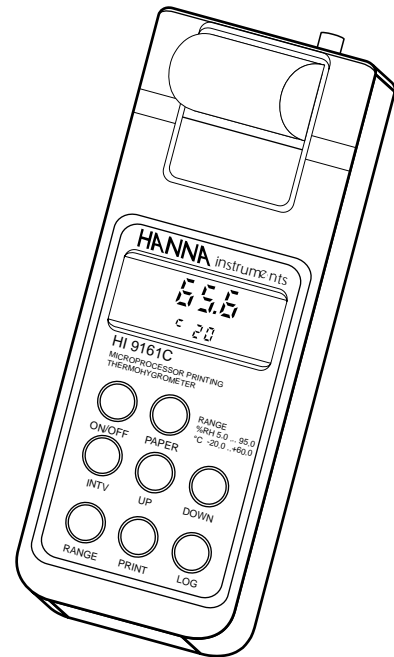


Instruction Manual

HI 9161 - HI 9261 HI 91610 Portable Microprocessor Printing and Logging Thermohygrometers



 **HANNA**
instruments
<http://www.hannainst.com>


These Instruments are in
Compliance with the CE Directives

Dear Customer,

Thank you for choosing a Hanna Product.

Please read this instruction manual carefully before using the instrument. This manual will provide you with the necessary information for the correct use of the instrument, as well as a precise idea of its versatility. If you need more technical information, do not hesitate to e-mail us at tech@hannainst.com.

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

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Company since 1992*

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 your Dealer or the nearest Hanna Customer Service Center.

Each printing thermohygrometer is supplied complete with:

- Relative Humidity Probe (HI 70604/2)
- Temperature Probe (HI 762L/2)
- 1.5V AA Size Batteries (4 pieces)
- Non-fading Printer Paper (5 rolls)
- Rugged Carrying Case

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

GENERAL DESCRIPTION

HI 9161, HI 9261 and HI 91610 are portable, microprocessor-based printing/logging thermohygrometers.

The housing is made of rugged, lightweight material, making them truly portable. HI 9261 has been specifically designed by Hanna Instruments for use in the food industry.

The meters come equipped with a large, easy-to-read LCD.

Measurements can be performed with lab-grade precision in the field as well as in the laboratory without compromising accuracy.

For prolonged field and lab applications, these meters can be connected to a 12VDC adapter.

The interchangeable relative humidity probe contains both the sensor and the electronic circuitry necessary to amplify the R.H. measurements. Another electronic circuit converts the signal sent by the probe into a digital readout in % Relative Humidity. The standard cable is 2 meters (7') long, and a 5 meter (16.5') version is also available.

Note: the RH probe sensor must never come into contact with water or other liquids.

For special applications, HI 70606/2 or HI 70606/5 RH probes can also be used. These probes come with a sintered cap on the sensor shaft for protection in dusty or corrosive environments.

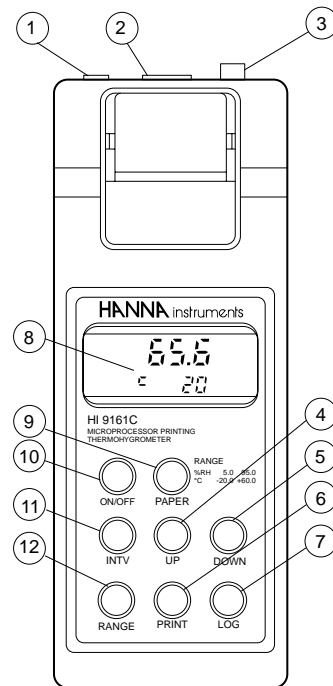
An independent temperature probe provides highly accurate temperature readings.

While in logging mode, HI 91610 stores the measurements into memory at a user selected interval from 1 to 180 minutes. The data can be retrieved at a later date for printing or can be transferred to a computer through the HI 9200 transmitter. The internal software allocates memory space to store up to 8000 measurements. HI 91610 will transfer the data in seconds through the infrared lights with no need for a cable between the transmitter and the meter.

Two versions of each instrument are available:

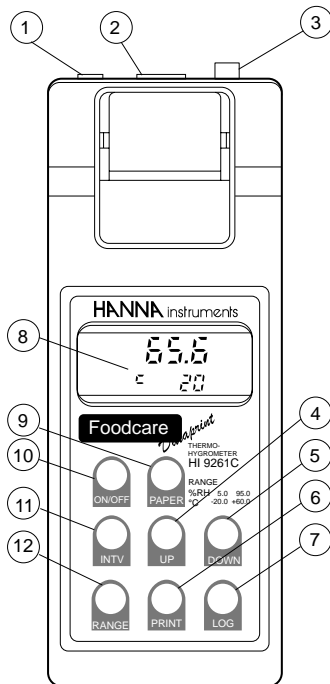
- HI 9161C, HI 9261C and HI 91610C are thermohygrometers with temperature readings in Celsius;
- HI 9161F, HI 9261F and HI 91610F are thermohygrometers with temperature readings in Fahrenheit.

FUNCTIONAL DESCRIPTION HI 9161



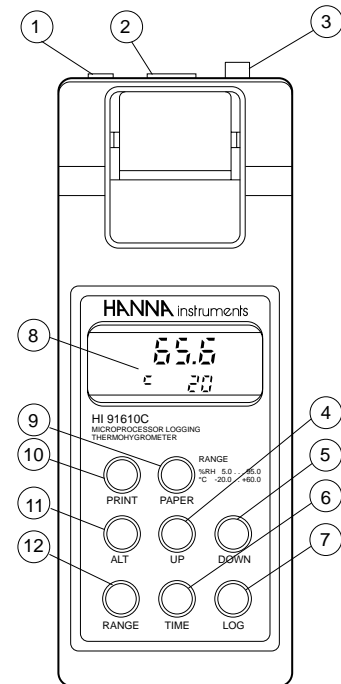
1. Power Socket
2. RH Probe Socket
3. Temperature Socket
4. UP (to set time, date and interval)
5. DOWN (to set time, date and interval)
6. PRINT (to obtain a printout of present time, RH and Temperature)
7. LOG (to start recording mode)
8. Liquid Crystal Display
9. PAPER (to advance paper)
10. ON/OFF (to switch the meter on/off or to leave the recording mode)
11. INTV (to set time, date and printing interval, press INTV + RANGE simultaneously)
12. RANGE (to display RH or Temperature on the primary LCD)

