

# HI83326

## Multiparameter Photometer for Pool & Spa



# INSTRUCTION MANUAL

Dear  
Customer,

Thank you for choosing a Hanna Instruments product.

Please read this instruction manual carefully before using this instrument.

This manual will provide you with the necessary information for correct use of this instrument, as well as a precise idea of its versatility.

If you need additional technical information, do not hesitate to e-mail us at [tech@hannainst.com](mailto:tech@hannainst.com) or view our worldwide contact list at [www.hannainst.com](http://www.hannainst.com).

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## 1. PRELIMINARY EXAMINATION

Remove the instrument and accessories from the packaging and examine it carefully. For further assistance, please contact your local Hanna Instruments Office or email us at [tech@hannainst.com](mailto:tech@hannainst.com). Each HI83326 is delivered in a rugged carrying case and is supplied with:

- Sample cuvette (4 pcs.)
- Sample cuvette cap (4 pcs.)
- Cloth for wiping cuvettes
- Scissors
- 100 mL graduated beaker
- USB cable
- 5 Vdc power adapter
- Instrument quality certificate
- Instruction manual

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

## 2. SAFETY MEASURES



- The chemicals contained in the reagent kits may be hazardous if improperly handled.
- Read the Safety Data Sheets (SDS) before performing tests.
- Safety equipment: Wear suitable eye protection and clothing when required and follow instructions carefully.
- Reagent spills: If a reagent spill occurs, wipe up immediately and rinse with plenty of water. If reagent contacts skin, rinse the affected area thoroughly with water. Avoid breathing released vapors.
- Waste disposal: For proper disposal of reagent kits and reacted samples, contact a licensed waste disposal provider.

## 3. SPECIFICATIONS

Measurement Channels		3 x optical channels
		1 x digital electrode channel (pH measurement)
Photometer	Range	0.000 to 4.000 Abs
	Resolution	0.001 Abs
	Accuracy	$\pm 0.003$ Abs @ 1.000 Abs
	Light source	Light Emitting Diode
	Bandpass filter bandwidth	8 nm
	Bandpass filter wavelength accuracy	$\pm 1.0$ nm
	Light detector	Silicon photocell
	Cuvette types	Round, 24.6 mm diameter
	Number of methods	17
Probe	Range	-2.00 to 16.00 pH ( $\pm 1000.0$ mV)*
	Resolution	0.01 pH (0.1 mV)
	Accuracy	$\pm 0.01$ pH ( $\pm 0.2$ mV) @ 25 °C / 77 °F
	Temperature compensation	ATC, -5.0 to 100.0 °C (23.0 to 212.0 °F)*
	Calibration	two-point, from five available buffers (4.01, 6.86, 7.01, 9.18, 10.01 pH)
	Electrode	Intelligent pH / temperature electrode
Temperature	Range	-20.0 to 120.0 °C (-4.0 to 248.0 °F)
	Resolution	0.1 °C (0.1 °F)
	Accuracy	$\pm 0.5$ °C @ 25 °C ( $\pm 0.9$ °F @ 77 °F)
Additional Specifications	Logging	1000 readings (mixed photometer and electrode)
	Display	128 x 64 pixel B/W LCD with backlight
	USB-A (Host) functions	Mass-storage host
	USB-B (Device) functions	Power input, mass-storage device
	Battery life	> 500 photometer measurements or 50 hours of continuous pH measurement
	Power supply	5 Vdc USB 2.0 power adapter / type micro-B connector 3.7 Vdc Li-polymer rechargeable battery, non-serviceable
	Environment	0 to 50 °C (32 to 122 °F) 0 to 95% RH, non-serviceable
	Dimensions	206 x 177 x 97 mm (8.1 x 7.0 x 3.8")
	Weight	1.0 kg (2.2 lbs.)

\*Limits will be reduced to actual probe / sensor limits.

## 4. ABBREVIATIONS

Abs	Absorbance
GLP	Good Laboratory Practice
NIST	National Institute of Standards and Technology
EPA	US Environmental Protection Agency
g/L	grams per liter (ppt)
$\mu\text{g/L}$	micrograms per liter (ppb)
mg/L	milligrams per liter (ppm)
mL	milliliter
HR	High Range
LR	Low Range

## 5. DESCRIPTION

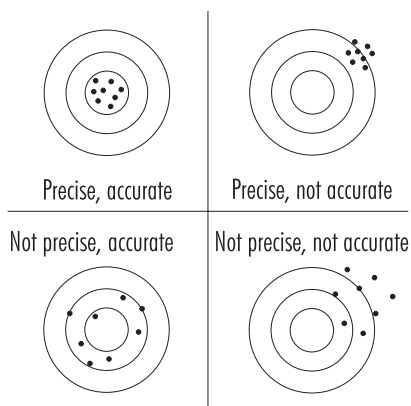
### 5.1. GENERAL DESCRIPTION & INTENDED USE

HI83326 multiparameter photometer is a compact and versatile meter with two measurement modes, Photometer and Probe. Photometer mode includes a CAL Check™ feature and 17 different methods that cover a wide variety of applications, making it ideal for both benchtop and portable operations. With the CAL Check™ feature users are able to validate the performance of the instrument and apply a user calibration (if necessary). Hanna Instruments CAL Check™ cuvettes are made with NIST traceable standards. Probe mode uses a digital pH probe with a one or two-point calibration.

- Digital electrode input for pH measurements
- Certified CAL Check cuvettes to confirm meter functionality
- Dual purpose micro-USB flash drive
- Lithium polymer rechargeable battery
- Auto-off
- Absorbance mode
- User and sample name entry
- GLP features

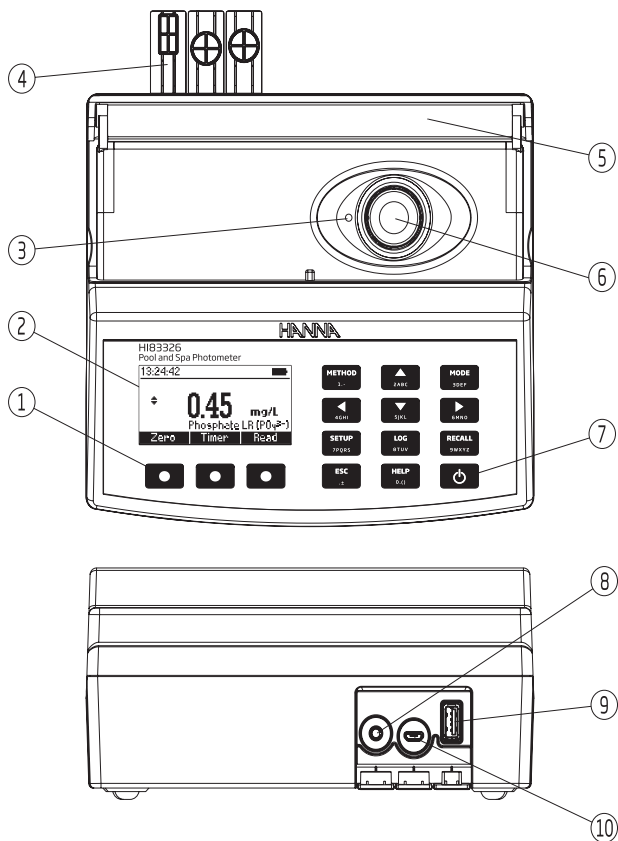
### 5.2. PRECISION & ACCURACY

Precision is how closely repeated measurements are to one another. Precision is usually expressed as standard deviation. Accuracy is defined as the closeness of a test result to the true value. Although good precision suggests good accuracy, precise results can be inaccurate. The figure explains these definitions. For each method, the accuracy is expressed in the related measurement section.


















## 5.3. FUNCTIONAL DESCRIPTION



1. Splash-proof keypad
2. Liquid Crystal Display (LCD)
3. Indexing mark
4. Protective port covers
5. Light-blocking cover panel
6. Cuvette holder
7. ON/OFF power button
8. 3.5-mm TRRS (jack) input for digital electrodes
9. Standard USB host connector for data transfer to a USB flash drive
10. Micro-USB device connector for power or PC interface

## Keypad Description

The keypad contains 12 direct keys and 3 functional keys with the following functions:

-  Press the functional key to perform the function displayed above it on the LCD.
-  Press to access the list of photometer methods.
-  Press to move up in a menu or a help screen, to increment a set value or to access second level functions.
-  Press to toggle between photometer and probe (pH electrode) mode.
-  Press to move left in a menu or to decrement a set value.
-  Press to move down in a menu or a help screen, to decrement a set value or to access second level functions.
-  Press to move right in a menu or to increment a set value.
-  Press to access the setup screen.
-  Press to log the current reading.
-  Press to review saved logs.
-  Press to exit the current screen.
-  Press to display the help screen.
-  ON/OFF power button

## 5.4. PRINCIPLE OF OPERATION

Absorption of light is a typical phenomenon of interaction between electromagnetic radiation and matter. When a light beam crosses a substance, some of the radiation may be absorbed by atoms, molecules or crystal lattices. Photometric chemical analysis is based on specific chemical reactions between a sample and reagent to produce a light-absorbing compound.

If pure absorption occurs, the fraction of light absorbed depends both on the optical path length through the matter and on the physical-chemical characteristics of the substance according to the Lambert-Beer Law. If all other factors are constant, the concentration "c" can be calculated from the absorbance of the substance.

Lambert Beer Law:

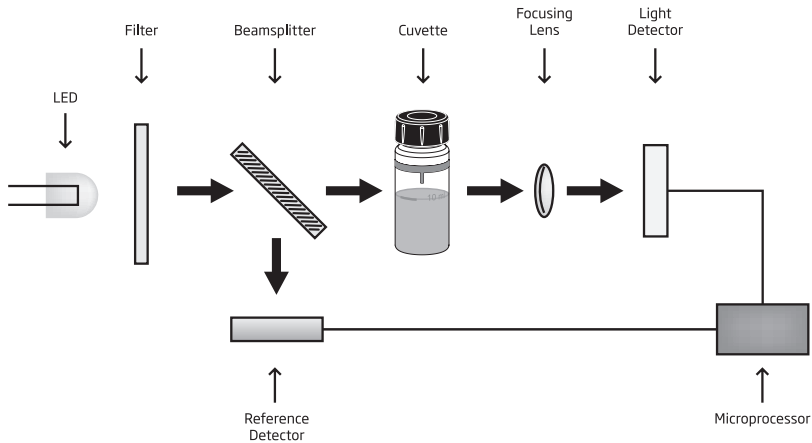
$$-\log I/I_o = \epsilon_{\lambda} c d$$

or

$$A = \epsilon_{\lambda} c d$$

- $I_o$  = intensity of incident light beam  
 $I$  = intensity of light beam after absorption  
 $\epsilon_{\lambda}$  = molar extinction coefficient at wavelength  $\lambda$   
 $c$  = molar concentration of the substance  
 $d$  = optical path through the substance

## 5.5. OPTICAL SYSTEM



Instrument Block Diagram

The internal reference system (reference detector) of the [HI83326](#) photometer compensates for any drifts due to power fluctuations or ambient temperature changes, providing a stable source of light for your blank (zero) measurement and sample measurement.

LED light sources offer superior performance compared to tungsten lamps. LEDs have a much higher luminous efficiency, providing more light while using less power. They also produce little heat, which could otherwise affect electronic stability. LEDs are available in a wide array of wavelengths, whereas tungsten lamps have poor blue / violet light output.

Improved optical filters ensure greater wavelength accuracy and allow a brighter, stronger signal to be received. The end result is higher measurement stability and less wavelength error.

A focusing lens collects all of the light that exits the cuvette, eliminating errors from cuvette imperfections and scratches, eliminating the need to index the cuvette.

## 6. GENERAL OPERATIONS

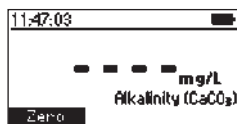
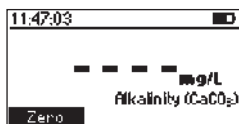
### 6.1. POWER CONNECTION & BATTERY MANAGEMENT

The meter can be powered from an AC / DC adapter (included) or from the built-in rechargeable battery.

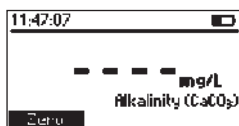
The meter will perform an auto-diagnostic test when it is first powered on. During this test, the Hanna Instruments logo will appear on the LCD. After 5 seconds, if the test was successful, the last method used will appear on the display.

The battery icon on the LCD will indicate the battery status:

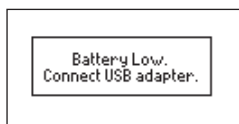
- battery is charging from external adapter
- battery fully charged (meter connected to AC / DC adapter)



- battery capacity (no external adapter)
- battery near 0% (no external adapter)



- battery exhausted (no external adapter)



To conserve battery, the meter will turn off automatically after 15 minutes of inactivity (30 minutes after a Zero measurement). If a photometer measurement is on the screen, an auto-log is created before shutdown.

### 6.2. MODE SELECTION

The **HI8326** has two operational modes: Photometer and Probe.

Photometer mode enables on-demand measurement of a cuvette using the integrated optical system.

Probe mode enables continuous measurement using a Hanna digital electrode connected to the 3.5 mm port.

To switch between Photometer mode and Probe mode, use the **MODE** key.

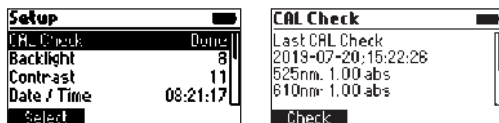
**Note:** The active mode cannot be switched while in Setup, Recall or Method menus.

### 6.3. GENERAL SETUP

Press the **SETUP** key to enter in **Setup** menu, highlight desired option using the ▲▼ keys and press **Select**.

#### CAL Check (Photometer Mode Only)

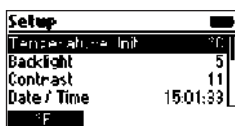
Press **Select** to enter the CAL Check screen. The date, time and values for the last CAL Check are displayed on the screen. To start a new CAL Check press **Check** and follow the prompts on the screen. See METER VALIDATION & CAL CHECK for additional information.



