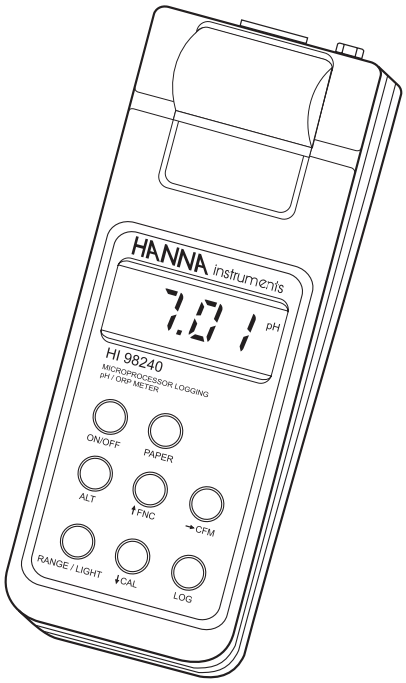
Instruction Manual

HI 98230 • HI 98240

Printing and Logging pH Meters with GLP and Smart Electrodes



HANNA® instruments

www.hannainst.com

Dear Customer,

Thank you for choosing a Hanna Instruments 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 instruments.

If you need additional technical information, do not hesitate to e-mail us at **tech@hannainst.com**.

These instruments are in compliance with the CE directives.

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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 your dealer.

Each meter is supplied in a rugged carrying case complete with:

- **HI 1618D** smart pH electrode with built-in temperature sensor, DIN connector and 1 m (3.3') cable
- pH 4.01 & pH 7.01 buffer sachets (20 mL each)
- Electrode cleaning solution
- 5 paper rolls
- Batteries (4 x 1.5V AA) and 12 Vdc power adapter
- Instruction manual

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

HI 98230 and **HI 98240** are portable printing and logging microprocessor-based pH/temperature meters. In addition, **HI 98240** provides ORP measurements.

Both models are supplied with an exclusive HANNA (smart) amplified pH/temperature electrode with DIN connector. The electrode has an internal memory for storing calibration data.

All pH measurements are automatically compensated for temperature (ATC). The instrument housing is made of rugged, lightweight material, making it truly portable.

Five memorized buffers (pH 4.01, 6.86, 7.01, 9.18 and 10.01) and wrong buffer recognition technology, make calibration simple and error free. One or two point procedure can be performed.

The meters are also equipped with a stability indicator and backlight feature for comfortable reading even in dark environments.

The GLP 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 pH calibration .

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

To prolong battery life, the backlight and printing features are disabled when the batteries are getting low, and the "LOBAT" indication is displayed to warn the user of this condition. However, the meter continues to measure correctly even when the low battery indication is displayed. When the batteries become too weak to support proper function, the Battery Error Preventing System (BEPS) automatically switches the meter off.

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

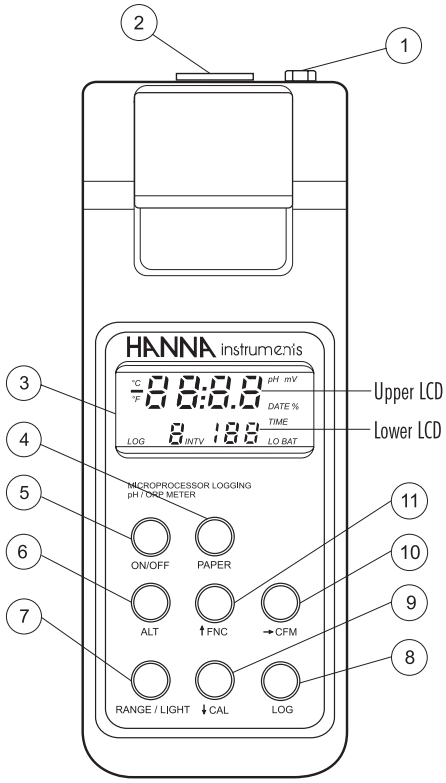
For long term field and lab applications, these meters can be connected to a 12 Vdc adapter.

When in logging mode, the meter stores 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.

HI 98230 and **HI 98240** also allow the transfer of stored data to a computer via the **HI 9200** infrared transmitter connected to the PC serial port.

In addition, the meters allow the user to enter an ID code to uniquely identify the instruments.

FUNCTIONAL DESCRIPTION



1) Power adapter plug
2) Electrode connector
3) LCD (Liquid Crystal Display)
4) **PAPER** key, to move the paper up
5) **ON/OFF** key, to turn the meter on and off
6) **ALT** key, to activate alternate key function
7) **RANGE/LIGHT** key, to select measurement range, to display time, and to enable/disable backlight (with ALT)
8) **LOG** key, to store measurements on-demand
9) **CAL** key, to move down or enter calibration (with ALT)
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	-4.00 to 19.99 pH ±400.0 mV / ±2000 mV autoranging (**HI 98240** only) -10.0 to 120.0°C / 14.0 to 248.0°F
Resolution	0.01 pH 0.1 mV (±400 mV) / 1 mV (outside) (**HI 98240** only) 0.1°C / 0.1°F
Accuracy (@20°C/68°F)	±0.01 pH ±0.5 mV (±400 mV) / ±2 mV (outside) (**HI 98240** only) ±0.5 °C (0 to 70°C) / ±1°C (outside) ±1°F (32 to 158°F) / ±1.8°F (outside)
Typical EMC Deviation	±0.03 pH ±1 mV (±400 mV) / ±2 mV (outside) (**HI 98240** only) ±0.8°C / ±1.4°F
pH Calibration	Automatic, 1 or 2 point with 5 memorized buffer values (pH 4.01, 6.86, 7.01, 9.18 and 10.01)
mV Calibration (**HI 98240** only)	Automatic, 2 point at 0 and 350 mV or 3 point at 0, 350 and 1900 mV
Temperature Compensation	Automatic, -10 to 120°C (14 to 248°F)
pH Electrode	**HI 1618D** smart electrode with built-in temperature, DIN connector and 1 m (3.3') cable (included)
ORP Electrode (**HI 98240** only)	Samrt ORP electrode with DIN connector and 1 m (3.3') cable (optional)
Input Impedance	10^{12} Ohm
PC Connection	**HI 9200** IR interface
Printer	Low power impact type-belt, 14 characters per line; 38 mm plain paper (**HI 710034**)
Printing/Logging Interval	Selectable at 1, 2, 5, 10, 15, 30, 60, 120 or 180 minutes
Power supply	4 x 1.5V AA batteries / approx. 350 of use (without printing and backlight) or 12 Vdc input
Environment	0 to 50°C (32 to 122°F); RH max 95%
Dimensions	220 x 87 x 75 mm (8.7 x 3.4 x 2.9")
Weight	550 g (1.2 lb.)