FUNCTIONAL DESCRIPTION HI 9261



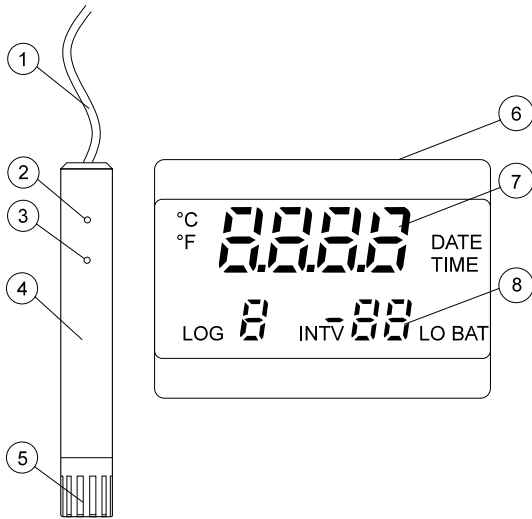
1. Power Socket
2. RH Probe Socket
3. Temperature Socket
4. UP (to set time, date and interval)
5. DOWN (to set time, date and interval)
6. PRINT (to obtain a printout of current time, RH and Temperature)
7. LOG (to start recording mode)
8. Liquid Crystal Display
9. PAPER (to advance paper)
10. ON/OFF (to switch the meter on/off or to leave the recording mode)
11. INTV (to set time, date and printing interval, press INTV + RANGE simultaneously)
12. RANGE (to display RH or Temperature on the primary LCD)

FUNCTIONAL DESCRIPTION HI 91610



1. Power Socket
2. RH Probe Socket
3. Temperature Socket
4. UP (to scan data or to set time, date and logging interval)
5. DOWN (to scan data or to set time, date and logging interval)
6. TIME (to display present time and printing interval - press ALT + TIME to set, date, time and printing interval)
7. LOG (press ALT+LOG to start/stop logging)
8. Liquid Crystal Display
9. PAPER (to advance paper)
10. PRINT (to obtain a printout)
11. ALT (press ALT first, then press a second key at the same time, e.g. ALT + PAPER disable the printing)
12. RANGE (to turn the meter on and to display RH or Temperature on the primary LCD)

FUNCTIONAL DESCRIPTION R.H. PROBE AND DISPLAY



1. Shielded Cable
2. Low RH Calibration Trimmer
3. High RH Calibration Trimmer
4. Polypropylene Probe Body
5. Perforated Sensor Cover
6. Liquid Crystal Display
7. Primary Display
8. Secondary Display

SPECIFICATIONS

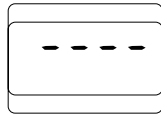
		HI 9161C HI 9261C HI 91610C	HI 9161F HI 9261F HI 91610F
Range	RH	5.0 to 95.0%	
	°C/°F	-20.0 to 60.0°C	-4.0 to 140.0°F
Resolution	RH	0.1%	
	°C/°F	0.1	
Accuracy (@25°C/77°F)	RH	±2% of full scale	
	°C/°F	±0.4°C	±1°F
Typical EMC Deviation	RH	±3% of full scale	
	°C/°F	±0.2°C	±0.4°F
Power		4 x 1.5V AA alkaline batteries, max 500 hours with 60 min. printing intervals. Power socket for 12VDC supply	
Auto Shut-off		After 5 minutes of non-use when used as a meter	
Printer		Low-power impact type belt, 14 characters per line using 38 mm plain paper (HI 710034)	
Printing Intervals		Selectable from 1, 2, 5, 10, 15, 30, 60, 120, 180 min.	
Operating Conditions		0 to 50°C (32 to 122°F) max. RH 98% non-condensing	
Dimensions		220 x 82 x 66 mm (8.7 x 3.2 x 2.6")	
Weight		500 g (18 oz.); Kit: 1.4 Kg (3.1 lb.)	

INITIAL PREPARATION

Each meter is supplied complete with 4 x 1.5V common AA batteries. Unscrew and remove the back cover, unwrap the batteries and install them while paying attention to their polarity.

Connect the RH probe to the 7-pin DIN socket on the top of the meter and fasten the threaded ring tightly. Connect the temperature probe to the appropriate connector. The temperature probe can be used independently to take temperature measurements, or it can be used in conjunction with the RH probe.

If neither the RH nor the temperature probes are connected, "----" will appear on the LCD.



To switch the HI 9161 and HI 9261 on, press ON/OFF.



To switch the HI 91610 on, press RANGE.



To maximize battery life, the display is automatically switched off after 5 minutes of non-use. However, the meter will continue to monitor (when in the recording/logging mode) RH and temperature.

To reactivate the display, press RANGE.



OPERATIONAL GUIDE

RELATIVE HUMIDITY MEASUREMENTS

Using the HI 9161, HI 9261 and HI 91610 thermohygrometers is simple. However, the recommendations below should always be followed.

- The sensor end of the humidity probe should be exposed to a current of air moving at 0.5 m (20") per second or more.
- In the absence of air movement, the response can be accelerated by moving the probe back and forth.
- The probe sensor must never come into contact with water or any other liquid. If this should happen, or if condensation causes drops to form on the surface of the humidity sensor, the instrument must be turned off until moisture has completely evaporated. In order to accelerate the evaporation process, the humidity sensor should be exposed to a current of air.

If you experience any problems in taking measurements, please contact your Dealer or the nearest Hanna Customer Service Center.

TEMPERATURE MEASUREMENTS

The HI 762L/2 temperature probe supplied with the HI 9161, HI 9261 and HI 91610 is a liquid/general purpose probe with 2 m (6.6') cable.

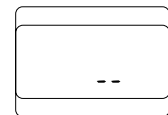
Simply plug the probe into the socket located on the top of the meter (refer to Functional Description on pages 5 to 7).

If it is necessary to monitor temperature continuously, keep the probe attached to the meter at all times.

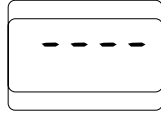
To view either the RH% or temperature reading on the display, press RANGE. The reading will appear without decimal digit when shown on the lower secondary display. The temperature range on the secondary display is from 0 to 99°F (or °C).



