

### To display temperature:

While holding down ▲ press and hold ⊕. After several seconds, the internal temperature will appear on the display (in °C when M display units are selected or in °F if selected display units are ft/ins.)

To go back to measurement mode, press and release ⊖.

Hint: To speed equalization of the HH-DM's internal temperature versus air temperature, wave the unit back and forth in the air to circulate room temperature air through the unit. For additional information, see "Temperature" in the section on Environmental Conditions.

### LOW BATTERY INDICATOR:

Replace the battery when the **BATT** symbol appears on the LCD.

### SPECIFICATIONS:

#### Range:

Typical: 14 m (45 ft)  
Actual: Will vary depending on environmental conditions.  
Min: 56 cm (1 ft, 10 ins)

**Accuracy:** 99.5% +/- 1 cm (1/4 ins), when environmental conditions are as follows:

Temperature: 0°C (32°F) to 30°C (86°F)  
Relative Humidity: 30 to 70%  
Altitude: -328 ft to +328 ft (-0.1 to 0.1 km)  
Wind Speed: Still Air

**Examples:** At 4.5m (15 ft) your reading will be within 3 cm (1 1/4 ins) and at 14m (45 ft) your reading will be within 8 cm (3 ins).

**Resolution:** 1 cm (1/4")

**Ultrasonic Frequency:** 40 kHz

**Battery:** 9 volt (alkaline recommended)

**Current Consumption:** 8 - 13 mA (approximately 50 hours continuous use with a new 9 volt, alkaline battery)

**Operating Temperature:** 0°C to 38°C (32°F to 100°F)

**Auto Shut-off:** Approximately 7 minutes after last key press.

**Size:** 133 x 73 x 33mm (5 1/4" x 2 7/8" x 1 5/16")

**Weight:** 170 g (6 oz ) with battery

### ENVIRONMENTAL CONDITIONS THAT COULD AFFECT PERFORMANCE:

**IMPORTANT:** Ultrasonic Distance Measuring Tools work best for quick and easy measuring and estimating. They are not intended for precision work, although they can be very accurate under optimal conditions.

**Humidity** - Humidity and temperature can affect the range and accuracy of all ultrasonic distance measuring tools. They may give measurements that are longer or shorter than their specifications (depending on atmospheric conditions). The range is longest in high temperature/high humidity and low temperature/low humidity. The range is shortest in high temperature/low humidity and low temperature/high humidity.

Humidity effects on accuracy are greatest at high temperatures and negligible at low temperatures. At 38°C (100°F) and 99% R.H., the distance measurement will be short by 0.6%. At 38°C

(100°F) and 0% Relative Humidity, the distance measurement will be long by 0.6%. At 0°C (32°F) the distance measurement will essentially not be affected by humidity.

**Temperature** - The HH-DM has unique automatic temperature compensation to ensure consistency of measurements between 0°C to 38°C (32°F and 100°F). The response rate of this circuitry enables you to move between warm and cold areas and measure with reasonable accuracy. However, we recommend that you do not leave the HH-DM unit in very cold or very hot conditions e.g. sunlight in a car, as the unit will then require more time to adjust to air temperature.

**Altitude/Barometric Pressure** - Altitude and barometric pressure can affect the range and accuracy of all ultrasonic distance measuring tools.

As the Altitude increases (barometric pressure decreases), the range is reduced. As altitude decreases (barometric pressure increases), the range is increased.

To correct for altitude (pressure) effects on accuracy, subtract .4% of the measured distance for each .3 km/15mm Hg (1000 ft/0.6" Hg) you are above sea level. Add .4% of the measured distance for each .3km/+15mm Hg (1000 ft +0.6" Hg) you are below sea level (Sea Level = 760mm Hg).

**Noise** - High frequency noise from machinery, engines, computers, stereos, TV sets, etc. can affect the reading and you may get random readings. Stand away from or shut off this type of equipment when measuring.

**Outdoor Measurements** - The HH-DM is designed for indoor use.

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### 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 which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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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, human applications.

### 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. 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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1 YEAR  
WARRANTY

CE



User's Guide

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## HH-DM Distance Measuring Meter

M4028/0104

**FCC NOTE:** This device has been tested and found to comply with the limits for a Class B device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This device generates, uses and can radiate radio frequency energy and, if not used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that "interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the device off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase separation between the device and receiver

This Class B Digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations.

