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HHAQ-107 **Data Logging VOC Meter**



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INTRODUCTION

Thank you for purchasing OMEGA's HHAQ-107 Data Logging VOC Meter. Please read this user's manual carefully and thoroughly before using the product.

The HHAQ-107 is an easy-to-use handheld instrument for making ballpark measurements of mixed-gas volatile organic compound (VOC) levels as part of an indoor air quality (IAQ) maintenance program. Examples of VOCs include cigarette smoke, ammonia, ethanol, and the low levels of toluene produced during wood finishing and construction products.

Why does the HHAQ-107 lack a VOC accuracy specification? Because it can only measure the *total* concentration of VOCs contributed by multiple gases, rather than the concentration of a single gas. VOC meters that use photo-ionization detection (PID) technology and ultraviolet lamps to break down single-gas VOCs into ions are faster and more accurate than the HHAQ-107 but they cost at least 10 times more. The HHAQ-107 is therefore a much more suitable solution for home inspectors and facilities managers who only need to spot-check concentrations of mixed-gas VOCs.

KEY FEATURES

- Metal-oxide semiconductor sensor within vented ball housing detects ammonia, toluene, ethanol, hydrogen sulfide (H_2S) and cigarette smoke
- Makes ballpark measurements of total VOC concentration as well as accurate measurements of ambient temperature, relative humidity (RH), dew point and wet bulb temperatures

- Logs up to 32,000 data points. The entire capacity can be devoted to VOC readings, or devoted one-third each to VOC, ambient temperature and RH readings.
- Powerful data logging software that downloads readings to a PC for display/printing as table or graph. Software supports four data logging modes—including starting and stopping recording without a PC.
- Adjustable high VOC concentration audible alarm
- Min/Max memory (for all measured parameters) and data hold
- Automated VOC zero adjustment procedure
- Manually offsettable temperature and RH sensor drift
- Large backlit dual-readout LCD
- 15-minute Auto Power Off (can be disabled)
- Low battery indication
- Tripod mount
- Powered by (6) “AAA” batteries (not included) or AC adaptor (included)
- CE and RoHS approved
- 2-year limited warranty

WHAT'S IN THE PACKAGE

The HHAQ-107 instrument, a PC-compatible data logging program on disc, a USB cable, an AC adaptor and this hardware user's manual come in a soft pouch inside a white box.

PRODUCT OVERVIEW

Fig. 1 shows all controls, indicators and physical structures of the HHAQ-107 Fig. 2 shows all possible indications on the LCD. Familiarize yourself with the locations and functions of the control buttons and the meanings of the display icons before moving on to the Setup and Operating Instructions.

1. VOC and temp-RH sensors inside vented ball housing
2. LCD with upper and lower readouts
3. Control buttons

- **HOLD.** Pressed briefly, freezes both readouts. Also used to raise VOC high alarm threshold. Pressed at same time as **PWR** button with meter off, disables 15-minute APO function. **Pressed and held**, clears stored Min and Max session values.

- **MODE.** Pressed briefly, selects value(s) shown on lower readout: Ambient temperature alternating with RH; Dew Point (DP) temperature; or Wet Bulb (WB) temperature. Also shifts flashing digit one position to the left in VOC high alarm threshold setting mode.

- **PWR.** Pressed briefly with meter off, powers meter on. **Pressed and held with meter on**, powers meter off. **Pressed briefly with meter on**, arms/disarms high VOC concentration alarm.

- **MAX/MIN.** Pressed briefly, displays on the upper readout the highest or lowest concentration detected since the



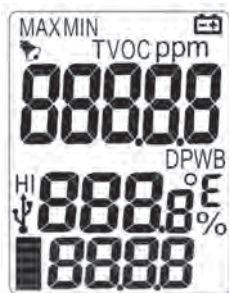
Fig. 1.
The controls,
indicators
and physical
structures
of the
HHAQ-107

meter was last powered on. Also shifts flashing digit one position to the right in VOC high alarm threshold setting mode.

- **SET. Pressed and held**, enters VOC high alarm threshold mode; also saves changed VOC alarm threshold settings and temperature/RH offset values.
- **UNIT**. Selects °F or °C unit for ambient, DP and WB temperatures.
- **BKLT. Pressed briefly**, turns backlight on and off. Also used to lower VOC high alarm threshold. **Pressed and held in Key Start or Rollover** mode (see Software Manual), starts/stops data logging without a USB connection to a PC.

4. Battery compartment (on back)
5. Threaded tripod mounting screw hole (on bottom)
6. Jack for AC adaptor (on side)
7. Micro USB jack

Fig. 2. All possible display indications



SETUP INSTRUCTIONS

INSTALL BATTERIES

The HHAQ-107 battery compartment (Fig. 1, Callout 4) is located on the lower back of the meter.

