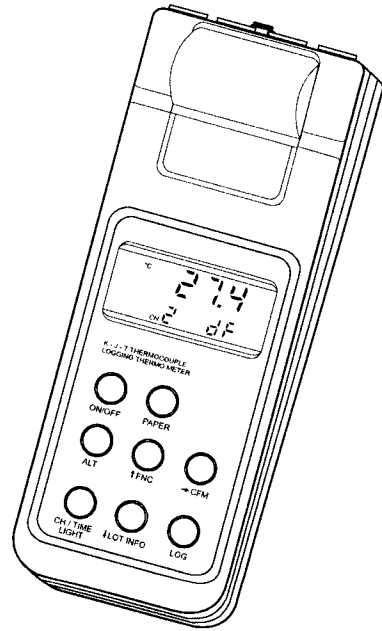


Instruction Manual

HH611A Series Portable Microprocessor Printing and Logging K - J - T Thermocouple Thermometers



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MANCHESTER, UK



Dear Customer,

Thank you for choosing an Omega Engineering Product.

Please read this instruction manual carefully before using the instrument.

This manual will provide you with all the necessary information for the correct use of the instrument, as well as a precise idea of its versatility in a wide range of applications.

These instruments are in compliance with **CE** directives EN 50081-1 and EN 50082-1.

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PRELIMINARY EXAMINATION

Remove the instrument from the packing material and examine it carefully to make sure that no damage has occurred during shipping. If there is any damage, notify Omega Customer Service.

Each thermometer is supplied complete with:

- AA size Alkaline Batteries (4 pcs)
- Instruction Manual
- Paper rolls (5 pcs)
- Rugged Carrying Case.

Note: Save all packing material until you are sure that the instrument functions correctly. All defective items must be returned in their original packaging together with the supplied accessories.

GENERAL DESCRIPTION

The HH611A Series portable thermocouple thermometers with built-in printers are microprocessor-based and enable you to accurately measure temperature and record data.

The thermocouple type is user selectable to best suit the temperature range of your application. K, J and T thermocouple types can be selected.

The instruments housing is made of rugged and lightweight material making it truly portable.

The meters come equipped with an easy-to-read LCD with backlight feature for comfortable reading even in dark environments.

A user friendly interface provides clear messages regarding errors, functions and more.

The GLP (Good Laboratory Practice) features provide a guarantee of data consistency.

Measurements can be performed with lab-grade precision in the field as well as in the laboratory.

An alarm time-out is available to alert the user if too much time has elapsed since the last calibration and that re-calibration may be required.

The meters provide a controlled access to calibration and GLP settings through a password protection method.

The Battery Error Preventing System (BEPS) recognizes batteries levels as they become weaker.

To prolong battery life, the backlight and printing features are disabled when the batteries are getting low; "LOBAT" indication is displayed on LCD to warn the user of this condition. However, the meter continues to measure correctly even when the low battery indication is displayed. The meter automatically switches itself off when the batteries are too weak to support proper function.

The meters are equipped with an internal lithium battery that powers the clock circuit even in the absence of power supplies.

For long term field and lab applications, these meters can be connected to a 12VDC adapter. (HH610-AC for 110 VAC)

HH611A-PL and **HH611A-PL4** have the capability to store the measurements in memory at a user selectable interval from 1 to 180 minutes. This information can be retrieved at a later time and also printed.

The Units also allow the transfer of stored data to a computer via the HH610-LOGGER infrared transmitter connected to the computer RS232 port.

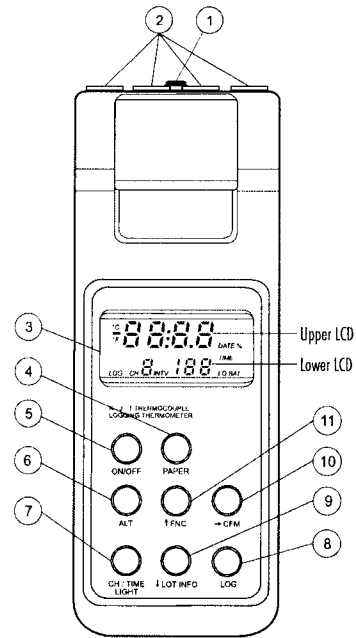
Each meter can also be uniquely identified by the user by assigning an ID code.

