

1 YEAR
WARRANTY



Ω OMEGA® **User's Guide**



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MADE IN CHINA

HH91
Single Channel
and HH92
Two Channel
Digital Thermocouple
Thermometers



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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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KEY FEATURES

- Min/Max/Avg memory
- Compatible with “K”, “J”, “T” and “E” type thermocouples
- Displays difference between thermocouple readings T1-T2 (HH92 only)
- 2.4 in. diagonal LCD with dual temperature readouts + relative time clock readout
- Adjustable relative time clock enables resetting measurement timeline

- Choice of three temperature units: °C, °F and °K
 - Data hold button
 - Manual temperature compensation (offset) for thermocouple(s)
 - Adjustable Auto Power Off trigger
 - Powered by “9V” battery
-

WHAT'S IN THE PACKAGE

Both models come in a white box with this user's manual. The HH91 includes one “K” type bead thermocouple probe with a measurement range of -40° to 572°F (-40° to 300°C). The HH92 comes with two “K” type probes with the same range.

A variety of other “K” type thermocouple probes with different sensor types, form factors and temperature ranges are available from OMEGA. Visit www.omega.com and enter “K type probe” in the **SEARCH** box.

QUICK START GUIDE

1. Obtain and install a “9V” battery.
 2. Plug included “K” type thermocouple probe(s) into the top jack(s).
 3. Press the **POWER** button.
-

PRODUCT OVERVIEW

Figure 1 shows all of the controls, indicators and physical features of the HH91 and HH92, including the differences between their keypads and jack configurations. Figure 2 shows all possible indications on the LCD. Familiarize yourself with the positions and functions of all controls, indicators and physical features before moving on to the Setup Instructions and Operating Instructions.

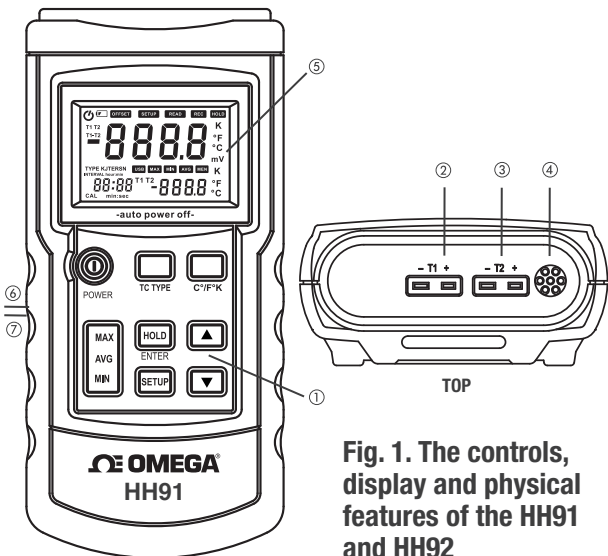
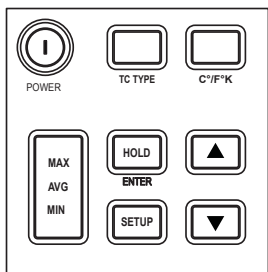
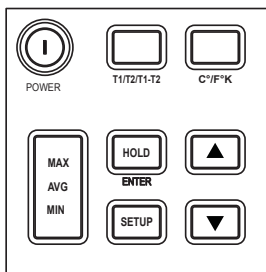


Fig. 1. The controls, display and physical features of the HH91 and HH92



HH91 Keypad



HH92 Keypad

1. Keypad
2. T1 jack for spade lug thermocouple
3. T2 jack for spade lug thermocouple (HH92 only)
4. Ambient temperature sensor
5. LCD
6. Flip-up stand (on back)
7. Battery compartment (on back)

POWER button. Powers thermometer on and off.

TC TYPE button (HH91 only). Selects thermometer type (“K”, “J”, “T” or “E”)

T1/T2/T1-T2 button (HH92 only). Selects one of four display options:

- a) **T1** on primary readout and **T2** on secondary readout
- b) **T2** on primary readout and **T1** on secondary readout
- c) **T1-T2** on primary readout and **T1** on secondary readout
- d) **T1-T2** on primary readout and **T2** on secondary readout

°C/°F/K button. Selects temperature unit of primary and secondary readouts

MAX/AVG/MIN button. **Pressed briefly**, selects whether maximum, minimum or average value of measurement session (since thermometer was powered on) is displayed on primary readout.

