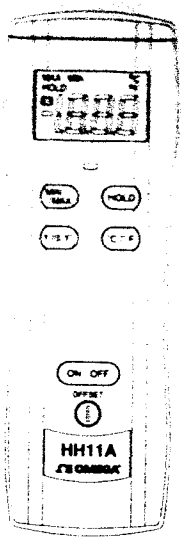

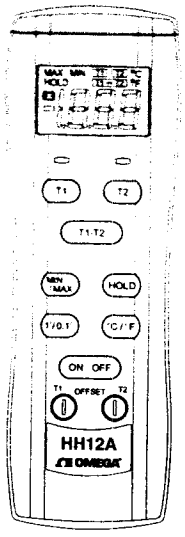

User's Guide

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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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INTRODUCTION

This instrument is a portable 3½ digit, compact–sized digital thermometer designed to use external K–type thermocouple as temperature sensor. Temperature indication follows National Bureau of Standards and IEC 584 temperature/voltage tables for K–type thermocouples. A K–type thermocouple is supplied with the thermometer for each input. The HH11A is a single input, the HH12A is a dual input unit.

SAFETY INFORMATION

It is recommended that you read the safety and operation instructions before using the thermometer.
Designed to meet IEC–1010–1, CE–EMC.

WARNING

TO AVOID ELECTRICAL SHOCK, DO NOT USE THIS INSTRUMENT WHEN VOLTAGES AT THE MEASUREMENT SURFACE EXCEED 24V AC OR 60V DC.

WARNING

TO AVOID DAMAGE OR BURNS, DO NOT MAKE TEMPERATURE MEASUREMENTS IN MICROWAVE OVENS.

CAUTION

Repeated sharp flexing can break the thermocouple leads. To prolong lead life, avoid sharp bends in the leads, especially near the connector.

The ⚠ symbol on the instrument indicates that the operator must refer to an explanation in this manual.

SPECIFICATIONS

ELECTRICAL

Temperature Scale:

Celsius or Fahrenheit user–selectable

Measurement Range:

–50°C to 1300°C, (–58°F to 2000°F)

Resolution:

1°C or 1°F, 0.1°C or 0.1°F

Accuracy: HH11A

Accuracy is specified for operating temperatures over the range of 18°C to 28°C (64°F to 82°F), for 1 year,not including thermocouple error.

±(0.3% rdg+1°C) –50°C to 1000°C

±(0.5% rdg+1°C) 1000°C to 1300°C

±(0.3% rdg+2°F) –58°F to 2000°F

Accuracy: HH12A

Accuracy is specified for operating temperatures over the range of 18°C to 28°C (64°F to 82°F) , for 1 year,not including thermocouple error.

±(2°C) –50°C to 0°C

±(0.3% rdg + 1°C) 0°C to 600°C

±(0.5% rdg + 1°C) 600°C to 1300°C

±(4°F) –58°F to 32°F

±(0.3% rdg + 2°F) 32°F to 1100°F

±(0.5% rdg + 2°F) 1100°F to 2000°F

Temperature Coefficient:

0.1x (specified accuracy) per °C . (0°C to 18°C , 28°C to 50°C).

Input Protection:

60V dc or 24V rms ac maximum input voltage on any combination of input pins.

Reading Rate:

2.5 times per second.

Input Connector:

Accepts standard miniature therm ocouple connectors (flat blades spaced 7.9mm , center to center) . SMP type

ENVIRONMENTAL

Ambient Operation Range:

0°C to 50°C, (32°F to 122°F)

Storage Temperature:

–20°C to 60°C, (–4°F to 140°F)

Relative Humidity:

0% to 80% (0°C to 35°C) (32°F to 95°F)

0% to 70% (35°C to 50°C) (95°F to 122°F)

GENERAL

Display: 3½ digit liquid crystal display (LCD) with maximum reading of 1999

Battery: Standard 9V battery (NEDA 1604,IEC 6F22)

Battery Life: 100 hours typical with carbon zinc battery
200 hours typical with alkaline battery

Dimensions: 184mm (H) x 62mm (W) x35mm (D)

Weight: 10.6oz (300g) including holster

Supplied Probe(s): 3 – foot type " K " thermocouple bead probe (teflon insulated) . Maximum insulation temperature 260°C (500°F). Probe accuracy ±2.2°C or ±0.75% of reading (whichever is greater) from 0° to 800°C.

OPERATING INSTRUCTIONS

Selecting the Temperature Scale

Readings are displayed in either degrees Celsius (°C) or degrees Fahrenheit (°F). When the thermometer is turned on, it is set to the temperature scale that was in use when the thermometer was last turned off. To change the temperature scale, press the °C or °F key.

Single-Thermocouple Temperature Measurement (HH12A only)

The thermometer displays the temperature of the thermocouple that is connected to the selected input. Press the T2 key to display the temperature of the thermocouple connected to the T2 input. Press the T1 key to display the temperature of the themocouple connected to the T1 input. The input selection cursor indicates which input is selected.

Differential Temperature Measurement (HH12A only)

Differential temperature measurement is selected by pressing the T1–T2 key. This causes the thermometer to display the temperature difference between the two thermocouples (the temperature of thermocouple T1 minus the temperature of thermocouple T2). The selection is indicated by the input selection cursor.

