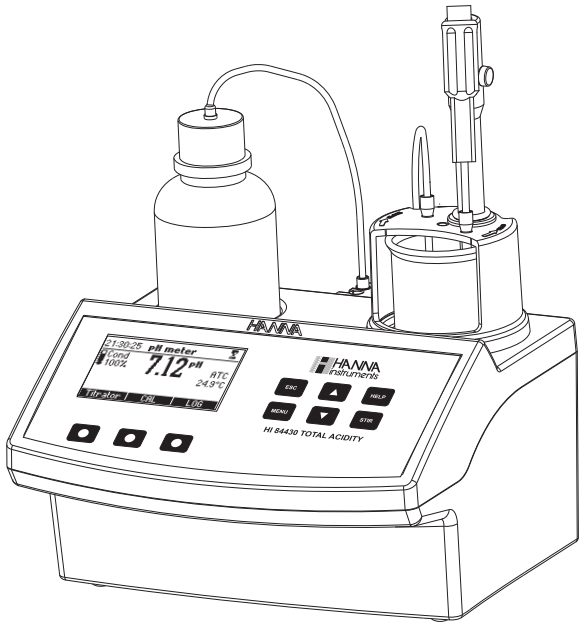
Instruction Manual

HI 84430
TOTAL ACIDITY MINITITRATOR & pH METER for Water Analysis



HANNA® instruments
www.hannainst.com

Dear Customer,

Thank you for choosing a Hanna product. This manual will provide you with the necessary information for the correct use of the instrument. Please read it carefully before using the meter. If you need additional technical information, do not hesitate to e-mail us at tech@hannainst.com.

This instrument is in compliance with CE directives.

TABLE OF CONTENTS

PRELIMINARY EXAMINATION

Please examine this product carefully. Make sure that the instrument is not damaged. If any damage occurred during shipment, please notify your Dealer.

Each **HI 84430** minititrator is supplied complete with:

- **HI 1131B** pH electrode
- **HI 7071** Filling solution (30 mL)
- **HI 7662-M** Temperature probe
- **HI 84430-50** Titrant low range (100 mL)
- **HI 84430-51** Titrant high range (100 mL)
- **HI 84430-55M** Pump calibration solution (230 mL)
- **HI 84430-58** Additional reagent (30 mL)
- **HI 7061** Cleaning solution
- **HI 7001M** pH 1.68 buffer solution (230 mL)
- **HI 7004M** pH 4.01 buffer solution (230 mL)
- **HI 70083M** pH 8.30 buffer solution (230 mL)
- Two 100 mL beakers
- Two tube sets with dispensing tip
- Stir bars (medium 2 pcs.)
- 12 Vdc power adapter
- Instruction manual

Note: Save all packing material until you are sure that the instrument works correctly. Any defective item must be returned in its original packing.

GENERAL DESCRIPTION

The **HI 84430** is an easy to use microprocessor-based automatic minititrator and pH meter designed for the rapid and accurate analysis of Total Titratable Acidity in water. By eliminating subjective factors including color indicators, errors in mathematical calculations or erratic titrant additions from the measurement, the **HI 84430** makes Total Titratable acidity analysis precisely. This will quickly become a valuable analysis tool of waters and waste waters.

The instrument benefits from Hanna's many years of experience as manufacturer of quality analytical instruments. A clear and well-designed user interface makes the instrument intuitive and simple to use. A dedicated **HELP** key aids in set-up, calibration, status and troubleshooting.

By simply pressing the **START** key, the **HI 84430** automatically starts pump operation and titrates the sample to the end point. The **HI 84430** has a simple and accurate peristaltic pump to ensure the best accuracy and repeatability. By performing pump calibration with the Hanna standard provided, the instrument accuracy is assured.

The instrument employs a powerful and effective built-in algorithm to analyze the pH response to determine the exact pH endpoint, then uses this to make the necessary calculations. The Titratable Acidity determination is instantaneously displayed in selected measurement units on the large dot matrix display. The instrument is ready for the next analysis immediately.

Other features:

- Log on demand up to 100 samples (50 for pH measurement; 50 for titration results)
- GLP feature, to view last calibration data for pH electrode and pump
- PC interface via USB connection

MEASUREMENT SIGNIFICANCE

Acidity is the quantitative capacity of the water sample to react with a strong base solution in order to obtain a pH end point value. Acids contribute to the corrosive capacity of the water, influence the chemical reaction rates and biological processes.

The results of acidity measurement also reflect the quality of the waters (surface, drinking, waste waters) and are an essential monitoring device to define and control the pollution. Strong acids (such as mineral acids: HNO_3, H_2SO_4, HCl) and weak acids (such as organic acids), carbon dioxide content in water, or others acid components (some polyvalent cations such as aluminium, iron, manganesse, chromium, cadmium trivalent cations) can contribute to the acidity of water. According to the Standard Methods for the Examination of Waters and Wastewaters, Volume 20, three options exist to determine water acidity:

- pH measurement using the meter in pH mode.
- Strong acidity determination by titration of the water samples with alkaline reagent to a 3.7 pH end point (known as methyl orange acidity).
- Total acidity determination by titration of the water samples with alkaline reagent to a 8.3 pH end point (known as phenolphthalein acidity).

Potentiometric end point determination, using a pH electrode, is more objective than visual end point determination, using color changing indicators. The **HI 84430** is a potentiometric titrator.

The volume of dispensing titrant necessary to reach the end point is used to calculate the water acidity, expressed in mg/L as $CaCO_3$ (most usual unit) or meq/L as $CaCO_3$.

Interferences:

- dissolved gases, lost or gained during sample storage or transport, can modify the acidity of the samples;
- the presence in the samples of: precipitates, solids suspensions, oils;
- samples containing polyvalent cations (aluminum, iron, manganese, chromium) may react slowly with the titrant causing a drifting end point;

To eliminate or diminish the interference effects, it is recommended:

- to treat the samples that contain polyvalent cations with hydrogen peroxide in order to increase the hydrolyzing rate of metal ions present.
- to protect the samples against atmospheric action (store in an airtight vessel).
- to avoid vigorous shaking or mixing: stir gently.

SPECIFICATIONS

Titrator	Range	Titratable acidity (low range) mg/L : 15.0 - 500.0 mg/L as $CaCO_3$ meq/L : 0.3 - 10.0 meq/L as $CaCO_3$ Titratable acidity (high range) mg/L : 400 - 4000 mg/L as $CaCO_3$ meq/L : 8 - 80 meq/L as $CaCO_3$
	Resolution	Titratable acidity (low range): 0.1 mg/L 0.1 meq/L Titratable acidity (high range): 1mg/L 1meq/L
	Accuracy	5% of reading
	Titration method	Acid-base titration (total acidity / strong acidity)
	Principle	End point titration : 8.3 pH / 3.7 pH
	Pump debit	0.5 mL/min
	Stirring speed	600 rpm
	Log data	Up to 50 samples
pH meter	pH meter	-2.0 to 16.0 pH / -2.00 to 16.00 pH
	pH Resolution:	0.1 pH / 0.01 pH
	pH Accuracy:	± 0.01 pH
	pH Calibration:	1, 2 or 3 calibration points; 3 available buffers (1.68; 4.01; 8.30)
	Temperature compensation:	manual or automatic from -20 to 120 °C (-4 to 248 °F)
	Log data	Up to 50 samples
Temperature	Range	-20.0 to 120.0 °C (-4.0 to 248.0 °F)
	Resolution	0.1 °C
	Accuracy	±0.4 °C without probe error

Electrode	HI 1131B (included)
Temperature Probe	HI 7662-M (included)
Environment	0 to 50 °C (32 to 122 °F); max 95% RH non-condensing
Power supply	12 Vdc power adapter
Dimensions	208 × 214 × 163 mm (8.2×8.4×6.4") (with beaker)
Weight	2200 g (77 oz.)

REQUIRED REAGENTS

Code	Description	Quantity/Test
HI 84430 - 50	Titrant (Low Range)	1 mL
HI 84430 - 51	Titrant (High Range)	1 mL
HI 84430 - 55M	Pump Calibration Solution	2 mL for low range 20 mL for high range

PRINCIPLE OF OPERATION

Water acidity determination is based on the neutralization of all acidic species contained in water samples by titration with base solutions (the titrant alkaline reagent):

$$H^+ + OH^- \rightarrow H_2O$$

In an ideal solution, the end point of an acid titration corresponds stoichiometrically to the complete neutralization of the acids present.

Water acidity results from strong and weak acids, and from the hydrolysis of salts. Due to these more complex mixtures, end points for water acidity are arbitrarily fixed on practical considerations. Unpolluted surface waters contain carbon dioxide as the main acidic component and titration of these samples corresponds to stoichiometric neutralization of carbonic acid (titration to 8.3 pH at 25°C degrees). Strong acidity of the polluted waters is determined by titration to 3.7 pH. If the samples are suspected to contain hydrolizable salts or polyvalent cations (such as chromium, iron, manganese), it is necessary to pretreat the samples with a HI 84430-58 reagent (see Sample preparation /Titration).