If the temperature exceeds this range "--" will appear indicating that the small portion of the display is unable to accommodate the reading.



If neither a temperature probe nor a calibration test plug is connected, the meter will display on the primary display and print "----" to alert the user. This could also indicate that the probe cable is damaged.



Hanna offers a wide range of temperature probes to meet all temperature measurement requirements. Hanna probes use highly sensitive thermistor sensors which provide greater accuracy and faster response than conventional thermistor probes.

Hanna temperature probes are supplied pre-calibrated from the factory and are ready to use.

Available in four different handle colors to avoid cross contamination during testing, these completely interchangeable probes make it possible to switch from one to another without needing to recalibrate the meter (see pages 34-35 for a complete listing).

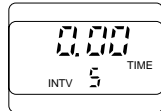
In order to keep accurate records of temperature, your monitoring equipment must be properly re-calibrated. Hanna Calibration Test Plugs provide a quick and easy way to test the meter's accuracy. If the reading differs by more than $\pm 0.4^{\circ}\text{C}$ ($\pm 0.8^{\circ}\text{F}$) from the Test Plug value, the unit is due for re-calibration and you should contact your Dealer or the nearest Hanna Customer Service Center.

See page 36 to choose the right Test Plug to suit your needs.

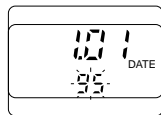
TO SET DATE, TIME, PRINTING INTERVAL

HI 9161 & HI 9261

When the instrument is turned on, the display will show the TIME.



Press the INTV and the RANGE keys simultaneously. The display will then show the date previously memorized with the year blinking (shown as the last 2 digits of the year, e.g. 95=1995).



Use the UP and DOWN keys to select the year.



When the correct year is selected, press the RANGE key once and the month will start blinking.



Select the correct month by pressing the UP or DOWN keys.



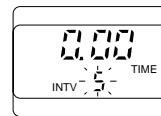
Press RANGE and the day will start blinking.



Use the UP or DOWN keys to select the correct day. The day will still be blinking.



Press the INTV and the RANGE keys simultaneously. The display will show the time/printing interval setting. The printing interval on the secondary LCD will be blinking.



Any interval can be selected from 1, 2, 5, 10, 15, 30, 60, 120 and 180 minutes by using the UP and DOWN keys.



Once the desired interval is selected, press RANGE once to memorize it. The hour will start blinking.



To select the hour, press the UP or the DOWN keys (24 hour clock).



To memorize the hour press RANGE once again. The minutes will start blinking.



Likewise, use UP and DOWN to set the minutes.



Press the INTV and the RANGE keys simultaneously to exit this mode and memorize the minute setting.

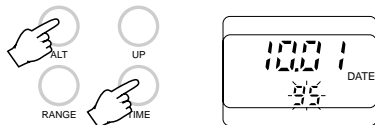


The time, date and printing interval are now stored and retained in the memory even when the meter or display are switched off.

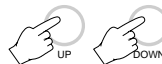
Note: if the batteries are replaced, the settings will need to be re-entered. This can be alleviated by applying an external voltage to the unit before replacing the batteries.

HI 91610

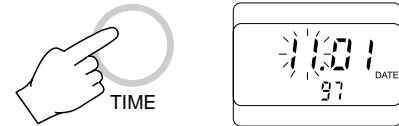
Press the ALT and the TIME keys simultaneously. The display will show the previously memorized date with the year blinking on the secondary display (as the last two digits of the year, e.g. 95 = 1995).



Use the UP or DOWN keys to select the correct year.



When the correct year is selected, press the TIME key once more to memorize it. The month will start blinking.



Select the month by using the UP or the DOWN keys.



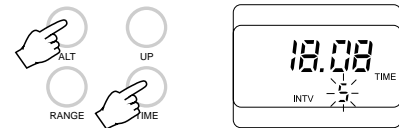
Press TIME. The day will start blinking.



Use UP or DOWN to select the correct day.



Press the ALT and the TIME keys simultaneously and the display will now show the previously memorized time with the printing interval blinking on the secondary LCD.



Any interval can be selected from 1, 2, 5, 10, 15, 30, 60, 120 or 180 minutes by using the UP and DOWN keys.



Set the desired interval by pressing TIME once more. The hour will blink.



To select the hour, press the UP or DOWN keys (24 hour clock).



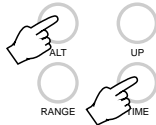
To set the hour press the TIME key again and the minutes will blink.



Use the UP or DOWN keys to select the correct minutes.



Press the ALT and the TIME keys together to exit this mode and memorize the minute setting.



The time, date and printing interval are now stored and retained in the memory even with the meter or display is off.

Note: if the batteries are replaced, the settings will need to be re-entered. This can be alleviated by applying an external voltage to the unit before replacing the batteries.

TO VIEW RH%, TEMPERATURE, TIME, DATE & PRINTING INTERVAL

HI 9161 & HI 9261

When the instrument is turned on the display will be in TIME mode.



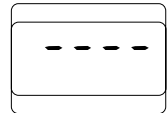
To view RH% on the primary display press the RANGE key.



To view temperature on the primary display with decimal points press the RANGE key.

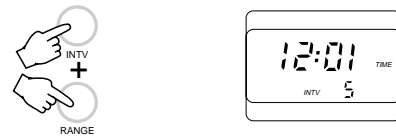


If "----" is displayed, it indicates that no probe is connected (or probe cable is broken).



Note: the RH% value is displayed without any symbol on the primary display and with a "H" on the secondary LCD. The temperature value is always displayed together with the "°C" or "°F" symbol.

To view time and the printing interval press the INTV and RANGE simultaneously.



To view date, press the UP or DOWN keys.

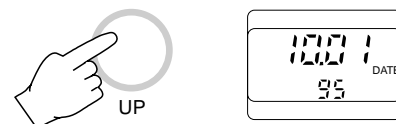


HI 91610

To view the time press the TIME key. This also displays the printing/ logging interval.



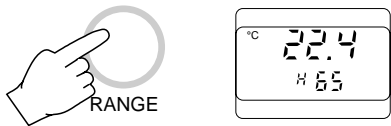
To view the date, press the UP key when the LCD is displaying time.