#### Temperature Unit (pH Only)

Option: °C or °F

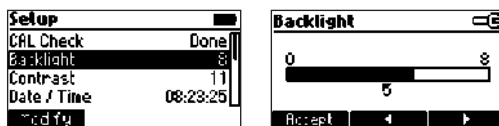
Press the functional key to select the desired temperature unit.



#### Backlight

Values: 0 to 8

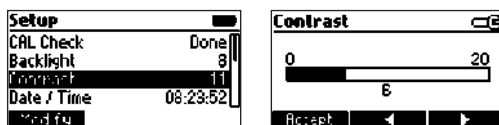
Press **Modify** to access the backlight intensity. Use the functional keys or the ◀▶ keys to increase or decrease the value. Press **Accept** to confirm or press the **ESC** key to return to the **Setup** menu without saving the new value.



#### Contrast

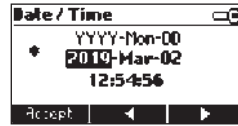
Values: 0 to 20

Press **Modify** to change the display's contrast. Use the functional keys or the ◀▶ keys to increase or decrease the value. Press **Accept** to confirm the value or the **ESC** key to return to the **Setup** menu without saving the new value.



## Date & Time

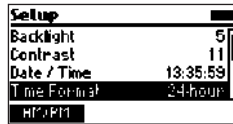
Press **Modify** to change the date and time. Press the functional keys or the ◀▶ keys to highlight the value to be modified (year, month, day, hour, minute or second). Use the ▲▼ keys to change the value. Press **Accept** to confirm or **ESC** key to return to the **Setup** without saving the new date or time.



## Time Format

Option: AM/PM or 24-hour

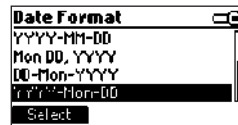
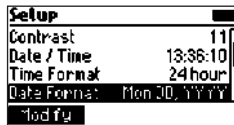
Press the functional key to select the desired time format.



## Date Format

Option: DD/MM/YYYY, MM/DD/YYYY, YYYY/MM/DD, YYYY-MM-DD, Mon DD, YYYY, DD-Mon-YYYY, YYYY-Mon-DD

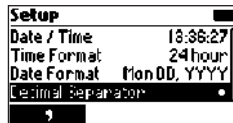
Press **Modify** to change the date format. Use the ▲▼ keys to select the desired format. Press **Select** to confirm or the **ESC** key to return to the **Setup** menu without saving the new format.



## Decimal Separator

Option: Comma (,) or Period (.)

Press the functional key to select the desired decimal separator. The decimal separator is used on the measurement screen and CSV (Comma-Separated Values) files.



### Language

Option: Português, Deutsch, English, Español, Français, Italiano, Dutch

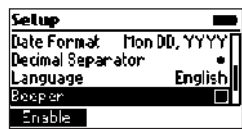
Press **Modify** to change the language. Use the ▲▼ keys to select the desired language. Press **Select** to change the language.



### Beeper

Option: Enable or Disable

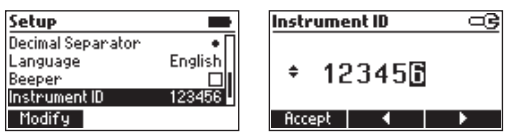
When enabled, a short beep is heard every time a key is pressed. A long beep alert sounds when the pressed key is not active or an error is detected. Press the functional key to enable or disable the beeper.



### Instrument ID

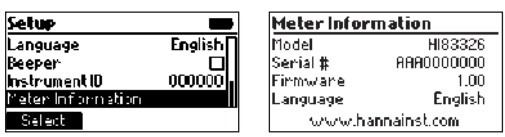
Option: 0 to 999999

This option is used to set the instrument's ID (identification number). Press **Modify** to access the instrument ID screen. Use the functional keys or the ◀▶ keys to highlight the digit to be modified. Press the ▲▼ keys in order to set the desired value. Press **Accept** to confirm the value or press the ESC key to return to the **Setup** menu without saving the new value.



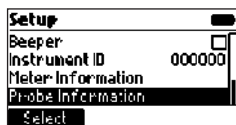
### Meter Information

Press **Select** to view the model, serial number, firmware version and selected language. Press the ESC key to return to the **Setup** menu.



### Probe Information (pH Mode Only)

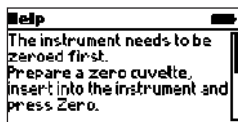
Press **Select** to view model number, serial number and firmware version for the connected probe. Press the **ESC** key to return to the **Setup** menu.



## 6.4. CONTEXTUAL HELP

HI83326 offers an interactive contextual help mode that assists the user at any time.

To access the help screen press the **HELP** key. The instrument will display additional information related to the current screen. To read all the available information, scroll the text using the **▲▼** keys. Press the **ESC** key to return to the previous screen.



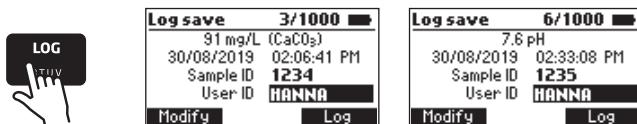


## 7. LOGGING DATA & DATA MANAGEMENT

The instrument features a data log function to help you keep track of all your analysis. The data log can hold 1000 individual measurements. Storing, viewing and deleting the data is possible using the **LOG** and **RECALL** keys.

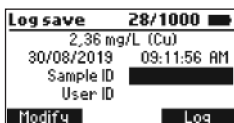
### 7.1. LOGGING DATA

Press the **LOG** key and the last valid measurement will be stored with a date and time stamp. Only valid measurements can be stored.



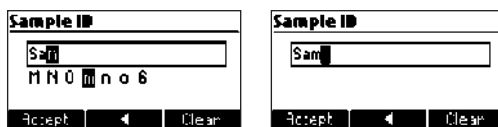
### 7.2. ADDING SAMPLE & USER NAMES TO LOG DATA

A sample ID and user ID can be added to the saved log. Use the ▲▼ keys to highlight the Sample ID or User ID then press **Modify**. Sample ID and user ID are entered using the alphanumeric multi-tapping keypad.



Enter one character at a time by pressing the key with the assigned character repeatedly until the desired character is highlighted. For reference, a list of the characters available for the current key will be shown under the text box.

The character will be entered after a two-second delay or after another key is pressed.



Press **Accept** to update the sample or user ID.

Press ◀ functional key to delete the last character.

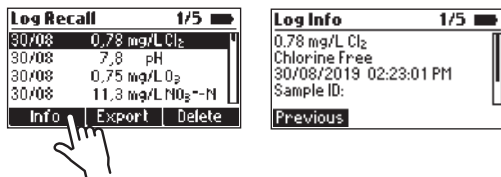
Press **Clear** to delete all of the characters.

Press the **ESC** key to discard all changes and return to the previous screen.

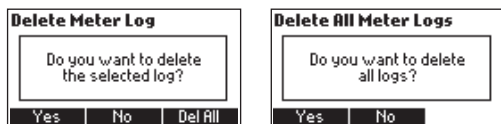
### 7.3. DATA MANAGEMENT

#### Viewing & Deleting

Data can be viewed, deleted and exported to a USB drive or a PC by pressing the **RECALL** key. Use the **▲▼** keys to scroll through the saved logs. Press **Info** to view additional information about the selected log.



Use **Delete** to erase logged data. After pressing **Delete** the prompt on the display will confirm the action.



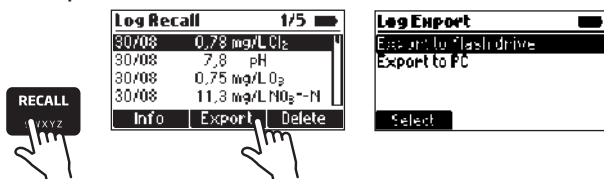
Press **No** or the **ESC** key to return to the previous screen.

Press **Yes** to delete the selected log.

Press **Del All** to erase all the logged data. If **Del All** is pressed the prompt on the display will confirm the action. Press **Yes** to delete all logged data, **No** or the **ESC** key to return to the log recall.

#### Data Export

Log data can be exported to a USB flash drive or to a PC. To access data export functions, press the **RECALL** key then **Export**.



Use the **▲▼** keys to select the desired export location.

For export to flash drive, insert the USB flash drive into the dedicated port at the back of the meter labeled **HOST USB**, then follow the on-screen prompts.

For export to PC, connect the meter to a PC using the supplied micro-USB cable. Insert the cable into the port at the back of the meter labeled **PC PWR**. Follow the on-screen prompts. When the meter says **PC connected**, the meter will appear as a removable disk. Use a file manager (such as Windows Explorer or Mac Finder) to move the file from the meter to the PC.

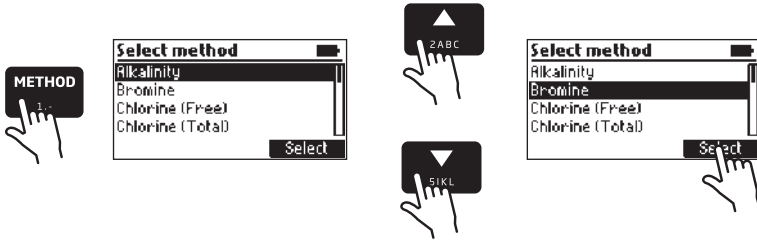
Log data is exported as a single file (**H183326.csv**) containing all logged photometer and probe data. The CSV file may be opened with a text editor or spreadsheet application.

## 8. PHOTOMETER MODE

### 8.1. METHOD SELECTION

In order to select the desired method press the **METHOD** key and a screen with the available methods will appear.

Press the ▲▼ keys to highlight the desired method. Press **Select**.

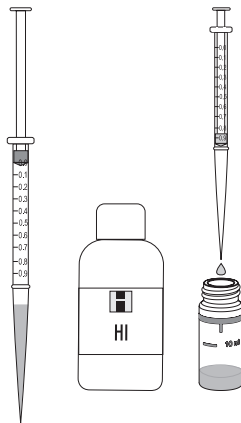


After the desired method is selected, follow the procedure described in the related section. Before performing a method, read all the instructions carefully.

### 8.2. COLLECTING & MEASURING SAMPLES AND REAGENTS

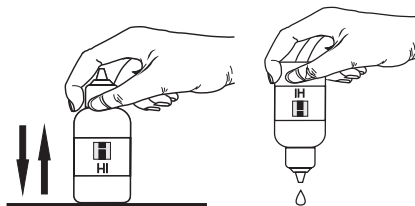
#### Proper Use of Syringe

1. Push the plunger completely into the syringe and insert the tip into the solution.
2. Pull the plunger up until the lower edge of the seal is exactly on the mark for the desired volume.
3. Take out the syringe and clean the outside of the syringe tip, be sure that no drops are hanging on the tip of the syringe. Then, keeping the syringe in a vertical position, push the plunger down into the syringe, the desired volume has been delivered.



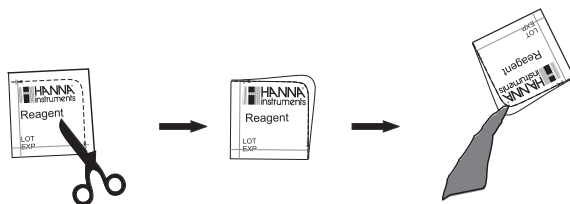
### Proper Use of Dropper Bottle

1. Tap the dropper on the table several times.
2. Remove the cap and wipe the outside of the tip with a cloth.
3. Keep the dropper bottle in a vertical position while dosing the reagent.



### Proper Use of Powder Packet

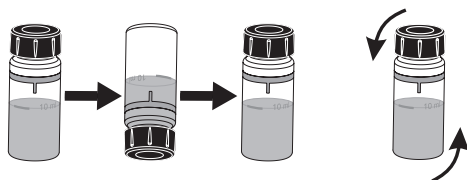
1. Use scissors to open the powder packet.
2. Push the edges of the packet to form a spout.
3. Pour out the content of the packet.



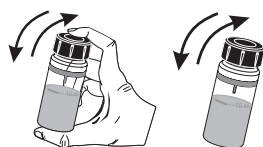
## 8.3. CUVETTE PREPARATION

Proper mixing is very important for reproducibility of the measurements. The proper mixing technique for each method is listed in the method procedure.

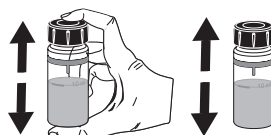
- (a) Invert the cuvette a couple of times or for a specified time: hold the cuvette in the vertical position. Turn the cuvette upside-down and wait for all of the solution to flow to the cap end, then return the cuvette to the upright vertical position and wait for all of the solution to flow to the cuvette bottom. This is one inversion. The correct speed for this mixing technique is 10 to 15 complete inversions in 30 seconds. This mixing technique is indicated with “invert to mix” and one of the following icons:



- (b) Shaking the cuvette, moving the cuvette up and down. The movement may be gentle or vigorous. This mixing technique is indicated with “shake gently” or “shake vigorously”, and one of the following icons:

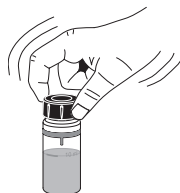



shake gently



shake vigorously

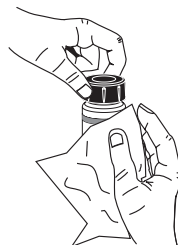
- (c) Swirl the cuvette gently to mix the solution. This mixing technique is indicated with one of the following icons:



In order to avoid reagent leaking and to obtain more accurate measurements, close the cuvette first with the supplied High-Density Polyethylene (HDPE) plastic stopper  and then the black cap.



Whenever the cuvette is placed into the measurement holder, it must be dry outside and free of fingerprints, oil and dirt. Wipe it thoroughly with [HI731318](#) microfiber cleaning cloth or a lint-free wipe prior to insertion. Shaking the cuvette can generate bubbles in the sample, causing higher readings. To obtain accurate measurements, remove such bubbles by swirling or by gently tapping the cuvette.



