



## pH Benchtop Meters

HI2620

HI2621 with Data Logging

## Dear Customer,

Thank you for choosing a Hanna Instruments® product.

Please read this instruction manual carefully before using this instrument as it provides the necessary information for correct use of this instrument, and 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).

Visit [www.hannainst.com](http://www.hannainst.com) for more information about Hanna Instruments and our products.

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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 device is supplied with:

- [HI11310](#) pH digital electrode
- pH calibration kit
  - pH 4 buffer solution (2 sachets)
  - pH 7 buffer solution (4 sachets)
  - pH 10 buffer solution (2 sachets)
  - Electrode cleaning solution (2 sachets)
- [HI764026](#) Electrode holder for [HI2600](#) family
- [HI920018](#) USB-C to USB-C cable
- USB-C power adapter
- Instrument quality certificate
- Electrode quality certificate
- Battery safety insert
- Quick reference guide with QR code for instruction manual download

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

### Ordering information

- [HI2620-01](#) (US power plug)
- [HI2620-02](#) (EU power plug)
- [HI2621-01](#) (US power plug)
- [HI2621-02](#) (EU power plug)

1.1. SAFETY MEASURES



Handling and usage precautions

The unit, although not fragile, can be damaged by improper handling and usage.

- Transport the unit with all cables removed.
- Keep the unit on a stable and even surface, away from contact with liquid.
- Avoid excessive dirt and dust.
- Protect the unit from contact with food, oils, and chemicals.
- If the device becomes wet, gently wipe the exterior with a clean, dry cloth.
- Keep away from direct sunlight.
- Use in a safe place that is appropriate to application requirements.
- Use attachments and accessories specified in this manual only.
- Operate the capacitive keys without applying pressure.
- Do not puncture the screen or drop the unit.
- Do not use the device near heat sources.
- Do not place objects on top of the device.
- Do not insert objects into the ports, spaces around keys, other than the intended cable, USB drive.

Battery Safety

The coin-cell battery is replaceable by a professional service center only.

 <b>WARNING</b>	
<ul style="list-style-type: none"><li>• <b>INGESTION HAZARD:</b> This product contains a button cell or coin battery.</li><li>• <b>DEATH</b> or serious injury can occur if digested.</li><li>• A swallowed button cell or coin battery can cause <b>Internal Chemical Burns</b> in as little as <b>2 hours</b>.</li><li>• <b>KEEP</b> new and used batteries <b>OUT OF REACH OF CHILDREN</b>.</li><li>• <b>Seek immediate medical attention</b> if a battery is suspected to be swallowed or inserted inside any part of the body.</li></ul>	

- Remove and immediately recycle or dispose of used batteries according to local regulations and keep away from children.  
Do NOT dispose of batteries in household trash or incinerate.
- Even used batteries may cause severe injury or death.
- Call a local poison control center for treatment information.
- Coin-cell battery type CR2032 | Nominal voltage 3.0 V
- Non-rechargeable batteries are not to be recharged.
- Do not force discharge, recharge, disassemble, heat above 85 °C (185 °F) or incinerate. Doing so may result in injury due to venting, leakage or explosion resulting in chemical burns.
- Ensure the batteries are installed correctly according to polarity (+ and -).
- Do not mix old and new batteries, different brands or types of batteries, such as alkaline, carbon-zinc, or rechargeable batteries.
- Remove and immediately recycle or dispose of batteries from equipment not used for an extended period of time according to local regulations.
- Always completely secure the battery compartment. If the battery compartment does not close securely, stop using the product, remove the batteries, and keep them away from children.

## 2. GENERAL DESCRIPTION & INTENDED USE

HI2620 and HI2621 enable fast, accurate pH and ORP measurements utilizing the Hanna Instruments® HI11310 digital pH electrode and HI36180 digital ORP probe.

The digital electrode has a unique serial number and, once connected, is automatically identified by the meter.

Both meters measure pH and ORP while the HI2621 adds data logging and data transfer capabilities.

The intuitive design simplifies configuration, calibration, measurement, data logging and transfer (to a USB thumb drive or computer).

HI2620 and HI2621 benchtop meters offer a Basic Mode that streamlines measurement configuration and is useful for routine applications.

Additionally, HI2621 can be used in Standard operating Mode, where all features and capabilities are enabled.

### Large display with capacitive keys

The meter features a 5.5" (14 cm) LCD display. The large display provides a 130 ° wide viewing angle.

### Main Features

- Automatic parameter recognition
- Choice of measurement unit:
  - » pH
  - » mV
- CAL Check™ indicators
- Sensor Check™ indicators
- Basic mode for simplified operation
- Dedicated GLP key
- Internal clock and date
- Adjustable resolution (HI2621)
- GLP data included with logged data (HI2621)
- Simplified data transfer to a PC (HI2621)

### 3. SYSTEM SPECIFICATIONS

**HI2620** and **HI2621** using **HI11310** pH electrode

	pH	mV	Temperature
Range	–2.00 to 16.00 pH –2.000 to 16.000 pH *	±1000.0 mV	–20.0 to 120.0 °C ** (–4.0 to 248.0 °F)
Resolution	0.01 pH 0.001 pH *	0.1 mV	0.1 °C / 0.1 °F
Accuracy at 25 °C / 77 °F	±0.01 pH ±0.002 pH *	±0.2 mV	±0.5 °C / ±0.9 °F
pH calibration	Automatic, up to three (five*) points Option to select from five (seven*) standard buffers: pH 1.68*, 4.01 or 3.00, 6.86, 7.01, 9.18, 10.01, 12.45* and two custom buffers*		
Temperature compensation	Automatic, using integral temperature sensor –5.0 to 100.0 °C (23.0 to 212.0 °F)		
Logging <b>HI2621</b> only	Up to 1000* records organized in: <ul style="list-style-type: none"> <li>• Manual log-on-demand, maximum 200 logs</li> <li>• Manual log-on-stability, maximum 200 logs</li> <li>• Interval logging, maximum 600 logs (100 lots)*</li> </ul>		

\* When operating in Standard Mode only!

\*\* Temperature limits will be reduced to actual probe limits.

**HI2620** and **HI2621** using **HI36180** ORP probe

	ORP	Temperature
Range	±2000.0 mV	–20.0 to 120.0 °C** (–4.0 to 248.0 °F)
Resolution	0.1 mV	0.1 °C / 0.1 °F
Accuracy at 25 °C / 77 °F	±0.2 mV (±999.9 mV) ±1 mV (±2000 mV)	±0.5 °C / ±0.9 °F
Calibration	Single point offset	
Temperature compensation	Automatic, using integral temperature sensor –5.0 to 100.0 °C (23.0 to 212.0 °F)	
Logging <b>HI2621</b> only	Up to 1000* records organized in: <ul style="list-style-type: none"> <li>• Manual log-on-demand, maximum 200 logs</li> <li>• Manual log-on-stability, maximum 200 logs</li> <li>• Interval logging, maximum 600 logs (100 lots)*</li> </ul>	

\* When operating in Standard Mode only!

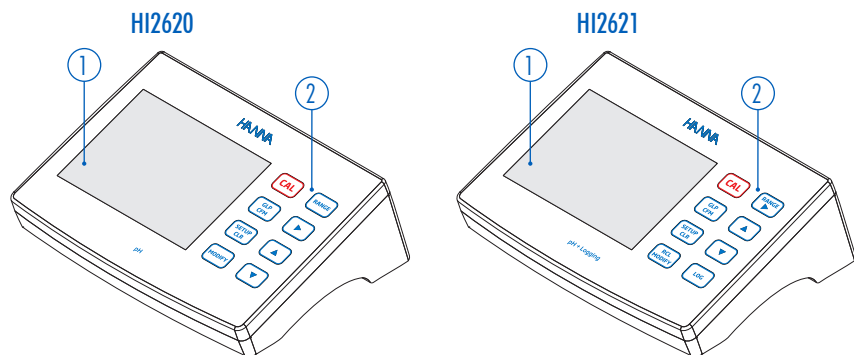
\*\* Temperature limits will be reduced to actual probe limits.

#### Additional Specifications

PC interface ( <b>HI2621</b> only)	USB-C
Power supply	USB Type C (5 VDC; 500 mA)
Environment	0 to 50 °C (32 to 122 °F) ; Maximum 95% RH non-condensing
Dimensions	205 x 160 x 77 mm (8.0 x 6.2 x 3.0 ")
Weight	Approximately 0.85 kg (1.87 lbs.)