A potentiometric acid-base titration employs an indicator electrode (such as a pH sensor) to establish the end point of the titration.

The **HI 84430** minititrator is designed to determine the acidity of waters by potentiometric titration in a low range (15-500mg/mL as $CaCO_3$) and in a high range (400-4000mg/mL as $CaCO_3$).

Both Strong and Total acidity can be determined by the **HI 84430**, however the actual sample pH may limit your choice. If the measured pH is lower than 3.7 both total and strong acidity can be determined. If the sample pH is greater than 3.7 only total acidity can be determined.

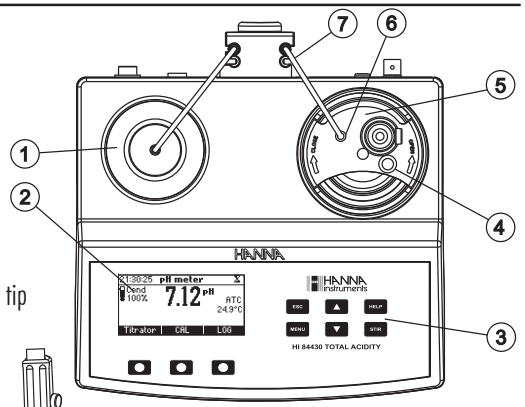
The **HI 84430** utilizes two different titrant solutions to cover the entire measurement range. The titrants used have different concentrations, appropriate for each work range. Low Range measurements use HI 84430-50 titrant. High Range measurements use HI 84430-51 titrant. If the range is changed, the titrant and the tube set must be changed and the peristaltic pump must be purged and recalibrated. The standard solution (HI 84430-55M) is used for pump calibration for both working ranges, but the pump calibration solution volume used is different.

Titratable Acidity in waters, as performed on the **HI 84430** minititrator, utilizes a simple sample preparation, a high quality peristaltic dosing pump for titrant, potentiometric endpoint detector and instantaneaous computations. To maintain the high precision of the titrator, a simple pump calibration procedure is required. A range change requires different titrant and a pump recalibration. The pump calibration involves the analysis of a known volume of a known solution (standard provided) and compensates for changes in pump dosing that may occur due to many factors including tube stretching or aging. This procedure should be performed regularly.

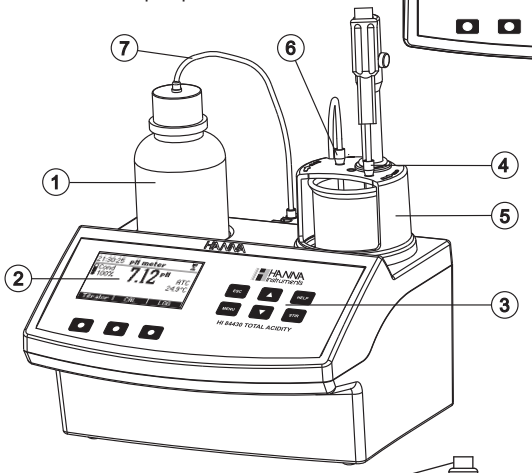
FUNCTIONAL AND PHYSICAL DESCRIPTION

OVERHEAD VIEW

1. Titrant bottle
2. Graphic LCD
3. Keypad
4. Dedicated guide tube for Temperature Probe
5. Electrode holder
6. Dedicated guide tube for titrant tip
7. Peristaltic pump tube

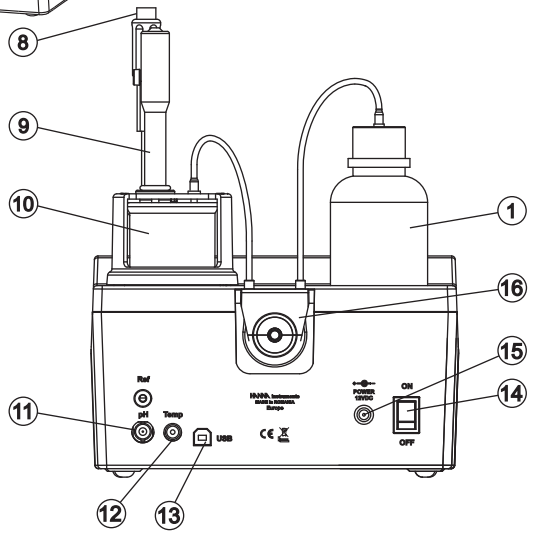


FRONT VIEW

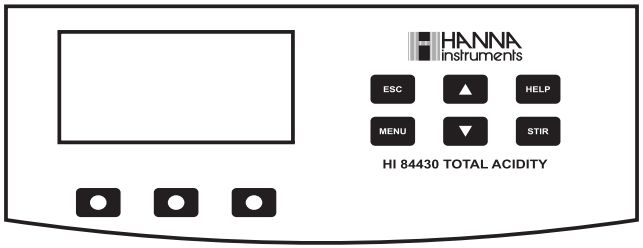


REAR VIEW

8. Temperature probe
9. pH Electrode
10. Beaker
11. BNC electrode connector
12. Temperature probe socket
13. USB connector
14. Power switch
15. Power adapter connector
16. Peristaltic pump



KEYPAD FUNCTION AND INDICATORS



ESC - used to leave the current screen and to return either to the previous screen or to the main screen. When pressed while modifying a parameter within the **SETUP** menu, exits parameter without changing it.

▼/▲ - used to modify the parameters' values, to scroll the information displayed while viewing a help or to move between the options from the instrument's **SETUP**

HELP - used to access/leave the instrument's contextual help

MENU - used to enter **SETUP**, **Recall** or **GLP** selection menu, while instrument is in **pH** or **Titration** main screen

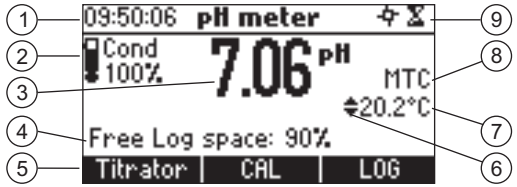
STIR - used to start/stop the stirrer.

Note: The stirer starts automatically during pump calibration and titration and cannot be stopped by pressing **STIR** key.

GUIDE TO INDICATORS

During the instrument's operation a set of information is displayed on the LCD.
Displayed icons:

⧗	Unstable reading.	▬	Pump running.
⏚	Stirrer on.	▲▼	Parameter can be changed.



1. Current time and instrument mode information (pH meter or Titrator)
2. pH electrode condition information
3. Main reading information
4. Instrument status information

5. Functional key area
6. Indicates that the displayed value can be changed using ARROW keys
7. Temperature value (°C, °F)
8. pH temperature compensation mode (Manual or Automatic)
9. Stirrer and reading status area

PERISTALTIC PUMP

Peristaltic pumps are self priming. Liquid never contacts the pump components. The titrant tubing is pressed along the rotating rollers of the pump. The rollers compress the tubing, driving the titrant to the dispensing tip.

TITRATOR STARTUP

This is a general outline of the steps required to make a titration. The following sections expand upon each section.

- Place the instrument on a flat table. Do not place the instrument in direct sun light.
- Connect the power adapter to the instrument.
- Turn the instrument ON using the power switch from the rear panel of the instrument.
- Set up the instrument. See the "Setup Configuration Menu" section for details. Pay attention to the Acidity Type.
- Connect the pH electrode and the temperature probe to the instrument.
- Calibrate the pH electrode. At least a single point calibration is necessary for titration.
- Place the peristaltic pump tube on the pump (inlet tube is connected with the reagent bottle, outlet tube is connected with the dosing tip). See the "Pump Tube Replacement" section for the procedure.
- Remove the reagent bottle cap and replace the bottle cap with the tubes. Place the reagent bottle in the appropriate place on the titrator top.
- Purge the titrant.
- Calibrate the pump.
- Prepare the sample.
- Run a titration and log sample results.

SETUP CONFIGURATION MENU

The titrator's setup configuration menu may be accessed from the pH or titration screens by pressing the **MENU** key, then **Setup**.

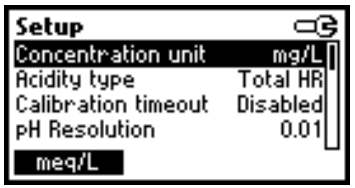
A list of setup parameters will be displayed with currently configured setting.

While in the setup menu it is possible to modify the instrument's operation parameters. The **ARROW** keys permit the user to scroll the setup parameters.

Press **HELP** to view the contextual help.

Press **ESC** to return to the main screen.

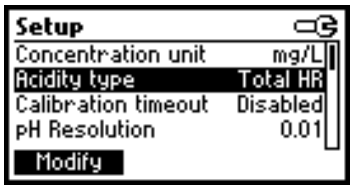
Concentration unit



Options: **mg/L**, **meq/L**.

Press the corresponding function key to change the option.

Acidity type



Options: **Total LR** (total acidity low range)
Total HR (total acidity high range)
Strong LR (strong acidity low range)
Strong HR (strong acidity high range)

Press the corresponding function key to change the option.