Obtain six “AAA” batteries. **To install them:**

1. Open the battery compartment by using your thumb to slide its cover down and away from the meter.

2. Install the batteries in series in the compartment, observing the polarity markings inside.
3. Close the battery compartment by sliding the cover back up on its track until it snaps shut.

OPERATING INSTRUCTIONS

STANDALONE MODE

To power on the HHAQ-107 press the **PWR** button. The LCD will illuminate and immediately begin scrolling “0s” across the five positions on the upper readout to indicate that it is warming up. During the warmup period, the meter will burn off any dust on the VOC sensor inside the vented ball. If this is the first use of the meter or if it has not been powered on in a long while, the warmup period may last as long as several hours. Normally, it takes 1 to 15 minutes until the scrolling stops and the upper readout stabilizes.

If you need to make ballpark measurements of mixed-gas VOC levels over a period longer than 15 minutes (the meter’s Auto Power Off triggering time), you must disable the APO function.

To power on the HHAQ-107 and simultaneously disable the APO function while running on battery power, with the meter off first press and hold the **HOLD** button, and then (without releasing **HOLD**) press and hold the **PWR** button. Doing this will cause a small **n** to briefly appear on the LCD before the meter powers up with both readouts visible. There is no permanent on-screen indication that the APO function has been disabled. So if you disable APO, realize that the batteries will discharge within an hour or two if you forget to manually power off the meter after a measurement session.

Once the meter has been powered on and the values on both readouts have stabilized, the HHAQ-107 automatically begins operating in real-time measurement mode. In this mode you can:

- 1) **Turn the display backlight on and off** by briefly pressing the **BKLT** button.
- 2) **Freeze both readouts** by pressing the **HOLD** button.
- 3) **Change the temperature unit** to/from °F and °C by briefly pressing the **UNIT** button. The HHAQ-107 will “remember” the unit in use when the meter powers off and will resume using that unit for ambient, DP and WB temperatures when it is powered on again.
- 4) **Change the values shown on the lower readout** by pressing the **MODE** button. The options available by pressing the button repeatedly are (in order): Ambient temperature alternating with RH; Dew Point (DP) temperature; or Wet Bulb (WB) temperature.

Using the **MODE** button to change the value(s) shown on the lower readout



- 5) **Adjust the high VOC concentration audible alarm threshold.** To enter threshold adjustment mode, press and hold the **SET** button. This will produce a display showing **35.00 ppm** (the default alarm threshold) on the upper readout, with the “5” flashing. Using the **MODE** and **MAX/MIN** buttons to shift the flashing digit to the left and right, respectively, press the **HOLD** and **BKLT** buttons as many times as necessary to increment and decrement the value of each digit until the desired concentration threshold

is displayed. Then, press and hold the **SET** button to save the setting and return to real-time measurement mode.

6) **Arm and disarm the high VOC concentration alarm.**

- a. To arm the alarm, briefly press the **PWR** button until the  icon appears in the upper left corner of the LCD.
- b. To disarm the alarm (turn off the beeper), briefly press the **PWR** button until the  icon disappears.
- c. To cancel the alarm when it sounds, briefly press the **PWR** button.

7) **Display maximum and minimum session values of all measured parameters** by using the **MAX/MIN** button. A measurement session is the period of time during which you measure VOC levels at multiple locations. The session begins when you power on the HHAQ-107; it typically ends 15 minutes after you finish making measurements with the activation of the APO function. Max and Min readings are automatically and continuously updated.

You can extend a measurement session beyond 15 minutes by pressing any front-panel button or by disabling the APO function (see page 7) by powering the HHAQ-107 through the included AC adaptor.

The value of being able to quickly determine where the level of VOCs is highest and lowest in a facility should be obvious.

To display the highest VOC concentration recorded during a measurement session, press the **MAX/MIN** button once with the meter operating in real-time measurement mode. The maximum reading will appear on the upper readout, with the term **MAX** above it on the top line of the LCD.

To display the lowest **VOC** concentration recorded during a measurement session, press the **MAX/MIN** button twice. The minimum reading will appear on the upper readout, with the term **MIN** above it on the top line.

The figure at right shows both session parameters in their selection sequence



relative to real-time measurement mode.

To clear the stored (and continually updated) values of Min and Max from the instrument's short-term (volatile) memory, press and hold the **HOLD** button with the meter operating in Max/Min mode. The letters **Clr** on the bottom line of the LCD will confirm the clearing.

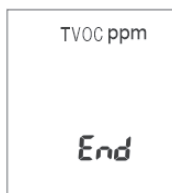
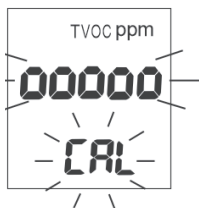
CALIBRATION PROCEDURE

VOC ZERO ADJUSTMENT

To make this temporary calibration procedure worthwhile, be sure the ambient environment is well-ventilated and shows no sign of VOC gases, as evidenced by a **0.00** reading on the meter's upper **TVOC ppm** readout.

