and slide the temp switch to the right to close lead jacks.
6. **Function/Range selector rotary switch**
This rotary switch selects the function, and selects the desired range.
7. **6000 or RS232**
 - (1) Press the 6000 button shift 6000 counts \leftrightarrow 60000 counts.
 - (2) Press the RS232 button to show "RS232" annunciator on LCD and to start sending data to computer being connected.
8. **SHIFT Button**
 - (1) Shift V \rightarrow \leftrightarrow V \rightarrow , mV \rightarrow \leftrightarrow mV \rightarrow ranges.
 - (2) Shift Ω \leftrightarrow \rightarrow \leftrightarrow \rightarrow \leftrightarrow ns, C \leftrightarrow \rightarrow °F, Hz \leftrightarrow % ranges.
 - (3) Shift μ A \rightarrow \leftrightarrow \square A \sim \leftrightarrow \square A \rightarrow ranges.
 - (4) Shift 20A \rightarrow \leftrightarrow 20A \sim \leftrightarrow 20A \rightarrow ranges.
9. ***Backlight Button**
Press *button to activate the backlight for approximately 3.0 minutes.
10. **MAX/MIN Button**
The "MAX" displays the maximum value of measurements. The "MIN" displays the minimum value of measurements. Press MAX/MIN button for more than 2 seconds to exit.

11. HOLD Button

- (1) 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 held on the display.**
- (2) Press [HOLD] button again to release the hold and current readings are once again displayed.**

12. HFR Button

Shift "HFR1" (High Frequency reject: > 1kHz) ↔ "HFR2" (High Frequency reject: > 100kHz), on AC Volts range.

13. PEAK± cal>2s Button

- (1) Record the peak+ or peak- value in a measurement. It is usable with AC voltage, AC current measurements. If the pressed time >2 sec, the PEAK function will enter to calibration mode, the LCD will show "CAL" and the internal buffer will remember the internal op off set voltage then back to the measure mode.**
- (2) Press PEAK± button for more than 2 seconds to exit.**
- (3) Response time: more than 1ms.**

14. REL△ Button

- (1) Press (REL△) button to enter the Relative mode. The "△" appears to indicate that the relative mode is activated and non-zero number is offset and saved. The flashing "△" appears and the offset value displays at the same time for comparison with the reading of measurement.**
- (2) After finishing the measurement, press (REL△) button for more than 2 seconds to exit.**

15. RANGE Button

- (1) Press (RANGE) button to select the Manual Range mode (The meter remains in the range it was in when manual ranging was selected).**
- (2) In the Manual Range mode, each time you press (RANGE) button, the range (and the input range annunciator) increments, and a new value is displayed. To exit the Manual Range mode and return to autoranging, press and hold down (RANGE) button for 2 seconds.**

16. Display

The display indicates the measured value of a signal, function mode, and annunciator.

Other Functions

Auto Power off

1. Auto power off: approx. 30 minutes.
2. After auto power off, change range position of the rotary knob to turn the meter back on again.

Cancellation Of Auto Power Off Feature:

Press and hold the (MAX/MIN) button while rotating function switch from off to any position to turn the meter on. The auto power off feature is disabled.

Note: "APO" annunciator is missing from the LCD.

HOW TO MAKE MEASUREMENTS

Before making any measurements read safety precautions. Always examine the instrument and accessories used with the instrument for damage, contamination (excessive dirt, grease, etc.) and defects. Examine the test leads for cracked or frayed insulation and make sure the lead plugs fit snugly into the instrument terminals. If any abnormal conditions exist, do not attempt to make any measurements.

VOLTAGE MEASUREMENTS

1. Turn off power to the device under test and discharge all capacitors.
2. Plug the black test lead into the COM input jack on the meter and connect the test lead tip to a grounded point (the reference point for measurement of voltage).
3. Set the Function/Range switch to the " V_{\sim} / mV_{\sim} or $V_{\text{---}} / mV_{\text{---}}$ or $V_{\text{~}} / mV_{\text{~}}$ " position.

WARNING

To avoid possible electric shock, instrument damage and/or equipment damage, do not attempt to take any voltage measurements if the voltage is above 1000Vdc /750Vac. 1000Vdc and 750Vac are the maximum voltages that this instrument is designed to measure. The "COM" terminal potential should not exceed 500V measured to ground.

4. Plug the red test lead into the V_{Ω} input jack on the meter and connect the circuit where a voltage measurement is required. Voltage is always measured in parallel across a test point.
5. Turn on power the circuit /device to be measured

and make the voltage measurement reduce the range setting if set too high until a satisfactory reading is obtained.