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 supplied 12 Vdc adapter to the power adapter plug.

To prepare the instrument for use, connect the pH or ORP (**HI 98240** only) electrode to the connector located on the top of the instrument.

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 (default is 5 minutes). If in logging mode, after the period of non-use, the meter will continue to monitor pH or mV (**HI 98240** only) and 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.

Before proceeding with pH measurements follow the calibration procedure.

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

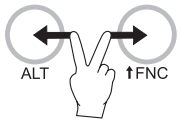
Note: To prevent damage to the electrode, remove the pH electrode from the sample before turning the meter off.

If the meter is OFF, detach the electrode from the meter before immersing the electrode in the storage solution.

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 have access to stored data.

- To enter this mode ensure the meter is not logging and then press the ALT and FNC keys.

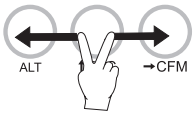


- The scrolling message "Insert the function code or press ALT - FNC to escape" in the upper LCD and the indication "F 00" with the first digit blinking in the lower LCD will be displayed.

- 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.



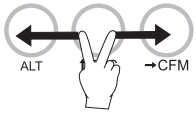
- If the entered code doesn't exist the "Err" message will be displayed for a few seconds and then the message "Insert the function code or press ALT - FNC to escape" will recommence scrolling in the upper LCD.

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.

PARAMETER SETTINGS

- 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	00 to 16	00
01 Print lots data summary		
02 Printer enable	On(enabled); Off(disabled)	On
03 Logging interval	1,2,5,10,15,30,60,120,180	1
05 Log on demand delete		
06 Timed data delete		

Code	Valid values	Default
10 Show pH GLP data		
11 Show ORP GLP data (**HI 98240** only)		
12 Print GLP data		
13 Calibration alarm time-out	00 to 99 days 00 means option disabled	00
14 Instrument ID code	0000 to 9999	0000
30 Current time[1]	hh:mm	00:00
31 Current day[1]	dd	01
32 Current month[1]	MM	01
33 Current year[1]	YYYY	1998
40 Auto-Off/Power down time-out	5,10,15,30,45,60	5
41 Battery level test		
50 RS232 baud rate	1200, 2400, 4800	4800
60 Firmware version		
70 Celsius/Fahrenheit selection	°C or °F	°C
99 Password[2]	0000 to 9999	0000

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

[1] 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.

[2] 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 your nearest Hanna Service Center.

SETUP MESSAGES LIST

code. 00: Lot data Printing
code 01: Lot table Printing
code 02: Printer enable
code 03: Log Interval
code 05: Press "ALT CFM" to delete Lot 00 or "ALT FNC" to escape
code 06: Press "ALT CFM" to delete Lot 01-16 or "ALT FNC" to escape
code 10: pH GLP
code 11: Volt GLP (**HI 98240** only)
code 12: GLP data printing
code 13: Calibration alarm time-out
code 14: Instrument ID Code
code 30: Hour - Minute
code 31: Day
code 32: Month
code 33: Year

code 40: Auto OFF
code 41: Battery test
code 50: Baud rate
code 60: Release code
code 70: Celsius or Fahrenheit
code 99: Password

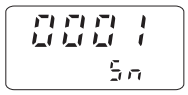
Some of the most important functions are explained below in a step by step sequence.

TO SCAN LOGGED DATA

CODE 00 - Lot Data Printing / Scrolling

- Select the code 00.
- The message "Lot data Printing" will scroll twice on 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 L01 to L16 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 L00 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.

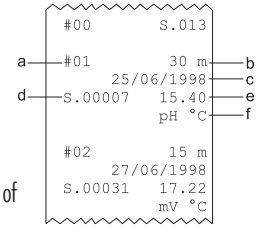
Viewing Logged Data

- Press RANGE to view data of the selected sample. Data will be displayed in the following order:
  pH or mV (mV reading available in **HI98240** only)
  temperature
  date
  time
- If RANGE 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 RANGE 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.

CODE 01 - Lot Summary Printout

- Select the code 01.
- The message "Lot table Printing" will scroll twice on LCD.
- The meter will then print a complete set of information based on the data stored in memory:

a - lot number
b - logging interval
c - starting date
d - number of samples
e - starting time
f - number and measure unit of the logged channels.



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

DELETE SET DATA

- 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 SCAN GLP DATA

CODE 10 - Viewing pH GLP

- Select the code 10
- The " pH GLP" message will scroll twice on LCD.
- Electrode calibration data are verified to be within acceptable values. If not the message "Old probe" or "Dead probe" will scroll once on LCD, depending on calibration data.
- The LCD will then display the instrument identification (ID) code.
- Press to scan remaining data, in the following order:
  last calibration date (DD.MM)
  last calibration year
  last calibration time (hh.mm)
  electrode offset value in mV ("OF" appears in the lower LCD)
  electrode slope in mV/pH ("SL" appears in the lower LCD)
  first point calibration buffer
  second point calibration buffer (only if a 2-point calibration has been performed).