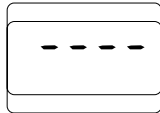
To view RH% on the primary display press RANGE.



To view temperature on the primary display when in RH% mode, press RANGE again.



If "----" is displayed, it indicates that no probe is connected (or that the probe cable is broken).

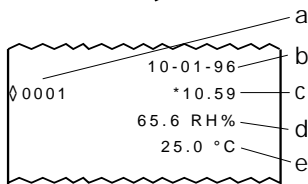


Note: the RH% value is displayed without any symbol on the primary display. The temperature value is always displayed together with the "°C" or "°F" symbol.

PRINTING/RECORDING WITH HI 9161 & HI 9261

To print the measured values press PRINT. Each printout provides the following information:

- a – Running sample number
- b – Date (DD-MM-YY)
- c – Time (HH.MM)
- d – RH% value
- e – Temperature value



RECORDING AT AN INTERVAL

Set the appropriate logging interval (see pages 12-14). Press LOG to enter the recording mode. The log number and the recording interval will appear for a few seconds on the secondary display to indicate the operational mode. The

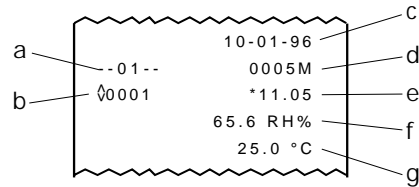


meter will print the measurements taken in that moment, and will print with the indicated printing interval thereafter until the ON/OFF key is pressed.

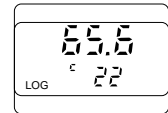


The printout provides the following information:

- a – A running log number
- b – A running sample number in that particular log
- c – Date (DD-MM-YY)
- d – Printing interval in minutes
- e – Time (HH.MM)
- f – RH% value
- g – Temperature value



When the meter is in recording mode "LOG" is displayed on the secondary LCD with the RH% value on the primary LCD.

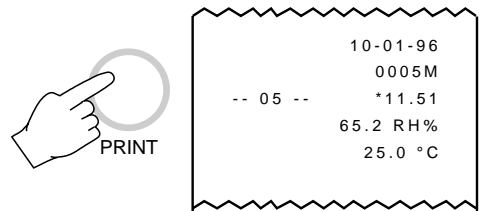


Press the RANGE key to read the temperature on the primary display.



If no keys are pressed after approx. 5 minutes, the meter goes in standby mode to prolong the battery life.

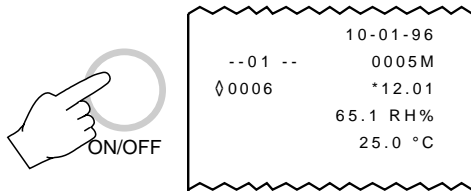
Note: If PRINT is pressed while still in recording mode, a printout is produced without affecting the running number.



Printing during recording

TO STOP RECORDING

To exit the recording mode, press the ON/OFF key. The instrument will then make one final exit printout.



The running log number can be reset by simply removing the batteries.

PRINTING/LOGGING WITH HI 91610

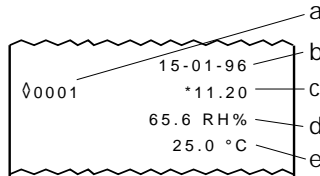
To print the values shown on the display, press PRINT.



This function can be activated in normal operation mode as well as during logging (and scanning) modes.

When in the measurement mode, each printout provides the following information:

- a – Running sample number
- b – Date (DD-MM-YY)
- c – Time (HH.MM)
- d – RH% value
- e – Temperature value



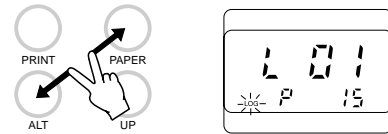
LOGGING MODE WITHOUT PRINTING

This function is particularly useful when measurements have to be taken continuously even in the absence of an operator over a long period of time. In this mode data will be stored directly into memory. Set the appropriate logging interval (see pages 14-16).

Press the ALT and LOG keys simultaneously to enter the logging mode. The current log number and remaining page numbers will appear for a few seconds on the display to indicate the correct operational mode. The printer will print a complete set of data and the "LOG" symbol will appear on the secondary LCD.



Press the ALT and PAPER keys at the same time and the "LOG" symbol on display will start to blink.



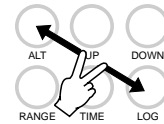
After approximately 5 minutes the display will switch itself off but the logging function remains active.

To reactivate the display press the TIME key.



Notes:

- Once in the logging mode, the interval cannot be changed. Exit the logging mode first (press ALT and LOG together) and then set the new interval.



- If the PRINT key is pressed while in logging mode, a printout is produced without affecting the running sample number.



SAMPLE NUMBER

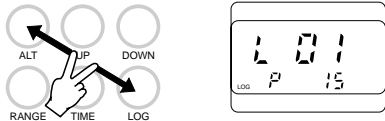
During logging it is possible to know the running sample number. Press the LOG key twice and the display will show the running number in the current log together with sample number symbol "Sn".



LOGGING MODE WITH PRINTING

This function is useful in a variety of applications from unsupervised monitoring to satisfying regulatory requirements. In addition to the printouts, the measurements are also stored into the memory.

Press the ALT and LOG key simultaneously to enter the logging mode. The current log number and the remaining page numbers will appear for a few seconds on the display to indicate the correct operational mode. The printer will print a complete set of data and the "LOG" symbol will appear on the secondary LCD.



If no key is pressed, the display goes blank after about 5 minutes and comes back on only to print at the next logging interval. During printing, the display shows the time, preselected interval and the "LOG" symbol.

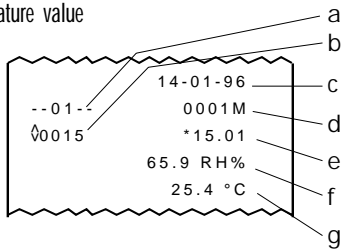


To reactivate the display press the TIME key.