Models Available	
HH611A-P	Printer only
HH611A-P4	Printer only, 4 inputs
HH611A-PL	Printer/Logger, 1 input
HH611A-PL4	Printer/Logger, 4 inputs

Accessories (ordered separately)

HH610-AC	110 VAC adapter
HH610-PR	Replacement paper (10 rolls)
PHH-25-IC	Replacement Ink Cartridge
HH610-LOGGER-9PIN	Infrared logging interface module with 9 pin RS232C connector
HH610-LOGGER-25PIN	Infrared logging interface module with 25 pin RS232C connector
HH610A-CASE	Rugged carrying case
HH610SW	Software

FUNCTIONAL DESCRIPTION



- 1) Power adapter plug
- 2) Temperature Probe Connectors (1 or 4 according to model, SMP type)
- 3) LCD Display
- 4) **PAPER** key, to move the paper up
- 5) **ON/OFF** key, to turn the meter on or off
- 6) **ALT** key, to alternate key function
- 7) **CH/TIME** key (HH611A-P4 and HH611A-PL4 only) to select input channels, to view date and time, and to enable backlight (with ALT) **TEMP/TIME** key (HH611A-P, HH611A-PL only) to select temperature reading, to view date and time, and to enable backlight (with ALT)
- 8) **LOG** key, to store and/or print measurements
- 9) **↓ LOT INFO** key (HH611A-PL and HH611A-PL4 only) to move down or view logging information (with ALT) **↓** key (HH611A-P and HH611A-P4 only) to move down
- 10) **→ CFM** key, to move right or confirm values (with ALT)
- 11) **↑ FNC** key, to move up or select function codes (with ALT)

SPECIFICATIONS

Range	K	-200.0 to 999.9 °C; 1000 to 1370 °C -300.0 to 999.9 °F; 1000 to 2500 °C
	J	-200.0 to 760.0 °C -300.0 to 999.9 °F; 1000 to 1400 °F
	T	-200.0 to 400.0 °C -300.0 to 750.0 °F
Resolution	K	0.1 °C (-99.9 to 999.9 °C); 1 °C (1000 to 1370 °C) 0.2 °C (-200.0 to -100.0 °C) 0.2 °F (-199.9 to 999.9 °F); 1 °F (1000 to 2500 °F)
		0.3 °C (-300.0 to -200.0 °F)
		0.3 °F (-300.0 to -200.0 °F)
	J	0.1 °C (-149.9 to 760.0 °C) 0.2 °C (-200.0 to -150.0 °C) 0.1 °F (32.0 to 999.9 °F); 1 °F (1000 to 1400 °F)
		0.2 °F (-300.0 to 32.0 °F)
		0.2 °F (-300.0 to 32.0 °F)
T	0.1 °C (-99.9 to 400.0 °C) 0.2 °C (-200.0 to -100.0 °C) 0.1 °F (300.0 to 750.0 °F); 0.2 °F (-149.9 to 300.0 °F) 0.3 °F (-300.0 to -150.0 °F)	
Accuracy (@20°C/68°F)		±0.5 °C (-200.0 to 999.9 °C); ±1°C outside ±1°F for one year (excluding probe error)
Typical EMC Dev.		±5 °C; ±9 °F
Channels		HH611A-P/HH611A-PL: 1 channel HH611A-P4/HH611A-PL4: 4 channels
Probe		K, J or T-type thermocouple
Cold Junction sensor		NTC 10K; 0.1°C resolution; ±0.3°C accuracy
Printer		Low power impact type-belt, 14 characters per line; 38 mm plain paper (HH610-PR)
Printing/Logging Interval		1, 2, 5, 10, 15, 30, 60, 120 and 180 minutes
Auto shut-off		Selectable at 5, 10, 15, 30, 45 or 60 minutes
Power supply		4x1.5V AA alkaline type/350 hours typical life (with 2700mAh batteries, without printing and backlight). 12 VDC adapter (HH610-AC)
Environment		0 to 50°C (32 to 122°F); 0-95% RH non-condensing
Dimensions		220 x 82 x 66 mm (8.7 x 3.2 x 2.6")
Weight		500 g (18 oz)

INITIAL PREPARATION

Each meter is supplied complete with batteries. Remove the back cover, unwrap the batteries and install them while paying attention to the polarity. Alternatively, connect the HH610-AC voltage adapter to the power adapter plug.

To prepare the instrument for use, choose the most appropriate temperature probe(s) for your application and connect it (them) to the connector(s) located on the top of the instrument.

With the meter facing you, channel #1 is the first connector on the top left hand side.

To switch the meter on, press the ON/OFF key. The batteries charge status or "LINE" message (if external power adapter is connected) will be displayed on the LCD for a few seconds.



The meter is now ready to operate.

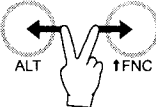
To maximize battery life, the meter is automatically switched off after a user selectable period of non-use (this feature is enabled and set to 5 minutes by default; it can be disabled or changed through setup code 40). If in logging mode, after the period of non-use, the meter will continue to monitor the temperature periodically at the end of every logging interval. Only the "LOG" indication will be visible on LCD. While storing data in memory, during the sleep mode, the reading will appear briefly on the LCD.

To reactivate the display press the ON/OFF key.

Note: When the use of an alternate function (FNC, CFM and LOT INFO) is requested, press and hold the ALT key first and then the second listed key.