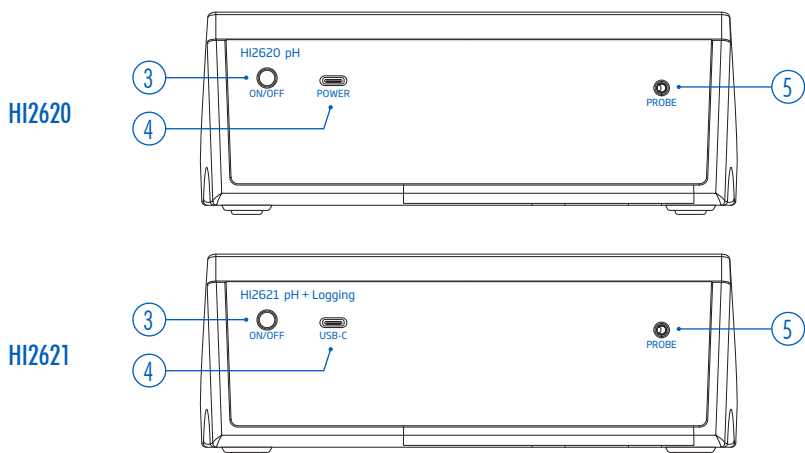
## 4. FUNCTIONAL & LCD DESCRIPTION

### 4.1. FRONT VIEW



1. Liquid Crystal Display (LCD)
2. Capacitive keys

### 4.2. REAR VIEW



3. Power button
4. USB-C port for power connection  
USB-C port for PC interface (HI2621)
5. Jack input (3 mm) for digital electrode



### 4.3. DIGITAL ELECTRODES & PROBES

HI2620 and HI2621 accept compatible pH and ORP digital probes interchangeably.

#### Probe compatibility

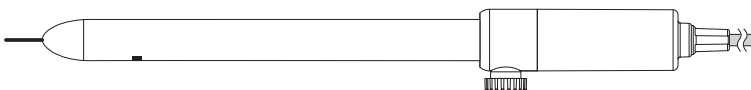
##### Delivered with the meter

- **HI11310**
  - » Digital pH electrode with integral temperature sensor



##### Available from [www.hannainst.com](http://www.hannainst.com)

- **HI36180**
  - » Digital ORP probe with integral temperature sensor
- **HI12300**
  - » Digital pH electrode for field applications, PEI body
- **HI11311**
  - » Digital pH electrode with temperature sensor and matching pin, glass body
- **HI12301**
  - » Digital pH electrode with temperature sensor and matching pin, PEI body
- **HI10530**
  - » Digital pH electrode with temperature sensor for semi-solids, glass body
- **HI10430**
  - » Double junction pH electrode with temperature sensor, glass body








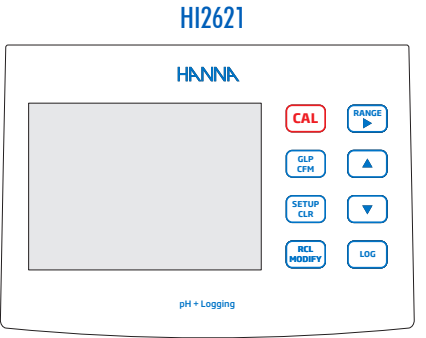
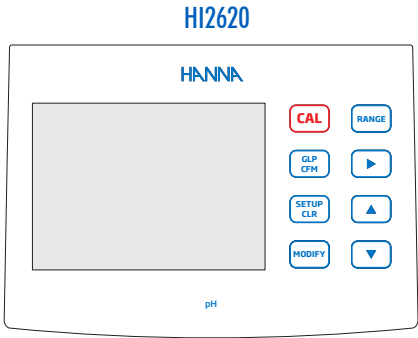
#### Probe Features







- Direct signal processing for noise-free measurements
- Automatic sensor recognition
- Storage of last calibration data
- Built with materials suitable for use in chemical analysis
- Integral temperature sensor
- 3 mm jack termination
- Unique serial ID for probe traceability

4.4. KEYPAD FUNCTION

Capacitive keys / Description

	Enter and exit calibration.
	Display GLP calibration information. In SETUP, confirm change made. During calibration, accept calibration points.
	Enter/exit SETUP mode. During calibration, clear previous calibration data. Clear log records in log recall.
	Scroll through setup menu items.
	Change selection when modifying a parameter in setup.*



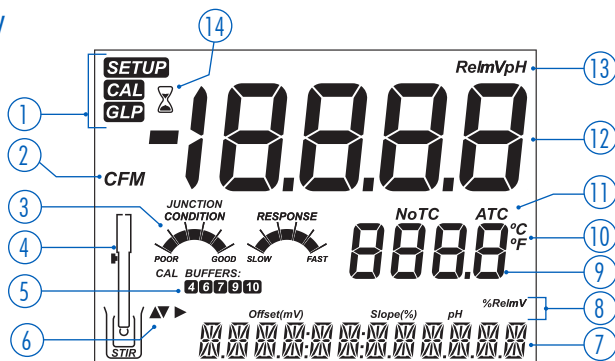
	Edit option.
	Select measurement range.
	Navigate right.
	View logged records. View percentage of used log memory.
	Select measurement range. Navigate right in setup menu items. View GLP data for a data point in log recall.
	Log data by manual log-on-demand or manual log-on-stability. Start/stop interval logging.

**Note:** During measurement, use the   keys to select desired message. Options include date, time, calibration data.  
If a measurement error or log status change occurs during measurement, the third line displays a pertinent message.

\* To make number changes faster, hold down  or  key.

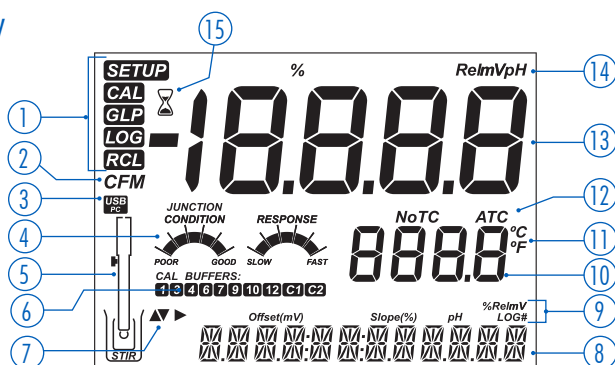
## 4.5. LCD DESCRIPTION

## HI2620 Display



- |  |  |
|--|--|
| 1. Mode tags                                     | 8. Labels                                    |
| 2. Confirm tag                                   | 9. Second LCD line (temperature measurement) |
| 3. pH electrode diagnostics                      | 10. Temperature units                        |
| 4. Electrode/probe symbol                        | 11. Temperature compensation status          |
| 5. Used pH calibration buffers                   | 12. First LCD line (measurement line)        |
| 6. Arrow tags, displayed when they are available | 13. Measurement units                        |
| 7. Third LCD line (message area)                 | 14. Stability indicator                      |

## HI2621 Display



- |  |   |
|--|---|
| 1. Mode tags                                     | 9. Labels                                     |
| 2. Confirm tag                                   | 10. Second LCD line (temperature measurement) |
| 3. USB connection status                         | 11. Temperature units                         |
| 4. pH electrode diagnostics                      | 12. Temperature compensation status           |
| 5. Electrode/probe symbol                        | 13. First LCD line (measurement line)         |
| 6. Used pH calibration buffers                   | 14. Measurement units                         |
| 7. Arrow tags, displayed when they are available | 15. Stability indicator                       |
| 8. Third LCD line (message area)                 |   |

## 5. SETUP / INSTALLATION

### 5.1. SETTING UP THE METER

The main operating modes are setup, calibration, measurement, data logging, and data export. Follow this general outline of steps to get started.

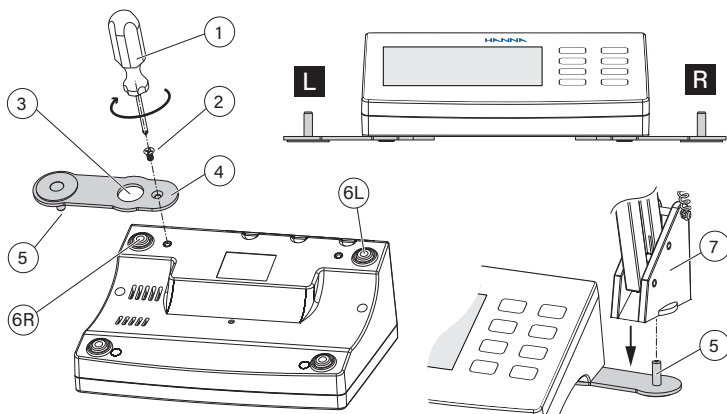
1. Use supplied USB-C to USB-C cable to connect the meter to power.
2. Press the ON/OFF button to turn the meter on.
3. Plug in the probe required for measurement.
4. Configure parameter settings required for the measurement.
5. Calibrate the electrode.