Do not let the reacted sample stand too long after reagent is added. For best accuracy, respect the timings described in each specific method.

It is possible to take multiple readings in a row, but it is recommended to take a new zero reading for each sample and to use the same cuvette for zeroing and measurement when possible.

Discard the sample immediately after the reading is taken, or the glass might become permanently stained.

All the reaction times reported in this manual are at 25 °C (77 °F). In general, the reaction time should be increased for temperatures lower than 20 °C (68 °F) and decreased for temperatures higher than 25 °C (77 °F).

### Interferences

In the method measurement section the most common interferences that may be present in a typical water sample have been reported. It is possible that a particular application could introduce other compounds that will also interfere.

## 8.4. TIMERS & MEASUREMENT FUNCTIONS

Each method requires a different preparation procedure, reaction times and sample preparations. If a timer or timers are necessary for proper sample preparation, the **Timer** will be available.

To use a reaction timer, press **Timer**. The default timer will start immediately. To stop and reset the timer, press **Stop**.

If the selected method requires more than one timer, the meter will automatically select each timer in the appropriate order. To bypass the default order, you may press the desired key to activate a different timer (only while the current timer is stopped). Press **Continue** to start the active timer.

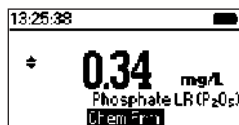
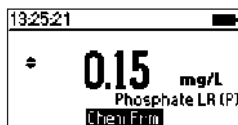
For some methods, the timer is only necessary after a Zero measurement has been performed. In this case, the timer key will only be available after the Zero measurement has been performed.

If the method requires a Zero or Read measurement after a timer has expired, the meter will automatically perform the appropriate action. Follow the instructions in the method procedure.

To perform a Zero or Read measurement, insert the prepared cuvette, then press **Zero** or **Read**. A Zero measurement must be conducted before a Read measurement.

## 8.5. CHEMICAL FORMULA & UNIT CONVERSION

Chemical formula and unit conversion factors are pre-programmed into the instrument and are method specific. In order to view the displayed result in the desired chemical formula press the ▲▼ keys to access the second level function and then press **Chem Frm** to toggle between the available chemical formulas for the selected method.



## 8.6. METER VALIDATION & CAL CHECK

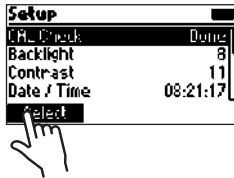
**Warning:** Do not validate the meter with standard solutions other than the Hanna Instruments® CAL Check Standards. For accurate validation results, please perform tests at room temperature, 18 to 25 °C (64.4 to 77.0 °F).

Validation of the HI83326 involves absorbance measurements of certified Hanna Instruments® CAL Check Standards (see ACCESSORIES section). The CAL Check screen guides the user through the measurement of each CAL Check Standard and applies the factory calibration corrections to each measurement. The HI83326 stores the results of the most recent CAL Check measurements which may be viewed on the CAL Check screen. Compare these results with the values printed on the Certificate provided with each Hanna Instruments® CAL Check Standards kit. To perform a validation:

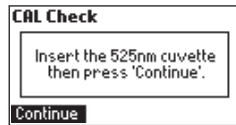
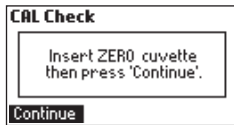
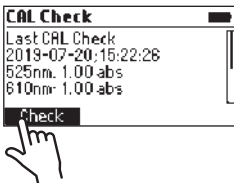
1. Press the **SETUP** key.



2. Highlight **CAL Check**, then press **Select**.



3. Follow the prompts on the screen. The meter will prompt to measure each cuvette provided in the Hanna Instruments® CAL Check Standards kit. To exit the process at any time, press **ESC** key.




4. Press the **ESC** key to return in **Setup** menu.



## 8.7. ABSORBANCE MEASUREMENTS

Raw absorbance measurements may be performed on the [HI83326](#) for personal or diagnostic purposes. For example, you may monitor the stability of a reagent blank by occasionally measuring its absorbance versus deionized water.

To measure the raw absorbance of a prepared sample:

1. Press the **METHOD** key. 
2. Highlight the appropriate Absorbance method (according to the wavelength to be used), then press **Select**. Absorbance methods are located at the bottom of the method list.
3. Prepare the sample cuvette according to the method.
4. Insert a cuvette filled with deionized water, then press **Zero**.
5. Insert the prepared sample cuvette, then press **Read**.

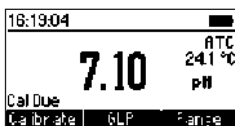
**Warning:** *Never use absorbance methods for validation using Hanna Instruments® CAL Check cuvettes. The factory calibration corrections for CAL Check cuvettes are applied while in CAL Check mode only!*



## 9. PROBE MODE

### 9.1. pH MEASUREMENT

The HI83326 can be used to perform direct pH measurements by connecting a Hanna Instruments® digital pH electrode with a 3.5 mm TRRS connector. Connect the electrode to the 3.5 mm port marked with EXT PROBE located at the rear of the meter. If the meter is in Photometer mode, set the meter to Probe mode by pressing the **MODE** key.



Press **Calibrate** to open the calibration window.

Press **GLP** to review the calibration information.

Press **Range** to switch between pH and mV.

For high accuracy it is recommended to calibrate your electrode often. pH electrodes should be recalibrated at least once per week, but daily calibration is recommended. Always recalibrate after cleaning an electrode, see pH CALIBRATION section for more information.

To take pH measurements:

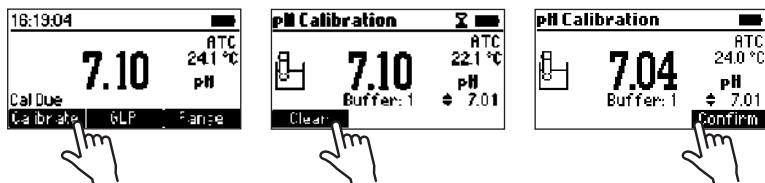
- Remove the protective cap and rinse the electrode with water.
- Collect some sample in a clean, dry beaker.
- Preferably, rinse the electrode with a small amount of sample.
- Submerge the electrode tip approximately 3 cm (1¼") into the sample to be tested and stir the sample gently. Make sure the electrode junction is completely submerged.
- Allow time for the electrode to stabilize in the sample. When the ⌚ symbol disappears, your reading is stable.

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

pH measurements are affected by temperature. Hanna Instruments® digital pH electrodes include a built-in temperature sensor and automatically calculate corrected pH values. The measured temperature is displayed on the screen with the pH measurements.

## 9.2. pH CALIBRATION

From the probe measurement screen, press **Calibrate** to begin the calibration process. During pH calibration, the display will show the current pH reading, temperature reading, selected buffer type and the buffer number (“Buffer: 1” for the first buffer, “Buffer: 2” for the second buffer).



Press **Clear** to clear the current calibration.

Press **Confirm** to accept the current calibration point (only available if the reading is stable and within the limits for the selected buffer).

Press the ▲▼ keys to cycle through the list of available buffers: pH 4.01, 6.86, 7.01, 9.18, 10.01.

Press the ESC key to exit calibration and return to pH measurement mode.

### Preparation

Pour small quantities of the buffer solutions into clean beakers. If possible, use plastic beakers to minimize any EMC interferences. For accurate calibrations and to minimize cross-contamination, use two beakers for each buffer solution: one for rinsing the electrode and one for calibration. If you are measuring in the acidic range, use pH 7.01 or 6.86 as the first buffer and pH 4.01 as the second buffer. If you are measuring in the alkaline range, use pH 7.01 or 6.86 as the first buffer and pH 10.01 or 9.18 as the second buffer.

### Procedure

Calibration can be performed using one or two calibration buffers. For more accurate measurements, a two-point calibration is recommended.

Submerge the pH electrode approximately 3 cm (1¼”) into a buffer solution and stir gently.

When the reading is stable and close to the selected buffer, press **Confirm** to accept and store the calibration point. The meter will prompt for the second buffer (Buffer: 2). To use only a one-point calibration, press the ESC key to exit calibration mode. The meter will store the calibration information to the probe and return to measurement mode. To continue calibrating with a second buffer, rinse and submerge the pH electrode approximately 3 cm (1¼”) into the second buffer solution and stir gently. If necessary, use the ▲▼ keys to select a different buffer value.

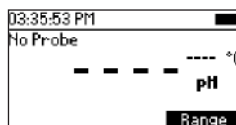
When the reading is stable and close to the selected buffer, press **Confirm** to accept and store the second calibration point.

The meter will store the two-point calibration information to the probe and return to Measurement mode. The list of calibrated buffers will appear at the bottom of the screen.

### 9.3. pH MESSAGES & WARNINGS

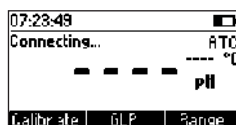
#### No Probe

No probe is connected or the probe is broken.



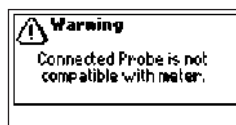
#### Connecting

The meter has detected a probe and is reading the probe configuration and calibration information.



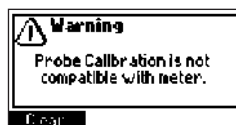
#### Incompatible Probe

The connected probe is not compatible with this device.



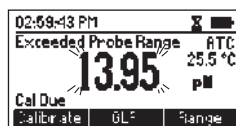
#### Incompatible Calibration

The probe's current calibration is not compatible with this meter. The calibration must be cleared to use this probe.



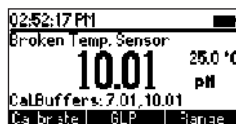
#### Exceeded Probe Range

The pH and/or temperature measurement exceed the specifications of the probe. The measurement value(s) will be blinking.



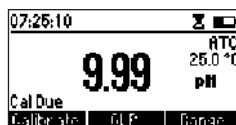
#### Broken Temperature Sensor

The temperature sensor inside the probe is broken. Temperature compensation will revert to a fixed value of 25 °C (77 °C).



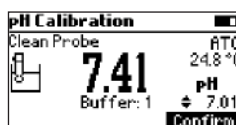
#### Cal Due

The probe has no calibration. See pH CALIBRATION section for details.



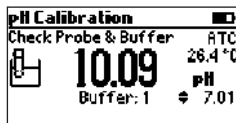
#### Clean Probe

The offset is outside the accepted window or the slope is under the accepted lower limit. Cleaning the probe will improve the pH electrode's response, repeat the calibration after cleaning. See pH ELECTRODE CONDITIONING & MAINTENANCE section for details.



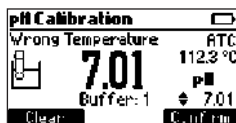
### Check Probe & Buffer

There is a large difference between the pH measurement and the selected buffer value or the electrode slope is outside of the accepted slope limit. Clean the probe and confirm the correct buffer selection.



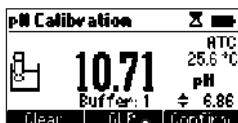
### Wrong Temperature

The buffer temperature is outside of the acceptable window for the selected buffer value.

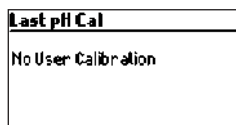
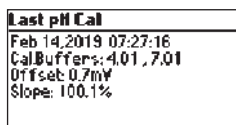


## 9.4. pH GLP

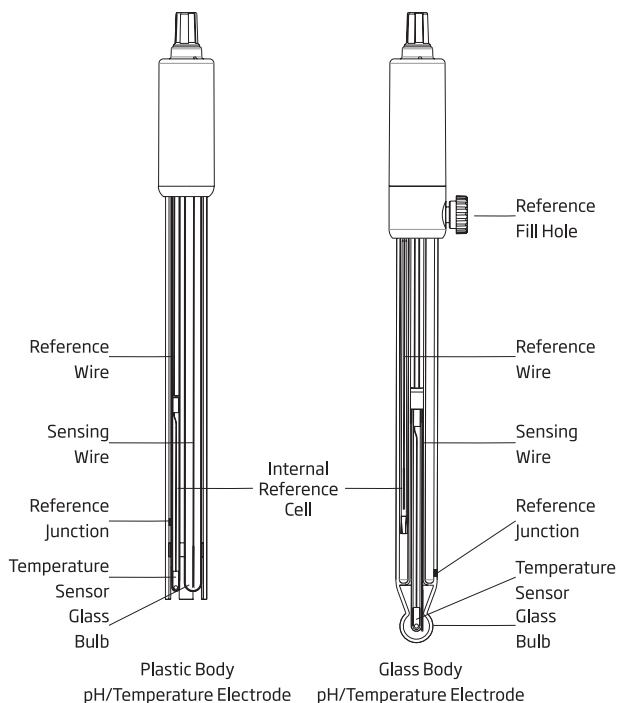
Good Laboratory Practice (GLP) refers to a quality control function used to ensure uniformity and consistency of sensor calibrations and measurements. To view the GLP information, press the GLP key from the probe measurement screen.



The pH GLP screen displays the date and time, buffers, slope and offset for the last calibration. If the probe has not been calibrated, "No User Calibration" is displayed. Press the ESC key to return to the measurement mode.



## 9.5. pH ELECTRODE CONDITIONING & MAINTENANCE



Remove the protective cap. Do not be alarmed if salt deposits are present, this is normal. Rinse the probe with water.

Shake the electrode down as you would do with a clinical thermometer to eliminate any air bubbles inside the glass bulb. If the bulb and / or junction are dry, soak the electrode in [HI70300](#) or [HI80300](#) Storage solution for a minimum of 30 minutes. Rinse with water. Calibrate before using.

For refillable electrodes if the filling solution (electrolyte) is more than 2½ cm (1”) below the fill hole, add [HI7082](#) or [HI8082](#) 3.5M KCl Electrolyte solution. Unscrew the fill hole cover during measurements so the liquid reference junction maintains an outward flow of electrolyte.

### Storage Procedure

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

Replace the solution in the protective cap with a few drops of [HI70300](#) or [HI80300](#) Storage solution or Filling solution ([HI7082](#) or [HI8082](#) 3.5M KCl Electrolyte solution). pH 4.01 or 7.01 buffer can also be used.