Pressed and held, exits Max/Min/Avg display mode and resumes real-time display mode.

HOLD (ENTER) button:

- On HH91, pressing **HOLD** button briefly “freezes” T1 value on primary readout.
- On HH92, pressing **HOLD** briefly freezes T1, T2 or T1-T2 value on primary readout and T1 or T2 value on secondary readout (values held are determined by setting of **T1/T2/T1-T2** button).
- On HH91 and HH92, **ENTER** button is only used to set system time format.

SETUP button. Initiates 7-step setup procedure (see p. 7)

▲ and ▼ buttons. **On HH91 and HH92**, used to enable/disable ambient temperature compensation

and change values of temperature compensation, Auto Power Off triggering time, relative time clock and local power line frequency. **On HH92**, also used to select thermocouple type (during Step 1 of Setup procedure).

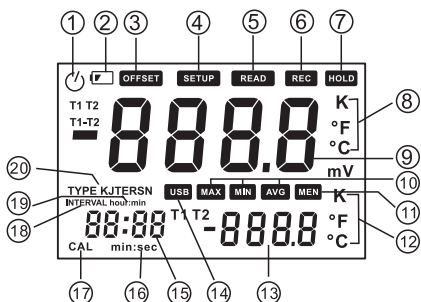


Fig. 2. All possible display indications

1. Auto Power Off enabled indicator
2. Low battery icon
3. **OFFSET**. Indicates that primary readout is showing thermocouple temperature compensation value
4. **SETUP**. Flashes during setup procedure
5. **READ**. Not used on HH91 or HH92
6. **REC**. Not used on HH91 or HH92
7. **HOLD**. Indicates that primary readout is showing held value
8. **K, °F, °C**. Primary readout temperature unit
9. Primary readout
10. **MAX, MIN, AVG**. Indicates which value is shown on primary readout
11. **MEM**. Not used on HH91 or HH92
12. **K, °F, °C**. Secondary readout temperature unit
13. Secondary readout
14. **USB**. Not used on HH91 or HH92

15. Relative time clock readout
16. **min:sec.** Relative time units
17. **CAL.** Flashes during calibration
18. **INTERVAL.** Not used on HH91 and HH92
19. **hour:min.** Relative time units
20. **Type KJTERSN.** Indicates selected thermocouple type

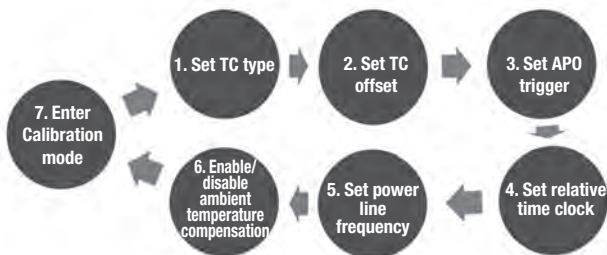
SETUP INSTRUCTIONS

INSTALL BATTERY

To open the battery compartment, turn the thermometer over and lift the flip-up stand (Fig. 1, Callout 6) to gain access to the battery compartment (Callout 7). Remove the single Philips-head screw securing the battery compartment cover. Set the cover and screw aside. Obtain a “9V” battery and install it in the compartment observing the polarity markings inside. Close the battery compartment by replacing its cover and securing it with the screw.

PERFORM SETUP PROCEDURE

The setup procedures for the HH91 AND HH92 are identical, with one exception: Step 2—adjusting the temperature compensation (offset) value—must be performed twice, for the thermocouples of both channels.



To enter Setup mode, press the **SETUP** button once. Doing so will clear all three readouts and cause the word **SETUP** to begin flashing on the top line of the LCD. **SETUP** will continue to flash until all steps of the setup procedure have been completed.

Note: It's important to understand that you must complete the entire 7-step Setup procedure shown above each time you initiate it. If you power off the thermometer during an interim step, none of your settings or changes will be saved.

Step 1 of the procedure enables you to configure the thermometer for the type of thermocouple to be used. HH92 users: You cannot plug two different types of thermocouple into the T1 and T2 jacks on the top of the unit (Fig. 1, Callouts 2 and 3). You must use two probes of the same type.

By default, the HH91 and HH92 are configured to work with "K" type thermocouples. To use a "J", "T" or "E" thermocouple, press the ▲ or ▼ button until the correct letter replaces **K** at the right of **TYPE** on the left side of the LCD.