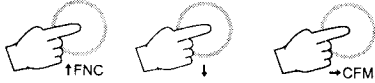
SETUP MODE



Setup can be used to view data regarding instrument status (e.g. battery charge) or GLP data (e.g. calibration date) or to view or print the logged data. It also allows the user to change the meter parameters (e.g. time) and to gain access to stored data.

- To enter this mode ensure the meter is not logging and then press the ALT and FNC keys. 
- The scrolling message "Insert the function code or press "ALT" - "FNC" to escape" in the upper LCD and the indication "F 00" with the first digit blinking in the lower LCD will be displayed.

INSERT THE Function...
F 00

- Enter the first digit of the code of the parameter you want to set using the ↑ or ↓ key and pass to the next digit with →. The second digit will start blinking.



- Enter the second digit using the ↑ or ↓ key. 
- Press ALT and CFM to confirm the code. 

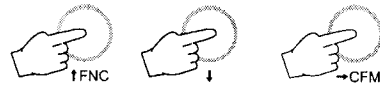
- If the entered code doesn't exist the "Err" message will be displayed for a few seconds and then the message "Insert the function code or press ALT - FNC to escape" will recommence scrolling in the upper LCD.


Err

PASSWORD PROTECTION

Setting of the GLP parameters (calibration alarm time-out, instrument ID code, time and date) can be password protected. If password is set to a value different from 0000 (factory setting), the user will be asked to enter the password.

- Select the desired GLP parameter code.
- Enter the password by the arrow keys.



- Press the ALT and CFM keys to confirm. 

- If password is wrong the meter will return to the function selection mode without any warning message.
- If password is correct, the meter provides access to the parameter.

PARAMETERS SETTING

- Once the parameter code has been entered, the appropriate message will scroll across the LCD for a few seconds.
- The current value of the selected parameter on the upper LCD and the parameter code on the lower LCD will be displayed. The first digit will blink if the parameter can assume continuous values. All the digits will blink if the parameter can assume only a fixed set of values.
- Enter the new value using the arrow keys.
- Press ALT and CFM to confirm the value.

The following table lists the setup codes along with the description of the specific setup items, their valid values and the factory settings (default):

Code	Valid values	Default
00 Lot data printing/scrolling ¹	00-16	00
01 Print lots data summary ¹		
02 Printer enable ¹	On(enabled); Off(disabled)	On
03 Logging interval	1,2,5,10,15,30,60,120,180	1
05 Log on demand delete ¹ or Reset sample number ²		
06 Timed data delete ¹		

Code	Valid values	Default
10 Show GLP data		
11 Calibration alarm time-out	On(enabled); Off(disabled)	On
20 Instrument ID code	0000-9999	0000
30 Current time ³	hh:mm	00:00
31 Current day ³	dd	01
32 Current month ³	MM	01
33 Current year ³	YYYY	1998
40 Auto-Off/Power down time-out	Off,5,10,15,30,45,60	5
41 Battery level test		
50 RS232 baud rate ¹	1200, 2400, 4800	4800
60 Firmware version		
70 Thermocouple type selection	"dEF"(K); "J"(J); "+"(T)	"dEF"
71 Celsius/Fahrenheit selection	°C; °F	°C
99 Password ⁴	0000-9999	0000

Note: If a wrong code is entered the "Err" message is displayed on LCD for a few seconds.

Note: Code 05 has a different function in printer or printer/logger series as explained in detail in the following.

¹ In HH611A-PL and HH611A-PL4 only.

² In HH611A-P and HH611A-P4 only.

³ The meter automatically checks for entered time/date accuracy as follows:
 0≤hh≤23; 0≤mm≤59; 01≤dd≤28/29/30/31; 1≤MM≤12; 1998≤YYYY≤2097.

⁴ To change the password, the correct code must be entered first. If the password has been forgotten, the password protected features are no longer accessible; in this case contact Omega.

SETUP MESSAGES LIST

cod. 00: Lot data Printing
 cod. 01: Lot table Printing
 cod. 02: Printer enable
 cod. 03: Log Interval
 cod. 05: Press "ALT CFM" to reset the sample number or "ALT FNC" to escape²
 or: Press "ALT CFM" to delete Lot00 or "ALT FNC" to escape¹
 cod. 06: Press "ALT CFM" to delete Lot 01-16 or "ALT FNC" to escape
 cod. 10: GLP
 cod. 11: Calibration alarm time-out
 cod. 20: Instrument ID Code
 cod. 30: Hour - Minute
 cod. 31: Day
 cod. 32: Month

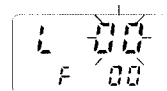
cod. 33: Year
 cod. 40: Auto OFF
 cod. 41: Battery test
 cod. 50: Baud rate
 cod. 60: Release code
 cod. 70: Thermocouple type
 cod. 71: Celsius or Fahrenheit
 cod. 99: Pass Code

Some of the most important functions are explained below in a step by step sequence.