## KEYS AND THEIR FUNCTIONS:

**▲ Measuring Button** - Turns unit on. Press and **HOLD** to track measurements - for continuous readings while moving. Fastest way to measure but no reading validation. Useful for locating correct surfaces when there are obstacles in the way.

Press and **RELEASE** to validate measurement only when unit is held absolutely still. **Most accurate mode.** Useful in environments when obtaining a stable reading can be difficult. Validates all measurement before displaying. Filters out noise from machinery and other sources.

**x Multiplies** measurements for area and volume. Stores and recalls  $\otimes$  memory.

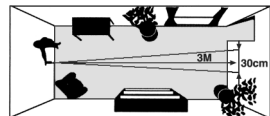
**+ Adds** linear distances, areas and volumes. Stores and recalls  $\oplus$  memory.

**⊙ Clear/Off Button.** Press and immediately release to clear display. Press twice to turn unit off.

Press and hold  $\odot$  key for more than 2 seconds to change display units. The display will cycle between **m** and **ft.in**. Release  $\odot$  key to select desired mode.

## TAKING A MEASUREMENT - Getting Started:

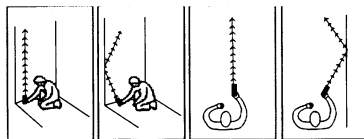
- 1) Install a fresh 9V alkaline battery in rear of unit. Push contacts firmly in place.
- 2) Aim cone at a hard, flat, unobstructed surface such as a wall or mirror.



[FIG 1. Beam spreads less than 1.5 foot (45 cm) for every 10 feet (3 m) measured.]

- 3) Make certain you have a clear path to the surface (wall).
- 4) Hold **Receiver** perpendicular to the surface.

**NOTE:** Measurement will be taken from bottom of unit.



YES NO YES NO  
(FIG 2.)

- 5) Press and hold  $\blacktriangle$  until a consistent measurement appears (about 2 seconds). The unit will continue to take and display rapid measurements as long as the button is held. Release  $\blacktriangle$  button to freeze the measurement.

Press and release  $\blacktriangle$  to validate measurements.

- 6) Your unit is factory preset to display metric. To set your display to desired mode (m or ft.in) Press and hold C button until desired mode displays, then release. NOTE: Unit will now default to your preset mode even after unit is turned off.

## HELPFUL MEASURING HINTS:

- 1) Measurements cannot be taken through glass or off of soft or padded surfaces.
- 2) The HH-DM's range and ability to measure in tight spaces can be increased. Stand in the middle of the distance to be measured and add measurements taken in opposite directions.

- 3) When measuring in confined spaces (hallways), try to measure down the center line and midway between the floor and ceiling.

- 4) To find a specific distance from a wall, walk toward or away from the wall while holding down  $\blacktriangle$ .

- 5) When the surface being measured to has protrusions and recesses, you can determine where the beam is hitting. Move sideways, parallel to the target, while holding down  $\blacktriangle$ . You will see the distance increase for recesses and decrease for protrusions.

- 6) Be sure the surface you are measuring to is hard, flat and uniform. Some surfaces such as stucco or clapboard may scatter signals.

- 7) The unit may lock on to a stronger (usually closer) target. If this happens, release the measuring button and try again.

- 8) Remember that the unit measures from the bottom of the unit (end opposite cone).

## READING THE DISPLAY:



The HH-DM shows readings in m/cm (to the nearest cm) or feet/inches (to the nearest 1/4 inch);



To change the displayed units or convert a displayed value from one mode to another, press and hold the  $\odot$  key for more than 2 seconds. the display will begin to cycle. Release  $\odot$  key to select

- 1) If the unit is unable to take a "good" reading the display will show one of the following:

**BLANK SCREEN** - Check/replace battery.

**BATT** When the **BATT** symbol appears on the display, replace the battery.

**ERROR 1** Out of Range or No Return Signal

**ERROR 2** No Valid Reading

Possible causes for Error 1 or Error 2 include:

- a) Measurement out of range [56 cm to 14m (1 ft 10 ins to 45 ft)]. See **Specification Section on Range.**
- b) Unit is not perpendicular to the surface.
- c) Surface is not hard and flat.
- d) Interference from external noise sources (see section on **Environmental Conditions**).