From your knowledge of expected concentrations, use the table below to determine which settings are appropriate:

Acidity Type		Total LR	Strong LR	Total HR	Strong HR
Measurement range	mg/L $CaCO_3$	15-500	15-500	400-4000	400-4000
	meq/L $CaCO_3$	0.3-10.0	0.3-10.0	8-80	8-80
Pump calibration solution (HI 84430-55M)		2 mL	2 mL	20 mL	20 mL
Titrant required		HI 84430-50	HI 84430-50	HI 84430-51	HI 84430-51
Sample size (mL)		50	50	50	50
Minimum pH of sample		<8.3	<3.7	<8.3	<3.7
End point of titration		8.3 pH	3.7 pH	8.3 pH	3.7 pH

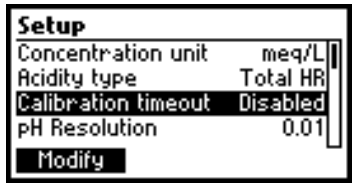
Use Total LR or Strong LR for waters acidity in the 15 - 500 mg/L range.

Use Total HR or Strong HR for waters acidity in the 400 - 4000 mg/L range.

Use the appropriate titrant for each range.

Also, the pump must be recalibrated when the measurement range is changed.

Calibration timeout



Options: **Disabled** or **1 to 7 days**.

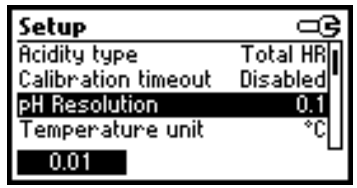
This option is used to set the number of days before the pH calibration expired warning message is flagged.

Press **Modify** to access the calibration timeout value modify parameter.

Use the **ARROW** keys in order to increase/decrease the value.

Press **Accept** to confirm or **ESC** to return to the setup menu without saving the new value.

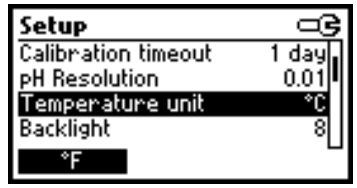
pH resolution



Options: **0.1**, **0.01**.

Press the displayed function key in order to change the pH resolution.

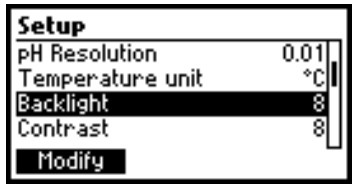
Temperature unit



Options: **°C**, **°F**.

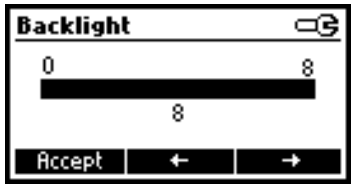
Press the function key in order to change the temperature unit.

Backlight



Options: **0** to **8**.

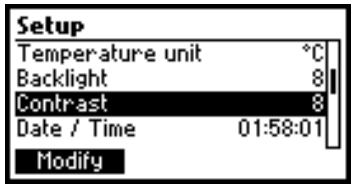
Press **Modify** to access the backlight level.



Use the **ARROW** keys or ← / → in order to increase/decrease the displayed constrast.

Press **Accept** to confirm or **ESC** to return to the setup menu.

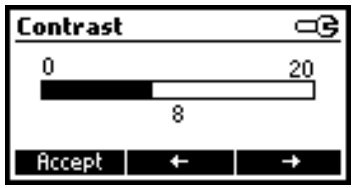
Contrast



Option: 0 to 20.

This option is used to set the display's contrast.

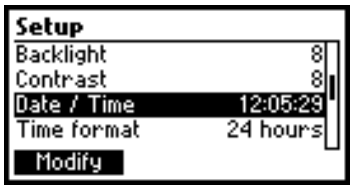
Press **Modify** to change the display's contrast.



Use the **ARROW** keys or ← / → in order to increase/decrease the value.

Press **Accept** to confirm the value or **ESC** to return to the setup menu.

Date / Time



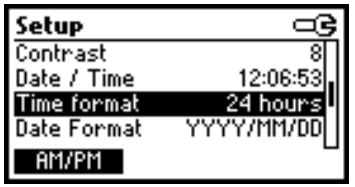
This option is used to set the instrument's date and time.

Press **Modify** to change the date/time.

Press ← / → to highlight the value to be modified (year, month, day, hour, minute or second). Use the **ARROW** keys to change the value.

Press **Accept** to confirm the new value or **ESC** to return to the setup.

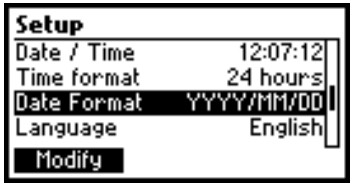
Time format



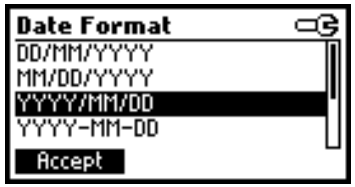
Option: AM/PM or 24 hours.

Press the functional key to select the new value.

Date format



Press **Modify** to change the Date Format.



Use the **ARROW** keys to select the desired format.

Press **Accept** to confirm the value or **ESC** to return to the setup menu.

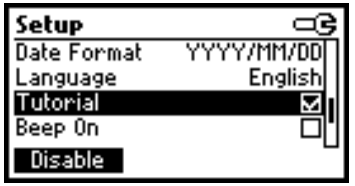
Language

Press the corresponding function key to change the language.

If the new selected language cannot be loaded, the previously selected language will be reloaded.

If no language can be loaded at startup the instrument will work in the "**safe mode**". In "**safe mode**" all the messages are displayed in English and tutorial and help information are not available.

Tutorial

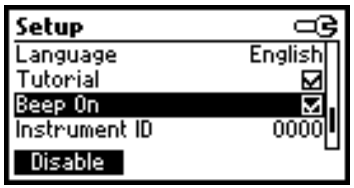


This option is used to enable/disable tutorial mode.

If enabled this option will provide the user short guides on the screen.

Press the function key to select this option.

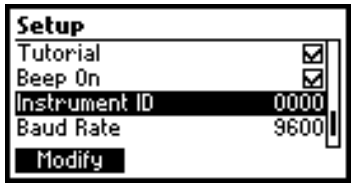
Beep On



Press the function key to select the new option. When enabled, a short beep is heard every time a key is pressed or when the calibration can be confirmed.

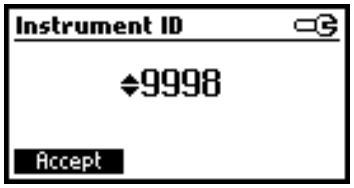
A long beep alert sounds when the pressed key is not active or a wrong condition is detected while in calibration.

Instrument ID



Option: 0 to **9999**.

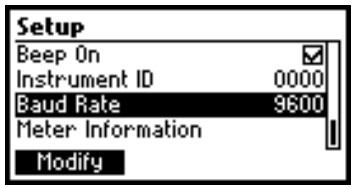
This option is used to set the instrument's ID. The instrument ID is used while exchanging data with a PC.



Press **Modify** to access the instrument ID screen.

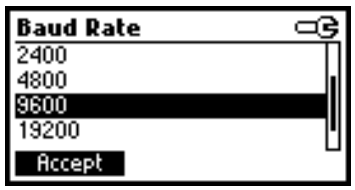
Press **ARROW** in order to select the desired value between 0 and 9999. Press **Accept** to confirm the value or **ESC** to return to the setup menu without saving the new value.

Baud rate



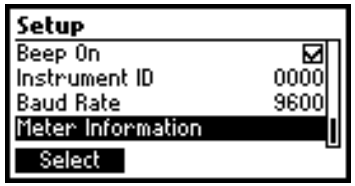
Options: 600, 1200, 2400, 4800, 9600, 19200, 38400 bps.

This parameter is used for setting the speed of the serial link between the instrument and a PC. Both must use the same setting.



Press **Modify** to access the baud rate screen. Use **ARROW** to scroll through baud rate values and press **Accept** to confirm the selection or **ESC** to return to the setup menu without saving the new value.

Meter information



Press **Select** to view the firmware version, language version, mV factory calibration date and time and temperature factory calibration date and time.

Press **ESC** to return to the **Setup** mode.

ELECTRODE PREPARATION

PREPARATION PROCEDURE

Remove the electrode protective cap.

DO NOT BE ALARMED IF ANY SALT DEPOSITS ARE PRESENT. This is normal with electrodes and they will disappear when rinsed with distilled water.

During transport tiny bubbles of air may have formed 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 is dry, soak the electrode in **HI 70300** Storage Solution for at least one hour.

ELECTRODE CALIBRATION PROCEDURE

It is recommended to calibrate the instrument frequently, especially if high accuracy is required. The pH electrode should be recalibrated:

a) Whenever the pH electrode is replaced

b) At least once a week

c) After testing aggressive chemicals and after electrode is cleaned

d) When high accuracy is required

e) If the pH calibration expired warning is displayed during measurement. Every time you calibrate the instrument clean the electrode (see the "pH Cleaning Procedure" section) and use fresh buffers.