TO SCAN LOGGED DATA (HH611A-PL and HH611A-PL4 only)

COD. 00 - Lot data Printing / Scrolling

- Select the code 00.
- The message "Lot data Printing" will scroll twice across LCD.
- The upper LCD will then display L 00 with the 00 blinking.
- Set the desired lot by the arrow keys. L00 is the lot of data of the "log on demand" and L 01 to L 16 are the lots of the "timed log".
- Press the ALT and CFM keys to confirm the lot number.
- If the lot doesn't contain data, the "no data" message will scroll across the LCD twice and the meter will return to setup mode.
- If the lot contains one or more data the LCD will display the sample number in its upper part and Sn in the lower part.



Note: In the L 00 lot (log on demand) the sample number will be displayed with 3 digits (001).

- Select the sample number to scan by the arrow keys.

Printing logged data

- Press ALT and CFM to print logged data.
- If the selected sample number is invalid (equal to 0 or bigger than the number of samples), the "Err" message will be displayed for a few seconds.
- If the sample number is correct, the samples starting from the selected one to the last sample of the lot will be printed. To stop printing before the last sample is reached, press and hold the ALT and PAPER keys until the printer stops.
- During printout the LCD will display the sample number being printed at that moment. If printout is stopped the LCD will show

the last printed sample number. It is then possible to select another sample.

- Press the ALT and FNC keys to return to setup mode.

Viewing logged data

- Press CH/TIME (HH611A-PL4 only) or TEMP/TIME (HH611A-PL only) to view data of the selected sample. Data will be displayed in the following order:
 - channel 1 temperature reading
 - channel 2 temperature reading (HH611A-PL4 only)
 - channel 3 temperature reading (HH611A-PL4 only)
 - channel 4 temperature reading (HH611A-PL4 only)
 - date
 - time
- If CH/TIME or TEMP/TIME is pressed when the time is displayed, the LCD will pass to the next Sample number.
- It is then possible to scroll the data of the next sample by pressing CH/TIME or TEMP/TIME or select a different sample by the arrow keys.
- to return to setup mode, press ALT and FNC when the meter displays the sample number.

Cod. 02 - Lot summary printout

- Select the code 02.
- The message "Lot table Printing" will scroll twice across LCD.
- The meter will then print a complete set of information based on the data stored in memory:

#00	S.013
a #01	30 m
	19/12/1998
d S.00007	15.40
	1 2 3 4
#02	15 m
	19/12/1998
S.00031	17.22
	1 2 3 4

 - a - lot number
 - b - logging interval
 - c - starting date
 - d - number of samples
 - e - starting time
 - f - logged channels numbers.

Note For lot 00 the number of samples only will be printed.

DELETE LOGGED DATA (HH611A-PL and HH611A-PL4 only)

- Select code 05 to delete the Log on Demand data or code 06 to delete the Timed Log Data.
- A scrolling message will be displayed.
- Press the ALT and CFM keys to confirm deletion.
- It is also possible to escape without data deletion pressing the ALT and FNC keys.

TO RESET PRINTING SAMPLE NUMBER

(HH611A-P and HH611A-P4 only)

This feature resets the print on demand sample number to 001.

- Select the code 05
- A scrolling message will be displayed.
- Press the ALT and CFM keys to confirm reset or ALT and FNC to escape.

GLP DATA

Cod. 10 - viewing GLP data

- Select the code 10
- A message will scroll twice across LCD.
- The LCD will then display the instrument identification (ID) code.
- Press ↑ to scan remaining data, in the following order:
 - channel 1 last calibration date (DD.MM)
 - channel 1 last calibration year

Note: Data can be viewed in reverse order pressing the ↓ key.

- Press ALT and FNC to return to function selection mode.

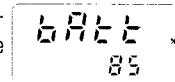
Code 20 - setting the identification (ID) code

When using several identical meters it may be useful to uniquely identify them by assigning an ID code to each meter.

- Select code 20. A message will scroll across LCD.
- Enter a 4-digit value using the arrow keys.
- Press ALT and CFM to confirm the value.

TESTING BATTERY LEVEL

- Select code 41. The message "Battery test" will scroll across LCD.
- If the meter is connected to an external power adapter, the LCD will display "LINE" otherwise it will display bAtt on the upper display, and the remaining percentage of battery charge (100% means fully charged battery and 0% corresponds to the minimum battery voltage that allows the meter to operate).



SELECTING THE THERMOCOUPLE TYPE

Three types of thermocouple can be connected to the meter: K, J and T.

- Select code 70.
- The types are indicated with "dEF" for K-type, "J" for J-type and "T" for T-type. Choose the desired type using the arrow keys.
- Press ALT and CFM to confirm the value.

TAKING TEMPERATURE MEASUREMENTS

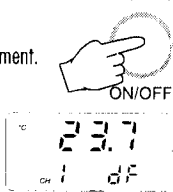
To prepare the instrument for use, choose the most appropriate temperature probe(s) for your application (see accessories) and connect it (them) to the connector(s) located on the top of the instrument.