The system is now ready for measurements.

### 5.2. ATTACHING THE ELECTRODE ARM

#### Attaching the Electrode Holder Base Plate

- Take the [HI764026](#) electrode arm from the box.
- Identify the metal base plate (4) with the integral pivot pin (5) and the screw (2).
- The plate may be attached to either side of the meter, left (L) or right (R).
- Place the meter face down on a clean, dry surface.
- Align the hole on the base plate (3) over the rubber foot (6R or 6L).
- The pivot pin (5) should be facing downward.
- Use a screwdriver (1) to tighten the screw (2) and attach the base plate to the meter.

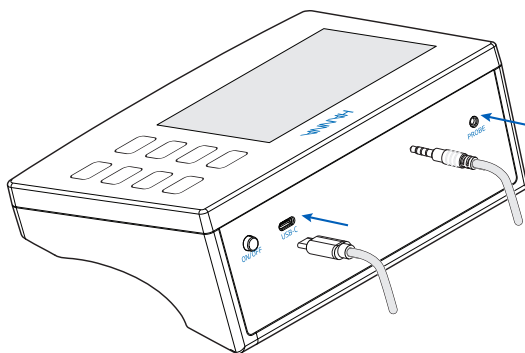


- Position the meter with the display facing up.
  - Slide electrode holder (7) over the pivot pin (5).
- A "slide in" motion is required to lock the arm into position.

### 5.3. POWERING THE UNIT

1. Plug one end of the USB-C cable into the USB-C port (HI2621) / POWER port (HI2620) of the meter.
2. Plug the other end of the USB-C cable to the power adapter.
3. Plug the adapter into the wall.
4. Press the black ON/OFF power button.

At start up, the meter briefly displays the initialization screen.



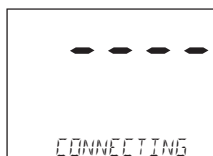
### 5.4. ELECTRODE & PROBE CONNECTIONS

pH electrode and the ORP probe attach to the meter through a jack connector, making attaching and removing the probe an easy process.

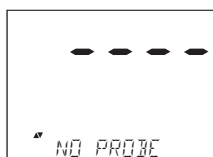
When connected, the probe is automatically detected.

- Insert the plug into the socket located on the meter's rear panel.
- Make sure the probe is completely connected.

If the probe is recognized, "CONNECTING" message is displayed along with sensor model.



If the probe is not connected or not recognized, "NO PROBE" message is displayed.

















## 5.5. GENERAL SETUP











The General Setup options are displayed regardless of the sensor being used.

These settings remain when switching to another probe type or when no probe is connected.

**Note:** The settings are reset to default when meter is restarted.

- » Tap  key to access configurable options.
- » Use the   keys to navigate options.
- » To modify settings:
  - HI2620 » tap  key
  - HI2621 » tap  key
- » To modify options:
  - HI2620 » use  key
  - HI2621 » use  key
  - Both models » use   keys
- » Tap  key to confirm the change.
- » Tap  key to exit setup.

General Setup Items	Description	Options	Default	Basic Mode
USB connection HI2621 only	When connected to a PC, select between logging or data export.	<ul style="list-style-type: none"> <li>LOG ON METER</li> <li>EXPORT TO PC</li> </ul>	LOG ON METER	Available
Log HI2621 only	<ul style="list-style-type: none"> <li>Manual log-on-demand</li> <li>Manual log-on-stability</li> <li>Timed interval lot logging</li> </ul>	<ul style="list-style-type: none"> <li>Manual log</li> <li>Stability log</li> <li>Fast, Medium, Accurate</li> <li>Interval log</li> <li>Interval log</li> <li>Interval log</li> </ul>	Interval (5 seconds)	Manual log Stability log (medium)
Set Calibration expiration warning	"EPL TIME" is displayed when set time in this parameter has been exceeded.	1, 2, 3, 4, 5, 6, 7 days OFF	7 days	Not available
Probe specific	Parameters that are specific to a measurement type are inserted here in the SETUP list.			
Set date	Tap     to set date. Tap  to save.	YYYY/MM/DD Date	Set date	Available

General Setup Items	Description	Options	Default	Basic Mode
Set time	Tap     to set time. Tap  to save.	24 hr:MM:SS Time	Set time	Available
Set Auto-Off	Automatically turns off when no key press is detected for time set.	5, 10, 30, 60 minutes OFF	10 minutes	Available
Sound	If enabled, a short audible tone is produced for key stroke or calibration confirmation. A longer audible tone is produced for wrong key.	On Off	On	Available
Temperature unit	Select degree Celsius or Fahrenheit scale for displayed and logged temperatures.	°C or °F	°C	Available
LCD contrast	Permits modification of the display contrast for various lighting conditions.	1 to 8	3	Available
Message transition	Select how messages are displayed on third LCD line of display.	Word scroll Letter scroll	Letter scroll	Available
Reset configuration to default	Tap     and  when prompted to reset parameters.			Available*
Instrument Firmware Probe Firmware	Displays meter firmware version. Use     to switch to probe firmware (if connected) and diagnostic mode for troubleshooting.	View only	Current firmware version	Available
Meter ID Meter SN Probe SN	Meter ID Meter and connected probe serial number Use     to navigate options.	User selectable meter ID	0000/Serial Number	Available
CSV file separator	Used to separate columns in the CSV file.	Comma (,) Semicolon (;)	Comma	Available

\* It resets with Basic Mode OFF.

## 6. pH CONFIGURATION

### 6.1. UNDERSTANDING STANDARD vs BASIC OPERATING MODES

Useful for routine applications, the Basic Mode streamlines measurement configuration.

#### 6.1.1. Standard Mode (HI2621 only)

The Standard pH Mode permits:

- Up to a 5-point buffer calibration
- Option to use up to 2 custom buffers
- Option to display 0.001 pH resolution
- Full CAL Check™ diagnostic features:
  - » Used buffers
  - » Probe condition
  - » Response time
  - » Contaminated buffer diagnostic (message) during calibration
  - » pH electrode maintenance required message during calibration
- Additional sensor check indicators, when using HI11311 or HI12301 pH electrodes, include:
  - » Broken electrode diagnostic
  - » Compromised (fouled) reference junction diagnostic
- Full logging capability, including Interval, Manual log on demand, Manual log on stability

#### 6.1.2. Basic Mode

When working in Basic Mode, there are no decisions to make regarding the pH measurement itself.

The Basic pH Mode provides a simplified setup menu and permits:

- Up to 3-point buffer calibration
  - » Option to select from pH 4.01, pH 6.86, pH 7.01, pH 9.18, or pH 10.01
- Display of 0.01 pH resolution
- CAL Check™ and sensor check diagnostic features limited to messages during calibration

**Note:** Calibration reminders are not available.

- Basic GLP information:
  - » Offset
  - » Slope
  - » Buffers used
  - » Calibration date
- Manual log-on-demand and manual log-on-stability (medium) (HI2621 only)
- pH CONDITION and RESPONSE graphs are not displayed.
- Measurement screen displays pH data and temperature.

**Note:** Changing from Standard to Basic operation in setup, clears previous calibration data. A prompt will force the user to facilitate this.




## Differences between Standard and Basic Modes

	Standard Mode	Basic Mode*
Calibration	5 points 2 custom buffers	3 points
Diagnostics**	CAL Check™ Sensor Check™ Error messages GLP	CAL Check™ Sensor Check™ Error messages GLP basic
Log types HI2621 only	Manual log-on-demand Manual log-on-stability (Fast, Medium, Accurate) Interval logging	Manual log-on-demand Manual log-on-stability (Medium)
Recommended pH electrodes	HI11310 • HI12300 HI11311 • HI12301 HI10530 • HI10430	HI11310* HI12300

\*All sensors work in Basic Mode but buffer selection does not extend to seven buffers.

\*\* Not all diagnostic features are available in Basic Mode.

## 6.2. pH SETUP

- Connect a pH probe to the meter.
- Press  key to access pH setup menu.

The parameter-specific options will be seen inserted into the menu.