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

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

Code 11 - Viewing mV GLP (HI98240 only)

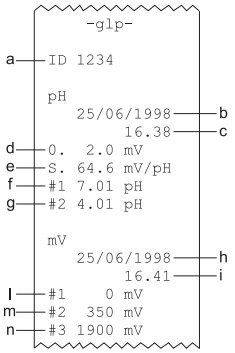
- Select code 11. The message "Volt GLP" will scroll twice across LCD.
- The LCD will then display the instrument identification (ID) code.
- Press to scan remaining data, in the following order:
  last calibration date (DD.MM)
  last calibration year
  last calibration time (hh.mm)
  first calibration point
  second calibration point
  third calibration point (if present).
- Press ALT and FNC to return to setup mode.

CODE 12 - Printing GLP Data

- Select code 12. The message "GLP data printing" will scroll across LCD.
- The meter will then print a complete set of the following GLP data:

a - Instrument identification (ID) code

b - last pH calibration date
c - last pH calibration time
d - pH electrode offset
e - pH electrode slope
f - 1st point pH calibration buffer
g - 2nd point pH calibration buffer (if present)
h - last mV calibration date (**HI98240** only)
i - last mV calibration time (**HI98240** only)



l - 1st point mV calibration (**HI98240** only)
m - 2nd point mV calibration (**HI98240** only)
n - 3rd point mV calibration (if present; **HI98240** only).

Note: If the pH is followed by a set of * or –, it means that the pH electrode is old or dead respectively.
A dashed line indicates that the calibration has never been performed.
If the calibration date is followed by the symbol "Dt", it means that the calibration alarm time-out period has been exceeded.

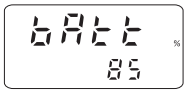
CODE 13 - Setting the Identification (ID) Code

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

- Select code 13. The message "Instrument ID code" 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).



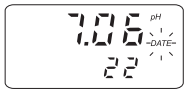
TAKING pH MEASUREMENTS

Connect the pH electrode with the built-in temperature sensor to the meter and press ON/OFF to power on the instrument.

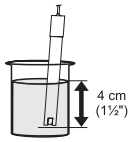
The meter automatically checks that the stored calibration data correspond to the connected electrode. The pH range will be automatically set.

If the pH electrode is not connected, the LCD will display the "no probe" message and then dashed lines in place of the readings.

For greatest accuracy, it is recommended to set the Calibration alarm time-out to the value appropriate to your specific use and calibrate the meter as soon as the "DATE" warning symbol blinks on LCD (see page 25).



To take pH measurements, simply submerge the bottom 4 cm (1½") of the electrode in the solution to be tested, stir gently and allow for the reading to stabilize. The temperature is displayed in the lower LCD without the decimal digit.

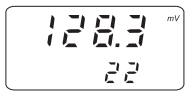


The pH reading is automatically temperature compensated (ATC).

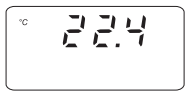
If the pH reading blinks it means that the electrode is "dead" and readings are not reliable.

By continuously pressing the RANGE key the following information will be displayed on the upper LCD:

- mV reading (**HI 98240** only)
  The mV scale is autoranging, when the reading is outside ±400 mV the decimal point automatically disappears.



- Temperature reading
  If the temperature reading is out of range, a dashed line will be displayed.



- Date
- Time

Pressing RANGE again, the meter returns to pH reading.

If measurements are taken successively in different samples, it is recommended to rinse the electrode thoroughly with deionized water or, if not available, tap water first and then with some of the next sample to condition the electrode before immersing it in the sample.

TAKING ORP MEASUREMENTS (HI 98240 ONLY)

Connect the ORP electrode to the meter and press ON/OFF to power on the instrument.
The meter automatically sets the mV range.

If the ORP electrode is not connected, the LCD will display the "no probe" message and then dashed lines in place of the readings.
To take ORP measurements, simply submerge the bottom 4 cm (1½") of the ORP electrode in the solution to be tested, stir gently and allow for the reading to stabilize.
The lower LCD displays the temperature reading, or a dashed line if the ORP electrode is not provided with the temperature sensor.
By continuously pressing the RANGE key the following information will be displayed on the upper LCD:

- Temperature reading
  If the ORP electrode is not provided with the temperature sensor, a dashed line will be displayed.
- Date
- Time

Pressing RANGE again, the meter returns to mV reading.
If measurements are taken successively in different samples, it is recommended to rinse the electrode thoroughly with deionized water or, if not available, tap water first and then with some of the next sample to condition the electrode before immersing it in the sample.

TAKING TEMPERATURE MEASUREMENTS

The temperature sensor is integrated in the pH electrode.
Secure the connection of the electrode to the top of the meter and immerse it in the sample solution (allow a few minutes for the temperature to stabilize). Press ON/OFF to power on the instrument. The temperature is displayed in the lower LCD without the decimal digit during pH and mV measurement. To display the temperature reading with decimal digit, press the "RANGE" key to get into the °C or °F mode. The temperature value and the "°C" or "°F" symbol will be displayed on the upper display.
Note: To choose between "°C " and "°F" unit, enter the setup code 70.
Note: If temperature measurement is out of range the LCD will display "- - - -".

pH CALIBRATION PROCEDURE

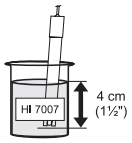
For better accuracy, it is recommended to calibrate the instrument frequently. For a faster procedure, it is possible to calibrate at 1 point, but it is always a good practice to calibrate at 2 points.
A two-point calibration can use any combination of the three sets:

(pH 4.01) (pH 6.86/7.01) (pH 9.18/10.01)

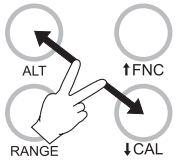
Only one value from each set can be selected. For example if pH 7.01 is used as first point, it will not be possible to select pH 6.86 as the second point.
In the case of a two-point calibration, in the acidic range (from 0 to 7 pH) use pH buffer 7.01 (or 6.86) as the first solution and pH buffer 4.01 as the second solution. If testing in the alkaline range (from 7 to 14 pH), use pH buffer 10.01 (or 9.18) as the second solution.
Due to electrode conditioning time, the electrode must be kept immersed a few seconds to stabilize. The meters are equipped with a stability indicator (a blinking "S") and the user will be guided step by step with easy indications on the LCD during the calibration. This will make the calibration a simple and error-free procedure.

pH CALIBRATION

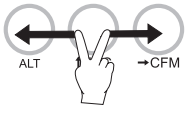
1. Rinse the electrode with a portion of the first calibration buffer or clean water. Dip the bottom, 4 cm (1½"), of the electrode into a beaker containing the solution.



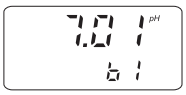
2. Press ALT and CAL while meter is not printing nor logging.



3. User is prompted to enter password if it has been set to a value different from 0000, otherwise skip to step 6.
4. Enter the password with the arrow keys.
5. Press ALT and CFM to confirm the password or ALT and CAL to exit.



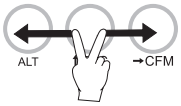
6. If password is correct or not set, the meter will display "7.01pH" on the upper LCD and "b1" on its lower part; if wrong, it will return to measurement mode without any message.



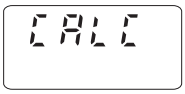
7. Select the first buffer solution value with ▲ and ▼ if necessary.
8. When the "S" symbol blinks in the lower LCD, the reading is stable and calibration can be confirmed.

Note: It is possible to display temperature pressing the RANGE key.

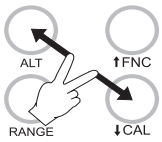
9. Press ALT and CFM to confirm the first buffer.



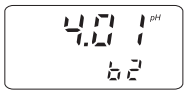
10. If everything is satisfactory the LCD will display CALC and then the second buffer value expected will be displayed. If a wrong solution or electrode has been used or if the buffer is polluted, "WRONG" will be displayed to alert the user.



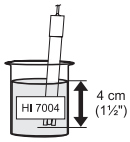
11. If only a single point calibration is required, press ALT and CAL to leave the calibration mode and maintain the previous slope calibration. "CALC" will be displayed for a few seconds. The instrument then checks the electrode parameters and advises user of abnormalities by "old probe" and "dead probe" indications.



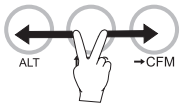
12. Press ▲ or ▼ to select the second buffer value. The "b2" symbol will be fixed on lower display.



13. Rinse the electrode with some of the second buffer solution or clean water.
14. Dip the bottom, 4 cm (1½"), of the electrode in a beaker containing the second buffer.

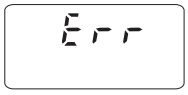


15. When the "S" symbol blinks in the lower LCD, press ALT and CFM to confirm the second calibration point.



16. "CALC" is displayed on the upper LCD for a few seconds and the meter is calibrated and ready to use.

17. If the buffer is wrong or the electrode is defective, "Err" will be displayed to alert the user. When calibration is completed, the instrument checks the electrode parameters and advises the user of abnormalities by "old probe" and "dead probe" indications (in these cases, repeat the calibration with fresh buffers).



CALIBRATION ERROR MESSAGES

If the "old probe", "dead probe" or "Err" messages are displayed during calibration, check your electrode by following the conditioning and maintenance procedure and repeat calibration. The pH electrode might have to be replaced if calibration cannot be successfully performed.

CALIBRATION DATA PRINTOUT

It is possible to print the characteristics of the electrode as a recording of the electrode performance over time by setup code 12 (see "Printing GLP data").

This will consist of: date, time, the offset characteristic of the pH electrode in mV, the slope characteristic in mV/pH and the pH buffer solution values.

If calibration has been performed with an "old" pH electrode the first line is: **pH ****

If calibration has been performed with a "dead" pH electrode the first line is: **pH – –**

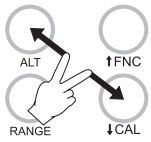
If the calibration alarm time-out is expired, the "**Dt**" string will be printed beside the date.

Note: A dashed line indicates that the calibration has never been performed.

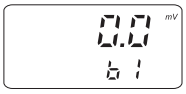
mV CALIBRATION PROCEDURE (HI 98240 ONLY)

A 4 point calibration must be performed. The first two calibration points are 0 and 350 mV for low range calibration; the other two points are 0 and 350 or 1900 mV for high range calibration.

1. Connect a mV simulator (**HI 8427** or **HI 931001** with the proper connection cable) to the meter and set it to 0 mV.
2. Press ALT and CAL when LCD is displaying mV.

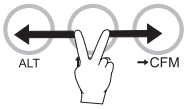


3. User is prompted to enter password if it has been set to a value different from 0000, otherwise skip to step 6.
4. Enter the password with the arrow keys.
5. Press ALT and CFM to confirm the password or ALT and CAL to return to normal operational mode.
6. If password is correct or not set, the meter will display "0.0 mV" on the upper LCD and "b1" on the lower; if wrong, it will return to normal operational mode without any message.