On the HH91, you can also change the thermocouple type by pressing the **TC TYPE** button repeatedly with the thermometer in real-time measurement mode.

After you complete Step 1, press the **SETUP** button again to initiate Step 2. During this step, the word **OFFSET** appears on the top line of the LCD, with the term **T1** in the upper left corner.

Step 2 of the procedure enables you to set the amount of temperature compensation (offset) to be applied to the Channel 1 (T1) thermocouple. Pressing the ▲ button applies a positive offset, and pressing the ▼ button applies a negative offset. Each press of either button adds 0.1°C of compensation to the amount shown on the primary readout. The

maximum amount of temperature compensation allowable is $\pm 6^{\circ}\text{C}$. You cannot apply temperature compensation using Fahrenheit or Kelvin units. After applying the desired amount of temperature compensation to T1, press the **SETUP** button again to save your setting and proceed to the next step.

On the HH92, the next step is Step 2A—setting the amount of temperature compensation (offset) to be applied to the Channel 2 (T2) thermocouple. After using the same procedure as before to apply the desired amount of temperature compensation to T2, press the **SETUP** button again to proceed to Step 3.

Note: Changing thermocouple type automatically restores offset value(s) to 0.0.

Step 3 enables you to change the triggering time of the Auto Power Off (APO) function from its default value of 30 minutes. During Step 3, the primary readout shows the term **P** – and the secondary readout shows the current value of the APO triggering time (the period of time during which no front-panel buttons are pressed).

Each press of the ▲ button increases the APO triggering time by 1 minute, and each press of the ▼ button decreases it by 1 minute. The maximum APO triggering time is 60 minutes. If the APO triggering time has been decreased to 5 minutes, the next press of the ▼ button causes the term **oFF** to appear on the secondary readout. Disabling the APO function in this way also causes the clock icon in the upper left corner of the LCD (Fig. 2, Callout 1) to disappear. The missing clock icon is a reminder that the thermometer will *not* automatically power itself off after an extended period of inactivity. With APO disabled, be aware that leaving the thermometer unattended for an extended period of time risks draining the battery.

After adjusting the APO triggering time, press the **SETUP** button again to proceed to Step 4.

Step 4 enables you to reset the relative time clock to a time other than the default value: how long it has been since the thermometer was powered on. The usual reason to change the value is to establish a new “zero” for the measurement timeline following any change that does not involve powering the thermometer off.

At the beginning of Step 4, the term **S - t** appears on the primary readout with 00:00 (hours and minutes) showing on the relative time clock readout (Fig. 2, Callout 15). To switch the display to show minutes and seconds, press the **HOLD** (ENTER) button. The relative clock setting can be adjusted to any value between 0 and 24 hours, with 1-second resolution. Each press of the **▲** button increases the setting by 1 minute or 1 second, and each press of the **▼** button decreases it by 1 minute or 1 second. You can press and hold either button to make a large change quickly.

After adjusting the relative time clock, press the **SETUP** button again to proceed to Step 5.

Step 5 enables you to compensate for thermocouple measurement errors caused by nearby power lines. By default, the thermometer automatically compensates for the effects of electric power transmission and distribution at a frequency of 60Hz. Upon entering Step 5, the thermometer shows the term **LinE** on the primary readout and **60H** on the secondary readout. Press either the **▲** or **▼** button to change **60H** to **50H** if your local power grid operates at 50Hz.

After adjusting the relative time clock, press the **SETUP** button again to proceed to Step 6.

Step 6 enables you to enable or disable ambient temperature compensation for the thermometer's thermocouple(s).

At the beginning of Step 6, the term **ntC** (an abbreviation of normal temperature compensation) appears on the primary readout, with **on** displayed on the secondary readout. Press either the ▲ or ▼ button to change **on** to **oFF**. If you disable ambient temperature compensation, it will be re-enabled after the thermometer is rebooted.

After enabling or disabling ambient temperature compensation, press the **SETUP** button again to proceed to Step 7.

Step 7 enables professional users with laboratory-grade electrical instruments to calibrate the HH91 or HH92. Because the calibration procedure requires applying voltages to the spade-lug thermocouple jacks, OMEGA considers it inappropriate for casual users who may be unfamiliar with electrical safety guidelines. Accordingly, the calibration procedure is not reproduced here.