PROCEDURE

A single, two or three-points calibration can be performed, using the three predefined buffers 1.68, 4.01 and 8.30 pH. For a single point calibration any of the three buffers may be used, but using 8.30 pH is recommended.

Note: The HI 84430 will not accept other pH buffers for calibration.

- Pour small quantities of selected buffer solutions into clean beakers. For accurate calibration use two beakers for each buffer solution, the first one for rinsing the electrode and the second one for calibration.
- Put a magnetic stir bar in each beaker with the calibration buffer solution.
- Remove the protective cap, open the fill hole and rinse the electrodes with some of the buffer solution to be used for the first calibration point.
- Put the first beaker with calibration buffer in the beaker holder.
- Place the electrode holder on the top of the beaker and secure it by turning clockwise.
- Insert the temperature probe into the dedicated tube guide.
- Immerse the pH electrode and the temperature probe approximately 2 cm (0.8") into the buffer paying attention not to touch the stir bar.

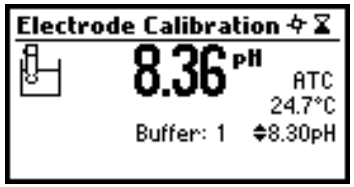
To select **Electrode calibration** screen follow the next steps:

- From **pH meter** screen press **CAL** function key then **Electrode**.
- From **Titrator** screen press **CAL** function key then **Electrode**.
- The electrode calibration screen will be displayed.

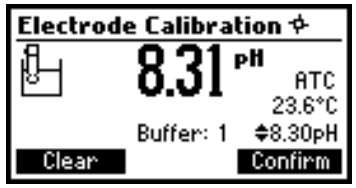
Point 1 calibration

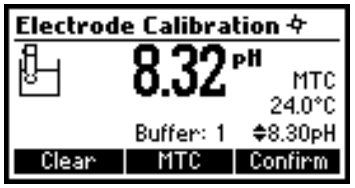
- The 8.30 buffer will be selected by default. If necessary press the **ARROW** keys in order to select a different buffer value.
- The Σ (unstable measurement) symbol will be shown on the display until the reading becomes stable.

• When the reading is stable and close to the selected buffer, the ⧗ (unstable measurement) symbol will disappear and the **Confirm** key will become active.



• Press **Confirm** to confirm the calibration.
• Press **ESC** to exit calibration.

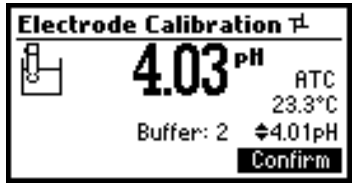


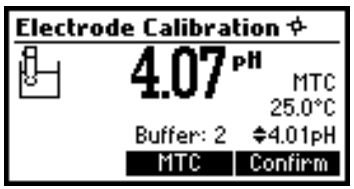


Notes: • To clear a previous calibration and to return to the default value, press **Clear** at any time after entering calibration mode. The "**Calibration cleared**" message will be shown for a few seconds on the display. If **Clear** is invoked during the first calibration point the instrument returns to the measurement mode.
• The **Clear** key is displayed only if a previous calibration exists.

Point 2 calibration

• The calibrated value will be shown on the display and the second expected buffer value will be displayed.
• Remove the electrode holder with electrodes from the top of the beaker.
• Place the second buffer into the beaker and place in beaker holder. Rinse the electrodes in a beaker containing the second buffer rinsing solution.
• Place the electrode holder (with electrodes) on the top of the beaker, lock cap by turning.
• If necessary press the **ARROW** keys in order to select a different buffer value.
• The ⧗ (unstable measurement) symbol will be shown on the display until the reading becomes stable.
• When the reading is stable and close to the selected buffer, the ⧗ (unstable measurement) symbol will disappear and the **Confirm** key will become active.



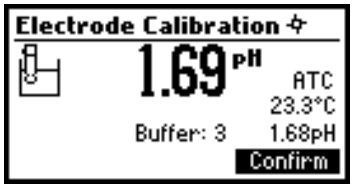


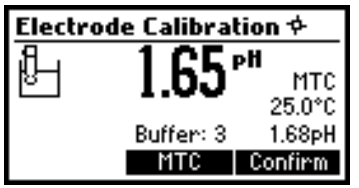
• Press **Confirm** to confirm the calibration.

• The calibrated value will be shown on the display and the third expected buffer value will be automatically selected.
• After the second calibration point has been confirmed, press **ESC** to exit without performing the third calibration point.

Point 3 calibration

• Remove the electrode holder with electrodes from the top of the beaker.
• Place the third buffer solution in a beaker and place in beaker holder. Rinse the probes in a beaker with third buffer rinsing solution.
• Place the electrode holder (with electrode) in the beaker with third buffer and secure top by locking. Press **STIR**.
• If necessary press the **ARROW** keys in order to select correct buffer value.
• The ⧗ (unstable measurement) symbol will be shown on the display until the reading becomes stable.
• When the reading is stable and close to the selected buffer, the ⧗ (unstable measurement) symbol will disappear and the **Confirm** key will become active.

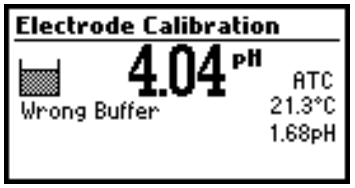




• Press **Confirm** to confirm the calibration. The instrument stores the calibration value and returns to pH meter/titrator calibration menu, where the date and time for the last pH calibration will be updated.

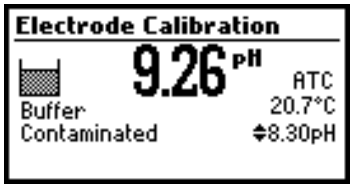
Notes:

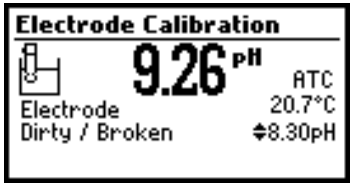
• A buffer confirmed during the calibration process is removed from the list of calibration buffers available for further calibration points.
• If the value measured by the instrument is not close to the selected buffer a "**Wrong Buffer**" error message will be shown on the display.



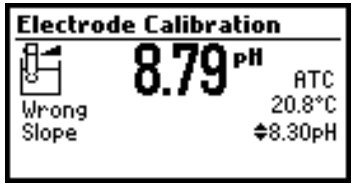
Check if the correct buffer has been used or regenerate the pH electrodes by following the Cleaning Procedure (see the "pH Cleaning Procedure" section). If necessary change the buffer or the electrode.

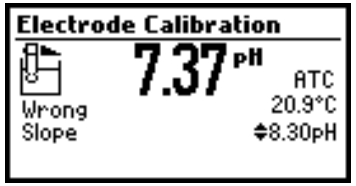
- If the measured offset isn't within the preset limits the meter will display the message **"Buffer Contaminated"** alternatively with **"Electrode Dirty/Broken"**.



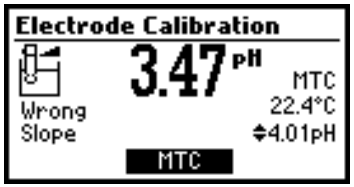


- If the computed slope isn't within the preset limits the meter will display the message **"Wrong Slope"**. If the slope is too high the symbol ◢ will be displayed. If the slope is too low the symbol ◣ will be displayed.



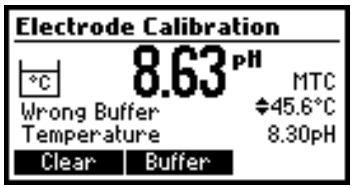


- If the **"Wrong Old Slope"** error message is displayed, an inconsistency exists between the current and the previous (old) calibration. Clear the calibration parameters by pressing **Clear** and proceed with calibration from the current calibration point. The instrument will keep all the



confirmed values during the current calibration point.

- If the temperature reading is out of the defined temperature range of the buffer (0 to 45°C)



the **"Wrong Buffer Temperature"** error message will be displayed, and the symbol °C will blink on the display. Calibration cannot be confirmed in this situation.

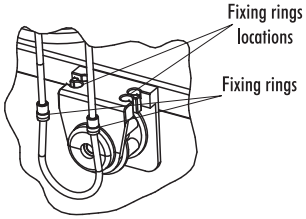
pH BUFFER TEMPERATURE DEPENDENCE

The temperature has an effect on pH. The calibration buffer solutions are affected by temperature changes to a lesser degree than normal solutions. During calibration the instrument will automatically calibrate to the pH value corresponding to the measured or set temperature.

During calibration the instrument will display the pH buffer value at 25 °C.