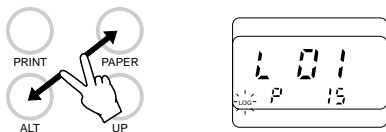


Each printout provides the following information:

- a – A running log number
- b – A running sample number (in that particular log)
- c – Date (DD-MM-YY)
- d – Printing interval in minutes
- e – Time (HH.MM)
- f – RH% value
- g – Temperature value

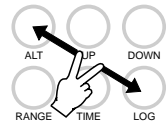


It is always possible to switch from the logging with printing function to logging without printouts. Press ALT and PAPER at the same time and the "LOG" symbol will start blinking to indicate that the data is now stored into memory but no longer are printed.



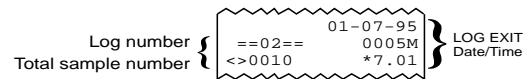
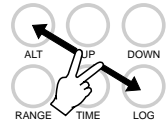
Notes:

- It is recommended to use an external power supply during logging with printing mode, especially when many printouts are required.
- Before proceeding with logging/printing, make sure there is enough paper for your measurements. There is no warning if the machine runs out of paper. If this happens, data will continue to be stored into memory, and it is always possible to print them at a later time (see below).
- It is possible to insert a new paper roll during logging session (see page 31).
- Once in the logging mode, the interval cannot be changed. Exit the logging mode first (by pressing the ALT and the LOG keys together) and reset a new interval.
- If the PRINT key is pressed while in logging mode, a printout is produced without affecting the running sample number.



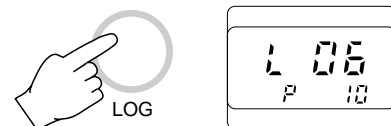
TO STOP LOGGING

Press the ALT and the LOG keys simultaneously. This will also generate an exit status printout.

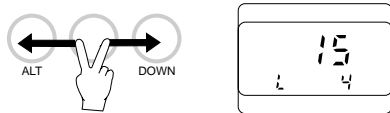


TO SCAN STORED DATA ON DISPLAY

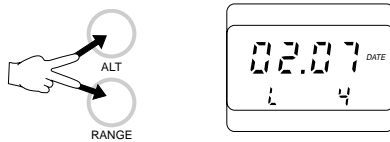
Press the LOG key. The log number and remaining page numbers will appear on display.



While pressing the ALT key, press the DOWN key until the log number to scan appears on the secondary display. The primary display will show the number of samples in that particular log.



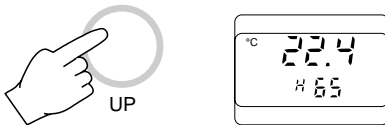
Press the ALT and the RANGE keys simultaneously. This now shows the date when logging started.



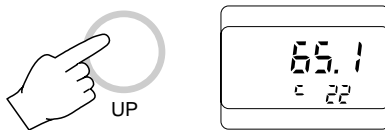
Press UP and the time of the most recent sample will be displayed.



Press UP and the temperature will be displayed on the primary LCD.



Press UP and the RH% value will be displayed on the primary LCD.



Continue pressing UP to display one by one all the memorized data of the same log in the above sequence i.e. time, temperature, RH% value.



Press the DOWN key to revert back to sampling time and scan the samples.



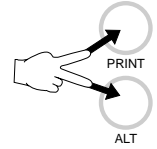
To exit from the recall mode press the LOG key.



Note: this mode will not alter data already present in the memory.

TO PRINT STORED DATA

Once a log number is selected (see "TO SCAN STORED DATA ON DISPLAY" on page 23) you can print all or part of that logged section by pressing the ALT and PRINT keys. The printer will print all the logged samples in that section beginning with the selected sample number without altering the content of the memory.



Note: It is always possible to print only the sample shown on the display by pressing the PRINT key.



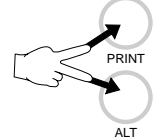
For example if 10 samples are stored in the logging section, use the DOWN key to display sample No. 5.



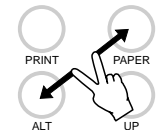
Sample # 5 can be printed on its own using the PRINT key.



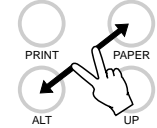
Sample # 5, 6, 7, 8, 9 and 10 are printed when ALT and PRINT are pressed simultaneously.



If you wish to stop the printer press ALT and PAPER together.



Note: Before proceeding with printing, make sure there is enough paper for the data to be printed. If the paper runs out, the meter will not advise the operator and the printouts could be lost. If this happens, stop the printer by pressing ALT and PAPER key simultaneously. Data will be kept in memory. Insert a new paper roll and repeat the instructions above starting from the last printed sample number (see "PRINTER MAINTENANCE" on page 31 for changing the paper roll).



CALIBRATION

All Hanna thermohygrometers have been precalibrated at the factory. Hanna Instruments uses state-of-the-art thermally-isolated humidity chambers for this purpose.

It is generally recommended to have all thermohygrometers recalibrated at least once a year.

For an accurate annual recalibration, contact your dealer or the nearest Hanna Customer Service Center.

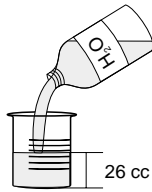
You can also check the status of your thermohygrometer and perform a quick RH recalibration (with an accuracy of $\pm 5\%$) by using the optional Hanna HI 7101 mini-calibration chamber.

The kit is composed of two thermally-isolated chambers, each one equipped with a cap and three bottles containing the appropriate precalibrated saturated salts to produce a known RH value.



PREPARING THE CALIBRATION SOLUTIONS

- Pour approximately 26 cc of distilled water into a glass container.



- Immerse this container into a bath of ice and water.

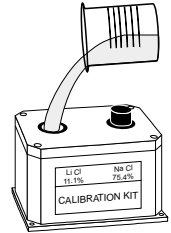
- Slowly add the contents of a HI 7111 bottle containing LiCl into the glass container while stirring gently.



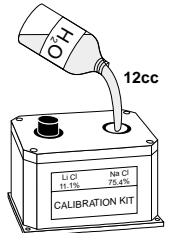
- When the salts have dissolved completely, add all the content of the second bottle of HI 7111.



- Allow the solution to cool, and pour it into the chamber marked "RH11.1%", making sure that no residue remains on the walls of the glass container.

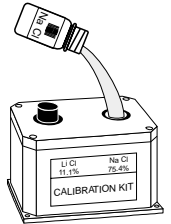


- Seal the chamber well when not in use, as the LiCl solution is extremely hygroscopic and tends to capture the humidity present in the air causing the solution to expand in volume and overflow from the container.



