OMEGA

HHM32
Digital Multimeter

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SAFETY INFORMATION

The following safety information must be observed to ensure maximum personal safety during the operation of 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: 1.5 times per second, nominal.
Analog bar graph: 41 segments with measurements 12 times per second.
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.
Accuracy: Stated accuracy at 23°C ± 5°C, <75% relative humidity.
Safety: According to EN61010-1 protection class II overvoltage category (CAT II 600V) pollution degree 2.
Power: single standard 9-volt battery, NEDA 1604, JIS 006P, IEC 6F22.
Battery life: 100 hours typical.
Dimensions: 192mm (H) x 91mm (W) x 52.5mm (D).
Weight: 301g including battery.
Accessories: One pair test leads, One spare fuse installed, 9V battery and Operating Instructions.

DC VOLTS
Ranges: 400mV,4V,40V,400V,600V
Resolution: 100µV
Accuracy: ±(0.25%rdg + 1dgt)
Input impedance: 10MW
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,600V
Resolution: 100µV
Accuracy: ±(0.75%rdg + 4dgts) on 400mV,40V,400V ranges
±(1.2%rdg + 4dgts) on 600V range
±(1.5%rdg + 4dgts) on 4V range (100Hz to 500Hz)
Input impedance: 10MW
Overload protection: 500VDC or AC rms on 400mV range
1000VDC or 750VAC rms on all other ranges

DC CURRENT
Ranges: 4mA,40mA,4A,10A
Accuracy: ±(0.5%rdg + 1dgt) on 40mA range
±(2.0%rdg + 10dgts) on 4mA , 4A ranges
±(3.0%rdg + 1dgt) on 10A range
Input protection: 100mA / 250V fast blow fuse
10A / 600V fast blow ceramic fuse

AC CURRENT (50Hz - 500Hz)
Ranges: 4mA,40mA,4A,10A
Accuracy: ±(1.2%rdg + 4dgts) on 40mA ranges
±(3.0%rdg + 20dgts) on 4mA,4A ranges
±(3.5%rdg + 4dgts) on 10A ranges
Input protection: 100mA / 250V fast blow fuse
10A / 600V fast blow ceramic fuse

RESISTANCE
Ranges: 40W ,400W ,4KW ,40KW ,400KW, 4MW ,40MW
Accuracy: ±(2.0%rdg + 10dgts) on 40W range
±(0.3%rdg + 4dgts) on 400W range
±(0.3%rdg + 1dgt) on 4KW to 4MW ranges
±(1.0%rdg + 4dgts) on 40MW range
Open circuit volts: 0.3Vdc (3.0Vdc on 40W ,400W)
Overload protection: 500VDC or AC rms

CONTINUITY (400W range)
Audible indication: less than 40W ±20W
Overload protection: 500VDC or AC rms

DIODE TEST
Ranges: 2V
Test current: 1.0mA ± 0.6mA
Accuracy: ±(3.0%rdg + 3dgts)
Open circuit volts: 3.0Vdc typical
Overload protection: 500VDC or AC rms

CAPACITANCE

Ranges: 400pF,40nF,4µF,400µF,40mF
Accuracy: ±(2.0% rdg + 5dgts) on 400pF to 4µF ranges
±(5.0% rdg + 10dgts) on 400µF range
±(5.0% rdg + 50dgts) on 40mF range

FREQUENCY (Autoranging)

Ranges: Auto-ranging up to 40MHz
Accuracy: ±(0.05%rdg + 3dgts) on all ranges
Sensitivity: 1.0Vrms min
Overload protection: 500VDC or AC rms

LOGIC TEST

Threshold: Logic Hi : >1.5V, 2.4V, 4.0V
Logic Lo : <0.8V

Frequency response: 20MHz
Detectable pulse width: 25nS
Pulse limits: >30% & <70% duty
Overload protection: 500VDC or AC rms

TRANSISTOR h_{FE}

Ranges: 0 - 1000
Base current: 10µAdc approx. (Vce=3.0Vdc)

TEMPERATURE (Autoranging)

Ranges: -4°F to 2498°F
Resolution: 1°F
Accuracy: ±(2.0%rdg + 6°F) on -4°F to 923°F
±(3.0%rdg + 4°F) on 923°F to 2498°F

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.

Auto-Power-Off function

Once turning on the meter, the auto-power-off function starts to count if the function does not change within 30 minutes, the auto-power-off condition will be activated. When power-off happens, the final data is saved. If push anyone of the push function (except HOLD and AC/DC key) that will turn on the power again, and LCD segment "APO" will be turn on.
The auto-power-off feature can be disabled manually as a power-on option by press MAX/MIN button while turning the meter on, and LCD segment "APO" will be turn off.

Re-Power-On

Once auto-power-off happens, push anyone of the push function (except HOLD and AC/DC key) or change the rotary mode can re-power-on the meter. When anyone of the push function is enabled, the storage value will display with HOLD mold (except logic state), if auto-power-off happened under MAX/MIN (or PEAK, REL) mode, the PMAX , PMIN or relative and reference value will be kept. But if re-power-on the meter with rotary mode, the storage value will be cleared.

LCD Segment Check

Press HOLD button while turning the meter on, and all LCD segment will be keep turn on until releasing HOLD button.