TEMP		pH BUFFERS		
°C	°F	1.68	4.01	8.30
0	32	1.67	4.01	8.48
5	41	1.67	4.00	8.44
10	50	1.67	4.00	8.41
15	59	1.67	4.00	8.37
20	68	1.68	4.00	8.33
25	77	1.68	4.01	8.30
30	86	1.68	4.02	8.27
35	95	1.69	4.03	8.24
40	104	1.69	4.04	8.21

PUMP TUBE INSTALLATION



To mount the new peristaltic pump tube set follow next steps:

- Position one peristaltic pump fixing ring on its location.
- Stretch the tube over the peristaltic pump rolls.
- Attach the second pump fixing ring on its location.
- Attach the tube to the reagent bottle. Choose which titrant is required for expected range. See table in Acidity Type section.

Note: Purge the peristaltic pump until drops of reagent appears on the dosing tip by pressing the **PURGE** key from the titrator main screen.

To remove the tube of the peristaltic pump follow next steps:

Caution: Purge line with water to remove titrant solution from tube.

- Detach the tubes system from the reagent bottle.
- Grasp one fixing ring of the peristaltic pump tube.
- Pull the tube until the fixing rings are taken out from their location.
- Remove the other side of the tube.

PURGE

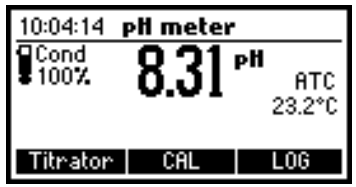
Purging should be performed:

- whenever the tube of the peristaltic pump is replaced;
- whenever the titrant is changed or a new bottle of titrant is used;
- before starting a pump calibration;
- before starting a lot of titrations.

In order to start purging press the **Purge** key from the titrator main screen. The purging stops automatically after 5 minutes.

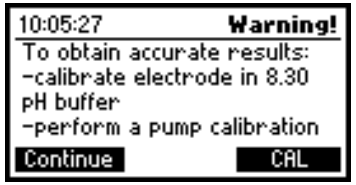
To access the **Purge** key follow the next steps.

- From the instrument main screen (pH meter screen) press "Titrator" function key.



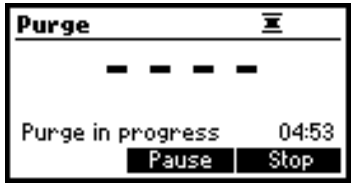
The instrument will display the next screen if tutorial is enabled and if any of the following conditions exist:

- the meter hasn't been calibrated in 8.30 pH buffer
- the pH calibration has expired
- a pump calibration hasn't been performed or more than 3 days have passed since the last pump calibration



- Press **CAL** to access the titration calibration menu where electrode and pump calibration may be accessed.
- Press **HELP** to view the contextual help.
- Press **Continue** or **ESC** to skip the message and enter titrator main screen.

- Press **Purge** to begin a purge cycle.



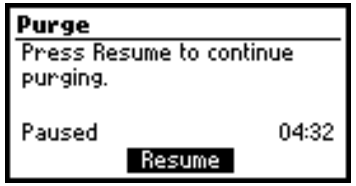
The purging stops automatically after 5 minutes.

To stop purging at any time and return to the main screen press **ESC** or **Stop**.

During a purge, a countdown timer displays remaining time in 5 minute purge.

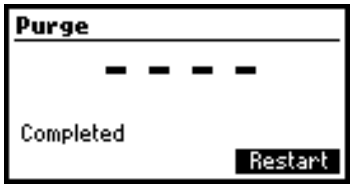
- Press **Pause** to interrupt the purge process.
- Press **Pause** or **Stop** (by pressing the corresponding function key in the purge screen)
  - after the first drops of fresh titrant appear at the dosing tip
  - in case an error condition is observed (empty titrant bottle, tubes or dosing tip disconnected, pump error)
  - if you want to resume at a later time

If **Pause** is pressed the next screen is displayed:



Press **Resume** to continue purging.

After the 5 minutes purging interval has elapsed the **"Completed"** message is displayed. Another purge period can be initiated by pressing **Restart** or press **Esc** to return to main titrator screen.



PUMP CALIBRATION PROCEDURE

Please set up the instrument before performing the pump calibration.

- Select the acidity type in SETUP menu to correspond with expected sample:

UNIT	Low Range (50 mL sample)	High Range (50 mL sample)
mg/L	15.0 to 500.0	400 to 4000
meq/L	0.3 to 10.0	8 to 80

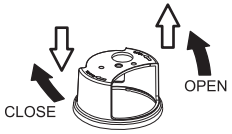
The calibration of the pump must be performed each time the pump tube, the reagent bottle or the pH electrode is changed. It is recommended to perform the pump calibration before each set of titrations.

Verify: The electrode has been calibrated in 8.30 pH buffer.

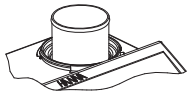
- **Sample preparation:** Precisely measure the amount of **HI 84430-55 Pump Calibration Solution** as indicated below and add to a clean beaker:

Low Range (Strong LR, Total LR) - 2 ml
High Range (Strong HR, Total HR) -20 ml

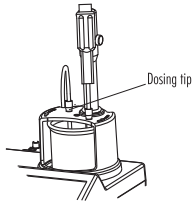
Fill the beaker up to the 50 mL mark with the distilled or deionized water. Place the stir bar into the beaker and then place the beaker in the appropriate place on the instrument top.



- Place the electrode holder on the top of the beaker and secure it by turning clockwise.

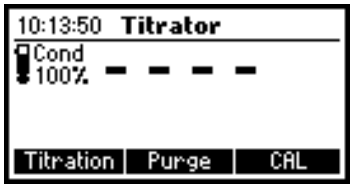


- Immerse the pH electrode approximatively 2 cm (0.8") into the standard paying attention not to touch the stir bar.
- Insert the temperature probe into the dedicated guide tube.
- Verify if the titrant correspondes to selected titration range.
  For Low Range (Strong LR, Total LR) use the **HI 84430-50**.
  For High Range (Strong HR, Total HR) use the **HI 84430-51**.
- Carefuly insert the dosing tip into the dedicated guide tube.

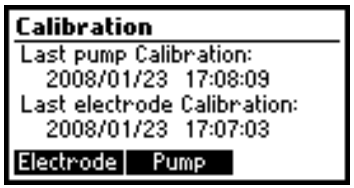


Note: The chemical reagents may be hazardous if improperly handled. Read Health and Safety Data Sheets before performing the test.

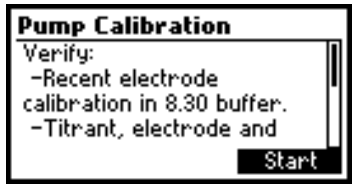
- From the titrator main screen press **CAL**.



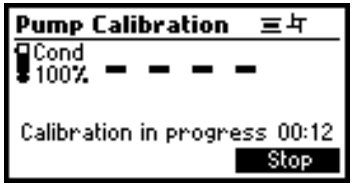
The instrument displays the date and time of the last electrode calibration, and the date and time of the last pump calibration, or calibration expired messages.



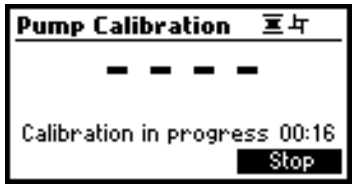
- Press **Pump**.
  The next screen will be displayed.



- Press **Start**.
- After the pump calibration is started, on the upper right side of the display two animations will be shown in order to indicate that the pump and the stirrer are working. On the lower right side of the display is shown the amount of time that has passed since the beginning of the calibration.



• After the pump calibration is complete a confirmation message is displayed for a few seconds, then the instrument will return to the titrator calibration menu and will display the new time and date for the last pump calibration.



Notes: • The calibration of the pump is dependent on acidity range selected during SETUP.

• If an erroneous situation is encountered during the calibration, an error message is displayed and the calibration can be restarted by pressing **Restart**.

• If the calibration doesn't complete within 6 minutes the error message "**Too much standard**" will be displayed and the calibration can be restarted by pressing **Restart** after a new standard is prepared.

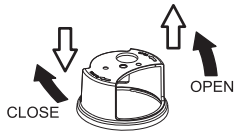
TITRATION PROCEDURE

Verify: The instrument has been calibrated (pH and pump) before performing a lot of titrations. An electrode calibration in at least one point (8.30 pH buffer) is recommended.

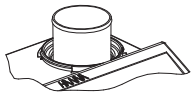
• **Sample preparation:** For all measurement samples, pour 50 mL of sample into the beaker provided. Place the stir bar into the beaker and then place the beaker in the appropriate place on the instrument top.

Notes: • Water samples must be collected and stored in capped botlles. Avoid disturbing any sediment in the sample.

• For samples containing metallic ions (iron, aluminium, chromium, manganesse) it is neccesary to add few drops (4-5) of an additional reagent (**HI 84430-58**) in order to increase the rate of hydrolysis at the metal ions present. Boil the solution 2-4 minute and cool to room temperature before titration.

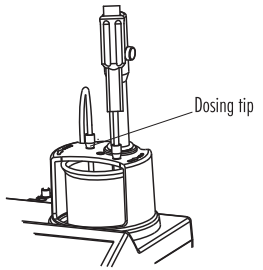


• Place the electrode holder on the top of the beaker and secure it by turning clockwise.



• Insert the temperature probe into the dedicated guide tube.