The factory default thermocouple type is K, represented with the "dF" indication. If needed, select a different type (J and T types also available) through setup code 70.

With the meter facing you, channel #1 is the first connector on the top left hand side.

Press the ON/OFF key to power on the instrument.

To take temperature measurements, insert the probe in the sample to be tested and allow the reading to stabilize. The temperature is displayed on the upper LCD. The lower LCD displays the selected channel number (HH611A-P4 and HH611A-PL4 only).



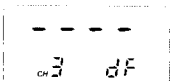
The meter selects channel 1 as default. Press CH/TIME (HH611A-P4 and HH611A-PL4 only) or TEMP/TIME (HH611A-P, HH611A-PL only) to view the reading of the other channels, the cold junction temperature, date and time in the following order:



- channel 2 temperature reading (4-channel versions only)
- channel 3 temperature reading (4-channel versions only)
- channel 4 temperature reading (4-channel versions only)
- cold junction temperature reading ("CJ" appears in the lower LCD)
- date
- time

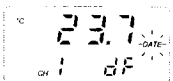
Pressing CH/TIME or TEMP/TIME again, the meter returns to channel 1 temperature reading.

If the reading is out of range or the probe is not connected to a channel, the LCD will display a dashed line in place of the reading.



Note: To choose between "°C" and "°F" unit, enter the setup code 71.

Note: The meter is factory calibrated. After 1 year since last thermocouple calibration the "DATE" symbol starts blinking on the LCD to warn the user that a recalibration is suggested to maintain the accuracy of the meter.



CALIBRATION

All OMEGA thermometers have been accurately pre-calibrated at the factory; they are not field calibratable.

However, it is recommended to have all thermometers recalibrated at least once a year.

For an accurate annual recalibration, contact OMEGA Customer Service Dept.

Both thermocouple inputs and cold junction can be calibrated.

A two-point calibration at 0.000 mV and 41.269 mV has to be performed in order to store the new thermocouple calibration data in memory. Cold junction calibration is at one point only, corresponding to the environment temperature.

HH611A-PL - HH611A-PL4 PRINTING / LOGGING FUNCTIONS

Two different modes to print / log data are available:

1. **Timed logging;** samples are stored and printed (if print function is active) at fixed time intervals. Data are stored in the lots 01 to 16.
2. **Log on demand;** samples are stored and printed (if print function is active) when the LOG key is pressed. Data are stored in the lot 00. It's possible to perform the Log on demand either in normal mode or in Timed logging mode.

It is possible to switch from logging without printing to logging with printing in two ways:

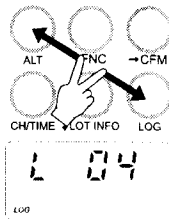
- set the function code 02 to "On" to enable printing, to "Off" to disable printing
- press ALT and PAPER to toggle between printer enabled and printer disabled while in Timed logging.

Note: In timed logging mode, channels with no probe connected are not logged nor printed. If all the channels are disconnected, the message "no connected probe" will scroll across the LCD.

Note: cold junction temperature is not logged nor printed.

TIMED LOGGING MODE

To start Timed logging, press ALT and LOG. The lot number will be displayed for a few seconds then the LOG symbol will appear on LCD and if printer is enabled a first set of data will be printed. The "LOG" symbol will be fixed if printer is enabled and will blink if printer is disabled.



The printout provides the following information:

- a - Lot number
- b - Logging interval
- c - Date (only for the first printed sample of the lot or of the day)
- d - Sample number
- e - Time
- f - Readings ("----" means out of range).

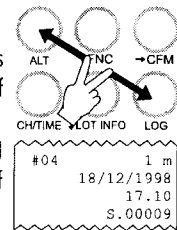
	#04	1 m			
a			b		
	18/12/1998		c		
	S.00001	17.02	d	e	
	#1	24.9 °C			
	#2	25.2 °C			
	#3	---- °C			f

Note: If no keys are pressed, the meter enters standby mode to prolong the battery life and only the "LOG" indication will be visible on LCD. While logging, during the sleep mode, the last

logged reading will appear briefly on the LCD. To reactivate the LCD press ON/OFF.

TO STOP LOGGING

In order to stop the recording mode, press ALT and LOG keys (press ON/OFF first, if meter is in sleep mode).



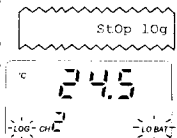
A last printout reporting the number of logged samples (e.g. S.00009) will be produced if printer is enabled.

Notes:

- It is recommended to use the adapter during logging in printing mode, especially when many printouts are going to be taken.
- Before proceeding with logging with printing, make sure there is enough paper for your measurements. When the paper is finished the meter will not advise the operator and the printouts could be lost. If this happens, data will continue to be stored in memory, and it is always possible to print the data at a later time through setup code 00.
- It is possible to insert a new paper roll during logging session.
- Once in the logging mode, the interval cannot be changed. Exit the logging mode first (pressing the ALT and LOG keys) to set a new interval.
- If the LOG key is pressed while in logging with printing mode, a printout is produced without affecting the running sample number and the value is stored in Log on demand area.