**Note:** When working in Basic Mode, the pH parameter list will not be displayed.

Option	Description	Choices	Default	Basic Mode
Basic Mode	A limited set of parameters and calibration buffers are available	Off On	Off	Available
Information	Used buffers, probe condition, response times displayed when calibrating with pH 7.01 and 4.01; and/or 10.01 buffers.	Off On	On	Not available
First Custom Buffer	Permits users to enter a custom pH buffer value to use during calibration.	Off Value	Off	Not available
Second Custom Buffer	Permits users to enter a custom pH buffer value to use during calibration.	Off Value	Off	Not available
First Calibration Point	Allows users to choose how the first point in calibration will be made.	Offset Point	Offset	Uses Offset
Resolution	Allows the user to select between 0.01 and 0.001 pH resolution.	0.01 pH 0.001 pH	0.01 pH	Uses 0.01 pH resolution
Set Out Of Calibration Range	A measurement outside the calibrated range (buffers used) will trigger a warning message.	Off On	On	Not available

## 6.3. pH CALIBRATION

### 6.3.1. Calibration in Standard Mode (HI2621)

- Set up a routine service schedule where measurement integrity is validated.
- Do not handle the sensing surfaces of the sensors.
- Avoid rough handling and abrasive environments that can scratch the reactive surfaces of the sensors.
- For best technique, use a rinse beaker and a separate calibration beaker for each buffer.
- Do not return the used buffers to the bottles of “fresh” buffer.  
Discard buffers after use.
- For measurements across a temperature gradient (when sample temperature is drastically different from the buffers), allow the electrodes to reach thermal equilibrium before conducting calibrations or making measurements.
- Choose calibration buffers that bracket the sample pH.

### 6.3.2. Calibration Guidelines

- If measuring in the acidic range, use pH 7.01 or 6.86 as the first buffer and pH 4.01 (or 3.00\*) as the second buffer.
- If measuring in the alkaline range, use pH 7.01 or 6.86 as first buffer and pH 10.01 or 9.18 as the second buffer.

**Note.\*** Only visible when using specific pH electrodes and will replace 4.01 pH buffer.

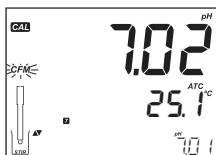
### 6.3.3. Procedure

The instrument will automatically skip custom buffers which are in a  $\pm 0.2$  pH window of an already calibrated buffer.

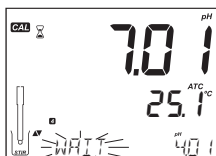
- Submerge the pH electrode approximately 3 cm (1¼”) into a buffer solution and stir gently.
- Tap **CAL** to enter calibration.  
The **EFM** tag is displayed along with the “**7.01**” buffer on the third LCD line.
- If necessary, use **▲** **▼** to select a different buffer value.  
The “**⌂**” indicator along with **STIR** tag are on display.  
“**WAIT**” message is displayed blinking until the reading is stable.







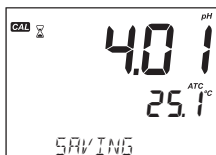
- When the reading is stable and close to the selected buffer, **EFM** tag is displayed blinking.  
Tap **GLP** **CFM** to confirm calibration.



The calibrated value is displayed on the first LCD line and the second expected buffer value on the third.



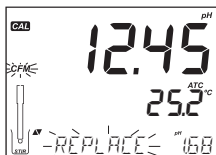
- Rinse and submerge the pH electrode approximately 3 cm (1¼") into the second buffer solution.
- Stir gently.
- If necessary, use   to select a different buffer value.  
The "⌚" indicator along with  $\pm$  T I F tag are on display.  
"WAIT" message is displayed blinking until the reading is stable.
- When the reading is stable and close to the selected buffer,  $\pm$  F M tag is displayed blinking.  
Tap  to confirm calibration.
- Repeat procedure with additional pH buffers (up to five).
- After confirming the last calibration point (or if all five buffer values were calibrated), tap .  
"SAVING" message is displayed as the information is stored on meter.  
The meter then returns to measurement mode.







Each time a buffer is confirmed, the new calibration data replaces the old data for the corresponding buffer or for any buffer in the proximity of  $\pm 0.2$  pH.

If current buffer has no previous data stored and the calibration is not full (five buffers), the current buffer is added to the existing calibration.







If the existing calibration is full, the instrument asks which buffer to replace.

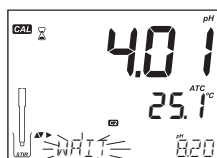


- Use   to select another buffer to be replaced.
- Tap  to confirm the buffer that will be replaced.
- Tap  key to leave calibration without replacing.

**Note:** If the replaced buffer is outside the  $\pm 0.2$  pH window of the calibrated buffers, it is possible to select this buffer during the next calibration.

## Working With Custom Buffers

- Use   to select a previously configured custom buffer .  
The  $E_1$  or  $E_2$  tag will be displayed once selected.
- Tap  if you want to modify the custom buffer value.  
The buffer value will start blinking.
- Use   to change the buffer value.  
After 5 seconds, the buffer value is updated.
- Tap  if you want to change it again.



**Note:** Custom buffer values can be adjusted  $\pm 1.00$  pH around the set value during calibration.

## First Calibration Point

When performing a new calibration, or adding to an existing one, the user can select how the first new calibration point will be treated in reference to the existing calibration point.

This is configured in setup via First Calibration Point option.

The choice is "Point" or "Offset".

### Point




A buffer value can be recalibrated and added to the previous calibration set.

The electrode slope of the other calibration points will be reevaluated with the recalibrated buffer value.

### Offset

The new buffer calibration point can create a constant offset to all existing pH calibration data (existing calibration must have a minimum of two pH buffers).

Recalibrating a pH sensor or adding to an existing calibration follows the described procedure.

- Tap .
- Place sensor in selected buffer solution.  
When sensor has equilibrated, the  $E_{FM}$  tag is displayed blinking.
- Tap .
- Tap  to exit calibration.
- Alternately, continue calibrating in additional buffers.  
The latest calibration point will be added to the existing data.  
GLP will reflect the latest calibration data.  
Older calibration buffers will be seen as blinking buffers.

**Note:** Each time a buffer is confirmed, the new calibration data replaces the old data for the corresponding buffer or for any buffer in the proximity of  $\pm 0.2$  pH.

If the current buffer has no previous data stored and the calibration has not used five buffers, the current buffer is added to the existing calibration.

If the existing calibration is full, the instrument asks which buffer to replace.

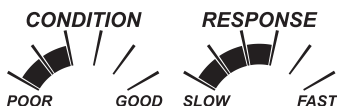


When in Standard Mode, electrode condition (**CONDITION**) and electrode response time (**RESPONSE**) can be on display. Part of the CAL Check™ system, these are configurable setup options.

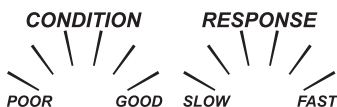
### 6.3.4. Electrode Condition & Electrode Response Time

- Meter's pH CAL Check™ feature assesses and displays **electrode condition** (based on offset and slope) and **response** time during calibration.
- The **RESPONSE** gauge is a function of the stabilization time between the first and second buffers, when calibration is performed between a pair of pH 4.01, 7.01 or 10.01 buffers.

The **RESPONSE** gauge reflects the electrode's performance and should be expected to slowly decrease over the life of the electrode.



- If the instrument is not calibrated, calibration history's been deleted, or it's been calibrated only at one point, the electrode **CONDITION** and the electrode **RESPONSE** gauges will be empty. To have electrode's condition and response time displayed continuously, daily calibration is required.



**Note:** Electrode's condition and response time may be viewed directly in GLP.

### 6.3.5. Junction Condition (HI1311 & HI2301 Only)

Meter's Sensor Check™ feature assesses the health of HI1311 or HI2301 reference junction during calibration. The junction gauge may also be viewed directly in GLP.

- If the junction is compromised (not 100%) the **JUNCTION** gauge is displayed blinking.



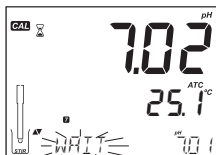
- The junction condition is a function of the electrode's reference impedance which should be kept low. If the reference junction becomes fouled from a precipitate or coating, the impedance will rise and cause the pH measurement to drift.

**Note:** This diagnostic feature serves as a warning to clean the sensor.

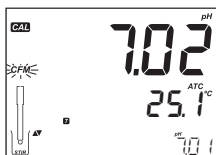
### 6.3.6. Calibration in Basic Mode

#### Three-Point Calibration

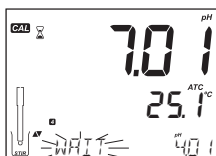
- Submerge the pH electrode approximately 3 cm (1 1/4") into a buffer solution and stir gently.
- Tap **CAL** to enter calibration.  
The **CFM** tag is displayed along with the "7.01" buffer on the third LCD line.
- If necessary, use **▲** **▼** to select a different buffer value.  
The "⌚" indicator along with **STIR** tag are on display.  
"WAIT" message is displayed blinking until the reading is stable.



- When the reading is stable and close to the selected buffer, **CFM** tag is displayed blinking.  
Tap **GLP CFM** to confirm calibration.