- 6. After completing the measurement, turn off power to the circuit / device under test, discharge all capacitors and disconnect the meter test leads.*
- 7. V_{\sim} , mV_{\sim} AC+DC TRUE RMS function AC+DC TRUE RMS = $\sqrt{(AC\ RMS\ component)^2 + (DC\ component)^2}$.*

$\mu A/mA/20A$ CURRENT MEASUREMENTS

- 1. Set the Function/Range switch to the " μA or $mA/20A$ " position. Use the "SHIFT" button to select the DC or AC or AC+DC current test.*
- 2. Connect the red test lead to the " $\mu A / mA$ or $20A$ " jack and the black test lead to the "COM" jack.*
- 3. Connect the test leads to the point of measurement and read the current from the display.*
- 4. μA_{\sim} , mA_{\sim} , $20A_{\sim}$ AC+DC TRUE RMS function AC+DC TRUE RMS = $\sqrt{(AC\ RMS\ component)^2 + (DC\ component)^2}$.*




RESISTANCE / CONDUCTANCE MEASUREMENTS

- 1. Set the Function/Range switch to the " $\Omega / \bullet \bullet / \rightarrow + / ns$ " position. Use the "SHIFT" button to select the " Ω " or " ns " resistance test.*
- 2. Turn off power to the circuit under test. External voltage across the components causes invalid reading.*
- 3. Connect the red test lead to the " $V\Omega$ " 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.*



CONTINUITY MEASUREMENTS

- 1. Set the Function switch to the " $\Omega / \bullet \bullet / \rightarrow + / ns$ " position. Use the "SHIFT" button to select the " $\bullet \bullet$ " continuity test.*
- 2. Turn off power to the circuit under test. External voltage across the components causes invalid reading.*
- 3. 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 40Ω .*

DIODE TESTS

1. Set the Function/Range switch to the " Ω /  /  / ns" position. Use the "SHIFT" button to select the " " diode test.
2. Turn off power to the circuit under test. External voltage across the components causes invalid reading.
3. Connect the red test lead to the " $V\Omega$ " jack and the black test lead to the "COM" jack.
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, "0.00" or another number is displayed.
6. If the diode is open, "OL" is displayed in both directions.
7. Audible Indication: Less than 0.05V.

CAPACITANCE MEASUREMENTS

1. Set the Function/Range switch to the " " position.
2. Connect the red test lead to the " " jack and the black test lead to the "COM" jack.
3. Touch the probes to the capacitor. Observe polarity when measuring polarized capacitors.
4. Read the capacitance directly from the display.
5. Discharge the capacitor before taking capacitance measurements.
6. When the capacitor to be tested is connected, if "DIS.C" symbol indicate on LCD, it means there is voltage existing in the tested capacitor and to be discharged before testing.

TEMPERATURE MEASUREMENTS

1. Set the Function/Range switch to the " $^{\circ}\text{C}$ / $^{\circ}\text{F}$ " position. Use the "SHIFT" button to select the $^{\circ}\text{C}$ or $^{\circ}\text{F}$ Temp test.
2. Remove leads and slide the Temp switch to the right to close lead jacks
3. Plug any K-type thermocouple directly into the meter to measure temperature.
4. Take temperature measurement using the thermocouple probe and read the temperature from the display.

FREQUENCY MEASUREMENTS

- 1. Set the Function/Range switch to the "Hz/%" position.
Use the "SHIFT" button to select the Hz Frequency test.**
- 2. Connect the red test lead to the "V Ω " 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.**

% DUTY CYCLE MEASUREMENTS

- 1. Set the Function/Range switch to the "Hz/%" position.
Use the "SHIFT" button to select the % duty cycle test.**
- 2. Connect the red test lead to the "V Ω " jack and the black test lead to the "COM" jack.**
- 3. Connect the test leads to the point of measurement and read the duty cycle from the display.**

RS232 OPERATING (on RS232 function model)

- 1. Connect the meter to the PC using the USB cable provided.**
- 2. At the PC, open the meter software.**
- 3. At the meter, rotate the function selector switch to the range**
- 4. Press the RS232 button to show "RS232" annunciator on LCD and to start sending data to computer being connected.**
- 5. Operations of RS232 software: Please refer to operations of each function described in the software.**

SPECIFICATIONS

Display: 60000 counts, 60 segments analog bargraph.

Polarity: Automatic, (-) negative polarity indication.