Selecting the Display Resolution

The thermometer allows two choices of resolution:

High resolution: 0.1°C or 0.1°F

Low resolution: 1.0°C or 1.0°F

To select the alternate display resolution , press the corresponding " 1° " or " 0.1° " key.

The 0.1° resolution is applicable for temperature measurements below 200°C or 200°F.

HOLD Mode

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

Pressing the HOLD key again cancels HOLD mode, causing the thermometer to resume taking measurements.

MIN/MAX Mode

Press MIN / MAX once to begin recording MIN and MAX. Press MIN / MAX to select MIN or MAX. Hold down for 2 seconds to exit MIN / MAX function.

OFFSET ADJUSTMENT

The OFFSET control is set at the factory to allow for the variations found in standard thermocouples. By adjusting the OFFSET control, you can optimize measurement accuracy for a particular thermocouple at a particular temperature.

Adjusting for T1 or T2 Accurate Measurements

1. Connect the thermocouple to the T1 or T2 input connector and turn the thermometer ON , then press the 0.1° key to select the high display resolution. (If using T2 , press the T2 key).

2. Place the thermocouple in a known , stable temperature environment at or near the temperature you wish to measure , and allow the readings to stabilize.

3. Slowly adjust the OFFSET control so that the thermometer reading matches the temperature of the known environment. Leave sufficient time between adjustments to allow for measurement lag.

4. The calibration of the thermometer–thermocouple combination is now optimized for measurements near the temperature measured in step 2.

Resetting the OFFSET Control

To return the OFFSET control to the factory setting without having to recalibrate the thermometer, perform the following procedure:

1. Connect a thermocouple that is in good working order to the input that is to be adjusted.
2. Place the thermocouple in an ice-water bath and allow the readings to stabilize.
3. Slowly adjust the OFFSET control until the thermometer reads 0°C (32°F)

Probe Detector

1. The red LED will be ON when no K-type thermocouple probe is inserted into the TEMP input of the meter, and will be OFF after K-type thermocople probe is inserted. If the red LED stays ON when thermocouple probe is attached, check the thermocouple probe which might be damaged.
2. For HH12A, when T1 button is pressed, the T1 red LED will be ON, and T2 red LED will be OFF.
   When T2 button is pressed, the T2 red LED will be ON, and T1 red LED will be OFF.
   When T1-T2 button is pressed,both T1 and T2 red LEDs will be ON.
   This is to advise the user to insert the thermocouple probes into the correct T1 and/or T2 TEMP input jack where the red LED is ON.

HH11A CALIBRATION PROCEDURE

A. Equipment Required
   1. Fluke 5101B Calibrator
   2. Omega TRC III Ice Point Cell
   3. Omega TRP (K) Reference Probe

B. Calibration
   1. Insert the T/C probe into the thermocouple Jack.
   2. Press " °C " and " °F " button to toggle in the 0.1°C mode.
   3. Set the output of the DC calibrator to 0.000mV and adjust VR1 VR 2KΩ until the meter indicates 00.0°C.
   4. Press " °F " button to toggle in the 0.1°F mode.
   5. Set the output of the DC calibrator to -0.692mV and adjust VR5 VR 220KΩ until the meter indicates 00.0°F.
   6. Set the output of the DC calibrator to 3.012mV and adjust VR3 VR 1KΩ until the meter indicates 165.0°F.
   7. Press " 1.0° " button to toggle in the 1°F mode.
   8. Set the output of the DC calibrator to 41.269mV and adjust VR6 VR 20KΩ until the meter indicates 1832°F.
   9. Press " °C " button to toggle in the 1°C mode.
   10. Set the output of the DC calibrator to 41.269mV and adjust VR4 VR 5KΩ until the meter indicates 1000°C.
   11. Remove thermocouple and reassemble the meter.

HH12A CALIBRATION PROCEDURE

A. Equipment Required

1. Fluke 5101B Calibrator
2. Omega TRC III Ice Point Cell
3. Omega TRP (K) Reference Probe

B. °C Adjustment:

1. Set the thermocouple select switch to " T1 " or " T2 " position.
2. Insert the T/C probe into the TC1 jack.
3. Set the Function switch to " 0.1°C " position.
4. Set the output of the DC calibrator to 0.000mV and adjust T1=VR3 VR 1KΩ or T2=VR1 VR 1KΩ until the meter indicates 00.0°C.

C. °F Adjustment

1. Set the function switch to " 0.1°F " position.
2. Set the output of the DC calibrator to –0.692mV and adjust VR6 VR 220KΩ until the meter indicates 0.00°F.
3. Set the output of the DC calibrator to 3.012mV and adjust VR7 VR 200Ω until the meter indicates 165.0°F.
4. Set the function switch to " 1°F " position.
5. Set the output of the DC calibrator to 41.269mV and adjust VR5 VR 2KΩ until the meter indicates 1832°F.
6. Remove thermocouple and reassemble the meter.

OPERATOR MAINTENANCE

WARNING

TO AVOID POSSIBLE ELECTRICAL SHOCK, DISCONNECT THE THERMOCOOUPLE CONNECTORS FROM THE THERMOMETER BEFORE REMOVING THE COVER.

Battery Replacement

Power is supplied by a standard 9 volt battery (NEDA 1604,IEC 6F22). The " [⊡] " appears on the LCD display when replacement is needed. To replace the battery, remove the screw from the battery cover on back of the meter. Remove the battery and replace with a new equivalent 9 volt battery.

NOTE

7000-1710

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. The 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 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; or 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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