The calibrated value is displayed on the first LCD line and the second expected buffer value on the third.



- Repeat with up to two more buffers.

- After confirming the last calibration point, “**SAVING**” message is displayed as the information is stored on meter. The meter then returns to measurement mode.
- Press **CAL** after the first or second calibration point is confirmed, and the meter will store the calibration data and then return to measurement mode

**Notes:** When performing a new calibration, or adding to an existing calibration, the first calibration point will be treated as an offset.

### Clear Calibration

- Tap **SETUP CLR** after entering calibration to clear previous calibrations stored on probe.  
“**CLEAR CALIBRATION**” message is displayed.
- Tap **SETUP CLR**. The instrument returns to measurement mode and “**END FILE**” message is displayed.

### 6.3.7. pH Buffer Temperature Dependence

Calibration pH buffers are affected by temperature.

During calibration with standard buffers, the meter will display the pH buffer value at 25 °C, however, it will use the appropriate value for that buffer at the temperature of the buffer for the calibration.

Immediately after exiting calibration, the buffer will read its value at the temperature of measurement.

Temperature		pH Buffers							
°C	°F	1.679	3.000	4.010	6.862	7.010	9.177	10.010	12.454
0	32	1.670	3.072	4.007	6.982	7.130	9.459	10.316	13.379
5	41	1.670	3.051	4.002	6.949	7.098	9.391	10.245	13.178
10	50	1.671	3.033	4.000	6.921	7.070	9.328	10.180	12.985
15	59	1.673	3.019	4.001	6.897	7.046	9.273	10.118	12.799
20	68	1.675	3.008	4.004	6.878	7.027	9.222	10.062	12.621
25	77	1.679	3.000	4.010	6.862	7.010	9.177	10.010	12.450
30	86	1.683	2.995	4.017	6.851	6.998	9.137	9.962	12.286
35	95	1.688	2.991	4.026	6.842	6.989	9.108	9.919	12.128
40	104	1.693	2.990	4.037	6.837	6.983	9.069	9.881	11.978
45	113	1.700	2.990	4.049	6.834	6.979	9.040	9.847	11.834
50	122	1.707	2.991	4.062	6.834	6.978	9.014	9.817	11.697
55	131	1.715	2.993	4.076	6.836	6.979	8.990	9.793	11.566
60	140	1.724	2.995	4.091	6.839	6.982	8.969	9.773	11.442
65	149	1.734	2.998	4.107	6.844	6.987	8.948	9.757	11.323
70	158	1.744	3.000	4.123	6.850	6.993	8.929	9.746	11.211
75	167	1.755	3.002	4.139	6.857	7.001	8.910	9.740	11.104
80	176	1.767	3.003	4.156	6.865	7.010	8.891	9.738	11.003
85	185	1.780	3.002	4.172	6.873	7.019	8.871	9.740	10.908
90	194	1.793	3.000	4.187	6.880	7.029	8.851	9.748	10.819
95	203	1.807	2.996	4.202	6.888	7.040	8.829	9.759	10.734

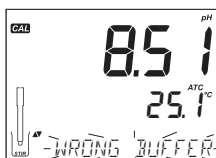
## 6.4. pH CALIBRATION MESSAGES

The CAL Check™ feature may flag diagnostic messages during a calibration.

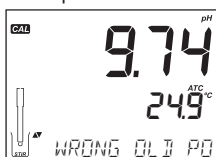
Electrode aging is a slow process therefore substantial changes from previous calibrations are likely due to a temporary problem with the probe or buffers.

These messages are seen in Standard and Basic Modes.

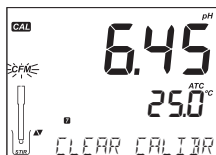
- "WRONG BUFFER" is displayed when the difference between the pH reading and the value of the selected buffer is too great.
  - » Check buffer solution.



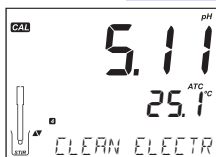
- "WRONG OLD POINTS INCONSISTENCY" is displayed if the new calibration differs significantly from the last value of that probe in that buffer.
  - » Clear the previous calibration and attempt a new calibration with fresh buffers.



- » Tap **CAL** followed by **SETUP CLR**.  
"CLEAR CALIBRATION" message is displayed.
- » Tap the **GLP CPM** to clear all calibration information or tap **CAL** to exit.  
The probe may retain a single point calibration if first point was accepted.  
Once calibration information is cleared, "CAL TUE" message is displayed.

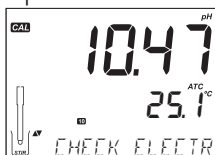


- "CLEAN ELECTRODE" indicates poor electrode performance. The offset is out of accepted window or the slope under the accepted lower limit.
  - » Clean the probe and repeat the calibration. See [9. Maintenance](#) for details.

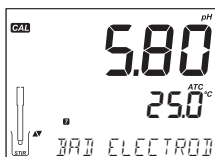




- "CHECK ELECTRODE CHECK BUFFER" is displayed when electrode slope exceeds the highest accepted slope limit.
  - » Check connected probe and use fresh buffer.
  - » Clean the probe to help improve response time.

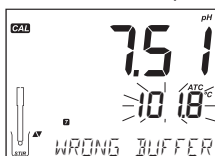


- "BAD ELECTRODE" is displayed if cleaning procedure performed as a result of the above two messages is not successful.
  - » Replace the probe.

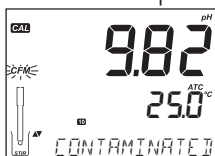


- "WRONG BUFFER TEMPERATURE" is displayed if buffer temperature is outside the defined buffer temperature range.

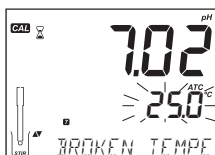
**Note:** Temperature limits will be reduced to actual sensor specifications.



- "CONTAMINATED BUFFER" indicates possible buffer contamination.
  - » Refresh buffer solution and continue the calibration procedure.






- "BROKEN TEMPERATURE SENSOR" is displayed, along with blinking "25.0 °C", should the temperature sensor malfunction or break.
  - » Replace the probe if this occurs.



**Note:** If this occurs during logging "25 °C !" will appear in the CSV file.

6.5. pH GLP INFORMATION

Good Laboratory Practice (GLP) is a quality control function used to ensure uniformity of sensor calibrations. GLP information is available in Basic and Standard Modes, and is included with every data log.

- Tap  to open latest calibration file information.  
Newest calibration points are reported as a solid number whereas older calibration data (still used) is displayed blinking.
- Use   to scroll through GLP information:

“NO CAL” message displayed blinking if calibration has not been performed.



Calculated offset and percent slope.  
The GLP slope is the average of the calibration slopes.  
The percentage is referenced to the ideal slope value at 25 °C (77 °F).

Last calibration time  
hh:mm:ss format



Calibration date  
yyyy.mm.dd format



E1 and E2 tags displayed when calibrating with custom buffers.  
**Note:** Not available when operating in Basic Mode

“EXPIRATION WARNING DISABLED” message if warning disabled.



Number of days until the “CAL DUE” alarm is displayed i.e. “CAL EXPIRES IN 2 DAYS”.

Standard mode only



Number of days since the calibration expired i.e. "CAL EXPIRED 2 DAYS AEG"

Standard mode only



Buffer tag displayed blinking (if buffer not from the last calibration)



Probe serial number



**Standard Mode only**

Condition and response gauges are displayed on the day of calibration.

**HI11311 or HI12301 electrodes only**

The glass impedance is continuously monitored, updated, and reported.  
The junction Condition gauge is fully visible.



## 6.6. pH MEASUREMENT

- Connect the pH electrode.

When correctly plugged in, the electrode is automatically recognized.

- "REMOVE PROTECTIVE AND FILLING CAPS" message is displayed along with "PH".
- Press any key to skip the message.
- The instrument enters measurement mode.

**Note:** For improved accuracy is recommended to work with calibrated electrodes!



- To prevent cross-contamination, if measurements are taken successively in different samples, rinse the electrode thoroughly with deionized water or tap water and then with some of the next sample.
- Submerge the electrode tip approximately 3 cm (1 1/4") into the sample to be tested.
- Stir the sample gently.
- Allow time for the electrode to stabilize.

The pH is displayed on the first LCD line and the temperature on the second LCD line.

- Use   to view date, time, and offset with slope (third LCD line).



- If the reading is out of measurement range, the closest full scale value will be displayed blinking on the first LCD line.

**Note:** The pH reading is affected by temperature. The temperature effect is compensated for using the integral temperature sensor. The resulting measurement is the actual pH at the temperature of measurement.