- *Over range Indication: (OL) or (-OL) is displayed.*
 - *Low Battery Indication: When change a new battery for the meter, the LCD will show the battery capacity with full status (■). If the meter operation lasts for a few hours, the capacity indication may show half battery status (▣). After a long time operation, the battery may be exhausted and low battery status is shown (□). Then "bAtt" displays accompanying with a continuous beep sound, and the meter shuts down in 5 seconds, and no further measurement is allowed.*
 - *Measurement Rate: 2.0/sec, nominal. 20/sec, Analog bar-graph.*
 - *Operating Environment: 0°C to 50°C at < 70% R.H.*
 - *Storage Environment: -20°C to 60°C at < 80% R.H.*
 - *Temperature Coefficient: 0.1 × (specified accuracy) Per °C. (0°C to 18°C, 28°C or 50°C).*
 - *Auto Power Off: approx. 30 minutes.*
 - *Altitude: 6561.7 Feet (2000m)*
 - *Power: single 9V battery.*
 - *Battery Life: 25 hours typical with carbon-zine
50 hours typical with alkaline.*
 - *Size (H × W × D): 7.8 × 3.6 × 1.7 inches (198 × 90 × 44 mm).*
 - *Weight: Approx. 14.1 OZ / 400g grams (including battery)*
- Accuracy is given as ± ([% of reading]+[number of least significant digits]) at 18°C to 28°C, with relative humidity up to 70%.*

DC Volts

Range	Resolution	Accuracy	Input Impedance
600mV	0.01mV	± (0.08% red+5d)	10MΩ
6V	0.1mV		11MΩ
60V	1mV		10MΩ
600V	10mV		10MΩ
1000V	100mV		10MΩ

Overload protection: 1000V DC or 750V AC RMS

AC Volts (True RMS)

Range	Resolution	Accuracy (45~2kHz)/HFR2	Input Impedance
600mV	0.01mV	± (1.0% red+20d) 45~500Hz	10MΩ
6V	0.1mV	± (1.5% red+20d) 500~1kHz	11MΩ
60V	1mV	± (1.0% red+20d) 45~500Hz	10MΩ
600V	10mV	± (1.5% red+20d) 500~1kHz	
		± (2.0% red+20d) 1k~2kHz	
750V	100mV	± (2.0% red+20d) 45~1kHz	10MΩ

Range	Resolution	Accuracy (45~60Hz)/HFR1	Input Impedance
600mV	0.01mV	± (2.0% red+20d) 45~60Hz	10MΩ
6V	0.1mV		11MΩ
60V	1mV		10MΩ
600V	10mV		10MΩ
750V	100mV		10MΩ

AC+DC Volts (True RMS)

Range	Resolution	Accuracy (45~2kHz)	Input Impedance
600mV	0.01m	± (1.5% red+30d) 45~500Hz	10MΩ
6V	0.1mV	± (2.0% red+30d) 500~1kHz	11MΩ
60V	1mV	± (1.5% red+30d) 45~500Hz	10MΩ
600V	10mV	± (2.0% red+30d) 500~1kHz	
		± (2.5% red+30d) 1k~2kHz	
750V	100m	± (2.5% red+30d) 45~1kHz	10MΩ

Crest Factor: ≤ 3 at full scale and ≤ 6 at half scale

AC coupled true RMS specified from 2% to 100% of range

HFR1: High Frequency reject: > 1kHz

HFR2: High Frequency reject: > 100kHz

Peak Hold Accuracy: ± (3.0% rdg + 500 dgts)

45~500Hz on AC 60V to 750V ranges

Overload protection: 1000V DC or 750V AC RMS

Current

DC Current

Range	Resolution	Accuracy
600 μ A	0.01 μ A	\pm (0.5% red+10d)
6000 μ A	0.1 μ A	
60mA	1 μ A	
400mA	10 μ A	\pm (1.0% red+10d)
20A	1mA	\pm (2.0% red+10d)

AC Current (True RMS)

Range	Resolution	Accuracy
600 μ A	0.01 μ A	\pm (1.5% red+20d)
6000 μ A	0.1 μ A	
60mA	1 μ A	
400mA	10 μ A	
20A	1mA	\pm (2.5% red+20d)

AC+DC Current (True RMS)

Range	Resolution	Accuracy
600 μ A	0.01 μ A	\pm (2.0% red+30d)
6000 μ A	0.1 μ A	
60mA	1 μ A	
400mA	10 μ A	
20A	1mA	\pm (3.0% red+30d)

Voltage burden: 500mV on 600 μ A, 60mA ranges, 2V on 6000 μ A, 400mA, 20A ranges.

Input protection: 0.5A/1000V fast blow ceramic fuse (6.3x32mm) on μ A/mA input. 20A/600V fast blow ceramic fuse (10x38mm) on 20A input.

20A Input: 20A for 30 seconds maximum cooling period followed by a 10 minutes.