LOW BATTERY CONDITION

Printout is automatically disabled when battery charge weakens. The last message "Stop log" will be printed and data will continue to be stored in memory with the LOG and LOBAT symbols blinking on LCD. If the user attempts to enable the printer while in low battery condition the message "bAtt" will appear for a few seconds on the LCD.



Note: When an external adapter or new batteries are connected, the printing must be manually enabled in order to return to logging with printing mode.

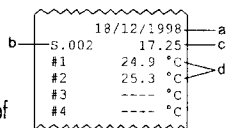
LOG ON DEMAND

In measuring or Timed log mode, press LOG to store the current reading. The LCD will display "Stor" and



the value will be stored in the lot 00 (log on demand data area). If the print function is enabled, a printout is also produced providing the following information:

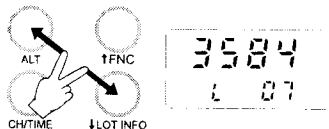
- a - Date
- b - Sample number
- c - Time
- d - Readings ("----" means out of range or probe not connected)



Note: When the Log on demand data area is full and the LOG key is pressed, the sample will not be stored and the LCD will display "FULL". In this case it is necessary to delete the Log on demand data to proceed.

TO VIEW LOGGING INFORMATION

If the ALT and LOT INFO keys are pressed during logging, the meter displays for a few seconds the current lot and the number of logged samples. The meter then returns to normal operational mode automatically.



If ALT and LOT INFO are pressed while the meter is not logging, the last logged lot in the lower LCD and the number of logged samples in the upper LCD are displayed. It is then possible to scroll through the following lot information with the → key:

- lot starting date (dd.mm)
- lot starting year
- lot starting time (hh.mm)
- lot logging interval
- logged channels

By pressing the → key again, the meter displays the number of logged samples again.

When the number of logged samples is displayed, it is possible to pass to another lot with the ↑ and ↓ keys. Press ↓ to view the older lots or ↑ to view the more recent ones.

If ↑ is pressed when the last lot is displayed, the meter displays the lot 00 (log on demand). By pressing the ↑ key again, the meter will pass to the oldest lot.

Note For lot 00, only the number of samples will be displayed.

To exit from the logging info viewing mode press ALT and LOT INFO again or CH/TIME (HH611A-PL4 only) or TEMP/TIME (HH611A-PL only).

TO RETRIEVE LOGGED DATA

Logged data can be viewed on LCD or printed. To view or print logged data see "TO SCAN LOGGED DATA" in the "SETUP MODE" paragraph.

The logging meters also allow the downloading of logged data to PC. To download data to PC see "DATA TRANSFER TO PC" paragraph.

HH611A-P - HH611A-P4 PRINTER ONLY FUNCTIONS

Two different modes to print data are available:

1. **Timed printing;** samples are printed at fixed time intervals. Data lots from 01 to 16 are available.
2. **Print on demand;** samples are printed when the LOG key is pressed. It's possible to perform the print on demand either in normal mode or in Timed printing mode.

Note: In timed printing mode, channels with no probe connected are not printed. If all the channels are disconnected, the message "no connected probe" will scroll across the LCD.

Note: cold junction temperature is not printed.

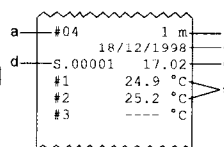
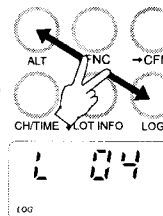
TIMED PRINTING MODE

To start Timed printing, press ALT and LOG.

The lot number will be displayed for a few seconds then the LOG symbol will appear on LCD and a first set of data will be printed.

The printout provides the following information:

- a - Lot number
- b - Logging interval
- c - Date (only for the first printed sample of the lot or of the day)
- d - Sample number
- e - Time
- f - Readings ("----" means out of range).



Note: If no keys are pressed, the meter enters standby mode to prolong the battery life and only the "LOG" indication will be visible on LCD. While timed printing during the sleep mode, the last printed reading will appear briefly on the LCD. To reactivate the LCD press ON/OFF.

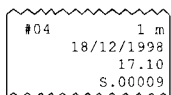
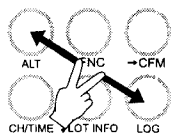
TO STOP PRINTING

In order to stop the recording mode, press ALT and LOG keys (press ON/OFF first, if meter is in sleep mode).

A last printout reporting the number of printed samples (e.g. S.00009) will be produced.