### 6.6.1. Error Messages During Measurement

- “PROBE NOT RECOGNIZED” scrolled on the third LCD line indicates an incorrect probe connected to the meter or a damaged connection cable.
- “ELECTRODE OUT OF SPEC” scrolled on third LCD line indicates that the pH, ORP, or temperature exceeds the limits of the sensor.

The temperature will continue to be displayed.

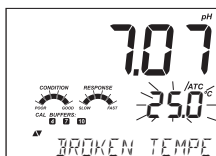


- “120 °C” displayed blinking, indicates that the temperature exceeds the meter specification of 120 °C.
- When logging and the pH or temperature exceeds meter specification, “OUT OF SPEC” message is displayed.

**Note:** In both cases the log file will indicate “°C!” next to the data.

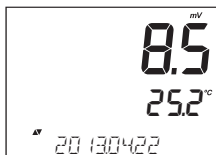
- “BROKEN TEMPERATURE SENSOR” along with “250 °C” blinking, indicate damaged temperature sensor.

The log file will indicate “°C!!” next to the data.



### 6.6.2. mV Reading of the pH

- Tap  to display the mV reading of the measured pH.



## 7. ORP CONFIGURATION

### 7.1. UNDERSTANDING STANDARD VS BASIC OPERATING MODES


#### 7.1.1. Standard Mode

The Standard Mode permits logging\* of measurement data using manual log-on-demand, manual log-on-stability, or interval logs.

#### 7.1.2. Basic Mode

The Basic Mode permits logging\* of measurement data using manual log-on-demand, manual log-on-stability (medium).

### 7.2. ORP METER SETUP


- Connect the ORP probe to the meter.
- Use  to configure ORP meter operation.

### 7.3. ORP CALIBRATION

#### 7.3.1. Calibration Guidelines





- ORP is displayed in mV.
- The voltage displayed results from the difference in potential between the platinum ORP sensor and the Ag/AgCl reference electrode.
- ORP values can change with temperature.  
ORP values should be reported with the reference electrode used and the temperature.
- The inert noble metal ORP surface provides an electron-exchange site with the sample (or standard) and its surface. The electron exchange is typically very fast in well-poised solutions (e.g. standards) but may be lengthier in actual samples.
- Calibration is used to compensate for changes due to contamination of the platinum surface and drift in the reference electrode. It establishes a baseline that can be used as a comparison for future work.
- A relative mV calibration can also be made to remove the voltage attributable to the Ag/AgCl reference electrode, to display the ORP versus a SHE (Standard Hydrogen Electrode).

#### 7.3.2. Procedure

- Connect the probe to the meter.
- Place electrode into the [HI764026](#) electrode holder for easy transfer in and out of containers during calibration.
- Tap  to enter calibration.  
The meter will open a Rel. mV calibration screen.
- Place ORP electrode tip into a beaker of standard or a sample with known value.  
[HI7021](#) (ORP solution for platinum and gold electrodes) reads 240 mV at 25 °C.  
[HI7022](#) (ORP solution for platinum and gold electrodes) reads 470 mV at 25 °C.

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\* [HI2621](#) only

- Tap .  
If necessary use   to enter a different value.  
“WAIT” message is displayed blinking until the reading is stable.
- When the reading is stable and close to the selected standard,  $E^M$  tag is displayed blinking.  
“SOLUTION STANDARD” message and solution value are displayed.
- Tap  to confirm calibration.  
“SPAVING” message is displayed. Meter stores calibration value then returns to measurement mode.

## 7.4. ORP MEASUREMENT

- Connect the ORP probe to the meter.  
Make sure the electrode has been recently calibrated and is working correctly.
- Place electrode into the [HI764026](#) electrode holder for easy transfer in and out of containers during sample measurement and storage.
- Rinse with purified water between buffers and/or samples.
- Blot (never rub!) the sensor with a lint-free tissue between buffers and samples.
- To limit sample contamination, pour two beakers of buffers and samples.  
Use one beaker to rinse the sensor and the second for measurement.  
**Note:** Use the same size beaker and immersion depth for samples and buffers.
- Gently stir the test sample to ensure the sensor is measuring a representative sample.
- Open the fill hole cover and keep the fill solution topped off to permit the fill solution to flow through the ceramic junction and maintain a stable reference signal.
- If measuring across a temperature gradient, allow the sensor to reach thermal equilibrium.
- Once the reading indicates Stable, record measurement data.
- When all samples have been measured, rinse the electrode and replace storage cap with storage solution.
- Replace fill hole cover.

## 8. LOGGING (HI2621 ONLY)

The instrument holds a maximum number of 1000 records divided as:

- Manual log-on-demand (maximum 200 logs)
- Manual log-on-stability (maximum 200 logs)
- Interval logging (maximum 600 samples organized in 100 lots)

**Note:** A record is a stored reading and a lot is a group of records.

When operating in Standard Mode users can select between any of the three supported options and can set any of the three stability criteria i.e. fast, medium, accurate.

When operating in Basic Mode users can select between manual log on demand and manual log on stability and can set medium stability criteria only.

### Stored data

- Manual log-on-demand and manual log-on-stability are stored in a single lot.
- The maximum number of records that may be stored in a manual or stability lot is 200 records.
- If the log memory is full during logging, the “LOG FULL” message is displayed and logging ceases. The display will return to the measurement screen.



- The maximum number of Interval lots that may be stored is 100. If a 101<sup>st</sup> lot is attempted, “MAX LOTS” will be displayed and some lots will need to be deleted.



- The lot numbering is up to 999 and restarts if all lot logs are deleted.

## 8.1. TYPES OF LOGGING

Logging type is configured in setup.

### Interval logging

A continuous log is recorded using a user-selected time interval.

**Note:** Interval logging is not available when operating in Basic Mode.

### Manual log-on-demand

Readings are logged each time **LOG** is used.

All records are stored in a single manual lot for the measurement type.

New records made on different days are stored in the same manual lot.



## Manual log-on-stability

Stability criteria may be set to fast, medium, or accurate.

**Note:** When operating in Basic Mode only medium stability criteria may be set.

A log on demand is made each time **LOG** is used and the stability criteria is reached.

- In Setup mode, choose log parameter.
- Tap **RCL MODIFY** key.
- Use the **RANGE** key to select between Interval, Manual, or Stability.
- When Interval is displayed, use **▲** **▼** to select the setting for the timed interval.
- When Stability is displayed, use **▲** **▼** to select the measurement stability setting.

A complete set of GLP information including date, time, range selection, temperature reading, calibration information and probe serial number is stored with each log made.

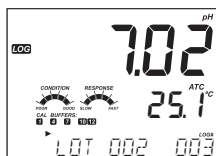
### 8.1.1. Interval Logging

- Configure interval and sampling period in the setup menu.
  - Tap **LOG** while the instrument is in measurement mode.
- “PLEASE WAIT” message is displayed followed by the number of free spaces.

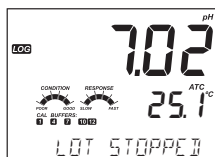
During active interval logging, lot information is displayed on the third LCD line.

It indicates in which lot the data will be placed and keeps track of the number of logged records taken.

The **LOG** tag is on continuously during active logging.



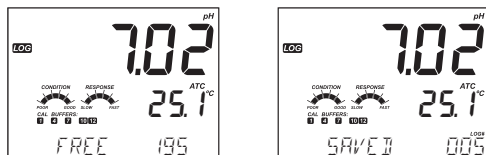
- Tap **RANGE** during logging to display the number of logs available.
  - Tap **LOG** again to stop logging.
- The “**LOG STOPPED**” message will be displayed for a few seconds.



**Note:** If a sensor failure occurs during interval logging, “**OUT OF SPEC.**” message will alternate with logging information.

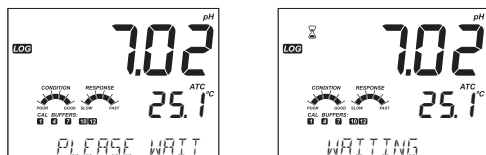
### 8.1.2. Manual Log-On-Demand

- Select Manual in the setup menu.
- Tap **LOG** while the instrument is in measurement mode.  
 "PLEASE WAIT" message is displayed followed by saved measurement confirmation screen and the number of available (free) spaces.  
 The **LOG** tag is kept on display.

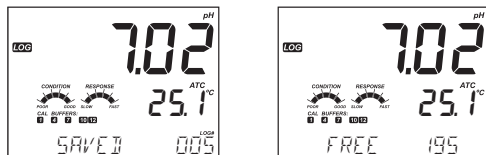


### 8.1.3. Manual Log-On-Stability

- Select Stability in the setup menu.
- Choose measurement stability criteria in the setup menu.  
*Note: In Basic Mode, Stability Medium is available only.*
- Tap **LOG** while the instrument is in measurement mode.
- "PLEASE WAIT" message is displayed followed by a screen displaying the stability tag, **LOG** tag.  
 "WAITING" message is displayed next.
- Tap **LOG** again while "WAITING" message is on display to stop logging.



