1 YEAR
WARRANTY

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User's Guide

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HHAQ-106
6-IN-1 Psychrometer With Enthalpy

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INTRODUCTION

Thank you for purchasing OMEGA's HHAQ-106 6-in-1 Psychrometer with Enthalpy. Please read this user's manual carefully and thoroughly before using the instrument.

The HHAQ-106 can measure any environment's ambient temperature, relative humidity (RH), dew point and wet bulb temperatures, absolute humidity (mixing ratio) and enthalpy of vaporization. These measurements are typically made by three groups of users:

- Water damage restoration contractors
- HVAC/R system installers and technicians

- Professionals charged with monitoring and maintaining the environment of facilities such as office buildings, greenhouses, food and equipment storage facilities, wineries, freezers, shipping containers, computer rooms, labs, libraries, museums and saunas.

The dew point is the temperature below which the water vapor in a volume of air at a given constant barometric pressure will condense into liquid water at the same rate at which it evaporates. Condensed water is called dew when it forms on a solid surface.

Another way to think of the dew point is as an air saturation temperature associated with relative humidity (RH). A high RH value indicates that the dew point is close to the current ambient air temperature. At 100% RH, the dew point temperature is equal to the ambient temperature because the air is completely saturated with water.

The wet bulb temperature is the temperature that a volume of air would have if it were cooled to saturation (100% RH) by the evaporation of water into it, with the latent heat coming from the volume of air. It is the lowest temperature that can be reached under current ambient conditions by the evaporation of water only. The wet bulb temperature is the temperature you feel when your skin is wet and exposed to moving air as opposed to the actual air temperature—the dry bulb temperature.

An environment's absolute humidity level (or mixing ratio) can be measured and expressed in units of grains per pound (GPP) or g/kg. GPP is a more useful moisture metric than RH to water damage remediators. Using RH alone, a remediator might unknowingly introduce moist air—with a low RH but a high GPP—during a job's drying phase.

The sixth environmental parameter that the HHAQ-106 can measure is enthalpy. Enthalpy is a measure of the amount of energy needed to change the state of a substance from a solid to a liquid or from a liquid to a gas. The most common application for the HHAQ-106's enthalpy-calculating algorithm is measuring the enthalpy of vaporization of air in an HVAC/R system duct.

The HHAQ-106 is powered by (3) "AAA" batteries (included).

KEY FEATURES

- Integral 6 in. long sensor-tipped probe for measuring conditions inside ductwork. Probe swivels, increasing placement options.
- Choice of Imperial or metric units for all measured parameters except RH
- 4-digit LCD
- 2-minute Auto Power Off (APO) function
- Low battery indicator

WHAT'S IN THE PACKAGE

The HHAQ-106 comes fully assembled in a blister pack along with a rubber bushing for inserting the probe into ductwork, (3) "AAA" batteries and this user's manual.

PRODUCT OVERVIEW

Figure 1 shows all of the controls, indicators and physical structures on the front and back of the HHAQ-106. Figure 2 shows all text and icons that could appear on the unit's LCD. Familiarize yourself with the positions and functions of all buttons, structures and icons before moving on to the Setup Instructions and Operating Instructions.