- Pour approximately 12 cc of distilled water into the other chamber marked "RH 75.4%".

- Add all the content of the HI 7121 bottle containing NaCl while continuously shaking the container to avoid the formation of lumps. Seal this container well when not in use.



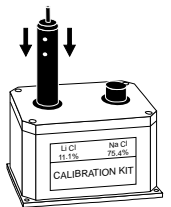
The calibration kit needs 4 hours for proper stabilization.



CALIBRATION PROCEDURE

- Bring the calibration kit to a temperature of approximately 20°C and keep it in an area with minimum amount of temperature variations.

- Remove the cap from the "RH 11.1%" chamber containing the LiCl solution and insert the probe paying attention that it does not come in contact with the liquid.



- Remove the adhesive sticker which covers the calibration trimmer access holes.

- Wait for the measurement to stabilize (this takes approximately 4 hours).



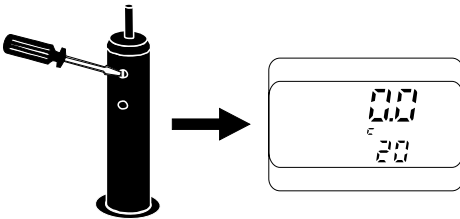
- Press the ON/OFF key (for HI 9161/ HI 9261) or the RANGE key (for HI 91610) to switch the instrument on.



- Press the RANGE key to display the RH% reading on the primary LCD.

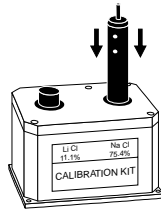


- Turn the low humidity trimmer (see Functional Description) until a value of 0.0% is reached (readings between 0.0% and 1.0% RH are acceptable).



- Remove the probe and tightly seal the chamber containing the LiCl solution.

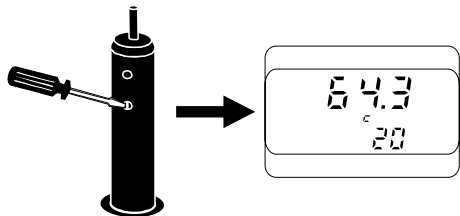
- Remove the cap from the "RH75.4%" chamber containing the NaCl solution and insert the probe, ensuring that it does not come in contact with the liquid.



- Wait for the measurement to stabilize (approximately 4 hours)

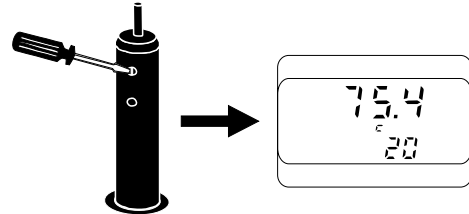


- Turn the high humidity trimmer until the readout on the display is 64.3%.



- Wait for 1 hour and readjust if necessary.

- Leaving the probe in the "RH 75.4%" chamber, adjust the low humidity trimmer until the display shows 75.4%.

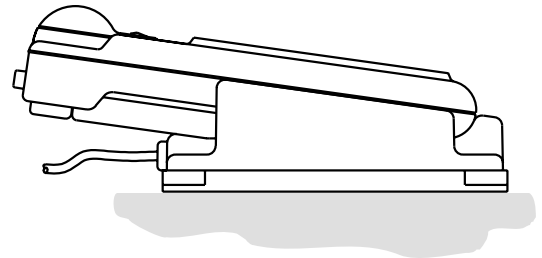
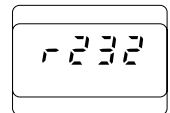


- The humidity calibration is now complete.

Spare saturation salts are also available: HI 7111/P (LiCl) for low range humidity, and HI 7121/P (NaCl) for high range humidity.

DATA TRANSFER TO PC (HI 91610 only)

HI 91610 contains infrared emitting circuitry. Set the meter to TIME mode and place it on a HI 9200 Infrared Transmitter (ensuring that the infrared LEDs are placed on top of each other). The logged data can be downloaded to your PC through the HI 9200's RS232 port. During the data transfer the instrument displays "r 232".



Using the HI 9200 Infrared Transmitter, all recorded data can be fed to your Personal Computer for easy reproduction, storage or elaboration without having to connect and disconnect cables between the meter and your PC.

Data can be further elaborated with the new optional HI 92000 Windows® compatible application software.

Windows® is a registered Trademark of "Microsoft Co."

HI 92000 allows use of commonest spread sheet programs (e.g. Excel, Lotus 1-2-3) and offers a variety of features with an on-line help routine. To install HI 92000, you need a 3.5" drive and a couple of minutes to follow the short instructions conveniently printed on the disk label.

SELF-DIAGNOSTIC FUNCTIONS

HI 9161, HI 9261 and HI 91610 are factory programmed to automatically diagnose a fault and inform the user by displaying an error code on the LCD.

Error codes are:

PEr0, PEr1, PEr2 = Short circuit on the system, the meter should be returned for repair (see Warranty).

PEr3 = Printer mechanism fault - repair needed (see Warranty).

PEr4 = Printer clutch jammed - reset the printer (see page 32).

PEr9 = Printer jammed - reset the printer (see page 32).

MEMORY ORGANIZATION (HI 91610 only)

Capacity: 8000 data samples which are divided into 16 pages.

Capacity per Page: up to 500 data.

Each time a new logging mode is entered, the meter automatically goes to the next available page. Once all 16 pages are used up, the meter will overwrite the first lot. During logging, the meter automatically returns to the oldest page in the memory and if it contains data, it will overwrite it. In this case the first log will not correspond to the oldest set of data. It is recommended to periodically "clean" the memory. Save data into a PC if you need to keep a record and then disconnect the batteries for about 1 minute. If you do this, remember to reset the time and date, once the batteries have been reinserted again.

ATTENTION

Data is stored into memory until batteries are removed. If replacement of the batteries is needed and data is not to be lost, first plug in an external 12VDC power supply and then proceed with battery replacement as described on page 33. Only once batteries have been replaced, it is possible to unplug the power supply without losing the previously memorized data.

Excel® Copyright of "Microsoft Co."
Lotus 1-2-3® Copyright of "Lotus Co."