**Note:** Never store the electrode in distilled or deionized water.

### Periodic Maintenance

Inspect the electrode and the cable. The cable used for connection to the instrument must be intact and there must be no points of broken insulation on the cable, connectors must be perfectly clean and dry. If there are any scratches or cracks on the electrode stem or bulb, replace the electrode.

For refillable electrodes, refill the reference chamber with fresh electrolyte (HI7082 or HI8082 3.5M KCl Electrolyte solution). Allow the electrode to stand upright for 1 hour.

### Cleaning Procedure

Several cleaning solutions are available:

- General — Soak in Hanna HI7061 or HI8061 General cleaning solution for approximately 30 minutes.
- Protein — Soak in Hanna HI7073 or HI8073 Protein cleaning solution for 15 minutes.
- Inorganic — Soak in Hanna HI7074 Inorganic cleaning solution for 15 minutes.
- Oil and grease — Rinse with Hanna HI7077 or HI8077 Oil and Fat cleaning solution.

After performing any of the cleaning procedures, rinse the electrode thoroughly with distilled water, refill the reference chamber with fresh electrolyte (refillable electrodes only) and soak the electrode in HI70300 or HI80300 Storage solution for at least 1 hour before taking measurements.

### Temperature Correlation for pH Sensitive Glass

Verify the temperature range by reading the limits on electrode's cap. The pH electrode's life is temperature dependent. If constantly cycled between two temperatures, the life of the electrode is drastically reduced.

## 10. METHOD PROCEDURES

### 10.1. ALKALINITY

#### SPECIFICATIONS

Range	0 to 500 mg/L (as CaCO <sub>3</sub> )
Resolution	1 mg/L
Accuracy	± 5 mg/L ± 5% of reading at 25 °C
Light Source	LED with narrow band interference filter @ 610 nm
Method	Colorimetric Method

#### REQUIRED REAGENTS

Code	Description	Quantity
HI775S	Alkalinity Reagent	1 mL
HI93755-53	Chlorine Removal Reagent	1 drop

#### REAGENT SETS

HI775-26 Reagents for 25 tests  
 For other accessories see ACCESSORIES section.

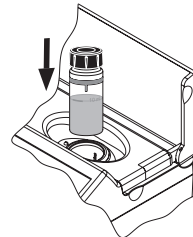
#### MEASUREMENT PROCEDURE

- Select the **Alkalinity** method using the procedure described in the METHOD SELECTION section.

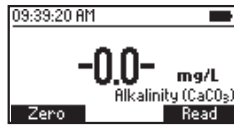
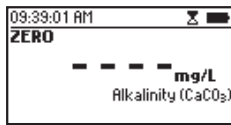
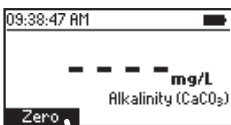
- Fill the cuvette with 10 mL of unreacted sample (up to the mark).  
 Replace the plastic stopper and the cap.



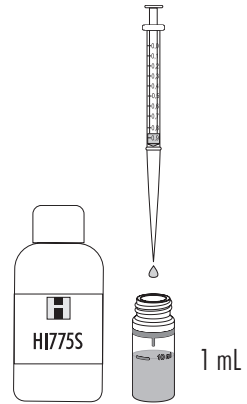
- Insert the cuvette into the holder and close the lid.



- Press **Zero**. The display will show “-0.0-” when the meter is zeroed and ready for measurement.



- Remove the cuvette.

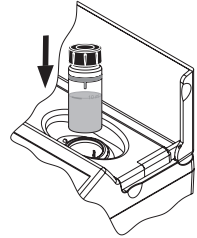


- Add 1 mL of HI775S Alkalinity Reagent to the sample using a 1 mL syringe.

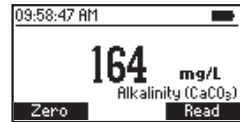
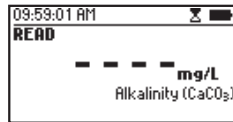
- Replace the plastic stopper and the cap. Invert 5 times.



- Insert the cuvette into the holder and close the lid.



- Press **Read** to start the reading. The instrument displays the results in **mg/L calcium carbonate (CaCO<sub>3</sub>)**.



## INTERFERENCES

Interference may be caused by:

- Chlorine must be absent, to remove the interference add one drop of HI93755-53 Chlorine Removal Reagent to the unreacted sample



## 10.2. BROMINE

### SPECIFICATIONS

Range	0.00 to 8.00 mg/L (as Br <sub>2</sub> )
Resolution	0.01 mg/L
Accuracy	±0.08 mg/L ± 3% of reading at 25 °C
Light Source	LED with narrow band interference filter @ 525 nm
Method	Adaptation of Standard Methods for the Examination of Water and Wastewater, 18 <sup>th</sup> Edition, DPD Method

### REQUIRED REAGENTS

Code	Description	Quantity
HI93716-0	Bromine Reagent	1 packet

### REAGENT SETS

HI93716-01 Reagents for 100 tests

HI93716-03 Reagents for 300 tests

For other accessories see ACCESSORIES section.

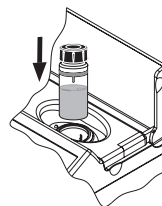
### MEASUREMENT PROCEDURE

- Select the **Bromine** method using the procedure described in the METHOD SELECTION section.

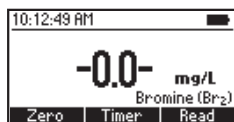
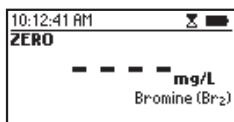
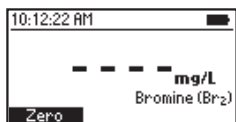
- Fill the cuvette with 10 mL of unreacted sample (up to the mark).  
Replace the plastic stopper and the cap.



- Insert the cuvette into the holder and close the lid.

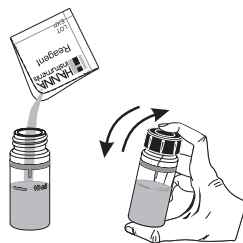


- Press **Zero**. The display will show “-0.0-” when the meter is zeroed and ready for measurement.

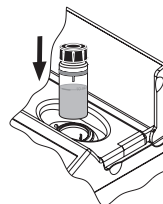


- Remove the cuvette.

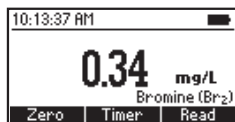
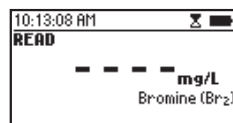
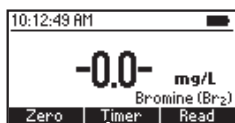
- Add one packet of **HI93716-0** Bromine Reagent. Replace the plastic stopper and the cap. Shake gently for about 20 seconds to dissolve most of the reagent.



- Insert the cuvette into the holder and close the lid.



- Press **Timer** and the display will show the countdown prior to the measurement or wait 2 minutes and 30 seconds and press **Read**. When the timer ends the meter will perform the reading. The instrument displays the results in **mg/L of bromine (Br<sub>2</sub>)**.



## INTERFERENCES

Interference may be caused by:

- Chlorine, Iodine, Ozone, Oxidized forms of Chromium and Manganese
- Hardness greater than 500 mg/L CaCO<sub>3</sub>, to remove the interference shake the sample for approximately 1 minute after adding the reagent
- Alkalinity greater than 300 mg/L CaCO<sub>3</sub> or acidity greater than 150 mg/L CaCO<sub>3</sub>, the color of the sample may develop only partially or rapidly fade, to remove the interference neutralize the sample with diluted HCl or NaOH

### 10.3. CHLORINE DIOXIDE

#### SPECIFICATIONS

Range	0.00 to 2.00 mg/L (as ClO <sub>2</sub> )
Resolution	0.01 mg/L
Accuracy	±0.10 mg/L ±5% of reading at 25 °C
Light Source	LED with narrow band interference filter @ 575 nm
Method	Adaptation of the Chlorophenol Red Method

#### REQUIRED REAGENT

Code	Description	Quantity
HI93738A-0	Chlorine Dioxide Reagent A	1 mL
HI93738B-0	Chlorine Dioxide Reagent B	1 packet
HI93738C-0	Chlorine Dioxide Reagent C	1 mL
HI93738D-0	Chlorine Dioxide Reagent D	1 mL

#### REAGENT SETS

HI93738-01 Reagents for 100 tests

HI93738-03 Reagents for 300 tests

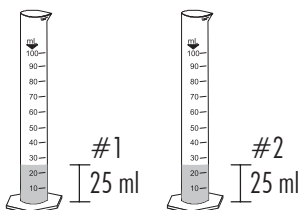
For other accessories see ACCESSORIES section.

#### SAMPLING PROCEDURE

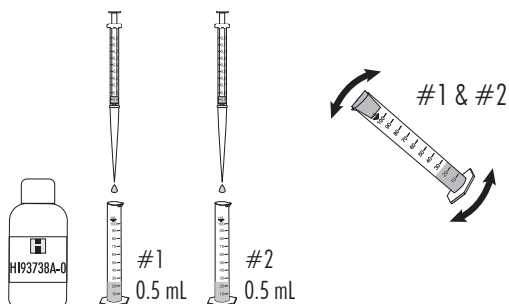
It is recommended to analyze Chlorine Dioxide samples immediately after collection. Chlorine Dioxide samples must be stored in sealed dark glass bottles, with minimal head space. Excessive heat (above 25 °C / 77 °F), agitation and exposure to light must be avoided.

#### MEASUREMENT PROCEDURE

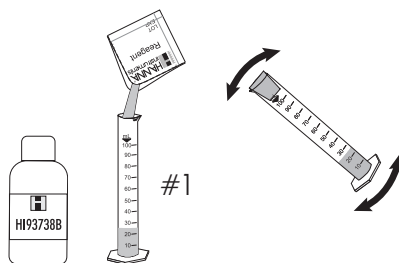
- Select the **Chlorine Dioxide** method using the procedure described in the **METHOD SELECTION** section.
- Fill two graduated mixing cylinders (#1 & #2) up to the 25 mL mark with the sample.



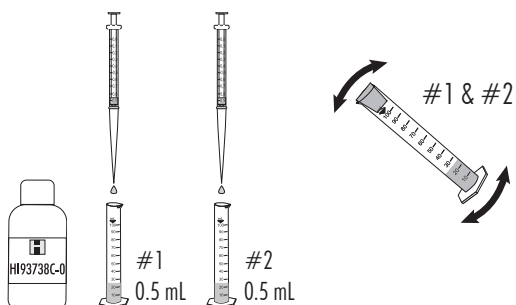
- Add 0.5 mL of **HI93738A-0** Chlorine Dioxide Reagent A to each cylinder (#1 & #2), using a 1 mL syringe, cap them and invert several times to mix.



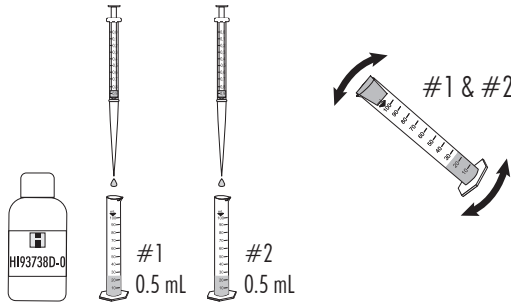
- Add one packet of **HI93738B-0** Chlorine Dioxide Reagent B to one of the two cylinders (#1), cap and invert it several times until it is totally dissolved. This is the blank.



- Add 0.5 mL of **HI93738C-0** Chlorine Dioxide Reagent C to each cylinder (#1 & #2), using a 1 mL syringe, cap them and invert several times to mix.



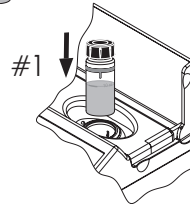
- Add 0.5 mL of HI93738D-0 Chlorine Dioxide Reagent to each cylinder (#1 & #2), using a 1 mL syringe, cap them and invert several times to mix. Cylinder #2 is the reacted sample.



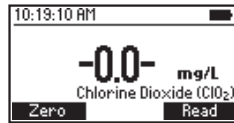
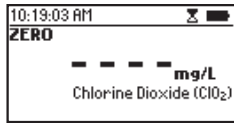
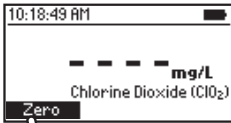
- Fill cuvette (#1) with 10 mL of the blank (up to the mark). Replace the plastic stopper and the cap.



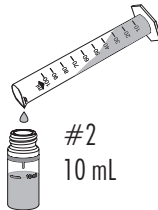
- Insert the blank (#1) into the holder and close the lid.



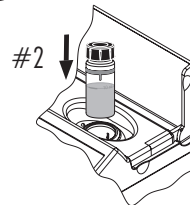
- Press **Zero**. The display will show “-0.0-” when the meter is zeroed and ready for measurement.



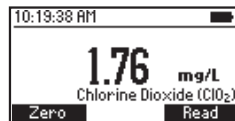
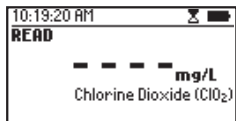
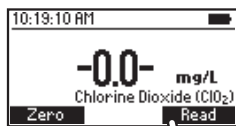
- Fill second cuvette (#2) with 10 mL of the reacted sample (up to the mark). Replace the plastic stopper and the cap.



- Insert the sample into the holder and close the lid.



- Press **Read** to start the reading. The instrument displays the results in mg/L of chlorine dioxide ( $\text{ClO}_2$ ).