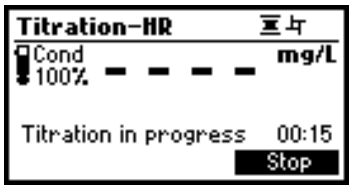
• Immerse the pH electrode approximatively 2 cm (0.8") into the sample to be tested paying attention not to touch the stir bar. Use **O-Rings** provided to secure the pH electrode in holder.



• Insert the dosing tip in the appropriate holder place.

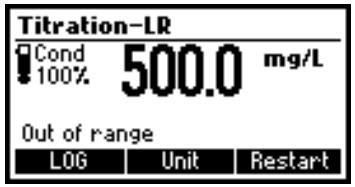
- From the titrator main screen press **Titration**. To enter titrator main screen from pH meter mode press **Titrator** and then **Titration**. If the tutorial is enabled this screen will be shown.

- Press **Start** to begin the titration process.
- After the titration is started two animations will be shown on the upper right side of the display to indicate that the pump and the stirrer are running. On the lower right side of the display is shown the period of time since the titration has been started.



- After the titration is complete, the concentration value is displayed in the selected unit.

- Press **Unit** to change the display unit.
- Press **LOG** to record the concentration value into the instrument's memory.
  A message will be displayed for a few seconds indicating the amount of the free log space. 50 log samples can be recorded in the instrument's memory. When the titrator free log space is under 12% the message will be shown permanently.
- If the concentration is out of limits an exceeded range limit message will be displayed blinking and the message "**Out of range**" will be shown. Another titration can be initiated by pressing **Restart**. Prepare a fresh sample and then press **Restart.**



Note: If the end-point is not reached or it is not recognized or the input reading is out of range, an error message will be displayed. The titration can be restarted after a new sample is prepared by pressing **Restart**.

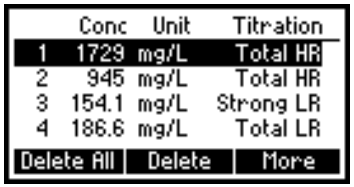
TIPS FOR AN ACCURATE MEASUREMENT

- Calibrate the instrument in 8.30 pH buffer solution at least once a day, before you start to perform measurements.
- Purge the peristaltic pump to have the fresh titrant when starting a new calibration.
- Calibrate the peristaltic pump daily before performing a set of analyses.
- Clean the electrode in order to remove the possible coating from bulb.
- Precision of the measurement can be improved by using volumetric pipets for standard and sample additions.

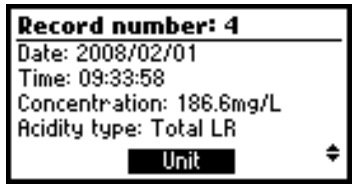
VIEW/DELETE TITRATOR RECORDED LOG DATA

Press **MENU** key while in Titrator main screen.

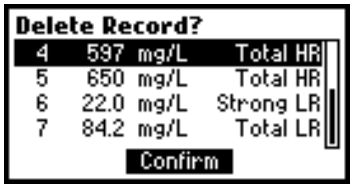
Press **Recall** to access the titrator recorded data.
The instrument will display a list of all the titration records stored in the titration log.
Use the **ARROW** keys to scroll the stored records list.
If the saved concentration was out of range the "**!**" symbol is displayed in front of the reading.



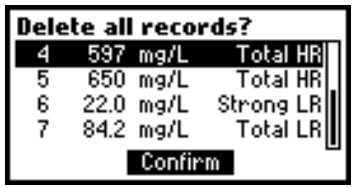
Press **Delete** to enter record deleting mode.
Press **Delete All** to enter all records deleting mode.
Press **More** to view more information.



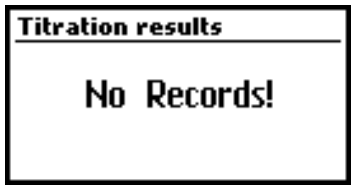
Press **Unit** to convert the result to other unit.
Use the **ARROW** keys when ▲▼ is displayed to scroll between the log records.
Press **ESC** to return to the previous screen.
If **Delete** was pressed the instrument will ask for confirmation.



Use the **ARROW** keys to focus on the record to be deleted.
Press **Confirm** to delete the record or **ESC** to return to the previous screen.
Deleting a record will renumber the list of records.
If **Delete All** was pressed the instrument will ask for confirmation.



Press **Confirm** to delete all the records or **ESC** to return to the previous screen.

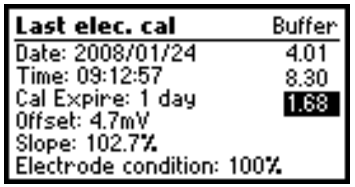


If the titrator log is empty the message "**No Records!**" will be displayed.

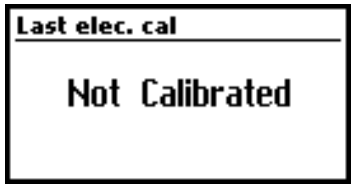
TITRATOR GLP INFORMATION

Press **MENU** while in **Titration** mode and then **GLP**.

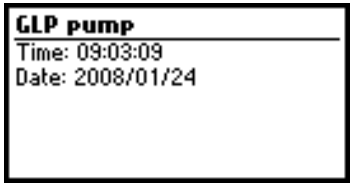
From this screen it is possible to select between viewing the **electrode GLP** or the **pump GLP**.
Press **GLP elec.** to view the **electrode's last calibration parameters and date**.
Press **GLP pump** to view the **pump's last calibration time and date**.
If **GLP elec.** is pressed one of the next screens will be displayed.



GLP contains a set of information regarding electrode calibration. The following items are included in electrode GLP: the time and date of the last calibration, offset, slope, electrode condition, calibration timeout and the calibration buffers. The buffers displayed in video inverse mode are from the previous calibration.
If a calibration hasn't been performed the message "**Not Calibrated**" will be displayed.

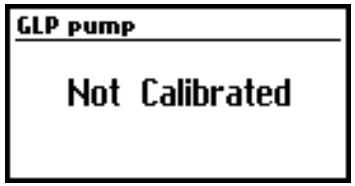


If GLP pump is pressed, one of the next screens is displayed.



The pump **GLP** displays the Time and Date of the last pump calibration.

If a calibration hasn't been performed the message **"Not Calibrated"** will be displayed.



pH MEASUREMENT

The **HI 84430** may be used as a pH meter for direct measurements.

Verify that the instrument has been calibrated before taking pH measurements. Set the instrument to **pH meter**. At power up the instrument enters **pH meter** mode. From titrator mode press ESC until pH units are displayed.

If an electrode calibration hasn't been performed, or the number of days exceedes calibration time out value set, the message **"CAL DUE"** will blink on the left side of the display (see **Calibration timeout** option in **Setup** for details).

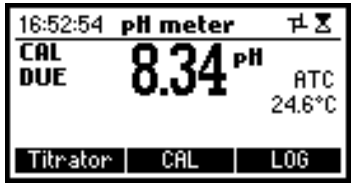
If **CAL DUE** is displayed perform an electrode calibration.

Place calibrated pH electrode into electrode holder. Open the fill hole.

Rinse the pH tip with distilled or deionized water. Immerse the pH electrode (bottom 2 cm / 0.8") in the sample and stir gently for a few 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. Press LOG to record sample pH in instrument pH log.

Press **MENU** to access the instrument's menu.



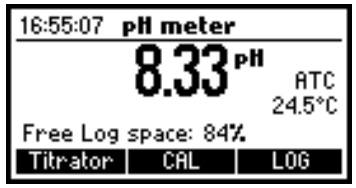
Press **HELP** to view the contextual help, every time you need supplementary information. The help is customized for every situation that can appear during instrument usage.

Press **STIR** to start/stop the stirrer.

Press **Titrator** to enter titrator mode.

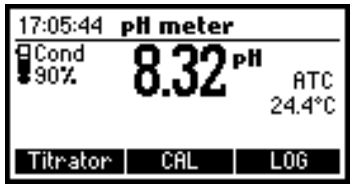
Press **CAL** to access the calibration menu.

Press **LOG** to memorize the current reading. A message indicating the free log space will be displayed for a few seconds.



In order to take pH measurements follow the next steps:

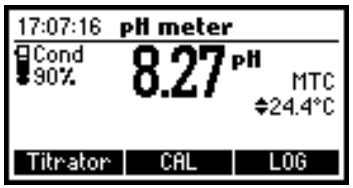
- Submerge the pH bulb 2 cm (0,8") and the temperature probe into the sample to be tested and stir gently. Allow time for the electrode to stabilize. When the reading becomes stable the ⧗ (unstable measurement) symbol will disappear.



- If the pH reading is less then -2.00 pH or greater then 16.00 pH the closest full-scale value (-2.00 pH or 16.00 pH) will be displayed blinking.

If measurements are taken successively in different samples, it is recommended to rinse the electrodes thoroughly with deionized water or distilled water and then with some of the next sample to prevent cross-contamination.