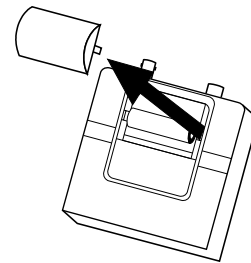
PRINTER MAINTENANCE

TO CHANGE THE INK CARTRIDGE

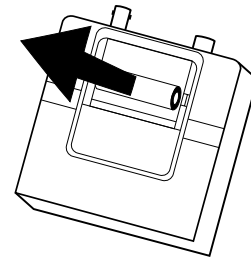
When printouts become faint, it might be necessary to change the ink cartridge. Contact your dealer or the nearest Hanna Customer Service Center for this.

TO INSERT PAPER ROLL

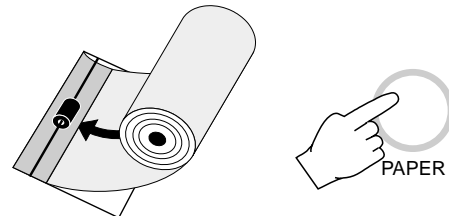
HI 9161, HI 9261 and HI 91610 use plain 38 mm wide paper rolls. To insert a new roll gently pull out the printer cover.



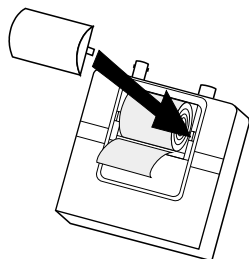
Take out the used paper cylinder.



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



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

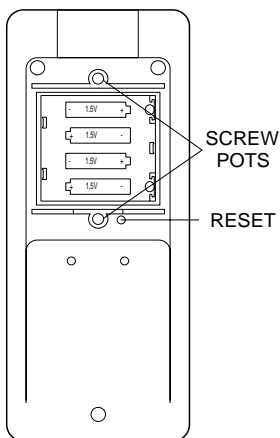


TO RESET THE PRINTER

Take the battery cover off by removing the screws on the back of the meter. Using a blunt pencil press the black reset button. This will reset the printing mechanism.

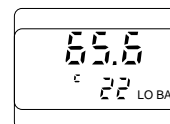
Before replacing the battery cover, investigate likely cause of the printer jam (e.g. the paper might be caught under the cover preventing the paper from advancing).

Replace the battery cover and tighten the screws.



BATTERY REPLACEMENT

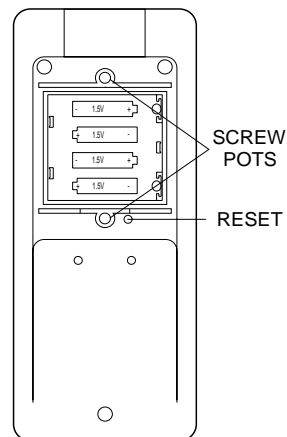
When the batteries are run down "LO BAT" is displayed on the Liquid Crystal Display to warn the user.



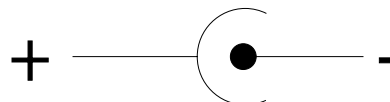
Battery replacement must only take place in a non-hazardous area using alkaline AA type 1.5V batteries.

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

A 12VDC power source can also be used to power the unit (Accessories on page 36).



Note: The instrument uses the following configuration.



It is recommended to use the Hanna HI 710005 and HI 710006 voltage adapters that use the proper polarity configuration.

HI 9161, HI 9261 and HI 91610 can also be used with other adapters supplying a 12VDC output. In this case, remember to check the correct polarity of your adapter before connecting it to the meter.

ACCESSORIES

R.H. PROBES

Hanna Instruments Relative Humidity probes use a high-tech Thin-Film Polymer Capacitance humidity sensor. This sensor provides rapid response and high accuracy. The probes are precalibrated and as a result are all interchangeable. Several different versions are available for your specific R.H. needs.

- HI 70604/5 R.H. probe with 5 m (16.5') cable
- HI 70606/2 R.H. probe with sintered protective cap and 2 m (7') cable
- HI 70606/5 R.H. probe with sintered cap and 5 m (16.5') cable

TEMPERATURE PROBES

These probes use highly sensitive thermistor sensors which provide greater accuracy, faster response and a temperature range that is superior to conventional probes.

All Hanna temperature probes are supplied precalibrated from the factory and are ready to be used with your meter. The probes are easily connected to your meter with a standard connector.

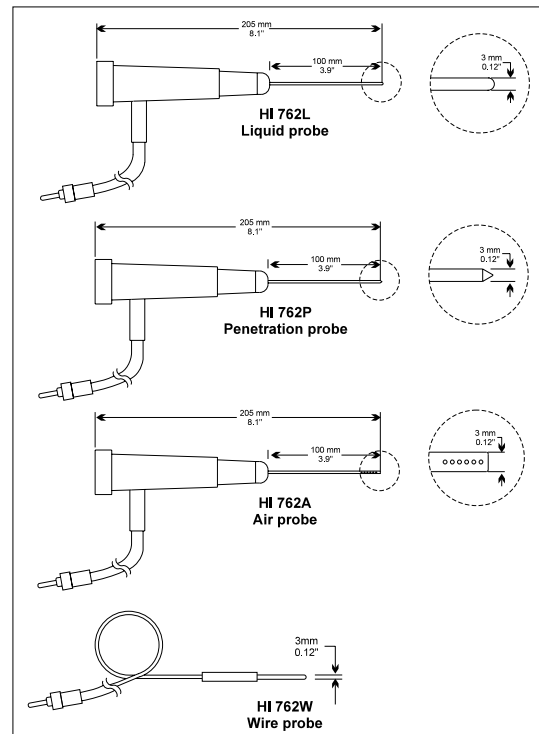
Completely interchangeable, these probes make it possible for you to switch from one to another without wasting time and money going through time-consuming and tedious calibration procedures.