To complete the Setup procedure (and save all of settings and any changes you made since entering Setup mode), press the **SETUP** button one last time with **CAL** displayed on the primary readout and **oFF** showing on the secondary readout. Doing so will cause the thermometer to exit Setup mode and enter real-time measurement mode.

INSTALL THERMOCOUPLE(S)

Plug one (HH91) or two (HH92) thermocouples of the selected type into the T1 jack (HH91) or T1 and T2 jacks (HH92) on the top of the thermometer. On spade-lug thermocouple probes, the narrower lug is the positive (+) terminal and the wider lug is the negative (-) terminal.

OPERATING INSTRUCTIONS

MONITORING TEMPERATURE(S) IN REAL TIME

To measure temperatures sensed by one or more installed thermocouples, press the **POWER** button to activate the thermometer. On the HH91, the temperature sensed by the T1 thermocouple will appear on the primary readout. On the HH92, the temperature sensed by the T1 thermocouple will appear on the primary readout and the T2 temperature (if a T2 thermocouple is installed) will appear on the secondary readout. This is the “normal” display mode for the HH92.

To swap the readouts on the HH92 (so T1 is shown on the secondary readout and T2 is shown on the primary readout), press the **T1/T2/T1-T2** button.

To show the value of T1-T2 on the primary readout and the value of T1 on the secondary readout, press the **T1/T2/T1-T2** button again. To show T1-T2 on the primary readout and T2 on the secondary readout, press the **T1/T2/T1-T2** button again.

When the HH92 is powered off and then on again, it will resume operation in “normal” display mode—with T1 on the primary readout and T2 on the secondary readout.

To hold the value on the primary readout (HH91) or the values on both readouts (HH92), press the **HOLD** button. Note that while the thermometer is holding a reading or readings, the relative time clock will continue ticking. To release the hold and resume real-time display of T1, T2 or T1-T2 values, press the **HOLD** button again.

To change the temperature unit used on the primary readout (HH91) or press the primary and secondary readouts (HH92), press the **K, °F, °C** button. Both models will “remember” the last selection and resume using that unit following a reboot.

DISPLAYING MIN/MAX/AVG TEMPERATURES

To display the minimum, maximum or average values of T1 (HH91) or T1-T2 (HH92) sensed during a measurement session (the period of time since the thermometer was last powered on), begin by briefly pressing the **MAX/AVG/MIN** button once. One press of the button causes the maximum value to be displayed on the secondary readout while the primary readout continues to track real-time temperature(s).

Briefly press the **MAX/AVG/MIN** button a second time to switch to showing the minimum temperature on the secondary readout. Briefly press the button a third time to show the average temperature over the duration of the measurement session on the secondary readout.

To exit Min/Max/Avg display mode and resume real-time display mode, press and hold the **MAX/AVG/MIN** button for at least 3 seconds.

SPECIFICATIONS

Measurement Ranges: -328° to 2501°F (-200° to 1372°C) with “K” type thermocouple(s)
-346° to 2192°F (-210° to 1200°C) with “J” type thermocouple(s)
-418° to 752°F (-250° to 400°C) with “T” type thermocouple(s)
-238° to 1832°F (-150° to 1000°C) with “E” type thermocouple(s)

Measurement Accuracy (excluding thermocouple error) from 64° to 82°F (18° to 28°C):
±(0.5% of reading + 0.9°F/0.5°C)

Measurement Resolution: 0.1° (F or C) below 1000°;
1° (F or C) above 1000°

Measurement Range of Included Thermocouple(s):
-40° to 572°F (-40° to 300°C)

Auto Power Off Trigger: Adjustable from 5 minutes to 1 hour; can be disabled

Operating Temperature:
32° to 122°F (0° to 50°C) @<80% RH

Dimensions: 7.5 x 3.5 x 1.6 in. (191 x 89 x 41mm)

Weight: 14.1 oz. (400g)

Power Source: One “9V” battery (not included)

OPERATING & MAINTENANCE TIPS

When the low battery icon appears at the upper left of the LCD, it's time to replace the “9V” battery that powers the thermometer (although measurements will remain valid for several hours after the icon first appears). To replace the battery, follow the instructions on p. 7.

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

Remove the battery 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 disassemble the thermometer or immerse it in water. Doing so voids the 1-year limited warranty.

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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