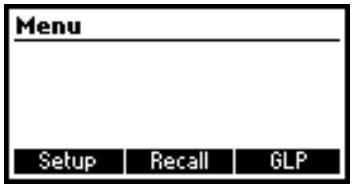
The pH measurement is affected by temperature. In order to have accurate pH measurements, the temperature effect must be compensated for. To use the Automatic Temperature Compensation (**ATC**) feature, connect and submerge the **HI 7662-M** temperature probe into the sample in the dedicated tubeguide and wait for a few seconds. The **"ATC"** message will be shown on the display. Automatic Temperature Compensation will provide pH corrected values at the temperature of measurements. If Manual Temperature Compensation (**MTC**) is desired, the temperature probe must be disconnected from the instrument. The default temperature of 25 °C (77 °F) or the last temperature reading will be displayed preceded by the symbol ▲▼ and the **"MTC"** message.



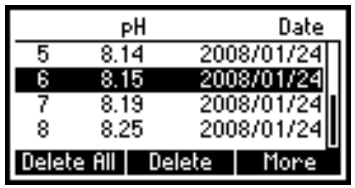
The manually set temperature can now be adjusted with the **ARROW** keys (from -20.0 to 120.0 °C).

VIEW/DELETE RECORDED pH DATA

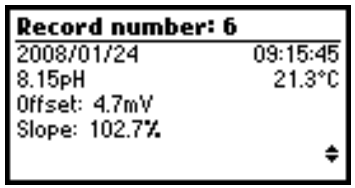
To view or delete previously logged pH records press **MENU** key while in pH meter screen.



Press **Recall** to access the pH recall.
A list of records is stored in the pH log.



Use the **ARROW** keys to scroll the list of records.
Press **More** to see detailed information about the highlighted record.
Press **Delete** to enter record deleting mode.
Press **Delete All** to enter all records deleting mode.
If **More** is pressed a complete set of data is displayed.



Use **ARROW** keys when ▲▼ is displayed to scroll between the records.
If **Delete** was pressed the instrument will ask for confirmation.

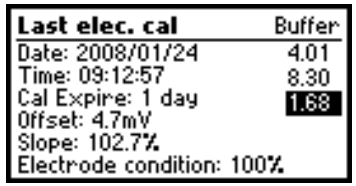
Use the **ARROW** keys to focus on the record to be deleted.
Press **Confirm** to delete the record or **ESC** to return to the previous screen without deleting.
Deleting a record will renumber the list of records.

If **Delete All** was pressed the instrument will ask for confirmation.

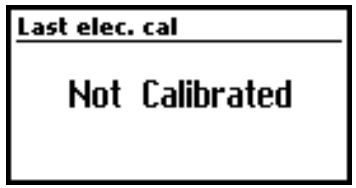
Press **Confirm** to delete all records or **ESC** to return to the previous screen without deleting.
If the pH log is empty the message **"No Records!"** will be displayed.

pH METER GLP INFORMATION

The pH meter GLP screens references the last pH calibration data. **GLP** is an acronym for **Good Laboratory Practice.**
To view this information, press **MENU** key then **GLP**.
A set of information regarding electrode calibration is displayed.



The following items are included in electrode GLP: the time and date of the last calibration, offset, slope, electrode condition, calibration timeout and the calibration buffers. The buffers displayed in video inverse mode are from the previous calibration.
If a calibration hasn't been performed the message **"Not Calibrated"** will be displayed.



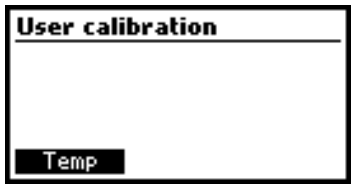
TEMPERATURE CALIBRATION PROCEDURE (for technical personnel only)

All the instruments are factory calibrated for temperature.

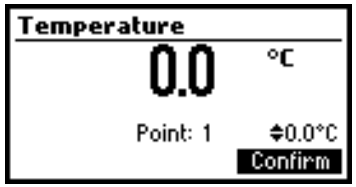
HANNA's temperature probes are interchangeable and no temperature calibration is needed when they are replaced.

If the temperature measurements are inaccurate, temperature recalibration should be performed. For an accurate recalibration, contact your dealer or the nearest HANNA Customer Service Center, or follow the instructions below.

- Prepare a vessel containing ice and water and another one containing hot water (at a temperature of around 50 °C). Place insulation material around the vessels to minimize temperature changes.
- Use a calibrated thermometer with a resolution of 0.1 °C as a reference.
- To enter user calibration screen press and hold down the **ARROW** keys simultaneously, then power on the instrument. After a few seconds the **User calibration** screen is displayed.

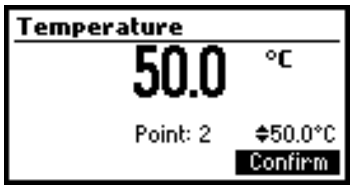


- Press **Temp** function key to enter temperature calibration.
- Immerse the temperature probe in the vessel with ice and water as near as possible to the reference thermometer. Allow a few seconds for the probe to stabilize.
- Use the **ARROW** keys to set the calibration point value to that of the ice and water measured by the reference thermometer.
- The ⧗ (unstable measurement) symbol will be shown on the display until the reading becomes stable.
- When the reading is stable and close to the selected calibration point, the ⧗ (unstable measurement) symbol will disappear and the **Confirm** key will become active.



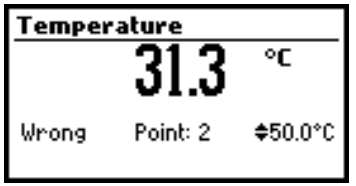
- Press **Confirm** to confirm the calibration point.
- The meter will be automatically move to the second calibration point, and will display 50 °C for the buffer value.

- Immerse the temperature probe in the second vessel as near as possible to the reference thermometer. Allow a few seconds for the probe to stabilize.
- Use the **ARROW** keys to set the calibration point value to that of the hot water, measured by the reference thermometer.
- The ⧗ (unstable measurement) symbol will be shown on the display until the reading becomes stable.
- When the reading is stable and close to the selected calibration point, the ⧗ (unstable measurement) symbol will disappear and the **Confirm** key will become active.

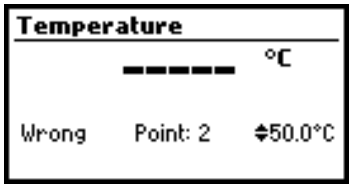


- Press **Confirm** to confirm the calibration point. The instrument will return to the pH meter/ titrator main screen.

Note: If the reading is not close to the selected calibration point, the **"Wrong"** message will be displayed. Change the temperature probe and restart the calibration.



If the temperature probe is disconnected or the measured temperature is out of the - 20 to120 °C range the instrument will display "----". The calibration point value can be changed using the **ARROW** keys.



PC INTERFACE

Data transmission from the instrument to the PC can be done with the **HI 92000** Windows compatible software (optional). **HI 92000** also offers graphing and on-line help features.

Data can be exported to the most popular spreadsheet programs for further analysis.

To connect your instrument to a PC use a standard USB connector. Make sure that your instrument is switched off and plug one connector to the instrument's USB socket and the other to the USB port of your PC.

If you are not using Hanna Instruments **HI 92000** software, please see the following instructions.

SENDING COMMANDS FROM PC

It is also possible to remotely control the instrument with any terminal program. Start the terminal program and set the communication options as follows: 8, N, 1, no flow control.

COMMAND TYPES

To send a command to the instrument follow the next scheme:

<command prefix> <comand><CR>

where <command prefix> is the ASCII character having the code 16.

<command> is the command code.

Note: Either small or capital letters can be used.

Upon reception of a command the instrument will answer with:

<STX><answer><checksum><ETX>

where the checksum is the bytes sum of the answer string, sent as 2 ASCII characters. All the answer messages are with ASCII characters.

COMMANDS

RAS Causes the instrument to send a complete set of readings in according with the current meter mode.

The answer string contains:

-Meter mode (2 chars): -00 pH meter (0.1 resolution)
-01 pH meter (0.01 resolution)
-02 titrator

-Meter status (2 chars) represents a 8 bit hexadecimal encoding.
-0x10: temperature probe connection
-0x01: new GLP data available
-0x02: new setup parameter

-Reading status (1 char): R-in range, O - over range, U - under range.
-pH reading with sign and decimal point (7 chars)
-Temperature, with sign and 2 decimals point, always in °C (7 chars).
-Checksum (2 chars)

Note: If the meter is in titrator mode only, the meter status and the checksum will be sent.

MDR Requests the instrument model name and firmware code (20 chars).

GLP Requests te calibration data record.