They are available with different handle colors to avoid cross contamination during testing:

- HI 762A Air probe, with 1 m (3.3') cable and white handle
- HI 762A/10 Air probe, with 10 m (33') cable and white handle
- HI 762BL General purpose liquid probe, with 1 m (3.3') cable and black handle
- HI 762BL/10 General purpose liquid probe, with 10 m (33') cable and black handle
- HI 762L General purpose liquid probe, with 1 m (3.3') cable and white handle
- HI 762L/10 General purpose liquid probe, with 10 m (33') cable and white handle
- HI 762PBL Penetration probe with 1 m (3.3') cable and blue handle
- HI 762PBL/10 Penetration probe with 10 m (33') cable and blue handle

- HI 762PG Penetration probe with 1 m (3.3') cable and green handle
- HI 762PG/10 Penetration probe with 10 m (33') cable and green handle
- HI 762PR Penetration probe with 1 m (3.3') cable and red handle
- HI 762PR/10 Penetration probe with 10 m (33') cable and red handle
- HI 762PW Penetration probe with 1 m (3.3') cable and white handle
- HI 762PW/10 Penetration probe with 10 m (33') cable and white handle
- HI 762W Wire probe, without handle (hard-to-reach places) with 1 m (3.3') cable
- HI 762W/10 Wire probe, without handle (hard-to-reach places) with 10 m (33') cable

HANNA INSTRUMENTS TEMPERATURE PROBES



CALIBRATION TEST PLUGS

Hanna Test Plugs provide a quick and easy way to test the meter's accuracy by simply connecting these Test Plugs to the probe connector of the meter.

If the reading differs by more than $\pm 0.4^{\circ}\text{C}$ ($\pm 0.8^{\circ}\text{F}$) from the Test Plug value, the unit is due for recalibration.

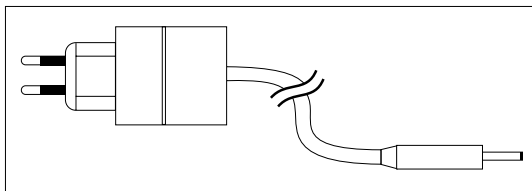
Choose the right Test Plug to suit your needs:

HI 762-18C	Calibration key,	-18.0°C	$\pm 0.4^{\circ}\text{C}$
HI 762000C	Calibration key,	0.0°C	$\pm 0.4^{\circ}\text{C}$
HI 762070C	Calibration key,	+70.0°C	$\pm 0.4^{\circ}\text{C}$
HI 762-004F	Calibration key,	-0.4°F	$\pm 0.8^{\circ}\text{F}$
HI 762032F	Calibration key,	+32.0°F	$\pm 0.8^{\circ}\text{F}$
HI 762158F	Calibration key,	+158.0°F	$\pm 0.8^{\circ}\text{F}$



ADAPTERS/TRANSFORMERS

HI 710005	Adapter 110 VAC to 12 VDC
HI 710006	Adapter 220 VAC to 12 VDC



OTHER ACCESSORIES

HI 9200	Infrared Transmitter
HI 92000	Windows® compatible software for data transfer to PC
HI 710034	Plain Paper Spare Rolls (10 pcs)
HI 710035	Spare Ink Cartridge (1 pc)
HI 710031	Rugged carrying case
MANRHPRNR2	Instruction manual

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WARRANTY

All Hanna Instruments meters are warranted for two years against defects in workmanship and materials when used for their intended purpose and maintained according to instructions.

The probes are warranted for a period of six months.

This warranty is limited to repair or replacement free of charge.

Damages due to accidents, misuse, tampering or lack of prescribed maintenance are not covered.

If service is required, contact the dealer from whom you purchased the instrument. If under warranty, report the model number, date of purchase, serial number and the nature of the failure. If the repair is not covered by the warranty, you will be notified of the charges incurred. If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization Number from the Customer Service department and then send it with shipment costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

To validate your warranty, fill out and return the enclosed warranty card within 14 days from the date of purchase.

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Hanna Instruments reserves the right to modify the design, construction and appearance of its products without advance notice.

OTHER PRODUCTS FROM HANNA

- CALIBRATION AND MAINTENANCE SOLUTIONS
- CHEMICAL TEST KITS
- CHLORINE METERS
- CONDUCTIVITY/TDS METERS
- DISSOLVED OXYGEN METERS
- HYGROMETERS
- ION SPECIFIC METERS (Colorimeters)
- MAGNETIC STIRRERS
- Na/NaCl METERS
- pH/ORP/Na ELECTRODES
- pH METERS
- PROBES (DO, $\mu\text{S}/\text{cm}$, RH, T, TDS)
- PUMPS
- REAGENTS
- SOFTWARE
- THERMOMETERS
- TITRATORS
- TRANSMITTERS
- TURBIDITY METERS
- Wide Range of Accessories



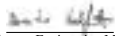
Most Hanna meters are available in the following formats:

- BENCH-TOP METERS
- POCKET-SIZED METERS
- PORTABLE METERS
- PRINTING/LOGGING METERS
- PROCESS METERS (Panel and Wall-mounted)
- WATERPROOF METERS
- METERS FOR FOOD INDUSTRY

For additional information, contact your dealer or the nearest Hanna Customer Service Center.

You can also e-mail us at tech@hannainst.com.

CE DECLARATION OF CONFORMITY

	
 DECLARATION OF CONFORMITY	
We Hanna Instruments Srl V.le delle industrie 12 35010 Ronchi di Villafranca (PD) ITALY	
herewith certify that the printing/logging thermohygrometers HI 9161 HI 9261 HI 91610	
have been tested and found to be in compliance with the following regulations:	
IEC 801-2	Electrostatic Discharge
IEC 801-3	RF Radiated
IEC 801-4	Fast Transient
EN 55022	Radiated, Class B
Date of Issue: <u>01-02-1996</u>	 D. Volpato - Engineering Manager On behalf of Hanna Instruments S.r.l.

Recommendations for Users

Before using these products, make sure that they are entirely suitable for the environment in which they are used.

Operation of these instruments in residential areas could cause unacceptable interference to radio and TV equipment.

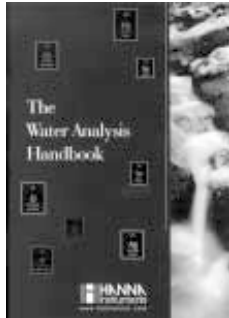
Any variation introduced by the user to the supplied equipment may degrade the instruments' EMC performance.

Unplug the instruments from power supply before replacing the fuse or making any electrical connections.

HANNA LITERATURE



LAB RECORDING



WATER ANALYSIS



ENVIROCARE



GENERAL CATALOG

These and many others catalogs, handbooks and leaflets are available from Hanna. To receive your free copy, contact your dealer or the nearest Hanna Customer Service Center.

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<http://www.hannainst.com>