**ERROR 3** Math error - square or cube result overflow

- 2) If you get readings which are excessively long or short, the likely causes are:

- a) The unit is not being held parallel to the floor. Hold the unit parallel to the floor and at 90° to the surface being measured to. (See FIG. 2).
- b) The surface you are measuring to is not sufficiently flat and the sound waves are continuing to rebound.

Place a flat object, such as a board or mirror against the surface and measure to the object. (See FIG. 2).

- c) The surface is not large enough (See FIG. 1).
- d) Environmental factors such as noise from machinery or close proximity to an air conditioner or computer screen.

- 3) If you get readings which are too short for the distance being measured, make sure there is a sufficiently clear and sufficiently wide path to the surface. Remove any objects in the way or select a different surface to measure to.

- 4) Range and accuracy can be affected by environmental factors such as wind, temperature, humidity and altitude (see section on **Environmental Conditions**).

## COMPUTATION FUNCTIONS:

To make the computations in the descriptions below, the  $\blacktriangle$  symbol indicates taking an actual measurement (length, width or height), the  $\oplus$  symbol indicates press the  $\oplus$  button, the  $\otimes$  indicates press the  $\otimes$  button.

- $\oplus$  **Adding:** The unit adds linear measurements, areas or volumes. When the  $\oplus$  is pressed the "+" symbol will appear in the upper left corner of display.
- $\otimes$  **Multiplying:** The unit multiplies linear measurements to compute areas and volumes. When the  $\otimes$  is pressed the "X" symbol will appear in the upper left corner of the display.

**Adding distances:**  $\blacktriangle, \oplus, \blacktriangle, \oplus$   
(Display shows ft/ins or m)  
(Continue until you are done adding distances.)

**Multiplying to compute areas:**  $\blacktriangle, \otimes, \blacktriangle, \otimes$   
(Display shows m<sup>2</sup> or ft<sup>2</sup>)

**Multiplying to compute volumes:**  
 $\blacktriangle, \otimes, \blacktriangle, \otimes, \blacktriangle, \otimes$   
(Display shows m<sup>3</sup> or ft<sup>3</sup>)

**To add areas:**  
 $\blacktriangle, \otimes, \blacktriangle, \otimes, \oplus$   
(Display shows m<sup>2</sup> or ft<sup>2</sup>)  
(Continue until you are done adding areas)

**To add Volumes:**  
 $\blacktriangle, \otimes, \blacktriangle, \otimes, \blacktriangle, \otimes, \oplus$   
(Display shows total volume: ft<sup>3</sup> or m<sup>3</sup>)  
(Continue until you are done adding volume)

**Note:** The HH-DM can only add like units of measure.

## MEMORIES:

The HH-DM has two memories. Memories can be stored using the  $\otimes$  and  $\oplus$  buttons.

### To store a measurement:

**To store in  $\otimes$  memory:**  
 $\blacktriangle, \otimes$  (the "x" symbol will appear in the upper left corner of the display).

**To store in  $\oplus$  memory:**  
 $\blacktriangle, \oplus$  (the "+" symbol, will appear in the upper left corner of the display).

## NOTES:

- 1) To store 2 linear measurements be sure to store the first in the  $\otimes$  memory and the second in the  $\oplus$  memory.
- 2) Storing a measurement in the  $\otimes$  memory after storing in the  $\oplus$  memory will erase the number in the  $\oplus$  memory.
- 3) Turning the unit off or making any computation using the  $\oplus$  or  $\otimes$  key will erase the number stored in that memory.

## TO RETRIEVE A STORED VALUE IN $\oplus$ AND $\otimes$ :

- 1) Clear the display by pressing and immediately releasing the  $\odot$  button.
- 2) Once you have cleared the display, press the  $\oplus$  or  $\otimes$  button to retrieve the reading stored in that memory.

## TEMPERATURE COMPENSATION:

Because temperature affects the speed of sound, the HH-DM has automatic temperature compensation for greater accuracy. In order to make the most of this feature, wait 2 minutes for each 1°C (1 minute for each 1°F) of temperature difference between locations.

## Displaying temperature to improve accuracy:

Since temperature affects accuracy, the HH-DM is most accurate when its internal temperature matches the air temperature.