The answer string contains:

-GLP status (1 char): represents a 4 bit hexadecimal enconding.
-0x1-pH calibration available
-0x2- pump calibration available

-pump calibration data (if available):
-calibration time, yymmddhhmmss (12 chars)

-pH calibration data (if available):
-the number of calibrated buffers (1 char)
-reserved (2 chars)
-the offset, with sign and decimal point (7 chars)
-the average of slopes, with sign and decimal point (7chars)
-the calibration time: yymmddhhmmss (12 chars)
-buffer information (for each buffer)
-type (1 char): O-standard
-status (1 char): N (new)-calibrated in last calibration
O (old)-from an old calibration
-warning during calibration (2 chars):
00- no warning,
04- Clean Electrode warning
-buffer value, with sign and decimal point (7 chars)
-calibration time, yyymmddhhmmss (12 chars)
-electrode condition, with sign (3 chars). The "01" code means not calculated.
-Checksum (2 chars)

PAR Requests the setup parameters setting.

The answer string contains:

-Instrument ID (4 chars)

-Calibration alarm time out (2 chars)

-Concentration unit (1 char): 0=mg/L, 1=meq/L

-Acidity type (1 char): 0=Total LR, 1=Total HR, 2=Strong LR, 3=Strong HR

-SETUP information (2 chars): 8 bit hexadecimal encoding

-0x01-beep ON (else OFF)

-0x04-degree Celsius (else degrees Fahrenheit)

-Backlight value (1 char)

-Contrast value (2 chars)

-Time format (1 char): 0=24 hours, 1=AM/PM

-Date format (1 char): 0-DD/MM/YYYY
1-MM/DD/YYYY
2-YYYY/MM/DD
3-YYYY-MM-DD
4-Mon DD, YYYY
5-DD-Mon-YYYY
6-YYYY-Mon-DD

-Language name (3 chars, "sfm" when the instrument is in safe mode)

-Checksum (2 chars)

NSLx Requests the number of logged samples (4 chars).

The command parameter (1 char):

-P-request for pH meter

-T-request for titrator

LODPxxx Requests the xxxth pH record logged data

LODTxxx Requests the xxxth titrator record logged data

LODPALL Requests all the stored records from the pH meter log

LODTALL Requests all the stored records from the titrator log

The answer string for each record contains:

-Logged mode (2 chars): -00-pH meter (0.1 resolution)
-01-pH meter (0.01 resolution)
-02-titrator

-Overrage for the measured value: R-in range, O-over range, U-under range.

-Measured value (7 chars): for the pH meter log this is the measured pH value; for the titrator log this is the concentration value

-Temperature reading, with two decimal points (7 chars) (only for pH meter log)

-Calibration offset (7 chars) (only for pH meter log)

-Calibration slope (7 chars) (only for pH meter log)

-Concentration unit (1 char) (only for titrator log): 0=mg/L, 1=meq/L

-Acidity type (1 char) (only for titrator log): 0=Total LR, 1=Total HR, 2=Strong LR, 3=Strong HR

-Logged time (12 chars): **yymmddhhmmss**

-Temperature probe presence (1 char)

-Checksum (2 chars)

Notes:

-"Err8" is sent if the instrument is not in measurement mode

-"Err6" is sent if the requested range is not available

-"Err4" is sent if the requested set parameter is not available

-"Err3" is sent if the Log on demand is empty

-Invalid commands will be ignored.

TROUBLESHOOTING GUIDE

SYMPTOMS	PROBLEM	SOLUTION
Slow response/excessive drift.	Dirty pH electrode.	Soak the electrode tip in **HI 7061** cleaning solution for 30 minutes. Refill with fill solution.
Reading fluctuates up and down (noise).	Clogged/dirty junction. Low electrolyte level (refillable pH electrodes only). Cable connection.	Soak the electrode tip in **HI 7061** cleaning solution for 30 minutes Refill with fill solution. Check cable connection to meter and verify protective cap is off.
While in pH reading mode, -2.00 or 16.00 pH is displayed blinking.	Reading out of range.	Check cable connection to meter and verify protective cap is off. Check the quality of the sample. Clean the electrodes. Refill with fresh fill solution.
The meter does not accept the pH buffer solution for calibration.	Broken pH electrode.	Replace the electrode or contact the vendor.
The pump calibration can't be performed	Broken pump tubing. Wrong or contaminated pump calibration solution. Broken pH electrode.	Verify tubing is intact and solution passed when purged. Check the pump calibration solution. Verify electrode is calibrated in fresh pH buffers. Prepare another standard, purge to have fresh titrant and restart the calibration.
The temperature probe is connected, but the meter displays "MTC".	Broken temperature probe.	Replace temperature probe.
After a titration in **Low Range** the instrument displays 500 mg/L or 15meq/L (with the selected unit) blinking.	Meter setup wrong for sample. Concentration out of range.	Change acidity type under **SETUP** to High Range and change titrant. Prime and recalibrate the instrument (pump).
After a titration in **High Range** the instrument displays 400mg/L or 8meq/L (with the selected unit) blinking.	Meter configured wrong for sample analyzed. Wrong sample. Concentration out of range.	Change acidity type under **SETUP** to Low Range and change titrant. Prime and recalibrate the instrument (pump and pH). Select Low Range. Use care during sample preparation.

SYMPTOMS	PROBLEM	SOLUTION
After a titration in **High Range** the instrument displays 4000 mg/L or 800 meq (with the selected unit) blinking.	Broken electrodes. Instrument not calibrated. Wrong sample. Concentration out of range.	Check/clean the electrodes. Recalibrate the instrument (pump and pH). Use care during sample preparation.
At startup the meter displays the HANNA logo permanently.	One of the keys is stuck.	Check the keyboard or contact the vendor.
"Error xx" message is displayed.	Internal error.	Power off the meter and then power it on again. If the error persists, contact the vendor.

ELECTRODE CONDITIONING AND MAINTENANCE

STORAGE PROCEDURE

To assure a quick response time, the glass bulb should be kept moist and not allowed to dry out. Replace the solution in the protective cap with a few drops of **HI 70300** or **HI 80300** Storage Solution. Follow the Preparation Procedure section before taking measurements.

Note: NEVER STORE THE pH ELECTRODE IN DISTILLED OR DEIONIZED WATER.

PERIODIC MAINTENANCE

Inspect the electrodes and the cables. The cable used for connection to the instrument must be intact and there must be no 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.

pH CLEANING PROCEDURE

- *General* Soak in Hanna **HI 7061** or **HI 8061** General Cleaning Solution for approximately ½ hour.

IMPORTANT: After performing any of the cleaning procedures, rinse the electrode thoroughly with distilled or deionized water and soak the electrode in **HI 70300** or **HI 80300** Storage Solution for at least 1 hour before use. Recalibrate electrode before taking measurements.

ACCESSORIES

REAGENTS

HI 84430-50	Titrant solution for low range (100mL)
HI 84430-51	Titrant solution for high range (100mL)
HI 84430-55M	Pump calibration solution (230mL)
HI 84430-58	Additional reagent (30mL)
HI 84430-70	Reagents kit for low and high range (about 150 titrations)
HI 84430-71	Reagents kit for low range (about 150 titrations)
HI 84430-72	Reagents kit for high range (about 150 titrations)

pH CALIBRATION SOLUTIONS

HI 7001M	Buffer solution pH 1.68 (230mL)
HI 7004M	Buffer solution pH 4.01 (230mL)
HI 7008M	Buffer solution pH 8.30 (230mL)
HI 7001M-6	Buffer solution pH 1.68 (6 x 230mL)
HI 7004M-6	Buffer solution pH 4.01 (6 x 230mL)
HI 70083M-6	Buffer solution pH 8.30 (6 x 230mL)

ELECTRODES

HI 1131B	pH Electrode
HI 7662-M	Temperature probe

ELECTRODE FILL SOLUTION

HI 7071	Filling solution for HI 1131B (30 mL)

ELECTRODE STORAGE SOLUTION

HI 70300M	Storage Solution, 230 mL bottle

CLEANING SOLUTION

HI 7061M	Electrode Cleaning Solution, 230 mL bottle

OTHER ACCESSORIES

HI 70483M	Tube set with cap and tip for titrant bottle
HI 731319	Stir bar 25 x 7 mm (10 pcs)
HI 731342	2000µL fixed volume pipette
HI 731352	Tip for 2000µL fixed pipette (4pcs)
HI 731341	1000µL fixed volume pipette
HI 731351	Tip for 1000µL fixed pipette (25pcs)

WARRANTY

HI 84430 is warranteed for two years against defects in workmanship and materials when used for its intended purpose and maintained according to the instructions.

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

Damage due to accident, misuse, tampering or lack of prescribed maintenance is not covered.

If service is required, contact your dealer. 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.

RECOMMENDATION FOR USERS

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

Operation of this instrument may cause unacceptable interferences to other electronic equipments, this requiring the operator to take all necessary steps to correct interferences.

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

To avoid damages or burns, do not put the instrument in microwave ovens. For yours and the instrument safety do not use or store the instrument in hazardous environments.

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

SALES AND TECHNICAL SERVICE CONTACTS

Australia:
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Tel. (10) 88570068 • Fax (10) 88570060

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Tel. (210) 823.5192 • Fax (210) 884.0210

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Tel. (401) 765.7500 • Fax (401) 765.7575

For e-mail contacts and a complete list of Sales and Technical offices, please see ***www.hannainst.com****.*

MAN84430R1
03/08