To initiate the process, press and hold the **MODE** button for at least five seconds. Initially, five zeroes and the term **CAL** will appear and flash for about 20 seconds (left image on next page). Then the zeroes will stop flashing, with **CAL** continuing to flash (middle image). When calibration has finished, the display will confirm that result by displaying **End** (right image). The meter will respond by resuming operation in real-time measurement mode with the calibration point back at the factory default setting.

Alternatively, you can recalibrate the meter using a standard VOC gas. But be aware that attempting to recalibrate the meter without a standard gas may actually lower the meter's accuracy. For best results, send the meter out for calibration to a qualified laboratory recommended by your distributor.



SPECIFICATIONS

VOC Measurement Range / Resolution: 0 to 50 ppm / 0.01 ppm

VOC Warmup Time: 10 minutes first use, 2 minutes thereafter

VOC Sensor Type / Longevity: Metal-oxide semiconductor / 5 years (typical)

Temperature Measurement Range: 14° to 122°F
(-10° to 50°C)

Temperature Measurement Accuracy / Resolution: $\pm 1.2^{\circ}\text{F}$
(0.6°C) / 0.1°

RH Measurement Range: 10 to 90%RH

RH Measurement Accuracy / Resolution: $\pm 5\%$ of reading
@77°F (25°C); $\pm 7\%$ of reading elsewhere in range /
0.1%RH

Dew Point Measurement Range: -99.22° to 118°F
(-72.9° to 47°C)

Wet Bulb Measurement Range: 12.2° to 118.8°F
(-11° to 48.2°C)

Data Logging Capacity: 32,000 points

Display Type / Size: Dual readout LCD / 2 in. (51mm) diagonal

Auto Power Off Trigger: 15 minutes of front-panel inactivity
(can be disabled)

Operating Temperature: 32° to 122°F (0° to 50°C)
@ 0 to 95%RH, non-condensing

Dimensions: 8.3 x 2.4 x 1.0 in. (210 x 60 x 25mm)

Weight: 7.2 oz. (204g), including batteries

Power Source: (6) “AAA” batteries (not included) or included
110VAC adaptor

OPERATING & MAINTENANCE TIPS

When the low battery indicator appears in the upper left corner of the LCD, install fresh batteries immediately, following the instructions on pages 6 and 7 of this manual.

The metal-oxide semiconductor VOC sensor is as power-hungry as it is sensitive. Omega recommends using the included AC adaptor if you expect to routinely conduct measurement sessions lasting more than 15 minutes.

Remove the batteries if you don't expect to use the HHAQ-107 or an extended period of time (months or years).

Abrupt temperature changes will cause condensation and possible vapor penetration. Clean the LCD after the vapor evaporates. Blow off loose particles with compressed air.

Gently brush remaining debris away with a lens hair brush.

Never use a solvent or an abrasive cleaner on the HHAQ-107. To clean the housing, use a soft, damp cloth.

Do not drop or disassemble the meter or immerse it in water.

The HHAQ-107 may display the following two sensor error messages on its bottom readout:

E- 1: The VOC, temperature or RH sensor is damaged, or communication with any of the sensors has failed.

E- 2: The VOC, temperature or RH level is beyond the range of its sensor.

If the LCD persistently shows a value of **00000** for VOC, that usually means that a logging session was initiated before the VOC sensor was fully warmed up.

OFFSETTING SENSOR DRIFT

The meter uses a capacitive RH sensor and a thermistor temperature sensor whose accuracy may drift over the long term. Following is a procedure that you can perform to offset these drifts and maximize the meter's measurement accuracy.

- 1) **With the meter powered off**, press and hold the **MODE** and **BKLT** buttons with fingers of your left hand while pressing and holding the **MAX/MIN** and **PWR** buttons with fingers of your right hand.
- 2) When the LCD shows **0.0°C** and **SET**, release all four buttons.
- 3) To select **°C** or **°F** as the temperature offset unit, press the **UNIT** button.
- 4) Press the **HOLD** button once for each 0.1° of temperature offset you wish to add, or the **BKLT** button once for each 0.1° of temperature offset you wish to subtract.
- 5) To offset RH drift instead of, or in addition to, temperature drift, briefly press the **SET** button. This will change the

displayed unit °C or °F to %. Then repeat Step 4. Each press of the **HOLD** or **BKLT** button increases or decreases the amount of RH offset by 0.1%.

- 6) When you are satisfied with the offset value(s) you have entered, press and hold the **SET** button to save the settings. After the bottom line of the LCD shows **SAVE** for two seconds, press and hold the **PWR** button to power off the meter with the offsets in place.

NOTE: To apply the maximum amount of temperature offset (+9.9° or -9.9°) or RH offset (+9.9% or -9.9%), press and hold the **HOLD** and/or **BKLT** buttons to quickly increase or decrease the values.



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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 in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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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.

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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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