## INTERFERENCES

Interference may be caused by:

- Strong oxidants

## 10.4. CHLORINE DIOXIDE, RAPID METHOD

### SPECIFICATIONS

Range	0.00 to 2.00 mg/L (as ClO <sub>2</sub> )
Resolution	0.01 mg/L
Accuracy	±0.10 mg/L ±5% of reading at 25 °C
Light Source	LED with narrow band interference filter @ 525 nm
Method	Adaptation of Standard Methods for the Examination of Water and Wastewater, 18 <sup>th</sup> Edition, 4500 ClO <sub>2</sub> D

### REQUIRED REAGENT

Code	Description	Quantity
HI96779A-0	Chlorine Dioxide Reagent A	5 drops
HI96779B-0	Chlorine Dioxide Reagent B	1 packet

### REAGENT SETS

HI96779-01	Reagents for 100 tests
HI96779-03	Reagents for 300 tests

For other accessories see ACCESSORIES section.

### PRINCIPLE

The reaction between the Chlorine Dioxide and DPD indicator causes a pink tint in the sample, the addition of glycine as a masking agent inhibits the response of free chlorine.

### APPLICATION

Drinking water, tap water, treated water

### SAMPLING PROCEDURE

Collect the sample in a clean glass bottle and analyze it immediately. Chlorine dioxide is a strong oxidizing agent and is unstable in water.

### SIGNIFICANCE & USE

Chlorine Dioxide is a commonly-used alternative to chlorine (Cl<sub>2</sub>) as a water disinfectant. The Chlorophenol Red method (non-rapid method) reacts specifically with chlorine dioxide with little interference from free chlorine or chloramines, but the method procedure is cumbersome. The Chlorine Dioxide Rapid Method based on the DPD (N,N-diethyl-p-phenylenediamine) indicator is a much simpler method by comparison, but it is susceptible to interference from other oxidizers. Glycine (Reagent A) is able to convert free chlorine to chloroaminoacetic acid without affecting the analysis of chlorine dioxide content.

## MEASUREMENT PROCEDURE

- Select the **Chlorine Dioxide (Rapid)** method using the procedure described in the **METHOD SELECTION** section.

- Fill the cuvette with 10 mL of unreacted sample (up to the mark).



- Add 5 drops of **HI96779A-0** Chlorine Dioxide Reagent A.



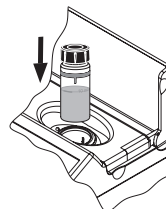
- Replace the plastic stopper and the cap. Shake gently for 30 seconds.



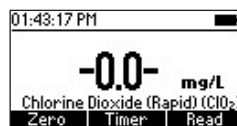
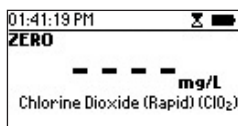
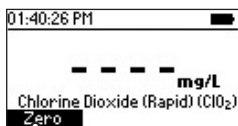
- Wait 30 seconds.



- Insert the cuvette into the holder and close the lid.



- Press **Zero**. The display will show “-0.0-” when the meter is zeroed and ready for measurement.





- Remove the cuvette.

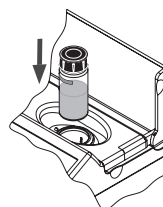
- Add one packet of **HI96779B-0** Chlorine Dioxide Reagent B.



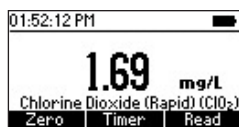
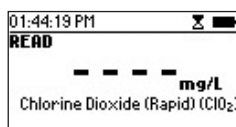
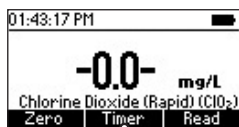
- Replace the plastic stopper and the cap. Shake gently for 20 seconds.



- Insert the cuvette into the holder and close the lid.



- Press **Timer** and the display will show the countdown prior to the measurement or wait 1 minute and press **Read**. When the timer ends the meter will perform the reading. The instrument displays the results in mg/L of ClO<sub>2</sub>.



## INTERFERENCES

Interference may be caused by:

- Acidity, Alkalinity, Flocculating agents, Hardness, Inorganic and Organic Chloramines, Manganese, Metals, Monochloramine, Oxidized forms of Chromium and Manganese, Ozone and Peroxides
- Chlorine above 5 mg/L
- Bromine above 0.1 mg/L
- Highly buffered samples or extreme sample pH

## 10.5. CHLORINE, FREE

### SPECIFICATIONS

Range	0.00 to 5.00 mg/L (as Cl <sub>2</sub> )
Resolution	0.01 mg/L
Accuracy	± 0.03 mg/L ± 3% of reading at 25 °C
Light Source	LED with narrow band interference filter @ 525 nm
Method	Adaptation of the EPA DPD Method 330.5

### REQUIRED REAGENTS

#### POWDER

Code	Description	Quantity
HI93701-0	Free Chlorine Reagent	1 packet

#### LIQUID

Code	Description	Quantity
HI93701A-F	Free Chlorine Reagent A	3 drops
HI93701B-F	Free Chlorine Reagent B	3 drops

### REAGENT SETS

HI93701-F	Reagents for 300 tests (liquid)
HI93701-01	Reagents for 100 tests (powder)
HI93701-03	Reagents for 300 tests (powder)

For other accessories see ACCESSORIES section.

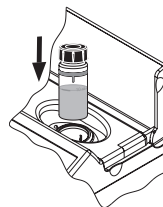
### MEASUREMENT PROCEDURE

- Select the **Chlorine (Free)** method using the procedure described in the METHOD SELECTION section.

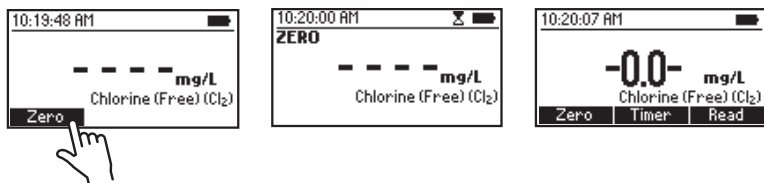
- Fill the cuvette with 10 mL of unreacted sample (up to the mark).  
Replace the plastic stopper and the cap.



- Insert the cuvette into the holder and close the lid.



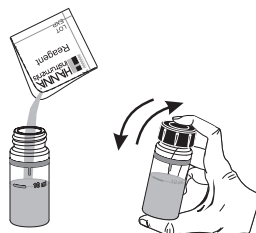
- Press **Zero**. The display will show “-0.0-” when the meter is zeroed and ready for measurement.



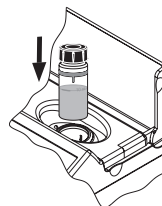
- Remove the cuvette.

### POWDER REAGENT PROCEDURE

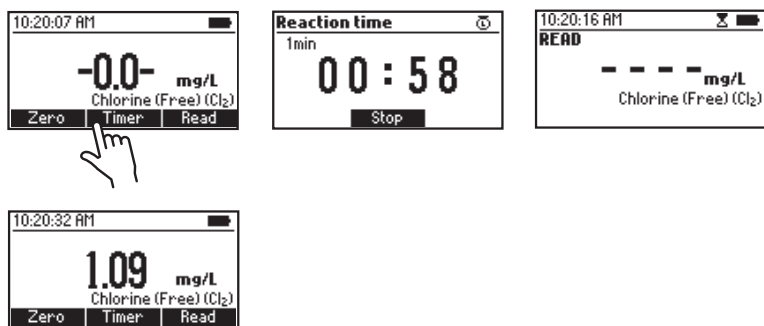
- Add the content of one packet of **HI93701-0** Free Chlorine Reagent. Replace the plastic stopper and the cap. Shake gently for 20 seconds.



- Insert the cuvette into the holder and close the lid.

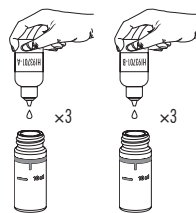


- Press **Timer** and the display will show the countdown prior to the measurement or wait 1 minute and press **Read**. When the timer ends the meter will perform the reading. The instrument displays the results in **mg/L of chlorine (Cl<sub>2</sub>)**.

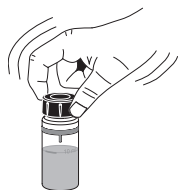


## LIQUID REAGENT PROCEDURE

- To an empty cuvette add 3 drops of HI93701A-F Free Chlorine Reagent A and 3 drops of HI93701B-F Free Chlorine Reagent B.



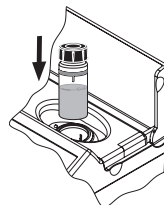
- Replace the plastic stopper and the cap. Swirl gently to mix.



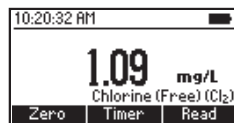
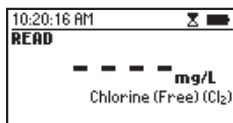
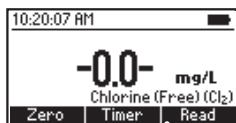
- Add 10 mL of unreacted sample (up to the mark). Replace the plastic stopper and the cap. Shake gently.



- Insert the cuvette into the holder and close the lid.



- Press **Read** to start the reading. The instrument displays the results in mg/L of chlorine ( $\text{Cl}_2$ ).



**Note:** Free and Total Chlorine have to be measured separately with fresh sample following the related procedure if both values are desired.

## INTERFERENCES

Interference may be caused by:

- Bromine, Iodine, Oxidized forms of Chromium and Manganese, Ozone
- Hardness greater than 500 mg/L  $\text{CaCO}_3$ , to remove the interference shake the sample for approximately 2 minutes after adding the powder reagent
- Alkalinity greater than 250 mg/L  $\text{CaCO}_3$  or acidity value greater than 150 mg/L  $\text{CaCO}_3$ , the color of the sample may develop only partially or rapidly fade, to remove the interference neutralize the sample with diluted HCl or NaOH

## 10.6. CHLORINE, TOTAL

### SPECIFICATIONS

Range	0.00 to 5.00 mg/L (as Cl <sub>2</sub> )
Resolution	0.01 mg/L
Accuracy	±0.03 mg/L ± 3% of reading at 25 °C
Light Source	LED with narrow band interference filter @ 525 nm
Method	Adaptation of the EPA DPD Method 330.5

### REQUIRED REAGENTS

#### POWDER

Code	Description	Quantity
HI93711-0	Total Chlorine Reagent	1 packet

#### LIQUID

Code	Description	Quantity
HI93701A-T	Total Chlorine Reagent A	3 drops
HI93701B-T	Total Chlorine Reagent B	3 drops
HI93701C-T	Total Chlorine Reagent C	1 drop

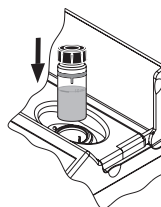
### REAGENT SETS

HI93701-T	Reagents for 300 tests (liquid)
HI93711-01	Reagents for 100 total tests (powder)
HI93711-03	Reagents for 300 total tests (powder)

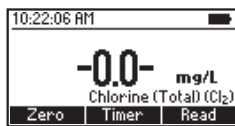
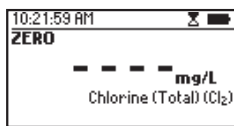
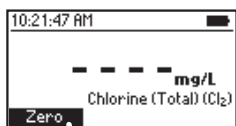
For other accessories see ACCESSORIES section.

### MEASUREMENT PROCEDURE

- Select the **Chlorine (Total)** method using the procedure described in the **METHOD SELECTION** section.
- Fill the cuvette with 10 mL of unreacted sample (up to the mark).  
Replace the plastic stopper and the cap.
- Insert the cuvette into the holder and close the lid.



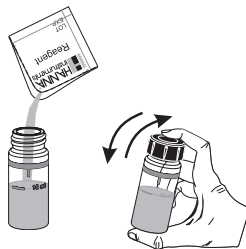
- Press **Zero**. The display will show “-0.0-” when the meter is zeroed and ready for measurement.



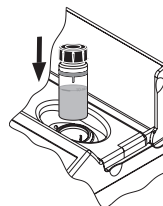
- Remove the cuvette.

## POWDER REAGENT PROCEDURE

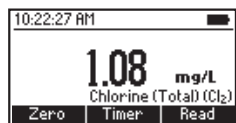
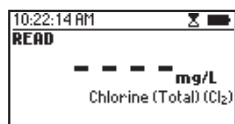
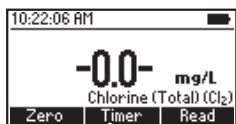
- Add 1 packet of **HI93711-0** Total Chlorine Reagent. Replace the plastic stopper and the cap. Shake gently for 20 seconds.



- Insert the cuvette into the holder and close the lid.

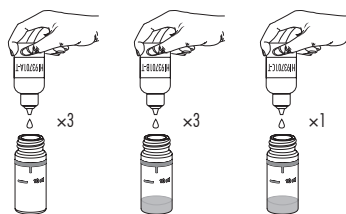


- Press **Timer** and the display will show the countdown prior to the measurement or wait 2 minutes and 30 seconds and press **Read**. When the timer ends the meter will perform the reading. The instrument displays the results in **mg/L of chlorine (Cl<sub>2</sub>)**.



## LIQUID REAGENT PROCEDURE

- To an empty cuvette add 3 drops of HI93701A-T Total Chlorine Reagent A, 3 drops of HI93701B-T Total Chlorine Reagent B and 1 drop of HI93701C-T Total Chlorine Reagent C.



- Replace the plastic stopper and the cap. Swirl gently to mix.



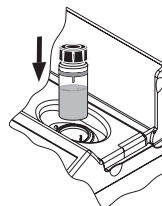
- Add 10 mL of unreacted sample (up to the mark). Replace the plastic stopper and the cap. Shake gently.



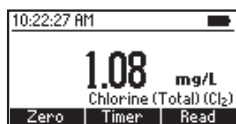
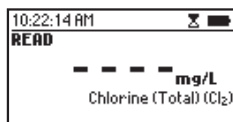
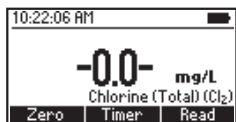
10 mL



- Insert the cuvette into the holder and close the lid.



- Press **Timer** and the display will show the countdown prior to the measurement or wait 2 minutes and 30 seconds and press **Read**. When the timer ends the meter will perform the reading. The instrument displays the results in mg/L of chlorine ( $\text{Cl}_2$ ).