Notes:

- It is recommended to use the adapter during printing mode, especially when many printouts are going to be taken.
- Before proceeding with printing, make sure there is enough paper for your measurements. When the paper is finished the meter will not advise the operator and the printouts could be lost.
- It is possible to insert a new paper roll during printing session.
- Once in the timed printing mode, the interval cannot be changed. Exit the timed printing mode first (pressing the ALT and LOG keys) to set a new interval.
- If the LOG key is pressed while in timed printing mode, a printout is produced without affecting the running sample number.



LOW BATTERY CONDITION

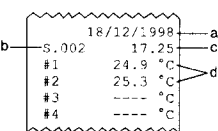
Printing is automatically interrupted when battery charge weakens. The last message "Stop log" will be printed and the LOBAT symbol will blink on LCD.

Note: When an external adapter or new batteries are connected, a new printing session must be manually restarted.

LOG ON DEMAND

In measuring or timed printing mode, press LOG to print the current readings. The printout provides the following information:

- a - Date
- b - Sample number
- c - Time
- d - Readings ("---" means out of range or probe not connected)



Note: If the user attempts to print while in low battery condition the message "bAtt" will appear for a few seconds on the LCD.

Note: It is possible to reset the sample number of the print on demand to 001 (see "TO RESET PRINTING SAMPLE NUMBER" in "SETUP MODE" paragraph).

GOOD LABORATORY PRACTICE (GLP)

GLP is a set of functions that allows the storage or retrieval (when necessary) of data regarding the maintenance and status of the meter.

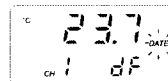
LAST CALIBRATION DATE

Last calibration date is stored automatically after a successful calibration. The last calibration date can be displayed through setup code 10 (see "SETUP MODE" paragraph).

CALIBRATION ALARM TIME-OUT

The meter checks if the time-out time, fixed at 1 year, has expired every time it is turned on. It is possible to enable/disable this feature through setup code 11. The default value is "On".

If the time has expired, the message "Cal date" scrolls across the LCD. The "DATE" symbol will blink to remind to the user to perform a new calibration soon.



Note: The alarm time-out is based on thermocouple calibration only.

GLP AND RS232 (HH611A-PL and HH611A-PL4 only)

GLP data (ID code and last calibration date) can be retrieved from a PC through the RS232 communication feature (see "Data transfer to PC").

OTHER FEATURES

LCD BACKLIGHT

The LCD can be illuminated to allow the user to see the readings even in dark environments. This feature can be enabled/disabled pressing the ALT and LIGHT keys. If the LCD backlight feature is enabled, the LCD remains illuminated until the feature is disabled pressing the ALT and LIGHT keys. The LCD backlight can be disabled in order to save power and it is automatically disabled when battery charge weakens.

Note: When an external power supply is connected to the instrument, the backlight is not automatically enabled.

Note: When LOBAT appears on LCD it is not possible to enable backlight. If the user attempts to enable the LCD backlight in low battery condition, the meter will show "batt" on LCD.

Real Time Clock (RTC)

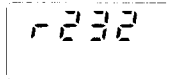
The instrument has an internal Real Time Clock (RTC) circuit with a backup lithium battery. This allows the meter to update time and date even when both batteries and external power adapter are disconnected.

DATA TRANSFER TO PC HH611A-PL - HH611A-PL4 only

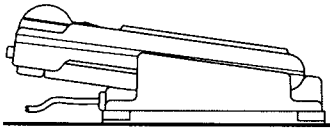
HH611A-PL and HH611A-PL4 contain infrared transmitting circuitry. Ensure there isn't any logging process active.

Press CH/TIME or TEMP/TIME to set the meter to time or date mode and simply place your data-logger on a HH610-LOGGER-* Infrared Transmitter (ensuring that the two infrared LEDs are placed on top of each other) and the memory content can then be downloaded to your PC through the RS232 port. Just ensure that baud rate on instrument (setup code 50) and on PC downloading program are set to the same value.

During the data transfer the instrument displays the message "r 232".



To stop communication, press CH/TIME or TEMP/TIME to display the temperature reading or take the meter out of the transmitter when it's not displaying "r 232".



Using the HH610-LOGGER-* Infrared Transmitter, all recorded data can be fed to your Personal Computer for easy reproduction, storage or elaboration without the need of cables between the meter and the transmitter.

Data transmission from the instrument to the PC is now much easier with new HH610SW Windows® compatible application software offered by OMEGA.

HH610-LOGGER-9PIN allows you to use the powerful capabilities of most spread sheet programs (e.g. Excel®, Lotus 1-2-3®). Simply open your file downloaded by HH610SW from your spread sheet program and then it is possible to make any elaboration available with your software (e.g. graphics, statistic analysis).

*There are two versions of the HH610-LOGGER:

The HH610-LOGGER-9PIN has a 9 pin connector for the RS232 port on the computer (the most common).

The HH610-LOGGER-25PIN has a 25 pin connector for the RS232 port on the computer.

User friendly, HH610SW offers a variety of features and has an on line help feature to support you throughout any situation.