Hold Feature

Pressing the HOLD key to enter the Data Hold mode, the"HOLD" annunciator is displayed. When HOLD mode is selected, the meter held the present readings and stops all further measurements.

Pressing the "H" key again to cancel HOLD mode causing meter to resume taking measurements.

In the MIN/MAX recording mode, press HOLD key to stop the recording. Press HOLD key again to resume recording. (Previously recorded reading are not erased).

MAX / MIN Record Feature

Press MIN/ MAX key to enter the MIN/ MAX Recording mode and autoranging feature is disabled, Push MIN/ MAX key to cycle through the Max/Min/Present readings. When LCD reads present value the "MAX MIN" annunciator will be blinking.

To prevent accidental loss of MIN, MAX data, in this mode can only be cancelled by pressing and hold down the MIN/ MAX key for 1 seconds to exit and erased recorded readings.

PEAK ± Hold Feature

Pressing PEAK ± key to enter the PEAK ± hold mode, Push PEAK ± key to cycle through the peak+/ peak- readings. To prevent accidental loss of PEAK ± data, In this mode can only be cancelled by pressing and hold down the PEAK ± key for 1 seconds to exit and erased recorded readings. Under the PEAK mode, 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 offset voltage then back to the manu mode. Whenever the PEAK function is enabled again, the reading value will minus the offset voltage, the purpose is to get the real peak reading. Under PEAK mode, the bargraph always show current value.

RANGE Button

Pressing RANGE key to enter the RANGE mode, the "  " annunciator is displayed. THE ranges of frequency and logic mode is selected by RANGE key. Pressing and hold down the RANGE key for 1 seconds to exit RANGE mode.

In logic mode 1 push can change the logic high reference voltage between 4.0, 2.4 and 1.5V.

"☼" Button

Press "☼" button to toggle on and off of backlight. The backlight will switch-off automatically after 60 seconds.

REL relative Button

Pressing REL key to enter the Relative mode and the "D" annunciator is displayed, then store the displayed Reading as a reference value.Pressing REL key again the "**D**" annunciator will be blinking, LCD reads reference value. Pressing and holding down the REL key for 1 seconds to exit REL mode. The value (can not >±3999 counts) shown on the LCD is always the difference between the stored reference and the present reading.

ZOOM Feature (analog Bargraph)

1. *Voltage, Ohm, Current, Capacitance, Temperature and h_{FE} mode (except logic, Frequency and Continuity mode)*

   The default status of the bargraph display is normal mode (from left to right). The unit of bargraph is 100 counts/bar, except the ZOOM function mode is in the middle (10 counts/bar). Once this function is pushed, the bargraph display will change to ZOOM function mode. But under the PEAK mode, this function is disabled, even if ZOOM function is enabled first.

   The ZOOM function is like the REL mode which is always the difference between the stored reference and the present reading, and store the current input value as a reference value.

   For instance: If the current reading is 100 counts and will be as reference, the next step input reading is 200 counts, the bargraph number will be +10 counts, and the 200 counts will be as reference. If the input value is always the same, the bargraph is zero.

2. *Logic mode*

   In LOGIC mode, this key is used to turn on the buzzer whether is under High, Low or unknown Logic (the default is High beep).

Voltage Measurements

1. Connect the red test lead to the "VW" 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 type (AC or DC) and range.
2. For current measurements less than 40mA, connect the red test lead to the "mA" jack and the black test lead to the "COM" jack.
3. For current measurements over 40mA or greater, connect the red test lead to the "A" 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 "VW" 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.
5. In continuity test, the beeper sounds continuously, if the resistance is less than 40W±20W.

WARNING

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

Diode Tests

1. Connect the red test lead to the "VW" 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 1kW. In this case the diode must be disconnected from the circuit for accurate testing.
8. In continuity test, the beeper sounds continuously, if the bargraph number is less than 3 counts.

Transistor Gain Measurements

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

Frequency Measurements

1. Set the Function/Range switch to the Hz position.
2. Connect the red test lead to the "VW" 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.

Capacitance (Cx) Measurements

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

Capacitance (F) Measurements

1. Set the Function/Range switch to the desired F (capacitance) range.
2. Dischange capacitors before trying to measure it.
3. Connect the "+" lead to the "COM" jack and the "-" lead to the "mA" jack.
4. Read the capacitance directly from the display.

Temperature Measurements

WARNING
Remove test leads being measured.

1.Set the Function/Range switch to the "°F" position.
2.Connect a type k thermocouple to the jack on the instrument. Place the probe or thermocouple tip on or in the material to be measured and take the temperature reading directly from the display.

Logic Measurements

1. Set the Function/Range switch to the "  " position.
2. Connect the red test lead to the "VW" jack and the black test lead to the "mA" 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 logic high and a " ▼ " indicates a logic low. Both indicators are on when the point of measurement is toggling high and low.

RANGE Buttom

This key can change the logic high reference voltage between 4.0 , 2.4 and 1.5V.

ZOOM Buttom

This key is used to turn on the buzzer whether is under High, Low or unknown Logic (the default is High beep).

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 "A" 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 100mA/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.

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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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M-3202/0799