*Note: Free and Total Chlorine have to be measured separately with fresh unreacted samples following the related procedure if both values are desired.*

**INTERFERENCES**

Interference may be caused by:

- Bromine, Iodine, Oxidized forms of Chromium and Manganese, Ozone
- Hardness greater than 500 mg/L  $\text{CaCO}_3$ , to remove the interference shake the sample for approximately 2 minutes after adding the powder reagent
- Alkalinity greater than 250 mg/L  $\text{CaCO}_3$  or acidity greater than 150 mg/L  $\text{CaCO}_3$ , the color of the sample may develop only partially or may rapidly fade, to remove the interference neutralize the sample with diluted HCl or NaOH



## 10.7. COPPER HIGH RANGE

### SPECIFICATIONS

Range	0.00 to 5.00 mg/L (as Cu <sup>2+</sup> )
Resolution	0.01 mg/L
Accuracy	±0.02 mg/L ±4% of reading at 25 °C
Light Source	LED with narrow band interference filter @ 575 nm
Method	Adaptation of the EPA Method

### REQUIRED REAGENTS

Code	Description	Quantity
HI93702-0	Copper High Range Reagent	1 packet

### REAGENT SETS

HI93702-01 Reagents for 100 tests

HI93702-03 Reagents for 300 tests

For other accessories see ACCESSORIES section.

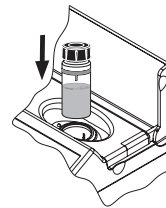
### MEASUREMENT PROCEDURE

- Select the **Copper HR** method using the procedure described in the METHOD SELECTION section.

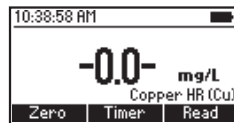
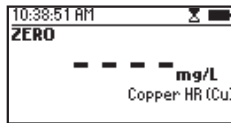
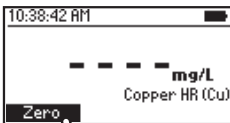
- Fill the cuvette with 10 mL of unreacted sample (up to the mark).  
Replace the plastic stopper and the cap.



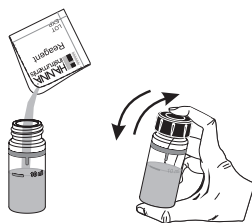
- Insert the cuvette into the holder and close the lid.



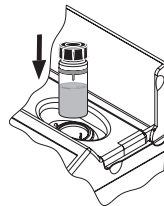
- Press **Zero**. The display will show “-0.0-” when the meter is zeroed and ready for measurement.



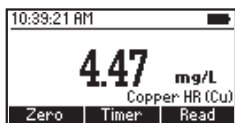
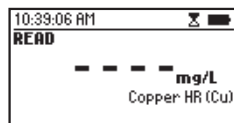
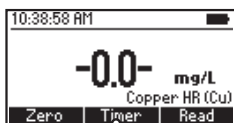
- Remove the cuvette.
- Add one packet of **HI93702-0** Copper High Range Reagent. Replace the plastic stopper and the cap. Shake gently for about 15 seconds.



- Insert the cuvette into the holder and close the lid.



- Press **Timer** and the display will show the countdown prior to the measurement or wait 45 seconds and press **Read**. When the timer ends the meter will perform the reading. The instrument displays the results in **mg/L of copper (Cu)**.



## INTERFERENCES

Interference may be caused by:

- Cyanide, Silver
- For samples overcoming buffering capacity of reagent around pH 6.8, pH should be adjusted between 6 and 8

## 10.8. CYANURIC ACID

### SPECIFICATIONS

Range	0 to 80 mg/L (as CYA)
Resolution	1 mg/L
Accuracy	$\pm 1$ mg/L $\pm 15\%$ of reading at 25 °C
Light Source	LED with narrow band interference filter @ 525 nm
Method	Adaptation of the Turbidimetric Method

### REQUIRED REAGENTS

Code	Description	Quantity
HI93722-0	Cyanuric Acid Reagent	1 packet

### REAGENT SETS

HI93722-01 Reagents for 100 tests

HI93722-03 Reagents for 300 tests

For other accessories see ACCESSORIES section.

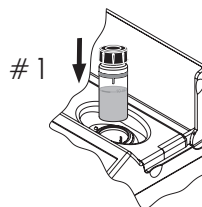
### MEASUREMENT PROCEDURE

- Select the [Cyanuric Acid](#) method using the procedure described in the METHOD SELECTION section.

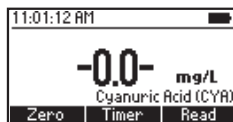
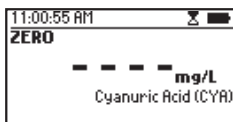
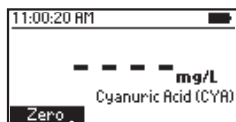
- Fill the first cuvette with 10 mL of unreacted sample (up to the mark). Replace the plastic stopper and the cap.



- Insert the cuvette into the holder and close the lid.



- Press **Zero**. The display will show “-0.0-” when the meter is zeroed and ready for measurement.



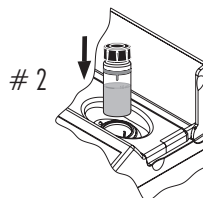
- Fill a beaker with 25 mL sample.
- Add one packet of HI93722-0 Cyanuric Acid Reagent and mix to dissolve.



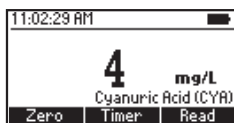
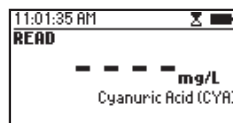
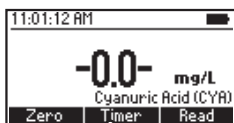
- Fill a second cuvette with 10 mL of the reacted sample (up to the mark). Replace the plastic stopper and the cap.



- Insert the cuvette into the holder and close the lid.



- Press **Timer** and the display will show the countdown prior to the measurement or wait 45 seconds and press **Read**. When the timer ends the meter will perform the reading. The instrument displays the concentration in **mg/L** of cyanuric acid.



## 10.9. HARDNESS, CALCIUM

### SPECIFICATIONS

Range	0.00 to 2.70 mg/L (as CaCO <sub>3</sub> )
Resolution	0.01 mg/L
Accuracy	±0.11 mg/L ±5% of reading at 25 °C
Light Source	LED with narrow band interference filter @ 525 nm
Method	Adaptation of Standard Methods for the Examination of Water and Wastewater, 18 <sup>th</sup> Edition, Calmagite Method

### REQUIRED REAGENTS

Code	Description	Quantity
HI93720A-0	Calcium Hardness Reagent A	0.5 mL
HI93720B-0	Calcium Hardness Reagent B	0.5 mL
HI93720C-0	Calcium Hardness Reagent C	1 drop

### REAGENT SETS

HI93720-01 Reagents for 100 tests

HI93720-03 Reagents for 300 tests

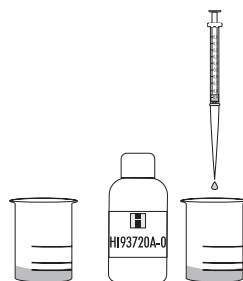
For other accessories see ACCESSORIES section.

### MEASUREMENT PROCEDURE

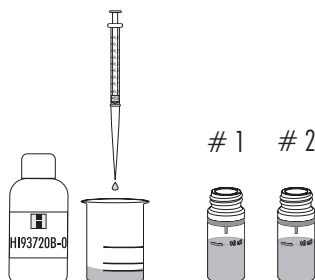
- Select the **Hardness (Calcium)** method using the procedure described in the **METHOD SELECTION** section.

- Rinse a graduated beaker several times with unreacted sample, before filling it to the 50 mL mark with the sample.

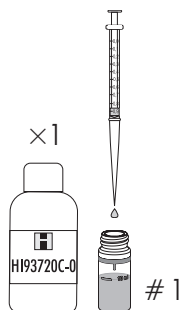
- Add 0.5 mL of **HI93720A-0** Calcium Hardness Reagent A and swirl to mix the solution.



- Add 0.5 mL of **HI93720B-0** Calcium Hardness Reagent B and swirl to mix the solution. Fill two cuvettes with 10 mL of sample (up to the mark).



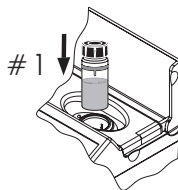
- Add 1 drop of HI93720C-0 Calcium Hardness Reagent C to one cuvette (#1).



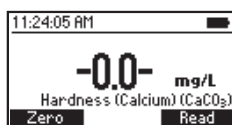
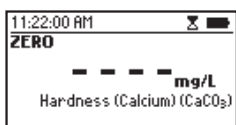
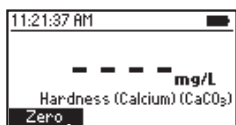
- Replace the plastic stopper and the cap. Invert the cuvette several times to mix. This is the blank.



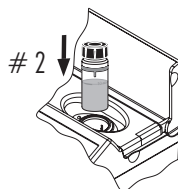
- Insert the blank (#1) into the holder and close the lid.



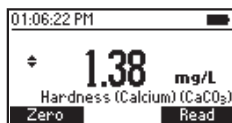
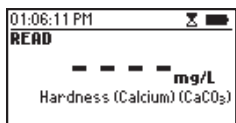
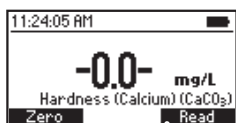
- Press **Zero**. The display will show “-0.0-” when the meter is zeroed and ready for measurement.



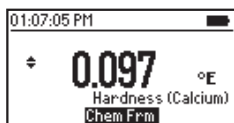
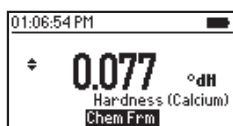
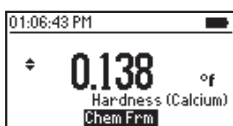
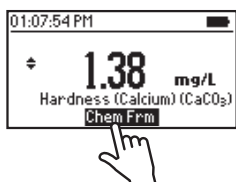
- Remove the blank (#1) and insert the second cuvette (#2) into the holder.



- Press **Read** to start the reading. The instrument displays concentration in mg/L of calcium carbonate (CaCO<sub>3</sub>).



- Press the ▲ or ▼ key to access the second level functions.
- Press Chem Frm to convert the results to French degrees (°f), German degrees (°dH) and English degrees (°E).



- Press the ▲ or ▼ key to return to the measurement screen.

**Note:** This test will detect any calcium contamination in the beaker, measuring syringes or sample cells. To test cleanliness repeat the test multiple times until you obtain consistent results.

## SAMPLE DILUTION

This meter is designed to determine low levels of hardness, typically found in water purification systems. Dilutions must be performed with hardness-free water or the readings will be erroneous.

To reduce the level of hardness by a factor of one hundred:

- Fill a 1 mL syringe with the sample.
- Add 0.5 mL of sample to a clean, dry 50 mL beaker
- Fill the beaker up to the 50 mL mark with hardness-free water.

## INTERFERENCES

Interference may be caused by:

- Excessive amounts of heavy metals

## 10.10. IRON HIGH RANGE

### SPECIFICATIONS

Range	0.00 to 5.00 mg/L (as Fe)
Resolution	0.01 mg/L
Accuracy	$\pm 0.04$ mg/L $\pm 2\%$ of reading at 25 °C
Light Source	LED with narrow band interference filter @ 525 nm
Method	Adaptation of Standard Methods for the Examination of Water and Wastewater, 23 <sup>rd</sup> Edition, 3500-Fe B, Phenanthroline Method

### REQUIRED REAGENTS

Code	Description	Quantity
HI93721-0	Iron High Range Reagent	1 packet

### REAGENT SETS

HI93721-01 Reagents for 100 tests

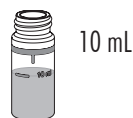
HI93721-03 Reagents for 300 tests

For other accessories see ACCESSORIES section.

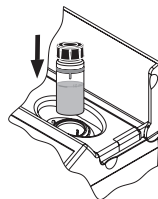
### MEASUREMENT PROCEDURE

- Select the **Iron HR** method using the procedure described in the METHOD SELECTION section.

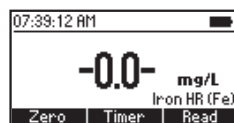
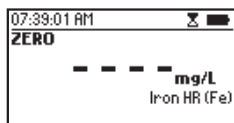
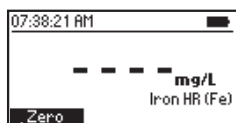
- Fill the cuvette with 10 mL of unreacted sample (up to the mark).  
Replace the plastic stopper and the cap.



- Insert the cuvette into the holder and close the lid.

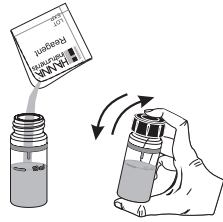


- Press **Zero**. The display will show “-0.0-” the meter is zeroed and ready for measurement.

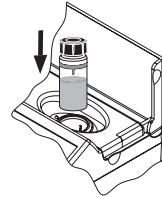




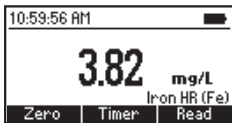
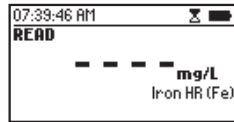
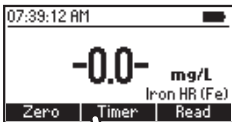
- Remove the cuvette and add the content of one packet of **HI93721-0 Iron High Range Reagent**. Replace the plastic stopper and the cap. Shake until powder is completely dissolved.



- Insert the cuvette into the holder and close the lid.



- Press **Timer** and the display will show the countdown prior to the measurement or wait 3 minutes and press **Read**. When the timer ends the meter will perform the reading. The instrument displays the result in **mg/L of iron (Fe)**.