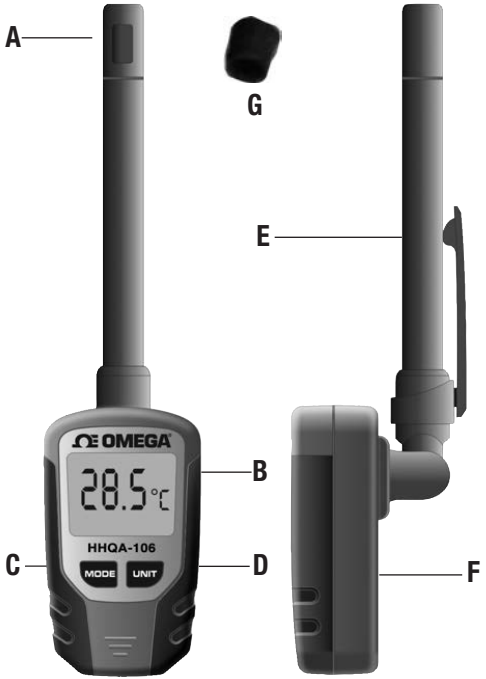


Fig. 1. The HHAQ-106's controls, indicators and physical structures

A. Humidity and temperature sensors under protective cap

B. LCD

C. **MODE** button

D. **UNIT** button

E. Pocket clip

F. Battery compartment

G. Rubber bushing for inserting probe in ductwork

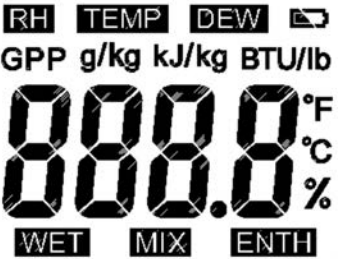


Fig. 2. All possible display indications and their meanings

RH = Relative humidity mode indicator

TEMP = Temperature mode indicator

DEW = Dew point mode indicator

WET = Wet bulb mode indicator

MIX = Mixing ratio mode indicator

ENTH = Enthalpy mode indicator

GPP = Mixing ratio Imperial unit

g/kg = Mixing ratio metric unit

kJ/kg = Enthalpy metric unit

BTU/lb = Enthalpy Imperial unit

°F = Fahrenheit indicator

°C = Celsius indicator

= Low battery indicator

SETUP INSTRUCTIONS

INSTALL BATTERIES

1. The meter's battery compartment (Fig. 1, Callout F) is accessible from the bottom of the unit. Slide the battery compartment cover down and away from the HHAQ-106 and set it aside.
2. Insert the three supplied "AAA" batteries in the compartment, orienting them as shown on the diagram stenciled on the battery compartment cover
3. Replace the battery compartment cover and slide it up until it latches shut.

OPERATING INSTRUCTIONS

Before making any measurements, rotate the sensor protection cap (Fig. 1, Callout A) with your thumb and index finger so both of its vents are open to the ambient environment. Press the **MODE** button to power on the meter. The LCD will immediately begin reading out the RH value of the environment. The reading will be accompanied by the term **RH** in the upper left corner of the LCD.

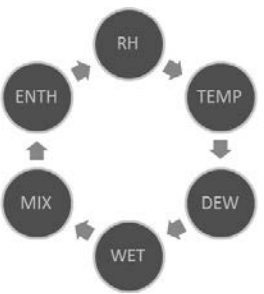
To display the ambient temperature, press the **MODE** button once. **TEMP** will replace **RH** on the top line of the LCD.

To display the dew point temperature, press the **MODE** button again. **DEW** will replace **TEMP** on the top line of the LCD.

To display the wet bulb temperature, press the **MODE** button again. **DEW** will disappear from the top line of the LCD and be replaced by **WET** on the bottom line.

To display the mixing ratio (absolute humidity) of the environment, press the **MODE** button again. **MIX** will replace **WET** on the bottom line of the LCD.

To display the enthalpy of the environment, press the **MODE** button again. **ENTH** will replace **MIX** on the bottom line of the LCD.



How pressing the MODE button changes the measured parameter

For all parameters except RH, the HHAQ-106 will automatically display readings in Imperial units. **To switch to metric units** for ambient, dew point or wet bulb temperature, mixing ratio or enthalpy, press

the **UNIT** button. To toggle back to Imperial units, press the **UNIT** button again.

The placement of the HHAQ-106's humidity and temperature sensors at the end of a probe makes it possible to take readings inside ductwork. And the fact that the probe swivels increases positioning options if the probe is inserted through a vent or grille.

If you wish to measure duct conditions where there is no grille or duct nearby, consider drilling a temporary hole in the ductwork and inserting the probe through it. The black rubber bushing is provided for this purpose. It is sized for a 1 in. diameter hole. Inserting the probe through it will extend the sensor 4 in. into the duct.

To extend the life of the batteries powering the HHAQ-106, the unit's Auto Power Off (APO) function will automatically shut down the instrument if no front-panel buttons are pressed within any 2-minute period.

To power off the HHAQ-106, press and hold the **MODE** button for at least 3 seconds.

SPECIFICATIONS

Ambient Temperature Measurement Range: -4° to 158°F (-20° to 70°C)

Ambient Temperature Measurement Accuracy: 1.8°F (±1°C)

Temperature Measurement Resolution: 0.1°

RH Measurement Range: 0 to 99.9%

RH Measurement Accuracy: ±2% from 10% to 90%RH; ±3% elsewhere

RH Measurement Resolution: 0.1%

Probe Length: 6 in. (150mm)

Display Size: 1.5 in. (38mm) diagonal

Current Consumption: <10mA

Battery Life: 1000 hours (typical)

Dimensions: 8.23 x 1.85 x 1.85 in. (209 x 47 x 47mm)

Weight (without battery): 2.2 oz. (63g)

Power Source: (3) “AAA” batteries (included)

OPERATING & MAINTENANCE TIPS

When the  icon appears on the top line of the display, it's time to replace the batteries that power the instrument (although measurements will remain valid for several hours after the icon first appears). To replace the batteries, follow the instructions on page 9.

To prevent dust and moisture from degrading the performance of the humidity and temperature sensors, after each measurement session rotate the sensor protection cap to close its three vents.

Do not operate the HHAQ-106 in the presence of a flammable or explosive gas or near an arc welder or induction heater.

After subjecting the unit to a large change in ambient temperature, wait at least 30 minutes before making measurements to guarantee the accuracy of readings.

Remove the batteries when storing the unit or when you do not expect to use it for an extended period of time (months rather than weeks).

Do not drop or disassemble the HHAQ-106 or immerse it in water.

NOTES

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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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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