To install the software you need a 3.5" drive and a few minutes to follow the instructions conveniently printed on the disk label.

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MEMORY ORGANIZATION HH611-PL AND HH611A-PL4 only

Logged data are stored in the internal EEPROM and are retained even if batteries and external power are disconnected.

MEMORY CAPACITY

- 14000 data samples divided into 16 lots (lots 01 to 16)
- 9999 data samples maximum for a single channel
- 300 data samples for the Log on demand (lot 00).

TIMED LOG (lots 01 to 16)

Each time a new logging period starts, it automatically starts from the next available lot. If the last lot was the 16th, the new logging period restarts from lot 01 overwriting previously logged data.

When Timed logging memory is full, the meter overwrites the oldest lot data progressively reducing the old lots. In this case the starting time, date and the dimension of the old lot are updated.

Note: The oldest lot data are erased without any warning message.

Note: Timed logging memory can be entirely erased through the setup code 06.

If the meter is powered only by the external power supply and there is a temporary power black out during logging, when power returns, the logging continues normally if no samples have been lost, otherwise the current lot is ended and a new lot starts. If printer is enabled, the "...Stop..." message will be printed. In any case, during scrolling the former lot will be preceded by the "Interrupted Lot" message and the latter by "Continuation Lot" to indicate the interruption.

LOG ON DEMAND (Lot 00)

When Log on demand data area is full the meter shows the "FULL" message to warn the user that the data are not stored in memory. Erase the memory area through setup code 05 to continue logging data on demand.

PRINTER MAINTENANCE

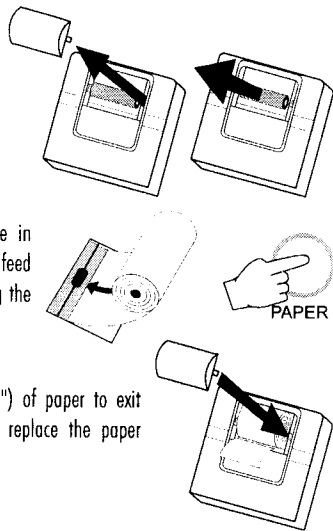
TO CHANGE THE INK CARTRIDGE

When printouts become faint, it might be necessary to change the ink cartridge. Contact your Hanna authorized center.

TO INSERT THE PAPER ROLL

The meters use plain paper rolls 38 mm width. To insert a new roll open the paper cover pulling it gently and take the cylinder away.

Insert the paper edge in the printer slot and feed the printer by pressing the PAPER key.



Allow about 5 cm (2") of paper to exit from the printer and replace the paper cover.

FAULT CONDITIONS

The printing/logging thermometers are factory programmed to automatically diagnose a fault and to display error codes on the LCD.

PRINTER ERROR

Whenever a printer fault condition is detected, the printer stops and the message "Printer error" scrolls across the upper LCD with the error code (see below) fixed on the secondary one.

- 1 = Motor locked
- 2 = Printer clutch jammed
- 3 = Selection lever fault

I²C BUS ERROR

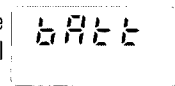
In case of an I²C bus fatal error due for example to a defective EEPROM or RTC, the message "Serial bus error" keeps scrolling across LCD from right to left indefinitely. Meter should be returned for repair (see warranty section).

BATTERY REPLACEMENT

When the batteries are inserted and no power adapter is connected, the meter can recognize different batteries charge levels.

1. **Fully charged batteries.** The backlight and printer can be enabled.
2. **Weakening batteries** - "LOBAT" symbol blinks on LCD. The backlight and printer are automatically disabled and it is not possible to enable them until new batteries are inserted or an external power adapter is connected.
3. **Weak batteries** - "LOBAT" symbol stays still on lower LCD. Backlight and printer are disabled and meter can work for about 20 hours. If in Timed logging mode with the power down function enabled this time can be longer.
4. **Dead batteries** - LCD shuts off. The instrument stops working to avoid erroneous readings.

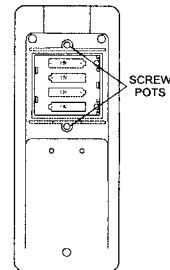
Note It is not possible to activate backlight and printer when the instrument is in a low battery condition. If the user attempts to enable these functions without replacing the batteries or connecting the external power adapter, the meter will show "batt" on LCD.



Battery replacement must only take place in a non hazardous area using 1.5V alkaline AA type batteries.

In order to replace run down batteries, simply remove the two screws on the rear cover of the instrument and replace the four 1.5V AA batteries with new ones, paying attention to the correct polarity.

A 12VDC power adapter can also be used to power the unit (see the accessories paragraph).



Note: The instrument uses the following configuration.



It is recommendable to purchase a HH610-AC 110 VAC voltage adapter that uses the proper polarity configuration.

However, the meters can be used with other adapters. In this case, remember to check the correct polarity of your adapter before connecting it to the meter.

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

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

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.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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