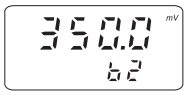


7. When the "S" symbol blinks in the lower LCD, the reading is stable and calibration can be confirmed.

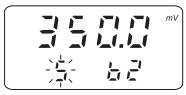
8. Press ALT and CFM to confirm the first value.



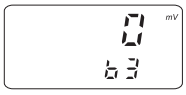
9. The meter will display "350.0 mV" in the upper LCD and "b2" on the lower one.



10. Set the simulator to +350 mV.
11. When the "S" symbol blinks in the lower LCD, the reading is stable. Press ALT and CFM to confirm the second value.

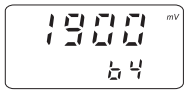


12. The meter will display "0 mV" in the upper LCD and "b3" on the lower one.



13. Set the simulator to 0 mV.
14. When the "S" symbol blinks in the lower LCD, the reading is stable. Press ALT and CFM to confirm the third value.

15. The meter will display "350 mV" in the upper LCD and "b4" on the lower one. Pressing the "□ " key, 1900 mV will be selected as calibration point.



Note: +1900 mV is suggested as the last calibration point to obtain the best accuracy throughout the entire mV range.

16. Set the simulator to +1900 mV.
17. When the "S" symbol blinks in the lower LCD, the reading is stable. Press ALT and CFM to confirm the fourth value.

18. Calibration is now complete and the instrument returns to normal operational mode.

Note: "Err" message notifies the user if the selected value is wrong.

TEMPERATURE CALIBRATION PROCEDURE (for technical personnel only)

The meter is factory calibrated for temperature. It is recommended that the following procedure is performed by authorized technical personnel only.

A two point calibration at 0.0, 25.0°C (32.0, 77.0°F) or 0.0, 50.0°C (32.0, 122.0°F) has to be performed in order to store the new calibration data in memory.

1. Immerse the electrode with the built-in temperature sensor in the 0°C (32°F) temperature bath.
2. Press RANGE until temperature reading is selected.
3. Press ALT and CAL to enter temperature calibration mode.
4. Enter the password if requested.
5. When the reading is stable the "S" symbol starts to blink.
6. Press ALT and CFM to confirm. LCD will display 50.0°C (122.0°F) as the following calibration point.
7. If 25.0°C (77.0°F) is desired as second point, press □ to display 25.0°C (77.0°F).
8. Immerse the probe in the second temperature bath.
9. When the reading is stable, the "S" symbol starts to blink.
10. Press ALT and CFM to confirm and return to temperature reading mode.

PRINTING / LOGGING FUNCTION

Two different modes to print / log data are available:

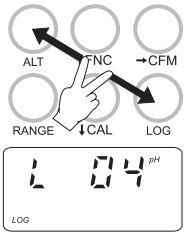
1. **Timed logging**; samples are stored and printed (if print function is active) at fixed time intervals. Data are stored in the lots 01 to 16.
2. **Log on demand**; samples are stored and printed (if print function is active) when the LOG key is pressed. Data are stored in the lot 00. It's possible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

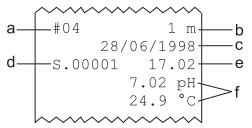
- set the function code 02 to "On" to enable printing, to "Off" to disable printing
- press ALT and PAPER to toggle between printer enabled and printer disabled while in Timed logging.

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:

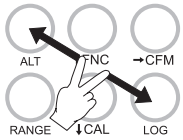


a - Lot number
b - Logging interval
c - Date (only for the first printed sample of the lot or of the day)
d - Sample number
e - Time
f - Readings.

To print the mV reading instead of pH, press ALT and LOG after entering the mV range (mV reading available in **HI98240** only).

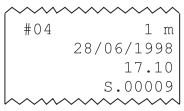
If no keys are pressed, the meter enters standby mode to prolong the battery life and only the "LOG" indication will be visible on LCD. While logging, during the sleep mode, the last logged reading will appear briefly on the LCD. To reactivate the LCD press ON/OFF.

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.

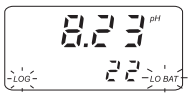


Notes:

- 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 (see page 29)
- 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.



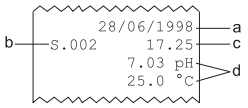
Note: When an external adapter or new batteries are connected, the printing must be manually enabled in order to return to logging with printing mode.

LOG ON DEMAND

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

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

a - Date
b - Sample number
c - Time
d - Readings



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 RETRIEVE LOGGED DATA

Logged data stored in the EEPROM can be viewed on LCD or printed. **HI98230** and **HI98240** also allow the downloading of logged data to PC for reproduction, storage and elaboration (e.g. graph drawing).

To view or print logged data see "TO SCAN LOGGED DATA" on page 11.
To download data to PC see "DATA TRANSFER TO PC" on page 27.

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 batteries are in low battery condition.

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.

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 electrode. The pH electrodes have a built-in EEPROM in which calibration data are read at start-up and stored after calibration.

HI98230 and **HI98240** can automatically analyze the data and advise the user if a problem is found with a clear message.

PROBE LIFE VERIFICATION

At the end of calibration, the meter checks if offset is between -30 and +30mV and the slope between 53.5 and 62 mV/pH. If the values are not within these parameters, the message "old probe" scrolls across the LCD and the symbol ** is reported in the Last Calibration Data. The electrode is still working, but it will be necessary to perform a cleaning procedure (see electrode cleaning and maintenance paragraph) or replace it.

If the offset is outside the -60 and +60 mV range, the "dead probe" message will scroll across the LCD and the symbol –– is reported in the Last Calibration Data. The readings will blink to warn the user that they are not reliable.

LAST CALIBRATION DATA

Last calibration data are stored automatically after a successful calibration. Data can be displayed or printed through the appropriate setup codes (10 to display pH data; 11 to display mV data; 12 to print pH and mV data); mV data are available in **HI98240** only.