Crest Factor: \leq 3 at full scale and \leq 6 at half scale

AC coupled true RMS specified from 2% to 100% of range

Peak Hold Accuracy: \pm (3.5% rdg + 500 dgts) 45~500Hz on AC current range

Resistance

Range	Resolution	Accuracy	Input
600 Ω	0.01 Ω	$\pm (0.3\%$	-3.0Vdc
6k Ω	0.1 Ω	$\pm (0.3\%$ red+10d)	-1.2Vdc
60k Ω	1 Ω		
600k Ω	10 Ω	$\pm (1.0\%$ red+10d)	
6M Ω	100 Ω	$\pm (3.0\%$ red+20d)	
60Mv	1k Ω		

Overload protection: 600V DC or 600V AC RMS

Continuity Test

Range	Audible Threshold	Response Time	Open Circuit
600 Ω	Less than 40 Ω	Approx. 100ms	-3.0Vdc

Overload protection: 600V DC or 600V AC RMS

Diode Test

Range	Resolution	Accuracy	Test Current	Open Circuit
2V	1mV	$\pm (2.0\%$ red+10d)	0.5mA	3.0Vdc typical

Audible indication: Less than 0.05V

Overload protection: 600V DC or 600V AC RMS

Conductance (6000 counts)

Range	Resolution	Accuracy	Open Circuit
60ns	0.01ns	$\pm (1.0\%$ red+10d)	-0.7Vdc

Equivalent Resistance Range: 16.7M Ω to 100G Ω

(S = Siemens = 1 / Ω), (0.01ns = 100Gs), (0.1ns = 10G Ω), (1ns = 1000M Ω), (10ns = 100M Ω), (60.0ns = 16.7M Ω)

Overload protection: 600V DC or 600V AC RMS

Capacitance (6000 counts)

Range	Resolution	Accuracy
6nF	0.001nF	$\pm (3.0\% \text{ red}+30d)$
60nF	0.01nF	$\pm (3.0\% \text{ red}+10d)$
600nF	0.1nF	
6 μ F	0.001 μ F	
60 μ F	0.01 μ F	
600 μ F	0.1 μ F	
6mF	1 μ F	$\pm (5.0\% \text{ red}+10d)$

Overload protection: 600V DC or 600V AC RMS

Temperature

Range	Resolution	Accuracy	Sensor type
0°C ~ 400°C	0.1°C	$\pm (1.0\%)$	K-type Thermocouple
-50°C ~ 0°C, 400°C ~ 1300°C		$\pm (2.0\% \text{ red}+3^\circ\text{C})$	
32°F ~ 750°F	0.1°F	$\pm (1.0\% \text{ red}+2^\circ\text{F})$	
-58°F ~ 32°F, 750°F ~ 2372°F		$\pm (2.0\% \text{ red}+6^\circ\text{F})$	

Overload protection: 30V DC or 30V AC RMS

% Duty Cycle

Range	Resolution	Pulse Width	Accuracy (5V logic)
5% to 95%	0.1%	> 10 μ s	$\pm (2.0\%)$

**Frequency range: 5% to 95% (40Hz to 1kHz),
10% to 90% (1kHz to 10kHz), 20% to 80% (10kHz to 20kHz)**

Overload protection: 600V DC or 600V AC RMS

Frequency

Rang	Resolutio	Accuracy	Trigger
60Hz	0.001Hz	$\pm (0.1\% \text{ red} + 10d)$	> 1.5V
600Hz	0.01Hz		
6kHz	0.1Hz		
60kHz	1Hz		
600kHz	10Hz		
6MHz	100Hz		> 2.5V < 5.0V
10MHz	1kHz		

Minimum Input Range: > 6Hz

Minimum Pulse Width: > 100ns

Duty cycle limits: > 30% and < 70%

Overload protection: 600V DC or 600V AC RMS

MAINTENANCE

Maintenance consists of periodic cleaning and battery replacement. The exterior of the instrument can be cleaned with a dry clean cloth 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 AND FUSE 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.

- 1. Disconnect test leads from any live source, turn the rotary switch to OFF, and remove the test leads from the input terminals.**
- 2. The bottom case is secured to the top case by four screws. Using a Phillips-head screwdriver, remove the screw from the bottom case and remove the bottom case.**
- 3. Remove battery and replace with a new equivalent "NEDA 1604" 9-volt battery.**
- 4. Fuse: F1/0.5A/1000V fast blow ceramic fuse (6.3 x 32 mm); F2/20A/600V fast blow ceramic fuse (10 x 38 mm).**
- 5. Replace the bottom case and reinstall the screw.**

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's 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 malfunctions, 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 having been 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 in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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