- When selected stability criteria has been met, "SAVE II" message is displayed followed by a screen indicating how much log space is available (**FREE**).  
 The **LOG** tag is kept on display.

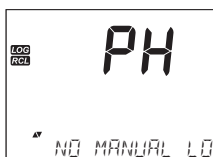


## 8.2. VIEW LOGGED DATA

- Tap **RCL MODIFY** to view all log records stored on the meter.  
The log records are grouped by measured parameter:
  - » pH
  - » ORP
- The parameter displayed first depends on the probe/sensor connected.  
The display also indicates the percentage of log memory used.
- Tap **GLP CFM** to display saved logs.
- If no sensor or probe is connected, tap **RANGE** to select measurement type.
- Tap **GLP CFM** to display those logs.



- Once a parameter is selected, use **▲** **▼** to select parameter log to view.  
Option to select from:
  - » Manual log-on-demand lot
  - » Manual log-on-stability lot
  - » Individual Interval logging lots
- If no data was logged for the selected measurement range, the instrument displays "NO MANUAL LOGS", "NO STABILITY LOGS" messages.







- Tap **GLP CFM** to access lot information and view recorded data.
- Use **▲** **▼** to toggle between different records.
- Tap **RANGE** to display GLP data, including calibration information, date, time.
- Tap **SETUP CLR** then **GLP CFM** when deleting records or lots.
- Tap **RCL MODIFY** to:
  - » exit the logging type
  - » exit the parameter selection screen
  - » return to the measurement screen

### 8.3. DELETE LOGGED DATA

Users can opt between:

- Delete logging type/lot
- Delete records (manual log on demand or manual log on stability)
- Delete all

#### Procedure

- Tap .
- Select the parameter log.
- Use   to select data to be deleted.
- Tap .

The instrument displays:

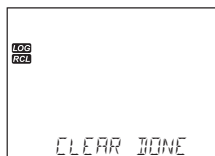
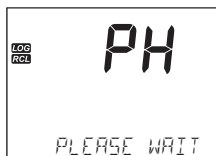
- » "CLEAR MANUAL" if Manual Records was selected
- » "CLEAR STAB" if Stability Records was selected
- » If interval lots was selected, the "CLEAR" message is displayed followed by the selected lot, with CFM tag blinking.







- Use   to select a different lot.
- Tap .

"PLEASE WAIT" message is displayed.

"CLEAR DONE" is displayed for a few seconds after the selected Interval lot is deleted.



#### 8.3.1. Delete Records (Manual Log-on-Demand & Manual Log-on-Stability)

- Tap  when Manual (Stability) is displayed, to enter Manual (Stability) log.
- Use   to select record to be deleted.
- Tap .

"CLEAR RECORD" message is displayed along with record number and CFM tag blinking.

- Use   to select another record if necessary.






- Tap .

"PLEASE WAIT" then "CLEAR DONE" messages are displayed.

When individual logs are deleted within saved Manual or Stability logs, the logs will renumber, filling in the deleted data but staying in chronological order.

See [8.3. Delete Logged Data](#) section to delete all Manual (Stability) logged records.



- Select the Manual (Stability) lot.
- Tap . "CLEAR" message is displayed along with "MANUAL" or "STABILITY". CFM tag is displayed blinking.
- Tap  to confirm deleting selected lot or all records.
- Tap  to exit without deleting.

A lot number is used to identify particular sets of data.

Lot numbers are allocated successively until 100, even if some lots were deleted. The total number of lots that can be saved is 100.

If some are deleted (for example 1-50), fifty additional logs may be stored. These will be numbered 101-150.

The lots are allocated successively (if enough memory space) until 999 is reached.

After number 999 is reached, delete all the lot logs to restart numbering.

### 8.3.2. Delete All

All logs can be deleted in a single clear.

This function will delete all Manual, Stability, and Interval logs for the measurement type selected.

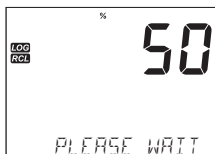
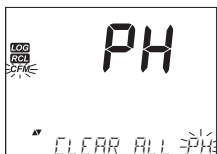
- Tap **RCL MODIFY**.  
The **PH** type will be blinking.
- With measurement type blinking and displayed message reading “LOG RECALL”, tap **SETUP CLR**.



“CLEAR ALL” message and measurement type are displayed.

CFM tag is displayed blinking.







- Tap **GLP CFM**.  
“PLEASE WAIT” along with percent cleared will be displayed until completed.



**Note:** If **SETUP CLR** is wrongly tapped, tap the key again to exit without deleting.

## 8.4. PC & STORAGE INTERFACE

### Meter to PC transfer

1. Connect the meter to the PC using the supplied USB cable.
2. Power the meter
3. Tap  and select "LOG ON METER".
4. Tap  then use   to change to "EXPORT TO PC".
5. Tap . The *USB/PC* tag is displayed.
6. Tap  to exit.

The PC detects the USB as a removable drive.

Open the drive to view the stored files.

Log files are formatted as Comma Separated Values (\*.CSV) and can be opened with any text editor or spreadsheet program.

#### Notes:

- » *Western Europe (ISO-8859-1) character set and English language are suggested settings.*
- » *Other files may be visible depending upon computer settings. All files stored will appear in this folder.*
- » *Adjust font (column) width appropriately. Adjust the decimal places if the pH was logged with 0.001 resolution.*

Interval logs are organized as:

- pH lot ▶ PHLOT001

Manual log-on-demand lots are organized as:

- pH lot ▶ PHLOTMAN

Manual log-on-stability lots are organized as:

- pH lot ▶ PHLOTSTA

All stability logs, regardless of configured stability criteria, are located in the same stability file for that measurement. Click on the desired log to view data.

#### Notes:

- » *"°C!" displayed in log data indicates that the probe (electrode) was used beyond it's operation specifications. Logged data should not be considered reliable!*
- » *"°C!!" displayed in log data indicates a broken temperature sensor. The probe/electrode should be replaced. Logged data should not be considered reliable!*

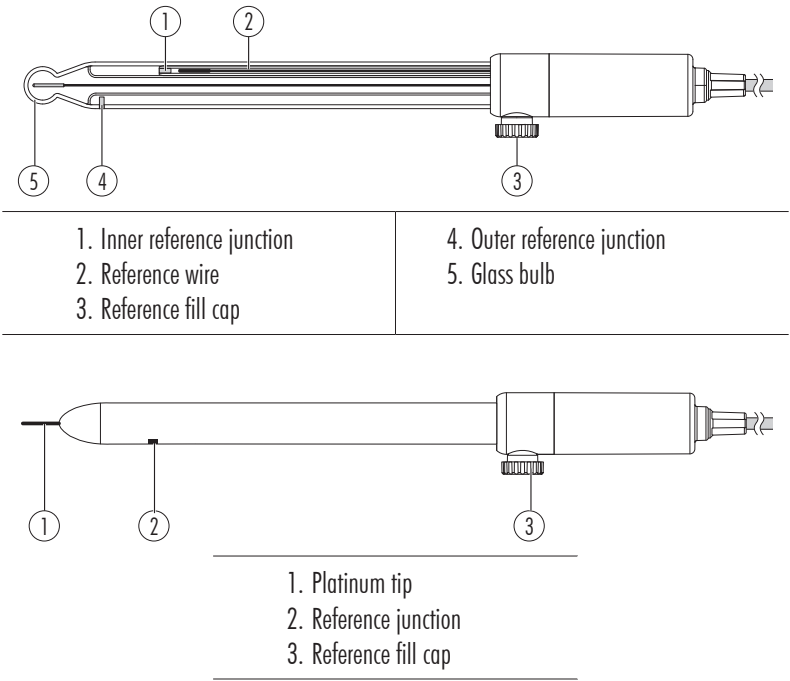
9. MAINTENANCE

9.1. METER

The following steps outline the process to ensure users keep the meter clean and disinfected while limiting the risk of damage from unsuitable cleaners.

- Disinfect the screen using commercially available, non-ammonia glass or disinfectant cleaner.
- Apply a small amount of cleaner directly to a microfiber or lint-free disposable cloth.  
Make sure the cloth is damp and not wet.
- Wipe the glass screen clean with the cloth. Do not apply cleaner directly to the interface.