ELECTRODE IDENTIFICATION

At start-up the meter checks if the electrode is inserted. If not the message "no probe" scrolls across the LCD and a dashed line will be display in place of the reading. Each printout will have a "◊" symbol on the pH line.

If the meter detects a "dead probe" the reading will blink.

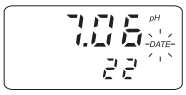
The meter checks the electrode only at start up. If an electrode replacement is needed, turn the meter off before disconnecting the electrode. Then replace the electrode and turn the meter on again.

CALIBRATION ALARM TIME-OUT

The calibration alarm time-out is available only for pH calibration.

It is possible to set (through setup code 13) the number of days before the next required calibration procedure. User can set a value from 00 (disabled) to 99 days. The default value is 00.

The meter checks if the time-out time has expired every time it is turned on. In the case the time has run out, the message "Cal date" scrolls across the LCD. The "DATE" symbol will blink as a reminder.



Alarm time-out is also signaled in the GLP data printout through the "Dt" symbol after the calibration date.

GLP AND RS232

All the GLP data can be retrieved from a PC through the RS232 communication feature. The calibration data are transferred to the computer along with measurement data for analysis and verification (see "Data transfer to PC" paragraph).

FAULT CONDITIONS

HI 98230 and **HI 98240** 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

I^2C BUS ERROR

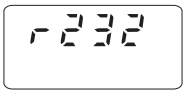
In case of an I^2C bus fatal error due for example to a defective EEPROM or RTC, the message "Serial bus error" keeps scrolling across LCD from right to left indefinitely. Meter should be returned for repair (see warranty section).

DATA TRANSFER TO PC

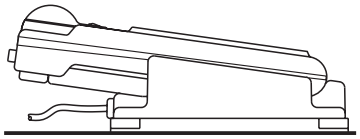
HI 98230 and **HI 98240** feature a infrared transmitting circuitry. Ensure there is not any logging process active.

Press RANGE to set the meter to time or date mode and simply place your data-logger on a **HI 9200** 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 a serial 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 RANGE to display the reading (pH or mV or temperature) or take the meter out of the transmitter when it is not displaying "r232".



Using the **HI 9200** infrared transmitter, all recorded data can be fed to your PC for easy reproduction, storage or elaboration without the interference of cables or cords between the meter and the transmitter.

Data transmission from the instrument to the PC is now much easier with new **HI 92000** Windows® compatible software by HANNA.

HI 92000 allows to use the powerful capabilities of most spread sheet programs (e.g. Excel©, Lotus 1-2-3©). Simply open the file downloaded by **HI 92000** from the spread sheet program and then it is possible to make any elaboration available with software (e.g. graphics, statistic analysis).

HI 92000 offers a variety of features and is provided with an on-line-help to support the user throughout any situation.

To install **HI 92000** you need a 3.5" drive and a few minutes to follow the instructions conveniently printed on the disk label.

MEMORY ORGANIZATION

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

MEMORY CAPACITY

- 1500 data samples which are divided into 16 lots (lots 01 to 16)
- 100 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

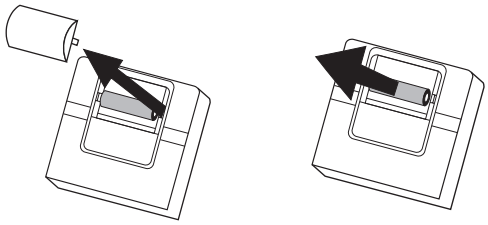
TO CHANGE THE INK CARTRIDGE

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

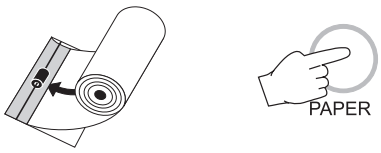
TO INSERT THE PAPER ROLL

HI 98230 and **HI 98240** use plain paper rolls 38 mm width. To insert a new roll is very easy.

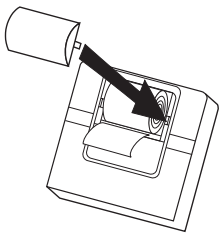
Open the paper cover pulling it gently and take the cylinder away.



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.



BATTERY REPLACEMENT

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

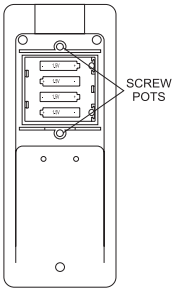
1. **Fully charged batteries**. The backlight and printer can be enabled.
2. **Weakening batteries**. "LOBAT" symbol blinks on LCD. The backlight and printer are automatically disabled and it is not possible to enable them until new batteries are inserted or an external power adapter is connected.
3. **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 any erroneous readings.

Note: It is not possible to enable 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, by 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, while paying attention to the correct polarity.

A 12 Vdc power adapter can also be used to power the unit.



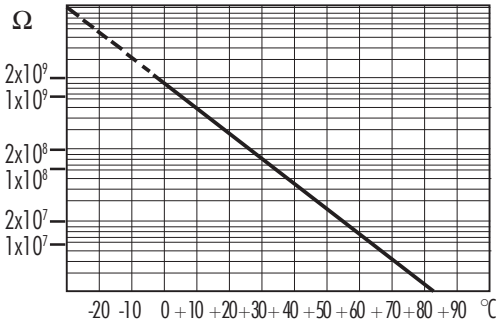
Note: The instrument uses the following configuration.

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

However, **HI 98230** and **HI 98240** can also be used with other adapters. In this case, remember to check the correct polarity of your adapter before connecting it to the meter.

TEMPERATURE-RESISTANCE CORRELATION FOR HANNA pH SENSITIVE GLASS

The resistance of glass electrodes partially depends on the temperature. The lower the temperature, the higher the resistance. It takes longer time for the reading to stabilize if the resistance is higher. In addition, the response time will suffer to a greater degree at temperatures below 10°C.