## INTERFERENCES

Interference may be caused by:

- Chloride above 185000 mg/L
- Magnesium above 100000 mg/L CaCO<sub>3</sub>
- Calcium above 10000 mg/L CaCO<sub>3</sub>
- Molybdate Molybdenum above 50 mg/L

## 10.11. NITRATE

### SPECIFICATIONS

Range	0.0 to 30.0 mg/L (as NO <sub>3</sub> <sup>-</sup> -N)
Resolution	0.1 mg/L
Accuracy	±0.5 mg/L ±10% of reading at 25 °C
Light Source	LED with narrow band interference filter @ 525 nm
Method	Adaptation of the Cadmium Reduction Method

### REQUIRED REAGENTS

Code	Description	Quantity
HI93728-0	Nitrate Reagent	1 packet

### REAGENT SETS

HI93728-01 Reagents for 100 tests

HI93728-03 Reagents for 300 tests

For other accessories see ACCESSORIES section.

### MEASUREMENT PROCEDURE

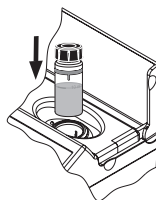
- Select the **Nitrate** method using the procedure described in the METHOD SELECTION section.

- Fill the cuvette with 10 mL of sample (up to the mark). Replace the plastic stopper and the cap.

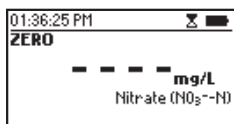
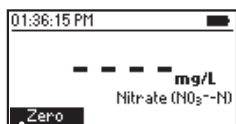


10 mL

- Insert the cuvette into the holder and close the lid.



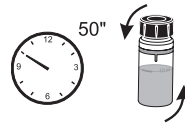
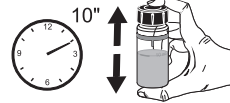
- Press **Zero**. The display will show “-0.0-” when the meter is zeroed and ready for measurement.



- Remove the cuvette and add one packet of HI93728-0 Nitrate Reagent.

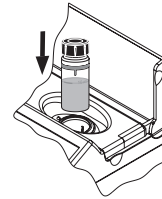


- Replace the plastic stopper and the cap. Shake vigorously up and down for exactly 10 seconds. Continue to mix by inverting the cuvette gently for 50 seconds, while taking care not to induce air bubbles. Powder will not completely dissolve.

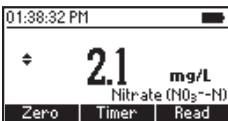
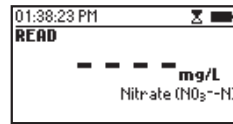
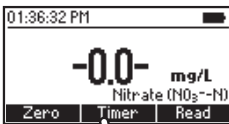


**Note:** The method is technique sensitive. See procedure described in CUVETTE PREPARATION section for proper mixing technique.

- Insert the cuvette into the holder and close the lid.

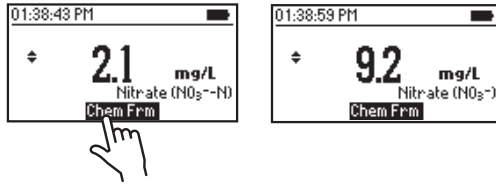


- Press **Timer** and the display will show the countdown prior to the measurement or wait 4 minutes and 30 seconds and press **Read**. When the timer ends the meter will perform the reading. The instrument displays the results in mg/L of nitrate-nitrogen ( $\text{NO}_3\text{-N}$ ).



- Press the ▲ or ▼ key to access the second level functions.

- Press **Chem Frm** to convert the result to **mg/L** of nitrate ( $\text{NO}_3^-$ ).



- Press the ▲ or ▼ key to return to the measurement screen.

## INTERFERENCES

Interference may be caused by:

- Ammonia and amines, as urea and primary aliphatic amines
- Chloride above 100 mg/L
- Chlorine above 2 mg/L
- Copper, Iron (Ferric), Strong oxidizing and reducing substances
- Sulfide must be absent

## 10.12. OZONE

### SPECIFICATIONS

Range	0.00 to 2.00 mg/L (as O <sub>3</sub> )
Resolution	0.01 mg/L
Accuracy	±0.02 mg/L ± 3% of reading at 25 °C
Light Source	LED with narrow band interference filter @ 525 nm
Method	Colorimetric DPD Method

### REQUIRED REAGENTS

Code	Description	Quantity
HI93757-0	Ozone Reagent	1 packet
HI93703-52-0	Glycine Powder (Optional Reagent)	1 packet

### REAGENT SETS

HI93757-01	Reagents for 100 tests
HI93757-03	Reagents for 300 tests
HI93703-52	Reagents for 100 tests (Optional)

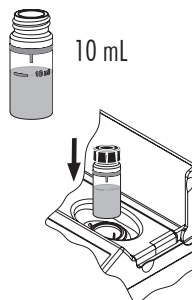
For other accessories see ACCESSORIES section.

### STANDARD MEASUREMENT PROCEDURE

#### Chlorine free samples

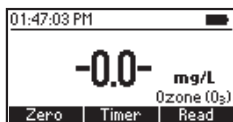
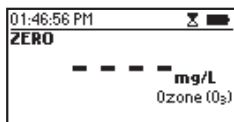
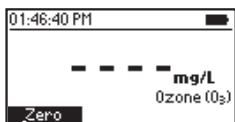
- Select the **Ozone** method using the procedure described in the METHOD SELECTION section.

- Fill the cuvette with 10 mL of unreacted sample (up to the mark).  
Replace the plastic stopper and the cap.

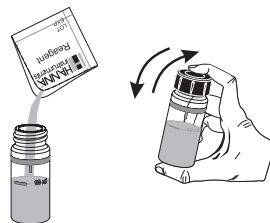


- Insert the cuvette into the holder and close the lid.

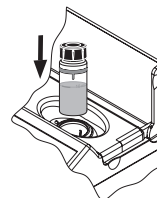
- Press **Zero**. The display will show “-0.0-” the meter is zeroed and ready for measurement.



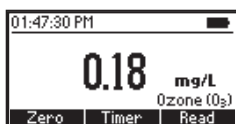
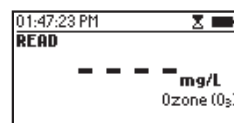
- Remove the cuvette.
- Add one packet of **HI93757-0** Ozone Reagent. Replace the plastic stopper and the cap. Shake gently for 20 seconds.



- Insert the cuvette into the holder and close the lid.



- Press **Timer** and the display will show the countdown prior to the measurement or wait 2 minutes and press **Read**. When the timer ends the meter will perform the reading. The instrument displays the result in **mg/L ozone (O<sub>3</sub>)** (chlorine free sample only). For samples containing chlorine, record this value as A.



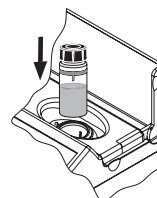
## ADDITIONAL MEASUREMENT PROCEDURE

### Samples containing chlorine

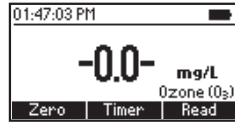
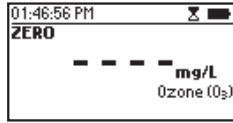
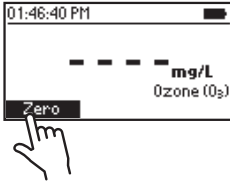
- Fill the cuvette with 10 mL of unreacted sample (up to the mark).



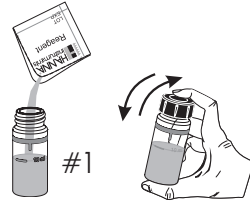
- Insert the cuvette into the holder and close the lid.



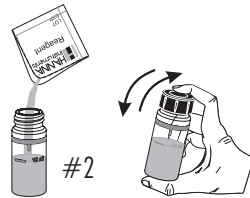
- Press **Zero**. The display will show “-0.0-” the meter is zeroed and ready for measure.



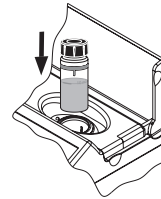
- Remove the cuvette.
- Add one packet of the **HI93703-52-0** Glycine Powder. Replace the plastic stopper and the cap. Shake gently until the powder is completely dissolved.



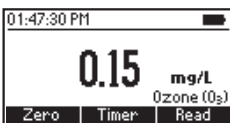
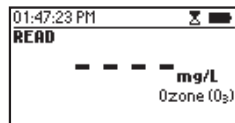
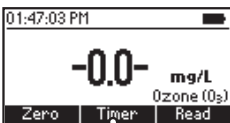
- Add one packet of **HI93757-0** Ozone Reagent. Replace the plastic stopper and the cap. Shake gently for 20 seconds.



- Insert the cuvette into the holder and close the lid.



- Press **Timer** and the display will show the countdown prior to the measurement or wait 2 minutes and press **Read**. When the timer ends the meter will perform the reading. Record this value as B.



- To determine the **mg/L ozone (O<sub>3</sub>)** concentration in sample containing chlorine, subtract value B (additional measurement procedure) from value A (standard measurement procedure).

### INTERFERENCES

Interference may be caused by:

- Bromine, Chlorine Dioxide, Iodine
- Hardness greater than 500 mg/L CaCO<sub>3</sub>, shake the sample for approximately 2 minutes after adding the powder reagent
- Alkalinity above 250 mg/L CaCO<sub>3</sub> will not reliably develop the full amount of color or it may rapidly fade, neutralize the sample with diluted HCl.
- If the sample is suspected to contain chlorine residue (free or total chlorine), follow the alternative measurement procedure described below, chlorine is a strong interferent.
  1. Perform the Standard Measurement Procedure. Record the result as Value A.
  2. Perform Additional Measurement Procedure. Record the result as Value B.
  3. To determine the ozone concentration in mg/L, subtract Value B from Value A.

$$\text{mg/L ozone (O}_3\text{)} = \text{Value A} - \text{Value B}$$



## 10.13. pH

### SPECIFICATIONS

Range	6.5 to 8.5 pH
Resolution	0.1 pH
Accuracy	$\pm 0.1$ pH at 25 °C
Light Source	LED with narrow band interference filter @ 525 nm
Method	Adaptation of the Phenol Red Method

### REQUIRED REAGENTS

Code	Description	Quantity
HI93710-0	pH Reagent	5 drops

### REAGENT SETS

HI93710-01 Reagents for 100 tests

HI93710-03 Reagents for 300 tests

For other accessories see ACCESSORIES section.

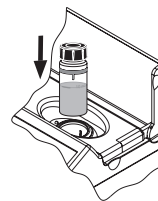
### MEASUREMENT PROCEDURE

- Select the pH method using the procedure described in the METHOD SELECTION section.

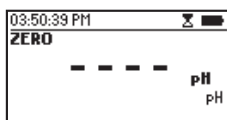
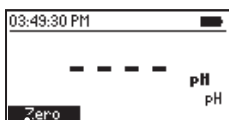
- Fill the cuvette with 10 mL of unreacted sample (up to the mark).  
Replace the plastic stopper and the cap.



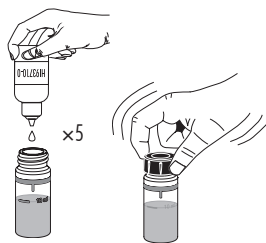
- Insert the cuvette into the holder and close the lid.



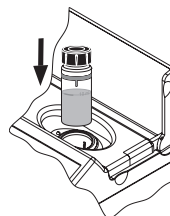
- Press **Zero**. The display will show “-0.0-” when the meter is zeroed and ready for measurement.



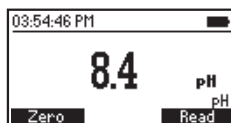
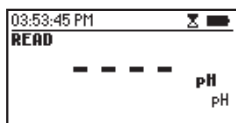
- Remove the cuvette and add 5 drops of HI93710-0 pH Reagent Indicator. Replace the plastic stopper and the cap and mix the solution.



- Insert the cuvette into the holder and close the lid.



- Press **Read** to start the reading. The instrument displays the result in **pH**.



## 10.14. PHOSPHATE LOW RANGE

### SPECIFICATIONS

Range	0.00 to 2.50 mg/L (as $\text{PO}_4^{3-}$ )
Resolution	0.01 mg/L
Accuracy	$\pm 0.04$ mg/L $\pm 4\%$ of reading at 25 °C
Light Source	LED with narrow band interference filter @ 610 nm
Method	Adaptation of the Ascorbic Acid Method

### REQUIRED REAGENTS

Code	Description	Quantity
HI93713-0	Phosphate Low Range Reagent	1 packet

### REAGENT SETS

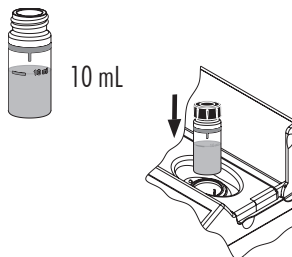
HI93713-01 Reagents for 100 tests

HI93713-03 Reagents for 300 tests

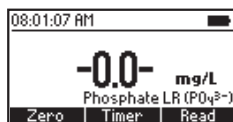
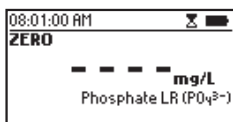
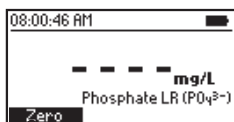
For other accessories see ACCESSORIES section.

### MEASUREMENT PROCEDURE

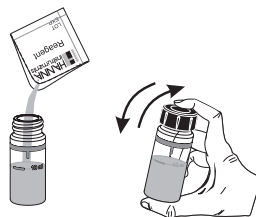
- Select the **Phosphate LR** method using the procedure described in the **METHOD SELECTION** section.
- Rinse and replace the plastic stopper and the cap. Shake the cuvette several times with unreacted sample.
- Fill the cuvette with 10 mL of sample (up to the mark). Replace the plastic stopper and the cap.



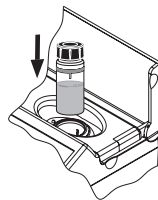
- Insert the cuvette into the holder and close the lid.
- Press **Zero**. The display will show “-0.0-” when the meter is zeroed and ready for measurement.



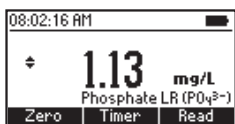
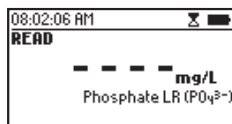
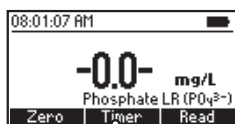
- Remove the cuvette and add the content of one packet of HI93713-0 Phosphate Low Range Reagent. Replace the plastic stopper and the cap. Shake gently (for about 2 minutes) until the powder is completely dissolved.