9.2. pH ELECTRODE/ORP PROBE



Electrode Maintenance

- Soak the pH bulb and reference junction in [HI70300 Storage Solution](#) for a minimum of 30 minutes to refresh the electrode (before calibration).
- Calibrate the electrode after prolonged storage or cleaning.
- After use, rinse the electrode with purified water and blot excess moisture with a lint free tissue.
- Inspect all sensor connectors for corrosion and replace if necessary.



### pH Sensor Maintenance

- Remove the sensor protective cap.
- Do not be alarmed if any salt deposits are present. This is normal with pH/ORP probes and they will disappear when rinsed with water.
- Shake the probe down gently to eliminate any trapped air bubbles.
- If the bulb and/or junction are dry, soak the electrode in [HI70300](#) Storage solution for at least 30 minutes. To ensure a quick response, the glass bulb and the junction should be kept moist and not allowed to dry. This can be achieved by storing the sensor with a few drops of [HI70300](#) Storage solution or pH 4.01 in the protective cap.

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

- If the electrolyte is more than 2½ cm (1") below the fill hole, add [HI7082](#) or [HI8082](#) 3.5M KCl Electrolyte Solution for double junction electrodes.

**Note:** *Unscrew the reference fill cap during measurements so the liquid reference junction maintains an outward electrolyte flow.*

### Periodic Maintenance

- Inspect the electrode for any scratches or cracks. If any are present, replace the electrode.
- Inspect the cable. The connection cable must be intact.
- Rinse off any salt deposits with water.

### pH Cleaning Procedure

1. Soak the sensor in [HI7061](#) Electrode cleaning solution for general use or application-specific cleaning solution for 15 minutes.
2. Rinse with water.
3. Soak the electrode in [HI70300](#) Storage solution for at least 30 minutes, rinse with water and calibrate before using.

### Protein, Inorganic, Oil, or Grease Cleaning Procedure

1. Soak the sensor in application-specific electrode cleaning solution (e.g. [HI7073](#) Protein cleaning, [HI7074](#) Inorganic cleaning for 15 minutes or [HI7077](#) Oil and Fat cleaning solution).
2. Rinse the sensor with water.

**Note:** *After performing any of the cleaning procedures, rinse the electrode thoroughly with water and soak in [HI70300](#) Storage solution for at least 30 minutes before calibrating it.*

3. Soak the electrode in [HI70300](#) Storage solution for at least 1 hour, rinse with water, and calibrate before using.

### 9.3. TROUBLESHOOTING GUIDE

The meter gives warning messages:

- when erroneous conditions appear
- while logging (HI2621 only)
- when measured values are outside the expected range
- for invalid temperature values

**Note:** See notifications area at the bottom of the screen.

The information below provides an explanation of the errors and warnings, and recommended action(s) to be taken.

Symptoms	Problem(s)	Solution(s)
Slow response Excessive drift	Dirty pH electrode	Clean the electrode. Soak the tip in HI7061 or HI8061 for 30 minutes.
Readings fluctuate up and down (noise)	Clogged/dirty junction. Low electrolyte level (refillable electrodes).	Clean the electrode. Refill with fresh solution. Check connection cable and connectors.
Meter does not accept calibration buffer/standard solution	Dirty electrode Contaminated buffer	Clean the electrode. If no results, replace the electrode. Replace the buffer.
"HH" and "--EOL" or "EOL" displayed blinking	Out of range	Verify no shipping cap. Verify pH sample is within specified range. Check electrolyte level.
"mV" and "--EOL" or "EOL" displayed blinking	Out of range	Verify no shipping cap. Verify sample pH is within specified range. Verify electrolyte level is topped up. Verify no trapped bubbles inside pH membrane.
Meter does not measure temperature	Broken temperature sensor	Replace the probe.
Meter fails to calibrate Meter gives faulty readings	Broken pH electrode	Replace the electrode.
At startup meter displays all LCD tags continuously		Contact local Hanna Instruments office.
CAL "Prod" message at startup.	Meter not factory calibrated	Contact local Hanna Instruments office.

## 10. METER ERROR CODES

Error Code	Message	Description
ERR_MSG_FACT_CAL_CORRUPTED	CORRUPT FACTORY CALIBRATION	Factory calibration data is invalid or damaged. Device accuracy cannot be guaranteed.
ERR_MSG_UCAL_CORRUPTED	CORRUPT USER CALIBRATION	User calibration data is corrupt and must be redone.
ERR_MSG_RTC_INTERFACE	RTC INTERFACE	Real-time clock interface communication error.
ERR_MSG_FLASH_INTERFACE	FLASH INTERFACE	Flash memory communication interface error.
ERR_MSG_LCD_INTERFACE	LCD INTERFACE	LCD interface communication error; display may not update correctly.
ERR_MSG_RS232	RS232	RS232 interface serial communication error.
ERR_MSG_RTC	RTC	Real-time clock malfunction or invalid data.
ERR_MSG_FLASH	FLASH	Flash memory read/write failure.
ERR_MSG_FS_FACTORY	FS FACTORY	Corrup factory file system.
ERR_MSG_FS_CORRUPTED	CORRUPT FS	Corrupt main file system. Full flash format needed.
ERR_MSG_DISK_FULL_FACTORY	DISK FACTORY FULL	Factory storage area is full.
ERR_MSG_DISK_FULL	DISK FULL	User storage memory is full.
ERR_MSG_NO_FLASH	NO FLASH	No flash memory detected.
ERR_MSG_UNSUPP_FLASH	FLASH NOT SUPPORTED	Detected flash type is not supported by the firmware.

## 11. ACCESSORIES

Ordering Information Description

### Electrodes & Probes

HI10530	Triple ceramic, double junction, glass body, refillable pH electrode with conical tip and temperature sensor
HI10430	Triple ceramic, double junction, glass body, 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

### Buffer Solutions

HI70004P	pH 4.01 buffer solution (25 sachets × 20 mL)
HI70007P	pH 7.01 buffer solution (25 sachets × 20 mL)
HI70010P	pH 10.01 buffer solution (25 sachets × 20 mL)
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, 500 mL FDA approved bottle
HI8006L	pH 6.86 buffer solution, 500 mL FDA approved bottle
HI8007L	pH 7.01 buffer solution, 500 mL FDA approved bottle
HI8009L	pH 9.18 buffer solution, 500 mL FDA approved bottle
HI8010L	pH 10.01 buffer solution, 500 mL FDA approved bottle

### Electrode Storage Solutions

HI70300L	Storage solution, 500 mL
HI80300L	Storage solution, 500 mL FDA approved bottle

### Electrode Cleaning Solutions

HI70000P	General purpose rinsing solution (25 sachets × 20 mL)
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, 500 mL FDA approved bottle
HI8073L	Protein cleaning solution, 500 mL FDA approved bottle
HI8077L	Oil & fat cleaning solution, 500 mL FDA approved bottle

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**Electrode Refill Electrolyte Solutions**

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HI7071	3.5M KCl + AgCl Electrolyte for single junction electrodes, 4 × 30 mL
HI7072	1M KNO <sub>3</sub> Electrolyte, 4 × 30 mL
HI7082	3.5M KCl Electrolyte for double junction electrodes, 4 × 30 mL
HI8071	3.5M KCl + AgCl Electrolyte for single junction electrodes, 4 × 30 mL, FDA approved bottle
HI8082	3.5M KCl Electrolyte for double junction electrodes, 4 × 30 mL, FDA approved bottle
HI8093	1M KCl + AgCl Electrolyte, 4 × 30 mL, FDA approved bottle

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**ORP Pretreatment Solutions**

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HI7091L	Reducing pretreatment solution, 500 mL + 14 g (set)
HI7092L	Oxidizing pretreatment solution, 500 mL

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**ORP Solutions**

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HI7021L	Test solution 240 mV, 500 mL
HI7022L	Test solution 470 mV, 500 mL

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**Other Accessories**

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HI764026	Electrode holder for <b>HI2600</b> family
HI75115U	115 to 230 VAC to 5 VDC USB-C power adapter, US plug
HI75230E	115 to 230 VAC to 5 VDC USB-C power adapter, European plug

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## CERTIFICATION

All Hanna<sup>®</sup> instruments conform to the CE European Directives.



RoHS  
compliant



**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.

Ensuring proper product disposal prevents potential negative consequences for the environment and human health. For more information, contact your city, your local household waste disposal service, or the place of purchase.

## 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 meter's performance. For your and the meter's safety do not use or store the meter in hazardous environments.

## WARRANTY

The benchtop meter is warranted for two years against defects in workmanship and materials when used for its intended purpose and maintained according to instructions.

Probe is warranted for six months.

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<sup>®</sup> office. If under warranty, report the model number, date of purchase, serial number 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.