Since the resistance of the pH electrode is in the range of 200 Mohm, the current across the membrane is in the pico-Ampere range. Large currents can disturb the calibration of the electrode for many hours.

For these reasons **high humidity environments, short circuits and static discharges** are detrimental to a stable pH reading.

The pH electrode's life also depends on the temperature. If constantly used at high temperatures, the electrode life is drastically reduced.

Typical Electrode Life	
Ambient Temperature	1- 3 years
90 °C	Less than 4 months
120°C	Less than 1 month

High concentrations of sodium ions interfere with readings in alkaline solutions; the pH at which the interference starts to be significant depends upon the composition of the glass. This interference is the alkaline error and causes the pH to be underestimated. Hanna's glass formulations have the indicated characteristics.

Alkaline Error

Sodium Ion Correction for the Glass at 20-25°C		
Concentration	pH	Error
0.1 Mol L^{-1} Na^+	13.00	0.10
	13.50	0.14
	14.00	0.20
1.0 Mol L^{-1} Na^+	12.50	0.10
	13.00	0.18
	13.50	0.29
	14.00	0.40

ELECTRODE CONDITIONING AND MAINTENANCE

Note: To prevent damage to the electrode, remove it from the sample before turning the meter off.

With the meter OFF, detach the electrode from the instrument and immerse it in the storage solution.

PREPARATION

Remove the protective cap.

DO NOT BE ALARMED IF SALT DEPOSITS ARE PRESENT.

This is normal with pH electrodes and they will disappear when rinsed with water.

During transport tiny bubbles of air may form inside the glass bulb. The electrode cannot function properly under these conditions. These bubbles can be removed by "shaking down" the electrode as you would do with a glass thermometer.

If the bulb and/or junction are dry, soak the electrode in **HI 70300** storage solution for at least one hour.

For refillable electrodes

If the fill solution (electrolyte) is less than 1 cm (½") below the fill hole, add **HI 7082** 3.5M KCl electrolyte solution for double junction or **HI 7071** 3.5M KCl+AgCl electrolyte solution for single junction electrodes.

For a faster response unscrew the fill hole screw during measurements.

For AmpHel® electrodes

If the electrode does not respond to pH changes, the battery is run down and the electrode should be replaced.

MEASUREMENT

Rinse the electrode tip with distilled water.

Immerse the tip (4 cm /1½") in the sample and stir gently for approximately 30 seconds.

For a faster response and to avoid cross contamination of the samples, rinse the electrode tip with a few drops of the solution to be tested, before taking measurements.

STORAGE

To minimize clogging and ensure a quick response time, the glass bulb and the junction should be kept always moist and not allowed to dry out.

Put in the protective cap a few drops of **HI 70300** storage solution or, in its absence, filling solution (**HI 7071** for single junction or **HI 7082** for double junction electrodes). Follow the Preparation Procedure above before taking measurements.

Note: NEVER STORE THE ELECTRODE IN DISTILLED WATER OR DRY.

PERIODIC MAINTENANCE

Inspect the electrode and the cable. The cable used for connection to the meter must be intact and there must be no points of broken insulation on the cable or cracks on the electrode stem or bulb. Connectors must be perfectly clean and dry.

If any scratches or cracks are present, replace the electrode.

Rinse off any salt deposits with water.

For refillable electrodes

Refill it with fresh electrolyte (**HI 7071** for single junction or **HI 7082** for double junction electrodes). Allow the electrode to stand upright for 1 hour. Follow the Storage Procedure above.

CLEANING PROCEDURE

General: soak in Hanna **HI 7061** general cleaning solution for approximately 1 hour.

Removal of films, dirt or deposits on the membrane/junction:

- *Protein* soak in Hanna **HI 7073** protein cleaning solution for 15 minutes
- *Inorganic* soak in Hanna **HI 7074** inorganic cleaning solution for 15 minutes
- *Oil/grease* Rinse with Hanna **HI 7077** Oil & Fat cleaning solution

IMPORTANT: After performing any of the cleaning procedures rinse the electrode thoroughly with distilled water, drain and refill the reference chamber with fresh electrolyte (not necessary for gel filled electrodes) and soak the electrode in **HI 70300** storage solution for at least 1 hour before taking any measurements.

TROUBLESHOOTING

Evaluate the performance of your electrode based on the following possibilities:

- **Noise** (readings fluctuate up and down) could be due to:
- **Clogged/Dirty Junction:** refer to the Cleaning Procedure above.
- **Loss of shielding** due to low electrolyte level (in refillable electrodes only): refill with fresh **HI 7071** for single junction electrodes, or **HI 7082** for double junction electrodes.

- **Dry Membrane/Junction:** soak in **HI 70300** storage solution for at least 1 hour.
- **Drifting:** Soak the electrode tip in warm **HI 7082** solution for one hour, then flush the tip with distilled water. Refill with fresh **HI 7071** for single junction electrodes, or **HI 7082** for double junction electrodes.
- **Low Slope:** refer to the cleaning procedure above.
- **No Slope:** check the electrode for cracks in glass stem or bulb and replace the electrode.
- **Slow Response/Excessive Drift:** soak the tip in **HI 7061** Hanna solution for 30 minutes, rinse thoroughly in distilled water and then follow the Cleaning Procedure above.