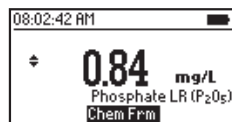
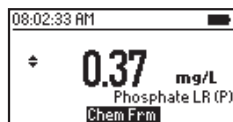
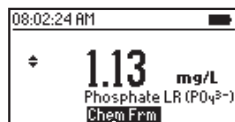
- Insert the cuvette into the holder and close the lid.



- Press **Timer** and the display will show the countdown prior to the measurement or wait 3 minutes and press **Read**. When the timer ends the meter will perform the reading. The instrument displays concentration in mg/L of phosphate ( $\text{PO}_4^{3-}$ ).



- Press the **▲** or **▼** key to access the second level functions.
- Press **Chem Frm** to convert the result to mg/L of phosphorus (P) and phosphorus pentoxide ( $\text{P}_2\text{O}_5$ ).



- Press the **▲** or **▼** key to return to the measurement screen.

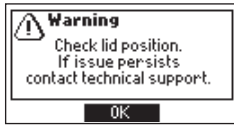
### INTERFERENCES

Interference may be caused by:

- Iron, Silica above 50 mg/L
- Copper, Silicate above 10 mg/L
- Arsenate, Highly buffered samples, Hydrogen sulfide, Turbid samples

## 11. WARNINGS & ERRORS

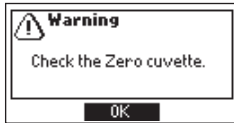
The instrument shows clear warning messages when erroneous conditions appear and when measured values are outside the expected range. The information below provides an explanation of the errors and warnings, and recommended action to be taken.



There is an excess amount of ambient light reaching the detector. Make sure the lid is closed before performing any measurements. If the issue persists, please contact Hanna Instruments technical support.



The sample and the zero cuvettes are inverted. Swap the cuvettes and repeat the measurement.



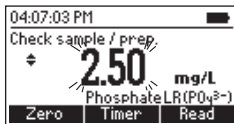
There is either too much light or the instrument can not adjust the light level. Please check the preparation of the zero cuvette and that the sample does not contain any debris.



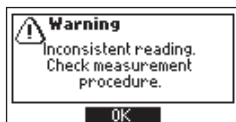
The meter is either overheating or its temperature has dropped too low to operate within published accuracy specifications. The meter must be between 0 and 50 °C (32 and 122 °F) to perform any measurements.



Meter temperature has changed significantly since the zero measurement has been performed. The zero measurement must be performed again.



The measured value is outside the limits of the method. If possible, change the method range. Verify that the sample does not contain any debris. Check the sample preparation and the measurement preparation.



The measured value cannot be calculated.  
Please check sample preparation and measurement procedure.



Stored results of the CAL Check measurements have been lost.  
Please redo the CAL Check measurements to ensure accurate results.



User settings have been lost.  
Please reset the values. If the issue persists, please contact Hanna Instruments technical support.



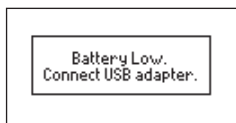
Flash drive is not recognized or it might be damaged.  
Please insert a new USB flash drive.



Data log is full.  
Please review logged data and delete unnecessary logs.



Date and time settings have been lost.  
Please reset the values. If the issue persists, please contact Hanna Instruments technical support.



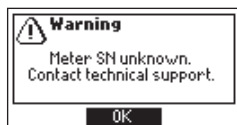
Battery level is too low to ensure normal functioning and the meter will turn off.  
Connect the USB adapter to charge the battery.



English is the only available language. Some features are no longer available.  
Restart the meter. If the issue persists, please contact Hanna Instruments technical support.



Real time clock is not accurate. Some features are no longer available. Restart the meter. If the issue persists, please contact Hanna Instruments technical support.



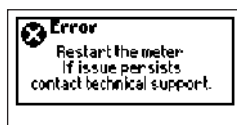
The device serial number can not be identified. Some features are no longer available. Restart the meter. If the issue persists, please contact Hanna Instruments technical support.



Logged data is no longer accessible. Some features are no longer available. Restart the meter. If the issue persists, please contact Hanna Instruments technical support.



Battery charge level is not accurate. Some features are no longer available. Restart the meter. If the issue persists, please contact Hanna Instruments technical support.



A critical error has occurred. Restart the meter. If the issue persists, please contact Hanna Instruments technical support.

## 12. STANDARD METHODS

Description	Range	Method
Alkalinity	0 to 500 mg/L (as CaCO <sub>3</sub> )	Colorimetric
Bromine	0.00 to 8.00 mg/L (as Br <sub>2</sub> )	DPD
Chlorine Dioxide	0.00 to 2.00 mg/L (as ClO <sub>2</sub> )	Chlorophenol Red
Chlorine Dioxide, Rapid Method	0.00 to 2.00 mg/L (as ClO <sub>2</sub> )	DPD
Chlorine, Free	0.00 to 5.00 mg/L (as Cl <sub>2</sub> )	DPD
Chlorine, Total	0.00 to 5.00 mg/L (as Cl <sub>2</sub> )	DPD
Copper HR	0.00 to 5.00 mg/L (as Cu <sup>2+</sup> )	Bicinchoninate
Cyanuric Acid	0 to 80 mg/L (as CYA)	Turbidimetric
Hardness, Calcium	0.00 to 2.70 mg/L (as CaCO <sub>3</sub> )	Calmagite
Iron HR	0.00 to 5.00 mg/L (as Fe)	Phenanthroline
Nitrate	0.0 to 30.0 mg/L (as NO <sub>3</sub> <sup>-</sup> - N)	Cadmium reduction
Ozone	0.00 to 2.00 mg/L (as O <sub>3</sub> )	DPD
pH	6.5 to 8.5 pH	Phenol Red
Phosphate LR	0.00 to 2.50 mg/L (as PO <sub>4</sub> <sup>3-</sup> )	Ascorbic Acid



## 13. ACCESSORIES

### 13.1. REAGENT SETS

Code	Description
HI775-26	25 alkalinity fresh water tests
HI93701-01	100 chlorine free tests (powder)
HI93701-03	300 chlorine free tests (powder)
HI93701-F	300 chlorine free tests (liquid)
HI93701-T	300 chlorine total tests (liquid)
HI93702-01	100 copper HR tests
HI93702-03	300 copper HR tests
HI93703-52	100 ozone tests
HI93710-01	100 pH tests
HI93710-03	300 pH tests
HI93711-01	100 chlorine total tests (powder)
HI93711-03	300 chlorine total tests (powder)
HI93713-01	100 phosphate LR tests
HI93713-03	300 phosphate LR tests
HI93716-01	100 bromine tests
HI93716-03	300 bromine tests
HI93720-01	100 hardness calcium tests
HI93720-03	300 hardness calcium tests
HI93721-01	100 iron HR tests
HI93721-03	300 iron HR tests
HI93722-01	100 cyanuric acid tests
HI93722-03	300 cyanuric acid tests
HI93728-01	100 nitrate tests
HI93728-03	300 nitrate tests

Code	Description
HI93738-01	100 chlorine dioxide tests
HI93738-03	300 chlorine dioxide tests
HI93757-01	100 ozone tests
HI93757-03	300 ozone tests
HI96779-01	100 chlorine dioxide (rapid) tests
HI96779-03	300 chlorine dioxide (rapid) tests

### 13.2. pH ELECTRODES

Code	Description
HI10530	Triple ceramic, double junction, low temperature glass, refillable pH electrode with conical tip and temperature sensor
HI10430	Triple ceramic, double junction, high temperature glass, refillable pH electrode with temperature sensor
HI11310	Glass body, double junction, refillable pH/temperature electrode
HI11311	Glass body, double junction, refillable pH/temperature electrode with enhanced diagnostics
HI12300	Plastic body, double junction, gel filled, non refillable pH/temperature electrode
HI12301	Plastic body, double junction, gel filled, non refillable pH/temperature electrode with enhanced diagnostics
HI10480	Glass body, double junction with temperature sensor for wine analysis
FC2320	Double junction, open reference, non refillable, electrolyte viscolene, PVDF body with conical tip, pH/temperature electrode
FC2100	Double junction, open reference, non refillable, electrolyte viscolene, glass body with conical tip, pH/temperature electrode
FC2020	Double junction, open reference, non refillable, electrolyte viscolene, PVDF body with conical tip, pH/temperature electrode

*Note: The enhanced diagnostics information are not displayed by meter.*

### 13.3. pH SOLUTIONS

#### BUFFER SOLUTIONS

Code	Description
HI70004P	pH 4.01 buffer sachet, 20 mL (25 pcs.)
HI70007P	pH 7.01 buffer sachet, 20 mL (25 pcs.)
HI70010P	pH 10.01 buffer sachet, 20 mL (25 pcs.)
HI7001L	pH 1.68 buffer solution, 500 mL
HI7004L	pH 4.01 buffer solution, 500 mL
HI7006L	pH 6.86 buffer solution, 500 mL
HI7007L	pH 7.01 buffer solution, 500 mL
HI7009L	pH 9.18 buffer solution, 500 mL
HI7010L	pH 10.01 buffer solution, 500 mL
HI8004L	pH 4.01 buffer solution in FDA approved bottle, 500 mL
HI8006L	pH 6.86 buffer solution in FDA approved bottle, 500 mL
HI8007L	pH 7.01 buffer solution in FDA approved bottle, 500 mL
HI8009L	pH 9.18 buffer solution in FDA approved bottle, 500 mL
HI8010L	pH 10.01 buffer solution in FDA approved bottle, 500 mL

#### ELECTRODE STORAGE SOLUTIONS

Code	Description
HI70300L	Storage solution, 500 mL
HI80300L	Storage solution in FDA approved bottle, 500 mL

## ELECTRODE CLEANING SOLUTIONS

Code	Description
HI70000P	Electrode rinse sachet, 20 mL (25 pcs.)
HI7061L	General cleaning solution, 500 mL
HI7073L	Protein cleaning solution, 500 mL
HI7074L	Inorganic cleaning solution, 500 mL
HI7077L	Oil & fat cleaning solution, 500 mL
HI8061L	General cleaning solution in FDA approved bottle, 500 mL
HI8073L	Protein cleaning solution in FDA approved bottle, 500 mL
HI8077L	Oil & fat cleaning solution in FDA approved bottle, 500 mL

## ELECTRODE REFILL ELECTROLYTE SOLUTIONS

Code	Description
HI7082	3.5M KCl electrolyte, 4x30 mL, for double junction electrodes
HI8082	3.5M KCl electrolyte in FDA approved bottle, 4x30 mL, for double junction

## 13.4. OTHER ACCESSORIES

Code	Description
HI72083300	carrying case
HI731318	cloth for wiping cuvettes (4 pcs.)
HI731331	glass cuvette (4 pcs.)
HI731335N	cap for cuvette (4 pcs.)
HI731340	200 $\mu$ L automatic pipette
HI731341	1000 $\mu$ L automatic pipette
HI731342	2000 $\mu$ L automatic pipette
HI740034P	cap for 100 mL beaker (10 pcs.)
HI740036P	100 mL plastic beaker (10 pcs.)
HI740038	60 mL glass bottle and stopper

Code	Description
HI740142P	1 mL graduated syringe (10 pcs)
HI740143	1 mL graduated syringe (6 pcs.)
HI740144	pipette tip (6 pcs.)
HI740157P	plastic refilling pipette (20 pcs.)
HI740220	25 mL graduated glass vial (2 pcs.)
HI740223	170 mL plastic beaker
HI740224	170 mL plastic beaker (12 pcs.)
HI740225	60 mL graduated syringe
HI740226	5 mL graduated syringe
HI740227	filter assembly
HI740228	filter disc (25 pcs.)
HI740229	100 mL graduated cylinder
DEMI-02	demineralizer
HI75110/220E	USB power adapter, European plug
HI75110/220U	USB power adapter, USA plug
HI76404A	electrode holder
HI83326-11	CAL Check cuvette kit for <a href="#">HI83326</a>
HI83300-100	Sample preparation kit consisting of activated carbon for 50 tests, demineralizer bottle for 10 L of water, 100 mL graduated beaker with cap, 170 mL graduated beaker with cap, 3 mL pipette, 60 mL syringe, 5 mL syringe, graduated cylinder, spoon, funnel, filter paper (25 pcs.)
HI920015	USB to micro USB cable connector
HI93703-50	cuvette cleaning solution (230 mL)
HI93703-55	activated carbon (50 pcs.)

## CERTIFICATION

All Hanna Instruments conform to the **CE European Directives**.



**Disposal of Electrical & Electronic Equipment.** The product should not be treated as household waste. Instead hand it over to the appropriate collection point for the recycling of electrical and electronic equipment which will conserve natural resources.

**Disposal of waste batteries.** This product contains batteries, do not dispose of them with other household waste. Hand them over to the appropriate collection point for recycling.

Ensuring proper product and battery disposal prevents potential negative consequences for the environment and human health. For more information, contact your city, your local household waste disposal service, the place of purchase or go to [www.hannainst.com](http://www.hannainst.com).



## RECOMMENDATIONS FOR USERS

Before using this product, make sure it is entirely suitable for your specific application and for the environment in which it is used. Any variation introduced by the user to the supplied equipment may degrade the photometer's performance. For yours and the meter's safety do not use or store the photometer in hazardous environments.

## WARRANTY

The **HI83326** is warranted for two years against defects in workmanship and materials when used for its intended purpose and maintained according to instructions. This warranty is limited to repair or replacement free of charge. Damage due to accidents, misuse, tampering or lack of prescribed maintenance is not covered.

If service is required, contact your local Hanna Instruments Office. If under warranty, report the model number, date of purchase, serial number (engraved on the bottom of the meter) and the nature of the problem. 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 (RGA) number from the Technical Service department and then send it with shipping costs prepaid. When shipping any instrument, make sure it is properly packed for complete protection.

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

## World Headquarters

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