ACCESSORIES

pH CALIBRATION SOLUTIONS

HI 70004P	pH 4.01 buffer solution, 20 mL sachet, 25 pcs
HI 70007P	pH 7.01 buffer solution, 20 mL sachet, 25 pcs
HI 70010P	pH 10.01 buffer solution, 20 mL sachet, 25 pcs
HI 7004L	pH 4.01 buffer solution, 500 mL bottle
HI 8004L	pH 4.01 buffer solution, 500 mL FDA bottle
HI 7006L	pH 6.86 buffer solution, 500 mL bottle
HI 8006L	pH 6.86 buffer solution, 500 mL FDA bottle
HI 7007L	pH 7.01 buffer solution, 500 mL bottle
HI 8007L	pH 7.01 buffer solution, 500 mL FDA bottle
HI 8009L	pH 9.18 buffer solution, 500 mL FDA bottle
HI 7009L	pH 9.18 buffer solution, 500 mL bottle
HI 7010L	pH 10.01 buffer solution, 500 mL bottle
HI 8010L	pH 10.01 buffer solution, 500 mL FDA bottle

ELECTRODE MAINTENANCE SOLUTIONS

HI 70300L	Storage solution, 500 mL bottle
HI 80300L	Storage solution, 500 mL FDA bottle
HI 70000P	Electrode rinsing solution, 20 mL sachet, 25 pcs
HI 7061L	General cleaning solution, 500 mL bottle
HI 8061L	General cleaning solution, 500 mL FDA bottle
HI 7073L	Protein cleaning solution, 500 mL bottle
HI 8073L	Protein cleaning solution, 500 mL FDA bottle
HI 7074L	Inorganic cleaning solution, 500 mL bottle
HI 8074L	Inorganic cleaning solution, 500 mL FDA bottle
HI 7077L	Oil & Fat cleaning solution, 500 mL bottle
HI 8077L	Oil & Fat cleaning solution, 500 mL FDA bottle
HI 7072	1M KNO_3 electrolyte solution, 4 x 50 mL bottle
HI 8072	1M KNO_3 electrolyte solution, 4 x 50 mL FDA bottle
HI 7082	3.5M KCl electrolyte solution, 4 x 50 mL bottle, for double junction electrodes
HI 8082	3.5M KCl electrolyte solution, 4 x 50 mL FDA bottle, for double junction electrodes

ORP PRETREATMENT SOLUTIONS

HI 7091L	Reducing pretreatment solution, 500 mL bottle
HI 7092L	Oxidizing pretreatment solution, 500 mL bottle

ELECTRODES

HI 1615D Smart pH electrode, glass body, single junction, refillable, with built-in temperature sensor, DIN connector and 1 m (3.3') cable

HI 1616D Smart pH electrode, glass body, single junction, gel-filled, with built-in temperature sensor, DIN connector and 1 m (3.3') cable

HI 1617D Smart pH electrode, glass body, single junction, triple ceramic, refillable, with built-in temperature sensor, DIN connector and 1 m (3.3') cable

HI 1618D Smart pH electrode, plastic body, single junction, gel-filled, with built-in temperature sensor, DIN connector and 1 m (3.3') cable

HI 3619D Smart ORP/Pt electrode, glass body, single junction, with DIN connector and 1 m (3.3') cable

HI 3620D Smart ORP/Pt electrode, single junction, gel-filled, with DIN connector and 1 m (3.3') cable

OTHER ACCESSORIES

HI 710005 Voltage adapter, 115 Vac / 12 Vdc

HI 710006 Voltage adapter, 230 Vac / 12 Vdc

HI 710031 Rugged carrying case

HI 710034 Paper roll (10 pcs)

HI 710035 Ink cartridge

HI 76405 Electrode holder

HI 8427 pH/mV simulator

HI 931001 pH/mV simulator with LCD

HI 9200 Infrared interface for PC connection

HI 92000 Windows® compatible software

Windows® is registered Trademark of "Microsoft Co."

OTHER PRODUCTS FROM HANNA

- CALIBRATION AND MAINTENANCE SOLUTIONS
- CHEMICAL TEST KITS
- CHLORINE METERS
- CONDUCTIVITY/TDS METERS
- DISSOLVED OXYGEN METERS
- HYGROMETERS
- ION SPECIFIC METERS
- MAGNETIC STIRRERS
- Na/NaCl METERS
- pH/ORP/Na ELECTRODES
- PROBES (DO, μS/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)
- 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**.

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 electrodes and the probes are warranted for a period of six months.** This warranty is limited to repair or replacement free of charge.

Damages due to accident, 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 shipping costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

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

CE DECLARATION OF CONFORMITY

HANNA instruments

CE

DECLARATION OF CONFORMITY

We

Hanna Instruments Italia Srl
via E.Fermi, 10
35030 Sarmeola di Rubano - PD
ITALY

herewith certify that the pH meters

HI 98230 HI 98240

have been tested and found to be in compliance with EMC Directive 89/336/EEC and Low Voltage Directive 73/23/EEC according to the following applicable normatives:

EN 50082-1: Electromagnetic Compatibility - Generic Immunity Standard
IEC 801-2 Electrostatic Discharge
IEC 801-3 RF Radiated
IEC 801-4 Fast Transient

EN 50081-1: Electromagnetic Compatibility - Generic Emission Standard
EN 55022 Radiated, Class B

EN61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use

Date of Issue: 9-7-1998

P. Cesa - Technical Director
On behalf of
Hanna Instruments S.r.l.

Recommendations for Users

Before using this product, make sure that it is entirely suitable for the environment in which it is used.

Operation of this instrument in residential area could cause unacceptable interferences to radio and TV equipments, requiring the operator to take all necessary steps to correct interferences.

The glass bulb at the end of the electrode is sensitive to electrostatic discharges. Avoid touching this glass bulb at all time. During calibration of instruments, ESD wrist straps should be worn to avoid possible damage to the electrode by electrostatic discharge.

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

To avoid electrical shock, do not use these instruments when voltages at the measurement surface exceed 24 Vac or 60 Vdc.

To avoid damages or burns, do not perform any measurement in microwave ovens.

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